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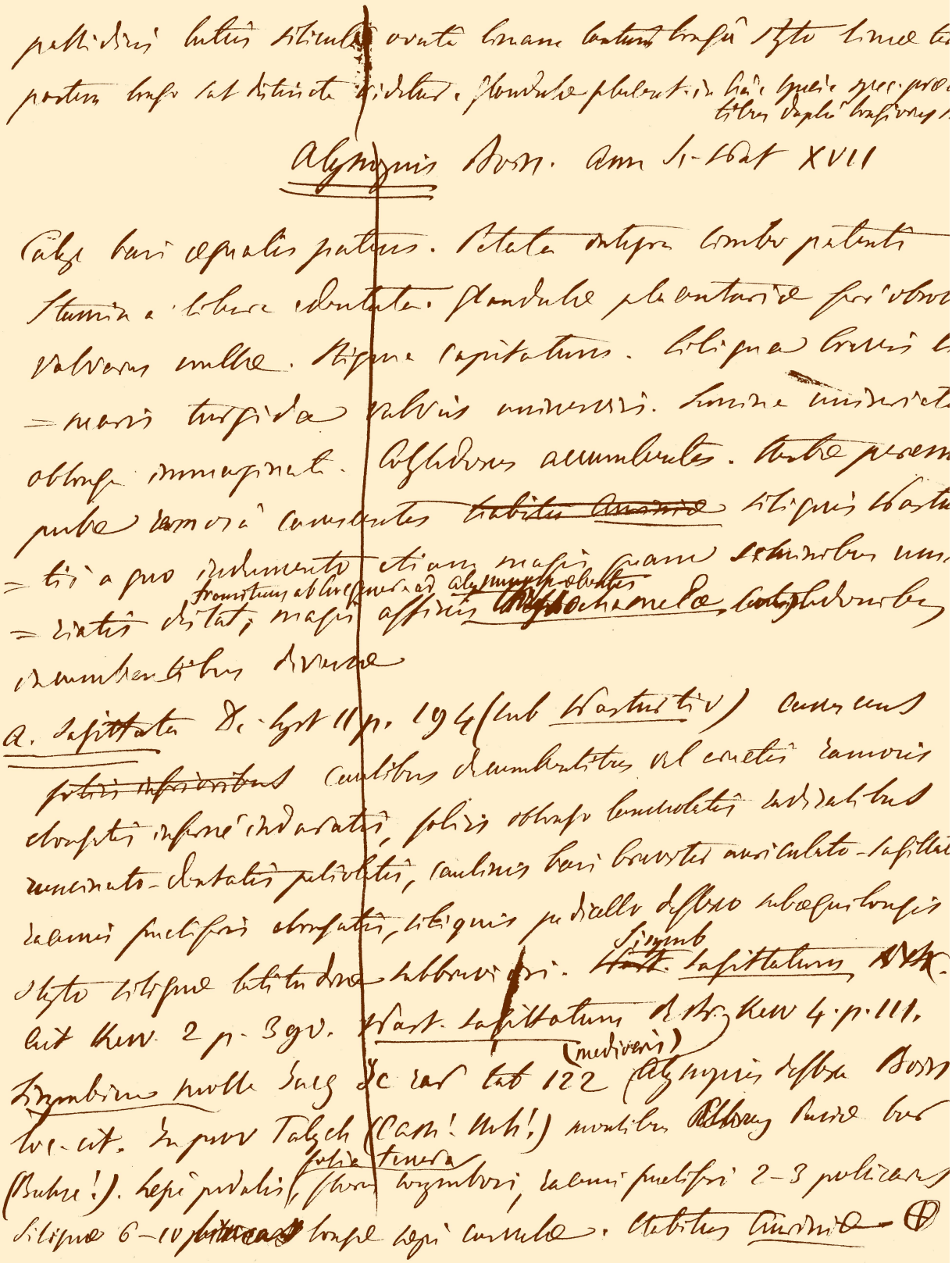
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Cover image: Two pages of the manuscript of the "Prodromus Flora Orientalis" treating *Alyssopsis* Boiss. and *Cochlearia* L. (see also Fig. 5).

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Typification of Edmond Boissier's Cruciferae (Brassicaceae) names enumerated in Flora Orientalis

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Abstract

The *Cruciferae* account in the *Flora Orientalis* and its *Supplementum* treated 118 genera, 784 species, and 155 varieties. Of these, 28 genera, 411 species, and 121 varieties were described by Edmond Boissier (1810–1885) either alone or in collaboration with other botanists and collectors to 1888. The present tribal affiliation and latest number of species are given here for each genus that included taxa described by Boissier. The new names *Draba antilibanotica* Al-Shehbaz and *Draba edmondii* Al-Shehbaz, and the new combinations *Acuston petalodes* (DC.) Al-Shehbaz and *Lepidium cartilagineum* subsp. *crenatifolium* (Boiss. & Balansa) Al-Shehbaz are proposed. The following new synonyms are proposed: *Aethionema heterophyllum* (Boiss. & Buhse) Boiss. is synonymized with *Noccaea trinervia* (DC.) Steud., *Malcolmia ciliaris* Boiss. with *Pseudodraba hystrix* (Hook. f. & Thomson) Al-Shehbaz et al., and *Erysimum canescens* var. *latifolium* Boiss. with *Erysimum bulgaricum* (Velen.) Ančev & Polatschek. A neotype for *Aethionema schistosum* Boiss. & Kotschy is designated.

All prior typifications of Boissier's species and varieties are critically evaluated here. Of the total 500 Boissier's novelties, the type collections of seven names (three species and four varieties) were not found. Fifty-one names were correctly typified by earlier authors, 280 holotypes are located, 161 lectotypes and one neotype are designated herein. Further details are provided in the section "Concluding remarks".

Résumé

Le traitement des *Cruciferae* pour la *Flora Orientalis* et son *Supplementum* traite de 118 genres, 784 espèces et 155 variétés. Parmi eux, 28 genres, 411 espèces et 121 variétés ont été décrits par Edmond Boissier (1810–1885) seul ou en collaboration avec d'autres botanistes jusqu'en 1888. Pour chaque genre comprenant des taxons décrits par Boissier nous donnons son rattachement actuel aux tribus ainsi que le nombre d'espèces. Deux nouveaux noms (*Draba antilibanotica* Al-Shehbaz et *Draba edmondii* Al-Shehbaz), deux nouvelles combinaisons (*Acuston petalodes* (DC.) Al-Shehbaz et *Lepidium cartilagineum* subsp. *crenatifolium* (Boiss. & Balansa) Al-Shehbaz) ainsi que trois synonymes nouveaux (*Aethionema heterophyllum* (Boiss. & Buhse) Boiss. synonyme de *Noccaea trinervia* (DC.) Steud.; *Malcolmia ciliaris* Boiss. synonyme de *Pseudodraba hystrix* (Hook. f. & Thomson) Al-Shehbaz et al.; *Erysimum canescens* var. *latifolium* Boiss. synonyme de *Erysimum bulgaricum* (Velen.) Ančev & Polatschek) sont proposés. Un néotype pour *Aethionema schistosum* Boiss. & Kotschy est désigné.

Toutes les typifications antérieures des espèces et variétés de Boissier sont évaluées de manière critique. Ainsi, parmi les 500 nouveautés décrites par Boissier, le matériel original de sept noms (3 espèces et 4 variétés) n'a pas été retrouvé. Pour 51 noms, les lectotypifications ont été réalisées par de précédents auteurs. Deux cent quatre-vingts (280) holotypes ont été localisés, 161 lectotypes et un néotype sont désignés ici. De plus amples détails sont fournis dans la partie "Concluding remarks".

Keywords

BRASSICACEAE – *CRUCIFERAE* – Edmond Boissier – *Flora Orientalis* – G-BOIS – Nomenclature – Taxonomy – Typifications

Introduction

The roots of early interest by the first author in the *Brassicaceae* go back to the mid 1960s after finishing college and working in one of the Baghdad herbaria, but knowledge of the family did not expand until subsequent higher studies in the West. It soon became evident that in order to learn more on the family, key references such as Candolle (1821a), Boissier (1867a), and Schulz (1936) should be constantly consulted. It is quite evident that subsequent *Brassicaceae* accounts for the floras of the former Soviet Union (Busch, 1939), Turkey and East Aegean Islands (Davis, 1965a), and Afghanistan, Iran, Iraq, and Pakistan (Rechinger, 1968) would have been severely delayed or hampered had it not been for Boissier's (1867–1888) monumental *Flora Orientalis*.

The foundation of the *Flora Orientalis* is the G-BOIS herbarium, which includes the collections of Boissier and numerous other botanists that are kept separate from the other herbaria of the Conservatoire et Jardin botaniques de la Ville de Genève (hereafter G). It is by far one of the richest herbaria in the world in type collections from that area, especially for Southwest Asia, Caucasus, and Balkan Peninsula. Obviously, no sound taxonomic conclusions can be made without consulting the types of that herbarium.

The *Brassicaceae* is extremely rich in the Irano-Turanian region, Southwest Asia and the Caucasus undoubtedly represents the main center of the family diversity. The *Cruciferae* account in the *Flora Orientalis* (Boissier, 1867a) and its *Supplementum* (Boissier, 1888) occupy a total 310 pages, and the total number of taxa treated are approximately 940 species and varieties, of which 532 taxa (56.6%) were described by Boissier either alone or in collaboration with other botanists. However, the bulk of novelties appeared prior to these two publications (see Boissier, 1841a, 1841b, 1842a, 1842b, 1842c, 1843, 1844, 1846, 1849, 1854, 1856, 1859). All 532 novelties are dealt with in this paper, and the holotypes or previously designated lectotypes are listed, discussed, and evaluated.

As a consequence of the lack of detailed guidelines for lectotypification of taxa in the *International Code of Nomenclature for algae, fungi, and plants* (Turland et al., 2018), many botanists lectotypified Boissier's novelties arbitrarily and regardless to whether or not Boissier had examined authentic material of a given institution and whether or not they are deposited in the G-BOIS herbarium. In fact, as the reader goes through the typifications below, it is easy to see that in some exceptional cases typifications were based on material allegedly present in G-BOIS when in fact it never existed there in the first place. We are always reminded by Rollins (1972, 1980) who emphasized the need to pay extreme care in lectotypifying taxa. Because of artificial or careless lectotypifications and because of the absolute importance of G-BOIS herbarium in studying the *Brassicaceae* of Southwest Asia and neighboring regions, the first author decided to undertake this challenging task and deal with every taxon described by Boissier and co-workers. In that, the sequence of taxa follows the *Flora Orientalis* and its *Supplementum*. However, before jumping on the enumeration of taxa, some background on Boissier and his work are necessary.

Pierre-Edmond Boissier

Pierre-Edmond Boissier (Geneva: 25 May 1810 – Valeyres-sous-Rances: 25 September 1885) (Fig. 1), an outstanding Swiss botanist, explorer, and mathematician, was one of the most productive taxonomist of the 19th century, and his scientific output is perhaps comparable only to that of his fellow citizen and mentor Augustin-Pyramus de Candolle (1778–1841). Boissier was privately educated at home mainly in French, Latin, and Italian, and his love of botany stems back to his childhood when his grandfather, Pierre Butini (naturalist and physician), took him, along with his sister and mother, on trips to Jura and the Swiss Alps. After taking courses in botany with Candolle at the Academy of Geneva, Boissier completed his studies in Paris in 1831–1832 with Jacques Étienne Gay (1786–1864) and Philip Barker Webb (1793–1854).

There is a wealth of literature covering Boissier's family, education, travel, friends, discoveries, gardening, herbarium, publications, and correspondences, and the interested reader is highly recommended to consult various publications commemorating him, including at least Christ (1888), Chodat et al. (1935–1936, and articles within), Rechinger (1969), Stafleu (1970), Burdet (1985), Lièvre (1994), Charpin (2011), Covillot (2011), Grenon (2011), and Jacquemoud (2011). However, matters only directly related to the *Flora Orientalis* are briefly dealt with here.

Collections and collectors

Stafleu (1970: 803) described Boissier as "…financially independent, healthy and strong, a born traveler and mountaineer, gifted with unusual mnemonic powers, and a consistent worker". Boissier continued to collect from 1832 to 1885, the year he passed away. In 1840, he married his cousin, Lucile Butini. Based on the recommendations of Candolle and Webb, Boissier collected in the Iberian Peninsula nine times, including in 1849 when he was accompanied by his wife who died during their travel to Spain and Algeria.

Shortly after purchasing in 1840 of an almost complete set (perhaps over 5400 numbers; see Boissier, 1888) of Aucher-Eloy collections from the 'Orient' and immediately after the recognition of numerous undescribed species and genera, Boissier became interested in the plants of what became the *Flora Orientalis* area. His first trip was in 1842 and then with his wife in 1845–1846. They collected in Greece, western Turkey, eastern Egypt along the Nile, Sinai Peninsula, Israel, Lebanon, and Syria, and details of his voyages were mapped with chronologically numbered localities and excellent discussions

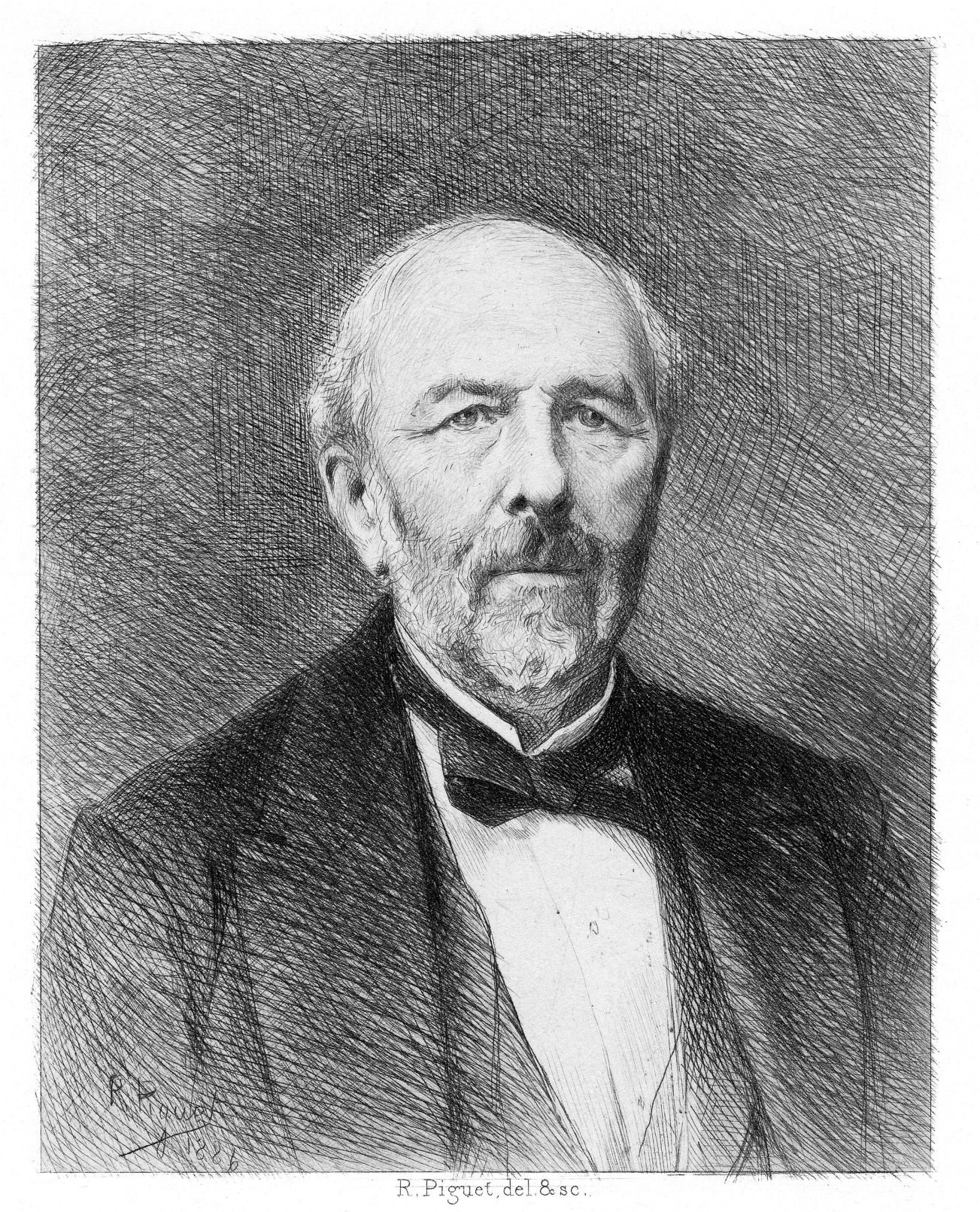


Fig. 1. Portrait of Edmond Boissier (1810–1885). Engraving by R. Piguet.
[Bibliothèque des Conservatoire et Jardin botaniques, Genève]

by Mermoud (1980) and Charpin (2011). The complete set of Boissier collections is in G-BOIS, and duplicates are currently housed in: A, AK, B, BERN, BM, BORD, BP, BR, C, CAS, CGE, CN, DBN, E, F, FABR, FI, G, GE, GH, GOET, H, HAL, JE, K, KIEL, KW, L, LAU, LE, LY, LZ, M, MA, MANCH, MICH, MO, MPU, OXF, P, PH, PI, STR, TCD, TO, US, VR, W, WAG, WB, WU, Z, and ZT.

Numerous collectors and collaborators worked closely with Boissier, and their collection numbers and citations in the *Flora Orientalis* volumes were presented in the supplementary volume (Boissier, 1888: 415–466). Some of them collected several *Brassicaceae* specimens from limited geographical areas, and they will not be mentioned in this paragraph, and their initials and last names will be listed under the type material they collected. However, others were prolific collectors, and only their last names are cited in the typified taxa below. Among the most notable of them was Pierre Martin Rémi Aucher-Eloy (1792–1838), a French pharmacist who collected in Greece, Turkey, and Egypt eastward into Oman and Iran. Another was Karl Georg Theodor Kotschy (1813–1866), an Austrian botanist and explorer who collected over 300,000 specimens from throughout the *Flora Orientalis* area. In addition, many other botanists sent their collections to Boissier or collected with him, and they include the Austrian Friedrich Wilhelm Noë (1798–1858); British William Griffith (1810–1845), John Ellerton Stocks (1822–1854), and James Edward Tierney Aitchison (1836–1898); French Georges François Reuter (1805–1872), Eugène Bourgeau (1813–1877), Joseph Arnaud Charles Gaillardot (1814–1883), Charles Isodore Blanche (1823–1887), Gaspard Joseph "Benjamin" Balansa (1825–1891), and Alfred Huet du Pavillon (1829–1907); German Georg Heinrich Wilhelm Schimper (1804–1878), Wilhelm von Spruner (1805–1874), Theodor Heinrich Hermann von Heldreich (1822–1902), and Heinrich Carl Haussknecht (1838–1903); Greek Theodoros G. Orphanides (1817–1886); Latvian Friedrich Alexander Buhse (1821–1898); Russian Alexander Andreevich von Bunge (1803–1890).

Coverage

The idea of writing the *Flora Orientalis* went on the back of Boissier's mind shortly after he acquired Aucher-Eloy plants and conducted his fieldwork in the Orient in 1842, 1845, and 1846. Perhaps it was crystallized after receiving a letter from William Jackson Hooker on 9 September 1847. It is currently in the Archives of the Conservatoire et Jardin botaniques of Geneva, and according to Lièvre (1994: 136) Hooker said "No one can do it [*Flora Orientalis*] as well as you can, and from no one will it be more acceptable. Everything west of the Indus belongs to that Flora".

The *Flora Orientalis* area was roughly outlined on a map by Rechinger (1969) (Fig. 2) and better delimited to countries by Jacquemoud (2011). Upon overlapping that map over the phytogeographical regions presented by Hedge (1976), the *Flora* area covers the eastern Mediterranean, nearly half of the Saharo-Sindian, and the vast majority of the Irano-Turanian regions. In terms of coordinate coverage, that area roughly falls between 19°E in Albania and 29°E in Egypt eastward to 66°E in Baluchistan (Pakistan) northward into easternmost Afghanistan, Turkmenistan, and Uzbekistan (Tashkent). The southern and northern limits include north of Aswan (Egypt) at about 27°N into the upper half of Saudi Arabia into Masqat (Oman) to the west of Karachi (Pakistan) and from Uzbekistan into Turkmenistan and Kazakhstan across roughly the upper two thirds of the Caspian Sea, all Caucasus (including the Russian part) and Crimea, into the upper half of Albania at about 41°N. This tremendously huge area covers the entire Greece, Cyprus, Turkey, the Caucasian countries (Armenia, Azerbaijan, and Georgia), Syria, Lebanon, Israel, Jordan, Iraq, Iran, most of Oman, and Turkmenistan.

The localities given in this work follow the original publications, though the current geography is used for the countries. For example, what was Armenia during the publication span of the *Flora,* i.e. during the Ottoman Empire, included both current Armenia, Azerbaijan, Georgia, Iranian Azerbaijan Province, and the eastern half of Turkey. Many collectors, including Aucher-Eloy, Buhse, Bunge, Kotschy, Huet du Pavillon, and Szovits loosly used "Armenia" to indicate that broad geographic region.

Publications

Excluding many articles published in various journals, the complete list of Boissier's publications are given in Stafleu & Cowan (1976), including the ones related to countries not covered by the *Flora Orientalis*. For the *Cruciferae* of *Flora Orientalis,* the important works are *Plantae Aucherianae orientales* published in *Annales des Sciences Naturelles* – hereafter *Annales* (Boissier, 1841a, 1841b, 1842a, 1842b, 1842c), followed chronologically by *Diagnoses plantarum orientalium novarum* – hereafter *Diagnoses* (Boissier, 1843, 1844, 1846, 1849, 1854, 1856, 1859), plants of the Transcaucasus and Persia (Boissier & Buhse, 1860), and ending with the monumental *Flora Orientalis* (Boissier, 1867a) and its *Supplementum* (Boissier, 1888: 29–67) published three years after Boissier's death (Fig. 5–6, p. 49–50).

The *Diagnoses* and *Flora Orientalis* remain the key references to the present on the vascular floras of Southwest Asia and, together with G-BOIS, they were vital for the production of subsequent floras of the area, especially the *Flora of Turkey* and *Flora Iranica*.

Although some *Brassicaceae* floras with a broadly defined species concept (e.g., *Flora Europaea* and to a lesser degree *Flora of Turkey* vol. 1) reduced many of Boissier's taxa to synonymy, the first author agrees with Rechinger (1969) that Boissier's narrower species concept is usually justified at least

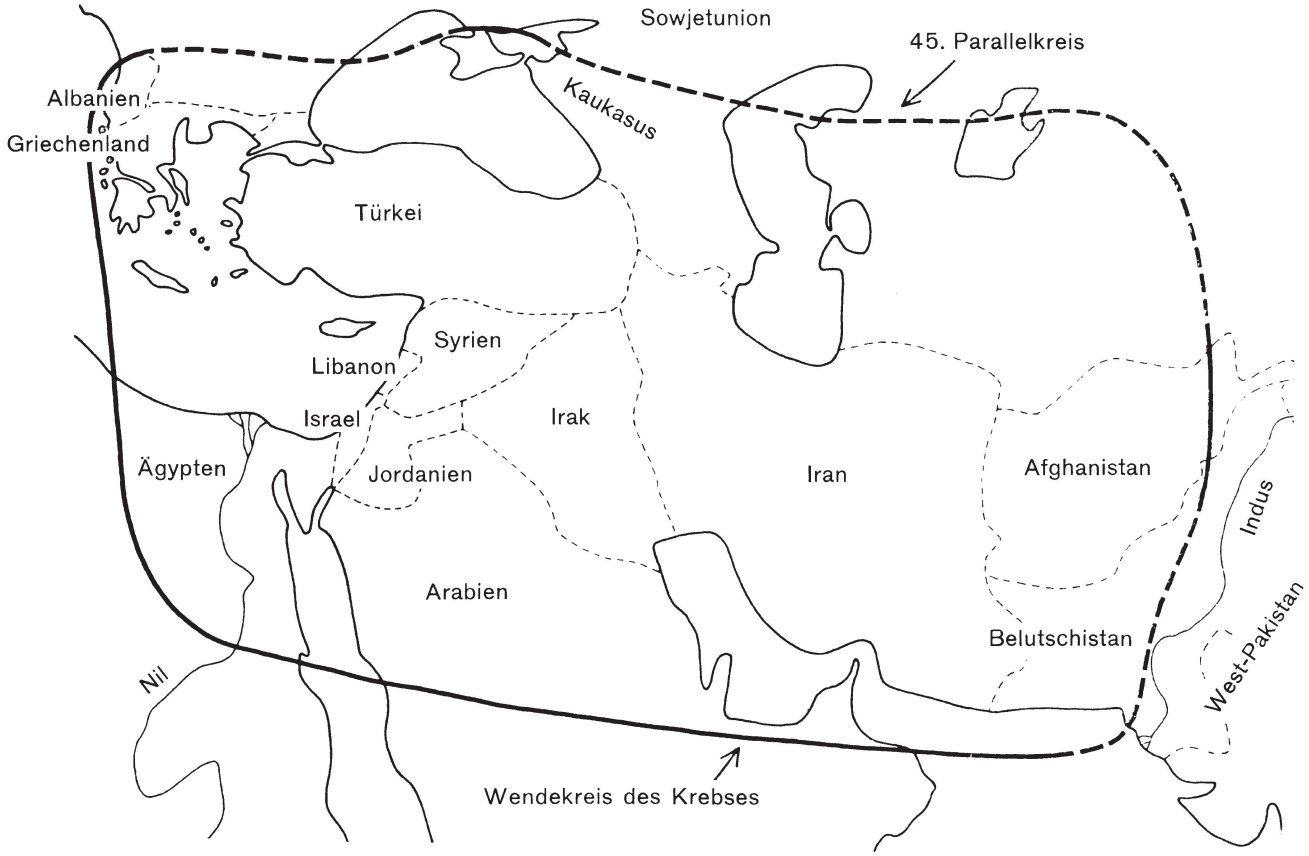


Fig. 2. Area Map of *Flora Orientalis* from Rechinger (1969: viii).
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for the *Brassicaceae,* where 273 of the 399 species (or 68 %) that were described by him and his coauthors as new are currently accepted in the same original genera or transferred to others. For the varieties, it is the opposite because only about 6.1 % (6 out of 98) are currently recognized.

As enumerated by Stafleu (1970), Boissier described about 6,000 new species, of which 3,336 were published in his *Diagnoses,* and finally the entire *Flora Orientalis* volumes and its *Supplementum* include the descriptions of 11,631 species. Boissier collaborated with numerous botanists, and he co-authored 2,388 novelties with them, notably Reuter (Lièvre, 1994).

Boissier herbarium

The history of Boissier's herbarium and library from its foundation, locations, and various curators to the present are well-covered by Jacquemoud (2011), and the interested reader should consult that valuable contribution. One important aspect to mention, however, is that the *Flora Orientalis* herbarium was originally not maintained separately from the remainder of Boissier's herbarium. Boissier and his son in law William Barbey (1842–1914) herbaria were given by Barbey's sons to the University of Geneva (Fig. 3, p. 14) in 1918 with an inauguration on June 5, 1919, to be maintained and curated through generous financial support (Lièvre, 1994; Jacquemoud, 2011). These two herbaria were then officially donated to the Conservatoire et Jardin botaniques in 1944, but physically transferred and housed together with those of Candolle, Delessert, and others from 1958 to the present. Starting in 1963 under the impulse of the former director Charles Baehni (1906–1964) the specimens related to *Flora Orientalis* have been meticulously extracted from the rest of the Boissier herbarium, remounted and rearranged in the original sequence of the *Flora* (Jacquemoud, 2011) (Fig. 7, p. 51). They are since kept separate, excluded from loan, their classification and sequence cannot be changed, and became accessible as G-BOIS only since 1974 (Fig. 4, p. 15). Consequently, in the floras published before this date (e.g., *Flora Iranica, Flora of Turkey*) when G is listed, it meant G-BOIS.

Although the herbarium sheets in the Boissier herbarium are distinctly larger in size than the vast majority of those in the other Geneva herbaria, the individual gatherings of a taxon by Boissier or his colleagues from a given locality often did not fit on a single sheet. Such single gatherings were kept in collection folders of few to several sheets at least one of which was fully labelled and the others remained unlabeled or have very abbreviated labels written by Boissier to indicate only partial information from the fully-labeled sheet. A few examples include a collection folder of up to seven sheets in *Alyssum cassium* or up to five sheet each in *Alyssum crenulatum* Boiss. & Heldr., *Erysimum gladiiferum* Boiss. & Hausskn., *Hesperis violacea* Boiss. (Fig. 8, p. 52), and *Hussonia uncata* Boiss.

Until recently, there has been a great deal of controversy among botanists unfamiliar with the way the Geneva herbaria have been operating for nearly the past century and a half, and some workers considered only the fully labelled sheets as type material, while ignoring the unlabeled ones or considering the partially labeled ones as syntypes, isotypes, or isolectotypes. The problem was fully discussed by Gautier et al. (2016), and their proposal submitted at the International Botanical Congress in Shenzhen (Turland & Wiersema, 2017) was approved. The Shenzen Code (Art. 8.3, Ex. 9, in Turland et al., 2018: 18) specifically mention this situation: "In the Geneva herbaria, a single specimen is often prepared on two or more sheets, which are not therefore duplicates. Although the individual sheets are usually not labelled as being part of the same specimen, they are physically kept together in their own specimen folder and bear a single, original label in common" (see Fig. 8, p. 52). Therefore, from here on, a given multisheet folder containing a holotype, isotype, lectotype, or syntype in G-BOIS is treated as a unit rather than by its individual sheets. Accordingly, and for an example, the phrase "The lectotype is a collection folder of x sheets" is used throughout this work.

As frequently happened, the holotypes or lectotypes of taxa described by Boissier have handwritten labels by their original collectors. When duplicates are sent as exsiccatae, printed, handwritten labels by Boissier often do not include the collection day or number. In numerous cases, material gathered by foreign collectors are sent to Boissier for determination but initially with provisional numbers on handwritten labels. Following determinations, the information was sent back to the collectors and the remaining duplicates were distributed with different numbers. Many such cases have been encountered and discussed in this work, especially for the collections of Balansa, Heldreich, and Kotschy. Indeed, because the isolectotypes (or isotypes) can have different labels with different collection numbers, some botanists erroneously believe that the two types of labels denote different collections.

Cruciferae in the Flora Orientalis

Boissier described an impressive 132 new genera of vascular plants, and only a few of them were co-authored with or published for other botanists. Of the 132 total, 28 genera (ca. 21 %) were in the *Cruciferae,* 14 are currently accepted, and three (*Buchingera* Boiss. & Hohen., *Diceratium* Boiss., *Pyramidium* Boiss.) of the 14 synonymized were later homonyms. The genera are: *Alyssopsis* Boiss., *Brossardia* Boiss. (= *Noccaea* Moench), *Buchingera* (= *Asperuginoides* Rauschert), *Campyloptera* Boiss. (= *Aethionema* W.T. Aiton), *Chalcanthus* Boiss. (= *Eutrema* R. Br.), *Chrysochamela* (Fenzl) Boiss., *Clastopus* Bunge ex Boiss., *Coluteocarpus* Boiss. (= *Noccaea*), *Crenularia* Boiss. (= *Aethionema*), *Diceratella* Boiss., *Diceratium* (= *Diceratella* Boiss.), *Didymophysa* Boiss., *Eremobium* Boiss., *Fortuynia* Shuttlew. ex Boiss., *Glastaria* Boiss., *Graellsia* Boiss.,

Heldreichia Boiss., *Hussonia* Boiss. (= *Erucaria* Gaertn.), *Iberidella* Boiss. (= *Noccaea*), *Moriera* Boiss. (= *Aethionema*), *Nasturtiopsis* Boiss., *Parlatoria* Boiss., *Physoptychis* Boiss., *Pyramidium* Boiss. (= *Veselskya* Opiz), *Strigosella* Boiss., *Strophades* Boiss. (= *Erysimum* L.), *Tchihatchewia* Boiss. (= *Hesperis* L.), and *Zerdana* Boiss. (= *Sterigmostemum* M. Bieb.).

Typification

As shown throughout the text, many authors of various floras often artificially typified the *Brassicaceae* taxa described by Boissier based on material they did not examine and currently housed in herbaria other than those in Geneva. By contrast, for taxa typified here, the first step was checking the holdings in G-BOIS and the original protologues to find out if Boissier indicated that he examined such material in other herbaria. In typifying taxa described by Boissier in *Flora Orientalis,* Boissier clearly stated that first he examined the specimens in his own herbarium (G-BOIS) and then, if necessary he completed with specimens deposited in other herbaria, most of all B, LE and W as loans and the herbaria of Paris and London that he visited (Boissier, 1867b). Likewise, we consider for the typification of the taxa described in the *Diagnoses* that Boissier consulted specimens of the same herbaria.

In typifying taxa described by Boissier in the *Annales,* almost all authors overlooked Boissier (1841a) and the footnote by the editor of that publication. Boissier clearly stated that he based that series on Aucher-Eloy's collections in his own herbarium (now in G-BOIS) and that of Candolle. As Aucher-Eloy's collections were received by Candolle in 1837, *i.e.* after the publication of volume 1 of the *Prodromus* in which the *Cruciferae* are treated (Candolle, 1824), these collections are not in the Prodromus herbarium (G-DC), but have been incorporated in the general collection G. All duplicates in these herbaria were checked because of their importance in the typification of taxa described by Boissier (1842a, 1842b, 1842c). Boissier did not examine the rich Aucher-Eloy collections in the Moricand or Delessert herbaria because they were not availbable in G on 1842, but he checked and annotated numerous duplicates at P. Some novelties were based on Aucher-Eloy unicates at P sent to Boissier by A. Brongniart, and these are recognized here as holotypes. He always annotated the specimens examined from other herbaria, and those unannotated (including those in P, or G with a label of Candolle's herbarium) are interpreted here as not examined. Boissier's unique handwriting easily distinguish his annotations from those of other botanists of his time.

If Boissier did not annotate or mention the source of material he studied, it is a definite rule that he based his descriptions *solely* on the material in his herbarium, and in the majority of cases he cited a single collection for a given taxon. Therefore, there is no justification to list a holotype or designate a lectotype based on material not studied by Boissier from any other herbarium This matter is clearly indicated in the Code (Article 9.1, note 1; Turland et al., 2018): "If the author used only one specimen or illustration, either cited or uncited, when preparing the account of the new taxon, it must be accepted as the holotype". This important note is enforced in identifying a given holotype, as well as in designating a lectotype, in a herbarium other than G-BOIS if it lacks Boissier's annotation or citation in the protologue. Such erroneous designations are either ignored or corrected by a second-step lectotypification throughout this work.

As for Gay's (1842) species novelties of *Erysimum,* it is clear that their names have priority because his account was published on 20 January 1842, whereas Boissier's (1842a) names in *Annales* were published in March of that year. Two of Gay's species, *E. purpureum* and *E. pycnophyllum,* are lectotypified in this work, and they are based on the same type collections of Boissier's illegitimate later homonym *E. purpureum* and name superfluous *E. thyrsoideum* respectively.

Sequence of the text

Boissier (1867a) partially adopted Candolle (1821a, 1821b, 1824) classification system of the *Cruciferae* by recognizing only three of the five major *"subordo"*. He united the *Pleurorzhizeae* DC. and *Notorhizeae* DC. into *Platylobeae* Boiss., maintained *Orthoploceae* DC. and *Spirolobeae* DC., and did not include *Diplecolobeae* DC. because it is an exclusively South African group. Furthermore, he did not recognize any of the 21 tribes of Candolle, of which many were recognized by subsequent botanists to the present. Boissier divided the three *subordo* into informal groups based on descriptive terms applied to fruit length/width ratio (e.g., *Siliquosae, Siliculosae*), type of fruit flattening *(Angustiseptae, Latiseptae),* and cotyledonary position *(Notorhizeae, Pleurorhizeae).* These descriptive fruit and embryo types were originally introduced by Candolle (1821a, 1821b). For a comparison of the two systems and generic arrangements of Candolle and Boissier, the reader is advised to consult Hayek (1911).

Except for the present work, not a single other author followed Boissier's (1867a) generic sequence. However, the main reason for doing so here is to link the present typification with the *Flora Orientalis* sequence to facilitate easy reference and future updates. Regardless to whether or not a given genus is currently recognized, the generic sequence follows the *Flora Orientalis*. Unless otherwise indicated, under each genus the species number and current tribal affiliation follow the latest estimates by Al-Shehbaz (2012) and/or the continuously updated *Brassicaceae* database or BrassiBase (2019). The aim is to aid the reader in linking the past and present knowledge of taxa.



Fig. 3. Boissier and Barbey herbaria at the University of Geneva with their curator, Gustave Beauverd in c. 1925.
[Bibliothèque des Conservatoire et Jardin botaniques, Genève]



Fig. 4. Historical herbarium G-BOIS at the Conservatoire et Jardin botaniques in Geneva (2019).
[Picture: F. Golay]

Concluding remarks

The *Cruciferae* in *Flora Orientalis* and its *Supplementum* are represented by a total of 118 genera, 784 species, and 155 varieties, of which 20 genera, 411 species, and 121 varieties were described as new by Boissier there or previously in the *Annales* and *Diagnoses*. Thirty two out of a total of 532 novelties described by Boissier did not necessitate any typification (19 renamings of taxa and 13 superfluous names). They are excluded from typifications statistics throughout the text and in Table 1. The status of only 7 out of the 500 remaining novelties are undetermined because their type collections were not located in any of the major herbaria consulted. It is not known if they were misplaced in those herbaria or housed in smaller ones not visited for this study. They include three species (*Clypeola glabra* Boiss., *Lepidium setosum* Boiss., and *Sisymbrium hesperidiflorum* Boiss. & Buhse) and four varieties (*Berteroa ascendens* var. *microcarpa* Boiss., *Cardamine uliginosa* var. *amethystina* Boiss., *Matthiola humilis* var. *ecornuta* Boiss., and *M. incana* var. *glabra* Boiss.).

Holotypes or lectotypes of 457 out of 500 novelties (91.4%) described by Boissier are definitely housed in his herbarium in G-BOIS. The remaining specimens (for 34 novelties) are housed in various herbaria: 25 at P, 7 at G, and one each at K and W. For those, Boissier often took fragments that he deposited in his herbarium, and they are considered as isotypes or isolectotypes.

Only 20 out of the 500 novelties (4%) that are dealt with in this work are illegitimate names, and they include 11 later homonyms and 9 superfluous names. In cases where Boissier's superfluous names were based on the same type collection that the correct name, e.g. in J. Gay's novelties of *Erysimum,* the holotypes or lectotypes were based on specimens available to Gay.

In summary, the present study deals with the typification of 500 names (395 species and 105 varieties). Fifty-one (51) have previously been correctly typified by earlier authors. Holotypes are considered for 280 names, lectotypes are designated herein for 161 taxa (including 28 second-step lectotypfications) and one neotype is designated (see Table 1). None of the 121 varieties described by Boissier is currently recognized, 156 out of 411 species (38%) described are recognized (147 in the original genus and 9 in another genus). Finally, 376 novelties out of 532 taxa are currently synonymized (see Table 2).

Table 1. Summary of the number of typifications

Status	Number of types	
Holotypes	280	(56.0%)
Lectotypes here designated	133	(26.6%)
2nd step designation	28	(5.6%)
Neotypus	1	(0.2%)
Previous typifications	51	(10.2%)
Types not found	7	(1.4%)
Total	**500**	

Table 2. Number of accepted and synonymized Boissier's names

Taxa	Accepted Boissier's names		Synonymized Boissier's names	Total
	in original genus	in other genera		
species	147	9	255	411
varieties	0	0	121	121
Total	**156** (29.3%)		**376** (70.7%)	**532**

Names typification

All currently accepted taxa (genera, species, varieties) in the text are listed in boldface, and those synonymized are in italics. No additional homotypic or heterotypic synonyms are given because it is beyond the scope of this work to do that. Following the bibliographic citation of the basionym of each taxon, the word "Type", the localities, and collectors are listed exactly as they appeared in the original work. For each entry, following the word "Holotypus" or "Lectotypus", exact data of the type locality is given in quotation marks based on the G-BOIS material, or rarely elsewhere if Boissier based his taxon description on such material, followed by the elevation, date, and collector indicated according to an established standard. And where appropriate, "Syntypus" is indicated with the same sequence as for the holo- or lectotypus.

Herbarium acronyms are arranged alphabetically, and whenever available, the barcode numbers are given. For herbaria with more than one duplicate, the barcode numbers are listed in an ascending order. The entire holdings, including types, of A, B, BM, E, G, G-BOIS, G-DC, GH, JE, K, KW, MO, P, PR, PRC, S, US, W, WU, Z, and ZT were examined for every species and variety described by Boissier. Therefore, there is no need to place an exclamation mark "!" following the acronyms and barcodes of these herbaria. All specimen images in the Virtual Herbaria (2019) were verified. For all other cited herbarium acronyms with barcode numbers, their images were examined on JSTOR Global Plants website [https://plants.jstor.org]. Finally, acronyms without barcodes were based on the literature.

Notes are provided about the typification of each species or variety, particularly if the lectotype is designated here for the first time, or if earlier lectotypifications were incomplete, controversial, or erroneous. Status of the holo- or lectotype material in G-BOIS is presented, especially when more than one sheet exists. Whenever necessary, taxonomic information is also given here.

Typifications and nomenclature

Chorispora R. Br. ex DC. in Mém. Mus. Hist. Nat. 7: 237. 1821 [nom. cons.].

Tribe: *Chorisporeae* C.A. Mey.

Note. – A genus of 11 Eurasian species, of which Boissier (1842c) described three and later in *Flora Orientalis* recognized two.

Chorispora syriaca Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 384. 1842.

Type: "[Aucher-Eloy] N. 181, Alep".

Holotypus: Syria: "Alep", s.d., *Aucher-Eloy 181* (G-BOIS [G00332023]; iso-: BM [BM000522116, BM000522123], G [G00389767, G00389768], MPU [MPU013500], P [P00741723, P00741724]).

= ***Chorispora purpurascens*** (Banks & Sol.) Eig in J. Bot. 75: 189. 1935.

Note. – Boissier did not examine the duplicates in P and G herbaria, and he based the species description solely on the unicate in his herbarium.

Chorispora persica Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 384. 1842.

Type: "[Aucher-Eloy] N. 4169 Q, Ispahan".

Lectotypus (designated here): **Iran:** "Ispahan", s.d., *Aucher-Eloy 4169Q* (G-BOIS [G00332024]; isolecto-: BM [BM001172151], G [G00389769, G00389770], K [K000693524], P [P00741711, P00741712]).

Note. – Boissier studied and annotated P00741712, and that justifies the lectotypification of the name.

Chorispora iberica var. *torulosa* Boiss., Fl. Orient. 1: 144. 1867.

= ***Chorispora iberica*** (M. Bieb.) DC., Syst. Nat. 2: 734. 1821.

Note. – This is a renaming of the following entry at the varietal level.

Chorispora compressa Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 385. 1842.

Type: "[Aucher-Eloy] Inter segetes *Aderbidjan* absque numero".

Lectotypus (designated here): **Iran:** "Aderbijan", s.d., *Aucher-Eloy s.n.* (G-BOIS [G00332025]; isolecto-: P [P00741779]).

= ***Chorispora iberica*** (M. Bieb.) DC., Syst. Nat. 2: 734. 1821.

Notes. – Lectotypification of *Chorispora compressa* is needed because Boissier based his description on the duplicates in G-BOIS and P00741779 that he annotated.

Boissier in *Flora Orientalis* reduced the species to synonymy of the previous entry.

Morettia DC. in Mém. Mus. Hist. Nat. 7: 236. 1821.

Tribe: *Anastaticeae* DC.

Note. – The genus consists of four species distributed in North Africa and Southwest Asia.

Morettia asperrima Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 60. 1842.

Type: "[Aucher-Eloy] N. 4102, Mascate".

Holotypus: Oman: "Mascate", s.d., *Aucher-Eloy 4102* (G-BOIS [G00332021]; iso-: BM [BM000583729], G [G00371891, G00371892], K [K000693515], MO [MO1617736], P [P00747584], W [W0075721]).

= ***Morettia philaeana*** (Delile) DC., Syst. Nat. 2: 426. 1821.

Notes. – Because none of the four cited isotypes was examined by Boissier, the unicate in G-BOIS is recognized as the holotype despite some might erroneously interpret the listing by Stork & Wüest (1980: 254) as lectotypification.

Boissier in *Flora Orientalis* reduced *Morettia asperrima* to synonymy of *M. philaeana*.

Morettia canescens Boiss., Diagn. Pl. Orient. 8: 17. 1849.

Type: "Hab. in desertis Arabiae Petreae (Schimper! Boiss!)".

Lectotypus (designated by Stork & Wüest, 1980: 255): **Israel:** "Nakkeb Arab. Petr. in arena et rupibus prostratum", 26.IV.1835, *Schimper 341* (G-BOIS [G00332020]; isolecto-: BM [BM000522088, BM000583725],

E [E00126649, E00126650], G [G00371909, G00371907], HAL [HAL0120825], HBG [HBG506149, HBG506150, HBG506151], K [K000230655, K000230656], P [P00747576, P00747577, P00747583], TUB [TUB000684, TUB000685], W [W, W0075719, W0075720, W18890168030]).

Note. – Boissier's collection (syntype) was not located.

Morettia parviflora Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 60. 1842.

Type: "[Aucher-Eloy] N. 4076, in Deserto ad Mascate".

Lectotypus (designated by Stork & Wüest, 1980: 257): **Oman:** "in deserto Mascate", s.d., *Aucher-Eloy 4076* (G-BOIS [G00332022]; isolecto-: G [G00371896], K [K00693516], P [P00747573, P00747574]).

Note. – The sheet P00747573 was annotated by Boissier, and it supports lectotypification of the name. The sheet at G belongs to the general collection and was not examined by him.

Matthiola W.T. Aiton, Hort. Kew. ed. 2, 4: 119. 1812 [nom. cons.].

Tribe: *Anchonieae* DC.

Notes. – A taxonomically difficult genus of 52 species much in need of thorough systematic and molecular studies throughout its range.

Although the study of Jaén-Molina et al. (2009) is a good starting point, substantial more work is needed to resolve many of the taxonomic problems.

Matthiola albicaulis Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 46. 1842 [nom. illeg.].

≡ *Hesperis alyssifolia* DC., Syst. Nat. 2: 447. 1821.

≡ ***Matthiola alyssifolia*** (DC.) Bornm. in Repert. Spec. Nov. Regni Veg. 39: 80. 1935.

Note. – *Matthiola albicaulis* is illegitimate because Boissier (1842a) listed the earlier published *Hesperis alyssifolia* DC. as a name inappropriately reflecting the species characters.

Matthiola incana var. *glabra* Boiss., Fl. Orient. 1: 148. 1867.

Type: "Hab. in Graeciâ (ex Juss.) Culta olim in hort. Par.".

= ***Matthiola incana*** (L.) W.T. Aiton, Hort. Kew. ed. 2, 4: 120. 1812.

Note. – No material of this taxon was located in G or P, including P-JU, and it appears that the variety was described from a plant in cultivation.

Matthiola sinuata var. *bracteata* Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. 8: 15. 1849.

Type: "Hab. in muris castelli *Suda* in *Cretâ.* Heldreich legit Marte florif.".

Holotypus: Greece: "murs des fortifications de Souda dans le golfe de Souda", 21.III.1846, *Heldreich 1342* (G-BOIS [G00332027]); iso-: G [G00446002, G00446003]).

= ***Matthiola sinuata*** W.T. Aiton, Hort. Kew. ed. 2, 4: 120. 1812.

Notes. – Status of this variety is uncertain, and it is somewhat anomalous because it has bracteate racemes the upper bracts of which are borne on the pedicels.

The variety was not listed by Livaniou-Tiniacou (2002). It may be a variant of *M. sinuata* (L.) W.T. Aiton, but field and experimental studies are needed to confirm that.

Matthiola crassifolia Boiss. & Gaill. in Boiss., Fl. Orient. 1: 149. 1867.

Note. – This is a renaming of the following entry at the specific rank.

Matthiola sinuata var. *integrifolia* Boiss. & Gaill. in Boiss., Diagn. Pl. Orient. ser. 2, 6: 10. 1859.

≡ ***Matthiola crassifolia*** Boiss. & Gaill. in Boiss., Fl. Orient. 1: 149. 1867.

Type: "Hab. in rupibus calcareis *Rarbagrouth* propè *Sidonem* cl. Gaillardot".

Holotypus: Lebanon: "Rochers calcaires de Rarbagrouth", 4.VIII.1855, *Gaillardot 1527* (G-BOIS [G00332030]; iso-: JE [JE00006130, JE00006131], K [K000693479], P [P05445157, P05445159]).

Notes. – The holotype is a collection folder of three sheets, of which the barcoded sheet is labeled and the other two are not.

All isotypes were collected from the same locality on the same date, and none was examined or annotated by Boissier.

Matthiola odoratissima var. *dentata* Boiss., Fl. Orient. 1: 149. 1867.

Type: "Hab. in salsis ad Schabanli districtus Khoi prov. Aderbidjan (Szow!)".

Holotypus: Azerbaijan: "In colle salem continente ad pag. Schabanli, Distr. Khoi", 3.V.1828, *Szovits 171* (G-BOIS [G00332031]; iso-: K [K000618623], LE).

= ***Matthiola spathulata*** Conti in Mém. Herb. Boissier 18: 49. 1900.

Notes. – Label of the K sheet states that the locality is "Armenia" but has the same collection number *171.* However, as in many other cases where Szovits collected in Azerbaijan, which encompassed then both Azerbaijan (the country) and the Iranian province, he used "Armenia" in the abbreviated labels of his duplicates.

Lectotypification of the above varietal name by Al-Shehbaz (Zeraatkar & Assadi, 2018: 141) was not needed because Boissier in *Flora Orientalis* based the description on the unicate in his herbarium.

Matthiola odoratissima var. *ovatifolia* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 49. 1842.

≡ ***Matthiola tomentosa*** Bélang., Voy. Indes Or. I: [tab. 3]. 1834.

≡ *Matthiola ovatifolia* (Boiss.) Boiss., Diagn. Pl. Orient. 6: 9. 1846 [nom. illeg.].

Type: "[Aucher-Eloy] N. 82, Persia, 4068, A. 4072, Ispahan; 4070, Téhéran; 4073, Asia minor. – *Matthiola tomentosa* Bélang. Voy. tab.".

Notes. – Boissier (1842a) described the variety and listed *Matthiola tomentosa* as a synyonym. It is then a renaming of *M. tomentosa* at a varietal level.

However, when Boissier (1846: 9) raised his variety to a species, *M. ovatifolia* became illegitimate even though he did not list in that publication the earlier published *M. tomentosa* in synonymy. The latter is a valid name based on an illustration with analyses.

Many earlier works (e.g., Rechinger, 1968; Jaén-Molina et al., 2009; Zerratkar & Assadi, 2018; BrassiBase, 2019) erroneously used Boissier's illegitimate name instead of taking *M. tomentosa*.

Matthiola ovatifolia var. *buhseana* Boiss., Fl. Orient. 1: 150. 1867.

Type: "Hab. in lapidosis ad limites deserti salsi prope Rischm in Persiâ orientali (Buhse!)".

Holotypus: Iran: "Rischm", IV.1849, *Buhse 1213* (G-BOIS [G00332032 excl. dehisced fruit in envelope]; iso-: LE [n.v.]).

= ***Matthiola tomentosa*** Bélang., Voy. Indes Or. I: [tab. 3]. 1834.

Note. – Boissier based the varietal description solely on the unicate in his herbarium.

Matthiola farinosa Bunge ex Boiss., Fl. Orient. 1: 150. 1867.

Type: "Hab. in jugo Elbrus Persiae bor. inter Asterabad et Schahrud (Bunge!)".

Holotypus: Iran: "In jugo Elbrusensi; inter Astrabad et Schahrud", 6000'–7000' [1830–2130 m], 17.V.1858, *Bunge s.n.* (G-BOIS [G00330322]; iso-: B [B100241934], K [K000693491], LE [LE00013098], P [P00731148, P00731149, P00731150, P00731151]).

Notes. – Of the four isotypes at P, only P00731151 carries the exact date and locality in Bunge's handwriting "Matthiola farinosa, m. prope Tasch. 17. mai. 1858". With that sheet are mounted fragmentary duplicates of P00731148 and P00731149. Except for P00731151, all other duplicates, including the holotype, have printed labels.

Unfortunately the holotype is rather fragmentary with flower and fruit fragments in a packet, though it has the original species description in Bunge's handwriting and was the only material examined by Boissier.

Matthiola damascena Boiss., Diagn. Pl. Orient. 8: 16. 1849.

Type: "Hab. in collibus aridissimis suprà *Salehieh* propè *Damascum* ubi legi Maio 1846".

Lectotypus (designated here): **Syria:** "Colles Damasci", V–VII.1846, *Boissier s.n.* (G-BOIS [G00332033 flowering plants]; isolecto-: G [G00371810 plant on right]). **Syntypi: Syria:** "Colles Damasci", V–VII.1846, *Boissier s.n.* (G [G00371812, G00371810 plant on left], G-BOIS [G00332033 fruiting plants], P [P00731154]); "colles Damasceni", VI.1846, *Boissier s.n.* (G [G00371846], K [K000693493], P [P00731153], PH [PH00017091], W [W19660021986]).

= ***Matthiola euboea*** Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 48. 1842.

Notes. – Boissier's type collection includes material gathered in May (in flower) and June into July (in fruit).

However, since the original publication stated that the plant was collected in May, only the flowering material is considered for lectotypification, and the other collections above are recognized here as syntypes.

Matthiola euboea Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 48. 1842.

Type: "[Aucher-Eloy] N. 89, Eubaea insula".

Holotypus: Greece: "Euboea", 1837, *Aucher-Eloy 89* (G [G00371848]; iso-: P [P00731152]).

Notes. – Boissier based the description of *M. euboea* solely on the unicate G00371848 and did not annotate the P duplicate. Therefore, the G specimen ought to be the holotype.

The name was listed by Boissier in *Flora Orientalis* in the synonymy of the later-published *M. damascena* (see previous entry) followed by the note "patriâ schedulae errore falsâ". The species name is perfectly validly published, and the original mistake made by *Aucher-Eloy* on the locality (Syria instead of Greece), followed by Boissier in the protologue, do not invalidate *M. euboea.*

Both Mouterde (1970) and Post (1896, 1932) recognized *M. damascena,* though Post placed *M. euboea* in its synonymy despite recognizing that the latter name predates the former.

Matthiola flavida Boiss., Diagn. Pl. Orient. 6: 9. 1846.

Type: "Hab. ad latera orientalia montis *Kuh-Ajub* prope *Persepolin.* Kotschy No. 392".

Holotypus: Iran: "Ad latera in orient. spectantia m. Kuh-Ajub pr. ruinas u. Persepolis", 19.V.1842, *Kotschy 392* (G-BOIS [G00150509]; iso-: B [B100241937], BM [BM000583719, BM000583721], E [E00386177], G [G00096679, G00096680], GOET [GOET002636], K [K000693495], KFTA [KFTA0000090], KW [KW000127933], LE [LE00013099, LE00013100], P [P00731145, P00731146, P04661038], US [US00100453], W [W19670002533], WAG [WAG0003963], WU [WU0101793]).

Notes. – The holotype is a collection folder of two sheets of which the barcoded sheet has a handwritten label by Kotschy and the other is unlabeled. Boissier based his species description solely on that material.

The isotypes have printed labels.

Matthiola revoluta Bunge ex Boiss., Fl. Orient. 1: 151. 1867.

Type: "Hab. inter Ispahan et Teheran (Bunge!)".

Holotypus: Iran: "Inter Isfahan et Teheran", V.1859, *Bunge s.n.* (G-BOIS [G00330329]; iso-: B [B100241920], GOET [GOET002638], K [K000693496], KFTA [KFTA0000091], LE [LE00013109], P [P00731124, P00731125], US [US00344589]).

Notes. – Label of the holotype sheet has the original species description in Bunge's handwriting and was somewhat modified by Boissier.

The P00731124 duplicate carries Bunge's annotation "Matthiola revoluta, m." and measurements of floral parts, as well as an illustration of the stigma.

The GOET sheet was collected from Isfahan rather than between Isfahan and Tehran and should perhaps be considered as a syntype instead of a isotype.

Matthiola dumulosa Boiss. & Buhse in Nouv. Mém. Soc. Imp. Naturalistes Moscou 12: 14. 1860.

Type: "In der dürren Ebene bei Dscheudak, 4 April 1849 (florens et fructifera). [Buhse] Nº 1253".

Holotypus: Iran: "in planitie Sicca Djendack", 4.IV.1849, *Buhse 1253* (G-BOIS [G00330328]; iso-: LE [LE00013096], P [P04657138]).

Notes. – The collection date on the LE sheet was handwritten and correctly given as in the protologue, whereas the holotype has Buhse's 1847 printed label with Boissier's handwritten locality data.

Discrepancy in the year of collections is considered here as an error that resulted from using a label pre-printed prior to the collection year, as in other taxa that appeared in Boissier & Buhse (1860).

Matthiola chorassanica Bunge ex Boiss., Fl. Orient. 1: 151. 1867.

Type: "Hab. in prov. Chorassan Persiae inter Schahrud et Nischapur (Bunge!)".

Holotypus: Iran: "Chorassan, inter Schahrud et Nischapur", VI.1858, *Bunge s.n.* (G-BOIS [G00150508]; iso-: K [K000693499], P [P00731156]).

Note. – The isotype at P carries a handwritten label by Bunge giving the species name, locality, and exact collection date "13 Juni. 58". By contrast, the holotype has the species description in Bunge's handwriting on a printed label with the date "Jun. 1858".

Matthiola montana Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 47. 1842.

Type: "[Aucher-Eloy] N. 80, Akdag".

Lectotypus (designated here): **Turkey:** "Ak-Dag", s.d., *Aucher-Eloy 80* (G-BOIS [G00330531]; isolecto-: BM [BM000522086], G [G00371839], K [K000693500], P [P00747173, P00747174]).

Note. – Boissier (1842a) based his species description on the sheet in his herbarium and P00747173 that he annotated. Therefore, lectotypification of the species is justified.

Matthiola arabica Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 49. 1842.

Type: "[Aucher-Eloy] N. 132, Sinaï. – *M. tritis* Decaisn. Florul. Sinaica. – Unio itin, n. 214 – Arabicè *Chomchom*".

Lectotypus (first step designated by Boulos, 1999: 200; second step designated here): **Egypt:** "Arabice: Chomchom. Inter lapides ad radices montis Sinai", 26.V.1835, *Schimper 314* (G-BOIS [G00332639]; isolecto-: BM [BM000614131], E [E00126651, E00126652, E00126653, E00126654], G [G00446296, G00446297], HAL [HAL0120818], HBG [HBG506160, HBG506161], K [K000230668, K000230669], KW [KW000127934], P [P00731164, P00731165, P05445189]). **Syntypus: Egypt:** "Sinaï", s.d., *Aucher-Eloy 132* (G [G00371816, G00446608], G-BOIS [G00332034], K [K000618624, K000618625], MO [MO5654247], P [P00731161, P00731162, P00731163], US [US00344712]).

Notes. – Boulos (1999) narrowed the selection to one of the two syntypes cited in the original publication and listed *Schimper 314* at K as the isolectotype (as isotype). The designation here of the duplicate in G-BOIS as the lectotype completes the process.

The collection number was erroneously given in the original description as *214,* but this was corrected to *314* in Boissier (1867a: 152).

Matthiola thessala Boiss. & Orph. in Boiss., Fl. Orient. 1: 153. 1867.

Type: "Hab. in regione inferiori Olympi Thessali ad Hagios Dionysios (Orph. exs. 3695!)".

Holotypus: Greece: "In regione inferiori monti Olympi Thessalica prope Hajos-Dionysios", 25.VII–6.VIII.1857, *Orphanides 3695* (G-BOIS [G00332035]).

= ***Matthiola fruticulosa*** subsp. ***valesiaca*** (Gay ex Gaudin) P.W. Ball in Feddes Repert. Spec. Nov. Regni Veg. 66: 157. 1962.

Notes. – Boissier based the species description solely on the unicate in his herbarium.

No duplicates of the type collection were found.

Matthiola humilis var. *hirta* Boiss., Fl. Orient. 1: 154. 1867.

Type: "Hab. in arenosis ad Aboukir (Kralik!)".

Holotypus: Egypt: "Sables maritimes, Aboukir (Egypti)", 28.III.1847, *Kralik s.n.* (G-BOIS [G00332036]; iso-: G [G00446004], K [K000618626]).

= ***Matthiola longipetala*** (Vent.) DC., Syst. Nat. 2: 174. 1821.

Note. – The holotype is a collection folder of two sheets, one of which is labeled and barcoded, and Boissier based the varietal description solely on this material.

Matthiola humilis var. *ecornuta* Boiss., Fl. Orient. 1: 155. 1867.

Type: "Hab. in Aegypto (Acerbi)".

= ***Matthiola longipetala*** (Vent.) DC., Syst. Nat. 2: 174. 1821.

Note. – No material of the taxon was examined in the Geneva herbaria.

Matthiola aspera Boiss., Diagn. Pl. Orient. 8: 16. 1849.

Type: "Hab. in sterilissimis calidis Judaeae inter *S. Saba* et *mare Mortuum,* legi [Boissier] Maio 1846".

Holotypus: Palestine: "Palaestina, inter Jerusalem et Jericho", IV–V.1846, *Boissier s.n.* (G-BOIS [G00330324]; iso-: G [G00342140, G00342143], KW [KW000127935], P [P00731168, P00731169]).

Notes. – The holotype is a collection folder of two sheets, of which the barcoded one has the full label above, and the other has Boissier's handwriting as "Palestina propè Jericho." G00342140, P00731168 and P00731169 duplicates have "Mayo 1846" as date.

As shown in other cases below, Boissier's protologue of a given taxon was sometimes presented in a broader geographic interpretation than found on the specimens in his herbarium or other herbaria. The reverse situation was also observed. In the case of Saint (or S.) Saba, or Mar Saba in Arabic, Wikipedia states that it is a Greek Orthodox monastery overlooking Kidron Valley to the east of Old Jerusalem City.

Greuter & Burdet (Greuter & Raus, 1983) reduced *M. aspera* to a subspecies of *M. longipetala,* but the differences in the indumentum, presence of glands on the sepals, petal color and shape, and seed width justify the recognition of two distinct species, as done by Zohary (1966) and Gowler (1998). *Matthiola aspera* is endemic to Israel and neighboring Jordan, and its report from Iraq (Rechinger, 1968: 240) was based on plants of *M. longipetala*.

Matthiola oxyceras var. *lunata* Boiss., Fl. Orient. 1: 156. 1867.

Type: "Hab. in Bithyniâ prope Nicomediam (Noë!), Lydiâ ad basin montis Mesogis (Boiss!), Lyciâ ad Elmalu (Bourg!), Isauriâ (Heldr!), Cappadociâ (Bal!)".

Lectotypus (designated here): **Turkey:** "Elmalu, in arvis incultis arenosis", 10.V.1860, *Bourgeau s.n.* (G-BOIS [G00332037]; isolecto-: G [G00446004], P [P05348419]). **Syntypi: Turkey:** "Environs de Bérékethy (Cappadoce)", 1300 m, 15.VI.1856, *Balansa s.n.* (G-BOIS [G00332049]); "Mesogis", VI.1842, *Boissier s.n.* (G-BOIS [G00332047]); "Elmalu, in arvis incultis arenosis", 11.V.1860, *Bourgeau s.n.* (P [P05445259]); "Nicomalia", 1844, *Noë s.n.* (G-BOIS [G00332048]).

= ***Matthiola longipetala*** (Vent.) DC., Syst. Nat. 2: 174. 1821.

Notes. – Although all syntypes were collected from Turkey, the varietal name was not listed in *Flora of Turkey* (Cullen, 1965).

Heldreich's collection from Isauriâ was not located.

Matthiola oxyceras var. *angulosa* (Boiss.) Boiss., Fl. Orient. 1: 156. 1867.

≡ *Matthiola angulosa* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 50. 1842.

Type: "[Aucher-Eloy] N. 84, Mossul".

Holotypus: Iraq: "Mossoul", s.d., *Aucher-Eloy 84* (G-BOIS [G00332039]; iso-: G [G00371843, G00371863, G00371864], K [K000693504], P [P00731142, P00747171, P00747175]).

= ***Matthiola longipetala*** (Vent.) DC., Syst. Nat. 2: 174. 1821.

Note. – Boissier based the description on the unicate in his herbarium and did not examine any of the duplicates at P or G.

Matthiola oxyceras var. *forcipifera* (Boiss.) Boiss., Fl. Orient. 1: 156. 1867.

≡ *Matthiola bicornis* var. *forcipifera* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 51. 1842.

Type: "[Aucher-Eloy] N. 88, Rhodus".

Lectotypus (designated here): **Syria:** "Alep", s.d., *Aucher-Eloy 83* (G-BOIS [G00332040]; isolecto-: G [G00446005, G00446006, G00446008], K [K000693502], P [P05348416, P05348420]).

= ***Matthiola longipetala*** (Vent.) DC., Syst. Nat. 2: 174. 1821.

Notes. – Boissier (1842a) based his description on G00446008, the unicate in G-BOIS, and P05348416 that he annotated, and therefore the name needed lectotypification (see Boissier, 1841a).

The collection number and locality were erroneously given in the original description of the variety as "N. 88, Rhodus", but these were corrected in *Flora Orientalis*.

Farsetia Turra, Farsetia: 5. 1765.

Tribe: *Anastaticeae* DC.

Notes. – A genus of 27 species distributed from North and East Africa eastward into southern Southwest Asia into Pakistan, with the highest concentration of species in eastern Africa (Ethiopia into Somalia) and southern Arabian Peninsula.

Farsetia was broadly delimited by Fournier (1864) to encompass *Fibigia* Medik., but the two genera have very different trichome types, and they belong to the unrelated tribes *Anastaticeae* and *Alysseae,* respectively.

Farsetia linearis Decne. ex Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 150. 1842.

Type: "[Aucher-Eloy] N. 4069, Mascate".

Holotypus: Oman: "Mascate", s.d., *Aucher-Eloy 4069* (P [P00747714]; iso-: BM [BM000582900], FI, G [G00371666, G00371686], G-BOIS [G00332041], K [K000484508], LE [LE00013045, LE00013046], MPU [MPU017099]).

Notes. – Boissier (1842b) based the species description on the P duplicate indicating: "Farsetia linearis Decaisne, mss. in herb. Mus. Par.". The fragmentary G-BOIS isotype was taken from the holotype. Boissier did not examine the duplicates at G because they were not part of the Candolle herbarium.

The above duplicate at FI was listed in Jonsell (1986), though its image was not seen on the websites consulted.

Farsetia aegyptia var. *gracilior* Boiss., Fl. Orient. 1: 159. 1867.

Type: "Hab. in Affghaniâ (Griff!)".

Lectotypus (designated here): **Afghanistan:** *sine loco,* s.d., *Griffith 1363* (G-BOIS [G00332042]; isolecto-: G [G00446008], K [K000484503, K000484505], P [P06618089]). **Syntypi: Afghanistan:** *sine loco,* s.d., *Griffith 1495* (G-BOIS [G00332043], K [K000484505, K000618628]); *sine loco,* s.d., *Griffith 1497* (K [K000484503]).

= ***Farsetia aegyptia*** subsp. ***edgeworthii*** (Hook. f. & Thomson) Jonsell in Acta Univ. Upsal., Symb. Bot. Upsal. 25(3): 43. 1986.

Notes. – The presence in G-BOIS of two collection numbers by *Griffith* (*1363* and *1495*) none of which was listed in the original protologue necessitated lectotypification of the taxon.

Jonsell (1986) did not list *Griffith 1363,* though he listed both *Griffith 1495* and *1497* as syntypes.

Farsetia ovalis Boiss., Diagn. Pl. Orient. 8: 32. 1849.

Type: "Hab. in desertis *Aegypti* et *Arabiae petreae* (Aucher! Sieber! Boiss!)".

Lectotypus (designated here): **Egypt:** *sine loco,* s.d., *Aucher-Eloy 238* (G-BOIS [G00332044]; isolecto-: BM [BM000582905], E, FI, G [G00446009, G00446010], MPU [MPU016926], P). **Syntypi: Egypt:** "Tentyra", s.d., *Sieber s.n.* (G [G00446013, G00446014], JE [JE00002545], K [K000230495], LE [LE00013053, LE00013054], MPU [MPU017101], P, W [W0010333, W0010334, W0010335, W0010336, W298671, W298675]). **Sine Patria:** "Arabia petraea", III.1846, *Boissier s.n.* (G [G00446015, G00446016], G-BOIS [G00332046], K [K000230496], KW [KW000127921], LE [LE00013056, LE00012057], UPS).

= ***Farsetia aegyptia*** Turra, Farsetia: 5. 1765.

Note. – Jonsell (1986: 40) listed all syntypes cited in the original publication but did not lectotypify the taxon. He also indicated that duplicates of *Aucher-Eloy 238* are housed at E, FI, and P, though those at E and P were not found during this study.

Cardamine L., Sp. Pl.: 654. 1753.

Tribe: *Cardamineae* Dumort.

Notes. – The genus includes 239 species represented by native taxa on all continents except Antarctica. For its size, it is poorly represented in the *Flora Orientalis* area.

Both *Cardamine* and *Dentaria* were simultaneously published by Linnaeus (1753). Crantz (1769), who united the two genera, adopted *Cardamine* for the combined genus and, therefore, this name has priority (see Turland et al., 2018: Art. 11.5).

Cardamine oxycarpa Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 56. 1842.

Type: "[Aucher-Eloy] N. 113, Alpes Laristan; 4119, Zarinkou".

Lectotypus (designated here): **Turkey:** "Alpibus Lazistani", s.d., *Aucher-Eloy 113* (G-BOIS [G00332050]; isolecto-: G [G00389439], K [K000697699]). **Syntypus: Iran:** "Mt. Zarinkou", s.d., *Aucher-Eloy 4119* (G [G00389440], G-BOIS [G00332051], K [K000697700]).

= ***Cardamine pectinata*** DC., Syst. Nat. 2: 264. 1821.

Note. – Boissier in *Flora Orientalis* reduced the species to synonymy of *C. pectinata,* whereas both Cullen (1965) and Hedge (1968), who did not list *C. oxycarpa* in their accounts, recognized the former as a subspecies of *C. impatiens* L. The first author agrees with Khatri (1988) in maintaining *C. pectinata* as a distinct species related to the former.

Cardamine impatiens var. *macropetala* Boiss., Fl. Orient. Suppl.: 31. 1888.

Type: "Hab. secus torrentes vallis subalpinae Djimil Ponti Lazici 6000' (Bal.!)".

Holotypus: Turkey: "Bords des torrents de la vallée sous-alpine de Djimil (Lazistan)", c. 2000 m, VII–VIII.1866, *Balansa 33* (G-BOIS [G00332662]; iso-: JE [JE00006187], K [K000618629]).

= ***Cardamine impatiens*** L., Sp. Pl.: 655. 1753.

Notes. – The holotype is a collection folder of two sheets, of which the barcoded one has the full label above, and the other is labeled as "Lazistan. Balansa".

Seeds from the type collection were grown in Geneva, and vouchers in flower were collected in May 1868.

Except for the collection number *1360* instead of *33,* the label data of the holotype and isotypes are identical.

Cardamine huetii Boiss., Diagn. Pl. Orient. ser. 2, 5: 18. 1856.

≡ *Sisymbrium huetii* (Boiss.) Boiss., Fl. Orient. 1: 957. 1867.

≡ ***Murbeckiella huetii*** (Boiss.) Rothm. in Bot. Not. 1939: 472. 1939.

Type: "Hab. in Armeniâ suprâ *Tachkeupru* cl. Huet. du Pavillon. Fl. Maio".

Holotypus: Turkey: "supra Tachkeupru", V.1853, *Huet du Pavillon s.n.* (G-BOIS [G00332052]; iso-: G [G00446018]).

Notes. – The isotype at G was part of the Huet du Pavillon's herbarium and has the locality as "inter Baibout et Erzeroum". It was added to the Geneva herbaria in 1912 then it was not examined by Boissier.

In addition to the type collection above, Hedge (1965, 1968) listed Balansa's collection from Djimil, but this collection was not cited in the protologue of the species.

Although Boissier (1867a: 161) maintained the species in *Cardamine*, he recognized it on p. 957 as *Sisymbrium huetii,* and a note on that change was given in Boissier (1888: 31) as: "161, Cardamine Huetii delenda et in *Sisymbrium Huetii* Fl. Or. 1. P. 957 mutanda".

Cardamine uliginosa var. *amethystina* Boiss., Fl. Orient. Suppl.: 31. 1888.

Type: "Hab. in herbidis elatioribus montis Rilo Macedoniae (Pančič!)".

= ***Cardamine uliginosa*** M. Bieb., Fl. Taur.-Caucas. 3: 438. 1819.

Note. – No material of this taxon was located.

Cardamine wiedemanniana Boiss., Fl. Orient. 1: 162. 1867.

Type: "Hab. in monte Aladagh Anatoliae (Wiedem!)".

Holotypus: Turkey: "environs Aladagh", s.d., *Wiedemann s.n.* (G-BOIS [G00332054]; iso-: K, LE).

Notes. – The holotype is a collection folder of two sheets, of which the barcoded one has a handwritten label by Wiedemann and was annotated in 1902 by Schulz, and the other sheet has a handwritten label by Boissier with the species name, locality, and collector.

C. wiedemanniana was not mentioned by Cullen (1965), though Schulz (1903: 497) cited its type collection as the record of *C. amara* from Turkey.

As indicated by Khatri (1988) and Lihová et al. (2004), *C. wiedemanniana* is a distinct Anatolian-Caucasian species to which belongs *C. lazica* (see below) that Cullen recognized. Khatri also indicated that he examined a duplicate at K, but we have not been able to locate that.

Cardamine olympica Boiss., Diagn. Pl. Orient. 8: 19. 1849.

Type: "Hab. in pratis humidis regionis tertiae *Olympi Bithyni* ubi cl. Aucher eam floriferam ego autem fructiferam legimus".

Holotypus: Turkey: "Olymp. Byth.", s.d., *Aucher-Eloy 114* (G-BOIS [G00332053]; iso-: G [G00446019], P [P06651949]).

= ***Cardamine uliginosa*** M. Bieb., Fl. Taur.-Caucas. 3: 438. 1819.

Notes. – The G isotype belongs to the Moricand herbarium, and the P sheet was not annotated by Boissier. Therefore, Boissier based his description solely on the unicate in his herbarium, and that sheet should be recognized as the holotype (see Boissier, 1841a).

The species was misidentified by Boissier (1842a) as *C. tenera* C.A. Mey., but was later reduced by him to synonymy of *C. uliginosa* in *Flora Orientalis*.

Cardamine lazica Boiss. & Balansa in Boiss., Fl. Orient. Suppl.: 31. 1888.

Type: "Hab. in Ponto littorali ad rivulos prope Rhizé et in regione subalpinâ inter Andon et Djimil 3300' (Bal.!)".

Lectotypus (designated here): **Turkey:** "Fruits: Bords des ruisseaux du Lazistan prés de Rhizé", c. 100 m, V.1866, *Balansa 31* (G-BOIS [G00332101 first sheet on the right and second sheet]; isolecto-: G (G [G00446020, G00446021], GOET [GOET002730], P [P00747531]). **Syntypus: Turkey:** "Fleurs: Khan situé entre Andon et Djimil (Lazistan)", 1836 m, 6.VII.1866, *Balansa 31* (G-BOIS [G00332101 two flowering plants on first sheet on the left]) (Fig. 9, p. 53).

= ***Cardamine wiedemanniana*** Boiss., Fl. Orient. 1: 162. 1867.

Notes. – The lectotype is a collection folder of two sheets both annotated by O. E. Schulz on 31 December 1901. The second sheet has two fruiting plants and no label, and the first sheet has a fruiting plant on the right, two flowering plants on left, and a label carrying the species name in Boissier's handwriting and the field number *31* (Fig. 9, p. 53). The flowering material is recognized here as the syntype, and the fruiting material is designated as the lectotype.

Cullen (1965: 441) listed both syntypes from Rhize and between Andon and Djimil and without discriminating flowering or fruiting material as the type, though he indicated to have seen them in K. A search of all the holdings at K and JSTOR Global Plants website revealed no Balansa material of the species at K. Therefore, we are not considering Cullen's action a first step lectotypification and preferring to lectotypify the name based on material examined by Boissier. Furthermore, the listing of such K material by Dorofeyev (2003: 58) cannot be considered an effective lectotypification (see McNeill, 2014; Turland et al., 2018: Art. 9, note 6).

Cardamine graeca var. *lasiocarpa* (Boiss. & Heldr.) Boiss., Fl. Orient. 1: 164. 1867.

≡ *Pteroneurum graecum* var. *lasiocarpum* Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. 8: 20. 1849.

Type: "Hab. in lapidosis montium Lassiti Cretâ suprà *Males* alt. circ. 4000' (Heldr.!)".

Holotypus: Greece: "In lapidosis sylvaticis. Montagnes de Lassiti – revers méridional, bois de Chênes et de Pins au dessus de Males" c. 4000' [1220 m], 7.V.1846, *Heldreich 1484* (G-BOIS [G00332057]; iso-: BM [BM000750056], G [G00383416, G00446022, G00446023, G00446024], H [H1511450], P [P05419170, P06489458], W [W0075717]).

= ***Cardamine graeca*** L., Sp. Pl.: 655. 1753.

Note. – None of the above isotypes was studied by Boissier.

Arabis L., Sp. Pl.: 664. 1753.

Tribe: *Arabideae* DC.

Note. – The genus includes some 100 species centered in Europe and distributed also in Asia, North America, and North Africa.

Arabis pseudoturritis Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. ser. 2, 1: 20. 1854.

Type: "Hab. in regione sylvaticâ montis *Olympi Thessaliae* (Heldr. Jul. 1852)".

Holotypus: Greece: "In reg. sylvatica m. Olympi Thessaliae", 22.VII.1851, *Heldreich s.n.* (G-BOIS [G00332058]).

= ***Turritis glabra*** L., Sp. Pl.: 666. 1753.

Notes. – The original protologue erroneously gave the collection year as 1852 instead of 1851. No duplicate of the type collection was examined. A sheet annotated in Boissier's handwriting as *Arabis pseudoturritis* collected by C.N. Fraas (G [G00383992]) is not part of the type collection.

Strid & Titz (1986: 262) lectotypified the species, but that was unnecessary because Boissier based the species description solely on the unicate in his herbarium. They and Titz & Schnattinger (1980) recognized this taxon as *Arabis glabra* var. *pseudoturritis* (Boiss. & Heldr.) Fiori (Nuova Fl. Ital. 1: 576. 1924). However, the taxon definitely belongs to *Turritis* (tribe *Turritideae*) rather than to *Arabis* (tribe *Arabideae*). Whether or not it merits recognition at the infraspecific rank is another matter, though the first author feels that it is not sufficiently distinct to be accepted.

Arabis laxa var. *cremocarpa* (Boiss. & Balansa) Boiss., Fl. Orient. 1: 168. 1867.

≡ *Arabis cremocarpa* Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 5: 16. 1856.

Type: "Hab. in pinetis vallis *Kar Boghas* suprâ *Gülek Boghas*. Fructiferam legit fine Julii cl. Balansa".

Holotypus: Turkey: "Forêts de Pins de la partie inférieure de la vallée de Kar-Boghas, au-dessus de Gulek-Boghas", 30.VII.1855, *Balansa 214* (G-BOIS [G00332059]).

= ***Turritis laxa*** (Sm.) Hayek in Repert. Spec. Nov. Regni Veg. Beih. 30(1): 402. 1925.

Notes. – No duplicates of the type collection were examined.

Two unnumbered collections by Balansa, P00747417 and P00747418, have mimeographed handwritten labels by him indicating a collection date of July 1855 and locality data as "région montagneuse du Taurus au nord du défilé des Portes ciliciennes". However, we believe that these do not belong to the type collection.

Arabis cordata Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 51. 1842.

Type: "[Aucher-Eloy] N. 111, Glibra cum *T. glabr*â mixta".

Holotypus: Sine patria: "Glibra", s.d., *Aucher-Eloy 111* (G-BOIS [G00332060]; iso-: K [K000618630]).

= ***Turritis laxa*** (Sm.) Hayek in Repert. Spec. Nov. Regni Veg. Beih. 30(1): 402. 1925.

Note. – The species was reduced by Boissier in *Flora Orientalis* to synonymy of *A. laxa*.

Arabis montbretiana Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 53. 1842.

Type: "[Aucher-Eloy] N. 98, Ak-Dag et in h. DC. ex Aleppo".

Lectotypus (designated here): **Turkey:** "Ak-Dag", s.d., *Aucher-Eloy 98* (G-BOIS [G00332061]; isolecto-: K [K000693257], P [P00747415]). **Syntypus: Syria:** *sine loco,* s.d., *Aucher-Eloy s.n.* (G [n.v.]).

= ***Arabis auriculata*** Lam., Encycl. 1: 219. 1783.

Notes. – No specimen of *Aucher-Eloy s.n.* was found in G under *A. auriculata, A. montbretiana,* or *A. nova* Vill., and the material examined by Boissier is likely misplaced.

Cullen (1965) and Hedge (1968) reduced *A. montbretiana,* together with *A. auriculata,* to synonymy of *A. nova*. However, as indicated by Titz (1973), the last species is quite distinct from the other two together, and the correct name for them is *A. auriculata*.

Arabis auriculata var. *sinaica* (Boiss.) Boiss., Fl. Orient. 1: 169. 1867.

≡ *Arabis sinaica* Boiss., Diagn. Pl. Orient. 8: 21. 1849.

Type: "Hab. in rupestribus vallium jugi *Sinaitici,* legi [Boissier] Marte 1846".

Holotypus: Egypt: "Arabia Petraea. Sinai", III.1846, *Boissier s.n.* (G-BOIS [G00332062]; iso-: G [G00446038, G00446039, G00446050], K [K000693261, K000693262], LE [LE00012991, LE00012992], P [P00747455, P05122994], PH [PH00003578], W [W19660021973]).

= ***Arabis auriculata*** Lam., Encycl. 1: 219. 1783.

Notes. – Boissier based his species description solely on the unicate in his herbarium.

Therefore, Boulos (1999: 194) listing the type at K and his annotation on K000693261 (25.IX.1997) are rejected.

Arabis cadmea Boiss., Diagn. Pl. Orient. 8: 21. 1849.

Type: "Hab. in pinguibus arenosis *Cadmi* orientalis suprà *Colossam* in *Cariâ* alt. 5000'-6000'. Legi [Boissier] Junio 1842".

Lectotypus (designated here): **Turkey:** "regio alpina Cadmi suprà Colossam", VIII.1842, *Boissier s.n.* (G-BOIS [G00332063]; isolecto-: JE [JE00003186]). **Syntypi: Turkey:** "Cadmes ad or. Denisleh in arenosis panguibus", VI.s.a., *Boissier s.n.* (G-BOIS [G00332064]); "Cadmus orientalis", VI.1842, *Boissier s.n.* (K [K000693259, K000693260]).

= ***Arabis auriculata*** Lam., Encycl. 1: 219. 1783.

Notes. – Based on Mermoud (1980), the two collections were made only a few days apart starting at Denisleh then Khonas (= *Colossas*). It appears that Boissier mixed the collection month because the lectotype has flowers and fruit, and the second collection has fully mature fruit.

The mere listing of the above lectotype as type by Tan (2002) does not constitute a valid lectotypification of the species (see Turland et al., 2018: Art. 9, note 6; McNeill, 2014).

The lectotype is a collection folder of two sheets one of which is unlabeled.

Arabis aucheri Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 52. 1842.

Type: "[Aucher-Eloy] N. 97, Alep".

Holotypus: Syria: "Alep", s.d., *Aucher-Eloy 97* (G-BOIS [G00332065]; iso-: BM [BM000583662, BM000583663], G [G00389095, G00389096, G00389097], K [K000963235], P [P00747456, P00747457, P00747458]).

Note. – Boissier (1842a) based the species description on the unicate in his herbarium and did not annotate any of the duplicates above.

Arabis hirsuta var. *glabrescens* Boiss., Fl. Orient. 1: 170. 1867.

≡ *Arabis constricta* Griseb., Spic. Fl. Rumel. 1: 249. 1843.

= ***Arabis sudetica*** Tausch in Flora 19: 407. 1836.

Notes. – This is a renaming at the varietal rank of *A. constricta.*

According to Strid & Titz (1986: 264), Grisebach's collection from Scardus is the type collection of *A. constricta* Griseb., and it is likely that our plant belongs to same collection, with duplicates at B, GOET, and K.

Arabis sagittata var. *glabrata* Boiss., Fl. Orient. 1: 171. 1867.

Type: "Hab. in monte Elbrus Persiae bor. (Ky. exs. 197!), in prov. Asterabad prope Siaret (Bunge!)".

Lectotypus (designated here): **Iran:** "In m. Elbrus pr. Derbend", 27.V.1843, *Kotschy 197* (G-BOIS [G00332067]; isolecto-: G [G00446032, G00446033, G00446034], K [K000693264], P [P00747427, P00747428, P00747429]). **Syntypus: Iran:** "in montosis prov. Astrabadensis [Gorgan] pr. Siaret", IV–V.1858, *Bunge s.n.* (G-BOIS [G00790755], K [K000693263]).

= ***Arabis sagittata*** (Bertol.) DC. in Lam. & DC., Fl. Franç. ed. 3, 5: 592. 1815.

Note. – Two sheets in the Bunge herbarium at P belong to this species, but their locality do not match the protologue and they were collected in 1868, a year after the publication of the varietal name.

Arabis sagittata var. *rosea* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 52. 1842.

Type: "[Aucher-Eloy] N. 106, Taurus; 153, Olympus Bithynus".

Lectotypus (designated here): **Turkey:** "Olympo Bythinia", s.d., *Aucher-Eloy 153* (G-BOIS [G00332665]; isolecto-: K [K000618631, K000618632], P [P05431939]). **Syntypus: Turkey:** "Taurus", s.d., *Aucher-Eloy 106* (G [G00389094], P [P00747414, P05431938]).

= ***Arabis sagittata*** (Bertol.) DC. in Lam. & DC., Fl. Franç. ed. 3, 5: 592. 1815.

Notes. – Boissier in *Flora Orientalis* did not mention this varietal name, though he listed the above lectotype number among the material cited under *A. sagittata*.

The limits of *A. sagittata* and *A. hirsuta* are often confused, but as shown by Titz (1978a and references therein), they are quite distinct cytologically, and more recent molecular studies (Karl & Koch, 2014) confirmed that morphologically and molecularly.

Arabis ochroleuca Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. ser. 2, 1: 21. 1854 [nom. illeg.] [non Lam.].

≡ ***Arabis subflava*** B.M.G. Jones in Feddes Repert. Spec. Nov. Regni Veg. 69: 60. 1964.

Type: "Hab. rara in regione alpinâ montis *Kyllenes* Peloponnesi suprâ *Livadi* 5500'–6500' (Heldr.! Orphanides!)".

Lectotypus (designated by Strid & Titz, 1986: 267): **Greece:** "in m. Kyllenes regione alpinâ", 6500' [1980 m], 6.VII.1848, *Heldreich 2161* (G-BOIS [G00332068]; isolecto-: B [B100201869]). **Syntypus: Greece:** "in reg. sup. montis Ziriae (Kuzznim) supra Livadi", 5000'–6000' [1520–1830 m], 8–20.VI.1852, *Orphanides 247* (G-BOIS [G00790758], K [K000693238], W [W0075713]).

Note. – The later homonym *A. ochroleuca* was renamed as *A. subflava.*

Arabis muralis var. *cretica* (Boiss. & Heldr.) Boiss., Fl. Orient. 1: 172. 1867.

≡ ***Arabis cretica*** Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. 8: 20. 1849.

Type: "Hab. in rupibus montium *Sphacioticorum* Cretae propè *Askyphous* alt. 4000' (Heldr.)".

Holotypus: Greece: "montagne Sphakiotes du côté d'Askyphous", 4000' [1220 m], 3.IV.1846, *Heldreich 1372* (G-BOIS [G00332069]; iso-: BM [BM000750071], G [G00389261, G00389262, G00389263], K [K000693228, K000693229, K000693230], KW [KW000127930], W [W18890026287]).

Note. – The species was described solely on the unicate in Boissier's herbarium and, therefore, that specimen ought to be recognized as the holotype.

Arabis drabaeformis Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 55. 1842.

Type: "[Aucher-Eloy] N. 100, Olympus Thessalus aut Bithynus".

Holotypus: Turkey: "Olymp. Bithyn.", s.d., *Aucher-Eloy 100* (G-BOIS [G00332077]; iso-: BM [BM000522055], G [G00389099, G00389279 two plants on top and one on lower left, G00389112], MPU [MPU013369], P [P00747449 plant on lower left, P00747447 four plants numbered 2 in pencil on upper half of sheet, P00747450]).

Notes. – The above isotype G00389112, was erroneously numbered as *Aucher-Eloy 160* instead of *100,* and the former number is *Erysimum carium* (see p. 38).

The major source of confusion came from Boissier's (1842a) citation of the same collection number *(Aucher-Eloy 100)* and exact locality data (Olympus Thessalus aut Bithynus) for both *A. drabaeformis* and *A. bryoides*. This resulted from Aucher-Eloy's giving the same number for the Turkish Bithynean Olympus for *A. drabaeformis* and Greek Thessalean Olympus

for *A. bryoides*. Both Cullen (1965) and Strid & Titz (1986) realized this label mix-up.

P00747447 is a mixed collection of *A. drabaeformis* and *A. bryoides*.

Arabis drabaeformis is generally a taller plant, (7–)10–20 cm, with much-branched loose caudex covered by some leaf remains with persistent midveins, sparsely pubescent, non-canescent basal leaves, and petals 4–6 mm long. By contrast, *A. bryoides* is a mat-forming plant with shorter stems 2–7(–10) cm, compact and few-branched caudex covered by persistent leaves with obscurely developed midvein, densely canescent basal leaves, and petals 6–11 mm long.

Arabis bryoides Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 55. 1842.

Type: "[Aucher-Eloy] N. 100, Olympus Thessalus aut Bithynus".

Holotypus: Greece: "in Olymp. Thessal. & Byth.", 1837, *Aucher-Eloy 100* (G-BOIS [G00332070]; iso-: BM [BM000750094], G [G00389277, G00389278, G00389279 two plants on the bottom center and right], K [K000693237], MPU [MPU013554], P [P00747446 six plants numbered 1 in pencil on upper half of the sheet]).

Note. – P00747446 is a mixed collection of *A. drabaeformis* and *A. bryoides*.

Arabis carduchorum Boiss., Fl. Orient. 1: 173. 1867.

Type: "Hab. in summo jugo Agerowdagh Armeniae Kurdicae inter Van et Müküs alt. 12000' (Ky!)".

Lectotypus (designated by Vitek et al., 2018: 228): **Turkey:** "Plantae in Karduchia ad Agerow Dàgh lectae. Crescit in summo jugo inter Wan et Müküs", 12000' [3660 m], IX.1859, *Kotschy 747* (W [W0050692 excl. plant in the middle]; isolecto-: G-BOIS [G00332071]).

Notes. – The lectotype at W has the collection number as *Kotschy 747,* but all other information on its label are basically identical to that of the G-BOIS isolectotype except the missing number and date and the original naming of the plant as "Draba gigas Stur".

At the end of the protologue, Boissier wrote "Drabo gigas Stur mss. in herb. Imp. Vindob!" This clearly means that he based his species description on the sheet at W. Furthermore, the sheet at W is a mixed collection involving a tiny fruiting plant of *Erysimum sp.,* a sterile portion of cushion, and much larger one of which the fruits were taken, except one left on the sheet which confirms the generic identity. Boissier did not annotate the W sheet, though based on the phrase above, he examined it and from which he most likely took the plant in G-BOIS and wrote its label. Therefore, the name needed lectotypification.

Arabis sulphurea Boiss., Fl. Orient. 1: 173. 1867.

≡ ***Draba aucheri*** Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 166. 1842.

Note. – Although one might erroneously consider *A. sulphurea* an illegitimate name resulting from citing the earlier published *Draba aucheri,* the correct interpretation is that Boissier renamed the species in *Arabis* to avoid creating a later homonym of *A. aucheri* (see above).

Arabis albida var. *umbrosa* Boiss., Fl. Orient. 1: 174. 1867.

≡ *Arabis viscosa* DC., Syst. Nat. 2: 216. 1821.

= ***Arabis alpina*** subsp. ***caucasica*** (Willd.) Briq., Prodr. Fl. Corse 1: 48. 1913.

Note. – This is a renaming at the varietal level of *A. viscosa* DC.

Arabis deflexa Boiss., Fl. Orient. 1: 175. 1867.

Type: "Hab. in rupestribus montis Akdagh Lyciae (Bourg!)".

Holotypus: Turkey: "Mt. Ak-Dagh. Dans les rochers", 3.VII.1860, *Bourgeau s.n.* (G-BOIS [G00332076]; iso-: G [G00446031], K [K000693234], P [P00747452, P00747453], W [W18890067070]).

Notes. – The holotype in G-BOIS is a collection folder of two sheets collected on the same day, but one has the information as above and the other "Ag-D'hag. région alpine" but with the number *44*.

The mimeographed labels of K, P, and W indicate "In regione alpina montis Ak-Dagh" but without any numbers. The note on sheet *44* reads "Sous ce nº 44 il y a deux espèces l'échant. fructifère appartient a l'arabis brevifolia DC l'autre est probablement une espèce nouvelle", translated by one of us (GB) as "Under nº 44 there are two species, the fructiferous sample belongs to *Arabis brevifolia* DC. the other is probably a new species".

Arabis aubrietioides Boiss., Fl. Orient. 1: 175. 1867.

Type: "Hab. in saxosis regionis subalpinae et alpinae Tauri Cilicici (Ky. exs. 26! 14! 259! Bal! sub *A. purpureâ*). Fl. aest.".

Lectotypus (designated here): **Turkey:** "Fleurs: région alpine du Taurus, au-dessus de Boulgarmaden. août. Fruits: chateau de Gulek Boghos, 9 juillet" 9.VII.1855 & VIII.1855, *Balansa 233* (G-BOIS [G00332079]; isolecto-: G [G00446028, G00442029], K [K000693274, K000693276], P [P00747377, P00747378]). **Syntypi: Turkey:** "Iter Cilicicum in Tauri alpes 'Bulgar Dagh.' in valle Gusguta locis argiloso-schistosis", 26.VI.1853, *Kotschy 14b* (GOET [GOET002699], P [P00747380, P00747384, P00747385]); "In Mounte Tauro", 1836, *Kotschy 26* (G [G00446027], G-BOIS [G00332080], K [K000693269, K000693270, K000693272], P [P00747381, P00747382], W [W0075712]); "Plantae montibus Bulhgar Dagh. In Karli Boghas", 6000' [1830 m], 6.VI.1859, *Kotschy 239* (G [G00446030], G-BOIS [G003320281], JE [JE00003183, JE00003184], K [K000693273], P [P00747387], W [W0075729, W18890058145]).

Notes. – The lectotype is a collection folder of three sheets, of which one is unlabeled, another has a handwritten label by Balansa with the field number *233*, and third is barcoded with the mimeographed Balansa label: "B. Balansa, Pl. d'Orient, 1855. Arabis purpurea Sibth. et Smith? (Boiss.). Fl. Région alpine du Taurus, au-dessus de Boulgarmaden, août – Fr. Rochers du chateau dominant le défilé des Portes ciliciennes 9 juillet". Also, a syntype folder in G-BOIS [G003320281] consists of two sheets, both are labeled.

Upon checking in the *Supplementum* and all available *Brassicaceae* collections made by Kotschy, none has number *259,* and Boissier in *Flora Orientalis* erroneously took that number for *239*. Also, the other syntype of *A. aubrietioides* is *Kotschy 14b,* rather than *Kotschy 14*.

Arabis ionocalyx Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. 8: 20. 1849.

Type: "Hab. in *Cariâ* (Pinard), in pinetis montis *Solyma* Lyciae (Heldreich)".

Lectotypus (designated here): **Turkey:** "In pinetis montis Solyma Lyciae", IV.1845, *Heldreich s.n.* (G-BOIS [G00332082]; isolecto-: B [B100249631], BM [BM001172157], E [E00386133], G [G00446051], K [K000693277, K000693278], KW [KW000127932], P [P00747421, P00747422, P00747423, P00747424], W [no barcode], WAG [WAG0004236]). **Syntypus: Turkey:** "Caria", s.d., *Pinard s.n.* (G [G00446035, G00446036, G00446052], G-BOIS [G00332084]).

Note. – The lectotype is a collection folder of two sheets with identical mimeographed labels handwritten by Boissier, of which one has a single plant and the barcoded sheet has three.

Arabis ionocalyx var. *cilicica* (Boiss. & Balansa) Boiss., Fl. Orient. 1: 176. 1867.

≡ *Arabis cilicica* Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 5: 17. 1856.

Type: "Hab. in umbrosis fauceis *Sedichig* suprâ *Mersina* in regione calidâ Ciliciae cl. Balansa".

Holotypus: Turkey: "Lieux ombragés de la gorge de Sedi-chig. Au NO de Mersina. – Région chaude", 4.V.1855, *Balansa 229* (G-BOIS [G00332085]; iso-: E [E00386134], K [K000693279], MPU [MPU13367], P [P00747419, P00747420]).

= ***Arabis ionocalyx*** Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. 8: 20. 1849.

Notes. – The holotype and isotypes were collected from the same general area on the same date.

Label of the holotype was handwritten by Boissier, whereas the isotypes have mimeographed, handwritten labels by Balansa but without the collection number and with a slightly different locality name correctly interpreted by Cullen (1965: 425) to be the same as that of the holotype.

Arabis nepetifolia Boiss., Fl. Orient. 1: 177. 1867.

Type: "Hab. in alpinis montis Elbrus Persiae borealis inter Asterabad et Schahrud (Bunge!)".

Holotypus: Iran: "Alpinis in jugo Elbrusensi; inter Astrabad et Schahrud", V.1858, *Bunge s.n.* (G-BOIS [G00332086]; iso-: K [K000693281], P [P00747412]).

Note. – Boissier based the species description solely on the unicate in his herbarium and, therefore, the listings by Hedge (1968) and Titz (1978b) are not treated as lectotypifications.

Arabis stylosa Boiss. & Balansa in Boiss., Fl. Orient. Suppl.: 34. 1888.

Type: "Hab. in regione alpinâ Ponti Lazici supra Djimil ad rivos (Bal.!), in jugo alpino Zehra Zehraros Cartaliniae (Brotherus!), in monte Hirtscha Abchasiae (Nordm.)".

Lectotypus (designated here): **Turkey:** "Bords des ruisseaux de la région alpine du Lazistan, au-dessus de Djimil", 17.VIII.1866, *Balansa s.n.* (G-BOIS [G00332087 plant

on lower left]; isolecto-: E [E00386136 plant on left], JE [JE00003167 plant on right], K [K000693284 plant on left], P [P00747371 plant on left, P00747372 plant on left, P05422077], W [W18890148462 plant on right]). **Syntypi: Turkey:** "Bords des ruisseaux de la région alpine du Lazistan, au-dessus de Djimil", 18.VII.1866, *Balansa s.n.* (G-BOIS [G00332087 plant on upper right], E [E00386136 plant on right], JE [JE00003167 plant on left], K [K000693283; K000693284 plant on right], P [P00747371 plant on right, P00747372 plant on right], US [US00324473], W [W18890148462 plant on left]); "Carthalinia: in alpe Zehra Zehraros", VI.1881, *A.H. & V.F. Brotherus s.n.* (G [G00446037], G-BOIS [G00332088], JE [JE00003166], P [P05446458]).

= ***Arabis brachycarpa*** Rupr., Fl. Cauc.: 73. 1869.

Notes. – Balansa's collection included flowering and fruiting material collected a month apart, and the fruiting material, which is more diagnostic, is designated here as the lectotype collection.

Nordmann's collection from Abkhazia was not located in the major herbaria consulted and was likely misplaced.

Nasturtium W.T. Aiton, Hort. Kew. ed. 2, 4: 109. 1812 [nom. cons.].

Tribe: *Cardamineae* Dumort.

Notes. – A genus of five species, of which two are native to North America, one in Morocco, one European species, and another a crop and cosmopolitan weed naturalized throughout world (Al-Shehbaz & Price, 1998).

The genus was so broadly delimited by Kuntze (1891) to include more than 50 species, but most other earlier authors, including Boissier in *Flora Orientalis,* circumscribed it to include species currently assigned to *Barbarea* and *Rorippa*.

Nasturtium niloticum Boiss., Diagn. Pl. Orient. 8: 19. 1849.

Type: "Hab. in humo limoso ad margines praeruptos Nili in Aegypto superiori (Boiss.!), in Nubiâ propè *Chartum* Kotschy pl. exs. Nº 324 sub *N. palustri*".

Lectotypus (first step designated by Jonsell, 1982: 56; second step designated here): **Sudan:** "Ad ripas nili caerulei prope Chartum", 4.III.1840, *Kotschy 324* (G [G00446042]; isolecto-: BM, BR [BR0000008886910], G [G00446043, G00446044], HAL [HAL0026657], HBG [HBG506141], HOH [HOH009372], JE [JE00003848], P [P04719362], REG [REG000606], STU [STU000335], TUB [TUB000547, TUB000548, TUB000552], UPS, W [W18890321737, W0036024]). **Syntypus: Egypt:** "Superior ad ripas praeruptus Nili", I–III.1846. *Boissier s.n.* (G [G00446045, G00446046], G-BOIS [G00332090]).

= ***Rorippa micrantha*** (Roth) Jonsell in Svensk Bot. Tidskr. 68: 384. 1974.

Notes. – The area of the designated lectotype falls outside the *Flora Orientalis* region, and that is why the specimen is housed in G rather than G-BOIS. *Kotschy 324,* instead of *Boissier s.n.,* is designated as lectotype because it has fully mature fruit with well-developed (vs undeveloped) seeds, both of which structures are essential in the determination of *Rorippa* (and *Nasturtium*) species.

There are three duplicates of the lectotype gathering in the Geneva herbaria, and Jonsell (1982) did not indicate which one is the "type" nor did he annotate any of them. For this reason, a second step designation is done here.

Nasturtium kurdicum Boiss. & Hausskn. in Boiss., Fl. Orient. Suppl.: 35. 1888.

≡ ***Rorippa kurdica*** (Boiss. & Hausskn.) Hedge in Rech. f., Fl. Iran. 57: 217. 1968.

Type: "Hab. ad rivulos montium Kurdistaniae Persicae prope Awiheng et Sihua 5–7000' (Haussk.!)".

Holotypus: Iran: "Ad rivul. mont p. Awiheng-Sihua", 5000'–7000' [1520–2130 m], VII.1867, *Haussknecht s.n.* (G-BOIS [G00332091]; iso-: BM [BM000583683, BM000583684], JE [JE00000008, JE00000009], K [K000693348, K000693349], P [P05444379], W [W0075707, W0075708]).

Note. – The holotype is a collection folder of two sheets of which label of the one handwritten by Haussknecht reads "Ad rivulos in montibus p. Awiheng. Kurdist. pers., 5–7000'" with printed "Persica austro-occidentalis. Haussknecht. 1868" and another with the above informations handwritten by Haussknecht.

Nasturtium aureum Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. 8: 17. 1849.

≡ ***Rorippa aurea*** (Boiss. & Heldr.) Hub.-Mor. in Feddes Repert. 52: 189. 1943.

Type: "Hab. in pratis ad orientem fluvii *Catarrhacti* non procul ab urbe *Adalia* Pamphyliae. (Heldreich Aprili.)".

Holotypus: Turkey: "in pratis. Dans la plaine à l'Est du Catarrhactus 3 lieues d'Adalia", 3.IV.1845, *Heldreich 524* (G-BOIS [G00332094]; iso-: BM [BM001172158], G [G00446047, G00446048, G00446054],

JE [JE00003956], K [K000567987, K000567988], P [P000747280], W [W0075709]).

Notes. – The holotype in G-BOIS is a collection folder of three sheets of which one was handwritten by Heldreich with the label above and another label with Boissier's handwritten diagnosis. This is the original sheet from which derived the abbreviated, mimeographed, handwritten label identical to those of all isotypes, and the two sheets in the collection folder in G-BOIS.

The locality data of the K duplicate is "In pratis ad fluv. Catarrhactum Pamphyliae", and it lacks the collection day and collector number.

Nasturtium macrocarpum Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. 8: 18. 1849.

≡ ***Barbarea macrocarpa*** (Boiss. & Heldr.) Al-Shehbaz & Jacquemoud in Candollea 55: 202. 2000.

Type: "Hab. in ericetis siccis ad radices Antilibani inter *Hasbeya* et *Rascheya,* legi [Boissier] Maio 1846".

Holotypus: Lebanon: "In ericetis inter Hasbeya et Rascheya", V–VII.1846, *Boissier s.n.* (G-BOIS [G00332095]; iso-: G [G00389132]).

Notes. – The holotype is a collection folder of three sheets of which sheet 1 has the label above and a barcode, sheet 2 has neither, and sheet 3 has only a label with: "Antilibanus infrà Rascheya" indicated.

The G isotype has the locality as "infra Rascheya", but it is not possible to determine beyond doubt whether it is from the very same locality as the holotype.

The species is known from limited collections, and it is morphologically more at home in *Barbarea* than in an other genus of the family (Al-Shehbaz & Jacquemoud, 2000).

Alyssopsis Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 57. 1842.

Tribe: *Alyssopsideae* Al-Shehbaz et al.

Note. – A genus of two species restricted to Azerbaijan, Iran, and Turkmenistan.

Alyssopsis deflexa Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 58. 1842 [nom. illeg.].

≡ *Nasturtium sagittatum* (Aiton) W.T. Aiton, Hort. Kew. ed. 2, 4: 111. 1812.

= ***Alyssopsis mollis*** (Jacq.) O.E. Schulz in Engl., Pflanzenr. 86: 186. 1924.

Notes. – *Alyssopsis deflexa* is illegitimate because Boissier (1842a) listed the earlier published *Nasturtium sagittatum* (Aiton) W.T. Aiton as a synonym.

Boissier then reduced in *Flora Orientalis A. deflexa* to synonymy of *A. sagittata* (Aiton) Boiss., but his combination is illegitimate also because he listed *Sisymbrium molle* Jacq. (1787) as a synonym, a name that predates *S. sagittatum* Aiton (1789).

Alyssopsis kotschyi Boiss., Diagn. Pl. Orient. 6: 14. 1846.

≡ ***Dielsiocharis kotschyi*** (Boiss.) O.E. Schulz in Engl., Pflanzenr. 86: 184. 1924.

Type: "Hab. in fissuris rupium regionis summae montium *Kuh-Daëna* et *Kuh-Barfi* Persiae australis Kotschy No. 334 et 760".

Lectotypus (designated here): **Iran:** "In fissuris rupium reg. summarum m. Kuh-Daëna", 29.VII.1842, *Kotschy 760* (G-BOIS [G00332107]; isolecto-: G [G00441261 plant on left], JE [JE00002217 two plants on top, JE00002218], K [K000693991 two plants in middle], KW, P [P02272358, P02272359 plant on right, P02272354 five plants in middle]). **Syntypus: Iran:** "Ad rupes in cacumine m. Kuh-Barfi pr. m. Schiras", 4.V.1842, *Kotschy 334* (BM [BM000522274, BM000522276], CAS [CAS0026901], CORD [CORD00002718], E [E00373165], FR [FR0031148], G [G00441261 plants on right, G00441262], G-BOIS [G00332108], GOET [GOET002746], HAL [HAL0085356], JE [JE00002217 plant on bottom], K [K000693991 plants on right and left], KW [KW000127995], LE [LE00012977], MO [MO5483551, MO5483552], P [P02272353, P02272355, P02272357, P02272359 plants in center and left, P02272354 plants on right and left]).

Notes. – The lectotype and syntype in G-BOIS are mounted on separate sheets, but the other collections elsewhere have one label for *Kotschy*'s both *334* (in flower and fruit remnants of the previous season) and *760* (in fruit of that current season). Since the lectotype is fruiting material collected in July, it is quite possible to determine whether the plants on a given herbarium sheet represent a syntype and/or an isolectotype.

The lectotype has four plants, a pair of which has a label with the collection number *760,* and the other pair with the number *760b*.

The duplicate P02272355 is a mixed collection of this species and the isotype of *Draba aucheri* [P02272365].

Barbarea W.T. Aiton, Hort. Kew. ed. 2, 4: 109. 1812 [nom. cons.].

Tribe: *Cardamineae* Dumort.

Note. – *Barbarea* includes 29 species native primarily to Eurasia, with few in Australia and North America.

Barbarea arcuata var. *pinnatisecta* Boiss., Fl. Orient. 1: 183. 1867.

Type: "Hab. in humidis montis Argaei Cappadociae (Ky. Suppl. 307!), in monte Aladagh Anatoliae (Wied!)".

Lectotypus (designated here): **Turkey:** "Plantae in itinero ad Argaeum montem lectae. Crescit in humidis Argaei", 5200' [1580 m], 31.V.1859, *Kotschy 307* (G-BOIS [G00332109]). **Syntypus: Turkey:** "Aladagh", s.d., *Wiedermann s.n.* (G-BOIS [G00790971]).

= ***Barbarea vulgaris*** subsp. ***arcuata*** (Opiz) Hayek in Repert. Spec. Nov. Regni Veg. Beih. 30(1): 387. 1925.

Note. – The more complete material of the two syntypes cited in the original publication is designated herein as the lectotype.

Barbarea conferta Boiss. & Heldr. in Boiss., Fl. Orient. Suppl.: 36. 1888.

Type: "Hab. in humidis regionis mediae montis Kyllenes supra Trikala Achaiae 3–4500' (Heldr. 3646!)".

Holotypus: Greece: "In humidis pagi. In m. Kyllenes regione media pr. Trikala (Achaiae)", 3000'–4500' [920–1370 m], 1.VIII.1871, *Heldreich 3646* (G-BOIS [G00332110]; iso-: B [B100241063]).

= ***Barbarea vulgaris*** subsp. ***arcuata*** (Opiz) Hayek in Repert. Spec. Nov. Regni Veg. Beih. 30(1): 387. 1925.

Note. – The holotype is a collection folder of three sheets, of which only one has a handwritten label by Heldreich, and the other two are unlabeled.

Barbarea brachycarpa Boiss., Diagn. Pl. Orient. 5: 80. 1844.

Type: "Hab. in muscosis madidis regionis alpinae *Olympi Bithyni* ad originem vallis *Kirkbounar* in consortio *Arenariae rotundifoliae* MB., fructiferum Aug. 1842 legi. [Boissier]".

Holotypus: Turkey: "Olympus in pratis humidis de Kirkbounar", VIII.1842, *Boissier s.n.* (G-BOIS [G00332113]; iso-: G [G00446055]).

Notes. – The above G duplicate is tentatively recognized as an isotype because of the incomplete locality data and collection in 1843 instead of 1842.

Coode & Cullen (1965) treated *B. brachycarpa* as a synonym of *B. minor* var. *eriopoda* N. Busch (Fl. Cauc. Crit. 3(4): 318. 1909). However, as pointed out by Greuter et al. (1986), *B. brachycarpa* has priority over *B. minor* K. Koch (Linnaea 19: 55. 1846).

The species was divided by Parolly & Eren (2006) into several infraspecific taxa, and our plant belongs to subsp. *brachycarpa*.

Cheiranthus L., Sp. Pl.: 661. 1753.

Tribe: *Erysimeae* Dumort.

Note. – *Cheiranthus* is universally accepted as a synonym of *Erysimum* L. Both genera were simultaneously described by Linnaeus (1753). Wettstein (1889) was the first to unite the genera, and he adopted *Erysimum* for the combined genus. Therefore, the latter has priority (see Turland et al., 2018: Art. 11.5).

Cheiranthus corinthius Boiss., Diagn. Pl. Orient. ser. 2, 1: 18. 1854.

≡ ***Erysimum corinthium*** (Boiss.) Wettst. in Österr. Bot. Z. 39: 283. 1889.

Type: "Hab. in fissuris rupium verticalium in monte *Acrocorintho* ubi legi [Boissier] floriferum primo vere 1842".

Lectotypus (designated by Snogerup, 1967: 60): **Greece:** "Acrocorinthus", IV.1842, *Boissier s.n.* (G-BOIS [G00332114]; isolecto-: G-BOIS [G00332115]). **Syntypus: Greece:** "Acrocorinthi rupes", III.1842, *Boissier s.n.* (G [G00371641, G00371646], GOET [GOET002581], K [K000693772, K000693773], UPS, W [W18890316200]) (Fig. 10, p. 54).

Notes. – The lectotype is a collection folder of two sheets the plants of which were collected in April. One sheet was annotated by Snogerup in 1967 as the lectotype, and it has a single plant with a flowering raceme and a fruit from the previous season. The second sheet of the lectotype folder is unlabeled and consists of four flowering branches one with fruit.

The G-BOIS isolectotype is another collection folder with three sheets, of which one is unlabeled, one has the locality name but without the date of collection and the third has both. Both collection folders in G-BOIS were collected in April 1842.

Although all syntypes above, were annotated and/or cited by Snogerup and/or Polatschek as isotypes, they were collected in March 1842 and, therefore, cannot be considered as isolectotypes (Fig. 10, p. 54).

Erysimum L., Sp. Pl.: 660. 1753.

Tribe: *Erysimeae* Dumort.

Notes. – Boissier (1842a) described the genus *Strophades* Boiss. and assigned two new species to it. However, he reduced in *Flora Orientalis* that genus to synonymy of *Erysimum.*

Erysimum is a well-defined, easily distinguished genus distributed primarily in Eurasia, with fewer species in North America and North Africa. It is taxonomically difficult because there is a general lack of agreement about the total number of species that range from ca. 200 (Al-Shehbaz, 2012), 274 (BrassiBase, 2019), and substantially higher number (290–350) in the works of Polatschek (2010, 2011, 2012, 2013a, 2013b, 2014), especially Polatschek & Snogerup (2002). Perhaps a more realistic number is something in the neighborhood of ca. 250 species (D.A. German, pers. comm.). The major sources of difficulty are the need of complete plants (with basal leaves, flowers, mature fruits) and the heavy dependence on trichome morphology that often shows tremendous qualitative and quantitative overlap.

As shown below, most of Polatschek's (2011) typifications of species described by Boissier were based on duplicates at W that Boissier never examined. In the vast majority of cases (almost 95%), Boissier based his species descriptions on the material in his own herbarium and, therefore, no typification is needed whenever a single collection was cited by Boissier, and the material in G-BOIS has to be the holotype.

Erysimum griffithianum Boiss., Diagn. Pl. Orient. ser. 2, 1: 28. 1854.

Type: "Hab. in *regno Cabulico* ad *Sinab, Quettah* (Griffith N° 300), in ditione *Beloutschistan* propè *Nichara* (Stocks N° 909)".

Lectotypus (designated by Polatschek & Rechinger, 1968: 304): **Pakistan:** "Sinab. Quettah", s.d., *Griffith 300* (G-BOIS [G00330496]; isolecto-: K [K000075638, K000075640]). **Syntypus: Pakistan:** "Nichara. Beloutchistan", 1851, *Stocks 909* (G-BOIS [G00330497], K [K000075637, K000075639]).

Note. – Although the types of both *E. griffithii* (Hook. f. & Thomson) Jafri and *E. griffithianum* were collected by Griffith, the two species should not be confused as the former is a suffrutescent perennial with distinct pedicels and is a narrow endemic to Afghanistan, whereas the latter is an annual with subsessile fruits and is common in both Afghanistan and Pakistan (see Polatschek, 2011).

Erysimum thyrsoideum Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 79. March 1842 [nom. illeg.].

≡ ***Erysimum pycnophyllum*** J. Gay, Erysim. Nov.: 3. January 1842.

Type: "Habitat in Armeniae monte Mouziourdag (Montbret! et Auch! in herb. mus. Par. et Webb.)".

Lectotypus (designated here): **Turkey:** "Armenia, Monzourdag", 1835, *Aucher-Eloy 163* (P [P02272777]; isolecto-: FI [009694], G-BOIS [G00154058], K [K000075626]).

Notes. – Boissier's name is illegitimate because its holotype is a syntype of *E. pycnophyllum*.

The fragmentary G-BOIS duplicate was taken from the P specimen that was annotated by Boissier.

As indicated above, Gay (1842) cited two collections under his *E. pycnophyllum.* Polatschek (2011) listed *Aucher-Eloy 163* [P02272777] as the holotype, thus failing to typify the name by overlooking Montbret's syntype. Therefore, both *E. pycnophyllum* and illegitimate *E. thyrsoideum* are formally lectotypified here on the same sheet**.** An image of the Montbret syntype from Webb's herbarium (#009694), which was annotated by J. Gay, was kindly sent by D. A. German.

Erysimum olympicum Boiss., Fl. Orient. 1: 191. 1867.

Type: "Hab. in regione sylvaticâ Olympi Thessali ad Mavrolonghos (Heldr!)".

Holotypus: Greece: "In reg. sylvatica m. Olympi Thessaliae (ad Mavrolonghos)", 25.VII.1851, *Heldreich 2403* (G-BOIS [G00332117]; iso-: B [B100249594], FI, W [W0064324, W18890311919], WU [WU0075954]).

Note. – The holotype is a collection folder of two sheets one of which is with a label as above and the other with: "Olympus Thessales" on the label.

Erysimum creticum Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. ser. 2, 1: 26. 1854.

Type: "Hab. in Cretâ, in saxosis *Contopoura* Eparchiae *Apocorona,* Heldr. pl. Cret. exs. sub *E. australi* (ubi mixtum est cum speciminibus floriferis pube simplici distinctis quae *E. longifolium* Dc. vel speciem affinem sistunt)".

Lectotypus (designated by Boissier, 1867a: 192): **Greece:** "Creta, in saxosis Contopoura Eparch. Apocorona", IV.1846, *Heldreich s.n.* (G-BOIS [G00332118]; isolecto-: FI [FI010140], G [G00371635, G00371638], GOET [GOET002583], K [K000693728, K000693749, K000693750], KW [KW000127961], W, WU [W0077278, WU0075959]).

Notes. – The original description of *E. creticum* listed from the same general locality mixed collections that belong to two species. Of these, one species has horizontally spreading to divaricate fruits, and the other has erect fruits appressed to the stem. However, Boissier in *Flora Orientalis* removed the species with erect-appressed fruits to *E. raulinii* and retained those with horizontal-divaricate fruits to *E. creticum,* thus indirectly "lectotypifying" the name.

Polatschek (1973) and Polatschek & Snogerup (2002) further clarified the case by citing the duplicates of the original collections under the appropriate species.

Although the collection *Heldreich 1363* was used for plants of both species, the fruit orientation should be relied on to assign a given duplicate to one or the other species. For example, that collection number was given to lectotype of *E. raulinii,* but it is also given on the FI and WU isolectotypes of *E. creticum*.

Erysimum raulinii Boiss., Fl. Orient. 1: 192. 1867.

Type: "Hab. in rupestribus ad Contopoura prov. Apocorona Cretae (Heldr. exs. sub *E. australi* ex parte!), in montibus Sphacioticis (Raulin!)".

Lectotypus (designated by Polatschek, 1973: 124): **Greece:** "In rupibus et saxis. Contopoura (Eparchio d'Apokorona)", 1.IV.1846, *Heldreich 1363* (G-BOIS [G00332119]; isolecto-: G [G00371655], GOET, H, W, WU [WU0075979]).

Notes. – Raulin's syntype was not found in the Geneva or other herbaria visited, and it must have been misplaced.

The lectotype was listed by Polatschek (1973) as a holotype.

Erysimum bulgaricum (Velen.) Ančev & Polatschek in Ann. Naturhist. Mus. Wien, B 104: 692. 2003.

= *Erysimum canescens* var. *latifolium* Boiss., Fl. Orient. 1: 193. 1867, **syn. nov.**

Type: "Hab. in Caucaso circa Elisabethgrad (Boschn!), in prov. Talysch (C.A.M!)".

Lectotypus (designated here by German & Al-Shehbaz): **Ukraine:** "Elisabethgrad", s.d., *Boschniak s.n.* (G-BOIS [G00332120]).

Notes. – No duplicates were found in the major herbaria consulted, though it is likely that LE might have one.

The C.A. Meyer's syntype was not located in any of the major herbaria consulted.

Erysimum graecum Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. ser. 2, 1: 27. 1854.

Type: "Hab. circâ *Athenas* vere copiosum (Boiss! Heldr. exs. Nº 1708)".

Lectotypus (designated by Polatschek, 1973: 118): **Greece:** "In campis Atticae", 24.V.1854, fl., *Heldreich 1708* (G-BOIS [G00154041 first sheet and plant on left of third sheet]; isolecto-: E [E00438496], FI [FI10144], G [G00446056], GJO, K [K000693747 plant on top], LI, M, PR, W [W0063911]). **Syntypi: Greece:** *sine loco,* 1842, *Boissier s.n.* (G-BOIS [G00330476]); *sine loco,* s.d., *Boissier s.n.* (G [G00446610], K [K000693747 two fruiting branches on bottom]); "Attica", VII.1854, fr., *Heldreich 1708* (BM [BM00125400], FI [FI10144 two fruiting branches], G [G00446056 second sheet, fruiting material], G-BOIS [G00154041 second sheet, and plant on right of third sheet]); *sine loco,* 1847, *Heldreich 1708* (G-BOIS [G00330477]).

Notes. – The type collection of *Erysimum graecum* in G-BOIS, which consists of three sheets in a collection folder, is a mixed collection of flowering plants collected in May 1854 and fruiting material collected in July of that year.

The first sheet of this folder (G-BOIS [G00154041]) is the lectotype, which is a single plant in flower, annotated in 1972 by Polatschek as the holotype and later (Polatschek, 1973) cited it as such. The second sheet is a single plant in fruit, and this is recognized here as a syntype. The third sheet, which is with a handwritten label by Boissier indicating "Attica Heldreich 1854", has a fruiting plant on right (syntype) and a flowering plant on the left, which is recognized as part of the lectotype.

Boissier's handwritten duplicates of the type collection of this species at G, as well as the sheet at E, do not carry Heldreich's collection number *1708*.

Erysimum uncinatifolium Boiss. & A. Huet in Boiss., Diagn. Pl. Orient. ser. 2, 5: 23. 1856.

Type: "Hab. in Armeniâ propè *Maimansour* cl. Huet du Pavillon".

Holotypus: Turkey: "Maimansour", V.1853, *Huet du Pavillon s.n.* (G-BOIS [G00154059]; iso-: B [B100068830], BM [BM000946328], BP, FI [FI005679], G [G00002431, G00002432], GH [GH00055747], JE [JE00003152],

K [K000075634], P [P02272775, P02272776], WAG [WAG0004249]).

Note. – Label of the holotype does not have a collection date, whereas that of the K isotype reads "Inter Baibout et Erzeroum. Suprà Maimansour. Maio 1853".

Erysimum smyrnaeum Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 5: 23. 1856.

Type: "Hab. in collibus lapidosis maritimis ad meridiem *Smyrnae* ubi fine Aprilis floriferum et fine Junii fructibus maturis legit cl. Balansa anno 1854".

Lectotypus (designated by Yildrimili, 2008: 14): **Turkey:** "Collines pierreuses bordant le sud du golfe de Smyrne", 26.IV.1854, fl., *Balansa 82* (G-BOIS [G00154057, first sheet]; isolecto-: B [B100068806], BM [BM000522234 plant on right], BR [BR0000006992842 plant on left], C [C10008846], E [E0037148, E00384840 plant on left], G [G00002430], GH [GH00275833 plant on right], GOET [GOET002601], JE [JE00003141 plant on right], K [K000075635 plant on left], KW [KW000127965], MPU [MPU017946, MPU017948], P [P02272764, P02272765, P04022665, P04022666], W [W0026686 plant on left], WAG [WAG0004248 plant on right]). **Syntypus: Turkey:** *ibid. loco,* 23.VI.1854, fr., *Balansa 82* (B [B100068806], BM [BM000522234 plant on left], BR [BR0000006992842 plant on right], C [C10008845], E [E00373147, E00384840 plant on right], FI [FI005678], G-BOIS [G00154057 second sheet], GH [GH00275833 plants on left], JE [JE00003141 plant on left], K [K000075635 plant on right], MPU [MPU017947, MPU017949], P [P02272763, P04022664, P02272766, P04627877], W [W0026686 plant on right], WAG [WAG0004248 two branches on left]).

Notes. – Yildrimili (2008) realized that the type collection of *E. smyrnaeum* cited by Boissier (1856) included flowering and fruiting material collected almost two months apart (flowers on April 26 and fruits on June 23), and he designated the flowering material as the lectotype collection.

The type collection in G-BOIS consists of two sheets in a collection folder, the first sheet consists of flowering plants (lectotype) and the second sheet of fruiting material (syntype).

Polatschek (2011: 461) treated both flowering and fruiting collections as one, as evidenced from his designation of a lectotype based on W0026686, which has a plant in flower on left and another in fruit to the right. Indeed, Polatschek did not discriminate between flowering or fruiting material, as he cited duplicates with flower only, with fruit only, and mixed collection as one thing.

Erysimum asperulum Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. ser. 2, 6: 11. 1859.

Type: "Hab. in ipso pago *Carpenisi Eurytaniae* cl. Samaritani et Guicciardi".

Holotypus: Greece: "In pago Carpenisi Eurytaniae", 2.VIII.1857, *Samaritani & Guicciardi 3285* (G-BOIS [G00332125]; iso-: FI [FI010134], K [K000693751]).

Notes. – The K isotype has only *Guicciardi 3285* as the collector, and all other data are the same as in the holotype.

Erysimum asperulum was lectotypified by Polatschek & Snogerup (in Tan & Iatroú, 2001: 144), but that action was unnecessary because the species description was based solely on the single sheet in G-BOIS.

Erysimum verrucosum Boiss. & Gaill. in Boiss., Diagn. Pl. Orient. ser. 2, 6: 12. 1859.

Type: "Hab. in latere occidentali montis *Gebel Cheick* (*Hermon*) loco *Ouadi el Habesch* dicto inter *Akabet Heurna* et *Chebâ*; cl Dr. Gaillardot legit fructiferum Junio".

Holotypus: Lebanon: "Ouadi el Habesch, entre la montée d'Akbet Heurna et Chebâ a Djebel cheikh, versant ouest", 18.VII.1856, *Gaillardot 1537* (G-BOIS [G00154060]; iso-: JE [JE00003147, JE00003148], WU [WU0033116]).

= ***Erysimum smyrnaeum*** Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 5: 23. 1856.

Note. – *Erysimum verrucosum* was lectotypified by Yildrimili (2008: 14) based on the G-BOIS specimen and by Polatschek (2011: 461) based on JE00003147, but both actions were not needed because the species description by Boissier was based solely on the G-BOIS unicate.

Erysimum verrucosum var. *leptocarpum* Boiss., Fl. Orient. 1: 195. 1867.

Type: "Hab. in montibus Ssoffdagh et prope Marasch in Syriâ boreali (Haussk!)".

Lectotypus (designated here): **Syria:** "inter Aintabes & Aleppo. Beilau; Soffdagh", 23.IV.1865, *Haussknecht s.n.* (G-BOIS [G00154061 fruiting material on top]). **Syntypus: Syria:** *ibid. loco,* 23.IV.1865, *Haussknecht s.n.* (G-BOIS [G00154061 flowering plant at bottom]).

= ***Erysimum smyrnaeum*** Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 5: 23. 1856.

Notes. – The varietal name was not accounted for by Polatschek (2011).

Boissier wrote on the label: "Les fleurs vont-elles bien avec le fruit??" i.e. do the flowers combine with the fruit? Because of that, as well as the listing of a syntype collection from Marasch (Turkey), which was not located in G or JE, lectotypification of the varietal name becomes necessary.

Erysimum brachycarpum Boiss., Fl. Orient. 1: 195. 1867 [nom. illeg.] [non Spreng.].

Type: "Hab. in Armeniâ Rossicâ vel Persiâ bor. (Szow!)".

Holotypus: Azerbaijan: "Armenia", s.d., *Szovits s.n.* (G-BOIS [G00154035]; iso-: GH [GH00283045], K [K000693833], LE).

= ***Erysimum hajastanicum*** Wissjul. & Bordz. in Bull. Jard. Bot. Kieff 12–13: 125. 1931.

Notes. – Polatschek (2011: 423) lectotypified *E. brachycarpum* based on the G-BOIS duplicate above, whereas Dorofeyev (1987: 1539, 2012: 403) lectotypified the name twice based on one of two sheets at LE. However the specimen of G-BOIS is recognized herein as the holotype because it was the sole sheet on which the species description was based.

The status of *E. brachycarpum* has fluctuated a great deal among authors or sometimes by the same author. It was recognized as a distinct species (Busch, 1939; Avetisian, 1966; Polatschek & Rechinger, 1968; Dorofeyev, 1987, 2012), as a synonym of *E. chazarjurti* N. Busch (Polatschek, 2011), or a synonym of *E. hajastanicum* (German, 2014). For a thorough discussion on the problem, the reader is advised to consult the last reference.

Erysimum kurdicum Boiss. & Hausskn. in Boiss., Fl. Orient. Suppl.: 38. 1888.

Type: "Hab. in graminosis montium Schahu et Avroman Kurdistaniae Persicae 5–7000' (Haussk.!)".

Holotypus: Iran: "Montes Avroman et Schahu", 5000'–7000' [1520–2130 m], VII.1867, *Haussknecht 78* (G-BOIS [G00154045]; iso-: B [B100068694], JE [JE00001844, JE00001845], P [P00531930], W [W0026700]).

Notes. – Boissier based his description on a specimen in his own herbarium and listed an unnumbered collection of Haussknecht in the protologue.

Polatschek (2011), who designated the W duplicate as the lectotype, did not annotate that collection but may have seen an image of it, and he considered all Haussknecht specimens from Schahu-Avroman as one collection regardless to whether unnumbered (B, JE [JE00001845], P), *Haussknecht 72* (JE [JE00001844], W [W0026700]), or *Haussknecht 78* (G-BOIS [G00154045]). Because the species description was based only on the G-BOIS specimen, there was no need for lectotypifying the name in the first place.

Erysimum gayanum Boiss., Fl. Orient. 1: 196. 1867 [nom. illeg.].

≡ *Erysimum aucherianum* J. Gay, Erysim. Nov: 9. 1842.

Type: "Habitat in Persiae borealis provinciâ Aderbigianâ, inter Tebris et Ardebil (Auch. exsicc. nº 4113! in herb. mus. Par., Deless. et Webb.)".

Lectotypus (designated by German, 2014: 17): **Iran:** "Aderbidjan", s.d., *Aucher-Eloy 4113* (G [G00002420]; isolecto-: BM, G [G00002421], K [K000075632], LE, P [P00535975, P02272695], W [W0026675]).

= ***Erysimum collinum*** (M. Bieb.) Andrz. ex DC., Prodr. 1: 198. 1824.

Notes. – Boissier in *Flora Orientalis* listed the earlier and validly published *E. aucherianum* in synonymy of *E. gayanum,* a name that he proposed to replace the former because he believed that his earlier published *aucheri* (see entry below) is the same as *aucherianum.*

He did not examine any of the duplicates at G because G00002421 belongs the Moricand herbarium, and G00002420, which was annotated by Gay in 1841, belongs to the Delessert herbarium. Furthermore, he did not annotate P00535975.

Boissier listed *Aucher-Eloy 4415* both in *Fl. Orient.* 1: 196 as the type of *E. gayanum* and in *Fl. Orient.* 2: 260 as *Astragalus mollis*. A considerable search in the Geneva herbaria and P failed to find any species of *Erysimum* with a type collection number *Aucher-Eloy 4415.*

We agree with Polatschek (2011: 486) and German (2014) in considering both species based on the same type, *Aucher-Eloy 4113* rather than *4415,* though we follow the latter author in synonymizing them with *E. collinum* instead of recognizing *E. aucherianum* as distinct from *E. collinum,* as done by Polatschek (2011).

Erysimum goniocaulon Boiss., Diagn. Pl. Orient. 8: 23. 1849.

Type: "Hab. in *Cariâ* (Pinard), in rupestribus propè *Tcheltickchi* Pisidiae (Heldreich), Antilibano propè *Zebdani* et monte *Cassio*. (Boiss.)".

Lectotypus (first step designated by Polatschek, 2011: 458; second step designated here): **Turkey:** "Caria", 1843, *Pinard s.n.* (G-BOIS [G00332128]; isolecto-: BM [BM001254041],

FI [FI01042], G [G00446058, G00446059, G00446060], GH [GH00275834], GOET [GOET002599], H [H1552458], K [K000075385], P [P02272716, P02272717, P02272719, P02272720], S [S06-0480], W [W0026667, W0026678]). **Syntypi: Bulgaria:** "Syria. Cassius près du sommet", V–VII.1846, *Boissier s.n.* (G-BOIS [G00332127], GH [GH00275835], K [K000075386, K000075387], KW [KW000127969], PH [PH00012968]); "In rupestribus inter frutices montagne près de Tcheltikchi à 6 heures au Sud de Bouldour", 2500' [760 m], 20.V.1845, *Heldreich 657* (B [B100068655], FI [FI010143], G-BOIS [G00332126]).

Notes. – The designation by Polatschek (2011) of the lectotype is corrected herein as a second-step typification from W to G-BOIS because Boissier did not examine any material additional to that of his herbarium on which he based the name.

None of the two following varieties was lectotypified by Polatschek (2011), though he cited their type collections among the examined specimens of *E. goniocaulon* and *E. scabrum* DC.

Erysimum goniocaulon var. *brachycarpum* Boiss., Fl. Orient. 1: 197. 1867.

Type: "Hab. in monte Cassio (Boiss!)".

Holotypus: Turkey: "Mons Cassius cacumen", VI. 1846, *Boissier s.n.* (G-BOIS [G00154040]; iso-: G [G00446061], P [P05354973, P05354974]).

= ***Erysimum goniocaulon*** Boiss., Diagn. Pl. Orient. 8: 23. 1849.

Note. – Boissier based the description of this variety on the unicate in his herbarium.

Erysimum goniocaulon var. *minus* Boiss., Fl. Orient. 1: 197. 1867.

Type: "Hab. in Antilibano ad Zebdani (Boiss! Gaill! Ky exs. 95!), in Libano ad Bscherre (Ky exs. 268!), ad Eden (Bl!)".

Lectotypus (designated here): **Syria:** "Antilianon propé Zebdani", V.1846, *Boissier s.n.* (G-BOIS [G00332130]). **Syntypi: Lebanon:** "Entre Eden et les Cèdres", 4.VII.1854, *Blanche 1130* (JE [JE00003145]); "In Libano ad Bscherre et circa Cedretum", 4500' [1370 m], 19.VII.1855, *Kotschy 266* (BM [BM001254042], E [E00384776, E00384778], G-BOIS [G00332132], P [P05354943, P05354944, P05354945], PR, W [W0026746]). **Syria:** "Circa Zebdaine prope Damascus, Monte Babri", 5000' [1520 m], 11.VI.1855, *Kotschy 95* (BM [BM001254043], G-BOIS [G00332131], K [K000075390], P [P00868473, P05354942], W [W18990311922]).

= ***Erysimum scabrum*** DC., Syst. Nat. 2: 505. 1821.

Notes. – The Gaillardot's syntype was not located in any of the major herbaria consulted.

Furthermore, the *Kotschy 266* syntype was listed in the original protologue as *268*.

Erysimum passgalense Boiss., Fl. Orient. 1: 198. 1867.

Type: "Hab. in regione inferiori montis Elburs Persiae borealis prope Passgala (Ky exs. 733!), in cacumine montium prope Schachbulagh (Szow!), ad Seidabad prope Tabris (Bunge!)".

Lectotypus (designated by Polatschek, 2011: 486): **Azerbaijan:** "In cacumine montium ad Schachbulagh", 18.V.1829, *Szovits 179* (G-BOIS [G00154051]; isolecto-: H, K [K000075395 not located], LE]). **Syntypi: Iran:** "Seidabad prope Tabriz", s.d., *Bunge 105* (P [P02272750]); "In m. Elbrus pr. pagum Passgala", 1843, *Kotschy 733* (G-BOIS [G00154050], P [P02272749]).

= ***Erysimum collinum*** (M. Bieb.) Andrz. ex DC., Prodr. 1: 198.

Notes. – Polatschek (2011) treated *E. passgalense* as a synonym of *E. aucherianum,* whereas German (2014) treated both as synonyms of *E. collinum*.

None of the above duplicates of the lectotype collection was examined.

Erysimum persicum Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 79. March 1842 [nom. illeg.].

≡ ***Erysimum subulatum*** J. Gay, Erysim. Nov.: 8. January 1842.

Type: "Habitat in Persiae borealis provinciâ Aderbigianâ (Auch. exsicc. nº 4105! in herb. mus Par., Deless. et Webb.)".

Holotypus: Iran: "Aderbidjan", s.d., *Aucher-Eloy 4105* (P [P02272779]; iso-: BM [BM000522231 plant on lower right], G [G00002427, G00002428], G-BOIS [G00154054], K [K000756396], W [W19810013750]).

Notes. – Both *E. persicum* and *E. subulatum* were based on the same type collection *(Aucher-Eloy 4105)*. As indicated in the introduction, Gay's taxa of *Erysimum* predate those of Boissier based on the same type.

The duplicate at K has a detailed, 3-page description of *E. subulatum* in Gay's hand-writing.

Erysimum szowitsianum Boiss., Fl. Orient. 1: 198. 1867.

Type: "Hab. in saxosis montium prope lacum Ourmiah (Szow!)".

Holotypus: Iran: "In vicino lac. Ormiah in saxosis montium", 24.IV.1828, *Szovits 133* (G-BOIS [G00150146]; iso-: H [H11076381], LE).

Notes. – The designation by Dorofeyev (1987) and Polatschek (2011: 444) of the G-BOIS specimen as the lectotype was unnecessary because it was the only specimen used by Boissier to generate his species description.

The isotype H11076381 is without the collection number.

Erysimum crassicaule (Boiss.) Boiss., Fl. Orient. 1: 199. 1867.

≡ *Cheiranthus crassicaulis* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 45. 1842.

Type: "[Aucher-Eloy] Ispahan *absque numero*".

Holotypus: Iran: "Ispahan", s.d., *Aucher-Eloy s.n.* (P [P02272710]; iso-: G-BOIS [G00332133], P [P02272709]).

Notes. – Both duplicates at P have the catalogue (not collection) number *1442*. The single material that Boissier examined for the species description was P02272710, which he annotated and from which he took a fragment consisting of an upper cauline leaf and three flowering tips. He did not annotate P02272709 and, most certainly did not examine it.

Jafri (1973: 234) arbitrarily indicated that the type is at G, though he did not examine nor annotate it. By contrast, Polatschek (2010: 251) designated P02272709 as the lectotype, and one of us (IAS) erroneously annotated it in 2016 as such. However, that sheet is less complete and does not show the inflated and thickened stem as does P02272710. In our opinion, no lectotypification is necessary, and P02272710 ought to be considered as the holotype (see Boissier, 1841a).

Erysimum stocksianum (Boiss.) Boiss., Fl. Orient. 1: 199. 1867.

≡ *Cheiranthus stocksianus* Boiss., Diagn. Pl. Orient. ser. 2, 1: 19. 1854.

Type: "Hab. in *Beloutchistan* superiori (Dr Stocks), in regno *Cabulico* propè *Quettah* (cl. Griffith)".

Lectotypus (designated by Polatschek & Rechinger, 1968: 301): **Pakistan:** "Beloutchistan", 5000' [1520 m], 13.IV–28.V.1851, *Stocks s.n.* (G-BOIS [G00330498]; isolecto-: K [K000693815, K000693816, K000693818, K000693819, K000693820]). **Syntypus: Pakistan:** "Quettah", s.d., *Griffith s.n.* (G-BOIS [G00330499], K [K000075397, K000075398, K000075399, K000693831], P [P02272783, P02272784]).

= ***Erysimum crassicaule*** (Boiss.) Boiss., Fl. Orient. 1: 199. 1867.

Notes. – The lectotype label does not have the day and month indicated. The three isolectotypes [K000693818, K000693819, K000693820] have *Stocks 923* as collection number. Only the duplicate K000693820 has the date as above and the locality as "Belouchistania superior, supra Kapota, Kelat, Kurdigap" indicated.

The above Griffith syntypes were collected from Quettah but no collection date was given. They carry the collection numbers *1352, 1439,* and *1440,* which correspond to Griffith's journal number *305*. Therefore, Polatschek's annotations of the K duplicates as syntypes are accepted.

Erysimum nanum Boiss. & Hoh. in Boiss., Diagn. Pl. Orient. 8: 23. 1849.

Type: "Hab. in cacuminibus alpium *Hasartschal* montis *Elbrus* alt. 1000'. Kotschy N° 487".

Holotypus: Iran: "Pr. cacumi in alpibus Hasartschal in partibus occidentalibus m. Elbrus", 10000' [3050 m], 12.VII.1843, *Kotschy 487* (G-BOIS [G00332134]; iso-: BM [BM001031449], BP, FI [FI005675], G [G00343205], GJO, KW [KW000127962], LE [LE00013005], MO [MO3831820], P [P02272738, P02272739], TUB, W [W0026724]).

= ***Erysimum caespitosum*** DC., Syst. Nat. 2: 497. 1821.

Notes. – Because Boissier based the species description solely on the unicate in his herbarium, the first lectotypification of the name by Polatschek & Rechinger (1968: 290) and second by Polatschek (2011: 421) based on the W rather than the G-BOIS duplicate were not needed.

The W duplicate slightly differs from the holotype in the locality and elevation and is recognized as a questionable isotype.

Erysimum carium Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 77. 1842.

Type: "[Aucher-Eloy] N. 160, Moglah".

Lectotypus (designated by Polatschek, 2011: 398): **Turkey:** "Moglah", 1832, *Aucher-Eloy 160* (G-BOIS [G00154036]; isolecto-: P [P00535981, P00535892], W [W18891702299]).

Notes. – Boissier (1842a) based his species description on the sheet in his herbarium and on P00535981 which he

annotated and from which he described the fruit morphology, as evidenced from his notes on the packet of that sheet.

Therefore, Polatschek's (2011) designation of the sheet in G-BOIS as the lectotype, instead of considering it as the holotype, is justified.

Erysimum mutabile Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. 8: 24. 1849.

Type: "Hab. in saxosis montium *Lassiti* Cretae alt. circ. 5000' et rarissimè in monte *Idâ* (Heldreich.) Floret Maio".

Holotypus: Greece: "In saxosis. Montagnes de Lassiti (Monte Lazzaro et Astheuti). Très rare au Mt Ida", 5000' [1520 m], 9.V.1846, *Heldreich 1492* (G-BOIS [G00332135]; iso-: B [B100249679], BP, GOET [GOET002593], JE [JE00001857], K [K000693741], KW [KW000127967], W [W0064325, W0064326, W0064327], WU [WU0075978]).

Notes. – The holotype is a collection folder of two sheets, the first one has a label in French and was annotated by Polatschek in 1972 as the lectotype. The second sheet has two labels in Latin and was annotated by Polatschek as syntypes. However, both sheets belong to the same collection as discussed below.

Label of the holotype sheet was written by Heldreich in French with his field collection number *(1492),* date of collection, and rarity of the species in Mt. Ida. By contrast, the isotypes were distributed as exsiccatae with printed, handwritten labels by Boissier in Latin but as *Heldreich s.n.* and without day of collection. Despite that, all belong to the same collection, as done by Boissier for many taxa collected by various botanists who co-authored those taxa with him.

Erysimum blancheanum Boiss., Fl. Orient. Suppl.: 38. 1888.

Type: "Hab. in ditione Gebel Abiad deserti ad Palmyram (Bl.)".

Holotypus: Syria: "Désert de Syrie. Hama à Palmyr. Dans le Djebel Abiad", 21.V.1857, *Blanche 2899* (G-BOIS [G00154034]; iso-: JE [JE0002791]).

= ***Erysimum oleifolium*** J. Gay, Erysim. Nov.: 6. 1842.

Notes. – Polatschek (2011: 442) examined both of the JE and G-BOIS duplicates and designated the former as the isolectotype of the illegitimate *E. hamosum* Post, which is based on the same collection of the earlier published *E. blancheanum*.

However, the latter name does not need lectotypification because Boissier examined only the unicate in his herbarium to draft the species description.

Erysimum hirschfeldioides Boiss. & Hausskn. in Boiss., Fl. Orient. Suppl.: 39. 1888.

Type: "Hab. in Mesopotamiae deserto fluvii Chabur (Haussk.!)".

Holotypus: Syria: "In deserto fl. Chabur", s.d., *Haussknecht s.n.* (G-BOIS [G00154042]; iso-: JE [JE00001840]).

Notes. – Polatschek (2011) designated the JE specimen as the lectotype and the G-BOIS (as G) as isolectotype. Both specimens were collected from the same locality, but the JE sheet has the collection date as May 1865, whereas the G-BOIS sheet has a preprinted label that reads "Inter Orient. Mesopotamia. C. Haussknecht. Mars-Juin 1867" in addition to handwritten locality exactly as in the protologue.

We believe that Haussknecht's preprinted label, which were encountered in several collections of other species, was used in error and does not imply a different collection date from that of JE specimen.

Furthermore, Polatschek erred by indicating that the JE sheet is *Haussknecht 39* (instead of *Haussknecht s.n.*) because that sheet has no such number, and the collection number that he added was a mistake resulting from taking the publication page "39" as the collection number. Finally, there is no evidence indicating that the original description of the species by Boissier was drafted from using both duplicates and, therefore, the G-BOIS sheet is recognized as the holotype.

Erysimum pseudocheiri Boiss., Fl. Orient. 1: 201. 1867.

≡ *Erysimum cheiriflorum* Boiss., Diagn. Pl. Orient. ser. 2, 5: 24. 1856 [nom. illeg.] [non Wallr.].

Type: "Hab. in regione alpinâ, mons Techdagh Armeniae (Calv!)".

Holotypus: Turkey: "Tech-dagh", 1853, *Calvert 92* (G-BOIS [G00154056]).

Notes. – *Erysimum pseudocheiri* was proposed as a new name based on the replaced later homonym *E. cheiriflorum* Boiss. Neither homonym was listed by Polatschek (2011: 409), who indicated that the lectotype is at G and isolectotype in G-BOIS.

However, both sheets are in G-BOIS, and they are in a collection folder representing the same specimen. The discrepancy in the "collection" date is misleading because 1854 represents the year Boissier received the specimen, and Erzeroum is part of Tech-Dagh Mts.

Erysimum gelidum var. *kotschyi* Boiss., Fl. Orient. 1: 202. 1867.

Type: "Hab. in alpibus circâ Erzeroum (Calv!), in summis Bingöldagh (Tchih! Ky Suppl. 660!), in monte Berytdagh Cataoniae alt 9000' (Hausskn!)".

Lectotypus (designated here): **Turkey:** "Crescit in Bimgoell alpinis", 7000' [2130 m], 23.VIII.1859, *Kotschy 660* (G-BOIS [G00332137]; isolecto-: G [G00446067], P [P02272712], PR, S, W [W0026647]). **Syntypi: Turkey:** "Erzeroum", 1853, *Calvert 557* (G-BOIS [G00332139]); *ibid. loco,* 1854, *Calvert 557* (G-BOIS [G00332140]); "Bertdagh, Taurus Cataonicus", 9000' [2740 m], 10.VIII.1865, *Haussknecht s.n.* (BM [BM001254046, BM001254047], G [G00446062], G-BOIS [G00332138], P [P02272713, P02272715]).

= ***Erysimum gelidum*** Bunge in Seidlitz, Bot. Erg. Reise Transkaukas.: 78. 1857.

Note. – The Tchihatcheff's syntype was not located in any of the herbaria consulted, and it is likely to be misplaced or lost.

Erysimum frigidum Boiss. & Hausskn. in Boiss., Fl. Orient. Suppl.: 39. 1888.

Type: "Hab. in rupestribus frigidis montis Sawus Persiae occidentalis 10–12000' (Haussk.!)".

Holotypus: Iran: "In rupestr. frigidis m. Sawers, dit Kuh Kilugek", 10000–12000' [3050–3660 m], VII.1868, *Haussknecht s.n.* (G-BOIS [G00154038]; iso-: BM, JE [JE00002772], W [W0026701]).

Note. – Lectotypification of the species name by Polatschek (2011: 414) based on the JE sheet is not justified because Boissier drafted the species description solely on the specimen in his herbarium.

Erysimum elbrusense Boiss., Fl. Orient. 1: 202. 1867.

Type: "Hab. in regione alpinâ montis Elburs supra Derbent (Ky exs. 164!)".

Holotypus: Iran: "Prope nives. In m. Elbrus pr. Derbend", 17.V.1843, *Kotschy 164* (G-BOIS [G00332141]; iso-: BM [BM001254048], BP, G [G00343195, G00343196, G00343197], GOET [GOET002587], K [K000075401, K000075402], MO [MO3831784], P [P02272706, P02272707], TUB, W [W0022401]).

Notes. – All of the collections above were made on the same day and have the same collection number. However, the W unicate differs from the others and the protologue in the locality data, and that is why it is considered as a questionable isotype.

The label data in the protologue, G-BOIS holotype, and all other isotypes are exactly the same. Derbend is a former village at the outskirts of Tehran, and the distance from Tehran to Mt. Tochal is several kilometers.

Polatschek & Rechinger (1968: 290) erroneously listed the type locality data as "In regione alpine M. Totschal supra Derbent" based of the unicate at W. The locality data of that sheet is "ad nives deliquescentes montis Totschal prope Tehran" and it is exactly the same way cited by Polatschek (2010: 257), who designated it as the lectotype.

There is no evidence indicating that Boissier used more than the single specimen in his herbarium to draft the species description and, therefore, the G-BOIS duplicate has to be taken as the holotype.

Erysimum alpestre Kotschy ex Boiss., Fl. Orient. 1: 202. 1867 [nom. illeg.] [non Jordan].

Type: "Hab. in regione alpinâ districtus Kassan Oglu Ciliciae Kurdicae prope Gorumse (Ky Suppl. 92!) in monte Berytdagh Cataoniae ad fodinas ferreas (Haussk!)".

Lectotypus (first step designated by Polatschek, 2011: 397; second step designated here): **Turkey:** "Plantae ex montibus Kassan Oghlu. Crescit in alpinis jugis ad Gorumse", 7200' [2190 m], 15.V.1859, *Kotschy 92* (G-BOIS [G00154032]; isolecto-: B, BP, P [P02272688, P02272689], S, W [W0026611, W0026612]). **Syntypus: Turkey:** "Taurus Cataonicus. Berytdagh", 8000' [2440 m], 10.VIII.1865, *Haussknecht s.n.* (G-BOIS [G00154033]).

= ***Erysimum adcumbens*** (Boiss.) Polatschek in Willdenowia 13: 88. 1983.

Notes. – A second step is needed to correct the Polatscheck's lectotypification from W to G-BOIS. The lectotype is a collection folder of two sheets, one of which with a label as above and the other with the printed label: "Th. Kotschy. Iter Orientale 1859".

Polatschek (2011) indicated that the lectotype is W0026611 and W0026612 (two duplicates), but there are three sheets all have the same printed label and were annotated by Polatschek in 1985 as holotypes.

Erysimum alpestre var. *adcumbens* Boiss., Fl. Orient. 1: 202. 1867.

≡ ***Erysimum adcumbens*** (Boiss.) Polatschek in Willdenowia 13: 88. 1983.

Type: "Hab. in monte Argaeo Cappadociae alt. 7500' (Ky!)".

Holotypus: **Turkey:** "Plantae Argaei montis Cappadociae. In jugo versus Caesaream", 7500' [2290 m], 30.V.1859, *Kotschy 200* (G-BOIS [G00332143]; iso-: B [B100068547, B100068552], BM [BM001254049], BP, E [E00373161], G [G00446063], JE [JE00002778], K [K000075403], P [P02272690, P02272691], PR, S [S04-346], US [US00100406], W [W0026769, W0026770]).

Note. – Davis et al. (1988) reduced *E. adcumbens* to synonymy of *E. sintensianum* Bornm., but the former is readily distinguished from the latter by having abaxially pubescent (vs glabrous) petals.

Erysimum aucheri Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 78. March 1842 [nom. illeg.].

≡ *Erysimum pulvinatum* J. Gay, Erysim. Nov.: 5. January 1842.

Type: "Habitat in Persiae borealis montibus *Elamout* (Auch. exsicc. nº 4111! in herb. mus. Par. et Deless.)".

Holotypus: **Iran:** "Elamout", s.d., *Aucher-Eloy 4111* (P [P02272758]; iso-: BM [BM000522226, BM001254044], FI [FI010138], G [G00343199, G00343186], G-BOIS [G00332144], K [K000693821, K000693822], KW [KW000127968], P [P02272759], S, W [W0026673]).

= ***Erysimum caespitosum*** DC., Syst. Nat. 2: 497. 1821.

Notes. – *Erysimum aucheri* is illegitimate because the single type collection cited is the same as that of the earlier published *E. pulvinatum* J. Gay (see the *E. persicum* entry above).

The duplicate P02272759 is from Cosson's herbarium that was not consulted by Gay.

Polatschek (2011: 420) recognized P02272758 and P02272759 as the holotype and isotype, respectively, of *E. pulvinatum* J. Gay which he synonymized with *E. caespitosum.*

Erysimum hookeri Boiss., Fl. Orient. 1: 203. 1867 [nom. illeg.].

≡ *Cheiranthus griffithii* Hook. f. & Thomson in J. Proc. Linn. Soc., Bot. 5: 137. 1861.

≡ ***Erysimum griffithii*** (Hook. f. & Thomson) Boiss. ex Hook. f. & T. Anderson in Hook. f., Fl. Brit. India 1: 153. 1872.

Note. – *Erysimum hookeri* is illegitimate because it is superfluous for *Cheiranthus griffithii.*

Erysimum caespitosum var. *brachycarpum* Boiss., Fl. Orient. 1: 203. 1867.

Type: "Hab. in jugo Elbrusensi inter Asterabad et Schahrud (Bunge!)".

Holotypus: **Iran:** "In jugo Elbrusensi; inter Astrabad et Schahrud", V.1858, *Bunge 108* (G-BOIS [G00332145]; iso-: P [P00868475, P05413799]).

= ***Erysimum caespitosum*** DC., Syst. Nat. 2: 496. 1821.

Note. – The P05413799 duplicate has the exact printed labels of the other two duplicates above but lacks the collection number.

Erysimum persepolitanum Boiss., Diagn. Pl. Orient. 6: 11. 1846.

Type: "Hab. in collibus prope *Persepolin* et *Schiraz*. Kotschy No. 261, in Persiâ Aucher No. 165".

Lectotypus (first step designated by Polatschek & Rechinger, 1968: 291; second step designated here): **Iran:** "In collibus pr. ruinas u. Persepolis", 19.IV.1842, *Kotschy 261* (G-BOIS [G00154052]; isolecto-: B [B100068696], BM [BM000522230, BM000946241], BP, C [C10008836, C10008837], E [E00373151, E00373152], FR [FR0038225], G [G00002423, G00002424, G00002425], GJO, GOET [GOET002591], H [H1107639], HAL [HAL0084090], JE [JE00001846], K [K000693789], KW [KW000127966], LE [LE00013007], M, MO [MO3831822], P [P02272751, P02272752, P022727531, P02272754], PR, S, W [W0026707, W0026708, W18890154970, W18890072844], WU [WU0067616]). **Syntypus:** **Iran:** "Persia", s.d., *Aucher-Eloy 165* (G-BOIS [G00154053]).

= ***Erysimum laxiflorum*** J. Gay, Erysim. Nov.: 4. 1842.

Notes. – There are four sheets of the type collection *Kotschy 261* at W, and none of which was annotated by the publication of Polatschek & Rechinger (1968) or later on, and none was examined by Boissier. Therefore, second-step is needed to correct the lectotypification from W to G-BOIS.

Boissier (1867a: 204) corrected the collection number from *Kotschy 231* to *Kotschy 261,* and that correction was indicated by Boissier (1888). *Kotschy 231,* which was collected on 3 June 1843 in Tochal near Tehran, was cited by Boissier (1867a: 342) under *Aethionema trinervium.*

Erysimum aciphyllum Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 80. March 1842 [nom. illeg.].

≡ ***Erysimum leptocarpum*** J. Gay, Erysim. Nov.: 4. January 1842.

Type: "Habitat in Armeniâ (Auch. exsicc. nº 161! in herb. mus. Par.: specimen fructiferum, et igitur petalis prorsùs destitutum)".

Holotypus: Turkey: *sine loco,* 1834, *Aucher-Eloy 161* (P [P02272733]; iso-: G [G00154046], K [K000075622]).

Notes. – Boissier's name is illegitimate because it was based on the same type collection of *E. leptocarpum* J. Gay.

Polatschek (2011: 408) lectotypified the species based on the P02272733 material that he annotated and indicated that isolectotypes were at G and K, both of them currently on JSTOR. These three sheets have fruiting material, and the K sheet also has a detailed handwritten description by J. Gay.

Boissier did not examine or annotate any of these three sheets. Instead, he annotated P05354918 as *Erysimum aciphyllum,* a flowering material that was subsequently annotated by Gay in 20 March 1842 as *Erysimum leptocarpum,* or more than two months after the publication of his species. All four sheets are *Aucher-Eloy 161.* Furthermore, both species names do not need lectotypification because both Gay and Boissier based their species descriptions on the unicates P02272733 and P05354918, respectively.

Yildrimili (2008: 13) lectotypified the species based on G-BOIS [G00154027], but that typification was erroneous for two reasons. First, Boissier (1842a) cited only *Aucher-Eloy 161,* not *Boissier s.n.,* in his description of the species. Second, Yildrimili's typification was predated by 25 years and correctly by Polatschek (1983: 93) but for *E. aciphyllum* var. *stylosum* (see below).

Yildrimili (2008) recognized *E. aciphyllum* as a distinct species. However, a comparison of the types of this and *E. leptocarpum* shows no significant differences and, therefore, Polatschek (2011)'s reduction of the former name to synonymy of the latter is accepted.

Erysimum aciphyllum var. *stylosum* Boiss., Fl. Orient. 1: 204. 1867.

≡ ***Erysimum stenophyllum*** Polatschek in Willdenowia 13: 93. 1983.

Type: "Hab. in regione excelsiori Tmoli (Boiss!), monte Karamas Cappadociae (Bal!)".

Lectotypus (designated by Polatschek, 1983: 93): **Turkey:** "Tmolus supra Bozdagh", VI.1842, *Boissier s.n.* (G-BOIS [G00154027]). **Syntypus: Turkey:** "Région sous-alpine du Karamas-Dagh, à 5 lieues à l'Est du Mont- Argée", 3.VII.1856, *Balansa 458* (G-BOIS [G00154031]).

Note. – No duplicates of the above two collections were found in any of the major herbaria consulted.

Erysimum nasturtioides Boiss. & Hausskn. in Boiss., Fl. Orient. Suppl.: 40. 1888.

Type: "Hab. ad nives regionis alpinae montium Kellal et Ssebsekuh ditionis Bachtiaris Persiae occidentalis (Haussk.!)".

Lectotypus (first step designated by Polatschek, 2011: 441; second step designated here): **Iran:** "In m. Kellal & Sebsekuh, dit. Bachtiariorum", IX.1868, *Haussknecht s.n.* (G-BOIS [G00154048]; isolecto-: B [B100068761], JE [JE00001855], K [K000075411], P [P00531931]).

Notes. – There are two sheets in G-BOIS, and Polatschek (2011: 441), who lectotypified the species and designated the JE specimen as the lectotype, overlooked the fact that Haussknecht's collection includes plants with fully mature fruit and others in flower, and they must have been from substantially different elevations from the two localities given in the protologue.

A second step lectotypification is needed to correct JE to G-BOIS and consider the fruiting material as the lectotype.

The G-BOIS lectotype is a collection folder of two sheets each with three plants, of which one sheet has all three plants with mature fruit, and the other has two with mature fruit and one in flower. Unfortunately, there is no way of knowing the locality from which Haussknecht collected the plants with mature fruit or with flower. Despite that, Polatschek's (2011) lectotypification based on the JE duplicate is rejected.

Erysimum gladiiferum Boiss. & Hausskn. in Boiss., Fl. Orient. Suppl.: 40. 1888.

Type: "Hab. in graminosis calcareis montis Pir Omar Gudrun Kurdistaniae Persicae 3–6000' (Haussk.!)".

Holotypus: Iraq: "In gramin. calc. Pir Omar Gudrun", 3000'–6000' [910–1820 m], VI.1867, *Haussknecht 71* (G-BOIS [G00154039]; iso-: B [B100068654], BM [BM000522227], BP, JE [JE00002774, JE00002775, JE00002776], K [K000075621], P [P5354979, P05354980], W [W0026710]).

Note. – The G-BOIS holotype is a collection folder of five sheets, of which two have the exact collection data, another two lack the printed label, and the fifth has the same printed label with Mesopotamia handwritten on it and with Polatschek annotation in 2005.

Erysimum boryanum Boiss. & Spruner in Boiss., Diagn. Pl. Orient. 1: 71. 1843.

Type: "Hab. in rupestribus montanis, *Pentelicus, Parnes* in *Atticâ,* montes *Arcadiae* (Boiss. Sprunner), in *Messeniâ* (Bory)".

Lectotypus (designated by Polatschek & Snogerup, 2002: 133): **Greece:** "Sommet et flancs du Pentélique", IV.s.a., *Spruner s.n.* (G-BOIS [G00332150]; isolecto-: LD [LD1064662]). **Syntypus: Greece:** "Pentelicus", V.1842, *Boissier s.n.* (G [G00446064, G00446065, G000446066], KW [KW000127964], W [W0077277]).

Notes. – Polatschek & Snogerup (2002) indicated an isolectotype at W, but that specimen was collected by Boissier not Spruner.

All three syntypes at G belong to the Reuter-Barbey herbarium, and despite search in several major herbaria, Bory's collection from Messenia was not found.

Erysimum boryanum var. *atticum* (Boiss.) Boiss., Fl. Orient. 1: 205. 1867.

≡ ***Erysimum atticum*** Boiss., Diagn. Pl. Orient. ser. 2, 1: 25. 1854.

Type: "Hab. in faucibus *Hymetti* meridionalis et in monte *Corydalo Atticae* (Heldr. et Sartori)".

Holotypus: Greece: "in faucibus Hymetti meridionalis", VI.1844, *Satori & Heldreich 1838* (G-BOIS [G00332149]).

Notes. – No duplicates of this type collection are found in the major herbaria consulted, and the G-BOIS sheet ought to be recognized as the holotype.

Therefore, the designation of that sheet by Polatschek & Snogerup (2002: 132) as a lectotype was unnecessary.

Erysimum boryanum var. *parnassi* (Boiss. & Heldr.) Boiss., Fl. Orient. 1: 205. 1867.

≡ *Cheiranthus parnassi* Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. ser. 2, 1: 18. 1854.

≡ ***Erysimum parnassi*** (Boiss. & Heldr.) Hausskn. in Mitth. Thuring. Bot. Vereins 3–4: 109. 1893.

Type: "In regione alpinâ montis *Parnassi* rarus (Heldr. 1852. N° 2651)".

Holotypus: Greece: "In monte Parnasso", 11.VIII.1852, *Heldreich 2651* (G-BOIS [G00332151]; iso-: BP, E [E009438493], FI [FI010136], GOET, W [W0064531, W19670010510]).

Note. – Although Polatschek (1986: 243) designated the above G-BOIS sheet as the lectotype, there was no need for such lectotypification because Boissier based the species description solely on the unicate in his herbarium.

Erysimum macrostigma Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 81. 1842.

Type: "[Aucher-Eloy] N. 4106, Aderbijan".

Lectotypus (designated by Polatschek, 2011: 440): **Iran:** "Aderbidjan", s.d., *Aucher-Eloy 4106* (G-BOIS [G00154047]; isolecto-: BM [BM000522229], G [G00446126, G00446227], K [K000075616], KW [KW000127963], MO [MO1617726], P [P02272734, P02272735, P02272736, P02272737], W [W0026650, W18890077524]).

Notes. – Boissier examined and annotated P02272734, and therefore the lectotypification by Polatschek (2011) is justified.

Polatschek & Rechinger (1968: 289) reduced *E. macrostigma* to synonymy of *E. caespitosum* DC., but Polatscheck (2011) maintained it as a distinct species.

Erysimum purpureum Aucher ex Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 82. March 1842 [nom. illeg.].

≡ ***Erysimum purpureum*** Aucher ex J. Gay, Erysim. Nov.: 7. January 1842.

Type: "Habitat in Armeniae montibus (Auch.! in herb. mus. Par., Montbret! in herb. Webb.)".

Lectotypus (designated here): **Turkey:** *sine loco,* s.d., *Aucher-Eloy 162* (P [P02272760]; isolecto-: BM [BM000522232], G [G00371620, G00371630], G-BOIS [G00332152], K [K000075610, K000075611, K000075613], MPU [MPU017777], P [P02272761]).

Notes. – Boissier's name is illegitimate because it was based on the same type collection of *E. purpureum* Aucher ex J. Gay. Gay's name has priority and needed lectotypification.

We were unable to locate the Montbret syntype and as P02272760 was annotated by Gay we choose it as lectotype.

The lecto- and isolectotype sheets at P were annotated by Polatschek in 1983 as holotype and isotype, respectively. However, he (Polatschek, 2011: 416) cited one sheet as a holotype and did not cite the other or specify which one was meant.

Erysimum laciniatum Boiss., Diagn. Pl. Orient. 1: 71. 1843.

Type: "[Boissier] Hab. in regione alpinâ montium *Lydiae* et *Cariae* ad umbram Juniperorum, *Mesogis, Cadmus, Tmolus.* Floret Junio".

Lectotypus (first step designated by Polatschek, 2011: 401; second step designated here): **Turkey:** "In dumosis Cadmi ad orientum Denislah", VI.1842, *Boissier s.n.* (G-BOIS [G00332155]; isolecto-: C [C10008844], GH [GH00055746], GOET [GOET002595], K [K000075607, K000075608], NY [NY00689139, NY00689140]). **Syntypi: Turkey:** "Tmolus supra Bozdagh ad rivus Lydia", VII.1842, *Boissier s.n.* (G-BOIS [G00332157]); "Tmolus", s.d., *Boissier s.n.* (G-BOIS [G00332153]); "Caria", 1843, *Pinard s.n.* (W [W0026657]).

= ***Erysimum pulchellum*** (Willd.) J. Gay, Erysim. Nov.: 10. 1842.

Notes. – Polatschek (2011) erroneously lectotypified the name on the unicate W0026657, which was not annotated by Boissier, and attributed its collection to Boissier instead of Pinard. The duplicates in C, GH, GOET, and NY that he cited were Boissier's collections listed above as isolectotypes.

Boissier (1843) based his species description almost exclusively on his own collections in G-BOIS that Polatschek did not examine or cite. Therefore, a second step is necessary to designate the lectotype in G-BOIS.

The lectotype has only the month and not the year, but all the isolectotypes have "Tmolus et Cadmus. VI. 1842" indicated.

Erysimum pulchellum var. *microphyllum* Boiss., Fl. Orient. 1: 207. 1867.

≡ *Cheiranthus rupestris* Sm. in Sibth., Fl. Graec. Prodr. 2: 23. 1813.

= ***Erysimum pulchellum*** (Willd.) J. Gay, Erysim. Nov.: 10. 1842.

Note. – This is a renaming at the varietal rank of *Cheiranthus rupestris* (holotype: *Sibthorp s.n.,* probably at OXF).

Erysimum pulchellum var. *calvertii* (Boiss. & A. Huet) Boiss., Fl. Orient. 1: 207. 1867.

≡ *Erysimum rupestre* var. *calvertii* Boiss. & A. Huet in Boiss., Diagn. Pl. Orient. ser. 2, 5: 22. 1856.

Type: "Hab. in Armeniâ propè *Messiré* in valle *Kassuklu* cl. Huet, in monte *Techdagh* cl. Calvert".

Lectotypus (designated here): **Turkey:** "Tech Dagh", 1853, *Calvert 38* (G-BOIS [G00332160]). **Syntypi: Turkey:** "In valle Kassuklu. Inter Baibout et Erzeroum", V.1853, *Huet du Pavilion s.n.* (G [G00446068], K [K000075603, K000075605], W [W18890010515]); "Ad viam propè Messiré. Inter Trapezuntem et Baibout", V.1853, *Huet du Pavilion s.n.* (GOET, K [K000075602, K000075606], W).

= ***Erysimum pulchellum*** (Willd.) J. Gay, Erysim. Nov.: 10. 1842.

Note. – Polatschek (2011) did not typify the variety, though he cited the syntypes under *E. pulchellum*.

Erysimum pallidum Boiss., Fl. Orient. 1: 207. 1867.

Type: "Hab. in rupestribus regionis alpinae Lyciae supra Elmalu (Bourg!)".

Holotypus: Turkey: "In rupestribus regionis alpinae montis Elmalu", 26.V.1860, *Bourgeau s.n.* (G-BOIS [G00154049]; iso-: K [K000075601], P [P02272748]).

= ***Erysimum kotschyanum*** J. Gay, Erysim. Nov.: 5. 1842.

Notes. – The three duplicates above fully agree with the protologue and all were collected on the same date. Boissier based the species description solely on the unicate in his herbarium, and that specimen has to be taken as the holotype, instead of lectotype as listed by Yildrimili (2008: 14).

Polatschek (2011: 406) erroneously listed an entirely different collection with a label that reads: "E. Bourgeau – Plantae Lyciae 1860. Erysimum kotschyi J. Gay (Boiss.) In cacuminibus regionis alpinae montis Elmalu, 9 Jun.", designated the W duplicate as the lectotype, and listed specimen in G-BOIS, GOET, and K as the duplicates. There are no such duplicates in G-BOIS or K, and Boissier never examined such a collection for this species.

Furthermore, the material collected on 26 May was distributed under the name *E. pallidum* whereas that collected on June 9 was distributed as *E. kotschyi*. All these factors collectively show some inaccuracies in designating a type. Since Polatschek examined the holotype of *E. pallidum,* it is surprising that he considered the two mixed collections as one.

Erysimum strophades Boiss., Diagn. Pl. Orient. 8: 24. 1849.

≡ *Strophades lanceolata* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 83. 1842 [non *Erysimum lanceolatum* W.T. Aiton].

Type: "[Aucher-Eloy] N. 192, Mesopotamia".

Holotypus: Iraq: "Mesopotamia", 1835, *Aucher-Eloy 192* (P [P02272745]; iso-: G-BOIS [G00332161], K [K000075600], P [P02272746]).

= ***Erysimum oleifolium*** J. Gay, Erysim. Nov.: 6. 1842.

Notes. – The duplicate in G-BOIS consists of four fragmentary branches taken by Boissier from P02272745 that he annotated on its packet. Boissier did not examine nor annotate P02272746. Therefore, he based his species description solely on P02272745, which ought to be considered as the holotype.

For this reason, Polatschek's (2011: 442) lectotypification of the name based on the same sheet is not needed at all.

Strophades linearis Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 83. March 1842 [nom. illeg.].

≡ ***Erysimum oleifolium*** J. Gay, Erysim. Nov.: 6. January 1842.

Type: "Habitat in Persiae maximè australis provinciâ Laristân, ann. 1838, Aprili mense lectum (Auch. exsicc. nº 4169! in herb. Webb.)".

Holotypus: Iran: "Laristan", s.d., *Aucher-Eloy 4169 I* (FI; iso-: BM [BM001254045], G [G00371623], G-BOIS [G00332162], K [K000075599], P [P02272742, P02272744]).

Notes. – Boissier's name is illegitimate because it was based on the same type collection of *Erysimum oleifolium* J. Gay.

Gay (1842) did not examine the two P duplicates of *Aucher-Eloy 4169 I* prior to the publication of his *Erysimum oleifolium*. Instead, he based his description on the unicate at FI, which has to be the holotype. Therefore, Polatschek's (2011: 442) designation of P02272744 as the lectotype for *E. oleifolium* was erroneous.

Boissier (1849) transferred *Strophades linearis* to *Erysimum* and later in *Flora Orientalis* reduced it to synonymy of *Erysimum oleifolium*. The type collection of *S. linearis* was erroneously listed in Boissier (1867a, 1888) as *Aucher-Eloy 4199 L* instead of *4169 I*.

Erysimum filifolium Boiss. & Hausskn. in Boiss., Fl. Orient. Suppl.: 41. 1888 [nom. illeg.] [non F. Muell.].

≡ ***Erysimum boissieri*** Polatschek in Phyton (Horn) 34: 200. 1994.

Type: "Hab. in rupestribus calcareis montis Avroman Kurdistaniae Persicae 5–6000' (Haussk.!)".

Holotypus: Iran-Iraq: "In rup. calc. m. Avroman", 5000'–6000' [1520–1830 m], VII.1867, *Haussknecht 72* (G-BOIS [G00154037]; iso-: B [B100068744], JE [JE00002737], K [K000075623], W [W0026674]).

Notes. – The G-BOIS holotype is a collection folder of three sheets, of which one has the full collection data listed above on a printed label with "Montes Avroman et Schahu" indicated, another has only Mesopotamia written on the same printed label and was annotated by Polatschek in 2005 as isotype, and the third is unlabeled.

Polatschek (1994) renamed Boissier's illegitimate name as *E. boissieri,* but he later (Polatschek, 2011) erroneously indicated the JE00002737 as the lectotype.

Conringia Heister ex Fabr., Enum.: 160. 1759.

Tribe: *Conringieae* D.A. German & Al-Shehbaz.

Note. – A genus of five species distributed in Europe and SW Asia.

Conringia grandiflora Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. 8: 25. 1849.

Type: "Hab. in *Lyciâ* cl. Pestalozza, in montibus *Climax* et *Solyma* Lyciae in regione inferiori (Heldreich), in monte *Ghibelleis* Pamphyliae suprà *Alaya* (Heldreich)".

Lectotypus (designated here): **Turkey:** "In rupestribus montis Solyma Lyciae", V.1845, *Heldreich s.n.* (G-BOIS [G00332165]; isolecto-: B [B100244872], G [G00389499, G00389500], GOET [GOET002741], K [K000653970, K000653971], P [P02272678], W[0075706A]). **Syntypi: Turkey:** "In saxosis. Région supérieure du Mt. Ghibelleïs à l'Est d'Alaya", c. 1500' [460 m], 17.IV.1845, *Heldreich 561* (G-BOIS [G00332167], W[0075706B]); "In rupestribus apricis. Montagne à l'Ouest d'Adalia rég. infér. du Mt. Solyma, Climax", V.1845, *Heldreich 561* (G-BOIS [G00332168]); "Pamphylia", 1846, *Pestalozza s.n.* (G-BOIS [G00332166]).

Note. – Although W007576B has the same collection number, month, and year as the G-BOIS syntype, the missing day of collection and slightly different locality makes including the specimen here tentative.

Conringia clavata Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 84. 1842.

≡ *Sisymbrium perfoliatum* C.A. Mey., Verz. Pfl. Casp. Meer.: 188. 1831.

Type: "[Meyer] 1645. In montibus Talüsch prope pagum Swant (alt. 670 hexap.)".

Lectotypus (designated by Dorofeyev, 2012: 376): **Azerbaijan:** "In campis siccis prope Swant", 23.VI.1830, *Meyer 1645* (LE; isolecto-: G-BOIS [G00789725]).

Notes. – Hedge (1965: 278, 1968: 61) treated *C. clavata* as a synonym of *Sisymbrium perfoliatum* C.A. Mey. and the illegitimate later combination *Conringia perfoliata* (C.A. Mey.) N. Busch (Fl. CCCP 8: 497. 1939), non *C. perfoliata* Link (Enum. Hort. Berol. Alt. 2: 172. 1822), which Hedge was apparently unaware of.

Indeed, Boissier (1842a) cited *Sisymbrium perfoliatum* in synonymy of *Conringia clavata,* and most likely he was aware of Link's earlier homonym. Therefore, Boissier's name is a new name based on Meyer's type rather than on *Aucher-Eloy 152* that he cited.

Conringia persica Boiss., Diagn. Pl. Orient. 6: 12. 1846.

Type: "Hab. prope *Schiraz* et in convallibus superioribus montis *Kuh-Barfi.* Kotschy No. 339 et 251a".

Lectotypus (designated here): **Iran:** "In convallibus reg. sup. m. Kuh-Barfi pr. u. Schiras", 4.V.1842, *Kotschy 339* (G-BOIS [G00332170]; isolecto-: B [B100244871], BM [BM000552466], E [E00199703], FR [FR0038279], G [G00389497, G00389498], GOET [GOET002742], H [H1263807], HAL [HAL0084091], JE [JE00001392], K [K000653973], MO [MO3830119], P [P02272679, P02272680, P02272681, P04739272, P04739273], W [W00075705, W18890029620, W18890154974], WU [WU0101801]). **Syntypus: Iran:** "Prope urbem Schiras", V.1842, *Kotschy 251a* (G-BOIS [G00332171]).

Note. – Hedge (1968: 60) listed *Kotschy 339* (K), as a type, but that duplicate was not examined by Boissier who based the species description solely on the pair of Kotschy specimens in his herbarium.

Chalcanthus Boiss., Fl. Orient. 1: 211. 1867.

Tribe: *Eutremeae* Al-Shehbaz et al.

Notes. – Based on molecular phylogenetic studies and a closer re-examination of morphology in light of molecular data, this monospecific genus has recently been reduced by Hao et al. (2017) to synonymy *Eutrema* R. Br.

Eutrema renifolium is distributed in Afghanistan, Iran, and Turkmenistan.

Chalcanthus renifolius (Boiss. & Hohen.) Boiss., Fl. Orient. 1: 212. 1867.

≡ *Hesperis renifolia* Boiss. & Hohen. in Boiss., Diagn. Pl. Orient. 8: 22. 1849.

≡ ***Eutrema renifolium*** (Boiss. & Hohen.) Al-Shehbaz et al. in Bot. J. Linn. Soc. 184: 218. 2017.

Type: "Hab. propè *Schah Neschim* in monte *Totschal* propè *Teheran* alt. 7–8000'. Kotschy Nº 248".

Holotypus: Iran: "Passim in valle Latkau prope Schah-Neschin in m. Totschal pr. Teheran", 7000–8000' [2130–2440 m], 2.VI.1843, *Kotschy 228* (G-BOIS [G00332172]; iso-: BM [BM000552465, BM000587810], E [E00386046], G [G00389772, G00389773, G00446071], GOET [GOET002734], H [H1512240], K [K000653967], KW [KW000127979], LE [LE00013090, LE00013123], MO [MO3831963], P [P05324865, P05324866, P05324868], US [US00100452], W [W0055932]).

Note. – The collection number in the original publication of the species was given as *Kotschy 248.* The holotype has two labels, one with printed *228* and the other with handwritten *248*. However, that error was corrected as *Kotschy 228* by Boissier in *Flora Orientalis* and confirmed later in its *Supplementum*.

Sisymbrium L., Sp. Pl.: 657. 1753.

Tribe: *Sisymbrieae* DC.

Note. – *Sisymbrium* includes some 47 species in Eurasia and North Africa, with only one native species in North America and three in South Africa.

Sisymbrium griffithianum Boiss., Diagn. Pl. Orient. ser. 2, 1: 23. 1854.

Type: "Hab. in *regno Cabulico* circâ *Quettah* (Griffith Nº 1481)".

Holotypus: Pakistan: "Quettah", s.d., *Griffith 1481* (G-BOIS [G00330374]; iso-: K [K000618633, K000618634]).

= ***Olimarabidopsis pumila*** (Stephan) Al-Shehbaz et al. in Novon 9: 303. 1999.

Notes. – Because of its descending or strongly reflexed (vs ascending or strongly incurved) fruits, there has been some debate as to whether or not *S. griffithianum* should be

recognized as a distinct species in *Olimarabidopsis* Al-Shehbaz, O'Kane & R.A. Price or be merged with *O. pumila*.

The isotype duplicate at K [K000618633] has two plants one with ascending and the other with reflexed fruits, whereas the other K isotype [K000618634] has only ascending, strongly incurved fruit. By contrast, the G-BOIS holotype is a single plant with sharply reflexed fruit.

Furthermore, another material (*Griffith 1483,* K) has eight plants, of which four have divaricate-ascending fruit and the other four have sharply reflexed fruits. Therefore, the recognition of *Sisymbrium griffithianum* as distinct from *Olimarabidopsis pumila* is unjustified. For related matters and conservation of the epithet "*pumilum*", see German & Al-Shehbaz (2015).

Sisymbrium nudum var. *brachycarpum* Boiss., Fl. Orient. 1: 215. 1867.

≡ *Arabis scapigera* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 54. 1842.

= ***Draba nuda*** (Bél.) Al-Shehbaz & M. Koch in Novon 13: 173. 2003.

Note. – This is a renaming of the following entry at the varietal level.

Arabis scapigera Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 54. 1842.

Type: "[Aucher-Eloy] N. 205, Armenia; 4115, Bayazid".

Lectotypus (designated here): **Turkey:** "Bayaza", s.d., *Aucher-Eloy 4115* (G-BOIS [G00332089]; isolecto-: BM [BM12054053, BM001250456], G [G00446040, G00446041], K [K000618638], KW [KW000127931], LE [LE00012990], P [P00868489, P05413414], W [W0075704]).

= ***Draba nuda*** (Bél.) Al-Shehbaz & M. Koch in Novon 13: 173. 2003.

Notes. – For some reason, *Aucher-Eloy 205,* which Boissier (1842a) cited as a syntype of *A. scapigera,* was not found in any of the herbaria consulted, and Boissier (1867a, 1888) did not list that collection again.

Two *Aucher-Eloy 205* duplicates, P00741481 and P00741482, clearly belong to *Isatis,* and the former was annotated by Boissier as *Isatis latisiliqua*.

Typification of *Draba nuda* (as *Arabis*) remained a mystery for over 160 years until the recent discovery of the holotype (see Al-Shehbaz, 2019).

Sisymbrium schimperi Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 76. 1842.

≡ ***Robeschia schimperi*** (Boiss.) O.E. Schulz in Engl., Pflanzenr. 86: 360. 1924.

Type: "[Schimper] N. 170".

Holotypus: Egypt: "Ad templum Eliae in monte Sinai inter glareas graniticas", 9.IV.1835, *Schimper 170* (G-BOIS [G00332173]; iso-: B [B100000710, B100000806], BM [BM000614092, BM000614093], E [E00126646, E00126648, E00438543], G [G00446072, G00446073, G00446074], HAL [HAL0120833], HBG [HBG506120, HBG506121], HOH [HOH009371], JE [JE00004168], K [K000618538, K000725117, K000725118, K000725119, K000725120], KW [KW000127971], M [M0108041, M0108042], P [P00747197, P00747198, P00747200, P00747201, P02272622, P02272623, P05383239], S [S14-30997], W [W0015898, W0015899, W0316261, W18890020449, W18890167963]).

Note. – Although described in *Plantae Aucherianae orientales* (Boissier, 1842a), the collection did not belong in that series, as confirmed by Boissier (1888: 462).

Sisymbrium sophia var. *brachycarpum* Boiss., Fl. Orient. 1: 216. 1867.

Type: "Hab. in Armeniâ circa Erzerum (Huet!)".

Holotypus: Turkey: "Erzeroum", VI.1853, *Huet du Pavillon s.n.* (G-BOIS [G00332174]; iso-: BM [BM001254061], K [K000725097], P [P04686475]).

= ***Descurainia sophia*** (L.) Webb ex Prantl, Nat. Pflanzenfam. 3(2): 192. 1891.

Note. – Boissier based the description of the variety solely on the unicate in his herbarium.

Sisymbrium irioides Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 76. 1842.

Type: "[Aucher-Eloy] N. 140, Mesopotamia".

Holotypus: Iraq: "Mesopotamia", s.d., *Aucher-Eloy 140* (P [P02272615]; iso-: G-BOIS [G00332175]).

= ***Sisymbrium irio*** L., Sp. Pl.: 659. 1753.

Note. – The above specimen in G-BOIS is a fragmentary material consisting of a leaf and part of inflorescence taken from the unicate P02272615 that Boissier annotated and which should be considered as the holotype (see Boissier, 1841a).

Sisymbrium damascenum Boiss., Diagn. Pl. Orient. ser. 2, 6: 11. 1859.

Type: "Hab. in hortis circà *Damascum* cl. Dr Gaillardot. Fl. Aprili".

Lectotypus (designated here): **Syria:** "Boustan el Nahâs. N. O. de Damas", 20.IV.1856, *Gaillardot 1580* (G-BOIS [G00332176]; isolecto-: JE [JE00001272]). **Syntypus: Syria:** "Boustan Seidoune ouest de Damas", 8.IV.1856, *Gaillardot 1579ter* (G-BOIS [G00332177], JE [JE00001273, JE00001274]).

Notes. – Most authors (e.g., Hedge, 1968: 314) and indices (e.g., IPNI, 2019) erroneously followed Boissier in *Flora Orientalis,* rather than the original description (Boissier, 1859), in attributing the authorship of the species to Boissier and Gaillardot rather than to Boissier alone.

There are two *Gaillardot's* specimens in G-BOIS and none in the general herbarium at G. Both specimens were collected on April 1856, but the plant collected on April 8 [G00332177] is in flowers and with small immature fruits, whereas the one collected on April 20 [G00332176] has fully mature fruit and few flowers. Boissier (1859) indicated that "Fl. Aprili", but the original account of the species gives full description of the mature fruit.

Because *S. damascenum* is closely related to and distinguished primarily from *S. irio* by having densely scabrid (vs glabrous) fruit, the designation of the fruiting, rather than flowering, material as the lectotype would be the only way to preserve the correct concept of the species limits.

Sisymbrium tetracmoides Boiss. & Hausskn. in Boiss., Fl. Orient. Suppl.: 43. 1888.

≡ ***Neotorularia tetracmoides*** (Boiss. & Hausskn.) Hedge & J. Léonard in Bull. Jard. Bot. Natl. Belgique 56: 394. 1986.

Type: "Hab. in deserto Mesopotamiae ad fluvium Chabur (Haussk.!)".

Holotypus: Syria: "In deserto fl. Chabur", V.1867, *Haussknecht 131* (G-BOIS [G00330350]; iso-: B [B100272095], BM [BM001254052], JE [JE00002855], K [K000725004], W [W0050786]).

Note. – The holotype is a collection folder of two sheets.

Malcolmia W.T. Aiton, Hort. Kew. ed. 2, 4: 121. 1812 [nom. cons.].

Tribe: *Malcolmieae* Al-Shehbaz & Warwick.

Notes. – Although Boissier (1854) described *Strigosella* as a distinct, monospecific genus, he reduced it to synonymy of *Malcolmia* in *Flora Orientalis,* though both genera are currently maintained.

All floras that covered the areas of *Flora Orientalis, Flora Europaea,* and floras of North Africa broadly delimited *Malcolmia* to include five genera currently assigned to the tribes *Anastaticeae* (*Maresia* Pomel and *Marcus-Kochia* Al-Shehbaz), *Conringieae* (*Zuvanda* Askerova), *Euclidieae* (*Strigosella* Boiss.), and monogeneric *Malcolmieae*. However, starting with Botschantzev (1972), who transferred most species of *Malcolmia* to *Strigosella,* and ending with Al-Shehbaz et al. (2014), *Malcolmia* presently includes only six species distributed primarily in the eastern Mediterranean region, especially the Balkan Peninsula.

Malcolmia confusa Boiss., Fl. Orient. 1: 221. 1867.

Type: "Hab. in arenosis maritimis Aetoliae ad Missolonghi (Nieder!), Aeginae (Sprun!), Anatoliae ad Samsun (Tchih! Wiedem!)".

Lectotypus (designated here): **Turkey:** "Samsoun", 1858, *Tchihatchef s.n.* (G-BOIS [G00332178]). **Syntypi: Greece:** "Aeginae", s.d., *Spruner s.n.* (G-BOIS [G00332181]). **Turkey:** "pr. Mesolongi Aetoliae", V.1860, *Nieder s.n.* (G-BOIS [G00332180]); "Samsoun", s.d., *Wiedemann s.n.* (G-BOIS [G00332179], K [K000693873]).

= ***Maresia nana*** (DC.) Batt. in Batt. & Trab., Fl. Algérie: 68. 1888.

Notes. – The lectotype specimen is the most complete of the four syntypes cited in the original publication.

Maresia nana is a tiny polymorphic annual widely distributed in the Mediterranean region and SW Asia.

Malcolmia africana var. *trichocarpa* (Boiss. & Buhse) Boiss., Fl. Orient. 1: 223. 1867.

≡ *Malcolmia trichocarpa* Boiss. & Buhse in Nouv. Mém. Soc. Imp. Naturalistes Moscou 12: 21. 1860.

≡ ***Strigosella trichocarpa*** (Boiss. & Buhse) Botsch. in Bot. Zhurn. (Moscow & Leningrad) 57: 1038. 1972.

Type: "Wüstenebene bei Dschendak, 5 und 6 April 1849 (fructifera et florens). [Buhse] No 1265".

Holotypus: Iran: "In desserto prope Djendak", 1847, *Buhse 1265* (G-BOIS [G00790354]; iso-: LE [LE01037309]).

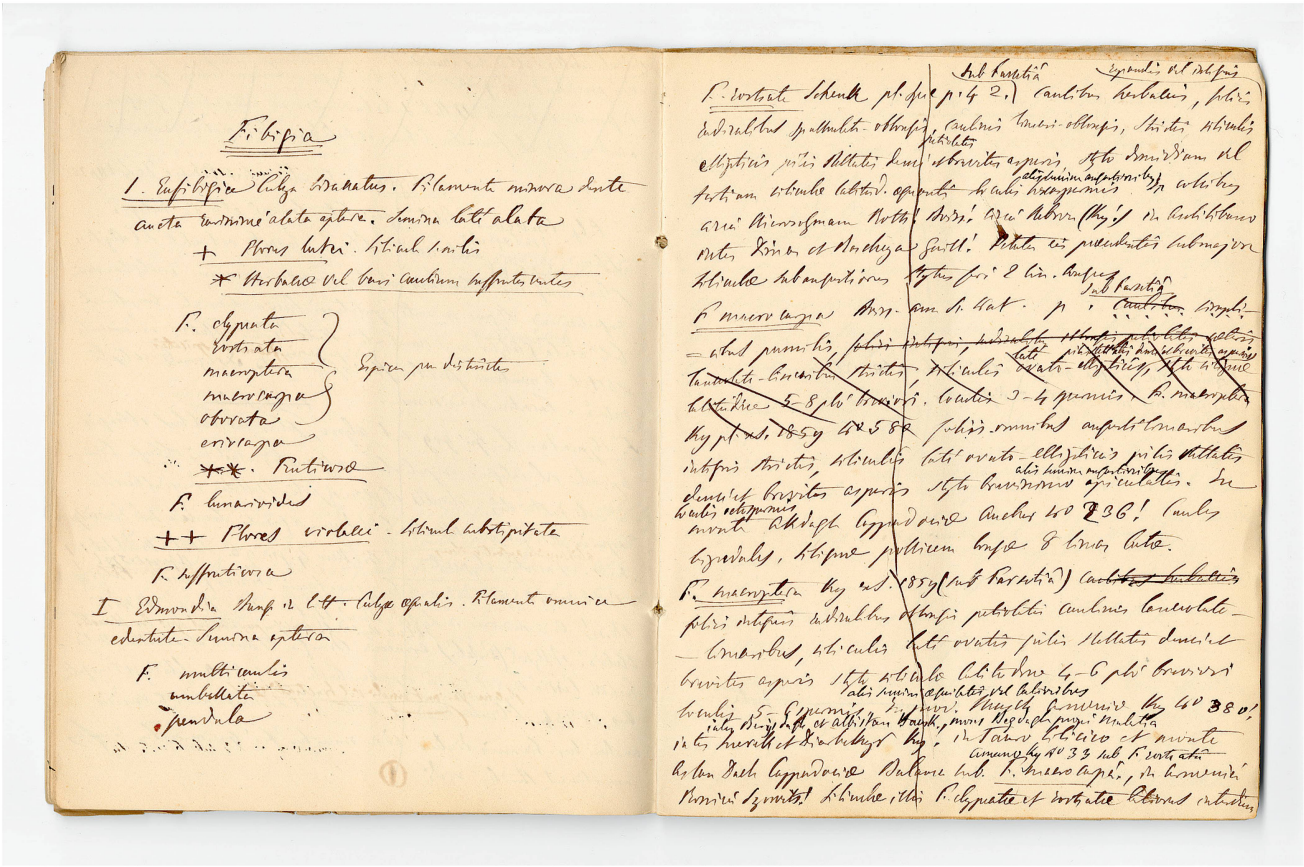


Fig. 5. Treatment of the genus *Fibigia* Medik. in Boissier's hand from the manuscript "Prodromus Flora Orientalis" later published as *Flora Orientalis* Vol. 1.
[Bibliothèque des Conservatoire et Jardin botaniques, Genève]



Fig. 6. *Flora Orientalis* published by Boissier (1867–1888) in the Library of the Conservatoire et Jardin botaniques in Geneva. [Picture: F. Golay]

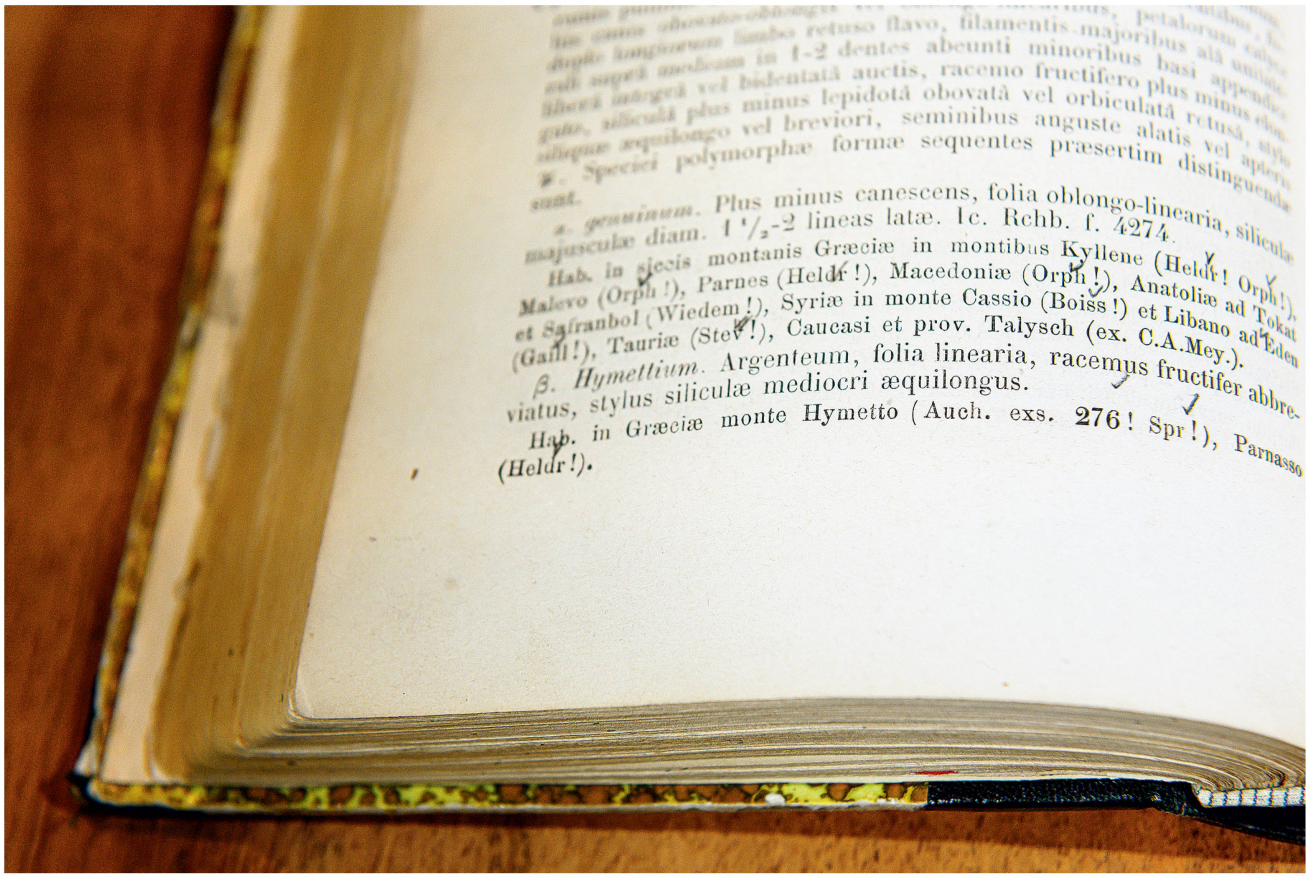


Fig. 7. Annotated first volume of *Flora Orientalis* open on page 274 of the *Cruciferae* treatment with check marks for specimens found and extracted from the rest of the Boissier herbarium to be remounted and rearranged in the original sequence of the *Flora* (Jacquemoud, 2011). [Bibliothèque des Conservatoire et Jardin botaniques, Genève] [Picture: F. Golay]



Fig. 8. Lectotype of *Hesperis violacea* Boiss. representing a collection folder of five sheets in G-BOIS (p. 12, 70).
[Picture: F. Golay]



Fig. 9. First sheet of type material of *Cardamine lazica* Boiss. & Balansa in G-BOIS. It represents a mixed gathering of flowering (syntype, plants in center and on left) and fruiting (lectotype, right) material (p. 24).
[*Balansa 31*]

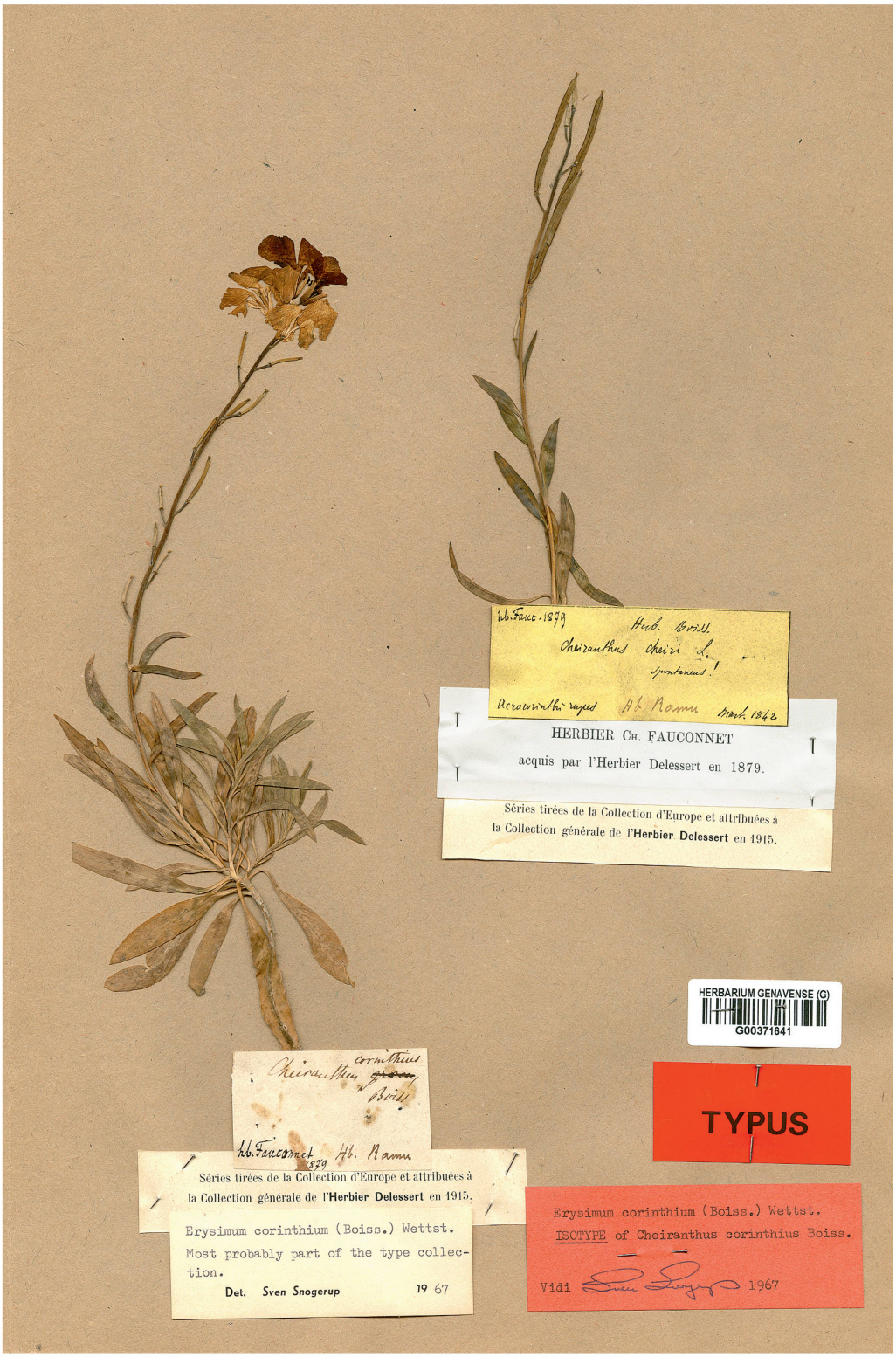


Fig. 10. Syntype of *Cheiranthus corinthius* Boiss. originating from the Delessert herbarium in G (p. 32). [*Boissier s.n.*]



Fig. 11. Syntype of *Hesperis violacea* Boiss. originating from the Moricand herbarium in G (p. 70). [*Pinard s.n.*]



Fig. 12. Lectotype of *Hesperis secundiflora* Boiss. & Spruner (first sheet) in G-BOIS (p. 73). [*Boissier s.n.*]



Fig. 13. A. *Sterigmostemum anchonioides* (Boiss.) D.A. German & Al-Shehbaz, plant grown in the greenhouse of the Royal Botanic Garden of Edinburgh (E) from seeds from SW Iran; **B–C.** *Aubrieta parviflora* Boiss., Iran; **D.** *Parlatoria cakiloidea* Boiss., Iraq.
[Pictures: **A:** A. Miller; **B:** A. Dönmez; **C–D:** I. Al-Shehbaz]



Fig. 14. Holotype of *Sterigma contortuplicatum* Boiss. in P (p. 77). [*Aucher-Eloy s.n.*] [© Muséum national d'Histoire naturelle, Paris]

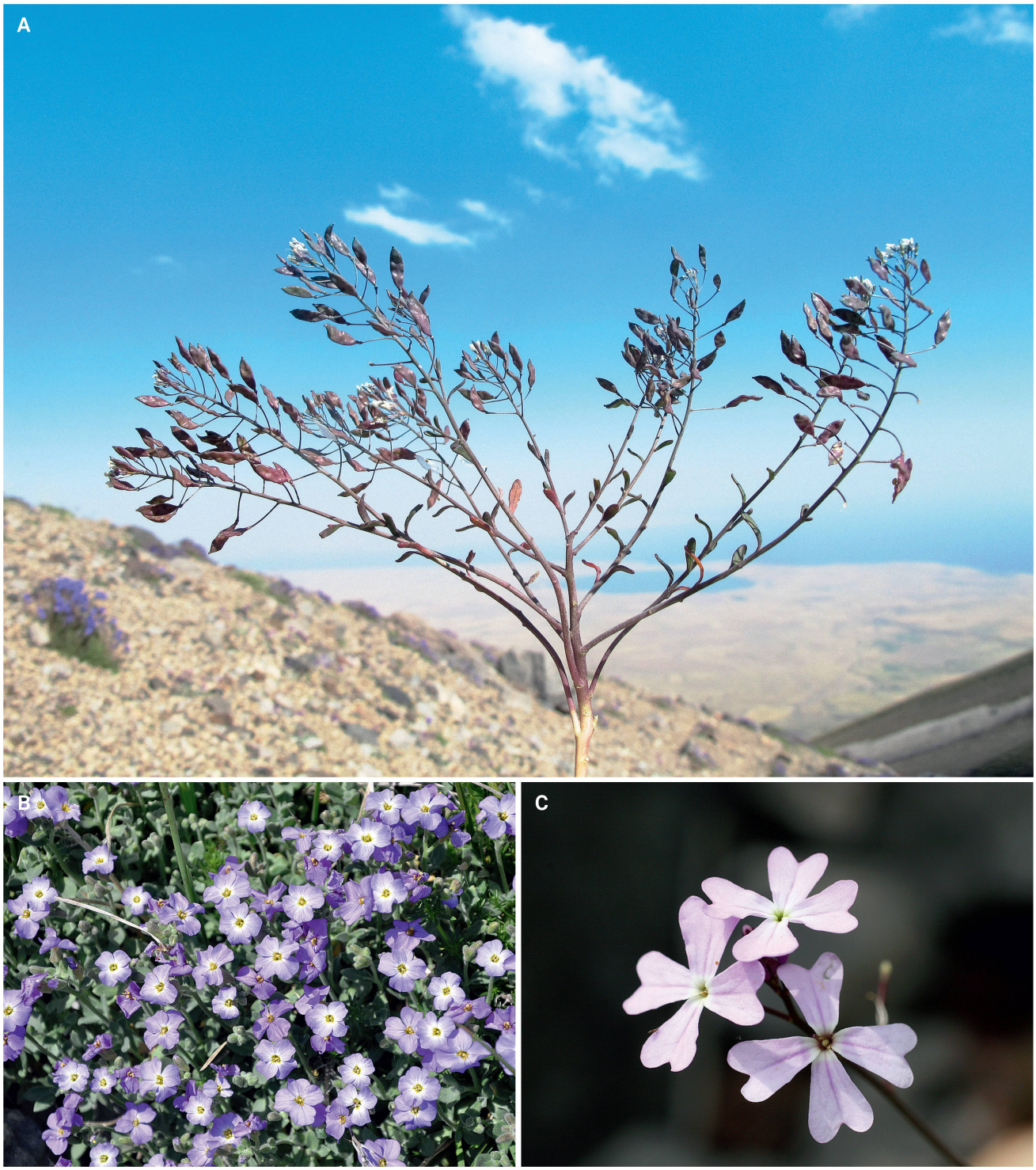


Fig. 15. A. *Peltariopsis planisiliqua* (Boiss.) N. Busch, Turkey; **B.** *Aubrieta canescens* (Boiss.) Bornm., Turkey; **C.** *Ricotia sinuata* Boiss. & Heldr., Turkey.
[Pictures: **A:** O. Karabacak; **B–C:** B. Özüdoğru]

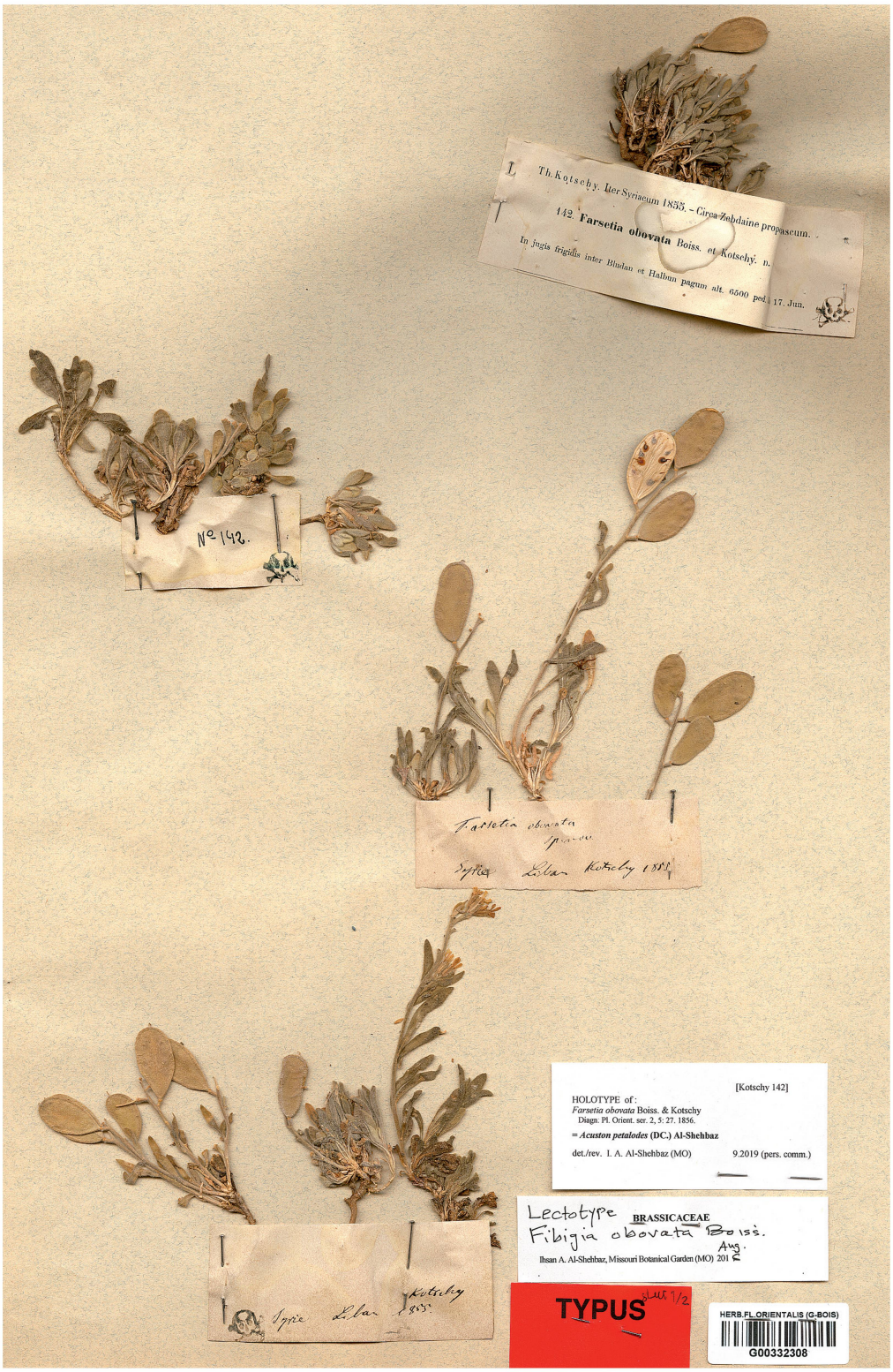


Fig. 16. Holotype of *Farsetia obovata* Boiss. & Kotschy (first sheet) in G-BOIS (p. 86).
[*Kotschy 142*]



Fig. 17. *Irania umbellata* (Boiss.) Hadač & Chrtek, Iran.
[Picture: H. Moazzeni]



Fig. 18. Holotype of *Alyssum oxycarpum* Boiss. & Balansa (first sheet) in G-BOIS (p. 89). [*Balansa 427*]



Fig. 19. *Odontarrhena peltarioidea* (Boiss.) Španiel et al., Turkey.
[Picture: B. Özüdoğru]



Fig. 20. Type collection of *Alyssum floribundum* Boiss. & Balansa in G-BOIS consisting of flowering material (syntype, right) and fruiting material (lectotype, left) (p. 91).
[*Balansa 171*]

Notes. – The unicate in G-BOIS does not have collection number nor the day or the month, the year is 1847 and printed, the locality in Boissier's handwriting was later crossed out.

As in some other cases involving taxa (e.g., *Alyssum muelleri, Lepidium intricatum*) that were collected by Buhse in 1849 and described jointly with Boissier (Boissier & Buhse, 1860), pre-printed 1847 labels were used by Boissier and to which he added some or all collection data. Therefore, the specimens of such collections in G-BOIS are considered duplicates of the same collections at LE that have the full and correct collection information in the protologues of those taxa.

In some of such cases the discrepancy in the labels in G-BOIS and LE is minimal, or in the case of *M. trichocarpa* they are substantial. Despite that, such labeling errors are not given any importance, just as in the numerous other cases that involved collections of other collectors throughout this work.

Botschantsev (1972: 1039) listed the type at LE and gave the full locality data as in the protologue. Image of the LE01037309 duplicate and several of its close-ups were kindly sent by Dr. D. A. German, and it consists of two plants (upper half) mounted on the same sheet with Bunge's collection of the same species from Shahrud, Persia. None of the collection or annotation labels of that duplicate has Boissier's annotation, indicating that he did not examine it. Therefore, the duplicate in G-BOIS, on which alone Boissier drafted the species description, has to be recognized as the holotype.

Malcolmia runcinata var. *glabra* Boiss., Fl. Orient. 1: 223. 1867.

Type: "Hab. ad Mohammera Mesopotamiae (Noë!)".

Lectotypus (designated here): **Iran:** "Mohammera in pascuis", III.1851, *Noë 85* (G-BOIS [G00332182]). **Syntypus: Iran:** "Mohammera in fossoso", IV.1851, *Noë 1049* (G-BOIS [G00332183]).

= ***Strigosella intermedia*** (C.A. Mey.) Botsch. in Bot. Zhurn. (Moscow & Leningrad) 57: 1040. 1972.

Note. – Boissier (1867a) only gave the general area and collector but did not give the collection number, and therefore lectotypification of the name is needed because both collections in G-BOIS equally qualify.

Malcolmia strigosa Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 70. 1842.

≡ ***Strigosella strigosa*** (Boiss.) Botsch. in Bot. Zhurn. (Moscow & Leningrad) 57: 1039. 1972.

Type: "[Aucher-Eloy] N. 4068, Ispahan".

Holotypus: Iran: "Ispahan", s.d., *Aucher-Eloy 4068* (G-BOIS [G00332184]; iso-: BM [BM000522155, BM000522156], G [G00446075, G00446076], K [K000693586], KW [KW000128011], LE, P [P02272553]).

Note. – Boissier based his description solely on the unicate in his herbarium. No duplicate was found in the Candolle's herbarium to justify the typification of the name, and the duplicate at P was not annotated by Boissier.

Strigosella cabulica Boiss., Diagn. Pl. Orient. ser. 2, 1: 22. 1854.

Type: "Hab. in regno *Cabulico* propè *Pushut* (W. Griffith N° 13)".

Holotypus: Afghanistan: "Pushut", s.d., *Griffith 13* (G-BOIS [G00330470]; iso-: B [B100241270], K [K000693592, K000693593, K000693595], LE).

Notes. – Both Rechinger (1968) and Jafri (1973) listed more than one herbarium as the type, and Botschantzev (1972) cited the duplicate at LE as an isotype.

Boissier (1854) did not examine more than the unicate in his herbarium. He annotated the duplicate at B as *Malcolmia cabulica,* but that annotation was made after his description of the species as *Strigosella*.

Boissier in *Flora Orientalis* treated the species as *Malcolmia cabulica* (Boiss.) Hook. f. & Thomson (in J. Proc. Linn. Soc., Bot. 5: 156. 1861).

The collection *Griffith 1542* corresponds to number *13* in Griffith's journal, as indicated on K000693592 and K000693595, and most likely also number *1374* on the B duplicate and number *1452* on K000693593.

Pseudodraba hystrix (Hook. f. & Thomson) Al-Shehbaz et al. in Pl. Diversity Evol. 129: 73. 2011.

= *Malcolmia ciliaris* Boiss., Fl. Orient. Suppl.: 44. 1888, **syn. nov.**

Type: "Hab. in Affghaniâ loco non indicato (Hulton!)".

Holotypus: Afghanistan: *sine loco,* s.d., *Aitchison s.n.* (G-BOIS [G00332185]).

Notes. – The identity of *Malcolmia ciliaris* remained a mystery since its publication about 140 years ago. Rechinger (1968) and Zohary et al. (1980) did not mention the species, and Al-Shehbaz et al. (2014) indicated that the status of the species is unknown.

An examination of the holotype reveals beyond any doubt that the plant belongs to the monospecific *Pseudodraba* Al-Shehbaz et al.

The collector was listed in the protologue as Hulton, instead of Aitchison on the unicate in G-BOIS.

Malcolmia ledebourii Boiss., Fl. Orient. 1: 224. 1867.

Type: "Hab. in Transcaucasiâ ad Baku (C.A. Mey!), in apricis trans Araxem ad amnem Karasu (Szow!)".

Lectotypus (first step designated by Dorofeyev, 2012: 450; second step designated here): **Azerbaijan:** "Baku", III–IV.1830, *Meyer 1653* (G-BOIS [G00332186]; isolecto-: LE). **Syntypus: Turkey:** "In siccis campestribus et apricis trans Araxem ad amnem Karasu", 29.II.1828, *Szovits 1* (G-BOIS [G00332187], LE).

= ***Neotorularia conturtiplicata*** (Stephan ex Willd.) Hedge & J. Léonard in Bull. Jard. Bot. Natl. Belgique 56: 394. 1986.

Notes. – Boissier based the species description on the unicates in his herbarium. Therefore, a second-step lectotypification is needed to correct Dorofeyev's erroneous designation from LE to G-BOIS.

The isolectotype and lectotype differ in the collection number respectively *Meyer s.n.* and *Meyer 1653,* no date is indicated on the lectotype and the locality of the isolectotype is listed as "In collibus et en campis prope Baku".

Malcolmia torulosa var. *contortuplicata* Boiss., Fl. Orient. 1: 225. 1867.

Type: "Hab. cum typo in Palaestinâ (Boiss.!), Persiae prov. Aderbidjan (Auch. exs. 4169 C!)".

Lectotypus (designated here): **Iran:** "Aderbidjan", s.d., *Aucher-Eloy 4169C* (G-BOIS [G00332188]; isolecto-: BM [BM001172165], G [G00446077, G00446078], P [P00747217, P05415964, P05415965], W [W0075698]). **Syntypus: Israel:** "Palestina incultis", 1846, *Boissier s.n.* (G-BOIS [G00332189]).

= ***Neotorularia torulosa*** (Desf.) Hedge & J. Léonard in Bull. Jard. Bot. Natl. Belgique 56: 395. 1986.

Notes. – The native distribution range of *Neotorularia torulosa* extends uninterrupted from Morocco into all SW Asia and eastward into China.

The twisted fruit, recognized by Boissier in *Flora Orientalis* as characteristic of his var. *contortuplicata,* varies within a given population and sometimes even on the same plant.

Malcolmia torulosa var. *leiocarpa* Boiss., Fl. Orient. 1: 225. 1867.

Type: "Hab. cum typo prope Gaza (Boiss!), in deserto Palmyrae (Bl!), Assyriâ ad Euphratem (Chesn. exs. 131!), Persiâ australi ad Ispahan (Auch. exs. 4155!), ad Schiraz (Ky!), ad Yezd (Bunge!)".

Lectotypus (designated here): **Iran:** "Ispahan", s.d., *Aucher-Eloy 4166* (G-BOIS [G00332190]; isolecto-: G [G00446079], K [K000694000], P [P05445998, P00747215]). **Syntypi: Iran:** "Prope urbem Schiras", V.1842, *Kotschy 126a* (G-BOIS [G00332191]). **Palestine:** "propè Gaza", 1846, *Boissier s.n.* (G-BOIS [G00332192]); "Expedition to the Euphrates", 1836, *Chesney 131* (P [P00747222], W [W0075699]).

= ***Neotorularia torulosa*** (Desf.) Hedge & J. Léonard in Bull. Jard. Bot. Natl. Belgique 56: 395. 1986.

Notes. – Only four of the six syntypes were located in G, G-BOIS, and P, and the remaining couple (Blanche and Bunge) must have been misplaced or examined by Boissier in other herbaria.

The type *Aucher-Eloy 4155* in the protologue instead of *4166* was overlooked by Boissier (1888), as there is no other collection of Aucher-Eloy from Isfahan for the above variety.

Malcolmia aculeolata (Boiss.) Boiss., Fl. Orient. 1: 226. 1867.

≡ ***Sisymbrium aculeolatum*** Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 75. 1842.

Type: "[Aucher-Eloy] Ispahan absque numero".

Holotypus: Iran: "Ispahan", s.d., *Aucher-Eloy s.n.* (P [P05384929]; iso-: W [W18890303536]).

Notes. – There is no material in the Geneva herbaria of the species with *Aucher-Eloy s.n.* It is certain that Boissier (1842a) based his description on the unicate P05384929 that he annotated, and he did not examine the duplicate at W. Unfortunately, Boissier (1867a, 1888) never mentioned the type collection of the species. Hedge (1968: 325) was correct in stating that the type is *Aucher-Eloy s.n.,* though he did not indicate the herbarium housing that collection. However, the listing of the type as *Schimper 124* from Sinai by Jafri (1973) is erroneous, and that collection was not cited in the original publication though listed, among others, in *Flora Orientalis.*

The initial placement of the species in *Sisymbrium* by Boissier (1842a) is currently accepted both on morphological (Warwick & Al-Shehbaz, 2003) and molecular grounds (Warwick et al., 2002). Although, the species was transferred by him to *Malcolmia,* its lack of the branched

trichomes and decurrent stigmas stands against such assignments. Furthermore, the placement in *Torularia* by Hedge (1968) or *Neotorularia* by Léonard and Hedge (in Leonard, 1986) is not acceptable because it has simple instead of the branched trichomes characteristic of the last genus.

Malcolmia bungei Boiss., Fl. Orient. 1: 226. 1867 [nom. illeg.].

≡ *Dontostemon grandiflorus* Bunge in Arbeiten Naturf. Vereins Riga 1: 147. 1847.

≡ ***Strigosella grandiflora*** (Bunge) Botsch. in Bot. Zhurn. (Moscow & Leningrad) 57: 1044. 1972.

Note. – *Malcolmia bungei* is illegitimate because Boissier in *Flora Orientalis* listed the earlier published *Dontostemon grandiflorus* as a synonym (see German et al., 2006).

Malcolmia bungei var. *glabrescens* Boiss., Fl. Orient. 1: 226. 1867.

Type: "Hab. in Affghaniâ (Griff. ex Hook), Belutschiâ prope Gurghina (Stocks!)".

Lectotypus (designated here): **Pakistan:** "Beloutchistan. Gurghina", 1851, *Stocks 975* (G-BOIS [G00332194]; isolecto-: K [K000693600, K000693601, K000693602]).

= ***Strigosella behboudiana*** (Rech. f. & Esfand.) Botsch. in Bot. Zhurn. (Moscow & Leningrad) 57: 1042. 1972.

Note. – An extensive search for the Griffith syntype in the major herbaria consulted was unsuccessful.

Malcolmia angulifolia Boiss. & Orph. in Boiss., Diagn. Pl. Orient. ser. 2, 5: 19. 1856.

≡ ***Malcolmia orsiniana*** subsp. ***angulifolia*** (Boiss. & Orph.) Stork in Svensk Bot. Tidskr. 66: 245. 1972.

Type: "Hab. in *Parnasso* propè *Trypia-Spitia* in speluncâ alt. 5500' cl. Guicciardi et Prof. Orphanidès 1854, eodem loco anno 1855 cl. Guicciardi ex Heldreich".

Lectotypus (designated by Stork, 1972a: 241): **Greece:** "In m. Parnassi reg. Tripia Spilaea, abietina in antro", VIII.1855, *Guicciardi s.n.* (G-BOIS [G00332195]; isolecto-: C [C10008867], K [K000693572], LD [LD1031045], P [P00868504], W [W1940-0019434]). **Syntypus: Greece:** "Legi in monte Parnasso prope Trypia-Spitià", 5500' [1680 m], 3–15.VII.1854, *Orphanidès 2555* (G-BOIS [G00332196], JE [JE00001304, JE00001305]).

Notes. – Both JE syntypes lack the collection number, but the other data are the same as the G-BOIS duplicate.

Guicciardi s.n. was distributed as *Heldreich 2975*.

Malcolmia graeca Boiss. & Spruner in Boiss., Diagn. Pl. Orient. 1: 71. 1843.

Type: "Hab. in rupestribus *Graeciae, Athenae* in monte *Lycabetto, Acrocorinthus,* etc. Fl. Aprili".

Lectotypus (designated by Stork, 1972b: 37): **Greece:** "Attica", s.d., *Spruner s.n.* (G-BOIS [G00332197]; isolecto-: B [B100241258], BM, BR, E [E00438498], K [K000693569], L, P, W [W0075696, W0075697]).

Note. – Unfortunately, none of the other syntypes cited in the protologue was located in G-BOIS or the other major herbaria consulted.

Malcolmia graeca var. *integrifolia* Boiss., Fl. Orient. 1: 228. 1867.

Type: "Hab. in montibus Atticae Lycabetto (Boiss!) et Corydalo Heldr!), Parnasso prope Arachova (Heldr. Fl. Gr. exs. 139!), Malevo (Orph!), prope Tripolizza (Heldr!)".

Lectotypus (designated by Stork, 1972b: 37): **Greece:** "in rupestribus Atticae", 21.IV.1842, *Boissier s.n.* (G-BOIS [G00332200]). **Syntypi: Greece:** "In m. Parnassi reg. infr. pr. Arachova", IV.1857, *Guicciardi s.n.* (G-BOIS [G00332203]); "In saxosis apricis m. Corydali, Atticae", 12.IV.1852, *Heldreich 139* (G-BOIS [G00332199], WAG [WAG0004240]); "Inter segetes près de Tripolizza", 11.V.1844, *Heldreich 139* (B [B100241254], BM [BM000750024], G [G00446080, G00446081, G00446084], G-BOIS [G00332198], K [K000693571], P [P05423338]); "in monte Malevo", 22.VI.–4.VII.1850, *Orphanides 2978* (G-BOIS [G00332201]); *ibid. loco,* 22.IV–4.V.1857, *Orphanides 3399* (G-BOIS [G00332202]).

= ***Malcolmia graeca*** subsp. ***bicolor*** (Boiss. & Heldr.) Stork in Opera Bot. 33: 39. 1972.

Notes. – The lectotype is a collection folder of two sheets, of which one has a complete label and one with Lycabettus only.

It is quite evident that Boissier's concept in *Flora Orientalis* of *Malcolmia graeca* var. *integrifolia* encompasses the principal variation among all three of the currently recognized subspecies as critically studied by Stork (1972b). Unfortunately, the lectotype sheet was not annotated by her, and none of the duplicates in the Geneva herbaria has the locality as Athens

(see Stork, 1972b: 37), though Attica is the peninsula that currently encompasses Athens.

Distributed syntypes carrying Heldreich's numbers or exsiccatae *139* are applied to different collections and, therefore, they should not be relied upon without careful evaluation.

The *Guicciardi s.n.* collection was distributed as *Heldreich 139*.

Malcolmia bicolor Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. 6: 10. 1846.

≡ ***Malcolmia graeca*** subsp. ***bicolor*** (Boiss. & Heldr.) Stork in Opera Bot. 33: 39. 1972.

Type: "Hab. in schistosis regionis excelsioris *Taygeti, Neraidovoum, Hagios Elias,* etc. copiosa. De Heldreich. Floret Junio".

Lectotypus (designated by Stork, 1972b: 39): **Greece:** "Taygète: rocailles schisteuses dans la partie inférieure de la région des sommités, en montant au Hagios-Elias depuis le Pentaplou", 6000'–6500' [1830–1980 m], VI–VII.1844, *Heldreich 240* (G-BOIS [G00332204]; isolecto-: BM [BM000750021], E [E00438497], G [G00371820, G00332202, G00371834], GOET [GOET002634], K [K000693576, K000693578], L, MO [MO3833277], OXF, P [P05423379, P05423390, P05423392], WAG [WAG0004239], ZT [ZT00008155]). **Syntypus: Greece:** "In saxosis. au Neraïdarvouno (partie du Taygète au-dessus d'Anavryti du Lacedemoniu) région de sapins", 5000'–6000' [1520–1830 m], 21.VI.1844, *Heldreich 240* (B [B100241256], G-BOIS [G00332205], P [P04718503, P05423376, P05423386, P05423389], WU [WU0076029]).

Notes. – The collection date on the lectotype sheet is 11 June 1844, whereas that on the unnumbered duplicates is VI–VII.1844. Both, however, were collected from an elevation of 6000–6500'.

The G-BOIS duplicate G00332205 was collected on 21 June 1844 from elevation of 5000–6000', though it carries the same collection number *(240)* as the lectotype. It is considered here as a syntype and interpretation of the lectotype is stretched as presented by Stork (1972b).

The four syntypes at P do not have a collection number.

Malcolmia veluchensis Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. ser. 2, 6: 10. 1859.

Type: "Hab. in regione abietinâ montis *Veluchi Aetoliae* cl. Samaritani et Guicciardi; hùc prob. quoque referenda planta ex monte *Ziria Peloponnesi* sub N° 164 Fl. Graec. exs. a cl. Prof. Orphanidés evulgata".

Lectotypus (designated by Stork, 1972b: 40): **Greece:** "In reg. abietina m. Veluchi ad Sympettericò", 3.VIII.1857, *Samaritani & Guicciardi 2160* (G-BOIS [G00332206]). **Syntypus: Greece:** "in regione media montis Ziriae prope Trikala", 10–22.VI.1851, *Orphanides 164* (BM [BM000750020, BM001171162, BM001172163], BR [BR0000006993559], G-BOIS [G00332207], K [K000618639], P [P05423377, P05423380, P05423388], W [W0075695]).

= ***Malcolmia graeca*** subsp. ***bicolor*** (Boiss. & Heldr.) Stork in Opera Bot. 33: 39. 1972.

Note. – The lectotype is a collection folder of two sheets one of which has the above label data and the other is unlabeled.

Malcolmia micrantha Boiss. & Reut. in Boiss., Fl. Orient. Suppl.: 45. 1888.

Type: "Hab. in rupestribus montis Buffavento Cypri 1200' (Ky. Suppl. 407!), in graminosis calcareis Mesopotamiae ad Mardin (Haussk.!)".

Lectotypus (designated by Stork, 1972b: 18): **Turkey:** "In grami. calc. c. Mardin", IV.1867, *Haussknecht 53* (G-BOIS [G00332208]; isolecto-: BM [BM000522149], BR [BR0000006993221], JE [JE00001614], K [K000693605], W [W0075693]). **Syntypus: Cyprus:** "Crescit in rupestribus montis Buffavento", 1200' [366 m], 3.IV.1859, *Kotschy suppl. 407* (W [W0075694]).

= ***Malcolmia chia*** (L.) DC., Syst. Nat. 2: 440. 1821.

Notes. – The JE isolectotype was annotated by Dvořák in 1972 as a lectotype, but apparently such lectotypification was never published.

A search in the G-BOIS and Geneva herbaria for Kotschy's syntype did not materialize and it must be misplaced because Stork (1972b: 18) examined it.

Malcolmia micrantha was recognized as a distinct species in the *Flora of Turkey* by Cullen (1965: 461), but as critically examined by Stork (1972b), the name is perfectly at home in *M. chia*.

Malcolmia meyeri Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 71. 1842.

– *Hesperis crenulata* sensu C.A. Mey., Verz. Pfl. Casp. Meer.: 187. 1831 [non DC.].

≡ ***Zuvanda meyeri*** (Boiss.) Askerova in Bot. Zhurn. (Moscow & Leningrad) 70: 523. 1985.

Type: "[Meyer] 1641. In montibus Talüsch prope pagum Swant, in glareosis (alt. 670 hexap.)".

Holotypus: Azerbaijan: "Talüsch", 20.VI.1830, *Meyer 1641* (G-BOIS [G00332209]; iso-: KW [KW000127980], LE, P [P05415917]).

Notes. – Dvořák (1972a), who proposed the name *Zuvanda* as subgenus of *Maresia* Pomel, did not list the type of *Malcolmia meyeri*. However, Askerova (1985), raised that subgenus to a genus and gave the type collection as above. Her listing is basically compatible with the protologue of Meyer (1831), the listing of Boissier (1867a), and specimens in both LE and G-BOIS, though the holotype above is without a collection date.

Furthermore, Dorofeyev (2012: 376) typified the species based on a specimen at LE, and that typification is rejected here. The name does not need typification because Boissier based the species description solely on the unicate in his herbarium and did not examine or annotate any specimen elsewhere. Therefore, the G-BOIS specimen is the holotype, and the LE duplicate, which was not examined, is the isotype.

Dorofeyev (1994) transferred the species to *Strigosella* of the tribe *Euclidieae,* but the total lack of branched trichomes and the presence of auriculate leaves do not support such generic assignment. Then he (Dorofeyev, 2002) placed the species in the genus *Moricandia* DC. of the *Brassiceae*, a tribe distinguished primarily by having segmented fruits and conduplicate cotyledons. None of these characters is present in *Zuvanda* and, therefore, such tribal assignment is unsupported by morphology and molecular data (see Al-Shehbaz, 2012).

Malcolmia conringioides Boiss., Fl. Orient. 1: 230. 1867.

≡ *Conringia nana* Boiss., Diagn. Pl. Orient. ser. 2, 5: 25. 1856.

Type: "Hab. inter Astragalos montis *Manschura* Antilibani cl. Kotschy alt. 6500'".

Holotypus: Syria: "In humosis vallis Martsch Manschura", 6000' [1830 m], 8.VI.1855, *Kotschy 85* (G-BOIS [G00446070]; iso-: B [B100241266], BM [BM001172161], E [E00384093], K [K000693606], KW [KW000127970], MPU [MPU022358], P [P05415834, P05415838, P05415843], W [W0075702]).

= ***Zuvanda exacoides*** (DC.) Askerova in Bot. Zhurn. (Moscow & Leningrad) 70: 524. 1985.

Notes. – There is a single sheet in G-BOIS, and it has three labels handwritten by Boissier with minimal information, including just Syria and *Kotschy s.n.* (two labels) and one with no. *85,* just as in the printed label distributed to the various herbaria above.

The mentioning of Manschura in the original protologue and printed label supports treating the sheet as one collection with highly abbreviated information, just as in many of Boissier's own collections or material from other collectors.

The original publication gives the altitude as 6500' instead of 6000' in the printed label, and that was most likely a typographical error.

Boissier in *Flora Orientalis* cited under the new name *Malcolmia conringioides* the type collection of *Conringia nana* Boiss. *(Kotschy 85),* among two others as: "Hab. in cultis Damasci et in Antilibano (Gaill!), in dumosis vallis Mandschura Antilibani (Ky exs. 85!), in Libano ad Zachle (Labill!)", and thereby he avoided creating a later homonym of *Malcolmia nana* (DC.) Boiss. Therefore, the type of both taxa is the same.

Hesperis L., Sp. Pl.: 663. 1753.

Tribe: *Hesperideae* Prantl.

Note. – An Eurasian genus of about 50 species centered in the Caucasus and neighboring SW Asia and E Europe.

Hesperis breviscapa Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 67. 1842.

Type: "[Aucher-Eloy] N. 135, Olympus Armenus".

Holotypus: Turkey: "in Olympo Armeniae", 1837, *Aucher-Eloy 135* (G-BOIS [G00332210]; iso-: G [G00371654, G00371729], K [K000075644 plant on left, K000693653 plant on right], P [P00234971, P02272556]).

Note. – The name does not need lectotypification because Boissier based the species description on the unicate in G-BOIS and did not study or annotate any of other six duplicates cited above.

Hesperis kotschyi Boiss., Diagn. Pl. Orient. ser. 2, 5: 21. 1856.

Type: "Hab. in praeruptis calcareis ad latus orientale montis *Gisyl tepe Tauri Cilicici* cl. Kotschy".

Holotypus: Turkey: "Iter Cilicicum in Tauri alpes 'Bulgar Dagh.' Loca praerupta in devexis orientalibus calcariis montis Gisyl Deppe", 20.VII.1853, *Kotschy 236g* (G-BOIS [G00332211]; iso-: GOET [GOET002616], KW [KW000127978], P [P00234974, P02272569], W [W0075692], WAG [WAG0004247]).

Notes. – It is certain that Boissier (1856) drafted the species description on the unicate in his herbarium alone and, therefore, it is safe to treat that unicate as the holotype.

Furthermore, he did not cite a collection number in that publication, though Boissier in *Flora Orientalis* listed *Kotschy 256,* an obvious typographical error for *236g,* when he synonymized *H. kotschyi* under the later-published *H. humilis* (see below).

Hesperis humilis Boiss., Fl. Orient. 1: 231. 1867 [nom. illeg.].

≡ ***Hesperis kotschyi*** Boiss., Diagn. Pl. Orient. ser. 2, 5: 21. 1856.

Type: see the following notes.

Notes. – *Hesperis humilis* is illegitimate because Boissier listed the earlier published *H. kotschyi* in synonymy.

By listing "*H. kotschyi* Boiss. Diagn. Ser. II, V, p. 21 non Fenzl Pug.", Boissier (1867a: 231) erroneously considered *H. kotschyi* a later homonym of *H. kotschyana* Fenzl (Pug. Pl. Nov. Syr. 13. 1842) and, therefore, proposed *H. humilis* as a replacing name.

Hesperis armena Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 63. 1842.

Type: "[Aucher-Eloy] N. 123, Olympus Armenus".

Holotypus: Turkey: "In Olympus Armeniae", s.d., *Aucher-Eloy 123* (G-BOIS [G00332214]; iso-: BM [BM000522165, BM000522179, BM000946228], E [E00148084], G [G00371702, G00371705, G00371711], K [K000075646, K000075645], P [P00234994, P02272560]).

Notes. – Dvořák annotated G00371705 in 1972 as the lectotype, but that sheet, which is part of the G general herbarium, was not examined by Boissier, and that designation remained unpublished. However, Dvořák (1973a: 168) listed *Aucher-Eloy 123* and *173* as the type collections, but the latter number was never cited by Boissier (1842a).

The name does not need typification because Boissier did not examine or annotate any of the 11 duplicates cited above and based the species description only on the unicate in his herbarium.

Hesperis violacea Boiss., Diagn. Pl. Orient. 5: 81. 1844.

Type: "Hab. in regione alpinâ *Cadmi* orientalis suprà *Colossam* ubi Junio 1842 floriferam legi [Boissier], e *Cariae* et *Lyciae* montibus attulit quoque Ch. Pinard".

Lectotypus (designated here): **Turkey:** "Caria", 1843, *Pinard s.n.* (G-BOIS [G00332217]; isolecto-: BM [BM000522193], G [G00371707, G00446091], GOET [GOET002614, GOET002615], JE [JE00002539], K [K000693658, K000693659, K000693660], KW [KW000127974], P [P00234992, P05413631, P05413632, P05413635, P05413636], W [W0075691, W18890310406], WAG [WAG0004238]).
Syntypi: Turkey: "Cacumina Cadmi suprà Colossam", VI.1842, *Boissier s.n.* (G-BOIS [G00332215]); "Caria", 1842, *Pinard s.n.* (G [G00371709, G00371732]) (Fig. 8, p. 52; 11, p. 55).

= ***Hesperis bicuspidata*** (Willd.) Poir., Encycl. Suppl. 3: 195. 1813.

Notes. – The lectotype is a collection folder of five sheets (Fig. 8, p. 52), two of them labeled and collected in 1843. The G-BOIS syntype is a collection folder of two sheets, of which one only is labeled with locality and date.

Pinard collected the species in Caria both in 1842 and 1843, though rather few duplicates of the 1842 collection exist (the above two from the Moricand (Fig. 11, p. 55) and Candolle's herbaria, respectively). It is unknown if Boissier examined Pinard's collections of 1842.

Hesperis reuteriana Boiss. & A. Huet in Boiss., Diagn. Pl. Orient. ser. 2, 5: 20. 1856.

Type: "Hab. in Armeniâ propè *Ispir* cl. Huet du Pavillon. Fl. Junio".

Holotypus: Turkey: "Ispir", VI.1853, *Huet du Pavillon s.n.* (G-BOIS [G00332218]; iso-: BM [BM000522178], FI [FI005659], G [G00446092, G00446606], JE [JE00002526], K [K000693657], P [P05149899, P05413628]).

= ***Hesperis bicuspidata*** (Willd.) Poir., Encycl. Suppl. 3: 195. 1813.

Notes. – The holotype is a collection folder of three sheets, one labeled as above, one with "Ispir & Baubout" without date and one with "Baibout" and V.1853 indicated.

Boissier in *Flora Orientalis* correctly reduced *H. reuteriana* to synonymy of *H. bicuspidata,* though the name was unaccounted for by Cullen (1965).

Hesperis unguicularis Boiss., Diagn. Pl. Orient. ser. 2, 5: 21. 1856.

Type: "Hab. in *Armeniâ* cl. Calvert".

Holotypus: Turkey: "Erzeroum", 1853, *Calvert 93* (G-BOIS [G00332219]; iso-: JE [JE00002543]).

= ***Hesperis bicuspidata*** (Willd.) Poir., Encycl. Suppl. 3: 195. 1813.

Notes. – It seems that only the above two duplicates are available for *H. unguicularis* in the major herbaria consulted. Although Dvořák (1965: 416), correctly indicated that the holotype is at G (for G-BOIS) and isotype is at JE, he (Dvořák, 1973a: 117) reversed action by indicating that the type, rather than isotype, is at JE. Boissier did not examine or annotate the JE sheet, and therefore it makes perfect sense to treat the G-BOIS material as the holotype.

Dvořák (1965, 1973b) recognized the species as a distinct instead of reducing it to synonymy of *H. biscuspidata,* but the differences between them are trivial, and it is more sound to recognize the latter as a variable species accommodating the former.

Hesperis leucoclada Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 69. 1842.

≡ ***Sisymbrium leucocladum*** (Boiss.) D.A. German & Al-Shehbaz in Phytotaxa 334: 96. 2018.

Type: "[Aucher-Eloy] N. 4123, Ispahan".

Lectotypus (designated here): **Iran:** "Ispahan", s.d., *Aucher-Eloy 4123* (G-BOIS [G00332220]; isolecto-: BM [BM000522181, BM000522182], G [G00446088, G00446089], K [K000693872], KW [KW000127972], LE [LE00013085], P [P02272565, P02272566, P02272567], W [W0050812]).

Notes. – In addition to the specimen in G-BOIS, Boissier (1842a) based the species description on the duplicate P02272565 that he annotated. Therefore, the lectotypification of Dvořák (1968a, 1968b), which was based on W0050812 that Boissier never examined and which was recently maintained by German & Al-Shehbaz (2018), cannot be accepted.

The generic placement of *Hesperis leucoclada* has been controversial, and Dvořák (1968a) compared it more with members of the tribe *Brassiceae* largely because he misinterpreted the incumbent cotyledons with slightly depressed inner one as somewhat conduplicate and eventually placed the species in monospecific *Gynophorea* Gilli almost solely on having stipitate vs sessile fruit. About a week after the above publication, Dvořák (1968b) retained the species in *Hesperis,* as was originally placed by Boissier (1842a). The species is quite anomalous in *Hesperis* because it does not have the decurrent stigmas, branched trichomes, and uniseriate multicellular glands characteristic of almost all species of the genus.

Another more realistic placement of *H. leucoclada* was proposed by Khosravi (2003) based on molecular studies and a closer look at morphology. He transferred the species to the Iranian-endemic *Pseudofortuynia* Hedge, but neither he nor Hedge (1968) realized that they were dealing with the same species that they assigned to the tribe *Brassiceae*. Except for their purple instead of yellow flowers and stipitate vs sessile fruits, a critical closer examination of the type collections at G and W of *Hesperis leucoclada* and *Pseudofortuynia esfandiari* Hedge reveals that, they are indistinguishable from *Sisymbrium* in every morphological character and therefore should be united with it. It is interesting to note that Boissier & Buhse (1860) described *S. hesperidiflorum* (see below) and compared it with *S. subspinescens* Bunge, then Boissier in *Flora Orientalis* reduced it to synonymy of *Hesperis leucoclada*.

In conclusion, *H. leucoclada* was recognized as a member of the tribe *Hesperideae* (Dvořák, 1968b), a member of the tribe *Brassiceae* (Dvořák, 1968a; Hedge, 1968; Khosravi, 2003), and *Sisymbrieae* (German & Al-Shehbaz, 2018, and herein). Therefore, the recent synonymy by the last authors of *Pseudofortuynia* with *Sisymbrium* is fully justified.

Sisymbrium hesperidiflorum Boiss. & Buhse in Nouv. Mém. Soc. Imp. Naturalistes Moscou 12: 22. 1860.

Type: "Im Gebirge von Jesd, Thal Derrehgoum, 23 April 1849 (florens et fructiferum). [Buhse] No 1296".

= ***Sisymbrium leucocladum*** (Boiss.) D.A. German & Al-Shehbaz in Phytotaxa 334: 96. 2018.

Notes. – No material of this species was located in all of the Geneva herbaria and LE (German & Al-Shehbaz, 2018).

These authors followed Boissier in *Flora Orientalis* in treating the two taxa as conspecific.

Hesperis glabra Boiss. & Noë in Boiss., Diagn. Pl. Orient. ser. 2, 5: 22. 1856 [nom. illeg.] [non Royle].

≡ ***Hesperis boissieriana*** Bornm. in Beih. Bot. Centralbl., Abt. 2, 27: 300. 1910.

Type: "Hab. in *Kurdistaniâ* propè *Van,* cl. Noë, Junio 1849".

Holotypus: Turkey: "Kurdistan. Zwischen Van und Jehuri", VI.1849, *Noë 160* (G-BOIS [G00332221]).

Note. – No duplicates of the type collection were found in the herbaria consulted.

Hesperis thyrsoidea Boiss., Fl. Orient. 1: 234. 1867.

Type: "Hab. in rupestribus faucium prope Baibout Armeniae (Bourg!), in monte Berytdagh Cataoniae (Haussk!)".

Lectotypus (designated here): **Turkey:** "Taurus Cataonicus. Berytdagh in ipso Popul.", 6000' [1830 m], 10.VIII.1865, *Haussknecht s.n.* (G-BOIS [G00332222];

isolecto-: JE [JE00002541]). **Syntypus: Turkey:** "Dans les ravins près Baibout", 2.VII.1862, *Bourgeau 132* (G-BOIS [G00791931], P [P00234985, P02272559, P04661335]).

Notes. – Boissier in *Flora Orientalis* based the species description only on the G-BOIS and JE duplicates of both syntypes above. The fragmentary W0032956 specimen has a preprinted label with Haussknecht's handwritten information "In dumetis popul. Bewul. m. Berytdagh Cataoniae. alt. 7000 ped. die 7.8.1865" that differs in the elevation and day of collection and, therefore, is not considered here as part of the type collection. Based on these facts, the listing of Dvořák (1968b: 273) of that sheets as part of the type collection is erroneous.

The three Bourgeau syntypes at P do not have a collection number and the G-BOIS syntype is a collection folder of two sheets.

Cullen (1965: 455) placed *H. thyrsoidea* as a synonym of *H. cappadocica* E. Fourn. (Bull. Soc. Bot. France 13: 351. 1868) because he interpreted the publication date of the latter name as 1866 instead of 1868. For exact publication dates of that journal, see Leussink (1985).

Hesperis pulmonarioides Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 68. 1842.

Type: "[Aucher-Eloy] N. 129, Alep et Nardin".

Lectotypus (designated by Dvořák, 1966b: 183): **Syria:** "Alep", s.d., *Aucher-Eloy 129* (G-BOIS [G00332224]; isolecto-: BM [BM000522194], K [K000693667], P [P00234984, P02272578, P02272579]).

Notes. – Description of the species was emended by Dvořák (1966b), and his lectotypification of the species is justified because Boissier annotated P02272578 and thus based his species description on that sheet and the unicate in his herbarium. Dvořák annotated P00234984 as the lectotype but did not cite that in his publications.

Fournier (1866) and Cullen (1965) recognized *H. pulmonarioides* and confirmed its occurrence in Turkey, though the latter author indicated that the species also grows in the Syrian desert.

Hesperis quadrangula Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 67. 1842.

Type: "Hujus specimen cum *H. tristi* ex Odessa sub [Aucher-Eloy] nº 149 mixtum recepi, an ex eâdem regione oriunda est?".

Holotypus: Ukraine: "Odessa", s.d., *Aucher-Eloy 149* (G-BOIS [G00332223]; iso-: BM [BM001254062], G [G00446093]).

Notes. – The isotype at G was part of the Moricand herbarium. Furthermore, there is no duplicate of this collection at P, and it is safe to conclude that the G-BOIS unicate is the holotype.

Boissier (1842a) did not provide the data on the type collection between the diagnosis and full description, as he normally did for other Aucher-Eloy novelties, but for this species the data (see above) was mentioned on the last two lines of the species entry.

The status of *H. quadrangula* remains unresolved, and several authors (e.g., Dvořák, 1973b; Czerepanov, 1995; Mosyakin & Fedoronchuk, 1999) did not list the species as part of the flora of Ukraine. By contrast, Fournier (1866) listed the name in synonymy of the Turkish-Syrian endemic *H. pulmonarioides*. Therefore, it is safe to conclude that Aucher-Eloy made mistake in the type locality of the species.

Hesperis nivalis Boiss. & Hausskn. in Boiss., Fl. Orient. Suppl.: 45. 1888.

Type: "Hab. ad nives montis Sawus Persiae austro-occidentalis 12000' (Haussk.!)".

Holotypus: Iran: "ad nives m. Sawers, dit Kuh Kilugek", 12000' [3660 m], VII.1868, *Haussknecht s.n.* (G-BOIS [G00332225]; iso-: JE [JE00002540]).

Note. – Dvořák (1968b: 273) listed a W duplicate of the type collection, but despite repeated search it was not found.

Hesperis scabrida Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 64. 1842.

Type: "[Aucher-Eloy] N. 166, Mesopotamia".

Holotypus: Sine Patria: "Mesopotamia", 1835, *Aucher-Eloy 166* (P [P00234982]; iso-: G-BOIS [G00332226]).

Notes. – Boissier (1842a) based his species description solely on the holotype that he annotated and from which he took fragments consisting of a leaf and two fruiting lateral branches.

The exact type locality of *H. scabrida* remains unknown, as Mesopotamia sensu Boissier includes the areas between the Tigris and Euphrates rivers in Turkey, Syria, and Iraq.

The specimens cited by Cullen (1965) under this species were shown by Dvořák (1972b) to be *H. novakii* Dvořák and *H. unguicularis*. Furthermore, Dvořák (1980: 1041) doubted the occurrence of *H. scabrida* in Iraq and suggested that the type was probably collected from Syria or Turkey.

Hesperis secundiflora Boiss. & Spruner in Boiss., Diagn. Pl. Orient. 1: 70. 1843.

≡ ***Hesperis laciniata*** subsp. ***secundiflora*** (Boiss. & Spruner) Breistr. in Mém Soc. Bot. France 33: 84. 1952.

Type: "Hab. in faucibus montis *Hymetti* propè *Athenas* inter frutices".

Lectotypus (designated here): **Greece:** "Hymettus", IV.1842, *Boissier s.n.* (G-BOIS [G00332229]; isolecto-: BM [BM000750011], G [G00446096, G00446097], GOET [GOET002618], HBG [HBG506202], JE [JE00002544], K [K000693651], KW [KW000127976, KW000127977], LD [LD1011478], PH [PH00014464], W [W00075688, W18890310416]). **Syntypus: Greece:** "Hymetti fauces", V.1842, *Spruner s.n.* (G [G00446094, G00446095], G-BOIS [G00332227], GOET [GOET002617], K [K000693652]) (Fig. 12, p. 56).

Notes. – As indicated by Mermoud (1980), it is not possible to pin down the exact dates of Boissier's 1842 trip to Greece, as he collected in Athens then Hymette before moving further in the fieldwork.

The problem of this species arises from placing all material of G-BOIS in two folders, the lectotype of which includes six plants in flower without a collection date (Fig. 12, p. 56), but all distributed duplicates, which have printed yellow labels, indicated a collection date in April 1842, and these are recognized as isolectotypes. The second folder in G-BOIS, the syntype, has three plants with developing fruit a collection date of May 1842.

Although Boissier (1843) did not give collectors names in his original description of the species, we agree with Tan & Suda (2002), who did not lectotypify *H. secundiflora,* in considering Boissier's and Spruner's collections as syntypes.

Hesperis secundiflora var. *scabricarpa* Boiss. & Spruner in Boiss., Diagn. Pl. Orient. 1: 70. 1843.

Type: "[Boissier] Hab. in faucibus montis *Hymetti* propè *Athenas* inter frutices. Varietas β multò rarior".

Holotypus: Greece: "Hymettus", s.d., *Boissier s.n.* (G-BOIS [G00332228]).

= ***Hesperis laciniata*** All., Fl. Pedem. 1: 271. 1785.

Note. – The variety was recognized by Dvořák (1971: 244) as a subspecies of *H. laciniata,* but basically in all morphological aspects, it is at home under *H. laciniata* subsp. *laciniata.*

Hesperis campicarpa Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 66. 1842.

Type: "[Aucher-Eloy] N. 127, Taurus".

Holotypus: Turkey: "Mte. Tauris", s.d., *Aucher-Eloy 127* (G-BOIS [G00332231]; iso-: E [E00148104], FI [FI005662], G [G00371728, G00371742], K [K000693668, K000693669], P [P02272571]).

≡ ***Hesperis pendula*** subsp. ***campicarpa*** (Boiss.) F. Dvořák in Spisy Přír. Fak. Univ. J. E. Purkinje Brně 491: 113. 1968.

Notes. – Dvořák reduced the species to a subspecies of *H. pendula,* and further divided it into three varieties and two forms that he distinguished on the basis of overlapping differences in fruit length and cauline leaves shape, as well as on slight differences of the indumentum at sepal apex. It is beyond the scope of this study to evaluate those varieties and forms, and the types of three of which were not available for us and none was based on taxa described by Boissier.

Although *H. pendula* DC. is used here as the accepted name for the present, and following entries, it is an illegitimate later homonym of *H. pendula* Murr. (Novi Comment. Soc. Regiae Sci. Gott. 6: 38, tab. 6. 1776). The former name is so widely used for almost two centuries, and a proposal to conserve it and reject the latter has already been submitted (Al-Shehbaz & German, 2018).

Hesperis aucheri Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 66. 1842.

Type: "[Aucher-Eloy] N. 126, Sypilus".

Lectotypus (first step designated by Dvořák, 1968c: 119; second step designated here): **Turkey:** "In Mte. Sypilo", s.d., *Aucher-Eloy 126* (G-BOIS [G00332232]; isolecto-: FI [FI005661], G [G00446099, G00446100], K [K000693670, K000693671, K000693681], P [P00234978, P02272576, P02272577], W [W18890172300]).

= ***Hesperis podocarpa*** Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 65. 1842.

Notes. – The lectotype is a collection folder of two sheets, of which the labeled one has plants with densely hispid fruits, and this sheet was annotated by Dvořák in 1965 as the type of *H. aucheri.* By contrast, fruit of the unlabeled sheet are not hispid, and they belong to *H. pendula.*

A second step is needed to designate the plant with hispid fruit as the lectotype.

Boissier (1867a) and Cullen (1965) reduced *H. aucheri* to synonymy of *H. pendula,* whereas Dvořák (1968c) recognized it as a subspecies of the latter species. By contrast, Duran (2012) reduced it to synonymy of *H. podocarpa*.

Hesperis rupestris Boiss. & Noë in Boiss., Diagn. Pl. Orient. ser. 2, 1: 22. 1854 [nom. illeg.] [non Pall.].

Type: "Hab. ad *Bakker Maden Armeniae* meridionalis in fissuris rupium ubi floriferam Maio 1852 legit cl. Noë".

Holotypus: Turkey: "Bakker Madem in fissuris rupium", V.1852, *Noë 810* (G-BOIS [G00332233]; iso-: BM [BM001254063], G [G00446101], KW [KW000127975], LE [LE00013091], P [P00234979], W [P18890310423]).

= ***Hesperis pendula*** subsp. ***campicarpa*** (Boiss.) F. Dvořák in Spisy Přír. Fak. Univ. J. E. Purkinje Brně 491: 113. 1968.

Notes. – None of the duplicates above was annotated by Boissier and no other duplicates were found elsewhere. Therefore, it is safe to conclude that Boissier based the species description solely on the unicate in his herbarium.

Fournier (1866) treated *H. rupestris* as a variety of *H. pendula,* Boissier (1867a) reduced it and the previous entry to synonymy of *H. pendula,* Cullen (1965: 458) recognized it as a distinct species, and Dvořák (1968c) reduced it to synonymy of *H. pendula* var. *campicarpa.* Position of the last author is tentatively acccepted here.

The earliest homonym *H. rupestris* Pall. has recently been rejected by German (2013), whereas that of Rafinesque is an illegitimate combination in *Matthiola* (Candolle, 1821a). By contrast Kuntze's (1891) later homonym was based on the South American endemic *Eudema rupestre* Bonpl., and together with many New World *Brassicaceae,* they were transferred by him to *Hesperis,* a genus restricted to Eurasia.

Hesperis podocarpa Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 65. 1842.

Type: "[Aucher-Eloy] N. 125, Syria".

Lectotypus (designated by Dvořák, 1966a: 165): **Syria:** *sine loco,* s.d., *Aucher-Eloy 125* (G [G00371715 fruiting branch second from right]; isolecto-: P [P00234981]).

Notes. – The G [G00371715] specimen is a mixed collection, and Dvořák designated the lectotype of *H. podocarpa* on the branch from Syria, and correctly attributed the other three branches to *H. persica* from Iran. The two species are strikingly different in their pedicels and fruit base, and it is rather surprising that Boissier confused them and drafted his species description from both taxa.

Hesperis podocarpa differs from *H. persica* by having fruiting pedicels 8–10 mm long that are erect and appressed to stem basally and only reflexed at apex, and it has fruits substantially narrower at base. By contrast, *H. persica* has fruiting pedicels 5–6 mm long that are abruptly deflexed from base, and its fruits are equally wide throughout.

Other duplicates of *Aucher-Eloy 125* (incl.: G [G00371743], G-BOIS [G00332234], K [K000693675, K000693676], MPU [MPU013456], P [P02272575]) clearly belong to *H. persica*.

The G00332234 is the only unicate in G-BOIS, and one of us (IAS) erroneously annotated it in 2016 as *H. podocarpa.* The only other duplicate of the latter species examined in this study is P00234981, which Dvořák annotated in 1965 as the lectotype, and this specimen is mounted with P02272575 on the same sheet.

Hesperis persica Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 64. 1842.

Type: "[Aucher-Eloy] N. 4103, Aderbidjan".

Holotypus: Iran: "Aderbidjan", s.d., *Aucher-Eloy 4103* (G-BOIS [G00332235]; iso-: BM [BM000522183], G [G00371741, G00446102], K [K0006936754], MO [MO1618790], P [P00234980, P02272572]).

Notes. – Although Dvořák (1968b: 270) lectotypified the name based on a sheet in G, only the above G-BOIS sheet was used by Boissier to generate the species description. None of the other two G duplicates is from the Candolle's herbarium and none of the pair at P was annotated by him. Therefore, the name does not need lectotypification.

Dvořák annotated P [P02272572] in 1967 as the isotype.

Hesperis multicaulis Boiss., Diagn. Pl. Orient. 6: 10. 1846.

≡ ***Micrantha multicaulis*** (Boiss.) F. Dvořák in Rech. f., Fl. Iran. 57: 274. 1968.

Type: "Hab. in rupestribus montis *Sabst-Buschom* prope *Schiraz*. Kotschy No. 428".

Holotypus: Iran: "In rupestribus m. Sabst-Buschom pr. u. Schiras", 24.V.1842, *Kotschy 428* (G-BOIS [G00332236]; iso-: B [B100241426], BM [BM000522191, BM000522192], E [E00386192, E00386193], FI [FI005660], G [G00371888, G00371917, G00371922], K [K000693679], KW [KW000127973], LE [LE00013086, LE00013087], P [P02272561, P02272562, P02272563], W [W0051433], WAG [WAG0004276]).

Note. – The holotype specimen is a collection folder of two sheets one of which is unlabeled.

Hesperis flava Kotschy & Boiss. in Boiss., Fl. Orient. 1: 237. 1867 [nom. illeg.] [non Georgi].

≡ ***Hesperis dvorakii*** D.A. German in Turczaninowia 15(4): 13. 2012.

Type: "Hab. in faucibus argillosis ditionis Kassan Oglu Ciliciae Kurdicae ad pagum Backchadjik, alt. 4600! (Ky exs. 137!)".

Holotypus: Turkey: "Plantae in montibus Kassan Oghlu ad pagum Gorumse lectae. In faucibus argillosis versus pagum Baktschadschik", 4600' [1700 m], 23.V.1859, *Kotschy 137* (G-BOIS [G00332237]; iso-: B [B100261504, B100261505], BM [BM000522180], E [E00148082], G [G00446226], K [K000693680], LE [LE00013083, LE00013084], P [P00234973, P00747234, P00747235], S [S11-32404], US [US00100449], W [W0075689, W0075690]).

Notes. – Although B has two sheets of the type collection of *H. flava,* Dvořák (1967) apparently examined one, showed its photo, and captioned it as the type, actually only typical material.

He segregated the species into monospecific *Diplopilosa* Dvořák based on slight differences in flowers, fruit, and cotyledons. However, the genus has recently been synonymized with *Hesperis* by Al-Shehbaz (2012) and German (2012).

Nasturtiopsis Boiss., Fl. Orient. 1: 237. 1867.

Tribe: *Brassiceae* DC.

Notes. – A genus of two or three species of which the following is native to Egypt, Israel, Jordan, and NW Africa (Abdel Khalek & Bakker, 2007).

Molecular phylogenetic studies on *Nasturtiopsis coronopifolia* (Desf.) Boiss. by Warwick et al. (2010) assigned the species to the tribe *Brassiceae,* but the genus does not have conduplicate cotyledons and/or segmented fruits that are characteristic of that tribe.

Nasturtiopsis arabica Boiss., Fl. Orient. 1: 237. 1867.

Type: "Hab. in valle Atal Arabiae petreae (Schimp. exs. 192! sub *N. coronopifolio*), in deserto Tih Palaestinae contermino (Boiss!). Fl. Aprili".

Lectotypus (designated here): **Egypt:** "In valle Atal Arab. petr.", 27.III.1835, *Schimper 192* (G-BOIS [G00332238]; isolecto-: BM [BM001254075], E [E00126655], G [G00446103, G00446104, G00446105], HBG [HBG506145, HBG506236], K [K0000725057, K0000725058, K0000725059], MPU [MPU022356, MPU022357], W [W0075710, W0075711, W18890020447, W18890167962, W18890316262]). **Syntypus: Egypt:** "Arabia petraea, désert du Tih", III.1846, *Boissier s.n.* (G-BOIS [G00791848]).

Notes. – Schimper's syntype collection is designated as the lectotype, instead of Boissier's unicate, because it is more complete and represented by many duplicates.

The species was reduced by Greuter & Burdet (in Greuter & Raus, 1983) to a subspecies of *N. coronopifolia* (Desv.) Boiss., but the first author believes that it should be maintained as distinct because it is geographically and morphologically distinct.

Zerdana Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 84. 1842.

Tribe: *Anchonieae* DC.

Note. – *Zerdana* was recognized in the past 175 years as a monospecific genus endemic to SW Iran. It has recently been united with *Sterigmostemum* by German & Al-Shehbaz (2017) based on molecular phylogenetic data and a closer evaluation with morphology.

Zerdana anchonioides Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 84. 1842.

≡ ***Sterigmostemum anchonioides*** (Boiss.) D.A. German & Al-Shehbaz in Novosti Sist. Vyssh. Rast. 48: 80. 2017 (Fig. 13A, p. 57).

Type: "[Aucher-Eloy] N. 91, in monte Zerde Persiae".

Lectotypus (designated by Jacquemoud, 1984a: 305): **Iran:** *sine loco,* s.d., *Aucher-Eloy 91* (G-BOIS [G00332239]; isolecto-: K [K000693883], P [P01817640]).

Notes. – Rechinger (1968: 307) indicated that the type is *Aucher-Eloy 253*, but that number was not cited in Boissier (1842a) and was listed as *Alyssum alpestre* by Boissier (1867a, 1888).

Jacquemoud (1984a) was correct in lectotypifying the species name because the duplicate P01817640 was annotated by Boissier.

The locality data of the lectotype is "Persia" and that of the isolectotypes is "Mte Zerde".

Zerdana anchonioides var. *stenophylla* Boiss., Fl. Orient. Suppl.: 46. 1888.

≡ ***Sterigmostemum anchonioides*** subsp. ***stenophyllum*** (Boiss.) D.A. German & Al-Shehbaz in Novosti Sist. Vyssh. Rast. 48: 80. 2017.

Type: "Hab. in lapidosis cacuminis montis Kuh Nur Persiae occidentalis 12000' (Haussk.!)".

Lectotypus (first step designated by Jacquemoud, 1985: 368; second step designated here): **Iran:** "In lapidosis cacum. m. Kuh Nur", 12000' [3660 m], 1868, *Haussknecht s.n.* (G-BOIS [G00332240]; isolecto-: BM [BM001172164], JE [JE00001383], P [P01817641, P01817642], W [W0051432]).

Notes. – The labels and taxon name of both duplicates at P were handwritten by Boissier, which justifies the above lectotypification by Jacquemoud (1985). However, it should be noted that the lectotype was designated at JE instead of G-BOIS, and a second step is proposed to correct that.

Authorship of the varietal name is erroneously listed as Boiss. & Hausskn. instead of Boiss. in BrassiBase (2019), IPNI (2019), and Jacquemoud (1985), but there is nothing in the protologue to support those listings.

Anchonium DC. in Mém. Mus. Hist. Nat. 7: 242. 1821.

Tribe: *Anchonieae* DC.

Note. – *Anchonium* was recognized for almost two centuries (see Jacquemoud, 1984b) as a genus of two species centered in SW Asia (Armenia, Azerbaijan, Georgia, Iran, Iraq, Lebanon, Syria, Turkey). However, it has recently been united with *Sterigmostemum* by German & Al-Shehbaz (2017) based on a closer examination of morphology in light for molecular phylogenetic data.

Anchonium tournefortii Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 386. 1842 [nom. illeg.].

≡ *Sterigma elychrisifolium* DC., Syst. Nat. 2: 581. 1821.

≡ *Anchonium elichrysifolium* (DC.) Boiss., Fl. Orient. 1: 240. 1867.

≡ ***Sterigmostemum elichrysifolium*** (DC.) D.A. German & Al-Shehbaz in Novosti Sist. Vyssh. Rast. 48: 81. 2017.

Note. – *Anchonium tournefortii* is illegitimate because its protologue listed the earlier published *Sterigma elychrisifolium* DC as a synonym.

Sterigma DC., Syst. Nat. 2: 579. 1821.

Tribe: *Anchonieae* DC.

Note. – *Sterigma* is a synonym of the earlier published *Sterigmostemum* M. Bieb., a genus of 13 species distributed from SW Asia into central China (German & Al-Shehbaz, 2017).

Sterigma brachypetalum Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 386. 1842.

≡ ***Sterigmostemum sulphureum*** var. ***asperulum*** (Boiss.) Bornm. in Beih. Bot. Centralbl., Abt. 2, 27: 300. 1910.

Type: "[Aucher-Eloy] N. 4169 H, Persia australis".

Lectotypus (designated by Jacquemoud, 1988: 105): **Iran:** *sine loco,* s.d., *Aucher-Eloy 4169H* (G-BOIS [G00332243]; isolecto-: G [G00440193], K [K000693702], P [P00741745, P00741746]).

Note. – Lectotypification of the name by Jacquemoud (1988) is justified because Boissier annotated P00741746 as "Sterigma brachypetalum! Boiss.". This indicates that Boissier based the species description on the unicates in G-BOIS and P (see Boissier, 1841a).

Sterigma sulphureum var. *asperulum* Boiss., Fl. Orient. 1: 241. 1867.

≡ *Sterigma brachypetalum* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 386. 1842.

≡ ***Sterigmostemum sulphureum*** var. ***asperulum*** (Boiss.) Bornm. in Beih. Bot. Centralbl., Abt. 2, 27: 300. 1910.

Note. – This is a renaming at the varietal rank of the previous entry.

Sterigma sulphureum var. *angustifolium* Boiss., Fl. Orient. 1: 241. 1867.

≡ *Cheiranthus tomentosus* Willd., Sp. Pl. 3: 523. 1800.

= ***Sterigmostemum incanum*** M. Bieb., Fl. Taur.-Caucas. 3: 444. 1819.

Note. – This is a renaming at the varietal rank of *Cheiranthus tomentosus*.

Sterigma purpurascens Boiss., Fl. Orient. 1: 241. 1867.

≡ ***Petiniotia purpurascens*** (Boiss.) J. Léonard in Bull. Jard. Bot. Natl. Belgique 50: 230. 1980.

Type: "Hab. in Persiâ orientali inter Kerman et Yezd et in Affghaniâ occidentali (Bunge!)".

Lectotypus (first step designated by Leonard, 1980: 230; second step by Jacquemoud, 1988: 122): **Iran:** "inter Kerman et Jesd. inter Bejas & Anar.", IV.1859, *Bunge 30* (G-BOIS [G00332246 fruiting plant]; isolecto-: GH [GH00260232], P [P00741734, P00741737]). **Syntypi: Iran:** "inter Kerman et Jesd. inter Bejas & Anar.", IV.1859, *Bunge 30* (G-BOIS [G00332246 flowering plant], LE [LE00013114], P [P00741734, P00741737]); "in Affghanistano occidentali et Persia orientali", II.1859, *Bunge 30* (G-BOIS [G00791829]).

Notes. – The lectotype has a plant in flower and another in fruit. The lectotypifications by Léonard (1980) just stating "inter Kerman and Yazd" but without specifying whether the flowering or fruiting plant was intended and without giving the details of the locality as given by Jacquemoud (1988) who specifically indicated that the lectotype is the fruiting plant.

The collections number *Bunge 30* appeared on both G-BOIS duplicates above and P00741737, but the other collections cited have *Bunge s.n.* The GH and two P duplicates each have both fruiting (isolectotypes) and flowering plants (syntypes) and listed as such above.

The generic placement of *S. purpureum* has been controversial. Léonard (1980) placed it in the monospecific *Petiniotia* J. Léonard, whereas Jacquemoud (1988) retained it in *Sterigmostemum* M. Bieb. but as a subgenus. The main differences between the two genera is having in *Sterigmostemum* of yellow to orange (vs white to purple) petals and connate (vs free) median filaments. The variation in flower color is not reliable in the genus and found in some of the Chinese species, whereas the presence of connate vs free median filaments remains as the major difference between the two genera.

Sonboli et al. (2006) and Khosravi et al. (2009a) conducted morphometric and molecular phylogenetic studies, respectively, on *S. purpurascens* and other *Sterigmostemum* species, and their data clearly supported Léonard's placement of the species in *Petiniotia.*

Sterigma longistylum Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 387. 1842.

≡ ***Sterigmostemum longistylum*** (Boiss.) Kuntze, Revis. Gen. Pl. 1: 36. 1891.

Type: "[Aucher-Eloy] N. 4169 N, Schiraz".

Lectotypus (designated here): **Iran:** "Chiraz", s.d., *Aucher-Eloy 4169N* (G-BOIS [G00332247]; isolecto-: BM [BM000522212], G [G00383980], P [P00741729, P00741730, P00741744]).

Note. – Boissier annotated P00741730 and, therefore, the above lectotypification is justified.

Sterigma contortuplicatum Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 387. 1842.

Type: "[Aucher-Eloy] Absque numero, in provinciâ Aderbidjan".

Holotypus: Iran: "Aderbidjan", s.d., *Aucher-Eloy s.n.* (P [P00741726]; iso-: G-BOIS [G00332242]) (Fig. 14, p. 58).

= ***Sterigmostemum incanum*** M. Bieb., Fl. Taur.-Caucas. 3: 444. 1819.

Note. – Although Jacquemoud (1988: 76) cited the P material as the lectotype, it should be recognized as the holotype because Boissier annotated it (Fig. 14, p. 58) and took the fragmentary G-BOIS piece from it. Therefore, Boissier (1842a) used that Paris unicate in the species description.

Goldbachia DC. in Mém. Mus. Hist. Nat. 7: 242. 1821 [nom. cons.].

Tribe: *Calepineae* Horan.

Note. – A genus of seven species distributed from SW Asia into India, China, and Mongolia.

Goldbachia laevigata var. *ascendens* Boiss., Fl. Orient. 1: 243. 1867.

Type: "Hab. circa Byzantium (Noë!), Asiâ minori in Pisidiâ (Heldr!), Cappadociâ (Bal!), Armeniâ Turcicâ ad Ispir (Bourg!) et Rossicâ (Buhse!), prov. Talysch (Hoh!), Persiâ bor. (Szow!) et australi (Ky exs. 227! Auch. exs. 4132!), Turkestaniâ ad Buchara (Lehm!), Affghaniâ (Griff!)".

Lectotypus (designated here): **Iran:** "In ruinis u. Persepolis", 12.IV.1842, *Kotschy 227* (G-BOIS [G00332248]; isolecto-: BM [BM001254069], G [G00446115, G00446116, G00446117], K [K000693723, K000693725], P [P05414900, P05414913, P05414918, P05414919, P05414948]). **Syntypi: Afghanistan:** "Achukyge", s.d., *Griffith 1543* (G-BOIS [G00791878]); "Lower Kaloo", s.d., *Griffith s.n.* (G-BOIS [G00791887]).

Azerbaijan: "In agris incultis prope Tablaechyje et Dipa ditionis Swant Georg. cauc.", 5000' [1520 m], VI.1836, *Hohenacker s.n.* (BM [BM001254070], G [G00446123, G00446124, G00446125], G-BOIS [G00332252], P [P04022618, P05414886, P05414911], W [W0075687]). **Iran:** *sine loco,* s.d., *Buhse s.n.* (G-BOIS [G00791886]); "Inter segetes circa Khoi", 18.III.1828, *Szovit 17* (G-BOIS [G00332251]). **Turkey:** "Laristan (Djaroun)", s.d., *Aucher-Eloy 4132* (BM [BM001254071, BM001254072], G [G00446118, G00446119], G-BOIS [G00332250], K [K000693724], P [P05414888, P05414912], W [W18890077539]); "Village d'Enèhil (Cappadoce)", 1460 m, 18.VI.1856, *Balansa 434* (G-BOIS [G00332253]); "Mt. près Ispir", 6.VII.1862, *Bourgeau s.n.* (G-BOIS [G00791876]); "Bouldour Pisidiae ad lucum", IV.1845, *Heldreich s.n.* (BM [BM001254068], G [G00446120, G00446121, G00446122], G-BOIS [G00332254]); "in subalpinis Anatoliae", VI.1862, *Noë 900* (G-BOIS [G00332249]). **Uzbekistan:** "prope Bucharam", s.d., *Lehmann s.n.* (G-BOIS [G00791888]).

= ***Goldbachia laevigata*** (M. Bieb.) DC., Syst. Nat. 2: 577. 1821.

Note. – The lectotype collections was selected over the other syntypes because it is more complete and several duplicates are extant.

Parlatoria Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 72. 1842.

Tribe: *Thlaspideae* DC.

Note. – A monospecific genus distributed in Iran, Iraq, and Turkey.

Parlatoria cakiloidea Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 72. 1842 (Fig. 13D, p. 57).

Type: "[Aucher-Eloy] N. 199, Mons Namkou Assyriae".

Lectotypus (designated here): **Iraq:** "in Mte. Namkou", s.d., *Aucher-Eloy 199* (G-BOIS [G00332255]; isolecto-: BM [BM000522258], G [G00446111], K [K000693916, K000693918], MO [MO1619107], P [P00741763, P00741764]).

Note. – Boissier (1842a) based the species description on G00446111 and the lectotype above.

Parlatoria griffithiana Boiss., Diagn. Pl. Orient. ser. 2, 1: 23. 1854.

Type: "Hab. in regno *Cabulico* (cl. Griffith No 1472)".

Holotypus: Afghanistan: *sine loco,* s.d., *Griffith 1472* (G-BOIS [G00330375]; iso-: K [K000693285, K00693286, K00693287]).

= ***Arabis bijuga*** G. Watt in J. Linn. Soc., Bot. 18: 378. 1881.

Notes. – Boissier (1854) based the species description solely on the unicate in his herbarium and therefore that unicate is the holotype.

He indicated in *Flora Orientalis* that *Parlatoria griffithiana* ought to be removed from the genus and placed in *Sisymbrium* sect. *Arabidopsis,* a position that influenced Schulz (1924) in recognizing the plant as *Arabidopsis mollissima* var. *griffithiana* (Boiss.) O.E. Schulz, and later tentatively accepted by Hedge (1968). The holotype was correctly annotated by Hedge in March 1965 as "*Arabis* sp.?", whereas Schulz annotated it on 19 Sept 1920 as "An genus novum?".

In every aspect of the plant, *Parlatoria griffithiana* is indistinguishable from *Arabis bijuga,* and although Boissier's epithet predates Watt's, it cannot be used because Jafri (1956) described *A. griffithiana* Jafri based on a different type. For further details and typification, see Al-Shehbaz (2015a, 2015b).

Parlatoria rostrata Boiss. & Hohen. in Boiss., Diagn. Pl. Orient. 8: 22. 1849.

≡ ***Lysakia rostrata*** (Boiss. & Hohen.) Esmailbegi & Al-Shehbaz in Taxon 67: 334. 2018.

Type: "Hab. in valle *Vesbach* montis *Elbrus* propè *Derbend* Kotschy No 236".

Lectotypus (designated by Esmailbegi & Al-Shehbaz in Esmailbegi et al., 2018: 334): **Iran:** "In valle Wesbach m. Elbrus pr. Derbend", 3.VI.1843, *Kotschy 236* (G-BOIS [G00332257]; isolecto-: BM [BM001254051, BM001254073], FI [FI005715], G [G00446112, G00446113, G00446114], P [P00741766, P00741767], W [W0075971, W0075972]).

Notes. – The lectotype is a collection folder of two sheets, one of which has a printed label as in the isolectotypes, and the other has the species name, collection number, and date written by Boissier.

The sheet P00741766, was annotated by Boissier on a strip glued to the printed label.

Parlatoria brachycarpa Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 73. 1842.

Type: "Clarus Kotschy è monte Tauro, collectionis n. 35".

Holotypus: Turkey: "In monte Tauro", summer 1836, *Kotschy 35* (G-BOIS [G00332259]; iso-: BM [BM001254074], G [G00446129], K [K000693920, K000693921, K000693925]).

= ***Sobolewskia clavata*** (Boiss.) Fenzl in Tchich., Asie Min., Bot. 1: 348. 1860.

Note. – This and next entry belong to *Sobolewskia* rather than *Parlatoria,* a genus distinguished from the latter by being perennials (vs annuals) with apiculate (vs non-apiculate) anthers, 2–4-seeded (vs 1-seeded) fruits, and non-articulate (vs articulate) fruiting pedicels (Esmailbegi et al., 2018).

Sobolewskia M. Bieb., Fl. Taur.-Caucas. 3: 421. 1819.

Tribe: *Thlaspideae* DC.

Note. – A genus of four species distributed in the Caucasus, Russia, Syria, Turkey, and Ukraine.

Parlatoria clavata Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 73. 1842.

≡ ***Sobolewskia clavata*** (Boiss.) Fenzl in Tchich., Asie Min., Bot. 1: 348. 1860.

Type: "[Aucher-Eloy] N. 134, Alpes Laristani; 183, circa Aleppum".

Lectotypus (designated here): **Turkey:** "in Kurdistano. Alpes Laristani", s.d., *Aucher-Eloy 134* (G-BOIS [G00332258]; isolecto-: G [G00403648, G00446126, G00446128], K [K000693925], P [P05415006, P05415023]). **Syntypus: Syria:** "Alep", s.d., *Aucher-Eloy 183* (P [P05415024]).

Note. – The *Aucher-Eloy 183* syntype was not found in all of the Geneva herbaria, though the P05415024 specimen was annotated by Boissier and taken here as a syntype.

Cochlearia L., Sp. Pl.: 647. 1753.

Tribe: *Cochlearieae* Buchenau.

Notes. – *Cochlearia* is a well-defined genus of about 16 species distributed primarily on costal northern North America, central, western, and northern Europe, and eastern Asia (Koch, 2012).

The genus was so broadly delimited by Boissier in *Flora Orientalis* to include species currently assigned to *Armoracia* G. Gaertn.et al.*(Cardamineae), Kernera* Medik. *(Kernereae), Peltariopsis* (Boiss.) N. Busch and *Pseudocamelina* (Boiss.) N. Bush *(Thlaspideae),* and *Noccaea* Moench *(Coluteocarpeae),* but none in *Cochlearia*.

The first three taxa below were assigned to *Pseudosempervivum* for almost 50 years, and they have recently been transferred to *Noccaea* (Özüdoğru et al., 2019).

Cochlearia sempervivum Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 5: 28. 1856.

≡ ***Noccaea sempervivum*** (Boiss. & Balansa) Özüdoğru & Al-Shehbaz in Ann. Missouri Bot. Gard. 104: 349. 2019.

Type: "Hab. in regione montanâ superiori montis *Masmeneudagh* cl. Balansa. Augusto jam fructiferum".

Holotypus: Turkey: "Région montagneuse supérieure du Masmeneu Dagh, à 25 lieues au SSO de Césarée", 8.VIII.1855, *Balansa 439* (G-BOIS [G00332260]; iso-: BM [BM000582868], G [G00389743], GOET [GOET001739], JE [JE00001803, JE00001804], K [K000484388, K000484389], KW [KW000128007], P [P02272525, P02272526, P02272527, P02272528], W [W18890011478, W18890076132], WAG [WAG0004283]).

Notes. – The holotype is a collection folder of three sheets, of which one has a handwritten label with the field number *179,* another has a printed label with identical information except the exsiccatae number *439* (as in all isotypes), and the third sheet has four rosettes and part of the inflorescence. The G isotype is also a collection folder of three sheets only one of which is labeled.

This species was recently lectotypified by Al-Shehbaz (Özüdoğru & German, 2018) based on the same G-BOIS duplicate above, but further checking revealed that Boissier based the species description solely on the specimen in his herbarium and, therefore, the above lectotypification was unnecessary.

Cochlearia aucheri Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 168. 1842.

≡ ***Noccaea aucheri*** (Boiss.) Özüdoğru & Al-Shehbaz in Ann. Missouri Bot. Gard. 104: 349. 2019.

Type: "[Aucher-Eloy] N. 305, Olympus Armeniae".

Holotypus: Turkey: "in Olympo Armeniae", s.d., *Aucher-Eloy 305* (G-BOIS [G00332262]; iso-: BM [BM000582864], G [G00446131, G00446132, G00446133], K [K000484392, K000484394], MO [MO1618792], P [P02272499]).

Note. – No additional duplicates of the type collection were found, and none of the above ones was examined or annotated by Boissier. Therefore, the unicate in G-BOIS is the holotype.

Cochlearia aucheri var. *minor* Boiss., Fl. Orient. Suppl.: 47. 1888.

Type: "Hab. in lapidosis mobilibus regionis alpinae Ponti Lazici supra Khabackar 9000' (Bal.!)".

Holotypus: Turkey: "Pierres mouvantes de la région alpine supérieure du Lazistan, au-dessus de Khabakhor", c. 2900 m, VIII.1866, *Balansa 58* (G-BOIS [G00332263]; iso-: JE [JE00002758], K [K000484384, K000484385], P [P04712343, P05413241, P05413242, P06648879], W [W0075686, W18890148461]).

= ***Noccaea aucheri*** (Boiss.) Özüdoğru & Al-Shehbaz in Ann. Missouri Bot. Gard. 104: 349. 2019.

Note. – The isotypes have the exsiccatae number *1364* instead of the field collection number *58* on the holotype.

Cochlearia drabicarpa Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 169. 1842.

≡ ***Peltariopsis drabicarpa*** (Boiss.) N. Busch in Věstn. Tiflissk. Bot. Sada ser. 2, 3–4: 8. 1927.

Type: "[Aucher-Eloy] N. 4152, Seid-Khodji".

Lectotypus (designated here): Azerbaijan: "Seid Kadji", s.d., *Aucher-Eloy 4152* (G-BOIS [G00332264]; isolecto-: BM [BM000582889, BM000582894], G [G00371880, G00371886], KW [KW000128006], LE [LE00012867], P [P02272513, P02272514, P02272515], W [W0075840]).

Notes. – Annotation by Boissier of P02272514 indicates that he used that sheet and the unicate in his herbarium to draft the species description.

The same type collection number *(Aucher-Eloy 4152)* was listed under *Thlaspi natolicum* though from a different locality.

Cochlearia planisiliqua Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 169. 1842.

≡ ***Peltariopsis planisiliqua*** (Boiss.) N. Busch in Věstn. Tiflissk. Bot. Sada ser. 2, 3–4: 8. 1927 (Fig. 15A, p. 59).

Type: "[Aucher-Eloy] N. 4069 L., Seid-Khodji".

Lectotypus (designated here): Azerbaijan: "Seid Khadji", s.d., *Aucher-Eloy 4169L* (G-BOIS [G00332265]; isolecto-: BM [BM000582893, BM000582895], G [G00389744, G00389745], LE [LE00012868, LE00012869], P [P05348508, P05358509]).

Notes. – Boissier's annotation of P05348508 indicates that he based his species description on that sheet and the unicate in his herbarium.

All duplicates of the type collection have the collection number as *Aucher-Eloy 4169L* instead of the erroneous listing of *4069L* in the protologue.

The type locality of this and previous species spelled differently in print and on the labels, and it is used here exactly the way it is presented.

Cochlearia szowitsii Boiss., Fl. Orient. 1: 248. 1867.

Type: "Hab. in rupestribus Koschadara prov. Aderbidjan (Szow!)".

Lectotypus (designated here): Azerbaijan: "In rupestribus Koschadara", 7.VII.1829, *Szovits 490* (G-BOIS [G00791209]; isolecto-: G-BOIS [G00791210], K [K000618640], LE, P [P02272524]).

= ***Peltariopsis planisiliqua*** (Boiss.) N. Busch in Věstn. Tiflissk. Bot. Sada ser. 2, 3–4: 8. 1927.

Note. – The isolectotype G00791210 is a collection folder of two sheets, and together with the isolectotypes at K and P, their labels list Armenia but without the precise locality or date: "Ex herbario horti Petropolitani. Cochlearia szovitsii Boiss. n. sp. (teste Boissier). Armenia. Szovits".

Cochlearia camelinae Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 172. 1842 [nom. illeg.] [non Ledeb.].

Type: "[Aucher-Eloy] N. 331 et 4164, Persia".

Lectotypus (designated by Miller, 1978: 28): Iran: *sine loco,* s.d., *Aucher-Eloy 4164* (G-BOIS [G00332266]; isolecto-: BM [BM000582866], E [E00381433], G [G00389747, G00389748], K [K000484395], MO [MO1618791], P [P02272509, P02272510, P02272511]). **Syntypus:** Iran: "Persia", 1835, *Aucher-Eloy 931* (P [P05413238]).

= ***Pseudocamelina glaucophylla*** (DC.) N. Busch in Beih. Bot. Centralbl., Abt. 2, 44: 214. 1927.

Notes. – Although Boissier (1842b) cited *Aucher-Eloy 331,* there is no trace of that number in the Geneva herbaria. However, the unicate P05413238, which was annotated by him as *Cochlearia camelinae,* is *Aucher-Eloy 931* (not *331*), and subsequently he (Boissier, 1867a, 1888) did not list that collection again.

The earlier homonym of *C. camelinae* was published in late 1841.

Cochlearia violacea Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 171. 1842.

Type: "[Aucher-Eloy] N. 91, Persia".

Lectotypus (designated by Miller, 1978: 28): **Iran:** *sine loco,* s.d., *Aucher-Eloy 91* (G-BOIS [G00332267]; isolecto-: G [G00371872, G00371889], P [P02272519, P02272520]).

= ***Pseudocamelina glaucophylla*** (DC.) N. Busch in Beih. Bot. Centralbl. Abt. 2, 44: 214. 1927.

Note. – Boissier annotated P02272519 and studied it, along with the duplicates in his and Candolle's herbaria, for the species description.

Cochlearia campylocarpa Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 171. 1842.

≡ ***Pseudocamelina campylocarpa*** (Boiss.) N. Busch in Zhurn. Russk. Bot. Obshch. Akad. Nauk. 13: 115. 1928.

Type: "[Aucher-Eloy] N. 95, Ispahan".

Holotypus: Iran: "Ispahan", s.d., *Aucher-Eloy 95* (G-BOIS [G00332268]; iso-: BM [BM001254038], G [G00389746], K [K000484396], P [P02272512]).

Note. – Boissier (1842b) based the species description solely on the unicate in his herbarium and did not examine the other duplicates at G or P.

Cochlearia aphragmodes Boiss., Diagn. Pl. Orient. 6: 15. 1846.

≡ ***Pseudocamelina aphragmodes*** (Boiss.) N. Busch in Zhurn. Russk. Bot. Obshch. Akad. Nauk. 13: 115. 1928.

Type: "Hab. in glareosis regionis summae alpis *Kuh-Daëna* Persiae australis Kotschy No. 656".

Lectotypus (designated by Esmailbegi et al., 2017b: 119): **Iran:** "In glareosis reg. superiorum m. Kuh-Daëna", 15.VII.1842, *Kotschy 656a* (G-BOIS [G00332269]; isolecto-: BM [BM000582869], G [G00389749], K [K000484397], KW [KW000128004], P [P02272501, P02272502, P02272503]).

Note. – As shown by Esmailbegi et al. (2017b), both of Kotschy's collection numbers *656a* and *656* were collected from the same locality, but those of *656* are coarser and perhaps were collected from lower elevations. They are recognized here as likely isolectotypes: BM [BM001254039], G [G000371890], P [P05348478, P05348481, P04627220, P05413210], W [W0051434].

Aubrieta Adans., Fam. Pl. 2: 420. 1763.

Tribe: *Arabideae* DC.

Note. – A genus of 21 species distributed is E Europe and SW Asia, with the highest concentration of species in Greece and Turkey.

Aubrieta gracilis Spruner ex Boiss., Diagn. Pl. Orient. 1: 74. 1843.

Type: "Hab. in regione alpinâ, in monte *Velugo* Aetoliae, *Tymphresto* veterum alt. 6000' detexit amic. Sprunner".

Holotypus: Greece: "Velugo in Aetolien", 6000' [1830 m], 1842, *Spruner s.n.* (G-BOIS [G00332270]; iso-: B [B100241177], BM [BM000750105], LD [LD1575687], W [no barcode]).

Notes. –Boissier (1843) based the species description on an unicate. The species was later lectotypified by Phitos (2002: 194) based on the same G-BOIS unicate. Therefore this lectotypification is superfluous.

The holotype is a collection folder of two sheets one of which is unlabeled, but the labeled one was undated, while the duplicate at B is.

Aubrieta intermedia Heldr. & Orph. ex Boiss., Diagn. Pl. Orient. ser. 2, 1: 36. 1854.

Type: "Hab. in monte *Kyllene* suprâ *Trikala* (Cl. Orphanides), in *Parnassi* regione alpinâ (Heldreich!), in rupestribus montis *Onii Baeotiae* (Heldr!) et probabiliter in multis aliis locis Graeciae cum *A. deltoideâ* commixta".

Lectotypus (designated by Phitos, 1970: 77): **Greece:** "In monte Parnasso reg. alpine", 6.VIII.1852, *Heldreich 2654* (G-BOIS [G00332271]; isolecto-: K [K000693425], W [W0075682], WAG [WAG0000789]). **Syntypi: Greece:** "In rupestribus reg. superioris m. Onii Baeotiae", 9.V.1851, *Heldreich 53* (G-BOIS [G00332272]); "Cyllene, Tricala", 22.IV.1854, *Orphanides 372* (C [C10008795], HAL [HAL0084116], K [K000693426], WAG [WAG0000790]); "Cyllene, Tricala", 4.V.1854, *Orphanides 372* (BM [BM000750097], JE [JE00003594, JE00003595]); "Kyllene (Trikala)", VI.1851, *Orphanides 2030* (G-BOIS [G00332273]).

= ***Aubrieta deltoidea*** (L.) DC., Syst. Nat. 2: 294. 1821.

Notes. – The G-BOIS material includes another *Heldreich 2654,* but that was collected from "submontines Achajae prope

Megaspilaeon" on 30 April 1861, six years after the publication of the species.

Several collections by Heldreich (e.g., [C10008796], [MPU017004]) and Orphanides (above) were collected in April, May, June, and August 1854, and their collection dates overlap with the publication date of Boissier (1854) which was in May-August of that year. These are recognized here, as on several websites, as syntypes because the exact publication day and month is not yet known.

Aubrieta olympica Boiss., Fl. Orient. 1: 251. 1867.

Type: "Hab. in regione alpinâ summâ Olympi Bithyni (Boiss! Clem!)".

Lectotypus (designated here): **Turkey:** "In rupestrib. alpin. Olymp. bith.", 14.VIII.1850, *Clement s.n.* (G-BOIS [G00332274]; isolecto-: E [E00438353], P [P00747673], W [W18890312947]). **Syntypus: Turkey:** "Olympus", s.d., *Boissier s.n.* (G-BOIS [G00332275]).

Note. – Clement's collection was chosen instead of Boissier's unicate as the lectotype because it is more complete and represented by duplicates.

Aubrieta pinardii Boiss., Diagn. Pl. Orient. ser. 2, 1: 37. 1854.

Type: "Hab. in Cariâ (Pinard exs. 1843 sub *A. gracili*)".

Holotypus: Turkey: "Caria", 1843, *Pinard s.n.* (G-BOIS [G00332276]; iso-: B [B100241173], BM [BM000583706], G [G00383421, G00383422, G00383423], K [K000618641, K000693428, K000693429], MPU [MPU017003], P [P00747650, P00747651, P00747652, P00747653], W [W00075791, W18890312946], WAG [WAG0000792]).

Note. – The G-BOIS holotype is a collection folder of three sheets all of which are labeled. Boissier did not examine additional material elsewhere.

Aubrieta pinardii var. *integrifolia* Boiss., Fl. Orient. 1: 252. 1867.

Type: "Hab. in monte Boulgasdagh Phrygiae (Bal!)".

Holotypus: Turkey: "Boulgas-Dagh (Phrygie)", 13.VI.1857, *Balansa 380* (G-BOIS [G00332279]).

= ***Aubrieta pinardii*** Boiss., Diagn. Pl. Orient. ser. 2, 1: 37. 1854.

Note. – Except for having an entire instead of minutely 1- or 2-toothed leaf margin, which is not a taxonomically reliable feature, this variety does not differ from *A. pinardii*.

Aubrieta deltoidea var. *microphylla* Boiss., Fl. Orient. 1: 252. 1867.

Type: "Hab. in alpinis Cephaloniae (Heldr!), Cariae in monte Cadmo (Boiss!), Sipyli supra Magnesiam (Bal. exs. 72!), Lyciae in monte Akdagh (Bourg!), Galatiae in monte Elmadagh (Tchih!)".

Lectotypus (designated here): **Turkey:** "In rupestribus ad basim montis Ak-Dagh", 4.VII.1860, *Bourgeau s.n.* (G-BOIS [G00332280]; isolecto-: G [G00446135], P [P00747671], W [W00075684, W18890067039]). **Syntypi: Turkey:** "Partie supérieure du Mont Sipyle, au-dessus de Magnésie", 10.VI.1854, *Balansa 72* (BM [BM001254079], G [G00446136, G00446605], G-BOIS [G00332281], K [K000693430], P [P04631692, P06618255], W [W00075683, W18890080873, W18890158132]); "Pic de Geyra. Jun. Cadmus occidentalis", s.d., *Boissier s.n.* (G-BOIS [G00332283]); "insula Cephalonia. M. Aenos", 9.V.1860, *Heldreich s.n.* (G-BOIS [G00332282]).

= ***Aubrieta deltoidea*** (L.) DC., Syst. Nat. 2: 294. 1821.

Notes. – The Bourgeau syntype is more complete than the other three syntypes in G-BOIS and, therefore, designated as the lectotype.

No material of the Tchihatcheff syntype was located.

Aubrieta deltoidea var. *canescens* Boiss., Fl. Orient. 1: 252. 1867.

≡ ***Aubrieta canescens*** (Boiss.) Bornm. in Repert. Spec. Nov. Regni Veg. Beih. 89: 44. 1936 (Fig. 15B, p. 59).

Type: "Hab. in Cadmo supra Geyra (Boiss.!), in alpinis montis Akdagh Lyciae (Bourg.!), in fissuris rupium montis Berytdagh Cataoniae (Haussk!)".

Lectotypus (designated here): **Turkey:** "In rupestribus regionis alpinae superioris montis Ak-Dagh", 3.VII.1860, *Bourgeau s.n.* (G-BOIS [G00332284]; isolecto-: K [K000693432], P [P00747672]). **Syntypi: Turkey:** "Pic de Geyra pars media. Jun ad rupes", s.d., *Boissier s.n.* (G-BOIS [G00332286]); "Taurus Cataonicus. In fissur. rup. Berytdagh", 10000' [3050 m], 10.VIII.1865, *Haussknecht s.n.* (G-BOIS [G00332285], JE [JE00003200]).

Note. – As in the previous similar cases, the designation of a lectotype among the syntypes in G-BOIS is based on the completness of specimens and availability of duplicates.

Aubrieta deltoidea var. *cilicica* Boiss., Fl. Orient. 1: 252. 1867.

≡ ***Aubrieta canescens*** subsp. ***cilicica*** (Boiss.) Cullen in Notes Roy. Bot. Gard. Edinburgh 26: 199. 1965.

Type: "Hab. in Tauro Cilicico (Ky! Bal!), Ciliciâ Kurdicâ (Ky exs. 104!)".

Lectotypus (designated here): **Turkey:** "Plantae in montibus Kassan Oghlu ad pagum Gorumse lectae. In Cedreto locis rupestribus fissura incolit", 5000' [1520 m], 18.V.1859, *Kotschy 104* (G-BOIS [G00332287]; isolecto-: B [B100241181], BM [BM000583707], G [G00389286], JE [JE00003199], K [K000693435], P [P00747669, P00747670], W [W18890058147]). **Syntypi: Turkey:** "Région montagneuse du Taurus oriental au-dessus de Gulex-Boghas", VII–VIII.1855, *Balansa 213* (G-BOIS [G00332288]); "Plantae Tauri Cilicici", 1853, *Kotschy s.n.* (G-BOIS [G00332289]).

Notes. – The same collection number *(Kotschy 104)* is also listed under *Sisymbrium nudum* var. *brachycarpum,* but from a different locality.

Several other collection numbers by Kotschy (e.g., *20, 27, 29*) have been considered as syntypes (see JSTOR Global Plants website), but these are excluded from the list above because no such collections were examined by Boissier.

Aubrieta parviflora Boiss., Diagn. Pl. Orient. 6: 14. 1846 (Fig. 13B–C, p. 57).

Type: "Hab. circa *Schiraz* Aucher 4169, ad rupes abscissas montis *Kuh-Barfi* prope eandem urbem Kotschy No. 342".

Lectotypus (designated here): **Iran:** "Chiraz", s.d., *Aucher-Eloy 4169O* (G-BOIS [G00332290]; isolecto-: BM [BM000583708, BM000583709], G [G00389138, G00389139], K [K000693444], P [P00747661, P00747662]). **Syntypus: Iran:** "Ad rupes abscissas m. Kuh-Barfi pr. u. Schiras", 4.V.1842, *Kotschy 342* (B [B100241174], BM [BM000522078], E [E00386183], G [G00389135, G00389136, G00389137], G-BOIS [G00332291], H [H1353873], K [K000693439], L [L1818812], MO [MO3728920], P [P00747654, P00747655, P00747656, P00747657, P00747658, P00747659, P00747660, P00747661], W [W00075789, W18890029645, W18890154968], WU [WU0101797]).

Note. – In the original protologue of the species, Boissier listed *Aucher-Eloy 4169,* rather than *4169O* as in all the duplicates of this collection, including the lectotype.

Aubrieta parviflora var. *kurdica* Boiss., Fl. Orient. 1: 253. 1867.

Type: "Hab. ad Mar Jako Kurdistaniae prope Mossoul (Barré de Lancy!)".

Holotypus: Iraq: "Environs de Mossoul (Mar Jako, 1rs pentes du Kurdistan)", Printemps de 1819, *Barré de Lancy 2671* (G-BOIS [G00332292]).

= ***Aubrieta parviflora*** Boiss., Diagn. Pl. Orient. 6: 14. 1846.

Note. – The holotype of this variety is basically indistinguishable from plants of this highly variable and most widespread species in the genus.

Aubrieta libanotica Boiss., Diagn. Pl. Orient. 8: 32. 1849.

Type: "Hab. in *Libano* suprà *Cedros*. Legi [Boissier] Jul. 1846".

Holotypus: Lebanon: "Liban au dessus des Cèdres", V–VII.1846, *Boissier s.n.* (G-BOIS [G00332293]; iso-: G [G00446137, G00446138], K [K000693446], KW [KW000127913], P [P06618291], PH [PH00005801], W [W19660021979]).

Note. – The holotype is a collection folder of two sheets, of which one lacks the collection date. Labels of the isotypes differ from that of the holotype in having the collection month as July and the locality as "supra Cedros".

Aubrieta kotschyi Boiss., Diagn. Pl. Orient. 8: 32. 1849.

Type: "Hab. in saxosis praeruptis regionis *Murch Mahal* montis *Elbrus* propè *Derbend*. Kotschy No 80".

Holotypus: Iran: "In saxosis praeruptis reg. Murch Mahal in m. Elbrus pr. Derbend", 5.V.1843, *Kotschy 84* (G-BOIS [G00332295]; iso-: G [G00389140, G00389141, G00389142], H [H1353874], K [K000693436, K000693438], KW [KW000127912], L [L1818915], MO [MO3728918], P [P00747663, P00747664, P00747665, P00747666, P00747667], W [W0075790], WAG [WAG0004274], WU [WU0101796]).

= ***Aubrieta parviflora*** Boiss., Diagn. Pl. Orient. 6: 14. 1846.

Note. – The obvious mistake in the collection number, *Kotschy 80* instead of *84,* in the original publication was later corrected by Boissier (1867a, 1888).

Aubrieta edentula Boiss., Fl. Orient. 1: 254. 1867.

Type: "Hab. in alpinis Armeniae Kurdicae ad Khana Putkie unde ex seminibus a cl. Kotschy allatis plantam in Hort. Valeyres colui".

Holotypus: Armenia: "Jardin de Valeyres Jun. 1869 en Armeniâ Channa Pucky", VI.1869, *Kotschy s.n.* (G-BOIS [G00332296]).

= ***Aubrieta parviflora*** Boiss., Diagn. Pl. Orient. 6: 14. 1846.

Note. – Only the holotype sheet exists, and it was taken from cultivated plant grown in Boissier's private garden at Valeyres from seeds collected by Kotschy.

Ricotia L., Sp. Pl.: 912. 1753.

Tribe: *Biscutelleae* Dumort.

Note. – An eastern Mediterranean genus of nine species centered in Turkey where five species are endemic (Özüdoğru et al., 2015).

Ricotia cretica Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. 8: 29. 1849.

Type: "Hab. inter saxa montium *Sphacioticorum* in fauce *Askyphous* dictâ alt. 3000'. (Heldreich) Fl. Aprili".

Lectotypus (designated here): **Greece:** "inter saxa. Sphakia: gorge d'Askyphous", c. 3000' [910 m], 2.IV.1846, *Heldreich 1368* (G-BOIS [G00332300]; isolecto-: BM [BM000750103], K [K000484453], W [W18890010564], WU [WU075948]). **Syntypus: Greece:** "Creta inter sysa mtium Sphaciot.", 3000' [910 m], V.1846, *Heldreich s.n.* (B [B100241717], GOET [GOET002649], K [K000484454], P [P00747550]).

Notes. – There is a single sheet in all of the G combined herbaria that matches perfectly well the original protologue, and it is designated above as the lectotype.

Burtt (1951: 130) cited the Kew sheet, "In montibus sphacioticis in regione pinetorum, 1050–1200 m [3500–4000 feet on the label], April 1846, *Heldreich* (isotypus, K!)" but that is not a lectotypification of the species.

Tan (2002) cited the G-BOIS sheet above as type and the K sheet as an isotype, but that does not qualify for lectotypification of the name because it is post 2001, and she did not use the phrase "designated here" or its equivalent (see Turland et al., 2018: Art. 9, note 6; McNeill, 2014).

Some duplicates were distributed with labels carrying Boissier's handwriting indicating a collection date of May instead of April 1846, and are treated here as syntypes. These and the isolectotypes do not have Heldreich's field collection number. Indeed, only the lectotype and WU duplicates have the collection number, though the latter has the locality as "in montibus Sphacioticis. Cretae prope Askyphous. inter saxa".

Ricotia carnosula Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. 8: 30. 1849.

Type: "Hab. inter saxa maritima ad occidentem urbis *Adalia* in *Pamphyliâ* (Heldr.) Fl. Mart. fruct. Aprili".

Lectotypus (first step designated by Burtt, 1951: 129; second step designated here): **Turkey:** "Inter lapides ad oras maris Adalia", IV.1845, *Heldreich s.n.* (G-BOIS [G00332297]; isolecto-: B [B100241718 three fruiting plants], BM [BM001254077], E [E00373142], G [G00446139, G00446140], GOET [GOET0024648], K [K000484459, K000484461], KW [KW000127926], P [P00747551, P00747552, P00747554, P00747555], W [W00075701A, W18890010563 bottom fruiting plant], WIS [WIS0255297]). **Syntypus: Turkey:** "Adalia", 14.III.1845, *Heldreich 475* (B [B100241718 seven plants in flower], G-BOIS [G00332299], W [W00075701B, W18890010563 five top plants in flower]).

Notes. – The protologue cited flowering material collected in March and fruiting in April, and by citing a specimen in Kew collected in April as an isotype, Burtt (1951) basically made a first step lectotypification. However, he did not indicate where the type (or lectotype) is housed, and that step is completed herein.

To our knowledge, there are only three numbered sheets *(Heldreich 475)* that indicate a flowering date of 14 March 1845 and fruiting date of 5 April 1845. The sheet in G-BOIS is cited above as a syntype. The other sheet is at B, and it has seven plants in flowers and three in fruit, and the mixed collections B100241718 and W18890010563 each is listed as an isotype and syntype.

Label of G-BOIS [G00332299] gives a slightly different locality "Dans les cailloux (*non* in arenosis!!) au bord de la mer à 1 lieue à l'ouest d'Adalia. le 14 mars en fleurs. Le 5 avril les siliques. 1845" and the duplicate includes only two plants in flower.

Ricotia sinuata Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. 8: 30. 1849 (Fig. 15C, p. 59).

Type: "Hab. in faucibus montis *Climax* propè *Kourmalu* Lyciae et in promontorio *Alaya* Pamphyliae in saxis inter frutices. (Heldreich.)".

Lectotypus (first step designated by Burtt, 1951: 129; second step designated here): **Turkey:** "rare au promontoir d'Alaya, dans les rocailles", 18.IV.1845, *Heldreich 564* (G-BOIS [G00332301]; isolecto-: BM [BM00125406], E [E00373140], G [G00446141, G00446142], GOET [GOET002650], K [K000484456, K000484457, K000484458], KW [KW000127928], P [P00747544, P00747545], WAG [WAG0004251]). **Syntypus: Turkey:** "in rupestribus apricis. Gorge du Mt. Climax près de Kourmalu. 3 heures à l'Ouest d'Adalia", 4.V.1845, *Heldreich 564* (G-BOIS [G00332303], KW [KW000127927], P [P00747543]).

Notes. – Burtt (1951) narrowed the two collections cited in the protologue to one at K as an isotype, but he did not indicate where the type (or lectotype) is housed. The presence in the Geneva herbaria of three duplicates of the type collection, including two in G-BOIS, necessitated a second step lectotypification.

One might consider that discrepancy in the collection data between the lectotype and isolectotypes sheets (*Heldreich s.n.* "Ad rupes promont. Alaya. Pamphyliae. Apr. 1845") to be significant, but the following arguments stand against that. First, the collection number on the lectotype was given by Heldreich on two other G-BOIS duplicates from different localities, just as he did for many other species in that herbarium. Second, the lectotype is a collection folder of two sheets, of which one has the original handwritten label by Heldreich and the other has the abbreviated handwritten label by Boissier. Finally, the printed, Boissier's handwritten label on all isolectotypes, as is the case for many other species, does not perfectly match the original Heldreich handwritten label. The same discrepancy exits for the syntype in G-BOIS that has an original label with indications as above but with number *564* and a printed handwritten label by Boissier with: "In faucibus montis Climax. propè Kourmalu. Pamphylia. Mai 1845" without collection number indicated.

Two duplicates in Paris, P00747548 and P00747549, have the locality as Pamphylia and the year 1845 but no month. These may be part of the same lectotype collection or perhaps only syntypes.

Fibigia Medik., Pfl.-Gatt.: 90. 1792.

Tribe: *Alysseae* DC.

Notes. – As most recently delimited (Španiel et al., 2015), *Fibigia* includes only three European and SW Asian species.

For taxa previously placed in the genus (especially *Acuston* Raf., *Brachypus* Ledeb., and *Irania* Hadač & Chrtek) the above reference should be consulted.

Fibigia macroptera (Kotschy & Boiss. ex E. Fourn.) Boiss., Fl. Orient. 1: 257. 1867.

≡ *Farsetia macroptera* Kotschy & Boiss. ex E. Fourn. in Bull. Soc. Bot. France 11: 60. 1864.

Type: "Kotschy *iter cilicico-curdicum,* n. 380".

Lectotypus (designated here): **Turkey:** 'Plantae in prov. Musch ad radices australes Bimgoell montis ad Gumgum in districtu Warto lectae. In valle Goschkar", 5600' [1705 m], 22.VIII.1859, *Kotschy 380* (P [P00747709]; isolecto-: B [B100241470, B100241471], E [E00373132], G [G00446144], G-BOIS [G00332305], JE [JE00001348], K [K000484529], P [P00747710, P06618013], S [S1216049, S1216050], W [W0075788]).

= ***Fibigia macrocarpa*** (Boiss.) Boiss., Fl. Orient. 1: 258. 1867.

Notes. – All three duplicates of the type collection at P have printed labels, and none was annotated by any of the three species authors. The one with dehiscent fruit showing the broadly winged seeds is taken here as the lectotype.

Boissier (1867a) did not cite Fournier (1864) for the original publication of the species as *Farsetia,* though it is evident that he had the same taxon in mind.

Fibigia macroptera var. *microcarpa* Boiss., Fl. Orient. Suppl.: 48. 1888.

Type: "Hab. in dumetis montis Sawers 8000' et in quercetis montis Kuh Eschker Persiae occid. 8–10000' (Haussk.!)".

Lectotypus (designated here): **Iran:** "In quercetis m. Kuh Eschker, dit Kuh Kilugek", 8000'–10000' [2440–3050 m], VII.1868, *Haussknecht s.n.* (G-BOIS [G00332306]; isolecto-: JE [JE00001347]). **Syntypus: Iran:** "In dumetis m. Sawers", 8000 [2440 m], VII.1868, *Haussknecht s.n.* (G-BOIS [G00332307], K [K000484528]).

= ***Fibigia macrocarpa*** (Boiss.) Boiss., Fl. Orient. 1: 258. 1867.

Note. – The variation in fruit size in *F. macrocarpa* is continuous and does not fall into any discrete geographical or morphological pattern that justifies its subdivision into infraspecific taxa.

Fibigia macrocarpa (Boiss.) Boiss., Fl. Orient. 1: 258. 1867.

≡ *Farsetia macrocarpa* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 89. 1842.

Type: "[Aucher-Eloy] N. 236, Akdag".

Holotypus: Turkey: "Akdagh", s.d., *Aucher-Eloy 236* (G-BOIS [G00386394]; iso-: G [G00334005, G00386395], K [K00048453], MPU [MPU017868], P [P00747711, P00747712]).

Note. – Boissier based the description of the species solely on the unicate in his herbarium, and he did not annotate or examine the duplicates of G or P.

Fibigia obovata (Boiss. & Kotschy) Boiss., Fl. Orient. 1: 258. 1867.

≡ *Farsetia obovata* Boiss. & Kotschy in Boiss., Diagn. Pl. Orient. ser. 2, 5: 27. 1856.

≡ *Acuston perenne* subsp. *obovatum* (Boiss. & Kotschy) Mabb. & Al-Shehbaz in Novon 25: 415. 2017.

Type: "Hab. in jugis frigidis Antilibani supra Bludan alt. 6300' (Ky exs. 152!)".

Holotypus: Syria: "Circa Zebdaine prope Damascum. In jugis frigidis inter Bludan et Halbun pagum", 6500' [1980 m], 17.VI.1855, *Kotschy 142* (G-BOIS [G00332308]; iso-: B [B100241465], BM [BM001254080], E [E00373134], GZU [GZU000273463], K [K000618642], KW [KW000127920], LE, MPU [MPU017097], P [P00747701, P06618104, P06618105], W [W0075786, W0075787]) (Fig. 16, p. 60).

= ***Acuston petalodes*** (DC.) Al-Shehbaz (see following entry).

Notes. – Boissier in *Flora Orientalis* erred by listing under *Fibigia obovata* the earlier published *Alyssum petalodes* DC. as a synonym. *Fibigia obovata* is not illegitimate being based on a legitimate name. It is incorrect when published. The following entry with a new combination is proposed to recognize the taxon in *Acuston*.

The holotype is a collection folder of two sheets. The above barcoded sheet has four groups of plants (Fig. 16, p. 60), of which one is pinned by Kotschy's printed label with the full locality and date as above, another by a smaller label on which Boissier wrote the collection number *142,* and the remaining two by labels on which Boissier wrote "Syrie Liban Kotschy 1855" with "Farsetia obovata sp. nov." on one of them. The second sheet of the holotype consists of flowering and fruiting plant mounted by a label with "Syrie Liban Kotschy 1855" but without species name. The entire folder represents a single collection.

Boissier (1856) did not give Kotschy's collection number, but in *Flora Orientalis* erroneously gave *Kotschy 152* instead of *Kotschy 142* and the elevation at 6300 instead of 6500 feet. Furthermore, no specimen in the Geneva herbaria or in any of the herbaria cited above for the isotypes has the locality Manschura [currently Mansoura]. Clearly, there is a single collection made by Kotschy for the species. It is rather surprising, however, that Boissier in *Flora Orientalis* did not list *Farsetia obovata* in the text or index.

Although Post (1896, 1932), followed by Mouterde (1970), reduced *F. obovata* to a variety of *F. clypeata*, they are clearly very distinct species. *Fibigia clypeata* is a much taller plant usually more than 30 cm tall (vs 2–10 cm) and has fully or only basally bracteate (vs ebracteate), 10–40-fruited (vs 1–3-fruited) infructescence with typically oblong (vs narrowly obovate) fruit widest at the middle (vs distally).

The Syrian *F. obovata* was most recently recognized by Al-Shehbaz & Mabberley (2017) as a subspecies of the Aegean *Acuston perenne* (Mill.) Mabb. & Al-Shehbaz (= *A. lunarioides* (Willd.) Raf.) based on some similarities in floral and fruit characters. However, the disjunction of 1000 km between the Aegean and Syrian plants, as well as morphological differences presented by these authors, are considered here as important factors leading to the recognition of two species in *Acuston* Raf., instead of one with two subspecies.

Acuston petalodes (DC.) Al-Shehbaz, **comb. nov.**

≡ *Alyssum petalodes* DC., Syst. Nat. 2: 312. 1821.

Type: "Hab. in Syriâ. *Labillardiere.* (v.s. sp. in h. Labill.)".

Holotypus: Syria: *sine loco,* 1819, *Labillardière s.n.* (G [G00371675]; iso-: G-DC [G00205585]).

Notes. – Candolle (1821b: 312) indicated that he examined the material in Labillardière's herbarium, but as shown by Stafleu & Cowan (1979), collections of that herbarium from Syria, which were in Lemonnier's herbarium, are currently housed in the Geneva herbaria.

A search for possible duplicates in the Virtual Herbaria (2019) and P (including P-JU and P-LA), where many of Labillardière duplicates are currently housed, did not yield anything. Therefore, the listing of the holotype in P by Al-Shehbaz & Mabberley (2017) is erroneous.

By contrast, the G00371675 specimen is from Labilladière's herbarium with two different labels indicating Syria and Liban but no date, and it is concluded here that this is the holotype. The G-DC specimen above is a fragmentary material with a label in Candolle's handwriting "Alyssum petaloideam. M.Labillard. 1819" but no country or locality. The conclusion is that it was taken by Candolle from the holotype and, therefore, it is an isotype.

Fibigia multicaulis (Boiss. & Hohen.) Boiss., Fl. Orient. 1: 259. 1867.

≡ *Farsetia multicaulis* Boiss. & Hohen. in Boiss., Diagn. Pl. Orient. 8: 31. 1849.

≡ ***Irania multicaulis*** (Boiss. & Hohen.) Hadač & Chrtek in Acta Univ. Carol., Biol. 1971: 248. 1973.

Type: "Hab. in monte *Elbrus* propè pagum *Passgala*. Kotschy. No 203".

Holotypus: Iran: "In m. Elbrus pr. pagum Passgala", 27.V.1843, *Kotschy 203* (G-BOIS [G00332310]; iso-: [P00747702]).

Notes. – Thirteen collections (G [G00371697, G00371764, G00371773], G-BOIS [G00332311 plant on lower left], K [K000484535, K000484536], P [P00747539, P00747703, P00747704, P00747705, P00747706], W [W0051430], WAG), have the collection number as "*203, 528*", collection date "15 Jul 1843", and locality data "Prope cataractas Ser Abi Schirr et prope pagum Asadbar in partibus occidentalibus m. Elbrus" and, therefore, are not considered as part of the type collection.

Furthermore, four other collections (B [B100241466], G-BOIS [G00332311 plant on upper right], JE [JE0005735], KW) have the number *203* or *528,* but with date of collection as 15 Jul 1843, and locality data as "Prope pagum Asadbar in partis occidentalibus m. Elburs". They too cannot be considered as part of the type collection.

The holotype sheet was annotated in Boissier's handwriting. If the above 17 collections are to be considered syntypes, it is only because they carry one of two collection numbers that matches that of the holotype, but all other information are quite different.

Fibigia umbellata (Boiss.) Boiss., Fl. Orient. 1: 259. 1867.

≡ *Farsetia umbellata* Boiss., Diagn. Pl. Orient. 6: 13. 1846.

≡ ***Irania umbellata*** (Boiss.) Hadač & Chrtek in Acta Univ. Carol., Biol. 1971: 248. 1973 (Fig. 17, p. 61).

Type: "Hab. ad rupes calcareas montis *Kuh-Daëna* Persiae australis Kotschy No. 576".

Holotypus: Iran: "Ad rupes calcareas alpis Kuh-Daëna", 8.VII.1842, *Kotschy 576* (G-BOIS [G00332312]; iso-: B [B100241469], BM [BM001254081], E [E00373129, E00373130], G [G00371683, G00371685, G00371690], K [K000484539], KW [KW000127922], MO [MO3831884], P [P00747541, P00747683, P00747684, P00747685, P00747686, P00747687, P00747688, P00868468], W [W0051431, W18890072855, W18890152828], WAG [WAG0003963]).

Note. – Rechinger (1968: 145) listed a specimen at W as the "type", but Boissier never examined any of the three duplicates at W, nor did he examine any other duplicate elsewhere. He based his species description solely on the specimen in his herbarium that ought to be the holotype.

Fibigia pendula (Boiss.) Boiss., Fl. Orient. 1: 260. 1867.

≡ *Farsetia pendula* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 90. 1842.

≡ ***Irania pendula*** (Boiss.) Hadač & Chrtek in Acta Univ. Carol., Biol. 1971: 248. 1973.

Type: "[Aucher-Eloy] N. 4086, absque loco".

Lectotypus (designated here): **Iran:** *sine loco,* s.d., *Aucher-Eloy 4086* (G-BOIS [G00330261]; isolecto-: BM [BM000582911], G [G00371672], K [K000484541], P [P00747698, P00747699, P00747700], W [W0033646]).

Notes. – Boissier annotated P00747699, and that justifies the lectotypification of the name. The duplicate at G belongs to the Moricand's herbarium.

The species is endemic to Iran, and that information was not available to Boissier because Aucher-Eloy did not mention the locality.

Clastopus Bunge ex Boiss., Fl. Orient. 1: 261. 1867.

Tribe: *Alysseae* DC.

Note. – A genus of two species distributed in Iran, Iraq, and Turkey.

Clastopus purpureus Bunge ex Boiss., Fl. Orient. 1: 261. 1867.

Type: "Hab. in Persiâ mediâ occidentali inter Ssof et Kohrud (Bunge!)".

Holotypus: Iran: "Inter Ssof & Kohrud", 14.V.1859, *Bunge s.n.* (G-BOIS [G00791307]; iso-: K [K000484514, K000484515], LE [LE00013037, LE00013038], P [P02272117, P02272118, P02272119]).

Notes. – Except for P02272119, which has a handwritten label by Bunge with the exact locality and date, all isotypes have printed labels that read "Iter persicum. inter Isfahan et Teheran. Maj. 1859". The G-BOIS holotype has the printed label, as well as Bunge's handwritten label in pencil of the exact locality but without the day of collection.

The species was transferred by Bornmüller (1906) to the monospecific *Straussiella* and remained there for more than

a century. However, it is recently retained by Španiel et al. (2015) in *Clastopus* based on molecular data and a closer re-examination of morphology.

Alyssum L., Sp. Pl.: 650. 1753.

Tribe: *Alysseae* DC.

Note. – Earlier works (e.g., Al-Shehbaz, 1987, 2012) recognized as many as 195 species in *Alyssum,* but based on detailed surveys of molecular and morphological data, Španiel et al. (2015) recognize 115 species. These are distributed throughout the temperate Eurasia and North Africa, with only a single native species in North America. The remaining species placed in *Alyssum* by previous authors were recognized in the latter work in *Odontarrhena* C.A. Mey., and that delimitation of both genera is followed here.

Alyssum bracteatum Boiss. & Buhse in Nouv. Mém. Soc. Imp. Naturalistes Moscou 12: 18. 1860.

≡ ***Odontarrhena bracteata*** (Boiss. & Buhse) Španiel et al. in Pl. Syst. Evol. 301: 2484. 2015.

Type: "Am Fuss des Illanglidagh bei Nachitschewan, [Buhse] 21 Mai 1847 (florens). Persien: Pl. exs. Aucherianae No 4101, B".

Lectotypus (designated here): **Azerbaijan:** *sine loco,* 1847, *Buhse s.n.* (G-BOIS [G00332313]; isolecto-: LE [n.v.]). **Syntypus: Iran:** "Ispahan", s.d., *Aucher-Eloy 4101B* (BM [BM000583323], G [G00446145, G00446607], G-BOIS [G00332314], K [K000484842], P [P02272224, P02272225, P02272226], W [W0068989, W18890075533]).

Note. – The combined Geneva herbaria have only a single specimen of the species collected by Buhse in 1847 and annotated in Boissier's handwriting as *Alyssum bracteatum*. However, it gives the locality as Persia, presumably a broader region that included Nakhchivan (Azerbaijan), the autonomous republic from which the lectotype was collected.

Alyssum singarense Boiss. & Hausskn. in Boiss., Fl. Orient. Suppl.: 49. 1888.

≡ ***Odontarrhena singarensis*** (Boiss. & Hausskn.) Španiel et al. in Pl. Syst. Evol. 301: 2486. 2015.

Type: "Hab. in cretaceis montis Sindjar inter Zamuche et Zakinia (Haussk.!)".

Holotypus: Iraq: "In cretac. inter Zamucha & Zakinia, mt. Singarae", V.1867, *Haussknecht 91* (G-BOIS [G00332315]; iso-: BM [BM000595356], JE [JE00001888, JE00001889], K [K000697027]).

Note. – The BM and K duplicates were annotated by Dudley as isotypes, but they lack the collection number and precise locality in Sinjar Mt.

Alyssum alpestre var. *suffrutescens* Boiss., Fl. Orient. 1: 268. 1867 [nom. illeg.].

≡ *Alyssum tortuosum* var. *orientale* DC., Syst. Nat. 2: 306. 1821.

= ***Alyssum sibiricum*** Willd., Sp. Pl. 3: 465. 1800.

Note. – Varietas *suffrutescens* is illegitimate because Boissier listed the earlier published *Alyssum tortuosum* var. *orientale* DC. in synonymy. Both varietal names are rather obscure, and the latter needs lectotypification.

Alyssum alpestre var. *minutiflorum* (Boiss.) Boiss., Fl. Orient. 1: 268. 1867.

≡ *Alyssum minutiflorum* Boiss., Diagn. Pl. Orient. 1: 73. 1843.

Type: "[Boissier] Hab. in collibus aridis vallis *Meandri* ad occidentem urbis *Guzel-hissar*. Floret Maio".

Holotypus: Turkey: "Colles arenosi ad Tralles. Caria", V.1842, *Boissier s.n.* (G-BOIS [G00332316]).

= ***Alyssum sibiricum*** Willd., Sp. Pl. 3: 465. 1800.

Note. – No duplicates of the type collection were found in any of the major herbaria consulted.

Alyssum condensatum Boiss. & Hausskn. in Boiss., Fl. Orient. 1: 268. 1867.

≡ ***Odontarrhena condensata*** (Boiss. & Hausskn.) Jord. & Fourr., Brev. Pl. Nov. 2: 4. 1868.

Type: "Hab. in Syriae borealis monte Akdagh (Auch. exs. 266!), monte Karabiyuckle inter Aintab et Marasch (Haussk!), Tauro Cilicico (Ky! Bal!), in monte Berytdagh Cataoniae alt. 8–9000' (Haussk!)".

Lectotypus (first step designated by Dudley, 1965b: 401; second step designated here): **Turkey:** "Taurus Cataonicus. Karabiyukle, inter Aintab et Marach", 11.VII.1865, *Haussknecht s.n.* (G-BOIS [G00332329]; isolecto-: A [A00018480], JE [JE00001754, JE00001755], W [W0055921, W18890055595]). **Syntypi: Turkey:** "Ak-Dagh",

s.d., *Aucher-Eloy 266* (G [G00446160, G00446161], MPU [MPU017001], P [P02272252, P06617191]); "village de Gulek-Boglas, N Taurus", 30.VI.1855, *Balansa 168* (G-BOIS [G00332328]); "Berytdagh, Taurus Cataonicus", 8000'–9000' [2440–2740 m], 10.VIII.1865, *Haussknecht s.n.* (G-BOIS [G00332326], JE [JE00001753], W [W0055922, W18890055607]); "Plantae Tauri Cilicici", 1853, *Kotschy s.n.* (G-BOIS [G00332327]).

Notes. – The lectotype is a collection folder of two sheets, of which one has a handwritten label by Boissier that reads "montes, inter Aintab et Marach" but without collector name or collection date.

In his designation of the lectotype collection, Dudley (1965b) listed Haussknecht's collections at G, JE, and W herbaria. That designation is narrowed here to G-BOIS, from which material Boissier based his description in *Flora Orientalis*. There is no duplicate of this collection in the other Geneva herbaria.

One of Haussknecht's collections from Mt. Marash in Turkey, P06617297, was annotated by Boissier as "*Alyssum confertum* Boiss. et Haussk.", but that species epithet was published by Boissier in 1842, or 25 years prior to the publication of *A. condensatum*. The collection is missing the exact locality and day and month, and it may be part of the type collection of the latter species.

Alyssum troodi Boiss., Fl. Orient. Suppl.: 49. 1888.

≡ ***Odontarrhena troodi*** (Boiss.) Španiel et al. in Pl. Syst. Evol. 301: 2487. 2015.

Type: "Hab. in monte Troodos Cypri (Sint. et Rigo!)".

Holotypus: Cyprus: "Ins. Cypro. In monte Troodos", 17.VI.1880, *Sintenis & Rigo 844* (G-BOIS [G00332331]; iso-: B [B100244946, B100244947], BM [BM000583332], CAS [CAS0026920], FI [F010120], GH [GH00018607], K [K000679034, K000679035, K000679036, K000679037, K000679038, K000679039], LD [LD1685802, LD1688922, LD1693789], NY [NY00172547], P [P02272344, P02272345, P04630381, P06649608, P06649609, P06649610], US [US00100424], W [W18890033480, W18890103863], WU [WU0101799], Z [Z000004366]).

Notes. – Meikle (1977: 135) stated that the type is at G and K but without any indication of the status of the type.

Except for the G-BOIS specimen, none of the other duplicates listed above was annotated by Boissier who based the species description solely on the folder in his herbarium.

The holotype is a collection folder of three sheets, of which one has a label identical to barcoded sheet, and the third has the collection number, the date, and Mt. Troodos.

Alyssum oxycarpum Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 5: 35. 1856.

≡ ***Odontarrhena oxycarpa*** (Boiss. & Balansa) Španiel et al. in Pl. Syst. Evol. 301: 2486. 2015.

Type: "Hab. in regione alpinâ inferiori montis *Masmeneudagh* inter *Taurum* et urbem *Caesaream,* legit fructiferum Aug. cl. Balansa".

Holotypus: Turkey: "Region alpine inférieure du Masmeneu-Dagh, à 25 lieues au SSO. de Césarée", 8.VIII.1855, *Balansa 427* (G-BOIS [G00332333]; iso-: BM [BM000595315], G [G00446152, G00446153], GH [GH00018569, GH00018569], JE [JE00001879], K [K000484850, K000484851], OXF, P [P02272323, P02272324], W [W18890076143], WAG [WAG0004264]) (Fig. 18, p. 62).

Note. – The holotype is a collection folder of two sheets, of which the first has a printed label with the exsiccatae number *427* (Fig. 18, p. 62) and the second sheet has handwritten label by Balansa that carries the field number *167*. All isotypes carry printed labels with the exsiccatae number *427*.

Alyssum oxycarpum var. *kurdicum* Boiss., Fl. Orient. 1: 269. 1867.

≡ ***Odontarrhena kurdica*** (Boiss.) Španiel et al. in Pl. Syst. Evol. 301: 2485. 2015.

Type: "Hab. in monte Gara Kurdistaniae (Ky exs. 337! Sub. *Od. tortuosâ*)".

Holotypus: Iraq: "Odontarrhena tortuosa C. A. Mey. In cacumine m. Gara Kurdist.", 27.VII.1841, *Kotschy 337* (G-BOIS [G00332335]; iso-: A [A00018570], BM [BM000583330, BM000583331], E [E00386009], G [G00388931, G00388932, G00388933], K [K000484846, K000484847], P [P05444892], W [W0003825, W0003826], WAG [WAG0004273]).

Note. – Except for the holotype, none of the duplicates above was annotated by Boissier.

Alyssum haussknechtii Boiss., Fl. Orient. 1: 269. 1867.

≡ ***Odontarrhena haussknechtii*** (Boiss.) Španiel et al. in Pl. Syst. Evol. 301: 2485. 2015.

Type: "Hab. in rupestribus alpinis montis Berytdagh Cataoniae alt. 8000'–10000' (Haussk!)".

Holotypus: Turkey: "Taurus Cataonicus. in rup. Berytdagh", 9000'–10000' [2740–3050 m], 10.VIII.1865,

Haussknecht s.n. (G-BOIS [G00332336]; iso-: B [B100244992], BM [BM000583298], JE [JE00003084, JE00003085, JE00003086], P [P02272268, P02272292, P02272293], W [W18890055599, W19270014882]).

Note. – The three duplicates at JE have photocopied handwritten annotations by Boissier and a collection number of *1116* not found on other sheets. However, the date of collection and locality are identical to those of the holotype.

Alyssum constellatum Boiss. in Ann. Sci. Nat., Bot. ser. 4, 2: 244. 1854.

≡ ***Odontarrhena constellata*** (Boiss.) Španiel et al. in Pl. Syst. Evol. 301: 2484. 2015.

Type: "Hab. prope *Rizildagh* ubi legit cl. P. a Tchihatcheff".

Holotypus: Turkey: "propè Kizildagh", s.d., *Tchihatcheff s.n.* (G-BOIS [G00332337]).

Note. – The species is restricted to the Kurdistan area of Iran, Iraq, and Turkey and its range extends westward into south central Turkey.

Alyssum constellatum var. *confertum* Boiss., Fl. Orient. 1: 270. 1867.

≡ *Alyssum callichroum* Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 5: 34. 1856.

= ***Odontarrhena callichroa*** (Boiss. & Balansa) Španiel et al. in Pl. Syst. Evol. 301: 2484. 2015.

Note. – This is a renaming at the varietal rank of the following entry.

Alyssum callichroum Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 5: 34. 1856.

≡ ***Odontarrhena callichroa*** (Boiss. & Balansa) Španiel et al. in Pl. Syst. Evol. 301: 2484. 2015.

Type: "Hab. in regione montanâ superiori montis *Masmeneudagh* inter Taurum et urbem *Caesaream* siti. Floret Augusto. Fr. Septembri".

Lectotypus (designated here): **Turkey:** "Région montagneuse supérieure du Masmeneu-Dagh, à 25 lieues au SSO. de Césarée", 7.IX.1855, *Balansa 432* (G-BOIS [G00332338]; isolecto-: BM [BM000583287], CAS [CAS0026903], E [E00105991], G [G00388596, G00388597], GH [GH00018468], GOET [GOET002677], JE [JE00003011], K [K000484860, K000484861, K000484862], MPU [MPU011455, MPU013355], P [P02272253, P02272254], US [00100409], W [W0069851, W18890076139]). **Syntypus: Turkey:** "Région montagneuse supérieure du Masmeneu-Dagh, à 5 lieues au SSO de Césarée", 8.VIII.1855, *Balansa 172* (G-BOIS [G00332340]).

Notes. – Lectotypification is needed to narrow the selection of the lectotype to one of the two duplicates in G-BOIS that consists of only fruiting material.

The other G-BOIS specimen is a flowering material collected in August, with the field number *172* and recognized here as a syntype.

As for the other isolectotypes, some consist of only fruiting material and these pose no concerns, but those with mixed flowers and fruit (such as the two duplicates at G), only the fruiting specimens are isolectotypes.

Alyssum masmenaeum Boiss., Diagn. Pl. Orient. ser. 2, 5: 36. 1856.

≡ ***Odontarrhena masmenaea*** (Boiss.) Španiel et al. in Pl. Syst. Evol. 301: 2485. 2015.

Type: "Hab. in regione montanâ superiori montis *Masmeneudagh,* cl. Balansa. Floret Aug. Fruct. Sept.".

Lectotypus (designated here): **Turkey:** "Région sous-alpine du Masmeneu-Dagh, à 25 lieues au SSO. de Césarée", 7.IX.1855, *Balansa 430* (G-BOIS [G00332341]; isolecto-: A [A00018520], BM [BM000583944 plant on left], CAS [CAS0026913 plant on left], G [G00388923 two plants on left, G00388924 two plants on left], GOET [GOET002690], JE [JE00001891 plant on right], K [K000484873 plant on lower left, K000484874 two plants on right, K000484875 two plants on right, K000484876 two plants on right], MPU [MPU014241], OXF, P [P02272312 plant on right, P02272314 lower plant, P02272315, P02272316], W [W0075785 plant on right, W18890076151 two plants on left], WAG [WAG0004265 plant on right]). **Syntypus: Turkey:** "Région sous-alpine du Masmeneu-Dagh, à 25 lieues SSO. de Césarée", 8.VIII.1855, *Balansa 430* (BM [BM000583944 plant on right], CAS [CAS0026913 plant on right], G [G00388923 plants on right, G00388924 plants on right], G-BOIS [G00332342], JE [JE00001891 plant on left], K [K000484873 plant on upper left, K000484874 plant on left, K000484875 plant on lower left, K000484876 plant on left], MPU [MPU013491], P [P02272312 plant on left, P02272313, P02272314 plant on top], W [W0075785 plant on left, W18890076151 plant on right], WAG [WAG0004265 plant on left]).

Notes. – With the exception of G00332342 with the handwritten field number *174,* all other duplicates have printed

labels with the exsiccatae number *430*. All labels carry the initial species epithet "kotschyanum" that was replaced in publication with "masmenaeum".

Because the fruits are very important taxonomically in *Alyssum* and *Odontarrhena,* the fruiting material collected on September 7 is selected as the lectotype collection and those in flower (collected on August 8) represent the syntypes.

As in the preceding species, Dudley (1965b) did not designate or annotate the lectotype from any of the two specimens each in G-BOIS or two at G. Furthermore, he considered both flowering and fruiting material as one collection and annotated both as isotypes. His mix-up was most likely resulted from the mixed collections (flowering and fruiting) on the majority of duplicates, including those at G and K. However, the flowering and fruiting plants are mounted on separate sheets in G-BOIS.

Alyssum argenteum var. *chrysanthum* Boiss., Fl. Orient. 1: 271. 1867.

Type: "Hab. ad basin montis Mouraddagh Phrygiae (Bal!), in Lyciâ ad Elmalu (Bourg!), in Armeniâ ad Maimansour (Huet!)".

Lectotypus (designated here): **Turkey:** "Elmalu, in lacunosis", 17.V.1860, *Bourgeau 25* (G-BOIS [G00332344]; isolecto-: BM [BM000583301, BM000595343], G [G00446154], K [K000484884], P [P02272239, P02272240, P04628049, P06681622]). **Syntypi: Turkey:** "Versant méridional du Mourad-Dagh (Phrygie)", 28.VI.1857, *Balansa 1249* (G [G00389030], GH [GH00018406], K [K000697041], MPU [MPU017002], P [P02272241], W [W18890013479]); "Meimansour", V.s.a., *Huet du Pavillon s.n.* (G-BOIS [G00332343]).

= ***Odontarrhena muralis*** (Waldst. & Kit.) Endl., Cat. Horti Vindob. 2: 245. 1841.

Note. – Although all of its type material cited by Boissier in *Flora Orientalis* were collected from Turkey, var. *chrysanthum* was not accounted by Dudley (1965b).

Alyssum elatum Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. 8: 33. 1849 [nom. illeg.] [non Kreutzer].

≡ *Alyssum pterocarpum* T.R. Dudley in J. Arnold Arbor. 45: 370. 1964.

Type: "Hab. in totâ *Anatoliâ meridionali, Cariâ* in regione sylvaticâ ad meridiem *Cadmi* sitâ (Boiss.! Pinard.!) ad rupes portûs *Tcherali* Lyciae (Heldreich), in *Tauro* Kotchy No 41".

Lectotypus (designated by Dudley, 1964b: 370): **Turkey:** "in campis sterilibus au pied des montagnes près du port de *Tcherali*, en Lycie", 13.V.1845, *Heldreich 620* (G-BOIS [G00332347]; isolecto-: B [B100244994], BM [BM000583308, BM001254083], CAS [CAS0027439], E [E00373072, E00373073], G [G00446618], GH [GH00018498], GOET [GOET002695], H [H1355575], K [K000484885], OXF, P [P02272261, P02272262], US [US000100413], W [W0075781, W18890026326], WAG [WAG0004234, WAG0004235]). **Syntypi: Turkey:** "Cadmus", VI.1842, *Boissier s.n.* (G-BOIS [G00332346]); "Mt. Tauro", s.d., *Kotschy 41* (GH [GH00018501], P [P02272258, P02272259]).

= ***Odontarrhena pterocarpa*** (T.R. Dudley) Španiel et al. in Pl. Syst. Evol. 301: 2484. 2015.

Notes. – The Pinard's syntypes belong to *Odontarrhena corsica* (Duby) Španiel et al.

The lectotype is a collection folder of two sheets, of which one has the handwritten label by Heldreich with the collection number *620,* as W0075781, and the other, as well as all of the isolectotypes, with a printed, handwritten label by Boissier but without the collection number. The isolectotypes labels have "ad rupes portus Tcherali Lycia. de Heldreich ver. 1845" indicated.

Alyssum crenulatum Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. 8: 33. 1849.

≡ ***Odontarrhena crenulata*** (Boiss. & Heldr.) Španiel et al. in Pl. Syst. Evol. 301: 2484. 2015.

Type: "Hab. in collibus ad radices meridionales jugi *Cassii* in viâ inter *Latakieh* et *Suadieh.* Legi [Boissier] Jun. 1846".

Holotypus: Turkey: "Chaîne du Cassius de la base", V–VII.1846, *Boissier s.n.* (G-BOIS [G00332349]; iso-: G [G00446173], GH [GH00018486], P [P02272255], WAG [WAG0004261]).

Notes. – Boissier (1849) based the species description on his own single collection above.

The holotype is a collection folder of five sheets, of which three have printed labels indicating "Syria, Mai-Jul. 1846. E. Boissier", though the locality is currently part of Turkey. The barcoded one has Boissier's handwriting of the species name in red ink and "Chaîne du Cassius de la base" in black ink.

Alyssum floribundum Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 5: 33. 1856.

≡ ***Odontarrhena floribunda*** (Boiss. & Balansa) Španiel et al. in Pl. Syst. Evol. 301: 2485. 2015.

Type: "Hab. in schistosis vallis *Guzel Déré* suprâ *Sedichig* in Ciliciâ littorali cl. Balansa. Floret fine Maii".

Lectotypus (designated here): **Turkey:** "Terrains schisteux du Guzel Déré, en amont de Sedi-chig (environs de Mersina)", 9.VI.1855, *Balansa 171* (G-BOIS [G00332351 plant on left]; isolecto-: BM [BM000583309 plant on left], CAS [CAS0026909 plant on left], G [G00388576 fragment on left, G00446603 first sheet], GOET [GOET002682 plant on left], JE [JE00003057 plant on right, JE00003058 two branches in middle], K [K000484887 plant on lower right, K000484888 plant on lower right], MPU [MPU013362 plant on right, MPU013363, MPU013364 plant on right, MPU014809 plant on right, MPU014810 plant on right, MPU014811 plant on right], OXF, P [P02272266 plant on left, P04708403, P06616637, P06616638, P06616639], US [US00100414 plant on right], W [W0075605], WAG [WAG0004259 plant on left]). **Syntypus: Turkey:** "Terrains schisteux du Guzel Déré, en amont de Sedi-chig (environs de Mersina)", 20.V.1855, *Balansa 171* (G-BOIS [G00332351 plant on right], only flowering material of all of the above mixed collections and the following duplicates: G [G00388577, G00446603 second and third sheet], MPU [MPU013361], WAG [WAG0004260]) (Fig. 20, p. 64).

Notes. – The type collection as a whole consists of flowering material collected on May 20 and fruiting material collected on June 9. The fruiting material is designated as the lectotype and the flowering material is treated as syntypes (Fig. 20, p. 64).

With the exception of the type specimens G [G00332351, G00388576], which is fragmentary material ex G-BOIS given to Huber-Morath's herbarium that was later donated to G in 1991, all other duplicates have printed labels with the exsiccatae number *434* instead of the field number *171*.

Dudley did not annotate the material in G or G-BOIS, though he annotated *Balansa 434,* and erroneously *Balansa 433* from Masmeneudagh (BM [BM000583310], K [K000484889, K000484890]), as isotypes. Flowering and fruiting material of *Balansa 433* were collected on 8 Aug and 6 Sep 1855, respectively.

Alyssum peltarioides Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 158. 1842.

≡ ***Odontarrhena peltarioidea*** (Boiss.) Španiel et al. in Pl. Syst. Evol. 301: 2486. 2015 (Fig. 19, p. 63).

Type: "[Aucher-Eloy] N. 286, Olympus Armeniae".

Lectotypus (designated here): **Turkey:** "in Olymp. Armenia", s.d., *Aucher-Eloy 286* (G-BOIS [G00332352]; isolecto-: BM [BM000583311], G [G00388906], K [K000484892], MO [MO1618794], OXF, P [P02272325, P05444886]).

Note. – Boissier (1842b) based the species description only on the unicate in his herbarium and P05444886, which he annotated and, therefore, the species name needed lectotypification. The duplicate at G was acquired from the Moricand herbarium.

Alyssum samariferum Boiss. & Hausskn. in Boiss., Fl. Orient. 1: 272. 1867.

≡ ***Odontarrhena samarifera*** (Boiss. & Hausskn.) Španiel et al. in Pl. Syst. Evol. 301: 2486. 2015.

Type: "Hab. in monte Berytdagh Cataoniae alt. 6000'–8000' (Haussk!)".

Lectotypus (designated here): **Turkey:** "Taurus Cataonicus. Allischerdagh. Berytdagh", 17.VIII.1865, *Haussknecht s.n.* (G-BOIS [G00332353]; isolecto-: JE [JE00001886, JE00001887]). **Syntypi: Turkey:** "In gramin. m. Beryt dagh, Cataoniae & Allischerdagh", 6000'–7000' [1830–2130 m], 8.VIII.1865, *Haussknecht s.n.* (B [B100244956], BM [BM000583322], K [K000484896], P [P02272330, P02272332], W [W18890055600, W0075784]); "Taurus cataonicus. Beyritdagh", 1865, *Haussknecht s.n.* (JE [JE00001884, JE00001885], P [P02272331]).

Notes. – The collection date on the lectotype is 17 August 1865, and Dudley (1965b) erred by giving the date as 8 July 1865, as on the duplicates at BM, K, and W that he cited and annotated. One of the syntypes, P02272331, was annotated by Boissier, though that sheet does not have the collection day and month.

All four duplicates at JE do not carry the date or month of collection. Of these, two have the collection number *1118,* which was not given on any of the above duplicates, and have the mountain Allischerdagh indicated, as in the lectotype. These two duplicates are recognized here as isolectotypes.

Alyssum eriophyllum Boiss. & Hausskn. in Boiss., Fl. Orient. 1: 273. 1867.

≡ ***Odontarrhena eriophylla*** (Boiss. & Hausskn.) Španiel et al. in Pl. Syst. Evol. 301: 2484. 2015.

Type: "Hab. in jugo Tolosdagh montis Amani Syriae bor. (Ky exs! sub *A. constellato*), in apricis montis Berytdagh Cataoniae alt. 6000' et ad Bazardjick Owa (Haussk!), in Armeniâ meridionali prope Musch (Ky Suppl. exs. 750!)".

Lectotypus (first step designated by Dudley, 1965b: 398; second step designated here): **Turkey:** "Taurus Cataonicus. in apricis Berytdagh", 6000' [1830 m], 11.VIII.1865, *Haussknecht s.n.* (G-BOIS [G00332358]; isolecto-: A [A00018502, A00018503], BM [BM000583288], GH, JE [JE00003007], K [K000484898], P [P2272263]). **Syntypi: Syria:** "in Tolos Dagh", 4000' [1220 m], 4.VII.1862, *Kotschy 203* (G-BOIS [G00332357]). **Turkey:** "Taurus Cataonicus. in apricis Bazardsihik Owa p. Marardh", 11.VII.1865, *Haussknecht s.n.* (G-BOIS [G00332354], JE [JE00003008], W [W18890055596]); "Crescit ad urbem Musch", 4300' [1310 m], 9.IX.1859, *Kotschy 750* (G-BOIS [G00332356]).

Notes. – Although Dudley (1965b) narrowed the number of syntypes cited in the original protologue from four to one, he listed five herbarium acronyms as the lectotype and did not specify any of them. Therefore, a second step lectotypification is completed here.

The lectotype is a collection folder of three sheets, of which one has no label, and the other has an abbreviated label stating "in apricis Beryt dagh 6000' Haussk.". The two labeled sheets were annotated in October 1961 by Dudley as "syntype = lectotype".

The *Kotschy 750* belongs to *Odontarrhena filiformis* (Nyár.) Španiel et al.

Alyssum cilicicum Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 5: 34. 1856.

≡ ***Odontarrhena cilicica*** (Boiss. & Balansa) Španiel et al. in Pl. Syst. Evol. 301: 2484. 2015.

Type: "Hab. in herbidis vallis *Guzel Déré* suprâ *Sedichig* in *Ciliciâ littorali* cl. Balansa. Fl. Junio Fruct. Sept.".

Lectotypus (designated here): **Turkey:** "Bords herbeux du Guzel Déré, en amont de Sedi-chig (environs de Mersina)", 9.VI.1855, *Balansa 170* (G-BOIS [G00332360]; isolecto-: BM [BM000583306], E [E00373076], G [G00446157], GH [GH00018478, GH00018479], GOET [GOET002681], JE [JE00003052], K [K000484900, K000484901, K000484902], MPU [MPU01473], OXF, P [P02272250, P02272251, P04661347], US [US00100410], WAG [WAG0004262]). **Syntypus: Turkey:** "Bords du Guzel Déré, en amont de Sedi-chig (environs de Mersina)", 2.X.1855, *Balansa 170* (G-BOIS [G00332360 fruiting branch]).

Notes. – The lectotype is a collection folder of two sheets the label of one of which was handwritten by Balansa with the field number *170* and Boissier's initial handwritten determination as "Alyssum cremocarpum n. sp!". The second sheet has a printed label with the collection number *435* and the same information as in the isolectotypes. The isolectotypes have a printed label with exsiccatae rather than field number: "Bords du Guzel-Déré, à 4 lieues au NO. de Mersina (Cilicie), 9 juin. 1855. B. Balansa 435".

There are three sheets in G-BOIS and two duplicates at G of the type collection. Dudley (1965b) indicated that the collection date is 9 September (instead of June 9) 1855, as in all the material he examined and annotated. Only a single fruiting material (third sheet in the lectotype folder) was examined from all the herbaria above, and it was collected on 2 October 1855 and recognized here as a syntype.

Alyssum cassium Boiss., Diagn. Pl. Orient. 8: 34. 1849.

≡ ***Odontarrhena cassia*** (Boiss.) Španiel et al. in Pl. Syst. Evol. 301: 2484. 2015.

Type: "[Boissier] Hab. in agris derelictis et collibus ad radices jugi *Cassii* in latere meridionali cum praecedenti [*A. crenulatum*] mixtum".

Holotypus: Turkey: "Syria. Bas de la chaîne du Cassius venant de Latakieh", V–VII.1846, *Boissier s.n.* (G-BOIS [G00332362]; iso-: BR [BR0000006993368], CAS [CAS0026904], E [E00373077], G [G00446158, G00446159, G00446160], GH [GH00018473], GOET [GOET002678, GOET002679], HBG [HBG505891], K [K000484903, K000484904], P [P02272242, P02272244, P02272246, P02272248, P02272249, P04708402], PH [PH00002542], W [W0072045, W18890016458, W19380001461]).

Notes. – The holotype is a collection folder of seven sheets. The label of one has Boissier's handwriting of the species name in red ink and locality in black ink and the print "Syria, Mai-Jul. 1846. E. Boissier". The locality data on the other six sheets is rather brief. Although the locality was originally belived in Syria, it is currently in Turkey near Latakia City.

The isotypes have a printed label in Boissier's handwriting "Syria ad radices Mtis Cassii Jun 1846. E. Boissier".

Alyssum bungei Boiss., Fl. Orient. 1: 274. 1867.

Type: "Hab. in Persiâ inter Ispahan et Teheran (Bunge!)".

Holotypus: Iran: "inter Isfahan et Teheran", V.1859, *Bunge s.n.* (G-BOIS [G00332364]; iso-: K [K000484971], P [P2272229, P2272230, P2272231]).

= ***Meniocus heterotrichus*** (Boiss.) Hadač & Chrtek in Acta Univ. Carol., Biol. 1971: 260. 1973.

Note. – Boissier somehow did not realize that the material he received from and named after Bunge was at a much younger stage of development than the mature material of conspecific *Alyssum heterotrichum* that he described 21 years earlier.

Alyssum montanum var. *hymettium* Boiss., Fl. Orient. 1: 274. 1867.

Type: "Hab. in Graeciae monte Hymetto (Auch. exs. 276! Spr.!), Parnasso (Heldr!)".

Lectotypus (designated by Španiel et al., 2017: 1438): **Greece:** "in Mte Hymetto", s.d., *Aucher-Eloy 276* (G-BOIS [G00332365]; isolecto-: BM [BM000750107], G [G00388918, G00446161, G00446162], K [K000484576], P [P05426246, P05426263, P05426422]). **Syntypi: Greece:** "In monte Parnasso. reg. alpina", 11.VIII.1852, *Heldreich s.n.* (G-BOIS [G00332366], WU [WU0076265]); "Gipsel d'Hymetteri", s.d., *Spruner s.n.* (G-BOIS [G00332367]).

= ***Alyssum montanum*** L., Sp. Pl.: 650. 1753.

Notes. – *Alyssum montanum* is the most variable species in the genus, and numerous infraspecific taxa at various ranks have been recognized.

Hartvig (2002: 210) accepted var. *hymettium* solely on morphological grounds within Greece, but without extensive population-based and detailed morphological and molecular studies. It is then advisable to reduce the variety to synonymy within subsp. *montanum,* as done in BrassiBase (2019).

Alyssum montanum var. *ochroleucum* (Boiss. & A. Huet) Boiss., Fl. Orient. 1: 274. 1867.

≡ ***Alyssum ochroleucum*** Boiss. & A. Huet in Boiss., Diagn. Pl. Orient. ser. 2, 5: 36. 1856.

Type: "Hab. in Armeniâ propè *Tortoum* cl. Huet du Pavillon".

Holotypus: Turkey: "inter Hako et Tortoum", VI.1853, *Huet du Pavillon s.n.* (G-BOIS [G00332368]; iso-: G [G00388911, G00388912], K [K000484908], KW [KW000127917], W [W18890093875]).

Notes. – There is only one sheet in G-BOIS and two duplicates in G. "In montibus inter Erzeroum et Ispir. In arenosis torrentium propè Tortum. 4–5000 p.s.m. Jun. 1853" is indicated for G [G00388911] and KW [KW000127917] and "circà Tortum. Jun. 1853" for G [G00388912], K [K000484908] and W [W18890093875].

Boissier in *Flora Orientalis* reduced the species to a variety of *Alyssum montanum* but changed his mind again in the *Supplementum* and re-recognized it as a distinct species.

Alyssum praecox Boiss., Fl. Orient. 1: 275. 1867.

Type: "Hab. in monte Tchoschdagh Ciliciae Kurdicae (Ky exs. 95! spec. florifera), Tauro Cilicico circa Gülekboghas (Bal!), et montibus inter Aintab et Marasch (Haussk! spec. fructifera). Fl. Maio".

Lectotypus (designated by Dudley, 1965b: 388): **Turkey:** "Coteaux calcaires entourant de village de Gulek-Boghas, à 10 lieues au nord de Tarsous", 26.VI.1855, *Balansa 166* (G-BOIS [G00332371]; isolecto-: E [E00386023], G [G00388900]). **Syntypi: Turkey:** "Taurus Cataonicus. Artrihakôi inter Aintab & Marasch", 12.VII.1865, *Haussknecht s.n.* (G-BOIS [G00332370], W [W0075794, W18890055594]); "In jugis montis Tschosch Dagh versus Bakhyr Dagh.", 5600' [1705 m], 15.V.1859, *Kotschy 95* (A [A00018576], BM [BM000582933, BM000582934], G-BOIS [G00332369], JE [JE00024513], K [K000484912], P [P05444874], W [W0075779, W18890058110]).

Notes. – Dudley (1965b) narrowed the selection of three syntypes in the original publication to one and he listed a G sheet as the lectotype. He annotated in 1961 the G-BOIS sheet as syntype. This sheet, which is taken here as the lectotype, is with a label that carries the species name in Boissier's handwriting and the rest of the data in Balansa's handwritten label, including the field number *166.*

Labels of the isolectotypes are printed, and they carry the exact collection data as the lectotype but without a collection or field number.

Alyssum suffrutescens Boiss., Fl. Orient. 1: 275. 1867 [nom. illeg.].

≡ ***Alyssum erosulum*** Gennari & Pestal. ex Clementi in Mem. Reale Accad. Sci. Torino ser. 2, 16: 248. 1855.

Note. – *Alyssum suffrutescens* is illegitimate because Boissier in *Flora Orientalis* listed the earlier published *Alyssum erosulum* Gennari & Pestal. ex Clementi as a synonym and indicated that it is a "nomen improprium".

Alyssum suffrutescens var. *olympicum* Boiss., Fl. Orient. 1: 276. 1867 [nom. illeg.].

≡ *Alyssum wulfenianum* var. *suffruticosum* Boiss. ex Clementi in Mem. Reale Accad. Sci. Torino ser. 2, 16: 248. 1855.

Type: "[Aucher-Eloy] n. 275, Olympus Bithynus".

Lectotypus (designated here): **Turkey:** "Olymp. Bith.", s.d., *Aucher-Eloy 275* (G-BOIS [G00332374]; isolecto-: A [A00018615], BM [BM000582930], G [G00388578, G00388579, G00388580], K [K000484913, K000484914], P [P2272342, P05444992]).

= ***Alyssum erosulum*** Gennari & Pestal. ex Clementi in Mem. Reale Accad. Sci. Torino ser. 2, 16: 248. 1855.

Notes. – *Alyssum suffrutescens* var. *olympicum* is illegitimate because it is superfluous for *A. wulfenianum* var. *suffruticosum*.

Although Boissier in *Flora Orientalis* recognized this and the above entry as different taxa, they belong to the same taxon.

Alyssum sphacioticum Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. 8: 35. 1849.

Type: "Hab. in monte *Stravopodia* cacumine excelso jugi *Sphaciotici* rarum (Heldreich)".

Holotypus: Greece: "Mt *Stravopodia* (les plus hautes sommités d'Sphakia)", 6500' [1980 m], 10.VII.1846, *Heldreich 1509* (G-BOIS [G00332375]; iso-: B [B100244953]).

Note. – This Greek endemic is highly restricted to W Crete.

Alyssum aurantiacum Boiss., Fl. Orient. 1: 276. 1867.

Type: "Hab. in regione alpinâ montis Akgadh Lyciae (Bourg. exs. 20! sub *A. lepidoto*)".

Holotypus: Turkey: "In glareosis regionis alpinae montis Ak-Dagh", 5.VII.1860, *Bourgeau 20* (G-BOIS [G00332376]; iso-: B [B100241659, B100241660], E [E00386024], G [G00446163, G00446164], GOET [GOET002675], JE [JE00003021, JE00003022], K [K000484917, K000484919, K000484920], P [P06681528], W [W0050688, W18890016459]).

Notes. – Boissier based the species description solely on the unicate in his herbarium and, therefore, the name does not need lectotypification.

Alyssum lepidotum Boiss., Diagn. Pl. Orient. 1: 73. 1843.

Type: "Hab. in regione alpinâ summâ *Cariae,* montes propè *Moglah* Aucher No 299, *Cadmus* suprà *Gheyra* ego Junio 1842 [Boissier]".

Lectotypus (first step designated by Dudley, 1965b: 390; second step designated here): **Turkey:** "Pic de Geyra", VI.1842, *Boissier s.n.* (G-BOIS [G00332378]; isolecto-: A [A00018554], B [B100244986], JE [JE00002999], W). **Syntypus: Turkey:** "Mouglah", s.d., *Aucher-Eloy 252* (G-BOIS [G00332377], K [K000484921, K000484922], P [P00868514, P05330196]).

Notes. – Dudley (1965b) selected one of the two syntypes cited in the original publication but did not indicate which of the four herbaria he cited house the lectotype, and therefore a second step is done here. Dudley listed K among the isolectotypes, but the two duplicates by Boissier K000484923 and K000484924 were collected from "Mesogis cacumen suprà Tralles" and are not recognized here as part of the type collection.

The lectotype is a collection folder of three sheets, of which one is unlabeled, and the barcoded sheet has the species name, locality, and month and collection year. The third sheet has four rows of plants with the locality "Pic de Geyra" on the second row and collection year on the other three rows.

Boissier (1843) erroneously cited the syntype as *Aucher-Eloy 299,* but he later corrected it to *252* (Boissier, 1867a).

Alyssum aizoides Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 153. 1842.

Type: "[Aucher-Eloy] N. 271 Armenia".

Lectotypus (designated here): **Turkey:** *sine loco,* s.d., *Aucher-Eloy 271* (G-BOIS [G00332380]; isolecto-: BM [BM000583935], G [G00429197, G00446165], K [K000484926], MPU [MPU017013], P [P00868521, P05372727]).

Note. – Lectotypification of the name is justified because Boissier based the original species description on G00446165 and the specimen in his herbarium.

Alyssum mouradicum Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 6: 16. 1859.

Type: "Hab. in regione alpinâ montis *Mouraddagh Phrygiae* alt. 2400 metr. ubi fine Junii floriferum et cum fruct. immaturis legit cl. Balansa".

Holotypus: Turkey: "Région alpine du Mourad-Dagh (Phrygià)", c. 2400 m, 27.VI.1857, *Balansa 373* (G-BOIS [G00332381]; iso-: A [A00018523], G [G00388917]).

Notes. – The A isotype was taken by Dudley from the G specimen(s).

The G00388917 duplicate was not examined by Boissier and does not have the collector's number.

Alyssum idaeum Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. 8: 35. 1849.

Type: "Hab. ad saxa cacuminum montis *Idae* act 6000' rarum (Heldreich)".

Holotypus: Greece: "Creta in saxosis montis Ida", 6000' [1830 m], 28.V.1846, *Heldreich 1509* (G-BOIS [G00332382]; iso-: B [B100244988], BM [BM000750129], G [G00389046, G00446190], GH [GH00018547], GOET [GOET002688], K [K000484586, K000484587, K000484588, K000484589], W [W00075613], WU [WU0076290]).

Notes. – The holotype sheet has two labels, of which the one written by Heldreich ("in saxis. Mt Ida – sommités") has the collection number and day, and the other is mimeographed written by Boissier as above but lacks both. However, the locality, elevation, month, and year in both are identical.

All isotypes, except for the BM and K000484588 that carry Heldreich's writing, have the mimeographed Boissier label.

Alyssum ruprechtii Boiss., Fl. Orient. Suppl.: 51. 1888 [nom. illeg.].

≡ ***Alyssum andinum*** Rupr., Fl. Caucasi: 103. 1869.

Lectotypus: designated by Dorofeyev (2012: 414).

Notes. – *Alyssum ruprechtii* is illegitimate because the earlier published *A. andinum* was listed as its synonym. Boissier (1888) apparently did not like the name *A. andinum* and indicated that it is "nomen absurdum, etenim Andes sunt Alpes Americae nec Orbis veteris".

Dorofeyev (2012: 414) did not list *Alyssum ruprechtii,* though he accepted *A. andinum* and lectotypified it.

Alyssum tetrastemon Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 153. 1842.

Type: "[Aucher-Eloy] N. 279, Cilicia".

Holotypus: Turkey: "Cilicia", s.d., *Aucher-Eloy 279* (G-BOIS [G00332384]; iso-: G [G00446166], P [P02272277]).

Note. – Boissier did not examine or annotate the duplicates at G and P.

Alyssum tetrastemon var. *cappadocicum* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 153. 1842.

Type: "[Aucher-Eloy] n. 270 Akdag".

Holotypus: Turkey: "Ak Dagh", s.d., *Aucher-Eloy 270* (G-BOIS [G00332385]; iso-: G [G00446168, G00446167], K [K000364807], MPU [MPU013463]).

= ***Alyssum tetrastemon*** Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 153. 1842.

Notes. – Boissier in *Flora Orientalis* erroneously maintained var. *cappadocicum* despite citing its type under the collections of *Alyssum tetrastemon* and listed a different collection under that variety.

He did not annotate the duplicate G00446167, and his *Flora Orientalis* varietal concept was the basis for Dudley's (1964a: 72) *A. corningii* T.R. Dudley.

Alyssum tetrastemon var. *latifolium* Boiss., Fl. Orient. 1: 278. 1867.

Type: "Hab. in Libani monte Sannin (Bourquenoud!), montibus Palaestinae prope Nazareth (Roth!)".

Lectotypus (designated here): **Lebanon:** "Sommet du Sannine", 14.VI.1859, *Bourquenoud 2465* (G-BOIS [G00332386]; isolecto-: JE [JE00003020]). **Syntypus: Israel:** "Nazareth", 1858, *Roth 149* (G-BOIS [G00332387], K [K000484932]).

= ***Alyssum baumgartnerianum*** Bornm. in Jahresber. K. Franz-Jos. Landesgymnas. Oberrealschule Baden 48: 16. 1911.

Note. – This small perennial is distributed from south central Turkey southward into Lebanon, Israel, and W Syria.

Alyssum armenum Boiss., Fl. Orient. 1: 278. 1867.

Type: "Hab. in Armeniâ Turcicâ prope Bayazid (Auch. exs. 4095!), in pascuis alpinis prope Gumuchkhané (Bourg. exs. sub. *A. montano*)".

Lectotypus (first step designated by Dudley, 1965b: 387; second step designated here): **Turkey:** "prope Bayazid", s.d., *Aucher-Eloy 4093* (G-BOIS [G00332389]; isolecto-: BM [BM000582931, BM000582932], G [G00446169], K [K000484935], LE [LE00013015], P [P2272232, P06681534], W [W0067796, W18890077481]). **Syntypus: Turkey:** "Paturages dans la Mt. de Brothacolin", 9.VI.1862, *Bourgeau 165* (G-BOIS [G00332388]).

Notes. – Although Dudley (1965b) narrowed the lectotypification of the species name from two syntypes to one, he did not complete the process to indicate where the lectotype is housed because he listed BM, G, K and W as lectotypes, and therefore the second step is designated here.

Boissier (1867a) listed Aucher-Eloy's collection number as *4095* instead of *4093,* and that mistake was not corrected in Boissier (1888).

Alyssum muellerii Boiss. & Buhse in Nouv. Mém. Soc. Imp. Naturalistes Moscou 12: 16. 1860.

Type: "In den Vorbergen des Kisildagh bei Gamarlu in der Nähe von Eriwan, 21 April 1847. [Buhse] No 93/1. Gebirge bei Jesd (Deh ballo), 24 April 1849 (florens). [Buhse] No 1358".

Lectotypus (designated here): **Iran:** "Yesd", 1847, *Buhse 1357* (G-BOIS [G00332390]; isolecto-: LE [LE00013023], P [P00868519]). **Syntypus: Armenia:** *sine loco,* 1847, *Buhse 93/1* (G-BOIS [G00332391]).

Notes. – The collection number for the lectotype was erroneously given in the original publication.

Although Buhse 1358 was collected in 1849, the lectotype has a printed label showing Persia, Dr. Buhse, and the year 1847, as well as in Boissier's handwriting of "1357 [for 1538] Alyssum Buhseanum n.sp. Yesd". Discrepancy in the year of collections is considered here as an error that resulted from using a label pre-printed prior to the collection year.

The lectotype sheet also carries Dudley's 1961 annotation of "A. mülleri Boiss. et Buhse. Cotype!". However, neither *1357* nor *1358* were listed in Boissier's (1888) index.

The duplicate at P is treated here as a likely isolectotype because it was collected from "Dehballoh", though no year or collection number accompany it.

Alyssum persicum Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 152. 1842.

Type: "[Aucher-Eloy] N. 4089, Ispahan".

Lectotypus (designated here): **Iran:** "Ispahan", s.d., *Aucher-Eloy 4089* (G-BOIS [G00332392]; isolecto-: BM [BM000583328], CAS [CAS0026916], G [G00388903, G00388904], K [K000484938], KW [KW000127918], LE [LE00013040], P [P02272326, P02272327, P02272328], W [W0007730, W18890077482]).

Note. – Although none of the duplicates at G is from the Candolle's herbarium, the annotation by Boissier of P02272327 justifies the lectotypification.

Alyssum xanthocarpum Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 154. 1842.

Type: "[Aucher-Eloy] N. 263 Akdag; 4098 A. Erzeroum".

Lectotypus (first step designated by Dudley, 1965b: 383; second step designated here): **Turkey:** "Ak Dag", s.d., *Aucher-Eloy 263* (G-BOIS [G00332393]; isolecto-: BM, K [K000484939]). **Syntypus: Turkey:** "Tokas Erzeroum", s.d., *Aucher-Eloy 4098A* (BM [BM000582925], G-BOIS [G00332394], K [K000484940], KW [KW000127919], P [P02272301]).

Note. – In his lectotypification of the species name, Dudley (1965b) selected *Aucher-Eloy 263* and listed BM, G, and K where the collection is housed but did not designate any of these three as the lectotype. Therefore, a second step designation is completed here.

Alyssum macrostylum Boiss. & A. Huet in Boiss., Fl. Orient. 1: 279. 1867 [nom. illeg.].

≡ ***Alyssum xanthocarpum*** Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 154. 1842.

Type: "Hab. in incultis Armeniae ad Erzeroum (Auch. exs. 4098 A!, Huet!), ad Baibout (Bourg. sub. *A. montano*), in monte Akdagh Syriae bor. (Auch. exs. 263!), in montibus Ciliciae Kurdicae (Ky exs. 130!) [Aucher Eloy] N. 263 Akdag; [Aucher Eloy] 4098 A. Erzeroum".

Lectotypus: see *Alyssum xanthocarpum* Boiss. entry above.

Note. – Under *Alyssum macrostylum,* Boissier in *Flora Orientalis* cited both syntypes (*Aucher-Eloy 263* from Akdag and *Aucher-Eloy 4098A* from Erzeroum) of the earlier published *A. xanthocarpum* and erroneously placed the latter in the synonymy of the former (see above).

Alyssum cephalotes Boiss., Diagn. Pl. Orient. ser. 2, 1: 34. 1854.

Type: "Hab. in pinguibus arenosis montis *Cadmi* Asiae minoris, in jugo ad orientem urbis *Geyra* sito, et in cacumine ad orientem urbis *Denisleh* suprâ *Khonas*. Legi [Boissier] fine Junii 1842".

Lectotypus (designated here): **Turkey:** "Pic de Gheyra suprà Cadmus", VI.1842, *Boissier s.n.* (G-BOIS [G00332400]; isolecto-: B [B100241652], G [G00446191, G00446172], GH [GH00018475], GOET [GOET002680], JE [JE00003012], K [K000484945, K000484946, K000484947], P [P02272304, P06617305], W [W0075835, W18890016448]). **Syntypus: Turkey:** "Cadmi ad or. Denisleh arenosi pinguibus", VI.1842, *Boissier s.n.* (G-BOIS [G00332398]).

Note. – Dudley (1965b: 385) did not lectotypify the species name and listed the acronyms G, GH, K, and W for the Gheyra and Denisleh collections above. No material of the latter locality was seen anywhere other than in G-BOIS, and the W syntypes cited by Dudley were not located.

Alyssum macropodum Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 6: 18. 1859.

Type: "Hab. in planitie *Caesareae* in *Cappadociâ* alt. 1100 metr. cl. Balansa. Fl. Jun. Jul.".

Holotypus: Turkey: "Plaine de Césarée (Cappadoce)", 1107 m, VII.1856, *Balansa 490* (G-BOIS [G00332401]; iso-: E [E00386065], G [G00388925], GOET [GOET002689], K [K000484948, K000484949], P [P02272296, P02272297, P02272298], W [W18890069393]).

Note. – As in his numerous other collections, Balansa gave field numbers on his handwritten labels deposited in G-BOIS. By contrast, he gave exsiccatae numbers on his mimeographed labels (i.e. *Balansa 987*), but all other data in the original vs exsiccatae are identical.

Alyssum modestum Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 6: 17. 1859.

Type: "Hab. in *Bithyniâ* Thirke, in regione alpinâ montis *Argaei* Bal. No 484, in monte *Almadagh Phrygiae* propè *Ouchak* Bal. pl. exs. 1857".

Lectotypus (designated here): **Turkey:** "Moissons du plateau de Tékir-Yaïla (mont Argée)", c. 2117 m, 9.VII.1856, *Balansa 484* (G-BOIS [G00332404]). **Syntypi: Turkey:** "Alma-Dagh, au nord d'Ouchak (Phrygie)", 3.VI.1857, *Balansa 370* (G [G00388922], G-BOIS [G00332403], GH [GH00018524], JE [JE00002963], P [P05445002]); "Turquie d'Europe", 1845, *Thirke s.n.* (G-BOIS [G00332402]).

= ***Alyssum minutum*** DC., Syst. Nat. 2: 316. 1821.

Notes. – The JE syntype lacks the collection date. All Balansa's duplicates except G-BOIS lack collection number.

Boissier in *Flora Orientalis* reduced *A. modestum* to synonymy of *A. minutum.*

Alyssum aucheri Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 156. 1842.

Type: "[Aucher-Eloy] N. 256, Asia minor".

Holotypus: Turkey: "As. m.", s.d., *Aucher-Eloy 256* (P [P02272267]; iso-: K [K000484952]).

= ***Alyssum foliosum*** Bory & Chaub., Expéd. Sci. Morée Bot.: 185. 1832.

Notes. – The only specimen on which Boissier based his description of the species is the holotype at P, and that sheet was annotated by him. He did not examine the specimen at K, and there are no duplicates in the Geneva herbaria.

Boissier in *Flora Orientalis* reduced this species to synonymy of *A. foliosum.*

Alyssum umbellatum var. *corymbulosum* Boiss., Diagn. Pl. Orient. ser. 2, 5: 38. 1856.

Type: "Hab. in collibus ad meridiem *Smyrnae* sitis, cl. Balansa".

Lectotypus (designated here): **Turkey:** "Collines bordant la partie sud du golfe de Smyrne", 8.V.1854, *Balansa 63* (G-BOIS [G00332405 plant on top]; isolecto-: BM [BM000582921 two plants on top], CAS [CAS0027440 two plants on top], E [E00386112 plants on lower left and top middle], G [G00446174 plants on top and lower right, G00446175 two plants on top], K [K000484953 plant on top left], JE [JE00003030 two plants on top], MPU [MPU014637], P [P02272347, P02272350, P04022518], W [W0075612 plant on top right, W18890158099, W18890080905 three plants on top]). **Syntypus: Turkey:** "Collines bordant la partie sud du golfe de Smyrne", 4.IV.1854, *Balansa 63* (BM [BM000582921], CAS [CAS0027440], E [E00386112], G [G00446174, G00446175], G-BOIS [G00332405], K [K000484953], JE [JE00003030], MPU [MPU013366], P [P02272348, P02272349, P05383124], W [W0075612, W18890080905]).

= ***Alyssum umbellatum*** Desv. in J. Bot. Agric. 3: 173. 1814.

Note. – The lectotype collection is based on fruiting material, whereas the syntype is flowering material.

Alyssum marginatum Steud. ex Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 157. 1842.

Type: "[Aucher-Eloy] N. 258, mons Horeb; [Aucher-Eloy] 4101, Ispahan (mixtum cum aliâ specie)".

Lectotypus (designated here): **Egypt:** "in Mte Horeb", s.d., *Aucher-Eloy 258* (G-BOIS [G00332406]; isolecto-: E [E00327984], G [G00389022, G00389023], K [K000484954], P [P02272307, P02272311]). **Syntypus: Iran:** "Ispahan", s.d., *Aucher-Eloy 4101* (G-BOIS [G00332407]).

Note. – The collection *Aucher-Eloy 4101* at K [K000484842] is *A. bracteatum* rather than *A. marginatum.*

Alyssum confertum Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 155. 1842.

Type: "[Aucher-Eloy] N. 262, Akdag".

Holotypus: Turkey: "Ak Dagh", s.d., *Aucher-Eloy 262* (G-BOIS [G00332408]; iso-: BM [BM000582919], G [G00446176, G00446177], K [K000484959], P [P02272334, P02272335]).

= ***Alyssum strictum*** Willd., Sp. Pl. 3: 464. 1800.

Notes. – Boissier based the species description on the unicate in his herbarium.

Alyssum confertum was reduced by Boissier in *Flora Orientalis* to synonymy of *A. strictum*.

Alyssum polyodon Boiss. & Buhse in Nouv. Mém. Soc. Imp. Naturalistes Moscou 12: 17. 1860.

Type: "In Weingärten der Stadt Eriwan, [Buhse] 15 April 1847 (florens). Bei Tassakend und Sisian, 23 Mai 1847 (florens et defloratum) [Buhse] No 69".

Lectotypus (designated here): **Uzbekistan:** "Tassakend", s.d., *Buhse s.n.* (G-BOIS [G00332409]; isolecto-: LE [n.v.]).

Notes. – The lectotype has Boissier's annotation of the species name, and the other Buhse syntypes were not located in G-BOIS or in the other Geneva herbaria.

This species name was reduced by Boissier in *Flora Orientalis* to a synonym of *A. campestre* var. *micropetalum* (Fisch.) Boiss. However, this varietal name was synonymized by Dudley (1965b: 381) under *A. minus* (L.) Rothm. Although both names are synonyms of *A. simplex* Rudolphi (in J. Bot. (Schrader) 1799(2): 290. 1799), the lectotype is a flowering branch quite different morphologically from plants of *A. simplex*. The name *A. polyodon* was not listed in Busch (1939), Botschantzev & Vvedensky (1955), Schermatov (1974), and Czerepanov (1995).

Because only the lectotype, which is in flower, was examined, it is not possible to determine at present the status of *A. polyodon.*

Alyssum damascenum Boiss. & Gaill. in Boiss., Diagn. Pl. Orient. ser. 2, 6: 18. 1859.

Type: "Hab. in cultis inter *Merrè* et *Damascum* cl. Dr Gaillardot. Fl. Martio".

Holotypus: Syria: "Dernier jardin à Ganche de la route de Merrè à Damas", 18.III.1846, *Gaillardot 857ter* (G-BOIS [G00332410]; iso-: A [A00019489]).

Notes. – Dudley (1965a: 203) listed as an isotype a fragmentary material at A that he took from G-BOIS. He mistyped and cited the collection number and year as *817* and 1847, respectively. There are no duplicates of the type collection elsewhere, and Boissier based his species description solely on the unicate in his herbarium.

Furthermore, Dudley's 1967 annotation of CAS0026905 as an isotype is erroneous because it was collected on a different day, month, year, and locality despite having the collection number *Gaillardot 857bis.*

Alyssum horebicum Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 156. 1842.

Type: "[Aucher-Eloy] N. 257, in monte Horeb".

Holotypus: Egypt: "in monte Horeb", 1830, *Aucher-Eloy 257* (P [P02272286]).

= ***Alyssum homalocarpum*** (Fisch. & C.A. Mey.) Boiss., Fl. Orient. 1: 285. 1867.

Notes. – Despite Dudley's (1965a: 211) listing of an isotype at G, there is no such material of *A. horebicum* in the Geneva herbaria, and the species description was based on the unicate at P that Boissier annotated and Dudley did not examine.

Alyssum horebicum was reduced by Boissier in *Flora Orientalis* to synonymy of *A. homalocarpum* Fisch. & C.A. Mey.

Alyssum meniocoides Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 158. 1842.

≡ ***Meniocus meniocoides*** (Boiss.) Hadač & Chrtek in Acta Univ. Carol., Biol. 1971: 260. 1973.

Type: "[Aucher-Eloy] N. 281, Mesopotamia".

Holotypus: Sine Patria: "Mesopotamia", s.d., *Aucher-Eloy 281* (G-BOIS [G00332411]; iso-: BM [BM000582915], G [G00446178, G00446179], K [K000484965], OXF, P [P02272264, P02272317]).

Note. – Boissier did not annotate G00446178 and, therefore, based the species description only on the material in his herbarium.

Alyssum heterotrichum Boiss., Diagn. Pl. Orient. 6: 15. 1846.

≡ ***Meniocus heterotrichus*** (Boiss.) Hadač & Chrtek in Acta Univ. Carol., Biol. 1971: 260. 1973.

Type: "Hab. ad muros hortorum prope ruinas *Persepolis* Kotschy No. 224".

Holotypus: Iran: "Ad muros hortorum pr. ruinas u. Persepolis", 11.IV.1842, *Kotschy 224* (G-BOIS [G00332412]; iso-: B [B100244989, B100244990], BM [BM000583321], CAS [CAS0026911], E [E00386124], FR [FR0038380], G [G00446180, G00446181, G00446182], GOET [GOET002684], H [H1262689], HAL [HAL0086102], JE [JE00003004, JE00003005], K [K000484970], KW [KW000127916], L [L1831206], MO [MO5457861, MO5492010], MPU [MPU013511], OXF, P [P02272269, P02272271, P02272272, P02272273, P02272274, P02272275, P02272276, P04628050, P04708538], US [US00100415], W [W0003838, W18890029631, W18890154960], WU [WU0101798]).

Note. – The previous and following pairs of entries have long been fluctuating between the genera *Alyssum* and *Meniocus,* but from Španiel et al. (2015) onward, the latter genus is firmly established on solid morphological and molecular grounds. It is readily distinguished from *Alyssum* by having 2–4(–8) vs 2 ovules per locule on parietal vs apical or subapical placentae.

Alyssum huetii Boiss., Fl. Orient. 1: 287. 1867.

≡ ***Meniocus hirsutus*** Boiss. & A. Huet in Boiss., Diagn. Pl. Orient. ser. 2, 5: 32. 1856.

Type: "Hab. in neglectis circâ *Erzeroum* cl. Huet du Pavillon in consortio *M. linifolii*".

Lectotypus (designated by Dudley, 1965a: 192): **Turkey:** "In neglectis prope Erzuroum", 6000' [1830 m], VI.1853, *Huet du Pavillon s.n.* (G-BOIS [G00332416]; isolecto-: FI [FI010112], JE [JE00003003], OXF, WAG [WAG0004268]). **Syntypus: Turkey:** "Circà Erzeroum", VII.1853, *Huet du Pavillon s.n.* (BM [BM000946181], G [G00388935, G00388936, G00388937], K [K000484972], P [02272288]).

Notes. – Boissier in *Flora Orientalis* renamed the species in *Alyssum,* listed his *Meniocus hirsutus* in its synonymy, and cited the type of the latter and additional collections under *Alyssum huetii*. Obviously, he was aware of the earlier published *A. hirsutum* M. Bieb. (Fl. Taur.-Caucas. 2: 106. 1808) that prevented him from the transfer of *Meniocus hirsutus* to *Alyssum*.

All of the isolectotypes and syntypes cited above have printed labels indicating "Huet du Pavillon. Plantae Orientales exsiccatae. Circà Erzeroum. 1853 Armenia" and the collection month (June or July) and the word "In neglectis" or "Inter segetes" were often added to collections of both months. The lectotype was collected in June, and the July collections (e.g., [BM000946181] and [K000484972]), are recognized as syntypes. The G00388935 duplicate has number *1240* indicated and no collection month.

Dudley (1965a) indicated that the holotype of *M. hirsutus* is *Balansa 1252* at G, but this collection was never cited in the original protologue of this species.

The transfer of *Alyssum huetii* to *Meniocus* by Hadač & Chrtek (1973) is illegitimate and superfluous because of the existence of earlier published *Meniocus hirsutus*. Their combination has erroneously been accepted by Španiel et al. (2015).

Alyssum stylare (Boiss. & Balansa) Boiss., Fl. Orient. 1: 287. 1867.

≡ ***Meniocus stylaris*** Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 6: 16. 1859.

Type: "Hab. inter segetes ad basin montis *Karamasdagh* quinque leucis ad orientem urbis *Caesareae* siti. Alt. circ. 1500 metr. Floret Junio. Cl. Balansa".

Holotypus: Turkey: "Moissons situées à la base du Karamas-Dagh, à 5 lieues à l'Est de Césarée", c. 1500 m, 2.VII.1856, *Balansa 486* (G-BOIS [G00332417]; iso-: A, G [G00389038], GOET [GOET002697], K [K000484976, K000484977], OXF, P [P02272336, P02272337, P02272339], W [W18890069352]).

Note. – Duplicates of the type collection have labels with identical locality and collection date, but the holotype has a handwritten label by Balansa with a field number *486,* and all the isotypes have mimeographed labels originally written by Balansa and distributed with the exsiccatae number *991*.

Ptilotrichum C.A. Mey. in Ledeb., Fl. Altaica 3: 64. 1831.

Notes. – Prior to the use of molecular phylogenetic studies in assessing generic relationships and boundaries in the *Brassicaceae, Ptilotrichum* was so broadly delimited to encompass as many as 30 species (see IPNI, 2019) currently placed in several genera of different tribes, especially *Aurinia* Desv. (Dudley, 1964c), *Bornmuellera* Hausskn., and *Hormathophylla* Cullen & T.R. Dudley of the *Alysseae* (Dudley & Cullen, 1965; Španiel et al., 2015) and *Stevenia* Fisch. of the *Stevenieae* (German & Al-Shehbaz, 2011).

The generic type of *Ptilotrichum* was transferred to *Stevenia* by Kransoborov & German (2007).

Schivereckia iberidea Boiss. & A. Huet in Boiss., Diagn. Pl. Orient. ser. 2, 5: 29. 1856.

Type: "Hab. in Armeniâ propè *Zazalarhané* cl. Huet du Pavillon".

Holotypus: Turkey: "Prope Zazalarchané", V.1853, *Huet du Pavillon s.n.* (G-BOIS [G00332418]; iso-: JE [JE00001942], K [K000484117, K000484118, K000484119], S [S0712590], WAG [WAG0104054]).

= ***Bornmuellera cappadocica*** (Willd.) Cullen & T.R. Dudley in Feddes Repert. 71: 228. 1965.

Note. – The species was listed by Boissier in *Flora Orientalis* in the synonymy of *Ptilotrichum cappadocicum* (Willd.) Boiss.

Ptilotrichum cyclocarpum Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 159. 1842.

≡ ***Phyllolepidum cyclocarpum*** (Boiss.) L. Cecchi in Pl. Biosystems 145: 828. 2011.

Type: "[Aucher-Eloy] N. 279 *bis,* Kurdistan".

Holotypus: Turkey: "Monzourdag, Kurdistan", s.d., *Aucher-Eloy 279bis* (G-BOIS [G00332419]; iso-: BM [BM001254082], G [G00446192], K [K000484525], P [P02272351, P06617344]).

Notes. – Because Boissier based the species description on the unicate of *Aucher-Eloy 279bis* in his herbarium, that sheet has to be recognized as holotype. The isotype sheet at G belongs to the Moricand's herbarium, and the two sheets at P were not annotated by him either (see Boissier, 1841a).

The generic placement of the species has fluctuated a great deal, but based on molecular phylogenetic studies by Cecchi (2011), the species is firmly placed in *Phyllolepidum* of the *Alysseae*.

Ptilotrichum emarginatum Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 160. 1842.

≡ ***Bornmuellera emarginata*** (Boiss.) Rešetnik in Phytotaxa 159: 299. 2014.

Type: "[Aucher-Eloy] N. 288, mons Delphi Eubeae".

Holotypus: Greece: "in Mte Delph. Euboea", s.d., *Aucher-Eloy 288* (G-BOIS [G00332420]; iso-: BM [BM000750102], G [G00371850], K [K000720736], P [P00835134, P00835135, P00835136]) (Fig. 21, p. 113).

Notes. – None of the three sheets at P was annotated by Boissier, and the duplicate at G is part of the Moricand's herbarium. Therefore, the treatment of the G-BOIS sheet as the holotype is fully supported (Fig. 21, p. 113).

The species has been known in *Leptoplax* O.E. Schulz for over 80 years since it was established by Schulz (1933), but molecular phylogenetic studies lead to its transfer to *Bornmuellera* (see Rešetnik et al., 2013, 2014).

Ptilotrichum glabrescens (Boiss. & Balansa) Boiss., Fl. Orient. 1: 289. 1867.

≡ *Vesicaria glabrescens* Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 5: 32. 1856.

≡ ***Bornmuellera glabrescens*** (Boiss. & Balansa) Cullen & T.R. Dudley in Feddes Repert. 71: 228. 1965.

Type: "Hab. in regione montanâ montis *Masmeneudagh* in viâ inter *Ciliciam* et *Caesaream* siti cl. Balansa qui legit fructiferam Augusto".

Holotypus: Turkey: "Région montagneuse supérieure du Masmeneu-Dagh, à 25 lieues SSO de Césarée", 8.VIII.1855, *Balansa 177* (G-BOIS [G00332422]; iso-: BM [BM000583334], CAS [CAS0005115], E [E00373128], G [G00389492, G00389493, G00446263], GH [GH00018820], GOET [GOET002719], JE [JE00002861], K [K000697062], KW [KW000127914], P [P02272072, P02272073, P02272074], US [US00100436, US00100670], WAG [WAG0104053]).

Note. – Plants of this species are quite large, and the holotype consists of four sheets in one collection folder of which only one sheet has a handwritten label by Balansa and has the field number *177* and the species name in Boissier's handwriting. Two sheets are unlabeled and the remaining sheet as well as the isotypes elsewhere, have printed labels with the exsiccatae number *437,* but all information of both types of labels are identical.

Koniga R. Br., Narr. Travels Africa 214: 1826.

Tribe: *Anastaticeae* DC.

Note. – *Koniga* is a synonym of the earlier published *Lobularia* Desv. (in J. Bot. Agric. 3: 162. 1815), a genus of four Macaronesian and circum-Mediterranean species one of which is naturalized worldwide (Borgen, 1987).

Koniga arabica Boiss., Diagn. Pl. Orient. 8: 26. 1849.

≡ ***Lobularia arabica*** (Boiss.) Muschl., Man. Fl. Egypt 1: 421. 1912.

Type: "Hab. in desertis Aegypti (Aucher), Arabiae petreae ad meridiem urbis *Gaza* in arenosis (Boiss.)".

Lectotypus (first step designated by Borgen, 1987: 66; second step designated here): **Egypt:** *sine loco,* 1837, *Aucher-Eloy 264* (G-BOIS [G00332424]; isolecto-: G [G00371856], K [K000230466], P [P00868524]). **Syntypus: Palestine:** "Désert frontières de Palestine", IV–V.1846, *Boissier s.n.* (G-BOIS [G00332423]).

Notes. – Borgen (1987) selected one of the two syntypes cited by Boissier (1849), *Aucher-Eloy 264,* as the lectotype collection and indicated that the G-DC specimen is the lectotype. The G-DC abbreviation stands for the *Prodromus* herbarium, which does not have any of Aucher-Eloy collections. Instead, what she likely meant was G00371856, which has a label of Candolle's herbarium, and such collections are part of the general herbarium (G).

However, this duplicate was not annotated by Boissier who described the species solely on the specimen in G-BOIS. Therefore, a second-step lectotypification is proposed here to solve this problem.

Berteroa DC. in Mém. Mus. Hist. Nat. 7: 232. 1821.

Tribe: *Alysseae* DC.

Note. – The genus includes six species native to the Mediterranean region, C Europe, and SW Asia (Yüzbaşıoğlu et al., 2017).

Berteroa graeca Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. ser. 2, 1: 35. 1854.

Type: "Hab. in Arcadiâ occidentali circâ *Andritzena,* propè *Pheneon* et *Kalavryta Arcadiae* borealis (Heldr.) propè *Klakines* Peloponnesi (Orphanid. Fl. Graeca exs. Nº 167)".

Lectotypus (designated here): **Greece:** "in Peloponneso prope Klakines (Vulg)", 3000' [910 m], 13–25.VI.1852, *Orphanides 167* (G-BOIS [G00332425]; isolecto-: ATHU [n.v.], BM [BM000750191, BM001254085], K [K000697064], KW [KW000127911], LD [LD1047942], P [P04626677, P04717656], W [W0075609A]). **Syntypus: Greece:** "in arvis Aradia pr. Kalavryta", VII.1848, *Heldreich s.n.* (BM [BM001254084]).

= ***Berteroa obliqua*** (Sm.) DC., Syst. Nat. 2: 292. 1821.

Notes. – Tan (2002: 226) listed one of the syntypes in the original protologue and indicated that ATHU, G-BOIS, and LD are the lectotype. Instead of 1852, she erroneously indicated that the year of collection was 1870, or 18 years after the publication of the species. However, despite that her action was inadequate to qualify for lectotypification because she did not use the phrase "designated here" or its equivalent (see Turland et al., 2018: Art. 9, note 6; McNeill, 2014).

Boissier in *Flora Orientalis* reduced *B. graeca* to synonymy of *B. mutabilis* (Vent.) DC. No material of the Heldreich syntype above was located in the G or P herbaria.

Berteroa orbiculata var. *stricta* (Boiss. & Heldr.) Boiss., Fl. Orient. 1: 291. 1867.

≡ *Berteroa stricta* Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. ser. 2, 1: 35. 1854.

Type: "Hab. frequens ad radices montis *Olympi Thessali* propè *Katarine* (Heldr. Aug. 1851)".

Holotypus: Greece: "Freq. ad radices m. Olympi. Thessaliae pr. Katarine", 3.VIII.1851, *Heldreich 2404* (G-BOIS [G00332428]; iso-: W [W18890008656]).

= ***Berteroa incana*** (L.) DC., Syst. Nat. 2: 291. 1821.

Note. – The species was described based on G-BOIS duplicate alone and, therefore, it is the holotype.

Berteroa ascendens var. *microcarpa* Boiss., Fl. Orient. Suppl.: 52. 1888.

Type: "Hab. in collibus aridis Ponti Lazici circa Djimil 6100 (Bal.!)".

= ***Berteroa incana*** (L.) DC., Syst. Nat. 2: 291. 1821.

Note. – No material in the Geneva or other herbaria was examined.

Draba L., Sp. Pl.: 642. 1753.

Tribe: *Arabideae* DC.

Note. – The largest genus in the family with previously estimated 390 species (Al-Shehbaz, 2012) but now 402 (BrassiBase, 2019) that are distributed primarily in the alpine and subarctic areas of Eurasia, North America (Rocky Mts.), and South America (Andes), with a few species in the alpine areas of NW Africa.

Draba aizoides var. *brevistyla* Boiss., Fl. Orient. 1: 293. 1867 [nom. illeg.] [non Neilr.].

Type: "Hab. in regione sylvaticâ Parnassi ad Gourna (Heldr!), in monte Kyllene (Orph!). Flores non vidi".

Lectotypus (designated here): **Greece:** "Legi in monte Cyllone supra Tricata", 3500' [1070 m], 22.IV–4.V.1854, *Orphanides 2649* (G-BOIS [G00332426]).

= ***Draba lacaitae*** Boiss., Fl. Orient. Suppl.: 53. 1888.

Note. – The Heldreich syntype was not located in the herbaria consulted.

Draba lacaitae Boiss., Fl. Orient. Suppl.: 53. 1888.

Type: "Hab. ad rupes schistosas montis Chelmos Peloponnesi prope Kalogeros 4–5000' (cl. C. Lacaita!)".

Holotypus: Greece: "in monte Chelmos Peloponnisus ad rupes schistosas prope mandram Kalógeros", 4000'–5000' [1220–1520 m], 4.V.1883, *Lacaita s.n.* (G-BOIS [G00332427]; iso-: B [B100241477]).

Note. – Buttler (1986) listed the holotype as "orig. coll." and cited G-BOIS for it.

Draba parnassica Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. ser. 2, 1: 34. 1854.

Type: "Hab. in summo cacumine montis *Parnassi* (Heldreich!)".

Holotypus: Greece: "In monte Parnasso. In summon cacumine!", 8.VIII.1852, *Heldreich 2655* (G-BOIS [G00332429]; iso-: BP, FI, W [W0051068, W18890305318]).

Note. – Boissier based the species description solely on the G-BOIS duplicate and, therefore, the lectotypification of the species by Buttler (1986: 312) based on that same sheets was unnecessary.

Draba cretica Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. 8: 27. 1849.

Type: "Hab. in cacumine *Lazzaro* montium *Lassiti* alt. 6000'. (Heldreich.)".

Holotypus: Greece: "sommet du Mt Lazzaro des montagnes des Lassiti", 6000' [1830 m], 9.V.1846, *Heldreich 1657* (G-BOIS [G00332430]; iso-: BM [BM000750202], G [G00446193, G00446194], GOET [GOET002751], JE [JE00003666], K [K000697132], P [P05450709], WU [WU0076310]).

Notes. – Labels of the isotypes lack the collection day and number.

As in the previous entry, the lectotypification by Buttler (1986: 312) based on the holotype was superfluous.

Draba bruniifolia var. *diversifolia* (Boiss. & A. Huet) Boiss., Fl. Orient. Suppl.: 54. 1888.

≡ *Draba diversifolia* Boiss. & A. Huet in Boiss., Diagn. Pl. Orient. ser. 2, 5: 30. 1856.

Type: "Hab. in monte *Techdagh* Armeniae alt. 7000'–8000', cl. Huet du Pavillon, cl. Calvert".

Lectotypus (first step designated by Dorofeyev, 2003: 70; second step designated here): **Turkey:** "Tech-Dagh", 7000'–8000' [2130–2440 m], VI.1853, *Huet du Pavillon s.n.* (G-BOIS [G00332431]; isolecto-: B [B100294033], BM [BM000583402], G [G00446195, G00446196, G00446264], GOET [GOET002750], JE [JE0002442 plant in middle, JE00002444], K [K000697184, K000697185], LE, P [P04625375], W [W18890011476, W18890093874], WAG [WAG0004245]). **Syntypus: Turkey:** "Erzeroum", *Calvert 19* (G-BOIS [G00332432], JE [JE00002443]).

= ***Draba bruniifolia*** Steven in Mém. Soc. Naturalistes Moscou 3: 269. 1812.

Notes. – One sheet, JE00002442, may be an isolectotype, but it lacks the collection date and elevation, and JE00002443 lacks the collection number.

Dorofeyev (2012: 427) re-lectotypified the species name based on the same specimen he designated earlier, but he erroneously took the LE duplicate as the lectotype, a specimen that was never examined nor annotated by Boissier. Therefore, a second step is needed to designate the G-BOIS duplicate as the lectotype.

Draba olympica var. *major* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 163. 1842.

Type: "[Aucher-Eloy] n. 302, Akdag; [Aucher-Eloy] 4065, absque loco".

Lectotypus (designated here): **Turkey:** "in rupib. Circa Tocat", s.d., *Aucher-Eloy 4065* (G-BOIS [G00796450]; isolecto-: BM [BM000583408, BM001254090]). **Syntypus: Turkey:** "Ak-Dag", s.d., *Aucher-Eloy 302* (BM [BM000583406, BM001254089], G-BOIS [G00796449]).

= ***Draba bruniifolia*** Steven in Mém. Soc. Naturalistes Moscou 3: 269. 1812.

Notes. – The var. *major* was not listed in *Flora Orientalis,* but the two syntypes listed in its original publication were cited in the *Flora* under *D. olympica* var. *diversifolia*.

The missing locality for *Aucher-Eloy 4065* in the original publication was listed as Tokat in *Flora Orientalis.*

Draba natolica Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 163. 1842.

Type: "[Aucher-Eloy] N. 4066, Tokat".

Holotypus: Turkey: "Tokas", s.d., *Aucher-Eloy 4066* (G-BOIS [G00332434]; iso-: BM [BM000583400, BM000583401], FI [FI010123], G [G00032274, G00446197, G00446198], K [K000697181], KW [KW000128002], P [P02272420, P02272421, P02272422, P02272423, P02272424, P04712517, P06616788], W [W0075602, W0075603, W18890077464, W18890077472]).

= ***Draba bruniifolia*** Steven in Mém. Soc. Naturalistes Moscou 3: 269. 1812.

Note. – Boissier in *Flora Orientalis* recognized this taxon as a distinct species, but later he reduced it in the *Supplementum* to synonymy of the illegitimate *D. bruniifolia* var. *incana* Boiss. (see below).

Draba natolica var. *argaea* Boiss., Fl. Orient. 1: 296. 1867.

Type: "Hab. in regione alpinâ montis Argaei Cappadociae (Bal! Ky exs. 202!). Specimen floriferum e monte Ssahend prov. Aderbidjan (Buhse exs 591!), huic quoque referendum videtur".

Lectotypus (designated here): **Turkey:** "Plantae Argaei montis Cappadociae", 30.V.1859, 8500' [2590 m], 30.V.1859, *Kotschy 202* (G-BOIS [G00332437]; isolecto-: BM [BM000583403], C [C10008825], G [G00446199], H [H1511655], JE [JE00002445, JE00002446], K [K000697179], P [P06616790, P06616791, P06616792], W [W0075606, W0075607, W18890058117]). **Syntypi: Turkey:** "Région alpine du Mont-Argée (Cappadoce)", VII.1856, *Balansa 442* (G-BOIS [G00332436]); "Schah Yordih", VII.1850, *Buhse 591* (G-BOIS [G00332435], LE).

= ***Draba bruniifolia*** Steven in Mém. Soc. Naturalistes Moscou 3: 269. 1812.

Note. – Although Coode & Cullen (1965: 414) correctly listed the previous entry in synonymy of *D. bruniifolia,* they did not list this varietal name.

Draba bruniifolia var. *incana* Boiss., Fl. Orient. Suppl.: 54. 1888.

≡ *Draba natolica* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 163. 1842.

Type: "Hab. in montibus Anatoliae orientalis, Cataoniae, Cappadociae".

= ***Draba bruniifolia*** Steven in Mém. Soc. Naturalistes Moscou 3: 269. 1812.

Notes. – Boissier in the *Supplementum* listed *D. natolica* and *D. argaea* in the synonymy of the variety. The latter species epithet was never published but was given as an exsiccatae name under var. *argaea*.

This is then a renaming at the varietal level of *D. natolica* Boiss. (see above).

Draba antilibanotica Al-Shehbaz, **nom. nov.**

≡ *Draba oxycarpa* Boiss., Diagn. Pl. Orient. 8: 28. 1849 [nom. illeg.] [non Sommerf.].

Type: "Hab. in cacuminibus *Hermonis* suprà *Rascheya* in *Antilibano*. (Boiss.)".

Holotypus: Syria: "Hermon", V–VII.1846, *Boissier s.n.* (G-BOIS [G00332433]).

Notes. – Several authors (e.g., Post, 1896, 1932; Zohary et al., 1980; Greuter et al., 1986) maintained Boissier's name and overlooked its earlier homonym. In that, they mostly likely followed Schulz (1927) who recognized the illegitimacy of that name but erroneously kept it while reducing the earlier homonym to a variety (var. *oxycarpa* Th. Fr.) of his highly polymorphic *D. alpina* L. that encompassed many species of northern Eurasia and North America.

The species is highly restricted to the Antilibanon Mountains west of Damascus in the Golan Heights, an area currently administered by Israel.

Draba dicranoides Boiss. & A. Huet in Boiss., Diagn. Pl. Orient. ser. 2, 5: 30. 1856.

Type: "Hab. in rupibus suprâ *Baibout* Armeniae cl. Huet du Pavillon, circâ *Ispir* cl. Calvert".

Lectotypus (designated here): **Turkey:** "ad rupes supra Baibout", V.1853, *Huet du Pavillon s.n.* (G-BOIS [G00332456]; isolecto-: BM [BM001254000], FI [FI005658], G [G00446209, G00446210], GOET [GOET002773], JE [JE00003680], K [K000697203, K000697204], P [P06616478, P06616479], W [W18890011473]). **Syntypus: Turkey:** "Ispir", 1853, *Calvert 1245* (G-BOIS [G00332457]).

= ***Draba rigida*** Willd., Sp. Pl. 3: 425. 1800.

Note. – The isolectotypes labels have "inter Baibout et Erzeroum" indicated.

Draba affghanica Boiss., Fl. Orient. Suppl.: 55. 1888.

Type: "Hab. in alpinis ad Schendtoi, Sikaram, etc. vallis Kuram Affghaniae (Aitch. 99! 112! 126!)".

Lectotypus (first step designated by Jafri, 1973: 134; second step designated here): **Pakistan:** "Affghania", 12.VI.1880, *Aitchison 99* (G-BOIS [G00330491]; isolecto-: GH [GH00046951], K [K000568096]). **Syntypi: Pakistan:** "Affghania", 10000'–14000' [3050–4270 m], 12.VII.1880, *Aitchison 112* (G-BOIS [G00332438]); *sine loco,* 13.VI.1880, *Aitchison 126B* (G-BOIS [G00332439], K [K000568066], LE [LE00012963]).

Notes. – A second-step lectotypification is necessary to correct the lectotype from K to G-BOIS because Boissier never examined or annotated any of the duplicates at K.

The specimens at K sometimes include different collections of Aitchison or different numbers on the same sheet (e.g., [K000568066]). However, all are from Afghanistan, and they lack data on collection dates or specific localities. Untangling the finer details of each these requires consulting the fieldbooks and travel itineraries of Aitchison, a task beyond the scope of this work, and that is why they are treated herein as syntypes.

What is most important for the lectotypification of the species name is *Aitchison 99* because it was initially designated by Jafri (1973: 134), and its single problem is resolved by taking the G-BOIS as the lectotype.

Draba reuteri Boiss. & A. Huet in Boiss., Diagn. Pl. Orient. ser. 2, 6: 13. 1859.

Type: "Hab. in summo monte *Karakaban Armeniae* ad nives cl. Huet du Pavillon. Fl. Maio".

Holotypus: Turkey: "In summo Karakaban ad nives", 9000'–10000' [2740–3050 m], V.1853, *Huet du Pavillon s.n.* (G-BOIS [G00332460]; iso-: BM [BM001254095, BM001254096], G [G00446212, G00446213], GOET [GOET002770], JE [JE00002048, JE00002049], K [K000697224, K000697225], W [W19310012473]).

= ***Draba polytricha*** Ledeb., Fl. Ross. 1: 146. 1842.

Note. – The isotypes labels have handwritten: "ad rupes Mtis Karakaban", and printed: "Inter Trapezuntem et Baibout. Maio 1853".

Draba polytricha var. *laxior* Boiss., Fl. Orient. 1: 298. 1867.

Type: "Hab. in Armeniâ Rossicâ (Szow!)".

Holotypus: Armenia: *sine loco,* s.d., *Szovits 145* (G-BOIS [G00332440]; iso-: K [K000697222], LE).

= ***Draba polytricha*** Ledeb., Fl. Ross. 1: 146. 1842.

Notes. – Boissier based his varietal name solely on the duplicate in his herbarium, which ought to be recognized as the holotype.

The holotype is a collection folder of two sheets, of which the barcoded one has *Szovits 145* and the other *Szovits s.n.* indicated.

Draba rosularis Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 165. 1842.

Type: "[Aucher-Eloy] N. 4062, Bayazid".

Lectotypus (designated here): **Turkey:** "Bayazid", s.d., *Aucher-Eloy 4062* (G-BOIS [G00332442]; isolecto-: G [G00446200], K [K000697229], P [P02272380, P02272381]).

Notes. – Lectotypification of the species name is justified because Boissier (1842b) based his description on the single sheet in his herbarium and P022724381 that he annotated. He did not annotate or examine the K or other P duplicates above.

Boissier in *Flora Orientalis* reduced the species to synonym of *D. calycosa* var. *aucheri* that he based on the same type.

Draba calycosa var. *aucheri* Boiss., Fl. Orient. 1: 299. 1867.

≡ ***Draba rosularis*** Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 165. 1842.

Note. – This is a renaming of the previous entry at the varietal rank.

Draba velutina Boiss. & A. Huet in Boiss., Diagn. Pl. Orient. ser. 2, 6: 15. 1859.

Type: "Hab. in monte *Techdagh Armeniae* propè *Erzeroum* cl. Huet du Pavillon, cl. Calvert. Hùc etiam spectare videtur Auch. No 203".

Lectotypus (designated here): **Turkey:** "Tech-Dagh", 7000'–8000' [2130–2440 m], VI.1853, *Huet du Pavillon s.n.* (G-BOIS [G00332443]; isolecto-: BM [BM001254097], G [G00446201, G00446202], GOET [GOET002779], JE [JE00002323], K [K000697227, K000697228], P [P02272445, P02272447], W [W18890011477]). **Syntypi: Turkey:** "Erzeroum", s.d., *Aucher-Eloy 203* (G [G00446201], G-BOIS [G00332445], P [P02272444]); "Tech Dagh", 1853, *Calvert 55* (G-BOIS [G00332444]).

= ***Draba rosularis*** Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 165. 1842.

Notes. – The isolectotypes labels have "In montibus Tech-Dagh suprà Erzeroum, 7–8000', Jun 1853, *Huet du Pavillon*" indicated.

On the specimen G00446201 two different collections are mounted: *Huet du Pavillon s.n.* and *Aucher-Eloy 203.*

Draba rosularis var. *leiocarpa* Boiss., Diagn. Pl. Orient. ser. 2, 5: 31. 1856.

Type: "Specimina in eodem monte *Techdagh* Armeniae a cl. Calvert lecta".

Holotypus: Turkey: "Tech Dagh", 1853, *Calvert 55* (G-BOIS [G00332444]).

= ***Draba rosularis*** Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 165. 1842.

Note. – Based on one of the syntypes of *D. velutina*.

Draba incompta var. *persica* (Boiss.) Boiss., Fl. Orient. 1: 299. 1867.

≡ *Draba persica* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 164. 1842.

Type: "[Aucher-Eloy] N. 4061, Elamout".

Holotypus: Iran: "Elamout", s.d., *Aucher-Eloy 4061* (G-BOIS [G00332446]; iso-: BM [BM001254091, BM001254092], G [G00446203, G00446204], K [K000697218], P [P02272368, P02272369, P02272370], W [W0075604]).

= ***Draba pulchella*** DC., Syst. Nat. 2: 354. 1821.

Note. – Boissier (1842b) based the species description solely on the unicate in his herbarium which ought to be recognized as the holotype. No duplicates were found in the Candolle's herbarium, and none of the three sheets at P were annotated by Boissier.

Draba calycina Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 6: 14. 1859 [nom. illeg.] [non Desv.].

Type: "Hab. in fissuris rupium regionis subalpinae montis *Argaei* suprà pagum *Assardjick* ad meridiem urbis *Caesareae* siti. Initio Julii fructiferam legit cl. Balansa".

Holotypus: Turkey: "au-dessus du village d'Assardjik, au S. de Césarée (Cappadoce)", 10.VII.1856, *Balansa 440* (G-BOIS [G00332447]; iso-: B [B0100294047], P [P02272379]).

= ***Draba cappadocica*** Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 6: 14. 1859.

Note. – Boissier did not examine the duplicates at B or P.

Draba calycosa Boiss. & Balansa in Boiss., Fl. Orient. 1: 299. 1867.

≡ *Draba calycina* Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 6: 14. 1859 [non Desv.].

= ***Draba cappadocica*** Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 6: 14. 1859.

Notes. – This is a renaming of Boissier's later homonym *D. calycina*.

The holotype of *D. calycina* in G-BOIS is stored alone in a folder cover named *D. calycosa.*

Draba acaulis Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 164. 1842 (Fig. 22A, p. 114).

Type: "monte Tauro a cl. Kotschy lecta".

Holotypus: Turkey: "In monte Tauro", summer 1836, *Kotschy 38* (G-BOIS [G00332448]; iso-: G [G00446205],

K [K000697231, K000697233, K000697234], KW [KW000128005], P [P02272584]).

Note. – Although some authors, such as Coode & Cullen (1965: 418), indicated that no type collection was cited in the original publication, the phrase "monte Tauro a cl. Kotschy lecta" was given two lines before the species description, and such original material is cited above.

Draba cappadocica Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 6: 14. 1859.

Type: "Hab. in regione alpinâ montis *Argaei Cappadociae* cl. Balansa. Floret Junio".

Holotypus: Turkey: "Région alpine du Mont-Argée (Cappadoce)", 20.VII.1856, *Balansa 441* (G-BOIS [G00332449]).

Note. – No duplicates of the type collection were found in any of the herbaria consulted, and JSTOR does not list any.

Draba elegans Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 166. 1842.

Type: "[Aucher-Eloy] N. 300, Taurus".

Holotypus: Turkey: "in Mte Taurus", s.d., *Aucher-Eloy 300* (G-BOIS [G00332450]; iso-: K [K000697215], P [P02272367]).

Note. – There are no duplicates of Aucher-Eloy in all of the other Geneva herbaria, and the P02272367 duplicate was not annotated by Boissier. Therefore, Boissier (1842b) based the species description solely on the unicate in his herbarium.

Draba armena Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 167. 1842.

Type: "[Aucher-Eloy] N. 4060, Armenia".

Holotypus: Turkey: "Armeni", s.d., *Aucher-Eloy 4060* (G-BOIS [G00332451]; iso-: G [G00446206], K [K000697221], P [P02272377], W [W0075608]).

= ***Draba pulchella*** DC., Syst. Nat. 2: 354. 1821.

Note. – No duplicate of the type collection was found in the Candolle's herbarium, and the sheet at P was not annotated by Boissier. Therefore, the G-BOIS is the holotype (see Boissier, 1841a).

Draba huetii Boiss., Diagn. Pl. Orient. ser. 2, 5: 31. 1856.

Type: "Hab. in Anatoliâ propè *Beybazar* Aucher No 4058 mixta cum *Dr. nemorali,* in Armeniâ propè *Kochaponar* cl. Huet du Pavillon".

Lectotypus (first step designated by Dorofeyev, 2012: 431; second step designated here): **Turkey:** "Beybasar", s.d., *Aucher-Eloy 4058* (G-BOIS [G00332452]; isolecto-: BM [BM000583556], G [G00441249, G00441250], K [K000697239], P [P02272398], W [W0032996]). **Syntypus: Turkey:** "Moulins de Kochaponar", V.1853, *Huet du Pavillon s.n.* (B [B100241487], BM [BM000583570], G [G00441246, G00441248], G-BOIS [G00332453], GOET [GOET002760], JE [JE00002044], K [K000697237, K000697243], LE, P [P02272402, P02272405], S [S1216185, S1216186], W [W18890011475]).

Note. – Dorofeyev (2012: 431) lectotypified the species based on the duplicate at LE that Boissier did not examine. Therefore, that typification is corrected here by a second step designating the G-BOIS duplicate as the lectotype.

Draba nemoralis var. *leiocarpa* Boiss., Fl. Orient. 1: 303. 1867.

≡ *Draba pontica* Desf. in Ann. Mus. Hist. Nat. 11: 381. 1808.

= ***Draba nemorosa*** L., Sp. Pl.: 643. 1753.

Note. – This is a renaming at the varietal rank of *D. pontica* Desf.

Draba aucheri Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 166. 1842.

Type: "[Aucher-Eloy] N. 92, Alpes Zerdkou".

Holotypus: Iran: "in Zerdakou", s.d., *Aucher-Eloy 92* (G-BOIS [G00332072]; iso-: G [G00441255, G00441256], K [K000729819], P [P00747370, P02272365]).

Notes. – Boissier did not examine or annotate any of the sheets at P or G and based the species solely on the duplicate in his herbarium.

Three species names were published by Boissier and compete for recognition: *Arabis sulphurea* (see under that genus) was a renaming of *Draba aucheri* in *Arabis*, *Draba linearis* (next entry) was simultaneously published with *D. aucheri* (Boissier, 1842b), and Schulz (1927: 316) reduced it to a variety of *D. aucheri.* Subsequent authors, including myself, have since placed both *D. linearis* and *Arabis sulphurea* in synonymy of *Draba aucheri*. Oddly enough, Boissier recognized the very

same species as *Arabis sulphurea* (Fl. Orient. 1: 173–174) and as *Draba linearis* (Fl. Orient. 1: 303).

The single species recognized here has yellow flowers, a feature taxonomically important in *Draba,* though it is never found in any species of *Arabis*.

Draba linearis Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 167. 1842.

Type: "[Aucher-Eloy] N. 4118, Elamout".

Holotypus: Iran: "Elamout", s.d., *Aucher-Eloy 4118* (G-BOIS [G00332458]; iso-: B [B100294017], BM [BM001254094], G [G00446211], K [K000729823], P [P02272414, P02272415, P02272416], W [W0032993]).

= ***Draba aucheri*** Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 166. 1842.

Note. – Boissier based the species description solely on the unicate in his herbarium and did not annotate the material at P nor examined the above sheet at G that belongs to the Moricand's herbarium.

Draba linearis var. *macrocarpa* Boiss., Fl. Orient. 1: 303. 1867.

Type: "Hab. in Persiae jugo Elbrus inter Asterabad et Schahrud (Bunge!)".

Holotypus: Iran: "in jugo Elbrusensi; inter Astrabad et Schahrud", V.1858, *Bunge s.n.* (G-BOIS [G00332459]; iso-: K [K000729822], P).

= ***Draba aucheri*** Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 166. 1842.

Note. – See the previous note under *D. aucheri.*

Erophila DC., Syst. Nat. 2: 356. 1821.

Tribe: *Arabideae* DC.

Notes. – All regional floras and checklists that covered parts of the *Flora Orientalis* area (e.g., Busch, 1939; Coode & Cullen, 1965; Hedge, 1968; Jafri, 1973; Greuter et al., 1986; Tan & Stevanović, 2002) recognized *Erophila* as a genus distinct from *Draba,* whereas only few recent authors (e.g., Appel & Al-Shehbaz, 2003; Al-Shehbaz, 2012) united the former with the latter. It is interesting to note that Linnaeus (1753) described the type species of *Erophila* as *Draba verna* L.

Molecular phylogenetic studies by Jordon-Thaden et al. (2010) firmly established that *Erophila* is nested within *Draba* and supported the recognition of a single genus.

In spite of synonymizing *Erophila* with *Draba,* the number of taxa recognized in *Erophila* have not yet been fully accounted for in *Draba*. One of the main reasons is the lack of agreement among experts of the *Brassicaceae* as to how many species and infraspecific taxa should be recognized in *Erophila*. For example, IPNI (2019) lists over 100 binomials, wheras Schulz (1927) recognized only seven species but divided *E. verna* (L.) DC. into 36 varieties.

By contrast, Al-Shehbaz et al. (2010) favored the recognition of a single polymorphic species. The second main reason is that no taxonomic study on the *Erophila* complex will be satisfactory unless combined with extensive, population-based molecular, cytological, and critical morphological studies. As shown by Winge (1940), chromosome numbers show a complex series form the lowest $2n = 14$ to the highest $2n = 96$, though future studies are needed to confirm that.

Erophila setulosa Boiss. & C.I. Blanche in Boiss., Diagn. Pl. Orient. ser. 2, 5: 31. 1856.

Type: "Hab. in cultis propè Saida ad pontem fluvii *Nahr-Aoulè* cl. Blanche, in viâ inter Saida et *Deir el Kammar* cl. Dr. Gaillardot. Fl Januario, Februario".

Lectotypus (designated here): **Lebanon:** "Dans les champs de Muriers près du pont de Nahr-Aoulé, Saïda", 15.II.1853, *Blanche 29* (G-BOIS [G00332461]). **Syntypus: Lebanon:** "route du Saïda à Deir el Kamar près du village de Crïn Belen", 28.I.1853, *Gaillardot 31* (G-BOIS [G00332462]).

= ***Draba verna*** L., Sp. Pl.: 642. 1753.

Note. – *Gaillardot s.n.* [JE00002073], "Sommet du rocher entre Djemélie et Medjloùna route de Saïda à Deir el Kamar" collected a day after the above syntype, was not examined by Boissier.

Draba edmondii Al-Shehbaz, **nom. nov.**

≡ *Draba macrocarpa* Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. 8: 28. 1849 [nom. illeg.] [non Adams].

≡ *Erophila macrocarpa* Boiss., Fl. Orient. 1: 304. 1867.

Type: "Hab. in collibus maritimis propè *Smyrnam* in consortio *Dr. vernae* Febr. et Mart. (Heldr.)".

Holotypus: Turkey: "in collibus ad littora maris prope Smyrnam", 26.II.1846, *Heldreich 1297* (G-BOIS [G00332463]; iso-: B [B000522043], E [E00373101], G [G00446214, G00446215], GOET [GOET002573], K [K000697635, K000697636, K000697637], P [P06650499], W [W0075600, W0075601]).

Etymology. – The species is named after the renouned Swiss botanist Pierre-Edmond Boissier (see introductory part of this paper).

Notes. – Except for the holotype in G-BOIS and isotype at W [W0075601], all other isotypes were distributed as exsiccatae without a collection number.

Halácsy (1900: 102) recognized this taxon as a variety of *Draba verna,* whereas both Walters (1964: 57) and Coode & Cullen (1965) maintained it as a subspecies of *Erophila verna*. As shown above, *Erophila* is perfectly nested within *Draba* and, therefore, the plant should be renamed when maintained as a distinct species of *Draba*.

Draba edmondii is unique among all the taxa previously assigned to *Erophila* and can be readily distinguished from them by having linear to linear-lanceolate (vs orbicular to ovate or elliptic) siliques (6–)7–10 times (vs equaling or to 4.5 times) longer than broad and with parallel (vs not parallel) margins, as well as fruiting pedicels shorter or rarely subequaling (vs longer) than fruit. It is distributed in Greece, the eastern Aegean Islands, and western Turkey.

Petrocallis W.T. Aiton, Hort. Kew. ed. 2, 4: 93. 1812.

Note. – This monospecific genus has not yet been assigned to tribe, and its type, *P. pyrenaica* (L.) W.T. Aiton, is an European species that does not grow in the *Flora Orientalis* area (see Jalas et al., 1996). However, the following species is currently recognized as *Didymophysa* Boiss. of the tribe *Thlaspideae* (see below).

Petrocallis fenestrata Boiss. & Hohen. in Boiss., Diagn. Pl. Orient. 8: 27. 1849.

≡ *Elburzia fenestrata* (Boiss. & Hohen.) Hedge in Notes Roy. Bot. Gard. Edinburgh 29: 181. 1969.

≡ ***Didymophysa fenestrata*** (Boiss. & Hohen.) Esmailbegi & Al-Shehbaz in Taxon 67: 334. 2018.

Type: "Hab. in saxosis *Meidan Abdallah* in valle *Loura* montis *Elbrus* Kotschy N° 493 et 795".

Lectotypus (designated here): **Iran:** "In saxosis Meidan Abdullah in valle Loura m. Elbrus", 15.VII.1843, *Kotschy 493a 795* (G-BOIS [G00332464]; isolecto-: P [P02272395], W [W0053489]).

Notes. – Boissier (1849) based the species description on the unicate in his herbarium and on P02272395 that he annotated and, therefore, lectotypification of the name is justified.

Both *Kotschy 493a* and *Kotschy 795* are listed in protologue and on the labels of the lectotype and W0053489. By contrast, the label of P duplicate has only *Kotschy 493a*. Since the other information on all duplicates of the type collection is identical, it is not possible to determine why Kotschy used both numbers on the lectotype and W isolectotype duplicates.

Following its transfer to *Elburzia* Hedge by Hedge (1969), the species remained in that genus to the present. However, molecular phylogenetic studies by Esmailbegi et al. (2018) strongly support its assignment to *Didymophysa*.

Buchingera Boiss. & Hohen. in Boiss., Diagn. Pl. Orient. 8: 29. 1849 [nom. illeg.] [non F.W. Schultz].

Note. – Boissier's later homonym was renamed by Rauschert (1982) as *Asperuginoides* Rauschert, a monospecific genus not yet assigned to tribe.

Buchingera axillaris Boiss. & Hohen. in Boiss., Diagn. Pl. Orient. 8: 29. 1849.

≡ ***Asperuginoides axillaris*** (Boiss. & Hohen.) Rauschert in Taxon 31: 558. 1982.

Type: "Hab. ad versuras agrorum propè urbem *Teheran* Aprili Kotschy N° 10".

Holotypus: Iran: "Ad versuras agrorum prope urbem Teheran", 15.IV.1843, *Kotschy 10* (G-BOIS [G00330399]; iso-: BM [BM000583346, BM000583347], G [G00382767, G00382768], GOET [GOET002728], H [H1355713], HAL, JE [JE00001945], K [K000697072, K000697074], KW [KW000128008], LE [LE00013028], P [P00747674, P00747675, P00747677, P00747678], WAG [WAG0004237], WU [WU0101795]).

Notes. – Jafri (1973: 124) indicated that the type of *Asperuginoides axillaris* (as *Buchingera*) is Bunge's collection from Isfahan. However, that specimen was collected ten years after the publication of the species name, though Bunge's collection was cited in *Flora Orientalis.*

The JE isotype lacks the collection number, year, and collector, and it is a fragment annotated by Boissier and given to Haussknecht.

Coluteocarpus Boiss. in Ann. Sci. Nat., Bot. ser. 2, 16: 378. 1841.

Tribe: *Coluteocarpeae* V.I. Dorof.

Notes. – Boissier (1841b) recognized *C. reticulatus* Boiss. in this monospecific genus, but that combination is illegitimate because the basionym, *Vesicaria reticulata* Lam. (1808), was predated by *Alyssum vesicaria* L. (1753) that Boissier listed in the synonymy.

The genus remained accepted for over 170 years until its recent union with the earlier published *Noccaea* Moench by Al-Shehbaz (2014).

Graellsia Boiss. in Ann. Sci. Nat., Bot. ser. 2, 16: 379. 1841.

Tribe: *Thlaspideae* DC.

Note. – A genus of nine species of which one is endemic to Turkey, one to Pakistan, two in Tajikistan, and three in Iran, with the ranges of one other Iranian species extend into Afghanistan and another into Iraq (Esmailbegi et al., 2017a).

Graellsia saxifragifolia var. *yezdana* Boiss., Fl. Orient. 1: 307. 1867.

Type: "Hab. in montibus prope Yezd (Buhse!)".

Holotypus: Iran: "Jesd", V.1849, *Buhse 1404/2* (G-BOIS [G00332467]; iso-: LE [n.v.]).

= ***Graellsia saxifragifolia*** (DC.) Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 173. 1842.

Note. – The variety was based on having somewhat longer and narrower fruit, a feature considered by Esmailbegi et al. (2017a) as trivial.

Peltaria Jacq., Enum. Stirp. Vindob.: 260. 1762.

Tribe: *Thlaspideae* DC.

Notes. – *Peltaria* is a genus of three species distributed from C Europe eastward into Turkmenistan.

Although the genus belongs to the tribe *Thlaspideae,* the following species belongs to *Ricotia* L., a genus of nine species that belongs to the tribe *Biscutelleae* Dumort. (Özüdoğru et al., 2015).

Peltaria aucheri Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 175. 1842.

≡ ***Ricotia aucheri*** (Boiss.) B.L. Burtt in Kew Bull. 6: 131. 1951 (Fig. 22B, p. 114).

Type: "[Aucher-Eloy] N. 285, Armenia".

Holotypus: Turkey: "Armenia", s.d., *Aucher-Eloy 285* (G-BOIS [G00332304]; iso-: BM [BM001254078], G [G00446143], K [K000484467], MO [MO1619005], P [P00835125], US [US00099941]).

Note. – Boissier (1842b) based the species description solely on the specimen in his herbarium and did not annotate the material at P nor examined the above sheet at G that belongs to the Moricand's herbarium (see Boissier, 1841a).

Clypeola L., Sp. Pl.: 652. 1753.

Tribe: *Alysseae* DC.

Notes. – The genus includes nine Eurasian-NW African species distributed from Morocco and Spain eastward into Uzbekistan (Španiel et al., 2015).

Although it was united earlier by Al-Shehbaz (2013) with *Alyssum,* the current evidence at hand strongly supports the maintenance of both genera.

Clypeola microcarpa Boiss., Diagn. Pl. Orient. 1: 74. 1843 [nom. illeg.] [non Moris].

≡ *Clypeola glabra* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 173. 1842.

Type: "Hab. in parte superiori montium Atticae *Pentelicus, Parnes*. Fl. Maio".

Typus: see *C. glabra* Boiss. entry below.

= ***Clypeola jonthlaspi*** subsp. ***microcarpa*** (Moris) Arcang., Comp. Fl. Ital.: 63. 1882.

Note. – *Clypeola microcarpa* is illegitimate because Boissier (1843) listed the earlier published *C. glabra* Boiss. as a synonym. Furthermore it is a later homonym of. *C. microcarpa* Moris.

Clypeola glabra Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 173. 1842.

= ***Clypeola jonthlaspi*** subsp. ***microcarpa*** (Moris) Arcang., Comp. Fl. Ital.: 63. 1882.

Notes. – No material was cited by Boissier (1842b), but Meikle (1977: 144) gave the type as: "Greece; in parte superiori montium Atticae Pentelicus, Parnes", which is the same as that of the illegitimate and later homonym *C. microcarpa* Boiss.

Boissier in *Flora Orientalis* listed *C. glabra* in the synonymy of *C. microcarpa* Moris (non Boiss.). The failure to cite any collections in the original description of *C. glabra* does not allow accurate and final evaluation of the name status.

Clypeola elegans Boiss. & A. Huet in Boiss., Diagn. Pl. Orient. ser. 2, 5: 38. 1856.

Type: "Hab. in Armeniâ inter *Zarbas* et *Haho* cl. Huet du Pavillon".

Holotypus: Turkey: "Inter Zarbas et Haho", 3000'–4000' [910–1220 m], VI.1853, *Huet du Pavillon s.n.* (G-BOIS [G00332469]; iso-: FI [FI005704], G [G00389755, G00389756, G00389757], K [K000697095, K000697097], P [P00835155, P00835156, P00835157]).

Notes. – Cullen (1965) listed a collection of Huet du Pavillon from between Erzurum and Ispir, but no such collection was cited in the original protologue.

The holotype is a collection folder of three sheets only one of which is labeled.

Clypeola ciliata Boiss., Fl. Orient. 1: 309. 1867.

Type: "Hab. in saxosis regionis subalpinae montium supra Elmalu Lyciae (Bourg!)".

Holotypus: Turkey: "In saxosis regionis subalpinae montis Elmalu", 13.V.1860, *Bourgeau 30* (G-BOIS [G00332470]; iso-: B [B100244895], BM [BM0001254087], E [E00814529, E00814530], G [G00446222, G00446223, G00446224], GOET [GOET002736], JE [JE00001762, JE00001763], K [K000697098], KW [KW000128010], MPU [MPU013460], P [P00835143, P00835144, P00835145, P00835146, P05362709], W [W00075598, W18890152686, W18890152687, W18890322115]).

Note. – A distinct species readily distinguished from its other congeners by the soft-ciliate, long-pilose fruit margin.

Clypeola lappacea Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 174. 1842.

Type: "[Aucher-Eloy] N. 282, Mesopotamia".

Holotypus: Turkey: "Mesopotamia", s.d., *Aucher-Eloy 282* (G-BOIS [G00332472]; iso-: BM [BM000583350, BM000583351], G [G00389750, G00389751, G00389752], K [K000697099], P [P00835161, P00835162, P00835163]).

Note. – Boissier based his species description on the unicate in his herbarium and did not annotate any of the duplicates above. Therefore, the indication by Al-Shehbaz (2013) of the G-BOIS sheet as the holotype was justified.

Clypeola dichotoma Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 175. 1842.

Type: "[Aucher-Eloy] N. 4082, Aderbidjan".

Holotypus: Iran: "in aridis Aderbidjan", s.d., *Aucher-Eloy 4082* (G-BOIS [G00332473]; iso-: BM [BM001254086], G [G00389753, G00389754], K [K000697102], KW [KW000128009], LE [LE00013027], MO [MO1617733], P [P00835147, P00835148, P00835149, P00835150], W [W0075599, W18890077507]).

Notes. – Because Boissier (1842b) based his species description solely on the unicate in his herbarium and did not annotate any of the four duplicates at P, the G-BOIS material should be the holotype. Therefore, the lectotypification by Al-Shehbaz (2013) of the G-BOIS unicate as the lectotype, was not needed.

Tchihatchewia Boiss. in Tchich., Asie Min., Bot. 1: 292. 1860.

Tribe: *Hesperideae* Prantl.

Notes. – Rauschert (1982) claimed that Boissier's name was published in 1866 and was predated by *Tchihatchewia* Unger, a fossil genus published in 1863. As indicated by Al-Shehbaz et al. (2007), Stafleu & Cowan (1976) clearly demonstrated that Tchihatcheff's volume 1 of *Asie Mineure* botanical account was published in 1860. Therefore, Rauschert's generic name *Neotchihatchewia* Rauschert as a replacement of Boissier's name is illegitimate.

Molecular phylogenetic studies by Warwick et al. (2010) clearly show that the monospecific *Tchihatchewia* is nested within the earlier published *Hesperis* and, therefore, the two genera have recently been united (German & Al-Shehbaz, 2018).

Tchihatchewia isatidea Boiss. in Tchich., Asie Min., Bot. 1: 292. 1860.

≡ ***Hesperis isatidea*** (Boiss.) D.A. German & Al-Shehbaz in Phytotaxa 334: 97. 2018 (Fig. 22C–D, p. 114).

Type: "*Armenia*: montibus ad septentr. Euphrates vallem circumdantibus, inter pagos Kalaratch et Almalu (ad Orient. urbis Erzindjan), alt. 1700–2000m. T[chihatcheff]".

Lectotypus (designated by Al-Shehbaz in German & Al-Shehbaz, 2018: 97): **Turkey:** "Armenia ad orientum. Urbis Erzindjan. Asia minor, Oest", 1858, *Tchihatcheff s.n.* (G-BOIS [G00332474]; isolecto-: P [P00835139]).

Note. – Label of the isolectotype sheet at P has the generic name written in Boissier's hand, and because of that the species name needed lectotypification.

Camelina Crantz, Stirp. Austr. 1: 17. 1762.

Tribe: *Camelineae* DC.

Note. – *Camelina* includes eight species distributed in Europe and SW Asia.

Camelina sylvestris var. *albiflora* Boiss., Fl. Orient. 1: 312. 1867.

Type: "Hab. in faucibus umbrosis Ciliciae Kurdicae ad Gorumse (Ky!)".

Holotypus: Turkey: "Plantae in montibus Kassan Oghlu ad pagum Gorumse lectae", 4500'–5000' [1370–1520 m], 12.V.1859, *Kotschy 52* (G-BOIS [G00332475]; iso-: B [B100241003, B100241005], BM [BM001254101], K [K000725081], P [P05324694], US [US00100157], W [W0075596, W0075597, W18890005811]).

= ***Camelina rumelica*** Vel. in Sitz. Boehm. Ges. Wiss. 1887: 448, f. 13a. 1887.

Note. – Boissier in *Flora Orientalis* based the species description on the unicate in his herbarium, and he did not examine or annotate any of the duplicates in the other herbaria. Therefore, the G-BOIS sheet ought to be recognized as the holotype.

Camelina hispida Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 176. 1842.

Type: "[Aucher-Eloy] N. 359, Armenia; 361, Persiâ".

Lectotypus (designated here): **Turkey:** "Armenia", s.d., *Aucher-Eloy 359* (G-BOIS [G00332476]); isolecto-: K [K000725082]). **Syntypus: Iran:** *sine loco,* s.d., *Aucher-Eloy 361* (G-BOIS [G00332477], P [P05325024]).

Note. – Boissier did not examine the K or P duplicates above.

Camelina lasiocarpa Boiss. & C.I. Blanche in Boiss., Fl. Orient. 1: 312. 1867.

Type: "Hab. in Syriae pascuis ad Agraba et Gebel Belas in viâ inter Hama et Palmyram (Blanche!)".

Lectotypus (designated here): **Syria:** "De Hama à Palmyre. Désert de Syrie. (Puits de Fadel). Dans le Djebel Belas", 19.V.1857, *Blanche 2878* (G-BOIS [G00330347]; isolecto-: JE [JE00002465]). **Syntypus: Syria:** "De Hama à Palmyre. Désert de Syrie. Au paturage d'Agraba", 18.V.1857, *Blanche 2971* (G-BOIS [G00330345]).

Note. – Boissier in *Flora Orientalis* listed two collections between Hama and Palmyra but one was near Agraba and the other at Gebel Belas.

Camelina grandiflora Boiss., Diagn. Pl. Orient. 5: 82. 1844.

Type: "Hab. in *Cariâ* undè aest. 1843 retulit Chr. Pinard".

Holotypus: Turkey: "Caria", 1843, *Pinard s.n.* (G-BOIS [G00332478]; iso-: B [B100241011], BM [BM001254100], G [G00446228, G00446229, G00446265], K [K000725083], MO [MO3729731], P [P05325035, P05325037, P05325039, P05325041], W [W0075595], WAG [WAG0004250]).

Notes. – The holotype is a collection folder of three sheets of which two are unlabeled.

Camelina hispida, together with *C. lasiocarpa* and *C. grandiflora,* form a species complex that can be readily distinguished on the bases of fruit and stem indumentum and orientation of the fruiting pedicels. Hedge (1965: 493) reduced the latter two to varieties of the first, though he admitted that more taxa at the specific and infraspecific ranks may eventually be recognized.

In our opinion, the differences between the three taxa above are quite settled, as *C. hispida* has rigid, divaricate to horizontal, often hispid fruiting pedicels and glabrous fruit. Both *C. lasiocarpa* and *C. grandiflora* have ascending fruiting pedicels subappressed to rachis, but the former has hispid (vs glabrous fruit), hispid rachis of fruiting raceme (vs glabrous or rarely sparsely pilose), and pedicels without (vs with) a tuft of axillary hairs.

Molecular phylogenetic studies are being conducted in more than one lab, and it is hoped that they resolve some of the entangled taxonomy of the genus, which most likely caused by hybridization, polyploidy, and introgression. In our opinion, it would be better to maintain the three species until future studies prove otherwise.

Camelina anomala Boiss. & Hausskn. in Boiss., Fl. Orient. 1: 313. 1867.

Type: "Hab. in agris argillosis prope Kharran Syriae borealis (Haussk!)".

Holotypus: Turkey: "in agris argil. p. Kharran. Syria borealis", 12.V.1865, *Haussknecht s.n.* (G-BOIS [G00332479]; iso-: B [B100241015], BM [BM000522288], JE [JE00002459, JE00002464], K [K000725088], P [P04738767, P05325042, P05325043], W [W0045020, W18890055604]).

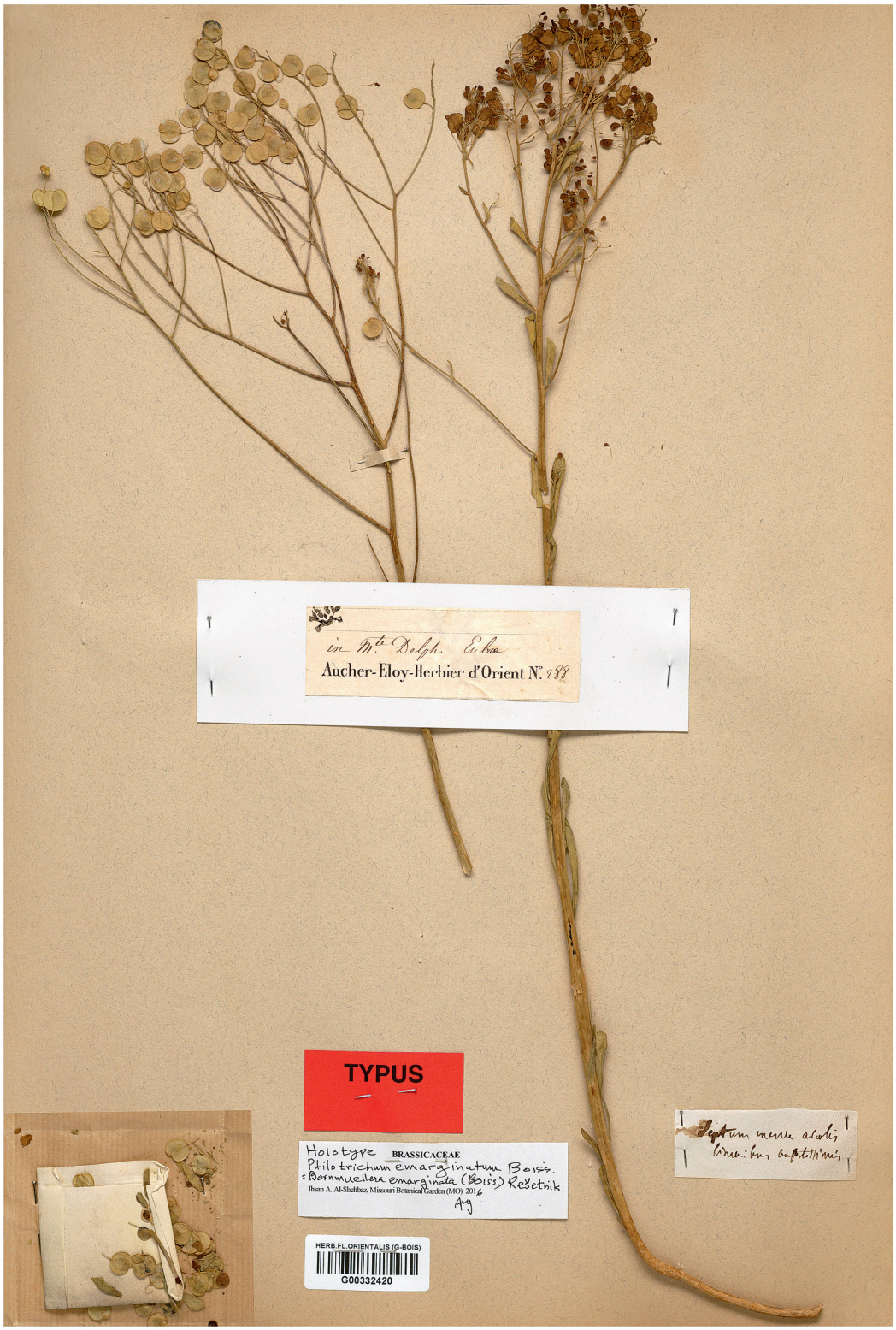


Fig. 21. Holotype of *Ptilotrichum emarginatum* Boiss. in G-BOIS (p. 101).
[*Aucher-Eloy 288*]



Fig. 22. A. *Draba acaulis* Boiss., Turkey; **B.** *Ricotia aucheri* (Boiss.) B.L. Burtt, Turkey; **C–D.** *Hesperis isatidea* (Boiss.) D.A. German & Al-Sheibaz, Turkey.
[Pictures: **A–B:** B. Özüdoğru; **C:** A. Dönmez; **D:** I. Al-Shehbaz]



Fig. 23. *Chrysochamela noeana* (Boiss.) Boiss., Turkey.
[Picture: A. Dönmez]

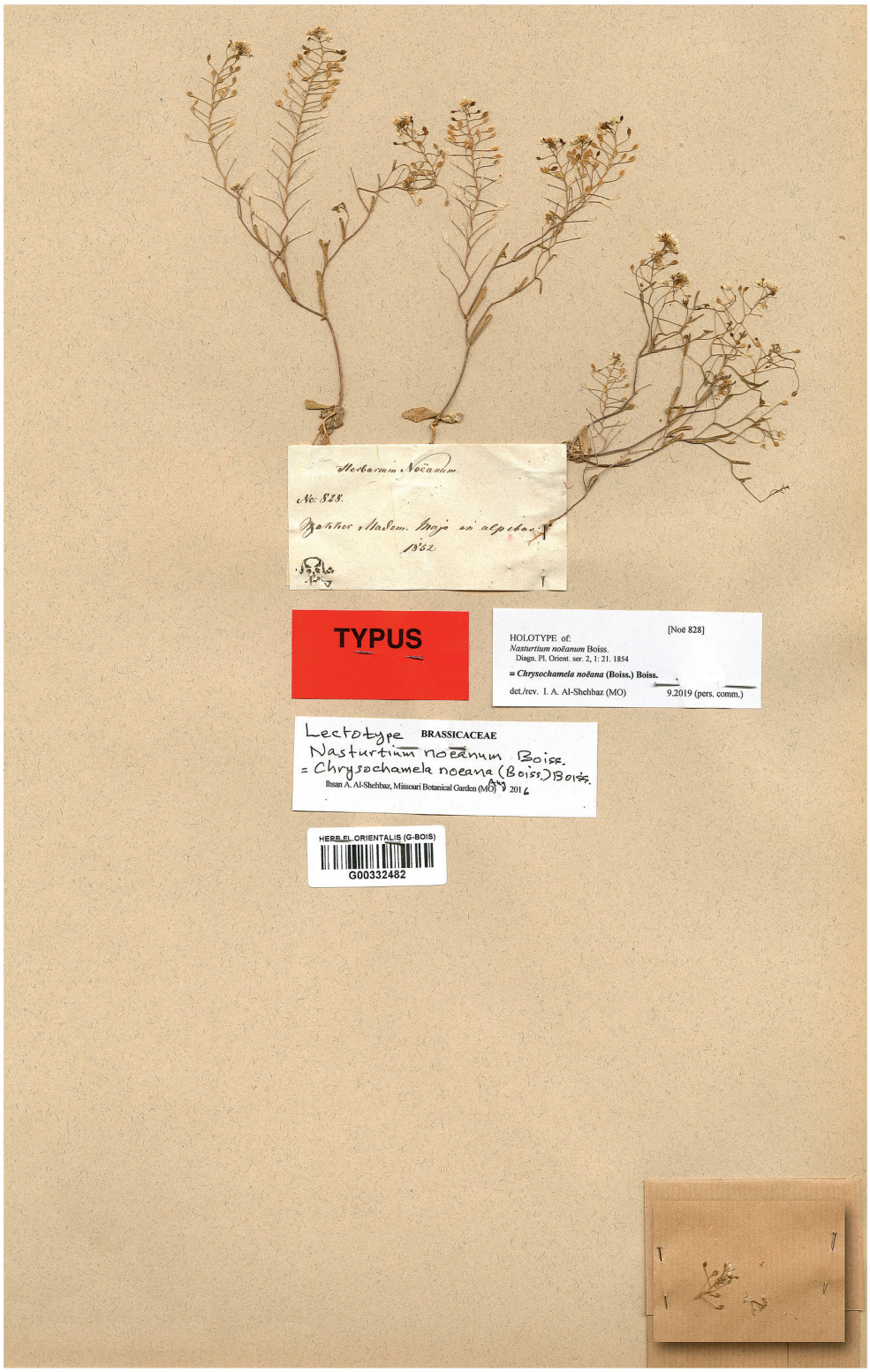


Fig. 24. Holotype of *Nasturtium noeanum* Boiss. in G-BOIS (p. 129).
[*Noë 828*]



Fig. 25. Holotype of *Sobolewskia stylosa* Boiss. & Hohen. (first sheet) in G-BOIS (p. 131). [*Kotschy 85*]



Fig. 26. A. *Graellsia stylosa* (Boiss. & Hohen.) Poulter, Iran; **B.** *Noccaea elegans* (Boiss.) Al-Shehbaz, Turkey; **C–D.** *Aethionema spinosum* (Boiss.) Prantl, Iran; **E.** *Noccaea papyracea* (Boiss.) Khosravi et al., Iraq; **F.** *Aethionema grandiflorum* Boiss. & Hohen., Iraq.
[Pictures: **A, D:** H. Moazzeni; **B:** B. Özüdoğru; **C:** I. Al-Shehbaz; **E:** A. Miller; **F:** S. Ahmad]



Fig. 27. *Noccaea* Moench. **A.** *Noccaea papyracea* (Boiss.) Khosravi et al., Iraq; **B.** *Noccaea griffithiana* (Boiss.) F.K. Mey. (≡ *Carpoceras griffithianum* Boiss.) originating from the Bentham herbarium in K (p. 135); **C.** *Noccaea caespitosa* (Boiss.) Al-Shehbaz & Menke, Turkey.
[**A:** I. Al-Shehbaz; **B:** http://specimens.kew.org/herbarium/K000484297 © Royal Botanic Gardens Kew; **C:** B. Özüdoğru]

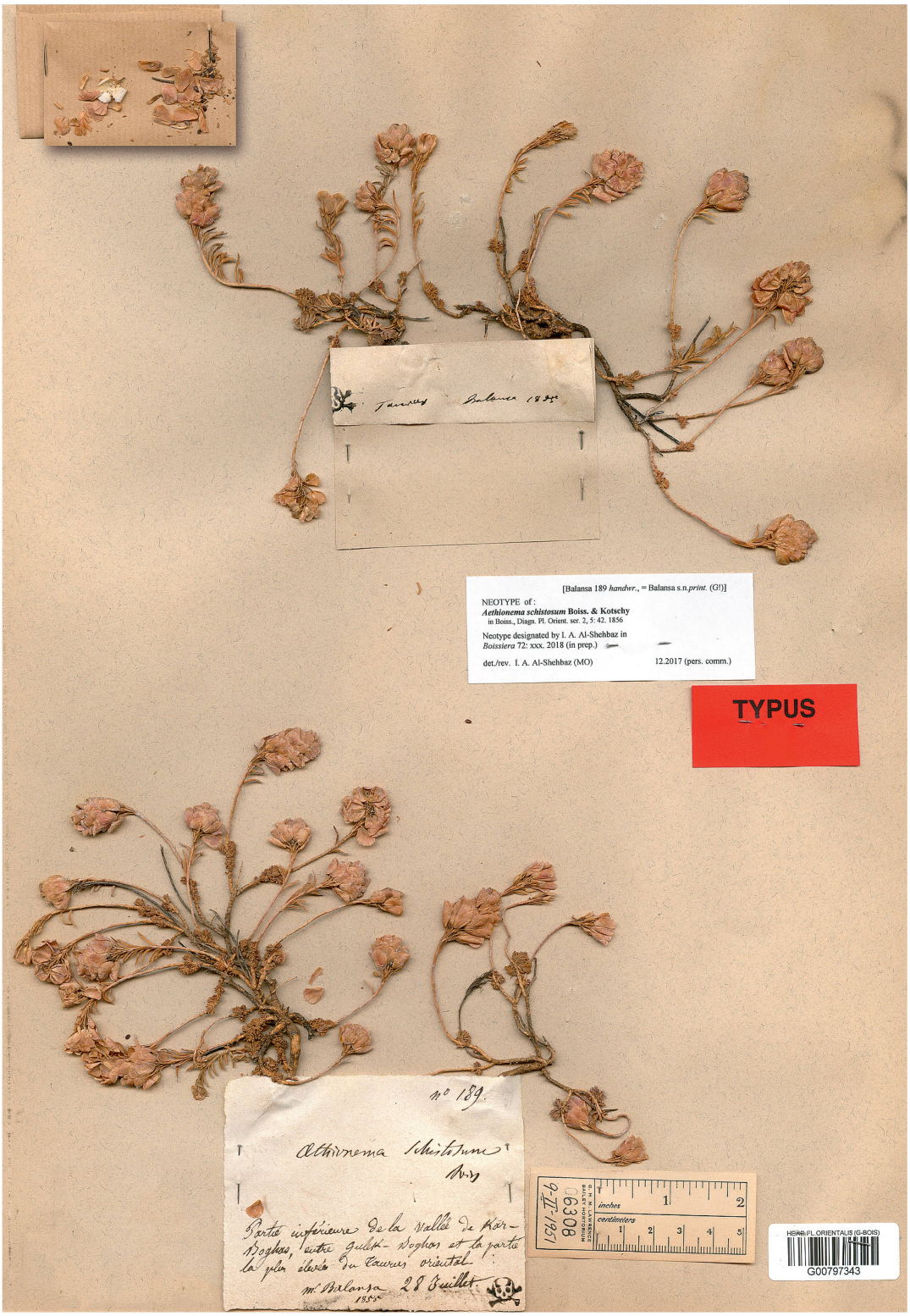


Fig. 28. Neotype of *Aethionema schistosum* Boiss. & Kotschy in G-BOIS (p. 145).
[*Balansa 189*]



Fig. 29. A. *Aethionema armenum* Boiss., Turkey; **B.** *Aethionema fimbriatum* Boiss., Iran; **C.** *Eunomia iberidea* Boiss., Turkey; **D.** *Aethionema syriacum* (Boiss.) Bornm., Iraq.
[Pictures: **A, C:** A. Dönmez; **B:** H. Moazzeni; **D:** S. Ahmad]



Fig. 30. Holotype of *Lepidium pumilum* Boiss. & Balansa in G-BOIS (p. 151).
[*Balansa 445*]

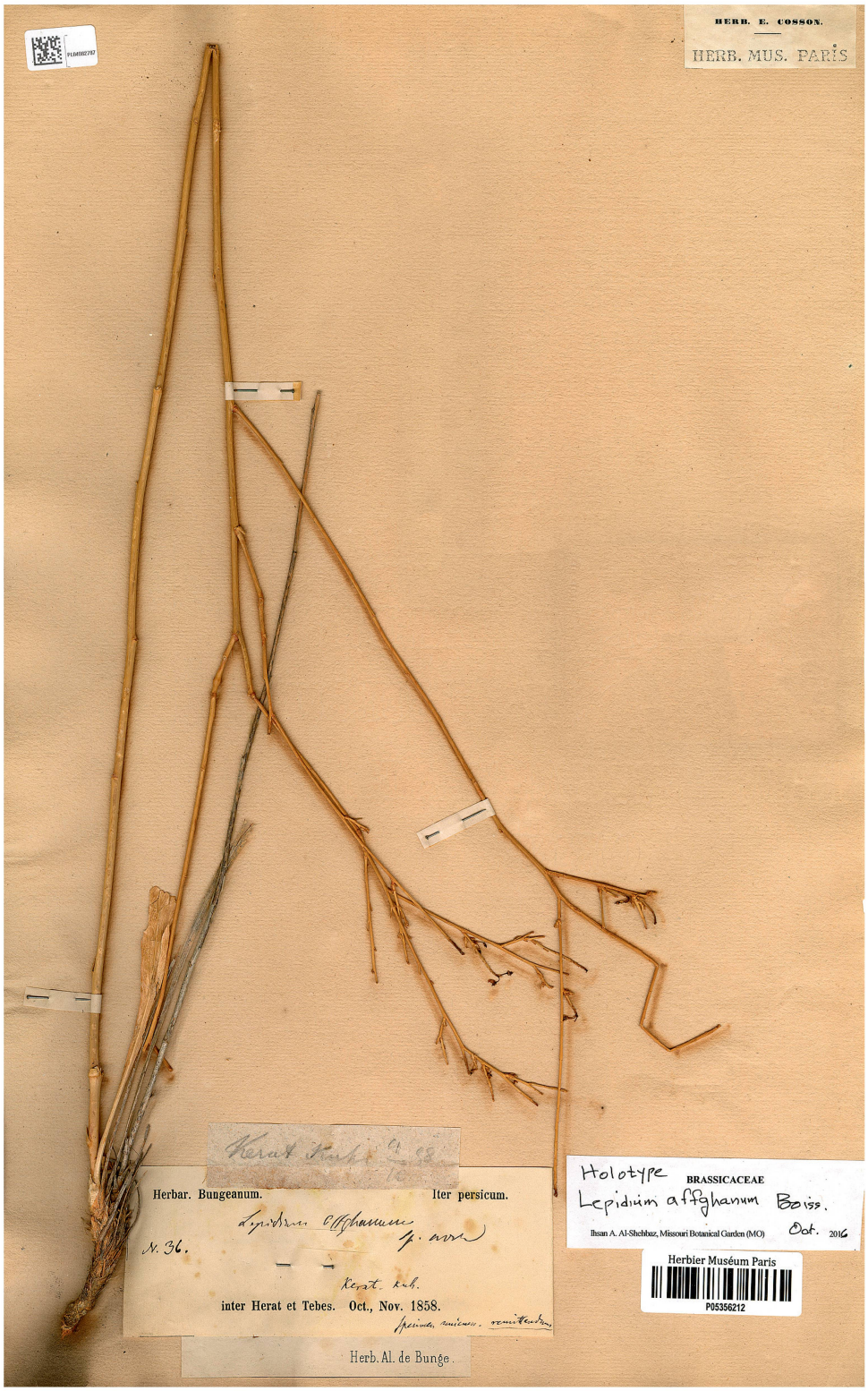


Fig. 31. Holotype of *Lepidium affghanum* Boiss. in P (p. 152).
[© Muséum national d'Histoire naturelle, Paris]

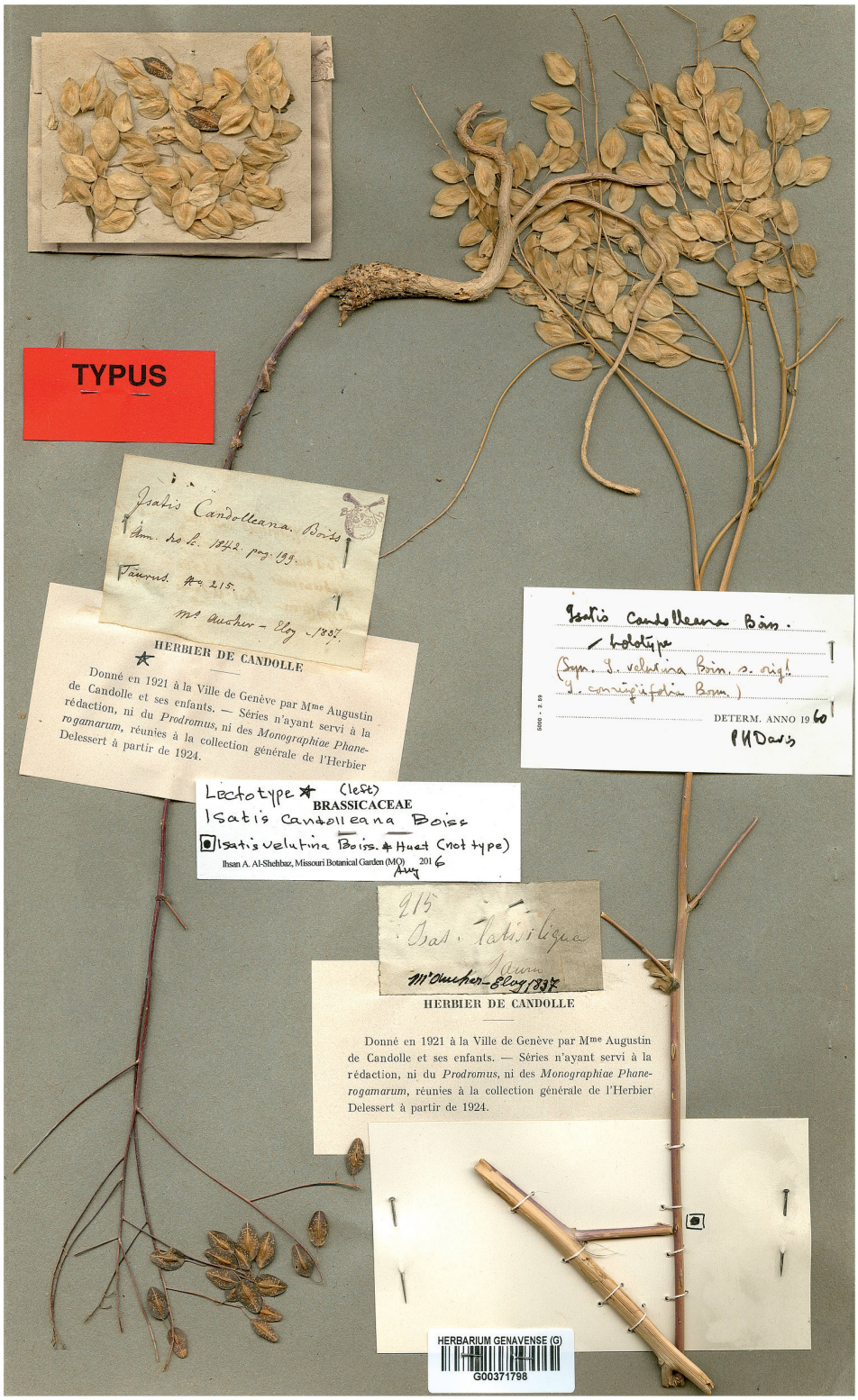


Fig. 32. Mixed collection including on the left the lectotype of *Isatis candolleana* Boiss. (p. 157) and on the right a collection of *I. velutina* Boiss. & Huet (p. 158) in G.
[*Aucher-Eloy 215*]

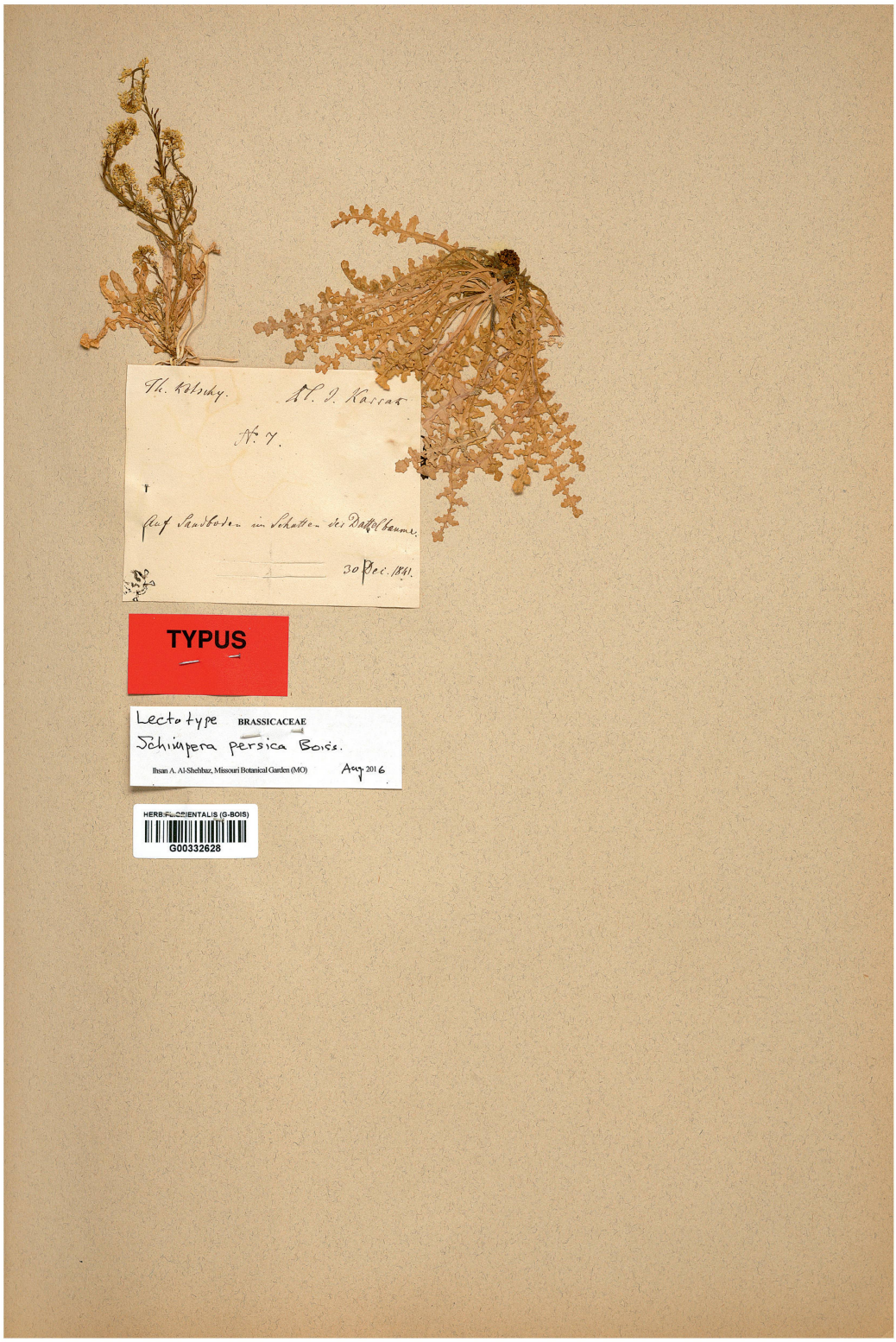


Fig. 33. Lectotype of *Schimpera persica* Boiss. in G-BOIS (p. 164).
[*Kotschy 7*]



Fig. 34. Lectotype of *Enarthrocarpus strangulatus* Boiss. (first sheet) in G-BOIS (p.169). [*Boissier s.n.*]



Fig. 35. Holotype of *Raphanus pugioniformis* Boiss. (first sheet) in G-BOIS (p. 169). [*Boissier s.n.*]



Fig. 36. *Isatis raphanifolia* Boiss., Iran.
[Picture: H. Moazzeni]

Notes. – The holotype is a collection folder of three sheets only one of which is unlabelled.

This is the most unique species in the genus for having linear to narrowly oblong siliques instead of obovate, obpyriform, or subglobose silicles characteristic of the remaining species.

Chrysochamela (Fenzl) Boiss., Fl. Orient. 1: 313. 1867.

Tribe: *Camelineae* DC.

Note. – The genus includes three species restricted to Turkey, with the range of one extends into Syria.

Nasturtium flexicaule Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 58. 1842.

Type: "*Cochlearia velutina* DC. in Deless. Ic. Select. t. 49. [Aucher-Eloy] N. 316, Alep".

Holotypus: Syria: "Alep", s.d., *Aucher-Eloy 316* (G-BOIS [G00332480]; iso-: BM [BM001254059, BM001254060], G [G00446230, G00446231, G00446232], P [P00580379, P02272500, P05348484]).

= ***Chrysochamela velutina*** (DC.) Boiss., Fl. Orient. 1: 313. 1867.

Note. – Boissier in *Flora Orientalis* reduced the name to synonymy of *Chrysochamela velutina.*

Chrysochamela elliptica (Boiss.) Boiss., Fl. Orient. 1: 314. 1867.

≡ *Nasturtium ellipticum* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 59. 1842.

Type: "[Aucher-Eloy] N. 4057, Beybazar".

Holotypus: Turkey: "Beybasar", s.d., *Aucher-Eloy 4057* (G-BOIS [G00332481]; iso-: BM [BM001254057, BM001254058], G [G00389764, G00389765, G00389766], K [K000725095], LE, P [P002272500, P05348487]).

Notes. – Boissier based the species description solely on the G-BOIS duplicate.

Dorofeyev (2003: 55) cited an isosyntype that was not examined in this study. He followed Hedge (1965: 494) in believing that Boissier (1842a) cited two collections in the original description of the species when in fact he cited only *Aucher-Eloy 4057.* Boissier in *Flora Orientalis* added another collection, *Balansa s.n.* from Bereketly, that Hedge and Dorofeyev erroneously took as a syntype.

Chrysochamela noeana (Boiss.) Boiss., Fl. Orient. 1: 314. 1867 (Fig. 23, p. 115).

≡ *Nasturtium noeanum* Boiss., Diagn. Pl. Orient. ser. 2, 1: 21. 1854.

Type: "Hab. in alpibus *Armeniae* ad *Bakker Maden* ubi Maio 1852 legit clar. Noë".

Holotypus: Turkey: "Bakker Madem", V.1852, *Noë 828* (G-BOIS [G00332482]; iso-: G [G00389763], KW [KW000127994], P [P00747281, P02272530]) (Fig. 24, p. 116).

Note. – Boissier based his species description solely on the unicate in his herbarium (Fig. 24, p. 116).

Diceratella Boiss., Diagn. Pl. Orient. 5: 80. 1844.

= *Diceratium* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 61. 1842 [nom. illeg.] [non Lag.].

Tribe: *Anastaticeae* DC.

Notes. – *Diceratella* is a substitute name for Boissier's illegitimate *Diceratium*.

The genus includes nine species in Africa, Saudi Arabia, Iran, and Pakistan.

Diceratella floccosa (Boiss.) Boiss., Fl. Orient. 1: 315. 1867.

≡ *Diceratium floccosum* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 61. 1842.

Type: "[Aucher-Eloy] N. 4075, absque loco natali".

Lectotypus (designated here): **Iran:** *sine loco,* s.d., *Aucher-Eloy 4075* (G-BOIS [G00332483]; isolecto-: FI [FI005657], G [G00441265], K [K000693469], P [P00747560, P00747561]).

Notes. – Lectotypification of the species name is justified because Boissier annotated P00747561 as *Diceratium floccosum* and, therefore, he examined more than one duplicate to generate the species description.

Although there are two duplicates of the type collection in the Geneva herbaria, Boissier did not examine G00441265 because it was part of the general herbarium.

Diceratella canescens (Boiss.) Boiss., Fl. Orient. 1: 315. 1867.

≡ *Diceratium canescens* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 62. 1842.

Type: "[Aucher-Eloy] N. 4077, In deserto Laristan".

Lectotypus (designated here): **Iran:** "in desert Laristan", s.d., *Aucher-Eloy 4077* (G-BOIS [G00332484]; isolecto-: BM [BM001254064, BM001254102], FI [FI005656, FI010108], G [G00446233], K [K000693470], P [P00747562, P00747563, P00747564, P00747565, P06616557]).

Note. – Boissier annotated P00747562 as *Diceratium canescens,* and this indicates that he based the species description on that specimen and the unicate in his herbarium. Therefore, lectotypification of the name is justified.

Tetracme Bunge, Del. Sem. Hort. Dorpat. 1836: 7. 1836.

Tribe: *Euclidieae* DC.

Note. – *Tetracme* consists of nine species in SW Asia and adjacent Russia eastward into western China and Mongolia.

Tetracme secunda Boiss., Diagn. Pl. Orient. ser. 2, 1: 29. 1854.

Type: "Hab. in regno *Cabulico* (Griffith sub Nº 1508)".

Holotypus: Afghanistan: *sine loco,* s.d., *Griffith 1508* (G-BOIS [G00332485]; iso-: K [K000693451, K000693453, K000693454]).

Notes. – Boissier based the species description solely on the unicate in his herbarium and did not examine any of the K duplicates above.

Two specimens, K000693451 and K000693454, have the same collection number as the holotype but differs in being collected from Dai Hag.

Tetracme stocksii Boiss., Fl. Orient. 1: 317. 1867.

Type: "Hab. in Belutschiâ ad Gurghina (Stocks exs. 974!)".

Holotypus: Pakistan: "Gurghina", 1851, *Stocks 974* (G-BOIS [G00332487]; iso-: K [K000693462, K000693463]).

Note. – The species is narrowly endemic in Pakistan and known thus far only from a handful collections.

Tetracme contorta Boiss., Fl. Orient. 1: 317. 1867.

Type: "Hab. in Affghaniâ ad Choky (Griff!), Belutschiâ ad Gurghina (Stocks exs. 953!)".

Lectotypus (first step designated by Rechinger, 1968: 226; second step designated here): **Afghanistan:** *sine loco,* 1838, *Griffith 1370* (G-BOIS [G00332486]; isolecto-: B [B100277030], G-BOIS [G00332488], K [K000693466], LE [LE00013941], P [P05414105, P05414122], W [W0055935]). **Syntypus: Pakistan:** "Gurghina", s.d., *Stocks 953* (G-BOIS [G00332489], K [K000693467, K000693468]).

Notes. – A second-step typification is needed to correct the herbarium of the lectotype from W to G-BOIS because the species was based only on the duplicates of the latter herbarium, and the duplicate at W was never examined or annotated by Boissier.

Label of G00332486 has the collection number *Griffith 1370* but no locality data, whereas G00332488 has the locality "Choky" but no collection number and Griffith's journal no. *492*. However the other isolectotypes have both the locality and collection number.

Didymophysa Boiss. in Ann. Sci. Nat., Bot. ser. 2, 16: 379. 1841.

Tribe: *Thlaspideae* DC.

Note. – A genus of three species distributed in Afghanistan, Armenia, Azerbaijan, Iran, Iraq, Kyrgyzstan, Pakistan, Tajikistan, Turkey, Uzbekistan (see also *Petrocallis* above).

Didymophysa aucheri Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 179. 1842.

Type: "[Aucher-Eloy] N. 247, mons Elwind; [Aucher-Eloy] 4079, Demavend; [Aucher-Eloy] 4080, Elamont".

Lectotypus (first step designated by Dorofeyev, 2003: 69; second step designated here): **Iran:** "Elamont", s.d., *Aucher-Eloy 4080* (G-BOIS [G00332490]; isolecto-: BM [BM000582572, BM000582573], G [G00441264], K [K000642948], KW [KW000127981], LE [LE00012861, LE00012862], P [P01817512, P01817516], W [W0003832]). **Syntypi: Iran:** "in Mte Elwind", s.d., *Aucher-Eloy 247* (G-BOIS [G00332491], K [K000642947], P [P01817518]); "Demavend", s.d., *Aucher-Eloy 4079* (BM [BM000582567], G [G00441263, G00441681], G-BOIS [G00332492], K [K000642949], P [P01817513, P01817517]).

Note. – Dorofeyev (2003) erroneously lectotypified the species name based on duplicate at LE that was never studied by Boissier. Therefore, a second step is needed to designate the G-BOIS duplicate as the lectotype. The label of G00441681 reflects a mix-up of both localities cited in the protologue.

Physalidium Fenzl in Tchich., Asie Min., Bot. 1: 327. 1860.

Tribe: *Thlaspideae* DC.

Note. – *Physalidium* was first reduced to synonymy of *Graellsia* by Poulter (1958) and, as presently recognized, this genus currently includes nine species (see *Graellsia*).

Physalidium stylosum (Boiss. & Hohen.) Fenzl in Tchich., Asie Min., Bot. 1: 327. 1860.

≡ *Sobolewskia stylosa* Boiss. & Hohen. in Boiss., Diagn. Pl. Orient. 8: 41. 1849.

≡ ***Graellsia stylosa*** (Boiss. & Hohen.) Poulter in Notes Roy. Bot. Gard. Edinburgh 22: 92. 1956 (Fig. 26A, p. 118).

Type: "Hab. in declivibus septentrionalibus montis *Elbrus* propè *Derbend* Kotschy No 85".

Holotypus: Iran: "In m. Elbrus pr. Derbend", 4000' [1220 m], 5.V.1843, *Kotschy 85* (G-BOIS [G00332493]; iso-: B [B100241750], BM [BM000582807, BM000582808], G [G00446234, G00446235], GH [GH00062503], K [K000342190, K000697688], KW [KW000127958], LE [LE00012882, LE00012883], P [P02141415, P02141416, P02141417], W [W0050814]) (Fig. 25, p. 117).

Notes. – The holotype is a collection folder of two sheets one of which has the species name in Boissier's handwriting and the locality as above printed. The collection number, day, month, and altitude were handwritten (Fig. 25, p. 117). The other sheet has fully printed label as in all the isotypes.

The printed labels of the isotypes lack the altitude and have the phrase "In declivibus septentrionem versus spectantibus" inserted before the locality data.

There was no need to lectotypify the name, as done in Esmailbegi et al. (2017a), because the species was based solely on the unicate in G-BOIS.

Heldreichia Boiss. in Ann. Sci. Nat., Bot. ser. 2, 16: 381. 1841.

Tribe: *Biscutelleae* Dumort.

Notes. – Although Hedge (1965) recognized three species in *Heldreichia,* Parolly et al. (2010) clearly demonstrated that the genus is monospecific, the type species of which, *H. bupleurifolia,* is highly polymorphic.

The latter authors divided the species into five taxa all except subsp. *bupleurifolia,* which also grows in Lebanon, are endemic to Turkey.

Heldreichia longifolia Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 187. 1842.

≡ ***Lepidium longifolium*** (Boiss.) Al-Shehbaz in Novon 12: 8. 2002.

Type: "[Aucher-Eloy] N. 320 in monte Zerdkou".

Lectotypus (designated here): **Iran:** "in Mte. Zerde", s.d., *Aucher-Eloy 320* (G-BOIS [G00150398]; isolecto-: BM [BM001254105], G [G00096409], K [K000484134], MPU [MPU023096], P [P01817522, P01817523, P06648212]).

Notes. – The species name needed lectotypification because Boissier based the description on the duplicates in G-BOIS and P06648212 which he annotated.

The listing by Al-Shehbaz et al. (2002: 8) of the holotype at G is incorrect and resulted from overlooking Boissier (1841a).

Heldreichia bupleurifolia Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 186. 1842.

Type: "[Aucher-Eloy] N. 292, Akdag".

Holotypus: Turkey: "Mak Dag", s.d., *Aucher-Eloy 292* (G-BOIS [G00150392]; iso-: BM [BM000582585, BM000582586], G [G00096399], K [K000484315], P [P01817519, P01817520, P01817521]).

Note. – There is no need for any lectotypification of the name because Boissier (1841a, 1842b) based the species description on the unicate in his herbarium and because there is no duplicate in the Candolle's herbarium and he did not annotate any of the three sheets at P.

Heldreichia bupleurifolia var. *subtriloba* Boiss., Fl. Orient. 1: 319. 1867.

Type: "Hab. inter lapides in monte Davros Pisidiae supra Isbarta (Heldr!), inter lapides montis Berytdagh Cataoniae alt. 9000' (Haussk!) in summis Libani (Ky exs. 692!)".

Lectotypus (first step designated by Parolly et al., 2010: 197; second step designated here): **Turkey:** "débris des rochers entre les pierres sur les pentes les plus rapides du sommet du Mt. Davros près d'Isparta", 6000'–7000' [1830–2130 m], 10.VIII.1845, *Heldreich 1180* (G-BOIS [G00332495]; isolecto-: B [B100673435], BM [BM001254103], G [G00446236, G00446237], K [K000484138]). **Syntypi: Lebanon:** "in summis glareosis Libani Dsihome Arasya", 9000' [2740 m], 24.VII.1855, *Kotschy 692* (G-BOIS [G00332497], P [P06648032]).

Turkey: "Taurus Cataonicus. Lapides Berytdagh.", 9000' [2740 m], 10.VIII.1865, *Haussknecht s.n.* (B [B100673436], BM [BM001254194], G-BOIS [G00332496], JE [JE00019281, JE00019282], K [K000484137], P [P06648030, P06648031, P06648033], W [W0075593, W18890055570]).

= ***Heldreichia bupleurifolia*** Boiss. subsp. ***bupleurifolia*** in Ann. Sci. Nat., Bot. ser. 2, 17: 186. 1842.

Notes. – The designation by Parolly et al. (2010) of the lectotype is corrected herein as a second-step typification from B to G-BOIS because Boissier did not examine any material additional to that of his herbarium.

Heldreich handwritten label in French [G00332495 and B100673435] as above was translated to Latin and distributed in mimeographed, handwritten printed labels by Boissier as "In mte Davros suprà Isparta interlapides. Aug 1845" but without elevation or day of the month. Such labels are found on the isolectotypes at G and K.

Heldreichia bourgaei Boiss., Fl. Orient. 1: 320. 1867.

≡ ***Heldreichia bupleurifolia*** subsp. ***bourgaei*** (Boiss.) Parolly et al. in Taxon 59: 198. 2010.

Type: "Hab. in glareosis alpinis montis Akdagh Lyciae (Bourg. exs. sub *H. bupleurifoliâ*)".

Holotypus: Turkey: "In glareosis regionis alpinae montis Ak-Dagh", 3.VII.1860, *Bourgeau 19* (G-BOIS [G00150391]; iso-: B [B100673498, B100673499], E [E0373125, E00373126], G [G00096398, G00096400, G00446238], GOET [GOET002606], K [K000484139], LE [LE00012865], P [P06648028, P06648034, P06648037, P06648039], W [W0075594, W18890072809, W18890152678]).

Notes. – The holotype, and the G00096400 and G00446238 isotypes are collection folders each of which consists of a labeled, barcoded sheet and another unlabeled sheet.

The collection date, collector, and locality on LE isotype is exactly the same as the holo- and isotypes, but the collection number was erroneously given as *Bourgeau 34* instead of *19*.

Heldreichia rotundifolia Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 185. 1842.

≡ ***Heldreichia bupleurifolia*** subsp. ***rotundifolia*** (Boiss.) Parolly et al. in Taxon 59: 198. 2010.

Type: "[Aucher-Eloy] N. 293, Olympus Armeniae".

Lectotypus (designated here): **Turkey:** "in Olympo Armenia", s.d., *Aucher-Eloy 293* (G-BOIS [G00150313]; isolecto-: BM [BM000582603], G [G00096292], K [K000484143], MO [MO1617689], P [P01817524, P01817525, P01817526]).

Note. – The name needed lectotypification because Boissier based the species description on the unicate in his herbarium and on P01817524 that he annotated.

Heldreichia kotschyi Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 186. 1842.

Type: "cl. Kotschy è monte Tauro sub numero 115".

Holotypus: Turkey: "In monte Tauro", summer 1836, *Kotschy 45* (G-BOIS [G00150399]; iso-: BM [BM00125410], G [G00096434, G00096435], K [K000484144, K000484145, K000484146, K000484147], KW [KW000127992], P [P05434838, P05434839], W [W0075592]).

= ***Heldreichia bupleurifolia*** subsp. ***rotundifolia*** (Boiss.) Parolly et al. in Taxon 59: 198. 2010.

Notes. – Parolly et al. (2010) erroneously designated Balansa's collection as the lectotype, and that collection was cited in Boissier (1867a) but not in the original publication (Boissier, 1842b).

However, *Kotschy 45,* which is the only collection of the species in G-BOIS and annotated by Boissier, was misprinted in the original protologue as *115,* where the handwritten *4* was definitely misread by Boissier as *11*. *Kotschy 45* was collected in 1836, whereas the two images of *Kotschy 115* at B imaged as types [http://herbarium.bgbm.org/object/B100673495] were collected in 1853 or 13 years after the publication of the species.

Thlaspi L., Sp. Pl.: 645. 1753.

Tribe: *Thlaspideae* DC.

Notes. – A genus of three Eurasian species, and the generic type, *Thlaspi arvense* L., is a cosmopolitan weed and cultivated plant.

As recognized by Candolle (1821a, 1821b), Boissier (1867a), and subsequent authors prior to 1973, *Thlaspi* was so broadly delimited to include over 100 species. Meyer (1973, 1979) retained only six species in the genus and transferred the remaining taxa into a dozen segregates based primarily on seed-coat anatomy.

However, subsequent authors (e.g., Greuter et al., 1986; Appel & Al-Shehbaz, 2003) retained the genus in the broad sense, whereas others (e.g., Al-Shehbaz, 2012, 2014) relied on

the available molecular data and placed all except six species in *Noccaea* of the tribe *Coluteocarpeae*. The latter genus also currently encompasses almost all taxa described in *Iberidella* by Boissier (1841b).

As recently delimited, Esmailbegi et al. (2018) recognized only four species in *Thlaspi,* of which *T. kochianum* F.K. Mey. was subsequently reduced by German (2018) to the following species.

Thlaspi huetii Boiss., Diagn. Pl. Orient. ser. 2, 5: 39. 1856.

Type: "Hab. circâ *Tortoum* cl. Huet. du Pavillon Fl. Fr. que Junio".

Holotypus: Turkey: "circa Tortoum", VI.1853, *Huet du Pavillon s.n.* (G-BOIS [G00332498]; iso-: G [G00371929, G00371966, G00446270], GOET [GOET002659], JE [JE00000226, JE00000227, JE00000228, JE00000229], K [K000484287, K000484288], KW [KW000127983], LE, P [P01817546], W [W18890010575], WAG [WAG0004281], ZT [ZT00008149]).

Note. – The holotype is a collection folder of two sheets, and Meyer (2001a: 21) correctly indicated that the holotype is the G-BOIS specimen.

Thlaspi kotschyanum Boiss. & Hohen. in Boiss., Diagn. Pl. Orient. 8: 39. 1849.

Type: "Hab. in monte *Elbrus* suprà pagum *Passgala* Kotschy".

Holotypus: Iran: "In m. Elbrus supra pagum Passgala", 6.V.1843, *Kotschy 102* (G-BOIS [G00330469]; iso-: B [B100249989], BM [BM000582802], FI [FI005701], GOET [GOET002660], H, JE [JE00000217], K [K000484289], KW [KW000127985], L [L1844733], LE [LE00012863], P [P01817548, P01817549, P01817550, P01817551], W [W0029522], WAG [WAG0004280], WU [WU0101803], ZT [ZT00008150]).

= ***Noccaea platycarpa*** (Fisch. & C.A. Mey.) Al-Shehbaz in Harvard Pap. Bot. 19: 44. 2014.

Notes. – Meyer (2001b: 49), followed by German & Chen (2009: 208) and Al-Shehbaz (2014: 44), indicated that the holotype is in G-BOIS.

The species was maintained by Hedge (1968: 114) and Artelari (2002: 255) in *Thlaspi,* reduced by Meyer (2001b) to synonymy of *Neurotropis platycarpa* (Fisch. & C.A. Mey.) F.K. Mey., and reduced by Al-Shehbaz (2014) to synonymy of *Noccaea platycarpa*.

Thlaspi szowitsianum Boiss., Fl. Orient. 1: 324. 1867.

≡ ***Noccaea szowitsiana*** (Boiss.) Al-Shehbaz in Harvard Pap. Bot. 19: 46. 2014.

Type: "Hab. in humidis montis Karagiol prov. Karabagh (Szow!)".

Holotypus: Armenia: "In m. Karagiol humidis", 1.VI.1829, *Szovits 295* (G-BOIS [G00332500]; iso-: H [H1052111], LE [photo at E]).

Note. – Meyer (2001b: 48) correctly indicated that the holotype is in G-BOIS, but Dorofeyev (2003: 213) stated that the lectotype is at LE. No lectotypification is needed because Boissier drafted the species description only on the unicate in his herbarium.

Thlaspi brevicaule Boiss. & Kotschy in Boiss., Diagn. Pl. Orient. ser. 2, 5: 40. 1856.

Type: "Hab. in subalpinis *Bludan* suprâ *Zebdani* Antilibani cl. Kotschy qui fructiferum legit Junio 1855".

Lectotypus (designated here): **Syria:** "Crescit in alpinnis supra Bludan Antilib", 6000' [1830 m], 6.VI.1855, *Kotschy 47* (G-BOIS [G00332501 plants on the top left and lower right]; isolecto-: B [B100277008], BM [BM001254108], G [G00446239], GZU [GZU000043738], JE [JE00000216], K [K000484290], KW [KW000127984], P [P01817533, P01817534, P01817535], S [S0712424], W, ZT [ZT00008140]).

= ***Noccaea platycarpa*** (Fisch. & C.A. Mey.) Al-Shehbaz in Harvard Pap. Bot. 19: 44. 2014.

Note. – The lectotype sheet includes four groups of plants, of which the group on the top right was collected by Kotschy from Lebanon, and this is not part of the type collection. The one on the lower left has a label with only number *47,* and it is considered as part of type gathering. Finally, two labels on the specimen, a handwritten one with the above locality but without the day and a printed one with: "Circa Zebdaine prope Damascum. Ad rivulos in sabusosis supra Bludan alt. 6000 ped. Die 6. Jun.".

Thlaspi microstylum Boiss., Diagn. Pl. Orient. 8: 38. 1849.

≡ ***Noccaea microstyla*** (Boiss.) F.K. Mey. in Feddes Repert. 84: 466. 1973.

Type: "[Boissier] Hab. in regione montanâ sylvaticâ *Cassii* in *Syriâ* boreali undè specimen unicum fructiferum retuli".

Holotypus: Turkey: "Cassius regio media", V–VII.1846, *Boissier s.n.* (G-BOIS [G00332511]).

Note. – No duplicates of the type collection were encountered in all of the herbaria consulted, and Meyer (2006c: 187) is followed in recognizing the G-BOIS sheet as the holotype.

Thlaspi perfoliatum var. *microcarpum* Boiss., Fl. Orient. 1: 325. 1867.

Type: "Hab. in agris schistosis prope Beylan Syr. bor. (Haussk!)".

Holotypus: Syria: "Syria borealis. in schistos. p. Beilan", 27.II.1865, *Haussknecht s.n.* (G-BOIS [G00332505]; iso-: G [G00446271], JE [JE00000224]).

= ***Noccaea perfoliata*** (L.) Al-Shehbaz in Harvard Pap. Bot. 19: 44. 2014.

Note. – The variety is based on a minor difference in the fruit size of a widespread and highly variable Eurasian species.

Thlaspi perfoliatum var. *rotundatum* Boiss., Fl. Orient. 1: 326. 1867.

= ***Noccaea perfoliata*** (L.) Al-Shehbaz in Harvard Pap. Bot. 19: 44. 2014.

Note. – This is a renaming at the varietal rank of the following entry.

Thlaspi micranthum Boiss. & C.I. Blanche in Boiss., Diagn. Pl. Orient. ser. 2, 5: 41. 1856 [nom. inval.].

Type: "pl. Syr. exs. speciminibus numerosioribus a cl. Blanche et Gaillardot acceptis a *Th. perfoliato* floribus subminoribus siliculisque paulò latiùs alatis non sat differt".

= ***Noccaea perfoliata*** (L.) Al-Shehbaz in Harvard Pap. Bot. 19: 44. 2014.

Notes. – *Thlaspi micranthum* was mentioned by Boissier (1856) as a note under *T. lilacinum* but not accepted by him.

It was listed by Boissier in *Flora Orientalis* as a synonym of *T. perfoliatum* var. *rotundatum,* and both names by Meyer (2003a) as synonyms of *Microthlaspi perfoliatum*.

Noccaea perfoliata and a handful of other species form a complex of very closely related and morphologically rather similar taxa. The complex has recently been split by Ali et al. (2016) into three genera (*Microthlaspi* F.K. Mey., *Friedrichkarlmeyeria* T. Ali & Thines, and *Ihsanalshehbazia* T. Ali & Thines) indistinguishable morphologically and better be maintained in *Noccaea* as broadly delimited by Al-Shehbaz (2014) and most recently recognized by Özüdoğru et al. (2019).

Thlaspi natolicum Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 180. 1842.

≡ ***Noccaea natolica*** (Boiss.) Al-Shehbaz in Harvard Pap. Bot. 19: 42. 2014.

Type: "[Aucher-Eloy] N. 306, Syria, 4151, Asia Minor; 4152, sylvae Asiae Minoris".

Lectotypus (designated by Meyer, 2003a: 7): **Turkey:** "As. Min.", s.d., *Aucher-Eloy 4151* (G-BOIS [G00332502]; isolecto-: BM [BM001254107, BM001254110], G [G00446240], K [K000484319], KW [KW000127986], P [P01817558], W [W0050744, W18890077526]). **Syntypi: Syria:** *sine loco,* s.d., *Aucher-Eloy 306* (G [G00442641, G00446242], G-BOIS [G00332503], K [K000484292], P [P01817556, P05408423]). **Turkey:** "Asia Minor", s.d., *Aucher-Eloy 4152* (P [P01817557, P01817560]).

Note. – None of the Geneva herbaria has *Aucher-Eloy 4152,* and Boissier cited that number based on P01817557 and P01817560 that he annotated.

Thlaspi bulbosum Spruner ex Boiss., Diagn. Pl. Orient. 1: 74. 1843.

≡ ***Noccaea bulbosa*** (Spruner ex Boiss.) Al-Shehbaz in Harvard Pap. Bot. 19: 35. 2014.

Type: "Hab. in umbrosis regionis montanae, mons *Parnes Atticae* (Sprunn. Boiss.), mons *Citheron Baeotiae* (Boiss.). Fl. Maio".

Lectotypus (designated by Meyer, 2006b: 197): **Greece:** "von Gipfel der Parnessi", 4000' [1220 m], 1840, *Spruner s.n.* (G-BOIS [G00332512]; isolecto-: B [B100277009], JE [JE00004200], W [W0075591]). **Syntypi: Greece:** "Cithéron Beotia", V.1842, *Boissier s.n.* (G-BOIS [G00332513]); "Parnes Attica", IV or V.1842, *Boissier s.n.* (B [B100277009], G-BOIS [G00332514], JE [JE00004021], K [K000484259]).

Note. – The isolectotype and syntype at B were mounted on the same sheet with a single barcode.

Thlaspi ochroleucum Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. 8: 39. 1849.

≡ ***Noccaea ochroleuca*** (Boiss. & Heldr.) F.K. Mey. in Feddes Repert. 84: 461. 1973.

Type: "Hab. ad nives in regione superiori montis *Davros dagh* alt. 5–6000' in *Pisidiâ* (Heldreich), in *Macedoniae* alpibus si specimen a cl. Friwuldsky mihi sub *Th. alpini* nomine missum hùc rectè refero".

Lectotypus (designated by Franzén, 1986: 324): **Turkey:** "Région supérieure du Davros-Dagh", 5000'–6000' [1520–1830 m], 28.V.1845, *Heldreich 740* (G-BOIS [G00332515]; isolecto-: B, BM [BM000582804], G [G00383953, G00383958], G-BOIS [G00332516], JE [JE00004182], K [K000484268], P [P01817561], W [W0050740, W18890010578]). **Syntypus: Sine Patria:** "Macedonia", s.d., *Frivaldszky s.n.* (G-BOIS [G00797085]).

Notes. – Meyer (2006c: 95), followed by Al-Shehbaz (2014: 43), erroneously attributed the lectotypification of the name to Hedge (1965: 335) who only copied the locality data but did not designate any herbarium.

The isolectotypes are without a collection number.

Thlaspi taygeteum Boiss., Diagn. Pl. Orient. 8: 40. 1849.

Type: "Hab. in regione sylvaticâ inferiori *Taygeti* suprà *Mistra* ubi legi [Boissier] florif. Aprili 1842".

Holotypus: Greece: "Taygeti pars inferior. Supra Mistra", IV.1842, *Boissier s.n.* (G-BOIS [G00332517]; iso-: JE, W [W0050738]).

= ***Noccaea graeca*** (Jord.) F.K. Mey. in Feddes Repert. 84: 463. 1973.

Note. – Boissier in *Flora Orientalis* reduced the species name to synonymy of *Thlaspi graecum,* and subsequent authors followed that.

Thlaspi microphyllum Boiss. & Orph. in Boiss., Diagn. Pl. Orient. ser. 2, 6: 19. 1859.

≡ ***Noccaea microphylla*** (Boiss. & Orph.) F.K. Mey. in Feddes Repert. 84: 460. 1973.

Type: "Hab. ad *Carcaria* montis *Parnassi* cl Prof. Orphanidès Junio 1854, ad nives in cacumine montis *Veluchi* cl. Samaritani et Guicciardi fine Julii 1857".

Lectotypus (designated by Franzén, 1986: 323): **Greece:** "Legi in monte Parnasso prope Carcaria", 4000' [1220 m], 28.VI–10.VII.1854, *Orphanides 2744* (G-BOIS [G00332518]; isolecto-: JE). **Syntypus: Greece:** "Ad nives in cacumine m. Veluchi", 30.VII.1857, *Samaritani & Guicciardi 3353* (B [B100249986], G [G00371982], G-BOIS [G00332519], K [K000484248]).

Note. – Meyer (2006c: 65) overlooked the earlier lectotypification by Franzén (1986), though both designated the same specimen as the lectotype.

Thlaspi densiflorum Boiss. & Kotschy in Boiss., Fl. Orient. 1: 328. 1867.

≡ ***Noccaea densiflora*** (Boiss. & Kotschy) F.K. Mey. in Feddes Repert. 84: 465. 1973.

Type: "Hab. in montibus Kassan Oglu Ciliciae Kurdicae (Ky exs. 62!), in Amano Syriae bor. (Ky!), in monte Troodos Cypri alt. 5000' (Ky!)".

Lectotypus (designated here): **Turkey:** "Plantae in montibus Kassan Oghlu ad pagum Gorumse", 5600' [1705 m], 13.V.1859, *Kotschy 62* (G-BOIS [G00332520]; isolecto-: B [B100277001, B100277002], BM [BM000582798, BM000582799], G [G00371979], JE [JE00004177], P [P01817542, P01817543, P01817544, P01817545], S [S0945758], W [W0032952, W18890058140], ZT [ZT00159919]). **Syntypi: Cyprus:** "Troodo ad fontes Ta Maschinari", 5000' [1520 m], 15.V.1862, *Kotschy 717* (G [G00446273], G-BOIS [G00332522]). **Syria:** "Amanus pr. Beylan", 1862, *Kotschy s.n.* (G-BOIS [G00332521]).

Notes. – Hedge annotated the G00371979 sheet in December 1965 though he did not indicate its type status and did not annotate the G-BOIS sheet.

As shown by Meyer (2006c: 189–190), *Kotschy 717* is an isotype of *Thlaspi cyprium* Bornm. (≡ *Noccaea cypria* (Bornm.) F.K. Mey.) and, therefore, that collection should not be taken as part of the *Noccaea densiflora* material.

Thlaspi griffithianum (Boiss.) Boiss., Fl. Orient. 1: 329. 1867.

≡ *Carpoceras griffithianum* Boiss., Diagn. Pl. Orient. ser. 2, 1: 40. 1854.

≡ ***Noccaea griffithiana*** (Boiss.) F.K. Mey. in Hausknechtia Beih. 12: 170. 2006.

Type: "Hab. in *Bharowul* regni *Cabulici* (cl. Griffith pl. exs. N° 1473)".

Holotypus: Afghanistan: "Bharowul", s.d., *Griffith 1473* (G-BOIS [G00330468]; iso-: K [K000484297]) (Fig. 27B, p. 119).

Notes. – Two sheets at K [K000484296, K000484298] have the collector and country but not the locality or collection number, and they may or may not be part of the type collection.

The isotype sheet at K has the collection number *1493* (Fig. 27B, p. 119), whereas that in G-BOIS is *1473*. However, labels of both sheets have Griffith's journal no. *111*. Based on our experience with Griffith's gatherings, different collection numbers were given for one area and often all have the same journal number. Boissier (1867a, 1888) never listed *Griffith 1473*.

Thlaspi elegans Boiss., Diagn. Pl. Orient. 5: 82. 1844.

≡ ***Noccaea elegans*** (Boiss.) Al-Shehbaz in Harvard Pap. Bot. 19: 37. 2014 (Fig. 26B, p. 118).

Type: "Hab. in *Cariâ* ubi 1843 detexit Chr. Pinard".

Holotypus: Turkey: "Caria", 1842, *Pinard s.n.* (G-BOIS [G00332507]; iso-: B [B100277003], G [G00371943, G00371944], GOET [GOET002657], JE [JE00004203], K [K000484300, K000484301, K000484302], P [P01817562, P01817563], W [W0032953], Z [Z000004435]).

Note. – Both Meyer (2003b: 89) and Al-Shehbaz (2014: 37) indicated that the specimen in G-BOIS is the holotype. It is a collection folder of two sheets one of which is labeled "Caria 1842".

Thlaspi rosulare Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 5: 39. 1856.

≡ ***Noccaea rosularis*** (Boiss. & Balansa) Al-Shehbaz in Harvard Pap. Bot. 19: 45. 2014.

Type: "Hab. in regione montanâ superiori jugi *Masmeneudagh,* cl. Balansa legit fructiferum Augusto 1855".

Holotypus: Turkey: "Région montagneuse supérieure du Masmeneu-Dagh, à 25 lieues SSO de Césarée", 8.VIII.1855, *Balansa 178* (G-BOIS [G00332523]; iso-: G [G00383939], GH [GH00062505], K [K000484304], P [P01817568, P01817569], US [US01117981]).

Note. – The species was described on the unicate in G-BOIS, a specimen correctly recognized by Al-Shehbaz (2014: 45) as the holotype.

Thlaspi lilacinum Boiss. & A. Huet in Boiss., Diagn. Pl. Orient. ser. 2, 5: 41. 1856.

≡ ***Noccaea lilacina*** (Boiss. & A. Huet) Al-Shehbaz in Harvard Pap. Bot. 19: 41. 2014.

Type: "Hab. in Armeniâ boreali in viâ inter *Gumuchchané* et *Zazalarchané* cl. Huet. du Pavillon qui legit floriferum Maio 1853".

Holotypus: Turkey: "Inter Gumuchané et Zazalarchané", V.1853, *Huet du Pavillon s.n.* (G-BOIS [G00332510]; iso-: FI [FI005702], G [G00371991, G00371992], GH [GH00062504], GOET [GOET002661], K [K000484305], P [P01817552, P01817553]).

Notes. – Meyer (1973) designated this species as the generic type for *Callothlaspi* F.K. Mey. He (Meyer, 2006a: 177) considered the G-BOIS sheet as the holotype, and it is the only material examined by Boissier.

The G-BOIS holotype is a collection folder of two sheets the label of one of which indicates "Armenia. May 1843", but this appears to be an error for 1853, as correctly shown in the K duplicate.

Thlaspi papillosum Boiss., Fl. Orient. 1: 330. 1867.

≡ ***Noccaea papillosa*** (Boiss.) F.K. Mey. in Feddes Repert. 84: 460. 1973.

Type: "Hab in Cariae monte Cadmo supra Khonas ad nives (Boiss!), in monte Akdagh Lyciae (Bourg. exs. sub *Th. ochroleuco*)".

Lectotypus (designated by Meyer, 2006c: 71): **Turkey:** "Cadmus, ad or. Denisleh ad nives", VI.1842, *Boissier s.n.* (G-BOIS [G00332524]; isolecto-: JE [JE00004180]). **Syntypus: Turkey:** "Plantae Lyciae. Mt. Ak-Dagh", 5.VII.1860, *Bourgeau s.n.* (K [K000484294], P [P05411314]).

Note. – The species was recently placed by Dorofeyev (2013) in *Apterigia* Galushko, but it is maintained here in *Noccaea.*

Thlaspi haussknechtii Boiss., Fl. Orient. 1: 330. 1867.

≡ ***Noccaea haussknechtii*** (Boiss.) F.K. Mey. in Feddes Repert. 84: 460. 1973.

Type: "Hab. ad nives montis Berytdagh Cataoniae alt. 9000'–10000' (Haussk!)".

Lectotypus (designated here): **Turkey:** "Taurus Cataonicus. Berytdagh", 9000'–10000' [2740–3050 m], 10.VIII.1865, *Haussknecht 1102* (G-BOIS [G00332525]; isolecto-: JE [JE00004166]).

Notes. – Boissier examined the sheet in his herbarium and that at JE, which he annotated. Therefore, the name needs lectotypification.

Meyer (2006c: 70) treated the material at JE as the holotype and the G-BOIS specimen as the isotype.

Carpoceras Link, Handb. 2: 289. 1831.

Tribe: *Thlaspideae* DC.

Note. – The type species of *Carpoceras, C. sibiricum* Link is a synonym of the earlier published *Thlaspi ceratocarpum* (Pall.) Murray, which is a perfectly good species of *Thlaspi,* and therefore the former genus is a synonym of *Thlaspi* (see Al-Shehbaz, 2012).

Carpoceras stenocarpum Boiss., Diagn. Pl. Orient. 8: 37. 1849.

≡ ***Noccaea stenocarpa*** (Boiss.) Al-Shehbaz in Harvard Pap. Bot. 19: 46. 2014.

Type: "Hab. propè nives in monte *Totschal* propè *Teheran* Kotschy No 165".

Lectotypus (designated here): **Iran:** "Prope nives m. Totschal pr. Teheran", 17.V.1843, *Kotschy 165* (G-BOIS [G00332509]; isolecto-: B [B100249757], BM [BM001254109], FI [FI005703], G [G00446243, G00446244, G00446245], GOET [GOET002666], JE [JE00004196], K [K000484308], KW [KW000127988], P [P01817570, P01817572, P01817573, P01817575], S [S032260], W [W0050743], ZT [ZT00008152]).

Notes. – Printed labels of the duplicates of the type collection have the name "*Thlaspi stenocarpum* Boiss. et Hohenack n. sp.", including the sheet in Bunge's herbarium, P01817572, which was annotated by Boissier.

The name was never published in *Thlaspi* until its transfer by Hedge (1968).

Carpoceras cilicicum Schott & Kotschy ex Boiss., Fl. Orient. 1: 332. 1867.

≡ ***Noccaea cilicica*** (Schott & Kotschy ex Boiss.) Al-Shehbaz in Harvard Pap. Bot. 19: 36. 2014.

Type: "Hab. in graminosis alpinis Tauri Cilicici supra Gülek alt. 7000' (Ky exs. 70!)".

Holotypus: Turkey: "Locis graminosis ad plumbi fodinas territorii Güllek", 7000' [2130 m], 8.VII.1853, *Kotschy 70a* (G-BOIS [G00332508]; iso-: K [K000484311], KW [KW000127987], P [P01817540, P01817541], S [S-G-9858], W [W0075783], WAG [WAG0004282]).

Note. – Geneva herbarium has just the above single sheet of the type collection, and both Meyer (2003c: 126) and Al-Shehbaz (2014: 36) indicated that it is the holotype.

Carpoceras sibiricum Boiss., Diagn. Pl. Orient. 8: 37. 1849 [nom. illeg.].

≡ ***Thlaspi ceratocarpum*** (Pall.) Murray in Novi. Comment. Soc. Regiae Sci. Gott. 5: 26. 1775.

Notes. – *Carpoceras sibiricum* Boiss. is illegitimate because Boissier (1849) listed the earlier published *Thlaspi ceratocarpum* in synonymy. Boissier also neglected Link (1831) who made the same error.

Both superfluous names of *Carpoceras sibiricum* are based on the same type collection, and Meyer (2001a) correctly placed them in the synonymy of the accepted name above in *Thlaspi*.

No material of Boissier's name was located in the Geneva herbaria.

The name *T. ceratocarpum* was lectotypified by German (2011: 52).

Carpoceras oxyceras Boiss., Diagn. Pl. Orient. 8: 37. 1849.

≡ ***Noccaea oxyceras*** (Boiss.) Al-Shehbaz in Harvard Pap. Bot. 19: 43. 2014.

Type: "[Boissier] Hab. in nemorosis regionis inferioris jugi *Cassii* inter *Cassab* et *Suadieh*".

Holotypus: Syria: "Chaîne du Cassius chemin de Suadieh", III.1846, *Boissier s.n.* (G-BOIS [G00332506]; iso-: G [G00383941, G00383944], GOET [GOET002664], K [K000484314, K000484316], KW [KW000127982], P [P01817565, P01817566, P01817567, P04656710], PH [PH00029990], W, ZT [ZT00008151]).

Notes. – The holotype is a collection folder of four sheets three of which lack the locality data. The isotypes have a printed, handwritten, abbreviated label by Boissier distributed as "Syria, Cassius, jun. 1846. E. Boissier".

Both Meyer (2003b: 75) and Al-Shehbaz (2014: 43) listed the holotype in G-BOIS. The duplicate at W was listed by Meyer (2003b), though a search for it was unsuccessful.

Labels of the G, GOET, K, and P duplicates have the species name as *Thlaspi oxyceras* Boiss., but that combination was published by Hedge (1965).

Carpoceras cappadocicum Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 6: 19. 1859.

≡ ***Noccaea cappadocica*** (Boiss. & Balansa) Al-Shehbaz in Harvard Pap. Bot. 19: 36. 2014.

Type: "Hab. in regione montanâ superiori montis *Dedé dagh Antitauri* ad orientem *Caesareae* cl. Balansa".

Holotypus: Turkey: "Région montagneuse supérieure du Dédé-Dagh (l'un des pics de l'anti-Taurus), à 12 lieues à l'ESE du mont-Argée", 6.VIII.1856, *Balansa 438* (G-BOIS [G00330550]; iso-: G [G00371948, G00371952], GOET [GOET002663], JE [JE00004204], K [K000484318], P [P01817536, P01817537, P01817538, P01817539], W [W18890069384]).

Notes. – The isotypes have a printed handwritten label by Balansa with indications as above but with the exsiccatae number *1004*.

Meyer (2003b: 82, 83) and Al-Shehbaz (2014: 36) recognized the sheet in G-BOIS as the holotype and did not recognize *Balansa 1004* as part of the same collection apparently because the field vs exsiccatae number (see above) was cited.

Balansa's duplicates of all collections carry his field numbers on the specimens sent to Boissier, but his exsiccatae numbers are always different. Meyer annotated G00371948 and W18890069384, which have the exsiccatae number *Balansa 1004,* as isotypes but apparently he later changed his mind.

Iberis L., Sp. Pl.: 648. 1753.

Tribe: *Iberideae* Webb & Berthel.

Note. – A genus of 27 species distributed primarily in C and S Europe, with fewer species in N Africa and SW Asia.

Iberis sempervirens var. *rosea* Boiss., Fl. Orient. 1: 333. 1867.

Type: "Hab. in monte Cadmo Cariae supra Khonas (Boiss!), Tauro Cilicico (Ky! Bal!), ditione Kassan Oglu (Ky!)".

Lectotypus (designated here): **Turkey:** "Cadmus ad or. Denisleh. Caria", VI.1842, *Boissier s.n.* (G-BOIS [G00332526]). **Syntypi: Turkey:** "Taurus", 20.VII.1855, *Balansa s.n.* (G [G00446248], G-BOIS [G00332529], P [P05415699]); "Kassan Oglu", 18.V.1859, *Kotschy 89* (G-BOIS [G00332527], P [P01817590], W [W0075589]); "Iter Cilicicum in Tauri alpes 'Bulgar Dagh.' Ad plumbi fodinas", 6000' [1830 m], VII.1853, *Kotschy 115 223 74 34* (G [G00446249], G-BOIS [G00332528], K [K000484120], P [P01817591, P01817592, P01817593], W [W0075588]).

= ***Iberis sempervirens*** L., Sp. Pl.: 648. 1753.

Notes. – The lectotype and syntypes are based on fruiting and flowering material, respectively.

Caution should be made in dealing with Kotschy's multiple collection numbers because he used to send handwritten labels to Boissier, and after receiving the determinations, he distributed his collections with printed labels sometimes different from the originals he sent to Boissier. More on this is discussed under the entries of *Brossardia papyracea* var. *kotschyi* and *Crenularia eunomioides*.

Iberis olympica Boiss., Diagn. Pl. Orient. ser. 2, 1: 37. 1854.

Type: "Hab. in summis jugis *Olympi Bithyni* (Boiss! Noë! Clementi!)".

Lectotypus (designated here): **Turkey:** "Olympus Bithynis", VIII.1842, *Boissier s.n.* (G-BOIS [G00332530]). **Syntypi: Turkey:** "In cacumis jugis Olympi bith.", VIII.1850, *Clement s.n.* (G [G00371777], G-BOIS [G00332531], K [K000484125, K000484126]); "Olympus Bithynia", 1847, *Noë s.n.* (G-BOIS [G00332532]).

= ***Iberis carnosa*** Willd., Sp. Pl. 3: 455. 1800.

Note. – Hedge (1965) treated the species as a synonym of *I. spruneri* Jord., but both species should be synonymized with *I. carnosa,* as done by Tan (2002).

Iberis jordanii Boiss., Diagn. Pl. Orient. ser. 2, 1: 38. 1854 [nom. illeg.].

≡ *Iberis attica* Jord., Observ. Pl. Nouv. 6: 42. 1847.

= ***Iberis carnosa*** Willd., Sp. Pl. 3: 455. 1800.

Note. – *Iberis jordanii* Boiss. is illegitimate because Boissier (1854) listed the earlier published *I. attica* Jord. in synonymy.

Brossardia Boiss. in Ann. Sci. Nat., Bot. ser. 2, 16: 380. 1841.

Tribe: *Coluteocarpeae* V.I. Dorof.

Note. – This monospecific genus was reduced by Khosravi et al. (2008b) to synonymy of *Noccaea*.

Brossardia papyracea Boiss. in Ann. Sci. Nat., Bot. ser. 2, 16: 380. 1841.

≡ ***Noccaea papyracea*** (Boiss.) Khosravi et al. in Feddes Repert. 119: 21. 2008 (Fig. 26E, p. 118; 27A, p. 119).

Type: "[Aucher-Eloy] N. 4127 Ispahan".

Lectotypus (designated here): **Iran:** "Ispahan", s.d., *Aucher-Eloy 4127* (G-BOIS [G00332538]; isolecto-: G [G00446250, G00446251], K [K000484219], P [P01817530, P01817531], W [W0055933]).

Notes. – Khosravi et al. (2008b) indicated that the above G-BOIS specimen is the holotype.

However, the name needed lectotypification because Boissier based the species description on the unicate in his herbarium and on P01817530 that he annotated.

Brossardia papyracea var. *kotschyi* Boiss., Diagn. Pl. Orient. 8: 41. 1849.

Type: "Hab. in declivibus septentrionalibus montis *Kuh Barfi* et *Kuh Delu* Persiae australis Kotschy No 523 et 327".

Lectotypus (first step designated by Al-Shehbaz, 2014: 43; second step designated here, plants with mature fruits): **Iran:** "In declivibus in sept. spectantibus alpis Kuh-Delu", 15.VI.1842, *Kotschy 523* (G-BOIS [G00332539]; isolecto-: B [B100241026 plant on top left, B100241027 two plants in middle], E [E00373121 plant in middle], G [G00446252, G00446253], KW [KW000127989], P [P06648118, P06648119, P6648121], S [S1216130 four plants except upper middle two], US [US00324433 upper left plant], W [W four plants except top center, W0070598 two plants on top right and top left, fragment on lower center, W18890029664 two plants on top right]). **Syntypus** [plants in flower]: **Iran:** "In m. Kuh-Barfi in n. Schiras", 3.V.1842, *Kotschy 327* (B [B100241026 five plants without fruit, B100241027 plants on left and right], E [E00373121 plants on left and right], G [G00446254], K [K000484221], KW [KW0001279901], P [P04022668, P04022672, P04022673, P06648121 plant on left], S [S1216130 upper middle two], US [US00324433 plants in middle and right], W [W remaining plants on the isolectotype above, W18890029616]).

= ***Noccaea papyracea*** (Boiss.) Khosravi et al. in Feddes Repert. 119: 21. 2008.

Notes. – The lectotype sheet (G-BOIS) has three labels, of which one (handwritten) gives the locality (Kuh-Barfi), flowering date (May 3), and the collection number *(327)*; the other (also handwritten) gives the locality (Kuh-Delu), fruiting date (June 15), and collection number *(523)*; and the third is printed and has the locality as Kuh-Delu, both flowering and fruiting dates above, and both collection numbers. It is the printed label that has been distributed often with both flowering and fruiting material. Because the fruit gives the most distinctive and distinguishing characters, the fruiting specimens are designated here as the lectotype collection. Plants in the flowering stage represent syntypes either distributed alone or mixed with the fruiting material.

The lectotype has eight plants, of which only two (bottom right and left) are in fruit, and the remaining six are syntypes. Therefore, the initial lectotypification by Al-Shehbaz (2014) was incomplete because neither flowering nor fruiting material was selected.

Brossardia retusa Boiss., Fl. Orient. 1: 336. 1867.

≡ *Brossardia papyracea* var. *kotschyi* Boiss., Diagn. Pl. Orient. 8: 41. 1849.

= ***Noccaea papyracea*** (Boiss.) Khosravi et al. in Feddes Repert. 119: 21. 2008.

Note. – This is a renaming at the species rank of the previous entry.

Crenularia Boiss. in Ann. Sci. Nat., Bot. ser. 2, 16: 380. 1841.

Tribe: *Aethionemeae* Al-Shehbaz et al.

Note. – All of the following species of *Crenularia* have been transferred to or synonymized with those of *Aethionema*.

Crenularia glaucescens (Boiss.) Boiss., Fl. Orient. 1: 337. 1867.

≡ *Iberis glaucescens* Boiss. in Ann. Sci. Nat., Bot. ser. 4, 2: 243. 1854.

Type: "Hab. prope Kizildagh, ad radices montis *Akdagh* declivitatem borealem montis *Bulghurdagh* Ciliciae constituentis ubi legit cl. P. a Tchihatcheff".

Holotypus: Turkey: "Propé Kizildagh. Asie Minoris", 1854, *Tchihatcheff s.n.* (G-BOIS [G00154064]).

= ***Aethionema balansae*** Boiss., Diagn. Pl. Orient. ser. 2, 6: 20. 1859.

Notes. – Upon the transfer of *Iberis glaucescens* to *Aethionema*, Bornmüller (1911) created an illegitmate later homonym of the Greek *A. glaucescens* Halácsy (in Verh. K. K. Zool.-Bot. Ges. Wien 38: 748. 1888). However, there is no need to create a new name for the central Turkish *Iberis glaucescens* in *Aethionema*, such as *A. glaucinum* Greuter et al. (Willdenowia 13: 85. 1983),

because of the availability of *A. balansae*, a name reduced by Boissier in *Flora Orientalis* to synonymy of *Crenularia glaucescens*.

The species was treated by Hedge (1965) as *Aethionema glaucescens*.

Aethionema balansae Boiss., Diagn. Pl. Orient. ser. 2, 6: 20. 1859.

Type: "Hab. in *Tauro*. Colui in Hort. Valeyres e seminibus a cl. Balansa lectis".

Holotypus: Turkey: "Taurus, Jardin de Valleyres", VI.1857, *Boissier s.n.* (G-BOIS [G00332540]).

Note. – There is a single sheet in G-BOIS with the species name, and its plants were cultivated in Boissier's garden and were collected in May, June and July.

Crenularia orbiculata Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 181. 1842.

≡ ***Aethionema orbiculatum*** (Boiss.) Hayek in Repert. Spec. Nov. Regni Veg. Beih. 30(1): 472. 1925.

Type: "[Aucher-Eloy] n. 336, Mons Athos".

Lectotypus (designated by Franzén, 1986: 327): **Greece:** "in Mte. Athos", s.d., *Aucher-Eloy 336* (G-BOIS [G00332541]; isolecto-: G [G00002100, G00002101], K [K000484166], P [P00835113, P00835114]).

Notes. – The name needed lectotypification because Boissier based the species description on the G-BOIS and G00002100 sheets.

Franzén (1986) indicated that the original collection is in G-BOIS, and that comment is taken as an effective lectotypification because of the existence of an unicate in this herbarium.

Crenularia eunomioides Boiss., Diagn. Pl. Orient. ser. 2, 5: 41. 1856.

≡ ***Aethionema eunomioides*** (Boiss.) Bornm. in Beih. Bot. Centralbl., Abt. 2, 28: 535. 1911.

Type: "Hab. in schistosis meridionalibus vallis *Gusguta* Tauri Cilicici alt. 7000' cl. Kotschy. Fl. Jun. Fruct. Jul.".

Lectotypus (designated here): **Turkey:** "Iter Cilicicum in Tauri alpes 'Bulgar Dagh.' In schistosis austro oppositis vallis Gusguta et Dasch Olugh", 7000' [2130 m], 26.VI.1853 and 2.VII.1853, *Kotschy 32 201 23d* (G-BOIS [G00154063]; isolecto-: G [G00002436], GOET [GOET002669], K [K000075759], P [P00835107, P00835108, P00835109, P00835110], S [S1216214], W [W0005563], WAG [WAG0004255]).
Syntypus: Turkey: "Iter Cilicicum in Tauri alpes 'Bulgar Dagh.' In schistosis austro oppositis vallis Gusguta et Dasch Olugh", 7000' [2130 m], 26.VI.1853 and 2.VII.1853, *Kotschy 32 201 23d* (G [G00002436], G-BOIS [G00154063], GOET [GOET002669], K [K000075759], P [P00835107, P00835108, P00835109, P00835110], S [S1216214], W [W0005563], WAG [WAG0004255]).

Notes. – Lectotypification of this species name involves several factors that contribute to its complexity.

First, many of the *Brassicaceae* material collected by Kotschy and sent to Boissier for determination were accompanied by Kotschy's handwritten labels, after which Kotschy distributed the exsiccatae with printed labels (for a good example, see the above-mentioned typification of *Brossardia papyracea* var. *kotschyi*). For this species, two rather vague labels saying "Plantae Tarui Cilicici. Th. Kotschy 1853", accompanied with the printed, complex, exsiccatae label, were sent to Boissier.

Second, that complex label gives two collection dates (June 26 and July 2), two localities (Gusguta et Dasch Olugh), three of Kotschy's collection numbers (*23d, 32,* and *201*), and identification as *Lipophragma eunomiodes*, a *nomen nudum* listed by Boissier (1856) but not elsewhere.

Third, it is impossible to know which plant was collected from where, at what date, and what collection number was assigned.

Fourth, *Crenularia eunomioides* is a perfectly good species not yet typified despite its original description over 110 years ago.

Fifth, both flowering and fruiting material are on the sheets, and it is impossible to tell which was collected when because the difference in the collection dates are only six days apart, and without knowing the altitude and locality of each plant material, the situation becomes rather complex.

Finally, in order to lectotypify the name, an arbitrary decision is made here to select the best fruiting material as lecto- and isolectotypes regardless to place and date of collection and collection number in order to avoid the situation where such a well-known species name ought to be discarded as an ambiguous name.

Crenularia umbellata (Boiss.) Boiss., Fl. Orient. 1: 338. 1867.

≡ *Moriera umbellata* Boiss., Diagn. Pl. Orient. 6: 16. 1846.

≡ ***Aethionema umbellatum*** (Boiss.) Bornm. in Beih. Bot. Centralbl., Abt. 2, 28: 535. 1911.

Type: "Hab. in glareosis regionum summarum alpis *Kuh-Daëna* Kotschy No. 780".

Holotypus: Iran: "In glareosis reg. sumarum alpis Kuh-Daëna", 2.VIII.1842, *Kotschy 780* (G-BOIS [G00154010]; iso-: B [B100241892], BM [BM001254112], E [E00061169, E00061170], FI [FI005705], G [G00002123, G00002124], K [K000075747], KW [KW000127991], LE [LE00012860], MO [MO2001061, MO2001062], P [P00835122, P00835123, P00835124, P00835126, P00835127], W [W0005554, W18890020458], WAG [WAG0003966]).

Note. – Boissier in *Flora Orientalis* based the species description only on the unicate in G-BOIS, and therefore there was no need to lectotypify the name by Al-Shehbaz (in Moazzeni et al., 2018: 261).

Moriera Boiss. in Ann. Sci. Nat., Bot. ser. 2, 16: 380. 1841.

Tribe: *Aethionemeae* Al-Shehbaz et al.

Note. – Although Hedge (1968) and Al-Shehbaz et al. (2006) recognized *Moriera* as distinct from *Aethionema,* the two genera were later united (Al-Shehbaz, 2012), and the main difference between them is the spiny habit. It is interesting to note that the spiny habit had evolved at least four times independently within *Aethionema,* including *A. erinaceum* (see under *Lepidium*) and *Aethionema spinosum* recognized here (see Mohammadin et al., 2017).

Moriera spinosa Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 182. 1842.

≡ ***Aethionema spinosum*** (Boiss.) Prantl in Engl. & Prantl, Nat. Pflanzenfam. 3(2): 165. 1891 (Fig. 26C–D, p. 118).

Type: "[Aucher-Eloy] N. 347, Persia".

Holotypus: Iran: *sine loco,* s.d., *Aucher-Eloy 347* (G-BOIS [G00330708]; iso-: BM [BM001254111], G [G00371901, G00371902], K [K000484161, K000484162], LE, P [P00835118, P00835119, P00835120, P00835121]).

Note. – Boissier (1842b) based the species description on the unicate in G-BOIS. He did not annotate any of the duplicates cited above.

Lepidium intricatum Boiss. & Buhse in Nouv. Mém. Soc. Imp. Naturalistes Moscou 12: 26. 1860.

Type: "Im Gebirge bei Ssou (im N. von Isfahan), [Buhse] 21 May 1849 (florens)".

Holotypus: Iran: "in montib. pr. Ispahan", 1847, *Buhse 1444* (G-BOIS [G00332559]; iso-: LE [LE00012820, LE00012821]).

= ***Aethionema spinosum*** (Boiss.) Prantl in Engl. & Prantl, Nat. Pflanzenfam. 3(2): 165. 1891.

Notes. – Label of the holotype was handwritten by Boissier on a Buhse 1847 blank printed label. Both duplicates at LE have the same information of the protologue, but their collection number is *1441.*

Boissier in *Flora Orientalis* reduced *L. intricatum* to synonymy of *Moriera spinosa.*

Moriera cabulica Boiss., Diagn. Pl. Orient. ser. 2, 1: 41. 1854.

Type: "Hab. in monte *Erak* regni *Cabulici* alt. 11000' (cl. Griffith Journal N° 1151)".

Holotypus: Afghanistan: "Erak", 11000' [3350 m], s.d., *Griffith 1151* (G-BOIS [G00332542]; iso-: K [K000618647, K000618648]).

= ***Aethionema spinosum*** (Boiss.) Prantl in Engl. & Prantl, Nat. Pflanzenfam. 3(2): 165. 1891.

Note. – Boissier (1854) based the species description only on the unicate in G-BOIS.

Aethionema W.T. Aiton, Hort. Kew. ed. 2, 4: 80. 1812.

= *Crenularia* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 16: 380. 1841.

= *Campyloptera* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 16: 381. 1841.

= *Moriera* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 16: 380. 1841.

Tribe: *Aethionemeae* Al-Shehbaz et al.

Notes. – *Aethionema* includes 56 species centered primarily in Turkey, with fewer species in Iran and the Balkan Peninsula, and the range of some reach Morocco and Spain and that of another species into Pakistan.

Based strictly on morphology, Yildrimili & Kiliç (2016) divided *Aethionema* into nine subgenera, four sections, two subsections, and three new series, but such division does not seem to be practical, and it is incompatible with the subsequently published and most recent molecular phylogenetic study on the genus (Mohammadin et al., 2017). In addition to their over splitting the genus, they described 11 new species and recognized only 51 species in the entire genus.

The genus is much in need of a thorough monograph that critically evaluates morphology in light of molecular, genomic, and cytological data.

Boissier (1841b) described four smaller genera allied to *Aethionema,* of which he maintained in *Flora Orientalis* both *Crenularia* and *Moriera* as distinct and reduced *Campyloptera* and *Iberidella* to synonymy of *Aethionema.* However, almost all species that he described originally in *Iberidella* are currently assigned to *Noccaea*.

All *Brassicaceae*-wide molecular phylogenetic studies have consistently showed that *Aethionema* is sister to the rest of the family, and the interested reader should consult Mohammadin et al. (2017). Therefore, the genus occupies a significant position for understanding trait evolution and other studies on the rest of the family.

Aethionema trinervium var. *ovalifolium* (Boiss.) Boiss., Fl. Orient. 1: 342. 1867.

≡ *Iberidella ovalifolia* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 189. 1842.

Type: "[Aucher-Eloy] N. 4125, Armenia".

Holotypus: Turkey: "Armenia", s.d., *Aucher-Eloy 4125* (G-BOIS [G00332543]; iso-: G [G00446255, G00446256], K [K000484170], P [P00700958, P05415776]).

= ***Noccaea trinervia*** (DC.) Steud., Nomencl. Bot. ed. 2, 2: 197. 1841.

Notes. – Boissier did not examine or annotate any of the duplicates at G or P, and, therefore, the G-BOIS sheet should be recognized as the holotype (see Boissier, 1841a).

The systematic position of the species has fluctuated a great deal, but based on molecular phylogenetic studies, it was placed by Khosravi et al. (2009b) in *Vania* F.K. Mey., and more recently (Al-Shehbaz, 2014) in *Noccaea* of the remotely related tribe *Coluteocarpeae*.

Aethionema sagittatum (Boiss.) Boiss., Fl. Orient. 1: 342. 1867.

≡ *Iberidella sagittata* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 188. 1842.

Type: "[Aucher-Eloy] N. 4126, Ispahan".

Holotypus: Iran: "Ispahan", s.d., *Aucher-Eloy 4126* (G-BOIS [G00154009]; iso-: BM [BM000883327, BM000883560], G [G00002121, G00002122], K [K000484179], KW [KW000127945], LE [LE00012845], P [P01817603, P01817604, P01817605, P01817606, P02428210, P02428210], W [W0005555, W18890077582]).

= ***Noccaea trinervia*** (DC.) Steud., Nomencl. Bot. ed. 2, 2: 197. 1841.

Notes. – Lectotypification of the species by Dorofeyev (2012: 463) based on *Kotschy 476* at LE is erroneous because Boissier (1842b) did not cite that collection number under *Iberidella sagittata.* It is when Boissier in *Flora Orientalis* transferred it to *Aethionema* that he cited the additional collection *Kotschy 476*.

There are no duplicates of *Aucher-Eloy 4126* in the Candolle's herbarium, and none of the six duplicates at P was annotated by Boissier. Therefore, the specimen in G-BOIS should be recognized as the holotype.

Aethionema tenue (Boiss. & Buhse) Boiss., Fl. Orient. 1: 343. 1867.

≡ *Iberidella tenuis* Boiss. & Buhse in Nouv. Mém. Soc. Imp. Naturalistes Moscou 12: 25. 1860.

≡ ***Noccaea tenuis*** (Boiss. & Buhse) F.K. Mey. in Feddes Repert. 84: 459. 1973.

Type: "Grasiger Abhang am Damirdagh (Ssahendgebirge) etwa 10000 Fuss hoch, 21 Juni 1847 (florens et deflorata). [Buhse] No 589/2".

Holotypus: Iran: "Damirdagh jugi Ssahen", 1847, *Buhse s.n.* (G-BOIS [G00332544]; iso-: K [K000484323], LE [LE00012855, LE00012856]).

Note. – Meyer (2006c: 50), who apparently neither annotated nor examined that unicate, recognized thin G-BOIS sheet as the holotype.

Noccaea trinervia (DC.) Steud., Nomencl. Bot. ed. 2, 2: 197. 1841.

= *Iberidella heterophylla* Boiss. & Buhse in Nouv. Mém. Soc. Imp. Naturalistes Moscou 12: 25. 1860.

≡ *Aethionema heterophyllum* (Boiss. & Buhse) Boiss., Fl. Orient. 1: 343. 1867, **syn. nov.**

Type: "Am Gipfel des Kuh Mulum in Talyschgebirge, [Buhse] 26 April 1847 (specimen unicum florens)".

Holotypus: Iran: *sine loco,* 1847, *Buhse s.n.* (G-BOIS [G00332545]; iso-: LE [n.v.]).

Note. – Hedge (1965: 329, 1968: 110) allied *Aethionema heterophyllum* to *A. caespitosum,* but it is definitely a synonym of the *Noccaea trinervia* complex, which is easily distinguished by the auriculate, prominently 3-veined cauline leaves.

Aethionema caespitosum (Boiss.) Boiss., Fl. Orient. 1: 343. 1867.

≡ *Iberidella caespitosa* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 190. 1842.

≡ ***Noccaea caespitosa*** (Boiss.) Al-Shehbaz & Menke in Taxon 61: 949. 2012 (Fig. 27C, p. 119).

Type: "[Aucher-Eloy] N. 155, Armenia".

Holotypus: Turkey: "Armenia", s.d., *Aucher-Eloy 155* (G-BOIS [G00330707]; iso-: BM [BM000582604], G [G00002080, G00002081, G00002082], K [K000484180], P [P01817600, P01817601]).

Notes. – Dorofeyev (2013) transferred the species to *Apterigia* solely based on slight morphological similarities.

However, the recognition of the species as *Noccaea* (Al-Shehbaz, 2012) was based on molecular phylogenetic studies that clearly supports its exclusion from *Aethionema* and its placement in *Noccaea,* where it was subsequently maintained (Al-Shehbaz, 2014).

Aethionema rubescens Boiss., Fl. Orient. 1: 343. 1867.

≡ ***Noccaea rubescens*** (Boiss.) F.K. Mey. in Feddes Repert. 84: 459. 1973.

Type: "Hab. in summo jugo Metdesis Tauri Cilicici alt. 11800' (Ky exs. 160!), in summo monte Masmeneudagh Cappadociae (Bal)".

Lectotypus (designated here): **Turkey:** "Iter Cilicicum in Tauri alpes 'Bulgar Dagh.' In summo Metdesis. glareosa ornat.", 11800' [3595 m], 3.VII.1853, *Kotschy 160* (G-BOIS [G00330706]; isolecto-: E [E00374334], G [G00002099], K [K000484183], P [P00432274, P01817625, P01817626], W [W0005557]). **Syntypus: Turkey:** "Masmeneu dagh in cacumine", 6.IX.1855, *Balansa s.n.* (G-BOIS [G00332546]).

Notes. – Meyer (2006c: 51), followed by Al-Shehbaz (2014: 45), overlooked the fact that two syntypes were cited in the original publication of *Aethionema rubescens*. They recognized the *Kotschy 160* in G-BOIS as the holotype.

By contrast, Hedge (1965: 323) reduced the species to synonymy of *A. oppositifolia,* both of which species are currently recognized in *Noccaea* (Al-Shehbaz, 2014).

Although the publication of *Eunomia rubescens* was attributed to Tchihatcheff (1860), the name was a *nomen nudum* and, therefore, its publication ought to be attributed to Boissier in *Flora Orientalis*.

Aethionema bourgaei Boiss., Fl. Orient. 1: 344. 1867.

Type: "Hab. in lapidosis regionis alpinae superioris montis Akdagh Syriae (Bourg!)".

Holotypus: Turkey: "Ag-D'hag, région alpine", 5.VII.1860, *Bourgeau 45* (G-BOIS [G00332547]; iso-: P [P00428103, P01817608]).

= ***Noccaea bourgaei*** (Boiss.) D.A. German in Turczaninowia 21: 181. 2018.

Notes. – Boissier did not examine any other material for the description of the species and, therefore, the specimen in G-BOIS is the holotype.

The holotype sheet has two labels, an original handwritten label carrying the field number *45,* and a second label, unnumbered, and with printed "Plantae Lyciae 1860" and handwritten "Mt. Ak-Dagh, région alpine supérieure dans les pierrailles" as in the isotypes at P.

German (2018) has clearly shown that the proper placement of *Aethionema bourgaei* is to recognize it as an independent species of *Noccaea* instead of reducing it to synonymy of others as done by Meyer (2006c) and Al-Shehbaz (2012, 2014).

Aethionema elongatum Boiss., Diagn. Pl. Orient. 6: 17. 1846.

Type: "Hab. sparsim in rupestribus alpis *Kuh-Daëna* Kotschy No. 583".

Holotypus: Iran: "In rupestribus alpis Kuh-Daëna sparsim", 8.VII.1842, *Kotschy 583* (G-BOIS [G00154019]; iso-: B [B100157906], E [E00048974], FI [FI005696, FI010161], G [G00002127, G00002128], H [H1349928], HAL [HAL0081456], JE [JE00024752], K [K000075778], KW [KW000127952], L [L1823691], LE [LE00012841], MO [MO2001054], P [P00428151, P01817611, P01817612, P01817613, P01817614], S [S0711030], W [W0005564, W0005565, W18890029626, W18890154980], WAG [WAG0000787], WU [WU0044247]).

= ***Aethionema virgatum*** (Boiss.) Hedge in Rech. f., Fl. Iran. 57: 354. 1968.

Note. – No lectotypification is needed because Boissier based its description on the unicate in G-BOIS.

Aethionema elongatum var. *minus* Boiss., Fl. Orient. 1: 345. 1867.

≡ *Moriera virgata* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 183. 1842.

≡ ***Aethionema virgatum*** (Boiss.) Hedge in Rech. f., Fl. Iran. 57: 354. 1968.

Note. – This is a renaming of the following entry at the varietal rank.

Moriera virgata Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 183. 1842.

≡ ***Aethionema virgatum*** (Boiss.) Hedge in Rech. f., Fl. Iran. 57: 354. 1968.

Type: "[Aucher-Eloy] N. 4165, Ispahan".

Lectotypus (designated by Al-Shehbaz in Moazzeni et al., 2018: 262): **Iran:** "Ispahan", s.d., *Aucher-Eloy 4165* (G-BOIS [G00154011]; isolecto-: BM [BM000883376, BM001254113], G [G00002125, G00002126], K [K000075779], P [P00428152]).

Notes. – The species name needs lectotypification because Boissier annotated P00428152 perhaps in 1840 as "Texiera virgata", a name that was never published and almost certainly replaced by *Moriera* published in 1841. *Texiera* Jaub. & Spach was published in March 1842.

The basionym *Moriera virgata* was not indexed in *Flora Orientalis* though listed in the synonymy of the previous entry.

Aethionema szowitsii Boiss., Fl. Orient. 1: 345. 1867.

Type: "Hab. in lapidosis montium prov. Aderbidjan Persiae ad Badalan (Szow!). [...] Formam siliculâ apice truncatâ nec retusâ cum typo legit Szowits exs. 535".

Holotypus: Iran: "In lapidosis montium ad Badalan. Distr. Khoi. Prov. Aderbeidzan", 5.VI.1828, *Szovits 335* (G-BOIS [G00332548]).

= ***Aethionema virgatum*** (Boiss.) Hedge in Rech. f., Fl. Iran. 57: 354. 1968.

Notes. – Szowitz exs. *535* in the protologue was a misprint of *335.*

Specimens from Armenia: B100157988, K000484184 and LE00012853 are possible isotypes.

Although LE00012852 and LE00012854 were annotated by Dorofeyev on 10/11/2010 as the type, their collection date and number are different from that in G-BOIS and, therefore, they cannot be recognized as part of the type collection.

Aethionema stenopterum Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 192. 1842.

Type: "[Aucher-Eloy] N. 341, Akdagh; 4129, Persia".

Lectotypus (first step designated by Al-Shehbaz in Moazzeni et al., 2018: 258; second step designated here): **Iran:** "Ispahan", s.d., *Aucher-Eloy 4129* (P [P00432260]; isolecto-: G [G00002108], G-BOIS [G00154001], P [P01817632]). **Syntypus: Turkey:** "Ak Dagh", s.d., *Aucher-Eloy 341* (G [G00002107], K [K000618646], P [P00428093, P01817633]).

Notes. – Label of the G-BOIS isolectotype was handwritten by Boissier, and its fragmentary flowering branch taken from P00432260 that Boissier annotated.

The species epithet is named after the fruiting material on the P specimen above. Al-Shehbaz (in Moazzeni et al., 2018) selected *Aucher-Eloy 4129* as the lectotype collection, but he designated the G-BOIS rather than the P fruiting specimen as the lectotype. That erroneous handling is corrected here by a second-step lectotypification.

As noted by Hedge (1968: 106), the syntype *(Aucher-Eloy 341)* was cited by Boissier (1867a: 346), under *A. thesiifolium* instead of *A. stenopterum*.

Hedge (1968: 103, 106) separated *Aethionema stenopterum* from *A. virgatum* solely by having style exserted vs included or subequalling the apical fruit sinus, but that difference alone is tenuous at best, and further morphological studies are needed to separate these two species which are clearly unrelated based on molecular phylogenetic studies by Mohammadin et al. (2017).

Aethionema thesiifolium Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. 8: 44. 1849.

Type: "Hab. in saxosis montis *Olklatschi* propè *Egirdir* in *Pisidiâ.* (Heldr.)".

Holotypus: Turkey: "Rocailles du Mt. Olklatschi près de la ville d'Egirdir au bord du lac", 1.VI.1845, *Heldreich 782* (G-BOIS [G00154007]; iso-: BM [BM000883384], E [E00048962], G [G00002119, G00002120], K [K000075774, K000075775], KW [KW000127951], P [P05434378], W [W0005556, W18890026321]).

Notes. – The G-BOIS holotype is a collection folder of two sheets, of which sheet 1 has a barcode and the original label handwritten in French by Heldreich and carrying the field number *782,* whereas sheet 2 is not barcoded, unnumbered, and has a printed, handwritten label in Latin by Boissier ("in saxosis montis Olklatschi suprà Egirdir, Jun. 1845") and distributed as in the other isotypes.

Furthermore, label of the W0005556 isotype was mimeographed by Boissier, whereas that of W18890026321 was written by Heldreich, but none of these duplicates was examined by Boissier.

Aethionema grandiflorum Boiss. & Hohen. in Boiss., Diagn. Pl. Orient. 8: 42. 1849 (Fig. 26F, p. 118).

Type: "Hab. in fauce *Schirdere* montis *Elbrus* Kotschy No 181".

Holotypus: Iran: "In fauce Schir Dere in m. Elbrus pr. Derbend", 21.V.1843, *Kotschy 181* (G-BOIS [G00330700]; iso-: B [B100157890], BM [BM000582594], FI [FI005697], G [G00002093, G00002094], GOET [GOET002671], H [H1349929], K [K000075768, K000484185], KW [KW000127948], LE [LE00012842], MICH [MICH1199201], P [P00432497, P00432500, P01817618, P01817619], W [W0005558, W0005559], WAG [WAG0000788], WU [WU0044250]).

Notes. – The holotype is a collection folder of two sheets, of which the barcoded one has the locality, date, and collection number handwritten, and the other has a printed label.

It was the only material studied by Boissier and, therefore, there was no need to lectotypify the name as done by Al-Shehbaz in Moazzeni et al. (2018: 253).

Aethionema grandiflorum var. *parviflorum* Boiss., Diagn. Pl. Orient. 8: 43. 1849.

Type: "Hab. in *Persiâ* Aucher No 342 et 4129A, in monte *Elbrus* propè *Asadbar* Kotschy No 455".

Lectotypus (designated here): Iran: *sine loco,* s.d., *Aucher-Eloy 342* (G-BOIS [G00332549]; isolecto-: K [K000618644], P [P00432313, P05434431]). **Syntypi:** Iran: *sine loco,* s.d., *Aucher-Eloy 4129A* (G [G00446257], G-BOIS [G00332550], K [K000618645], P [P00432312, P0534429]); "Prope pagum Asadbar in partibus occidentalibus m. Elbrus", 8.VII.1842, *Kotschy 455* (G-BOIS [G00332551], LE [LE00012843]).

= ***Aethionema grandiflorum*** Boiss. & Hohen. in Boiss., Diagn. Pl. Orient. 8: 42. 1849.

Note. – Boissier (1867a: 346) reduced this variety to synonymy of *Aethionema pulchellum,* under which he listed all three syntypes above.

Aethionema pulchellum Boiss. & A. Huet in Boiss., Diagn. Pl. Orient. ser. 2, 5: 43. 1856.

Type: "Hab. in incultis propè *Erzeroum* secùs viam quae ad Persiam ducit".

Lectotypus (designated by Al-Shehbaz in Moazzeni et al., 2018: 254): Turkey: "In incultis vice Persicae 2 h. Erzeroum", VI.1853, *Huet du Pavillon s.n.* (G-BOIS [G00332552]; isolecto-: JE [JE00007934]). **Syntypus:** Turkey: "Circà Erzeroum", 6000'–6500' [1830–1980 m], VII.1853, *Huet du Pavillon s.n.* (FI [FI005698], K [K000075773, K000075783], LE [LE00012844], P [P00432289, P00580381, P05434432], W [W18890026319]).

= ***Aethionema grandiflorum*** Boiss. & Hohen. in Boiss., Diagn. Pl. Orient. 8: 42. 1849.

Notes. – The lectotype is a collection folder of two sheets one of which was labeled "Armenia. Huet.". No other duplicates of the type collection were found among the Huet du Pavillon herbarium that was incorporated in the Geneva herbaria.

All of the above syntypes were most likely collected near the type locality but in July rather than June of the same year.

Aethionema armenum Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 191. 1842 (Fig. 29A, p. 121).

Type: "[Aucher-Eloy] N. 344, montes Armeniae".

Holotypus: Turkey: "In Mte. Armenia", s.d., *Aucher-Eloy 344* (G-BOIS [G00154002]; iso-: BM [BM000582601], FI [FI010158], G [G0002076, G00002077], K [K000075786], MO [MO1619007], P [P00428094, P01817607]).

Note. – Boissier based his species description on the G-BOIS unicate alone.

Aethionema schistosum Boiss. & Kotschy in Boiss., Diagn. Pl. Orient. ser. 2, 5: 42. 1856.

Type: "Hab. in schistosis Tauri Cilicici cl. Kotschy".

Neotypus (designated here): Turkey: "Partie inférieure de la vallée de Kar-Boghas, entre Gulet-Boghas et la partie la plus élevée du Taurus oriental", 28.VII.1855, *Balansa 189* (G-BOIS [G00797343]; isoneo-: G [G00414303], P [P00432272, P05434356]) (Fig. 28, p. 120).

Notes. – Not a single Kotschy specimen of the very distinctive *A. schistosum* was found in the Geneva herbaria. Such specimen, if existed, may have been misplaced, lost, or seen elsewhere.

The species folder in G-BOIS has two specimens, of which one was collected by Haussknecht in 1865, nine years after the publication of the species. The second was collected by Balansa in Taurus Cilicici on 28 July 1855, at least 13–14 months before the publication date of *A. schistosum*. It is rather puzzling why Boissier (1856) did not cite Balansa's collection, though he cited it in *Flora Orientalis* along with the collections of Haussknecht and Kotschy. It would be an important find if Kotschy's specimen is discovered. However, in its absence, the best way to preserve the correct interpretation of the species limits is to designate a neotype. In our opinion, the best choice is Balansa's collection, which was examined by Boissier, and it is represented by four duplicates one each at G and G-BOIS and a pair in P.

Balansa's duplicate P05434356 is a mixed collection with Haussknecht's 1865 gathering annotated by Boissier and initially part of Bunge's herbarium.

Locality of the P duplicates is "Région sous-alpine du Taurus, au nord du défilé des Portes Ciliciennes". Except for the neotype, which has the collection number *Balansa 189,* the isoneotypes have *Balansa s.n.*

Aethionema capitatum Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 5: 43. 1856.

Type: "Hab. ad rupes quibus insidet castellum dirutum *Pylarum Ciliciarum*. Fructiferum fine Junii legit cl. Balansa".

Holotypus: Turkey: "Rochers de la montagne où est situé le chateau en ruine dominant le défilé des Portes Ciliciennes, à 10 lieues au nord de Tarsous", 27.VI.1855, *Balansa 190* (G-BOIS [G00156033]; iso-: BM [BM000582605], E [E00201001], FI [FI005691], G [G00002083], GOET [GOET002668], JE [JE00010991], K [K000075764, K000075765, K000075766], KW [KW000127949], P [P00428110, P01817609, P01817610], W [W0005568, W18890076131], WAG [WAG0004256, WAG0004257]).

Notes. – The name needs no lectotypification because Boissier based the species description solely on the material in G-BOIS.

All the isotypes have printed labels with slightly modified text from the original: "Rochers du château en ruine dominant le défilé des Portes Ciliciennes, à 10 lieues au N. de Tarsous. 27 juin. 1855. Balansa 440".

The locality given in the protologue differs from that of the holotype or isotypes sheets. However, Hedge (1965) gave a "hybrid" label information half of it "Ad rupes quibus insidet castellum dirutum Pylarum Ciliciarum" was taken from the original protologue, and the other half "27 vi 1855, *Balansa* 440" was copied from the isotype printed label.

The G00002083 isotype is a collection folder of two sheets one of which is unlabeled.

Aethionema lignosum Boiss. & Hausskn. in Boiss., Fl. Orient. 1: 348. 1867.

Type: "Hab. in summo monte Berytdagh Cataoniae in rupestribus alt. 8000'–9000' (Haussk!)".

Lectotypus (designated here): **Turkey:** "In rup. Berytdagh. Taurus Cataonicus", 9000' [2740 m], 10.VIII.1865, *Haussknecht s.n.* (G-BOIS [G00330701]; isolecto-: B [B100157876], BM [BM000883517], G [G00002085], JE [JE00010965], P [P00432314], W [W0005569, W18890312712]).

= ***Aethionema capitatum*** Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 5: 43. 1856.

Note. – In addtition to the duplicate in his berbarium, Boissier examined and annotated JE00010965 and, therefore, the name needs lectotypification.

Aethionema speciosum Boiss. & A. Huet in Boiss., Diagn. Pl. Orient. ser. 2, 5: 44. 1856.

Type: "Hab. in Armeniâ inter *Gumuchhané* et *Zazalarhané* et propè *Erzeroum* cl. Huet du Pavillon. Fl. Maio. Fr. Jun.".

Lectotypus (designated here): **Turkey:** "Inter Gumuchané et Zazalarhanée", V.1853, *Huet du Pavillon s.n.* (G-BOIS [G00154003]; isolecto-: G [G00002109, G00002110], JE [JE00010977, JE00010979], K [K000484191, K000484193], P [P00432267, P01817622]). **Syntypus: Turkey:** "Circa Erzeroum", 6000'–6200' [1830–1890 m], VI.1853, *Huet du Pavillon s.n.* (FI [FI005692], G [G00002111, G00002112], G-BOIS [G00154004], K [K000484195, K000484196], P [P00432265, P00432277]).

Notes. – By missing "et" before "circa Erzeroum" in citing the exact protologue, Hedge (1965: 322) was likely left with the impression that a single collection of May 1853 was involved. The Geneva herbaria have three duplicates of each syntype collection, and none of these six duplicates was annotated by Hedge.

The labels of the isolectotypes have: "Prope Zazalarhané. Inter Baibut et Erzeroum, 5–6000', Mai 1853, A. Huet du Pavillon" indicated.

The original handwritten labels by Huet in the G-BOIS herbarium are somewhat different from the partially printed type labels for material distributed as exsiccatae, as well as those in Huet herbarium G00002109 and G00002111.

Aethionema subulatum (Boiss. & Heldr.) Boiss., Fl. Orient. 1: 349. 1867.

≡ *Eunomia subulata* Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. 8: 42. 1849.

Type: "Hab. in parte occidentali montis *Gheidagh* Tauri Isaurici alt. 6000' (Heldreich). Fl. Julio".

Holotypus: Turkey: "Taurus: Mt. Gheï-Dagh partie occident.", 6000' [1830 m], 9.VII.1845, *Heldreich 1047* (G-BOIS [G00332554]; iso-: B [B100157989]).

Note. – Only the above two specimens were found in the major herbaria consulted, Boissier did not examine the duplicate at B.

Aethionema lacerum Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 5: 45. 1856.

Type: "Hab. in rupestribus partis superioris *Pylarum Ciliciarum* Tauri cl. Balansa, fl. et fr. ineunte Julio".

Holotypus: Turkey: "Rochers de la partie supérieure du défilé des Portes Ciliciennes, au nord de Tarsous", 1.VII.1855, *Balansa 187* (G-BOIS [G00154005]; iso-: BM [BM000883343], E [E00061097, E00061098], G [G00002115, G00002116], K [K000484198, K000484199], MPU [MPU013480], P [P00432315, P01817621]).

= ***Aethionema stylosum*** DC., Syst. Nat. 2: 562. 1821.

Note. – The isotypes have a printed, handwritten label: "Défilé des portes Ciliciennes. 1er Juillet 1855. B. Balansa".

Aethionema fimbriatum Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 193. 1842 (Fig. 29B, p. 121).

Type: "[Aucher-Eloy] N. 4128, Aderbidjan".

Lectotypus (designated by Al-Shehbaz in Moazzeni et al., 2018: 253): **Iran:** "Aderbidjan", s.d., *Aucher-Eloy 4128* (G-BOIS [G00330699]; isolecto-: BM [BM000582597], E [E00201073], G [G00002089, G00002090], K [K000075763], KW [KW000127950], LE [LE01039436], MO [MO1619144], P [P00428153, P01817615, P01817616], W [W0005562, W18890077583]).

Note. – Boissier annotated P00428153, and this means that he based the species description on that specimen and duplicate in his herbarium. Therefore, lectotypification of the name is needed.

Aethionema schizopterum Boiss. & Hausskn. in Boiss., Fl. Orient. Suppl.: 60. 1888.

Type: "Hab. in rupestribus calcareis montium Avroman et Schahu Kurdistaniae Persicae (Haussk.!)".

Holotypus: Iran: "In rupestr. calc. m. Avroman & Schahu", VII.1867, *Haussknecht 107* (G-BOIS [G00330702]; iso-: JE [JE00007936, JE00007937, JE00007938], K [K000484200, K000484201]).

= ***Aethionema fimbriatum*** Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 193. 1842.

Notes. – The holotype is a collection folder of three sheets: sheet 1 of 3 is barcoded and has a handwritten label by Haussknecht as given above in the quotation phrase, plus a printed label indicating "Haussknecht It. Orient. Montes Avroman et Schahu. Jul.-1867". Sheet 2 of 3 has a label with printed information as in sheet 1. Sheet 3 of 3 has a packet with the collection number *107* and Boissier's handwriting that reads "Avroman et Schahu".

The K duplicates do not have the collection number, but their printed label is the same as that of the holotype.

Aethionema cardiophyllum Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. 8: 43. 1849.

Type: "Hab. in montibus tophaceis suprà urbem *Bouldour* Pisidiae rarum (Heldreich)".

Holotypus: Turkey: "Bouldour. Montagnes de tuffe blanche à 1 lieue au dessus de la ville", 24.V.1845, *Heldreich 707* (G-BOIS [G00330694]; iso-: BM [BM000883357], E [E00374320], G [G00002087, G00002088, G00446266], K [K000075762], KW [KW000127946], LE [LE00012840], P [P5434756]).

= ***Aethionema cordatum*** (Desf.) Boiss., Fl. Orient. 1: 350. 1867.

Notes. – The isotypes have printed, handwritten labels by Boissier and read "In montibus tophaceis ad Bouldour", and lack the day and collection number.

Because Boissier examined only the unicate in his herbarium in drafting the species description, that specimen is the holotype. There was no need to lectotypify the name as done by Dorofeyev (2012: 463) who recognized *A. cardiophyllum* as a distinct species and designated its lectotype based on the LE duplicate that was neither examined nor annotated by Boissier.

Aethionema cardiophyllum var. *edentulatum* Boiss. & A. Huet in Boiss., Diagn. Pl. Orient. ser. 2, 5: 45. 1856.

Type: "Hab. propè *Tortoum* Armeniae cl. Huet du Pavillon".

Holotypus: Turkey: "Prope Tortoum", VI.1853, *Huet du Pavillon s.n.* (G-BOIS [G00332555]; iso-: BM [BM000883356], K [K000075785]).

= ***Aethionema cordatum*** (Desf.) Boiss., Fl. Orient. 1: 350. 1867.

Note. – This varietal name was not mentioned in Boissier (1867a, 1888).

Aethionema cordatum var. *pichleri* Boiss., Fl. Orient. Suppl.: 61. 1888.

Type: "Hab. in summis Olympi Bithyni ad latus meridionale (Pichler!)".

Lectotypus (designated here): **Turkey:** "Bythinien. Auf den südliche Abhange des Mte. Olymp, bei Brussa", VI.1874, *Pichler s.n.* (G-BOIS [G00330696]). **Syntypi: Turkey:** "Auf steinigen Abhängen des Südseite am Mte. Olymp.", VI.1874, *Pichler s.n.* (G-BOIS [G00330695]); "Auf den höchsten Jöchern des Mte Olymp bei Brussa", VII.1873, *Pichler 232* (G-BOIS [G00330697]).

= ***Aethionema cordatum*** (Desf.) Boiss., Fl. Orient. 1: 350. 1867.

Note. – All three G-BOIS specimens have handwritten labels by Pichler in German, and although they differ in their exact locality data from the protologue, they were the only material studied by Boissier in his description of the variety, and a lectotype is designated from one of them.

Aethionema salmasium Boiss., Fl. Orient. 1: 350. 1867.

Type: "Hab. in saxosis ad pagum Temer ditionis Salmas prov. Aderbidjan Persiae (Szow!)".

Holotypus: Iran: "In elatis saxonum ad pagum Temer Distr. Salmas Prov. Aderbeidzan", 23.IV.1828, *Szovits 120* (G-BOIS [G00332556]; iso-: LE [LE00012850, LE00012851]).

= ***Noccaea trinervia*** (DC.) Steud., Nomencl. Bot. ed. 2, 2: 197. 1841.

Notes. – The designation of LE00012851 by Dorofeyev (2012: 462) as the lectotype is rejected because Boissier based the species description solely on the G-BOIS specimen.

Labels of B100157855, CM0660, GH00018396, and K000484177 have the locality as Armenia plus the collector name. As in type collections of other species by Szovits from Azerbaijan, such brief labels are common, and the above four duplicates may also belong to the type collection of *Aethionema salmasium*.

Aethionema moricandianum (Boiss.) Boiss., Fl. Orient. 1: 351. 1867.

≡ *Eunomia moricandiana* Boiss., Diagn. Pl. Orient. 5: 83. 1844.

Type: "Hab. in *Cariae* montibus ubi aestate 1843 detexit Ch. Pinard".

Holotypus: Turkey: "Caria", 1843, *Pinard s.n.* (G-BOIS [G00330705]; iso-: BM [BM000883360], G [G00002091, G00002092, G00446267], K [K000484203, K000484204]).

= ***Aethionema cordatum*** (Desf.) Boiss., Fl. Orient. 1: 350. 1867.

Note. – Boissier based the species description solely on G00330705 and did not examine the other duplicates at G or K. Therefore, the designation by Al-Shehbaz in Moazzeni et al. (2018: 250) of the G-BOIS duplicate as a lectotype was unnecessary.

Aethionema iberideum (Boiss.) Boiss., Fl. Orient. 1: 351. 1867.

≡ ***Eunomia iberidea*** Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 191. 1842 (Fig. 29C, p. 121).

Type: "[Aucher-Eloy] N. 345, Olympus Bithynus".

Holotypus: Turkey: "Olympus Bithynia", s.d., *Aucher-Eloy 345* (G-BOIS [G00330704]; iso-: E [E00199978], G [G00002095, G00002096], K [K000075761], P [P00432483, P01817620]).

Note. – Boissier based his species description on the unicate in his herbarium and did not annotate any of the duplicates at G.

Aethionema creticum Boiss. & Heldr. in Boiss., Fl. Orient. Suppl.: 61. 1888.

≡ ***Aethionema saxatile*** subsp. ***creticum*** (Boiss. & Heldr.) Andersson et al. in Willdenowia 13: 18. 1983.

Type: "Hab. in rupestribus montium Sphacioticorum Cretae supra Askyphous 3–4000' (Heldr.!) et in montibus

Lakous (Reverch.!), in Anatoliâ (Auch. 343!), in monte Kalolamni insulae Karpathos (Pichl.!)".

Lectotypus (designated by Andersson et al., 1983: 18): **Greece:** "in rupestribus montium Sphacioticorum supra Askyphous", 3000'–4000' [910–1220 m], 3.IV.1846, *Heldreich 1371* (G-BOIS [G00332557]; isolecto-: E [E00199891], G [G00002102, G00002103], K [K000484172, K000484173], W [W0005566, W0005567], WU [WU0044162]). **Syntypi: Greece:** "Plantes de Crête. Montagnes de Lakous", 1.VI.1883, *Reverchon s.n.* (G-BOIS [G00797221]); "in insula Karpatos. Monte Kalolimni", 18.V.1883, *Pichler 59* (G-BOIS [G00797222]). **Turkey:** *sine loco,* s.d., *Aucher-Eloy 343* (G-BOIS [G00797220], K [K000618649]).

Note. – The lectotype has a handwritten label by Heldreich. The isolectotypes have printed handwritten label by Boissier "Aethionema saxatile var. ovalifolium DC. Creta in rupestribus Sphaciot. supra Askyphous 4000'. Apr. 1846. De Heldreich" without collection number.

Aethionema graecum Boiss. & Spruner in Boiss., Diagn. Pl. Orient. 6: 16. 1846.

≡ ***Aethionema saxatile*** subsp. ***graecum*** (Boiss. & Spruner) Hayek in Repert. Spec. Nov. Regni Veg. Beih. 30(1): 472. 1925.

Type: "Hab. in collibus calcareis *Graeciae, Pentelici* et *Hymetti* prope *Athenas*, montis *Parnes Atticae Argolidis*. Spruner".

Lectotypus (designated by Andersson et al., 1983: 17): **Greece:** "Pentelicon", 1841, *Spruner s.n.* (G-BOIS [G00332558]; isolecto-: G [G00002104], W [W0005560, W0005561]). **Syntypus: Greece:** "Parnes", s.d., *Spruner s.n.* (BM [BM000556337], K [K000484174]).

Note. – This and the preceding entry belong to the highly variable and most widespread perennial *A. saxatile.* Critical, population-based molecular and morphological studies are needed to entangle the complexity of the species.

Aethionema campylopterum Boiss., Fl. Orient. 1: 353. 1867 [nom. illeg.].

≡ *Campyloptera syriaca* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 194. 1842.

≡ ***Aethionema syriacum*** (Boiss.) Bornm. in Beih. Bot. Centralbl., Abt. 2, 28: 120. 1911 (Fig. 29D, p. 121).

Type: "Hab. in agris Syriae (Auch. exs. 339!), ad Aleppo et Aintab (Haussk!)".

Holotypus: Syria: *sine loco,* s.d., *Aucher-Eloy 339* (G-BOIS [G00154006]; iso-: BM [BM000582590], G [G00002117], K [K000075760], MO [MO1619145], P [P00428104]).

Notes. – *Aethionema campylopterum* is illegitimate because Boissier in *Flora Orientalis* listed the earlier published *Campyloptera syriaca* Boiss. as a synonym.

Boissier based the species description solely on the unicate in his herbarium, and he did not examine or annotate the duplicates in G or P (see Boissier, 1841a).

Lepidium L., Sp. Pl.: 643. 1753.

Tribe: *Lepidieae* DC.

Notes. – *Lepidium* is third largest genus in the *Brassicaceae* after *Draba* and *Erysimum,* with 259 species represented by native taxa on all continents except Antarctica.

Based on extensive developmental and molecular phylogenetic studies (e.g., Bowman et al., 1999; Mummenhoff et al., 2001, 2004, 2009), *Lepidium* was expanded by Al-Shehbaz et al. (2002), Al-Shehbaz (2003), and Al-Shehbaz & Mummenhoff (2010) to include *Cardaria* Desv., *Coronopus* Zinn, *Hymenophysa* C.A. Mey., *Stroganowia* Kar. & Kir., *Stubendorffia* Schrenk ex Fish., and *Winklera* Regel.

Lepidium aucheri Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 195. 1842.

Type: "[Aucher-Eloy] N. 319, Bagdad; 4142, Persia australis".

Lectotypus (first step designated by Dorofeyev, 2012: 467; second step designated here): **Iraq:** "Bagdad", s.d., *Aucher-Eloy 319* (G-BOIS [G00150393]; isolecto-: BM [BM000946193], G [G00096401, G00096402, G00096403], K [K000654400], LE, P [P53356151, P053356153]). **Syntypus: Iran:** "ad Oras Pers. austr.", s.d., *Aucher-Eloy 4142* (BM [BM000593539, BM000593540], G [G00096404, G00096405], G-BOIS [G00150394], K [K000653999], KW [KW000128000], MO [MO1617334], P [P053356150, P53356155], W [W0075837]).

Note. – Dorofeyev (2012: 467) selected *Aucher-Eloy 319* from the two original syntypes in the protologue, but he designated the LE duplicate as the lectotype. However, Boissier based the species description solely on the two duplicate syntypes in his herbarium and did not examine or annotate the LE specimen. Therefore, a second-step designation is proposed here to correct the lectotypification from LE to G-BOIS.

Lepidium nebrodense var. *microstylum* (Boiss. & Heldr.) Boiss., Fl. Orient. Suppl.: 62. 1888.

≡ *Lepidium microstylum* Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. ser. 2, 6: 21. 1859.

Type: "Hab. in regione superiori *Sympetherico* montis *Veluchi Aetoliae* cl. Samaritani et Guicciardi".

Holotypus: Greece: "m. Veluchi – in reg. super. (Sympetterico)", 3.VIII.1857, *Samaritani & Guicciardi 3352* (G-BOIS [G00332560]).

= ***Lepidium hirtum*** subsp. ***nebrodense*** (Raf.) Thell. in Vierteljahrsschr. Naturf. Ges. Zürich 51: 154. 1906.

Notes. – Boissier based the species description solely on the unicate in G-BOIS.

No duplicates of the type collection have been found in any of the major herbaria consulted.

Lepidium propinquum var. *auriculatum* Boiss., Fl. Orient. 1: 357. 1867.

Type: "Hab. in lapidosis humidis Armeniae ad Koschadara (Szow!)".

Holotypus: Azerbaijan: "In lapidosis secus rivulos Kotschadara", 18.VII.1829, *Szovits 537* (G-BOIS [G00330475]; iso-: LE, P [P05444762]).

= ***Lepidium chalepense*** L., Cent. Pl. 2: 23. 1756.

Notes. – The holotype is a collection folder of two sheets, of which one is unlabeled but with the same collection number. The P duplicate has the collector as *Szovits s.n.*

Thellung (1906b: 89) recognized one of the holotype sheets as *Lepidium draba* var. *auriculatum* (Boiss.) Thell., and he annotated the other as var. *propinquum*. By contrast, Mulligan & Frankton (1962: 1425) transferred var. *auriculatum* to *Cardaria propinqua* (Fisch. & Mey.) N. Busch, though they did not typify it.

Except for the presence of minute auricles on the cauline leaves, in nearly all other aspects, the plant is more at home in *Lepidium propinquum,* though the latter species has no auricles at all. Perhaps the taxon should be maintained infraspecific taxon of this species, as originally described by Boissier in *Flora Orientalis,* but the lack of sufficient material for this study prevented accepting such assignments.

Lepidium erinaceum Boiss., Diagn. Pl. Orient. 6: 17. 1846.

≡ ***Aethionema erinaceum*** (Boiss.) Khosravi & Mumm. in Nordic J. Bot. 26: 29. 2008.

Type: "Hab. in alpe *Kuh-Daëna* Persiae australis Kotschy No. 701".

Holotypus: Iran: "In alpe Kuh-Daëna", 20.VII.1842, *Kotschy 701* (G-BOIS [G00154026]; iso-: B [B100241671], BM [BM001172147], CAS [CAS00123206], E [E00077261], FI [FI005689], K [K000642707], KW [KW000127997], LE, MO [MO1926529], P [P05330964, P05330965, P05330966], PR [PR375027], PRC [PRC455628], W [W18890020395], WAG [WAG0004278], WU [WU0059756, WU0101802], Z [Z00078596]).

Notes. – The isotypes have printed label with same information as in the holotype but with phrase "Habitu siliculisque lineari-oblongis distinct species".

Thellung (1906a) placed *Lepidium erinaceum* in a monospecific *Acanthocardamum* Thell., where it remained accepted by all subsequent works, including Hedge (1968), Appel & Al-Shehbaz (2003), and Al-Shehbaz et al. (2006). However, Khosravi et al. (2008a) have established beyond a doubt that the species is perfectly nested within *Aethionema*. Their listing of the holotype in G-BOIS is correct because Boissier based the species description on that specimen alone.

Lepidium crassifolium var. *ramosissimum* Boiss., Fl. Orient. 1: 358. 1867.

Type: "Hab. in inundatis salsis Anatoliae prope Koniah (Heldr!)".

Lectotypus (designated here): **Turkey:** "In salsis hieme inundatis planitiei Koniah", VII.1845, *Heldreich s.n.* (G-BOIS [G00332561]; isolecto-: G [G00446258, G00446259, G00446611], K [K000642708], LE, W). **Syntypus: Turkey:** "Plaine de Koniah, entre Koniah et le Karadagh, lieux salés et inondés en hiver", 18.VI.1845, *Heldreich 907* (G-BOIS [G00332332]).

= ***Lepidium cartilagineum*** (J. Mayer) Thell. in Vierteljahrsschr. Naturf. Ges. Zürich 51:173. 1906.

Notes. – Boissier in *Flora Orientalis* did not specify the collection date, though labels of all isolectotypes above give July. Therefore, the unicate collected in June is recognized here as a syntype.

The status of this and following two entries are discussed under *L. pumilum*.

Lepidium crassifolium var. *dentatum* Boiss., Diagn. Pl. Orient. ser. 2, 6: 22. 1859.

Type: "Hab. in pratis salsis ad occidentem urbis *Caesareae* sitis cl. Balansa, in pascuis salsis circà *Van Armeniae* cl. Noë".

Lectotypus (designated here): **Turkey:** "Van in pascuis", IV.1849, *Noë 176* (G-BOIS [G00332562]). **Syntypi: Turkey:** "Van. Auf sandigen Triften", V.1849, *Noë 219* (G-BOIS [G00332563]); "Bords des marais salés. Marais situés à l'ouest de Césarée", 1107 m, VII.1856, *Balansa 447* (G-BOIS [G00332564]).

= ***Lepidium cartilagineum*** (J. Mayer) Thell. in Vierteljahrsschr. Naturf. Ges. Zürich 51:173. 1906.

Note. – See discussion under *L. pumilum.*

Lepidium cartilagineum subsp. ***crenatifolium*** (Boiss. & Balansa) Al-Shehbaz, **comb. et stat. nov.**

≡ *Lepidium crenatifolium* Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 6: 22. 1859.

Type: "Hab. ad marginem paludum salsarum *Cappadociae* circà *Kara-hissar* alt. 1200 metr. Floret aestate".

Holotypus: Turkey: "Plaine de Kara-Hissar (Cappadoce)", c. 1200 m, 18.VI.1856, *Balansa s.n.* (G-BOIS [G00332565]).

Notes. – This taxon is by far one of the most distinctive variants of the *L. cartilagineum* complex, and its unique feature is the coarsely crenate leaves.

Thellung (1906b: 155) recognized this taxon as a variety, just as he did for the preceding and following entries, though it merits the subspecific rank.

Lepidium pumilum Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 6: 21. 1859.

Type: "Hab. in salsis ad margines paludum ad occidentem *Caesareae* sitarum alt. 1000 metr. cl. Balansa qui legit fructiferam Sept. 1856".

Holotypus: Turkey: "Terrains salés. – Bords des marais situés à l'ouest de Césarée (Cappadoce)", c. 1107 m, 23.VII.1856, *Balansa 448* (G-BOIS [G00150395]; iso-: BM [BM001172145], FI [FI005690], G [G00446260, G00446261], JE [JE00005905], K [K000642709, K000642710], P [P05444741, P05444743, P05444744], W [W18890019374, W18890069354], ZT [ZT00078598, ZT00078599]) (Fig. 30, p. 122).

Notes. – The holotype has a handwritten label by Balansa with the field number *448*. The labels of the isotypes have printed, handwritten label by Balansa "Prés salés situés au NO de Césarée (Cappadoce), à 1100 mètr. d'alt." with the exsiccatae number *999*.

This and the previous three entries belong to the *Lepidium cartilagineum* complex in which a total of 20 species and infraspecific taxa have been described by various authors. No single treatment has been satisfactory, and thorough molecular phylogenetic studies, coupled with a critical re-evaluation of morphology in light of molecular data, are needed to determine the status of every specific and infraspecific taxon recognized in this complex. Thellung (1906b) provided the latest and most comprehensive treatment of the complex, and he divided *L. cartilagineum* into two subspecies, of which only subsp. *cartilagineum* was further divided into five varieties and four forms.

Lepidium cartilagineum subsp. *caespitosum* (Desv.) Thell. is by far the most distinctive, and it differs from subsp. *cartilagineum* by having caudex branches densely covered with leaf remains of previous seasons (vs naked caudices), narrowly linear to filiform (vs suborbicular, broadly ovate, elliptic, or lanceolate) basal leaves, non-auriculate, linear (vs frequently auriculate, variously shaped) cauline leaves, sepals 2.5–3 (vs 1–1.5) mm long, and fruit 4–5 (vs 2–3.5) mm long. In our opinion, these are well-defined taxa, and *L. caespitosum* Desv. ought to be maintained as a distinct species.

The rest of the complex was treated by Thellung (1906b) as *Lepidium cartilagineum* subsp. *crassifolium* (Waldst. & Kit.) Thell., and it included the type of *L. cartilagineum*. Therefore, it should be recognized it as subsp. *cartilagineum,* just as more recently done by Hedge (1968: 67), but not as Hedge (1965: 283), where he followed Thellung.

In addition to the variation in basal- and cauline-leaf morphology and development of auricles on uppermost cauline leaves, plants of this complex can be quite variable in height and the degree of branching, and only three taxa are consistently recognizable here. The subsp. *cartilagineum* is the most widespread (Asian Turkey, Caucasus, W Russia, Iran, Afghanistan, Pakistan), and the bulk of its range falls within the *Flora Orientalis* area. It consists of robust plants often (15–)18–35 cm tall, entire, or rarely obscurely dentate and basally cuneate basal leaves, and sagittate to amplexicaul or cordate upper cauline leaves.

By contrast, subsp. *crenatifolium* (endemic to central Turkey) has orbicular to broadly ovate basal leaves with truncate base and prominently crenate margin, and rather small cauline leaves with poorly developed auricles. Boissier in *Flora Orientalis* maintained this taxon as a distinct species, Thellung (1906b) reduced it to a variety of *L. cartilagineum,* and it is maintained here as a subspecies of the latter species. Finally, *L. pumilum* (Crimea, central Turkey, Iran) is a small plant 6–12(–15) cm tall,

with lanceolate, entire, and basally cuneate to attenuate basal leaves, and narrowly lanceolate to linear and exauriculate or very rarely minutely auriculate uppermost cauline leaves. It can easily be distinguished from the other members of the *L. cartilagineum* complex, and Boissier in *Flora Orientalis* is followed in recognizing it as a distinct species.

By contrast, Thellung (1906b) treated *L. pumilum* as a variety of *L. cartilagineum* subsp. *crassifolium* (Waldst. & Kit.) Thell., Hedge (1965) reduced it to synonymy of subsp. *cartilagineum,* and then Hedge (1968) and BrassiBase (2019) accepted it as *L. cartilagineum* subsp. *pumilum* (Boiss. & Balansa) Hedge.

Lepidium affghanum Boiss., Fl. Orient. 1: 358. 1867.

Type: "Hab. ad Keratkuh inter Herat et Tebes ubi specimen unicum legit cl. Bunge".

Holotypus: Iran: "inter Herat et Tebes. Kerat-Kuh", X–XI.1858, *Bunge 36* (P [P05356212]) (Fig. 31, p. 123).

Notes. – No specimens were located in the Geneva herbaria, and the unicate P05356212 was annotated by Boissier. It has to be taken as the holotype because no duplicates were seen elsewhere in any of the major herbaria consulted. If such exist, then it is still highly unlikely that Boissier examined them.

Hedge (1968: 121), who treated the species as *Stroganowia affghana* (Boiss.) Pavlov, indicated that the type is at G even though it did not exist in the first place.

Lepidium coronopifolium var. *aucherianum* Boiss., Fl. Orient. 1: 360. 1867.

Type: "Hab. in prov. Aderbidjan Persiae (Auch. exs. 4169 M!)".

Holotypus: Iran: "Aderbidjan", s.d., *Aucher-Eloy 4169M* (G-BOIS [G00332566]; iso-: BM [BM001172146]).

= ***Lepidium persicum*** Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 196. 1842.

Note. – Although described from Azerbaijan in Iran, this taxon was not accounted for in *Flora Iranica* (Hedge, 1968). However, Thellung (1906b: 168) reduced it to synonymy of the highly heterogenous *L. lyratum* L. in which he included the very distinctive *L. persicum.*

Lepidium persicum Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 196. 1842.

Type: "[Aucher-Eloy] N. 321 et 4141, montes ad Ispahan".

Lectotypus (first step designated by Dorofeyev, 2008: 1966; second step designated here): **Iran:** "Ispahan", s.d., *Aucher-Eloy 4141* (G-BOIS [G00150396]; isolecto-: G [G00096406, G00096407], K [K000642711], KW [KW000127998], LE, P [P05444613, P05444614, P05444616, P05444644, P05444645, P05444646], W [W0024182]). **Syntypus: Iran:** "in Mte. ad Ispahan", s.d., *Aucher-Eloy 321* (G [G00096408, G00446262], G-BOIS [G00150397], K [K000642712], P [P05444618, P05444647]).

Notes. – Dorofeyev's (2008: 1966) lectotypification based on the LE duplicate is considered partial and corrected here by designating the G-BOIS as the lectotype because Boissier based the species description solely on the two specimens in his herbarium and did not examine or annotate any of the other duplicates cited above.

Hedge (1968: 70) listed two collections, Buhse's from N Iran and Griffith's from Afghanistan, as syntypes, but these were listed in Boissier (1867a), not in the original publication (Boissier, 1842b).

Lepidium pichleri Boiss., Fl. Orient. Suppl.: 63. 1888.

Type: "Hab. in Persiâ loco non notato, unde semina attulit cl. Pichler!".

Holotypus: Iran: "Cult Valeyres", 1883, *Pichler s.n.* (G-BOIS [G00332567]).

= ***Lepidium vesicarium*** L., Sp. Pl.: 643. 1753.

Notes. – The holotype is a collection folder of two sheets of which one is unlabeled.

We agree with Thellung (1906b: 149) that *L. pichleri* is a cultivated form of *L. vesicarium* in which the stems failed to inflate at the inflorescence nodes to produce the characteristic aspect of the species. In every other feature of the plant the former is indistinguishable from the latter.

Lepidium setosum Boiss., Diagn. Pl. Orient. ser. 2, 1: 45. 1854.

Type: "Hab. in regno *Cabulico* propè *Hydozyl.* (cl. Griffith pl. exs. N° 1483)".

Note. – The species was not mentioned in Boissier (1867a, 1888) and was not mentioned in treatment of *Lepidium* for Pakistan (Jafri, 1973), *Flora Iranica* (Hedge, 1968), or BrassiBase (2019). However, it was treated by Thellung (1906b: 318) as a synonym of *Sisymbrium griffithianum* Boiss., though no such material of the species was found in any of the Geneva or other major herbaria consulted. Therefore, the identity of *Lepidium setosum* remains unresolved.

Hymenophysa C.A. Mey. ex Ledeb., Icon. Pl. Nov. 2: 20. 1830.

Tribe: *Lepidieae* DC.

Note. – As indicated in the preceding generic entry of *Lepidium,* the genus is currently defined to include *Hymenophysa*.

Hymenophysa fenestrata Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 197. 1842.

Type: "[Aucher-Eloy] N. 4095, Perezend".

Holotypus: Iran: "Pire Zend', s.d., *Aucher-Eloy 4095* (P [P02141403]; iso-: G-BOIS [G00330474], K [K000642717], P [P02141402]).

= ***Lepidium chalepense*** L., Cent. Pl. 2: 23. 1756.

Note. – The above G-BOIS duplicate consists of three fragmentary pieces taken by Boissier from P02141403 that he annotated.

Cakile Mill., Gard. Dict. ed. 4. 1754.

Tribe: *Brassiceae* DC.

Note. – A genus of seven species six of which are native to the coasts of the Mediterranean sea, N Atlantic of Europe and North America, Caribbean Islands, and Gulf of Mexico. Two species are naturalized in the coasts of other continents. One species, *C. arabica* Vel., is an inland desert species in Kuwait, Iraq, Jordan, and Saudi Arabia (Rodman, 1974).

Cakile maritima var. *integrifolia* Boiss., Fl. Orient. 1: 365. 1867.

Type: "Hab. in Aegypto ad Alexandriam (Samar!), in Euxino ad Moeotidem (Stev!)".

Lectotypus (designated here): **Egypt:** "Inter Alexandriam et Ramole", 26.VIII.1855, *Samaritani 3054* (G-BOIS [G00332568]). **Syntypus: Turkey:** "Taur. Littor.", 1820, *Steven s.n.* (G-DC [G00202895]).

= ***Cakile maritima*** Scop., Fl. Carniol. ed. 2, 2: 35. 1772.

Notes. – Rodman (1974) did not examine the two syntypes above and did not lectotypify the taxon.

The only specimen of this species in the G herbaria that was collected by Steven is the one listed above. Its locality is different from that in the protologue, and it is not known if there is another specimen that has been misplaced or there is some error in the original listing of the locality. Therefore the problem of this syntype remains unresolved.

The G-BOIS specimen is more complete and designated as the lectotype.

Erucaria Gaertn., Fruct. Sem. Pl. 2: 298. 1791.

Tribe: *Brassiceae* DC.

Note. – A genus of ten species restricted to SW Asia and North Africa.

Erucaria aleppica var. *puberula* Boiss., Fl. Orient. 1: 365. 1867.

Type: "Hab. in Palaestinâ inter Hierosolymam et Jericho (Boiss!)".

Holotypus: Palestine: "Palaestina. Descente à Jéricho", IV–V.1846, *Boissier s.n.* (G-BOIS [G00332569]; iso-: G [G00446320], P [P05415289, P05415306]).

= ***Erucaria hispanica*** (L.) Druce in Rep. Bot. Exch. Club Soc. Brit. Isles 3: 418. 1914.

Note. – The holotype is a collection folder with three labelled sheets, of which one was annotated by Otto Eugene Schulz, and of the other two labeled sheets, one is barcoded.

Erucaria aleppica var. *polysperma* Boiss., Fl. Orient. 1: 366. 1867.

Type: "Hab. inter segetes ad Mersina Ciliciae (Bal!), in Assyriâ ad Tigridem (Noë!)".

Lectotypus (designated here): **Turkey:** "Mersina, dans les moissons", 20.IV.1855, *Balansa 235* (G-BOIS [G00332572]). **Syntypi: Syria:** "Kass. ad Tigrid: in pratis et ruderatis", 1851, *Noë 8* (G-BOIS [G00332570]); "Kass. ad Tigridem", V.1851, *Noë 1128* (G-BOIS [G00332571]).

= ***Erucaria hispanica*** (L.) Druce in Rep. Bot. Exch. Club Soc. Brit. Isles 3: 418. 1914.

Note. – The lectotype consists of two labelled sheets in a collection folder.

Erucaria grandiflora Boiss., Diagn. Pl. Orient. 6: 13. 1846.

Type: "Hab. in declivibus apricis prope *Dalechi* et *Gere* [in Fl. Or: inter Abuchir et Schiraz] Persiae australis Kotschy No. 74".

Holotypus: Iran: "In declivibus apricis pr. Gere inter Abuschir et Schiras", 22.III.1842, *Kotschy 74* (G-BOIS [G00332573]; iso-: BM [BM001254139, BM001254140, BM001254141], FI [FI005713], G [G00371682, G00371694, G00371696], GOET [GOET002574], H [H1260168], JE [JE00001704], K [K000653927], KW [KW000127937], LE [LE00012900], MO [MO1930353], P [P00741648, P00741649, P00741650, P00741651, P00741652, P04743340], US [US00099975], W [W0075587, W18890154986, W18890029608, W18890029625], WU [WU0101806]).

= ***Erucaria hispanica*** (L.) Druce in Rep. Bot. Exch. Club Soc. Brit. Isles 3: 418. 1914.

Notes. – Label of the holotype sheet was handwritten by Kotschy, while those of the isotypes were subsequently printed and distributed.

The holotype is a collection folder of two sheets, the label of one of which gives "Schiraz", and on the packet has the collection number *74*.

Erucaria lineariloba Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 390. 1842.

Type: "[Aucher-Eloy] N, 4140, Bouchir in Persiâ australi".

Holotypus: Iran: "Bider Bouchir", s.d., *Aucher-Eloy 4140* (G-BOIS [G00332574]; iso-: BM [BM001254142, BM001254143], G [G00371653, G00371692], K [K000653926], LE [LE00012901], P [P00741653, P00741655, P00741656], W [W18890077521]).

= ***Erucaria hispanica*** (L.) Druce in Rep. Bot. Exch. Club Soc. Brit. Isles 3: 418. 1914.

Note. – Boissier based the species description on the unicate in his herbarium and did not examine any duplicates elsewhere.

Erucaria microcarpa Boiss., Diagn. Pl. Orient. 8: 47. 1849.

Type: "Hab. in deserto *Arabiae petreae* contermino et in vallibus calidis inter *St.-Saba* et *mare Mortuum* (Boiss.)".

Lectotypus (designated here): Israel: "Arabia petreae, frontière de Palestine", III.1846, *Boissier s.n.* (G-BOIS [G00332576]; isolecto-: G [G00371691, G00371701, G00371704, G00446319], GOET [GOET002646], K [K00065377, K000653878], KW [KW000127938], P [P00741657, P00741658], PH [PH00012908]). **Syntypus:** Israel: "Palestine, Mar Morte", IV–V.1846, *Boissier s.n.* (G-BOIS [G00332575]).

Note. – The lectotype is a collection folder of three sheets, of which two have only the collection month and year. The barcoded sheet has two labels one of which with the species name in red ink in Boissier's handwriting.

Hussonia Boiss., Diagn. Pl. Orient. 8: 46. 1849.

Tribe: *Brassiceae* DC.

Note. – The genus was reduced to synonymy of *Erucaria* by Schulz (1923), and with the exception of Jafri (1977), all subsequent authors to the present have not recognized *Hussonia*.

Hussonia uncata Boiss., Diagn. Pl. Orient. 8: 47. 1849.

Type: "Hab. in *Wadi Feiran* Arabiae petreae Schimper No 453, frequens in toto deserto Arabiae petreae Palaestinae contermino inter *Nuckl* et *Gaza* [Boissier] in arenosis ad umbram suffruticum inter quos caules scandunt, in *Palaestinae* desertis (Pinard). Fl. Aprili".

Lectotypus (designated here): Israel: "Arabia petraea, inter Nuckl et Gaza", III.1846, *Boissier s.n.* (G-BOIS [G00332577]; isolecto-: G [G00371611, G00371613, G00371614], K [K000653928, K000653929], KW [KW000127960], P [P00741642, P00741643, P00741660, P00741661], PH [PH00015037]). **Syntypi:** Sine Patria: "Arabia petraea", 1846, *Pinard s.n.* (G [G00371610, G00371612], K [K000230250], KW [KW000127959], P [P00741662]). Egypt: "Arabia petraea, Wadi Ferran", 18.V.1835, *Schimper 453* (MO [MO3831305], P [P00741646, P00741647], TUB [TUB000588, TUB000589]).

= ***Erucaria pinnata*** (Viv.) Täckh. & Boulos in Publ. Cairo Univ. Herb. 5: 37. 1974.

Notes. – The lectotype is a collection folder of five sheets, of which one has Boissier's handwriting of *Erucaria* in black ink with species epithet in red and "inter Nuckl et Gaza" on a printed label that reads "Arabia petraea, Mart. 1846. E. Boissier". Another sheet is unlabeled, two carry the month and year of collection, and the fifth has only the above-mentioned printed label.

No duplicates of Pinard's collection were found in G-BOIS, but the above sheets at G, K, KW, and P have printed labels handwritten by Boissier with the name "Erucaria uncata Boiss." However, this name is a *nomen nudum* listed as synonym in the original publication of *Hussonia uncata*.

The two TUB duplicates have the collection number as *Schimper 457* instead of *453,* but all the data are the same in both numbers, and both specimens are considered as most likely syntypes.

Greuter and Burdet (Greuter & Raus, 1983: 88) and Greuter et al. (1986: 105) treated *Hussonia uncata* as a subspecies of *Erucaria pinnata,* but the differences between them are minor, and it is better to recognize a single, slightly polymorphic species as did Boulos (1999).

Zohary (1966) followed Schulz (1923) in treating the species as *Erucaria uncata* (Boiss.) Asch. & Schweinf., but Boissier's plant is indistinguishable from the earlier published *Raphanus pinnatus* Viv. (Fl. Libyc. Spec.: 37. 1824), and both plants have non-torulose fruit with a long, curved beak. Schulz (1919) misinterpreted the limits of the species and transferred the latter name as *Reboudia pinnata* (Viv.) O.E. Schulz, which is indistinguishable from Boissier's *Erucaria microcarpa,* a species with torulose, beakless fruit.

Pyramidium Boiss., Diagn. Pl. Orient. ser. 2, 1: 46. 1854 [nom. illeg.] [non Brid.].

Tribe: *Anchonieae* DC.

Note. – This monospecific genus, which is now known as *Veselskya* Opiz, is endemic to Afghanistan.

Pyramidium griffithianum Boiss., Diagn. Pl. Orient. ser. 2, 1: 47. 1854.

≡ ***Veselskya griffithiana*** (Boiss.) Opiz in Lotos 6: 257. 1856.

Type: "Hab. in regno *Cabulico* circâ *Dair Haj,* (W. Griffith. Coll. N° 1549 et 553 Journal)".

Holotypus: Afghanistan: "553 Journal. half way to Dair Haj", s.d., *Griffith 1549* (K [K000693474]; iso-: G-BOIS [G00332578], K [K000693473]).

Notes. – The specimen of K with the journal and collection numbers on the label is the holotype.

The G-BOIS isotype is fragmentary and was taken from the holotype. The label of the holotype also has "Herb. Lemann, 1852" indicated whereas the G-BOIS isotype has "Mr. Lemann 1851".

In addition to *Griffith 1549,* the isotype K000693473 has the number *1409* followed by "distr. cat.".

Octoceras Bunge in Arbeiten Naturf. Vereins Riga 1: 172. 1847.

Tribe: *Euclidieae* DC.

Note. – A monospecific genus distibuted from Iran into Afghanistan, Pakistan, Turkmenistan, Uzbekistan, and Kazakhstan.

Octoceras lehmannianum var. *stocksianum* Boiss., Fl. Orient. 1: 370. 1867.

Type: "Hab. in Belutschiâ prope Nichara (Stocks!), in Affghaniâ prope Quettah (Giff!)".

Lectotypus (designated here): **Pakistan:** "Nichara", 1851, *Stocks 805* (G-BOIS [G00332579]; isolecto-: K [K000484421, K000484422, K000618651]). **Syntypi: Afghanistan:** *sine loco,* s.d., *Griffith 1407* (P [P00741615]); "near Quettah", s.d., *Griffith 1506* (K [K000618650]).

= ***Octoceras lehmannianum*** Bunge in Arbeiten Naturf. Vereins Riga 1: 172. 1847.

Notes. – The collection *Griffith 1506* corresponds to number *427* in Griffith's journal as indicated on K000618650.

The variety is said to have straight fruit spines as long as or longer than the fruit width, but these aspects of the spine are quite variable and not useful taxonomically.

Boreava Jaub. & Spach in Ann. Sci. Nat., Bot. ser. 2, 16: 341. 1841.

Tribe: *Isatideae* DC.

Note. – As previously recognized, the genus included two species, but based on molecular studies, it has recently been united with the larger *Isatis* L. (see Al-Shehbaz, 2012).

Boreava aptera Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. 8: 49. 1849.

≡ ***Isatis aptera*** (Boiss. & Heldr.) Al-Shehbaz et al. in Taxon 61: 948. 2012.

Type: "Hab. propè *Bouldour* Pisidiae (Heldreich)".

Holotypus: Turkey: "Bouldour", 24.V.1845, *Heldreich 1086* (G-BOIS [G00332580]).

Note. – The holotype is a collection folder of three sheets, of which one has the handwritten label by Heldreich, with a collection number and day of collection. The two other sheets have a printed, handwritten label by Boissier: "Propé Bouldour Pisidiae", but do not have the collection date or number.

Glastaria Boiss. in Ann. Sci. Nat., Bot. ser. 2, 16: 382. 1841.

Tribe: *Isatideae* DC.

Note. – A genus of one species distributed in Iraq, Israel, Jordan, Lebanon, Syria, and Turkey.

Glastaria deflexa Boiss. in Ann. Sci. Nat., Bot. ser. 2, 16: 382. 1841 [nom. illeg.].

≡ ***Glastaria glastifolia*** (DC.) Kuntze, Revis. Gen. Pl. 1: 30. 1891.

Notes. – *Glastaria deflexa* is illegitimate because its protologue listed the earlier published *Peltaria glastifolia* DC. (Syst. Nat. 2: 330. 1821) as a synonym.

Boissier in *Flora Orientalis* adopted the generic name *Texiera* Jaub. & Spach and combination *T. glastifolia* (DC.) Jaub. & Spach (Ill. Pl. Orient. 1(1): 1, t. 1. 1842), under which he placed *Glastaria deflexa* in synonymy, without realizing that *Glastaria* (Boissier, 1841b) has priority over *Texiera*.

Pachypterygium Bunge, Del. Sem. Hort. Dorpat. 1843: 8. 1843.

Tribe: *Isatideae* DC.

Note. – The genus was reduced by Jafri (1973) to synonymy of *Isatis* L., and that merger was supported by Al-Shehbaz (2012) based on molecular phylogenetic data by Moazzeni et al. (2010).

Pachypterygium densiflorum Bunge ex Boiss., Fl. Orient. 1: 373. 1867.

≡ ***Isatis densiflora*** (Bunge ex Boiss.) German in Turczaninowia 19(4): 130. 2016.

Type: "Hab. in montosis Persiae australis inter Khabbise et Kerman (Bunge!)".

Holotypus: Iran: "in montosis inter Chabbis et Kerman", IV.1859, *Bunge s.n.* (G-BOIS [G00332583]; iso-: B [B100272077], K [K000642924], LE [LE00012933, LE00012934], P [P00741529]).

Notes. – Boissier did not examine any material other than the duplicate in his herbarium.

German (2016) is followed in recognizing this species as distinct instead of Jafri's (1973) position in reducing it to synonymy of *I. multicaulis* (Kar. & Kir.) Jafri.

Pachypterygium brevipes var. *persica* Boiss., Fl. Orient. 1: 374. 1867.

≡ ***Isatis brevipes*** (Bunge) Jafri in Nasir & Ali, Fl. W. Pakistan 55: 72. 1973.

Type: "Hab. in Persiâ bor.-orientali ad Schahrud (Bunge!)".

Holotypus: Iran: "prope Schahrud", V.1858, *Bunge s.n.* (G-BOIS [G00332584]; iso-: K [K000642922], LE [LE00012929, LE00012930], P [P00741524]).

Note. – The variety was raised by Parsa (1951: 846) to a species, but its minor variation from the plants of *I. brevipes* does not merit its recognition at any rank.

Sameraria Desv. in J. Bot. Agric. 3: 161. 1815.

Tribe: *Isatideae* DC.

Note. – *Sameraria* included nine species of southwestern Asian, but some of its species were transferred by Hadač & Chrtek (1973) to the earlier published *Isatis*. Subsequent molecular phylogenetic studies (Moazzeni et al., 2010) supported that transfer, and the remaining species were later moved to *Isatis* by Al-Shehbaz (2012).

Sameraria elegans Boiss., Fl. Orient. 1: 375. 1867.

≡ ***Isatis elegans*** (Boiss.) Hadač & Chrtek in Acta Univ. Carol., Biol. 1971: 251. 1973.

Type: "Hab. in Persiâ orientali inter Kerman et Yezd (Bunge!)".

Holotypus: Iran: "Inter Kerman et Jesd, inter Booriderum & Gerdekuh", IV.1859, *Bunge 78* (G-BOIS [G00332585]; iso-: B [B100241703], G [G00446316], K [K000642927], LE [LE00012904, LE00012908], P [P00741433, P00741434, P00741435, P00741437], US [US000324435], W [W0050791]).

Note. – All isotypes have the printed locality "inter Kerman et Jesd. Apr. 1859" and lack the additional details "inter Booriderum & Gerdekuh" and the collection number *78,* though label of the isotype P00741433 has that collection number.

Sameraria leiocarpa Boiss., Fl. Orient. 1: 375. 1867.

Type: "Hab. in Persiâ austro-orientali inter Kerman et Yezd (Bunge!)".

Holotypus: Iran: "Inter Kerman et Jesd, inter Booriderum & Gerdekuh", IV.1859, *Bunge 79* (G-BOIS [G00332586]; iso-: P [P00741436]).

= ***Isatis elegans*** (Boiss.) Hadač & Chrtek in Acta Univ. Carol., Biol. 1971: 251. 1973.

Note. – The P duplicate was neither studied nor annotated by Boissier who based the species only on the material in G-BOIS.

Sameraria macrocarpa Boiss. & Hausskn. in Boiss., Fl. Orient. Suppl.: 64. 1888.

Type: "Hab. in jugo Pir Omar Gudrun Kurdistaniae Persicae (Haussk.!)".

Holotypus: Iraq: "Pir Omar Gudrun", VI.1867, *Haussknecht 126* (G-BOIS [G00332587]; iso-: JE [JE00002856]).

= ***Isatis stylophora*** (Jaub. & Spach) Hadač & Chrtek in Acta Univ. Carol., Biol. 1971: 251. 1973.

Note. – The JE duplicate was not seen by Boissier.

Isatis L., Sp. Pl.: 670. 1753.

Tribe: *Isatideae* DC.

Notes. – *Isatis* is Eurasian genus of some 94 species centered primarily in SW Asia. As indicated by Davis (1964, 1965b), the genus is taxonomically rather difficult due to the high morphological variability and overlap among related taxa. Indeed, without mature fruit, identification of species becomes tentative at best.

Extensive molecular, morphological, and cytological studies are needed to understand the sources of taxonomic complexity and evolutionary history of the genus.

Isatis violascens var. *longipes* Boiss., Fl. Orient. 1: 376. 1867.

Type: "Hab. in deserto ad Ssertschah Persiae mediae orientalis (Bunge!)".

Holotypus: Iran: "pr. Sser-tschah Persiae mediae orientalis. pr. desertum m. Otesch-Kerde", III.1859, *Bunge 74* (G-BOIS [G00332588]; iso-: P [P00741509, P00741510]).

= ***Isatis emarginata*** Kar. & Kir. in Bull. Soc. Naturalistes Moscow 15: 158. 1842.

Note. – Only the holotype was examined by Boissier.

Isatis stocksii Boiss., Fl. Orient. 1: 376. 1867.

Type: "Hab. in Belutschiâ prope Doubund (Stocks!)".

Holotypus: Pakistan: "Beloutchistan. Doobund", 1851, *Stocks 964* (G-BOIS [G00332589]; iso-: K [K000642850, K000642851]).

Note. – A distinctive species treated by Hedge (1968) as *Pachypterygium,* but molecular phylogenetic studies by Moazzeni et al. (2010) supported its initial assignment in *Isatis* by Boissier in *Flora Orientalis.*

Isatis candolleana Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 199. 1842.

Type: "[Aucher-Eloy] N. 215, Taurus".

Lectotypus (designated here): **Turkey:** "Taurus", 1837, *Aucher-Eloy 215* (G [G00371798 plant on left with glabrous fruit]; isolecto-: G-BOIS [G00332591 fragment on left with glabrous fruit], P [P00741461]) (Fig. 32, p. 124).

Notes. – The specimen in G-BOIS is a mixed collection of fragments both of which were almost certainly taken from the more complete lectotype specimen that was studied by Boissier and consists of two complete plants also representing two taxa. Therefore, the name needs lectotypification.

Boissier (1842b) noticed that one plant had glabrous fruit and the other has densely velutinous ones, and he recognized them as var. α and β, respectively. He questioned if the glabrous plant (var. α) might be the same as *I. leiocarpa* DC., but this is a different taxon that belongs to *I. cappadocica* subsp. *subradiata* (Rupr.) P.H. Davis.

Davis (1965b: 297) described the fruit of *I. candolleana* as either velutinous or glabrous, thus agreeing with Boissier's original concept of the species and overlooking the fact that two species are involved.

Boissier (1856) described *I. velutina* and cited a single collection (*Huet du Pavillon s.n.,* see below), but he (*Fl. Orient.* 1: 377) added to the confusion by reducing *I. candolleana* to synonymy of the Caucasian *I. latisiliqua* Steven and cited its type collection, *Aucher-Eloy 215* (*Fl. Orient.* 1: 378), as one of the three collections of *I. velutina*.

As lectotypified above, the plant with glabrous, smaller, purple fruit (var. α) is *I. candolleana,* whereas the plant with densely velutinous, larger, and yellowish fruit (var. β) should be attributed to *I. velutina*.

Davis (1965b: 296) overlooked the mixed type collections above and reduced *I. velutina* to synonymy of the earlier published *I. candolleana,* thus accepting a much broader species circumscription with drastically different fruit morphology.

There are other duplicates of *Aucher-Eloy 215* (e.g., P00741508) that consist of only *I. velutina.*

Isatis latisiliqua var. *apiculata* (Boiss.) Boiss., Fl. Orient. 1: 377. 1867.

≡ *Isatis apiculata* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 199. 1842.

Type: "[Aucher-Eloy] N. 4139, Ispahan".

Holotypus: Iran: "Ispahan", s.d., *Aucher-Eloy 4139* (P [P00741485]; iso-: G [G004462750], G-BOIS [G00332590], P [P00741463]).

= ***Isatis cappadocica*** Desv. in J. Bot. Agric. 3: 174. 1815.

Notes. – The G-BOIS specimen is fragmentary and consists of a basal leaf and leafless flowering and fruiting branches, and unlike the other duplicates above with printed labels, that of G-BOIS was handwritten by Boissier.

The fragments were certainly taken from the complete P00741485 specimen that was annotated in Boissier's handwriting as "*Isatis apiculata*! Boiss.".

This taxon most likely belongs to the *I. cappadocica* complex, but because of the immature fruit, it is almost impossible to confidently assign the type collection to any of the several subspecies of *I. cappadocica*.

Isatis latisiliqua var. *gudrunensis* Boiss., Fl. Orient. Suppl.: 64. 1888.

Type: "Hab. in rupestribus calcareis montis Pir Omar Gudrun Kurdistaniae 3–7000' (Haussk.!)".

Holotypus: Iraq: "Pir Omar Gudrun", 3000'–6000' [910–1830 m], VI.1867, *Haussknecht s.n.* (G-BOIS [G00332592]; iso-: BM [BM001254136], K [K000642855], JE [JE00001296], P [P05384183]).

= ***Isatis cappadocica*** subsp. ***subradiata*** (Rupr.) Davis in Notes Roy. Bot. Gard. Edinburgh 26: 18. 1965.

Notes. – The above duplicates at K and P were collected at an elevation of 4–7000 ft, instead of 3–6000 ft as in the other duplicates, and may well belong here.

This taxon was treated by Davis (1964, 1965b) as *I. cappadocica* subsp. *subradiata* var. *gudrunensis* (Boiss.) Davis and by Hedge (1968: 81–82) as a synonym of *I. cappadococica* subsp. *stenophylla* (Bornm. & Gauba) Hedge & Lamond. The differences between these two subspecies are tenuous at best and rest exclusively on the length/width ratio of the fruit.

Plants of the type collection of var. *gudrunensis* do not have mature fruit, and they are only reluctantly assigned here to the earlier published subsp. *subradiata*.

Isatis cordigera Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 198. 1842.

Type: "[Aucher-Eloy] E *Persiâ* probabiliter sed nec locus nec numerus in Schedulâ indicantur".

Holotypus: Iran: *sine loco,* s.d., *Aucher-Eloy s.n.* (P [P00741483]; iso-: G-BOIS [G00332594]).

= ***Isatis cappadocica*** subsp. ***besseri*** (Trautv.) Hedge & Lamond in Rech. f., Fl. Iran. 57: 82. 1968.

Notes. – The G-BOIS sheet consists of a handwritten label by Boissier and an envelope with only two fruits taken from the unicate P00741483 that was annotated in Boissier's handwriting as "*Isatis cordigera*! Boiss.". Therefore, this P specimen is the holotype.

Isatis cordigera was not listed in Hedge (1968) in the synonymy of *I. cappadocica* subsp. *besseri.*

Isatis undulata Aucher ex Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 200. 1842.

Type: "[Aucher-Eloy] N. 212, Cappadocia ad Euphratem".

Holotypus: Turkey: "Cappad. ad Euphratem", s.d., *Aucher-Eloy 212* (G-BOIS [G00332593]; iso-: E [E00386034], G [G00371663], K [K000642857], P [P00741502, P00741503, P00741504], W [W18890171321]).

Note. – The evidence supporting Davis (1965b: 297) recognition of the G-BOIS duplicate as the holotype is that none of the isotypes was annotated by Boissier.

Isatis velutina Boiss. & A. Huet in Boiss., Diagn. Pl. Orient. ser. 2, 5: 45. 1856.

Type: "Hab. in valle *Kassuklu* Armeniae borealis cl. Huet du Pavillon".

Holotypus: Turkey: "In valle Kassuklu", V.1853, *Huet du Pavillon s.n.* (G-BOIS [G00332595]; iso-: BM [BM001254135], G [G00371803], K [K000642859]).

Notes. – The isotype sheet at G has a label with the handwritten part "In ruderatis vallis Kassuklu 4–5000 p.s.m." and a printed part "Inter Baibout et Erzeroum. Armenia". The sheet was erroneously annotated by Davis as holotype.

As discussed under *I. candolleana,* the fate of *I. velutina* depends on whether the mixed type collection of the lectotype of the former is treated as one or two species. It is concluded here that two species are involved, though Davis (1965b: 296), followed by Greuter et al. (1986: 129), reduced *I. velutina* to synonymy of *I. candolleana* and accepted the latter as a polymorphic species with two fruit types.

Davis annotated the holotype sheet of *I. velutina* in 1960 (Fig. 32, p. 124) as a synonym of the later-published *I. conringiifolia* Bornm., but he (Davis, 1964: 21, 1965b: 296) treated both as synonyms of *I. candolleana*. He also annotated

the isotype G00371803 as holotype of *I. velutina* and "probably best treated as a var. of *I. candolleana,* or possibly a hybrid between the latter & sp. aff. *I. atropatana* Grossh.".

Isatis alyssifolia Boiss., Fl. Orient. 1: 378. 1867.

≡ ***Isatis cappadocica*** subsp. ***alyssifolia*** (Boiss.) P.H. Davis in Notes Roy. Bot. Gard. Edinburgh 26: 18. 1964.

Type: "Hab. in rupestribus montis Ballouklardan Lyciae (Bourg!)".

Holotypus: Turkey: "Mt de Baluclardan prov. de Elmali", 28.V.1860, *Bourgeau 56* (G-BOIS [G00332596]; iso-: B [B100249796, B100249797], E [E00386032], G [G00371786], K [K000642854], P [P00741408, P00741409, P00741410], W [W18890067000]).

Note. – The holotype is a collection folder of two sheets one with a handwritten label and the other with a printed label, as in isotypes: "In rupestribus montis Ballouklardan *Bourgeau s.n.* ".

Isatis iconia Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. 8: 48. 1849.

≡ ***Isatis glauca*** subsp. ***iconia*** (Boiss. & Heldr.) P.H. Davis in Notes Roy. Bot. Gard. Edinburgh 26: 22. 1964.

Type: "Hab. in agris propè *Koniah* (Heldreich)".

Holotypus: Turkey: "in campis Koniah", 16.VI.1845, *Heldreich 827* (G-BOIS [G00332598]).

Notes. – No duplicates of the type collection were seen in any of the major herbaria consulted, and it is not known if Heldreich collected more than the type specimen above.

The holotype is a collection folder of two sheets, of which the labeled, barcoded one consists of the lower part of the plant, and the other sheet is unlabeled and consists of an infructescence. Without either of the two sheets, it is impossible to know the identity of the species. It is also unknown if the two sheets belong to the same species.

No complete fruiting collections of the species were examined for this study, and a designation of such material as an epitype is highly desirable.

Isatis kotschyana Boiss. & Hohen. in Boiss., Diagn. Pl. Orient. 8: 48. 1849.

Type: "Hab. ad radices montis *Demawend* in provinciâ *Lar*. Kotschy No 333".

Lectotypus (designated here): **Iran:** "Ad radices m. Demawend pr. p. Lar.", 19.VI.1843, *Kotschy 333* (G-BOIS [G00332600]; isolecto-: BM [BM000582563], E [E00386030, E00386031], FI [FI005706], G [G00371783, G00371784], GOET [GOET002619], K [K000642860], KW [KW000127956], LE [LE00012915, LE00012916], MO [MO1930850], P [P00580385, P00741455, P00741456, P00741457, P00741458, P004745146, P05384224], W [W0050808, W0075582], WAG [WAG0000827]).

Notes. – The sheet in Bunge's herbarium P00741456 was annotated on a small piece of paper by Boissier as "*Isatis kotschyi* B.", and that annotation justifies lectotypifying the name.

Label of one duplicate [P05384224] has exactly the same information as that of the type except for a collection number as *Kotschy 333a* instead of *333,* and it is recognized here as an isolectotype.

Isatis glauca Aucher ex Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 201. 1842.

Type: "[Aucher-Eloy] N. 214, Cappadocia ad Euphratem".

Holotypus: Turkey: "Capp. ad Euphratem", s.d., *Aucher-Eloy 214* (P [P00741452; iso-: G-BOIS [G00332601], P [P00741453]).

Notes. – The G-BOIS specimen has a label in Boissier's handwriting, and it consists of a basal leaf and two lateral branches of developing infructescence taken from P00741452 that was annotated by Boissier as "*Isatis glauca*! Auch".

The species was divided by Davis (1965b) into three subspecies.

Isatis glauca var. *collina* Boiss., Fl. Orient. 1: 379. 1867.

Type: "Hab. in collibus Lyciae et Armeniae (Bourg!), Cappadociae (Bal)".

Lectotypus (designated here): **Turkey:** "Collines situées au nord des Marais de Césarée (Cappadoce)", c. 1200 m, 23.VII.1856, *Balansa 454* (G-BOIS [G00332602]). **Syntypus: Turkey:** "Mt. de Ballouklardan", 17.VI.1860, *Bourgeau 58* (E [E00386029], G [G00446276, G00446277], G-BOIS [G00332603], K [K000642862], W [W18890066999]).

= ***Isatis glauca*** Aucher ex Boiss. subsp. ***glauca*** in Ann. Sci. Nat., Bot. ser. 2, 17: 201. 1842.

Notes. – The lectotype sheet was annotated as such by Davis in 1960, and his typification is accepted here.

The syntypes have *Bourgeau 58* on the G-BOIS sheet or *Bourgeau s.n.* in exsiccatae distributed as *Isatis aucheri* var. *glabrescens.*

Isatis callifera Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 5: 46. 1856.

Type: "Hab. in fauce fluvii *Guzel Déré* suprâ *Sedichig* in *Ciliciâ* littorali cl. Balansa Fl. et Fr. Aprili".

Holotypus: Turkey: "Berges du Guzel Déré, en amont de Sedi-chig (Environs de Mersìna)", 14.IV.1855, *Balansa 203* (G-BOIS [G00332604]; iso-: P [P00741421]).

Note. – The label indicates that the specimen is "unique", though there is the duplicate above at P that was not annotated by Boissier. It was collected by Balansa and its label carries the exact information as that of the holotype but without the collection number and with the year indicated.

Isatis frigida Boiss. & Kotschy in Boiss., Diagn. Pl. Orient. ser. 2, 5: 47. 1856.

Type: "Hab. in declivibus cacuminis *Metdesis* Tauri Cilicici suprâ fodinas plumbeas *Gülek* alt. 9000' cl. Kotschy".

Holotypus: Turkey: "in Tauri alpes 'Bulgar-Dagh.' Ad devexa summi cacuminis Metdesis supra plumbi fodinas pagi Güllek", 9000' [2740 m], 30.VII.1853, *Kotschy 156 112 222* (G-BOIS [G00332605]; iso-: E [E00257786], G [G00446278], GOET [GOET002620], K [K000642864, K000642865], KW [KW000127955], P [P00741443, P00741444, P00741445, P00741446, P00741447, P00741448, P00741449], S [S0912386, S0912398], W [W0075583, W0075584, W0075585], WAG [WAG0004253, WAG0004254]).

Notes. – Labels of the type collection have one to three collection numbers, but all the other data are identical, and it appears that different collection numbers were given by Kotschy with the thought that they represent different things. However, all labels carry the name *I. suffrutescens* Boiss., a *nomen nudum* listed in the synonymy in the original publication and in *Flora Orientalis.*

The label of P00741446 in Cosson's herbarium is handwritten, and it reads "*Isatis suffrutescens,* Boiss. Kotschy, iter cilic. no. 156". However, plants with the numbers *156, 112,* and *222* were mounted on a single sheet with barcodes P00741443, P00741444, and P00741445, respectively, though carrying the same information as that of the holotype. Therefore, such collection numbers have no value for this species.

The holotype is a collection folder of two sheets, the printed label of one of which indicate "Plantae Tauri Cilicici. Th. Kotschy. 1853".

Isatis athoa Boiss., Fl. Orient. Suppl.: 64. 1888.

≡ ***Isatis tinctoria*** subsp. ***athoa*** (Boiss.) Papan. in Strid, Mount. Fl. Greece 1: 238. 1986.

Type: "Hab. in monte Atho unde semina ex quibus hanc plantam colui retulit cl. Pichler".

Lectotypus (designated here): **Greece:** "Mt Athos", cult. 1875, *Pichler s.n.* (G-BOIS [G00332612 fruiting plant]). **Syntypus: Greece:** "Mt Athos", cult. 1875, *Pichler s.n.* (G-BOIS [G00332612 flowering plant]).

Notes. – The plant was grown in Boissier's private garden at Valeyres from fruit collected by Pichler in 1873, and the voucher was collected by Boissier in 1875.

It is not known if Pichler made a voucher specimen of the fruits he sent to Boissier, but there is no such material in the Geneva herbaria.

The lectotype is a collection folder of two sheets, the plants of each were collected by Boissier at different times of the year because each sheet has plants in early flower and others with mature fruit. However, no collection dates were given. The flowers in *Isatis* hardly have any taxonomic value, but the fruits are essential. Therefore, the fruiting material is designated as the lectotype and the flowering branches as a syntype.

Isatis leuconeura Boiss. & Buhse in Nouv. Mém. Soc. Imp. Naturalistes Moscou 12: 28. 1860.

Type: "Im Joluthal des Albursgebirges, [Buhse] 18 Juni 1848 (specimen unicum)".

Holotypus: Iran: "Elburs", s.d., *Buhse 1024* (G-BOIS [G00332607]; iso-: LE [LE00012917]).

Notes. – The LE specimen is a more complete unicate than the somewhat fragmentary material in G-BOIS.

As indicated in the protologue, the LE sheet has well-developed oblong auricles on the sagittate-amplexicaul cauline leaves the measurements of which were given in the original description.

The G-BOIS sheet has only reduced, non-auriculate leaves at the inflorescence branches. However, there are some problems with the label information on the G-BOIS sheet. It has a pre-printed 1847 label, just as most other Persian collection of Buhse that he collected post 1847 and sent to Boissier, and the locality as "Persia. Elburs" [Johu Valley] and collection number *1024,* compared to the LE sheet without a collection number. Finally, the G-BOIS duplicate has better developed fruits than the LE duplicate, and the latter was not annotated

by Boissier. For these reasons, the G-BOIS specimen is recognized as the holotype.

Hedge (1968: 84) indicated that *Isatis leuconeura* may be conspecific with *I. glauca,* though further studies on mature fruiting material is needed to elucidate that.

Isatis biscutellifolia Boiss. & Buhse in Nouv. Mém. Soc. Imp. Naturalistes Moscou 12: 28. 1860.

Type: "Gebirge bei Jesd, Deh ballo, 24 Aprii 1849 (florens et fructifera). Zwischen Isfahan und Kaschan im Gebirge bei Ssoffi, 21 Mai 1849 (fructu immaturo). [Buhse] No 1367 et 1430. Provinz Aderbidschan: Pl. exs. Aucherianae No 4138, A".

Lectotypus (designated here): **Iran:** *sine loco,* s.d., *Buhse 1430* (G-BOIS [G00332608]; isolecto-: LE [LE00012910], P [P00741420]). **Syntypi: Iran:** "Aderbidjan", s.d., *Aucher-Eloy 4138A* (BM [BM001254138], G-BOIS [G00332609]); *sine loco,* 1849, *Buhse 1367* (P [P00741418]).

Notes. – The G-BOIS herbarium has one of the two syntypes of Buhse, and that number is designated here as the lectotype. The label of the isolectotypes have "Deh Ballo bei Jesd" at P without any Buhse number indicated and "1430. Gebirge bei Jesd, 24. April 1849" at LE.

Despite being immature, the fruit are rather bizarre for being contorted siliques. As for the Aucher-Eloy syntype, it is in the early flowering stage and almost impossible to assess its identity, though it has longer and denser indumentum than the lectotype which it resembles in leaf shape and size.

The Aucher-Eloy collection is tentatively taken as a syntype. Both duplicates at P are part of the Bunge herbarium.

Isatis aucheri Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 202. 1842.

Type: "[Aucher-Eloy] N. 213, Besnie".

Lectotypus (designated here): **Turkey:** "Besni", s.d., *Aucher-Eloy 213* (G [G00371802]; isolecto-: G [G00371782], G-BOIS [G00332610], P [P00580386, P00741411, P00741412, P00741413, P04742615], W).

Note. – Although Boissier (1841a) was followed in determining whether the above specimen is a holotype or a lectotype, lectotypifying the name is preferred because Boissier examined G00371802 and because of the uncertainty whether the fragmentary specimen in G-BOIS, which consists of two small infructescence branches, was taken from the above duplicate or sent to him from P.

Isatis aucheri var. *vellerifera* (Boiss. & Noë) Boiss., Fl. Orient. 1: 380. 1867.

≡ *Isatis vellerifera* Boiss. & Noë in Boiss., Diagn. Pl. Orient. ser. 2, 1: 46. 1854.

Type: "Hab. in *Armeniâ* meridionali ad *Bakker Maaden* ubi Junio 1852 detexit cl. Noë".

Holotypus: Turkey: "Bakker Madem", V–VI.1852, *Noë 827* (G-BOIS [G00332611]; iso-: KW [KW000127953]).

= ***Isatis aucheri*** Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 202. 1842.

Note. – Boissier did not examine the duplicate at KW, and he based the description on the unicate in his herbarium.

Isatis cochlearis Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 202. 1842.

Type: "[Aucher-Eloy] N. 211, Besnie".

Holotypus: Turkey: "Besnie", 1834, *Aucher-Eloy 211* (P [P00741423]; iso-: G-BOIS [G00332613], K [K000642881], W [W0050809]).

Note. – The sole material in the Geneva herbaria is the rather fragmentary specimen in G-BOIS that consists of two, small infructescence branches doubtless taken from the far more complete P00741423 by Boissier. Then the Paris sheet ought to be recognized as the holotype.

Isatis tinctoria var. *stenocarpa* Boiss., Fl. Orient. 1: 381. 1867.

≡ ***Isatis tinctoria*** subsp. ***tomentella*** (Boiss. & Balansa) P.H. Davis in Notes Roy. Bot. Gard. Edinburgh 26: 22. 1964.

Note. – Boissier in *Flora Orientalis* renamed the following entry at the varietal rank.

Isatis tomentella Boiss. & Balansa in Boiss., Diagn. Pl. Orient. ser. 2, 5: 46. 1856.

≡ ***Isatis tinctoria*** subsp. ***tomentella*** (Boiss. & Balansa) P.H. Davis in Notes Roy. Bot. Gard. Edinburgh 26: 22. 1964.

Type: "Hab. in regione mediâ montis *Sipyli* suprâ *Magnesiam* cl. Balansa".

Holotypus: Turkey: "Partie moyenne du *Mont Sipyle,* au-dessus Magnésie", 10.VI.1854, *Balansa 85* (G-BOIS [G00332614]; iso-: BM [BM000582564], E [E00386106, E00386108], FI [FI005708], G [G00371657,

G00371785], GOET [GOET002624], JE [JE00001299], K [K000642882], KW [KW000127957], LE [LE00012928], P [P00741495, P00741498], US [US00099984], W [W0050162, W0050163, W1889158145], WAG [WAG0004252]).

Notes. – As indicated above, Boissier in *Flora Orientalis* reduced the species to synonymy of *I. tinctoria* var. *stenocarpa*.

This taxon, the preceding, and following entries clearly belong to the highly variable *I. tinctoria* complex, which is the most widespread naturalized species in the genus and the only one cultivated extensively in the past for the blue dye woad (Leggett, 1944). It is still cultivated in SW Asia, through the central Asian republics of the former Soviet Union, into western and central China.

The lines separating its component infraspecific taxa can be tenuous and, therefore, Davis (1964) is followed in treating the extremes at the subspecific rather than the specific rank. In addition to Turkey, subsp. *tomentella* grows in Greece. However, in recognizing this entity at the species rank, Tan (2002: 127) erred in placing in its synonymy the earlier published *I. corymbosa.* Perhaps the ideal solution for the Greek representatives of this complex is to follow Davis (1964) in recognizing them at the subspecific rank.

Isatis corymbosa Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 200. 1842.

≡ ***Isatis tinctoria*** subsp. ***corymbosa*** (Boiss.) P.H. Davis in Notes Roy. Bot. Gard. Edinburgh 26: 22. 1964.

Type: "[Aucher-Eloy] N. 210, è Schedulâ collectionis meae in monte *Tauro,* ex eâ Musaei Parisiensis in *Thessali*â, circà *Larissam*".

Lectotypus (designated here): **Turkey:** "in Mte. Tauro", s.d., *Aucher-Eloy 210* (G-BOIS [G00332615]; isolecto-: K [K000642883]). **Syntypi: Greece:** "Inter Jugets Thessaliae. circa Larystam", 1836, *Aucher-Eloy s.n.* (P [P00741424]); "Thessalia", s.d., *Aucher-Eloy s.n.* (P [P00741425]).

Notes. – Boissier (1842b) based the species description on the unicate in his herbarium and on P00741424 that he annotated. Therefore, lectotypification is justified.

The label data in P00741426 is "Graecia, Cilicia, 1834–1936, *Aucher-Eloy 210*", and although the collection number is the same as that of the lectotype, the collection date and locality are quite different. To our knowledge, Cilicia is in southern Turkey, not Greece, and therefore, this specimen is not considered as part of the type collection.

The subspecies is distributed in the southwestern portions of Turkey, south central and western Greece, and Crimea. It was recognized by Tan (2002) as a synonym of *Isatis tomentella* (see previous entry), but it is more practical to treat it as independent taxon, as recognized here, by Davis (1965b), and BrassiBase (2019).

Isatis lockmanniana Kotschy ex Boiss., Fl. Orient. 1: 381. 1867.

Type: "Hab. in fissuris rupium montis Gebel Nur Ciliciae Kurdicae (Ky exs. 11!)".

Holotypus: Turkey: "Plantae in monte Lokmanni 'Dschebbel Nur' lectae. In fissuris rupestribus occidentem versus spectantibus", 2100' [640 m], 24.IV.1859, *Kotschy 11* (G-BOIS [G00332616]; iso-: E [E00386145, E00441857], G [G00446279], JE [JE00001835], K [K000642884], LE [LE00012918, LE00012919], P [P00741472, P00741473, P00741474], S [S0912342], W [W0077482]).

Note. – The holotype is a collection folder of two sheets, the label of the barcoded one is printed, as in all isotypes, whereas label of the other sheet has "Th. Kotschy. Iter Orientale 1859".

Isatis microcarpa J. Gay ex Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 201. 1842.

Type: "[Aucher-Eloy] N. 209, Sinaï".

Holotypus: Egypt: "Sinai", s.d., *Aucher-Eloy 209* (G-BOIS [G00332617]; iso-: G [G00446280, G00446281], K [K000642888], P [P00741407, P00741478, P00741479]).

Note. – The P00741407 and P00741478 duplicates were annotated by Gay as "*Isatis microcarpa* Gay in pl. un. itin Boiss. pl Aucher", and except for the G-BOIS, all other duplicates were distributed with the species name. The original holotype label still lacks the species name, and none of the above duplicats was annotated by Boissier.

Isatis aleppica var. *pamphylica* Boiss., Fl. Orient. 1: 383. 1867.

Type: "in cultis et ruderatis ad Adalia Pamphyliae (Heldr, Pestw Bourg!)".

Lectotypus (designated here): **Turkey:** "sur plusieurs cimetières turcs autour de la ville d'Adalia", III.1845, *Heldreich 472* (G-BOIS [G00332620]; isolecto-: E [E00386102, E00386103], G [G00446283, G00446284, G00446314], GOET [GOET002621], K [K000642889, K000642891]). **Syntypi: Turkey:** "Adalia, in arvis", 19.IV.1860, *Bourgeau 23* (E [E00386100, E00386101], G [G00446282], G-BOIS [G00332619], K [K000642890]); "Adalia", 1846, *Pestalozza s.n.* (G-BOIS [G00332618]).

= ***Isatis lusitanica*** L., Sp. Pl.: 670. 1753.

Notes. – The lectotype is a collection folder of three sheets, of which one has the barcode and original label in French, another has the printed, handwritten label by Boissier, and the third is unlabeled.

The isolectotypes have printed label handwritten by Boissier: "circa Adalia. Mart 1845. Heldreich".

Isatis songarica var. *persica* Boiss. & Buhse in Nouv. Mém. Soc. Imp. Naturalistes Moscou 12: 27. 1860.

Type: "Wüste Ebene bei Dschendak, [Buhse] 6 April 1849 (deflorata). Gebirge bei Jesd, [Buhse] 24 April 1849 (fructu immaturo)".

Lectotypus (designated here): **Iran:** "Planitium ad Djendack", 1847, *Buhse s.n.* (G-BOIS [G00332622]; isolecto-: LE).

= ***Isatis minima*** Bunge, Del. Sem. Hort. Dorpat. 1843: 7. 1843.

Notes. – Label of the lectotype has "Persia. Dr. Buhse. 1847" pre-printed prior to collecting the material in 1849. It carries the species name handwritten perhaps by Buhse, but the locality in Boissier's handwriting.

The syntype from Yezd was not found in G-BOIS and is most likely housed at LE.

This varietal name was not mentioned in *Flora Orientalis,* though *I. songarica* was listed in the synonymy of *I. minima* Bunge. Furthermore, it was not mentioned under the treatment of the latter species in *Flora Iranica* (Hedge, 1968: 87).

Isatis campylocarpa Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 203. 1842.

Type: "[Aucher-Eloy] N. 204, Persia".

Holotypus: Iran: *sine loco,* s.d., *Aucher-Eloy 204* (P [P00741422]; iso-: G-BOIS [G00332621], W [W0050810]).

Notes. – The only material of the species in the Geneva herbaria is a fragment consisting of a tiny branch with two fruits and empty packet. Boissier annotated P00741422, as "*Isatis campylocarpa*! Boiss.", from which he took that tiny branch.

The Paris material is the only unicate that Boissier (1842b) used in his full description of the species, including details on the plant habit, basal leaves, flowers, and infructescence, all of which characters not found on the G-BOIS material. Therefore, the P unicate is recognized as the holotype.

Isatis raphanifolia Boiss., Diagn. Pl. Orient. 6: 19. 1846 (Fig. 36, p. 128).

Type: "Hab. in umbrosis prope *Gere* inter *Abuschir* et *Schiraz* et ad fontes petrolei prope *Dalechi* Kotschy No. 67".

Lectotypus (designated here): **Iran:** "In umbrosis promontorii prope Gere inter Abuschir et Schiras", 19.III.1842, *Kotschy 67* (G-BOIS [G00332624]; isolecto-: B [B100249767, B100249768], BM [BM001254137], E [E00386099], FI [FI005707], G [G00371779, G00371797, G00371781], GOET [GOET002622], HAL [HAL0081726], JE [JE00001301, JE00001302], K [K000642292], KW [KW000127954], L [L1837775], LE [LE00012924, LE00012925], P [P00580387, P00741486, P00741487, P00741488, P007414869], S [S0912354], US [US00324438], W [W0055930, W1889002398], WAG [WAG0003967], WU [WU0101804]). **Syntypus: Iran:** "Ad fontes petroleum fundentes ad Dalechi", III.1842, *Kotschy 67a* (G-BOIS [G00332623]).

Note. – The only specimens examined by Boissier are the two collections in his herbarium, and the one with duplicates is designated as the lectotype.

Isatis rugulosa Bunge ex Boiss., Fl. Orient. 1: 384. 1867.

Type: "Hab. in Persiâ inter Kerman et Yezd et inter Yezd et Ispahan (Bunge!)".

Lectotypus (designated here): **Iran:** "in desertis inter Kerman Jesd & Isfahan", IV.1859, *Bunge s.n.* (G-BOIS [G00332625]; isolecto-: G [G00446315], LE, P [P00741490, P00741491], W [W0050807]). **Syntypus: Iran:** "inter Kerman et Jesd", IV.1859, *Bunge s.n.* (B [B100249765], G [G00371794], K [K000642895], LE [LE00018183, LE00018186], NY [NY00185421], P [P00580388, P00741492, P00741493, P00741494], US [US000324437]).

Note. – The G-BOIS lectotype is a collection folder of two sheets, of which only one is labelled and barcoded.

Schimpera Hochst. & Steud. in Schimper, Pl. Arab. Exsicc. nº 244. 1835 [in sched.].

Tribe: *Isatideae* DC.

Note. – A monospecific genus, the type species of which is distributed in the deserts of Iran, Iraq, Israel, Jordan, Kuwait, Qatar, Saudi Arabia, Syria, and the United Arab Emirates.

Schimpera arabica var. *lasiocarpa* Boiss., Fl. Orient. 1: 384. 1867.

Type: "Hab. in deserto inter Nuckl et Gaza (Boiss!)".

Holotypus: Israel: "Intra Nuckl et Gaza. Arabia petraea", III.1846, *Boissier s.n.* (G-BOIS [G00332626]).

= ***Schimpera arabica*** Hochst. & Steud. in Schimper, Pl. Arab. Exsicc. no. 244. 1835 [in sched.].

Note. – No duplicates of the type collection were found. Boissier based the description of this variety solely on the unicate in his herbarium.

Schimpera persica Boiss., Diagn. Pl. Orient. 6: 18. 1846.

Type: "Hab in insulâ *Karek* sinus *Persici* Kotschy No. 7 florifera, prope *Dalechi Persiae australis* ad fontes petrolei No. 1009 fructifera".

Lectotypus (designated here): **Iran:** "Auf Sandboden im Schatten der Dattelbaume. Karrak", 30.XII.1841, *Kotschy 7* (G-BOIS [G00332628]; isolecto-: E [E00043019], G [G00446285, G00446286, G00446287], HAL [HAL0118322], JE [JE00004217], K [K000484436, K000484437], M [M9198940], MO [MO1930729], P [P00741588, P00741589, P00741590, P00741591, P00741592, P00741593], S [S1216129], W [W0075581]). **Syntypus: Iran:** "Ad fontes petroleum fundentes prope Dalechi", III.1842, *Kotschy 1009* (G-BOIS [G00332627], P [P00741595]) (Fig. 33, p. 125).

= ***Schimpera arabica*** Hochst. & Steud. in Schimper, Pl. Arab. Exsicc. nº 244. 1835 [in sched.].

Note. – The isolectotypes have an exsiccatae printed label with "In palmetis ins. Karek in Sinu Persico. D. 30. Dec. 1841. Th. Kotschy 7" indicated.

Moricandia DC. in Mém. Mus. Hist. Nat. 7: 243. 1821.

Tribe: *Brassiceae* DC.

Note. – A genus of eight species distributed in North Africa and SW Asia eastward into western Pakistan.

Moricandia sinaica (Boiss.) Boiss., Fl. Orient. 1: 386. 1867.

≡ *Brassica sinaica* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 85. 1842.

Type: "[Aucher-Eloy] N. 167, Sinai".

Holotypus: Egypt: "in Mte Sinaï", 1830, *Aucher-Eloy 167* (P [P02141433]; iso-: K [K000230234], W [W1889172258]).

Notes. – The type collection is apparently represented only by the three sheets above, and the holotype was annotated by Boissier. It is that sheet that Boissier studied and from which he drafted the species description, and no duplicates are found in any of the Geneva herbaria.

The type collection *(Aucher-Eloy 167)* was not cited by Boissier (1867a, 1888).

Moricandia dumosa Boiss., Diagn. Pl. Orient. 8: 25. 1849.

Type: "Hab. in omni Arabiâ petraeâ septentrionali copiosè a jugo *Tih* ad limites Palaestinae. Legi [Boissier] Aprili 1846".

Holotypus: Egypt: "Arabia petraea. Chaîne du Tih", III.1846, *Boissier s.n.* (G-BOIS [G00332629]; iso-: G [G00446288, G00446289, G00446312], K [K000653954, K000653955], KW [KW000127942], PH [PH00018408]).

= ***Moricandia nitens*** (Viv.) Durrand & Barratte, Prodr. Fl. Lib.: 15. 1910.

Notes. – The holotype is a collection folder of two sheets, of which one has a printed label with Boissier's handwriting of the locality and genus name in black ink and the species epithet and his name abbreviation in red ink. The other sheet has only the locality on two small labels holding the two plants.

The protologue erroneously indicates that Boissier collected the material in April instead of March, as evidenced from all the material examined, including the holotype.

Pinard collected material of the species in the same year, but his collections are not considered as part of the type gathering because Boissier always listed him whenever Pinard was the collector.

Moricandia clavata Boiss. & Reut. in Boiss., Diagn. Pl. Orient. ser. 2, 5: 25. 1856.

≡ ***Pseuderucaria clavata*** (Boiss. & Reut.) O.E. Schulz in Beibl. Bot. Jahrb. Syst. 54(3): 54. 1916.

Type: "*Moricandia teretifolia* Schimp. Pl. exs. Arab. Petr. Nº 205 non DC. Hab. in *Arabiâ petraeâ* Schimper! Boissier!".

Lectotypus (designated here): **Egypt:** "Ad rivulum salsum exsiccatum in WadiAtal. Arab. petr.", 17.III.1835, *Schimper 205* (G-BOIS [G00332631]; isolecto-: BM [BM001172159, BM001254050], E [E00372198, E00372199, E00372200, E00372202], FI [FI005688], G [G00446290, G00446291,

G00446292, G00446293], HBG [HBG506126, HBG506127, HBG506128], K [K000230443, K000230444], P [P02141431, P02141436, P02141437]). **Syntypus: Egypt:** "Arabia petraea. Desert du Tih", III.1846, *Boissier s.n.* (G-BOIS [G00332632]).

Note. – Boissier placed the species in unranked, presumably section, *Pseuderucaria* of *Moricandia* that was raised by Schulz (1916) to the generic rank.

Diplotaxis DC. in Mém. Mus. Hist. Nat. 7: 243. 1821.

Tribe: *Brassiceae* DC.

Note. – *Diplotaxis* includes 33 species that grow primarily in the Mediterranean region, with the center of diversity in NW Africa and SW Europe and fewer species in C Europe and SW Asia eastward into Pakistan and Nepal.

Diplotaxis tenuifolia var. *integrifolia* Boiss., Fl. Orient. 1: 387. 1867.

Type: "Hab. in Cariâ (Pinard!)".

Holotypus: Turkey: "Caria", 1843, *Pinard s.n.* (G-BOIS [G00332633]).

= ***Diplotaxis tenuifolia*** (L.) DC., Syst. Nat. 2: 632. 1821.

Notes. – The holotype is a collection folder of two labelled sheets, of which one has the varietal name.

No duplicates of the type collection were found in all of the major herbaria consulted for this research, but if they exist, it is highly unlikely that Boissier examined them. For this reason, the G-BOIS folder is recognized as the holotype.

Diplotaxis viminea var. *integrifolia* Boiss., Fl. Orient. 1: 388. 1867.

Type: "Hab. in Syriâ ad Berythum et Tripolim (Bl!), Hierosolymam (Auch. exs. 197! Boiss!)".

Lectotypus (designated here): **Israel:** "Jerusalem", s.d., *Aucher-Eloy 197* (G-BOIS [G00332636]; isolecto-: G [G00446294, G00446295], P [P05382206]). **Syntypi: Israel:** "Palaestina. Jerusalem", IV–V.1846, *Boissier s.n.* (G-BOIS [G00332634]). **Lebanon:** "Beyrouth A. C.", III.1850, *Blanche 1005* (G-BOIS [G00332635]).

= ***Diplotaxis viminea*** (L.) DC., Syst. Nat. 2: 635. 1821.

Note. – The isolectotype G00446295 was annotated by Boissier as *Brassica prolongii.*

Erucastrum C. Presl, Fl. Sicula: 92. 1826 [nom. cons.].

Tribe: *Brassiceae* DC.

Note. – A genus of about 25 species centered in the Iberian Peninsula and NW Africa, with fewer species into N Europe and others in SW Asia and eastern and South Africa.

Erucastrum arabicum Fisch. & C.A. Mey., Index Sem. Hort. Petrop. 5: 35. 1839.

≡ *Brassica schimperi* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 86. 1842 [nom. illeg.].

Note. – *Brassica schimperi* is illegitimate because Boissier (1842a) listed the earlier published *Erucastrum arabicum* as a synonym. Later Boissier in *Flora Orientalis* reversed the assignment and placed the former species in the synonymy of the latter.

Brassica L., Sp. Pl.: 666. 1753.

Tribe: *Brassiceae* DC.

Notes. – The tribe *Brassiceae* is notoriously complex, and none of the current molecular phylogenetic studies provided satisfactory data that agree with the current generic delimitation based solely on morphology (see Warwick & Sauder, 2005; Warwick & Hall, 2009; Arias & Pires, 2012; Arias et al., 2014).

Indeed, *Brassica,* which currently includes 44 species centered in the Mediterranean region and SW Asia, is polyphyletic and needs substantial nomenclatural adjustments to make it monophyletic. When that is done, the genus would be substantially smaller and may well end up including *B. oleracea* (*n*=9), *B. rapa* (*n*=10), and some of their wild relatives with such chromosome numbers (see Snogerup et al., 1990).

Therefore, with the exclusion of *B. cretica,* the other species retained here in *Brassica* are only tentatively assigned to the genus, and detailed molecular, morphological, cytogenetic, and genomic studies would most likely assign them to other genera.

Brassica nivea Boiss. & Spruner in Boiss., Diagn. Pl. Orient. 1: 72. 1843.

≡ ***Brassica cretica*** subsp. ***nivea*** (Boiss. & Spruner) M.A. Gust. & Snogerup in Bot. Chron. (Patras) 3: 8. 1983.

Type: "[Boissier] Hab. in fissuris rupium verticalium *Acrocorinthi* ubi Aprili ineunte montem totum elegantissimis ornat racemis".

Holotypus: Greece: "Rupes Acrocorinthi", IV.1842, *Boissier s.n.* (G-BOIS [G00332640]; iso-: BM [BM000750337], G [G00389480, G00389481], K [K000653810, K000653811, K000653812], KW [KW000127944], P [P05333502, P05333504, P05441735], UPS).

Notes. – The above combination was also superfluously published by Greuter & Burdet (Greuter & Raus, 1985: 64).

Label of the holotype, which was handwritten by Boissier, shows April as the month of collection, as in the protologue. However, labels of all isotypes, which are printed mimeographs in Boissier's handwriting, indicate March as the collection month. Because the plants of both holotype and isotypes are at the same developmental stage, and because there is only a single specimen of the species in G-BOIS, it is very likely that Boissier made a mistake in the month of collection. If it is shown otherwise, then the isotypes should be treated as syntypes.

Brassica nivalis Boiss. & Heldr. in Boiss., Diagn. Pl. Orient. ser. 2, 1: 32. 1854.

Type: "Hab. in rupibus ad nives *Olympi Thessali* rara (Heldr. Julio 1851)".

Holotypus: Greece: "In rupibus ad nives Olympi Thessaliae", 24.VII.1851, *Heldreich 2559* (G-BOIS [G00332641]; iso-: WU [WU0076059]).

Notes. – The systematic position of *Brassica nivalis* is controversial, and it has been assigned to at least five genera of the tribe *Brassiceae*. Although some authors placed the species in *Coincya* Rouy (Greuter & Burdet in Greuter & Raus, 1983; Greuter et al., 1986; Tan, 2002) or in *Guenthera* Andrz. (Gómez-Campo, 2003, see comments under *Brassica persica*), it is tentatively retained in *Brassica,* as done by Leadlay & Heywood (1990), Jalas et al. (1996), and Warwick & Al-Shehbaz (2006).

The species does not fit in *Coincya* because it drastically differs in floral morphology, geography, and chromosome numbers.

Brassica leptocarpa Boiss., Fl. Orient. 1: 392. 1867.

Type: "Hab. in Persiâ ad Hour-i-Sultan inter Ispahan et Teheran (Bunge!)".

Holotypus: Iran: "Hour-i-Sultan. Inter Isfahan et Teheran", V.1859, *Bunge 92* (G-BOIS [G00332642]; iso-: GOET [GOET002721], P [P05383350]).

= ***Brassica deflexa*** Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 87. 1842.

Notes. – The G-BOIS specimen is the sole material studied by Boissier to describe the species, and it should be recognized as the holotype.

Hedge (1968) recognized *B. leptocarpa* as a subspecies of *B. deflexa* and distinguished it by having fruit 3–4.5 (vs to 6) cm long and horizontal or deflexed (vs deflexed) fruiting pedicels 4–9 (vs 10–18) mm long. In fact these continuous characters are not inherited in that combination, and there are divaricate fruits on pedicels to 22 mm long or reflexed fruits on pedicels to 5 mm long. For these reasons, and without detailed, population-based studies, no infraspecific taxa are recognized in *B. deflexa*.

Brassica deflexa Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 87. 1842.

Type: "[Aucher-Eloy] N. 229. Propè Aleppum".

Holotypus: Syria: "Alep", s.d., *Aucher-Eloy 229* (G-BOIS [G00332643]; iso-: BM [BM000552447, BM000593490], G [G00446298, G00446299], K [K000653839, K000653840], P [P05325385, P05325392, P05325393]).

Note. – None of isotypes was annotated by Boissier.

Brassica deflexa var. *tigridis* (Boiss.) Boiss., Fl. Orient. 1: 393. 1867.

≡ *Brassica tigridis* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 87. 1842.

Type: "[Aucher-Eloy] N. 227, Mesopotamia ad Tigrim".

Holotypus: Sine Patria: "ad Tigrim", s.d., *Aucher-Eloy 227* (G-BOIS [G00332644]; iso-: G [G00446300], K [K000653842, K000653843]).

= ***Brassica deflexa*** Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 87. 1842.

Notes. – The holotype is a collection folder of four sheets all carrying the collection number, and one has the original Aucher-Eloy label and another the varietal name in Boissier's handwriting.

It is not possible to determine whether the type locality of this taxon falls in Turkey or Iraq in what is known as Kurdistan region of both countries.

Brassica lasiocalycina (Boiss. & Hausskn.) Boiss., Fl. Orient. Suppl.: 66. 1888.

≡ *Erucastrum lasiocalycinum* Boiss. & Hausskn. in Boiss., Fl. Orient. 1: 389. 1867.

Type: "Hab. in hortis graminosis Aleppi (Haussk!)".

Holotypus: Syria: "In hort. gram. Aleppo", 12.III.1865, *Haussknecht s.n.* (G-BOIS [G00332638]; iso-: B [B100241049], JE [JE00002582], W [W0075580, W18890055605]).

= ***Brassica deflexa*** Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 87. 1842.

Note. – The description of this species under *Brassica* and *Erucastrum* clearly reflects the blurry lines separating these two genera, a problem that persists to the present because both genera are polyphyletic and the characters separating them evolved independently several times in the tribe *Brassiceae* to which they belong (see below).

Brassica elongata var. *integrifolia* Boiss., Fl. Orient. 1: 394. 1867.

Type: "Hab. in Cappadociâ (Bal!), Armeniâ Turcicâ (Ky! Bourg!), Mesopotamiâ (Auch. exs. 253!), Persiâ boreali (Auch. exs. 219! Ky! Bunge!)".

Lectotypus (designated here): Turkey: "Moìssons.-Plaine de Césarée (Cappadoce)", 1107 m, VI.1856, *Balansa 443* (G-BOIS [G00332645]; isolecto-: G [G00446301], P [P05325375, P05325376], W [W18890069385]). **Syntypi:** Iran: *sine loco,* s.d., *Aucher-Eloy 219* (BM [BM000587780], G [G00446302], G-BOIS [G00332649], K [K000618652], P [P05325380, P05325381, P05325382]); "Champs incultes à Perguis à pies Baibout", 10.VII.1862, *Bourgeau 127* (G-BOIS [G00332648], P [P05325364, P05325365]); "Inter Teheran et Tabris pr. Tinkmedasch", VI.1859, *Bunge 87* (G-BOIS [G00332646]); "Chorassan, pr. Nischapur", VI.1859, *Bunge 93* (G-BOIS [G00332647], P [P05325360]); "Crescit ad Zylzyle Chan versus Erzerum", 4500' [1370 m], 28.VII.1859, *Kotschy 753* (G-BOIS [G00332650]).

= ***Brassica elongata*** Ehrh., Beitr. Naturk. 7: 159. 1792.

Notes. – The handwritten label of the lectotype has the elevation as 1107 m and the collection number as *Balansa 443,* whereas the mimeographed printed labels of the isolectotypes have 1200 m and *Balansa 1003,* respectively. Similar discrepancies are found in collections of other taxa and, therefore, it is believed that a single collection is meant here.

The syntype *Aucher-Eloy 253* was not located.

Boissier in *Flora Orientalis* recognized the plants he formerly (Boissier, 1842a) identified as *B. elongata* and later (Boissier, 1849) listed under *B. persica,* as the new var. *integrifolia* and cited additional collections besides the pair of Aucher-Eloy numbers (*219* and *253*) that he listed in his two earlier publications above.

The above duplicate P05325360 of *Bunge 93* is a "possible syntype" because it was collected in 1858.

Brassica persica Boiss. & Hohen. in Boiss., Diagn. Pl. Orient. 8: 26. 1849.

Type: "*Br. elongata* Boiss. Ann. Sc. Nat. 1842 non Ehrh. Hab. in *Mesopotamiâ* Aucher l. cit.! [n. 253] Persiâ Aucher loc. cit.! [n. 219] inter segetes ad *Teheran* Kotschy N° 32".

Lectotypus (designated here): Iran: "Inter segetes prope urbem Teheran", 17.IV.1843, *Kotschy 32* (G-BOIS [G00332651]; isolecto-: BM [BM000593489, BM001254154, BM001254155], G [G00446303, G00446304, G00446305], G-BOIS [G00332653], H [H1511099], K [K000653836, K000653837], KW [KW000127943], MO [MO3729750], P [P00580389, P04687356, P05325349, P05325351, P05325354]). **Syntypus:** Iran: *sine loco,* s.d., *Aucher-Eloy 219* (BM [BM000587780], G [G00446302], G-BOIS [G00332649], K [K000618652], P [P05325380, P05325381, P05325382]).

= ***Brassica elongata*** Ehrh., Beitr. Naturk. 7: 159. 1792.

Notes. – No specimens of *Aucher-Eloy 253* were found in the Geneva and Paris herbaria, though Boissier (1867a: 268, 394) listed that collection number under both *Alyssum alpestre* var. *suffrutescens* and *Brassica elongata* var. *integrifolia*.

Both P05325380 and P05325382 were annotated by Boissier as "*Brassica elongata* W.K.".

The species was reduced by Boissier (1867a: 394) to synonymy of the previous entry.

Brassica persica has recently been transferred by German (2015) to *Guenthera,* a genus resurrected by Gómez-Campo (2003) to include nine species that he separated from *Brassica* on the basis of morphological characters and chromosome numbers.

As shown by Warwick & Sauder (2005) and Warwick & Hall (2009) nuclear and chloroplast markers did not provide support for the monophyly of *Guenthera* sensu Gómez-Campo, though the chloroplast data by Arias & Pires (2012) showed that the four *Guenthera* species they examined formed a well-supported monophyletic clade. While *Guenthera* might be the ultimate generic home for these species, they are temporarily retained in *Brassica,* with the hope of seeing a more comprehensive, genus-wide taxonomic adjustments for all species currently assigned to the latter genus.

Brassica willdenovii Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 88. 1842.

– *Sinapis integrifolia* sensu Willd., Hort. Berol. 1: tab. 14. 1804 [non H. West].

Type: "*Sinapis integrifolia* Wild. [Aucher-Eloy] Mascate absque numero".

Holotypus: Oman: "Muscat", s.d., *Aucher-Eloy 1078* (P [P05383513]).

= ***Brassica juncea*** (L.) Czern., Conspect. Pl. Charc.: 8. 1859.

Notes. – Boissier in *Flora Orientalis* placed *Brassica willdenowii* and *Sinapis integrifolia* in the synonymy of *S. juncea* L., a species currently recognized as *Brassica juncea*.

No material of the species was located in the Geneva herbaria, and the holotype sheet was annotated by Boissier as "*Brassica willdenowii*! Boiss. *Sinapis integrifolia* Willd.". *Brassica willdenowii* remained in ambiguity for over 175 years until the above discovery of the holotype.

Eruca Mill., Gard. Dict. Abr. ed. 4. 1754.

Tribe: *Brassiceae* DC.

Note. – A genus of four species native to NW Africa and SW Europe, with one subspecies as a crop and cosmopolitan weed (see below).

Eruca cappadocica Reut. ex Boiss., Diagn. Pl. Orient. ser. 2, 6: 13. 1859.

Type: "Hab. in planitie *Koniah Asiae minoris* cl. de Heldr. pl. exs. 1845, Nº 1289 sub. *Er. sativâ,* inter segetes *Cappadociae* propè *Enehil* alt. 1460 metr. cl. Balansa Nº 445".

Lectotypus (designated here): **Turkey:** "Jardins Moissous.-Village d'Enéhil (Cappadoce)", 1460 m, IX.1856, *Balansa 445* (G-BOIS [G00332655]). **Syntypus: Turkey:** "Plaine de Koniah près de Soulimanhatsi au pied du Karadagh", 19.VI.1845, *Heldreich 1289* (G-BOIS [G00332656]).

= ***Eruca vesicaria*** subsp. ***sativa*** (Mill.) Thell. in Hegi, Ill. Fl. Mitt.-Eur. 4: 201. 1918.

Notes. – *Eruca vesicaria* is one of the most variable species in the tribe *Brassiceae* due to its weediness and successful escape from cultivation as the salad crop arugula (English) or roquette (French) or as a source of industrial oil.

There is tremendous diversity in floral and leaf morphology, coupled with a greater variability in fruit length, width, seed size and number, and length of the apical segment "beak" relative to that of the proximal valvular segment.

All attempts in the past to accord species, subspecies, or varietal ranks to some of the variants led to further confusion, and the taxonomy of this complex is best served by the recognition of one species with two subspecies. The subsp. *vesicaria* has persistent calyx and is endemic to Spain, including the Balearic Islands, whereas subsp. *sativa* has readily deciduous calyx and is the cosmopolitan weed and cultivated crop.

Eruca cappadocica var. *eriocarpa* Boiss., Fl. Orient. 1: 396. 1867.

Type: "Hab. in insulâ Cypro (ex Sibth.)".

Holotypus: Cyprus: "In insula Cypro", s.d., *Sibthorp s.n.* (OXF).

= ***Eruca vesicaria*** subsp. ***sativa*** (Mill.) Thell. in Hegi, Ill. Fl. Mitt.-Eur. 4: 201. 1918.

Note. – We have not examined the type collection, and Meikle (1977: 105) maintained it as a variety of *Eruca sativa* Mill.

Eruca lativalvis (Boiss.) Boiss., Fl. Orient. 1: 396. 1867.

≡ *Brassica lativalvis* Boiss., Diagn. Pl. Orient. 6: 12. 1846.

Type: "Hab. ad sinum *Persicum* Aucher No. 4169. D., in *Persiâ australi* Kotschy No. 896".

Lectotypus (designated here): **Iran:** "ad Sinum Persicum", s.d., *Aucher-Eloy 4169D* (G-BOIS [G00332653]; isolecto-: BM [BM001254145, BM001254146], FI [FI010153], G [G00371680, G00371695], K [K000653894]). **Syntypus: Iran:** "In m. Kuh-Ajub. Prope ruinas Persepolis.", IV.1842, *Kotschy 896* (BM [BM001254144], G [G00371693], G-BOIS [G00332654]).

= ***Eruca vesicaria*** subsp. ***sativa*** (Mill.) Thell. in Hegi, Ill. Fl. Mitt.-Eur. 4: 201. 1918.

Note. – *Kotschy 896* has well-developed broad fruits that reflect the name "*lativalvis*". However, Aucher-Eloy's collection is designated as the lectotype because it is more complete and represented by more duplicates.

Savignya DC. in Mém. Mus. Hist. Nat. 7: 231. 1821.

Tribe: *Brassiceae* DC.

Note. – A monospecific genus of desert annuals distributed throughout North Africa eastward into southern SW Asia to Afghanistan and Pakistan.

Savignya aegyptiaca var. *oblonga* Boiss., Diagn. Pl. Orient. 8: 31. 1849.

Type: "Hab. inter frutices in arenosis vallis *Wadi Mokatteb* jugi *Sinaitici* ubi legi [Boissier] Mart. 1846".

Holotypus: Egypt: "Arabia petraea. Wadi Mokatteb", III.1846, *Boissier s.n.* (G-BOIS [G00332657]; iso-: G [G00446313], K [K000230245]).

= ***Savignya parviflora*** (Delile) Webb in Giorn. Bot. Ital. 2(2): 215. 1849.

Note. – The holotype is a collection folder of three sheets, of which labels of two have the locality as "Wadi Mokatteb" and the collection date. The third sheet has the varietal name in Boissier's handwriting, and its plants have only the collection date.

Enarthrocarpus Labill., Icon. Pl. Syr. 5: 4. 1812.

Tribe: *Brassiceae* DC.

Note. – A genus of five species distributed in North Africa and the eastern Mediterranean from the Balkan Peninsula eastward into Pakistan.

Enarthrocarpus strangulatus Boiss., Diagn. Pl. Orient. 8: 44. 1849.

Type: "Hab. in *Aegypto* (Aucher! Husson!), in *Arabiâ petreâ* versùs Palaestinam copiosè. (Boiss.)".

Lectotypus (designated here): Israel: "Arabia petraea versus Palestinam", IV.1846, *Boissier s.n.* (G-BOIS [G00332660]; isolecto-: G [G00446306, G00446307], K [K000230266, K000230267], KW [KW000127940], P [P00741640], PH [PH00012115]). **Syntypi:** Egypt: *sine loco,* s.d., *Aucher-Eloy 188* (G-BOIS [G00332659]); "Mabaroh", s.d., *Husson s.n.* (G-BOIS [G00332658]). Israel: "Arabia petraea versus Palestinam", III.1846, *Boissier s.n.* (G [G00446318], G-BOIS [G00332661]) (Fig. 34, p. 126).

Notes. – There is a single collection folder in G-BOIS with four sheets. One sheet, which is barcoded, was collected by Boissier in April 1846 and has a label with the locality in Boissier's handwriting (Fig. 34, p. 126). The remaining three sheets are unlabeled, and their fruit maturity is much more similar to the lectotype rather than to the syntype G00332661.

Another specimen was also collected by Boissier in March 1846, but with a printed label annotated by Boissier, it is listed above as a syntype.

Enarthrocarpus tragicerus Boiss. & Hausskn. in Boiss., Fl. Orient. Suppl.: 67. 1888.

Type: "Hab. in graminosis Persiae australis inter Kumaredj et Dalechi (Haussk.!)".

Holotypus: Iran: "In gramin. inter Kumaredj et Dalaki", 1000'–3000' [300–910 m], IV.1868, *Haussknecht s.n.* (G-BOIS [G00332663]; iso-: JE [JE00000249], W [W0044940]).

= ***Brassica aucheri*** Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 88. 1842.

Notes. – The holotype is a collection folder of two sheets with identical labels and one in flower and the other in fruit. The first author erroneously annotated the sheet with fruiting plants in 1984 as holotype and the flowering one as isotype. However, they both represent one gathering that was too large to mount on one sheet.

The systematic position of this taxon has been controversial, and it is tentatively placed here in *Brassica,* though that generic assignment is tenuous at best. A summary of the taxonomic confusion is presented under *Raphanus aucheri* (see below).

Raphanus L., Sp. Pl.: 669. 1753.

Tribe: *Brassiceae* DC.

Note. – A genus of three species centered in the Mediterranean region, with one weedy species, another (radish or radis) cultivated and naturalized, and a third endemic to Israel and Jordan.

Raphanus pugioniformis Boiss., Diagn. Pl. Orient. 8: 46. 1849.

Type: "[Boissier] Hab. in totâ *Galilaeâ* septentrionali a monte *Ithabure* ad *Banias* in pinguibus herbidis frequens".

Holotypus: Israel: "Galilea. Palaestina", IV–V.1846, *Boissier s.n.* (G-BOIS [G00302007]; iso-: G [G00223997, G00223998, G00446321], GOET [GOET008304], K [K000653896, K000653897], KW [KW000127939], P [P00741703, P00741704, P00741705], ZT [ZT00013962]) (Fig. 35, p. 127).

Notes. – The holotype is a collection folder of four sheets.

Status of this taxon had fluctuated a great deal from being accepted as a distinct species (Post, 1896: 17, 1932: 127), as variety of *R. rostratus* DC. (Schulz, 1919: 202; Zohary, 1966: 326; Mouterde, 1970: 117), or a synonym of *R. raphanistrum* subsp. *rostratus* (DC.) Thell. (Greuter et al., 1986: 150).

The molecular phylogenetic study by Ziffer-Berger et al. (2014) provides a strong support for the recognition of this taxon as a distinct species with a characteristically long, seedless beak to 9 cm long.

Raphanus raphanistrum var. *brevistylus* Boiss., Fl. Orient. 1: 401. 1867.

Type: "Hab. in littora Euxini circa Trapezuntem (Huet!)".

Holotypus: Turkey: "Bord de la mer noire à 1 h. de Trebusonde", s.d., *Huet du Pavillon s.n.* (G-BOIS [G00332667]).

= ***Raphanus raphanistrum*** L., Sp. Pl.: 669. 1753.

Note. – No duplicate of this collection was found in the other Geneva herbaria, and it is best to treat the unicate as the holotype for now.

Raphanus aucheri (Boiss.) Boiss., Diagn. Pl. Orient. 8: 45. 1849.

≡ ***Brassica aucheri*** Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 88. 1842.

Type: "[Aucher-Eloy] N. 203. Mossul".

Lectotypus (designated here): Iraq: "Mosul", s.d., *Aucher-Eloy 203* (G-BOIS [G00332666]; isolecto-: P [P00741698]).

Notes. – Boissier annotated P00741698, and that means he based the species description on the two duplicates above and the lectotypification is then justified.

In treating *B. aucheri* as *Raphanus,* Boissier (1849: 45, 1867a: 401) confused two unrelated species that superficially resemble each other in flower color and reflexed fruit.

Schulz (1919) recognized that problem and treated (p. 209) the eastern Mediterranean species (N Israel, Lebanon and W Syria) as *R. aucheri,* and assigned (p. 135) the plants from Iran and Iraq to *Sinapis aucheri* (Boiss.) O.E. Schulz. However, the name *Raphanus aucheri* was a combination based on the same type of *Brassica aucheri* and, therefore, Schulz added to the confusion.

Both Al-Shehbaz (1985) and Baillargeon (1985) discussed the history and distribution of both species, and the name *Raphanus boissieri* Al-Shehbaz, which was proposed for the eastern Mediterranean species, was illegitimate to the earlier published *Quidproquo confusum* Greuter & Burdet (Greuter & Raus, 1983). Although the status of the last name was accepted by some (e.g., Baillargeon, 1985; Greuter et al., 1986: 149) and rejected by others (e.g., Al-Shehbaz, 2012), recent molecular studies by Ziffer-Berger et al. (2014) have firmly established *Quidproquo* Greuter & Burdet as a distinct genus.

Fortuynia Shuttlew. ex Boiss. in Ann. Sci. Nat., Bot. ser. 2, 16: 379. 1841.

Tribe: *Brassiceae* DC.

Note. – A monospecific genus distributed in Afghanistan, Iran, and Pakistan.

Fortuynia aucheri Shuttlew. ex Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 178. 1842.

Type: "[Aucher-Eloy] N. 4145, Bender Abassy, Persiâ australia."

Holotypus: Iran: "Bender Abbassy", s.d., *Aucher-Eloy 4145* (G-BOIS [G00796798]; iso-: G [G00371687, G00371689], K [K000653944], P [P00741663, P00741664, P00741665]).

= ***Fortuynia garcinii*** (Burm.) Shuttlew. ex Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 178. 1842.

Note. – None of the above six duplicates at G, K, or P was annotated by Boissier and, therefore, the unicate in G-BOIS is the holotype.

Fortuynia bungei Boiss., Fl. Orient. 1: 402. 1867.

Type: "Hab. ubique in Persiâ australi trans desertum magnum et inter Yezd et Ispahan (Bunge!). in deserto circa Djendack (Buhse!), in Affghaniâ occid. ad Anarderch (Bunge!)".

Lectotypus (designated here): Iran: "inter Jesd et Isfahan", V.1859, *Bunge s.n.* (G-BOIS [G00332669]; isolecto-: P [P00741667, P00741668]). **Syntypus:** Iran: "Persia", 1847, *Buhse 1259* (G-BOIS [G00332668], LE).

= ***Fortuynia garcinii*** (Burm.) Shuttlew. ex Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 178. 1842.

Notes. – The lectotype is a collection folder of two sheets, the label of one is handwritten by Bunge and the other has a printed label and the species name in Boissier's handwriting.

No material of Bunge from Afghanistan was found in the Geneva herbaria, and it is likely that such material is at LE. Of the six sheets collected by Bunge and deposited at P, only the above two probably qualify for isolectotypes, though the printed label indicate April instead of May 1859, and the locality data was written in pencil that almost completely faded away.

Although Hedge (1968: 52–53) and Jafri (1973: 43) recognized two species in *Fortuynia,* the former author correctly observed that there is a continuous variation in fruit morphology from being typically emarginate and as long as wide *(F. bungei)* to the acute or slightly emarginate and longer than broad *(F. garcini)* and that such variation can be found within the same population. Therefore, the genus is recognized here as monospecific instead of dispecific (Al-Shehbaz, 2012).

Physorhynchus Hook. in Icon. Pl. 5: tab. 821, 822. 1851.

Tribe: *Brassiceae* DC.

Note. – A genus of two species distributed in Afghanistan, Iran, Oman, Pakistan, and United Arab Emirates.

Zilla schouwioides Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 382. 1842.

Type: "[Aucher-Eloy] N. 4146, Persia australis".

Holotypus: Iran: "Pers. australis", s.d., *Aucher-Eloy 4146* (G-BOIS [G00332671]; iso-: BM [BM001254147, BM001254148], G [G00446308, G00446309], K [K000653941], KW [KW000127941], P [P00741672, P00741673], W [W0075579]).

= ***Physorhynchus chamaerapistrum*** (Boiss.) Boiss., Fl. Orient. 1: 403. 1867.

Note. – The specimen in G-BOIS is the holotype because Boissier (1842c) based the species description solely on it.

Physorhynchus chamaerapistrum (Boiss.) Boiss., Fl. Orient. 1: 403. 1867.

≡ *Zilla chamaerapistrum* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 381. 1842.

Type: "[Aucher-Eloy] N. 4169 A, Persia australis".

Lectotypus (designated here): **Iran:** *sine loco,* s.d., *Aucher-Eloy 4169A* (G-BOIS [G00332670]; isolecto-: BM [BM001254149, BM001254159], G [G00371873], K [K000653942], P [P00580390, P00741675, P00741676, P00741677]).

Note. – Because Boissier (1842c) based his species description on the unicate sheet in his herbarium and on P00580390 that he annotated, the lectotypification is justified. The above other sheet at G was not examined by Boissier.

Didesmus Desv. in J. Bot. Agric. 3: 160. 1815.

Tribe: *Brassiceae* DC.

Note. – A genus of two species distributed in the eastern Mediterranean. However, the following species does not belong to this genus as assigned by Boissier in *Flora Orientalis*.

Didesmus rostratus Boiss., Fl. Orient. 1: 405. 1867.

Type: "Hab. in Palaestinâ (Roth!)".

Holotypus: Israel: "Palestina", s.d., *Roth 994* (G-BOIS [G00332673]).

= ***Erucaria rostrata*** (Boiss.) A.W. Hill ex Greuter & Burdet in Willdenowia 15: 419. 1986.

Note. – This is the last of most of the entries above in the tribe *Brassiceae* where Boissier describes a novelty in a genus and subsequently either him or others place it in another. The situation reflects the need to draw the generic lines in the tribe on more solid grounds.

Crambe L., Sp. Pl.: 671. 1753.

Tribe: *Brassiceae* DC.

Note. – A well-defined genus of 37 species distributed in Macaronesia, Eurasia to western China, and from Tanzania northward into Scandinavia (Prina, 2009; Prina & Martínez-Laborde, 2008).

Crambe kotschyana Boiss., Diagn. Pl. Orient. 6: 19. 1846.

Type: "Hab. ad latera occidentalia montis *Sabst Buschom* prope Schiraz. Kotschy No. 380".

Lectotypus (designated here): **Iran:** "Ad latera occid. spectantia m. Sabst-Buschom pr. u. Schiras", 14.V.1842, *Kotschy 380* (G-BOIS [G00330471]; isolecto-: BM [BM000521176, BM000522982], E [E00042585], FI [FI005712], G [G00389494, G00389495, G00389496], H [H1350881], HAL [HAL0080982], JE [JE00006108], K [K000653909], L [L1834828], LE [LE00012944, LE00012945], MO [MO830199, MO3830200], MPU [MPU013479], P [P00741683, P00741684, P00741687, P00741688, P00741689], US [US00099990], W [W0051060, W18890029619], WAG [WAG0000793, WAG0000794, WAG0000795, WAG0000796], WU [WU0101805]).

Notes. – The name needs lectotypification because Boissier examined and annotated the duplicate at FI and based the species description on it and the duplicate in G-BOIS.

Although Hedge (1968: 46) indicated that the type is at W, none of the two W duplicates of *Kotschy 380* is acceptable because they were not examined or annotated by Boissier. Furthermore, W0051060 has the year of collection as 1841 instead of 1842 and lacks the locality data.

The lectotype in G-BOIS is a collection folder of three sheets all carrying the collection number but missing the date of gathering and two of which carrying locality data. The three isolectotypes at G each consists of two sheets in a collection folder.

Crambe quadricostata Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 388. 1842.

Type: "[Aucher-Eloy] N. 179, Mesopotamia".

Holotypus: Sine Patria: "Mesopotamia", s.d., *Aucher-Eloy 179* (G-BOIS [G00330472]; iso-: G [G00446310, G00446311], K [K000653911], P [P05408797, P05408804]).

= ***Crambe orientalis*** L., Sp. Pl.: 671. 1753.

Notes. – It is not possible to determine the country of origin of the type collection, and it could be Iraq, Syria, or Turkey.

Boissier in *Flora Orientalis* reduced the species to synonymy of *C. orientalis*.

Crambe orientalis var. *aucheri* (Boiss.) Boiss., Fl. Orient. 1: 407. 1867.

≡ *Crambe aucheri* Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 388. 1842.

Type: "[Aucher-Eloy] N. 180, Syria".

Lectotypus (designated here): **Syria:** *sine loco,* s.d., *Aucher-Eloy 180* (G-BOIS [G00330473]; isolecto-: G [G00441286, G00441553], K [K000653916, K000653917], P [P00741691, P00741692, P00741693]).

= ***Crambe orientalis*** L., Sp. Pl.: 671. 1753.

Note. – Boissier examined both G00441286 and the G-BOIS specimens, but none of the other duplicates, in drafting the species description and therefore the name needed lectotypification. The specimen in G-BOIS is a fruiting material without leaves, and the original description provides a good description of leaves that was most likely taken from the former duplicate.

Crambe persica Boiss. in Ann. Sci. Nat., Bot. ser. 2, 17: 389. 1842.

Type: "[Aucher-Eloy] N. 4131, Demavend".

Lectotypus (designated here): **Iran:** "Demavend", s.d., *Aucher-Eloy 4131* (G-BOIS [G00332129]; isolecto-: G [G00441285], K [K000653918], P [P00741694, P00741695]).

= ***Crambe orientalis*** L., Sp. Pl.: 671. 1753.

Note. – Boissier (1842c) based the species description on the material in his herbarium and on P00741695 that he annotated.

Bunias L., Sp. Pl.: 669. 1753.

Tribe: *Buniadeae* DC.

Note. – *Bunias* includes only two Eurasian species.

Bunias erucago var. *echinata* Boiss., Fl. Orient. 1: 409. 1867.

Type: "Hab. in Syriâ circa Elmalu".

Holotypus: Turkey: "Elmali Champs", 14.VI.1860, *Bourgeau s.n.* (G-BOIS [G00332674]).

= ***Bunias erucago*** L., Sp. Pl.: 670. 1753.

Note. – No duplicate was found in any of the herbaria consulted and therefore the G-BOIS unicate is recognized as the holotype.

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