

Zeitschrift: Candollea : journal international de botanique systématique = international journal of systematic botany
Herausgeber: Conservatoire et Jardin botaniques de la Ville de Genève
Band: 35 (1980)
Heft: 1

Artikel: A contribution to the Iraqi Rosaceae
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DOI: <https://doi.org/10.5169/seals-880094>

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A contribution to the Iraqi Rosaceae

EMIL HADAČ
&
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RÉSUMÉ

HADAČ, E. & J. CHRTEK (1980). Contribution à l'étude des Rosaceae d'Iraq. *Candollea* 35: 311-328. En anglais, résumé français.

Les auteurs présentent des données sur la répartition de 29 espèces et sous-espèces de la famille des *Rosaceae* qu'ils ont collectionnées en Iraq. Quatre taxa sont décrits comme nouveaux: *Crataegus kurdistanica*, *C. sakranensis*, *Sorbus shirinensis* et *Amygdalus carduchorum* Bornm. var. *macrocarpa*. Les cartes de répartition géographique sont dressées à partir de nos données originales et de renseignements tirés de la "Flora Iranica" et de la "Flora of Iraq". Le genre *Alchemilla* est traité séparément par M. Fröhner.

ABSTRACT

HADAČ, E. & J. CHRTEK (1980). A contribution to the Iraqi Rosaceae. *Candollea* 35: 311-328. In English, French abstract.

The authors present records of 29 species and subspecies of the family *Rosaceae*, collected by one of us in Iraq. Four taxa are described as new: *Crataegus kurdistanica*, *C. sakranensis*, *Sorbus shirinensis* and *Amygdalus carduchorum* Bornm. var. *macrocarpa*. Maps of distribution were prepared from our own data and from the information in the "Flora Iranica" and "Flora of Iraq". The genus *Alchemilla* is treated separately by S. Fröhner.

In our former contributions we have dealt with grasses (CHRTEK & HADAČ, 1969, 1970) and with the *Brassicaceae* (HADAČ & CHRTEK, 1973). In this paper, we present some notes on the Iraqi *Rosaceae*, collected by E. Hadač in the years 1959-1961 and deposited in the National Museum, Department of Botany, Průhonice (PR). Further information may be found in CHRTEK & HADAČ (1969).

LIST OF SPECIES

Agrimonia eupatoria L. subsp. *eupatoria*

MRO: in decliviis calcareis supra vicum Zeyta, 19.6.1961, *Hadač* 5925; ad viam inter Derbend and Haji Omran, in horto, 13.6.1960, *Hadač* 2566. Det. V. Skalický.

Agrimonia eupatoria L. subsp. *asiatica* (Juz.) Skalický var. *villosa* Skalický

LCA: Baghdad, Aadhamiya, in horto botanico universitatis subspontanea nec culta, 15.5.1961, *Hadač* 4656; ad subspeciem grandem (Andrz. ex Aschers. & Graebn.) Bornm. vergens. Det. V. Skalický.



Map 1. — ● *Agrimonia eupatoria* subsp. *eupatoria*; ● subsp. *orientalis*.
Agrimonia eupatoria subsp. *eupatoria*, eurosiberian, in Iraq in an area with more than 700 mm annual rainfall in an oak region. *A. eupatoria* subsp. *orientalis*, from Europe to Afghanistan. In Iraq in the grass steppe zone on brown and chestnut soils with 380-900 mm annual rainfall. In Baghdad subspontaneous.



Map 2. — ● *Amygdalus arabica*.

Amygdalus arabica grows in Syria, Lebanon, Jordan, Turkey and Iran; in Iraq on sierozem in the grass steppe and brown soils in the oak forest region up to 1500 m alt., with about 100 mm up to 1000 mm annual rainfall, outside the area of saline soils.

***Amygdalus arabica* Oliver**

MAM: Madhiq ad meridiem a Zakho, 21.3.1961, *Hadač* 3730.

MSU: Shaqlawa, 11.4.1960, *Hadač* 1385.

Very variable especially in the form of the stone, which might be oval to elliptic or even spherical. The last form can be seen e.g. in the Nefud (Arabia). This character could be used perhaps for infraspecific taxonomy, but more material is needed.

Amygdalus carduchorum* Bornm. subsp. *carduchorum

MRO: Sarcal, ripa dextra rivuli sub monte Helgurd, 2190 m, 5.6.1960, *Hadač* 2191; Sarcal, vallis Nowandae ripa dextra, 2220 m, 9.6.1960,

Hadač 2332; in valle Hassar-i-Sakran, 7.5.1961, *Hadač* 5676; inter vicos Sheikhan et Sakri Sakran, 5.6.1961, *Hadač* 5397.

Our material is glabrous or scattered hairy with all transitions.

***Amygdalus carduchorum* Bornm. subsp. *serrata* Browicz**

Studied material differs from the subspecies, as described by Browicz, having very big fruits. It seems to be a new variety.

Amygdalus carduchorum* Bornm. subsp. *serrata* Browicz var. *macrocarpa* Hadač & Chrtek var. *nova

Frutex ramis cinerascentibus, ramulis haud spinescentibus, foliis brevissime petiolatis 3-4.5 cm longis, 3-6 mm latis, glaberrimis, distincte serrulatis; drupae (18-)22-24 × 16-19 mm, subtomentosae.

Typus. MRO: declivio boreali montis Potine, 1900 m, 20.6.1961, leg. *E. Hadač, A. D. Q. Agnew et R. W. Haines; Hadač* 6090; in herbario PR asservatur.

A subsp. *carduchorum* nec non a subsp. *serrata* Browicz praecipue drupis multo maioribus, a subsp. *carduchorum* foliis distincte serratis differt.

***Amygdalus kotschyi* Boiss. & Hohen.**

MRO: in cota 2530 m supra Sarcal, alt. 2520 m, 5.6.1960, *Hadač* 2262; Sarcal, ripa rivuli dextra, 2200 m, in Aethionemeto, 4.6.1960, *Hadač* 2692; declivio boreali cotae 2450 m supra Sarcal, alt. 2350 m, 5.6.1960, *Hadač* 2257.

Amygdalus orientalis* Duh. subsp. *orientalis

MRO: summo Kopi Qaradagh, 29.5.1961, *Hadač* 5176; declivio boreali montis Pira Magrun, 28.5.1960, *Hadač* 2007.

***Cerasus brachypetala* Boiss.**

MRO: in valle Hassar-i-Sakran, 7.6.1961, *Hadač* 5679; in declivio boreali montis Potine, 20.6.1961, *Hadač* 6167.

Our material fits well with var. *bornmülleri* (Schneider) Browicz.

***Cerasus mahaleb* (L.) Miller**

MRO: declivio boreali montis Potine, 20.6.1961, *Hadač* 6051; ad rivulum sub fonte Kani Mâm Shirin, 22.6.1961, *Hadač* 6045.



Map 3. — ○ *Cerasus mahaleb*; ● *Amygdalus carduchorum*.

Cerasus mahaleb ranges from Southern Europe to Central Asia and Tian Shan. In Iraq in a region with more than 800 mm annual rainfall, at the altitude of 1200-2350 m. *Amygdalus carduchorum* is endemic in Kurdish mountains. 1500-2450 m alt. in Iraq.

VASILČENKO (1973) separated this species in a new genus *Padellus* Vas. This was already accepted by some Soviet botanists. Considering that there are only few diacritical characters separating this proposed genus from *Cerasus* resp. *Prunus*, we think it best to hold this species in the genus *Cerasus*.

***Cerasus microcarpa* (C. A. Meyer) Boiss.**

- MRO: ad fontem Kani Mâm Shirin, prope pagum Zeyta, 22.6.1961, *Hadač 6011*; declivio boreali montis Potine, 20.6.1961, *Hadač 6070*; ripa rivuli sub pago Sakri Sakran, alt. 1900 m, 6.6.1961, *Hadač 5878*.
 MSU: declivio montis calcarei supra vicum Khormal, montes Avroman, 27.5.1961, *Hadač 5063*; Shaqlawa, 11.4.1960, *Hadač 1386*.

Our material is very variable in size and shape of fruits and stones, as well as in hairiness of leaves. They are almost glabrous in some samples, in others more or less pubescent. We were not able to place them with certainty either in subsp. *tortuosa* (Boiss. & Hauskn.) Browicz, or in subsp. *microcarpa*; most of our material is of transitional character between the two subspecies.

Cotoneaster racemiflora (Desf.) K. Koch

MRO: ad fontem Kani Mâm Shirin prope vicum Zeyta, ad pedem montis Potine, 20.6.1961, *Hadač* 5976; declivio boreali montis Potine, 22.6.1961, *Hadač* 6072, 6073; Zeyta, 19.6.1961, *Hadač* 5888; in valle Hassar-i-Sakran, 7.6.1961, *Hadač* 5696; Sarcal, ad pedem montis



Map 4. — ○ *Crataegus aronia*; ● *Amygdalus orientalis*.

Crataegus aronia is an Eastern-Mediterranean species, in the oak forest region with more than 700 mm annual rainfall, in 700-1850 m alt. *Amygdalus orientalis* grows in mountains of Syria, Turkey, Iran and Iraq. In Iraq practically in the same area as *C. aronia*, 900-2000 m alt.

Helgurd, 2200 m, 4.6.1960, *Hadač 2120*; ad vicum Naprdan, 5.6.-1961, *Hadač 5369* (fruits in this sample nearly glabrous).

MSU: Benawa Suta prope Penjwin, 26.5.1961, *Hadač 4956*.

The Iraqi material of *Cotoneaster* is very variable as to the shape and hairiness of leaves and the hairiness of twigs. In recognising this species we are following MEIKLE (1966).

***Crataegus aronia* (L.) Bosc ex DC.**

MRO: ad vicum Sakri Sakran prope rivum, alt. 1900 m, 6.6.1961, *Hadač 5608*; inter vicos Sheikhan et Sakri Sakran, 5.6.1961, *Hadač 5424*.

MSU: loco Benawa Suta prope opp. Penjwin, 26.5.1961, *Hadač 4838*; in decliviis supra opp. Penjwin, 26.5.1961, *Hadač 4907, 4861*; summo monte Kopi Qaradagh, 29.5.1961, *Hadač 5182*.

***Crataegus kurdistanica* Hadač & Chrtek species nova**

Frutex circa 2 m alta; rami juveniles villosi, vetustiores glabrescentes rubrobrunnei, spinae circa 1 cm longae; petiolus 5-8(-12) mm longus, lamina \pm 4 cm longa et 3 cm lata, villosa, ovato-rhomboida, basi cuneata, ad tertiam partem vel paulo plus incisa, lobis tribus acutis, grosse paucidentatis, supra subtusque sat dense pilosa, superne triste viridis, subtus cinereo-viridis; inflorescentiae 10-14 flores, pedicellis sat dense villosis, 2-3 cm longis; sepala ovato-triangularia, reflexa, circa 2 mm longa et 2 mm lata, infra dense, supra sparse villosa. Petala alba, 6-7 mm longa, circa 6 mm lata, antherae 16, plus minusve 6 mm longae, glabrae; styli tres, staminibus paulo breviores; discus pilosus, receptaculum infundibuliforme, villosum. Fructus ignotus.

Typus. MRO: Hassar-i-Sakran, alt. 2400-2800 m, 7.6.1961, leg. *E. Hadač et Faisal abd-el-Kader*; *Hadač 5620*; in herbario PR asservatur.

C. kurdistanica stands probably nearest to *C. meyeri* Pojark., but *C. kurdistanica* has a higher number of styles, 3 instead of 2, and leaves are more densely hairy. Our material has also twigs reddish brown, hairy when young, later glabrescent, whereas in *C. meyeri* are "twigs greyish brown, finely fissured" (MEIKLE, 1966: 118). In our material, petiols are very short, only 5-8 mm, rarely to 12 mm long, whereas in *C. meyeri* they are 1-2.5 cm long. Petals seem to be somewhat broader than in *C. meyeri*, where they are 3-5 mm in diam., in our material circa 6 mm. Stamens are distinctly longer than in *C. meyeri*. (\pm 6 mm), in *C. meyeri* 4-5 mm.

MEIKLE (1966: 118) has an interesting note in discussing *C. meyeri*: "One specimen (MRO, Rayat, 1800 m alt., Aug. 25, 1953, *Guest 13123*) resembles *C. meyeri* A. Pojark. in leaf characters and fruit size, but appears to be 4-styled, with 4 pyrenes in each fruit. It may be an aberrant form of *C. meyeri*, but the possibility remains that it may also be distinct, either an underscribed species or a hybrid. Additional material, especially flowering material, is



Fig. 1. — *Crataegus kurdistanica* species nova, Hadač 5620.

required to establish its identity.” The higher number of styles and stones thus seems not to be accidental, but a constant, specific character. Our material was collected not far from the above locality and both are possibly conspecific. *C. kurdistanica* is striking especially in flower, as its anthers are conspicuously long.

***Crataegus sakranensis* Hadač & Chrték species nova**

Frutex 2-3 m alta, ramis juvenilibus atropurpureis, glabris; spinae deficientes vel paucae; folia superne viridia, subtus opace viridia, 4.5-5.5 cm longa; petiolis 1-2 cm longis, glabris vel disperse pilosis; lamina foliorum (2.5-)3-3.5 cm longa et (2.5-)3.5-3.8 cm lata, ovata rhomboidea, profunde incisa usque ad medium, rare ad 2/3 lobis tribus acutis, acute serratis,

dentibus acuminatis, lobo medio breviter trilobato; lamina supra parcissime pilosa vel subglabra, subtus praecipue margine et axillis nervorum usque dense pilosa, domatiis distinctis. Inflorescentiae pauciflorae, laxae, plerumque bi- vel triflorae, flores longe pedicellati, pedicelli glabri vel rarissime pilosi; sepala 1.5 mm longa et 2-2.5 mm lata, ovato-triangularia, saepe sparse pilosa, subtus pilosa, reflexa, recurvata; petala late ovata, alba; styli (2-)3, fructus ovoidei, plus minusve 6 mm diam., glabri, atropurpurei, parum albo punctati, pyrenis (2-)3.

Typus. MRO: ad vicum Sakri-Sakran, ad rivum, alt. 1900 m, 6.6.1961, leg. E. Hadač et Faisal abd-el-Kader; Hadač 5607; in herbario PR asservatur.

C. sakranensis resembles by its habit and leaf form *C. atosanguinea* Pojark., described from the surroundings of Jerevan, but it has mostly 3 styles and its fruits are smaller, more or less 6 mm in diam., whereas *C. atosanguinea* has only 2 styles and its fruits are 13-16 mm in diam.

The characters of *C. sakranensis* given above seem to be constant enough in both localities; there were no other *Crataegus* species in the surroundings and the other species occurring in Iraq have quite other hairiness and other characters, so its hybridogenous origin is not probable.



Fig. 2. — *Crataegus sakranensis* species nova, Hadač 5607.

Collected also in the following locality: MRO: ad vicum Skeikhan, 5.6.1961, *Hadač* 5375.

***Geum urbanum* L.**

MRO: declivio montis calcarei supra vicum Khormal, montes Avroman, 27.5.1961, *Hadač* 5028; Shaqlawa, 14.6.1960, *Hadač* 2632.

Iraqi plants differ from the European material especially in the size of achenes. This circumstance was already mentioned by several authors. So e.g. MEIKLE (1966: 130) writes: "The achene heads of Iraq specimens tend to be larger than in material of the same species from western Europe, and the styles are seldom as strongly red-tinged." SCHÖNBECK-TEMESY (1969: 120) discusses too the problem of taxonomical evaluation of *G. urbanum* in Iraq



Map 5. — ○ *Neurada procumbens*; ● *Geum urbanum*.

Neurada procumbens, in deserts from N. Africa to N.W. India. In Iraq on sandy deserts with less than 300 mm annual rainfall, usually below 100 mm. *Geum urbanum*, ranges from Europe and N. Africa to Central Asia and Tian Shan; in Iraq on brown and chestnut soils usually at (500-)1000-1200 m alt., in the oak forest region with about 600-800 mm annual rainfall.

and Iran. Also BORNMÜLLER (1940: 237) writes on problems with *G. urbanum* in Anatolia in connection with *G. strictum* Aiton. To solve this problem, it would be necessary to study plants from whole Near East.

Neurada procumbens L.

DSD: in deserto inter Najaf et Rahba, 2.4.1961, *Hadač 4009*; in deserto 68 km ad boreo-occidentem a Khidr-al-Mai, 8.3.1961, *Hadač 3438*; in deserto 52 km ad boreo-occidentem a Khidr-al-Mai, 8.3.1961, *Hadač 3436*; Sha'ib al Hisb prope Rahba, 13.4.1961, *Hadač 4083*.



Map 6. — ○ *Potentilla hirta*; ◐ *Potentilla supina*; ● *Potentilla speciosa*.

Potentilla hirta — Mediterranean to Irano-Turanian species (distributed from Spain to Iran), occurring on volcanic rocks or limestone at (1100)-1900 up to 2450 m alt., with more than 800 mm annual rainfall. *Potentilla supina* — Eurasian-N. African species, occurring often as synanthrope, mainly in ruderal places or on alluvial, irrigated soil in the vicinity of settlements. *Potentilla speciosa* — Mediterranean species (from the Balcan-Peninsula and Crete to N. Iraq), mainly on limestone in mountains with more than 800 mm annual rainfall.

Potentilla hirta L., s.l.

- MRO: ad vicum Sakri-Sakran, ad rivum, alt. 1900 m, 6.6.1961, *Hadač* 5598; ad vicum Sakri-Sakran, alt. supra 2000 m, 6.6.1961, *Hadač* 5509; declivio boreali cotae 2450 m supra Sarcál, alt. 2250 m, 5.6.1960, *Hadač* 2220; inter Sarcál et Nowandae, 13.6.1960, *Hadač* 2481; Sarcál, vallis Nowandae ripa dextra, alt. 2220 m, 5.6.1960, *Hadač* 2305; Nowanda, 13.6.1960, *Hadač* 2490; in decliviis calcareis supra vicum Zeyta, 19.6.1961, *Hadač* 5926.
- MSU: ad viam inter Benawa Suta et Penjwin, 26.5.1961, *Hadač* 4987; loco Benawa Suta dicto prope opp. Penjwin, 26.5.1961, *Hadač* 4935.

Potentilla kurdica Boiss. & Hohen.

- MRO: ad vicum Sakri-Sakran, 6.6.1961, *Hadač* 5502; in valle Hassar-i-Sakran, 7.6.1961, *Hadač* 5711; ad vicum Sheikhan, 5.6.1961, *Hadač* 5371; Sarcál, vallis Nowandae ripa dextra, alt. 2220 m, 5.6.1960, *Hadač* 2304.

Potentilla pannosa Boiss. & Hausskn.

- MSU: Pira Magrun, locis praeruptis sub cacumine, alt. 2480 m, in rupibus calcareis, 23.10.1960, *Hadač* 2900; in declivio montis Pira Magrun, 28.5.1960, *Hadač* 2017.

Potentilla reptans L.

- MRO: ad viam inter Kirkuk et Sulaimania loco Derbend dicto, 26.5.1960, *Hadač* 1819.
- MSU: Shaqlawa, 11.4.1960, *Hadač* 1423.

Potentilla speciosa Willd.

- MRO: declivio boreali montis Potine, supra 2100 m, 20.6.1961, *Hadač* 6113; rupibus calcareis supra pagum Zawiya, 21.6.1960, *Hadač* 2804.

P. speciosa grows in mountains of the Mediterranean resp. Palaeo-mediterranean region in the Balkan Peninsula, Crete, Turkey and Iraq. Iraqi plants we have studied differ from the other populations by glabrous achenes. This was observed already by MEIKLE (1966: 124). SCHIMAN-CZEIKA (1969) reports from the mountain area of Iraq only *P. straussii* Bornm. (syn. *P. speciosa* Willd. sensu Meikle in Townsend & Guest: "Flora of Iraq" 2: 124. 1966 pp.), with achenes described as pilose. BORNMÜLLER (1911: 230), describing *P. speciosa* var. *straussii* holds for important the denticulation of leaves: "Foliolis late ovatis infra medium subintegris supra medium paucicrenatis, crenis utrinque 1-4 latis obtusissimis." Our material correspond well with *P. speciosa* var. *speciosa* by their habitus, by the shape and denticulation



Map 7. — ○ *Potentilla reptans*; ● *Potentilla pannosa*.

Potentilla reptans is an Eurasian-N. African species occurring in the mountains above 500 m alt., with more than 500 mm annual rainfall. *Potentilla pannosa*, an Irano-Turanian species (S.E. Anatolia, N. and W. Iran, N. Iraq, Afghanistan), grows mainly on limestone at the altitude of 2300 m and above, with more than 2000 mm annual rainfall.

of the leaves, but their fruits are glabrous. It seems that it is a distinct population, endemic in the Kurdish mountains. Further studies on this topic will be necessary.

***Potentilla supina* L.**

LCA: ripa Euphratis dextra sub opp. Falluja, 7.10.1960, *Hadač* 2746; Falluja, ad Euphratem, sub ponte, 1.10.1960, *Hadač* 2718.

***Poterium lasiocarpum* Boiss. & Hausskn.**

MRO: in decliviis calcareis supra vicum Zeyta, 19.6.1961, *Hadač* 5965; in decliviis ad vicum Mergazor, ca. 1070 m alt., 18.6.1961, *Hadač* 5844;

inter Rowanduz et Mazna, 18.6.1961, *Hadač* 5787; ad vicum Naprdan, 5.6.1961, *Hadač* 5314.

MSU: ad pedem montis Pira Magrun, loco Girdabor dicto, 25.5.1961, *Hadač* 4717.

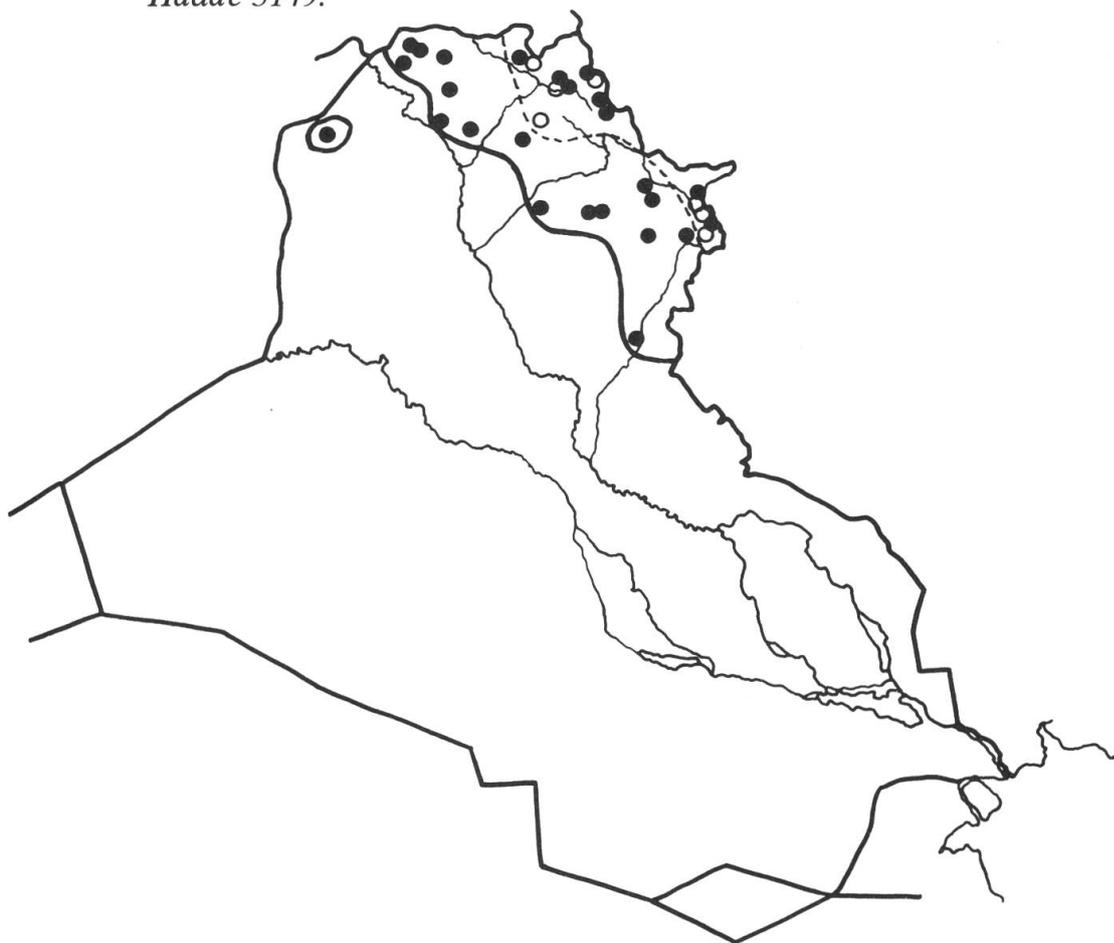
***Poterium sanguisorba* L. subsp. *muricatum* (Spach) Rouy & Fouc.**

MSU: Nalparaiz, 25.5.1961, *Hadač* 4819.

***Pyrus syriaca* Boiss.**

MRO: ad fontem Kani Mâm Shirin prope vicum Zeyta, 22.6.1961, *Hadač* 6010; in declivio supra pagum Zawiya, 21.10.1960, *Hadač* 2798.

MSU: declivio boreali Kopi Qaradagh, loco Waziara dicto, 29.5.1961, *Hadač* 5149.



Map 8. — ● *Poterium lasiocarpum*; ○ *Poterium sanguisorba* subsp. *muricatum*. *Poterium lasiocarpum* ranges from Syria to Afghanistan. In Iraq in oak forest region in an area with more than 300 mm annual rainfall. *Poterium sanguisorba* subsp. *muricatum* grows from S.-C. Europe, N. Africa to S.W. Asia. In Iraq in the oak forest region with more than 400 mm annual rainfall.

Rubus sanctus Schreb.

- MRO: in decliviis calcareis supra vicum Zeyta, 19.6.1961, *Hadač* 5923.
MSU: Sarchinar, 27.5.1960, *Hadač* 1913; Alaya, vicus inter Chamchamal et Tasluja, 21.10.1960, *Hadač* 2781.
DWD: insula Abu Said ad Haqlaniya, in Euphrato, 10.2.1960, *Hadač* 345.

Sorbus persica Hedl.

- MRO: declivio boreali montis Potine, 1900 m, 20.6.1961, *Hadač* 6083.

This species was hitherto not known from Iraq. Our plants have somewhat broader leaves if compared with plants from Iran, Caucasus or Kazakhstan. Taking in account that the species is fairly variable and that our plants grow on the periphery of its total range, we think it best to name our plants still *S. persica*.

Sorbus shirinensis Hadač & Chrtek **species nova**

Frutex usque arbor, ramis atropurpureis, sublucidis, lamina foliorum 6.0-9.5 × 4.5-8.5 cm, ovate suborbicularis, basi cuneata, apice rotundata, obtusa, margine inconspicue lobata, inaequaliter dentata, dentibus acuminatis, ad tertiam partem integra, superne glabra, nervo mediano et basi nervium secundarium villosa-tomentosa, triste viridis; subtus albobiride tomentosa, nervi laterales utrinque 8-9, stricti, basi tantum subarcuati. Petioli 1-2 cm longi, tomentosi. Inflorescentia plus minusve 6 cm in diam., ramis et pedicellis subtomentosis. Calycis lacinae 2.5-3.5 mm longae, utrinque tomentosae, triangulares, in fructu erectae vel reflexae, styli basi tomentosi, mox glabrescentes.

Typus. Ad rivulum inter Kani Mâm Shirin et Zeyta, 22.6.1961, leg. *E. Hadač, A. D. Agnew et R. W. Haines; Hadač* 6048; in herbario PR asservatur.

It differs from *S. persica* Hedl. in the first place by its leaf shape, their lobes being indistinct and the number of veins higher. In *S. persica* we find usually 5-6 pairs of veins, in *S. shirinensis* 8-9. It differs from *S. luristanica* (Bornm.) Schönbeck-Temesy by a higher number of veins, but especially by its leaf shape. *S. luristanica* has leaves oblong-ovate-elliptic to ovate, whereas leaves of *S. shirinensis* are broadly ovate and in some cases suborbiculate. There are some similarities with *S. umbellata* (Desf.) Fritsch & Kerner, which has sometimes the same vein number, but the denticulation of leaves is rather different, in *S. shirinensis* being more acute and its petioles are longer (10-20 mm) than in *S. umbellata* (6-12 mm in Iraqi specimens). *S. shirinensis* differs also by its leaf shape from the species described newly from Caucasus (cf. GABRIELAN, 1972; ZAIKONNIKOVA, 1973, 1975). Moreover, our material was analysed by Challise & Kovanda as concerns its flavonoids; according to their personal communication, *S. shirinensis* is biochemically well characterised.

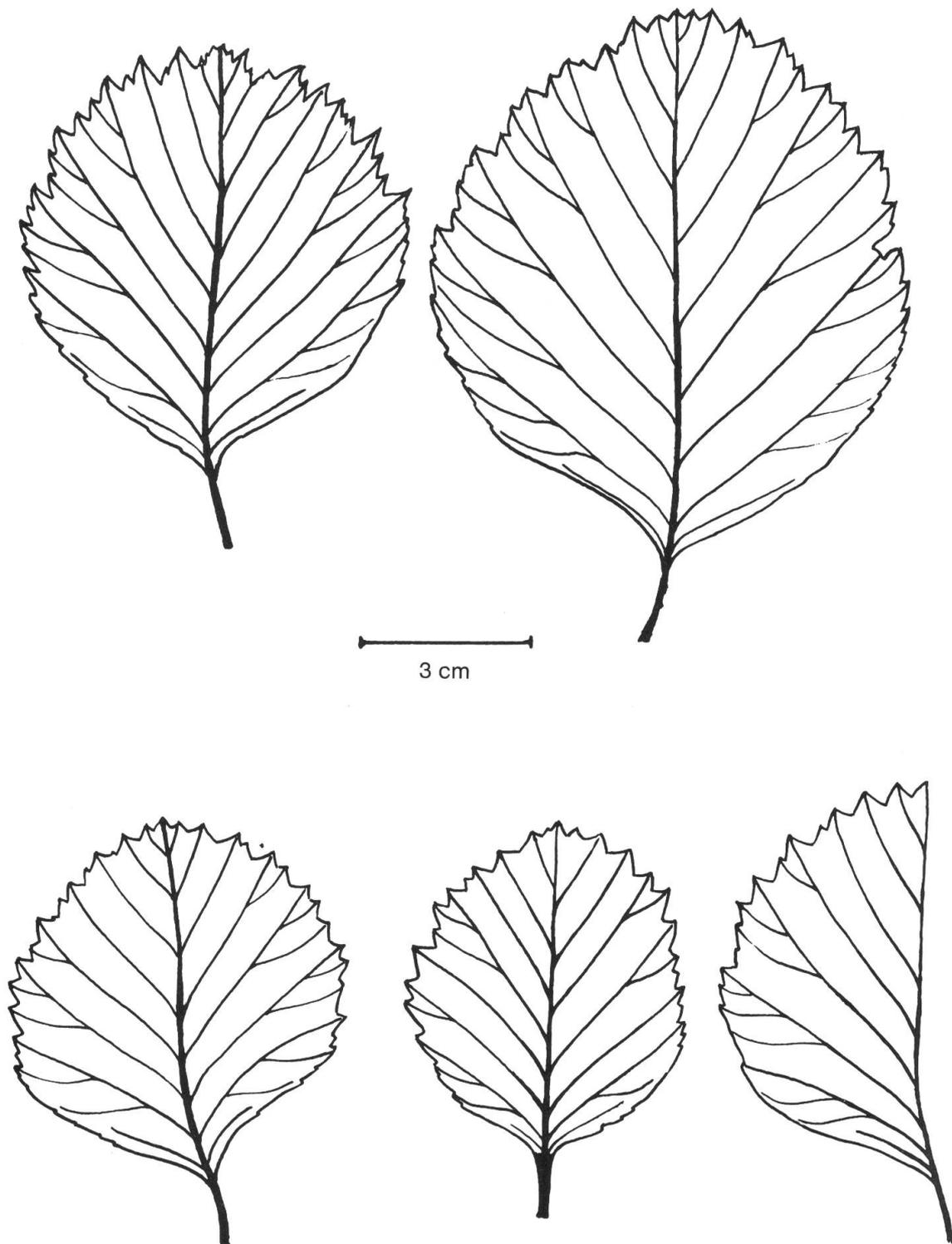


Fig. 3. — *Sorbus shirinensis* species nova, Hadač 6048 (above); *Sorbus umbellata* (Desf.) Fritsch & Kerner, Hadač 5687 (below).



Map 9. — ● *Sorbus umbellata*; ○ *Pyrus syriaca*.

Sorbus umbellata is distributed from Cyprus to Caucasus. In Iraq in the altitude of 1200-2400 m, in an area with more than 900 mm annual rainfall. *Pyrus syriaca* is distributed from Cyprus to Caucasus, in Iraq at 1000-1700 m alt., in an area with more than 800 mm annual rainfall.

***Sorbus umbellata* (Desf.) Fritsch & Kerner**

MRO: in valle Hassar-i-Sakran, 7.6.1961, *Hadač* 5687.

S. umbellata was hitherto the only species of *Sorbus* known in Iraq.

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