The zoogeography of western Palaearctic Tipulidae (Diptera) : part IV : the Tipulidae of Corsica and Sardinia with a note on Dolichopeza fuscipes Bergroth

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Objekttyp: **Article**

Zeitschrift: **Mitteilungen der Schweizerischen Entomologischen Gesellschaft = Bulletin de la Société Entomologique Suisse = Journal of the Swiss Entomological Society**

Band (Jahr): **55 (1982)**

Heft 3-4

PDF erstellt am: **28.04.2024**

Persistenter Link: https://doi.org/10.5169/seals-402042

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MITTEILUNGEN DER SCHWEIZERISCHEN ENTOMOLOGISCHEN GESELLSCHAFT
BULLETIN DE LA SOCIÉTÉ ENTOMOLOGIQUE SUISSE
55, 317-332, 1982

The zoogeography of the western Palaearctic Tipulidae (Diptera). Part IV: the Tipulidae of Corsica and Sardinia with a note on Dolichopeza fuscipes BERGROTH*.

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Une liste des Tipulidae de Corse et de Sardaigne est établie et 5 nouveaux taxa décrits: *Tipula (Yamatotipula) montium italia, Tipula (Savtshenkia) corsosignata, T. (S.) cyrnosardensis, T. (S.) gimmerthali pteromaculata* and *T. (S.) hartigiana.* Une clé de détermination des femelles des espèces du sous-genre *Savtshenkia* des deux îles est incluse. La comparaison des spécimens de *Dolichopeza* provenant de Corse avec le matériel type de *Dolichopeza fuscipes* BERGROTH et *Dolichopeza algira* VAILLANT révèle que ces noms sont des synonymes, *fuscipes* ayant la priorité. Cette espèce décrite à l'origine d'Algérie (Constantine) est largement distribuée en Méditerannée orientale de même qu'en Corse.
Au total 47 taxa de Tipulidae sont répertoriés pour les deux îles, 41 de Corse et 26 de Sardaigne. Quinze taxa (32%) sont endémiques, deux en Sardaigne, cinq en Corse uniquement et huit distribués dans les deux îles. Il est montré que la faune des Tipulidae de Corse et de Sardaigne, par opposition à celle d'Italie, appartient principalement à l'élément européen (72%). Il est suggéré que la majorité (91%) des Tipulidae sont arrivés sur les îles au pléistocène moyen ou tardif durant les glaciations du nord de l'Europe. Seules 4 espèces appartenant à l'élément méditerranéen sont considérées des endémiques plus anciennes.

A list is provided of the Tipulidae from Corsica and Sardinia, together with the description of five new taxa: *Tipula (Yamatotipula) montium italia, Tipula (Savtshenkia) corsosignata, T. (S.) cyrnosardensis, T. (S.) gimmerthali pteromaculata* and *T. (S.) hartigiana.* A key to the females of the *Savtshenkia* species from the islands is included. Comparison of *Dolichopeza* specimens from Corsica with type-material from *Dolichopeza fuscipes* BERGROTH and *Dolichopeza algira* VAILLANT revealed that these species-names are synonyms, *fuscipes* having priority. This species, originally described from Algeria (Constantine), is distributed throughout the eastern Mediterranean region, including Corsica.

In total 47 Tipulidae taxa are recorded from the islands, 41 from Corsica and 26 from Sardinia. Fifteen taxa (32%) are endemic, two on Sardinia, five on Corsica and eight distributed on both islands. It is shown that the Tipulidae fauna of Corsica and Sardinia, in contrast to that of Italy, mainly belongs to the European element (72%). It is assumed that the majority (91%) of the tipulids arrived on the islands in mid- or late- Pleistocene times during periods of glaciation in the north. Only four species, belonging to the Mediterranean element, are considered older endemics.

*Part I: Die Tipuliden von Nordafrika. - Beaufortia, 30: 179-192. II: Die Tipuliden der Iberischen Halbinsel. - idem, 31: 31-50. III: Die Tipuliden der europäischen Tiefebenen. - Bonn. zool. Beitr., (in print).

The first paper about Tipulidae of Corsica is by KUNTZE (1913), followed by PIERRE (1921, 1924a, 1926), EDWARDS (1928) and GAUNITZ (1968). Records are further mentioned by PIERRE (1924b) and MANNHEIMS & THEOWALD (1951-1980, 1959). Additional specimens were collected by VAN DER GOOT (1956, 1957, preserved at ZMA), ELLIS (1971, ZMA) and by DUFOUR, HENRIKSSON and OOSTERBROEK (1981, ZMA & MHNN). For this paper the material mentioned in the literature has been examined as far as necessary and available. The result has been that at present 41 species are known from Corsica, 5 of which are endemic to the island and another 8 to both Corsica and Sardinia.

Sardinian tipulids are recorded by MANNHEIMS & THEOWALD (1951-1980, 1959), based mainly on the material of NOACK (1938, MAK), and JEEKEL (1957, ZMA). Extensive collecting was undertaken by HARTIG (ZMA & IEB) during the period 1972-1977, adding up the number of Sardinian species to 26, including 2 endemics and 8 shared with Corsica only.

ABBREVIATIONS

ETH	Eidgenössische Technische Hochschule, Zürich.
IEB	Istituto di Entomologia, Bolzano.
MAK	Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn.
MHNN	Musée d'histoire naturelle, Neuchâtel.
MNHNP	Muséum national d'histoire naturelle, Paris.
RMNL	Rijksmuseum van Natuurlijke Historie, Leiden.
ZMA	Instituut voor Taxonomische Zoölogie (Zoölogisch Museum), Amsterdam.

In the citation of the labels of type-material specimens, the different labels on the same pin are separated by a virgule (/).

LIST OF SPECIES

In this list the number of localities or the localities themselves, the period of flight and the altitudes on the two islands are given, as well as the distribution of the species outside the island with special reference the Iberian Peninsula, Italy and the Balkan Peninsula. For endemic species the related taxa and their distribution is mentioned. The list includes all names attributed in literature to tipulids from Corsica and Sardinia. New species are indicated by an asterisk.

Genus Dolichopeza CURTIS, *1825.*

1 *fuscipes* BERGROTH, 1889.

In 1981 the first *Dolichopeza* specimens from Corsica were collected. This material, all belonging to one species, was identified as *algira,* a species very close to *hispanica* MANNHEIMS, 1951, and described from Algeria (Aurès) by VAILLANT in 1953. *D. hispanica* and *algira* differ from all other western Palaearctic *Dolichopeza* species *(albipes* [STRÖM], *graeca* MANNHEIMS, *hirsuticauda* SAVTSHENKO, *nitida* MIK and *schahriari* THEOWALD) by the presence of ribbles on the dorsal and lateral parts of the head (fig. 1a). In *algira* the hind margin of the male tergite nine possesses a triangular process in the middle (fig. 1b) which is lacking in *hispanica.* Examination of the *Dolichopeza* material preserved at the ZMA in Amsterdam showed that *algira* is distributed not only in Algeria and Corsica but also in southern Italy (Calabria, Sicily) and Greece (Gorgopotamus-Oiti Mts, Kefallinia, Zakynthos and Crete). *D. hispanica* is known from southern France (Var, Pyr. Or.), the Iberian Peninsula and Morocco (Ht Atlas).

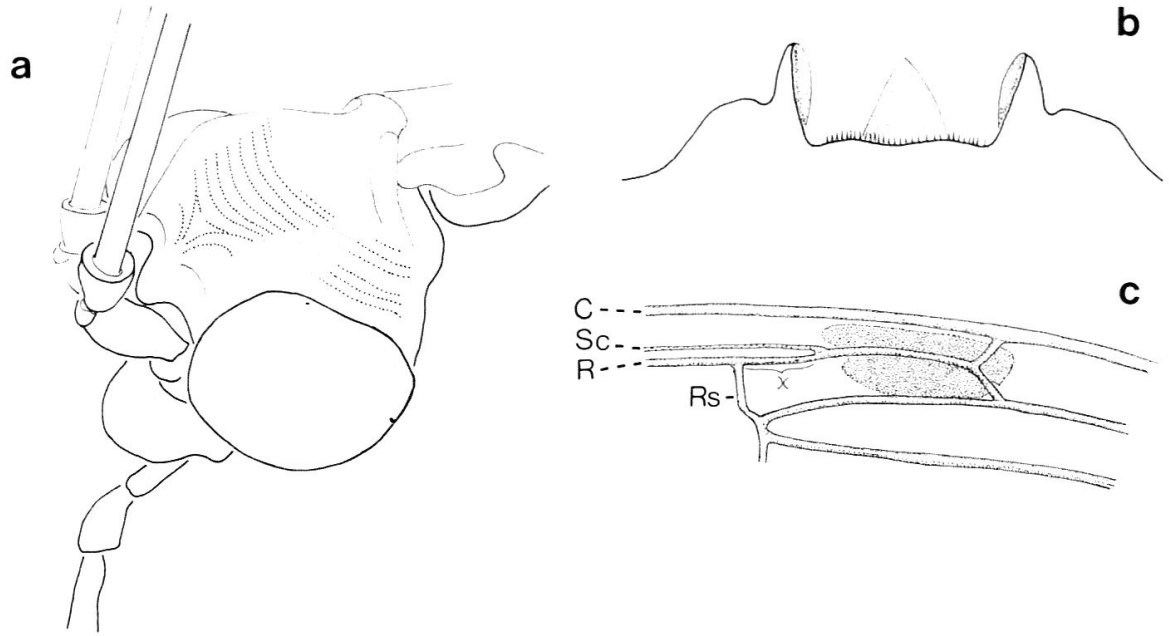

Fig. 1 a–c: *Dolichopeza fuscipes* BERGROTH. a, ribbled surface of dorsal and lateral parts of the head; b, tergite 9 showing triangular process in the middle; c, wing venation of a *fuscipes* ♀ from Corsica.

Apart from *hispanica* and *algira,* a third *Dolichopeza* species is known from northern Africa, namely *fuscipes* BERGROTH, 1889. Until recently this species was known only after the description. the female holotype however, was rediscovered by DUFOUR in the HUGUENIN collection at the ETH, Zürich. This specimen, labeled as follows: Algier/ 1/ ex. Coll. HUGUENIN/ *Dolichopeza fuscipes* BERGROTH/ Holotypus, also has the dorsal and lateral parts of the head ribbed. It was compared with the material identified by us as *algira,* and with type-material from *algira* from the MNHNP, Paris. This material is labeled as follows: 1♂: *Dolichopeza algira* ♂ VAILLANT/ Type/ Juillet 1949 Rhouffi (Aurès) (this specimen is considered the holotype as it bears an original type label, inspite of the year of collecting, 1949, whereas VAILLANT [1953] mentions 1950); 1♀: labeled as the holotype; 1♂: labeled as the holotype but without the «Type» label; 2♂: *Dolichopeza algira* ♂ VAILLANT/ Aïn Mimoun (Aurès) juin 1950. This comparison revealed that *fuscipes* must be considered the senior synonym of *algira* by wing venation, namely the distance between the base of Rs and the end of Sc (x in fig. 1c). In *hispanica* this distance is usually half the length of Rs and at most ⅔ the length of Rs (fig. 1d). In our «*algira*» specimens and in the types of *algira* the distances range from half the length of Rs to slightly longer than Rs (fig. 1c). In the female type of *fuscipes* the

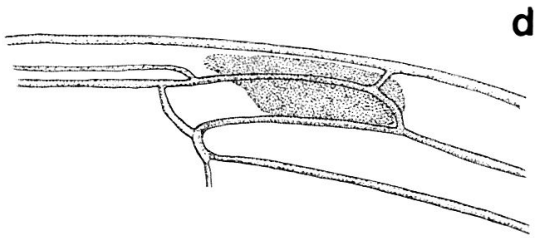

Fig. 1 d: *Dolichopeza hispanica* MANNHEIMS. Wing venation of a ♀ from France.

distance is sligthly longer than Rs. VAILLANT (1953) already noted this character to separate *algira* and *hispanica* but found it less reliable due to variability. Because the character state, as found in the *fuscipes* type, falls outside the range of variability in *hispanica* and inside the range of *algira, fuscipes* is considered the senior synonym of *algira*. It is also according to MARTINOVSKÝ (c. l. May, 1982) the senior synonym of *staryi* MARTINOVSKÝ, a name already mentioned by THEOWALD, 1978 and 1980, but still in print.

Genus Tipula LINNAEUS, *1758.*

Subgenus Schummelia EDWARDS, *1931.*

2 *butzi* EDWARDS, 1928.

Endemic to Corsica (8 loc.), VI–IX, 600–1700 m. Forms a species group with *ahrensi* SAVTSHENKO, 1957 from the Caucasus and *variicornis* SCHUMMEL, 1833 from Eurasia, Italy and the Balkan.

- *variicornis* SCHUMMEL, 1833, in KUNTZE 1913 = *butzi* EDWARDS.

Subgenus Platytipula MATSUMURA, *1916*

3 *luteipennis* MEIGEN, 1830.

Corsica (St Pierre de Venaco) and Sardinia (3 loc.), IX–X, 500–1000 m. Eurasiatic, also Italy and Balkan.

Subgenus Yamatotipula MATSUMURA, *1916*

- *lateralis* MEIGEN, 1818, sensu auct. = *montium italia* subsp. nov.

- *marginata* MEIGEN, 1818, sensu auct. = *marginella* THEOWALD.

4 *marginella* THEOWALD, 1980.

Corsica (Biguglia), IV, 0 m. Distributed in central and northern Europe, also northern Italy and northern Balkan.

* 5 *montium italia* subsp. nov.

Corsica (14 loc.) and Sardinia (10 loc.), I–XII, 0–1400 m. *T. montium* is divided in three subspecies: *m. montium* in central, western and northern Europe and northern Balkan, *m. afriberia* in northern Africa and the Iberian Peninsula and *m. italia* in Italy and southern France. *m. montium* and *m. italia* are both found in Tessin (southern Switzerland).

Subgenus Acutipula ALEXANDER, *1924*

6 *corsica* PIERRE, 1921.

Endemic to Corsica (Forêt de Valdoniello, Calvi. Ajaccio; Asco by EDWARDS, 1928, refers to *doriae*. IV–VII, 0–900 m. Belongs to the *maxima* group and apparently forms a species group together with *macra* SAVTSHENKO, 1961, from the Caucasus and northern Iran and *rifensis* THEOWALD & OOSTERBROEK, 1980, from northern Morocco. PIERRE described this species after the female. The wing-pattern is very characteristic as well as the male inner dististyle with pars 1 abbreviated. (A revision of the *maxima* group by Vermoolen is in print.)

7 *doriae* PIERRE, 1926.

Endemic to Corsica (13 loc.), Sardinia (8 loc.) and Giglio (type-locality), VII–X, 0–1300 m. This species has a rather isolated position within the *maxima* group and is probably most closely related to a new species from Cyprus.

8 *fulvipennis* De Geer, 1776.

Corsica (17 loc.) and Sardinia (6 loc.), VII-X, 0-1750 m. Distributed in Europe, the Iberian Peninsula, Italy and Balkan.

- *lutescens* Fabricius, 1805, in Kuntze, 1913 = *fulvipennis* De Geer.
- *maxima* Poda, 1761, in Kuntze, 1913 = *corsica* Pierre.

Subgenus Tipula Linnaeus, *1758.*

- *czizeki* De Jong, 1925, in Mannheims & Theowald, 1959 = *subcunctans* Alexander.
- *fusca* Staeger, 1840, in Mannheims & Theowald, 1959 = *subcunctans* Alexander.

9 *italica* Lackschewitz, 1930.

Corsica (7 loc.) and Sardinia (7 loc.), VI-X, 300-1000 m. Distributed in Asia Minor, the eastern Mediterranean region, the Balkan and northern Italy.

10 *mediterranea* Lackschewitz, 1930.

Corsica (12 loc.) and Sardinia (14 loc.), IV-X, 0-900 m. Italy, western Mediterranean and Canary Islands.

11 *oleracea* Linnaeus, 1758.

Corsica (4 loc.) and Sardinia (Musei, Sassari), IX-V, 0-800 m. Distributed in Europe including Spain, Italy and the Balkan.

12 *paludosa* Meigen, 1830.

Known from Corsica (St Florent, RNHL), VI, 0 m. Distributed in Europe, northern Italy and the northern Balkan.

13 *plumbea* Fabricius, 1781.

Sardinia (4 loc.), IX-XI, 100-900 m. Known from southern France, Italy and Greece (Dilos).

14 *subcunctans* Alexander, 1921.

Corsica (Lac de Nino, IX, 1700-1800 m) and Sardinia (7 loc., IX-XII, 500-1000 m). Eurasiatic, also Italian Alps.

Subgenus Savtshenkia Mannheims, *1962.*

15 *alpium* Bergroth, 1888.

Known from Corsica (4 loc., IX, 1300-2200 m), northern Italy, northern Balkan and central and northern Europe.

16 *breviantennata* Lackschewitz, 1933.

Known from Sardinia (Belvi, Aritzo, VI-XII, 700-800 m), Italy and Spain (Sierra Nevada) (see also description of *hartigiana).*

* 17 *corsosignata* spec. nov.

Endemic to Corsica (8 loc., IX, 700-2200 m). Closely related to *subsignata* Lackschewitz, 1933, distributed in the mountains of central and eastern Europe, including the Italian Alps.

* 18 *cyrnosardensis* spec. nov.

Endemic to Corsica (4 loc.) and Sardinia (2 loc.), IX-X, 600-1000 m. Closely related to *subsignata* (see above).

19 *eugeni* THEOWALD, 1973.

Known from Corsica (5 loc., IX, 600–1000 m) and Calabria. Forms a species group with *confusa* VAN DER WULP, 1884, from western Europe and Spain and the holomediterranean *jeekeli* MANNHEIMS & THEOWALD, 1959.

* 20 *gimmerthali pteromaculata* subsp. nov.

Endemic to Corsica (2 loc., IX, 1700–1800 m). The nominal subspecies has a boreoalpine distribution in Europe, including the Italian Alps.

* 21 *hartigiana* spec. nov.

Endemic to Corsica (2 loc., IX, 1300–2200 m) and Sardinia (2 loc., VII–II, 700–1400 m). Belongs to the *atlas* species group (see description).

22 *jeekeli* MANNHEIMS & THEOWALD, 1959.

Known from Corsica (St Pierre de Venaco, Vivario, IX, 700–800 m), Sardinia (6 loc., IX–X, 500–1000 m), Majorca, southern France and Greece (see also *eugeni).*

23 *rufina* MEIGEN, 1818.

Known from Sardinia (Belvi, XII, 700 m), western and southern Europe, Asia Minor, the Iberian Peninsula, Italy and the Balkan.

24 *sardosignata* MANNHEIMS & THEOWALD, 1959.

Known from Corsica (6 loc.) and Sardinia (4 loc.) only, IX–XII, 400–1100 m. Closely related to *subsignata* (see *corsosignata).*

25 *serrulifera* ALEXANDER, 1942.

Corsica (4 loc.) and Sardinia (6 loc.), IX–XII, 600–2200 m (Corsica), 600–1200 m (Sardinia). Distributed in the mountains of central and eastern Europe, including the Pyrenees and Italian Alps.

Subgenus Mediotipula PIERRE, *1924.*

26 *siebkei* ZETTERSTEDT, 1852.

Known from Corsica (Vizzavona, VII, 950 m). Distributed in the central European mountains, Denmark, southern Sweden, the Pyrenees, Italy and the Balkan.

Subgenus Odonatisca SAVTSHENKO, *1964.*

- *juncea* MEIGEN, 1818 (= *nodicornis* MEIGEN, 1818), in KUNTZE, 1913. No specimens in the KUNTZE collection (SMTD) and removed from the list of Corsican tipulids.

Subgenus Pterelachisus RONDANI, *1842.*

27 submarmorata SCHUMMEL, 1833.

Known from Corsica (Restonica, VI, 1200 m). Distributed in Europe, northern Spain, Italy and northern Balkan.

Subgenus Vestiplex BEZZI, *1924.*

28 *pallidicosta* PIERRE, 1924.

Corsica (6 loc.) and Sardinia (Gennargentu), VII–IX, 600–1400 m (Corsica), 1750 m (Sardinia). Boreoalpine: Pyrenees, Alps, Italian mountains, the Balkan, northern Europe.

- *scripta* MEIGEN, 1830, in KUNTZE, 1913 = *pallidicosta* PIERRE.

Subgenus Lunatipula EDWARDS, *1931.*

29 *cerva* MANNHEIMS & THEOWALD, 1959.

Known from Corsica (Ajaccio, VI, 0 m), Italy and northern Yugoslavia (Krk). Closely related with *cervula* MANNHEIMS & THEOWALD, 1959, from Italy and *fascipennis* MEIGEN, 1818, from Europe and the Balkan.

- *cinerascens* LOEW, 1873, in KUNTZE, 1913 = *rugulosa* MANNHEIMS & THEOWALD.
- *limitata* SCHUMMEL, 1833, in KUNTZE, 1913. No specimens in the KUNTZE collection (SMTD) and removed from the list of Corsican tipulids.
- *livida* VAN DER WULP, 1858, in MANNHEIMS & THEOWALD, 1959 = *livida sardolivida* MANNHEIMS & THEOWALD, 1968.

30 *livida sardolivida* MANNHEIMS & THEOWALD, 1968.

Endemic to Corsica (Restonica, 500–900 m) and Sardinia (12 loc., IV–VIII, 0–1750 m). The nominal subspecies occurs in Europe, Italy and the Balkan.

31 *macciana* EDWARDS, 1928.

Endemic to Corsica (6 loc.) and Sardinia (15 loc.), III–VIII, 0–1750 m. This species is closely related with *cretis* MANNHEIMS, 1965, from Italy, the Balkan and Crete, and *selenis* LOEW, 1873, from Rhodos.

32 *parapeliostigma* MANNHEIMS & THEOWALD, 1959.

Endemic to Corsica (4 loc.) and Sardinia (3 loc.), V–VIII, 500–1800 m (Corsica), 500–1000 m (Sardinia). Closely related with *peliostigma* SCHUMMEL, 1833, from Europe, the Iberian Peninsula, southern Italy and the Balkan.

33 *rugulosa* MANNHEIMS & THEOWALD, 1959.

Endemic to Corsica (7 loc., V–VIII, 0–1800 m). Closely related with *helvola* LOEW, 1873, from central and western Europe and the Balkan, *subhelvola* MANNHEIMS & THEOWALD, 1959, from Italy and *skylla* THEISCHINGER, 1979, from Sicily.

34 *sacerdotula* RIEDEL, 1916.

Endemic to Sardinia (Sassari = type-locality, IV, 0 m, not collected since 1889). Isolated species within the *livida* group, probably related to *macquarti* BECKER, 1890, from the Canary Islands.

35 *vernalis* MEIGEN, 1804.

Known from Corsica (St Florent, VI, 0 m). Distributed in Europe, northern Spain, Italy and the Balkan.

Genus Nephrotoma MEIGEN, *1803.*

36 *analis* (SCHUMMEL, 1833).

Known from Corsica (Vizzavona, after GAUNITZ, 1968, det. MANNHEIMS; VI, 950 m). *N. analis* has an Eurasiatic distribution, including northern Italy and the Balkan.

37 *appendiculata appendiculata* (PIERRE, 1919).

Known from Sardinia (6 loc., III–V, 100–1400 m), central and western Europe and the Balkan.

38 *appendiculata pertenua* OOSTERBROEK, 1978.

Distributed in Corsica (Restonica, Col de Bavella, IV-VI, 500-1200 m), Italy, southern France, the Iberian Peninsula and northern Africa.

39 *cornicina cornicina* (LINNAEUS, 1758).

Corsica (St Florent, VI, 0 m). Distributed throughout the Palaearctic, including the Iberian Peninsula, Italy and the Balkan.

40 *cornicina sardegniensis* OOSTERBROEK, 1978, stat. nov.

Endemic to Sardinia (6 loc., VII-VIII, 700-1400 m).

- *crinicauda* (RIEDEL, 1910), in EDWARDS, 1928 = *flavipalpis* (MEIGEN).

41 *crocata crocata* (LINNAEUS, 1758).

Known from Corsica (4 loc., VI-IX, 0-1100 m), Italy, the Balkan and Eurasia east to Yakutsk. The subspecies *luteata* (MEIGEN, 1818) occurs in southwestern France, the Iberian Peninsula and northern Africa.

42 *flavipalpis* (MEIGEN, 1830).

Known from Corsica (8 loc.) and Sardinia (4 loc.), IV-X, 0-900 m and is distributed in northern Africa and western Europe, including the Iberian Peninsula, Italy and the Adriatic coast of the Balkan. The closest related species is *cretensis* OOSTERBROEK, 1982, from Crete.

43 *guestfalica hartigiana* OOSTERBROEK, 1982.

Endemic to Corsica (?: MANNHEIMS, 1951, mentions *«guesfalica»* from Corsica) and Sardinia (3 loc., V-VI, 100-200 m). The nominal subspecies occurs in Europe, the Iberian Peninsula, Italy, and the Balkan. A third subspecies, *surcoufi* (PIERRE, 1925), is known from northern Africa.

- *hartigi* (MANNHEIMS, 1951), in MANNHEIMS & THEOWALD, 1959 = *crocata crocata* (LINNAEUS).
- *luteata* (MEIGEN, 1818), in PIERRE, 1924b = *crocata crocata* (LINNAEUS).
- *maculata* (MEIGEN, 1804), sensu auct., = *appendiculata appendiculata* (PIERRE) or *a. pertenua* OOSTERBROEK.
- *scalaris* (MEIGEN, 1818) in OOSTERBROEK, 1979a = *flavipalpis* (MEIGEN) (see OOSTERBROEK, 1979b: 156).

44 *submaculosa* EDWARDS, 1928.

Known from Corsica (Calvi, near Evisa) and Sardinia (Belvi, Aritzo), IV-VII, 0-1200 m. *N. submaculosa* is distributed in Europe, the Iberian Peninsula, Italy and the northern Balkan.

- *zonata* (PIERRE, 1919) (= *crocata luteata),* in EDWARDS, 1928, = *crocata crocata* (LINNAEUS).

Genus Dictenidia BRULLÉ, *1833.*

45 *bimaculata* (LINNAEUS, 1758).

Known from Corsica (Vizzavona, VII, 1000-1150 m). Distributed in Europe, the Iberian Peninsula, Italy and the Balkan.

46 *guttata* MEIGEN, 1818.

Known from Corsica (Vizzavona, after GAUNITZ, det. MANNHEIMS; VII, 950 m). Distributed in Europe, northern Italy and the Balkan.

47 *pectinicornis* (LINNAEUS, 1758).

Known from Corsica (Vizzavona, 950 m). Distributed in Europe, the Iberian Peninsula, Italy and the Balkan.

NEW TAXA

Tipula (Yamatotipula) montium italia subsp. nov. (fig. 2).

Characteristics: Very similar to the nominal, central and West European subspecies, but, as in subsp. *afriberia* with a more reddened, instead of grey, abdominal dorsal stripe.

Morphological differences between the three subspecies are found in the basal part and the hind part of the id, as exemplified in fig. 2 (drawn after macerated specimens).

Type-material: Holotype ♂: Italia, Calabria, Sila Grande, Monte Oliveto, 1300–1400 m, 31.VII.1959, BINK, V. D. GOOT, THEOWALD (ZMA). Paratypes: 41 ♂ 21 ♀: labelled as the holotype (ZMA). 1 ♂: idem, 3.VIII.1959 (ZMA).

Other material: 43 ♂ 5 ♀: Italy (Novara, Bologna, Calabria). 3 ♂: Italy (Sicily). 16 ♂ 12 ♀: Italy (Sardinia). 53 ♂ 21 ♀: France (Corsica). 1 ♂: France (Haut Alps, Theus-Durance, barrage de Serre Poncon, 640 m, VII.1979). 21 ♂ 5 ♀: Switzerland (Tessin) (ZMA, Corsican and Swiss specimens also MHNN).

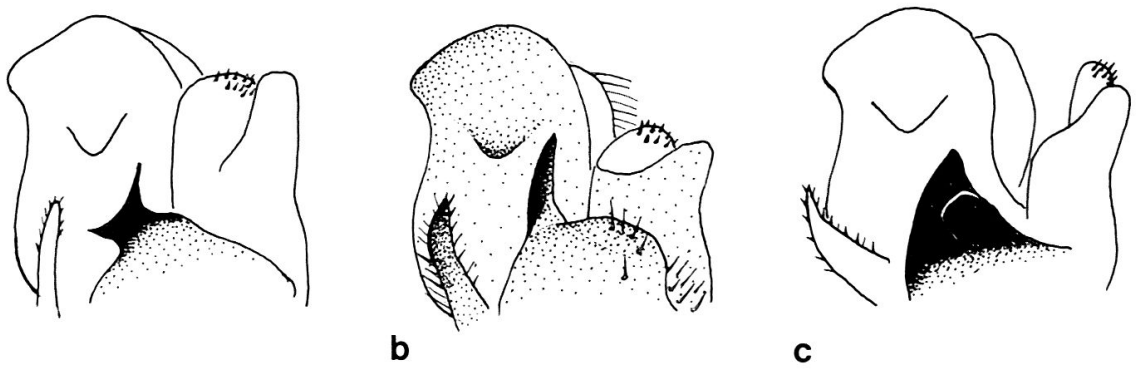

Fig. 2: Left id outside. a, *Tipula (Yamatotipula) montium afriberia* THEOWALD & OOSTERBROEK, 1980; b, *Tipula (Yamatotipula) montium italia* ssp. nov.; c, *Tipula (Yamatotipula) montium montium* EGGER, 1863.

Tipula (Savtshenkia) corsosignata spec. nov. (fig. 3).

Characteristics: Very similar to *subsignata,* differing in the male hypopygium as follows: posterior corners of tergite nine not prolonged caudal (fig. 3a); base of od sclerotized but without hook-like projection (fig. 3b); sternite nine laterally with a distinct flange underneath outer base of id, continuing towards mid-ventral region (fig. 3e); lateral appendages of adminiculum broad and apically rounded (fig. 3e).

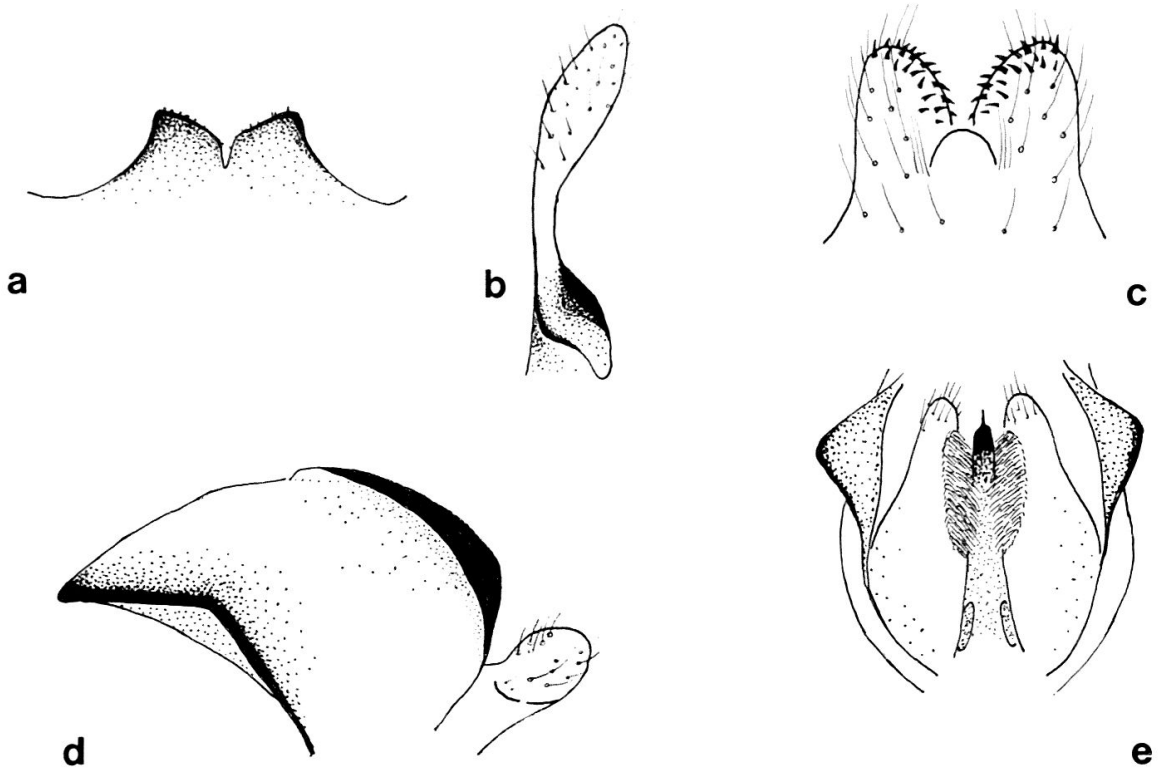

Fig. 3: *Tipula (Savtshenkia) corsosignata* spec. nov. a, posterior margin of tergite 9, dorsal view; b, left od outside; c, posterior extension of sternite 8; d, left id, outside; e, opening of sternite 9, hind view.

Type-material: Holotype ♂: Corsica, 14.-24.IX.1981, C. DUFOUR, J. O. HENRIKSSON, P. OOSTERBROEK/Forêt de Ghisoni, 1000 m, 2 km NW Ghisoni, wet Pinus laricio forest, St 21 (ZMA). Paratypes: 11 ♂: Corse, 14.-24.IX.1981, C. DUFOUR, J. O. HENRIKSSON, P. OOSTERBROEK/Restonica, Berg. Grotelle, 15 km SW Corte, 1700 m, Alnus on pozzine, St 7 (2 ♂ ZMA, 9 ♂ MHNN). 2 ♂: idem/idem, 1400-1800 m, Dripping rocks (Narthecium), St 3 (1 ♂ ZMA, 1 ♂ MHNN). 1 ♂: idem/7 km SW Albertacce, 1000 m, along stream in Pinus laricio forest, St 16 (ZMA). 3 ♂ 2 ♀: idem/Haut Asco, 12 km SW Asco, 1300-1800 m, Alnus and Dripping rocks (Narthecium), St 18 (2 ♂ 2 ♀ ZMA, 1 ♂ MHNN). 7 ♂ 8 ♀: idem/Lac de Nino, 1700-1800 m, 10 km SE Col de Vergio, Pozzine, St 20 (3 ♂ 3 ♀ ZMA, 4 ♂ 5 ♀ MHNN). 1 ♂: idem/ St Pierre de Venaco, 9 km S Corte, 730 m, Quercus-Castanea forest, St 1, light trap (MHNN).

Tipula (Savtshenkia) cyrnosardensis spec. nov. (fig. 4).

Characteristics: Very similar to *subsignata,* differing as follows: second flagellar segment in both sexes distinctly shorter than the first (in *subsignata* of about equal length); od with a distinct sclerotized process halfway the outer margin (fig. 4b); bulbous projections of sternite eight short (fig. 4c); posterior corners of tergite nine less protruding, but with elongate processes (fig. 4a).

Type-material: Holotype ♂: Sardinia, c. 800 m, Barbagia Belvi Ortuabis-Br. Trotu, 5.X.1977, leg. HARTIG (ZMA).

Paratypes: 1 ♂: Sard. Cent., Ortuabis/B. Trotu, Quercetum ilices, 750 m, 6.X.1975, coll. HARTIG (ZMA). 1 ♂ 6 ♀: Corsica, 14.-24.IX.1981, C. DUFOUR, J. O. HENRIKSSON, P. OOSTERBROEK/St Pierre de Venaco, 9 km S Corte, 730 m,

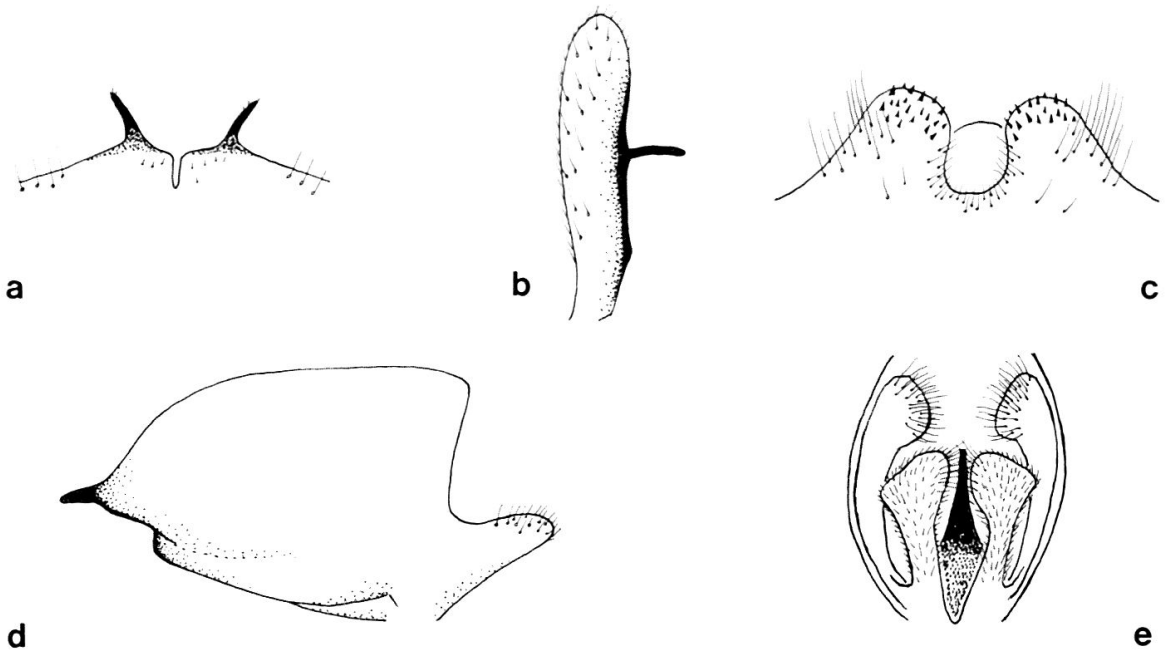

Fig. 4: *Tipula (Savtshenkia) cyrnosardensis* sp. nov. a, posterior extension of tergite 9, dorsal view; b, left od, outside; c, posterior extension of sternite 8; d, id outside; e, opening of sternite 9, hind view.

Quercus-Castanea forest, St 1, light trap (MHNN, alcohol). 1 ♀: idem/Restonica, 4 km SW Corte, 600 m, Mixed forest along stream, St 2 (ZMA). 2 ♂ 1 ♀: idem/Forêt de Vizzavona, 2 km N Vizzavona, 870 m, Pinus Laricio forest, St 9 (1 ♂ 1 ♀ ZMA, 1 ♂ MHNN, alcohol). 9 ♂ 9 ♀: idem/7 km SW Albertacce, 1000 m, along stream in Pinus laricio forest, St 16 (2 ♂ 3 ♀ ZMA, 7 ♂ 6 ♀ MHNN, alcohol). 1 ♂ 2 ♀: idem/9 km E Ghisoni, Quercus ilex along river Orbu, 400 m St 21 (MHNN, alcohol).

Tipula (Savtshenkia) gimmerthali pteromaculata subsp. nov.

Characteristics of the male differing from the nominal subspecies: head, thorax and abdomen darker grey; second flagellar segment distinctly shorter than the first; wings greyish with large, yellowish-hyaline spots on either side of the stigma, in cell M in front of cross-vein r-m, and in anal cell above base of vein an_2. Female unknown.

Type-material: Holotype ♂: Corsica, 14.-24.IX.1981, C. Dufour, J. O. Henriksson, P. Oosterbroek: Lac de Nino, 10 km SE Col de Vergio, 1700-1800 m, Pozzine, St 20 (ZMA).

Paratypes: 3 ♂: labeled as the holotype (2 ♂♂ ZMA, 1 ♂ MHNN, alcohol). 1 ♂: idem/Restonica, Berg. Grotelle, 15 km SW Corte, 2000-2200 m, dripping rocks (Narthecium), St 8 (MHNN, alcohol).

Tipula (Savtshenkia) hartigiana spec. nov. (fig. 5).

Belongs to the *atlas* group (Mannheims & Theowald, 1951-1980: 362, 516).

Characteristics: Separation of eyes ventrally about twice the diametre of the first antennal segment. Nasus distinct. Palpi darkened. Scape and pedicel yellow, flagellar segments dark-brown to black. Second flagellar segment of both sexes about twice as long as pedicel (fig. 5a, b; in *breviantennata* only slightly

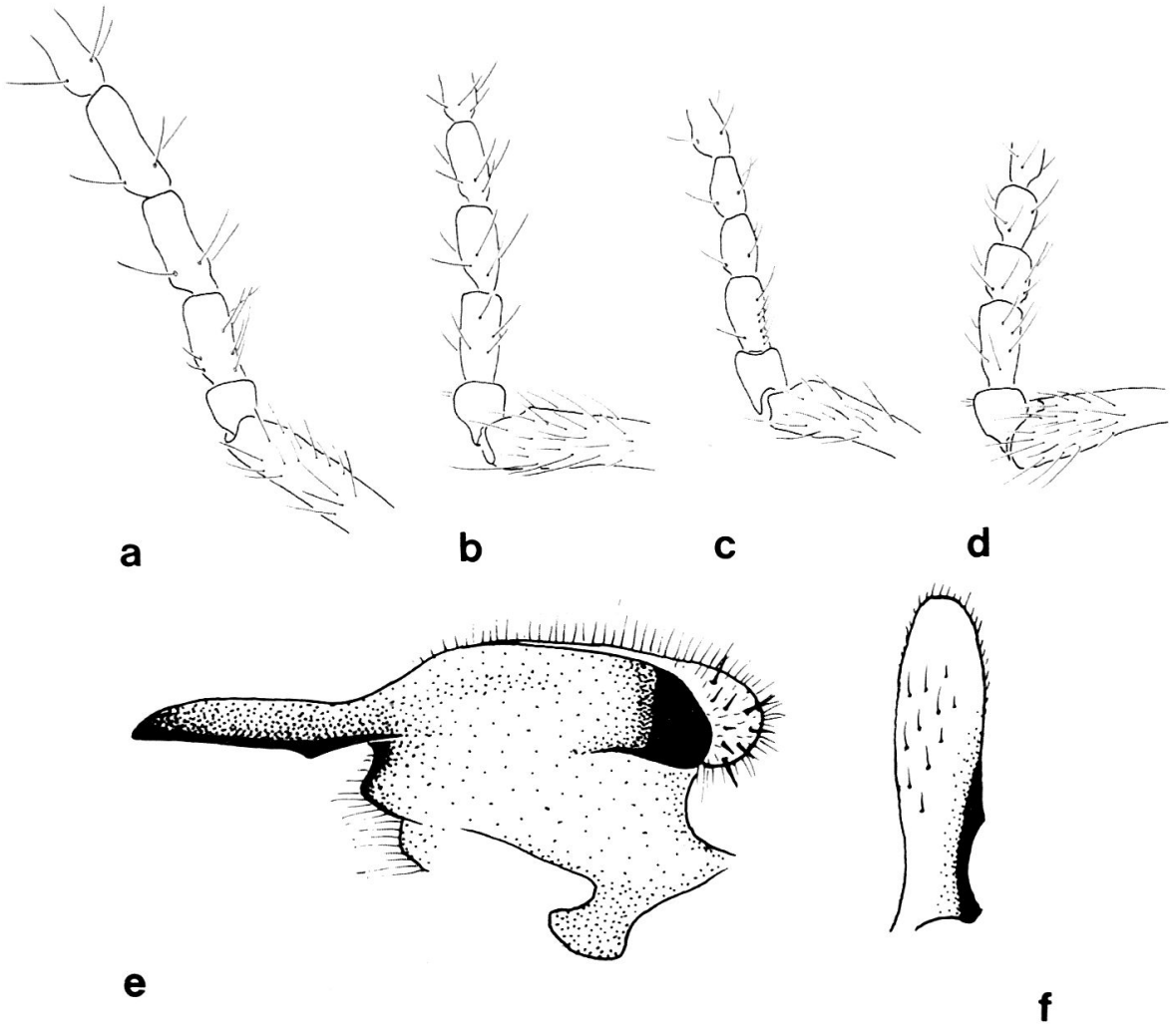

Fig. 5 a, b, e, f: *Tipula (Savtshenkia) hartigiana* sp. nov. a, basal segments of antenna in holotype ♂; b, idem in ♀ from Gennargentu; e, left id, outside; f, left od outside.

Fig. 5 c, d: *Tipula (Savtshenkia) breviantennata* LACKSCHEWITZ. c, basal segments of antenna in ♂ from Belvi; d, idem in ♀ from Sierra Nevada.

longer than pedicel, fig. 5c, d). Lateral prescutal stripes divided over the middle with grey, central stripes with the anterior part invaginated by grey. Wingmembrane with two distinct hyaline spots, one at the middle and one near margin of the wing towards wingbase. Squamae nacked. Abdomen yellowish with black lateral stripes. Hypopygium similar to *breviantennata* and *atlas,* but with a very differently shaped id (fig. 5e). Od with the sclerotized margin as in fig. 5f (Sardinian specimens) or straight (Corsican specimens). Lateral appendages of adminiculum as in *atlas.*

Type-material: Holotype ♂: Sardinia Centr., Belvi Umg., 700 m, 22.II.1976, coll F. HARTIG (ZMA).

Paratypes: 1♂: labeled as the holotype. 1♀: Sardinia C, Gennargentu, Brunca Spina, 1400 m, 15.VII.1976, leg. HARTIG (ZMA). 1♂: Corsica, 14.-24.IX.1981, C. DUFOUR, J. O. HENRIKSSON, P. OOSTERBROEK/Haut Asco, 12 km SW Asco, 1300-1800 m, Alnus and dripping rocks (Narthecium), St 18 (ZMA, alcohol). 2♂ 1♀: idem/Restonica, Berg. Grotelle, 15 km SW Corte, 2000-2200 m, dripping rocks (Narthecium), St 8 (MHNN, alcohol).

The species is named in honour of Prof. Dr. Count F. HARTIG. It is apparently very close to *atlas* from northern Africa, having similar lateral appendages at the adminiculum. These appendages are bifid in *breviantennata* and *cheethami*.

KEY TO THE CORSICAN AND SARDINIAN FEMALES OF TIPULA (SAVTSHENKIA).

1. Squamae with a few hairs — 2.
- Squamae naked — 3.
2. Thorax laterally with a broad, brown to dark brown stripe running from the neck in the direction of the halter, ending underneath the wing; sternopleurite without any fine hairs; lateral prescutal stripes brighter in the middle — *rufina*.
- A dark stripe on the side of the neck, fainter on the thorax; lateral prescutal stripes not brightened; a few fine hairs on the sternopleurite. — *alpium*.
3. Wings very shortened. — *gimmerthali* subsp. *pteromaculata*.
(No females of this species are known from the islands. Several alpine populations have normal wings, see below.)
- wings normal — 4.
4. Eyes very close ventrally, separated by at most twice the diametre of the first antennal segment. — 5.
- Eyes separated ventrally by at least three times the diametre of the first antennal segment. — 10.
5. Flagellar segment short (fig. 5). Anterior part of medial prescutal stripes invaginated by the ground colour of the thorax (lateral borders of the stripes further in front than central parts). — 6.
- Flagellar segments long. Medial prescutal stripes complete or anteriorly abbreviated throughout. — 8.
6. Second flagellar segment as long as pedicel (fig. 5d). — *breviantennata*.
- Second flagellar segment as long as first and distinctly longer than pedicel (fig. 5b). — 7.
7. Wing length 15–17 mm. — *hartigiana*.
- Wing length 12–13 mm. — *jeekeli*.
8. Abdominal tergites uniformly coloured; basal part of hypovalvae, seen laterally, swollen (fig. 6a). — *corsosignata*.
- Abdominal tergites distinctly darkened laterally; hypovalvae not swollen basally (fig. 6b, 6c). — 9.
9. Fork of m_1 and m_2 before the end of r_{1+2}; abdominal tergites with very conspicuous lateral markings, fused dorsally on tergites 5 and 6. — *sardosignata*.
- Fork of m_1 and m_2 at or beyond the end of r_{1+2}; lateral markings of the tergites less distinct and not fused dorsally. — *cyrnosardensis*.
10. Abdominal tergites uniformly coloured — *gimmerthali* subsp. *pteromaculata*.
- Abdominal tergites darkened laterally. — 11.

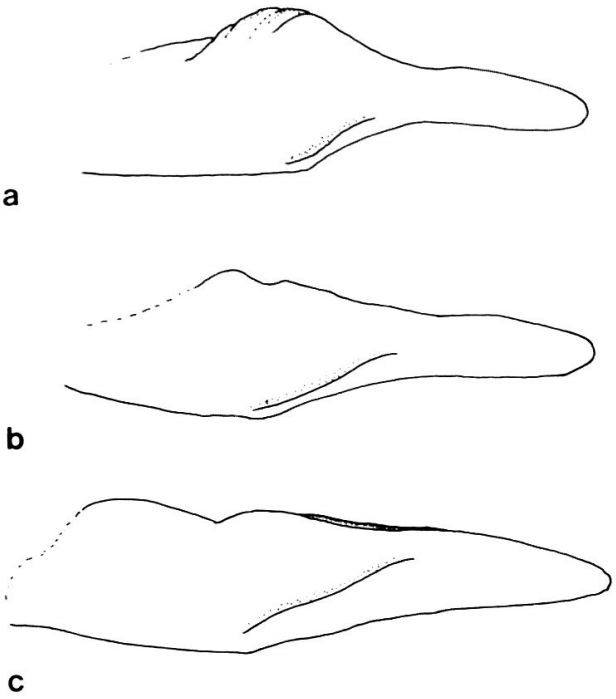

Fig. 6: Side view of hypovalvae. a, *Tipula (Savtshenkia) corsosignata* sp. nov.; b, *Tipula (Savtshenkia) sardosignata* MANNHEIMS & THEOWALD; c, *Tipula (Savtshenkia) cyrnosardensis* sp. nov.

11. Discal cell small, its distal end before origin of r_{1+2}. *eugeni*
- Discal cell large, its distal end beyond origin of r_{1+2}. *serrulifera*

ZOOGEOGRAPHICAL REMARKS

The European and Mediterranean element

The tipulids of Corsica and Sardinia can be divided in species distributed in the Mediterranean or belonging to species-groups distributed as such, and in species with a distribution at least in central and western Europe or belonging to European species-groups.

On the islands the European element is much larger than the Mediterranean element (table 1 & 2). This is in contrast with the tipulid fauna of Italy (table 2).

The Mediterranean element is almost equally represented on both islands (Corsica 10, Sardinia 9). The distributions or affinities of the Mediterranean species are either west- *(mediterranea, breviantennata, hartigiana, sacerdotula, a. pertenua),* east- *(doriae, italica, plumbea, macciana)* or holo-mediterranean *(corsica, eugeni, jeekeli, fuscipes).*

The origin of the fauna

Four species are considered older endemics (early-Pleistocene or older), viz *corsica, doriae, hartigiana* and *sacerdotula,* all four belonging to the Mediterranean element. Their closest relatives are found in northern Africa, the Canary Islands or the Caucasus and are morphologically quite different.

The eleven other endemic species are considered young endemics. They are similar or very similar to their closest relatives and, moreover, all these close relatives are distributed in Italy. It is assumed here that these endemics are of mid-

Table 1. Number of Mediterranean and European taxa of Tipulidae on Corsica and Sardinia.

	Older endemic taxa				Younger endemic taxa				Non-endemic taxa			
	Corsica only	Sardinia only	both islands	total	Corsica only	Sardinia only	both islands	total	Corsica only	Sardinia only	both islands	total
Mediterranean element	1	1	2	4	-	-	1	1	3	2	3	8
European element	-	-	-	-	4	1	5	10	13	2	9	24

Table 2. Number and percentage of Mediterranean and European taxa of Tipulidae on Corsica, Sardinia and (parts of) Italy (excl. alpine speci es and older endemics.

	Italian Alps	Corsica	Sardinia	Central Italy	Italy (excl. It. Alps)
Mediterranean element	5 / 11%	7 / 18%	6 / 26%	14 / 44%	30 / 45%
European element	42 / 89%	31 / 82%	17 / 74%	18 / 56%	37 / 55%

or late-Pleistocene origin. The same applies to the non-endemic species. All these species, eight belonging to the Mediterranean and twenty-four to the European element, are also known from Italy except one *T. (Savtshenkia) jeekeli,* recorded from Majorca, southern France, Corsica, Sardinia and Greece; the records of the Autumn subgenus *Savtshenkia* might well be incomplete because very few collecting was undertaken throughout the Mediterranean during Autumn). The faunal connections between Italy and the islands are very apparent and presumably became established during glacial periods of the mid- and late-Pleistocene when the eustatic lowering of the sea-level by at least 100 m broadly connected the islands and diminished the distance between Corsica and the Italian mainland to about 30 km (an eustatic lowering of 200 m would have resulted in a distance of less than 10 km). That the faunal exchange mainly took place during a glacial period is also apparent from the composition of the Tipulidae fauna of the islands. It can be expected that during a glacial period the European element is well represented in Italy. At present this is still the case on the islands whereas in adjacent central Italy the Tipulidae fauna has become more mediterranean (table 2).

In short, it can be stated that 9% of the Tipulidae of Corsica and Sardinia are apparently older than the mid-Pleistocene and that the remaining 91% arrived on the islands from Italy during glacial periods of the mid- and late-Pleistocene.

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(reçu le 10 juin 1982)