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The Bibionidae (Diptera) of Sardinia, with description of two new species*

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Abstract

The occurrence of eight species of Bibionidae is reported from Sardinia, mainly based upon recent collections made in the south-western part of the island. Two species, *Dilophus bispinosus* Lundström, 1913 and *D. humeralis* Zetterstedt, 1850, are new records for Sardinia, while two species are described as new to science: *Bibio sardocyrneus* **sp. nov.** (from Sardinia and Corsica) and *Dilophus sardous* **sp. nov.** (from Sardinia). The presence on the island of a ninth species, *D. femoratus* (Meigen, 1804), is considered as dubious. Finally, the following synonymy is proposed: *Bibio hortulanus* (Linnaeus, 1758) = *Bibio siculus* Loew, 1846 **syn. rev**.

Key words: Diptera, Bibionidae, Italy, Sardinia, Corsica, faunistics, new species, new records

Introduction

The Bibionidae are a small family of characteristic, robust nematoceran Diptera often with marked sexual dimorphism. The adults are often abundant in open, semi-open or wooded habitats. They are most frequent and diverse in semi-open and mosaic agricultural/wooded landscapes. In some species males may form large aerial mating swarms. The larvae of most species live in mass-aggregations of up to several hundreds specimens. They are phytosaprophagous and develop in decaying vegetable matter, mainly in leaf litter and soils rich in humus. In temperate Europe some species may become minor pests, as the larvae can feed on roots of grasses and crops (D'Arcy Burt & Blackshaw 1991).

About 45 species of bibionid flies are known in Europe (Skartveit 2004). The Italian fauna as a whole includes 19 species according to Dahl *et al.* (1995) and Skartveit (2004), both lists being mainly based upon literature records although they differ for some species. Additional species have been recently recorded by Rivosecchi and Di Luca (2001), Skartveit and Thaler (2001), Vanin (2002, 2003, 2006), Sommaggio *et al.* (2004) and Zeegers (2006), increasing the number of species known from Italy to 22.

The study of the Bibionidae from Sardinia has been nearly completely neglected. The only records are based on the old collections made by Costa (1882, 1883), while one species was recorded by Haenni (1982). Accordingly only four species are mentioned from the island by Dahl *et al*. (1995) in the *Checklist delle specie della fauna italiana*, namely *Bibio hortulanus* (Linnaeus, 1758), *Dilophus antipedalis* Wiedemann *in* Meigen, 1818, *D. febrilis* (Linnaeus, 1758) and *D. femoratus* Meigen, 1804. In Fauna Europaea (Skartveit 2004) the same species are considered as present in Sardinia, together with two others, *Bibio marci* (Linnaeus, 1758) and *B. siculus* Loew, 1846, although the latter species is merely a synonym of *B. hortulanus* (Linnaeus, 1758) (see comment below this species).

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Material and methods

All the Sardinian material referred to in this paper was collected in the framework of a project carried out by the Centro Nazionale per lo Studio e la Conservazione della Biodiversità Forestale "Bosco Fontana", Verona (CNBFVR) in the period 2003–2006 (*cf.* Mason *et al*. 2006). Most specimens are preserved in 70° ethanol (except some pinned specimens) in the CNBFVR collection. A small part is retained in the author's collection in Muséum d'Histoire Naturelle, Neuchâtel (MHNN). For the sake of comparison, additional museum material from Corsica was studied. The genitalia of dissected males were cleared in 10% potash and are preserved in glycerin in a microvial attached to the same pin or put in the same vial as the source specimen. Holotype label data are quoted verbatim, i.e. without interpretation; a slash (/) indicates the end of a line of print or handwriting; significant supplementary or qualifying information is given in square brackets.

Species are listed in alphabetical order and numbered consecutively, except for species of doubtful occurrence in Sardinia, which are left unnumbered. The original description and principal papers treating the taxonomy, with relative nomenclatural combinations, are listed under each species. Literature sources for Italian regional distributions are quoted under each species. In the list of recent records by CNBFVR, localities are listed according to the recent re-arrangement of the administrative regions of Sardinia; this of course does not apply to older literature or museum data. Sampling sites of material collected by CNBFVR are abbreviated as follows:

C07: Carbonia-Iglesias province, Domusnovas, near Planargia-Scoveri, 625 m, UTM 32 S 465523 4362921, Malaise trap, leg. M. Bardiani, D. Birtele, P. Cornacchia & D. Whitmore.

C23: Medio Campidano province, Villacidro, radura sponda sinistra [= clearing on left bank] Rio Cannisoni, 401 m, UTM 32 S 468459 4362806, Malaise trap, leg. M. Bardiani, D. Birtele, P. Cornacchia & D. Whitmore.

C70: Carbonia-Iglesias province, Iglesias, Marganai, near Case Marganai, 660 m, UTM 32S 0463341 4556196, hand net (unless otherwise specified), leg. D. Birtele, P. Cerretti, G. Nardi, M. Tisato & D. Whitmore.

C82: Carbonia-Iglesias, Iglesias, Monti Marganai, Tintillonis, 480 m, UTM 32 S 463010 4355249, Malaise trap (unless otherwise specified), leg. D. Birtele P. Cerretti, G. Nardi, M. Tisato & D. Whitmore.

S1: Carbonia-Iglesias province, Iglesias, near Colonia Beneck, 636 m, UTM 32S 0462391 4355441, Malaise trap, leg. G. Chessa.

S2: Carbonia-Iglesias province, Domusnovas, Sa Duchessa, 371 m, UTM 32 S 464990 4358384, Malaise trap, leg. G. Chessa.

S3: Carbonia-Iglesias province, Domusnovas, Valle Oridda, 592 m, UTM 32S 0466973 4362228, Malaise trap (unless otherwise specified), leg. G. Chessa (unless otherwise specified).

SAR1: Carbonia-Iglesias province, Iglesias, Marganai, 700 m, UTM 32S 0462853 4355582, Malaise trap (unless otherwise specified), leg. G. Chessa.

Chorotypes used in this paper are those proposed by Vigna Taglianti *et al*. (1999), based on distributions summarized by Krivosheina (1986) and Skartveit (2004).

Terminology of the external morphology follows Skartveit (1997) and Merz and Haenni (2000).

Acronyms of specimen depositories are as follows:

CNBFVR	Centro Nazionale per lo Studio e la Conservazione della Biodiversità Forestale "Bosco Fontana", Verona, Italy
ETHZ	Entomological collection, Eidgenössische Technische Hochschule, Zurich, Switzerland
MHNG	Muséum d'Histoire Naturelle, Genève, Switzerland
MHNN	Muséum d'Histoire Naturelle, Neuchâtel, Switzerland

Faunistic list

1. *Bibio hortulanus* (Linnaeus, 1758)

Tipula hortulana Linnaeus, 1758: 588
Bibio siculus Loew, 1846: 344 **syn. rev.**
Bibio hortulanus L. s. str.: Duda 1930: 57
Bibio hortulanus L. var. *siculus* Loew: Duda 1930: 60
Bibio hortulanus L.: Krivosheina 1986: 322
Bibio siculus Loew: Krivosheina 1986: 325

Literature records. Cagliari prov., near Cagliari, mid April 1882 (Costa 1883). Sardinia (without further data) (Dahl *et al*. 1995; Skartveit 2004) [probably based on Costa (1883)].

Other records. Italy, Aosta Valley: St. Denis, 880m, 13.V.2006, 1 ♀, J.-P. Haenni leg. (MHNN). Italy, Lombardy: Como prov., Menaggio, 18-30.V.1891, 6 ♂♂, 14 ♀♀, Escher-Kündig leg. (ETHZ).

Chorotype. A probable Asiatic-European element, present at least in the whole W-Palaearctic region.

Italian distribution. Mainland Italy, Sicily, Sardinia (Dahl *et al*. 1995). All of Italy (Boselli 1928: 92), Piedmont (Leonardi 1927; Boselli 1928), Trentino-Alto Adige (Marcuzzi 1956; Hellrigl 1996; Skartveit & Thaler 2001; Vanin 2006), Venetia (Sommaggio *et al*. 2004), Emilia-Romagna (Leonardi 1927), Latium (Krivosheina 1997; Rivosecchi & Di Luca 2001), Campania (Leonardi 1927), Sicily (Loew 1846), Aosta Valley, Lombardy (present paper).

Ecology. A common vernal species, especially abundant in traditional agricultural landscape.

Notes. The species is not represented in recent material from Sardinia (CNBFVR), but its very characteristic features make it unmistakable, especially females. *Bibio siculus* Loew has been considered as a separate species in recent catalogues (Krivosheina 1986; Skartveit 2004), pending a study of the variability within the *Bibio hortulanus* complex. Variability is indeed important in southern Palaearctic forms, but the characters concerned are only colour of thorax and abdomen, and colour of pilosity, which are not reliable at the specific level within *Bibio* Geoffroy, as recently pointed out by Skartveit (2006). For this reason I here follow Duda (1930), who treated *B. siculus* (and other forms) as mere varieties of *B. hortulanus*, and I consider both names as synomyms: *Bibio hortulanus* (Linnaeus, 1758) = *Bibio siculus* Loew, 1846: 344 **syn. rev**.

2. *Bibio marci* (Linnaeus, 1758)

Tipula marci Linnaeus, 1758: 588
Bibio hortulanus L. var. *marci* (L.): Duda 1930: 59
Bibio marci (L.): Krivosheina 1986: 323

Literature records. Sardinia (Skartveit 2004).

Records. S2: 1.III–4.IV.2006, 4 ♂♂ (CNBFVR).

Other records. France, Corsica, Corse-du-Sud, Spelunca, 11.IV.1935, 1 ♂, J. Simonet leg. (MHNG). Italy, Aosta Valley: St. Vincent, Salirod, 1080m, 14.V.2006, 1 ♂, J.-P. Haenni leg. (MHNN). Italy, Abruzzi: Chieti prov., Abetina di Rosello, F.te Volpona, 980m, 18.V.2005, 1 ♀, D. Birtele, M. Bardiani & D. Whitmore leg. (CNBFVR). Calabria: Reggio Calabria prov., near Giffone, Piano Limina, 800m, 11.V.2004, 3 ♂♂, 1 ♀, D. Birtele, P. Cerretti, G. Nardi & D. Whitmore leg. (CNBFVR).

Chorotype. W-Palaearctic.

Italian distribution. Mainland Italy, Sicily (Dahl *et al*. 1995). Lombardy (Vanin 2002), Trentino-Alto Adige (Marcuzzi 1956; Hellrigl 1996; Vanin 2006), Venetia (Sommaggio *et al*. 2004), Tuscany (Vanin 2003),

Latium (*cf*. Krivosheina 1997), Aosta Valley, Abruzzi, Calabria, Sardinia (Skartveit 2004; present paper).

Ecology. One of the commonest species of the genus, widespread in various biotopes in the whole of Europe, flight period in spring.

Notes. Recorded from Sardinia by Skartveit (2004), but with no known locality. Confusion may however have occurred with the closely related *B. sardocyrneus* **sp. nov.** (see below). The above record from Domusnovas (SW Sardinia) is thus the first verified proof of the occurrence of *B. marci* in Sardinia, where both species are apparently sympatric. This is also the case in Corsica.

3. *Bibio sardocyrneus* sp. nov.

(Figs 1–3, 5–8)

Type locality. Italy, Sardinia (Medio Campidano prov.), Villacidro, Rio Cannisoni, 375 m, UTM 32 S 0468713 4362692.

Type material. Holotype ♂, labelled: "I – Sardegna (Medio Campidano) / Villacidro, Rio Cannisoni, 375 m / UTM 32 S 0468713 4362692 / 24.III.2006 retino [= net] / D. Whitmore, M. Bardiani, D. Birtele, P. Cornacchia legit / Progetto Sardegna – CNBF [print]", "Centro Nazionale per lo Studio e / Conservazione della /Biodiversità / forestale –Verona / Corpo Forestale dello Stato / Progetto Sardegna" [print], "*Bibio sardocyrneus* sp. nov. ♂/ HOLOTYPE / J.-P. Haenni 2007" [handwritten, red label], in good condition, dry pinned (CNBFVR).

Paratypes: same data as holotype, 2 ♂♂, 1 ♀, D. Birtele (CNBFVR); Villacidro (Medio Campidano prov.), Montimannu, vivaio forestale [= forest nursery], 24.III.2006, r [retino = net], 1 ♀, D. Birtele legit (MHNN); Villacidro (Medio Campidano prov.), 296 m: 20.III.2006, r [retino = net], 1 ♂, D. Birtele leg. (CNBFVR).

Other material. France, Corsica: Corse-du-Sud, Ajaccio [without date, but 19th century], 3 ♂♂, 1 ♀, Huguenin leg. (ETHZ); Filitosa, 67 m, 10.IV.1999, 2 ♂♂, J.-P. Haenni leg. (MHNN).

Diagnosis. This new species is very close to *B. marci*, but presents in both genders distinct morphological features which allow a safe identification. In males the posterior femur is more clavate, with narrow basal part longer, reaching slightly beyond middle of femur (Fig. 3); hind tarsus inflated (Figs 3, 6), decreasing in thickness from 1st to 5th tarsomere, instead of simple, not inflated, parallel-sided, as in *B. marci* (see Figs. 4, 9). In the female, the wing membrane is lighter, more greyish-white than brownish, hind veins not contrasting, hyaline or nearly so (Fig. 2).

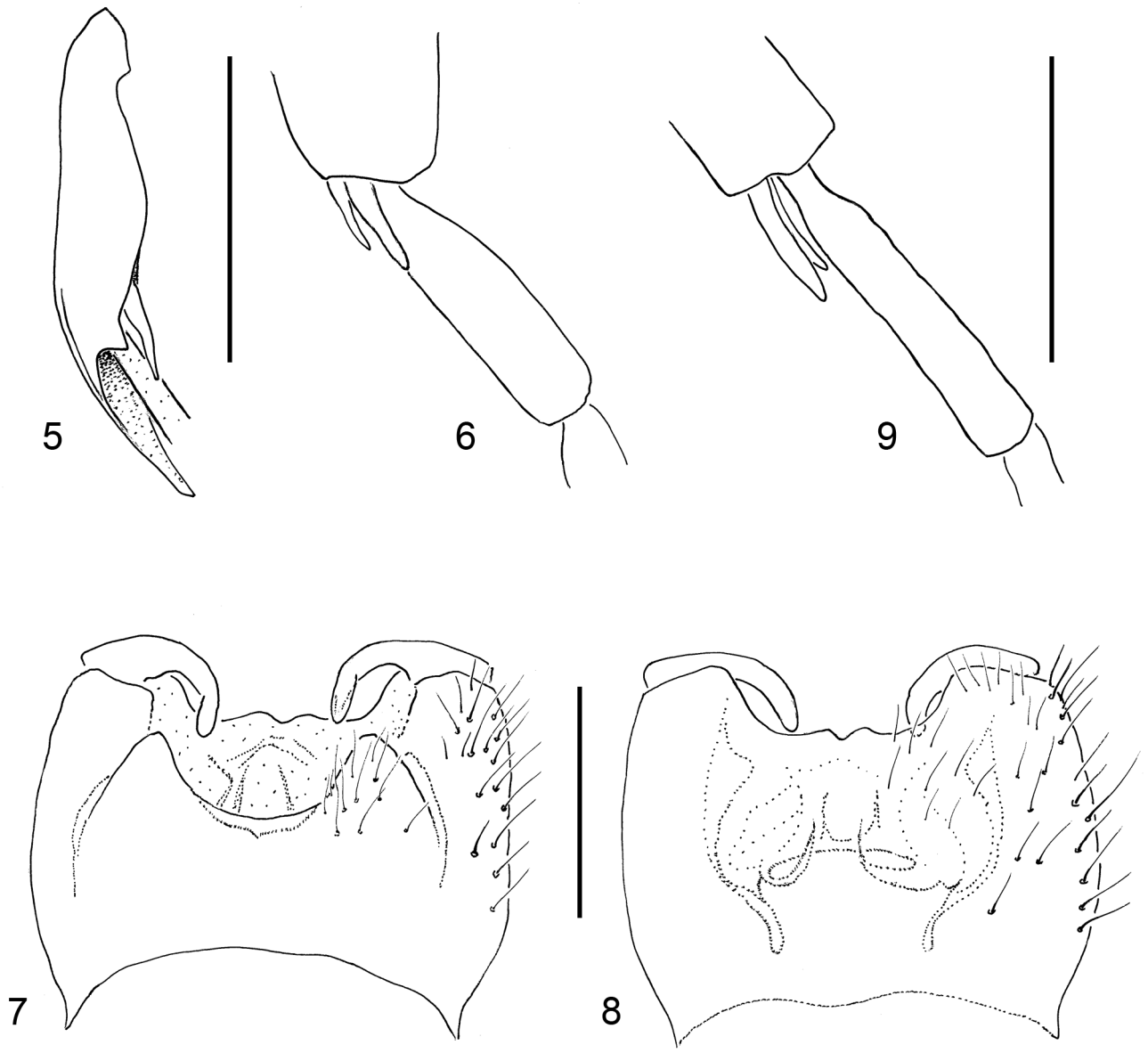
Description. Male. Body 8–10 mm long. Black, with long and dense black pilosity in general appearance (Fig. 1), with tibiae and tarsi lighter, brownish. Head. Black, with long black wavy pilosity, especially on occiput, eyes with long stiff pilosity. Ocellar tubercle prominent. Antennae black, flagellum 7-segmented. Palpi black, practically as long as antennae. Thorax. Mesonotum black, finely shagreened, weakly shining, postpronotal streak obscurely rufous (more so in Corsican specimens). Black pilosity, long and nearly wavy on dorsum and pleurae. Wing (Fig. 1). Length, 6.5–8 mm, dirty whitish, with costal and most of radial cell brownish, pterostigma slightly darker brown, anterior veins brown-black, posterior veins translucent. Basal part of Rs more than twice as long as R-M cross-vein. Halteres black, with black stem. Coxae and femora black, with long, somewhat wavy, black pilosity, less so on hind femur. Anterior and mid tibiae castaneous-brown, hind tibia darker, brownish black. Tibiae and tarsi with shorter dark pilosity. Tarsi castaneous-brown, becoming darker towards tip, the individual tarsomeres more or less darkened at apex. Hind femur (Fig. 3) brownish black, clavate, widening at or shortly after middle. Fore tibia with strong posterior projection (Fig. 5). Posterior tibia (Fig. 3) widening towards apex, first hind tarsomere (Figs 3, 6) inflated, shorter and broader than in *B. marci*, second tarsomere narrower and shorter than first, but distinctly inflated, third also somewhat inflated. Abdomen black, with long, somewhat wavy black pilosity. Hypopygium (Figs 7–8). Epandrium basally fused with base of gonocoxites, with U-shaped posterior emargination hardly reaching its half length (Fig. 7), gonostyles strongly curved (Fig. 7), cercus flattened, apically broadly rounded and pilose, aedeagal complex elongate, narrowly shovel-shaped, posterior emargination of sternite 9 complex, shallow (Fig. 8).

Female. 10–12 mm. Black with black pilosity in general appearance. Head. Frons granulate and hairy between the eyes. Palpi black, practically as long as antennae. Thorax black with black pilosity, notum feably shining, finely shagreened as in male. Wing (Fig. 2). 8–9 mm. Costal cell and most of radial cell brown, pterostigma darker brown, strongly contrasting, rest of wing membrane greyish-white tinged, lighter than in *B. marci*, with posterior veins not contrasting. Legs black and black pilose. Abdomen black with black pilosity.

Etymology. The name *sardocyrneus* refers to the geographical distribution of the new species. It is a composed latinized adjective, contraction of *sardous* (from Sardinia) and *cyrneus* (from *Cyrnos*, Corsica in Greek).

Chorotype. A probable Sardo-Corsican endemic.

FIGURES 1–4. *Bibio* spp. **1–3.** *Bibio sardocyrneus* sp. nov. **1.** Male habitus (paratype, Villacidro), scale bar: 5 mm. **2.** Female wing (paratype, Montimannu), scale bar: 5 mm. **3.** Male hind leg (paratype, Villacidro), scale bar: 2 mm. **4.** Male hind leg of *Bibio marci* (Linnaeus) (Italy, Aosta province, St. Vincent). Photos by G. Haldimann.



FIGURES 5–9. Males of *Bibio* spp. **5–8.** *Bibio sardocyrneus* sp. nov., scale bars: 1 mm. **5.** Anterior tibia in posterior view (holotype). **6.** Hind basitarsus in anterior view (holotype). **7.** Hypopygium in dorsal view (paratype, Rio Cannisoni). **8.** Hypopygium in ventral view (paratype, Rio Cannisoni). **9.** Hind basitarsus of *Bibio marci* (Linnaeus) in posterior view (Aosta prov., St. Vincent).

Ecology. The few known specimens have been caught in wooded habitats in Sardinia and in agricultural semi-wooded habitats in Corsica. In Sardinia most specimens were collected near Rio Cannisoni, a small river that runs almost dry during the summer months; surrounding vegetation consists mainly of open holm oak woodlands, interspersed with bushes of *Cistus* spp. and *Erica* spp.

Notes. Sardinian and Corsican specimens of the new species have been compared with specimens of *B. marci* and both taxa have been found to differ consistently. The shape and length of the first hind tarsomere of *B. marci*, which is not at all inflated and somewhat elongated (Figs 4, 9) is a remarkably constant character in this species: I have seen hundreds of specimens from Europe (Germany, France, Switzerland, Austria, Czech republic, Italy, Portugal, Greece, including Crete), North Africa (Tunisia, Algeria, Morocco) and Central Asia (Uzbekistan) and none present an inflated first hind tarsomere resembling that of *B. sardocyrneus* sp. nov.

4. *Dilophus antipedalis* Wiedemann *in* Meigen, 1818

Dilophus antipedalis Wiedemann *in* Meigen, 1818: 239
Dilophus femoratus Meig. var. *andulasiacus* Strobl 1900: 92, 369
Dilophus antipedalis Wiedemann *in* Meigen: Duda 1930: 26 (*partim*)
Dilophus femoratus Meig. var. *andulasiacus* Strobl: Duda 1930: 31
Dilophus andulasiacus Strobl: Pecina 1971: 107
Dilophus antipedalis Wiedemann *in* Meigen: Haenni 1982: 340
Dilophus andulasiacus Strobl: Krivosheina 1986: 327
Dilophus antipedalis Meigen: Krivosheina 1986: 327

Literature records. Oristano prov., Oristano, Krausse leg., 1 ♂ 1 ♀ (Haenni 1982).

Records. S1: near Colonia Beneck, 636 m, 18.IV–2.V.2006, ?3 ♀f. **S2**: 18.IV–2.V.2006, 2 ♂♂. **S3**: 18.IV–2.V.2006, 1 ♂. **SAR1**: 16.II–15.VI.2004, ?3 ♀♀ (see below); 29.IV–20.V.2005, 1 ♂ (all CNBFVR).

Chorotype. A typical W-Mediterranean element present in North Africa and Southern Europe.

Italian distribution. Sardinia. Not yet recorded from mainland Italy nor from Sicily.

Ecology. A vernal species, flight period earlier than that of *D. sardous* **sp. nov.**, with a wide ecological amplitude in Southern Europe.

Notes. The female specimens from SAR1 and S1 do not present the usual wing pattern of *D. antipedalis*. The costal cell is hardly or not yellowish-tinged, thus not contrasting with the rest of the membrane, and the hind veins are only weakly darker than membrane. Accordingly, they are only tentatively attributed to *D. antipedalis*, even if the shared similarities with this species (e.g., shape of head, arrangement of spines on anterior tibia, first antennal flagellomere contrasting yellow, abdomen markedly bicolorous, with tergites much darker than sternites etc.) are numerous.

5. *Dilophus bispinosus* Lundström, 1913

Dilophus bispinosus Lundström, 1913: 392
Dilophus bispinosus Ldstr.: Duda 1930: 27
Dilophus bispinosus Ldstr.: Krivosheina 1986: 327

Records. S2: 3–17.X.2006, 1 ♂, 1 ♀. **S3**: 3–17.X.2006, 1♂, 1 ♀. **SAR1**: 21.IX–21.X.2003, 2 ♂♂; 6.X–5.XI.2004, pitfall trap, 3 ♀♀; **S1**: 19.IX–3.X.2006, 1 ♀; 3–17.X.2006, 2 ♀♀ (all CNBFVR).

Other records. France, Corsica: Corse-du-Sud, Tavera, 400 m, 14–24.IX.1981, C. Dufour, I. Henriksen & P. Oosterbroek leg., 1 ♂, 1 ♀; Haute-Corse, Corte, St. Pierre-de-Venaco, 730 m, 14–24.IX.1981, C. Dufour, I. Henriksen & P. Oosterbroek leg., 2 ♂♂ (all MHNN).

Chorotype. Euro-Mediterranean element, extending as far north as Great Britain, Switzerland and the Czech Republic, but more frequent in the Mediterranean region.

Italian distribution. Southern Italy (Dahl *et al*. 1995). Lombardy (Vanin 2003), Venetia (Sommaggio *et al*. 2004), Tuscany (Vanin 2003), Campania (Séguy 1940), Sardinia (present paper).

Ecology. Common in wooded areas. *D. bispinosus* is bivoltine in Southern Europe with flight periods in early spring and autumn.

Notes. First records for Sardinia and Corsica.

6. *Dilophus febrilis* (Linnaeus, 1758)

Tipula febrilis Linnaeus, 1758: 588
Dilophus vulgaris Meigen, 1818: 306

Dilophus febrilis (L.): Duda 1930: 29
Dilophus febrilis (L.): Haenni 1982: 342
Dilophus febrilis (L.): Krivosheina 1986: 328

Literature records. "Diffuso per molte parti dell'isola [= occurs in many parts of the island]", 1881 (Costa 1882); Cagliari prov., Cagliari area, second half of April 1882 (Costa 1883).

Other records. Italy, Umbria: Perugia prov., Gubbio, Loc. Colonnata, 500m, 19.IV.2003, 1 ♂, D. Whitmore leg. (CNBFVR). Latium: Latina prov., Sabaudia, Pantani dell'Inferno, lato nord [= northern side], 14.IV.2004, 1 ♀, G. Nardi leg. (CNBFVR).

Chorotype. Sibero-European.

Italian distribution. Northern Italy, Sicily, Sardinia (Dahl *et al*. 1995). Lombardy (Vanin 2002), Trentino-Alto Adige (Marcuzzi 1956; Hellrigl 1996), Venetia (Sommaggio *et al*. 2004), Tuscany (Vanin 2003), "nel sud Italia [in southern Italy]" (Rivosecchi & Di Luca 2001), Umbria, Latium (present paper).

Ecology. A widespread and very common species, abundant in all kinds of habitats in Europe, from lower to high elevations. Bivoltine in Central and Southern Europe.

Notes. Not present in the recent CNBFVR material, but the species is easily recognizable at least in females and its presence in Sardinia is not in doubt.

[*Dilophus femoratus* Meigen, 1804]

Dilophus femoratus Meigen, 1804: 116
Dilophus albipennis Meigen, 1830: 315
Dilophus femoratus Meig.: Duda 1930: 30
Dilophus femoratus Meig.: Haenni 1982: 344
Dilophus femoratus Meig.: Krivosheina 1986: 328

Literature records. Cagliari prov., near Cagliari, April 1882 (Costa 1883). Oristano prov., San Lussurgio [= Santulussurgio], May 1882 (Costa 1883). Sardinia (Dahl *et al*. 1995; Skartveit 2004) [probably based on Costa (1883)].

Chorotype. Palaearctic.

Ecology. A widespread and common species in various habitats, more frequent in mountainous areas. Bivoltine in parts of its range.

Italian distribution. Northern and Southern Italy, Sardinia (Dahl *et al*.1995). Lombardy (Vanin 2002), Trentino-Alto Adige (Vanin 2006), Emilia-Romagna, Tuscany (Vanin 2003).

Notes. In the absence of material, the discovery of *Dilophus sardous* **sp. nov.** brings some doubt about the occurrence of the closely related *D. femoratus* in Sardinia (which however remains possible). The specific identity of the species of this group may only be confirmed by the study of male genitalic characters or by detailed molecular studies. Accordingly, *D. femoratus* is provisorily deleted from the list of Sardinian species, pending the examination of possible relevant material.

7. *Dilophus humeralis* Zetterstedt, 1850

Dilophus humeralis Zetterstedt, 1850: 3393
Dilophus humeralis Zett.: Duda 1930: 32 (p.p.)
Dilophus humeralis Zett.: Haenni 1982: 345
Dilophus humeralis Zett.: Krivosheina 1986: 328

Records. Medio Campidano prov., Villacidro, Montimannu, vivaio forestale [= forest nursery], hand net,

24.III.2006, 1 ♂, D. Birtele leg. (CNBFVR).

Chorotype. European; the presence of this species in North Africa remains doubtful (Haenni 1981). This species has a wide European distribution.

Italian distribution. Northern Italy, Sicily (Dahl *et al*. 1995). Sardinia (present paper).

Ecology. Generally at low altitudes, but it occurs also at higher altitudes in the southern parts of its range, where it is bivoltine.

Notes. *Dilophus humeralis* is recorded here for the first time from Sardinia.

8. *Dilophus sardous* sp. nov.

(Figs 10–16)

Type locality. Italy, Sardinia (Cagliari province [= Carbonia-Iglesias prov. since 2005]): Iglesias, Monti Marganai, Tintillonis, 480 m, UTM 32 S 463010 4355249.

Type material. Holotype ♂ labelled: "I – Sardegna (CA [= Carbonia-Iglesias prov.]) / Iglesias M.ti Marganai / località Tintillonis 480m / 11-12.VI.2004 (Malaise) / UTM 32 S 463010 4355249 / D. Birtele, P. Cerretti, G. Nardi, M. Tisato, D. Whitmore leg./ Progetto Sardegna – CNBF" [print], "Centro Nazionale per lo Sudio / e Conservazione della /Biodiversità forestale – CNBF / Verona – Bosco della Fontana / Corpo Forestale dello Stato / Progetto Sardegna" [print], "*Dilophus sardous* sp. nov. ♂/ HOLOTYPE / J.- P. Haenni 2007" [partly handwritten, red label].

Paratypes: same data as holotype, 367 ♂♂, 89 ♀♀; Carbonia-Iglesias province, Iglesias, Marganai, near Case Marganai, 660 m, UTM 32S 0463341 4556196, hand net, leg. D. Birtele, P. Cerretti, G. Nardi, M. Tisato & D. Whitmore 5.VI.2004, 1 ♀; 6.VI.2004, 2 ♂♂.

FIGURES 10–11. *Dilophus sardous* sp. nov., scale bars: 2 mm. **10.** Male habitus (paratype, Case Marganai). **11.** Female wing (paratype, Case Marganai). Photos by G. Haldimann.

Remarks: Holotype in good condition, dry pinned, paratypes partly dry pinned, partly preserved in alcohol, in coll. CNBFVR except 20 males and 10 females in coll. MHNN, Neuchâtel.

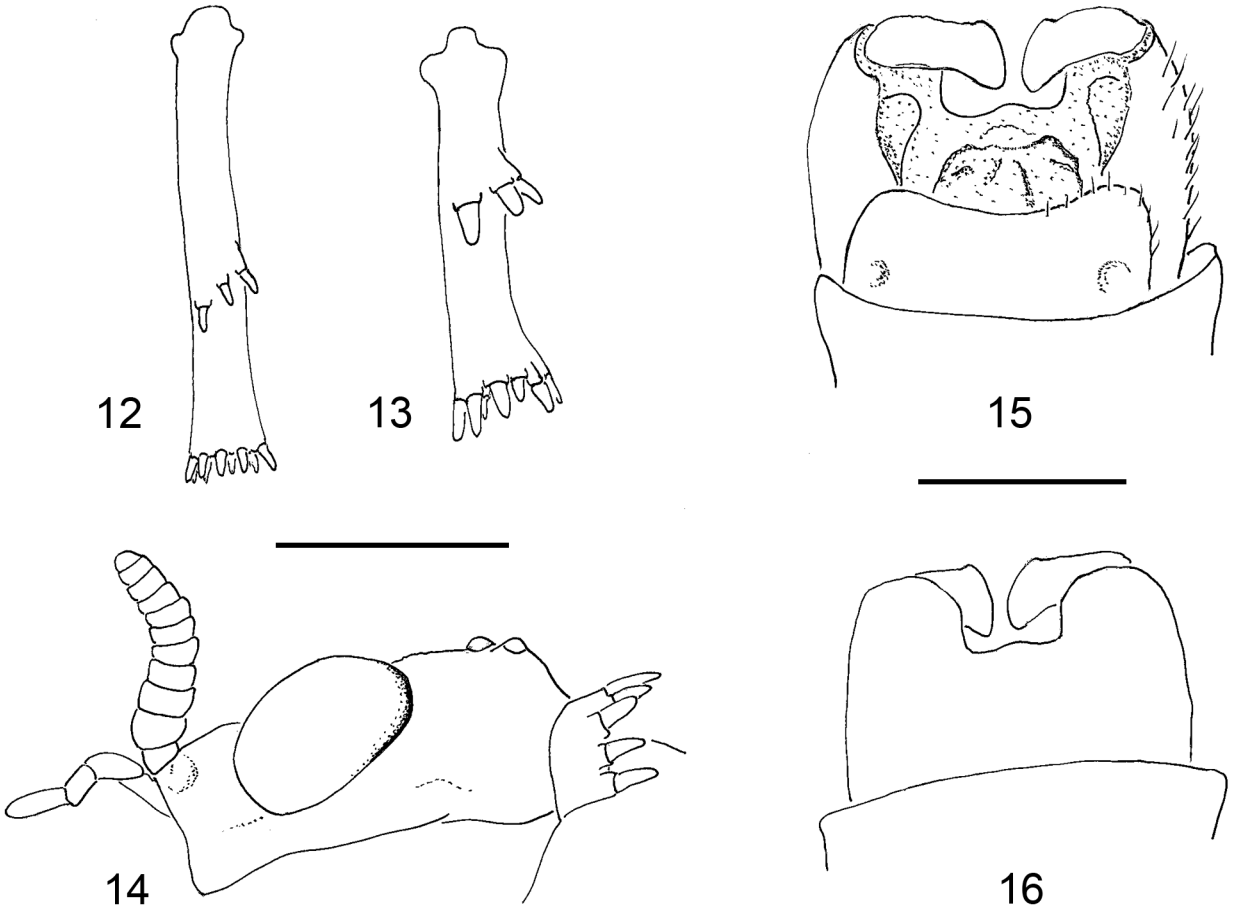
Other material examined. C07: 20–24.V.2006, 2 ♂♂, 3 ♀♀. **C23**: 19–24.V.2006, 1 ♂. **C70**: 7.VI.2004, car net [= entomological hand net held outside the window of a moving car], 2 ♂♂; 8.VI.2004, car net, 3 ♂♂.

C82: 7.VI.2004, hand net, 11 ♂♂, 3 ♀♀; 9–12.VI.2004, several hundreds of males and females of both sexes; 12.VI.2004, 29 ♂♂, 6 ♀♀. **S3**: 7.VI.2004, hand net, D. Birtele, P. Cerretti, G. Nardi, M. Tisato, D. Whitmore leg., 1 ♂. **SAR1**: 15–30.VI.2004, 20 ♂♂, 1 ♀; 20.V–16.VI.2005, Malaise trap and window flight trap, 13 ♂♂, 12 ♀♀; **S2**: 16–30.V.2006, 3 ♂♂, 2 ♀♀; 30.V–13.VI.2006, 1 ♂, 1 ♀ (all CNBFVR).

Diagnosis. Among the west Palaearctic species of the *Dilophus febrilis*-group (those species with only 2 sets of spines on anterior tibiae), *D. sardous* may be distinguished by the following combination of characters: in both sexes, the median row of spines of anterior tibiae consists of three spines only (Figs 12–13), while most other species have four spines, the anterior one often more or less separated from the others; it is unique for males, the deep parallel-sided posterior incision of sternite 9 (Fig. 16), combined with the shape of the gonostyle (which is only weakly angled; Fig. 15), and the milky white wing membrane with hardly contrasting, whitish pterostigma and translucent, not contrasting posterior veins (Fig. 10); *D. femoratus* Meigen (generally distributed in Europe) males have milky white wings and a similar posterior incision on sternite 9, but strongly angled, axe-shaped gonostyles; *D. maderae* Wollaston (from Madera) has a similar posterior incision of sternite 9 and quite similar gonostyles, but light brownish wings with strongly contrasting brown pterostigma and brown veins (see Haenni & Báez 2001); in females the brownish tinged wing with contrasting hind veins and the entirely fuscous abdomen with last sternite contrasting yellow is present otherwise only in *D. neglectus* Haenni, 1982 (from mountain ranges in Central Europe), which has four spines in the middle row on fore tibiae (3 spines in *D. sardous* sp. nov.) and both species differ in many male characters (shape of sternite 9 and gonostyles, etc) (see Haenni 1982).

Description. Male. Body 4.1–5.2 mm long. Shiny black in general colour, with light golden pilosity (Fig. 10). Head black, rostrum hardly extending beyond base of antennae, eyes short pubescent, antennae short, with 9-segmented flagellum. Thorax strongly shining, polished black on notum and on most of pleurae; posterior margin of pronotum bearing a row of 12 spines, anterior margin of mesonotum with a row of 16 (rarely 18) smaller spines. Wing (Fig. 10) 3.3–3.9 mm long, hyaline, appearing slightly milky white according to the angle of view; pterostigma whitish, more or less suffused of brownish along veins, not contrasting with membrane; anterior veins brownish, posterior veins hyaline, not contrasting with membrane. Halteres brownish black with yellowish-brown stem. Legs black, except apex of anterior coxa and most of outer surface and a broad longitudinal band on inner surface of anterior femur, contrasting brown. Femora shiny black. Anterior tibia (Fig. 12) bearing two rows of well developed spines, a transverse set of three spines in an oblique row and an apical set of nine spines. Hind tibia and first hind tarsomere not modified, both weakly widening towards apex, the latter elongate and reaching nearly 2/5 of length of tibia. Abdomen black, shining, but less so than thorax. Hypopygium with posterior margin of sternite 9 (Fig. 16) bearing a deep posterior median, more or less parallel-sided emargination reaching a third of length of sternite, tergite 9 straight or slightly concave on posterior margin (Fig. 15), gonostyles (Fig. 15) nearly straight, apically blunt pointed.

Female. Body 4.2–5.8 mm long, variegated black and yellow in general colour, with sparse and rather short golden yellow pilosity. Head (Fig. 13) shiny black, antennae short, flagellum 9-segmented, the flagellomeres closely set but easy to count; whitish yellow pilosity more developed posteriorly, part of head anterior to the eyes less than half the height of eyes. Thorax. Notum shiny black, with postpronotal lobes rufous yellow, scutellum laterally and posteriorly more obscurely tinged with rufous; pleurae variegated, black and obscurely rufous. Prothoracic comb of 12 black spines, notal comb irregular, consisting of 12–14 smaller spines. Wing (Fig. 11) 3.5–4.8 mm long; membrane slightly but distinctly tinged with brownish, pterostigma well marked, brown, strongly contrasting, anterior veins light brown, posterior veins light brownish, contrasting with membrane. Halteres brown with yellowish stem. Legs. Coxae and femora rufous yellow, trochanters darker, tibiae and tarsi black. Anterior tibia (Fig. 13) with two rows of strong spines, a submedian transverse set of three spines in an oblique row and an apical set of nine spines. Abdomen entirely dark brown, with light pilosity, except for contrasting yellow sternite 9. In quite numerous specimens the anterior sternites are somewhat lighter coloured than posterior ones, frequently with a median longitudinal lighter band.



FIGURES 12–16. *Dilophus sardous* sp. nov. **12.** Male anterior tibia (holotype), scale bar: 0.5 mm. **13.** Female anterior tibia (paratype, Tintillonis), scale bar: 0.5 mm. **14.** Female head (paratype, Tintillonis), scale bar: 0.5 mm. **15.** Male hypopygium in dorsal view (paratype, Tintillonis), scale bar: 0.25 mm. **16.** Male hypopygium in ventral view (paratype, Tintillonis), scale bar: 0.25 mm.

Etymology. The name *sardous* is an adjective referring to the geographic origin of the new species.

Chorotype. A probable Sardinian endemic element according to present knowledge, but its presence might be expected in Corsica.

Ecology. The new taxon appears to be abundant and widespread in the Monti Marganai and Montimannu areas at altitudes ranging from 480 to 700 m. Like several *Dilophus* Meigen species, *D. sardous* sp. nov. presents mass occurrences since several hundreds of specimens were caught by a Malaise trap during a short period in mid June.

Notes. Morphological variation appears reduced, although 2 males (from Tintillonis) with 4 spines in the median row of anterior tibiae were found.

Discussion

The recently collected material includes six species, four of which are new records for Sardinia (two described as new), while two species formerly recorded from the island were not found during the recent survey by CNBFVR. The number of taxa recorded from the island amounts now to eight species, while the occurrence of a ninth species is considered dubious. This number seems low in contrast to the number of species (21) known from mainland Italy (Haenni 2008). This is especially true for *Bibio*, with 15 species in continental

Italy, but only three recorded so far in Sardinia. Unfortunately the fauna of Bibionidae of the other large islands of the Mediterranean is even less well known than that of Sardinia, and no meaningful comparison can be made. It is highly probable that further collecting in various parts of the island will allow the number of species to rise significantly.

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