



Systematics of the Euro-Mediterranean *Empis* (*Kritempis*) (Diptera: Empididae: Empidinae)*

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Abstract

The Euro-Mediterranean subgenus *Kritempis* Collin of *Empis* Linnaeus is here redefined on the basis of three synapomorphies, namely (1) hypandrium reduced to its lateral arms, (2) presence of a posteroventral group of spine-like setae on the female mid tibia at base, (3) anal vein faint, incomplete. This subgenus includes eight species: *Empis* (*K.*) *algira* Macquart, *E.* (*K.*) *livida* Linnaeus, *E.* (*K.*) *macquarti* Becker, *E.* (*K.*) *macropalpa* Egger, *E.* (*K.*) *nigrimana* Becker, *E.* (*K.*) *sardoa* **sp. nov.**, *E.* (*K.*) *sibillina* Bezzi and *E.* (*K.*) *taffertensis* **sp. nov.** A detailed diagnosis of the group as well as a key to all known species is provided. All species are described or redescribed, exclusive of the well-known *E.* (*K.*) *livida*. The holotype of *E.* (*K.*) *algira* is identified and a lectotype designated for *E.* (*K.*) *macquarti*, *E.* (*K.*) *macropalpa* and *E.* (*K.*) *sibillina*. *Empis hoffmannseggii* Loew is moved from the subgenus *Kritempis* to the subgenus *Coptophlebia* Bezzi. The subgenus is restricted to the Mediterranean basin exclusive of *E.* (*K.*) *livida* which is widely distributed in Europe and Algeria where the species is newly recorded.

Key words: Systematics, Diptera, Empididae, Empidinae, *Empis*, *Kritempis*, new species, monophyly, Euro-Mediterranean distribution, Sardinia, Morocco

Introduction

The Empidinae (Diptera: Empididae) are well adapted to temperate areas of the Palaearctic region, where three huge genera, *Empis* Linnaeus, *Rhamphomyia* Meigen and *Hilara* Meigen that include hundreds of species, are known (Chvála & Wagner 1989). The first two genera were divided into several subgenera (e.g. see Bezzi 1909; Frey 1909; Collin 1926), and the subgenus *Kritempis* Collin of *Empis* was created for five species with a Mediterranean distribution, including *E. algira* Macquart as type species, as well as *E. livida* Linnaeus which has a large west Palaearctic distribution (Collin 1926). However the status of a number of these Mediterranean species was questioned by Chvála and Wagner (1989) and Chvála (1994), who finally restricted the subgenus to three species. In this paper the monophyly of *Kritempis* is assessed on the basis of three morphological characters; the species originally recognized as belonging to *Kritempis* are kept in this group, all known species, exclusive of *E. livida*, as well as two new species from Sardinia and Morocco, are described. *Kritempis* is considered a typical Mediterranean group of Empidinae as confirmed by the discovery of *E. livida* in North Africa, and *E. hoffmannseggii* Loew is moved to the subgenus *Coptophlebia* Bezzi.

Material and methods

This work is primarily based on the study of type material except for *Empis livida*, that is a well-known,

widely distributed species already redescribed and illustrated on several occasions (e.g. Collin 1961: 473, fig. 170; Chvála 1994: 45, figs 51–53).

Specimens of the new species *Empis sardoa* were collected during a survey in southern Sardinia by the CNBFVR (Centro Nazionale per lo Studio e la Conservazione della Biodiversità Forestale, Verona, Italy) staff (see Mason *et al.* 2006). A chorotype (see Vigna Taglianti *et al.* 1999) is proposed for the subgenus and each species. The purpose of the lectotype designations made in this paper is to assure correct and consistent application of the names.

The material studied is alcohol-preserved or pinned and belongs to the following institutional collections:

CNBFVR	Centro Nazionale per lo Studio e la Conservazione della Biodiversità Forestale “Bosco Fontana”, Verona, Italy.
MCNM	Museo Civico di Storia Naturale di Milano, Italy.
MNHN	Muséum national d’Histoire naturelle, Paris, France.
NMW	Naturhistorisches Museum Wien, Austria.
ZMHU	Museum für Naturkunde der Humboldt-Universität zu Berlin, Germany.

The morpho-anatomical terms follow McAlpine (1981), Sinclair *et al.* (1994), Cumming *et al.* (1995), Daugeron (1997a) and Stuckenberg (1999). The term epandrial lamella simply refers to the lateral aspects of the epandrium.

The male genitalia were dissected and macerated in hot 10% KOH, and drawn in glycerine using a camera lucida. Original label data are given in full between inverted commas. Some of the characters common to all species are given in a general diagnosis of *Kritempis*, and thus are not repeated in the description of each species.

Genus *Empis* Linnaeus, 1758 subgenus *Kritempis* Collin, 1926

Kritempis Collin, 1926: 236 (as subgenus of *Empis* Linnaeus, 1758). Type species: *Empis algira* Macquart, 1838: 275 (original designation).

Monophyly and included species. Collin (1926) included in his new subgenus *Kritempis* five chiefly Mediterranean species, namely *E. algira* Macquart, *E. macquarti* Becker (= *E. geniculata* Macquart), *E. nigrimana* Becker, *E. sibillina* Bezzi and *E. macropalpa* Egger, as well as the European species *E. livida* Linnaeus, especially on account of the considerable development of the male cercus (dorsal lamella *sensu* Collin). *Empis macquarti*, *E. nigrimana* and *E. sibillina* were arranged as “unplaced species of *Empis*” in the Palaearctic catalogue by Chvála and Wagner (1989), on account of their male genitalia apparently very different from the type-species *E. algira* (Chvála 1994). Chvála and Wagner (1989) added to *Kritempis* the species *E. hoffmannseggii* Loew from Portugal and Northern Italy (Raffone 2008: 109) for which Chvála examined the holotype in 1986 (ZMHU); later, Chvála (1994) suggested that *E. hoffmannseggii* had rather a close affinity with the subgenus *Euempis* Frey, 1953, but did not re-assign the species to this subgenus.

Exclusive of *E. livida*, I reviewed the type material of all the above species, including *E. hoffmannseggii* Loew, and studied in detail the male genitalia. The hypandrium is reduced to a pair of well sclerotized lateral arms, with the ventral part absent (Figs 1-5, 8-9). The reduction of the hypandrium occurred in several other species groups (e.g., the *Empis* (*Coptophlebia*) *hyalipennis*-group) within the Empidinae but not in groups narrowly related to *Kritempis* (i.e. subgenera *Leptempis* Collin, 1926 and *Planempis* Frey, 1953 see below). This character is found in all species given above, exclusive of *E. hoffmannseggii*, and is thus considered synapomorphic for them.

In addition, in all available females, the mid tibia is somewhat twisted, bent with a posteroventral group of short spine-like setae at basal tip (Fig. 6). This character is considered a second synapomorphic character for those species.

In all the studied species, exclusive of *E. hoffmannseggii*, the anal vein (A_1) is faint, incomplete and sometimes not visible (Fig. 7; Collin 1961: fig. 169). Generally the abbreviation of the anal vein is linked to the presence of a not well developed anal lobe. The anal lobe is strongly developed in *Kritempis* and the presence of a faint anal vein could be an additional autapomorphic character for the subgenus.

Chvála (1994: 44) was mistaken in believing that the dorsal lamella (= cercus) of the male hypopygium of *E. macquarti* Becker is small; actually the male cercus of this species is considerably developed (Fig. 2) as in all other species (Figs 1, 3-5, 8-9) (exclusive of *E. hoffmannseggii*) as already stated by Collin (1926, 1961); however the cercus is also much broader than the epandrial lamella in the subgenera *Leptempis* and *Planempis*, and should be considered a synapomorphic character for all species belonging to *Kritempis*, *Leptempis* and *Planempis* (Daugeron *et al.* 2002), and not only for species of *Kritempis* alone.

Empis hoffmannseggii actually belongs to the polyphyletic subgenus *Coptophlebia* Bezzi (vein M_1 abbreviated), and according to the structure and shape of male hypopygium as well as the presence of ventral setae on the prosternum, could have a close affinity to *E. (E.) pilosa* and other related species of the subgenus *Empis* (see Srovátka 1980, 1991).

Finally, Collin's (1926) original views are here followed, and I include in the subgenus *Kritempis* the following species: *E. algira* Macquart, *E. livida* Linnaeus, *E. macquarti* Becker, *E. macropalpa* Egger, *E. nigrimana* Becker, *E. sibillina* Bezzi as well as two new species, namely *E. sardoa* sp. nov. (Sardinia) and *E. taffertensis* sp. nov. (Morocco).

Diagnosis. Male with holoptic eyes, upper ommatidia enlarged, postgena with fine pale yellow setae, proboscis about as long as head height, labella thick. Prosternum with numerous lateral pale yellow setae, bare ventrally, laterotergite with fan of pale or golden yellow setae (*E. livida* Linnaeus has also an anterior row of black setae on laterotergite); 1 and 4 strong, long postalar and scutellar setae respectively. Wing with anal lobe well developed, Sc abbreviated, R_{4+5} forked, A_1 faint, incomplete. Hypopygium with cercus considerably developed, distinctly broader than epandrial lamella; hypandrium reduced to pair of lateral arms; phallus generally long, rather thick basally, more or less undulated, always with specific shape. Female similar to male except for following characters: eyes dichoptic with all ommatidia subequal, frons as wide as face, mid tibia somewhat S-shaped or bent bearing a ventral or posteroventral group of short spine-like setae at base.

Discussion. Within the subfamily Empidinae, *Kritempis* belongs to a monophyletic group of subgenera, namely *Euempis*, *Leptempis*, *Pachymeria* Stephens, 1829 *Planempis* and *Polyblepharis* Bezzi, 1909 (Daugeron *et al.* 2002). The combination of the following characters allows distinguishing *Kritempis* from the remaining subgenera: A_1 faint, abbreviated, male cercus considerably developed but not bilobed, hypandrium reduced, ventrally absent, presence of posteroventral group of short spine-like setae on female mid tibia basally. It must be noted that the abbreviation of the median veins M_1 and / or M_2 is not a diagnostic character since it is only found in three species: *E. algira*, *E. livida* and *E. macropalpa*.

Chorotype. Euro-Mediterranean. *Kritempis* is mainly distributed around the Mediterranean basin; recorded from North Africa (Algeria and Morocco), Corsica, Sardinia, Sicily, and mainland Italy. Only *E. livida* Linnaeus is widely distributed, known from Europe to North Africa (Algeria), where it is newly recorded.

Key to species of *Empis* (*Kritempis*)

1. Male 2
- Female..... 9
2. M_1 and / or M_2 distinctly abbreviated (Collin 1961: fig. 169 ; Chvála 1994: fig. 51) 3
- Median veins complete or feebly sclerotized at wing margins, never distinctly abbreviated (Fig. 7) 5
3. M_1 and M_2 abbreviated, laterotergite with strong, black setae anteriorly, coxae yellowish
.....*E. livida* Linnaeus (Europe, Algeria)
- M_1 complete, M_2 abbreviated, laterotergite with pale yellow setae anteriorly, coxae greyish 4
4. Palpus blackish, phallus not undulated (Fig. 3)..... *E. macropalpa* Egger (Italy, Sicily)
- Palpus yellowish, phallus characteristically undulated at middle (Fig. 1)..... *E. algira* Macquart (Algeria)

5. Hind femur mainly yellowish..... *E. taffertensis* sp. nov. (Morocco)
- Hind femur mainly brownish black 6
6. Proepisternum with pale yellow setae, anterior and posterior spiracles yellowish, scutum distinctly striped 7
- Proepisternum with black setae, anterior and posterior spiracles blackish, scutum indistinctly striped
..... *E. nigrimana* Becker (Algeria)
7. Scape with numerous long setae, wing brownish, cercus with simple setae (Figs 2, 8) 8
- Scape with a few short setae, wing rather clear, cercus with anterodorsal group of strong setae (Fig. 5)
..... *E. sardoa* sp. nov. (Sardinia)
8. Three strong, long notopleurals, apical tip of hind femur and basal tip of hind tibia yellowish
..... *E. macquarti* Becker (Algeria)
- Four strong, long notopleurals, hind leg entirely brownish..... *E. sibillina* Bezzi (Italy, Corsica)
9. At least some legs with pennate setae..... 10
- All legs lacking pennation *E. macquarti* Becker (Algeria)
10. Hind tibia with pennate setae (Fig. 7)..... *E. sardoa* sp. nov. (Sardinia)
- Hind tibia without pennation 11
11. Fore femur without pennation, mid femur with posteroventral pennate setae at apex.....
..... *E. macropalpa* Egger (Italy, Sicily)
- Fore femur with distinct short pennate setae, mid femur without pennation 12
12. Coxae greyish, hind femur without pennation, M_1 complete 13
- Coxae yellowish, hind femur with anteroventral pennate setae, M_1 abbreviated.....
..... *E. livida* Linnaeus (Europe, Algeria)
13. Legs dark brown-blackish, M_2 complete, halter with brownish black knob..... *E. sibillina* Bezzi (Italy, Corsica)
- Legs brown-yellowish, M_2 abbreviated, halter with pale yellow knob *E. algira* Macquart (Algeria)

Description of *Kritempis* species

Empis (Kritempis) algira Macquart, 1838

(Fig. 1)

Empis algira Macquart, 1838: 159 (original description).

Diagnosis. Greyish to blackish species, with palpus yellowish, M_1 feebly sclerotized at wing margin, M_2 abbreviated, coxae greyish. Female fore femur with short anterior pennation.

Holotype identification. One male and one female are present in the Macquart collection (MNHN); they are pinned above the label “n° 82, *E. algira* Macqt, Alger”. However the species was described on the basis of one female (Macquart 1838: 159); consequently the female specimen (with the additional label “126, 38”) is herewith identified as the holotype of the species. The male specimen (with the additional label “126, 98; n° 791, *Empis algira*”) is considered a simple representative of the species.

Additional material. 1 ♂, “692; *Empis geniculata*, m.” (pinned above the label “n° 84, *E. geniculata* Macqt, M. Lucas, Algérie”) (Macquart collection); 1 ♂, “Muséum Paris, Rouiba, Dept d’Alger, J. Surcouf, 1923”; 1 ♂, “Stora-Ph-ville, Algérie, A. Théry”; 1 ♂ “Philippeville, Algérie, A. Théry”; 1 ♀, “Philippeville, Algérie, A. Théry; Muséum Paris, Algérie, Philippeville, A. Théry, 1903” (MNHN).

Re-description. Male. Head. Occiput dusty grey; occipital, postocular, ocellar setae black, rather strong, postgenal setae pale yellow. Face dusty grey to shiny black. Antenna blackish. Labrum more than 2x head height, palpus yellowish.

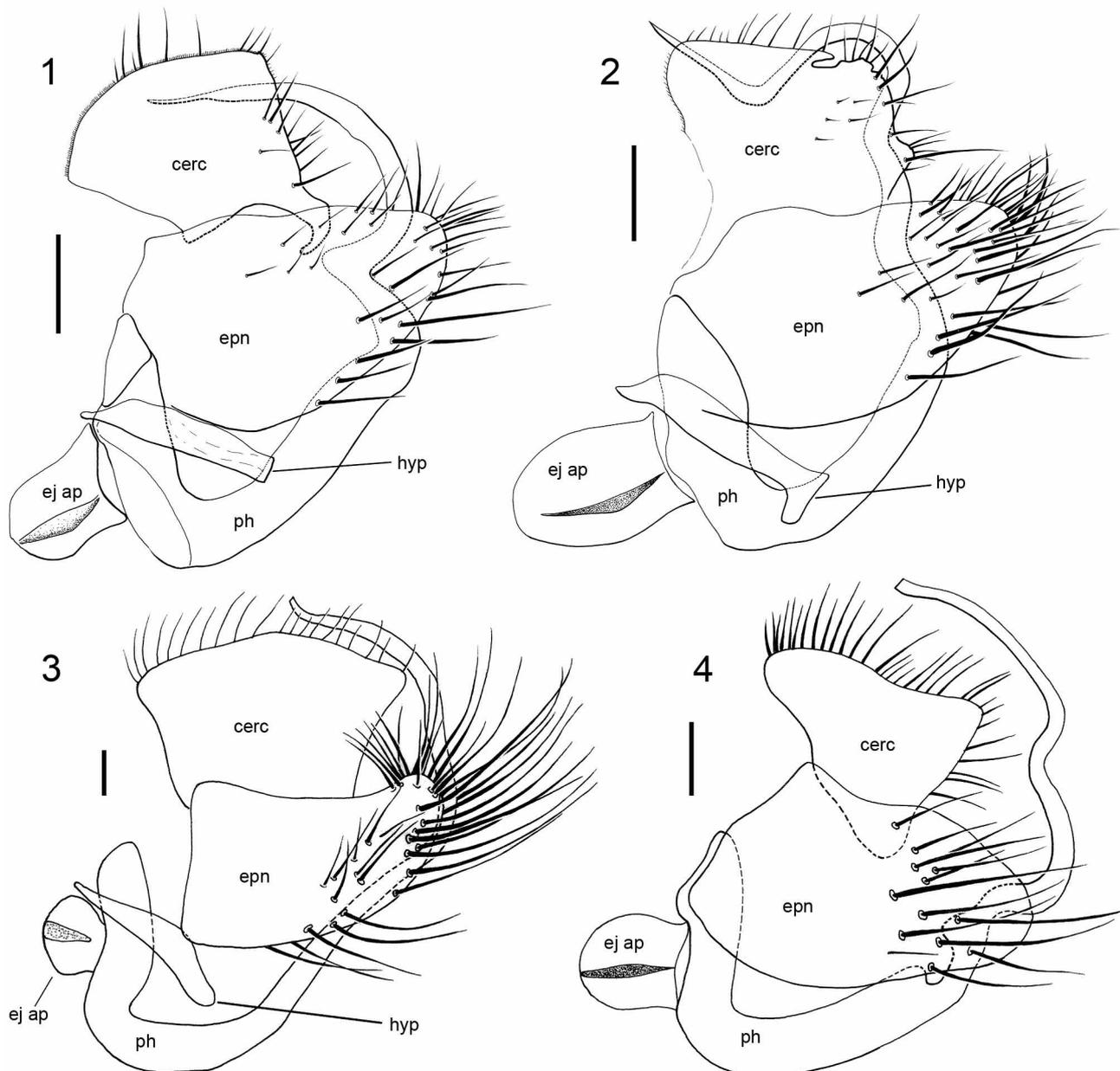
Thorax. Dusty grey. Antepnotum with strong black setae. Proepisternum, prosternum with fine, short pale yellow setae. Antepnotal lobes with 1 strong, long black basal seta. Scutum with 3 brownish stripes on acrostichals and dorsocentrals, scutal setae black. Acrostichals biserial, short, fine; dorsocentrals uni to biserial, short, fine except for 3-4 strong, long prescutellars. Other strong, long setae as follows: 1 presutural, 2 postsutural supraalar, 3 notopleurals. Laterotergite with fan of long pale yellow setae. Anterior, posterior spiracles yellowish.

Legs. Coxae dusty greyish with numerous pale yellow setae. Fore femur dark brown to yellowish apically; fore tibia yellowish to brownish apically, with antero- and posterodorsal rows of distinct short setae; fore tarsus blackish with tarsomeres 1–3 with distinct apical setae. Mid femur dark brown to yellowish apically; mid tibia yellowish to brownish at tips with anterodorsal row of strong, long setae, strong, long anteroventral setae apically; mid tarsus blackish with tarsomeres 1–3 with distinct ventral short setae. Hind femur yellowish; hind tibia yellowish with dorsal rows of distinct setae; hind tarsus as mid tarsus.

Wing (length about 6.4 mm). Clear. M_1 feebly sclerotized at tip, M_2 abbreviated. Halter yellow.

Abdomen dusty grey to brownish on tergites. First two tergites with distinct lateral pale yellow setae.

Hypopygium (Fig. 1) with cercus bearing characteristic ventroapical hook; epandrial lamella with strong, long ventral setae; phallus characteristically undulated at middle.



FIGURES 1–4. Male hypopygium of *Empis* (*Kritempis*) spp. in lateral view, scale bars: 0.1 mm. Abbreviations: cerc = cercus; ej ap = ejaculatory apodeme; epn = epandrium; hyp = lateral arm of hypandrium; ph = phallus. **1.** *Empis* (*K.*) *algira* Macquart (Algeria, Rouiba). **2.** *Empis* (*K.*) *macquarti* Becker (lectotype, Algeria). **3.** *Empis* (*K.*) *macropalpa* Egger (lectotype, Sicily). **4.** *Empis* (*K.*) *nigrimana* Becker (holotype, Algeria).

Female. Similar to male except for following characters: frons greyish-black. Scutal chaetotaxy shorter. Fore femur with short anterior pennation; mid tibia with posteroventral group of short spine-like setae at basal tip. Tergites 1–5 greyish black, subshiny.

Chorotype. W-Mediterranean. *Empis algira* is known from Algeria; it is also recorded from Sardinia in the Palaearctic catalogue (Chvála & Wagner 1989: 258) and Fauna Europaea (Chvála 2004); however I did not see any specimens from this area amongst the material recently collected by the CNBFVR staff in Sardinia, and the species is not recorded in the on-line checklist of the Italian fauna (Raffone 2003).

Empis (Kritempis) livida Linnaeus, 1758

Empis livida Linnaeus, 1758: 127 (original description).

A detailed list of the synonyms of this species can be found in the Palaearctic catalogue (Chvála & Wagner 1989: 258).

Diagnosis. Palpus yellowish with fine setae; labrum 2 x head height. Scutum distinctly greyish brown with 3 blackish stripes on dorsocentrals and acrostichals; scutellar margin brownish; laterotergite with fan of black, strong, long anterior and brownish, fine, shorter posterior setae. Coxae, femora, tibiae entirely yellow; coxae with black setae. Wing with veins M_1 and M_2 distinctly abbreviated, brownish in male, hyaline in female. Male abdomen yellowish brown. Female with fore femur with short anterior pennation; hind femur with short posteroventral pennation; mid tibia somewhat S-shaped in dorsal view with posteroventral group of short spine-like setae basally; abdomen subshiny greyish.

Material. About 300 specimens from different parts of France, as well as 16 specimens from Algeria: 5 ♂♂, 2 ♀♀ “Rouiba, Dept. d’Alger, J. Surcouf, VI. 1923”; 5 ♂♂, 4 ♀♀ “Algérie, Chellala, J. Surcouf, 1921”.

Chorotype. European with an extension in Maghreb. *Empis livida* is known from the west Palaearctic and here firstly recorded from North Africa (Algeria).

Remark. Detailed descriptions and illustrations of *E. livida* Linnaeus can be found in Collin (1961: 473, figs 169-170) and Chvála (1994: 45, figs 51–53).

Empis (Kritempis) macquarti Becker, 1907

(Fig. 2)

Empis macquarti Becker, 1907: 127, new name for *E. geniculata* Macquart, 1849 nec *Empis geniculata* Zetterstedt, 1842 (see below).

Empis geniculata Macquart, 1849: 443.

Diagnosis. Scape with long setae; palpus projected with many strong, long ventral setae. Dorsocentrals rather strong, long. Wing with median veins complete. Male tergites 5-6 enlarged.

Lectotype designation. This species was described by Macquart (1849) with the name *Empis geniculata*, then renamed *Empis macquarti* by Becker (1907) because it is a junior primary homonym of *Empis geniculata* Zetterstedt, 1842 itself synonymized with *Iteaphila macquarti* Zetterstedt, 1838.

In the Macquart collection (MNHN), two males and one female are pinned above the label n° 84 “*E. geniculata* Macquart, monsieur Lucas, Algérie”. The species was indeed described from both sexes (Macquart, 1849: 444); the first male and the female (with the respective additional label “213; *Empis geniculata* Macquart” and “1179”) correspond to the original description and here considered conspecific; the remaining male belongs to the species *Empis algira*. Although the number of specimens is not given in the original description, and given that *Empis algira* was described by Macquart himself and differs significantly from *Empis macquarti* (e.g. M_2 is abbreviated in *E. algira*, complete in *E. macquarti*), I consider that this

specimen was added to the series later. Consequently, the first male is herewith designated as lectotype of *Empis geniculata* Macquart and labelled accordingly to fix and stabilize the current concept of the name; the female becomes a paralectotype of the species, and the second male is considered a representative of *E. algira*.

Additional material. 1 ♂, “Alger-IV, 52449; Museum Paris, Th. Becker 1902; *E. macquarti* B., det. Becker; *Empis macquarti* Beck.”; 1 ♂, “Muséum Paris, Biskra, coll. Parendel, coll. J. Chataney 1914”; 5 ♂♂, 1 ♀ “Algérie, Rocher Blanc, mars-avril 1913, J. Surcouf”; 1 ♂, 2 ♀♀ “Muséum Paris, Algérie, Forêt l’Empereur, P. Lesne, vi.1897”; 3 ♂♂, 9 ♀♀, “Philippeville, Algérie, A. Théry”; 1 ♀, “St Charles, Algérie, A. Théry, Muséum Paris, coll. Abeille de Perrin, 1919” (MNHN).

Re-description. Male. Head. Occiput dusty greyish, covered with rather strong, black setae; ocellar triangle with distinct pair of setae. Scape dark brown with numerous long setae, pedicel dark brown, postpedicel black. Palpus long, projected, with strong, long ventral setae; labrum 2x head height.

Thorax. Greyish. Antepronotum with row of distinct setae. Proepisternum with pale yellow setae, prosternum with fan of long, fine, pale yellow setae. Scutum with 3 distinct dark brown-blackish stripes on acrostichals and dorsocentrals; acrostichals biserial, fine; dorsocentrals uniserial, strong, long. Other strong long setae as follows: 1 presutural, 1–2 postsutural supraalar; 3 notopleurals. Laterotergite with fan of strong, long golden yellow setae. Anterior and posterior spiracles yellowish.

Legs. Coxae greyish to brownish. Fore coxa with pale yellow setae; mid coxa with row of strong, long black lateral setae; hind coxa with pale yellow setae, 2 strong, long black setae. Fore femur brown; fore tibia brown with antero- and posterodorsal rows of about 10 strong setae as long as tibia depth; fore tarsomeres 1–4 with distinct apical setae. Mid femur brown; mid tibia brown with antero- and posterodorsal rows of strong, rather long setae; mid tarsomeres 1–4 with two ventral rows of spine-like setae. Hind femur brown to yellowish apically with posteroventral row of strong, short setae, posterodorsal row of distinct setae at apical third; hind tibia brown to yellowish with posterodorsal rows of about 10 strong, rather short setae, anterodorsal row of strong, a little longer setae; first four hind tarsomeres brownish, with two ventral rows of spine-like setae.

Wing. Length about 6.5 mm. Brownish. Median veins complete. Halter yellow.

Abdomen. Greyish to blackish, somewhat shiny. Tergites 1–5 with strong, long black marginal setae, distinct pale yellow laterals. Pregenital sclerites modified: tergites 5–6 enlarged, tergite 6 with more or less concave anterior margin (in dorsal view), posterior margin lengthened ventrolaterally, tergite 7 somewhat desclerotized anteriorly, tergite 8 desclerotized posteriorly at middle.

Hypopygium (Fig. 2). Dorsal margin of cercus with characteristic subapical indentation. Epandrial lamella with strong, long setae apically. Phallus long, undulated, especially apically.

Female. Similar to male except for following characters: mid tibia brownish to yellowish basally, somewhat bent, with posteroventral group of spine-like setae at basal tip.

Chorotype. W-Mediterranean. The species is known from Algeria; it is also recorded from Tunisia in the Palaearctic catalogue (Chvála & Wagner 1989: 278); however, I have not seen any specimens from this area.

Empis (Kritempis) macropalpa Egger, 1860

(Fig. 3)

Empis macropalpa Egger, 1860: 344 (original description).

Diagnosis. Greyish species with brownish legs, labrum about as long as head height, presutural supraalar seta fine, M_2 abbreviated; male with scape and palpus with numerous rather long setae; female with mid femur with a few short posteroventral pennate setae apically, hind femur with ventral pennation on apical half.

Lectotype designation. The original description is based on both sexes from Sicily but the number of specimens examined was not given by Egger (1860). In the NMW collection, five males and three females are

present and all labelled in the same way: “Mann, 1858, Sicilia; Empis, Alte Sammlung”. Specimens are conspecific and correspond to the original description and thus here considered syntypes. A male specimen is herewith designated as lectotype of the species and labelled accordingly to fix and stabilize the current concept of the name. The remaining seven specimens become paralectotypes.

Re-description. Male. Head. Occiput dusty greyish, covered with fine, rather long black setae. Ocellar triangle with pair of fine setae. Scape dark brown with numerous long setae, pedicel dark brown, postpedicel black. Labrum dark brown, slightly longer than head height; labium blackish; palpus blackish, long, projected, with numerous distinct setae.

Thorax. Dusty greyish. Anteprepronotum with a few black setae. Anteprepronotal lobes with 1 rather fine, long black basal bristle, many other finer, short brownish to pale yellow anteriors. Proepisternum, prosternum with fan of pale yellow setae. Scutum with 3 blackish stripes on acrostichals and dorsocentrals; acrostichals quadri- to biserial, fine. Dorsocentrals quadri- to biserial, fine, except for 3-4 strong, long prescutellars. Other strong, long setae as follows: 1 presutural, 1 postsutural supraalar; 3 notopleurals. Laterotergite with fan of long pale yellow setae. Anterior, posterior spiracles yellowish.

Wing. Length about 6.7 mm. Feebly tinted of brown. M_2 abbreviated. Halter yellow.

Legs. Coxae greyish with many pale yellow setae. Fore femur brownish; fore tibia brownish to yellowish basally with anterodorsal row of rather strong setae about as long as tibia depth, finer posterodorsals; fore tarsus dark brown, fore tarsomeres 1–2 with strong apical setae. Mid femur brownish; mid tibia brownish to yellowish basally, with antero- and posterodorsal rows of 3-5 strong, rather long setae, antero- and posteroventral rows of strong, shorter setae on apical half; mid tarsus dark brown with tarsomeres 1–4 with 2 ventral rows of spine-like setae. Hind femur brownish to yellowish apically; hind tibia brownish to yellowish basally, with antero- and posterodorsal rows of setae as long as tibia depth; hind tarsomeres dark brown with 2 ventral spine-like setae.

Abdomen. Tergites brownish to greyish at margins, sternites greyish, covered with rather long pale yellow setae.

Hypopygium (Fig. 3). Cercus broad, somewhat square. Epandrial lamella somewhat lengthened with many strong, long apical setae. Phallus rather simple, gently curved, not undulated.

Female. Similar to male except for following characters: scape, palpus with shorter setae. All setae on legs short; fore tibia yellowish to brownish apically; mid femur with a few posteroventral short pennate setae apically; mid tibia yellowish to brownish apically, with posteroventral group of *ca.* 10 very short spine-like setae; hind femur with numerous fine pale yellow ventral setae, ventral pennation on apical half. Wing clear. Abdominal setae short.

Chorotype. W-Mediterranean. *Empis macropalpa* is known from Sicily, but not mentioned in the on-line checklist of the Italian fauna (Raffone 2003).

***Empis (Kritempis) nigrimana* Becker, 1907** (Fig. 4)

Empis nigrimana Becker, 1907: 225 (original description).

Diagnosis. Blackish species, palpus rather long, projected with strong, long setae; proepisternum with black setae; anterior, posterior spiracles black.

Type material. Holotype ♂ “Algier 52337; nigrimana Beck.; Holotypus; *Empis nigrimana* Beck., 1807, ♂, det. M. Chvála, 1986” (ZMHU).

Re-description. Male. Head. Occiput blackish, covered with black distinct setae. Ocellar triangle with pair of distinct black setae. Scape, pedicel dark brown, scape with rather long setae, postpedicel missing. Palpus blackish, projected, with numerous rather strong, long setae. Labrum brownish, 1.8x head height, labium blackish.

Thorax. Blackish. Anteprenotum with row of black setae. Anteprenotal lobes with 1 strong, long basal seta, many other finer black anteriors. Proepisternum with a few blackish setae. Prosternum with fan of pale yellow and blackish setae. Scutum subshiny, indistinctly striped. Acrostichals biserial, fine. Dorsocentrals irregularly biserial, rather strong, long, ending in 3-4 stronger, longer prescutellars. Other strong, long setae as follows: 1 presutural, 2 postsutural supraalars; 3 notopleurals. Laterotergite with fan of numerous strong, long golden to pale yellow setae. Anterior and posterior spiracles blackish.

Wing. Length = 6 mm. Feebly brownish with indistinct brown stigma. Median veins complete. Halter yellowish.

Legs. Dark brown-blackish except greyish coxae. Fore, hind coxae with pale yellow setae, 2-3 strong black setae; mid coxa with pale yellow bristles, row of 5-6 strong, long setae. Fore femur covered with many setae, fine posteriorly, strong anteriorly; fore tibia with antero- and posterodorsal rows of strong setae somewhat longer than tibia depth; fore tarsomeres 1-4 with strong setae apically. Mid tibia with antero- and posterodorsal rows of strong, long setae, antero- and posteroventral rows of strong, shorter setae; mid tarsus with 2 ventral rows of short spines. Hind femur with posterodorsal row of strong setae at apical half; hind tibia with antero- and posterodorsal rows of rather strong setae as long as tibia depth; hind tarsus missing.

Abdomen. Blackish. Tergites with long pale yellow setae.

Hypopygium (Fig. 4). Cercus somewhat triangular with rather fine dorsal setae. Epandrial lamella not very bristled, less than 10 strong, long setae. Phallus characteristically undulated, especially basally.

Female unknown.

Chorotype. W-Mediterranean. *Empis nigrimana* is known from Algeria.

Empis (Kritempis) sardoa sp. nov.

(Figs 5-7)

Diagnosis. Greyish species with blackish male legs, yellowish to blackish female legs. Male cercus considerably developed, with anterodorsal group of strong setae. Female legs strongly pennate.

Type material. Holotype ♂ "I, Sardegna, Carbonia Iglesias, Domusnovas, sa Duchessa, 371 m, UTMWGS84 32S 464990 4358384, 4-18.IV.2006, Malaise trap, G. Chessa leg." (CNBFVR). Paratypes. 9 ♂♂, 10 ♀♀, same data; 9 ♂♂, 3 ♀♀, same data except "21.III-4.IV.2006"; 3 ♂♂ "Sardegna, Carbonia Iglesias, Iglesias, near colonia Beneck, 636 m, UTMWGS84 32S 462391 4355441, 4-18.IV.2006, Malaise trap, G. Chessa leg."; 1 ♂, same data except "21.III-4.IV.2006"; 2 ♂♂, 3 ♀♀, same data except "16-30.V.2006"; 2 ♂♂, 17 ♀♀ same data except "18.IV-2.V.2006"; 24 ♂♂, 7 ♀♀, same data except "18.IV-2.V.2006"; 28 ♂♂, 27 ♀♀, same data except "2-16.V.2006"; 1 ♂, 3 ♀♀ "I, Sardegna, Domusnovas, Valle Oridda, UTMWGS84 32S 466973 4362228, 592 m, 2-16.V.2006, Malaise trap, G. Chessa leg."; 2 ♀♀, same data except "16-30.V.2006"; 1 ♂, same data except "18.IV-2.V.2006"; 2 ♂♂ "I, Sardegna (Cagliari), Iglesias, Marganai, Tintillonis, 480 m, 11-12.VI.2004, Malaise trap, P. Cerretti, D. Birtele, G. Nardi, M. Tisato, D. Whitmore leg."; 1 ♂ "I, Sardegna, Carbonia Iglesias, Domusnovas, lago Siuru, 322 m, UTMWGS84 32S 467069 4357916, 20-23.V.2006, Malaise trap, M. Bardiani, D. Birtele, P. Cornacchia, D. Whitmore leg." (CNBFVR, MNHN).

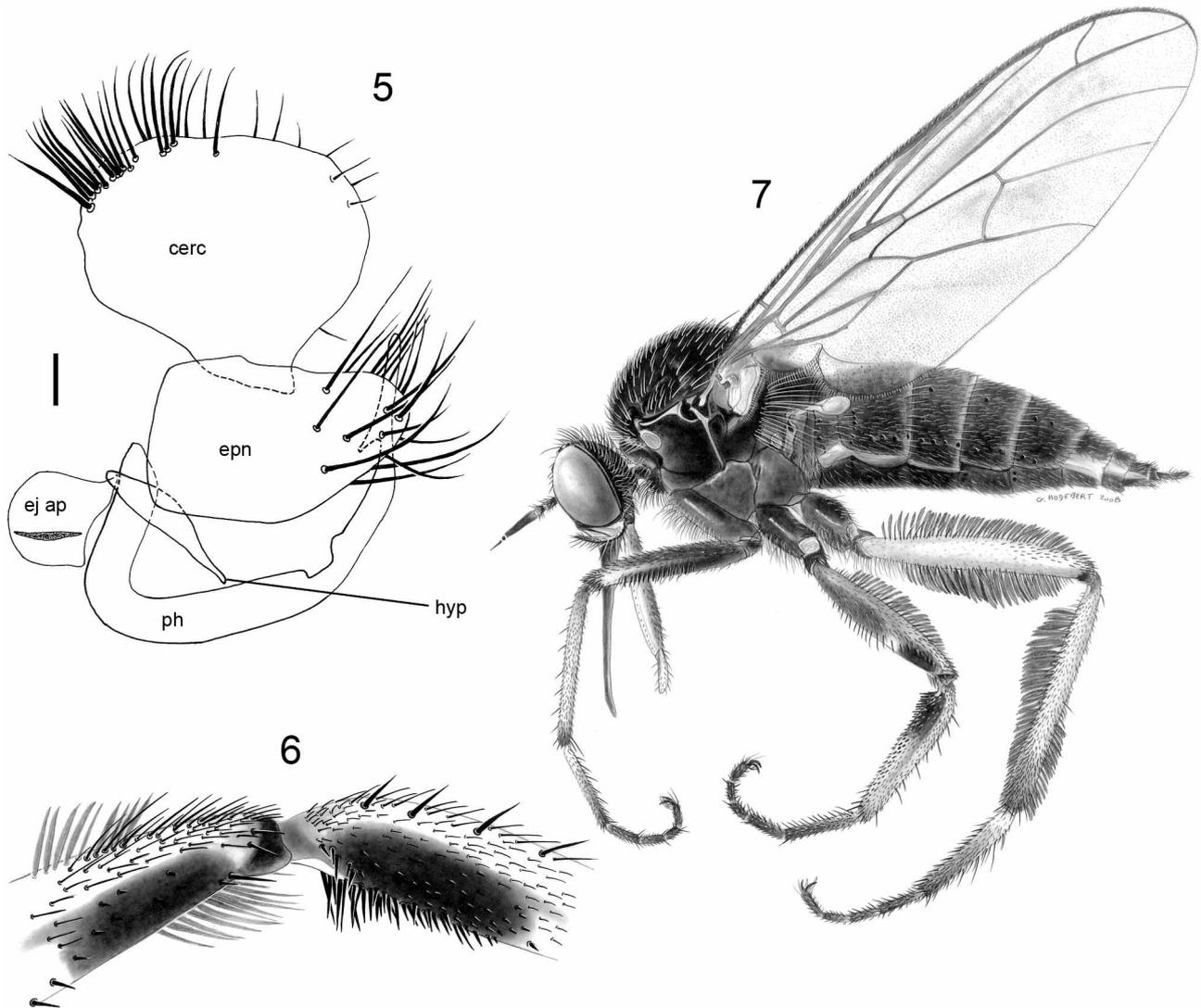
Description. Male. Head. Occiput covered with black fine setae. Ocellar triangle with pair of fine setae. Antenna black. Palpus black, long, projected, with long rather fine setae; labrum blackish, about 1.6x head height; labium black.

Thorax. Anteprenotum with row of black fine setae. Anteprenotal lobes with 1 strong, long basal bristle, numerous other black, pale yellow fine anteriors. Proepisternum, prosternum with fan of pale yellow setae. Scutum with 3 black stripes on acrostichals and dorsocentrals. Acrostichals biserial, fine; dorsocentrals biserial, fine, except for 3 strong, long prescutellars. Other strong, long setae are as follows: 1 presutural, 2 postsutural supraalars; 3 notopleurals. Laterotergite with fan of long pale yellow setae. Anterior, posterior spiracles yellowish.

Wing. Length about 7 mm. Somewhat dark with black veins, indistinct brownish stigma. Median veins

complete. Halter yellow.

Legs. Coxae greyish, with many long pale yellow setae. Fore and mid femora black with fine setae; fore tibia black to yellowish basally with antero- and posterodorsal rows of rather strong setae about as long as tibia depth; fore tarsus black, tarsomeres 1–4 with strong setae apically. Mid tibia black to yellowish dorsally, with antero- and posterodorsal rows of 4–5 strong, long setae, strong, shorter posteroventral setae on apical half; mid tarsomeres black, with 2 ventral rows of short spine-like setae. Hind femur blackish to brownish-yellow apically, with ventral rows of very short, rather strong setae; hind tibia brownish black to yellowish dorsobasally, with antero- and posterodorsal rows of setae shorter to as long as tibia depth, anteroventral row of short spine-like setae; hind tarsus black with antero- and posteroventral rows of short spine-like setae, first tarsomere with dorsal setae longer than tarsomere depth.



FIGURES 5–7. *Empis (Kritempis) sardoa* sp. nov., abbreviations as in Figs 1–4. **5.** Male hypopygium (holotype, Sardinia), scale bar: 0.1 mm. **6.** Female mid femur and tibia (paratype, Sardinia). **7.** Female habitus (paratype, Sardinia).

Abdomen. Greyish to brownish dorsally. Tergites with distinct pale yellow lateral setae, short black marginals, sternites with distinct pale yellow ventral setae.

Hypopygium (Fig. 5). Cercus large, more or less circular, with anterodorsal group of strong setae. Epandrial lamella with a few strong, long apical setae. Phallus short, extending only to base of cercus, not undulated.

Female (Figs 6–7). Fore femur blackish to brownish apically, with long anterodorsal pennation except

apically, short posteroventral pennation at apical half; fore tibia, first tarsomere of all tarsi brownish to yellowish; remaining tarsomeres of all tarsi blackish. Mid femur yellowish-brown with anteroventral black patch apically, long dorsal pennation except apically, a few long posteroventral setae apically, short to minute spine-like anteroventral setae; mid tibia somewhat bent, yellowish with black anteroventral patch basally, posteroventral group of short spine-like setae at basal tip. Hind femur yellow with long dorsal pennation, long ventral pennation except basally; hind tibia yellow with short dorsal pennation on apical half, long ventral pennation except at tips. Abdominal setae short.

Etymology. From the Latin word *sardous*, *a, um* meaning “from Sardinia”.

Chorotype. W-Mediterranean. *Empis sardoa* is known from Sardinia.

Empis (Kritempis) sibillina Bezzi, 1899

(Fig. 8)

Empis sibillina Bezzi, 1899: 133 (original description)

Diagnosis. Greyish species with dark brown-blackish legs, four strong, long notopleurals; male with palpus long, somewhat projected with strong, long setae, halter yellowish; female with halter brownish black, fore femur with short anterodorsal and posteroventral pennations, mid tibia with posteroventral group of a few minute spine-like setae basally.

Type material and lectotype designation. The original description (Bezzi 1899) was based on both sexes from central Italy, but the number of specimens was not given. In the Bezzi collection (MCNM), one male and three females are present. The male and two females are labelled “Tennacola” (according to Bezzi: *non rara in maggio nella valle del Tennacola, nei Sibillini, a 1300 m* = not rare in May in the Valley of the Tennacola, on the Sibillini mountains at 1300 m); the male and one female with the date “30.v.97”, the other female was also collected in May 1897 but the day is not readable. The third female is labelled “29.v.97” with the locality not readable. Specimens are conspecific and considered syntypes. The male specimen is herewith designated as lectotype of the species and labelled accordingly to fix and stabilize the current concept of the name. The three females become paralectotypes and labelled accordingly.

Additional material. 4 ♂♂ “Corse, forêt de Sorba, 16.vi.1976, S. Kelner-Pillault réc.; chemin près du torrent, carte 90, pli 7; Muséum Paris”; 5 ♂♂ “Corse, Gorges de la Restonica, 01.vi.1972, L. Matile réc.”; 1 ♂ “Corse, rte. [= road] N. 194, col de Verde, Zicavo, 16.vi.1976, S. Kelner-Pillault réc.; Muséum Paris”; 1 ♂ “Corse, Canaglia, près du pont dessus du torrent, 16.vi.1976, S. Kelner-Pillault réc.; Muséum Paris” (MNHN).

Re-description. Male. Head. Occiput covered with black, rather fine setae. Ocellar triangle with pair of fine black setae. Scape dark brown with rather long setae, pedicel dark brown, postpedicel black. Palpus black, rather long, projected, with numerous rather strong, long setae; labrum brownish, 1.5x head height; labium blackish.

Thorax greyish. Antepronotum with row of black setae. Antepronotal lobes with 1 strong, long basal seta, many distinct other anteriors. Proepisternum, prosternum with fan of pale yellow setae. Scutum with 3 black stripes on acrostichals and dorsocentrals. Acrostichals, dorsocentrals bi-triserial, fine, dorsocentrals ending in 3-4 strong, long prescutellars. Other strong, long setae as follows: 1 presutural, 2 postsutural supraalars; 4 notopleurals. Laterotergite with fan of strong, long golden yellow setae. Anterior, posterior spiracles pale yellow.

Wing (length = 7.5 mm) feebly tinted of brown with indistinct brown stigma. Median veins complete. Halter with brownish base, yellow knob.

Legs brownish exclusive of greyish coxae. Coxae with many long pale yellow setae. Fore tibia with antero- and posterodorsal rows of rather strong setae somewhat longer than tibia depth; fore tarsomere 1 with antero- and posteroventral strong setae; tarsomeres 1–3 with spine-like apical setae. Mid tibia with rows of

strong, long antero- and posterodorsal and antero- and posteroventral setae; mid tarsus with 2 ventral rows of spines; mid tarsomeres 1–3 with strong apical setae. Hind femur with rather strong, short anteroventral setae; hind tibia with antero- and posterodorsal rows of rather strong setae as long as tibia depth; hind tarsus with 2 ventral rows of spine-like setae; hind tarsomere 1 with long antero- and posterodorsal setae.

Abdomen greyish to blackish. Tergites 1–4 with many long pale yellow setae.

Hypopygium (Fig. 8). Cercus longer than wide with fine dorsal setae. Epandrial lamella with strong, long ventral setae. Phallus long, strongly undulated.

Female. Similar to male except for following characters: palpus somewhat shorter, with less numerous, distinctly shorter setae. Fore femur with short anterodorsal pennation except basally, short posterodorsal pennation apically. Mid tibia somewhat S-shaped with posteroventral group of a few minute spine-like setae basally. Wing clear, halter brownish-black.

Chorotype. W-Mediterranean. *Empis sibillina* is known from Italy (mainland) and Corsica. The species is not listed in the on-line checklist of the Italian fauna (Raffone 2003).

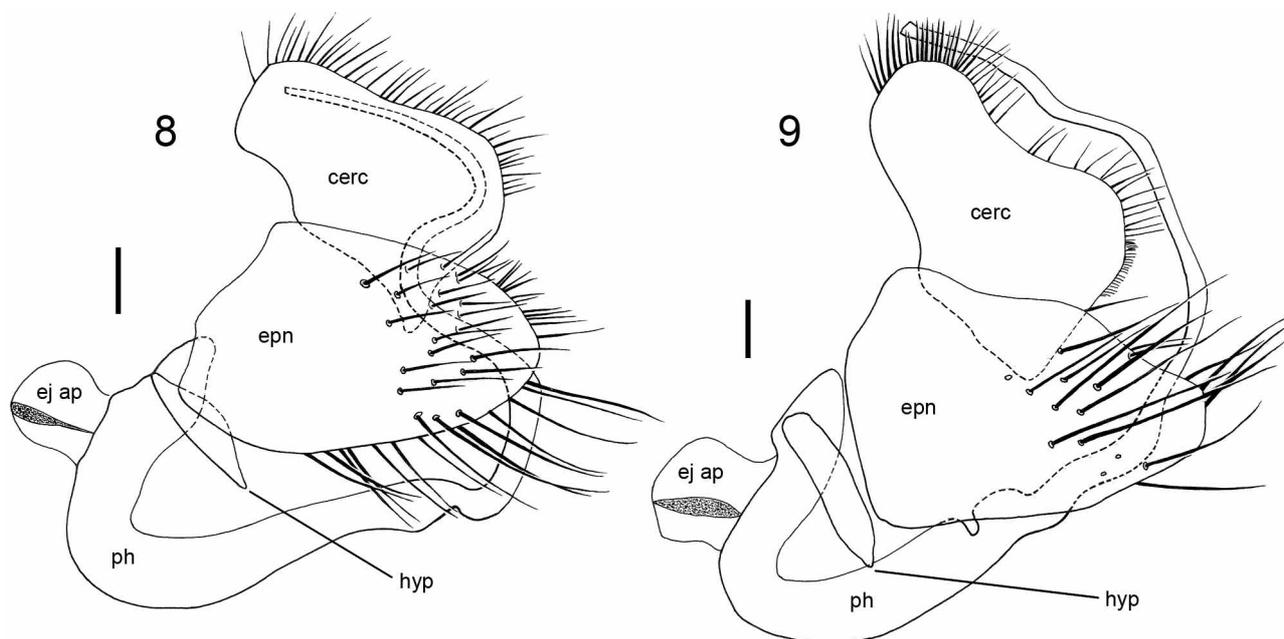
***Empis (Kritempis) taffertensis* sp. nov.**

(Fig. 9)

Diagnosis. Greyish species with clear wings, yellowish legs.

Type material. Holotype ♂, “Muséum Paris, Maroc, Moyen Atlas, forêt de Taffert, lisière est, 2000-2800 m, F. Le Cerf, 21-22.vi.1929” (MNHN).

Description. Male (holotype). Head. Occiput covered with fine black setae; ocellar triangle prominent with pair of fine setae. Face, antenna blackish. Palpus brownish, somewhat projected, with a few fine setae; labrum brownish, more than 2x head height; labium black.



FIGURES 8–9. Male hypopygium of *Empis (Kritempis)* spp., scale bars: 0.1 mm. Abbreviations as in Figs 1–4. **8.** *Empis (K.) sibillina* Bezzi (lectotype, Tennacola). **9.** *Empis (K.) taffertensis* sp.nov. (holotype, Morocco).

Thorax dusty greyish. Anteprepronotum with row of setae, black dorsally, pale yellow laterally. Anteprepronotal lobes with 1 distinct rather fine basal seta, numerous other yellow fine anteriors. Proepisternum, prosternum with fan of pale yellow fine setae. Scutum with 2 brownish stripes on dorsocentrals, 1 indistinct stripe on acrostichals; acrostichals biserial, distinct, fine; dorsocentrals biserial, fine, ending in 3 stronger, longer

prescutellars. One fine, long presutural, 1 strong, long postsutural supraalars, 3 notopleurals. Laterotergite with fan of long pale yellow setae. Anterior, posterior spiracles yellowish.

Wing (length = 7 mm) clear with indistinct brown stigma; median veins complete. Halter yellow.

Legs. Coxae greyish to brownish, with many pale yellow fine setae. Fore, mid legs, exclusive of coxae, brownish, hind femur yellowish, hind tibia yellowish to brownish, hind tarsus dark brown. Fore femur with pale yellow fine setae. Fore tibia with antero- and posterodorsal rows of rather strong setae, about as long as tibia depth; tarsomeres 1–4 with strong apical setae. Mid femur with distinct posteroventral setae; mid tibia, with anterodorsal row of 4 strong, long setae, posterodorsal row of 3 strong, shorter setae; mid tarsus with antero- and posteroventral rows of spine-like setae. Hind femur with anteroventral row of short setae, distinct anterodorsals on apical half; hind tibia with antero- and posterodorsal rows of setae, as long as tibia depth; hind tarsus with antero- and posteroventral rows of spine-like setae.

Abdomen greyish to blackish. Tergites with rather long lateral pale yellow setae.

Hypopygium (Fig. 9). Cercus somewhat prolonged anteriorly with group of rather fine anterodorsal setae. Phallus somewhat undulated, with characteristic dorsal indentation at basal third.

Female unknown.

Chorotype. W-Mediterranean. *Empis taffertensis* is known from Morocco.

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