

Monophyly of the subgenus *Leptempis*, and description of seven new species of the *Empis (Leptempis) rustica*-group (Diptera: Empididae)

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Abstract. The monophyly of the subgenus *Leptempis* Collin of the genus *Empis* L. is established on the basis of a male hypopygial character, and the possibility of a close relationship between the subgenera *Leptempis* Collin, *Planempis* Frey and *Kritempis* Collin is discussed. Seven new species belonging to *Empis (Leptempis) rustica*-group are described from France, Germany, Greece and Spain: *E. (L.) abdominalis* sp. n., *E. (L.) lamellata* sp. n., *E. (L.) multispina* sp. n., *E. (L.) pandellei* sp. n., *E. (L.) lamellimanis* sp. n., *E. (L.) sinuosa* sp. n. and *E. (L.) trunca* sp. n. A key to the *E. (L.) rustica*-group is presented.

INTRODUCTION

As part of a generic revision of the subfamily Empidinae tribe Empidini (Daugeron, 1997a and in prep.), which takes the Palearctic and Afrotropical faunas into account, the subgenus *Leptempis* Collin, 1926 of the genus *Empis* L., 1758 was studied. *Leptempis* is commonly recognized by the shape of the male genitalia (epandrial lamellae elongated and bearing numerous strong, long bristles on their lower margin, cerci well developed and phallus long and thin) and currently includes 28 Palearctic species (of which 24 are European) (Chvála & Wagner, 1989), and four Oriental species (Burma, China and Taiwan).

Chvála (1977) recognized four European species-groups for 23 species: the *Empis (Leptempis) rustica*-, *maculata*-, *dimidiata*- (= *monogramma*) and *grisea*-groups represented by six, nine, five and three species respectively. In 1994, he recognized only two species-groups, *rustica* and *grisea*, the first consisting of the previous first three species-groups and the second the previous last species-group.

In addition to the 23 European species studied by Chvála (1977), the other Palearctic species are *E. (L.) frauscheri* Strobl, another European species from Austria (Alps), *E. (L.) itoiana* Frey from Japan, and three others from the Far East. Saigusa (1964, 1992) has tentatively transferred these last four, plus the Oriental species, to the subgenus *Planempis* Frey, 1953 on account of the structure and the shape of male cerci, which are closer to the *E. pan*-type characteristic of the subgenus *Planempis*.

On the basis of important material, including seven new species of the *E. (L.) rustica*-group from West Europe (France, Germany and Spain) and Greece, the monophyly of the subgenus *Leptempis* is established, a close relationship between *Leptempis* and two other subgenera, *Planempis* and *Kritempis* Collin, 1926, is hypothesized, and the distribution of *Leptempis* reviewed.

MATERIAL AND METHODS

This study is based on pinned adult specimens in the general collection of Diptera at the Muséum national d'Histoire naturelle, Paris (MNHN) and Charles University, Prague (CUPC), and in the historical Gobert and Pandellé collections bequeathed to the Société entomologique de France (SEF) and deposited in the MNHN. Many other Empidini were also studied, especially of the subgenus *Kritempis*, and the types of *E. (Kritempis) al-gira* Macquart and *E. (K.) macquarti* Becker (placed incertae sedis in *Empis*, Chvála & Wagner, 1989), in the Macquart collection (MNHN), were revised (Daugeron, in prep.), in order to define the subgenus *Kritempis* and determine the relationship between *Kritempis*, *Planempis* and *Leptempis*.

The morphological terms follow McAlpine (1981), except for the genital sclerites, the interpretation of which follows Sinclair et al. (1994) and Cumming et al. (1995). Consequently the traditional terms dorsal, lateral and ventral lamellae are respectively replaced by cercus, epandrium and hypandrium. However, since the epandrium is paired in the subfamily Empidinae, I use the term epandrial lamella for the lateral sclerites (Daugeron, 1997b).

The length of proboscis (labrum) is given relative to head height; the lengths of body and wings are given in millimetres.

The male genitalia were macerated in hot 10% KOH, mounted in glycerine, and then drawn with the aid of camera lucida.

MONOPHYLY OF THE GROUP CONSISTING OF THE SUBGENERA *LEPTEMPIS*, *KRITEMPIS* AND *PLANEMPIS*

Chvála (1994) hypothesized that *Leptempis* is closer to the subgenus *Empis* s. str. than to any other subgenus of *Empis*, but did not give the precise apomorphic characters they share. He noted some similarities in the male hypopygial structure of *Leptempis* and especially the *Empis lepidopus*-complex, a species-complex of *Empis* s. str. In fact, only the phallus is similar, long and thin, but this is a common feature of other Empidinae and is therefore probably without phylogenetic significance at the subfamily level. On the other hand, even though several other characters are shared by both subgenera, for instance the

long proboscis or the structure of the antennae, they are also found in other subgenera of *Empis*. Consequently the resemblances between *Leptempis* and *Empis* s. str. are not significant, and the opinion of Chvála (1994, 1996), that *Leptempis* and *Empis* s. str., or a part of the latter (*E. lepidopus*-complex), are sister-groups, should be reconsidered.

Cerci of males of *Leptempis* form a pair of large-sized sclerites (Figs 2–8): They are considerably developed, both antero-posteriorly and ventro-dorsally, and are elevated in relation to the epandrial lamellae. Male cerci of the same structure and position are also found in *Planempis* and *Kritempis*, but nowhere else in the Empidinae. This character should therefore be synapomorphic for these three subgenera.

Planempis is a large subgenus of *Empis* with 31 species, including tentatively those from the east Palearctic and Oriental region, which were originally placed in *Leptempis* (Saigusa, 1964, 1992).

Kritempis was created by Collin (1926) to receive five species with Mediterranean distributions and *E. (K.) livida* L. which is more widely distributed (temperate and northern Europe). The other species included by Collin are *E. (K.) algira* Macquart as type of the subgenus, *E. (K.) macropalpa* Egger, *E. (K.) sibillina* Bezzi, *E. (K.) macquarti* Becker and *E. (K.) nigrimana* Becker. Collin justified the creation of this group by the presence of large male cerci (dorsal lamellae), the faint anal vein (A1) which does not reach wing-margin, and the frequent abbreviation of veins M2 or M1 and M2. Chvála (1994) reduced the group to three species, *E. (K.) algira*, *E. (K.) livida* and *E. (K.) macropalpa* on the basis of differences in the male genitalia; males of *E. (K.) macquarti*, *E. (K.) nigrimana* and *E. (K.) sibillina* have a long, slender and undulating phallus; furthermore, according to Chvála, *E. (K.) macquarti* has small cerci and a long bristled hypandrium. I have studied *E. (K.) livida* and revised the types of *E. (K.) algira* and *E. (K.) macquarti* (Daugeron, in prep.). In fact, these three species form a natural group, the monophyly of which is based on the presence of a considerably reduced hypandrium, which is only represented by its lateral arms. On the other hand, males of these species, including *E. (K.) macquarti*, have a pair of large-sized cerci. Consequently Chvála (1994) misinterpreted the position of the sclerites in *E. (K.) macquarti*. I have not yet seen the three other species originally included in *Kritempis* by Collin, but have found three other undetermined species from the Mediterranean region, in which the male hypandrium is reduced to its lateral arms. Thus, on the basis of this exclusive character, *Kritempis* is regarded as a monophyletic group consisting of at least six species. In having a pair of large-sized male cerci, *Kritempis* may form, together with *Leptempis* and *Planempis*, a monophyletic lineage.

MONOPHYLY OF *LEPTEMPIS*

The shape of the epandrial lamellae is very variable in the subfamily Empidinae, especially in the tribe Empidini. Nevertheless, as Chvála noted (1994), the epandrial la-

mellae of *Leptempis* are very distinctive, since in all species they are always narrow and elongated posteriorly (Figs 2–8). This character is unique within the tribe Empidini and can be therefore considered as synapomorphic for species of *Leptempis*.

However, epandrial lamellae of a similar shape are also found in the species *Empis ciliata* F. of the subgenus *Euempis* Frey, 1953. Nevertheless, *E. ciliata* is provisionally retained in *Euempis* because this subgenus is a heterogeneous group of several unrelated species or species-groups, which is in need of revision.

As already indicated, species of *Leptempis* from the east Palearctic described by Collin (1941) and Frey (1953) and those from the Oriental region described by Bezzi (1912) and Frey (1953) have been tentatively transferred to *Planempis* by Saigusa (1964, 1992).

DISTRIBUTION OF *LEPTEMPIS*

I found a single male from Morocco (MNHN collection), belonging to an undescribed species of the *E. (L.) maculata*-group. The subgenus *Leptempis* is therefore newly recorded from North Africa. This specimen was collected in the Middle Atlas mountains at a high altitude (1,760 m). Thus, the subgenus *Leptempis* as defined in this paper occurs in the Palearctic region, where it is confined to Europe and North Africa.

TAXONOMY

The *E. (L.) rustica*-group (sensu Chvála, 1977), mainly characterized by the greyish black colour of the body, the wings clear or dark but never maculated, and the legs simple, includes six species: *E. (L.) cognata* Egger, *E. (L.) lindneri* Oldenberg, *E. (L.) meridionalis* Meigen, *E. (L.) nigricans* Meigen, *E. (L.) rustica* Fallén and *E. (L.) spitzeri* Chvála, all revised by Chvála (1977). I add to this group seven new European species, new data on the distribution of *E. (L.) cognata* and *E. (L.) nigricans*, identify the holotype of this last species, and discuss the status of *E. (L.) frauscheri*.

Empis (Leptempis) abdominalis sp. n.

(Figs 1, 2)

A species of medium size, dusted grey to black, scape and pedicel dark brown, flagellum black. Abdominal terga with only scattered bristles. Male cerci well developed but not cleft laterally.

Male. Head with occiput dusted grey covered with distinct black bristles becoming yellow towards postgenae. Ocellar triangle prominent, greyish with several fine, short bristles. Frons reduced to two small black triangular spaces respectively beneath ocellar triangle and above antennae. Face grey to shiny brown in lower part. Proboscis long (1.7 times the head height), labrum brown, prementum and labella black, palpi yellow with a few fine bristly hairs. Scape and pedicel brown to yellow, flagellum black. Eyes holoptic, upper ommatidia enlarged.

Thorax greyish. Anteprenotum with black bristles becoming yellow laterally, not very strong or very long. Postpronotal lobes greyish, shiny at apex, with 2 to 3 strong bristles plus a few shorter and finer ones. Proepis-

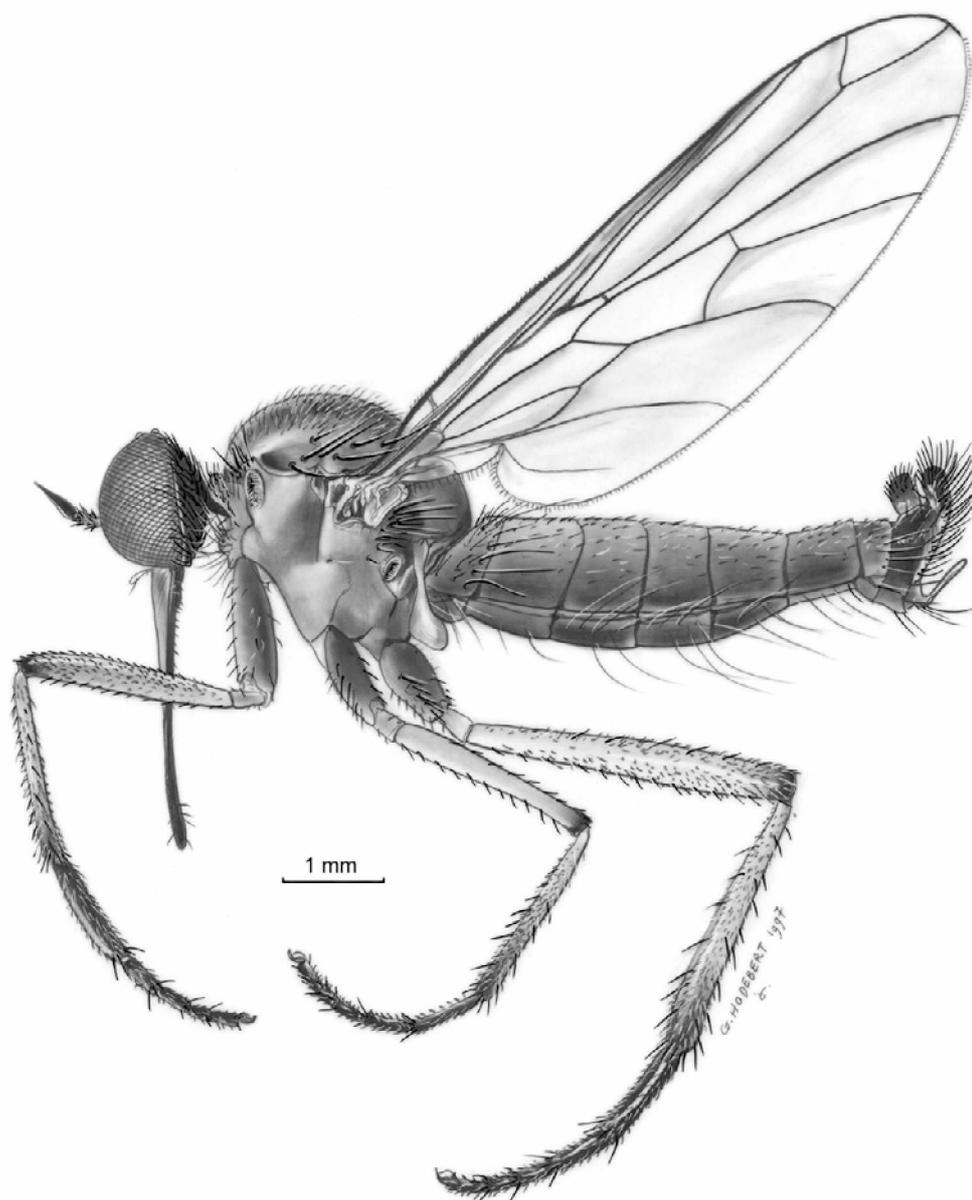


Fig. 1. *E. (L.) abdominalis* sp. n., habitus, male.

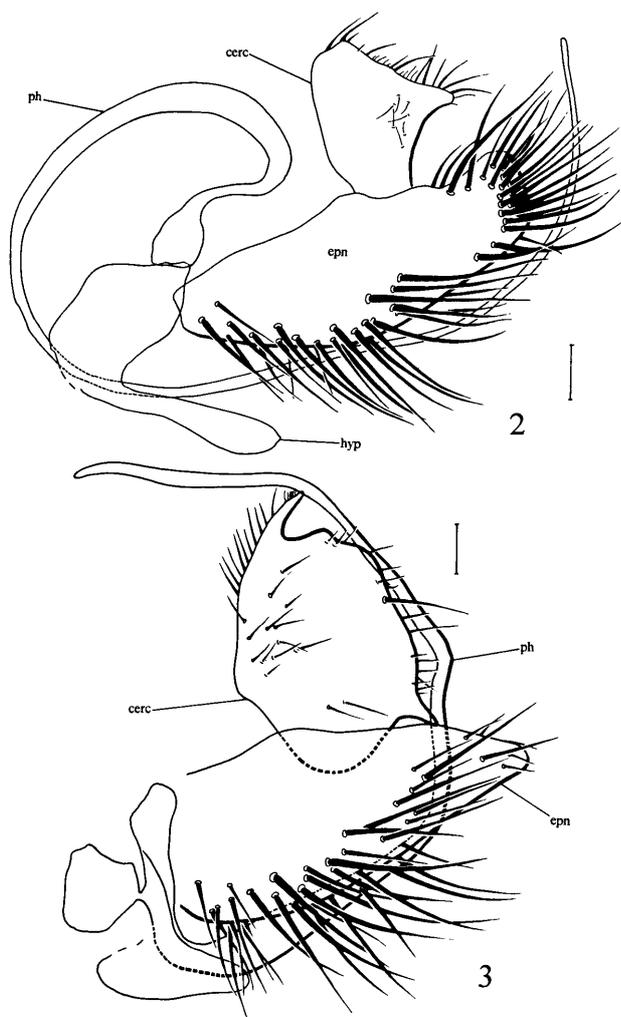
ternum almost bare, prosternum with lateral fan of yellow fine bristles, a few ventral bristly hairs. Scutum greyish, becoming darker towards notopleuron, with 3 brown stripes, the first one on acrostichals, two broader ones on dorsocentrals. Acrostichals and dorsocentrals fine, rather short, bi- to pluriserial, present in the prescutellar depression. All intraalars and supraalars fine, short except for 1 strong, long postsutural supraalar. One strong, long postalar. Three strong, long notopleurals. Scutellum with 2 strong, long apical bristles. Laterotergite with fan of bristles, black, strong, and long anteriorly, yellow, finer and almost as long posteriorly. Anterior and posterior spiracles yellow. Mesepisternum and mesepimeron dusted grey.

Legs with coxae dusted grey, femora and tibiae yellowish to brownish, tarsi blackish. Fore femora bare ventrally, with only very short dorsal bristles. Mid femora with 1 antero- and posteroventral rows of short, strong

bristles. Hind femora with 1 distinct anteroventral row of strong bristles. Fore tibiae with 1 row of short, strong anterodorsal bristles and 2 distinct anterolaterals in apical half. Mid and hind tibiae with 1 more or less regular antero- and posteroventral and antero- and posterodorsal rows of rather short, strong bristles. First tarsomere of all tarsi with strong ventral bristles. Numerous short, strong bristles at tip of each tibia and tarsomere. First tarsomere of fore tarsi somewhat dilated.

Wings rather clear. Costa black, veins complete (except Sc), well sclerotized, dark brown (except Sc and A1 less sclerotized, brown) to yellowish at base. Anal angle very acute, consequently anal lobe well developed. Halteres yellowish.

Abdomen greyish on sterna to blackish on terga. Terga almost bare, with only scattered bristles, except for the first two which bear distinct bristles, especially marginally. Presence of fine, clear, rather long bristles on sterna



Figs 2–3. 2 – *E. (L.) abdominalis* sp. n., male hypopygium, lateral view; 3 – *E. (L.) lamellata* sp. n., dtto. cerc – cercus; epn – epandrium; hyp – hypandrium; ph – phallus. Scale: 0.2 mm.

5 to 7. Segment 8 brownish to blackish, very shiny and bearing distinct bristles on its posterior margin, especially on sternum.

Hypopygium (Fig. 2) with cerci and epandrial lamellae strongly sclerotized, shiny. Cerci black dorsally to brownish ventrally, not cleft laterally, with black dorsal bristles neither very strong or very long. Epandrial lamellae black at tip, otherwise blackish to brownish, elongated, with strong, long black bristles both ventrally and at tip. Hypandrium yellowish, distinct, somewhat rounded at tip. Phallus long, thin, with long anterodorsal loop.

Length. Body 7.4–8.7 mm, wing 6.6–7.9 mm.

Female. Similar to male except for the following characters: Pilosity reduced everywhere on the body. Eyes dichoptic with all ommatidia of equal size. Anterior half of segments 8 and 10 dark brown, shiny, rest of abdomen rather greyish. Cerci longer than wide and always covered with short bristly hairs. Abdomen bare except for distinct marginal black bristles on first tergum and a tuft of clear bristles on sterna 3 and 4.

Length. Body 7–8.2 mm, wing 6.8–7.1 mm.

Type material. Holotype ♂, France: Hautes-Pyrénées (St Savin), 7.vi.1911 (ex Hesse collection, MNHN). 60 paratypes: 1♂ with same data, 2♂, France: Basses-Pyrénées (Pau), 22.vi.1911, 1♂, France: Hautes-Pyrénées (Bordères), vii.1919, 1♂, France: Basses-Pyrénées (Larrau), 1.vii.1913, 1♂, France: Ariège (Ax-les-Thermes), 4.ix.1910, 1♂, France: Hautes-Pyrénées (Gèdre), viii.1927, 1♂, France: Hautes-Pyrénées (Gèdre), 30.vii.1928 (ex Hesse collection, MNHN), 6♂, 10♀, France: Hautes-Pyrénées (Pandellé collection, SEF, MNHN), 1♂, SPAIN: Vielha (rives du Ribagoza), 1,500 m, 2.viii.1996, C. Daugeron (MNHN), 8♂, 11♀, Spain: Santander, 24.vi.1988, leg. R. Hall (CUPC), 1♂, 1♀ with same data (MNHN), 4♂, 4♀, SPAIN: Santander, 1.vii.1986, R. Hall (CUPC), 1♂, 1♀ with same data (MNHN), 1♂, Spain: Santander, 8.vi.1981, leg. R. Hall (CUPC), 1♂ with same data (MNHN), 1♂, Spain: Oviedo (Cavadonga), 21.vi.1988, leg. R. Hall, 1♂, France: Fabian, 9.vii.1990, Barták (CUPC).

Other material. 1♀ without label (Pandellé collection, SEF, MNHN).

Etymology. From the Latin word abdomen, on account of the absence of a distinct pilosity on the abdomen.

Distribution. France, Spain (in or near Pyrenees).

Differential diagnosis. *E. (L.) abdominalis* cannot be mistaken for other species of the subgenus on account of the absence of a distinct pilosity on abdominal terga, the presence of a tuft of clear bristles on female sterna 3 and 4, and the presence of uncleft male cerci, tentatively considered as a reversion in *Leptempis*.

Empis (Leptempis) lamellata sp. n.

(Fig. 3)

A large species, grey and characterized by the male cerci egg-shaped and not deeply cleft laterally.

Male. Head with occiput dusted grey bearing distinct black bristles becoming yellow towards postgenae. Ocellar triangle prominent, with 2 pairs of distinct bristles. Frons blackish to dusted greyish, reduced to a small triangle beneath ocelli, a narrow space between eyes and a broader triangle above antennae. Face dusted grey, somewhat shiny in lower part. Scape and pedicel brown-orange, flagellum black. Proboscis long (1.75 times the head height), palpi yellowish-orange with distinct ventral bristles, labrum brown-yellowish, prementum and labella dark brown. Eyes holoptic with upper ommatidia enlarged.

Thorax dusted greyish. Anteprepronotum with distinct yellow bristles except at middle. Proepisternum and lateral part of prosternum with several rather long yellow bristles. Postpronotum greyish to brown-yellowish at apex with about 15 distinct black and yellow bristles of which 1 strong, long, black basal. Scutum with a narrow blackish central stripe, and a broader one on dorsocentrals. Acrostichals biserial, black, rather short, absent in the prescutellar depression. Dorsocentrals biserial anteriorly to uniserial posteriorly, rather longer than acrostichals, ending with row of three strong, long bristles. Another strong and long bristle is present medially of last dorsocentral. One to 2 distinct presutural intraalars. Several supraalars of which 2 strong, long presuturals, 3 distinct postsuturals at notopleuron level and 1 strong, long postsutural at wing level. Notopleuron

grey, rather lighter than scutum, with at least 4 strong, long, black bristles, and a few finer, shorter black and yellow bristles anteriorly. Postalar calli yellowish, with 1 strong, long bristle. Scutellum greyish to brown-yellowish laterally with at least 4 distinct bristles. Mediotergum greyish. Laterotergite greyish to brown with fan of numerous strong, long yellow bristles. Mesepisternum and mesepimeron greyish to yellowish on sutures. Anterior and posterior spiracles yellow.

Legs yellowish to brownish. Fore femora almost bare ventrally, with only short dorsal bristles. Fore tibiae with short ventral pubescence, 1 row of strong, not very long anterodorsal bristles. Fore tarsi with short ventral pubescence, distinct bristles at tip of each tarsomere. Mid femora with only short dorsal bristles, 1 antero- and posteroventral rows of strong bristles. Mid tibiae with 1 antero- and posterodorsal rows of 5 to 6 strong bristles, particularly long at tip. First tarsomere of mid tarsi with distinct bristles, other tarsomeres with only fine, short bristles except for strong apicals. Hind femora with only short dorsal bristles, 1 row of rather strong, not very long anteroventrals. Hind tibiae like mid tibiae but with rows of about 8 dorsal bristles. Hind tarsi with ventral spine-like bristles, otherwise like mid tarsi.

Wings long, brown. Stigma indistinct. Veins complete (except Sc), brownish to blackish (except Sc and A1 lighter), yellowish at base. Anal angle very acute, consequently anal lobe well developed. Halteres yellow.

Abdomen grey to black, somewhat shining. Terga laterally covered with rather strong, long, yellow bristles, rather short marginal black bristles.

Hypopygium (Fig. 3) yellowish to brownish, with narrowly and shortly cleft cerci, egg-shaped, covered with fine, short, black bristles. Epandrial lamellae elongated, shiny in its anterior part, with numerous yellow, strong, long bristles ventrally and at tip. Hypandrium distinct, with an indistinct ventral pubescence. Phallus long, thin.

Length. Body about 10.5 mm, wing about 11 mm.

Female. Similar to male except for the following characters: Eyes dichoptic with all ommatidia of equal size. Frons and face well developed, grey to black, the first with a few very short lateral bristles. Two to 3 other bristles are present medially of last dorsocentral. Fore tibiae with 1 dorsal and 1 ventral row of distinct bristles. Mid tibiae with 1 row of strong dorsal bristles, and additional antero- and posterodorsals. First tarsomere of fore tarsi with distinct ventral bristles. Abdomen with only a few lateral yellow bristles, on the first two terga, marginal black bristles distinct but short. Sternum 8 with a distinct posterior rounded expansion. Cerci longer than wide, always covered with short bristly hairs.

Length. Body about 10.5 mm, wing about 11 mm.

Type material. Holotype ♂, France: Hautes-Pyrénées (Pandellé collection, SEF, MNHN). Paratypes 1♂, 2♀, same data and collection.

Etymology. From the Latin word lamella on account of the characteristic shape of cerci (in the Empidinae traditionally named the dorsal lamellae).

Distribution. France (Pyrenees).

Differential diagnosis. *E. (L.) lamellata* is a large robust species with brown-yellow legs including coxae, grey abdomen and long brown wings. In addition, in the subgenus *Leptempis*, the shape of male cerci in *E. (L.) lamellata* is unique. Thus *E. (L.) lamellata* can be easily distinguished from all other species belonging to the subgenus *Leptempis*, especially the *E. (L.) rustica*-group.

***Empis (Leptempis) lamellimanis* sp. n.**

(Fig. 4)

Species of medium size, dusted grey to black with yellow legs, clear wings, enormous male cerci with both upper and lower parts well developed, and very elongated epandrial lamellae.

Male. Head with occiput dusted grey bearing distinct black bristles becoming yellowish towards postgenae. Ocellar triangle prominent, blackish, with a pair of distinct bristles. Frons dusted greyish, reduced to two small spaces respectively beneath ocellar triangle and above antennae. Face dusted greyish, somewhat shiny in lower part. Scape and pedicel yellowish, flagellum blackish. Proboscis long (1.5 times the head height), palpi yellow, labrum brownish, prementum and labella dark brown. Eyes holoptic, upper ommatidia enlarged.

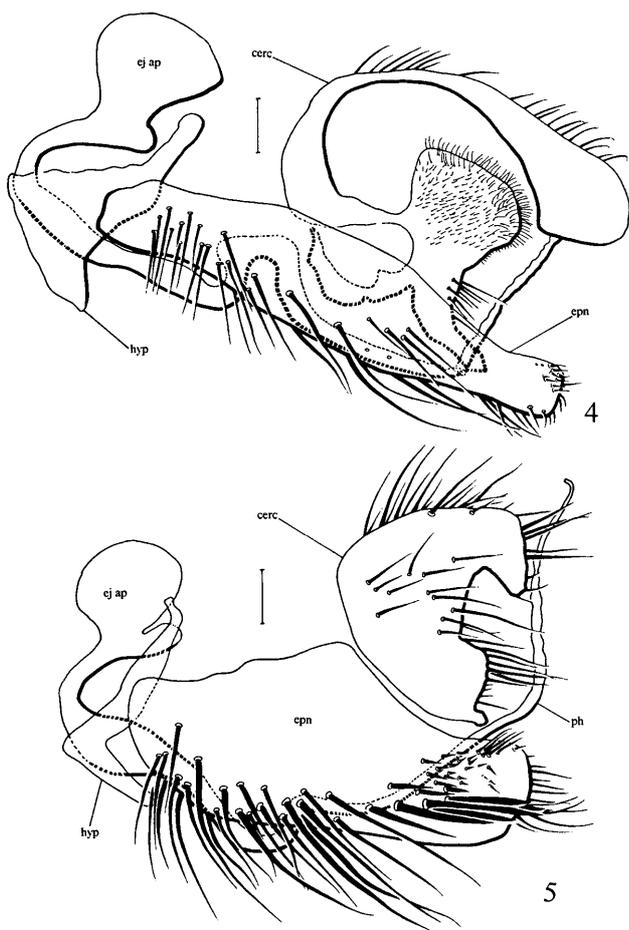
Thorax dusted greyish. Antepronotum with a few fine bristles. Postpronotum brownish at apex, with 1 strong, long basal bristle, 4–5 finer, shorter anteriors. Proepisternum and lateral part of prosternum with distinct yellow bristles. Scutum with 3 more or less distinct narrow stripes, the first on acrostichals, the other two on dorsocentrals. Acrostichals biserial, short, absent in the prescutellar depression. Dorsocentrals irregularly biserial, longer, stronger than acrostichals, becoming uniserial, very strong and long posteriorly. Three distinct supraalars, 1 presutural, 2 postsuturals. Three strong, long notopleurals. Postalar calli somewhat yellowish on margins, with 1 strong, long bristle. Scutellum with two strong, long apical bristles, two finer, shorter subapicals. Laterotergite with fan of numerous long, strong, yellow bristles. Anterior and posterior spiracles whitish.

Legs with coxae dusted greyish to yellowish brown especially posteriorly. Femora and tibiae yellow, tarsi brown to black. Forelegs with only very short bristles. Middle femora with 1 antero- and 1 posteroventral row of rather strong, long bristles. Middle tibiae with 1 row of 5 posterodorsal distinct bristles and numerous shorter anterior and posterior ventrals. Hind femora with 1 anteroventral row of rather strong, long bristles. Middle tibiae with 1 dorsal row of 7–8 distinct bristles. Middle and hind tarsi with only short bristles, a little more distinct at tip of each tarsomere.

Wings long, clear, with a distinct brownish stigma. Veins complete (except Sc), black (except Sc lighter) to brown at base. Anal angle very acute, consequently anal lobe well developed. Halteres yellow.

Abdomen grey to black, with long yellow bristles on the first three terga, especially laterally.

Hypopygium (Fig. 4) brownish to blackish. Cerci enormous: Upper part lengthened posteriorly, with rather strong, long, black to brown bristles at tip on inner mar-



Figs 4–5. 4 – *E. (L.) lamellimmanis* sp. n., male hypopygium, lateral view; 5 – *E. (L.) multispina* sp. n., dtdo. cerc – cercus; ej ap – ejaculatory apodeme; epn – epandrium; hyp – hypandrium; ph – phallus. Scale: 0.2 mm.

gin (only visible in dorsal view), lower part with antero- and posteroventral expansions, with only short bristly hairs. Epandrial lamellae elongated, very narrow, with numerous whitish ventral bristles. Hypandrium distinct. Phallus long, thin, with a dorsobasal loop, with small constrictions on apical third.

Length. Body 8.1 mm, wing 7.5 mm.

Female. Similar to male except for the following characters: Eyes dichoptic with all ommatidia of equal size. Frons and face well developed, dusted greyish. Halteres with whitish knob. Shorter bristles especially on abdomen and legs. Abdomen with very short bristles, a little longer at base and on the first two terga. Cerci longer than wide, with very short bristly hairs.

Length. Body 6 mm, wing 6.8 mm.

Type material. Holotype ♂, Greece: Samos (Pirgos), 21.iv.1988, J.A.W. Lucas (CUPC). Paratype 1 ♀, same data and collection.

Etymology. From the Latin words lamella and immanis on account of the presence of enormous cerci (in the Empidinae traditionally named the dorsal lamellae).

Distribution. Greece (Samos).

Differential diagnosis. In having yellow-brown coxae and a black abdomen, *E. (L.) lamellimmanis* resembles *E.*

(L.) lindneri Oldenberg. Nevertheless they can be distinguished by the presence of a shorter labrum in the first species (1.5 times the head height versus almost three times the head height). In addition the shape of the male hypopygium (Fig. 4) in *E. (L.) lamellimmanis* is very characteristic.

***Empis (Leptempis) multispina* sp. n.**

(Fig. 5)

A large black species with clear wings, yellow-brown abdominal sterna, and several strong spine-like bristles towards tip of epandrial lamellae.

Male. Head with blackish occiput and distinct black bristles becoming finer and clear towards postgenae. Ocellar triangle prominent, with a pair of bristles. Frons reduced to two small spaces, respectively, beneath ocellar triangle and above antennae. Face blackish, shiny in lower part. Scape and pedicel yellow, flagellum black. Proboscis long (1.7 times the head height), labrum yellowish brown, prementum and labella brownish, palpi yellowish with fine bristles. Eyes holoptic, upper ommatidia enlarged.

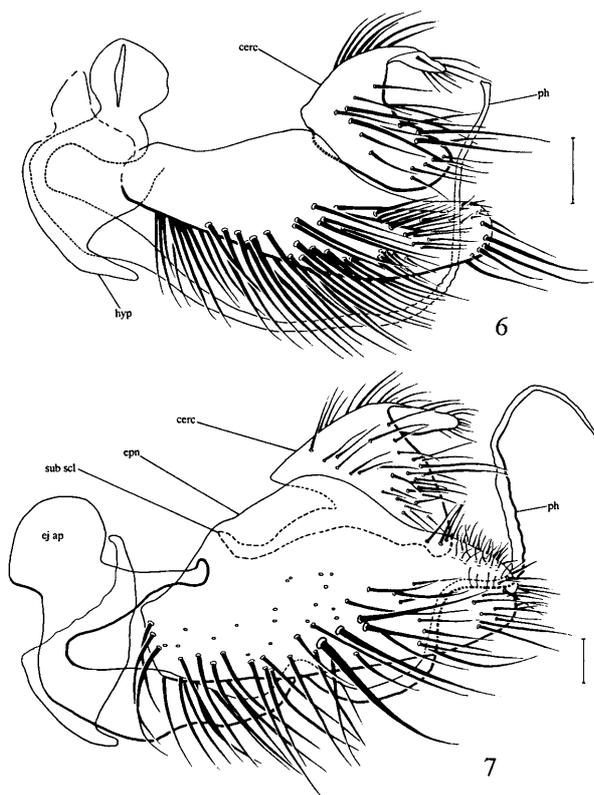
Thorax with anteprenotum greyish and bearing a few distinct bristles. Postpronotal lobes greyish to yellowish at apex, with 1 strong, long basal bristle, a few others anteriorly. Proepisternum and lateral part of prosternum with fine yellow bristles. Scutum greyish to blackish with a distinct central darker stripe. Acrostichals biserial, rather fine, short, absent in the prescutellar depression. Dorsocentrals biserial, becoming uniserial, strong and long in the prescutellar depression. Three distinct supraalars, 1 presutural, 2 postsuturals. Four strong, long notopleurals. One strong, long postalar. Scutellum with 2 strong, long apical bristles, 2 finer, shorter subapicals. Laterotergite with fan of rather strong, long, yellow bristles. Mesepisternum and mesepimeron blackish. Anterior and posterior spiracles yellow.

Legs with coxae, femora and tibiae yellow to brown, tarsi brownish to blackish. Forelegs with only short bristles, a little longer at tip of femora, on tibiae and each tarsomere. Middle femora with 1 antero- and 1 posteroventral row of distinct bristles. Middle tibiae with numerous short distinct ventral bristles, 1 row of 4 anterodorsals. Hind femora only with numerous short ventral bristles. Hind tibiae with 1 antero- and 1 posteroventral row of strong, rather short bristles. All tarsi with only short bristles, more distinct at tip of each tarsomere.

Wings clear with distinct brown stigma, veins black to yellow-brown at base, complete (except Sc). Anal angle very acute, consequently anal lobe well developed. Halteres yellow.

Abdomen with blackish terga, not shiny, becoming yellow-brown on sides, with rather long, fine, yellow bristles at base and on the first three terga, distinct black marginal bristles. Sterna more or less yellowish brown.

Hypopygium (Fig. 5) brownish black. Cerci distinctly cleft, consequently broadly open posteriorly, with distinct black to brown fine bristles. Epandrial lamellae elongated, with numerous strong, ventral bristles which are long and yellow basally, shorter, spine-like and black



Figs 6–7. 6 – *E. (L.) pandellei* sp. n., male hypopygium, lateral view; 7 – *E. (L.) sinuosa* sp. n., ditto. cerc – cercus; ej ap – ejaculatory apodeme; hyp – hypandrium; ph – phallus; sub scl – subepandrial sclerite. Scale: 0.2 mm.

towards tip, especially obvious in dorsal view. Hypandrium brownish, distinct. Phallus long, thin, undulating at base, with small constrictions on apical third.

Length. Body 8.7–9.2 mm, wing 8.4–9.5 mm.

Female unknown.

Type material. Holotype, ♂, Greece: Peloponnese (Lakonia, Tayjetos), 30.v.1981, E. and J. Hüttinger leg. (CUPC). Paratypes: 1 ♂ with same data (CUPC), 1 ♂ with same data (MNHN), 1 ♂, Greece: Peloponnese (Leonidion), E. and J. Hüttinger leg. (MNHN).

Etymology. From the Latin words multus and spina on account of the presence of numerous ventral spine-like bristles on the epandrial lamellae.

Distribution. Greece (Peloponnese).

Differential diagnosis. As in *E. (L.) cognata*, the abdominal sterna of *E. (L.) multispina* are yellow-brown but a little darker; nevertheless the shape of their cerci differ, with the lower part longer in the first species (Chvála, 1977: 49, Fig. 5) whereas they are broadly open posteriorly with upper and lower part of the same length in the second species. Finally, the presence of strong, spine-like bristles at tip of the epandrial lamellae in *E. (L.) multispina* distinguish it from all other species belonging to the *E. (L.) rustica*-group.

***Empis (Leptempis) pandellei* sp. n.**

(Fig. 6)

A large grey to black species, with distinct yellow bristles on the first cervical sclerite, legs dark brown-black to

dusted grey on coxae, abdomen black, shiny terga, with long yellow bristles, epandrial lamellae with numerous strong bristles.

Male. Head with a greyish occiput covered with numerous black bristles which become fine and clear towards postgenae. Ocellar triangle prominent, with a pair of distinct bristles and a few other short ones. Frons reduced to two small spaces, respectively, beneath ocellar triangle and above antennae. Face grey to brown, shiny in lower part. Scape and pedicel dark brown to black, flagellum blackish. Proboscis long (1.9 times the head height), labrum dark brown to black, prementum and labella blackish, palpi yellow-brown with fine dark bristles. Eyes holoptic, upper ommatidia enlarged.

Thorax with antepnotum dark grey and bearing numerous black bristles becoming yellow laterally. Postpronotal lobes brownish, lighter at apex and posteriorly, with 1 strong, long, black basal bristle, numerous other distinct bristles, some of which brown. First cervical sclerite with a few fine, long, yellow bristles. Proepisternum and lateral part of prosternum with fan of fine, rather long, yellow bristles. Scutum greyish to blackish with a distinct central stripe and two others on dorsocentrals. Acrostichals biserial, rather fine, short, absent in the prescutellar depression. Dorsocentrals bi- to pluriserial, becoming uniserial, strong and long in the prescutellar depression. Numerous rather fine, short intraalars and supraalars. Two strong, long supraalars, respectively pre- and postsutural. Five to 7 strong, long notopleurals, some anteriors yellow, finer, shorter. One strong, long postalar. Scutellum with at least 3 pairs of strong, rather long bristles. Laterotergite with fan of rather fine, long, yellow bristles. Mesepisternum and mesepimeron dusted greyish to brownish. Anterior and posterior spiracles yellow.

Legs with coxae brown to dusted grey, femora, tibiae and tarsi brown to black to yellow at base, somewhat shiny. Fore femora with only very short dorsal bristles, fine, short anteroventrals. Fore tibiae with short ventral pubescence, distinct anteroventral bristles. Mid femora covered with fine, short dorsal bristles, 1 distinct row of ventrals. Hind femora with 1 row of strong, not very long bristles. Mid tibiae with distinct ventral bristly hairs, 2 rows of antero- and posterodorsal bristles, the first one ending with 1 long apical. Hind tibiae with 2 rows of antero- and posterodorsal bristles. Tarsi with rather fine, short bristles except for several spine-like ventrals and dorsals on the first tarsomere of hind tarsi. Presence of strong bristles at tip of each tibia and tarsomere of tarsi. Fore and mid coxae with numerous yellow bristles anteriorly. Hind coxae with 3 strong, long, black lateral bristles.

Wings brown, veins brown, lighter at base, complete (except Sc). Middle and tip of A1 less sclerotized. Anal angle very acute, consequently anal lobe well developed. Halteres yellow.

Abdomen with shiny black terga except for the dusted grey first tergum. Sterna greyish, somewhat dusted. Numerous fine, long, yellow bristles on terga laterally, and on sterna. Short black marginal bristles on terga.

Hypopygium (Fig. 6) with cerci brown in lower part at tip, blackish anteriorly, distinctly cleft laterally, with brownish strong bristles, rather long in lower part. Epan-drial lamellae black to brown at tip, very elongated, with numerous strong, long, brownish bristles on the lower margin and at tip. Hypandrium brownish, distinct. Phallus long, thin, with small constrictions in apical third, not swollen in its basal third.

Length. Body 10.5–11 mm, wing 9.8–10.5 mm.

Female. Similar to male except for the following characters: Eyes dichoptic with all ommatidia of equal size, frons greyish, somewhat dusted, with a few short bristles towards the margin of eyes. Pilosity of the body reduced, especially on legs and abdomen. Abdomen grey to brown with terga somewhat shiny. Legs yellow to brown with tarsi black. Fore femora brown to yellow, mid and hind femora yellow, fore and hind tibiae yellow to black at tip. Cerci longer than broad, always covered with short bristly hairs.

Length. Body about 10 mm, wing 9.5–10 mm.

Type material. Holotype ♂, France: Hautes-Pyrénées (Pandellé collection, SEF, MNHN). Paratypes: 4♂, 4♀, same data and collection, 2♂, France: Savoie (Mt Cenis), 13.vii.1912, 1♂, 1♀, France: Hautes-Alpes (Le Lautaret), 1.viii.1918, 1♂, France: Hautes-Alpes (Le Lautaret), 12.vii.1918 (ex Hesse collection, MNHN), 1♂, 1♀, France: Hautes-Alpes (Le Lautaret), 17.vii.1954 (Bayard collection, MNHN), 1♂, France: Savoie, vii.1929 (MNHN).

Etymology. The species is dedicated to L. Pandellé.

Distribution. France (Alps and Pyrenees).

Differential diagnosis. Although *E. (L.) pandellei* sp. n. resembles *E. (L.) rustica* Fallén in the shape of the epan-drial lamellae and *E. (L.) spitzeri* Chvála in its black-brown legs, it cannot be mistaken for these two species on account of the presence in both male and female of distinct yellow bristles on the first cervical sclerite.

Empis (Leptempis) sinuosa sp. n.

(Fig. 7)

A very large black-grey species with yellow legs, brown wings, very long proboscis and a phallus with the basal two-thirds distinctly undulated.

Male. Head with occiput dusted grey, bearing numerous distinct black bristles becoming yellow towards postgenae. Ocellar triangle prominent, blackish, with distinct pair of bristles. Frons reduced to a very narrow space between eyes, becoming a little broader beneath ocellar triangle and above antennae. Face blackish, somewhat dusted, shiny in lower part. Antennae black. Proboscis long (twice the head height), palpi yellow with 1 distinct bristle, labrum brownish, prementum and labella dark brown to black. Eyes holoptic with upper ommatidia enlarged.

Thorax dusted grey to black. Anteprepronotum with a few distinct black bristles. Postpronotum with 1 strong, long, black basal bristle, numerous other shorter finer black and brownish bristles anteriorly. Proepisternum and lateral part of prosternum with fan of numerous distinct yellow bristles. First cervical sclerite with a few yellow bristles. Scutum with 3 black stripes, narrow on acrostichals,

broad on dorsocentrals. Acrostichals biserial, short, absent in the prescutellar depression. Dorsocentrals biserial, becoming uniserial posteriorly, longer than acrostichals, strong and long in the prescutellar depression. Four strong, long supraalars, 2 presuturals and 2 postsuturals. At least 6 strong, long notopleurals. One strong, long postalar. Four strong, long scutellars. Laterotergite with fan of numerous, long, yellow bristles. Anterior and posterior spiracles yellow.

Legs with coxae black, femora brown, tibiae brown to black at tip, tarsi black. Fore femora with only rather short, fine bristles. Fore tibiae with distinct dorsal bristles. Middle femora with 1 posteroventral row of numerous strong, not very long bristles. Middle tibiae with 2 dorsal rows of 4–5 strong, not very long bristles. Hind femora with numerous short distinct ventral bristles, a few strong, longer dorsals at apical tip. Hind tibiae with 1 postero- and 1 anterodorsal row of 6–10 strong, rather short bristles. All tarsi with rather short bristles, more distinct at tip of each tarsomere.

Wings long, brown, with a distinct brown stigma. Veins complete (except Sc), black to brown at base. Anal angle very acute, anal lobe well developed. Halteres yellow.

Abdomen blackish, not shiny. First three terga with distinct yellow bristles especially laterally. Marginal black bristles rather short.

Hypopygium (Fig. 7) brownish to blackish, with voluminous appearance. Cerci distinctly cleft, bearing black to brownish bristles. Epan-drial lamellae elongated and developed mediodorsally, rounded at tip, consequently with a characteristic shape, numerous distinct black and brown ventral bristles, a group of numerous more or less strong and long dorsal bristles at tip, a few distinct stronger, longer, black ventrals. Hypandrium distinct. Phallus long, thin, characteristically undulated, with constrictions on apical third.

Length. Body 10–11.7 mm, wing about 12 mm.

Female unknown.

Type material. Holotype ♂, Spain: Leon (San Glorio), Alt. 1,500 m, 26.vi.1986, R. Hall (CUPC). Paratypes: 3♂, same data (CUPC), 2♂, same data (MNHN).

Etymology. From the Latin word sinuosus on account of the presence of an undulating phallus.

Distribution. Spain (Castilla).

Differential diagnosis. As in *E. (L.) lindneri* Oldenberg, the phallus of *E. (L.) sinuosa* undulates, but these two species cannot be mistaken because of the colour of their coxae, which are yellow in the first and black in the second species. In addition the voluminous appearance of male genitalia and the characteristic pilosity of the epan-drial lamellae distinguish *E. (L.) sinuosa* from all other species of the *E. (L.) rustica*-group.

Empis (Leptempis) trunca sp. n.

(Fig. 8)

A large grey species with yellow legs, including coxae, clear wings and truncate epan-drial lamellae.

Male. Head with occiput dusted grey to black with distinct black bristles, becoming yellow towards postgenae.

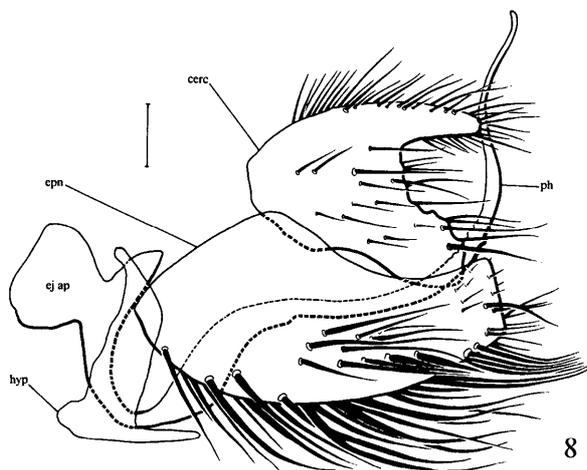


Fig. 8. *E. (L.) trunca* sp. n., male hypopygium, lateral view. cerc – cercus; ej ap – ejaculatory apodeme; epn – epandrium; hyp – hypandrium; ph – phallus. Scale: 0.2 mm.

Ocellar triangle prominent, with pair of distinct bristles. Frons reduced to two narrow black spaces, respectively, beneath ocellar triangle and above antennae. Face dusted grey to brown, shiny in lower part. Scape and pedicel brownish, flagellum blackish. Proboscis long (1.7 times the head height), palpi yellow with a few distinct bristles, labrum yellow to brown, prementum and labella blackish. Eyes holoptic, upper ommatidia enlarged.

Thorax dusted greyish. Anteprenotum with a few distinct black bristles. Postpronotum yellow at apex, with 1 strong, long basal bristle and about 10 finer, shorter anteriorly. Proepisternum and lateral part of prosternum with distinct yellow bristles. Scutum with 2 rather broad brown stripes on dorsocentrals. Acrostichals biserial, rather short, absent in the prescutellar depression. Dorsocentrals irregularly biserial becoming uniserial posteriorly, strong and long in the prescutellar depression. Five distinct supraalars, 1 presutural, 4 postsuturals. Postalar calli yellowish, with 1 strong, long bristle. Four strong, long scutellars. Laterotergite with fan of numerous yellow bristles. Anterior and posterior spiracles whitish to yellowish.

Legs with fore coxae greyish to yellowish, middle and hind coxae and femora yellow, tibiae yellow to black at tip, tarsi black. Fore femora with only short bristles. Middle femora with 1 posteroventral row of about 12 strong, not very long bristles. Middle tibiae with 2 dorsal rows of strong, not very long bristles. Hind femora with a few strong dorsal bristles on apical fourth. Hind tibiae with 2 dorsal rows of 6–8 strong, not very long bristles. All tarsi with rather short bristles, more distinct at tip of each tarsomere.

Wings clear with distinct brownish stigma. Veins complete (except Sc), brown to yellow at base. Anal angle acute, anal lobe well developed. Halteres yellow.

Abdomen dusted greyish with distinct yellow bristles especially on terga laterally.

Hypopygium (Fig. 8) brown to black, all bristles black. Cerci broadly cleft, with distinct, not very long bristles. Epandrial lamellae elongated but distinctly truncate at tip, with numerous strong, long ventral bristles especially to-

wards tip. Hypandrium distinct. Phallus rather long, thin, with small constrictions on apical third.

Length. Body 10.5 mm, wing 11 mm.

Female unknown.

Type material. Holotype ♂, Germany: Starnberger (Seegebiet), leg. F. Stöcklein, 19.v.1950 (CUPC).

Etymology. From the Latin word truncus on account of the truncate aspect of the epandrial lamellae.

Distribution. Germany (Bavaria).

Differential diagnosis. *E. (L.) trunca* is the only species of the *E. (L.) rustica*-group in which the epandrial lamellae are distinctly truncate at tip.

Empis (Leptempis) cognata Egger, 1860

Empis cognata Egger, 1860: 340.

Distribution. Austria, France (Drôme, Hautes-Pyrénées) (new record), Germany, former Czechoslovakia.

Remark. This species was redescribed by Chvála (1977: 47).

Empis (Leptempis) frauscheri Strobl, 1901

Empis frauscheri Strobl, 1901: 198.

Distribution. Austria.

Remarks. According to the original description (Strobl, 1901: 198), this species probably belongs to the *Empis (Leptempis) rustica*-group since Strobl indicated that it closely resembles *E. cognata* Egger. Nevertheless Chvála did not include this species in his revision of this group (1977). In fact the type may have been lost as it is not present in Admont (Chvála, pers. comm.). As Strobl did not figure the male genitalia and I have not seen any specimens from the type-locality (Villach), the systematic position of *E. (L.) frauscheri* remains unclear.

Empis (Leptempis) nigricans Meigen, 1804

Empis nigricans Meigen, 1804: 224.

Holotype identification. According to the original description, Meigen (1804) described this species from one male (“Ich habe nur einmal das Männchen gefangen”), but in the Meigen collection (MNHN) two males are present, respectively labelled “*Empis nigricans* ♂ (*rustica* Fall.)” and “*Empis nigricans* ♂”. Meigen synonymized *E. rustica* Fallén with *E. nigricans* in 1822, it is thus probable that the first male was added to the collection at this time. The general aspect of the second male agrees with the original description, and although its genitalia are damaged, this specimen is identified as the holotype of *E. (L.) nigricans* Meigen, and I labelled it accordingly.

Distribution. Austria, France (Hautes-Pyrénées) (new record), Germany, Hungary, Italy, Netherlands, Poland, Roumania, former Czechoslovakia, Slovenia.

Remarks. This species was redescribed by Chvála (1977: 43).

Key to males of species of the *Empis (Leptempis) rustica*-group (modified from Chvála, 1977)

- 1 Coxae yellowish brown or yellowish in ground color, may be somewhat grey dusted (in *E. lamellimanis* sp. n.) . . . 2

- Coxae black, grey dusted, never yellowish in ground color 8
- 2 Abdomen with sterna extensively yellow or more or less brownish, especially on margins between terga and sterna 3
- Abdomen entirely blackish in ground color, dusted greyish 4
- 3 Labrum about 1.3 times the head height, wings somewhat brownish, lower part of cerci narrowly elongated (Chvála, 1977: Fig. 5), epandrial lamellae without black spine-like bristles towards tip *E. cognata* Egger
- Labrum about 1.7 times the head height, wings rather clear, lower part of cerci not narrowly elongated, epandrial lamellae with several black spine-like bristles towards tip (Fig. 5) *E. multispina* sp. n.
- 4 Phallus undulating at least at base 5
- Phallus not undulating at base 6
- 5 Labrum almost 3 times the head height, lower part of cerci not considerably developed posteriorly, phallus undulating (Chvála, 1977: Figs 7, 18) *E. lindneri* Oldenberg
- Labrum shorter, 1.5 times the head height, lower part of cerci considerably developed posteriorly, phallus only with a distinct basodorsal loop (Fig. 4) *E. lamellimmanis* sp. n.
- 6 Epandrial lamellae strongly truncate at tip (Fig. 8), with black bristles *E. trunca* sp. n.
- Epandrial lamellae more or less rounded at tip, with yellowish bristles at least on their lower margin 7
- 7 Cerci egg-shaped and less distinctly cleft laterally (Fig. 3) *E. lamellata* sp. n.
- Cerci of different shape in lateral view, strongly cleft (Chvála, 1977: Fig. 3) *E. rustica* Fallén
- 8 Cerci uncleft (Fig. 2), abdominal terga, except at base, with only short, scattered bristles (Fig. 1) *E. abdominalis* sp. n.
- Cerci more or less cleft, abdomen with distinct bristles especially on the first three segments 9
- 9 Legs yellowish brown except for black tarsi, terga of abdomen greyish to blackish, not shiny 10
- At least fore femora entirely black or black and brown on apical third only, terga of abdomen subshiny black 11
- 10 Species of greyish colour, labrum less than 1.5 times the head height, phallus not undulating (Chvála, 1977: Fig. 16) *E. nigricans* Meigen
- Species of blackish colour, labrum twice the head height, phallus undulating (Fig. 7) *E. sinuosa* sp. n.
- 11 Mid and hind femora and tibiae yellowish brown *E. meridionalis* Meigen
- Legs blackish except for brownish base of hind femora 12
- 12 Cervical sclerite bare. Only basal half of phallus visible (Chvála, 1977: Fig. 11) *E. spitzeri* Chvála
- Cervical sclerite with distinct yellow bristles. Phallus visible except between epandrial lamellae (Fig. 6) *E. pandellei* sp. n.

CONCLUSION

Phylogenetically, the subgenus *Leptempis* is defined on the basis of a unique character of the male genitalia, the presence of narrow and elongated epandrial lamellae. As hypothesized by Saigusa (1992), the species are mainly European, with one undescribed species from North Africa.

Leptempis, *Planempis* and *Kritempis*, as defined here, form a monophyletic group of subgenera within *Empis*, because the males all have large-sized cerci. The relationships within this group will be discussed elsewhere, but

Leptempis and *Planempis* are likely to be sister-groups as their male genitalia, especially the structure of cerci, have a similar structure.

Seven species from West Europe and Greece were added to the subgenus *Leptempis*, which confirms that the subgenus *Leptempis* is widely distributed in Europe, especially in mountainous areas. The new species are added to the key to the *E. (L.) rustica*-group proposed by Chvála (1977).

Phylogenetic hypotheses will have to be tested by a complete character analysis of the subfamily Empidinae or at least the tribe Empidini (Daugeron, 1997 and in prep.).

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