Boletín Sociedad Entomológica Aragonesa, nº **39** (2006) : 103–109.

MICROSELIA MICROPILA SP.N.: A NEW PHORID SPECIES FROM SPAIN, ETHOLOGY OF *MICROSELIA RIVIERAE* SCHMITZ, 1934, AND A KEY TO THE EUROPEAN SPECIES OF *MICROSELIA* SCHMITZ (DIPTERA, PHORIDAE)

Miguel Carles-Tolrá

Avda. Príncipe de Asturias 30, ático 1; E-08012 Barcelona. Spain.

Abstract: A new phorid species of *Microselia* Schmitz is described, its wing variability is commented upon and the ethology of *M. rivierae* Schmitz is described. This genus is here recorded from the Iberian Peninsula for the first time and its European distribution is shown. Finally, a key to the European species of *Microselia* is presented.
Key words: Diptera, Phoridae, *Microselia*, new species, ethology, European distribution, key.

***Microselia micropila* sp.n.: una especie nueva de fórido de España, etología de *Microselia rivierae* Schmitz, 1934, y una clave de las especies europeas de *Microselia* Schmitz (Diptera, Phoridae)**
Resumen: Se describe una especie nueva de fórido de *Microselia* Schmitz, se comenta la variabilidad alar y se describe la etología de *M. rivierae* Schmitz. Este género se cita por primera vez de la Península Ibérica, y se muestra su distribución geográfica en Europa. Finalmente, se presenta una clave de las especies europeas de *Microselia*.
Palabras clave: Diptera, Phoridae, *Microselia*, especie nueva, etología, distribución europea, clave.
Taxonomy / Taxonomía: *Microselia micropila* **sp.n.**

Introduction

Microselia Schmitz is a phorid genus of very small flies. It was described on the basis of only one female specimen collected in southern France (Schmitz, 1934).

This genus includes, as far as known, parasitic or parasitoid species of ant workers. In the case of European species the ants belong, according to the actual knowledge, to the genus *Camponotus* Mayr, 1861 (Hymenoptera: Formicidae). The flies, of a few milimetres (1-2.5), fly over the ants with the intention of biting them on the gaster to lay their eggs. Unfortunately, its life cycle and the amount of eggs they can lay are unknown.

Hitherto, 10 species of this genus have been described, and they are distributed geographically among three continents. Regarding Europe, 4 species of this genus were known up to now (*M. forsiusi* Schmitz, 1927; *M. rivierae* Schmitz, 1934; *M. southwoodi* Disney, 1988 and *M. daccordii* Gori, 1999). Out of Europe 6 more species have been described: 4 from Africa (Beyer, 1965; Disney, 1983, 1991) and 2 from America (Disney, 1982; Borgmeier, 1969), although some of them probably belong to another genus (Disney, 1988; Gori, 1999).

The genus *Camponotus* Mayr is worldwide distributed and it is found in all Europe. From 8 to 11 species are known from Central Europe, depending on how defined, of which 2 are known as hosts of *Microselia*: *C. cruentatus* Latreille, 1802 and *C. vagus* (Scopoli, 1763). The European distribution of *C. cruentatus* is found in the western Mediterranean (Iberian Peninsula, Meridional France and Liguria (Italy)), while that of *C. vagus* goes from southern Finland and Sweden until the southern Iberian Peninsula, and from Galicia (northwestern Spain) to the Caucasus.

Material and methods

For almost 20 years the author has had the opportunity to collect 65 *Microselia* specimens while they were flying over and lying over the gaster of worker ants of the genus *Camponotus*. To capture them, three methods were used: a) small nets with a very small mesh due to the small size of the flies, b) small transparent plastic bags that were lowered slowly towards the flies, and c) alcohol soaked tops so the flies would get caught.

All the dipterological material was collected from Cabrils, in the province of Barcelona, situated at about 100 m above sea level.

Identification

The study of the mentioned dipterological material has resulted in the identification of two species that belong to the genus *Microselia* Schmitz, 1934. This genus doesn't appear in the recent phorid catalogue by García Romera y Báez (2002) and therefore it is now recorded from the Iberian Peninsula for the first time. The finding of a new species has resulted in a very interesting fact for science. This is *Microselia micropila* sp.n. that is described below. The other species, on the other hand, belongs to *Microselia rivierae* Schmitz, 1934. The ants, identified by Dr. Espadaler, belong to the species *Camponotus cruentatus* Latreille, 1802.

However, at first the placement of this material in the genus *Microselia* wasn't easy. This was due to the variability that vein 2 has, as it was said in Disney & Shaw (1994). Now, the great amount of material captured has made easier the study of this variability. It has been proved that vein 2 is much more variable than thought, as it may be from clearly distinctly developed to weakly, very weakly, incompletely developed or absent (Fig.7, 8). Furthermore, it may be present in both wings, in only one wing or absent in both wings as it is shown in Table I. We can see in *M. rivierae* that vein 2 is developed, even though it may only be weakly, in a little more than half of the specimens collected

Table I. Variability of the vein 2 in *M. rivierae* and *M. micropila*, indicating the number of specimens and corresponding percentages. L = presence of vein 2 on the left wing; R = presence of vein 2 on the right wing; – = absence of vein 2.

	M. rivierae		*M. micropila*	
	specimens	**%**	**specimens**	**%**
L R	32	56.1	2	25.0
L –	3	5.3	1	12.5
– R	5	8.8	1	12.5
– –	17	29.8	4	50.0
Total	57		8	

(56.1%) while it is totally absent in almost a third (29.8%). In the rest of the specimens (14.1%) vein 2 is only present in one of the wings. In *M. micropila*, only 2 of the 8 specimens captured show vein 2 in both wings, 2 specimens have it in one of the two wings and in 4 it is absent in both wings.

According to the key by Disney (1998), couplet 26 has been achieved without difficulty and it is from here where the problems begin. At this couplet it is asked if vein 3 is forked or not, that is if vein 2 is present or not. If "vein 3 forked" is choosen, then we arrive to the genus *Microselia*, while if "vein 3 not forked" is choosen we arrive to the genus *Pseudacteon* Coquillett (1907). These two genera are closely related as it was said in Delage et Lauraire (1971) and Disney (1988, 1994). In fact, the first species included in this genus was initially described in the genus *Pseudacteon* by Schmitz (1927). Nevertheless, from the shape of the antennae (Fig. 3, 4) and having the 5th tarsal joint of fore tarsus longer than the 4th (Fig. 5, 6), makes us arrive to genus *Microselia*. Consequently, it is obvious that the presence or absence of vein 2 is not a good character to differ these two genera.

Microselia micropila sp.n.

DESCRIPTION:

Fig. 1, 3, 5, 6, 9, 11, 13, 15, 17, 19.

Head, dark brown to blackish. Supra-antennals very short, maximum as long as the setae of palpus. Antials slightly nearer to the supra-antennals than to the antero-laterals. Preocellars more separated among each other than the distance to the medio-laterals. Distance between supra-antennals bigger than the length of a bristle. Frons covered by very short hairs. Antenna (Fig. 3) and arista brown, third joint somewhat elongate, slightly pointed and very convex ventrally. Palpi yellowish, with 3-4(5) short bristles.

Thorax brown, pleurae somewhat clearer. 2 notopleurals, mesopleura glabrous, scutellum with 2 bristles, the basal one very short, hair-like.

Legs brown. Mid and hind tibiae with a dorsal row of hair palisade and a dorsal row of fine hairs, absent basally. Fore tibiae and tarsi paler. Apex of fore femur clear. Joint 5 of fore tarsus longer than joint 4, and slightly tapered apically (Fig. 5, 6). Joint 5 of mid tarsus slightly longer than joint 4 and slightly tapered apically. Tarsal claws normal, not specially small.

Wing. Veins brown. Costal base with a long bristle. Vein 3 without dorsal hairs. Vein 4 curved backwards apically. 2 axillary bristles, basal one shorter. Wing length = 0.92-1.07 mm; costal index = 0.29-0.34; costal cilia = 0.042-0.051 mm; cs1:(cs2+cs3) = 2.1-2.7. Haltere brown dorsally and yellowish ventrally, stem darker dorsally. Knob completely brown dorsally, darker apicodorsally.

Abdomen (Fig. 1, 9, 11): tergites dark brown to blackish; venter clearer, membranose, sternites absents, only sternite 6 present. Sternite 6 (Fig. 19) desclerotized in the middle, with 6-7 very short hairs on each side, hairs distinctly shorter than length of tergite 4 (aproximately half length of tergite 4), shorter than cephalic bristles. Ovipositor sheath (segment 7) (Fig. 15, 17) distinctly divergent posteriorly, posterior margin convex, brown on its wider part. Tergite 6 divided, short, small, but well visible, with very small, diminute posterior hairs.

Total body length (without ovipositor): 1.2-1.5 mm.

MALE: unknown.

TYPE MATERIAL:

Holotype female: Spain: Barcelona: Cabrils (Can Tolrá), 23.6.2001, M. Carles-Tolrá leg.

Paratypes: 1 female with same data as holotype. Other paratypes: same data as holotype but 17.7.1991 4 females (+/- 8:00 PM), 30.6.2001 2 females. Holotype and 6 paratypes deposited in the private collection of the author, 1 paratype deposited in the collection of R.H.L Disney at the University Museum of Zoology (Cambridge). Total: 8 females.

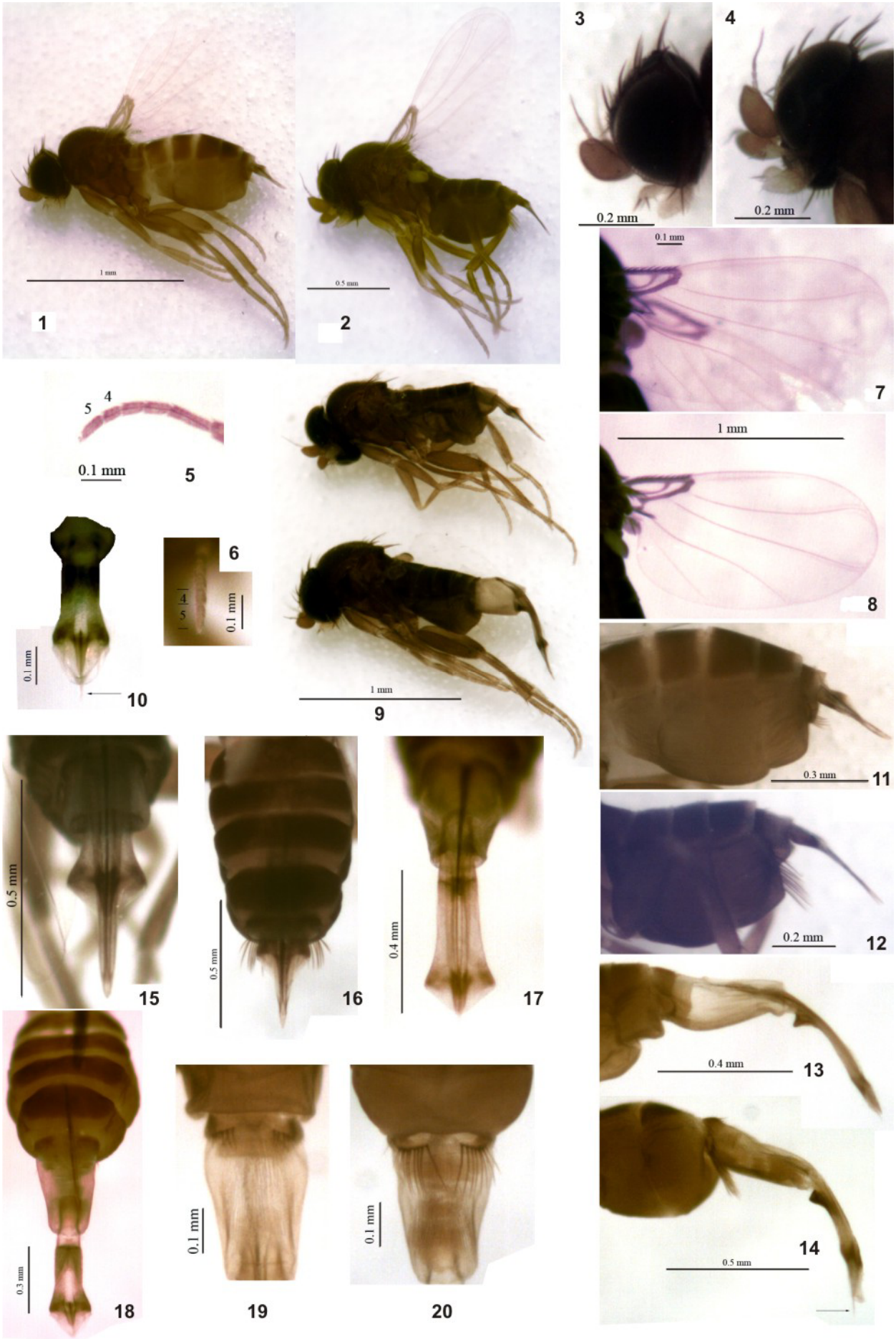
BIOLOGY: all the specimens were collected while hovering over and/or after stinging *Camponotus cruentatus* on the gaster. Until now only one phorid species (*M. rivierae*) that attacks *Camponotus cruentatus* was known.

ETIMOLOGY: the specific name refers to the very short hairs on sternite 6 (micros = small in Greek; pilum = hair in Latin).

DISCUSSION: *Microselia micropila* sp.n. is closely related to *M. rivierae* Schmitz, as the ovipositor of both species are identical (Fig. 11-18). Both species may be easily differentiated by external morphological characters (sternite 6, haltere and tarsi) as is shown in the key below.

→

Fig. 1-2. Habitus in lateral view: **1.** *Microselia micropila* sp.n. **2.** *Microselia rivierae* Schmitz. **Fig. 3-4.** Antenna in lateral view: **3.** *Microselia micropila* sp.n. **4.** *Microselia rivierae* Schmitz. **Fig. 5-6.** *Microselia micropila* sp.n.: Joint 5 of fore tarsus (joints 4 and 5 are indicated). **5.** Lateral view. **6.** Dorsal view. **Fig. 7-8.** *Microselia rivierae* Schmitz: **7.** Wing with vein 3 forked. **8.** Wing with vein 3 not forked. **Fig. 9.** *Microselia micropila* sp.n.: habitus of two specimens in lateral view with (above) and without (below) evaginated ovipositor. **Fig. 10.** *Microselia rivierae* Schmitz: apex of ovipositor sheath in dorsal view (apex of the sting indicated by an arrow). **Fig. 11-12.** Abdomen in lateal view. **11.** *Microselia micropila* sp.n. **12.** *Microselia rivierae* Schmitz. **Fig. 13-14.** Ovipositor evaginated in lateral view. **13.** *Microselia micropila* sp.n. **14.** *Microselia rivierae* Schmitz (apex of the sting indicated by an arrow). **Fig. 15-16.** Ovipositor in dorsal view. **15.** *Microselia micropila* sp.n. **16.** *Microselia rivierae* Schmitz. **Fig. 17-18.** Ovipositor evaginated in dorsal view. **17.** *Microselia micropila* sp.n. **18.** *Microselia rivierae* Schmitz. **Fig. 19-20.** Sternite 6 in ventral view. **19.** *Microselia micropila* sp.n. **20.** *Microselia rivierae* Schmitz.


1
1 mm
2
0.5 mm
3
0.2 mm
4
0.2 mm
5
4
5
0.1 mm
6
4
5
0.1 mm
7
0.1 mm
8
1 mm
9
1 mm
10
0.1 mm
11
0.3 mm
12
0.2 mm
13
0.4 mm
14
0.5 mm
15
0.5 mm
16
0.5 mm
17
0.4 mm
18
0.3 mm
19
0.1 mm
20
0.1 mm

***Microselia rivierae* Schmitz, 1934**
Fig. 2, 4, 7, 8, 10, 12, 14, 16, 18, 20)
(see VIDEO http://www.sea-entomologia.org/phoridae)

EXAMINED MATERIAL: Spain: Barcelona: Cabrils, 30.6.1984 3 females (Urbanización Santa Elena), 10.7.1991 1 female (Can Tolrá), 17.7.1991 3 females (Can Tolrá, +/- 8:00 PM), 19.7.1992 9 females (Can Tolrá) (see VIDEO below), 18.6.1994 5 females (Can Tolrá), 25.7.1994 10 females (Can Tolrá), 11.8.1998 1 female (crta. Mutua Metalúrgica), 23.6.2001 4 females (Can Tolrá), 30.6.2001 1 female (Can Tolrá), 1.7.2001 18 females (Can Tolrá), 15.8.2001 1 female (Can Tolrá), 7.8.2002 1 female (Can Tolrá). Total: 57 females. All M. Carles-Tolrá leg. The material is preserved in alcohol in the private collection of the author, excepting 4 specimens which are deposited in R.H.L. Disney's collection at the University Museum of Zoology (Cambridge).

All the specimens were collected while hovering over and/or after stinging *Camponotus cruentatus* on the gaster.

This species was only known from France, therefore this material represents the first record of *M. rivierae* for the Iberian Peninsula.

Geographical distribution of the genus *Microselia* in Europe

In figure 36 and Table II we can see the known geographical distribution of the five European species of *Microselia*. At first, we can deduce that their distribution seems to be mainly Mediterranean, except one (*M. forsiusi*) that was described from Finland. The remaining four are only known from the Mediterranean region. Taking into account the presence of this genus in such opposite latitude territories, such as Finland and the Mediterranean, it's strange that such species of *Microselia* haven't been recorded in countries so dipterologically studied as those of Central Europe. Likewise, the recent record by Gori (1999) of this genus from Italy is also surprising due to the long dipterological tradition that this country has had and has, and also being a Mediterranean country.

In Spain, still mainly being Mediterranean, the lack of records is due to the lack of dipterological tradition that has existed in this country for decades. In my opinion, the absence of records of *Microselia* in Central Europe is due, not to the fact that these species (or probably others) aren't found in the mentioned region, but that these tiny flies go unnoticed unless you specifically look for them while they are hovering over the ants.

Table II. Geographical distribution of the five European species of *Microselia*.

Microselia	Countries
daccordii	Italy
forsiusi	Finland
micropila	Spain
rivierae	Spain, France
Southwoodi	France

Etology of *Microselia rivierae* Schmitz
Fig. 24-35.

Recently, Della Santa (1993) gathered information from the knowledge of the relationship between phorids and *Camponotus* in Europe. He included a brief description of his own observations of the behaviour of six specimens of *M. rivierae* flying over *C. cruentatus*.

As we can see from the abundant material studied of *M. rivierae*, we have had the opportunity to capture specimens of this species for several years, which has permitted us to observe the behaviour before capturing them and confirm and extend the coments of Della Santa.

We have to say that these tiny flies are very easily frightened, which makes them disappear quickly, not knowing that they are present, when we get close to the ants to observe them more closely. If we are pacient and very lucky, it is possible to see black spots hovering over the ants at a height of few milimetres (5-20). Once these spots have been seen, we have to slowly get near the flies and capture them.

We also have to say that the behaviour of the ants is different when the flies are present. In normal conditions the ants walk calmly without being frightened and without turning around. On the other hand, when they have flies hovering over them that are trying to sit on them, the ants seem anxious and their movements are quick and jerky. If the fly achieves to sit on the ants and stings them with the sting (Fig. 10, 14), then this tries to get rid of them by using their hind legs and/or by turning around quickly.

It has been observed that the ants can be followed and stung several times by the flies. The flies are very insistant, they follow the ants by hovering over them several seconds until they achieve to sit on them (Fig. 24-26 and 27-29) and if they can they will sting them before the ant frightens them. It is not strange to see how the same fly tries to sit on the same ant several times and stings or tries to sting it more than once (2-4). This could be because it hasn't been able to lay the egg (or eggs) the previous times, since the ant scares the fly away as soon as possible with its hind legs kicking or with quick body movements. We must say that in all the observed cases, the flies sit on the back dorsal half of the gaster. It was not strange to see more than one (2-3, including 4) (Fig. 30-32) flies flying over the same victim or victims. In two occasions, two flies were able to sit on the same ant, but were frightened quickly.

Nevertheless, the most impressing observation was to see a group of 9 ants that were found in the grass and were being attacked by a small cloud of flies. It was really surprising to see the ants behaving as if they were scared, terrified, trying to run away from the cloud as they could through the grass, continuously turning around. The scene was observed for more or less one minute, after I hurried to get as many flies as possible, that is to say 18, but all at once! (see "Examined material" of *M. rivierae*). Consequently, the rest of the flies were scared away and the ants had dispersed. Having captured 18 flies at once I dare to confirm that there must have been more or less double the cited number, that is 30-40 specimens!

Delage et Lauraire (1971) say that these flies attack specimens that are perfectly healthy. After my observations I can say that at least *M. rivierae* attacks and stings healthy (Fig. 24-26) and wounded and lame ants (Fig. 27-29). Furthermore, it attacks ants that are alone (Fig. 30), as well as those that are in groups (Fig. 31, 32), it can also attack alone (Fig. 24-26 and 27-29), in small groups of 2-4 (Fig. 30-32), or even in groups of 30-40 specimens forming

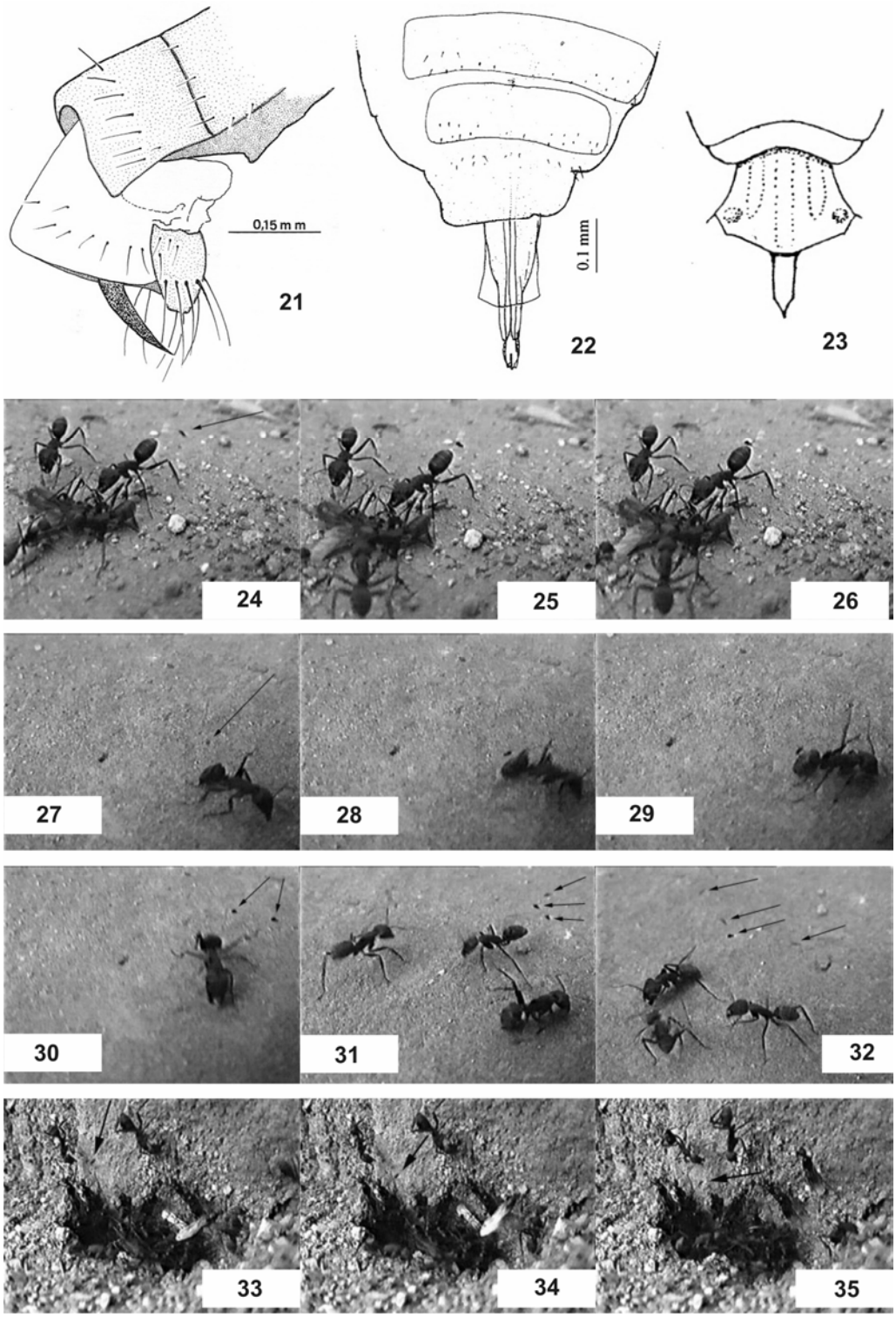


Fig. 21. *Microselia daccordii* Gori: ovipositor in lateral view (after Gori, 1999). **Fig. 22.** *Microselia southwoodi* Disney: ovipositor in dorsal view (after Disney, 1988). **Fig. 23.** *Microselia forsiusi* Schmitz: ovipositor in dorsal view (after Schmitz, 1927). **Fig. 24-26.** Sequence of three images showing the approach of a specimen of *Microselia rivierae* (arrow) to a healthy specimen of *Camponotus cruentatus* until it sits on its gaster. **Fig. 27-29.** Sequence of three images showing the approach of a specimen of *Microselia rivierae* (arrow) to a wounded and lame specimen of *Camponotus cruentatus* until it sits on its gaster. **Fig. 30-32**. Specimens of *Microselia rivierae* (arrows) flying over a specimen of *Camponotus cruentatus*. **30.** Two specimens. **31.** Three specimens. **32.** Four specimens. **Fig. 33-35.** Specimen of *Microselia rivierae* (arrow) flying over the entrance of an ant hill of *Camponotus cruentatus*.

clouds. Finally, it even flies over the entrance of ant hills (Fig. 33-35), where there can be dozens of workers and winged ants together.

Part of all this behaviour was filmed on video and can be observed at the following website: http://www.sea-entomologia.org/phoridae (see "Examined material" of *Microselia rivierae*) (taking into account the small size of the flies and that they have a very quick and zigzagging flight, it is recommended to see the video a couple of times as not to lose any details.

Fig. 36. Geographical distribution of all known records of *Microselia* in Europe. Abbreviations: D = *M. daccordii*, F = *M. forsiusi*, M = *M. micropila*, R = *M. rivierae*, S = *M. southwoodi*. →

Della Santa (1993) in his discussion says that *Camponotus cruentatus* is probably the host of *M. rivierae*. According to the numerous observations mentioned, I can confirm that *C. cruentatus* is the host or one of the hosts of *M. rivierae*, or that *M. rivierae* is a parasite or parasitoid of at least *C. cruentatus*.

In Table III we can see the ant hosts known from the 5 European species. Up to now the ant hosts of *M. forsiusi* and *M. daccordii* are unknown.

Table III. European species of *Microselia* with their respective known ant hosts (*Camponotus*).

Microselia species	Ant hosts
M. daccordii	?
M. forsiusi	?
M. micropila	*C. cruentatus*
M. rivierae	*C. cruentatus*
M. southwoodi	*C. vagus*

Flight period and abundance

M. rivierae appears during the hot months, that is during June, July and august, which coincides with the capturing of the other European species. In my case I caught them the last fifteen days of June up to the first fifteen days of August. Even though they weren't caught, a few specimens were also seen at the beginning of June and the end of August.

Judging from the very few specimens captured from the other species until now (1 of *M. forsiusi*, 1 of *M. daccordii*, 4 of *M. southwoodi*, 8 of *M. micropila* and 8 of *M. rivierae*) you could think that they are rare or very rare species. However, taking into account that the captured specimens (57) represent a part of all the flies observed all these years, you can say that at least *M. rivierae* is not such a rare species as it could seem, but a unnoticeable species, the same as the other four, by the mayority of entomologists. This is due to their special lifestyle which forces us to look for them upon their hosts, not being captured with conventional methods (sweeping, Malaise trap, etc.).

Key to the european species of genus *Microselia* (females only)

(Up to now, only the male of *M. southwoodi* represented by only one specimen is known)

1a. Species bigger than 2 mm (2.5 mm). Tergite 6 absent, sternite 6 with long posterior hairs, ovipositor right-angled shaped in dorsal view (Fig. 21) .... *daccordii* Gori

1b. Species smaller than 2 mm (between 1 – 1.5 mm.).....2

2a. Ovipositor narrow, subrectangular, with almost parallel sides (Fig. 22) ..... *southwoodi* Disney

2b. Ovipositor distinctly divergent posteriorly, trapezoidal, hind margin convex (Fig. 17, 18, 23)..... 3

3a. Ovipositor sheath with a pair of posterodorsal subcircular swelling at its widest part (Fig. 23). Anterior scutellar bristle shorter and weaker than posterior one .... *forsiusi* Schmitz

3b. Such swellings absent (Fig. 17, 18). Anterior scutellar bristle very small and short, hair-like 4

4a. Sternite 6 with 8-16 very long hairs on each side (Fig. 20), as long as or longer than tergite 4, as long as or longer than the cephalic bristles; hairs perfectly visibles in lateral view (Fig. 2, 12, 14). Haltere knob from completely yellowish dorsally to at most with a dorsoapical slightly brownish spot. Joint 5 of fore and mid tarsi distinctly tapered apically; claws very small, minute .... *rivierae* Schmitz

4b. Sternite 6 with only 6-7 very short hairs each side (Fig. 19), distinctly shorter than length of tergite 4 (aproximately half length of tergite 4), shorter than the cephalic bristles; hairs almost unnoticeable in lateral view (Fig. 1, 11, 13). Haltere knob completely brown dorsally, darker apically. Joint 5 of fore and mid tarsi slightly tapered apically; claws normal, not reduced..... ..... *micropila* sp.n.

Acknowledgements

My most sincere thanks to Dr. R. Henry L. Disney (Cambridge) for the shipment of papers and reprints about genus *Microselia*, as well as for the corroboration of my identifications. Many thanks also to Dr. Xavier Espadaler (Universidad de Bellaterra, Barcelona) for the identification of the ants, as well as for the information of the geographical distribution of genus *Camponotus* and their species, as well as to Joana Danés (Barcelona) for her help on Latin and Greek nomenclatures. Finally, I'm very much indebted to Jane Pérez (Barcelona) for her English translation.

References

BEYER, E.M. 1965. Phoridae. *Explor. Parc nat. Albert, Miss de Witte* (1933-1935), fasc. 39. Hayez, Bruxelles, 221 pp.

BORGMEIER, T. 1969. New or little-known phorid flies, mainly of the Neotropical Region (Diptera, Phoridae). *Studia entomologica*, **12**: 33-132.

DELAGE, A. & M.-C. LAURAIRE 1971. Présence au Jardin des Plantes d'un Phoride Myrmécophile rare. Microselia rivierae, Schmitz. *Annales de la Société d'Horticulture et d'Histoire Naturelle de l'Hérault*, **111**(3): 107-110.

DELLA SANTA, E. 1993. Camponotus cruentatus Latreille, 1802 (Hymenoptera: Formicidae), hote du Phoridé myrmecophile Microselia rivierae Schmitz, 1934 (Diptera: Phoridae). *Mitteilungen der schweizerischen entomologischen Gesellschaft*, **66**: 135-136.

DISNEY, R.H.L. 1982. Three new species of scuttle-fly (Diptera: Phoridae) that parasitize ants (Hymenoptera: Formicidae) in North America. *Journal of Zoology*, **197**: 473-481.

DISNEY, R.H.L. 1983. Two new species of Afrotropical Microselia (Diptera: Phoridae). *Entomologica Scandinavica*, **14**: 407-410.

DISNEY, R.H.L. 1988. A new species of Microselia (Dipt. Phoridae) from France. *Annales de Parasitologie Humaine et Comparée*, **63**(1): 85-88.

DISNEY, R.H.L. 1991. Scuttle flies from Zimbabwe with the description of five new species. *Journal of African Zoology*, **105**: 27-48.

DISNEY, R.H.L. 1994. *Scuttle Flies: The Phoridae*. Chapman & Hall, London, i-xii + 1-467 pp.

DISNEY, R.H.L. 1998. 3.4. Family Phoridae: 51-79. In Papp, L. and Darvas, B. (eds.): *Contributions to a Manual of Palaearctic Diptera (with special reference to flies of economic importance).* Volume 3. Higher Brachycera. Science Herald, Budapest. 880 pp.

DISNEY, R.H.L. & M.R. SHAW 1994. The ant host (Hym. Formicidae) of a Microselia (Dipt., Phoridae) from France. *Entomologist's Monthly Magazine*, **130**: 227-228.

GARCÍA ROMERA, C. & M. BÁEZ 2002. Phoridae: 125-129. In Carles-Tolrá Hjorth-Andersen, M. (coord.): *Catálogo de los Diptera de España, Portugal y Andorra (Insecta).* Monografías de la Sociedad Entomológica Aragonesa, 8: 323 pp.

GORI, M. 1999. Una nuova specie di Microselia proveniente dalle Alpì occidentali italiane (Diptera Phoridae). *Bollettino della Società entomologica italiana*, **131**(3): 239-243.

SCHMITZ, H. 1927. Revision der Phoridengattungen mit Beschreibung neuer Gattungen und Arten. *Natuurhistorisch Maandblad*, **16**: 110-116.

SCHMITZ, H. 1934. Eine neue parasitische Phoride aus dem Mittelmeergebiet. Microselia rivierae n.g., n.sp. *Brotéria*, **30**: 10-14.

Microselia rivierae

Part of behaviour was filmed on video and can be observed at the following website:

Parte del comportamiento de la especie descrito en este artículo ha sido filmado en vídeo y puede ser visionado en el siguiente sitio web:

http://www.sea-entomologia.org/phoridae