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Three new species of *Megaselia* Rondani, 1856 (Diptera, Phoridae) from Switzerland

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The new species *M. limpachensis* sp. n., *M. rochefortensis* sp. n. and *M. sihlwaldensis* sp. n., are described. *Megaselia beyeri* Schmitz, 1965 is synonymised with *M. differens* Schmitz, 1948. *M. nectergata* Disney, 1989 and *M. praeacuta* (Schmitz, 1919) are recorded from Switzerland for the first time.

Keywords: Diptera, Phoridae, *Megaselia*, new species, new records, Switzerland.

INTRODUCTION

The scuttle flies (Diptera, Phoridae) of Switzerland are comparatively well documented. The specimens dealt with in this paper were collected by Peter Duelli near Limpach, by Karin Schiegg at Sihlwald-Kaila, by Christophe Dufour at Château de Rochefort and by Marco Moretti in the canton of Ticino (Prescher *et al.* 2000), Weber & Schiegg (2001), Prescher & Haenni (2001) and Prescher *et al.* (2002). A summary of the species identified in these surveys omitted some problem specimens, which are dealt with below.

MATERIAL AND METHODS

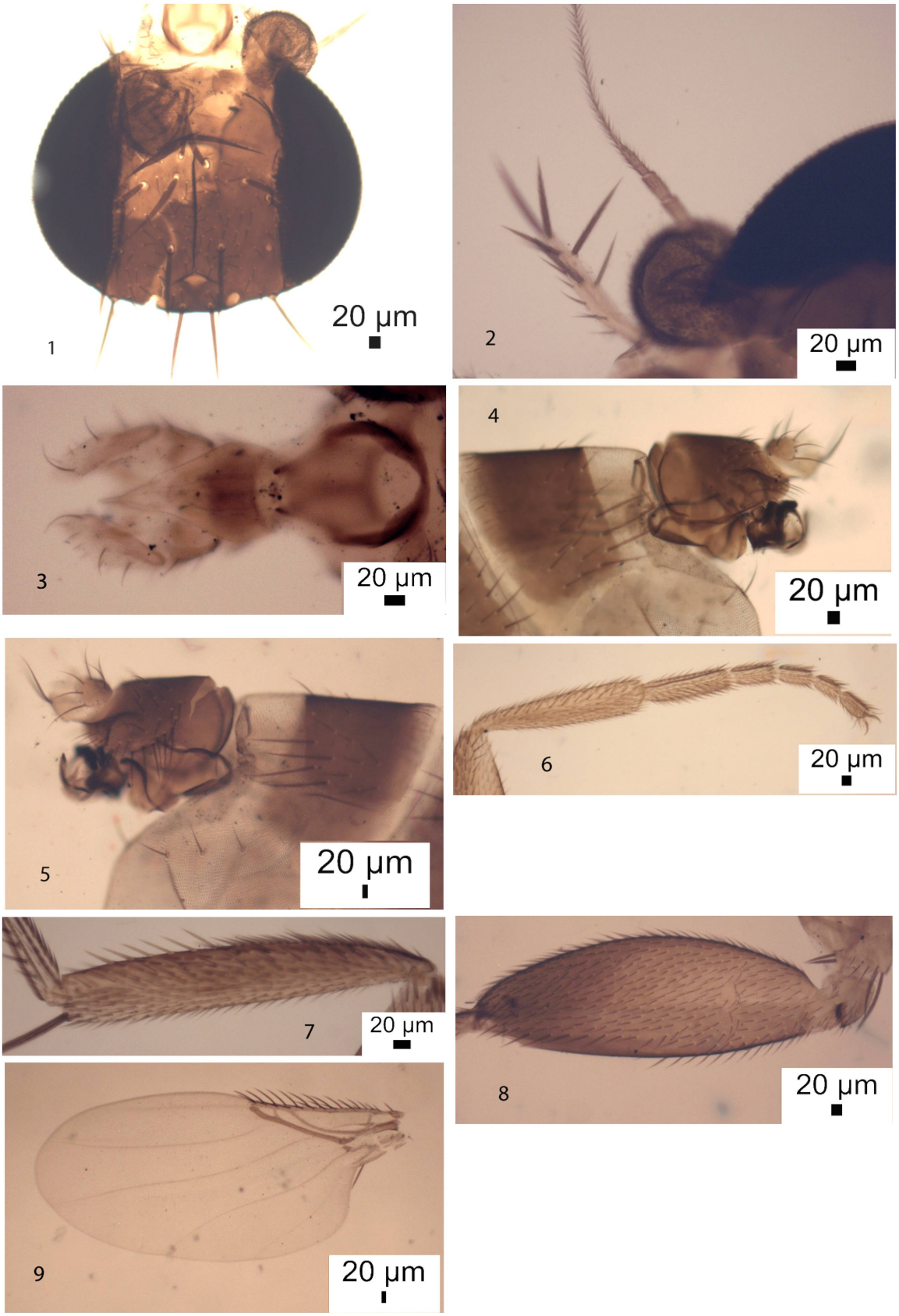
The scuttle flies were preserved in alcohol and subsequently slide mounted in Berlese Fluid (Disney 2001) and deposited in the Cambridge University Museum of Zoology (CUMZ) with some duplicates in the Eidgenössische Technische Hochschule Zürich (ETHZ).

RESULTS AND DISCUSSION

Megaselia differens Schmitz, 1948

Megaselia differens Schmitz, 1948: 394 (male).
Megaselia beyeri Schmitz in Schmitz & Beyer, 1965: 606, **syn. n.**
Aphiochaeta beckeri Dampf, 1924: 36. Not Wood, 1909.

In the keys to Abteilung IV, Zweite Reihe of Palaearctic species of *Megaselia* (Schmitz & Beyer 1965) *M. beyeri* and *M. differens* are keyed out in the poorly constructed section of couplets 83 to 97. Couplet 83 initiates problems by dividing species with a costal index exceeding 0.49 from those with the CI less than 0.48. This causes *M. beyeri* to key out at couplet 86 but *M. differens* to run out at couplet



Figs 1–9. *Megaselia limpachensis* sp. n. male. — 1. frons; — 2. postpedicel and palp; — 3. proboscis; — 4. left face of hypopygium; — 5. right face of hypopygium; — 6. front tibia and tarsus; — 7. mid tibia; —8. hind femur; —9. wing.

96. In the keys to the males of species from the British Isles (Disney 1989) these two species both run out at couplet 114, with the distinction between the two being very fine. Namely the slight difference in the costal indexes and the number of bristles on the epandrium. With the examination of further material of this complex, suspicion that *M. beyeri* was merely a variant of *M. differens* arose. This was reinforced by the description of *M. beyeri* noting that the atypically robust hairs below the base of the male's hind femur are not crowded as in *M. beckeri*, but without mentioning that they are indistinguishable from those of *M. differens*.

A subset of this complex of species is characterized by the labella of the proboscis being enlarged and with numerous small spinules on their lower faces. These can then be subdivided on the basis of the details of the hypopygia, whether the hairs below the male's hind femora are unusually robust or at most only moderately robust, as in the common *M. altifrons* (Wood, 1909), and whether the haltere knob is yellow or brown. With regard to the hypopygia the tip of the posteroventral lobe of the epandriun is convex in some but concave in others. *M. beyeri* and *M. differens* belong to the concave group, with brown haltere knobs and identical hind femora. The supposed difference in the number of epandrial bristles merely represents two ends of a continuous range of variation. It is concluded that *M. beyeri* is a synonym of *M. differens*. The brief (three and a half lines) description of the female of *M. beyeri* did not allow its recognition. However, the female of *M. differens* has since been described (Disney 2015). As *M. beyeri* this species has previously been reported from Switzerland. We report two males from Ticino after a forest fire (Prescher *et al*. 2002) Waldbrand, 10 June 1997, Moretti (Bek 19.1 & 142, ETHZ, 19-175, CUMZ, 19-176).

Megaselia limpachensis sp. n.

(Figs 1–9)

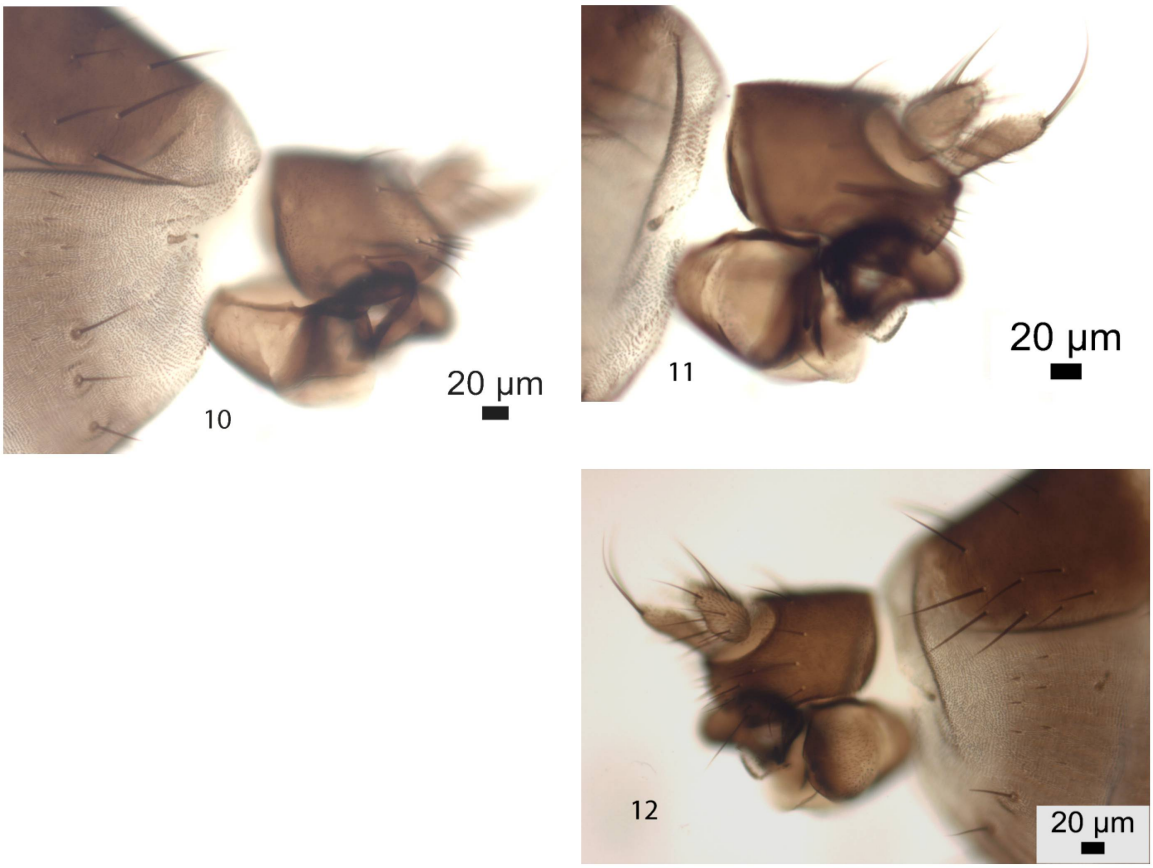
In the key to the males of the British species (Disney 1989) this species runs to couplet 126, lead 2 to *M. unguicularis* (Wood, 1909), which it closely resembles. It is distinguished by its paler abdominal venter, the proctiger hairs being longer and more robust than those on cerci, by the anterior ocellus being at least as large as the posterior pair (the anterior ocellus of *M. unguicularis* is distinctly smaller than the posterior ocelli). In addition it has posterodorsal hair palisades on the segments 1–4 of the front tarsus (as opposed to 1–5 in *M. unguicularis*). For Palaearctic species not yet recorded from the British Isles, in the key to the species of Abteilung V (Schmitz & Delage 1974) it runs to couplet 6, lead 1 to *M. divergens* (Malloch, 1912) or couplet 28, lead 1 to *M. involuta* (Wood, 1910). The shorter wing (0.9–1.0 mm) and costal index (0.33) distinguishes *M. divergens*. The epandrium has fewer more robust hairs in *M. involuta,* as well as posterodorsal hair palisades on all five segments of the front tarsus and whose basitarsus has some hairs reduced to small spinules.

Other European species not recorded from the British Isles will run to the same couplet. This couplet is expanded below to include the new species and those most resembling it. Other species have a longer anal tube and/or bristles not hairs on the epandrium.

Description. Male: Frons brown and as in Fig. 1, with very fine microtrichia absent from most of frons (the lower supra-antennal bristle is absent on the right side and

the upper SA is displaced forwards. The left side displays the correct positions of these bristles). Cheek with 4 bristles and jowl with two that are longer. Postpedicel (Fig. 2) lacks subcutaneous pit sensilla (SPS vesicles). Palps as in Fig. 2. Proboscis as in Fig. 3, the labella with only a few short spinules below. Thorax brown. Three notopleural bristles and no cleft in front of these. Mesopleuron with 8–9 hairs. Scutellum with an anterior pair of small hairs and a posterior pair of bristles. Abdominal tergites brown with hairs that are clearly longest posterolaterally on T6 (Figs 4 & 5). Venter gray (Fig. 4), and with hairs on segments 3–6. Hypopygium as in Figs 4 & 5, with hypandrial lobes vestigial. Coxae to tibiae of legs brown but those of front legs only lightly tinged and all tarsi pale. Fore tarsus (Fig. 6) with posterodorsal hair palisades on segments 1–4. Dorsal hair palisade of mid tibia extends almost half its length (Fig. 7). Hairs below basal half of hind femur shorter than those of anteroventral row of outer half (Fig. 8). Hind tibia with 14–16 differentiated posterodorsal hairs and spinules of apical combs simple. Wings (Fig. 9) 1.46 mm long. Costal index 0.40. Costal ratios 4.6–4.7 : 0.9 : 1. Costal cilia (of section 3) 0.12 mm long. A very small hair at base of vein 3. With 2 axillary bristles, the outer being 0.12 mm long. Sc not quite reaching R1. Haltere brown.

Material: HOLOTYPE male, Switzerland, Limpach [BE], 14 May 1987, Peter Duelli (6, GiE (2), CUMZ, 19-137).
Etymology: Named after the type locality.



Figs 10–12. *Megaselia digitalis*, male hypopygium. — 10. left face of epandrium; — 11. left face of anal tube; — 12. right face of hypopygium.

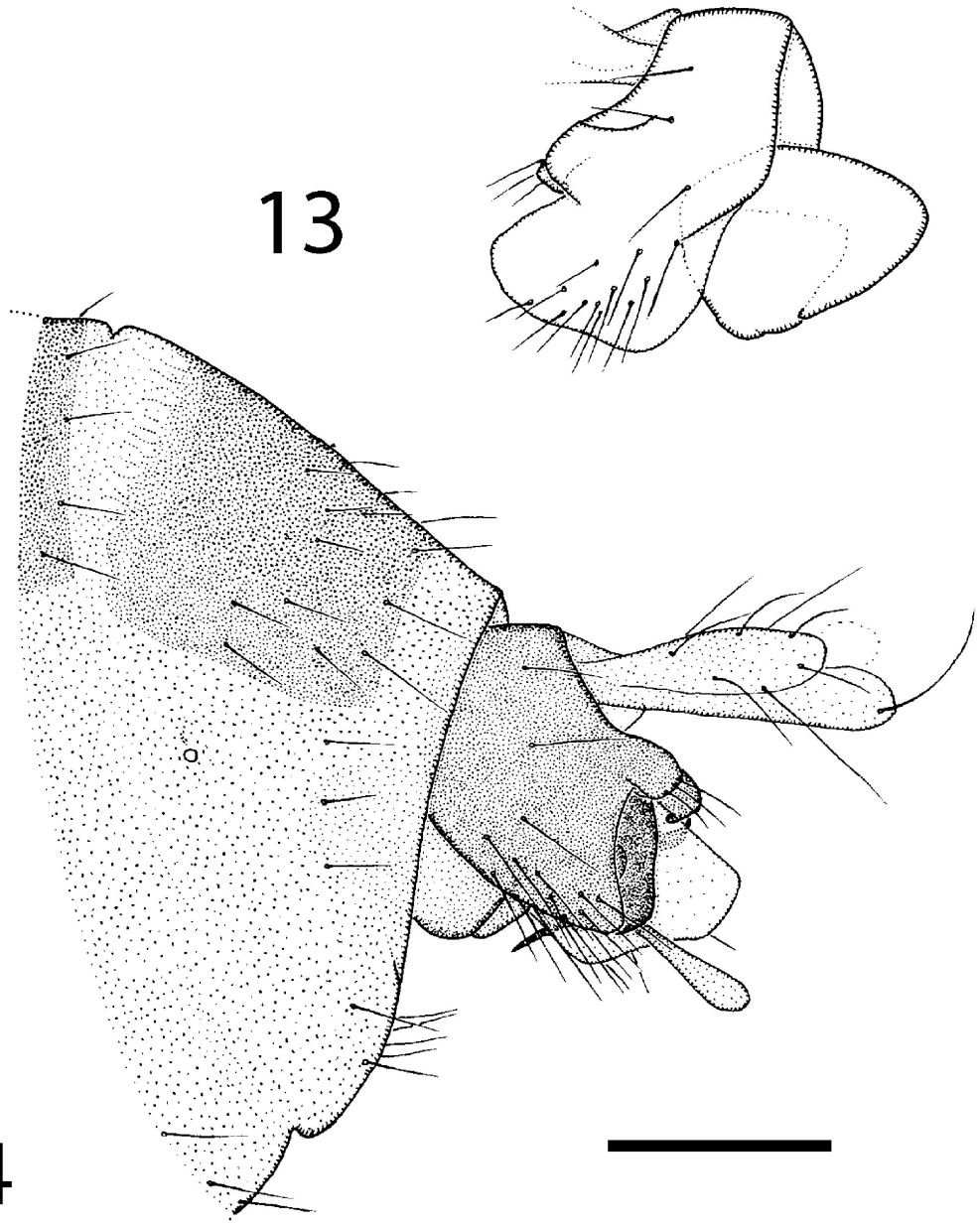
Expanded couplet 126 of Disney (1989). Figs D89-XXX refer to figures in this publication.

126 Scutellum with an anterior pair of small hairs and a posterior pair of bristles 126A

— Scutellum with 4 bristles that are about the same length. (The anterior spur of the hind tibia is about 0.8 times as long as the ventral spur). The length of the epandrium is far greater than its height. The brown vestigial hypandrial lobes are very broad .. .. ***aristica* (Schmitz)**

126A Anal tube clearly shorter than dorsal length of epandrium. (Costal cilia more than 0.10 mm long) 126B

— Anal tube about as long as epandrium or longer 126C



Figs 13–14. *Megaselia lavourensis* male. — 13. right face of epandrium and hypandrium; — 14. left face of hypopygium. Scale bar = 0.1 mm.

126B Wing membrane dusky (clearly evident when viewed with the naked eye against a white background). With at least 3 axillary bristles. The hairs at tip of proctiger clearly weaker than hairs of cerci (Fig. D89 366) ..... ***unguicularis* (Wood)**

— Wing membrane only lightly tinged grey. With only 2 axillary bristles. Hairs at tip of proctiger clearly stronger than hairs of cerci (Fig. 5) ..... ***limpachensis*** sp. n.

126C Palps yellow 126D

— Palps brown. (Costa more than two fifths of length. Hypopygium as in Figs 10–12) ..... ***digitalis* Schmitz**

126D Anal tube about as long as dorsal face of epandrium or slightly shorter 126E

— Anal tube clearly longer than epandrium (Fig. 14). (Hairs below basal half of hind femur shorter than AV hairs of outer half ..... ***lavoursensis* Disney & Withers**

126E Hypopygium as in Fig. 15, the hairs of proctiger being about as strong as those of cerci. Costal cilia of section 3 at most 0.10 mm long ..... ***subcarpalis* (Lundbeck)**

— Hypopygium as Fig. D89-367 the hairs of proctiger being longer and more robust than hairs of cerci. Costal cilia of section 3 at least 0.13 mm long ... ***feshiensis* Disney**

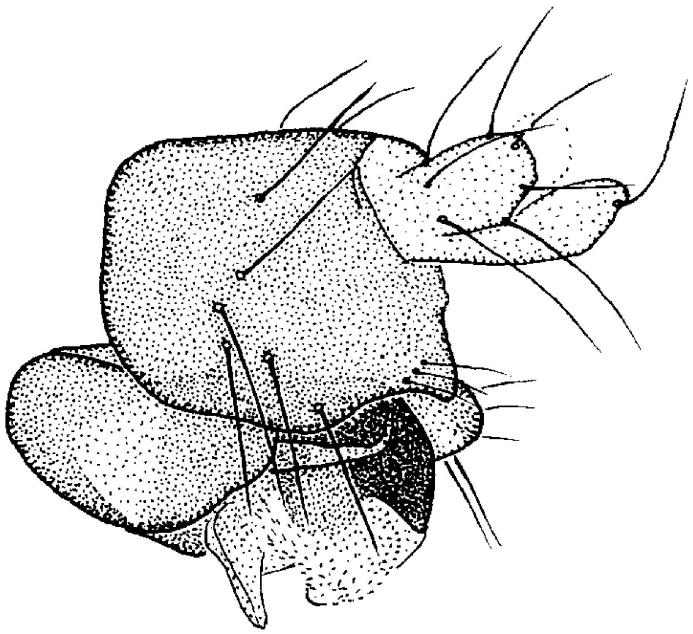


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Fig. 15. *Megaselia subcarpalis* male, left face of hypopygium. Scale bar = 0.1 mm.

Megaselia nectergata Disney, 1989

Megaselia nectergata Disney, 1999: 1193 (male).

A male from South Switzerland, Ticino, Waldbrand (burnt woodland of sweet chestnut, *Castanea sativa* Miller), 10 June 1997, Dr Marco Moretti (BEK 18.3, CUMZ, 19-175). This is a new record for Switzerland.

Megaselia praeacuta (Schmitz, 1919)

Aphiochaeta praeacuta Schmitz, 1919: 115 (male).
Megaselia arietina Disney in Cakar & Disney, 1991: 21 (both sexes). Disney & Campadelli, 1997: 63.

This species is widely distributed in Europe, but seemingly not recorded from Switzerland before. A male was trapped at Rochefort Chateau, 780 m (CH, NE), Malaise lumineuse, 14–16 July 1982, C. Dufour (CUMZ, 19-176).

Megaselia pumila (Meigen, 1830)

The following specimen caused problems with regard to its recognition as it had lost its labella and its palps were paler than usual.

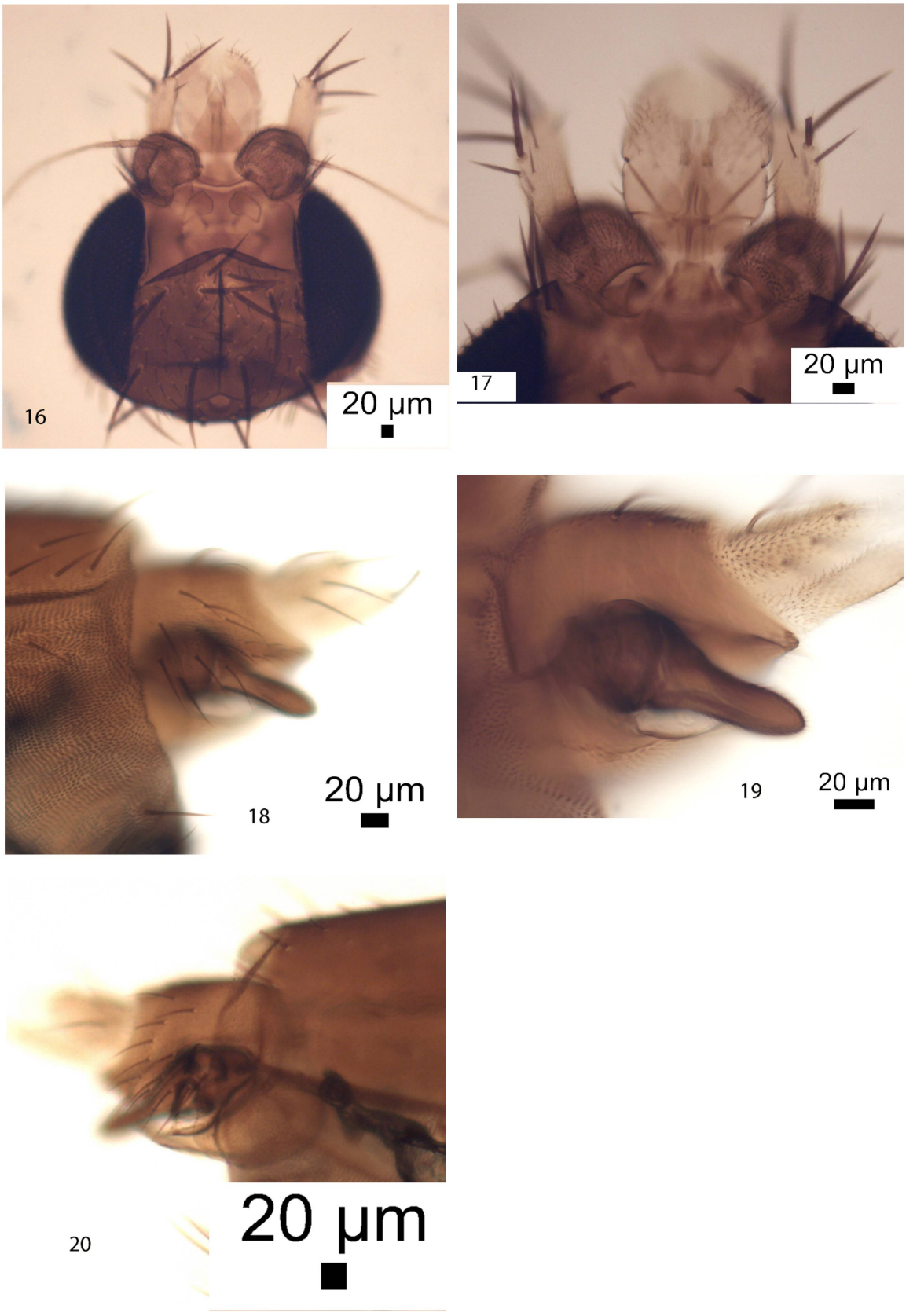
Male, South Switzerland, Ticino, Waldbrand (burnt woodland of sweet chestnut, *Castanea sativa* Miller), 24 June 1997, Dr Marco Moretti (BEK 17.1, CUMZ, 19-175).

Megaselia rochefortensis sp. n.

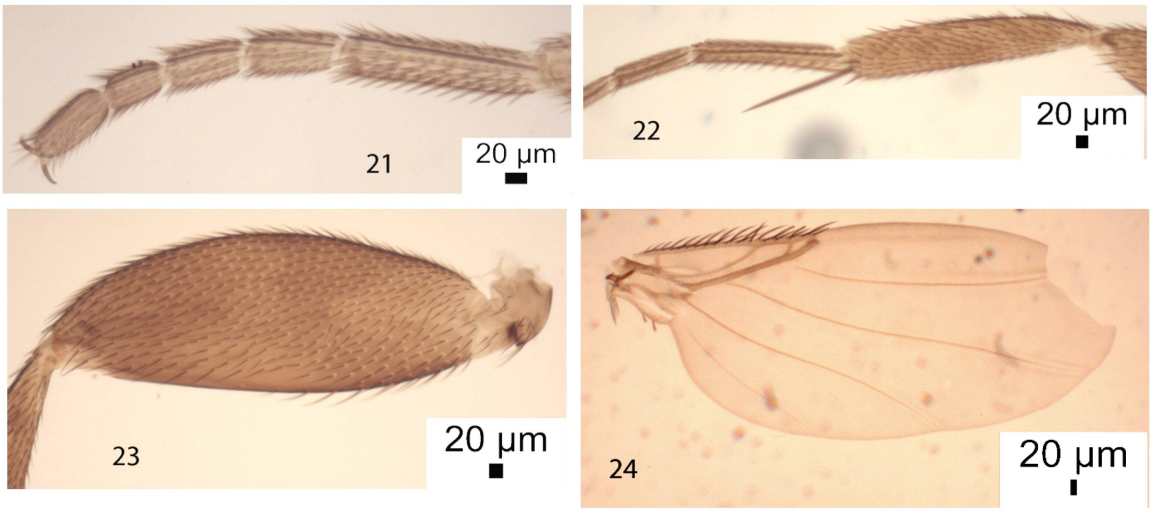
(Figs 16–24)

In the key to the males of the British species (Disney 1989) this species will run to 247, lead 1 or couplet 258 lead 1; but both options are ruled out by their different hypopygia. Of species not then recorded from the British Isles or subsequently described species only *M. longistyla* (Brenner, 2004) needs considering. It is very similar, indeed the wings are the same and likewise the heads. The differences are in details of the hypopygia. In particular the right paraphysis is narrower and with conspicuous microtrichia (Fig. 19) compared with that of *M. longistyla*, which has a pair of hairs at its tip (Fig. 27).

Description. Male: Head as in Fig. 16 and lacking microtrichia. Cheek with 4 bristles and jowl with two that are longer. Postpedicels without subcutaneous pit sensilla (SPS) vesicles. Labella with many short spinules below (Fig. 17). Thorax brown, with three notopleural bristles and no cleft in front of these. Mesopleuron bare. Scutellum with an anterior pair of small hairs and a posterior pair of bristles. Abdominal tergites brown with hairs longest at rear of T6 (Fig. 18). Venter light brown, and with hairs on segments 3–6. Hypopygium as in Figs 18–20, the right hypandrial lobe being short, broad and pale. Legs brown to yellowish brown with paler tarsi. Fore tarsus with posterodorsal hair palisade on segments 1–4 and 5 clearly longer than 4 (Fig. 21). Mid tibia dorsal hair palisade extends about 0.6 times its length and first two tarsal segments as in Fig. 22. Hairs below basal half of hind femur scarcely longer than those of anteroventral row of outer half (Fig. 23). Hind tibia with 14 differentiated posterodorsal hairs and spinules of apical combs simple. Wings (Fig. 24) 1.4–1.5 mm long. Costal index 0.41. Costal ratios 4.4 : 1.5 : 1. Costal cilia (of section 3) 0.10 mm



Figs 16–20. *Megaselia rochefortensis* sp. n. male. — 16. head; — 17. labella from below; — 18. left face of hypopygium; — 19. paraphyses; — 20. right face of hypopygium.



Figs 21–24. *Megaselia rochefortensis* sp. n. male. — 21. front tarsus; — 22. mid tibia and tarsal segments 1 and 2; — 23. hind femur; —24. wing.

long. Hair at base of vein 3 small. With 2 axillary bristles, the outer being 0.10 mm long. Sc not reaching R1. Haltere light brown.
Material. HOLOTYPE male, Switzerland, Rochefort Château, 780 m (CH, NE), T. Malaise lumineuse, 13–16 May1982, C. Dufour (CUMZ, 19-176).
Etymology. Named after the type locality.

***Megaselia sihlwaldensis* sp. n.**

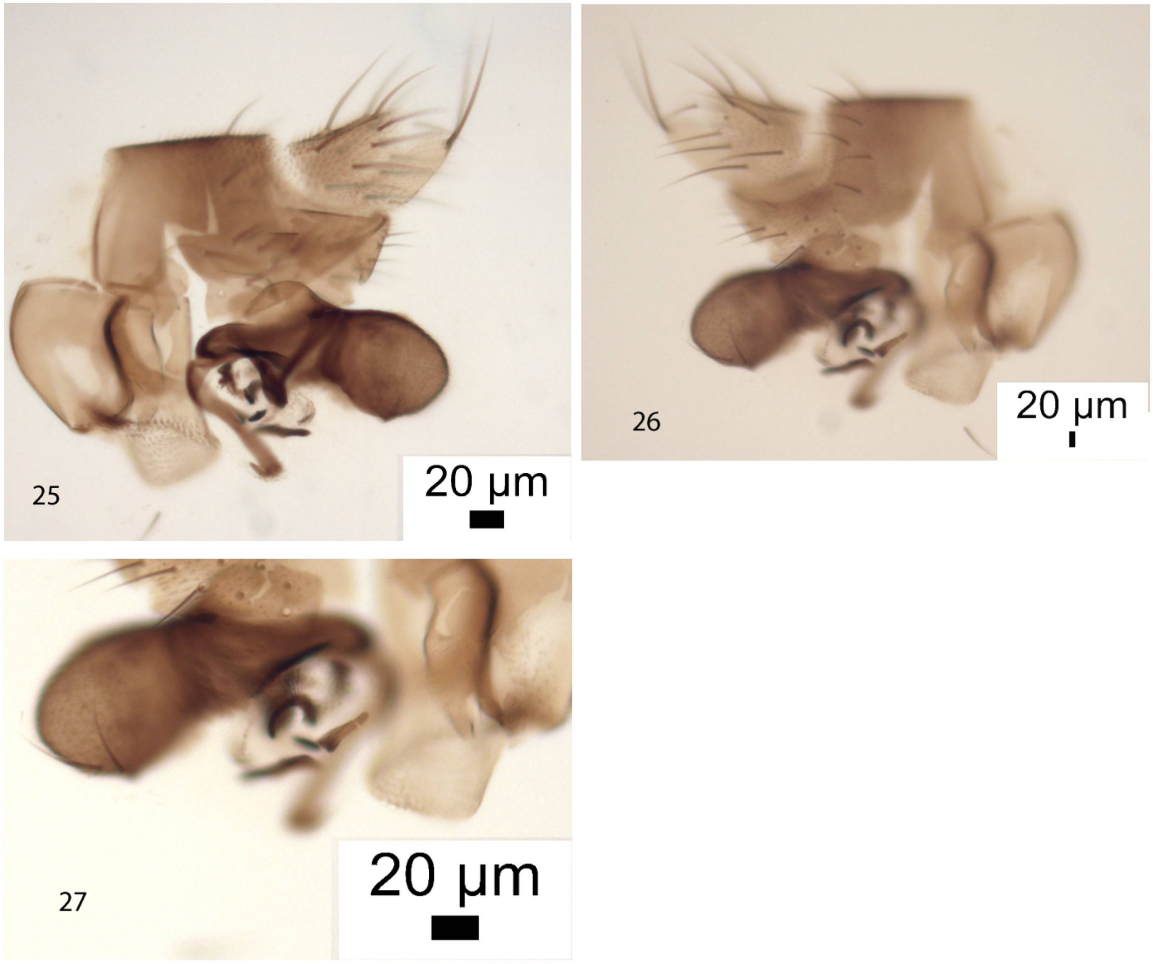
(Figs 28–34)

In the key to the males of the British species (Disney 1989) this species runs to couplet 283, lead 2 to *M. maura* (Wood, 1910), which is immediately distinguished by its well developed hypandrial lobes in contrast to the vestigial lobes of the new species. The abdominal venter and mid and front femora are also paler than those of *M. maura*. This couplet is expanded thus:

283A Hypandrium with a pair of posterior lobes. Abdominal venter dark brownish grey. Mid and front femora yellowish brown or darker 283
— Hypandrial lobes vestigial (Figs 30 & 31). Venter light grey. Mid and front femora more yellow than brown ..... ***sihlwaldensis*** sp. n.

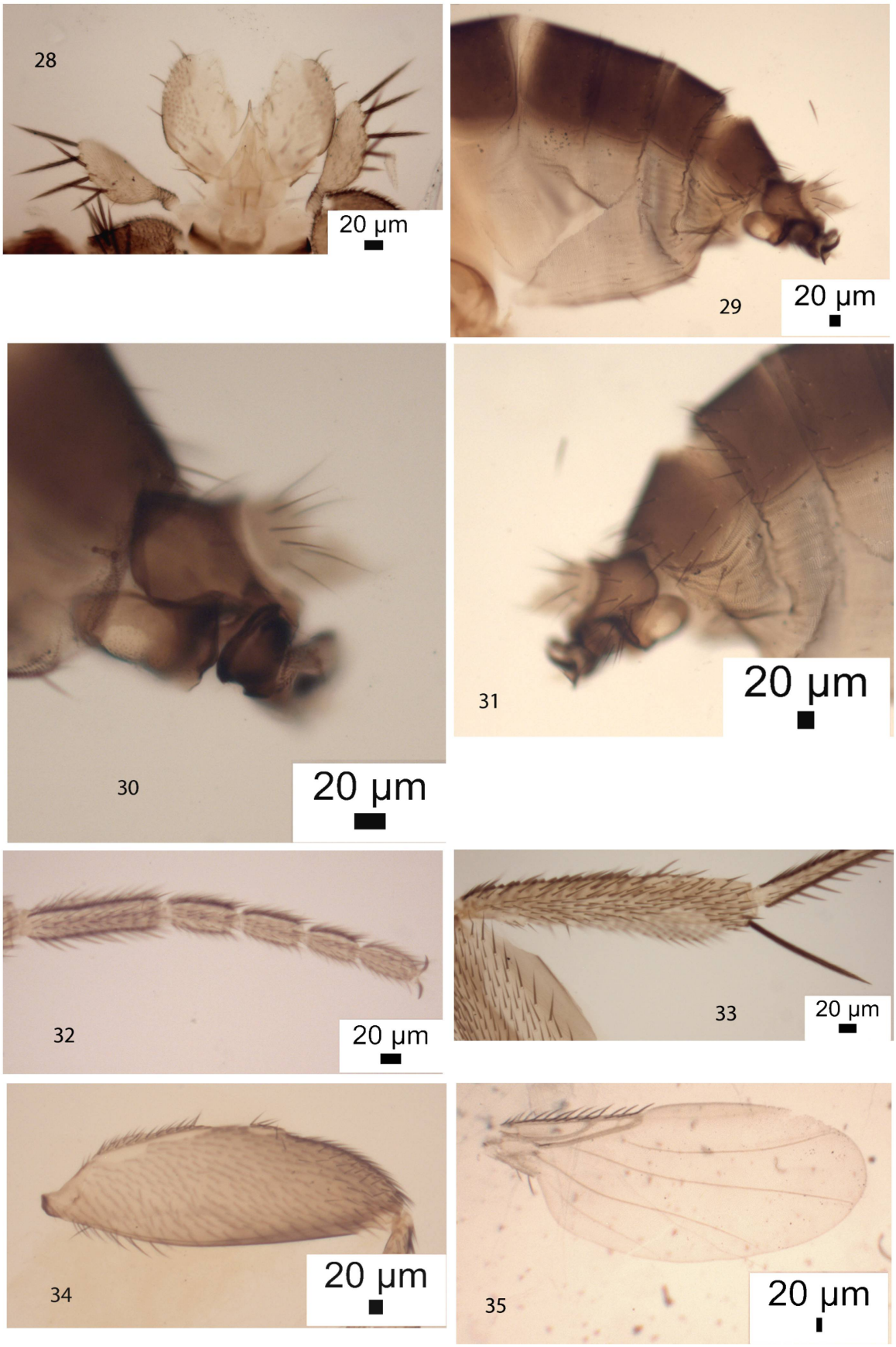
283 Costa at least half length of wing. Hypopygium as in Fig. 492 in Disney (1989), the left hypandrial lobe being clearly longer than the right lobe .... ***frontalis* (Wood)**
— Costa clearly less than half wing length. Hypopygium as in Fig. 493 in Disney (1989), the hypandrial lobes being more nearly equal in length .... ***maura* (Wood)**

Description. Male: Frons brown, clearly broader than long, with 66–76 hairs and crowded but very fine microtrichia. Supra-antennal bristles (SAs) about equal in length. The antials lower on frons than anterolaterals, and a little further from upper SAs than either is from an AL bristle. Pre-ocellars about as far apart as either is from a mediolateral bristle, which is at about the same level on frons, and as far



Figs 25–27. *Megaselia longistyla* male hypopygium. — 25. left face; — 26. right face; — 27. right paraphysis.

apart as upper SAs. Cheek with 5 bristles and jowl with two longer ones. The subglobose postpedicels light brown and without subcutaneous pit sensilla (SPS) vesicles. Palps and proboscis as in Fig. 28, the labella paler than palps and with numerous short spinules below and their combined width about 1.3 times that of postpedicel. Thorax brown. Two notopleural bristles and no cleft in front of these. Mesopleuron bare. Scutellum with an anterior pair of small hairs (about the same as those in middle of scutum) and a posterior pair of bristles. Abdominal tergites brown with hairs, which are clearly longer at rear of T6 (Fig. 29). Venter pale grey (Fig. 29), and with hairs on segments 3–6. Hypopygium as in Figs 29–31. Apart from brown patch on mid coxa, legs mainly yellow but hind femur more yellowish brown (Fig. 34). Fore tarsus with posterodorsal hair palisade on segments 1–4 and 5 longer than 4 (Fig. 32). Dorsal hair palisade of mid tibia extends about 0.6 times its length (Fig. 33). Hairs below basal half of hind femur about as long as those of anteroventral row of outer half (Fig. 34). Hind tibia with at least a dozen differentiated posterodorsal hairs and spinules of apical combs simple. Wings (Fig. 35) 1.25 mm long. Costal index 0.40. Costal ratios 3.3 : 1.3 : 1. Costal cilia (of section 3) 0.08 mm long. Hair at base of vein 3 well developed. With 2 axillary bristles, the outer being very slightly longer than the outer costal cilium. Sc not reaching R_1. Haltere brown.



Figs 28–35. *Megaselia sihlwaldensis* sp. n. male. — 28. palps and proboscis from below; — 29–31. hypopygium; — 32. front tarsus; — 33. mid tibia; — 34. hind femur; 5. wing.

Material. HOLOTYPE male, Switzerland, Sihlwald Kaila [ZH], 24 May to 5 June 1996, Karin Schiegg (3, CUMZ, 19-143).
Etymology. Named after the type locality.

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