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SUBILLA PRINCIPIAE N. SP., A NEW SPECTACULAR SNAKEFLY FROM SARDINIA
(RAPHIDIOPTERA RAPHIDIIDAE)

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Pantaleoni R. A., Aspöck U., Cao O. V., Aspöck H. – *Subilla principiae* n. sp., a new spectacular snakefly from Sardinia (Raphidioptera Raphidiidae).

A new species of Raphidioptera Raphidiidae, *Subilla principiae* n. sp., found near Fonni (western Gennargentu, Sardinia, Italy) is described and illustrated. The habitat of the species seems to be white oak woods, particularly *Saniculo-Quercetum pubescentis* Camarda and Pignatti, 1998. The systematic position of the new species is rather isolated and it could be of Palaeo-Tyrrhenian origin.

KEY WORDS: Neuroptera, Mediterranean, Italia, Gennargentu, white oak woods.

INTRODUCTION

Cyrno-Sardinian white oak woods are found on the granite mountains of central Sardinia, particularly on the slopes of the Goceano and the northwestern side of the Gennargentu. These xerophilous, deciduous oak woods, formally described as *Saniculo-Quercetum pubescentis* Camarda and Pignatti, 1998, stand 900-1400 mt a.s.l., on level ground or not very steep slopes, where the mesoclimate is oceanic with damp winds from the sea, heavy dew and frequent morning mist. The most important plant species is *Quercus pubescens* Willd. and there are a great many lichens and epiphytes. The undergrowth is relatively humid (PIGNATTI, 1998).

One of us (R.A.P.) had serendipitously hypothesized the presence of an endemic species of Raphidioptera in these woods and when an investigation of the Lepidoptera of the Fonni woods (western Gennargentu) was begun in spring 2001, he asked the researchers particularly to look out for these extremely characteristic insects.

Nevertheless, the finding (by O.V.C.) of the first female and immediately afterwards of the first male of a new species belonging to the genus *Subilla*, at the end of May 2001, came as a great surprise. The presence of the species in the locality was confirmed in 2002. Two research trips carried out the two following springs (2003/2004) resulted in the collection of other specimens and the discovery of preimaginal stages.

Subilla principiae n. sp.

DERIVATIO NOMINIS – The name of this very remarkable new species is a grateful homage to the neuropterologist Maria Matilde Principi, emeritus professor at the University of Bologna, respectfully admired by all of us, on the occasion of her 90th birthday.

MATERIAL STUDIED – Holotype: ♂, Italia, Sardinia, Gennargentu, Fonni, 40°5,81'N / 9°15,5'E, 1050 m asl, 4 June



Fig. I – *Subilla principiae* n. sp. – adult female. [Paratype]

2004 (SA04/16), H. Aspöck leg. (in coll. H. & U. Aspöck). Paratypes: all from the type locality in an area of about 3000 m², in an altitude of 1020-1060 m, collected by H. Aspöck (2003, 2004), U. Aspöck (2003, 2004), O. V. Cao (2001, 2002), L. Loru (2003), and R. A. Pantaleoni (2002, 2003): 1♀ (21 May 2001), 1♂ (25 May 2001), 1♀ (25 May 2002), 1♂ (28 May 2002), 1♀ (1 June 2002), 1♂, 3♀ (22 May 2003), 1♂, 2♀ (24 May 2003), 1♂, 8♀ (25 May 2003), 2♂♂, 2♀♀ (30 May 2004), 1♂ (4 June 2004). Moreover, from larvae collected under bark of *Quercus pubescens* on 24 May 2003 2♀♀ were reared which hatched on 5 May 2004, and 3 ♂♂ reared from eggs laid by one of the females collected on 25 May 2003 hatched on 20-21 April 2005. Paratypes in coll Naturhistorisches Museum Wien (1♂, 1♀); H. & U. Aspöck, Wien (7♂♂, 11♀♀); H. & R. Rausch, Scheibbs (1♂, 1♀); R. A. Pantaleoni, Sassari (2♂♂, 6♀♀); Università degli Studi di Sassari sede staccata di Nuoro (1♀).

DESCRIPTION – A delicate, rather dark species (fig. I), length of forewing of the ♂ 8,2-9,2 mm, of the ♀ 8,5-10,5 mm. Head flat, somewhat notched at the level of the basal ocelli,

black with brownish pattern, with a rough sculpture, clypeus brown with yellowish margin, labrum brown; basal third of antennae yellowish in ♂, brownish in ♀, rest of flagellum black. Pronotum delicate and short, black with yellowish and brownish margins laterally and in front. Legs with coxae brown to black, femora brownish, rest of legs dirty yellowish. Wings (fig. II) with hyaline membrane, venation predominantly brown, basal parts of Costa, Radius and Cubitus yellowish. Pterostigma smoky ochre, along the first pterostigmal cell, or a little shorter, with one vein crossing. Basal part of Media anterior in hind wing as a longitudinal vein. Abdomen with tergites and sternites blackish-brownish, caudal margins yellowish, sternite VII of ♀ predominantly yellowish, only cephalically blackish.

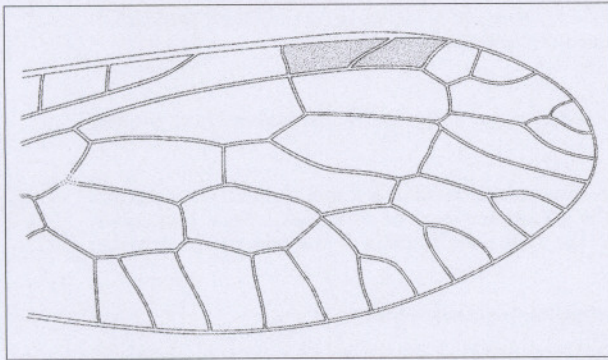


Fig. II – *Subilla principiae* n. sp. – forewing (distal two thirds). [Female paratype]

♂ genital segments (fig. III, 1-3) with sternite of segment VIII only slightly shorter than tergite; tergite IX forming a narrow ring; gonocoxites IX with inconspicuous dorsal parts, but with excessively domed and protruded ventral parts which terminate in long tooth like apices crossing each other ventrally; styli of the typical *Subilla*-shape with a basal plate and long apically curved processus. Sternite IX rather indistinct and reduced to a small median plate; hypovalva unpaired, with V-like basal incision, the apical half is covered with little teeth; parameres rod-like, in basal half paired, apically membranously connected. Hypandrium internum large.

♀ genital segments (fig. III, 4-6) with caudal margin of segment VII convex, intersegmentale VII/VIII deep; tergite VIII cephalically only weakly convex; dorsal part of atrium bursae in broad connection with sacculus bursae; the latter is short, cephalically narrowing into the hose-like ductus receptaculi; receptaculum seminis forming a sclerotized bowl, glandulae receptaculi filiform.

DIFFERENTIATION

From the hitherto described 9 species of the genus – *Subilla confinis* (Stephens, 1836), *S. aliena* (Navás, 1915), *S. artemis* (H. Aspöck & U. Aspöck, 1971), *S. xylidiophila* (H. Aspöck & U. Aspöck, 1974), *S. walteri* (H. Aspöck & U. Aspöck, 1967), *S. fatma* (H. Aspöck & U. Aspöck & Rausch, 1979), *S. colossea* (H. Aspöck & U. Aspöck & Rausch, 1979), *S. priapella* H. Aspöck & U. Aspöck & Rausch, 1982 and *S. physodes* (Navás, 1914) – four (*S. fatma*, *S. colossea*, *S. priapella*, *S. physodes*) have, what is called, monstrous male genital segments (H. ASPÖCK *et al.*, 1991, H. ASPÖCK *et al.*, 2001). This monstrosity concerns predominantly the ventral parts of the male gonocoxites IX, which are enlarged and directed ventrally (the plesiomorphic condition is «directed caudally»). The enlarged gonocoxites IX of *S. principiae*

identify this species as a member of the group with the monstrous genitalia. Within this group only *S. fatma* and *S. principiae* have inconspicuous ectoprocts, the other three species have their ectoprocts considerably enlarged. From *S. fatma* as well as from all other species of *Subilla*, *S. principiae* can easily be differentiated in the male by the extraordinarily long apices of the gonocoxites IX which are crossing each other. This character can even be seen in dried specimens. In the ♀ a striking diagnostic character is the sclerotized bowl-like receptaculum seminis. In all other species this structure is soft. From the only other *Subilla* species occurring in Italy, *S. confinis*, *S. principiae* may be readily distinguished in addition by its dark smoky pterostigma. Whether *S. principiae* is the adelphotaxon of all other species with «monstrous genitalia» or only of *S. fatma* remains open at present.

ECOLOGY AND BIOLOGY

Subilla principiae is markedly associated with *Quercus pubescens* and possibly confined to this oak species in *Saniculo-Quercetum pubescentis*. Almost all adults were swept from low vegetation under *Q. pubescens*, a few specimens (but also a larva) were obtained by fogging or beating *Q. pubescens* canopy. Several larvae and pupae were found under bark of *Qu. pubescens*.

S. principiae has so far been found exclusively near Fonni, Talessu, within an area of ca. 3000 m² (fig. IV). The surroundings of the *locus typicus* are similarly structured and one may assume that the species occurs all over the white oak woods around Fonni and probably also in other parts of the W-Gennargentu, although our particular efforts to find the species in other *Saniculo-Quercetum pubescentis* stations have been unsuccessful so far. It is very likely that *S. principiae* is endemic to Sardinia although it certainly cannot be excluded that it might also be found in Corsican Cyro-Sardinian white oak woods. A field trip to Corsica carried out in 2004 by three of us (R.A.P., H.A., U.A. together with Laura Loru) and especially devoted also to the search of snakeflies was, however, unsuccessful.

REMARKS

Due to its relatively isolated systematic position (compared to other species of the genus occurring in the Iberian and the Apennines peninsulas and in other parts of Western Europe) it is suggested that *Subilla principiae* is a very old Tyrrhenian faunal element. At present further substantial biogeographical speculations are not yet feasible.

ACKNOWLEDGEMENTS

The two research trips carried out in Sardinia in 2003 and in Sardinia and Corsica in 2004 would not have been possible but for the helpfulness and extraordinary patience of a great number of people, who gave us their enthusiastic support and friendship. Although we are afraid some might be left out, we can do no less than mention the following: Dr. Laura Loru, who with her usual authority and courtesy managed most of the logistics and none of us could have done our work without her support; Professor Piero Corda of the University of Sassari, who as president of the Ente Foreste della Regione Sardegna provided us with the services of some of his formidable collaborators, Dionigi Secci, Michele Pireddu, Alessio Sussarellu and others; Dr. Daniele Sechi, of the Servizio Fitopatologico Regionale, who was our guide in the south of Sardinia; Cesario Giotta, of the Corpo Forestale e di Vigilanza

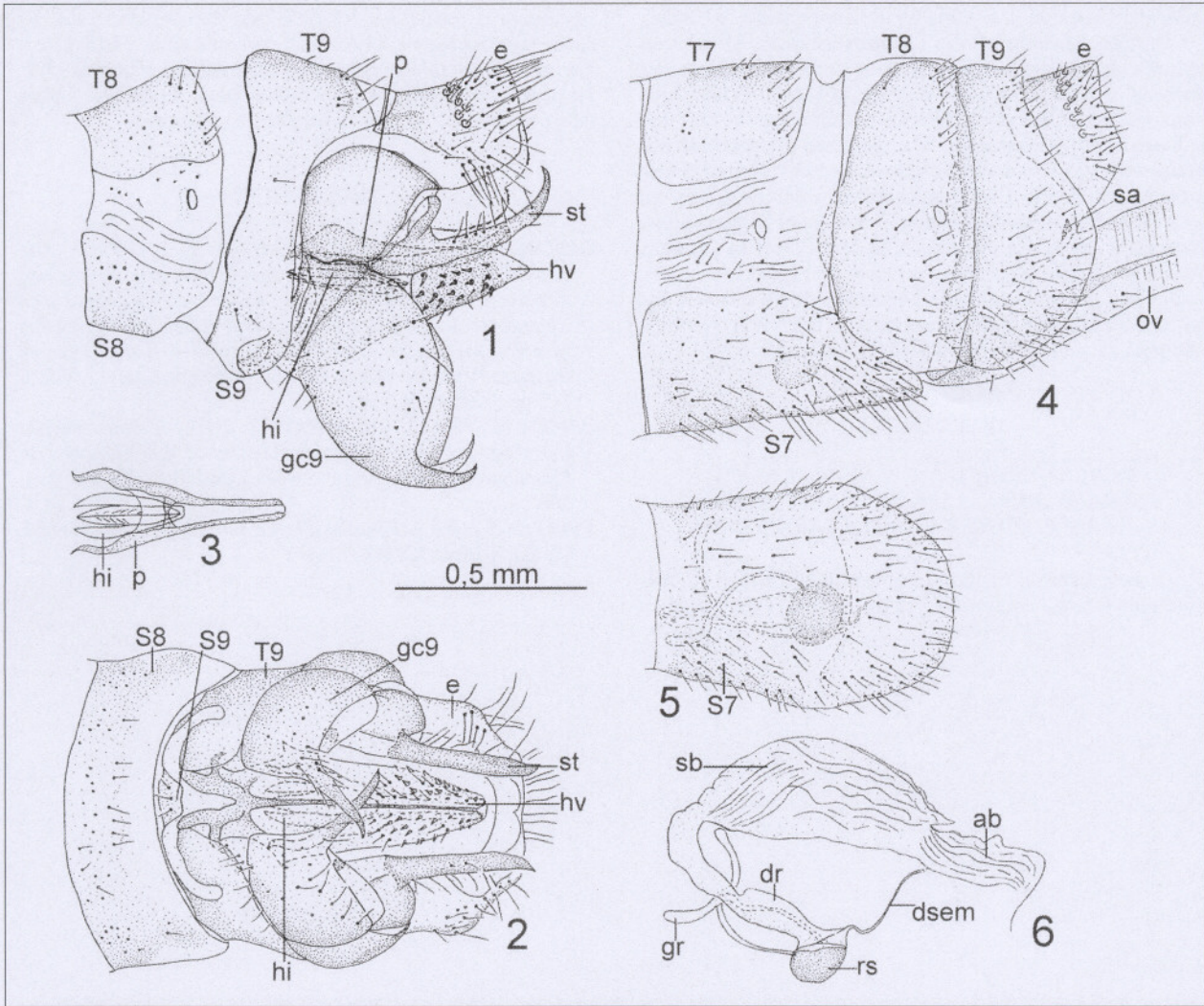


Fig. III – *Subilla principiae* n. sp. – ♂ genital segments [Holotype]: 1) lateral view; 2) ventral view; 3) hyandrium internum and parameres. ♀ genital segments [Paratype]: 4) lateral view; 5) sternite VII with bursa copulatrix in transparency; 6) bursa copulatrix in lateral view. **ab** = atrium bursae; **dr** = ductus receptaculi; **dsem** = ductus seminalis; **e** = ectoproct; **gc9** = gonocoxit IX; **gr** = glandula receptaculi; **hi** = hypandrium internum; **hv** = hypovalva; **ov** = ovipositor; **p** = paramere; **rs** = receptaculum seminis; **S** = sternite; **sa** = subanale; **sb** = sacculus bursae; **st** = stylus; **T** = tergite.



Fig. IV – Locus typicus of *Subilla principiae* n. sp.: Fonni, Talessu, 1050 mt a.s.l.

Ambientale, Lanusei, our guide on the Supramonte of Urzulei, and Franco Anedda of the Gonnosfanadiga Municipal Administration who accompanied us on Mount Linas; our friends Giampietro Vacca (Belvì), Sandro Marchi (Villaverde), Leonardo Sulas (Bolotana), Gianfranco Garippa (Fonni) and the Sassu family (Bonarcado), whom we had the good fortune to stay with in various circumstances and at different times. Another warm word of thanks goes to Michele Loi, an energetic technical assistant of the University of Sassari and an outstanding driver. Cordial thanks to Mrs Franziska Anderle, University of Vienna, for her careful graphical assistance. Finally, last but not least, the University of Sassari and the Institute for the Study of Ecosystems of the CNR (National Research Council) for its financial and logistic support.

RIASSUNTO

SUBILLA PRINCIPIAE N. SP., UNA NUOVA STRAORDINARIA SPECIE DI RAPPHIDIIDAE (RAPPHIDIPTERA) DELLA SARDEGNA

Una nuova specie di Raphidioptera Raphidiidae, *Subilla principiae* n. sp., rinvenuta presso Fonni (Gennargentu

occidentale, Sardegna, Italia) è descritta ed illustrata. La specie sembra legata ai boschi di roverella ed in particolare a *Saniculo-Quercetum pubescentis* Camarda and Pignatti, 1998. La posizione sistematica della nuova specie è piuttosto isolata ed è possibile che essa sia di origine paleotirrenica.

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