Biodiversity Journal, 2015, 6 (1): 305–308

MONOGRAPH

On the presence of *Campodea majorica sicula* Condé, 1957 (Diplura Campodeidae) in the "Abisso della Pietra Selvaggia" cave (Mount Pellegrino, Palermo, Italy)

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ABSTRACT We report for the first time the presence of *Campodea majorica sicula* Condé, 1957 (Insecta, Diplura, Campodeidae) in the "Abisso della Pietra Selvaggia", a vertical karst cave situated in the southern slope of Mount Pellegrino, adjacent to the city of Palermo (Sicily). This hypogean subspecies is considered endemic of Sicily and up to now it was known only for the "Addaura Caprara" cave, located at the opposite slope (north-east) of Mount Pellegrino. During a speleological excursion in the "Abisso della Pietra Selvaggia" cave, organized by "Centro Speleologico Etneo" (Catania, Italy), 14 specimens of this subspecies were collected in the bottom of the cave, at -170 m. The bottom is one of the few humid areas of the cave, whereas the rest is very dry, dusty and apparently without Diplura. In addition to *C. majorica sicula*, currently are known the following *C. majorica* subspecies, all hypogean: *C. majorica majorica* Condé, 1955, *C. majorica interjecta* Condé, 1955, both endemic of some caves of Majorca Island (Balearic Islands, Spain) and *C. majorica valentina* Sendra et Moreno, 2004, found inside 7 caves located in the karstic area of Mount Mondúver and Sierra de Corbera (SE of Valencia, Spain).

KEY WORDS Diplura; biospeleology; karst cave; hypogean fauna; Sicily.

Received 22.07.2014; accepted 30.10.2014; printed 30.03.2015
Proceedings of the 2nd International Congress "Speciation and Taxonomy", May 16th-18th 2014, Cefalù-Castelbuono (Italy)

INTRODUCTION

Diplura is a poorly investigated order wich contains small and wingless species. They are unpigmented and eyeless. The antennae are long and moniliformis.The abdomen ends with a pair of cerci that can be long and thin or short and pincer-like. The majority of the species usually are 2-5 mm long, although some species can reach 50 mm. There are about 94 known species in Italy, 19 of which occur in Sicily (Thibaud, 2013). The most part of the species belong to the Campodeidae family, that includes epigean and hypogean species.

Campodea majorica sicula Condè, 1957 was described on 4 specimens collected by P. Strinati on 21 August 1956 in the Addaura Caprara III cave (Condè, 1957), located in the NE slope of Mount Pellegrino, near the city of Palermo (Sicily). Until now this was the only record in Sicily for the taxon. In the present paper we report for the first time the

presence of this subspecies also in the "Abisso della Pietra Selvaggia", a vertical karst cave situated in the southern slope of Mount Pellegrino.

Up to now, in addition to *C. majorica sicula*, other three subspecies are known: *C. majorica majorica* Condé, 1955, *C. majorica interjecta* Condé, 1955, both endemic of some caves of Majorca Island (Balearic Islands, Spain) and *C. majorica valentina* Sendra et Moreno, 2004, found inside 7 caves located in the karstic area of Mount Mondúver and Sierra de Corbera (SE of Valencia, Spain). All these taxa are strictly hypogean (Condé, 1955b, 1957; Sendra, 1985, Sendra & Moreno, 2004) .

MATERIAL AND METHODS

During the sampling in the "Abisso della Pietra Selvaggia" cave, 14 specimens of this subspecies were collected by hand and preserved in 70% ethanol.

The "Abisso della Pietra Selvaggia" cave is located in the Mount Pellegrino massif, within the "Riserva Naturale Orientata Regionale Monte Pellegrino" (managed by Rangers d'Italia), in the North-West Sicily, at the northern side of Palermo (Figs. 1, 2). The Reserve covers about 1020 ha and was created in 1996 to protect the Mount Pellegrino massif and the "Tenuta Reale della Favorita". It is also a Site of Community Importance (SCI) ITA020014. Mount Pellegrino is a carbonatic massif (606 m a.s.l.) made up of rocks originated in shallow seas from Trias to Eocene. The mount is subject to karst phenomena and counts 134 caves of both marine and karst origin.

The "Abisso della Pietra Selvaggia", is a vertical karst cave situated in the southern slope of Mount Pellegrino at an elevation of 425 m a.s.l. It is 171 m deep (Fig. 3) and it consists of a sequence of four shaft, respectevely of 31 m, 6 m, 38 m, 62 m (Mannino, 1985).

The specimens were collected in the bottom of the cave (-157/-171 m), on the moist soil, among the stones and near stalagmites (Fig. 4). The bottom is one of the few humid areas of the cave, the rest is very dry, dusty and apparently without Diplura.

The specimens were examined in laboratory using a Leica M205A stereomicroscope equipped with a Leica DFC450 digital camera and a multifocus image acquisition software (Leica Application Suite v.4.2.0). Moreover some macrophotos have been made on-site using digital SLR camera. Taxonomical reference are based on the checklist of "Fauna Europaea", version 2.6 (Thibaud, 2013).

ABBREVIATIONS: ma: medial anterior macrochaeta; la: lateral anterior macrochaeta; lp: lateral posterior macrochaeta.

Figure 1. Location of Mount Pellegrino (Palermo, Sicily). Figure 2. Satellite image of Mount Pellegrino, with location of the investigated caves. Red square: Addaura Caprara; yellow square: Abisso della Pietra Selvaggia (from Google Earth)

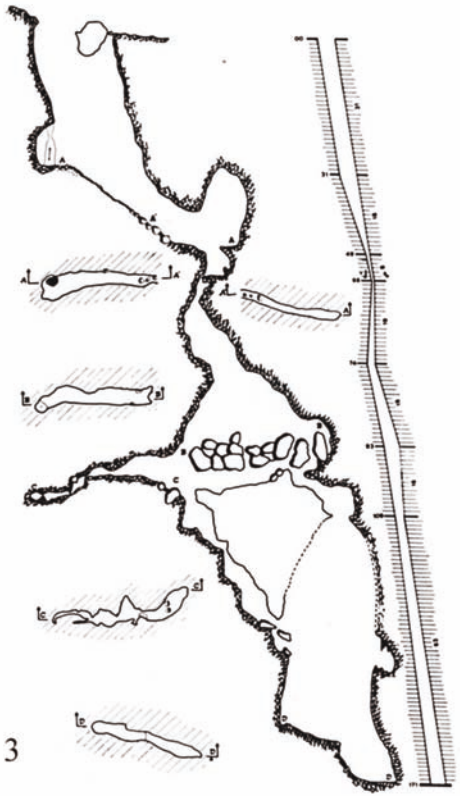

Figure 3. Longitudinal section and plan of "Abisso della Pietra Selvaggia" cave (M. Panzica survey, from Mannino, 1985).
Figure 4. Bottom of "Abisso della Pietra Selvaggia" (Photo by F. Fiorenza).

Figure 5. *C. majorica sicula* adult female from "Abisso della Pietra Selvaggia", body length 8 mm (Photo by F. Fiorenza).

Campodea majorica sicula Condè, 1957

EXAMINED MATERIAL. Italy, Sicily, Palermo, "Abisso della Pietra Selvaggia" cave, 38°09'33.2"N; 13°21'25.6"E; 16.III.2014, 3 females, 2 males; 11.V.2014, 5 females and 4 males, Marletta A., Nicolosi G., Grech T. legit.

DESCRIPTION. Body length: 7mm male; 8 mm female (Fig. 5). Head (Fig. 6): Antennae with 41-43 antennomeres, cupuliform organ with 9-12 sensilla. Insertion line of antennae bordered by 3+3 macrochaetae. Sensillum of third antennomere bacilliform and in latero-sternal position. Thorax: the typical notal macrochaetae distribution is similar to the other *C. majorica* subspecies with 3+3 (ma, la, lp) pronotal macrochaetae, 3+3 (ma, la, lp) mesonotal macrochaetae and 1+1 (ma) metanotal macrochaetae (Fig. 7). Notal macrochaetae and setae similar to the other *C. majorica* subspecies, but slightly longer and thinner. The posterior-marginal setae are thick and crenellated. Mesonotal macrochaetae lp/ma ratio is 1.74-2.21. Abdomen (Fig. 8): urotergite VI with 1+1 la macrochaetae, lp macrochaetae absent. Urotergite VII with 1+1 la macrochaetae and 1+1 lp macrochaetae. Urotergite VIII with la macrochaetae absent and 3+3 lp macrochaetae. Posterior margin of urosternite I of males with 2-3 rows of glandular setae. Cerci 1.5 times longer than body length, with about 20 elongated articles with long macrochaetae and setae (Condé, 1957; Sendra & Moreno, 2004).

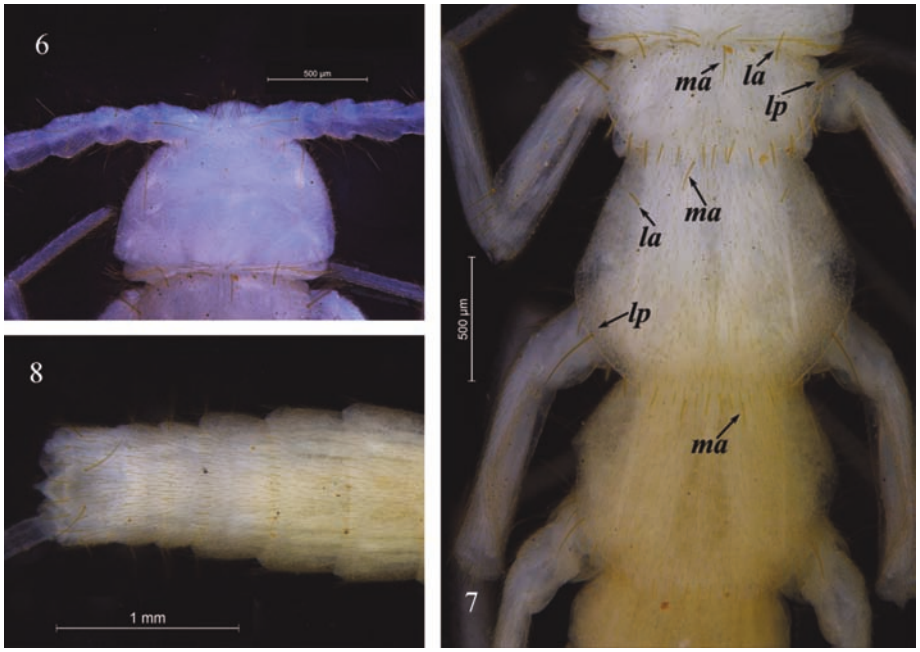

Figure 6. *Campodea majorica sicula*: head (dorsal view).
Figure 7. Thorax (dorsal view).
Figure 8. Abdomen, urotergites V-X (for abbreviations see text).

REMARKS. According to Condè (1948, 1955a, 1957) and Sendra & Moreno (2004), *C. majorica* subspecies, together with *C. cyrnea* Condé, 1948 and *C. blandinae* Condé, 1948 (both hypogean species endemic of Corsica island), are considered closely related with *C. grassi* Silvestri, 1912, an epigean species widespread in the western Mediterranean area (Italy mainland, Corsica, Sicily, Tunisia, Algeria and north-eastern of Iberian Peninsula) (Silvestri, 1912). They form a group of related species that share following common characters: elongated appendages, hypertrophic cupuliform organ of antennae, robust and short notal macrochaetae, lateral posterior (lp) macrochaetae absent or reduced, short clothing setae, body surface densely covered with thin microdenticles and abdomen with 1+1 lateral anterior (la) macrochaetae from urotergites V or VI, 1+1 lp from VII and 3+3 lp in VIII. The phylogenetic history of these species and their adaptation process in the hypogean environment are still uncertain, thus more investigation would be necessary, also with mitochondrial DNA-based analysis.

ACKNOWLEDGEMENTS

We would like to thanks Dr. Alberto Sendra (Valencia, Spain) for his precious advices on identification of this taxon; Dr. Salvatore Palascino (Director of Mount Pellegrino Natural Reserve) for allowing us to conduct this study. And also the speleologists of "Centro Speleologico Etneo" for their technical support into the cave.

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