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Short scientific note

A new cave-dwelling *Centromerus* from Sardinia (Araneae: Linyphiidae)

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Abstract
Centromerus marciai sp. n. is described on both sexes on specimens collected in a karstic cave in the province of Nuoro, North-eastern Sardinia, Italy. Differences with other species of the genus *Centromerus* Dahl, 1886 occurring in Sardinia are pointed out.

Key words: Araneae, Linyphiidae, *Centromerus*, new species, Sardinia.

Introduction

The Tyrrhenian island of Sardinia features important limestone areas with well developed underground karstic phenomena. More than 3000 caves have been explored so far and a very interesting subterranean fauna, with a great number of highly specialized and endemic obligatory cave-dwelling arthropods, appeared to be present.

The start of the research on the cave fauna of the island dates back to the end of the XIX century, and the first Sardinian cave spider described was the poorly documented, normal-eyed linyphiid *Lepthyphantes sardous*, described by A. Gozo in 1908. The single female comes from the cave Grotta di Su Marmuri, 55 Sa/NU, province Ogliastra, municipality Ulassai. The taxonomic position of this species is unclear.

The great importance and diversity of the troglomorphic organisms of Sardinia was brought to light only at the beginning of the second half of the XX century, as a result of the investigations performed by the biospeleologist S. Patrizi from Rome. He visited a number of large caves of easy access all over the island, together with Italian and French colleagues.

Patrizi found many unknown cave arthropods, including five new spider species belonging to the families Leptonetidae and Dysderidae that were described by C. F. Roewer in 1953 and 1956, just after their discovery. Only one of these species – the large dysderid *Sardostalita patrizii* (Roewer, 1956) – is eyeless and can be considered a true troglobiont. In the same years, one further troglophilic agelenid species, *Tegenaria henroti*, was described by E. Dresco (1956).

Searches carried out by Italian biospeleologists in the following 50 years led to the finding of a great number of invertebrates new to science. Among them, the only spiders were the troglophilic agelenid *Tegenaria eleonorae* and two normal-eyed troglophilic – or even trogloxene – linyphiid *Centromerus* species, all three described by P. M. Brignoli (1974, 1979) in the seventies of the past century.

Summarizing, one troglobitic and nine troglophilic spider species have been described from Sardinia so far.

For that reason the recent discovery in Sardinian caves by P. Marcia of four troglobitic (anophtalmic) spiders, all certainly attributable to new, strictly endemic species, can be considered extremely surprising. Three of the mentioned species, belonging to the families Leptonetidae, Dysderidae and Linyphiidae, are presently known on one or two female specimens only. They will be studied after the desirable collection of more individuals and by preference of males. The fourth one is described on both sexes in the present paper.

Material and methods

The material treated in this paper was collected by P. Marcia and other Sardinian speleologists during recent studies on the cave fauna of the island.

Specimens were examined and illustrated using a Wild M5 stereomicroscope. Further details were studied using an Olympus CH-2 stereoscopic microscope with a drawing tube. Structures of the left palp are depicted. All morphological measurements are given in millimeters. Somatic morphological measurements were taken using a scale reticule in the eyepiece of the stereo microscope. Measurements of the legs are taken from the dorsal side.

The left male palp was detached and transferred to glycerol for examination under the microscope. Female genitalia were excised using sharpened needles and then transferred to clove oil for examination under the microscope. Later, palp and epigyne were returned to 70% ethanol.

Nomenclature for the male palp is as in Gnelitsa (2007) and for the epigyne as in Hormiga & Tu (2010).

The examined specimens are deposited, as indicated, in the Zoological Museum of the University of Rome "Sapienza" (MZUR) and in the personal collection of F. Gasparo, Trieste (FG).

Taxonomy

Centromerus marciai sp. n.

(Figs 1-11)

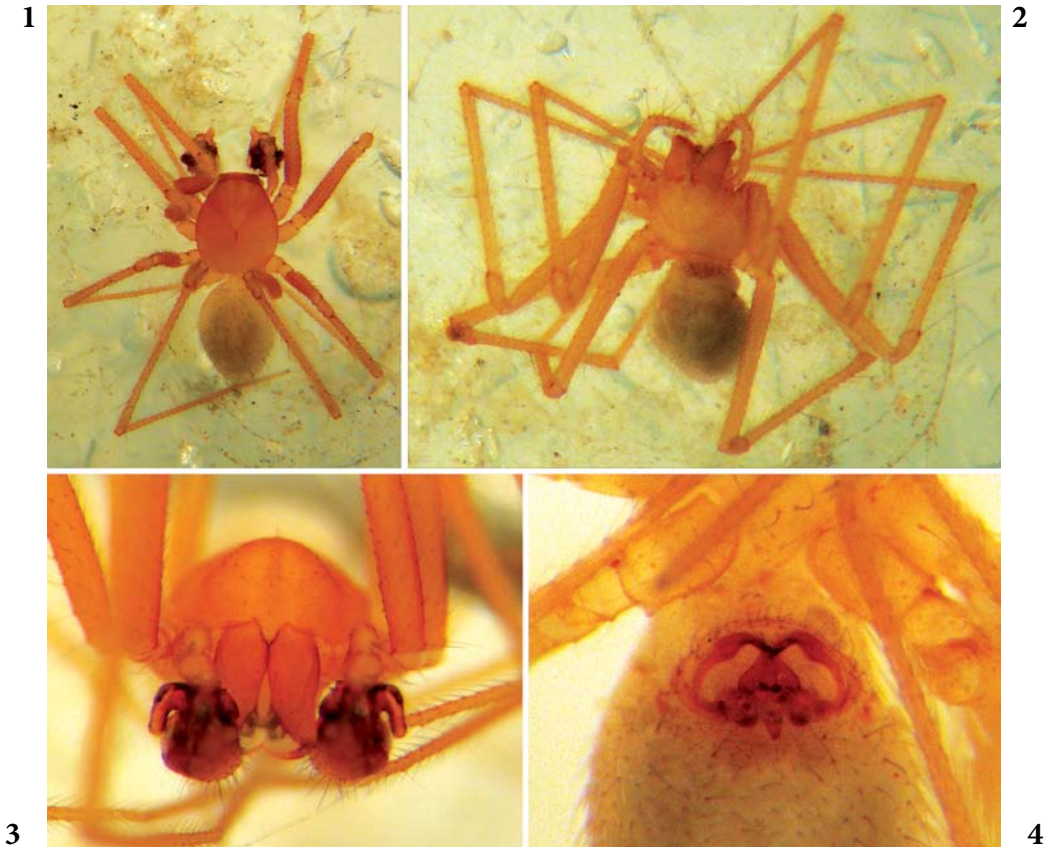
Diagnosis. Anophtalmic species. Males are directly differentiated from all other *Centromerus* species by combined characters of the male palp: the cymbium with small basal tubercle and large dorsal hump and the presence of three strong teeth on the posterior margin of the paracymbium; females are recognized by the strongly protruding anterior margin of the epigyne, covering the basal part of the scape with typical triangular sclerite. *Centromerus marciae* sp. n. can be easily separated from *C. puddui*, the only other *Centromerus* species of Sardinia of which the male is known, by the 3 denticles on the paracymbium (only one large tooth in *C. puddui*). The females of *C. puddui* and *C. bonaeviae* both have shorter copulatory grooves and the triangular sclerite at the base of the scape is absent, although this is difficult to decide from Brignoli's figures (Brignoli, 1979: Figs 40-41 and 44-46).

Type material. Holotype ♂ from Italy, Sardinia, province Nuoro, municipality Galtellì, cave Pozzo n. 1 di Tres Puntas, number of the speleological cadastre 1150 Sa/NU, 40°22'44.4"N 9°38'26.3"E (WGS84), 750 m, 24 Aug 2011, P. Marcia leg. (MZUR); paratype ♀, same locality, 24 Aug 2011, P. Marcia leg. (MZUR); paratype ♀, same locality, 16 Jan 2011, P. Marcia leg. (MZUR).

Description. Prosoma without any trace of eyes.

Colour: prosoma, chelicerae, sternum and legs pale yellowish brown, in male cephalic part of prosoma somewhat darker than in female; abdomen whitish (Figs 1-4).

Chelicerae: fang groove with 3 teeth at anterior margin and 4 small, closely set teeth at posterior margin; laterally with an oblique row of small scales.



Figs **1-4** – *Centromerus marciai* sp. n. **1**, Male holotype, dorsal view; **2**, Female paratype, antero-dorsal view; **3**, Male holotype, frontal view; **4**, Basal part of female paratype abdomen, postero-ventral view.

Legs: femora spineless, tibia I with 2 dorsal, 2 prolateral and 2 retrolateral spines, all patellae with one dorsal spine, tibia II with 2 dorsal and 1 retrolateral spines, tibia III-IV with 2 dorsal spines, metatarsi spineless; position of basal spine on tibia I at 0.46, 2.75 times as long as the tibia's diameter; position of basal dorsal spine on tibia IV at 0.40, spine 4.25 times as long as the tibia's diameter; position trichobothrium on metatarsus I at 0.76-0.80.

Measurements of holotype ♂: total length 2.35; carapace 0.96 long, 0.75 wide; legs (tarsus of palp = cymbium):

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	1.54	0.30	1.61	1.48	0.73	5.66
II	1.45	0.29	1.47	1.39	0.68	5.28
III	1.29	0.26	1.19	1.23	0.59	4.56
IV	1.61	0.27	1.69	1.55	0.66	5.78
palp	0.35	0.12	0.17	–	0.43	1.07

Measurements of a paratype ♀ (24 Aug 2011): total length 2.20; carapace 0.97 long, 0.72 wide; legs and palp:

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	1.58	0.31	1.65	1.45	0.77	5.76
II	1.51	0.30	1.51	1.38	0.74	5.44
III	1.35	0.27	1.22	1.22	0.61	4.67
IV	1.64	0.28	1.69	1.50	0.71	5.82
palp	0.39	0.13	0.26	–	0.52	1.30

Male palp (Figs 5-7): patella and tibia both with long dorsal spines, the one on patella slightly longer; tibia with 3 trichobothria; cymbium with small basal tubercle and a large dorsal hump; basal branch of paracymbium with 4 hairs, posterior margin with two teeth directed in anterior direction and one larger tooth directed dorsally, distal part rounded; suprategular apophysis strongly pointed, slightly curved; anteroproximal part of median membrane with a row of black teeth; radix gently curved, basal part much wider than distal part; lamellar part of radix flat and rounded, at base with elongated tooth, bifid at tip; terminal apophys of radix reaching half the length of the embolus, triangular, bluntly pointed; embolus J-shaped, pointed.

Epigyne (Figs 8-11): anterior margin in ventral view strongly protruding in the middle, covering a large epigynal cavity (Fig. 8); in postero-ventral view (Fig. 9), in the cavity the basal part of the scape is visible as a large, triangular sclerite; distal part of scape short, with median pit, hardly protruding from the cavity, wider than basal part. Spermathecae oval, with postero-median chamber; copulatory grooves first curving in posterior direction, turning outwards and returning to the middle, ending in copulatory openings at the large postero-lateral part of the scape (Fig. 11).

Etymology. The new species is named after its collector, the distinguished biospeleologist Dr Paolo Marcia (University of Sassari).

Distribution. Only known from the type locality, a 10 meters deep well with dripstone and rocky debris at the bottom, opening on the southern slope of the isolated mountain Monte Tuttavista in eastern Sardinia.

Further material examined. We could also examine one single damaged female specimen of a *Centromerus* close to the species described above, coming from a cave in the province Nuoro, municipality Orgosolo, located 30 km SSW of the type locality of *C. marciai* sp. n.: Grotta Piggios de Su Mudrecu, not registered in the speleological cadastre, 40°08'38.7"N 9°27'37.8"E (WGS84), 800 m, C. Corongiu leg. 20 Aug 2009 (CG).

This specimen has the same size and general morphology as the specimens from the cave Pozzo n. 1 di Tres Puntas. The epigyne looks almost exactly the same and there only seems to be a small difference in the shape of the triangular sclerite at the base of the scape. Collections of males should confirm it is the same species.

Discussion

The genus *Centromerus* at present counts 86 species (World Spider Catalogue 2014) and is wide-spread in Europe. Italy counts 21 species (Pantini & Isaia 2014) whereas Sardinia only has 4 species according to Pantini et al. (2013). However, *C. subalpinus* Lessert and *C. succinus* (Simon) have to be deleted from the list because these are misidentifications of *Meioneta innotabilis* (O. P.-Cambridge) (P. Pantini, personal communication). The remaining 2 species were both described from caves and are known from their type localities only: *C. bonaeviae* Brignoli, 1979, province Carbonia-Iglesias, municipality Iglesias, Grotta di Buoncammino, not registered in the speleological cadastre (♀) and *C. puddui* Brignoli, 1979, province Carbonia-Iglesias, municipality Villamassargia, Grotta dei Pipistrelli, 608 Sa/CA (♂ ♀) (Pantini et al. 2013). Whether these species are real troglophilic or even trogloxene remains to be pointed out. A third troglobitic *Centromerus* species is added in the present paper and the presence of a fourth troglobitic species needs further research. It appears that the epigeic *Centromerus* fauna from Sardinia is not known at all. This can be due to a lack of captures in winter, when the members of this genus generally are adult.

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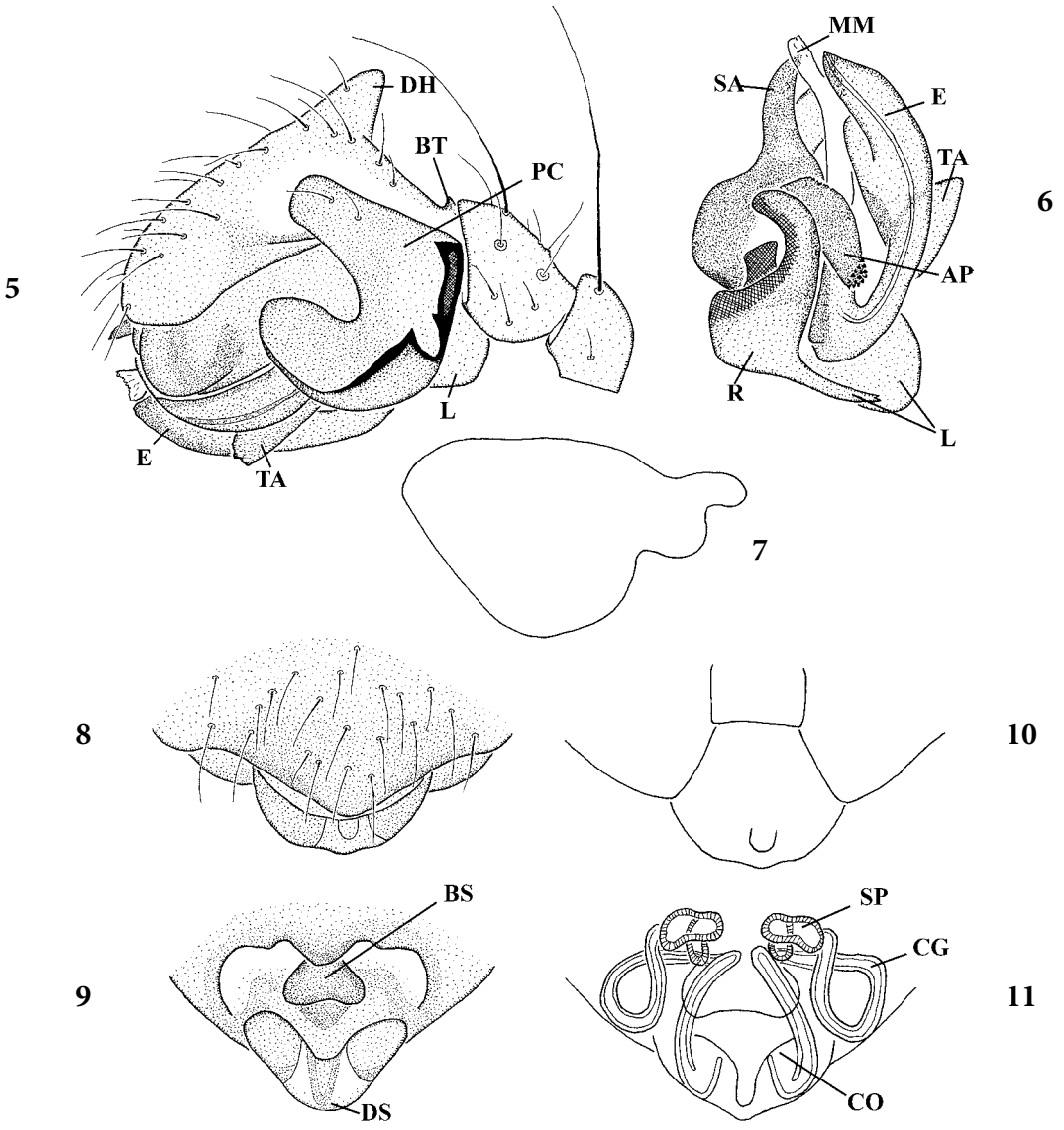

Figs 5-11 − *Centromerus marciai* sp. n. **5**, Male palp, lateral view; **6**, Male cymbium, dorsal view; **7**, Male palp, ventral view; **8**, Epigyne, ventral view; **9**, Ditto, postero-ventral view; 10. Ditto, dorsal view; **11**, Vulva, dorsal view. AP = proximal part of median membrane; BT = basal tubercle on cymbium; DH = dorsal hump on cymbium; E = embolus; L = lamella; MM = median membrane; PC = paracymbium; R = radix; SA = suprategular apophysis; TA = terminal apophysis; BS: basal part of scape; CG = copulatory grooves, CO = copulatory openings; DS: distal part of scape; SP = spermathecae.

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