Int. J. Speleol., 25, 1-2 (1996): 59-66. 1997

Lithobius nuragicus n. sp., a new *Lithobius* from a Sardinian cave (Chilopoda Lithobiomorpha)

Marzio Zapparoli *

SUMMARY

A new species of *Lithobius* from a Sardinian cave (Cagliari, Santadi, loc. Su Benatzu, Grotta "Pirosu", 631 Sa/Ca, m 270) is described. *Lithobius nuragicus* n. sp. belongs to the subgenus *Lithobius* s. str. and is related to *Lithobius variegatus* Leach, 1814, occurring in the British Isles, Brittany, Channel Isles, Iberian Peninsula, Maghreb, Sicily and Southern Italy. This new species is differentiated from *L. variegatus* by the number of prosternal teeth (3+3), the number and arrangement of ocelli (1+3; little, depigmented, not contiguous to each other, in the center of a depigmented area, posterosuperior ocellus larger than the other ocelli), the size of the organ of Tömösváry (larger), the number of antennal articles (79-86), the number of dorso-lateral and dorso-median setae and the shape and size of the claw of the female gonopods (4-5; 10-11; short, with a small lateral denticle on the internal side).

INTRODUCTION

The species of troglobitic centipedes known to date are very few and most of them belong to the order Lithobiomorpha (Negrea & Minelli, 1994). One of the most important world areas in terms of number of species is the Mediterranean basin, and Sardinia, W Liguria and NE Alps are the most interesting and more characterized Italian regions (Minelli, 1982). The most specialized centipedes in Italy occur in Sardinia, such as the two endemics *Lithobius sbordonii* Matic, 1967, a troglobitic species whose affinities are uncertain, and *Lithobius doderoi* Silvestri, 1907, with a lower degree of cave adaptations than *L. sbordonii* and apparently close to some cavernicolous *Lithobius* from the Pyrenees. In Sardinian caves we can also find *Lithobius cerii* Verhoeff, 1942-43, also found in a cave in Capri Island (Thyrrhenian Sea); the affinities of this species are unclear but certainly it is not close to the two species mentioned before.

About twenty centipedes are to date known in Sardinian caves (Puddu & Pirodda, 1974; Minelli, 1985; Grafitti & Zapparoli, 1992). In the present article a description of a new species of cave *Lithobius*, collected in the

* Dipartimento di Protezione delle Piante, Università della Tuscia, Via S. Camillo de Lellis, 01100 Viterbo, Italy.

Sulcis area in the framework of the biospeological campaigns carried out in Sardinia by the Gruppo Speleo-Archeologico "G. Spano", from Cagliari in 1994, is given. The new species, which shows clear morphological adaptations to cave habitat, is not close to other Sardinian cave *Lithobius* already known, but it seems close to some forms occurring in W-Europe and in the Maghreb.

Diagnosis

A large sized *Lithobius* s. str. (20.0 mm long), morphologically close to *Lithobius variegatus* Leach, 1814; antennae of 79-86 articles, 1+3 ocelli on each side, organ of Tömösváry larger than the ocelli, prosternum with 3+3 conical teeth, porodont spiniform; tergites 9, 11 and 13 with broad triangular posterior projections, increasingly larger from T. 9 to T. 13; coxal pores 6-8, VaC absent, 15th legs without accessory apical claw; female gonopods with 2+2 short, cylindro-conical spur and a short claw with a small lateral denticle on the internal side. Male unknown.

The new species differs from *L. variegatus* especially for the lower number of prosternal teeth, and for the shape of the apical claw of the female gonopods; female gonopods also shows a lower number of dorsolateral setae on the first article and a lower number of dorsomedian setae on the second article and on the apical claw.

Material examined

Holotypus: 1 ♀, Sardegna, Cagliari, Santadi, loc. Su Benatzu, Grotta "Pirosu", 631 Sa/Ca, m 270, 25.VI.1994, M. Mucedda leg., at the Museo di Zoologia dell'Università di Roma "La Sapienza".

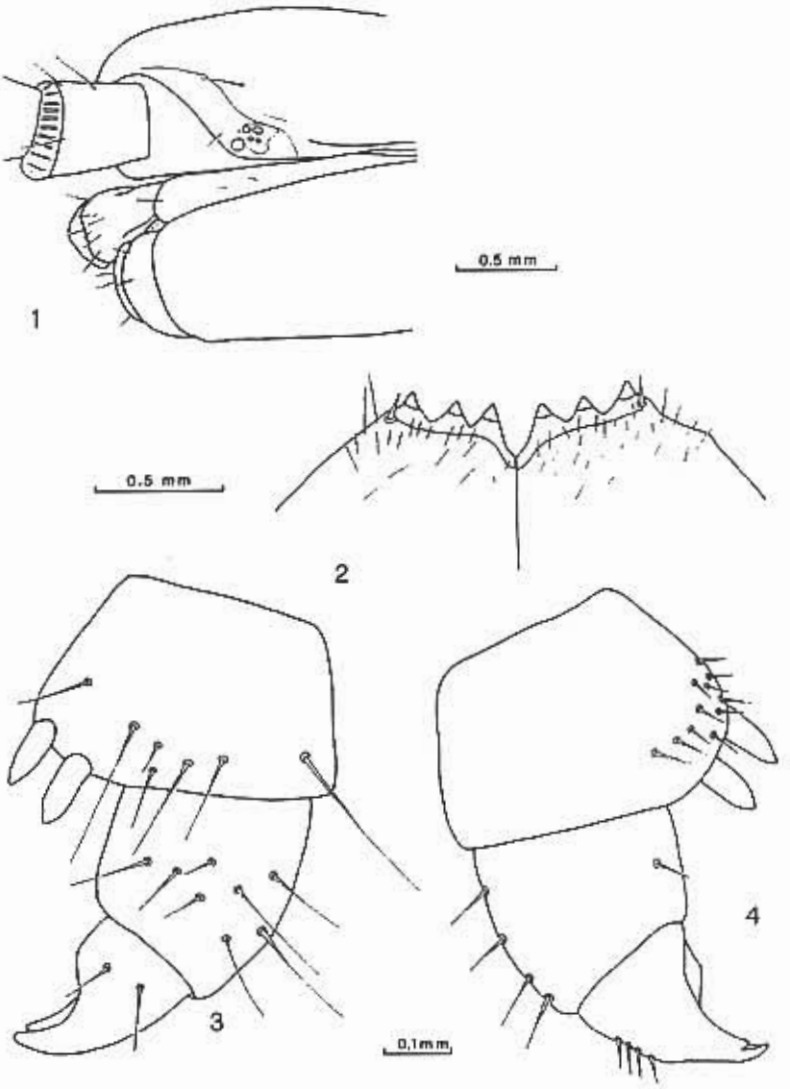
Description

Female. Body 20.0 mm long, 2.5 mm broad at T. 10, tergites pale chestnut, head dark chestnut, legs slender and long, spines long.

Head feebly wrinkled, broader than long, as broad as T. 1, posterior border straight, median thickening of marginal ridge very distinct; antennae 14.5-15.0 mm long, with 79-86 articles as broad as long, terminal article about two times longer than broad; ocelli (Fig. 1) 1+3 on each side, little, not contiguous each other, in the middle of a depigmented area, posterosuperior ocellus larger than the other ocelli, organ of Tömösváry (Fig. 1) larger than ocelli; prosternum (Fig. 2) with 3+3 conical teeth, porodont spiniform, shoulders asimmetrical, absent on the right side, very feebly on the left side.

Lithobius nuragicus n. sp.

(Figs. 1-4)



Figs. 1-4 – *Lithobius nuragicus* n. sp., Holotypus. Head, lateral (1); prosternum, ventral (2); left female gonopod, ventral (3), dorsal (4).

Tergites feebly wrinkled and long; T.1 trapeziform, larger than T.3, with posterior angles rounded and posterior border feebly concave; lateral borders parallel in TT. 3, 5 and 7, feebly convergent to the posterior end and almost straight in TT. 8 and 10, feebly convergent to the posterior end and feebly arcuated in TT. 12 and 14; posterior angles rounded in TT. 3 and 5, angulated in TT. 7, 8, 10, 12 and 14; posterior border straight in T. 3, feebly concave in T. 5, concave in TT. 8 and 10, feebly emarginate in TT. 7, 12 and 14; intermediate tergites with lateral borders almost arcuate in TT. 2, 4 and 6, parallel in TT. 9, 11 and 13; posterior angles blunt in T. 2, angulated in TT. 4 and 6, with broad, short and increasingly larger triangular projections in TT. 9, 11 and 13, the triangular projections in T. 13 are longer and sharper than in T. 9 and T. 11; posterior border straight in all the intermediate tergites.

Coxal pores 6, 7, 8, 7, the proximal pores are circular and little, the distal pores are oblong. Legs 14th and 15th are 9.5 mm and 13.0 mm long respectively, with femur, tibia and tarso with numerous glandular pores on the internal side, 15th legs without accessory apical claw. VaC absent, see Tab. 1 for spinulation.

Female gonopods (Figs. 3-4) with 2+2 short, cylindro-conical spurs especially those on the external side, claw short, with a little denticle on the internal side; first article with a group of 10-11 dorsomedian setae proximal to the insertions of the spurs; second article with 4-5 dorsolateral setae in a line and one dorsomedian seta; apical claw with 4-5 shorter dorsolateral setae in a line.

Table 1 – *Lithobius nuragicus* n. sp. Spinulation of legs. C = coxa, t = trochanter, P = prefemur, F = femur, T = tibia, a = anterior spine, m = median spine, p = posterior spine.

	Ventral					Dorsal				
legs	C	t	P	F	T	C	t	P	F	T
1	-	-	amp	am	am	-	-	mp	ap	a
2	-	-	amp	amp	am	-	-	amp	ap	ap
3	-	-	amp	amp	am	-	-	amp	ap	ap
4	-	-	amp	amp	am	-	-	amp	ap	ap
5	-	-	amp	amp	am	-	-	amp	ap	ap
6	-	-	amp	amp	am	-	-	amp	ap	ap
7	-	-	amp	amp	am	-	-	amp	ap	ap
8	-	-	amp	amp	am	-	-	amp	ap	ap
9	-	-	amp	amp	am	-	-	amp	ap	ap
10	-	-	amp	amp	am	-	-	amp	ap	ap
11	-	-	amp	amp	am	-	-	amp	ap	ap
12	-	m	amp	amp	am	a	-	amp	ap	ap
13	-	m	amp	amp	am	a	-	amp	ap	ap
14	-	m	amp	am	am	a	-	amp	ap	ap
15	-	m	amp	am	-	a	-	amp	ap	-

Derivatio nominis

After the culture of nuraghi, characteristic of Sardinian prehistory.

Affinities

The new species is morphologically close to *Lithobius variegatus* s.l., an epigeic species distinct in two subspecies, *L. v. variegatus* Leach, 1814, known from S Scotland, England, Galles, Ireland, Channel Islands (introduced ?), Brittany, NW Spain and N Portugal, and *L. v. rubriceps* Newport, 1845, recorded in Central and Southern Iberian Peninsula, Morocco, Tunisia, Sicily and Calabria (Eason, 1964; Eason & Minelli, 1976; Eason & Serra, 1986). The British populations of *L. v. variegatus* show preference especially for mesophilous woodlands and seem not to tolerate low winter temperatures (Eason, 1964; Eason e Serra, 1986); the habitat preferences of other populations of *L. variegatus* s.l. are unknown.

L. variegatus s.l. and *L. nuragicus* n. sp. share the following morphological characters: the large general size, especially as regards the body lenght, between 16-24 mm in *L. v. variegatus* and up to 40 mm in *L. v. rubriceps*; the number of prosternal teeth, more than 2+2; the shape of T. 1, trapezioidal; the presence of triangular projections in the posterior angles of TT. 9, 11 and 13; the absence of VaC; the absence of accessory apical claw on 15th legs; the general shape of the female gonopods with 2+2 spurs and no tridentate claw; the general arrangement of spinulation.

The new species differs from *L. variegatus* s.l. by the presence of 3+3 prosternal teeth instead of 6+6 or 7+7; by the claw of the female gonopods with a distinct lateral denticle, instead of quite simple without denticulations as in *L. v. rubriceps*, or with small and irregular lateral denticle as in *L. v. variegatus*. *L. nuragicus* n. sp. and *L. variegatus* s.l. also differ from one another in the arrangement of the setae of the female gonopods: in *L. nuragicus* n. sp. dorsolateral setae of the second article and those of the apical claw are arranged on a longitudinal line of 4-5 setae, whereas in *L. variegatus* s.l. dorsolateral setae of the same articles are arranged on a band of 2-3 lines and their number is very higher than in *L. nuragicus* n. sp. (about 20 on the second article); *L. nuragicus* n. sp. also shows about 10-11 dorsomedian setae arranged in a small area of the first article proximal to the insertion of the spurs, instead of more numerous setae arranged on a larger area as in *L. variegatus* s. l.

L. nuragicus n. sp. also differs from *L. variegatus* s.l. in characters, such as the lower number and different arrangement of ocelli, 1+3 in the center of a depigmented area insetad of 13-20 in 4-5 irregular rows, and in

the higher number of antennal articles, 79-86 instead of 35-52, obviusly as a result of morphological adaptations of the new species to the cave habitat.

For differential characters of *Lithobius variegatus* Leach, 1814 s.l. and *Lithobius nuragicus* n. sp. see Tab. 2.

Table 2 - Differential characters of *Lithobius variegatus* Leach, 1814 s.l. and *Lithobius nuragicus* n. sp.

	L. v. variegatus	*L. v. rubriceps*	*L. nuragicus* n. sp.
body lenght (mm)	16-24 (British Isles) 24-30 (Iberian Peninsula)	40-42	20
body colour	pale brown with variegated markings (in live specimens)	uniform dark brown	uniform pale brown (in preserved holotype)
n° ocelli	1+13-18	1+15-20	1+3
n° prosternal teeth	6+6, 7+7		3+3
n° antennal articles	35-46	48-52	79-86
triangular projections on T. 7	small but distinct	very small or absent	absent
glandular pores on 15th legs	sparse or absent	very numerous	very numerous
15th legs/body lenght ratio	ca. ½	ca. 1/3	ca. 1/2
n° coxal pores	5-7 (British Isles) 7-10 (Iberia Peninsula)	7-10, occasionally 3-5	6-8
claw of female gonopods	with small or irregular lateral denticles	simple, without lateral denticles	with a lateral denticle
dorsomedian setae 1st article of female gonopods	ca. 15		ca. 10
dorsolateral setae 2nd article of female gonopods	ca. 20 on a band of 2-3 lines		4-5 on a line
dorsolateral setae claws of female gonopods	ca. 10 on a band of 2-3 lines		4-5 on a line

Distribution and ecology

The new species is only know from the type locality, the Grotta "Pirosu", 631 Sa/Ca, Su Benatzu, Santadi (Sardinia, Cagliari province), in the Sulcis. The cave develops in Cambrian limestones and dolomias, it has a lenght of about 475 m and a difference of level of - 52 m. The cave has three entrances leading to a large main hall, from which some short galleries start; for a map of the cave see Maxia (1972). "Pirosu" cave was used during the nuragic age as a holy place and today, because of important ar-

chaeological findings, is one of the most important Sardinian prehistoric sites (Todde, 1972). Due to this, entrance to the cave is limited.

The holotypus of *L. nuragicus* n. sp. has been collected among organic debris on a stalagmite (Grafitti pers. com.). In the cave a rich fauna is present, including also troglobitic species, with some Sardinian endemics (see Argano & Rampini, 1973; Puddu & Pirodda, 1974; Strasser, 1974; Mahnert, 1976; Gardini, 1980): *Oxychilus* sp. *oppressus* (Fisher & Studer, 1878) (Gastropoda Sylommatophora Zonitidae), troglophilic; *Chthonius siculus* Beier, 1961 (Arachnida Pseudoscorpionida Chthoniidae), troglophilic; *Roncus puddui* Mahnert, 1976 (Arachnida Pseudoscorpionida Neobisiidae), troglobitic, Sardinian endemic; *Catalauniscus puddui* Argano, 1973 (Crustacea Isopoda Trichoniscidae), troglobitic, Sardinian endemic; *Blaniulus eulophus* Silvestri, 1903 (Diplopoda Iulida Blaniulidae), troglophilic, Sardinian endemic; *Paranchus albipes* (Fabricius, 1796) (Insecta Coleoptera Carabidae), trogloxene; *Catopomorphus orientalis* Aubé, 1850 (Insecta Coleoptera Cholevidae), troglophilic; *Aglenus brunneus* (Gyllenhal, 1813) (Insecta Coleoptera Othniidae); *Nycteribia vexata* Westwood, 1835 (Insecta Diptera Nycteribiidae), ectoparasite on Chiroptera.

ACKNOWLEDGMENTS

I wish to express my thanks to Giuseppe Grafitti, of the Gruppo Speleologico Sassarese, for providing informations on the type locality of the new species described; Alessandro Minelli, of the Dipartimento di Biologia dell'Università, Padova, for the useful suggestions and discussion; M. Mucedda, of the Gruppo Speleo-Archeologico "G. Spano", Cagliari, for collecting the holotype of the new species.

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