



## An annotated catalogue of the epigeic and cave centipedes (Chilopoda) of Sardinia\*

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### Abstract

Published and unpublished data on the epigeic and cave centipedes of Sardinia (Italy) are summarized and critically revised in this paper. Fifty-four species are listed and discussed (1 Scutigermorpha, 19 Lithobiomorpha, 6 Scolopendromorpha, 28 Geophilomorpha), two of which new to the island: *Lamyctes emarginatus* (Newport, 1844) and *Schendyla montana* (Attems, 1895). Thirty-one species have been recorded in caves (1 Scutigermorpha, 14 Lithobiomorpha, 6 Scolopendromorpha, 10 Geophilomorpha) – including the poorly known *Plutonium zwierleini* Cavanna, 1881 – six of which exclusive of this habitat (5 *Lithobius* spp., 1 *Cryptops* sp.). Five species are introduced or probably introduced. General geographic distribution, chorotype, Sardinian localities and ecological notes (altitudinal ranges, habitats) are given for each species. Taxonomic notes are given for some species. *Lithobius turritanus* Fanzago, 1881 and *Lithobius molophai* Restivo De Miranda, 1978, previously considered synonyms of *Lithobius tricuspis* Meinert, 1872 and *Lithobius cerii* Verhoeff, 1943, respectively, are recognized as valid species, **status rev.** The new synonymies *Lithobius melanops domusnovae* Restivo De Miranda, 1976 = *Lithobius lapidicola* Meinert, 1872 **syn. nov.**, *Lithobius oligoporus* Latzel, 1884 = *Lithobius turritanus* Fanzago, 1881 **syn. nov.** and *Lithobius fraleliae* De Miranda Restivo, 1978 = *Lithobius turritanus* Fanzago, 1881 **syn. nov.** are proposed. *Lithobius turritanei* Restivo De Miranda *i. l.* in Cassola, 1982 is recognized as *nomen nudum*. *Cryptops breviunguis* A. Costa, 1882 is proposed as *species inquirenda* and its identity with *Cryptops anomalans* Newport, 1844 is rejected. *Lithobius molophai* Restivo De Miranda, 1978 and *L. sardous* Silvestri, 1898 are redescribed on type or topotypical material. A lectotype for *L. sardous* Silvestri, 1898 is also designated. *Lithobius sardus* Manfredi, 1956 **status nov.**, formerly a subspecies of *L. agilis* C. L. Koch, 1847, is raised to species level; its probable affinity with *L. turritanus* Fanzago, 1881 is also discussed. *Lithobius infossus*

Silvestri, 1894 (= *L. dahliei* Verhoeff, 1925) is erased from the centipede fauna of Sardinia, and previous records should be referred to an unidentified species of *Lithobius* or to *L. nuragicus* Zapparoli, 1997.

**Key words:** Scutigermorpha, Lithobiomorpha, Scolopendromorpha, Geophilomorpha, lectotype designation, new synonymies, taxonomy, distribution, catalogue, Sardinia.

## Historical background

Sardinia is one of the Mediterranean islands of main faunistic and zoogeographical interest and it has been the object of intensive scientific exploration since the first half of the 18<sup>th</sup> century, especially by Italian naturalists (Cassola 1983; Baccetti 1964, 1996).

The first records on epigeic centipedes dates back to the second half of the 19<sup>th</sup> century when Pirotta (1878) published the findings of *Scolopendra oraniensis* Lucas, 1846 from Vacca Island (SW Sardinia) and from near Cagliari (Cala Salinas, S Sardinia), collected during two expeditions of the cutter “Violante” by members of the Museum of Natural History of Genoa in 1875 and 1876. At about the same time, Magretti (1878, 1880), entomologist from Milan (Italy), published the results of his research carried out between 1877 and 1879 in Asinara Island (NW Sardinia) and a few other localities of the main island (Baccetti 1996; Cassola 1983; Manfredi 1981).

Soon after these first occasional reports, more substantial information was gathered by the Italian zoologist Achille Costa during his historical surveys on the “Geo-Fauna Sarda”, conducted in 1881–1885 (Costa 1882, 1883, 1884a, 1884b, 1884c, 1884d, 1884e, 1885) (*cf.* Croveti 1970), and data from the province of Sassari were added in the same period by the Italian myriapodologist Filippo Fanzago (Fanzago 1881a, 1881b, 1884a, 1884b, 1884c). A few other records from San Pietro Island (SW Sardinia) are due to Pietro Pavesi (De Carlini 1885), while collections in various parts of the island by the Italian entomologists and naturalists Raffaello Gestro, Umberto Lostia di Santa Sofia, Angelo Solari and Giovan Battista Traverso formed the subject of a note by Silvestri (1898). Material occasionally collected in 1896 by the German palaeontologist Eberhard Fraas was published by Verhoeff (1901: 412).

Further collections, so far unpublished, were made during the zoological expedition in northern Sardinia of the ship “Washington”, of the Italian Royal Navy, under the command of Captain G. Cassanello in 1893, and by Giacomo Doria, the founder of the Museum of Natural History in Genoa, in the Gennargentu massif in 1899 (see under “Material and methods”).

After this pioneering period, no papers on the epigeic centipedes of Sardinia were published before the seventies and eighties of the 20<sup>th</sup> century. Apart from the contributions of De Miranda Restivo (1978a [as Restivo de Miranda 1978a in References], 1982, 1983, 1986), based on material collected in those years, noteworthy is a paper by Eason (1980) in which the findings collected in 1957 by the Dutch myriapodologist C.A.W. Jeekel are described, laying the basis for a modern revision of the Sardinian centipede fauna. Other findings gathered by C.A.W. Jeekel in the same occasion were later discussed in Bonato *et al.* (2006).

More recently, the collections made during several surveys organized by the Italian universities of Genoa, Padua, Siena and Rome, and the natural history museums of Verona and Bergamo during the 1970's, form the bulk of a paper by Minelli (1983a), certainly the richest work ever prepared on the centipede fauna of the island in terms of material examined, collecting sites and information. This work was followed by those of Minelli *et al.* (1984), Minelli and Iovane (1987) and Zapparoli and Minelli (2005).

Other investigations later focused on the epigeic centipedes of Sardinia, namely those carried out in the small circumsardinian islands (Foddai *et al.* 1994; Minelli *et al.* 1994; Foddai *et al.* 1996), between 1985 and 1995, in the framework of a survey by the Italian National Council of Research by means of the oceanographic ship “Minerva” (Baccetti *et al.* 1989; Baccetti 1996).

Regarding the cave fauna, the first hypogean centipede record from Sardinia was collected in the area of Nuoro by the Genoese entomologist Agostino Dodero in 1903, even though the biospeleological exploration

of Sardinia had already begun some thirty years earlier (Grafitti 2002). This material was studied by Silvestri (1908) who described the first cave centipede of the area, *Lithobius doderoi*, endemic to the Nuoro province. Additional specimens from caves were to be collected long after, in the 1950's, mainly by Saverio Patrizi, Marcello Cerutti and Henri Henrot of the Circolo Speleologico Romano of Rome (Patrizi 1956a, 1956b), and were studied by Manfredi (1953, 1956). Other material collected by Augusto Vigna Taglianti and Valerio Sbordonì, also biospeleologists of the C.S.R., formed the subject of a note by Matic (1967), who described one of the most interesting European troglobitic lithobiomorph species, *Lithobius sbordonii*, endemic of coastal Supramonte in E Sardinia, near Nuoro.

Finds collected in the 1960's and 1970's, especially by Sardinian biospeleologists (S. Puddu, G. Grafitti), were studied by Restivo De Miranda (1976a, 1976b, 1977, 1978a, 1978b, 1983 [as De Miranda Restivo 1983 in the References]). A summary of the cave centipede fauna known in Sardinia at the beginning of the 1990's could be inferred from Minelli (1985).

An intense biospeleological and exploratory activity has been carried out in the subsequent years in many karst areas of the island, especially by local speleological groups (e.g., Grafitti *et al.* 1999; Grafitti 2002; Lana *et al.* 2004; Casale *et al.* 2006, 2008; Grafitti & Merella 2008). These investigations, still under way, allowed to greatly expand the knowledge on the cave centipede fauna of Sardinia (De Miranda Restivo & Guaita 1986; Grafitti & Zapparoli 1995; Zapparoli 1997, 2001). In spite of the numerous papers later published, the only and most recent summary of the epigeic and cave centipede fauna of Sardinia is that of Minelli (1983b).

The research on the arthropod communities of the Mediterranean forest habitats of the Reserves of Marganai and Monti Mannu (*cf.* Mason *et al.* 2006), sponsored by the Centro Nazionale per lo Studio e la Conservazione della Biodiversità Forestale "Bosco Fontana", Verona, Italy (CNBFVR) and organized in cooperation with the Forestry and Environmental Surveillance Service (Ente Foreste Sardegna) of Sardinia, Italy, provided the opportunity to weigh up the centipede fauna of Sardinia. The aim of this paper is therefore to provide an updated synthesis of the knowledge on the distribution and ecology of the epigeic and cave centipedes of this island. About 1,100 epigeic and 145 cave bibliographic records from about 370 and 120 sites, respectively, have been revised. Some 2,200 specimens from about 225 epigeic sites and 60 caves have been examined.

## Material and methods

The present catalogue is based on critically revised literature records and on unpublished material. Species are listed mostly according to Foddai *et al.* (1995) and Zapparoli and Minelli (2005). The classification of Edgecombe and Bonato (in press) was adopted for the Scolopendromorpha. Recent nomenclatural updates by Minelli (2006), Zapparoli (2006) and Bonato and Minelli (2008) are also considered.

For each species the following data are reported:

- scientific name, Author and year of publication according to Minelli (2006);
- bibliographic references concerning Sardinia are listed chronologically/alphabetically, with the name of the species, Author and year of description as originally quoted; data included in the electronic database of the project CK map (Checklist and distribution of the Italian fauna, Ruffo & Stoch 2006) are quoted as "Zapparoli and Minelli 2005: CD"; uncertain records are quoted with a "?" and discussed in the Remarks; dates of publication of the papers by A. Costa are given according to Pantaleoni (2005);
- literature records on the epigeic and cave collecting sites are arranged separately according to the historic administrative provinces (from north to south: Sassari, Nuoro, Oristano, Cagliari) and listed alphabetically; localities are spelled mainly according to the Road Atlas of the Touring Club Italiano (1999); in order to give a more precise location of the collecting sites, details or emendations on toponyms have sometimes been added in square brackets; generic quotations from the Corso-Sardinian geographic complex, Sardinia, and small circumsardinian islands (mostly based on previously published localities) are also included; except those in the section "Unreliable or erroneous records", quotations based on original records

only vaguely reported are marked with §; each locality is followed by the corresponding bibliographic reference/s (given as a number directly referring to the list of bibliographic references for the species); for epigeic localities, the elevation above sea level, as well as information on vegetal formation or habitat as originally quoted, is also given when available; for each cave, the cadastre number and elevation of cave entrance according to the still unpublished Speleological Cadastre of Sardinia (c/o Federazione Speleologica Sarda, Miniera di San Giovanni, Iglesias; G. Grafitti pers. comm.) are also given when available;

— the material examined is listed in the same way as the literature records: site, vegetal formation and/or habitat, elevation above sea level, date, number of specimens (males, females, immatures not belonging to larval stadia, larvae, unsexed specimens), collector and collection where the material is preserved are given for each record when available; collecting methods (mostly hand searching, pitfall trapping, soil washing and Berlese extraction, leaf-litter sifting) are detailed when known; body length of lithobiomorph larvae and adult scolopendromorphs (from the anterior margin of the head shield to the posterior end of the last trunk segment) as well as number of leg pairs in geophilomorphs are given when relevant; material followed by an asterisk (CMZ\*) concerns records included in the electronic database of the project CK map (Zapparoli & Minelli 2005); the historical collections gathered during the zoological expedition of the ship “Washington” in 1893 and by Giacomo Doria in 1899 (see Historical background) are also included; also examined were some unpublished specimens identified by Filippo Silvestri at the end of the 19<sup>th</sup> century; the heading “Other” refers to materials published by Pirotta (1878), Silvestri (1898, 1908), Zapparoli (1982), De Miranda Restivo (1983) and Grafitti and Zapparoli (1995), here re-examined; labels of these materials are reported as in original and quoted in inverted commas, the corresponding bibliographic reference is quoted in square brackets, and the original identification is quoted if different;

— general geographic distribution, mainly as a list of the countries or geopolitical units from where the species is known, according to Zapparoli (2006) or critically revised from the literature (Minelli 2006) or from other updated checklists and reviews (e.g., Stoev & Geoffroy 2004; Bonato *et al.* 2005; Spelda 2005; Zapparoli and Minelli 2005; Lindner 2007; Akkari *et al.* 2008; Andersson *et al.* 2008; Barber 2008, 2009; Berg *et al.* 2008);

— chorotype according to Zapparoli and Minelli (2005), based on the classification proposed by Vigna Taglianti *et al.* (1993, 1999);

— ecological notes, as a synthesis of the available published and unpublished data on the altitudinal range and habitats colonized in Sardinia; for each habitat the number of sites where a species has been collected is given in parentheses; the number of records from endogenous habitats (collected by soil washing and Berlese extraction, L. Fancello leg.) is also given; a list of references where habitat data in Sardinia have been published is also given; a classification of the species recorded in caves according to the classic troglone, sub-/eu-troglophilic and troglotic categories (Balbiano d’Aramengo *et al.* 2004), replacing and updating the scheme of Cassola (1982: 706–707), is proposed;

— remarks, including taxonomic notes, comments on uncertain records and descriptions of the material examined where relevant; in the descriptions of lithobiomorph specimens, body length is measured from the anterior margin of the head shield to the posterior end of the intermediate tergite (adult specimens) or to the posterior end of the trunk (larvae).

The following abbreviations are used in the text and tables.

Repositories: CCA = Dipartimento di Biologia Animale ed Ecologia, Parassitologia, Università degli Studi di Cagliari, Cagliari (Italy); CFF = F. Fois collection, Cagliari (Italy); CFG = F. Gasparo collection, Trieste (Italy); CMZ = M. Zapparoli collection, Viterbo (Italy); CNBFVR = Centro Nazionale per lo Studio della Biodiversità Forestale “Bosco Fontana”, Verona (Italy); GGNU = Gruppo Grotte Nuorese, Nuoro (Italy); GSS = Gruppo Speleologico Sassarese, Sassari (Italy); IEASS = Istituto di Entomologia Agraria, Università degli Studi di Sassari, Sassari (Italy); MGE = Museo civico di Storia naturale “G. Doria”, Genoa (Italy); MVR = Museo civico di Storia naturale, Verona (Italy).

Collectors: ABBN = D. Avesani, M. Bardiani, D. Birtele & G. Nardi; AC = A. Casale; AD = A. Di Giulio; AG = A. Gillono; AM = A. Molinu; AP = A. Pinna; AS = A. Sassu; AVT = A. Vigna Taglianti; BBCW = M. Bardiani, D. Birtele, P. Cornacchia & D. Whitmore; BE = M. Bertelli; BI = A. B. Biscaccianti; BNW = M. Bardiani, G. Nardi & D. Whitmore; BNWZ = M. Bardiani, G. Nardi, D. Whitmore & M. Zapparoli; BP = B. Pirodda; CA = F. Cassola; CF = C. Figini; CL = C. Logias; CM = C. Manicastro; CO = C. Onnis; CP = A. Campanaro; CR = A. Carta; CT = C. Torti; CU = C. Utzeri; DB = D. Birtele; DC = D. Cillo; DD = D. Deidda; DE = ? Delitala; DO = A. Dodero; DP = D. Piras; DW = D. Whitmore; EL = E. Lana; FB = F. Baldari; FC = F. Chessa; FF = F. Fois; FG = F. Gasparo; FI = F. Fiori; FM = F. Melis; FS = L. Fadda & G. Serra; GA = G. Gardini; GB = P. Gardini; GC = G. Carpaneto; GD = G. Doria; GG = G. Grafitti; GGO = Gruppo Grotte Olbia; GM = G. Marini; GN = G. Nardi; GO = G. Osella; GR = Gregori; GT = G.B. Traverso; IC = I. Culurgioni; JD = J. De Waele; LF = L. Fancello; LL = L. Latella; LP = L. Pavesi; MA = F. Mason; MB = M. Bologna; MC = M. Carcupino; ME = G. Merella; MG = M. Grussu; ML = M. Lucarelli; MM = M. Mucedda; MP = M. Pappacoda; MZ = M. Zapparoli; NABT = G. Nardi, P. Audisio, M. Bardiani, M. Trizzino; NI = N. Ibba; PA = P. Audisio; PB = P. Brignoli; PG = P. Giachino; PL = P. Leo; PM = P. Marcia; PP = P. Piras; PU = S. Puddu; RA = R. Argano; RAJ = R. Abou Jaoudé; RG = R. Gestro; SA = A. Sale; SL = A. Solari; SO = S. Onnis; SP = S. Papinuto; ST = S. Taiti; UL = U. Lostia; VS = V. Sbordoni; VV = V. Vomero.

Literature records and material examined: ex/exx = specimen/specimens; imm. = immature/immatures; Is./Isl. = island/islands; prov. = province; S.S. (followed by number) = national road.

Leg spinulation: spines: a = anterior, m = median, p = posterior; leg articles: C = coxa; t = trochanter; P = praefemur; F = femur; Ti = tibia; leg sides: V = ventral, D = dorsal.

Other: lp = number of leg-bearing segments; T/TT = tergite/tergites.

## Catalogue

### Order SCUTIGEROMORPHA Pocock, 1895

#### Scutigeridae Gervais, 1837

#### *Scutigera* Lamarck, 1801

##### 1. *Scutigera coleoptrata* (Linnaeus, 1758)

- 1) *Scutigera coleoptrata* Lin. [sic]: A. Costa 1885: 9.
- 2) *Scutigera coleoptrata* (L.): Silvestri 1898: 681.
- 3) *Scutigera coleoptrata* L. [sic]: Verhoeff 1925a: 656.
- 4) *Scutigera coleoptrata* L. [sic]: Attems 1949: 118.
- 5) *Scutigera coleoptrata* (L.): Matic 1971: 255.
- 6) *Scutigera coleoptrata* Linneus [sic]: Puddu & Pirodda 1974: 177.
- 7) *Scutigera coleoptrata* (Linnaeus, 1758): Minelli 1978a: 155.
- 8) *Scutigera coleoptrata* Linnaeus, 1758 [sic]: Cassola 1982: 670, 708.
- 9) *Scutigera coleoptrata* (Linnaeus, 1758): Minelli 1983a: 15.
- 10) *Scutigera coleoptrata* (L., 1758): Minelli 1983b: 408.
- 11) *Scutigera coleoptrata* L. [sic]: De Miranda Restivo & Guaita 1986: 34.
- 12) *Scutigera coleoptrata* (Linnaeus, 1758): Minelli *et al.* 1994: 500.
- 13) *Scutigera coleoptrata*: Foddai *et al.* 1994: 14.
- 14) *Scutigera coleoptrata* (Linnaeus, 1758): Foddai *et al.* 1995: 5.
- 15) *Scutigera coleoptrata* (Linnaeus, 1758): Foddai *et al.* 1996: 360, tab. I.
- 16) *Scutigera coleoptrata* (Linnaeus, 1758): Zapparoli & Minelli 2005: CD.
- 17) *Scutigera* sp.: Lana *et al.* 2006: 44.

18) *Scutigera coleoptrata* (Linnaeus, 1758): Grafitti 2007c: 70.

19) *Scutigera coleoptrata* (Linnaeus, 1758): Grafitti & Merella 2008: 88, 91.

### Literature records

**General.** Sardinia-Corsica (7). Sardinia (3, 4, 8, 10, 14, 15). Circumsardinian islands (13).

**Epigeic.** Sassari prov.: Alghero, Porto Conte (9, 11). Asinara Is., Campo Perdu (12, 15, 16). Caprera Is. (12, 15, 16). Rocche Is. (12, 15, 16). Maddalena Is. (15, 16); *ibidem*, La Maddalena (12, 16). Molaria Is. (12, 15, 16). Ratti Is. (12, 15, 16). Sassari, surroundings (1). Tavolara Is. (12, 15, 16). Nuoro prov.: Dorgali (16). Genoni (2, 16). Oristano prov.: Monte Arci (16). Cagliari prov.: Burcei, Cantoniera [Ovile] Cannas, S.S. 125 (5, 16). Cagliari (2, 16). Iglesias, under *Eucalyptus* sp. (9, 16). Sant'Antioco Is. (15, 16); *ibidem*, Cussorgia (12, 16). Nuraminis, 2 km N (9, 16). San Pietro Is. (15, 16); *ibidem*, Guardia dei Mori [emendation for Mari] (12, 16); *ibidem*, pond of Cala Vinagra [emendation for Vinogra] (12, 16). Sarroch (16).

**Cave.** Sassari prov.: Mara, Bonu Ighinu, cave in front of "Su Tintirriolu" (18). Cagliari prov.: Carbonia, Riu Cannas, "Grotta dei Fiori" 218 Sa/CA [= 218 Sa/CI] (6, 16, 17, 19). Iglesias, "Grotta I di Cuccuru Is Piras" 620 Sa/CA (11). Villaputzu, Monte Castello di Quirra, "Grotta de Nicolao" 604 Sa/CA (6, 16). Perdu Pippiu, Teulada, "Grotta di Perdu Pippiu" 633 Sa/CA (19).

### Material examined

**Epigeic.** Sassari prov.: Asinara Is., Cala Sabina, pitfall traps: 25/27.IX.2003, AM & AS, 1 ex (IEASS). Nuoro prov.: Dorgali, Cala Gonone: 21.V.1980, AVT, 1 ex (CMZ\*). Oristano prov.: Monte Arci, garrigue: 1–4.III.1992, GC, 1 ex (CMZ\*). Cagliari prov.: Domusnovas, Sa Duchessa, 371 m, 32S 0464990 4358384, in Malaise trap: 8–22.VIII.2006, FC, 1 ex (CNBFVR). Seui, near Monte Tonneri, Foresteria Montarbu, 867 m, 32S 0534040 4413461, in house: 4.IX.2006, ABBN, 1 ex (CNBFVR). Villasor, vineyard Giviamolas (turfed), pitfall traps: 29.IV.2003, FS, 1 ♀ (IEASS); 28.V.2003, FS, 1 ♀, 1 imm. (IEASS); 2.VII.2003, FS, 1 ♀, 1 imm. (IEASS); 30.VII.2003, FS, 2 imm., 2 larvae (IEASS); 4.IX.2003, FS, 2 imm. (IEASS); 26.V.2004, FS, 1 imm. (IEASS). Villasor, vineyard Giviamolas (worked), pitfall traps: 28.XI.2002, FS, 2 ♂♂, 1 ♀, 2 imm. (IEASS); 1.IV.2003, FS, 1 ♀ (IEASS); 29.IV.2003, FS, 3 ♂♂, 1 ♀ (IEASS); 28.V.2003, FS, 2 ♂♂, 3 ♀♀, 1 imm. (IEASS); 2.VII.2003, FS, 3 ♂♂, 1 ♀, 9 imm., 1 larva (IEASS); 30.VII.2003, FS, 1 ♂, 1 ♀, 3 larvae (IEASS); 8.X.2003, FS, 3 ♂♂, 2 imm. (IEASS); 23.VI.2004, FS, 2 ♂♂, 4 ♀♀ (IEASS); 2.VIII.2004, FS, 1 ♂, 1 imm., 2 larvae (IEASS); 10.IX.2004, FS, 2 exx (IEASS); 5.X.2004, FS, 2 exx (IEASS); 12.XI.2004, FS, 6 ♂♂ (IEASS).

**Cave.** Sassari prov.: Bancaleddu, Sassari, "Grotta di Lu Gardu" or "Grotta Lu Cardu" 2936 Sa/SS, 102 m: no date, P. Murcia vidit, 1 ex. Nuoro prov.: Baunei, Gillové, "Grotta rifugio di Gillové" 2590 Sa/NU, 840 m: X.2003, P. Murcia vidit, 1 ex. Domusnovas, Monte Acqua "Grotta di San Giovanni" 81 Sa/CA, 206 m: 11.VI.2004, DB, 1 ex (CNBFVR). Iglesias, Carraras, cave n. 1 without cadastre number: 4.V.1967, VS, 1 ex (CMZ). Perdu Pippiu, Teulada, "Grotta di Perdu Pippiu" 633 Sa/CA, 74 m, in the left branch, under stone: 30.IV.2006, ME, 1 ex (GSS). Cagliari prov.: "Carbonia, Su Porcili, Grotta dei Fiori 218 Sa/CA, 24.X.2004, E. Lana leg.", 1 larva (GSS) [in Lana *et al.* 2006: 44 under *Scutigera* sp.].

**General distribution.** Europe: Albania, Austria, Bosnia and Herzegovina, Bulgaria, Croatia (including Cherso Is.), Czech Republic, France (mainland, Corsica), Germany (southern), Greece (mainland, insular including Crete), Hungary (southern), Italy (mainland, Sicily, Sardinia), Republic of Macedonia, Malta, Montenegro, Portugal (mainland), Romania, Russia, Serbia, Slovak Republic, Slovenia, Spain (mainland, Balearic Isl.), Sweden, Switzerland, Ukraine (including Crimea); North Africa: Algeria, Egypt, Libya, Morocco, Tunisia; West Asia: Azerbaijan, Georgia, Iran, Irak, Jordan, Lebanon, Palestine, Syria, Turkey; Central Asia: Turkmenistan. Introduced in central and northern Europe (British Isl., Channel Is.?, mainland Denmark, north and central France, The Netherlands), Atlantic islands (Azores Isl., Bermuda Isl., Cabo Verde Isl., Canary Isl., Madeira Is., Salvage Isl., St. Elena Is.); Austral Africa (Angola, Cameroon, Kenya, Mozambique, Republic of South Africa, Tanzania, Zimbabwe); North (Canada, USA), Central (Mexico) and

South (Argentina, Uruguay) Amerca; South–east Asia (Taiwan, Vietnam) (Stoev & Geoffroy 2004; Andersson *et al.* 2008).

**Chorotype.** Centralasiatic-Mediterranean.

**Ecological notes.** 0–870 m; mostly in open or semi-open Mediterranean habitats (one record from garrigue), but also in agricultural habitats (vineyards, one site with many records), in *Eucalyptus* sp. plantations (one record) and in human settlements (one record); also in caves (8 sites, 70–200 m; subtrogliphilic species).

**Remarks.** The material quoted under *Scutigera* sp. by Lana *et al.* (2006) from Carbonia, Su Porcili, “Grotta dei Fiori” 218 Sa/CA, has been here examined and refers to this species.

## Order LITHOBIOMORPHA Pocock, 1895

### Henicopidae Pocock, 1901

#### *Lamyctes* Meinert, 1868

#### 2. *Lamyctes emarginatus* (Newport, 1844)

##### Literature records

None.

##### Material examined

**Epigeic.** Sassari prov.: Sorso, Azienda Nali, mixed orchard, pitfall traps: 23.V.1997, leg.?, 2 ♀♀ (IEASS); 3.VI.1997, 2 ♀♀ (IEASS); 6.VI.1997, 3 ♀♀ (IEASS); 12.VI.1997, 2 ♀♀ (IEASS); 2.VII.1997, 2 ♀♀ (IEASS); 10.VII.1997, 1 ♀ (IEASS); 22.XII.1997, 2 ♀♀ (IEASS); 7.I.1998, 1 ♀ (IEASS); 13.I.1998, 1 ♀ (IEASS); 10.II.1998, 1 ♀ (IEASS); 18.II.1998, 1 ♀ (IEASS); 10.III.1998, 2 ♀♀ (IEASS); 13.V.1998, 1 ♀ (IEASS); 1.VI.1998, 1 ♀ (IEASS); 19.VI.1998, 1 ♀ (IEASS). Cagliari prov.: Villasor, vineyard Giviamolas (turfed), pitfall traps: 14.III.2003, FS, 1 ♀ (IEASS); 28.V.2003, FS, 1 ♀ (IEASS); 2.VII.2003, FS, 3 ♀♀ (IEASS); 26.V.2004, FS, 7 ♀♀ (IEASS); 2.VII.2004, FS, 4 ♀♀ (IEASS).

**Cave.** No records.

**General distribution.** Species of Australasian origin (western and southern Australia including Tasmania; also known in New Caledonia, New Zealand, Chatham, Fiji and Kermadec Isl. but probably not indigenous), now cosmopolitan as introduced throughout temperate parts of North America, including Greenland and Newfoundland, in the Canary, Azores and Faroe Isl., Iceland, Europe, Near East, North Africa, East Africa, north–east Asia, Kurile and Hawaii Isl., South America (Brazil) (see, e.g., Mesibov 1986; Eason 1992; Hollington & Edgecombe 2004; Andersson *et al.* 2008).

**Chorotype.** Cosmopolitan.

**Ecological notes.** Although no data have been recorded, elevation preferences of this species in Sardinia probably range between 20 and 130 m; in agricultural habitats (mixed orchards, 1 site; vineyards, 1 site).

**Remarks.** No previous records for this species in Sardinia.

### Lithobiidae Newport, 1844

#### *Eupolybothrus* Verhoeff, 1907

##### Subgenus *Eupolybothrus* Verhoeff, 1907

#### 3. *Eupolybothrus (Eupolybothrus) fasciatus* (Newport, 1845)

- 1) *Eupolybothrus fasciatus* (Newport, 1845): Minelli 1983a: 13.
- 2) *Eupolybothrus fasciatus* (New. 1845) [sic]: Minelli 1983b: 407.
- 3) *Eupolybothrus fasciatus* (Newport, 1845): Foddai *et al.* 1995: 5.
- 4) *Eupolybothrus fasciatus* (Newport, 1845): Foddai *et al.* 1996: 360, tab. I.
- 5) *Eupolybothrus fasciatus* (Newport, 1845): Zapparoli & Minelli 2005: CD.

#### Literature records

**General.** Sardinia (2, 3, 4).

**Epigeic.** Sassari prov.: Olbia, 30 km SE (1, 5).

**Cave.** No records.

#### Material examined

No records.

**General distribution.** Europe: Italy (mainland; Sardinia and Aeolian Isl., introduced) (Foddai *et al.* 1995).

**Ecological notes.** Epigeic species, no data on the Sardinian population/s.

**Remarks.** Apparently an unreliable record. Although data from Sardinia have been considered as probably related to unintentional anthropogenic introductions (Foddai *et al.* 1995), possibly in recent times, a label error is also possible. Subgeneric assignment according to Jeekel (1967).

#### Subgenus *Allopolybothrus* Verhoeff, 1907

#### 4. *Eupolybothrus* (*Allopolybothrus*) *nudicornis* (Gervais, 1837)

- 1) *Lithobius grossipes* C. Koch: Fanzago 1881b: 3.
- 2) *Lithobius impressus* C. Koch: A. Costa 1885: 9.
- 3) *Lithobius impressus* F. [sic] Koch: Berlese 1890: 1.
- 4) *Lithobius* (s. s.) *impressus* C. Koch: Silvestri 1898: 681 [pars].
- 5) *Polybothrus impressus* Koch [sic]: Verhoeff 1925a: 656.
- 6) *Bothropolys* (*elongatus*? Newp.): Manfredi 1953: 99.
- 7) *Bothropolys* (*Parapolybothrus*) *elongatus* Newp. subsp. *sardus* Manfredi 1956: 207, figs 4a, 4b.
- 8) *Eupolybothrus elongatus* (Newp.): Matic 1967: 78.
- 9) *Eupolybothrus elongatus* (Newp.): Cerruti 1968: 232.
- 10) *Bothropolys* (*Parapolybothrus*) *elongatus sardus* Manfr., 1956: Cerruti 1968: 232.
- 11) *Eupolybothrus elongatus* (Newport): Puddu & Pirodda 1974: 176.
- 12) *Bothropolys* (*Parapolybothrus*) *elongatus* Newp. subsp. *sardus* Manfredi 1956: Manfredi 1976: 231.
- 13) *Eupolybothrus* (*Allopolybothrus*) *elongatus* (Newport, 1849): Minelli 1978a: 153.
- 14) *Eupolybothrus impressus* (C.L. Koch): Eason 1980: 22.
- 15) *Bothropolys* sp.: De Miranda Restivo 1982: 173.
- 16) *Eupolybothrus elongatus sardus* Manfredi, 1956: Cassola 1982: 670, 695, 708.
- 17) *Eupolybothrus elongatus sardus* Manfredi 1956: De Miranda Restivo 1983: 112.
- 18) *Eupolybothrus elongatus* New. 1849 [sic]: De Miranda Restivo 1983: 112.
- 19) *Eupolybothrus grossipes* Koch 1874 [sic]: De Miranda Restivo 1983: 112.
- 20) *Eupolybothrus nudicornis* (Gervais 1873): De Miranda Restivo 1983: 113.
- 21) *Eupolybothrus tridentinus* Fanzago 1874 [sic]: De Miranda Restivo 1983: 113.
- 22) *Lithobius impressus* Koch 1841: De Miranda Restivo 1983: 115.
- 23) *Eupolybothrus nudicornis* (Gervais, 1837): Minelli 1983a: 12.
- 24) *Eupolybothrus nudicornis* (Gerv. 1837): Minelli 1983b: 407.
- 25) *Eupolybothrus* cfr. *nudicornis* (Gervais, 1837): Minelli 1985: 36.
- 26) *Eupolybothrus nudicornis corsicus* Leg. e Dub. [sic]: De Miranda Restivo & Guaita 1986: 32.



- 27) *Eupolybothrus nudicornis* (Gervais, 1837): Minelli *et al.* 1994: 498.  
 28) *Eupolybothrus* (*Allopolybothrus*) *nudicornis* (Gervais, 1837): Grafitti & Zapparoli 1995: 123.  
 29) *Eupolybothrus nudicornis* (Gervais, 1837): Foddai *et al.* 1995: 5.  
 30) *Bothropolys* (*Parapolybothrus*) *elongatus* Newp. subsp. *sardus* Manfredi, 1956: Leonardi 1995: 137.  
 31) *Eupolybothrus nudicornis* (Gervais, 1837): Foddai *et al.* 1996: 360, tab. I.  
 32) *Eupolybothrus nudicornis*: Mucedda *et al.* 2002: 30.  
 33) *Eupolybothrus nudicornis* (Gervais, 1837): Zapparoli & Minelli 2005: CD.  
 34) *Eupolybothrus nudicornis* (Gervais, 1837): Grafitti & Merella 2008: 88, 89.

## Literature records

**General.** Sardinia-Corsica (13). Sardinia (3, 5, 16, 18, 24, 29, 30, 31).

**Epigeic.** Sassari prov.: Asinara Is. (31); ibidem, Rio Baddi Longa (27, 33). Bono, Passo o'Uccaidu [emendation for Succheddu], 1000 m (20, 33). Bortigali, Mulargia, 600 m (23, 33). Giave (1, 4, 19, 22, 33). Maddalena Is. (20, 27, 31, 33). Molaria Is. (23, 33). [Monte] Limbara, Punta Balistreri, 1300 m (20, 33); ibidem, Vallicciola, 1000 m (33). Razzoli Is. (27, 31, 33). Sassari, surroundings (1, 4, 18, 19, 21, 22, 33). Sorso (1, 4, 19, 22, 33). Spargiotto Is. (27, 31, 33). Taniga (1, 4, 22, 33). Tempio Pausania (14, 33). Nuoro prov.: Aritzo (23, 33). Dorgali, Codula Ilune (33). Gennargentu (4, 22). Isili (4, 22). Macomer, Monte Sant'Antonio, *Quercus ilex* wood (15). Meana [Sardo] (2). Monte Spada, 1400 m (23, 33). Nuragus (33) Orani (23, 33). Siniscola, between La Caletta and Siniscola (33). Oristano prov.: Asuni (20). Oristano (2, 23, 33). Samugheo (33). Villaurbana (4, 22, 33). Cagliari prov.: Burcei, 1000 m (23, 33). Cagliari (2, 4, 18, 20, 22, 33). Cala di Torre Regina (23, 33). Colle di San Michele (23, 33). Monte [dei] Sette Fratelli (23, 33). Muravera, Nuraghe Soro (20, 33). Pula (2). San Nicolò Gerrei, Rio Mannu (23, 33). San Pietro Is. (31, 33); ibidem, Carloforte (23, 33); ibidem, pond of Cala Vinagra [emendation for Vinogra] (27, 33). Sardara (23, 33); ibidem, Rio Setti (33). Sarrabus [area] (4, 22). Senorbì, Rio Cardaxius (20, 33). Villamar (33).

**Cave.** Sassari prov.: Laerru, Giannas 'e Sinisi, "Grotta Su Coloru" 28 Sa/SS, 370 m (6, 9, 11, 25, 28, 32, 33). Nuoro prov.: Gadoni, Gruttas Albas, "Grotta del Bandito" 236 Sa/NU, 500 m (11, 33). Oliena, Cannagosula, "Grotta Su Guanu" or "Grotta del Guano" 103 Sa/NU, 95 m (type locality of *Bothropolys* (*Parapolybothrus*) *elongatus sardus* Manfredi, 1956) (12, 7, 8, 10, 11, 18, 25, 28, 33). Cagliari prov.: Carbonia, Su Niu 'e S'Acchili, "Grotta della Campana 2" or "Grotta di Cannas" 127 Sa/CI [= 127 Sa/CA] (34). Domusnovas, Monte Acqua, "Grotta di San Giovanni" 81 Sa/CI [= 81 Sa/CA], [206 m] (26). Santadi, Monte Meana, "Grotta di Monte Meana" 2478 Sa/CI [= 2478 Sa/CA] (34).

## Material examined

**Epigeic.** Sassari prov.: Bono, Passo o'Uccaidu, 1000 m: 31.III.1972, PB, 3 exx (CMZ\*); 31.III.1972, AVT, 1 ex (CMZ\*). [Monte] Limbara, Punta Balistreri, 1300 m: 3.III.1972, PB, 2 exx (CMZ\*); ibidem, Punta Balistreri, 1330 m, 40°51'07.3"N 9°10'37.9"E (WGS84): 30.IV.2008, RA & ST, 1 ♀ (CMZ); ibidem, Vallicciola, 1000 m: 30.III.1972, AVT, 1 ex (CMZ\*). Nuoro prov.: Arzana, Bruncu Spina, 1800 m, garrigue: 19.IV.1996, AVT, 2 imm. ♂♂ (CMZ\*). Arzana, Monte Tuvara, 1000 m: XI.2007, DC, 1 ♀ (CFF). Belvì, walnut orchard Chiesa, 600 m, pitfall traps: 4.X.2007, FI, 1 ♀ (IEASS). Dorgali, River Cedrino: 24.V.1980, CM, 4 exx (CMZ). Esterzili, soil washing and Berlese extraction: 1.XII.2006, LF, 1 ♀ (CMZ). Fonni, Rio Aratu: 6.VI.1992, AC, 1 ex (CMZ). Gairo, Monte Perda Liana, 1219 m, 32S 0535096 4417848, hand searching: 16.V.2008, NABT, 1 ♂ (CNBFVR). Gennargentu, Bruncu Spina, 1300 m, hand searching: 22.V.1980, AVT, 6 ♂♂, 10 ♀♀ (CMZ\*); 22.V.1980, MB, 1 ♂, 2 ♀♀, 2 imm., 3 larvae (CMZ\*); 22.V.1980, MZ, 1 ex (CMZ\*); ibidem, 1400 m: 25.V.1980, FB, 3 exx (CMZ\*); ibidem, 1300–1500 m: 21.V.1980, MB, 1 ♂, 1 ♀ (CMZ\*). Genoni: without date, leg.?, 6 imm. "*Lithobius piceus* L. Koch" F. Silvestri det. (MGE). Laconi: 4.XII.2001, LF, 1 ♂, 1 ♀ (CMZ). Monte Spada: 17.V.1982, GC, 1 ♀ (CMZ). Nuragus: 10.IV.1971, AVT, 5 imm. (CMZ\*). Orgosolo, 800 m: 14.V.1982, GC, 1 ex (CMZ). Seui: 7.V.1902, DO, 1 ♂ "*Lithobius* sp." F. Silvestri det. (MGE). Oristano prov.: Asuni: 25.I.1971, AVT, 2 exx (CMZ); 20.II.1971, AVT, 6 exx (CMZ); ibidem, Samugheo: 22.II.1971, AVT, 2 exx (CMZ\*). Cagliari prov.: Burcei, 631 m, 32S 05228639 4356008, hand searching: 13.XI.2006, BNWZ, 1 imm., 1 larva (CMZ). Burcei, surroundings, 725 m, 32S

0528219 4356591, hand searching: 13.XI.2006, BNWZ, 1 imm. ♂ (CNBFVR); ibidem, under stones in pine wood edge: 13.XI.2006, GN, 1 ♂, 2 imm. (CNBFVR); ibidem, near Punta Serpeddì, 785 m, 32S 0526996 4356738, under stones in *Quercus ilex* wood: 13.XI.2006, BNWZ, 1 imm. (CNBFVR). Domusnovas, Lago Siuru, 322 m, 32S 0467069 4357916, under stones: 15.XI.2006, BNW, 1 imm. (CNBFVR). Domusnovas, Sa Duchessa, 371 m, 32S 0464990 4358384, hand searching, under stones: 23.III.2006, BBCW, 3 imm. (CNBFVR). Domusnovas, Valle di Oridda: 28.II.1971, AVT, 1 imm. (CMZ); ibidem, 592 m, 32S 0466973 4362228, hand searching, under stones: 23.III.2006, BBCW, 3 ♂♂, 2 ♀♀ (CNBFVR); ibidem, 643 m, 32S 0465399 4362770, under stones: 7.VI.2004, GN, 2 ♂♂, 1 ♀ (CNBFVR). Muravera, Nuraghe Soro: 28.III.1971, AVT, 1 ex (CMZ\*). Iglesias, Conca Margiani, 725 m, 32S 0462470 4357011, clearing: 15.XI.2006, BNW, 1 ex (CNBFVR). Maracalagonis, near a cave: 10.II.2008, FF & PP, 2 ♀♀ (CFF). Pimentel: 4.IV.1971, AVT, 1 imm. (CMZ). Sardara, Rio Setti: 12.IV.1971, AVT, 1 ex (CMZ\*). Senorbì, Rio Cardaxius, 4.IV.1971, AVT, 1 ex (CMZ\*). Sinnai, Sa Siliqua: 27.X.2007, DC & FF, 1 ♀ (CFF). Villacidro, Rio Cannisoni, 390 m, 32S 0469095 4362383, hand searching: 9.XI.2006, BBCW, 1 imm. ♂ (CNBFVR); 9.XI.2006, MZ, 1 imm. (CMZ). Villacidro, near River Leni, 300 m, 32S 0469793 4361088, under stones in *Eucalyptus* sp. plantation: 9.XI.2006, BNWZ, 1 imm. (CNBFVR). Villacidro, Rio Cannisoni, 390 m, 32S 0469095 4362383, 20.V.2008, hand searching, NABT, 1 ♂ (CNBFVR). Villamar: 20.II.1971, AVT, 1 ex (CMZ\*).

**Cave. Oristano prov.:** Cuglieri, Tegas, “Grotta di Cappas” 181 Sa/OR, 197 m, under a stone, in the left branch, 25 m from entrance: 2.IV.2005, GG & CL, 1 imm. ♂ (GSS); ibidem, under a stone, in the main branch, 50 m from entrance: 5.XI.2005, GG, 1 larva with 8 lp (GSS). **Cagliari prov.:** Carbonia, Su Niu ‘e S’Acchili, “Grotta della Campana 2” or “Grotta di Cannas” 127 Sa/CA, 130 m: 4.VI.2006, MG, 1 larva with 10 lp (GSS). Domusnovas, Monte Acqua, “Grotta di San Giovanni” 81 Sa/CA, 206 m: 11.XI.2006, DW, 1 ♀ (CMZ). Santadi, Monte Meana, “Grotta di Monte Meana” 2478 Sa/CA: 11.I.2004, CO, 1 imm., 1 larva (GSS). Santadi, Punta Su Campu ‘e Su Casteddu, “Grotta della Scaletta” or “Grotta de Sa Scala” 2705 Sa/CA, 780 m: 10.III.2007, GG, 1 larva with 10 lp (GSS).

**Other. Nuoro prov.:** “*Lithobius impressus* L. Koch”, “M. Gennargentu/Magg. 1871/R. Gestro [leg.]”, 2 ♂♂, 2 ♀♀ [in Silvestri 1898: 681 under *Lithobius* (s. s.) *impressus* C. Koch] (MGE). “*Lithobius impressus*, C. Koch/Isili”, 1 ♂, 2 ♀♀ together with 1 ♀ of *L. castaneus* [in Silvestri 1898: 681 under *Lithobius* (s. s.) *impressus* C. Koch] (MGE). **Cagliari prov.:** “*Lithobius impressus*, L. Koch”, “Sarrabus/Magg. [18]73/R. Gestro”, 2 ♂♂, 1 ♀ together with 1 ♀ of *L. castaneus* [in Silvestri 1898: 681 under *Lithobius* (s. s.) *impressus* C. Koch] (MGE).

**General distribution.** Europe: France (mainland, Corsica), Italy (mainland, Sicily, Sardinia), Malta; reported also from Spain, but record needs confirming. North Africa: Algeria (north), Morocco (north–east), Tunisia (north).

**Chorotype.** W-Mediterranean.

**Ecological notes.** 0–1800 m; thermophilous species but few data from oakwoods (*Quercus ilex*, 2 sites), pine (1 site) and *Eucalyptus* sp. plantations (1 site) as well as garrigue (1 site) and agricultural habitats (walnut orchards, 1 site) are available; a vague record from open habitats (1 site) is also known; sometimes in caves (7 sites, 95–780 m; troglone species). One record from an endogeous habitat. See also De Miranda Restivo (1982).

**Remarks.** Except for the uncertain records of *Eupolybothrus fasciatus*, this is the only species of the genus present in the study area. Records from Sardinia published under *E. impressus* (C. L. Koch, 1841) or *E. elongatus* (Newport in Lucas, 1849) by the Authors (also in *Lithobius* Leach, 1814, in *Bothropolys* Wood, 1862 or in *Polybothrus* Latzel, 1880) are here listed under *E. nudicornis* according to the synonymies supposed by Jeekel (1967) but formerly proposed by Silvestri (1896a, 1897). The identity of *E. impressus* and *E. elongatus* and their possible synonymy with *E. nudicornis* have been also discussed in Eason (1972a, 1972b, 1980). Among the subspecies described for *elongatus* is *sardus* Manfredi, 1956, only known from the type locality (Oliena, Cannagosula, “Grotta Su Guanu” 103 Sa/NU), the identity of which needs to be confirmed in the framework of a complete revision of the group (Eason 1972a). The above records of *E.*

*grossipes* (C. L. Koch, 1847) and *E. tridentinus* (Fanzago, 1874) are certainly due to misidentification as the two species only occur in continental Europe (e.g., Eason 1982; Zapparoli & Minelli 2005), and they must be referred to *E. nudicornis*. To this species are also referred the specimens quoted under *Bothropolys* sp. and *Eupolybothrus nudicornis corsicus* (Legér & Duboscq, 1903) in De Miranda Restivo (1982) and De Miranda Restivo and Guaita (1986), respectively. Part of the material from Sardinia published by Silvestri (1898) under *Lithobius impressus* C. L. Koch, 1841 (specimens from Gennargentu, Isili and Sarrabus) has been re-examined and must be referred partly to this species, partly to *L. castaneus* Newport, 1844 (see below). Subgeneric assignment according to Jeekel (1967).

## ***Lithobius* Leach, 1814**

### **Subgenus *Lithobius* Leach, 1814**

#### **5. *Lithobius (Lithobius) aligherus* Manfredi, 1953**

- 1) *Lithobius*: Patrizi, 1952: 18.
- 2) *Lithobius doderoi aligherus* Manfredi 1953: 98.
- 3) *Lithobius doderoi*: Patrizi 1956a: 190.
- 4) *Lithobius doderoi aligherus* Manfr.: Patrizi 1956b: 203.
- 5) *Lithobius doderoi* Silv. subsp. *aligherus*: Manfredi 1956: 205.
- 6) *Lithobius doderoi alighericus* [sic] Manfr., 1953: Cerruti 1968: 231.
- 7) *Lithobius doderoi aligherus* Manfredi: Brignoli 1972: 200.
- 8) *Lithobius doderoi aligherus* Manfredi, 1956 [sic]: Puddu & Pirodda 1974: 176.
- 9) *Lithobius doderoi* Silv. subsp. *aligherus* Manfredi, 1953: Manfredi 1976: 231.
- 10) *Lithobius doderoi aligherius* [sic]: Badini 1977: 90.
- 11) *Lithobius doderoi aligherus* Manfredi, 1953: Cassola 1982: 632, 707.
- 12) *Lithobius doderoi aligherus* Manfredi 1953: De Miranda Restivo 1983: 112.
- 13) *Lithobius doderoi aligherus* Manfredi 1953: Minelli 1983b: 403, 407.
- 14) *Lithobius doderoi aligherus* Manfredi, 1953: Grafitti 1983: 46.
- 15) *Lithobius (Lithobius) doderoi* Silvestri, 1907: Minelli 1985: 38 [pars].
- 16) *Lithobius doderoi aligherus* Manfr.: Grafitti & Mucedda 1988: 30.
- 17) *Lithobius doderoi aligherus*: Prota & Floris 1989: 92.
- 18) *Lithobius (Lithobius) piceus verhoeffi* Demange, 1958: Grafitti & Zapparoli 1995: 127.
- 19) *Lithobius doderoi aligherus* Manfredi, 1953: Foddai *et al.* 1995: 6.
- 20) *Lithobius doderoi* Silv. subsp. *aligherus* Manfredi, 1953: Leonardi 1995: 138.
- 21) *Lithobius piceus verhoeffi* Demange, 1958: Foddai *et al.* 1995: 6 [pars].
- 22) *Lithobius doderoi aligherus* Manfredi, 1953: Foddai *et al.* 1996: 360, tab. I.
- 23) *Lithobius doderoi aligherus*: De Waele & Grafitti 2000: 85.
- 24) *Lithobius aligherus* Manfredi, 1953: Zapparoli 2001: 38, figs 1–4.
- 25) *Lithobius aligherus*: Grafitti 2001a: 23.
- 26) *Lithobius doderoi aligherus* Manfr.: Grafitti & Mucedda 2001: 34.
- 27) *Lithobius doderoi aligherus*: Grafitti 2002: 275.
- 28) *Lithobius doderoi aligherus*: Mucedda *et al.* 2002: 30.
- 29) *Lithobius aligherus* Manfredi, 1953: Zapparoli & Minelli 2005: CD.  
not *Lithobius doderoi alighericus* [sic]: Puddu 1970: 85, 88.

#### **Literature records**

**General.** Sardinia (11, 13, 19, 20, 21, 22).

**Epigeic.** No records.

**Cave.** Sassari prov.: Capo Caccia, “Grotta Verde” 3 Sa/SS, 90 m (type locality of *Lithobius doderoi aligherus* Manfredi, 1953) (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 15, 16, 17, 18, 23, 24, 25, 26, 27, 28, 29).

## Material examined

**Epigeic.** No records.

**Cave.** Sassari prov.: Alghero, Capo Caccia, “Grotta Verde” 3 Sa/SS, on the cave floor, in the main branch, near the big stalagmites: 7.X.2001, MM, 3 imm. ♂♂ (GSS); 13.IV.2002, MM, 1 ♂ (GSS).

**General distribution.** Europe: Italy (Sardinia).

**Chorotype.** Sardinian endemic, W-Mediterranean affinities.

**Ecological notes.** Found only in the cave “Grotta Verde” 3 Sa/SS, Sassari province; probably a eutroglophilic species.

**Remarks.** A revision of the identity of this species has been published by Zapparoli (2001). The record under “*Lithobius*” quoted in Patrizi (1952) refers to this species, whereas the quotation of *L. doderoi alighericus* [sic] from Ussassai, “Grotta di Tacchixeddu”, Nuoro province published in Puddu (1970) refers to *L. doderoi* (see below). Included in the list of threatened invertebrate troglobitic species of Italy by Priano (1992).

## 6. *Lithobius (Lithobius) castaneus* Newport, 1844

- 1) ? *Lithobius Fanzagoi* Fedrizzi: Fanzago 1881b: 5 [pars?].
- 2) *Lithobius audax* Meinert: Fanzago 1881b: 9.
- 3) *Lithobius audax* Mein.: A. Costa 1885: 9.
- 4) *Lithobius* (s. s.) *impressus* C. Koch: Silvestri 1898: 681 [pars].
- 5) ? *Lithobius* (s. s.) *piceus* L. Koch: Silvestri 1898: 682 [pars?].
- 6) *Lithobius (Archilithobius) audax* Mein.: Silvestri 1898: 683.
- 7) *Lithobius castaneus* N.: De Miranda Restivo 1978: 41.
- 8) *Lithobius (Lithobius) castaneus* Newport, 1844: Minelli 1978a: 154.
- 9) *Lithobius castaneus* Newport: Eason 1980: 23, fig. 1.
- 10) *Lithobius castaneus* Newport: De Miranda Restivo 1982: 172, 174.
- 11) *Lithobius audax* (Mein 1872) [sic]: De Miranda Restivo 1983: 113.
- 12) *Lithobius castaneus* New. 1844 [sic]: De Miranda Restivo 1983: 114.
- 13) *Lithobius castaneus* Newport, 1844: Minelli 1983a: 14.
- 14) *Lithobius castaneus* Newp. 1844 [sic]: Minelli 1983b: 408.
- 15) *Lithobius castaneus* Newp.: De Miranda Restivo 1986: 44, 45.
- 16) *Lithobius castaneus* New.: De Miranda Restivo & Guaita 1986: 35, 36, 37, 41.
- 17) *Lithobius castaneus*: Minelli & Iovane 1987: 28, 30.
- 18) *Lithobius castaneus* Newport, 1844: Minelli *et al.* 1994: 498.
- 19) *Lithobius castaneus* Newport, 1844: Foddai *et al.* 1995: 5.
- 20) *Lithobius (Lithobius) castaneus* Newport, 1844: Grafitti & Zapparoli 1995: 124.
- 21) *Lithobius castaneus* Newport, 1844: Foddai *et al.* 1996: 360, tab. I.
- 22) *Lithobius castaneus* Newport, 1844: Grafitti 1996: 42, 45.
- 23) *Lithobius castaneus* Newport, 1844: Zapparoli & Minelli 2005: CD.
- 24) *Lithobius castaneus* Newport, 1844: Grafitti & Merella 2008: 90.

## Literature records

**General.** Sardinia-Corsica (8). Sardinia (14, 19, 21).

**Epigeic.** Sassari prov.: Asinara Is. (21, 23); ibidem, Elighemannu (18). Bono, Passo o’Uccaidu (23). Caprera Is. (21); ibidem, N of Monte Teialone (18, 23). Lago di Coghinas (13, 23). Maddalena Is. (21); ibidem, La Maddalena (18, 23); ibidem, La Trinità (18, 23). Molara Is. (13, 18, 21, 23). [Monte] Limbara (12, 23); ibidem, meadow and mosses (13); ibidem, Punta Balistreri, 1300 m (23); ibidem, Vallicciola (23). Nughedu di San Nicolò, 700–800 m (13, 23); ibidem, Monte Sefraigada, 1000 m (13, 23). Oddastru, *Pistacia lentiscus*, *Quercus ilex*, *Cistus* sp. (13, 23). Oschiri, surroundings, 646 m, *Quercus ilex* (13, 17, 23). Porto Torres, along the beach (10, 6, 11, 23). Portobello [di Gallura] (13, 23). Santa Maria Is. (18, 21, 23). Santa

Teresa di Gallura (13, 23); ibidem, Rena Majore (23). Santo Stefano Is. (18, 21, 23). Sassari, surroundings (1, 2, 5, 11, 12, 23). Spargi Is. (18, 21, 23). Tavolara Is. (13, 18, 21, 23). Tempio Pausania (9, 12, 23). Trinità d'Agultu, Paduledda (23). Nuoro prov.: Arcu Correboi, 1300 m, mosses near a stream (13, 23). Aritzo (3, 6, 11, 13, 23). Bortigali, Mulargia, 600 m (13, 23). Desulo (9, 12, 23). Dorgali (12). Dorgali, Rio Flumineddu, *Alnus* sp. and *Nerium oleander* (10). Dualchi, 400 m (23). Fonni (3, 6, 11, 23). Fonni, 4 km N (13, 23). Fonni, Monte Spada, 1300 m (13, 23). Fonni, S'Arcu de Tascussi (13, 23). Gennargentu, Bruncu Spina, 1829 m (13, 23); ibidem, valley Sa Rutta (3). Lago di Gusana, mosses and humus near the lake (13, 23). Macomer, Monte Sant'Antonio, *Quercus ilex* wood (10). Monte Albo, Monte Turuddò (23). Oliena (9, 12, 23). Sorgono (9, 12, 23). Punta Cupetti, N slope, 700 m (23). Tonara (9, 12, 23); ibidem, 1.5 km N (13, 23). Oristano prov.: Asuni (23). Monte Arci (23). Monte Ferru (13, 23). Cagliari prov.: Guspini, meadow with *Pistacia lentiscus* (13, 17, 23). Isili (4). Monte [dei] Sette Fratelli (12); ibidem, NW slope, maquis, 300 m (15); ibidem, *Quercus ilex* and *Phyllirea*, 500 m (7, 15). Sarrabus [area] (4). Villaputzu, Castle of Ruirra (23).

**Cave.** Sassari prov.: Bonorva, Rebeccu, "Grotta di Rebeccu" 774 Sa/SS, 350 m (20, 23). Ploaghe, Salvenero, "Grotta dell'Ombrello" (= "Grotta Sa Corona 'e Salighe") without cadastre number, 300 m (20, 23). Pozzomaggiore, Valle di Androliga, "Grotta Androliga" 142 Sa/SS (20, 23). Nuoro prov.: Dorgali, Su Anzu, "Grotta Scavi Taramelli" or "Grotta Nona di Iscala de Su Anzu" (= "Grotta Sos Jocos") 344 Sa/NU, 171 m (20, 23). Lula, Monte Albo, "Grotta Conca 'e Crapa" 30 Sa/NU, 1040 m (20, 22, 23). Cagliari prov.: Fluminimaggiore, "Grotta di San Pietro" 605 Sa/CA (16). Iglesias, "Grotta III di Monte Figù" 631 Sa/CA (16). Iglesias, "Grotta V di Monte Figù" 635 Sa/CA (16). Nuxis, Tattinu, "Grotta Sa Cava Romana" (= "Grotta Sa Serra de Is Fossas") 601 Sa/CA, 225 m (16, 20, 23). Teulada, Piscinas, "Grotta Fossa de Lurdagu" 1469 Sa/CA (24). Orbai – S'Arridelaxiu, Domus de Maria, "Grotta presso sorgente di Orbai" 1428 Sa/CA (24).

### Material examined

**Epigeic.** Sassari prov.: Bono, Passo o'Uccaidu, 1000 m: 31.III.1972, PB, 4 ex (CMZ\*). Buddusò, hand searching: 25.V.1980, MZ, 1 ♂, 1 ♀, 1 ex (CMZ). Cantoniera Gaddari: 30.III.1977, PB, 2 ex (CMZ). Capo Coda Cavallo, anthropized coast habitats, hand searching: 21.V.1994, MZ, 1 ♂ (CMZ). Maddalena Is., "Raccolte Zoologiche R.N.I. Washington, Com.te [= Captain] Cassanello": X.1893, 1 ♂ (MGE). Monte Ferru, N slope, *Quercus ilex* wood, hand searching: 27.VI.2000, MZ & MB, 1 ♀ (CMZ). Monte Limbara, near the summit, 1200 m: 3.VI.1992, AC, 1 ex (CMZ); ibidem, Punta Balistreri, 1300 m: 30.III.1972, PB, 1 ex (CMZ\*); ibidem, Vallicciola, 1000 m: 30.III.1972, AVT, 1 ex (CMZ\*). Romana, slopes of Monte Frusciu: 29.IV.2008, RA, PM & ST, 1 ♀ (CMZ). Sassari, Scala di Giocca: I.1899, GD, 1 ♂, 1 ♀ (MGE). Su Padru: 6.VII.2002, leg.?, 1 ♂ (CMZ). Tempio Pausania: IV.1903, CF, 1 ♀ (MGE). Usini: 13.VII.2002, leg.?, 1 ♂ (CMZ). Villanova, Monteleone, soil washing and Berlese extraction: 15.XI.2006, LF, 1 ♂, 1 ♀ (CMZ). Nuoro prov.: Aritzo: 1.XI.1989, MC, 1 ex (CMZ). Desulo, *Quercus pubescens* wood, 1000 m, hand searching: 19.V.1994, MZ, 1 ♀ (CMZ). Desulo (refuge), Gennargentu, 1600 m, *Juniperus* sp. shrub, pitfall traps: 15.I.2007, FI, 1 ♀ with 2+3 spurs on gonopods (IEASS). Dorgali, River Cedrino, hand searching: 24.V.1980, MZ, 1 ♂ (CMZ). Fonni, 6 km S: 19.V.1994, MB, 1 imm. ♀ (CMZ). Fonni (refuge), Gennargentu, 1600 m, *Alnus* sp. shrub, pitfall traps: 26.IX.2006, FI, 1 ♀ (IEASS); 10.X.2006, FI, 1 ♀ (IEASS); 9.I.2007, FI, 1 ♂ (IEASS); 19.VI.2007, FI, 1 ♂, 1 imm. ♀ (IEASS); 1.VII.2007, FI, 1 ♂ (IEASS). Fonni (refuge), Gennargentu, 1600 m, *Juniperus* sp. shrub, pitfall traps: 19.VI.2007, FI, 1 ♀ (IEASS). Gavoi, Lago di Gusana, hand searching: 19.V.1994, MZ, 1 larva (CMZ). Gennargentu, Bruncu Spina, 1800 m, hand searching: 22.V.1980, AVT, 5 ex (CMZ); 22.V.1980, MZ, 2 ex (CMZ). Gennargentu, Monte Cresia: I.1899, GD, 3 ♂♂, 5 ♀♀ (MGE). Monte Spada: 17.V.1982, GC, 2 ♀♀ (CMZ). Near Nuraghe Ladduna, S.S. 389, 25.V.1980, AVT, 4 ex (CMZ); 25.V.1980, MB, 1 ♂, 15 imm. (CMZ). Perdasdefogu, road to Tertenia (under a scrub): 4.IV.2008, CT, 1 imm. (CMZ). Seui: 7.V.1902, DO, 1 ♀ (MGE). Tonara, walnut orchard Uatzo, 600 m, pitfall traps: 29.II.2008, FI, 1 imm. (IEASS); 24.VII.2007, FI, 1 imm. ♀ (IEASS). Oristano prov.: Asuni: 22.II.1971, AVT, 2 ex (CMZ\*). Monte Arci, *Erica arborea* and *Arbutus unedo*: 1–4.III.1992, GC, 2 ex (CMZ\*); ibidem, garrigue: 1–4.III.1992, GC, 3 ex (CMZ\*); ibidem, *Quercus ilex* wood: 1–4.III.1992, GC, 1 ex (CMZ\*). Monte Ferru, Rifugio La Madunnina, between Cuglieri and Santolussorgiu, 865 m, hand searching:

27.VI.2000, MB, 1 ♂, 2 imm. (CMZ); 27.VI.2000, MZ, 5 ♂♂, 1 ♀ (CMZ). Ula Tirso, soil washing and Berlese extraction: 28.XII.2006, LF, 1 ♀ (CMZ). Cagliari prov.: Buggerru, near mine of San Luigi, 347 m, 32S 0452771 4358704, leaf-litter sifting: 11.XI.2006, MZ, 1 ♂, 1 ♀ (CMZ). Burcei, 631 m, 32S 05228639 4356008, hand searching: 13.XI.2006, MZ, 1 ♀ (CMZ); ibidem, near Punta Serpeddì, 785 m, 32S 0526996 4356738, *Quercus ilex* wood, hand searching: 13.XI.2006, MZ, 1 ♂ (CMZ); ibidem, ibidem, under stones, *Quercus ilex* wood, hand searching: 13.XI.2006, BNWZ, 1 ♀ (CNBFVR). Domusnovas, Lago Siuru, 322 m, 32S 0467069 4357916, leaf-litter sifting: 22.III.2006, MZ, 1 imm. (CMZ). Domusnovas, near Gutturu Abis, 580 m, 32S 0468140 4360761, mixed *Quercus ilex* wood, leaf-litter sifting: 10.XI.2006, MZ, 2 ♂♂ (CMZ); ibidem, under stones: 10.XI.2006, BNWZ, 1 ♀ (CNBFVR). Domusnovas, near Punta Planotzara, 309 m, 32S 0465718 4356515, under stones, *Quercus ilex* wood: 15.XI.2006, GN, 2 ♀♀ (CNBFVR). Domusnovas, Sa Duchessa (road to Perda Niedda), 350 m, 32S 04666233 435905, leaf-litter sifting: 23.III.2006, BBCW, 3 larvae (CMZ). Iglesias, Mamenga, 610 m, 32S 462170 43 56618, in calcareous soil (40–50 cm deep) in *Quercus ilex* wood, soil washing and Berlese extraction: 1.III.2006, LF, 1 imm. ♂ (CNBFVR). Iglesias, Monte San Miai, soil washing and Berlese extraction: 13.III.2006, LF, 1 ♂ (CMZ). Iglesias, near Punta Genna Ollioni, 650 m, 32S 0463293 4356570, leaf-litter sifting: 14.XI.2006, GN & MZ, 1 larva (CMZ). Monti Mannu [Punta Piscina Argiolas], 282 m, near guestrooms, under *Populus* sp., leaf-litter sifting: 14.XI.2006, MZ, 1 larva (CMZ). Sarrabus: without date, GT, 1 ♂ “*Lithobius castaneus* Newp.” F. Silvestri det. (MGE). Villacidro, Punta Fenu, 300 m, 32S 0472097 4357122, hand searching: 11.XI.2006, MZ, 1 larva (CMZ); ibidem, under stones, pinewood: 11.XI.2006, BNWZ, 1 imm. (CNBFVR).

**Cave.** Nuoro prov.: Orani, Monte Gonara “Grotta di San Francesco” 202 Sa/NU, 560 m: 15.VI.2007, PM & AC, 1 imm. ♂ (CMZ). Sadali, “Grotta de Su Guanu” [= Sadali, Foresta di Addoli, “Grotta de Is Janas” 51 Sa/NU, 780 m]: 27.V.1901, DO, 1 ♂ (MGE). Usassai, “Grotta Sa Ucca de Babois” 36 Sa/NU: 9.V.1967, VS & AVT, 1 imm. (CMZ). Cagliari prov.: Santadi, Is Zuddas, “Grotta Il Campanaccio” 2529 Sa/CA, 130 m: 14.IV.2007, ME, 1 larva (GSS).

**Other.** Nuoro prov.: “*Lithobius impressus*, C. Koch/Isili”, 1 ♀ together with 1 ♂, 2 ♀♀ of *E. nudicornis* [in Silvestri 1898: 681 under *L.* (s. s.) *impressus* C. Koch] (MGE). Cagliari prov.: “*Lithobius impressus*, L. Koch”, “Sarrabus/Magg. [18]73/R. Gestro [leg.]”, 1 ♀ together with 2 ♂♂, 1 ♀ of *E. nudicornis* [in Silvestri 1898: 681 under *L.* (s. s.) *impressus* C. Koch] (MGE).

**General distribution.** Europe: Austria (south), Bosnia and Herzegovina, Croatia, France (mainland, Corsica), Italy (mainland, Sicily, Sardinia), Malta, Portugal (mainland), Serbia, Slovenia, Spain (mainland); records from Bulgaria requires confirmation; North Africa: Algeria, Morocco, Tunisia; Central America: Guatemala (introduced, established?).

**Chorotype.** S-European.

**Ecological notes.** 0–1800 m; woodland species mostly occurring in oakwoods (*Quercus ilex*, 11 sites; *Q. pubescens*, 1 site), pinewoods (1 site) and riparian habitats (under *Populus* sp., 1 site; *Alnus* sp. and *Nerium oleander*, 1 site); also in shrub and open Mediterranean habitats (under *Pistacia lentiscus*, 1 site; *Erica arborea* and *Arbutus unedo*, 1 site; vague records from garrigue, 1 site, and maquis, 1 site, are also known) as well as in montane formations (*Juniperus* sp. shrubs, 2 sites; *Alnus* sp. shrubs, 1 site); seldom in human settlements (1 site) and orchards (1 site); sometimes in caves (14 sites, 130–1040 m; subtrogliphilic species). Four records from endogeous habitats. See also Minelli (1983a), Minelli and Iovane (1987) and De Miranda Restivo (1978, 1982, 1986).

**Remarks.** Quotations of *Lithobius audax* Meinert, 1872 published by Fanzago (1881b) and Costa (1885), afterwards copied by Silvestri (1898), are here referred to this species according to Eason (1974). The record of *L. fanzagoi* Fedrizzi, 1876a quoted by Fanzago (1881b) from the neighbourhood of Sassari and then referred to *L. piceus* by Silvestri (1898) is here tentatively assigned to *L. castaneus* only in part as Fanzago’s (1881b) description seems composite, probably based on specimens of this species and of another species of *Lithobius*, maybe *L. turritanus* (see below). Part of the material from Sardinia published by Silvestri (1898) as *Lithobius impressus* C. L. Koch, 1841 has been re-examined and must be referred partly to this species (specimens from Isili and Sarrabus, see Other material), partly to *Eupolybothrus nudicornis* (see above).

## 7. *Lithobius (Lithobius) doderoi* Silvestri, 1908

- 1) *Lithobius* (s. s.) *Doderoi* Silvestri 1908: 647.
- 2) *Lithobius Doderoi* Silv.: Manfredi 1932a: 82, 85.
- 3) *Lithobius Doderoi* Silv.: Manfredi 1932b: 14.
- 4) *Lithobius doderoi*: Wolf 1937: 183, 184.
- 5) *Lithobius doderoi* Silvestri: Wolf 1938: 527.
- 6) *Lithobius doderoi* Silvestri: Manfredi 1953: 99.
- 7) *Lithobius doderoi* Silv.: Manfredi 1956: 205.
- 8) *Lithobius doderoi alighericus* [sic]: Puddu 1970: 88.
- 9) *Lithobius doderoi* Silvestri: Brignoli 1972: 200.
- 10) *Lithobius doderoi* Silvestri: Puddu & Pirodda 1974: 176.
- 11) *Lithobius zachii* Restivo De Miranda 1978a: 143, figs 1–4.
- 12) *Lithobius (Lithobius) doderoi* Silvestri 1907: Minelli 1978a: 155.
- 13) *Lithobius doderoi* Silv.: Minelli 1982b: 98, 100.
- 14) *Lithobius doderoi* Silvestri, 1908: Cassola 1982: 629 (sub *Lithobius*), 630, 707.
- 15) *Lithobius doderoi* Silvestri, 1907: De Miranda Restivo 1983: 112.
- 16) *Lithobius zachii* De Miranda Restivo 1978: De Miranda Restivo 1983: 112.
- 17) *Lithobius zachii* Restivo de Miranda 1978: Minelli 1983b: 403.
- 18) *Lithobius doderoi* Silv. 1908: Minelli 1983b: 407.
- 19) *Lithobius doderoi* Silv.: Puddu 1983a: 33, 39.
- 20) *Lithobius (Lithobius) doderoi* Silvestri, 1907: Minelli 1985: 38 [pars].
- 21) (*L. zachii* Restivo De Miranda, 1978) [sic]: Minelli 1985: 42.
- 22) *Lithobius doderoi* Silvestri, 1907: Minelli & Iovane 1987: 17.
- 23) *Monotarsobius* [sic] *doderoi* Silvestri: Negrea & Minelli 1994: 251.
- 24) *Lithobius doderoi*: Cobolli Sbordoni *et al.* 1994: 745.
- 25) *Lithobius doderoi doderoi* Silvestri, 1907: Foddai *et al.* 1995: 6.
- 26) *Lithobius (Lithobius) doderoi* Silvestri, 1907: Grafitti & Zapparoli 1995: 125.
- 27) *Lithobius doderoi doderoi* Silvestri, 1907/8: Foddai *et al.* 1996: 360, tab. I.
- 28) *Lithobius doderoi*: Grafitti 1999a: 36.
- 29) *Lithobius (L.) doderoi*: Grafitti 1999b: 173–183.
- 30) *Lithobius doderoi*: De Waele & Grafitti 2000: 86.
- 31) *Lithobius doderoi*: Grafitti 2001a: 19.
- 32) *Lithobius doderoi* Silvestri, 1908: Zapparoli 2001: 47.
- 33) *Lithobius doderoi* Silv.: Grafitti 2002: 273, 280, 282, 291, 292.
- 34) *Lithobius doderoi* Silvestri: De Waele *et al.* 2004: 41, 46.
- 35) *Lithobius doderoi* Silvestri, 1908: Zapparoli & Minelli 2005: CD.
- 36) *Lithobius doderoi*: Lana *et al.* 2006: 45.
- 37) *Lithobius doderoi*: Grafitti 2007a: 389, 390, 391, 392, 395, 396, 399, 400.
- 38) *Lithobius* sp. prope *doderoi*?: Grafitti 2007a: 399.
- 39) *Lithobius doderoi* Silvestri: Grafitti 2009: 226, 227, 229–230, 231, 233, fig. 3.

### Literature records

**General.** Sardinia-Corsica (12). Sardinia (13, 14, 17, 18, 22, 23, 24, 25, 27).

**Epigeic.** No records.

**Cave.** Nuoro prov.: Gairo [generic quotation for the caves of the area] (39). Gairo, “Grotta degli Pseudoscorpioni” or “Grotta del Macigno” 2350 Sa/NU, 830 m (29, 32, 35, 37). Gairo, “Grotta Su Coloru” 670 Sa/NU, 825 m (29, 32, 35, 37). Gairo, Serbissi, “Grotta delle Vaschette” 2352 Sa/NU, 850 m (32, 35, 37). Gairo Taquisara, “Grotta de Genn’e Ua” 43 Sa/NU, 920 m (type locality of *Lithobius doderoi* Silvestri, 1908) (1, 2, 3, 4, 5, 10, 15 as “Grotta Ginnesu” [sic], 20, 29, 31, 32, 33, 34, 35, 37). Gairo Taquisara, “Grotta di Taquisara” or “Grotta del Marmo” 86 Sa/NU, 860 m (26, 32, 33, 34, 35, 37). Gairo Taquisara, near Nuraghe Serbissi, “Grotta di Serbissi” 669 Sa/NU, 955 m (26, 29, 32, 33, 35, 37). Gennargentu [generic quotation for

the caves of the area] (31). Jerzu [generic quotation for the caves of the area] (39). Jerzu, “Grotta del Leccio” 1431 Sa/NU, 688 m (32, 35, 37). Osini [generic quotation for the caves of the area] (39). Osini, Bruncu S’Armidda, “Grotta S’Armidda” 549 Sa/NU, 900 m (26, 32, 33, 35, 37). Osini, Scala Su Istressi, “Grotta Su Lioni” 222 Sa/NU, 935 m (29, 32, 35, 37). Osini, Serbissi, “Grotta ‘e S’Orroli” 671 Sa/NU, 940 m (26, 29, 32, 33, 35, 37). Osini, Serbissi, Serra di Orrioli, “Grotta di Orrioli” 70 Sa/NU, 902 m (26, 29, 32, 33, 35, 37). Osini, Tacco di Ulassai, “Grotta Su Puligi” 1480 Sa/NU, 930 m (26, 29, 32, 33, 35, 37). Seulo, Addoli, “Grotta di Is Gianas” or “Domu de Is Janas” 679 Sa/NU, 810 m (type locality of *Lithobius zachii* Restivo De Miranda, 1978) (11, 16, 21, 26, 32, 35). Siniscola, “Grotta Cane Gortoe” 19 Sa/NU (35). Tacco di Ulassai [generic quotation for the caves of the area] (28, 39). Ulassai [generic quotation for the caves of the area] (39). Ulassai, “Grotta de Sa Foxi de S’Abba” 728 Sa/NU, 875 m (type locality of *Lithobius doderoi* Silvestri, 1908) (1, 2, 3, 4, 5, 10, 15 as “Grotta de S’Abba” [sic], 20, 29, 31, 32, 33, 35, 37). Ulassai, “Grotta di Su Marmorì” or “Grutta de Su Mamuri” 55 Sa/NU, 880 m (type locality of *Lithobius doderoi* Silvestri, 1908) (1, 2, 3, 4, 5, 7, 9, 10, 15, 19, 20, 26, 29, 30, 31, 32, 33, 35, 36, 37, 39). Ulassai, Tacco di Ulassai, “Grotta Is Chillottis” 727 Sa/NU, 855 m (26, 29, 32, 33, 35, 37). Ulassai, Tacco di Ulassai, [Monte Tisiddu], “Grotta de Is Janas” [or “Grutta Basoccu”] 715 Sa/NU, 830 m (26, 29, 30, 32, 33, 35, 37). Ulassai, Trodori, “Grotta Risorgente di Funtana Trodori” 730 Sa/NU, 745 m (26, 29, 32, 33, 35, 37). Ulassai, Trodori–Bruncu Preugheddu, “Grotta [di] Trodori” 674 Sa/NU, 793 m (26, 29, 32, 33, 35, 37). Ulassai, Truculu, “Grotta de Is Lianas” or “Sa Rutt’e Noa” or “Grotta Truculu” 193 Sa/NU, 905 m (29, 32, 37). Ussassai [generic quotation for the caves of the area] (39). Ussassai, “Grotta Su Stampu ‘e Marceddu” or “Grotta Su Stampu ‘e Trulu” 765 Sa/NU, 975 m (32, 35, 37). Ussassai, Tacchixeddu, “Grotta di Tacchixeddu” 829 Sa/NU, 1010 m (8, 38). Nuoro prov./Cagliari prov.: Ulassai/Villaputzu, Monte Cardiga, Su Pranu, “Grotta S’Angurtigorgiu Mannu” [= “Grotta S’Angurtidorgiu Mannu”] 4 Sa/NU-CA, [470 m] (26, 32, 35).

## Material examined

**Epigeic.** No records.

**Cave.** Nuoro prov.: Gairo, Genn ‘e Ua, “Grotta di Bulverera” 138 Sa/NU, 50 m from cave entrance: 18.XII.1999, JD, 1 ♀ (GSS). Gairo, Genn ‘e Ua, “Grotta di Genn ‘e Ua” 43 Sa/NU, 50 m from cave entrance: 18.XII.1999, JD, 1 imm. ♀ (GSS). Gairo, Taquisara, “Grotta de Sa Rena” (= “Grutta de S’Arena”) 673 Sa/NU: 26.XII.2004, JD, CO & SP, 2 imm. ♂♂, 1 imm. ♀ (GSS). Gairo Taquisara, “Grotta di Taquisara” 86 Sa/NU: 25.IV.2004, CO, JD & FM, 1 ♂ (GSS). Osini, Tacco di Ulassai, “Grotta Su Lioni” 222 Sa/NU: 9.II.1999, CO, 1 imm. ♂, 1 imm. ♀ (GSS). Ulassai, Su Marmorì, “Grotta Su Marmorì” 55 Sa/NU: 4.VIII.2003, MM, 1 imm. ♂ (GSS).

**Other.** The following material, belonging to the type series of Silvestri (1908): Nuoro prov.: “*Lithobius Doderoi* Silv./Gr. di Genneua (Gairo)/ A. Dodero [leg.] – 25.V.1901”, “*Lithobius doderoi* Silv./det. F. Silvestri/Sardegna: Gr. di Genneua (Gairo)/25.V.1901 leg. A. Dodero”, 2 ♂♂, 2 ♀♀, 5 imm. [in Silvestri 1908: 647] (MGE). “*Lithobius Doderoi* Silv./Gr. de su Marmorì (Ulassai)/ A. Dodero [leg.] – 24.V.1901”, “*Lithobius doderoi* Silv./det. F. Silvestri/Sardegna: Gr. de su Marmorì (Ulassai)/25.V.1901 leg. A. Dodero”, 1 ♂, 2 ♀♀, 1 imm. ♀ [in Silvestri 1908: 647] (MGE).

**General distribution.** Europe: Italy (Sardinia).

**Chorotype.** Sardinian endemic, S-European affinities.

**Ecological notes.** Only in caves of the Nuoro province, 470–1010 m a.s.l. (26 sites; eutroglophilic species).

**Remarks.** This species has been recently redescribed and discussed in Zapparoli (2001). De Miranda Restivo (1983) erroneously located the cave “Is Gianas”, type locality of *Lithobius zachii*, in the municipality of Pozzomaggiore instead of Seulo and named the cave “de Sa Foxi de S’Abba” as “Grotta de S’Abba”. Included in the list of threatened invertebrate troglobitic species of Italy by Priano (1992).



## 8. *Lithobius (Lithobius) forficatus* (Linnaeus, 1758)

- 1) *Lithobius forficatus* Linneo [sic]: Fanzago 1881b: 5.
- 2) *Lithobius* (s. s.) *forficatus* (L.): Silvestri 1898: 682.
- 3) *Lithobius forficatus* L. [sic]: Verhoeff 1925a: 656.
- 4) *Lithobius forficatus* L. [sic]: Attems 1949: 111.
- 5) *Lithobius (Lithobius) forficatus* (Linnaeus, 1758): Minelli 1978a: 154.
- 6) *Lithobius forficatus* L. [sic]: De Miranda Restivo 1978: 41.
- 7) *Lithobius forficatus* (Linneo 1758): De Miranda Restivo 1983: 115.
- 8) *Lithobius forficatus* (L.): Minelli 1983b: 402.
- 9) *Lithobius forficatus* L. [sic]: De Miranda Restivo 1986: 44.
- 10) *Lithobius forficatus* L. [sic]: De Miranda Restivo & Guaita 1986: 38.
- 11) *Lithobius forficatus* (Linnaeus, 1758): Foddai *et al.* 1995: 6.
- 12) *Lithobius forficatus* (Linnaeus, 1758): Zapparoli & Minelli 2005: CD.

### Literature records

**General.** Sardinia-Corsica (5). Sardinia (3, 4, 8, 11).

**Epigeic.** Sassari prov.: Sassari, surroundings (1, 2, 7, 12). Cagliari prov.: Monte [dei] Sette Fratelli, NW slope, maquis, 300 m (6, 7, 9).

**Cave.** Cagliari prov.: Fluminimaggiore, “Grotticella di Corona Arrubiu” 58 Sa/CA (10).

### Material examined

No records.

**General distribution.** Europe: Albania, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark (mainland, Faroe Is.), Finland, France (mainland, Corsica but introduced), Germany, Great Britain, Greece (mainland), Hungary, Iceland, Ireland, Italy (mainland; Sicily, Sardinia but probably introduced), Malta?, Montenegro, Norway, Poland, Republic of Macedonia, Romania, Serbia, Slovak Republic, Slovenia, Sweden, Switzerland, The Netherlands; North Africa: Algeria (introduced?), Tunisia (introduced?); West Asia: Georgia, Russia (Krasnodar Province), Turkey; East Asia: Kuriles Isl. (introduced); North America: Canada, Greenland, USA (introduced); South America: Brazil (introduced); Pacific islands: Hawaii Isl. (introduced), Atlantic islands: St. Elena Is. (introduced).

**Chorotype.** European.

**Ecological notes.** One record at 300 m a.s.l.; one generic record from maquis (De Miranda Restivo 1986) and one record from caves (trogloxene species).

**Remarks.** Although epigeic and cave records have been recently published (De Miranda Restivo 1983, 1986; De Miranda Restivo & Guaita 1986) and the more updated checklists of the Italian centipedes (Foddai *et al.* 1995; Zapparoli & Minelli 2005) include this species in the Sardinian fauna, the real presence of *L. forficatus* on the island deserves confirmation as reliable evidence has never been collected (see also Minelli 1983b). Confusion with immature specimens of *Eupolybothrus nudicornis* is suspected.

## 9. *Lithobius (Lithobius) inermis* L. Koch, 1856

- 1) *Lithobius flavus* Meinert: Fanzago 1881b: 7.
- 2) *Lithobius (Archilithobius) flavus* Mein.: Silvestri 1898: 683.
- 3) *Lithobius inermis* L. Koch, 1856: Minelli 1983a: 13.
- 4) *Lithobius inermis* L. Koch 1856: Minelli 1983b: 408.
- 5) *Lithobius flavus* Mein. 1872: De Miranda Restivo 1983: 115.
- 6) *Lithobius inermis* L. Koch, 1856: Foddai *et al.* 1995: 6 [pars].
- 7) *Lithobius inermis* L. Koch, 1856: Foddai *et al.* 1996: 360, tab. I [pars].

- 8) *Lithobius inermis* L. Koch, 1856: Zapparoli & Minelli 2005: CD [pars].  
not *Lithobius (Lithobius) inermis* L. Koch, 1856: Grafitti & Zapparoli 1995: 126.  
not *Lithobius (Lithobius) inermis*: De Waele & Pisano 1998: 27.

### Literature records

**General.** Sardinia (4, 6, 7).

**Epigeic.** Sassari prov.: Sassari, surroundings (1, 2, 5). Nuoro prov.: Fonni, Rio Taloro, meadow and mosses (3, 8). Park of Laconi, mosses near waterfalls (3, 8).

### Material examined

No records.

**General distribution.** Europe: Italy (Sardinia, Sicily), Spain (mainland, Balearic Isl.); North Africa: Morocco (Eason 1975; Zapparoli & Minelli 2005).

**Chorotype.** W-Mediterranean.

**Ecological notes.** No data on elevation range; apart from some vague records from meadows or mosses near waterfalls (Minelli 1983a), no data are available on the habitat of this species in the study area.

**Remarks.** Quotations of *Lithobius flavus* Meinert, 1872 published in Fanzago (1881b), then copied by Silvestri (1898) and De Miranda Restivo (1983), are referred to this species according to Eason (1974). The cave records of *L. inermis* published in Grafitti and Zapparoli (1995: 126), and then in De Waele and Pisano (1998), were here re-examined and must be referred to *L. nuragicus* Zapparoli, 1997 (see below).

## 10. *Lithobius (Lithobius) lapidicola* Meinert, 1872

- 1) *Lithobius borealis* Meinert: Fanzago 1881b: 6.
- 2) ? *Lithobius lapidicola* Meinert: Fanzago 1881b: 9.
- 3) ? *Lithobius lapidicola* Mein.: A. Costa 1885: 9.
- 4) *Lithobius (Hemilithobius) borealis* Mein.: Silvestri 1898: 682.
- 5) ? *Lithobius (Archilithobius) lapidicola* (Mein.) [sic]: Silvestri 1898: 683.
- 6) *Lithobius borealis* Mein. (?): Verhoeff 1925a: 656.
- 7) *Lithobius borealis* Mein.: Attems 1949: 113.
- 8) *Lithobius lapidicola* Mein.: Attems 1949: 114.
- 9) *Lithobius pusillus pusillus* Latz.: Attems 1949: 116.
- 10) *Monotarsobius grafittii* Restivo De Miranda 1976a: 180, figs 1–5.
- 11) *Lithobius melanops domusnovae* Restivo De Miranda 1976b: 88, figs 1–3, 5 [pars] **syn. nov.**
- 12) *Lithobius (Lithobius) pusillus* Latzel, 1880: Minelli 1978a: 154.
- 13) *Lithobius (Lithobius) borealis* Meinert, 1872: Minelli 1978a: 154.
- 14) *Lithobius (Lithobius) lapidicola* Meinert, 1872: Minelli 1978a: 154.
- 15) *Lithobius lapidicola* Meinert: Eason 1980: 26, figs 3, 4.
- 16) *Lithobius lapidicola* Meinert: De Miranda Restivo 1982: 172.
- 17) *Lithobius melanops domusnovae* Restivo De Miranda 1976: Cassola 1982: 638, 670, 707.
- 18) *Monotarsobius grafittii* Restivo De Miranda 1976: Cassola 1982: 639, 691, 708.
- 19) *Lithobius melanops domusnovae* De Miranda Restivo 1976: De Miranda Restivo 1983: 112.
- 20) *Monotarsobius grafittii* De Miranda Restivo 1976: De Miranda Restivo 1983: 112.
- 21) *Lithobius borealis* Mein 1872: De Miranda Restivo 1983: 113.
- 22) *Lithobius lapidicola* Mein. 1872: De Miranda Restivo 1983: 115.
- 23) *Monotarsobius dubosqui* [sic] Brlo. [sic] 1896: De Miranda Restivo 1983: 116 [pars].
- 24) *Monotarsobius microps* Mein. 1868 [sic]: De Miranda Restivo 1983: 117 [pars].
- 25) *Lithobius lapidicola* Meinert, 1872: Minelli 1983a: 14.
- 26) *Lithobius melanops domusnovae* Restivo de Miranda 1976: Minelli 1983b: 403.
- 27) *Lithobius lapidicola* Mein. 1872: Minelli 1983b: 403, 408.

- 28) *Lithobius (Lithobius) melanops* Newport, 1845: Minelli 1985: 39 [pars].  
 29) *Lithobius (Lithobius) lapidicola* Meinert, 1872 + *L. (L.) pusillus* Latzel, 1880 [sic]: Minelli 1985: 41.  
 30) ? *Monotarsobius manfrediae* Bianchi: De Miranda Restivo & Guaita 1986: 32, 40.  
 31) *Lithobius melanops domusnovae* De Mir. Rest.: De Miranda Restivo & Guaita 1986: 32, 40.  
 32) *Lithobius pusillus* Latz.: De Miranda Restivo & Guaita 1986: 37, 41.  
 33) *Lithobius melanops domusnovae* Restivo De Miranda 1976: Puddu 1986: 64, 70.  
 34) *Lithobius lapidicola*: Minelli & Iovane 1987: 28.  
 35) *Lithobius (Monotarsobius) grafittii* Restivo De Miranda = *Lithobius lapidicola* Mein.: Grafitti 1987: 36.  
 36) *Lithobius lapidicola* Meinert, 1872: Minelli *et al.* 1994: 499.  
 37) *Lithobius lapidicola* Meinert: Grafitti 1994: 36, 40.  
 38) *Lithobius (Lithobius) lapidicola* Meinert, 1872: Grafitti & Zapparoli 1995: 126.  
 39) *Lithobius lapidicola* Meinert, 1872: Foddai *et al.* 1995: 6.  
 40) *Lithobius lapidicola* Meinert, 1872: Foddai *et al.* 1996: 360, tab. I.  
 41) *Lithobius (Lithobius) lapidicola* Meinert, 1872: Grafitti 1998: 58, 63.  
 42) *Lithobius melanops domusnovae*: Grafitti 2002: 282.  
 43) *Lithobius lapidicola*: Mucedda *et al.* 2002: 30.  
 44) *Lithobius lapidicola* Meinert, 1872: Zapparoli & Minelli 2005: CD [pars].  
 45) *Lithobius melanops* Newport, 1845: Zapparoli & Minelli 2005: CD [pars].  
 46) *Lithobius* sp.: Lana *et al.* 2006: 43.  
 47) Lithobiidae [indet.]: Grafitti 2007b: 224, 226.  
 48) *Lithobius lapidicola* Meinert, 1872: Grafitti 2007c: 69, 70.  
 49) *Lithobius lapidicola* Meinert, 1872: Grafitti & Merella 2008: 84.

## Literature records

**General.** Sardinia-Corsica (12, 13, 14). Sardinia (6, 7, 8, 9, 26, 27, 35, 39).

**Epigeic.** Sassari prov.: Asinara Is. (36, 40, 44). Bono [Passo o'Uccaidu, 1000 m] (24). Between Luogosanto and Tempio Pausania (25, 44). Caniga (44). Caprera Is. (40); *ibidem*, Fonte Teialone (36, 44). Figarolo Is. (36, 40, 44). Maddalena Is. (40); *ibidem*, Penisola Abbatoggia (36, 44); *ibidem*, La Trinità (36, 44). Molarà Is. (36, 40, 44). Molarotto Is. (25, 44). [Monte] Limbara, Vallicciola, 1000 m (23). Porto Cervo, Monte Villico (25, 44). Oschiri (24). Porto Torres (22). Razzoli Is. (36, 40, 44). San Pasquale (25, 44). Santo Stefano Is. (36, 40, 44). Sassari (4, 5, 15, 22, 44); *ibidem*, surroundings (1, 2, 21). Tavolara Is. (40); *ibidem*, near "Grotta Arance" (36, 44). Tempio Pausania (25, 44). Nuoro prov.: Desulo (15, 22, 44). Oniferi, *Quercus ilex* (25, 44). Macomer, Monte Sant'Antonio, *Quercus ilex* wood (16). Oliena (15, 22, 44). Osini, *Quercus ilex* (34, 44). Punta Cupetti, S slope, 600 m (44). Sorgono (15, 22, 44). Oristano prov.: Arborea (25, 44). Monte Arci (44). Monte Ferru (25). Cagliari prov.: Between Argentiera and Palmadula (25, 44). Cagliari (3, 5, 22). Elmas (25, 44). Portoscuso (3, 5, 22). Sant'Antioco Is. (40, 44); *ibidem*, pond Cindu (36, 44). Sarroch, Rio Monte Nieddu (25, 44). Serreuli, 4.5 km S (25, 44). Ussana (22).

**Cave.** Sassari prov.: Laerru, Tanca Manna, "Grotta Su Coloru" 28 Sa/SS, 370 m (24, 38, 44). Mara, Bonu Ighinu, Rocca Tuva 'e Mare, "Grotta Tuva 'e Mare" 94 Sa/SS, 525 m (38, 44, 48). Mara, near Nuraghe of Tomaso, "Grotta Sa Ucca 'e Tomaso" without cadastre number, 300 m (38, 44). Mara, Bonu Ighinu, "Sa Tumba de Tomaso" 292 Sa/SS (48). Pozzomaggiore, Badde, "Grotta Badde" or "Grotta Su Guanù" 143 Sa/SS, 320 m (type locality of *Monotarsobius grafittii* Restivo De Miranda, 1976) (7, 18, 20, 29, 38, 43, 44). Romana, San Lussurgiu, "Grotta del Rospo" 251 Sa/SS, 350 m (38, 37, 44). Romana, Santu Giagu, "Sa Grutta de Santu Giagu" 260 Sa/SS, 370 m (38, 37, 44). Sedinì, Conchi, "Grotta Conca II di Conchi" 168 Sa/SS (38, 41, 44). Oristano prov.: Cuglieri, Monte Santu, "Grotta di Monte Santu" 206 Sa/OR, 41 m (47). Nuoro prov.: Silanus, Monte Arbu, "Grotta Sa Perca de Peppe Ninu" 73 Sa/NU, 490 m (38, 44). Cuglieri, Monte Santu, "Grotta di Monte Santu" 206 Sa/OR, 41 m (47). Cagliari prov.: Domusnovas, Monte Acqua, "Grotta di San Giovanni" 81 Sa/CA, [206 m] (type locality of *Lithobius melanops domusnovae* Restivo De Miranda, 1976) (8, 17, 19, 28, 30, 31, 33, 38, 42, 44, 45, 46, 49). Domusnovas, Siuru, "Voragine di Monte Crabas" 1113 Sa/CA, 513 m (23, 38, 44). Fluminimaggiore, "Grotta di Su Mannau" 97 Sa/CA (32). Gonnessa, Monte San Giovanni, "Pozzo dei Muri Pisani" 2943 Sa/CI [= 2943 Sa/CA] (49).

## Material examined

**Epigeic.** Sassari prov.: Arzachena, near a river: 28.I.1979, CU, 2 ♂♂ (CMZ). Asinara Is., “Raccolte Zoologiche R.N.I. Washington, Com.te [= Captain] Cassanello”: IX.1893, 1 ♂ (MGE). Buddusò: 25.V.1980, CM, 1 ♀ (CMZ). Capocaccia: 17.IV.1902, DO, 2 ♂♂, 1 ♀ (MGE). Il Toro Is.: 10.V.1988, GO, 3 ♂♂ (CMZ). [Monte] Limbara, Punta Balistreri, 1300 m, 30.III.1971, PB, 1 ♀ (CMZ). Monte Santa Giusta: 31.VIII.2003, leg.?, 1 ♂ (CMZ). Padria, soil washing and Berlese extraction: 1.III.2007, LF, 1 ♀ (CMZ). Sorso, Azienda Nali, mixed orchard, pitfall traps: 17.VII.1997, leg.?, 1 ♂ (IEASS). Usini: 20.V.2002, leg.?, 2 ♂♂, 1 ♀ (CMZ). Nuoro prov.: Between Aritzo and Gennargentu, 1400 m: 24.I.1899, GD, 1 ♂ (MGE). Arzana, Bruncu Spina, 1800 m, garrigue: 19.IV.1996, AVT, 1 ♀ (CMZ). Belvì, hazel grove, pitfall traps: 8.IX.2004, leg.?, 1 ♂ (IEASS); 13.X.2004, leg.?, 2 ♀♀ (IEASS); 27.X.2004, leg.?, 1 ♂ (IEASS); 16.VI.2005, leg.?, 1 ♀ (IEASS); 14.IX.2005, leg.?, 1 ♂ (IEASS); 28.IX.2005, leg.?, 1 ♂, 1 ♀ (IEASS); 6.X.2005, leg.?, 1 ♀ (IEASS). Belvì, cherry orchard Vacca, 600 m, pitfall traps: 26.IV.2007, FI, 1 ♀ (IEASS). Belvì, walnut orchard Chiesa, 600 m, pitfall traps: 24.VII.2007, FI, 1 ♀ (IEASS); 18.I.2008, FI, 1 ♀ (IEASS). Desulo, 1000 m: 19.V.1994, PA, 1 ♀ (CMZ). Desulo (refuge), Gennargentu, 1600 m, *Alnus* sp. shrub, pitfall traps: 9.VIII.2006, FI, 1 ♂ with 3+2 prosternal teeth (IEASS); 19.IX.2006, FI, 2 ♂♂, 2 ♀♀ (IEASS). Dorgali, River Cedrino: 24.V.1980, AVT, 1 ♀ (CMZ). Fonni, 6 km S, *Quercus suber* wood, hand searching: 19.IV.1994, MZ, 1 ♂ (CMZ). Fonni (refuge), Gennargentu, 1600 m, *Alnus* sp. shrub, pitfall traps: 20.IX.2006, FI, 3 ♀♀ (IEASS). Gennargentu: 24–25.I.1899, UL & GD, 2 ♂♂, 1 ♀ (MGE); ibidem, Bruncu Spina, 1300–1500 m: 21.V.1980, MB, 1 ♀ (CMZ); ibidem, ibidem, 1400 m: 25.V.1980, FB, 1 ♂ (CMZ); ibidem, Monte Cresia: I.1899, GD, 1 ♀ (MGE); [ibidem], Regione Laccheddi, 1400 m: 24.I.1899, GD, 1 ♂ (MGE); ibidem, road to Punta La Marmora (Desulo, Foresta Gerini), hand searching: 29.VI.2000, MZ, 1 ♀ (CMZ); ibidem, top, 1850 m: 24.I.1899, GD, 9 ♂♂, 2 ♀♀ (MGE). Nuraghe Loddune, hand searching: 25.V.1980, MZ, 2 ♀♀, 2 imm. (CMZ). Oristano prov.: Monte Arci, *Quercus ilex* wood: 1–4.III.1992, GC, 4 exx (CMZ\*). Monte Ferru, Rifugio La Madunnina, between Cuglieri and Santolussorgiu, 865 m: 27.VI.2000, MB, 1 ♀ (CMZ). Sedilo, soil washing and Berlese extraction: 18.III.2006, LF, 1 ♂ (CMZ). Ula Tirso, soil washing and Berlese extraction: 28.XII.2006, LF, 1 ♂, 1 ♀ (CMZ). Cagliari prov.: Bolotana, soil washing and Berlese extraction: 6.II.2007, LF, 4 ♂♂, 1 ♀ (CMZ). Buggerru, near Mine of San Luigi, 347 m, 32S 0452771 4358704, leaf-litter sifting: 11.XI.2006, MZ, 1 ♀ (CMZ). Burcei, near Burcei, 725 m, 32S 0528219 4356591, under stones at edge of pine wood: 13.XI.2006, GN, 1 ♀ (CNBFVR). Giara di Gesturi: 19.III.1994, LL, 1 ♀ (CMZ). Villacidro, Rio Cannisoni, 390 m, 32S 0469095 4362383, hand searching: 9.XI.2006, DW, 1 ♂ (CMZ). Villador, vineyard Giviamolas (worked), pitfall traps: 11.III.2004, FS, 1 ♂ (IEASS).

**Cave.** Sassari prov.: Pozzomaggiore, Badde, “Grotta Badde” or “Grotta Su Guanu” 143 Sa/SS, 320 m: 31.VII.2006, PM, 2 ♂♂, 1 ♀ (CMZ). Nuoro prov.: Gairo Taquisara, “Grotta di Genn’e Ua” 43 Sa/NU, 920 m: 25.V.1901, DO, 1 ♀ “*Lithobius lapidicola* (Mein)” F. Silvestri det. (MGE). Orani, Monte Gonara. “Grotta di San Francesco” 202 Sa/NU, 560 m: 15.VI.2007, PM & AC, 1 ♂ (CMZ). Oristano prov.: Cuglieri, Monte Santu, “Grotta di Monte Santu” 206 Sa/OR, 41 m, under a stone 35 m from cave entrance: 6.III.2005, GG, 1 ♂ (GSS) [in Grafitti 2007b: 224, 226 under Lithobiidae indet.]. Cagliari prov.: Domusnovas, Monte Acqua, “Grotta di San Giovanni” 81 Sa/CA, 206 m, under stones, in the Sala dei Pipistrelli, south–west branch: 21.III.2004, GG, 2 ♂♂, 1 ♀ (GSS); ibidem, on guano, in the Bobore branch: 1.V.2004, MM, 2 ♂♂, 2 ♀♀ (GSS); 26.VI.2004, EL, 1 ♂ (GSS) [in Lana *et al.* 2006: 46 under *Lithobius* sp.]; 11.XI.2006, BNWZ, 3 ♂♂, 1 ♀ (CNBFVR); hand searching: 11.XI.2006, MZ, 4 ♂♂, 4 ♀♀ (CNBFVR). Gonnese, Monte San Giovanni, “Pozzo dei Muri Pisani” 2943 Sa/CA: 19.XII.2004, JD & CO, 1 ♀ (GSS). Province ?. Voragine Mine of Piredda, 200 m from entrance, - 50 m, 15.X.1972, leg.?, 1 ♀ (CMZ).

**Other.** Sassari prov.: “Sardegna, SS [= Sassari prov.], Bono o’Uccaidu, 1000 m, 31.III.1972, A. Vigna [leg.]”, 1 ♀ (CMZ) [in De Miranda Restivo 1983: 117 under *Monotarsobius microps* Mein. 1868]. “Sardegna, SS [= Sassari prov.], Limbara, Vallicciola, 1000 m, 30.III.1972, A. Vigna [leg.]”, 2 exx (CMZ) [in De Miranda Restivo 1983: 116 under *Monotarsobius dubosqui* [sic] Brlo. [sic] 1896]. “Sardegna, SS [= Sassari prov.] Oschiri, 7.III.1968, R. Argano [leg.]”, 2 exx (CMZ) [in De Miranda Restivo 1983: 117 under *Monotarsobius microps* Mein. 1868]. Cagliari prov.: “*Lithobius lapidicola*, Meinert/Ussana”, 2 ♀♀, 1 imm. ♀ [in Silvestri 1898: 683 under *Lithobius (Archilithobius) lapidicola* (Mein.)] (MGE).

**General distribution.** Europe: Albania, Austria, Bosnia and Herzegovina, Czech Republic, Denmark (mainland), France (mainland, Corsica), Germany, Great Britain, Greece (mainland, Ionic Isl.), Hungary, Ireland, Italy (mainland, Sicily, Sardinia), Montenegro, Norway, Poland, Romania, Slovak Republic, Slovenia, Spain (mainland, Canary Isl.), Sweden, Switzerland, The Netherlands, Ukraine.

**Chorotype.** Centraleuropean.

**Ecological notes.** 0–1800 m; few habitat records exist for this euryoecious species: in *Quercus ilex* (3 sites), *Q. suber* (1 site) and pine woods (1 site), garrigue (1 site), montane formations (*Alnus* sp. shrubs, 2 sites); also in agricultural habitats such as orchards (1 site), cherry orchards (1 site), vineyards (1 site), walnut (1 site) and hazel groves (1 site); also in caves (16 sites, 200–920 m; troglodyte species). Four records from endogenous habitats. See also De Miranda Restivo (1982) and Minelli and Iovane (1987).

**Remarks.** Quotations of *Lithobius borealis* Meinert, 1868, published by Fanzago (1881b) then copied by Silvestri (1898), Verhoeff (1925a), Attems (1949), Minelli (1978a) and De Miranda Restivo (1983), as well as those of *L. pusillus* Latzel, 1880, published by Minelli (1978a) and De Miranda Restivo and Guaita (1986), are referred to this species according to Eason (1974). Old records of *L. lapidicola* by Fanzago (1881b) are considered uncertain according to Eason (1980), as well as those of Costa (1885). Part of the records of Silvestri (1898) have been here re-examined and confirmed. Quotations of *Monotarsobius grafitti* published by Restivo De Miranda (1976a), Cassola (1982), De Miranda Restivo (1983) and De Miranda Restivo and Guaita (1986), are referred to this species following Minelli (1983b). The record of *L. lapidicola* from Porto Torres is probably due to a misreading of literature data by De Miranda Restivo (1983). Records of *Monotarsobius manfrediae* Bianchi in Bianchi *et al.*, 1949 from the cave of San Giovanni published by De Miranda Restivo and Guaita (1986) are here tentatively referred to this species according to Foddai *et al.* (1995). Records of *M. microps* (Meinert, 1868) from the cave Su Coloru, published by De Miranda Restivo (1983), are referred to this species according to Grafitti and Zapparoli (1995). Records of *M. duboscqui* Brölemann, 1896, from Mount Limbara, and *M. microps* (Meinert, 1868), from Oschiri and Bono, published in De Miranda Restivo (1983) have been re-examined and must refer to this species. The quotation of *Lithobius calcaratus* C.L. Koch, 1844 from Sant’Anatolia (Sassari province) published by Fanzago (1881b) and assigned to this species by Zapparoli and Minelli (2005), is not included in the above list of literature records as it is here considered uncertain (see below in the “Unreliable or erroneous records” section, under *L. calcaratus*).

*Lithobius melanops domusnovae* Restivo De Miranda, 1976, very defectively described from “Grotta di San Giovanni” near Cagliari and considered an unrecognizable taxon by Minelli (1983b), must be referred to this species as material from the type locality corresponding to the original description of Restivo De Miranda (1976b) does not differ from the description of Sardinian specimens of *L. lapidicola* given by Eason (1980). The specimen with 3+4 prosternal teeth, assumed to be anomalous (see Restivo De Miranda 1976b: 90, fig. 4), also mentioned in the original description of *L. m. domusnovae* and apparently not included in the type series, probably belongs to another species of *Lithobius*, maybe *L. nuragicus*, the presence of which in the same cave has been verified (see below). The new synonymy is therefore proposed: *Lithobius melanops domusnovae* Restivo De Miranda, 1976 = *Lithobius lapidicola* Meinert, 1872 **syn. nov.**

Worthy of notice is a female from the above mentioned cave (M. Mucedda leg., 1.V.2004) showing a supplementary *L. borealis*-like spine on the praefemur of the left 15<sup>th</sup> leg (right leg mutilated).

The unidentified Lithobiidae from Cuglieri, Monte Santu, “Grotta di Monte Santu” 206 Sa/OR quoted by Grafitti (2007b) and the record of *Lithobius* sp. from Domusnovas, Monte Acqua, “Grotta di San Giovanni” 81 Sa/CA published by Lana *et al.* (2006), have been here examined and belong to this species.

## 11. *Lithobius (Lithobius) molophai* Restivo De Miranda, 1978 status rev.

(Figs 1–6)

- 1) *Lithobius molophai* Restivo De Miranda 1978b: 151, figs 1–3.
- 2) *Lithobius molafai* n. sp. [sic]: Grafitti 1978: 26.
- 3) *Lithobius molafai* [sic] n. sp. Restivo de Miranda i. l.: Cassola 1982: 714.
- 4) *Lithobius molophai* De Miranda Restivo 1976 [sic]: De Miranda Restivo 1983: 112.
- 5) *Lithobius cerii* Verh. 1942/43: Minelli 1983b: 403, 408.
- 6) *Lithobius (Lithobius) cerii* Verhoeff, 1942/43 [sic]: Minelli 1985: 40.
- 7) *Lithobius molophai* Rest. de Mir. = *Lithobius cerii* Verh.: Grafitti 1987: 36.

- 8) *Lithobius cerii* Verhoeff: Mucedda & Grafitti 1994: 30.
- 9) *Lithobius cerii* Verhoeff: Negrea & Minelli 1994: 250.
- 10) *Lithobius (Lithobius) cerii* Verhoeff, 1942/43 [sic]: Grafitti & Zapparoli 1995: 124.
- 11) *Lithobius cerii* Verhoeff, 1937 [sic]: Foddai *et al.* 1995: 6 [pars].
- 12) *Lithobius cerii* Verhoeff, 1937 [sic]: Foddai *et al.* 1996: 360, tab. I.
- 13) *Lithobius cerii*: Grafitti 1999a: 36.
- 14) *Lithobius cerii*: Mucedda *et al.* 2002: 30.
- 15) *Lithobius cerii* Verhoeff, 1937 [sic]: Zapparoli & Minelli 2005: CD [pars].
- 16) *Lithobius* sp.: Casale *et al.* 2006: 212.
- 17) *Lithobius* sp.: Lana *et al.* 2006: 44.
- 18) “Chilopodi”: Lana *et al.* 2006: 46.

## Literature records

**General.** Sardinia (3, 5, 7, 9, 11, 12).

**Epigeic.** No records.

**Cave.** Sassari prov.: Alghero, Capo Caccia, “Inghiottitoio della Dragunara” 174 Sa/SS, 23 m (10, 14, 15, 17). Alghero, Maristella, “Grotta di Maristella” 2655 Sa/SS, 10 m (8, 10, 14, 15). Logudoro [generic quotation for the caves of the area] (13). Sassari, Molafà, “Grotta di Molafà [emendation for Molofà]” 937 Sa/SS, 120 m (type locality of *Lithobius molophai* Restivo De Miranda 1978) (1, 2, 4, 6, 10, 14, 15). Nurra [generic quotation for the caves of the area] (13). Badde, Pozzomaggiore, “Grotta Badde” (= “Grotta Su Guanù”) 143 Sa/SS, 320 m (10, 14, 15). Bancaleddu, “Grotta di Lu Gardu” 2936 Sa/SS, 102 m (16, 17). Sassari [generic quotation for the caves of the area] (13).

**TABLE 1.** *Lithobius molophai* Restivo De Miranda; Molafà, “Grotta di Molafà” 937 Sa/SS, 1 ♂: spinulation; 1st VmP on one side only.

	Ventral					Dorsal				
	C	t	P	F	Ti	C	t	P	F	Ti
1	-	-	mp	am	am	-	-	p	a p	a
2-3	-	-	mp	am	am	-	-	p	a p	a
4	-	-	mp	am	am	-	-	mp	a p	a
5-6	-	-	mp	am	am	-	-	mp	a p	a p
7-11	-	-	mp	amp	am	-	-	mp	a p	a p
12	-	-	mp	amp	am	-	-	amp	a p	a p
13	-	m	mp	amp	am	-	-	amp	a p	a p
14	-	m	amp	m	-	-	-	amp	p	-
15	-	m	amp	m	-	a	-	mp	-	-

## Material examined

**Epigeic.** No records.

**Cave.** Sassari prov.: Alghero, Capo Caccia, “Grotta Verde” 3 Sa/SS, 90 m, hand searching: 5.VII.2000, MM, MB & MZ, 1 ♂ (CMZ). Alghero, Capo Caccia, Cala Dragunara, “Inghiottitoio della Dragunara” 174 Sa/SS: 23.X.2004, EL, 1 ♀ (GSS) [in Lana *et al.* 2006: 44 under *Lithobius* sp.]. Alghero, Maristella, “Grotta di Maristella” 2655 Sa/SS, 10 m: 5.II.1989, GG, 1 ♂ (CMZ). Badde, Pozzomaggiore, “Grotta Badde” or “Grotta Su Guanù” 143 Sa/SS, 320 m: 18.VII.1996, AP, 1 imm. (GSS). Bancaleddu, Sassari, “Grotta di Lu Gardu” or “Grotta Lu Cardu” 2936 Sa/SS, 102 m: 1.XI.2005, EL & PM, 2 exx in very bad conditions (2 ♂♂ ?) (GSS) [in Casale *et al.* 2006: 212 under *Lithobius* sp.; Lana *et al.* 2006: 44 under “Chilopodi ciechi”]; 4.XII.2006, PM, 2 ♀♀ (CMZ). Sassari, Molafà “Grotta di Molafà” 937 Sa/SS, 120 m: 25.VI.1978, GG, 1 ♂ (CMZ).

**TABLE 2.** *Lithobius molophai* Restivo De Miranda; Bancaleddu, “Grotta di Lu Gardu” 2936 Sa/SS, 2 ♀♀, 4.XII.2006, PM: spinulation; the letters in parentheses indicate variable spines; one specimen with 13<sup>th</sup> Vmt on one side only.

	Ventral					Dorsal				
	C	t	P	F	Ti	C	t	P	F	Ti
1	-	-	mp	am	m	-	-	p	a	a
2	-	-	mp	am	(a)m	-	-	p	a (p)	a
3-5	-	-	mp	am(p)	(a)m	-	-	p	a p	a
6-10	-	-	mp	am(p)	am	-	-	p	a p	a p
11	-	-	mp	am(p)	am	-	-	p	a p	a p
12	-	-	mp	am(p)	am	-	-	amp	a p	a p
13	-	m	mp	am(p)	am	-	-	amp	p	a p
14	-	m	amp	m	-	-	-	(a)mp	p	-
15	-	m	amp	m	-	a	-	mp	-	-

**TABLE 3.** *Lithobius molophai* Restivo De Miranda; Alghero, Maristella, “Grotta di Maristella” 2655 Sa/SS, 1 ♂: spinulation; 15<sup>th</sup> t, P, F and Ti mutilated (?), presumed spines in square parentheses; 2<sup>nd</sup> DmP on one side only.

	Ventral					Dorsal				
	C	t	P	F	Ti	C	t	P	F	Ti
1	-	-	mp	am	m	-	-	p	a p	a
2	-	-	mp	am	am	-	-	mp	a p	a
3	-	-	mp	am	am	-	-	mp	a p	a
4-9	-	-	mp	am	am	-	-	amp	a p	a p
10-12	-	-	mp	amp	am	-	-	amp	a p	a p
13	-	-	mp	mp	am	-	-	amp	a p	a p
14	-	m	amp	m	-	-	-	amp	p	-
15	-	[m]	?	?	?	a	[-]	?	?	?

**Description.** Colour: body and legs yellow, head darker. Length: 10.0–11.0 mm (cave of Lu Gardu), 12.0 (caves of Molafà and Maristella), 12.5 (Grotta Verde), 16.0 mm (cave of Dragunara). Antennae: long, about two thirds of body length, of 52–53 (Lu Gardu), to 55–57 (Molafà), 60–63 (Grotta Verde), 66–66 (Maristella), 72 (Dragunara) articles; last article twice as long as the penultimate; articles almost long as broad, densely covered by long setae. Head: weakly rugose, 1.1 mm long, 1.2 mm broad, broader than T. 1, posterior border rounded. Ocelli: absent. Organ of Tömösváry: large; close to the organ of Tömösváry, in antero-dorsal position are generally one-two setae, when two setae are present the dorsal one is longer than the ventral. Prosternum: with 3+4, 4+4, 5+5 (Lu Gardu, Fig. 1), 4+4 (Molafà, Fig. 2), 5+5 (Maristella), 5+6 (Badde), 7+7 (Dragunara) small, rounded teeth; in an abnormal male from Grotta Verde, the teeth are completely absent (Fig. 3). Tergites: T. 1 subtrapezoid, the lateral borders convergent forwards, broader than T. 3, with posterior border emarginate; posterior border of TT. 3, 5, 7, 8, 10, 12 and 14 slightly emarginate, those of TT. 9, 11 and 13 straight; posterior angles of TT. 3 and 5 almost rounded, those of TT. 7, 8, 10, 12 and 14 angulated, those of TT. 9, 11 and 13 angulated and without triangular posterior projections. Intermediate tergite with posterior border straight. Tergites with sparse, small and thin setae on the anterior part; lateral and posterior borders with longer and relatively stouter setae, more numerous on T. 14 in larger specimens. Sternites with some setae on a transverse line on the anterior part, setae present also along the lateral and posterior borders; setae of sternite 15 more numerous and regularly arranged mostly on the posterior part. Setae numerous especially on the antennae and legs, mostly on the ventral side. Numerous setae also present on the ventral side of the

1<sup>st</sup>–3<sup>rd</sup> and 14<sup>th</sup>–15<sup>th</sup> coxae; coxae 4<sup>th</sup>–13<sup>th</sup> bearing a smaller number of setae. Coxal pores: circular, small, arranged in a row, 3, 3, 4, 3 or 4, 4, 5, 4 (Lu Gardu), 4, 5, 5, 4 (Molafà), 6, 6, 6, 6 (Grotta Verde, the proximal pore is circular in shape, the distal ones are elliptical), 6, 7 (8), 8, 5 (Maristella) or elliptical, large, 8, 8, 7, 9 in the larger specimen (Dragunara); pores are separated from one another by a space equal or smaller than their own diameter. Anterior legs: 1<sup>st</sup>–13<sup>th</sup> legs with articulate tarsus. Fourteenth and 15<sup>th</sup> legs: about half of body length, slender, 15<sup>th</sup> accessory apical claw absent; in both sexes with a faint latero-internal longitudinal sulcus on femur, tibia and tarsus (Fig. 4). Principal claw of all legs long, 1<sup>st</sup>–14<sup>th</sup> legs with a long accessory apical claw, about half as long as the principal claw; between the principal claw and the accessory claw a long accessory seta is also present. VaC spine: absent. Glandular pores: on internal side of femur, tibia and tarsus of 14<sup>th</sup> and 15<sup>th</sup> legs. Spinulation: see Tabs 1–5. Female gonopod: with 2+2 sharp spurs (Fig. 5) and a tridentate large claw (Fig. 6). Male genitalia: first genital sternite with twelve setae on each side, second genital sternite without setae, gonopod short, consisting of a single article with two (Maristella, Grotta Verde) or three (Molafà) apical setae.

**General distribution.** Europe: Italy (Sardinia).

**Chorotype.** Sardinian endemic, W-Mediterranean affinities (?).

**Ecological notes.** Troglotic species, found only in caves of the Sassari province, 10–320 m a.s.l. (5 sites).

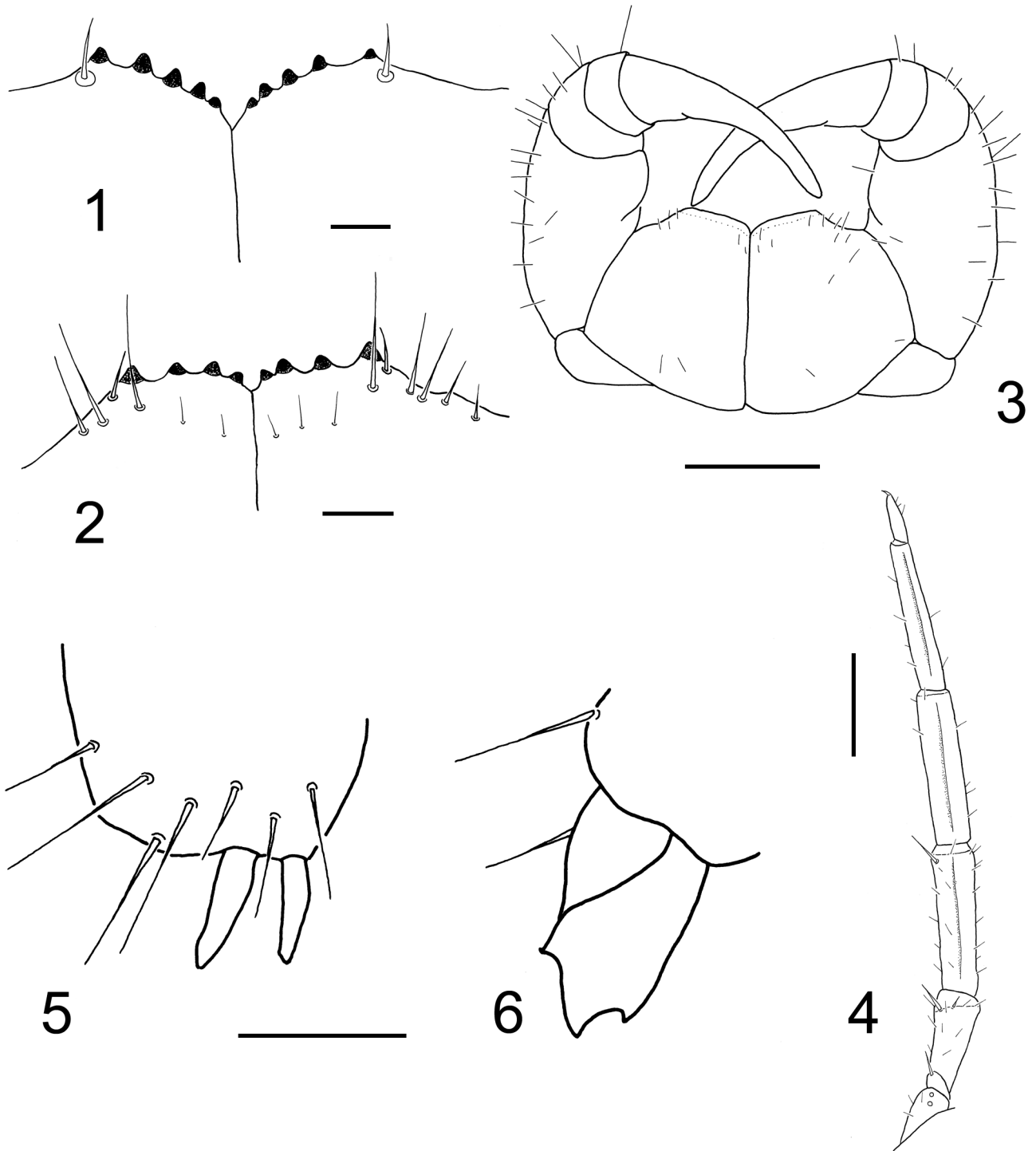
**TABLE 4.** *Lithobius molophai* Restivo De Miranda; Capo Caccia, “Inghiottitoio della Dragunara” 174 Sa/SS, 1 ♀: spinulation; 15<sup>th</sup> t, P, F and Ti mutilated (?), presumed spines in square parentheses.

	Ventral					Dorsal				
	C	t	P	F	Ti	C	t	P	F	Ti
1	-	-	m	am	am	-	-	p	a p	a
2	-	-	mp	amp	am	-	-	a p	a p	a
3	-	-	mp	amp	am	-	-	amp	a p	a
4-13	-	-	mp	amp	am	-	-	amp	a p	a p
14	-	m	amp	mp	-	-	-	amp	p	-
15	-	[m]	?	?	?	a	[-]	?	?	?

**TABLE 5.** *Lithobius molophai* Restivo De Miranda; Capo Caccia, “Grotta Verde”, 3 Sa/SS, male: spinulation; 14<sup>th</sup> VaF on one side only.

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





**FIGURES 1–6.** *Lithobius molophai* Restivo De Miranda. **1–3.** Male prosternum, ventral. **1.** Bancaleddu, “Grotta di Lu Gardu” 2936 Sa/SS, scale bar: 0.1 mm. **2.** Molafà, “Grotta di Molafà” 937 Sa/SS, scale bar: 0.1 mm. **3.** Capo Caccia, “Grotta Verde”, 3 Sa/SS, scale bar: 0.5 mm. **4.** Left 15<sup>th</sup> leg of male, internal side (Molafà, “Grotta di Molafà” 937 Sa/SS), scale bar: 1.0 mm. **5–6.** Right female gonopod, ventral (Capo Caccia, “Inghiottoio della Dragunara” 174 Sa/SS), scale bar: 0.1 mm. **5.** Spurs. **6.** Claw.

**Remarks.** The present examined specimens were collected in four caves of the same karst area of Sardinia including the type locality of *Lithobius molophai*, the cave of Molafà (Sassari province). Such specimens apparently belong to a same cave specialized taxon in spite of the differences in some morphological characters probably related to size, such as body length, number of antennal articles, number of

prosternal teeth and number and shape of coxal pores. These characters fit quite well with the original description of *L. molophai*, although the latter is inadequate in some details such as the latero-internal longitudinal sulcus on the 14<sup>th</sup> and 15<sup>th</sup> legs observed in all the specimens here examined but not quoted in the original description, probably because overlooked. This feature seems however a good differential character between *L. molophai* and *L. cerii* Verhoeff, 1943a, a morphologically close troglobitic species described from a cave of Capri island (Campania, Italy) in which such furrows have however not been quoted in both the descriptions of Verhoeff (1943a, 1943b) and the synonymy of which with *L. molophai*, although generally accepted by the subsequent Authors (e.g. Foddai et al 1995; Zapparoli & Minelli 2005), has been only hesitantly proposed by Minelli (1983b). A latero-internal longitudinal sulcus on the 14<sup>th</sup> and 15<sup>th</sup> legs is also present in other W-Palaeartic epigeic and cave *Lithobius* species, such as those of the W-Mediterranean *L. inermis* L. Koch, 1856 group and the SE-European and NW-Anatolian *L. lakatnicensis* Verhoeff, 1926 group (Serra 1987; Zapparoli 2003), but their relationships with *L. molophai* have not yet been stated. Some differences between *L. molophai* and *L. cerii* are also found in the pattern of the spinulation of the legs. Although the spine arrangement of *L. cerii* is not known in full detail, the spinulation of the 14<sup>th</sup> and 15<sup>th</sup> legs of *L. molophai* seems poorer than in *L. cerii*; moreover, a 15 VaC is present in *L. cerii* (see Verhoeff 1943a) but not in *L. molophai*. In spite of their morphological resemblance, likely due to convergent adaptation to the same habitat, the identity of *L. molophai* with *L. cerii* is rejected and both species must be considered as valid. The distinction between *L. molophai* and *L. cerii* seems also confirmed by their geographic ranges, restricted to the caves of NW Sardinia and Capri island, respectively. Also zoogeography suggests a distinction between the two species: these areas have a different origin and age and belong to two distinct Italian faunistic provinces, the cave faunas of which form two historically and zoogeographically individual groups (Latella & Stoch 2001; Minelli et al. 2004).

The materials published as *Lithobius* sp. by Casale et al. (2006) or “Chilopodi ciechi” [= blind Chilopoda] by Lana et al. (2006) from Bancaleddu, “Grotta di Lu Gardu” 2936 Sa/SS and as *Lithobius* sp. by Lana et al. (2006) from Alghero, Capo Caccia, Cala Dragunara, “Inghiottoio della Dragunara” 174 Sa/SS have been here examined and refer to this species.

## 12. *Lithobius (Lithobius) nuragicus* Zapparoli, 1997

(Figs 7–11)

- 1) ? *Lithobius melanops domusnovae* Restivo De Miranda 1976b: 88 [pars], fig. 4.
- 2) *Lithobius dahli* Verhoeff, 1925: Zapparoli 1982: 244.
- 3) *Lithobius dahli* Verh. 1925: De Miranda Restivo 1983: 114 [pars].
- 4) *Lithobius (Lithobius) dahli* Verhoeff, 1925: Minelli 1985: 40 [pars].
- 5) ? *Lithobius pilatoi* Matic: De Miranda Restivo & Guaita 1986: 34.
- 6) *Lithobius dahlii* Verhoeff, 1925: Foddai et al. 1995: 6 [pars].
- 7) *Lithobius inermis* L. Koch, 1856: Foddai et al. 1995: 6 [pars].
- 8) *Lithobius (Lithobius) dahli* Verhoeff, 1928 [sic]: Grafitti & Zapparoli 1995: 125.
- 9) *Lithobius (Lithobius) inermis* L. Koch, 1856: Grafitti & Zapparoli 1995: 126.
- 10) *Lithobius dahlii* Verhoeff, 1925: Foddai et al. 1996: 360, tab. I [pars].
- 11) *Lithobius inermis* L. Koch, 1856: Foddai et al. 1996: 360, tab. I [pars].
- 12) *Lithobius dahli*: Grafitti & De Waele 1996: 32.
- 13) *Lithobius inermis*: Grafitti & De Waele 1996: 32.
- 14) *Lithobius* n. sp. (Zapparoli, 1996 i. l.): Grafitti et al. 1996: 66.
- 15) *Lithobius nuragicus* Zapparoli 1997: 60.
- 16) *Lithobius (Lithobius) inermis*: De Waele & Pisano 1998: 27.
- 17) *Lithobius nuragicus*: Grafitti 2001a: 22.
- 18) *Lithobius dahlii* Verhoeff, 1925: Zapparoli & Minelli 2005: CD [pars].
- 19) *Lithobius inermis* L. Koch, 1856: Zapparoli & Minelli 2005: CD [pars].
- 20) *Lithobius melanops* Newport, 1845: Zapparoli & Minelli 2005: CD [pars].

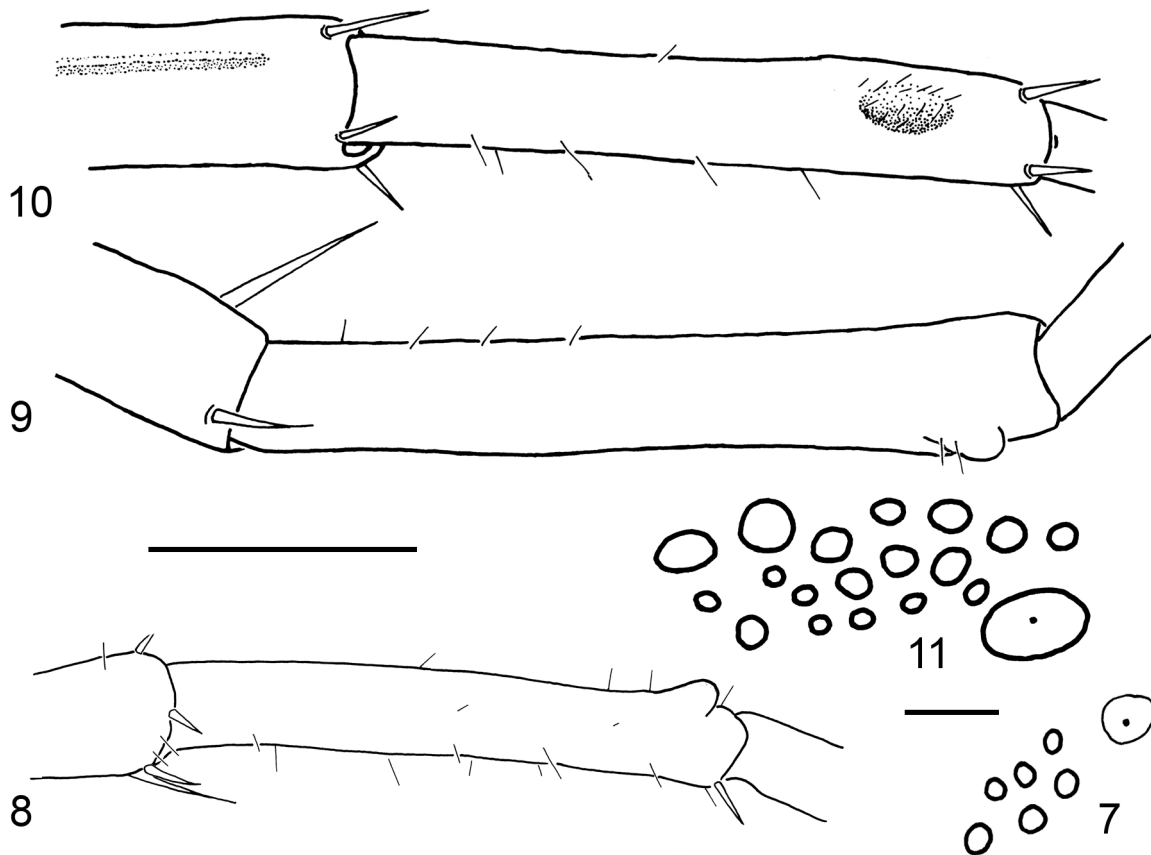
- 21) *Lithobius nuragicus* Zapparoli, 1997: Zapparoli & Minelli 2005: CD.  
 22) *Lithobius* sp.: Lana *et al.* 2006: 46.  
 23) *Lithobius nuragicus* Zapparoli, 1997: Grafitti & Merella 2008: 84, 85.  
 24) *Lithobius variegatus rubriceps* Newport, 1845: Grafitti & Merella 2008: 86.  
 25) *Lithobius* sp. pr. *nuragicus* Zapparoli, 1997: Grafitti & Merella 2008: 89.

### Literature records

**General.** Sardinia (6, 7, 10, 11).

**Epigeic.** No records.

**Cave.** Oristano prov.: Asuni, Monte Perdedu, Abba Suergiu, “Grotta Su Stampu ‘e Muscione Stunnu” 242 Sa/OR, 430 m (8, 16, 19). Cagliari prov.: Fluminimaggiore, Antas, “Grotta S’Oghittu” 1077 Sa/CI [=1077 Sa/CA], [317 m] (23). Domusnovas, Monte Acqua, “Grotta di San Giovanni” 81 Sa/CA, 206 m (1, 20, 23). Iglesias, Corongiu de Mari, “Grotta Prima di Corongiu de Mari” or “Grotta n. 16” (= “Grotta di Pili”) 258 Sa/CA [= 258 Sa/CI], 180 m (2, 3, 4, 8, 9, 12, 13, 18, 19, 24). Iglesias, Corongiu de Mari, “Grotta di Santa Vita” 130 Sa/CA (5). Su Benatzu, Santadi, [“Grotta di Su Benatzu”] or “Grotta Pirosu” 631 Sa/CA [= 576 Sa/CI], 200 m (type locality of *Lithobius nuragicus* Zapparoli, 1997) (14, 15, 17, 21, 22, 25).



**FIGURES 7–11.** *Lithobius nuragicus* Zapparoli. 7–8. Male (Su Benatzu, Santadi, “Grotta di Su Benatzu” 631 Sa/CA). 7. Right ocelli and organ of Tömösváry (dotted), scale bar: 0.1 mm. 8. Left 15<sup>th</sup> tibia, scale bar: 1.0 mm. 9–10. Male (Antas, “Grotta S’Oghittu” 1077 Sa/CA), scale bar: 1.0 mm. 9. Left 15<sup>th</sup> tibia, dorsolateral. 10. Left 14<sup>th</sup> tibia, dorsal. 11. Right ocelli and organ of Tömösváry (dotted) of female (Ozieri, “Grotta di S. Michele” 83 Sa/SS), scale bar: 0.1 mm.

### Material examined

**Epigeic.** Sassari prov.: Golfo Aranci: IV.1903, CF, 1 imm. ♂ (MGE).

**Cave.** Sassari prov.: Ozieri, “Grotta di San Michele” 83 Sa/SS, 429 m: 11.III.1995, GG & SA, 1 larva (CMZ); 8.IV.1995, MM, 1 ♀ (CMZ). Ozieri, “Grotta del Carmelo” 21 Sa/SS, 420 m: 9.IV.1995, GG, 1 larva (CMZ). Capo Figari, Golfo Aranci, “Pozzo di Su Passu Malu” 1356 Sa/SS, 70 m: 7.I.1996, GGO, 1 imm. in

bad conditions (CMZ); 23.II.1997, JD & AG, 1 imm. (CMZ). Cagliari prov.: Iglesias, Corongiu de Mari, “Grotta delle Scalette” 308 Sa/CA, 180 m: 11.I.1997, JD, 1 imm. (GSS). Domusnovas, Monte Acqua, “Grotta di San Giovanni” 81 Sa/CA, 206 m, under a stone in the Sala dei Pipistrelli, south–west branch: 12.XII.2004, GG & BE, 1 ♀ (GSS). Fluminimaggiore, Antas, “Grotta S’Oghittu” 1077 Sa/CA, 317 m: 20.XI.2001, GM, 1 ♂ (CMZ). Su Benatzu, Santadi, “Grotta di Su Benatzu” or “Grotta Piroso” 576 Sa/CA, 200 m: 30.X.2005, PM & CO, 1 imm. ♂ (GSS) [in Lana *et al.* 2006: 44 under *Lithobius* sp.]; 22.IV.2007, ME, 1 ♂ (GSS).

**Other.** Oristano prov.: “Asuni, Grotta Su Stampu ‘e Muscione Stunnu (OR), 16.II.92, M. Mucedda [leg.]”, Monte Perdedu, Abba Suergiu, 242 Sa/OR, 430 m, 1 imm. ♂ [in Grafitti & Zapparoli 1995: 126 under *Lithobius (Lithobius) inermis* L. Koch, 1856]. Cagliari prov.: “Sardegna, CA [= Cagliari prov.], Iglesias, grotta N. 16 Corongiu de Mari (= “Grotta di Pili”) 2.V.1971, A. Vigna leg.” [= “Grotta Prima di Corongiu de Mari” 258 Sa/CA, 180 m], 1 imm., 2 larvae with 12 lp, 1 larva with 10 lp (CMZ) [in Zapparoli 1982: 244 under *Lithobius (Lithobius) dahli* Verhoeff, 1928 (print error for 1925)]. “Sardegna, Iglesias, Grotta Grande di Corongiu de Mari (Marganai), 10.IX.67, leg. F. Cassola” (= “Grotta Prima di Corongiu de Mari” 258 Sa/CA, 180 m), 1 imm. ♀ (CMZ) [in Grafitti & Zapparoli 1995: 126 under *Lithobius (Lithobius) inermis* L. Koch, 1856].

**TABLE 6.** *Lithobius nuragicus* Zapparoli; Su Benatzu, Santadi, “Grotta di Su Benatzu” 631 Sa/CA, ME, 22.IV.2007, male: spinulation.

	Ventral					Dorsal				
	C	t	P	F	Ti	C	t	P	F	Ti
1	-	-	mp	mp	am	-	-	mp	a	a
2-3	-	-	amp	amp	am	-	-	mp	a p	a p
4-11	-	-	amp	amp	am	-	-	amp	a p	a p
12-13	-	-	amp	amp	am	a	-	amp	a p	a p
14	-	m	amp	amp	am	a	-	amp	a p	a p
15	-	m	amp	am	a	a	-	amp	a p	-

**TABLE 7.** *Lithobius nuragicus* Zapparoli; Ozieri, “Grotta di S. Michele”, 8.IV.1995, MM, female: spinulation; 15<sup>th</sup> VpF on one side only.

	Ventral					Dorsal				
	C	t	P	F	Ti	C	t	P	F	Ti
1	-	-	amp	amp	am	-	-	amp	a p	a
2-11	-	-	amp	amp	am	-	-	amp	a p	a p
12	-	m	amp	amp	am	-	-	amp	a p	a p
13-14	-	m	amp	amp	am	a	-	amp	a p	a p
15	-	m	amp	amp	a	a	-	amp	p	-

**General distribution.** Europe: Italy (Sardinia).

**Chorotype.** Sardinian endemic, W-Mediterranean affinities.

**Ecological notes.** Mostly in caves (10 sites), 70–429 m a.s.l.; one old epigeic record near sea level (Sassari prov., Golfo Aranci, 1903) needs to be confirmed; eutroglophilic species.

**Remarks.** This species was described on a single female from “Grotta di Su Benatzu” or “Grotta Piroso”, Su Benatzu, Santadi, Cagliari province. Records from “Grotta Prima di Corongiu de Mari” near Corongiu de Mari, Cagliari province, published by Zapparoli (1982) under *Lithobius dahli* Verhoeff, 1925, and from “Grotta Su Stampu ‘e Muscione Stunnu” Asuni, Monte Perdedu, Abba Suergiu, Oristano province, published

by Grafitti and Zapparoli (1995) under *L. inermis* L. Koch, 1856 (see also De Waele and Pisano 1998), have been here re-examined and must also be referred to this species. The record from “Grotta di Santa Vita”, Iglesias, Corongiu de Mari, a cave of the same karst area, published by De Miranda Restivo and Guaita (1986) under *L. pilatoi* Matic, 1968, probably also refers to *L. nuragicus*. The specimen with 3+4 prosternal teeth from “Grotta di San Giovanni” 81 Sa/CA, Domusnovas, Cagliari province, apparently belonging to the paratype series of *L. melanops domusnovae* Restivo De Miranda 1976b and assumed as anomalous in the original description of this taxon (see Restivo De Miranda 1976b: 90, fig. 4), probably belongs to *L. nuragicus* as well, as its presence in the cave has been verified on new material recently collected.

**Additional remarks on the material examined.** The new material from “Grotta di Su Benatzu”, the type locality of this species, agrees well with its original description. Of the two specimens examined, the mature male (G. Merella leg., 22.IV.2007) shows the following characters: body length 16.0 mm, antennae mutilated but at least 12.0 mm long and with 72 articles; ocelli small, 1 + 3, 2, as in Fig. 7; prosternum with 3+4 teeth, without shoulder lateral to prodont; coxal pores 5, 5, 6, 5; 15<sup>th</sup> leg 10.0 mm long, with a distal dorsal rounded protuberance on the tibia (Fig. 8). First genital sternite with 16–17 setae on each side; second genital sternite with two setae; gonopod large, of two articles, with three setae on the proximal and one apical seta on the distal one. Spinulation as in Tab. 6. From the same locality is also an immature male 14.0 mm long, with 1+3 small and not contiguous ocelli, large organ of Tömösváry, 4+3 conical forcipular teeth, antennae mutilated with at least 48 articles, 4, 4, 5, 4 circular coxal pores. Although less developed, the protuberance on 15<sup>th</sup> tibia is present as well.

Specimens from “Grotta di San Giovanni” (Domusnovas) and “Grotta S’Oghittu” (Fluminimaggiore), both in Cagliari province, also agree well with the type and topotype material of *L. nuragicus*, although the single mature female from the former locality has a slightly higher number of antennal articles (86–89). The mature male (body length 22.0 mm) from “Grotta S’Oghittu” also shows the already described distal dorsal rounded protuberance on tibia 15 (Fig. 9). Moreover, a distal dorsal small and well circumscribed pit surrounded by about 12 short setae is present on the 14<sup>th</sup> tibia (Fig. 10). This structure is not evident in the two above-mentioned males from “Grotta di Su Benatzu”, probably because they are not fully mature.

The mature female from “Grotta di San Michele”, Ozieri, Sassari province, differs from the original description in the following characters: body 23.0 mm long, antennae 12.0–12.5 mm long with 76–77 articles, terminal article three times longer than the penultimate; 1 + 17 (right side), 1 + 15 (left side) small and scarcely pigmented ocelli arranged in 3–4 irregular rows (Fig. 11); coxal pores 6, 8, 9, 7; gonopod without lateral denticle. Spinulation as in Tab. 7. In the same locality, a specimen assigned to the 4<sup>th</sup> larval stadium – as it has well developed legs on 1<sup>st</sup>–12<sup>th</sup> segments – was collected, the characters of which are compatible with those of the above-mentioned adult female, suggesting conspecificity. Its main features are: body length 5.5 mm, antennae of 12 (mutilated)–27 articles, 4.0 mm long, 3+3 prosternal teeth, 1 + 1, 2 ocelli on each side, anterosuperior ocellus very small, organ of Tömösváry large.

From the neighbouring “Grotta del Carmelo”, Ozieri, Sassari province, a larva with developed legs on 1<sup>st</sup>–12<sup>th</sup> segments was collected, the characters of which are compatible with those of the above-mentioned larva; it has therefore been assigned to *L. nuragicus* as well. However, it differs in having antennae of 24 (mutilated)–29 articles, 3.5 mm long, 1 + 1, 2 ocelli on each sides, anterosuperior of the same size of the other ocelli.

The two immature specimens (post-larval stadia) from Capo Figari, Golfo Aranci, “Pozzo di Su Passu Malu”, Sassari province, show characters compatible with those of the above mentioned specimens and are thus assumed conspecific: body length 9.9 and 13.0 mm, colour yellow, antennae 4.0 and 8.5–9.0 mm long of 44 (left side, right side mutilated) and 57–58 articles, 3+3 prosternal teeth, ocelli 1 + 2, 1 or 1 + 2, 2 and 1 + 1, 2, 2, 1 or 1 + 2, 2, 3, not well defined and poorly pigmented, respectively. The immature male labelled “Sardegna/Golfo Aranci/Apr. 1903/C. Figini [leg.]” (MGE), apparently collected in an epigeic site of the same area, despite being mutilated seems conspecific with these two cave specimens. Its main features are: body length 8.0 mm, colour yellow, antennae of 40–40 articles, 5.0 mm long, ocelli indistinct on the right side, unpigmented and apparently 1+1 on the left side, 3+3 prosternal teeth, coxal pores round 2, 2, 2, 2.

The specimens from Corongiu de Mari, “Grotta Prima di Corongiu de Mari”, Cagliari province, quoted under *L. dahli* in Zapparoli (1982), and from Iglesias, “Grotta Grande di Corongiu de Mari”, Cagliari province, and Asuni, “Grotta Su Stampu ‘e Muscione Stunnu”, Oristano province, both quoted under *L. inermis* in Grafitti and Zapparoli (1995), all re-examined here, although in bad conditions and mutilated of many legs, show characters that fit well with those of the above-mentioned materials and with the holotype of *L. nuragicus*, therefore they are here assigned to this species. The material quoted under *L. dahli* are represented by two specimens with well developed legs on 1<sup>st</sup>–10<sup>th</sup> segments (assigned to the 3<sup>rd</sup> larval stadium), one specimen with well developed legs on 1<sup>st</sup>–12<sup>th</sup> segments (assigned to the 4<sup>th</sup> larval stadium) and one postlarval specimen. The two larvae with 1<sup>st</sup>–10<sup>th</sup> legs have body 4.1–5.0 mm long, colour yellow, antennae 3.0–3.5 mm long of 24–24 articles, 3+3 prosternal teeth, ocelli 1+1 or 1+1, 1 semipigmented; the larva with 1<sup>st</sup>–12<sup>th</sup> legs has body 5.0 mm long, colour yellow, antennae both mutilated but at least 3.5 mm long and with 22 antennal articles, 3+3 prosternal teeth, ocelli 1 + 1, 1, unpigmented; the postlarval specimen has body 6.5 mm long, colour yellow, antennae 5.0 mm long of 37 articles on one side, mutilated on the other side, 3+3 prosternal teeth, ocelli 1+1, 1 semipigmented. The material quoted under *L. inermis* is represented by an immature female (Iglesias, “Grotta Grande di Corongiu de Mari”), 15.0 mm long, colour dark yellow, antennae 9.0–10.0 mm long with 62–64 articles, 3+3 prosternal teeth, ocelli 1 + 3, 4 (left side), 1 + 4, 2 (right side), organ of Tömösváry larger than the ocelli, gonopods not fully developed but with 2+2 spurs and unidentate claw, and an immature male (Asuni, “Grotta Su Stampu ‘e Muscione Stunnu”), 10.0 mm long, colour light yellow, antennae about 6.0 mm long with 44–46 articles, 3+3 prosternal teeth, ocelli 1 + 2, 2 (left side), 1 + 2, 3 (right side), organ of Tömösváry indistinct.

The record published by Lana *et al.* (2006) under *Lithobius* sp. from Su Benatzu, Santadi, “Grotta di Su Benatzu” 576 Sa/CA has been here examined and belongs to this species.

### 13. *Lithobius (Lithobius) pilicornis* Newport, 1844

- 1) *Lithobius (Lithobius) doriae* (Pocock, 1890): Minelli 1978a: 154.
- 2) *Lithobius pilicornis doriae* Pocock: Eason 1980: 24.
- 3) *Lithobius doriae* (Pochok) [sic]: De Miranda Restivo 1982: 174.
- 4) *Lithobius doriae (pilicornis doriae)* Pocock 1890: De Miranda Restivo 1983: 114.
- 5) *Lithobius pilicornis doriae* Pocock, 1890: Minelli 1983a: 13.
- 6) *Lithobius pilicornis doriae* Pocock 1890: Minelli 1983b: 408.
- 7) *Lithobius pilicornis*: Minelli & Iovane 1987: 28.
- 8) *Lithobius pilicornis* Newport, 1844: Foddai *et al.* 1995: 7.
- 9) *Lithobius pilicornis* Newport, 1844: Foddai *et al.* 1996: 360, tab. I.
- 10) *Lithobius pilicornis* Newport, 1844: Zapparoli & Minelli 2005: CD.

#### Literature records

**General.** Sardinia-Corsica (1§). Sardinia (6, 8, 9).

**Epigeic.** Nuoro prov.: Aritzo (10). Desulo (2, 4, 10). Dorgali (4). Dorgali, Codula Ilune (10). Dorgali, Rio Flumineddu, *Alnus* sp. and *Nerium oleander* (3). Fonni, Monte Spada, 1300 m (5, 10). Gennargentu, Bruncu Spina (5, 10). Monte d’Iscudu, 1300 m (4, 10). Villagrande Strisaili, Villanova Strisaili, *Quercus ilex*, 850 m (7, 10).

**Cave.** No records.

#### Material examined

**Epigeic.** Nuoro prov.: Aritzo: 1.XI.1989, MC, multiple exx (CMZ\*). Desulo (refuge), Gennargentu, 1600 m, *Alnus* sp. shrub, pitfall traps: 3.X.2006, FI, 1 imm. ♂ (IEASS); 17.X.2006, FI, 1 ♀ (IEASS); 24.V.2007, FI, 1 ♂, 1 ♀ (IEASS). Fonni (refuge), Gennargentu, 1600 m, *Alnus* sp. shrub, pitfall traps: 12.IX.2006, FI, 1 ♀ (IEASS); 26.IX.2006, FI, 1 imm. ♂ (IEASS); 9.V.2007, FI, 1 ♂ (IEASS); 19.VI.2007, FI, 1 imm. ♂ (IEASS). Gennargentu: without date, RG, 1 ♀ “*Lithobius castaneus*, Newp.” F. Silvestri det. (MGE); ibidem, Bruncu

Spina, 1600 m, *Alnus* sp. shrub: 19.IV.1996, AVT, 16 exx (CMZ\*); 22.V.1980, AVT, 3 exx (CMZ\*); ibidem, Monte Cresia: I.1899, GD, 3 ♂♂, 1 ♀ (MGE); ibidem, road to Punta La Marmora (Desulo, Foresta Gerini), hand searching: 29.VI.2000, MZ, 4 ♀♀, 3 imm. (CMZ). Monte d'Iscudu, N slope, 1300 m: 6.IX.1975, leg.?, 1 ex (CMZ\*). Orgosolo, 800 m: 16.V.1982, GC, 1 ex (CMZ). Orgosolo, Oristillai, 947 m, 32T 0529688 4446725: 4.IX.2006, GN, 1 ♂ (CNBFVR).

**Cave.** Nuoro prov.: Urzulei, Codula Ilune, “Grotta di Monte Longos” or “Grotta Su Spiria” 1988 Sa/NU: 22.VIII.2004, PM, 1 ♀ (GSS).

**General distribution.** Europe: France (mainland, Corsica), Great Britain (including Channel Isl.), Italy (northern regions, Sardinia), Portugal (mainland, Azores Isl., Madeira Is.), Spain (mainland, Canary Isl.), The Netherlands; North Africa: Morocco (Brölemann 1921, 1930; Machado 1952; Eason 1964, 1985; Matic *et al.* 1967; Jeekel 1977; Zapparoli & Minelli 2005); introduced in Ireland, Nicobare Isl. (India) and Sao Tomé Is. (Gulf of Guinea) (Eason 1974, 1985; Cawley 1999).

**Chorotype.** W-European.

**Ecological notes.** 800–1600 m; woodland species, recorded from *Quercus ilex* woods (2 sites), riparian habitats (under *Alnus* sp., 1 site; under *Alnus* sp. and *Nerium oleander*, 1 site) and montane formations (*Alnus* sp. shrubs, 2 sites); also in caves (2 sites; troglaxene species). See also De Miranda Restivo (1982) and Minelli and Iovane (1987).

**Remarks.** This species has been recorded in Sardinia only from the Gennargentu massif and adjacent areas, Nuoro province.

#### 14. *Lithobius (Lithobius) sardous* Silvestri, 1898

(Figs 12–14)

- 1) *Lithobius (Archilithobius) sardous* Silvestri 1898: 683.
- 2) *Lithobius sardous*, n. sp.[sic]: Gestro 1904: 325.
- 3) *L. sardous* Silv.: Verhoeff 1943c: 67.
- 4) *Lithobius sardous*: Viggiani 1973: 376.
- 5) *Lithobius (Lithobius) sardous* Silvestri, 1897: Minelli 1978a: 155.
- 6) *Lithobius sardous* Silv. 1897 [sic]: Minelli 1983b: 402.
- 7) *Lithobius sardous* Silvestri, 1897: Minelli & Iovane 1987: 20.
- 8) *Lithobius sardous* Silvestri, 1897: Foddai *et al.* 1995: 7.
- 9) *Lithobius sardous* Silvestri, 1897: Foddai *et al.* 1996: 360, tab. I.
- 10) *Lithobius sardous* Silvestri, 1897: Zapparoli & Minelli 2005: CD [pars].  
not *Lithobius sardous* Silvestri 1902 [sic]: De Miranda Restivo 1983: 112.

#### Literature records

**General.** Sardinia-Corsica (5). Sardinia (3, 6, 7, 8, 9).

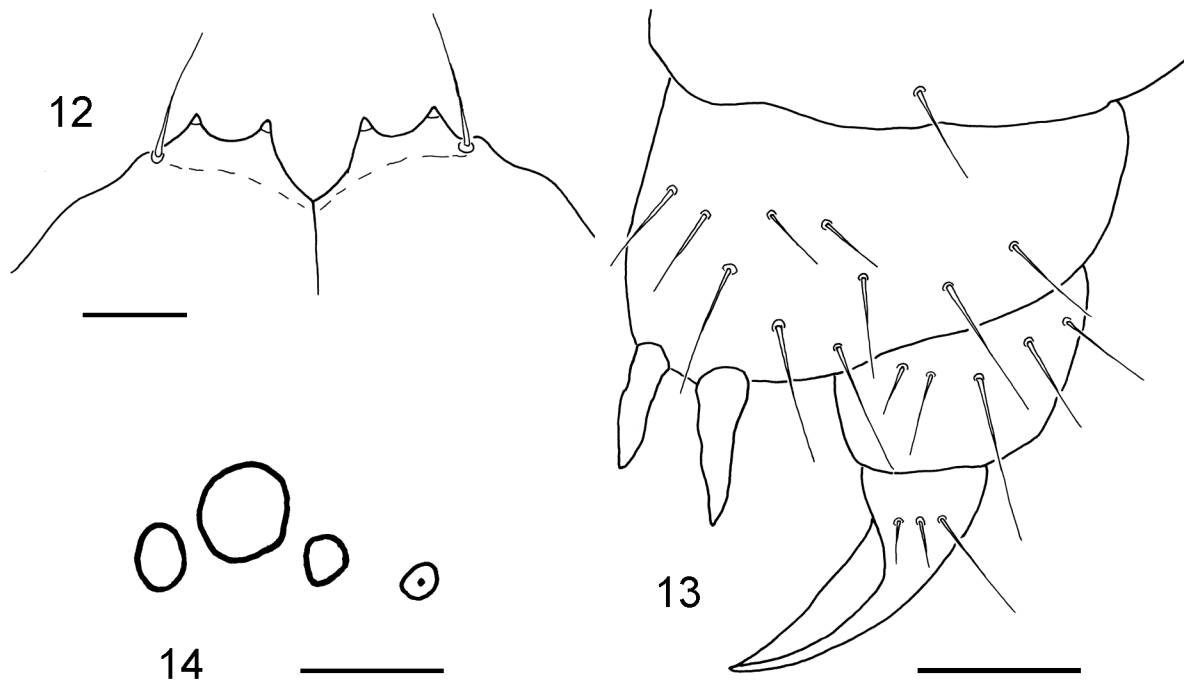
**Epigeic.** Cagliari prov.: Cagliari (type locality of *Lithobius (Archilithobius) sardous* Silvestri, 1898) (1, 2, 4); ibidem, Sant’Elia (10).

#### Material examined

**Epigeic.** Cagliari prov.: Domusnovas, Valle di Oridda: 28.II.1971, AVT, 3 ♀♀ (CMZ). Muravera, San Priamo, soil washing and Berlese extraction: 25.XI.2006, LF, 1 ♀ (CMZ). Sant’Elia: 18.II.1971, AVT, 1 ♂, 3 ♀♀ (CMZ\*). Quartu: II.1895, leg.?, 1 ♀ “*Lithobius* sp.”, F. Silvestri det. (MGE).

**Cave.** No records.

**Other.** Cagliari prov.: “*Lithobius sardous*, Silv./cotypi/Cagliari”, 1 ♂ (paralectotype, M. Zapparoli designavit 2008), 1 ♀ (lectotype, M. Zapparoli designavit 2008) in 75% ethanol [in Silvestri 1898: 683] (MGE).



**FIGURES 12–14.** *Lithobius sardous* Silvestri (♀, lectotype, Cagliari, Sant’Elia), scale bars: 0.1 mm. **12.** Prosternum in ventral view, setae not shown. **13.** Left gonopod, ventral. **14.** Right ocelli and organ of Tömösváry (dotted).

**General distribution.** Europe: Italy (Sardinia).

**Chorotype.** Sardinian endemic, W-Mediterranean affinities (?).

**Ecological notes.** Species apparently related to sites at low elevation; no record from caves; erroneously quoted as a cave species by Minelli and Iovane (1987: 20). One record from an endogeous habitat.

**Notes on the type material.** The lectotype is hereby designated by selecting, among the two specimens labelled as cotypes, the female specimen described below; lectotype and paralectotype have been arranged in two separate vials, both placed in a larger vial with the original china ink label.

**Description of lectotype.** Female. Colour light chestnut. Size 9.0 mm long, 1.25 broad at T. 10. Head slightly broader than long; broader than T. 1; lateral marginal interruption distinct; posterior border straight; antennae one third of body length, 3.0 mm long, of 37 (right) – 38 (left) articles, last article four times longer than the penultimate; ocelli 1 + 1, 1 on each side, depigmented, difficult to see, arranged in a single almost horizontal row, the median ocellus about twice as large the others; organ of Tömösváry obscure; prosternum with 2+2 triangular teeth, prodont long and setiform but stouter than a seta, no shoulders lateral to prodont, lateral sides of coxosternite gently sloping behind prodonts (Fig. 12). T. 1 slightly narrower than T. 3, almost trapeziform, posterior border straight; lateral borders of TT. 3, 5, 7 almost parallel, feebly convergent posteriorly in TT. 8 and 10, convergent posteriorly in TT. 12 and 14; posterior border of TT. 3 and 5 very feebly emarginate, straight in TT. 7, 12 and 14, feebly emarginate in T. 8, emarginate in TT. 10; posterior angles rounded in TT. 3, 5, 8 and 10, angulated in TT. 7, 12 and 14; posterior angles of TT. 9, 11 and 13 without triangular projections, angulated in T. 9, rounded in TT. 11 and 13; TT. 2, 4 and 6 with posterior border straight, lateral borders almost parallel, posterior angles angulated or blunt; intermediate tergite with posterior margin straight. Coxal pores small, circular, 3, 3, 3, 3, separated from one another by their own diameter or more, proximal pore smaller than the distal ones. Female gonopod with two relatively long and well separated spurs, the outer larger than the inner and lanceolate; claw long and almost narrow, without lateral denticles (Fig. 13). Tarsal articulation on 1<sup>st</sup>–13<sup>th</sup> legs not well-defined; praefemur, femur, tibia and tarsi of 14<sup>th</sup> and 15<sup>th</sup> legs missing; VaC absent; spinulation as in Tab. 8.



**TABLE 8.** *Lithobius sardous* Silvestri; Cagliari, lectotype, male: spinulation; 12<sup>th</sup> DmP on one side only; 14<sup>th</sup> and 15<sup>th</sup> t, P, F, Ti mutilated (?).

	Ventral					Dorsal				
	C	t	P	F	Ti	C	t	P	F	Ti
1	-	-	-	-	-	-	-	-	-	a
2	-	-	-	-	m	-	-	-	a p	a
3	-	-	-	-	m	-	-	-	a p	a p
4-9	-	-	-	m	m	-	-	-	a p	a p
10-11	-	-	p	am	m	-	-	-	a p	a p
12	-	-	mp	am	m	-	-	mp	p	a p
13	-	-	mp	am	m	-	-	mp	p	p
14-15	-	?	?	?	?	-	?	?	?	?

**TABLE 9.** *Lithobius sardous* Silvestri; Cagliari, paralectotype, female: spinulation; 5<sup>th</sup> VaF on one side only; 14<sup>th</sup> t, P, F and Ti mutilated (?), presumed spines in square parentheses.

	Ventral					Dorsal				
	C	t	P	F	Ti	C	t	P	F	Ti
1	-	-	-	-	m	-	-	-	a	-
2	-	-	-	-	m	-	-	-	a p	a
3	-	-	-	-	m	-	-	-	a p	a p
4	-	-	-	m	m	-	-	-	a p	a p
5	-	-	-	am	m	-	-	-	a p	a p
6-10	-	-	-	am	m	-	-	-	a p	a p
11	-	-	-	m	m	-	-	-	p	a p
12-13	-	-	mp	m	m	-	-	mp	p	a p
14	-	?	[mp]	[m]	?	-	[-]	[mp]	?	?
15	-	m	mp	m	-	-	-	mp	-	-

**TABLE 10.** *Lithobius sardous* Silvestri, 1898; Cagliari, S. Elia, 1 ♂, 3 ♀♀: spinulation, the letters in parentheses indicate variable spines.

	Ventral					Dorsal				
	C	t	P	F	Ti	C	t	P	F	Ti
1	-	-	-	-	-	-	-	-	(a)	(a)
2	-	-	-	-	m	-	-	-	a p	a (p)
3-4	-	-	-	-	m	-	-	-	a p	a p
5-11	-	-	-	am	m	-	-	-	a p	a p
12	-	-	mp	am	m	-	-	(m)p	p	a p
13	-	-	mp	am	m	-	-	mp	p	(a) p
14	-	m	mp	am	-	-	-	mp	p	(p)
15	-	m	mp	m	-	-	-	mp	-	-

**Description of paralectotype.** Male. Differing from the lectotype in the following features: size 8.0 mm long, 1.0 mm broad at T. 10; antennae 2.5 mm long, of 38 articles with last article three times longer than the penultimate one on right side, mutilated at 27<sup>th</sup> article on left side; coxal pores 2, 2, 2, 2; praefemur, femur, tibia and tarsi of 14<sup>th</sup> leg missing; 15<sup>th</sup> leg 2.0 mm long without secondary sexual characters, glandular pores on internal side of praefemur, femur and tibia; 15<sup>th</sup> leg with a small accessory apical claw; spinulation as in Tab. 9.

**Description of other specimens.** Differing from type material in the following features: colour light chestnut, yellowish; size 9.5 to 10.5 mm long; antennae 3.2 to 4.0 mm long, of 34–36 articles, last article 2–3 times longer than the penultimate; ocelli as in Fig. 14, feebly pigmented; organ of Tömösváry close to the ocelli and about the size of the smaller ones (Fig. 14); coxal pores 2, 2, 2, 2 in the male, 2, 2, 2, 3 or 3, 3, 3, 3 in the females; male gonopod of a single article with a long apical seta; second genital sternite covered with 6–7 scattered short setae; spinulation as in Tab. 10, a 15 VaP spine, apparently abnormal, is present on the right leg of a female specimen.

**Remarks.** *Lithobius sardous* was described briefly and without figures by Silvestri (1898), based on an unspecified number of specimens from Cagliari. No other records are known in the literature apart from those much later published by Zapparoli and Minelli (2005), also from Cagliari province. The record from Villasalto, “Grotta e’ Scusi”, Cagliari province, published by De Miranda Restivo (1983) and included in Zapparoli and Minelli (2005), is erroneous and must be referred to *L. sardus* Manfredi, 1956 (see below).

*Lithobius sardous* had never been discussed from a taxonomic point of view before Minelli (1983a), who considered it of uncertain identity or, at least, morphologically close to *L. inermis* L. Koch, 1856.

Based upon the present material, *L. sardous* seems quite different from *L. inermis*, a species from North Africa and the Iberian Peninsula, also known from Sardinia (see above), belonging to a group of W-Mediterranean taxa characterized by a latero-internal longitudinal sulcus on the 14<sup>th</sup> and 15<sup>th</sup> legs (Serra 1987); moreover, in *L. inermis* body size is larger, number of prosternal teeth, ocelli, antennal articles and coxal pores is generally greater and leg spinulation is richer (see Brölemann 1930) than in *L. sardous*. *Lithobius sardous* seems instead closely related to another group of W-Mediterranean *Lithobius* including *L. hispanicus* Meinert, 1872, from south Spain (including Balearic Isl.) and North Africa, and *L. h. alicatai* Matic in Matic *et al.*, 1967, from central Spain and central and northern Portugal (Eason 1974; Serra 1979; Vadell 2007). With these taxa it shares the general body size, the number of prosternal teeth, the small number of ocelli, the pattern of spinulation and, chiefly with *L. h. alicatai*, the shape of the female gonopod.

## 15. *Lithobius (Lithobius) sardus* Manfredi, 1956 status nov.

- 1) *Lithobius agilis* Koch subsp. *sardus* Manfredi, 1956: 205.
- 2) *Lithobius agilis sardus* Manfr., 1956: Cerruti 1968: 231.
- 3) *Lithobius agilis sardus* Manfredi, 1956: Puddu & Pirodda 1974: 175.
- 4) *Lithobius agilis sardus* Manfredi: Eason 1975: 454.
- 5) *Lithobius agilis* Koch subsp. *sardus* Manfredi, 1956: Manfredi 1976: 231.
- 6) *Lithobius (Lithobius) agilis* C. L. Koch, 1847: Minelli 1978a: 154 [pars].
- 7) *Lithobius agilis sardus* Manfredi, 1956: Cassola 1982: 634, 707.
- 8) ? *Lithobius agilis sardus* Manfredi: De Miranda Restivo 1982: 172.
- 9) *Lithobius agilis sardus* Manfredi 1956 [sic]: De Miranda Restivo 1983: 111.
- 10) *Lithobius sardus* Silvestri 1902 [sic]: De Miranda Restivo 1983: 112.
- 11) ? *Lithobius agilis* Koch 1847 [sic]: De Miranda Restivo 1983: 113 [pars].
- 12) *Lithobius agilis sardus* Manfr. 1956 [sic]: Minelli 1983b: 408.
- 13) *Lithobius (Lithobius) agilis* C.L. Koch, 1847: Minelli 1985: 38.
- 14) *Lithobius agilis sardus*: Grafitti 1990b: 118.
- 15) *Lithobius agilis sardus* Manfredi, 1956: Foddai *et al.* 1995: 5.
- 16) *Lithobius (Lithobius) agilis sardus* Manfredi, 1956: Grafitti & Zapparoli 1995: 123.
- 17) *Lithobius agilis* Koch subsp. *sardus* Manfredi, 1956: Leonardi 1995: 137.

- 18) *Lithobius agilis sardus* Manfredi, 1956: Foddai *et al.* 1996: 360, tab. I.  
 19) *Lithobius agilis*: Fancello & Mucedda 1997: 49.  
 20) *Lithobius (Lithobius) agilis sardus*: De Waele & Pisano 1998: 27.  
 21) *Lithobius agilis sardus* [sic]: Grafitti 1999a: 36.  
 22) *Lithobius agilis sardus*: Grafitti 2001a: 16.  
 23) *Lithobius agilis sardus* Manfredi, 1956: Zapparoli & Minelli 2005: CD [pars].  
 24) *Lithobius sardus* Silvestri, 1898: Zapparoli & Minelli 2005: CD [pars].  
 25) *Lithobius agilis sardus*: Grafitti 2007a: 387.  
 26) *Lithobius agilis sardus*: Lana *et al.* 2007: 43.  
 not *Lithobius* (s. s.) *agilis* C. Koch: Silvestri 1898: 628.  
 not *Lithobius agilis* Koch: Verhoeff 1925a: 656.  
 not *Lithobius agilis* C. Koch: Attems 1949: 112.

## Literature records

**General.** Sardinia-Corsica (6). Sardinia (4, 12, 15, 17, 18).

**Epigeic.** Nuoro prov.: Macomer, Monte Sant'Antonio, *Quercus ilex* wood (8).

**Cave.** Nuoro prov.: Baunei, [Feneu, Codula de Sisini], "Grotta Su Tufu de Mangalistru" 422 Sa/NU, [320 m] (26). Dorgali [generic quotation for the caves of the area] (21). Dorgali, Codula Fuili, "Sa Grotta de S'Orcu" or "Sa Rutta Niedda" 101 Sa/NU, 150 m (16, 19, 23). Dorgali, Monte Coazza [generic quotation for the caves of the area] (14). Dorgali, Monte Corallinu [generic quotation for the caves of the area] (14). Dorgali, Monte Coazza, "Grotta di Cava Coazza" (= "Grotta Collettore") without cadastre number, 91 m (16, 23). Dorgali, Monte Coazza, "Grotta Pisanu" 215 Sa/NU (type locality of *Lithobius agilis sardus* Manfredi, 1956) (1, 3, 8, 9). Dorgali, Monte Corallinu, "Grotta Corallina" 58 Sa/NU, 156 m (16, 23). Dorgali, Su Anzu, "Grotta Scavi Taramelli" or "Grotta Nona di Iscala de Su Anzu" (= "Grotta Sos Jocos") 344 Sa/NU, 171 m (16, 23). Fonni, "Grotta di Correboi" or "Grotta di Monte Bruttu" without cadastre number (16, 23). Oliena [generic quotation for the caves of the area] (21). Oliena, Monte Corrasì, "Grotta S'Abb'a Medica" 335 Sa/NU (type locality of *Lithobius agilis sardus* Manfredi, 1956) (1, 2, 3, 5, 7, 8, 9, 13, 22, 23). Urzulei, Codula di Luna [= Ilune], Telettotes, "Grotta di Su Palu" [1988 Sa/NU], 185 m (16, 23, 25). Oristano prov.: Asuni, Sa Serradedda, "Grotta Conca 'e Su Bandidu" 1851 Sa/OR (16, 20, 23). Nuoro prov./Cagliari prov.: Ulassai/Villaputzu, [Monte Cardiga], Su Pranu, "Grotta S'Angurtidorgiu Mannnu" [= "Grotta S'Angurtigorgiu Mannu"] 4 Sa/NU-CA, [470 m] (16, 23). Cagliari prov.: Domusnovas, Monte Acqua, "Grotta di San Giovanni" 81 Sa/CA, [206 m] (11). Villasalto, Monte Pardu, "Grotta 'e Scusi" 602 Sa/CA, 525 m (10, 16, 23, 24).

## Material examined

**Epigeic.** No records.

**Cave.** Nuoro prov.: Baunei, Dolimasio-Mesu 'e Monte, "Grotta Nurra de Mesu 'e Monte" 3063 Sa/NU, 850 m: 16.VI.2003, AC, 1 ♀ (GSS). Baunei, Feneu, Codula de Sisini, "Grotta Su Tufu de Mangalistru" 422 Sa/NU, 320 m: 14.X.2007, GG & PM, 1 ♂, 1 ♀ with 3+3 spurs (GSS). Dorgali, Monte Coazza "Sistema di Coazza" 905 Sa/NU: VI.2004, PM, 1 ♂ (GSS). Dorgali, Su Anzu, "Grotta Sos Jocos" or "Scavi Taramelli" 344 Sa/NU: 22.X.2003, EL, 1 ♂ (GSS). Fenugu, Perdasdefogu, "Grotta di Su Fenugu" 1935 Sa/NU, 415 m: 29.X.2005, EL & PM, 1 ♂ (GSS). Laconi, Parco Aymerich, "Grotta di Laconi" or "Grotta del Parco Aymerich" 52 Sa/NU, 540 m: 27.V.1902, DO, 2 ♂♂, 1 ♀ "*Lithobius* sp." F. Silvestri det. labelled as "Laconi (grotta)" (MGE). Nurri, Crabarida, "Grotta Asutta 'e Scracca" 5 Sa/NU, 490 m: 23.VII.1967, CA, 1 ♀ with 58 antennal articles and 3+3 spurs (CMZ); 9.VIII.1998, JD & DD, 1 ♀ with 51 antennal articles and 2+2 spurs, 1 imm. (CMZ). Orgosolo, Valle del Flumineddu, "Grotta Sas Venas" without cadastre number: 18.IV.2004, PM, 1 ♀ (GSS). Sadali, "Grotta de Su Guanu" [= Sadali, Foresta di Addoli, "Grotta de Is Janas" 51 Sa/NU, 780 m]: 27.V.1901, DO, 2 ♂♂, 2 ♀♀ (MGE). Seulo, Foresta di Addoli, "Grotta de Is Gianas" or "Domu de Is Janas" 679 Sa/NU, 810 m: 28.V.1901, DO, 1 ♀ labelled as "Grotta di Seulo" (MGE). Supramonte di Baunei, "Grotta di Istitzili" 50 Sa/NU, 507 m: 27.IV.2006, CO & NI, 1 imm. ♂, 1 imm. ♀ (GSS). Supramonte di Urzulei, Valle del Flumineddu, Zippiri 'e Josso "Grotta di Mandara 'e Suru Manna" 2489 Sa/NU: 6.I.2000,

MM, 1 ♂ (GSS). Urzulei, Fennau, “Grotta Sa Rutta ‘e S’Edera” 588 Sa/NU, 950 m: 4.VIII.1970, AC, 1 ♂ (CMZ). Oristano prov.: Samugheo, Castello della Medusa, “Grotta Sa Conca de Su Cuaddu” 1859 Sa/OR: 4.IV.2004, LF, 2 ♀♀ (CMZ). Asuni, Sa Serradedda, “Grotta Sa Conca ‘e Su Bandidu” 1851 Sa/OR: 11.III.2007, MM, 1 ♂, 1 imm. ♂, 1 imm. ♀ (GSS). Cagliari prov.: Villaputzu, Monte del Castello di Quirra, “Grotta del Caprone Tyson” without cadastre number, under stones: I.1999, GM, 1 ♂, 1 imm. ♂, 1 ♀, 2 imm. ♀♀ (GSS).

**General distribution.** Europe: Italy (Sardinia) (Zapparoli & Minelli 2005).

**Chorotype.** Sardinian endemic, W-Mediterranean affinities (?).

**Ecological notes.** Mostly in caves (23 sites, 90–950 m a.s.l.; eutroglophilic species); a doubtful record exists from an epigeic site, in *Quercus pubescens* woods.

**TABLE 11.** *Lithobius agilis* C.L. Koch, *L. turritanus* Fanzago and *L. sardus* Manfredi: comparative table of morphological characters.

	<i>Lithobius agilis</i>	<i>Lithobius turritanus</i>		<i>Lithobius sardus</i>
Reference	Eason 1964	Fanzago 1881 [in original]	Eason 1980 (as <i>Lithobius tricuspis</i> Meinert, 1872)	Manfredi 1956 (as <i>Lithobius agilis</i> Koch <i>sardus</i> n. subsp.)
Body length (in mm)	8–11	11	12–16	16–17
Colour	chestnut-brown	testaceous-brown [testaceo-brunneus]	not quoted	brown or pinkish brown, sternites lighter
Integument	not punctate; setae fairly long	evidently wrinkled, densely covered with setae [manifeste et dense rugosus et pilosus]	not quoted	smooth, with long and sparse setae
Cephalic shield	slightly broader than long	almost square, posteriorly straight [lamina cephalica subquadrata, postice truncata]	not quoted	rounded
Number of antennal articles	31–35	33–35	35–48	56–57
Antennal length	about one third of body length	5 mm, not reaching half of body length [dimidiam partem corporis longitudinis non attingentes]	one third of body length	more than half of body length
Number of ocelli and arrangement	7–11: 1 + 3, 2, 1; 1 + 3, 3, 2; 1 + 4, 4, 2; arranged on three rows	12, arranged on three rows [12 in series 3 digesti]	1 + 4, 3, 3; 1 + 3, 3, 3; 1 + 3, 3, 2	10–12; arranged on three rows
Organ of Tömösváry	not quoted	not quoted	equal in size to one of the smaller ocelli	smaller than the ocelli

.....continued

**TABLE 11** (continued)

	<i>Lithobius agilis</i>	<i>Lithobius turritanus</i>		<i>Lithobius sardus</i>
Number of prosternal teeth	2+2	2+2	2+2	2+2 stout, somewhat spaced from one another
Median notch on the anterior margin of the prosternum	not quoted	not quoted	not quoted	rather deep
Porodont	not quoted	not quoted	not quoted	spiniform
Tergites 9, 11, 13	T. 9 with broad, blunt projections; those of TT. 11 and 13 with more prominent projections	angles of TT. 11 and 13 with posterior projections [scuta dorsalia 11, 13 angulis posticis productis]	posterior angles of T. 9 with much smaller projections than those of TT. 11 and 13	with triangular posterior projections rather long and pointed
Number and shape of coxal pores	3–5, usually 4, 4, 4, 3 or 4, 4, 4, 4; rounded	3, 3, 4, 2; oval [3, 3, 4, 2; ovales]	2, 3, 3, 3; 3, 3, 3, 3; small	2, 3, 3, 3; 2, 4, 4, 4; 3, 3, 4, 4; rounded, large
15 <sup>th</sup> accessory apical claw	well-developed	last pair of legs with a double claw [pedes anales unguibus binis]	well-developed	present
VaC	on 15 <sup>th</sup> leg only	not quoted	on 14 <sup>th</sup> and 15 <sup>th</sup> legs	on 15 <sup>th</sup> leg only
Leg 15	slightly thickened in both sexes	not quoted	not quoted	long and slender
Leg 15 spinulation	D: a, –, amp, p, –; V: a, m, amp, am, –	D: not quoted; V: *, m, amp, amp, a? [calcaribus 1+3+3+1 armati] * = not quoted, probably “a”	D: a, –, amp, p, –; V: a, m, amp, amp, –	D: a, –, amp, –, –; V: a, m, amp, am, a
Female gonopod	with 2+2 spurs rather long and slender but relatively broad at the base; claw tridentate with both dorsal and ventral denticles almost as large as the tip of the claw itself	claw simple, 3+3 spurs [unguis simplex calcaribus tria paria]	with three spurs and a single claw	with 2+2 conical spurs and wide claw without lateral denticles
Male genitalia	gonopod of a single article, second genital sternite without setae	not quoted	gonopod of a single article, second genital sternite without setae	not quoted

**Remarks.** *Lithobius sardus* was described as a subspecies of the European *L. agilis* C. L. Koch, 1847 on specimens from two caves of the Nuoro province, “Grotta S’Abb’a Medica” and “Grotta Pisanu” (syntypes from “Grotta S’Abb’a Medica” according to Manfredi 1976: 231), and most of the subsequent records come from cave localities of the same area (Grafitti 1990b; Grafitti & Zapparoli 1995). According to Manfredi (1956), *L. agilis agilis* and *L. a. sardus* differ in general body size, number of antennal articles, length of antennae, spinulation of the legs, shape of the 15<sup>th</sup> leg, and shape of the claw of the female gonopod . Minelli

(1983b) considers the taxonomic identity of *L. a. sardus* as uncertain and Eason (1975: 454) formerly suggests it as specifically distinct from *L. a. agilis*. The differences between the two forms (Tab. 11) seem sufficient to justify their separation into two species, in agreement with the former hypothesis of Eason (1975). The new taxonomic status is here therefore formalized (**status nov.**). The identity of *L. sardus* is, however, still not completely clear as, comparing the descriptions published and the material examined, this species appears morphologically close to *L. turritanus* Fanzago, 1881. Although the long and slender 15<sup>th</sup> leg seems to characterize *L. sardus* and differences can be found in the number of antennal articles, the length of the antennae, the shape of the triangular projections of TT. 9, 11 and 13, and in the number of spurs on the female gonopod (Tab. 11), the two taxa seem morphologically closely related. On the other hand, cave specimens of *L. sardus* with a smaller number of antennal articles (48, 51) and 3+3 spurs (“Grotta Su Tufu de Mangalistru” 422 Sa/NU, 1 ♀; “Grotta Asutta ‘e Scracca” 5 Sa/NU, 1 ♀) have been here examined and epigeic specimens from the Nuoro province (especially from Gennargentu area, 600–1800 m a.s.l.), here referred to *L. turritanus* (see below) have female gonopods with 2+2 spurs and elongate 15<sup>th</sup> legs. The relationship between *L. sardus* and *L. turritanus* therefore deserves further investigation.

The epigeic records from Sassari province formerly published by Fanzago (1881b) under *L. macilentus* L. Koch, 1862 and then referred to *L. agilis* by Silvestri (1898), Verhoeff (1925a), Attems (1949) and De Miranda Restivo (1983), are unreliable and refer to *L. turritanus* (see below). The epigeic record from Macomer, Monte Sant’Antonio, Nuoro province, published by De Miranda Restivo (1982), is doubtful and probably also refers to *L. turritanus*. The record from Domusnovas, “Grotta di San Giovanni”, Cagliari province, published by De Miranda Restivo (1983), is also doubtful and needs to be confirmed. The record under *L. macilentus* from Giave, published by De Miranda Restivo (1983), is erroneous and due to a misprint. The record from Villasalto, “Grotta ‘e Scusi”, Cagliari province, published by De Miranda Restivo (1983: 112) under *Lithobius sardous* Silvestri, 1898, is based on the same material later published as *L. (L.) a. sardus* Manfredi by Grafitti and Zapparoli (1995: 123).

## 16. *Lithobius (Lithobius) sbordonii* Matic, 1967

(Fig. 15)

- 1) *Lithobius (Troglolithobius) sbordonii* Matic, 1967: 94, figs 5–7.
- 2) *L[ithobius]. sbordoni* [sic] Matic: Matic & Darabantu 1968a: 215.
- 3) *Lithobius (Troglolithobius) sbordonii* Matic, 1967: Cerruti 1968: 232.
- 4) *Lithobius (Troglolithobius) sbordonii* Matic: Brignoli 1972: 198.
- 5) *Lithobius (Troglolithobius) sbordonii* Matic: Casale 1972: 22.
- 6) *Lithobius (Troglolithobius) sbordonii* Matic, 1967: Puddu & Pirodda 1974: 176.
- 7) *Lithobius (Troglolithobius) sbordonii*: Aellen & Strinati 1976: 200.
- 8) *Lithobius (Troglolithobius) sbordonii* Mat.: Restivo De Miranda 1977: 42, figs 1–5.
- 9) *Troglolithobius sbordonii*: Forestiero & Sbordonii 1978: 269.
- 10) *Lithobius (Troglolithobius) sbordonii* Matic, 1967: Minelli 1978a: 153.
- 11) *Troglolithobius sbordonii* Matic, 1970 [sic]: Atzori *et al.* 1982: 12.
- 12) *Lithobius (Troglolithobius) sbordonii* Matic, 1967: Cassola 1982: 638, 670, 691, 707.
- 13) *Lithobius (Troglolithobius) sbordonii* Matic: Minelli 1982b: 95, 96, 98, 100.
- 14) *Troglolithobius Sbordonii* Matic 1970 [sic]: Pappacoda 1982: 24.
- 15) *Troglolithobius sbordoni* [sic] Matic 1967: De Miranda Restivo 1983: 112.
- 16) *Lithobius sbordonii* Matic 1967: Minelli 1983b: 408.
- 17) *Lithobius (troglolithobius)* [sic] *sbordonii* Matic 67: Puddu 1983b: 18.
- 18) *Lithobius (Troglolithobius) sbordonii* Matic, 1967: Minelli 1985: 42.
- 19) *Lithobius sbordonii* Matic, 1967: Minelli & Iovane 1987: 20.
- 20) *Lithobius (Troglolithobius) sbordonii* Matic: Casale & Giachino 1988: 599.
- 21) *Troglolithobius sbordonii*: Grafitti 1990a: 39.
- 22) *Lithobius sbordonii*: Cobolli Sbordonii *et al.* 1994: 745.
- 23) *Lithobius sbordonii* Matic: Negrea & Minelli 1994: 250, 252.

- 24) *Lithobius sbordonii* Matic, 1967: Foddai *et al.* 1995: 7.  
 25) *Lithobius (Troglolithobius) sbordonii* Matic, 1967: Grafitti & Zapparoli 1995: 128.  
 26) *Troglolithobius sbordonii*: De Waele & Pappacoda 1996: 21.  
 27) *Lithobius sbordonii* Matic, 1967: Foddai *et al.* 1996: 360, tab. I.  
 28) *Lithobius sbordonii* Matic, 1967: Stoev 1997: 90.  
 29) *Troglolithobius sbordonii*: Grafitti 1999a: 36.  
 30) *Lithobius (Troglolithobius) sbordonii*: De Waele & Grafitti 2000: 85.  
 31) *Troglolithobius sbordonii*: Grafitti 2001a: 16.  
 32) *Lithobius sbordonii*: Stoch *et al.* 2001: 109.  
 33) *Lithobius (Troglolithobius) sbordonii* Matic: Grafitti 2002: 280, 281, 288, 291, 293.  
 34) *Lithobius sbordonii* Matic: Zapparoli 2003: 28.  
 35) *Troglolithobius sbordonii*: Lana *et al.* 2004: 41.  
 36) *Lithobius sbordonii* Matic, 1967: Zapparoli & Minelli 2005: CD.  
 37) *Lithobius (Troglolithobius) sbordonii* Matic, 1967: Shelley 2006: 6.  
 38) *Lithobius (Troglolithobius) sbordonii*: Grafitti 2007a: 397, 400.  
 39) *Lithobius (Troglolithobius) sbordonii* Matic: Casale *et al.* 2008: 62, 63, 64, 65, fig. 4, tab. 1.

### Literature records

**General.** Sardinia-Corsica (10). Sardinia (2, 9, 15, 18, 22, 23, 24, 26, 27, 31, 33).

**Epigeic.** No records.

**Cave.** Nuoro prov.: Cala Gonone, “Grotta del Bue Marino” 12 Sa/NU (type locality of *Lithobius (Troglolithobius) sbordonii* Matic, 1967) (1, 3, 4, 5, 6, 7, 8, 12, 13, 15, 17, 18, 20, 21, 25, 29, 30, 31, 33, 35, 36, 37, 39). Dorgali, “Grotta Pisanu” 215 Sa/NU (36). Dorgali, Marcheddie, N of Cala Gonone, “Grotta di Sos Molentes” 1616 Sa/NU, 180 m (25, 29, 36). Dorgali, Monte S’Ospile, “Voragine di Orolittu” 366 Sa/NU (8, 13, 18, 20, 21, 29, 36). Urzulei, “Grotta di Su Palu” 1988 Sa/NU, 185 m (11, 14, 17, 20, 33, 38). Urzulei, Codula Ilune karst system [= “Grotta di Su Palu” + “Grotta di Monte Longos” or “Grotta di Su Spiria”, *cf.* De Waele & Pappacoda 1996], 1988 Sa/NU (26).



**FIGURES 15–16.** Photos of Sardinian centipedes. **15.** Predation of *Lithobius sbordonii* Matic on *Alpionisucus fragilis* Budde-Lund (Crustacea, Isopoda, Trichoniscidae) in the cave of Su Molente near Codula Ilune (Nuoro province, without cadastre number) (photo by G. Dussoni, 17.III.2007). **16.** *Plutonium zwierleini* Cavanna in the cave “Nurra ‘e Pradu” Sa/NU 3083 (Nuoro province) (photo by L. Sanna, 9.XI.2008).

## Material examined

**Epigeic.** No records.

**Cave. Nuoro prov.:** Baunei, Codula Ilune, “Grotta di Su Molente” withouth cadastre number, 40 m: 17.III.2007, 1 ex, photo by G. Dussoni; 8.IV.2007, MM, 1 ♀ (GSS). Dorgali, “Grotta Pisanu” 215 Sa/NU: 15.XI.1985, PG, 1 ex (TO\*). Dorgali, “Grotta di Toddeitto” 89 Sa/NU, m 166: 12.X.1989, FG, 1 imm. ♂ (CFG). Lovettecannas, Supramonte di Baunei, “Grotta di Lovettecannas” 2642 Sa/NU, 930 m: 5.VI.2005, CO, 1 ♂ (GSS). Supramonte di Urzulei, Valle del Flumineddu, Zippiri ‘e Josso “Grotta di Mandara ‘e Suru Manna” 2489 Sa/NU, 870 m: 4.IV.2004, PM, 1 ♀ (GSS).

**General distribution.** Europe: Italy (Sardinia).

**Chorotype.** Sardinian endemic, S-European affinities.

**Ecological notes.** Highly specialized troglobitic species (Lewis 1981; Negrea & Minelli 1994), known only from caves of coastal Supramonte, Nuoro province, E-Sardinia, 40–930 m a.s.l. (10 sites). Predation on *Alpionisucus fragilis* Budde-Lund, 1909 (Crustacea Isopoda Trichoniscidae) has been observed (17.III.2007) in the cave of Su Molente withouth cadastre number, near Codula Ilune, Nuoro province (G. Dussoni and G. Grafitti com. pers.) (Fig. 15).

**Remarks.** *Lithobius (Troglolithobius)* Matic, 1967 was erected to include *L. sbordonii* (type species by original designation, cf. also Shelley 2006) and two other highly specialized cave species, both from the west Balkans, *L. matulici* Verhoeff, 1899b and its possible synonym *L. sketi* Matic & Darabantu, 1968a (Verhoeff 1899b; Matic 1967; Matic & Darabantu 1968a). Kos (1992) noted the unclear systematic position of *Troglolithobius* and Stoev (1997), considering it a non-monophyletic group, correctly synonymized this subgenus with *Lithobius* s. str. This synonymy, although accepted in the myriapodological literature (Zapparoli 2003; Zapparoli & Minelli 2005), has been overlooked in most of the subsequently published biospeleological papers on the Sardinian cave fauna, being *L. sbordonii* quoted under *Troglolithobius* either at genus or subgenus rank (Grafitti 1999a, 2001a, 2002, 2007a; De Waele & Grafitti 2000; Lana *et al.* 2004; Casale *et al.* 2008). Included in the list of threatened invertebrate troglobitic species of Italy by Priano (1992). A history of the collections of this species in the Bue Marino cave, one of the most interesting in Sardinia from a biospeleological point of view, is summarized in Casale *et al.* (2008). The material from “Grotta di Mandara ‘e Suru Manna” 2489 Sa/NU is only tentatively identified, because the cave is out of the range of the species.

## 17. *Lithobius (Lithobius) turritanus* Fanzago, 1881b

- 1) *Lithobius tricuspis* Meinert: Fanzago 1881b: 4.
- 2) ? *Lithobius macilentus* L. Koch: Fanzago 1881b: 4.
- 3) ? *Lithobius Fanzagoi* Fedrizzi: Fanzago 1881b: 5 [pars?].
- 4) *Lithobius turritanus* Fanzago 1881b: 6.
- 5) *Lithobius oligoporus* Latzel 1884: 173 **syn. nov.**
- 6) *Lithobius oligoporus* Latzel: A. Costa 1885: 9, 30.
- 7) *Lithobius oligoporus* Latzel 1885: 254.
- 8) *Lithobius tricuspis* Mein.: Silvestri 1898: 681.
- 9) ? *Lithobius* (s. s.) *agilis* C. Koch: Silvestri 1898: 628.
- 10) *Lithobius* (s. s.) *piceus* L. Koch: Silvestri 1898: 682 [pars?].
- 11) *Lithobius* (s. s.) *oligoporus* Latzel: Silvestri 1898: 682.
- 12) *Lithobius (Hemilithobius) turritanus* Fanz.: Silvestri 1898: 682.
- 13) ? *Lithobius agilis* Koch: Verhoeff 1925a: 656.
- 14) *Lithobius piceus* Koch: Verhoeff 1925a: 656.
- 15) *Lithobius tricuspis* Mein.: Verhoeff 1925a: 656.
- 16) *Lithobius oligoporus* Latz.: Verhoeff 1925b: 148.
- 17) *Lithobius piceus* L. Koch: Attems 1949: 112.



- 18) ? *Lithobius agilis* C. Koch: Attems 1949: 112.
- 19) *Lithobius tricuspis* Mein.: Attems 1949: 112.
- 20) *Lithobius turritanus* Fanzago: Eason & Minelli 1976: 200.
- 21) *Lithobius tricuspis* M.: De Miranda Restivo 1978: 41.
- 22) *Lithobius fraleliae* De Miranda Restivo 1978: 41 **syn. nov.**
- 23) *Lithobius (Lithobius) piceus* L. Koch, 1862: Minelli 1978a: 154.
- 24) *Lithobius (Lithobius) tricuspis* Meinert, 1872: Minelli 1978a: 154.
- 25) *Lithobius (Lithobius) oligoporus* Latzel, 1885: Minelli 1978a: 155.
- 26) *Lithobius tricuspis* Meinert: Eason 1980: 24, fig. 2.
- 27) *Lithobius alpicosiensis* Matic: De Miranda Restivo 1982: 172.
- 28) ? *Lithobius agilis* Koch 1847: De Miranda Restivo 1983: 113 (pars).
- 29) *Lithobius alpicosiensis* Matic 1973: De Miranda Restivo 1983: 113.
- 30) *Lithobius dentatus* Koch 1844: De Miranda Restivo 1983: 114 [pars].
- 31) ? *Lithobius macilentus* Koch 1882: De Miranda Restivo 1983: 116.
- 32) *Lithobius microdon* Latz. 1885: De Miranda Restivo 1983: 116.
- 33) *Lithobius piceus* Koch 1862: De Miranda Restivo 1983: 116.
- 34) *Lithobius tricuspis* Mein 1872: De Miranda Restivo 1983: 116.
- 35) *Lithobius tricuspis* Meinert, 1872: Minelli 1983a: 13.
- 36) *Lithobius piceus* L. Koch: Minelli 1983a: 13.
- 37) *Lithobius piceus* L. Koch 1862: Minelli 1983b: 407.
- 38) *Lithobius tricuspis* Mein. 1872: Minelli 1983b: 407.
- 39) *Lithobius tricuspis* Mein.: De Miranda Restivo 1986: 44, 45, 46, 47.
- 40) *Lithobius alpicosiensis* Mat.: De Miranda Restivo & Guaita 1986: 32, 38, fig. 10c.
- 41) *Lithobius tricuspis* Koch: De Miranda Restivo & Guaita 1986: 36, 37, 39.
- 42) *Lithobius tricuspis mononyx* Lat.: De Miranda Restivo 1986: 45.
- 43) *Lithobius tricuspis*: Minelli & Iovane 1987: 28, 30.
- 44) *Lithobius oligoporus* Latzel, 1885: Foddai *et al.* 1995: 7.
- 45) *Lithobius piceus* Meinert, 1872: Foddai *et al.* 1995: 7 [pars].
- 46) *Lithobius tricuspis* Meinert, 1872: Foddai *et al.* 1995: 7 [pars].
- 47) *Lithobius piceus* L. Koch, 1862: Foddai *et al.* 1996: 360, tab. I.
- 48) *Lithobius tricuspis* Meinert, 1872: Foddai *et al.* 1996: 360, tab. I.
- 49) *Lithobius tricuspis* Meinert, 1872: Zapparoli & Minelli 2005: CD [pars].
- 50) *Lithobius agilis sardus* Manfredi, 1956: Zapparoli & Minelli 2005: CD [pars]

## Literature records

**General.** Sardinia-Corsica (23, 24, 25). Sardinia (5, 7, 13, 14, 15, 16, 17, 18, 19, 37, 38, 44, 45, 46, 47, 48).

**Epigeic.** Sassari prov.: Costa Smeralda, near a small river, humus (35). Lago di Coghinas (35). Lago di Liscia (emendation for Lago di Liscia di Vacca), dam (35, 49). Between Luogosanto and Tempio Pausania (35, 49). Between Mores and Ozieri, meadow and humus of *Quercus* sp. (35). Nughedu di San Nicolò, 700–800 m (35, 49); *ibidem*, Monte Sefraigada, 1000 m (35, 49). Ozieri (35, 49). Pond of Sorso (type locality of *Lithobius turritanus* Fanzago, 1881) (2, 4, 9, 28, 31, 49, 50). Porto Torres (1, 8, 34, 49). San Pasquale (35, 49). Sassari (10, 26, 33, 34, 49, 50); *ibidem*, surroundings (type locality of *Lithobius turritanus* Fanzago, 1881) (1, 2, 3, 4, 8, 9, 12, 20, 28, 31). Sorso (1, 8, 32, 34). Tempio Pausania (26, 35, 30, 34, 49). Nuoro prov.: Aritzo (35, 49). Bolotana (35, 49). Borore (36). Desulo (type locality of *Lithobius oligoporus* Latzel, 1885) (6, 11, 35, 49). Gairo Marina (35, 49). Macomer, Monte Sant'Antonio, *Quercus ilex* wood (27, 29). Monte Ortobene (26, 34, 49). Oliena (26, 34, 49). Sorgono (26, 34, 49). Oristano prov.: Arborea (35, 49). Monte Ferru (35, 49). Cagliari prov.: Burcei (10, 11, 33). Cagliari (26, 34, 49). Campu Omu (26, 49). Domusnovas, [Monte Acqua], entrance of "Grotta di San Giovanni" [81 Sa/CA], [206 m] (35, 49). [Domusnovas], Sa Duchessa, humus of *Quercus ilex* (35, 49). [Domusnovas], Sarroch, Rio Monte Nieddu (35, 49). [Domusnovas], Seddas Moddizzis (35, 49). Fluminimaggiore, Rio Aretos, *Quercus ilex* (35, 43, 49). Guspini, *Quercus ilex* (35, 43, 49). Guspini, Ingurtusu, humus of *Quercus ilex* (35, 49). Iglesias, valley near -, meadow

and mosses (35, 49). Monte San Benedetto, meadow and mosses (35, 49). Monte [dei] Sette Fratelli (33, 34); ibidem, 300–700 m (type locality of *Lithobius fraleliae* Restivo De Miranda, 1978) (22); ibidem, 300 m (21); ibidem, 500 m (21); ibidem, NW slope, maquis, 300 m (39); ibidem, NW slope, pine plantation, 400 m (39); ibidem, NW slope, *Quercus ilex* and *Phyllirea*, 500 m (39); ibidem, NW slope, maquis and woodland, 600 m (39); ibidem, NW slope, *Pinus* and *Quercus ilex*, 700 m (39); ibidem, NW slope, garrigue, 800–900 m (39); ibidem, NW slope, maquis and woodlands, 600 m (42); ibidem, NW slope, garrigue, 900 m (42); ibidem, Sinnai, pine plantation (39). Montevecchio, mosses under *Quercus ilex* (35, 43, 49). Muravera, Porto Corallo (35, 49). Near Perdaxius, *Pistacia lentiscus* (35, 43, 49).

**Cave.** Cagliari prov.: Fluminimaggiore, “Grotta di San Pietro” 605 Sa/CA (41). Iglesias, “Grotta di Santa Aintroxia” 129 Sa/CA (40). Iglesias, “Grotta V di Monte Figù” 635 Sa/CA (41).

### Material examined

**Epigeic.** Sassari prov.: Arzachena, near a river: 28.I.1979, CU, 1 ♂ without VaC 15<sup>th</sup> (CMZ). Buddusò: 25.V.1980, CM, 1 ♂ (CMZ). Capocaccia: 17.IV.1902, DO, 1 ♂ (MGE). Cargeghe: 13.VII.2002, leg.?, 1 ♂ (CMZ). Golfo Aranci: IV.1903, CF, 1 ♂ without VaC 15<sup>th</sup> (MGE). Lago Baratz, under *Tamarix* in *Pinus halepensis* plantation: 1.X.2008, RAJ, 5 ♂♂ (CMZ). Monte Limbara, Punta Balistreri, 1330 m, 40°51'07.3"N 9°10'37.9"E (WGS84): 30.IV.2008, RA & ST, 2 ♀♀ VaC 15<sup>th</sup> absent or asymmetric (CMZ). Monte Traossu: 6.X.2002, leg.?, 1 imm. ♀ (CMZ); 22.X.2002, leg.?, 1 imm. ♀ (CMZ). Porto Conte-Capo Caccia, Regional Reserve, Mediterranean shrub, hand searching: 29.IX.2008, RAJ, 1 imm. ♀ with 3+2 spur on gonopods and without VaC 15<sup>th</sup> (CMZ). Sassari, Scala di Giocca: I.1899, GD, 1 ♀ (MGE). Stintino: 2.IV.1972, PB, 1 ♂ without VaC 15<sup>th</sup> (CMZ). Tempio Pausania: IV.1903, RG, 1 imm. ♀ (MGE). Usini: 3.X.2002, leg.?, 1 ♂ (CMZ). Nuoro prov.: From Aritzo to Gennargentu, 1400 m: 24.I.1899, GD, 1 ♂, 1 ♀ with 2+2 spurs on gonopods (MGE). Belvì, cherry orchard Marotto, 600 m, pitfall traps: 18.IV.2007, FI, 1 ♀ with 2+2 spur on gonopods (IEASS). Belvì, walnut orchard Chiesa, 600 m, pitfall traps: 23.V.2007, FI, 1 ♂ (IEASS); 24.VII.2007, FI, 1 ♂, 3 imm. ♀♀ (IEASS). Desulo, *Quercus pubescens* wood, 1100 m, hand searching: 19.V.1994, MZ, 1 ♂ (CMZ); 19.V.1994, PA, 1 ♂ (CMZ). Dorgali, Cedrino river, hand searching: 24.V.1980, CM, 2 ♂♂ (1 ♂ with VaTi 15<sup>th</sup>), 1 ♀ with 2+2 spurs on gonopods (CMZ); 24.V.1980, MZ, 2 ♂♂, 2 ♀♀ with 2+2 spurs on gonopods (CMZ). Esterzili, soil washing and Berlese extraction: 1.XII.2006, LF, 1 ♀ without VaC (CMZ). Fonni (refuge), Gennargentu, 1600 m, *Juniperus* sp. shrub, pitfall traps: 19.VI.2007, FI, 1 ♂ (IEASS). Gairo, Monte Perda Liana, 1219 m, 32S 0535096 4417848, hand searching: 16.V.2008, NABT, 1 ♀ with 1+2 spurs on gonopods (CNBFVR). Gairo, Monte Tonneri, 1020 m, UTM 32S 0530263 4415529, in *Quercus ilex* wood, pitfall traps: 16-20.V.2008, NABT, 1 imm. ♀ (CNBFVR). Gennargentu: 24–25.I.1899, UL & GD, 1 ♂ (MGE). Gennargentu, Bruncu Spina, 1300 m, hand searching: 22.V.1980, AVT, 2 ♂♂, 1 ♀ with 2+2 spurs on gonopods (CMZ); 22.V.1980, MB, 4 ♂♂, 5 ♀♀ with 2+2 spurs on gonopods (one female has 2+3 prosternal teeth) (CMZ); 22.V.1980, MZ, 10 ♂♂ (1 ♂ with VaTi 15<sup>th</sup> on the left side only), 5 ♀♀ with 2+2 spurs on gonopods (1 ♀ with VaTi 15<sup>th</sup>), 1 imm. (CMZ). Gennargentu, Bruncu Spina, 1800 m, garrigue: 19.IV.1996, AVT, 3 ♂♂ (2 ♂♂ without VaC 15<sup>th</sup>) (CMZ); Gennargentu, Regione Laccheddi, 1400 m: 24.I.1899, GD, 1 ♂, 1 ♀ with 3+3 spurs on gonopods (MGE); Gennargentu, top, 1850 m: 24.I.1899, GD, 1 ♀ (MGE). Lula, Monte Albo, walk to Punta Ferulargiu, 850 m: 29.IV.2008, GA, 2 ♀♀ with 2+2 spurs on gonopods (CMZ). Nuraghe Loddune: 25.V.1980, leg.?, 2 ♂♂, 2 ♀♀ with 2+2 spurs on gonopods (CMZ). Silanus, 400 m: 3.XII.1985, PL, 4 ♂♂ (MVR). Tonara, walnut orchard Uatzo, 600 m, pitfall traps: 28.VI.2007, FI, 1 imm. ♂ (IEASS); 24.VII.2007, FI, 1 ♂ (IEASS); 11.X.2007, FI, 1 ♂ (IEASS). Oristano prov.: Asuni, Samugheo, 22.II.1971, AVT, 1 ♂ (CMZ). Mal di Ventre Is.: IV.2006, FF, 1 ♂ (CFF). Monte Arci, *Erica arborea* and *Arbutus unedo*: 1–4.III.1992, GC, 1 ex (CMZ\*); ibidem, garrigue: 1–4.III.1992, GC, 3 exx (CMZ\*); ibidem, *Quercus ilex* wood: 1–4.III.1992, GC, 4 exx (CMZ\*). Cagliari prov.: Arbus, in the village, soil washing and Berlese extraction: 2.X.2006, LF, 1 ♀ with 2+3 spur and without VaC 15<sup>th</sup> (CMZ). Burcei, near Punta Serpeddì, 785 m, 32S 0526996 4356738, under stones in *Quercus ilex* wood, hand searching: 13.XI.2006, BNWZ, 2 ♂♂ (CNBFVR); ibidem, ibidem, 954 m, open habitat, 32S 0525266 4356808, hand searching: 13.XI.2006, BNWZ, 1 ♂ (CMZ); ibidem, ibidem: 13.XI.2006, MZ, 1 ♂, 1 ♀ (CMZ); ibidem, ibidem, 785 m, 32S 0526996 4356738, *Quercus ilex* wood, hand searching: 13.XI.2006, MZ,

1 ♂, 2 ♀♀, VaC 15<sup>th</sup> might be absent (CMZ). Capoterra, soil washing and Berlese extraction: 4.X.2006, LF, 1 ♀ (CMZ). Domusnovas, Monte Acqua, near entrance of “Grotta di San Giovanni” 81 Sa/CA, 200 m, 32S 0467900 4354891, leaf-litter sifting: 11.XI.2006, BNWZ, 1 imm. ♂ (CNBFVR). Domusnovas, Lago Siuru, 322 m, 32S 0467069 4357916, leaf-litter sifting: 12.XI.2006, MZ, 1 ♂, 1 ♀, VaC 15<sup>th</sup> might be absent (CMZ); ibidem, under stones: 15.XI.2006, BNW, 1 ♀ (CNBFVR). Domusnovas, near Gutturu Abis, 580 m, WGS84 32S 0468140 4360761, mixed *Quercus ilex* wood, leaf-litter sifting: 10.XI.2006, MZ, 1 ♂, 1 ♀ 16 mm long, 53 antennal articles, 1 ♀ with 3+2 spurs on gonopods (CMZ); ibidem, under stones: 10.XI.2006, BNWZ, 1 ♀ (CMZ). Domusnovas, near Punta Planotzara, 309 m, 32S 0465718 4356515, leaf-litter sifting: 14.XI.2006, GN & MZ, 1 ♂ (CMZ); ibidem, 14.XI.2006, GN & MZ, 1 ♀ (CMZ); ibidem, under stones, *Quercus ilex* wood: 15.XI.2006, BNWZ, 2 ♂♂, 4 ♀♀ (1 ♀ without VaC 15<sup>th</sup>) (CNBFVR); ibidem, under stones, *Quercus ilex* wood: 15.XI.2006, GN, 2 ♀♀ without VaC 15<sup>th</sup> (CNBFVR). Domusnovas, near Sa Duchessa, 320 m, WGS84 32S 04666164 4358209, leaf-litter sifting: 12.XI.2006, MZ, 1 ♀ without VaC 15<sup>th</sup> (CMZ). Domusnovas, Sa Duchessa (road to Perda Niedda), 350 m, 32S 04666233 435905, leaf-litter sifting: 12.XI.2006, MZ, 1 ♂, 1 ♀ without VpF 15<sup>th</sup> (CMZ). Domusnovas, Valle di Oridda, 592 m, 32S 0466973 4362228, under *Alnus* sp., hand searching: 10.XI.2006, MZ, 1 ♀ (CMZ). Domusnovas, Valle di Oridda, 643 m, 32S 0465399 4362770, under stones: 7.VI.2004, GN, 1 imm. ♀ (CNBFVR); ibidem, under stones: 7.VI.2004, GN, 1 ♂ (CNBFVR). Giara di Gesturi: 15.III.1994, LL, 3 exx (CMZ). Iglesias, soil washing and Berlese extraction: 16.VI.2003, LF, 1 ♂ (CMZ); ibidem, idem: 10.II.2008, LF, 1 ♂ without VaC, 1 ♀ (CMZ). Iglesias, near Case Marganai, 660 m, WGS84 32S 0462853 4355582, leaf-litter sifting: 14.XI.2006, MZ, 1 ♂, 1 ♀ with 2+2 spurs on gonopods (CMZ). Iglesias, Case Marganai, 700 m, 32S 0462853 4355582, hand searching: 10.XI.2006, MZ, 2 ♂♂, 1 ♀, VaC 15<sup>th</sup> on one side only or absent (CNBFVR); ibidem, 725 m, 32S 0463890 4355925, *Quercus ilex* wood, leaf-litter sifting: 10.XI.2006, MZ, 1 ♂, 4 ♀♀, VaC 15<sup>th</sup> might be absent (CMZ). Iglesias, Cantoniera Marganai, 491 m, 32S 0462272 4354677, *Quercus ilex* wood, leaf-litter sifting: 9.VI.2004, GN, 1 imm. ♂ (CNBFVR); ibidem: 9.VI.2004, GN, 1 ♀ with 2+2 spurs on gonopods (CNBFVR). Iglesias, near “Colonia Beneck”, 636 m, 32S 0462391 4355441, 6.IX.2007, CP, 1 ♂ (CNBFVR). Iglesias, Conca Margiani, 725 m, 32S 0462470 4357011, clearing, under stones: 15.XI.2006, BNW, 1 ♀ without VaC 15<sup>th</sup> (CNBFVR). Iglesias, Punta San Michele, 906 m, 32S 0465910 4354561, *Quercus ilex* wood, leaf-litter sifting: 10.XI.2006, GN, 1 ♀ (CNBFVR). Iglesias, near Punta Genna Ollioni, 650 m, 32S 0463293 4356570, under stones, *Quercus ilex* wood: 14.XI.2006, GN & DW, 1 ♂ (CMZ). Muravera, Porto Corallo, 18.III.1971, AVT, 1 ♀ (CMZ). Muravera, San Priamo, soil washing and Berlese extraction: 25.XI.2006, LF, 1 ♂ (CMZ). San Pietro Is., Carloforte: 27.IV.1902, DO, 1 imm. ♀ (MGE); ibidem, Guardia dei Mori: 27.VI.1987, VV, 1 ♀ with 3+3 spurs on gonopods and VaC 15<sup>th</sup> asymmethric, 1 imm. ♂, 2 imm. ♀♀ (CNBFVR). Solanas, soil washing and Berlese extraction: 18.XII.2006, LF, 1 ♂ (CMZ). Teulada: 12.IX.2004, LF, 1 ♂ (CMZ). Villacidro, Punta Fenu, 300 m, 32S 0472097 4357122, hand searching: 11.XI.2006, MZ, 2 ♀♀ with 4+3, 3+2 spurs on gonopods, a very small spur is also present on one side in 3+2 spurs female, VaC 15<sup>th</sup> absent (CMZ). Villacidro, Rio Cannisoni, 390 m, 32S 0469095 4362383, hand searching: 9.XI.2006, MZ, 1 ♂ (CMZ); ibidem, hand searching: 9.XI.2006, DW, 1 ♂, 2 ♀♀ with 2+2 spurs on gonopods; VaC 15<sup>th</sup> might be absent (CMZ). Villacidro, near River Leni, in *Eucalyptus* sp. plantation, 300 m, 32S 0469793 4361088, hand searching: 9.XI.2006, MZ, 1 ♂ (CNBFVR). Villasor, vineyard Giviamolas (worked), pitfall traps: 28.V.2003, FS, 1 ♂ (IEASS); 4.IX.2003, FS, 1 ♂ (IEASS); 5.II.2004, FS, 1 ♀ (IEASS).

**Cave.** Sassari prov.: Muros, Monte Tudurighe, “Grotta dell’Inferno” or “Grotta del Diavolo” 48 Sa/SS, 320 m, over 250 m from entrance: 16.I.1899, GD, 2 ♂♂ without VaC 15<sup>th</sup> labelled as “Grotta dell’Inferno a Scala di Giocca, Sassari” (MGE). Cagliari prov.: Domusnovas, Monte Acqua, “Grotta di San Giovanni” 81 Sa/CA, 206 m, 32S 0467900 4354891, hand searching: 12.XI.2006, BNWZ, 1 ♀ without accessory apical claw on 15<sup>th</sup> left leg (CNBFVR); 12.XI.2006, MZ, 1 imm. ♀ (CMZ).

**Other.** Sassari prov.: “Sardegna, SS [= Sassari prov.], Tempio Pausania, 10.III.1968, R. Argano [leg.]”, 1 ♂, 1 ♀ without VaC 15<sup>th</sup> (CMZ\*) [in De Miranda Restivo 1983: 114 under *Lithobius dentatus* Koch 1844]. Cagliari prov.: “*Lithobius oligoporus*, Latz./Burcei”, 3 ♀♀ (one female with 3+2 spurs on gonopods, VaC 15<sup>th</sup> present but asymmetric in one specimen [in Silvestri 1898: 682 under *Lithobius* (s. s.) *oligoporus*] (MGE).

**General distribution.** Europe: Italy (Sardinia).

**Chorotype.** Sardinian endemic, W-Mediterranean affinities (?).

**Ecological notes.** 0–1300 m; one of the most common Sardinian Lithobiidae; thermophilous species mostly found in oakwoods (*Quercus ilex*, 18 sites; *Quercus* sp., 1 site) but also in open and shrub Mediterranean habitats (garrigue, 4 sites; maquis, 2 sites; *Pistacia lentiscus*, 1 site; *Erica arborea* and *Arbutus unedo*, 1 site; generic records from habitats not obviously distinct from one another, such as meadows, 2 sites, and open habitats, 1 site, are also known); two records from riparian habitats, including under *Alnus* sp. (1 site); in montane formations (*Juniperus* sp. shrubs, 1 site); in pine plantations (3 sites including *Tamarix* and *Pinus halepensis* plantations, 1 site); in agricultural habitats (walnut orchards, 2 sites; cherry orchards, 1 site; vineyards, 1 site); in *Eucalyptus* sp. plantations (1 site); sometimes in caves (5 sites, 206–320 m; troglone species). Six records from endogeous habitats. See also De Miranda Restivo (1982, 1986), Minelli (1983a) and Minelli and Iovane (1987).

**Remarks.** The identity of the Sardinian records wholly or at least partly published under *Lithobius alpicosiensis* Matic, 1973, *L. dentatus* C. L. Koch, 1844, *L. fanzagoi* Fedrizzi, 1876a, *L. fraleliae* De Miranda Restivo, 1978, *L. microdon* Latzel, 1886, *L. oligoporus* Latzel, 1885, *L. piceus* L. Koch, 1862, *L. tricuspis* Meinert, 1872, *L. tricuspis mononyx* Latzel, 1888 and *L. turritanus* Fanzago, 1881b is uncertain. Most of them are due to misidentifications and have been acritically repeated by the authors (*L. alpicosiensis*, *L. dentatus*, *L. fanzagoi*, *L. microdon*, *L. piceus*, *L. tricuspis*, *L. tricuspis mononyx*), others are related to species the taxonomic identity of which is unclear (*L. turritanus*, *L. oligoporus*, *L. fraleliae*). Likely, they all refer to a same very common and quite variable taxon, probably endemic to Sardinia (or to Corsica and Sardinia), the correct name of which should be *L. turritanus*, and the most modern and complete description of which – well corresponding to the material here examined – has been provided by Eason (1980) under *L. tricuspis*, a Central European species the presence of which in Sardinia is uncertain in spite of the numerous records.

*Lithobius turritanus* was described by Fanzago (1881b) on specimens from the Sassari province. Eason and Minelli (1976) suggested it as a possible senior synonym of *L. microdon* Latzel, 1886, from Spain and Morocco (Brölemann 1932), but they did not make a formal synonymy pending the re-examination of type or Sardinian specimens. Eason (1980) later rejected this early hypothesis and formally proposed *L. turritanus* as a junior synonym of *L. tricuspis*. This identity has become established because the relatively small size of the posterior triangular projections of tergites 9, 11 and 13 found in the Sardinian specimens, particularly the projections of T. 9, falls within the variation range of French populations of *L. tricuspis*, as described by Brölemann (1930). However, as Eason (1980) emphasized, such variation has not been recorded in English populations of this species, where only prominent projections are present (Eason 1965), and even *L. tricuspis* from Austria and mainland Italy do not show the pattern described by Brölemann (1930), having only prominent projections as well (Latzel 1880; Koren 1992; Zapparoli unpublished). This lead to the doubt that Brölemann's (1930) description may be composite and based on other species of *Lithobius* besides *L. tricuspis* (e.g. *L. acuminatus* Brölemann, 1892), thus leading Eason (1980) to a wrong conclusion. Eason (1980) also noticed some constant differences between his Sardinian specimens and French (Brölemann 1930) and English (Eason 1965) populations of *L. tricuspis*, such as in the presence of a VpP spine on 1<sup>st</sup>–2<sup>nd</sup> to 15<sup>th</sup> legs and in the absence of a 15<sup>th</sup> VaTi spine. The spinulation of Sardinian specimens examined by Eason (1980) differs from that of Austrian populations of *L. tricuspis* in the same way (see Koren 1992). Other strong differences not explicitly highlighted by Eason (1980) are to be found in the shape of the claw of female gonopods, being unidentate in the Sardinian specimens and tridentate in the populations from England and continental Europe (Brölemann 1930; Eason 1965; Koren 1992; Zapparoli unpublished); females with a unidentate claw seem however to occur in France (Brölemann 1930: fig. 426). Significant differences also apparently exist in habitat preferences, *L. turritanus* being mostly thermophilous, while *L. tricuspis* is chiefly related to mesophilous woodlands (see Barber 1985; Minelli & Iovane 1987; Koren 1992; Zapparoli 2006), although records from Mediterranean forest habitats are also known (Serra & Miquel 2003). Eason's (1980) synonymy of *L. turritanus* with *L. tricuspis* is therefore unconvincing and is here rejected.

*Lithobius oligoporus* was described on a male specimen from Desulo (Nuoro) (Latzel 1884). The same description was again published one year later (Latzel 1885), therefore *Lithobius oligoporus* Latzel, 1884 =

*Lithobius oligoporus* Latzel, 1885, **syn. nov.** Although scanty, the original description of this species agrees well with the original description of *L. turritanus* and with the description of *L. tricuspis* given by Eason (1980). *Lithobius oligoporus* apparently differs only in the presence of two ventral spines in the 15<sup>th</sup> femur and the absence of the 15<sup>th</sup> accessory apical claw. However, these supposed differences are likely due to erroneous observation, as in the 65 mature and not mutilated specimens (31 males, 34 females) of the material here examined, VaF and VpF 15<sup>th</sup> are only occasionally absent (see also Eason 1980) and the 15<sup>th</sup> accessory apical claw is absent only in the left leg of an asymmetrical female from “Grotta di San Giovanni” (CNBFVR). Silvestri (1898) quoted and redescribed *L. oligoporus* on specimens from Burcei (Cagliari); according to Eason (1980) this record is uncertain and was tentatively referred to *L. tricuspis* as the ventral spinulation of the 15<sup>th</sup> femur is quite different from the pattern usually found in Sardinian specimens. The specimens studied by Silvestri (1898) have been here re-examined and the spinulation pattern found is the same given in Eason (1980) for *L. tricuspis*. All the published records of *L. oligoporus* must be therefore referred to *L. turritanus*.

*Lithobius fraleliae* was established by De Miranda Restivo (1978) on specimens from Monte dei Sette Fratelli (Cagliari prov.) without giving a complete description but only some comparative remarks with respect to *L. tricuspis*. Although not explicitly affirmed and without formalizing its identity, it seems almost clear that in a subsequent paper the same author assigned the same material to *L. tricuspis* (De Miranda Restivo 1986).

Although the type specimens of *Lithobius turritanus*, *Lithobius oligoporus* and *Lithobius fraleliae* have not been examined, after the examination of a large collection of specimens from Sardinia, the following new synonymies are proposed: *Lithobius oligoporus* Latzel, 1884 = *Lithobius turritanus* Fanzago, 1881b **syn. nov.** and *Lithobius fraleliae* De Miranda Restivo, 1978 = *Lithobius turritanus* Fanzago, 1881b **syn. nov.**

The record of *L. fanzagoi* quoted by Fanzago (1881b) from the neighbourhood of Sassari and then referred to *L. piceus* – a south European species not present in Sardinia – by Silvestri (1898) is here tentatively assigned partly to *L. turritanus*. The description given by Fanzago (1881b) seems composite, maybe based on specimens both of *L. turritanus* and *Lithobius* sp., probably *L. castaneus* (see above). Silvestri (1898) quoted *L. piceus* also from Burcei; although it has not been possible to re-examine the material, this record probably refers to misidentified specimens of *L. turritanus*.

*Lithobius turritanus* seems closely related to a group of species distributed in the W-Mediterranean area, including some more or less thermophilous taxa such as *L. acuminatus* Brölemann, 1892 from southern France, north-west Italy, also quoted from Corsica (Léger & Duboscq 1903; Brölemann 1930; Iorio 2008) but the record needs confirming, *L. cassinensis* Verhoeff, 1925b, from Peninsular Italy, Tuscan Archipelago, Pontine Isl., Ischia Is., Capri Is. (see Eason 1983), also quoted from Corsica (Verhoeff 1943d) but the record needs confirming, and *L. trinacrius* Verhoeff, 1925b (= *L. sicilianus* Matic & Darabantu, 1968b, see Zapparoli 1995; Zapparoli *et al.* 2004) from Sicily, Egadi Isl., Pantelleria Is., Lampedusa Is. and Malta Is. Apparently related to *L. turritanus* are also some taxa of doubtful identity from Corsica, such as *L. blanchardi* Léger & Duboscq, 1903, *L. aidonensis aidonensis* Verhoeff, 1943d and *L. a. valdoniellensis* Verhoeff, 1943d (Léger & Duboscq 1903; Brölemann 1930; Verhoeff 1943d), as well as *L. microdon* Latzel, 1886 (North Africa) and *L. clarki* Eason, 1975 (Balearic Isl.), a subspecies of *L. microdon* according to Serra (1986) (see also Zapparoli 1984, 1995). In this group should be included also *L. alpicosiensis* from NW Italy – a synonym of *L. tricuspis* according to Iorio (2008) – the habitat preferences of which, however, are more mesophilous.

Although some differences in morphological characters have been recorded such as the number of antennal articles, the length of antennae, the shape of the triangular projections of TT. 9, 11 and 13, the number of spurs of the female gonopod, and the shape of the 15<sup>th</sup> leg, *L. turritanus* seems also close to *L. sardus* (Tab. 11), a species recorded only in caves of the Nuoro province, originally described as a subspecies of *L. agilis* and here raised to species rank (see above). Indeed, in the material examined, specimens with a high number of antennal articles (53) and elongate 15<sup>th</sup> leg, as in *L. sardus*, have been observed, albeit occasionally. Moreover, mature females from the Gennargentu area, Nuoro province, show almost regularly gonopods with 2+2 spurs, again as in *L. sardus*, whereas in other Sardinian areas mature females with 2+2 spurs, or other arrangements as well, such as 2+3 or 4+3 spurs, only occasionally occur. Thus, the relationships between the two taxa clearly deserve further investigation.

Notes on the variation of the number of prosternal teeth, spurs of gonopods and on 15<sup>th</sup> leg spinulation of the present specimens are given in the material examined.

The epigeic records published by Fanzago (1881b) under *L. macilentus* from Sassari province and then referred to *L. agilis* by Silvestri (1898), Verhoeff (1925a) and De Miranda Restivo (1983) are here referred to *L. turritanus* as they show the same characters as this species and the collecting sites correspond (see Fanzago 1881b: 4, 6).

### Subgenus *Sigibius* Chamberlin, 1913

#### 18. *Lithobius* (*Sigibius*) *micropodus* Matic, 1980

- 1) *Monotarsobius microps* Mein. 1868 [sic]: De Miranda Restivo 1983: 117 [pars].
- 2) *Monotarsobius microps* Mein. [sic]: De Miranda Restivo 1986: 47.
- 3) ? *Monotarsobius tamaninini* [sic] Manfr.: De Miranda Restivo & Guaita 1986: 32.
- 4) *Lithobius micropodus* Matic, 1980: Foddai *et al.* 1995: 6.
- 5) *Lithobius microps* sensu AA. nec Meinert, 1868: Grafitti 1995: 35.
- 6) *Lithobius* (*Sigibius*) *microps* sensu Auctorum nec Meinert, 1868: Grafitti & Zapparoli 1995: 128.
- 7) *Lithobius microps* Auctorum nec Meinert, 1868: Foddai *et al.* 1996: 360, tab. I.
- 8) *Lithobius microps*: Grafitti & De Waele 1996: 32, 33.
- 9) *Lithobius* (*Sigibius*) *microps* sensu AA. nec Meinert, 1868: Grafitti & Mucedda 1996: 60.
- 10) *Lithobius* (*Sigibius*) *microps*: De Waele & Pisano 1998: 27.
- 11) *Lithobius microps*: Mucedda *et al.* 2002: 30.
- 12) *Lithobius micropodus* Matic, 1980: Zapparoli & Minelli 2005: CD.
- 13) *Lithobius microps*: Grafitti 2007a: 387.
- 14) *Lithobius* sp.: Grafitti 2007b: 223.

#### Literature records

**General.** Sardinia (4, 7).

**Epigeic.** Sassari prov.: Arzachena (1). Palmadula (1). Nuoro prov.: Monte d'Iscudu (1). Oristano prov.: Monte Arci (12). Cagliari prov.: Monte [dei] Sette Fratelli, Domo or Rupe dell'Acquafredda, 100 m, maquis (2).

**Cave.** Sassari prov.: Tavolara Is. [generic quotation for the caves of the area] (8); ibidem, Punta del Papa, "Grotta del Papa" 87 Sa/SS (6, 9, 11, 12). Nuoro prov.: Baunei [generic quotation for the caves of the area] (5). Supramonte di Baunei, Punta Giradili, Forrola, "Grotta S'Erriu Mortu" (= "Grotta di Su Riu Mortu") 796 Sa/NU (6, 5, 12, 13). Oristano prov.: Asuni, Monte Perdedu, Abba Suergiu, "Grotta Su Stampu 'e Muscione Stunnu" 242 Sa/OR, 430 m (6, 10, 12). Tegas, Cuglieri, "Grotta di Cappas" 181 Sa/OR (14). Cagliari prov.: Domusnovas, [Monte Acqua], "Grotta di San Giovanni" 81 Sa/CA, [206 m] (3). Iglesias, Cananes, cave n. 3 (6, 12). Iglesias, Corongiu de Mari, "Grotta Prima di Corongiu de Mari" (= "Grotta di Pili") 258 Sa/CA, 180 m (1, 6, 8). Corongiu de Mari, "Grotta di Loddo" 309 Sa/CA (8, 12).

#### Material examined

**Epigeic.** Sassari prov.: Near Palmadula, 1.IV.1972, PB, 1 ex (CMZ). Nuoro prov.: Monte d'Iscudu, N slope, 1300 m: 6.IX.1975, leg.?, 1 ex (CMZ). Oristano prov.: Asuni: 29.III.2007, AC, 1 ♀ (CMZ). Monte Arci, garrigue: 1–4.III.1992, GC, 1 ex (CMZ\*). Cagliari prov.: Buggerru, near Grugua, 530 m, WG884 32S 0454376 4359900, leaf-litter sifting: 11.XI.2006, MZ, 2 ♂♂ (CMZ). Buggerru, near Mine of San Luigi, 347 m, 32S 0452771 4358704, leaf-litter sifting: 11.XI.2006, MZ, 2 ♂♂, 2 ♀♀ (CMZ). Burcei, 631 m, 32S 05228639 4356008, under stones, hand searching: 13.XI.2006, MZ, 1 ♂, 1 ♀ (CMZ). Domusnovas, near Gutturu Abis, 580 m, 32S 0468140 4360761, mixed *Quercus ilex* wood, leaf-litter sifting: 10.XI.2006, MZ, 10 ♂♂, 7 ♀♀ (CMZ); ibidem, under stones: 10.XI.2006, BNWZ, 1 ♂, 1 ♀ (CNBFVR); ibidem, under stones: 10.XI.2006, GN, 1 ♂, 3 ♀♀ (CNBFVR). Domusnovas, near Punta Planotzara, 309 m, 32S 0465718 4356515,

leaf-litter sifting: 14.XI.2006, GN & MZ, 3 ♂♂, 4 ♀♀ (CMZ); ibidem, *Quercus ilex* wood, leaf-litter sifting: 14.XI.2006, GN & MZ, 1 ♀ (CNBFVR); ibidem, under stones, *Quercus ilex* wood: 15.XI.2006, GN, 1 ♀ (CNBFVR). Domusnovas, near Sa Duchessa, 320 m, 32S 04666164 4358209, leaf-litter sifting: 23.III.2006, BBCW, 2 ♀♀ (CMZ); ibidem, leaf-litter sifting: 23.III.2006, BNWZ, 1 ♀ (CNBFVR). Domusnovas, Sa Duchessa (road to Perda Niedda), 350 m, 32S 04666233 435905, leaf-litter sifting: 23.III.2006, BBCW, 5 ♂♂, 5 ♀♀, 1 larva (CMZ). Domusnovas, Valle di Oridda, 592 m, 32S 0466973 4362228, under *Alnus* sp., hand searching: 10.XI.2006, MZ, 4 ♀♀ (CMZ). Domusnovas, Valle di Oridda, 592 m, 32S 0466973 4362228, hand searching: 23.III.2006, BBCW, 1 ♀ (CNBFVR). Iglesias, Case Marganai, 660 m, 32S 0463341 4356196, *Quercus ilex* wood, leaf-litter sifting: 14.XI.2006, MZ, 1 ♀ (CMZ). Iglesias, Punta San Michele, 906 m, 32S 0465910 4354561, hand searching: 10.XI.2006, MZ, 2 ♀♀ (CMZ). Monti Mannu [Punta Piscina Argiolas], 282 m, along a small river near guestrooms, under *Populus* sp., leaf-litter sifting: 14.XI.2006, MZ, 1 ♀ (CMZ). Villacidro, near Monte Anzeddu, 500 m, 32S 04669031 4361072, leaf-litter sifting: 10.XI.2006, MZ, 2 ♂♂ (CMZ). Villacidro, Punta Fenu, 225 m, 32S 0471850 4356980, under stones: 11.XI.2006, GN, 1 imm. ♀ (CNBFVR).

**Cave.** Oristano prov.: Tegas, Cuglieri, “Grotta di Cappas” 181 Sa/OR, 197 m, under stone, in the main branch, 50 m from entrance: 5.XI.2005, GG, 1 ♂ (GSS) [in Grafitti 2007b: 223 under *Lithobius* sp.].

**General distribution.** The distribution of this species is still not satisfactorily detailed, owing to the confusion with *L. microps* Meinert, 1868 by the most Authors (*cf.* Eason 1974); it includes Albania, France (?), Greece (mainland, insular including Crete), Italy (mainland, Sicily, Sardinia), Montenegro (?), Romania, the Russian Plain (= a vast area covering most of the European part of the former Soviet Union, *cf.* Zaleskaja & Golovatch, 1996), Slovenia, ex Yugoslavia [Bosnia and Herzegovina, Croatia, Serbia], Turkey.

**Chorotype.** S-European.

**Ecological notes.** 100–1300 m; in *Quercus ilex* woods (4 sites), in riparian habitats (under *Populus* sp., 1 site; *Alnus* sp., 1 site); in garrigue (1 site) and maquis (1 site); also in caves (8 sites, 180–430 m; troglone species). See also De Miranda Restivo (1986).

**Remarks.** Records of *Monotarsobius microps* (Meinert, 1868) published by De Miranda Restivo (1983, 1986) are here referred to this species following Eason (1974) and Foddai *et al.* (1995). Records of *Monotarsobius tamaninii* Manfredi, 1948 from the “Grotta di San Giovanni” 81 Sa/CA published by De Miranda Restivo and Guaita (1986) are here tentatively referred to this species according to Foddai *et al.* (1995). Records under *Monotarsobius microps* published by De Miranda Restivo (1983) partly refer also to *L. lapidicola* (see above).

The unidentified *Lithobius* sp. from Tegas, Cuglieri, “Grotta di Cappas” 181 Sa/OR quoted by Grafitti (2007b) has been here examined and belongs to this species.

## 19. *Lithobius (Sigibius) microps* Meinert, 1868

- 1) *Monotarsobius dubosqui* (Rib.) [sic]: De Miranda Restivo 1982: 174.
- 2) *Monotarsobius dubosqui* Brlo. [sic] 1896: De Miranda Restivo 1983: 116 [pars].
- 3) *Monotarsobius exarmatus* Brol 1926: De Miranda Restivo 1983: 116.
- 4) *Lithobius microps* Meinert, 1868: Minelli 1983a: 14.
- 5) *Lithobius microps* Mein. 1868: Minelli 1983b: 408.
- 6) *Lithobius microps* Mein.: Minelli & Iovane 1987: 28, 30.
- 7) *Lithobius microps* Meinert, 1868: Minelli *et al.* 1994: 499.
- 8) *Lithobius microps* Meinert, 1868: Foddai *et al.* 1995: 6.
- 9) *Lithobius microps* Meinert, 1868: Foddai *et al.* 1996: 360, tab. I.
- 10) *Lithobius microps* Meinert, 1868: Zapparoli & Minelli 2005: CD.

### Literature records

**General.** Sardinia (5, 8, 9).

**Epigeic.** Sassari prov.: Asinara Is., Punta Sant'Andrea (2, 10). Lago di Liscia (emendation for Lago di Liscia di Vacca), dam (4, 10). Molara Is. (7, 9, 10). Nughedu di San Nicolò, Monte Seffraigada, 1000 m (4, 10). Olbia, Monti, under *Cistus* sp. (4, 10). Oschiri, Punta Limbara, humus of *Quercus ilex* (4, 6, 10). Stintino (3). Nuoro prov.: Oliena, Punta Sos Nidos, *Quercus ilex* (4, 6, 10). Dorgali, Rio Flumineddu, *Alnus* sp. and *Nerium oleander* (1). Cagliari prov.: Cagliari, Monte Urpino (2). Domusnovas, [Monte Acqua], entrance of "Grotta di San Giovanni" [81 Sa/CA], [206 m] (4, 10). [Domusnovas], Sa Duchessa, humus of *Quercus ilex* (4, 10). Fluminimaggiore, Rio Aretos, *Quercus ilex* (6, 10). Guspini (4, 10); ibidem, meadow with *Pistacia lentiscus* (4, 6, 10); ibidem, *Quercus ilex* (4, 6, 10); ibidem, Ingurtusu (4, 10). Iglesias, Fluminimaggiore, meadow and mosses (4, 6, 10). Iglesias, Rio Aretos, humus of *Quercus ilex* (4, 10). Between Is Palaceris and Is Cannoneris, humus of *Quercus ilex* (4, 10). Between Is Scattas and Is Carillus, under leaf-litter of *Pistacia lentiscus* (4, 10). Monte San Benedetto, meadow and mosses (4, 10). Nuxis, Monte Nieddu (4, 10). Perdaxius, surroundings (4, 10). Pimentel (2). Teulada, Domus de Maria (4, 10). Between Sant'Anna Arresi and Teulada (4, 10). Seddas Moddizzis (4, 10). Serpentara Is. (7, 9, 10). Siliqua (3).

**Cave.** No records.

### Material examined

**Epigeic.** Sassari prov.: Asinara Is., Punta Sant'Andrea: 9.III.1968, RA, 1 ex (CMZ\*). Stintino, 2.IV.1972, PB, 1 ♂ (CMZ). Usini: 20.V.2002, leg.?, 6 ♂♂ (CMZ). Oristano prov.: Monte Ferru, Rifugio La Madunnina, between Cuglieri and Santolussorgiu, 865 m, hand searching: 27.VI.2000, MZ, 1 ♂ (CMZ). Ula Tirso, soil washing and Berlese extraction: 28.XII.2006, LF, 1 ♂ (CMZ). Cagliari prov.: Burcei, near Punta Serpeddi, 954 m, 32S 0525266 4356808, under stones: 13.XI.2006, BNWZ, 1 ♂ (CMZ). Iglesias, Mamenga, 610 m, 32S 462170 4356618, in calcareous soil (40-50 cm deep) in *Quercus ilex* wood, soil washing and Berlese extraction: 1.III.2006, LF, 1 ♂ (CNBFVR). Iglesias, Marganai, soil washing and Berlese extraction: 16.XII.2006, LF, 1 ♂ (CMZ). Muravera, San Priamo, soil washing and Berlese extraction: 25.XI.2006, LF, 1 imm. ♀ (CMZ). Pimentel: 4.III.1971, AVT, 1 ♂ (CMZ). San Pietro Is., Carloforte: 27.IV.I.1902, DO, 1 ♂, 1 ♀ (MGE). Siliqua, 9.IV.1971, AVT, 3 ♀♀ (CMZ). Villasor, vineyard Giviamolas (worked), pitfall traps: 2.VII.2003, FS, 1 ♀ (IEASS).

**Cave.** No records.

**General distribution.** Europe: Albania, Belgium, Bulgaria, Denmark (mainland), Finland, France (mainland), Germany, Great Britain, Greece (mainland, insular), Ireland, Italy (mainland, Sicily, Sardinia), Republic of Macedonia, Norway, Poland, Portugal (mainland), Romania, Spain (mainland, Balearic Isl.), Sweden, Switzerland, The Netherlands, Ukraine, ex-Yugoslavia [Bosnia and Herzegovina, Croatia, Serbia]; Scandinavian and north European populations are mainly synanthropic; West Asia: Turkey; North America (introduced): Canada, U.S.A.

**Chorotype.** European.

**Ecological notes.** 0–1000 m; mostly in *Quercus ilex* woods (8 sites) but also in Mediterranean open and shrub habitats (*Pistacia lentiscus*, 2 sites; meadows, 2 sites; *Cistus* sp., 1 site), as well as in riparian habitats (*Alnus* sp. and *Nerium oleander*, 1 site); one record from agricultural habitats (vineyards); no records from caves. Four records from endogeous habitats. See also De Miranda Restivo (1982), Minelli (1983a) and Minelli and Iovane (1987).

**Remarks.** Records of *Monotarsobius duboscqui* Brölemann, 1896 and *Monotarsobius exarmatus* Brölemann, 1926 published by De Miranda Restivo (1982, 1983) are here referred to this species following Eason (1974) and Foddai *et al.* (1995). Records under *Monotarsobius duboscqui* Brölemann, 1896 published by De Miranda Restivo (1983) partly refer to *L. lapidicola* (see above).



## Subgenus *Monotarsobius* Verhoeff, 1905

### 20. *Lithobius (Monotarsobius) crassipes* L. Koch, 1862

- 1) *Lithobius (Archilithobius) crassipes* L. Koch: Silvestri 1898: 684.
- 2) *Lithobius crassipes* Koch: Verhoeff 1925a: 657.
- 3) *Lithobius crassipes crassipes* L. [sic]: Attems 1949: 117.
- 4) *Lithobius (Monotarsobius) crassipes* L. Koch, 1862: Minelli 1978a: 153.
- 5) *Lithobius (Monotarsobius) crassipes* L. Koch: Eason 1980: 29.
- 6) *Monotarsobius crassipes* Koch 1862: De Miranda Restivo 1983: 116.
- 7) *Lithobius crassipes* L. Koch, 1862: Minelli 1983a: 14.
- 8) *Lithobius crassipes* L. Koch 1862: Minelli 1983b: 408.
- 9) *Lithobius crassipes*: Minelli & Iovane 1987: 28.
- 10) *Lithobius crassipes* L. Koch, 1862: Minelli *et al.* 1994: 499.
- 11) *Lithobius crassipes* L. Koch, 1862: Foddai *et al.* 1995: 6.
- 12) *Lithobius (Monotarsobius) crassipes* L. Koch, 1862: Grafitti & Zapparoli 1995: 128.
- 13) *Lithobius crassipes* L. Koch, 1862: Foddai *et al.* 1996: 360, tab. I.
- 14) *Lithobius crassipes* L. Koch, 1862: Zapparoli & Minelli 2005: CD.
- 15) *Lithobius crassipes* L. Koch, 1862: Grafitti & Merella 2008: 87.

#### Literature records

**General.** Sardinia-Corsica (4). Sardinia (2, 3, 8, 11, 13).

**Epigeic.** Sassari prov.: Caprera Is. (13, 14); ibidem, Ferraciolo (10, 14). Maddalena Is. (10, 13, 14). Tempio Pausania (5, 6, 14). Nuoro prov.: Park of Laconi, *Quercus ilex* (7, 9, 14). Oristano prov.: Monte Arci (14). Oristano (1). Tordongiano (14). Cagliari prov.: Cagliari (1, 6, 14). Iglesias, under *Eucalyptus* sp. (7, 14). Monte [dei] Sette Fratelli (6). Portoscuso (6).

**Cave.** Cagliari prov.: Villamassargia, Monte Ollastus, "Grotta dei Pipistrelli" 608 Sa/CA [= 608 Sa/CI] (12, 14, 15).

#### Material examined

**Epigeic.** Oristano prov.: Monte Arci, *Quercus ilex* wood: 1–4.III.1992, GC, 1 ex (CMZ\*). Tordongiano: 31.XI.1989, MC, 1 ex (CMZ\*). Cagliari prov.: Cagliari: III.1898, UL, 1 ♀, 2 imm. (MGE).

**Cave.** No records.

**Other.** Oristano prov.: "*Lithobius (A.) crassipes*, L. Koch/Oristano, III.1895", 3 ♀♀ [in Silvestri 1898: 684 under *Lithobius (Archilithobius) crassipes* L. Koch] (MGE). Cagliari prov.: "*Lithobius crassipes*, L. Koch/Cagliari giu. [= June] 1894", 3 ♀♀ [in Silvestri 1898: 684 under *Lithobius (Archilithobius) crassipes* L. Koch] (MGE).

**General distribution.** Europe: Albania, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark (mainland), Finland, France (mainland), Germany, Great Britain, Greece (mainland, Dodecanese Isl., Crete), Hungary, Iceland, Ireland, Italy (mainland, Sicily, Sardinia), Liechtenstein, Luxembourg, Republic of Macedonia, Malta, Montenegro, Northern Ireland (?), Norway (mainland), Poland, Portugal (Madeira Is.), Romania, Russia (Central European territories, Siberia), Serbia, Slovak Republic, Slovenia, Spain (mainland, Canary Isl.), Sweden, Switzerland, The Netherlands, Ukraine; North Africa: Algeria; Tunisia; West Asia: Caucasus, Jordan, Israel, Syria, Turkey; North America: USA, probably introduced (Brölemann 1921, 1930, 1932; Loksa 1955; Remy & Hoffman 1959; Eason 1964, 1982, 1985; Matic 1966; Würmli 1972; Jeekel 1977; Zalesskaja 1978; Serra 1982; Enghoff 1983; Zapparoli 1991, 1999, 2002; Kos 1992; Stoev 1997, 2000, 2001a, 2002; Wytwer 1997; Lock 2000; Ország 2001; Tajovský 2001; Zapparoli *et al.* 2004; Zapparoli & Minelli 2005; Andersson *et al.* 2008).

**Chorotype.** Sibero-European.

**Ecological notes.** No data on elevation range; few habitat records from *Quercus ilex* woods (2 sites) and *Eucalyptus* sp. plantations (1 site); rarely in caves (1 site; troglone species).

**Remarks.** The records of this species published by Silvestri (1898) from Sardinia have been re-examined and the identifications confirmed.

### ***Lithobius* s.l. spp.**

- 1) *Lithobius* sp.: Magretti 1880: 27, 30, 34.
- 2) *Lithobius* sp.: A. Costa 1882: 28.
- 3) *Lithobius* spp.: A. Costa 1883: 81.
- 4) *Lithobius* sp.: Manfredi 1956: 207.
- 5) *Lithobius* sp.: Puddu 1970: 90.
- 6) *Lithobius* sp.: Assorgia *et al.* 1973: 166.
- 7) *Lithobius* sp.: Cherri 1977: 20.
- 8) *Lithobius* sp.: De Miranda Restivo 1978: 41.
- 9) *Monotarsobius* sp.: De Miranda Restivo 1982: 173, 174.
- 10) *Lithobius* sp.: Puddu 1982: 79.
- 11) *Monotarsobius* sp.: De Miranda Restivo 1986: 47.
- 12) *Lithobius* sp.: De Miranda Restivo & Guaita 1986: 34.
- 13) *Lithobius* sp.: Grafitti 1992: 27.
- 14) *Lithobius* spp.: Minelli *et al.* 1994: 499.
- 15) *Lithobius* sp.: Grafitti 1995: 32.
- 16) *Lithobius* sp.: Grafitti & De Waele 1996: 32, 33.
- 17) Chilopoda indet.: Grafitti & De Waele 1996: 33.
- 18) *Lithobius* sp.: Grafitti & De Waele 1997: 57.
- 19) *Lithobius* sp.: De Waele & Pisano 1998: 27.
- 20) *Lithobius* sp.: De Waele & Pani 1999: 32.
- 21) *Lithobius* sp.: Grafitti 1999b: 177, 183.
- 22) *Lithobius* sp.: Grafitti 2005: 47.
- 23) *Lithobius* sp.: Grafitti 2007a: 385, 396.
- 24) *Lithobius* sp.: Grafitti & Merella 2008: 84, 86, 90.

### **Literature records**

**General.** Sardinia (3).

**Epigeic.** Sassari prov.: Caprera Is., Ferraciolo (14). Figarolo Is. (14). Il Toro Is. (14). Mal di Ventre Is. (14). Molarotto Is. (14). Nuoro prov.: Dorgali, Rio Flumineddu, *Alnus* sp. and *Nerium oleander* (9). Macomer, Monte Sant'Antonio, *Quercus ilex* wood (9). Oristano prov.: Baulaldo (1). Between Mistra and surroundings of Oristano (1). Oristano (2). Cagliari prov.: Cagliari (1). Monte [dei] Sette Fratelli, 500 m (8); ibidem, Sinnai, pine wood reforestation (11).

**Cave.** Sassari prov.: Bonorva, Galleria di Tilìpera, "Grotta di Tilìpera" 1581 Sa/SS (22). Nuoro prov.: Baunei, "Grotta di S'Erriu Mortu" 796 Sa/NU (13). Baunei "Grotta di Istitzili" 50 SA/NU (23). Isili, "Grotta di Crabilis" 1300 Sa/NU (19). Isili, "Pozzo di Sa Mandra I" 1334 Sa/NU (19). Gairo, "Grotta Su Coloru" [670 Sa/NU, 825 m] (5). Oliena, Monte Corras, "Grotta S'Abb'a Medica" 335 Sa/NU (4). Osini, "Grotta S'Armidda" 549 Sa/NU (21). Sadali, [Foresta di Addoli], "Grotta de Is Janas" 51 Sa/NU, [780 m] (10). Supramonte di Baunei, "Grotta Nurra de Battista Piras" 691 Sa/NU (15, 23). Urzulei, "Grotta Luigi Donini" or "Su Cunnu 'e S'Ebba" 424 Sa/NU (6, 20, 23). Cagliari prov.: Domusnovas, Monte Acqua "Grotta di San Giovanni" 81 Sa/CA, 206 m (24). Iglesias, Corongiu de Mari, "Grotta di Santa Vita" 130 Sa/CA (7, 12, 16). Iglesias, Corongiu de Mari, "Grotta delle Scalette" 308 Sa/CA [= 308 Sa/CI], [180 m] (16, 24). Iglesias, Corongiu de Mari, "Grotta del Sorcio" 307 Sa/CA [= 307 Sa/CI] (17, 24). Masainas, "Grotta di Ses Flores" 2265 Sa/CA [= 2265 Sa/CI] (18, 24). Sant'Anna Arresi, "S'Ega Sa Grutta" 675 Sa/CA [= 675 Sa/CI] (18, 24).

## Material examined

**Epigeic.** No records.

**Cave.** Sassari prov.: Badde, Pozzomaggiore, “Grotta Badde” or “Grotta Su Guanu” 143 Sa/SS, 320 m: 31.VII.2006, PM, 2 larvae 1.9–2.0 mm long, with 8 pairs of legs, 11–11 or 14–14 antennal articles, 2 pigmented ocelli, 2+2 prosternal teeth (CMZ). San Pietro di Sorres, Borutta, “Grotta Sa Rocca Ulari” 257 Sa/SS, on the wall in the main gallery, about 150 m from entrance: 10.V.2003, EL, 1 imm. (GSS). Nuoro prov.: Oliena, Corojos, Monte Tiscali, “Voragine di Tiscali” 88 Sa/NU: 21.III.1999, BP, 1 imm. (GSS). Orani, Monte Gonara “Grotta di San Francesco” 202 Sa/NU, 560 m: 15.VI.2007, PM & AC, 1 imm. 13.5 mm long, with 1+1 ocelli, 3+3 prosternal teeth, antennae 6.0 mm long with 38–39 articles, TT. 9, 11, 13 with posterior triangular projections (CMZ). Posada, small pit on Monte Ida: 14.III.1965, AVT, 1 ex in bad conditions (CMZ). Urzulei, “Grotta Punta Is Gruttas” or “Grotta di Sa Losula” without cadastre number, 925 m, 30.III.2008, PM, 1 ex (CMZ). Cagliari prov.: Armungia, Baccu Gospuru, “Grotta Gospuru” 148 Sa/CA, on mud, about 50 m from entrance: 12.XI.2000, CO & JD, 1 larva (GSS). Cagliari, Ipogeo di Santa Restituta: 1.X.1971, PU, DP & SO, 1 larva with 8 lp (CMZ). Fluminimaggiore, Punta Campu Spina – Punta de Baueddu, “Miniera di Punta de Baueddu”, on rotten wood, 80 m from entrance: 6.II.2005, CO & SP, 1 imm. (GSS). Iglesias, Monte San Giovanni, “Miniera di San Giovanni”, on rotten wood: 6.VI.2004, CO, FM & SP, 1 ♂, 1 ♀ (GSS). Monte San Giovanni, Gonnessa, “Miniera di San Giovanni”, 170 m: 10.XI.2005, SP, 1 ♀ (CMZ).

**Remarks.** Quotations here reported are based on immature or mutilated specimens or on materials of uncertain identity.

The generic quotation of unidentified Chilopoda from Iglesias, Corongiu de Mari, “Grotta del Sorcio”, published by Grafitti and De Waele (1996), and of unidentified *Lithobius* sp. from the same cave, published by Grafitti and Merella (2008), refers to the same material.

## Lithobiidae gen. sp.

- 1) Lithobiidae indet.: Sanna *et al.* 1972: 109.
- 2) Lithobiidae indet.: Rivalta 1982: 46.
- 3) Lithobiidae indet.: Grafitti 1989: 5, 11 [as Chilopoda indet.].
- 4) Lithobiomorpha indet.: Grafitti 1989: 5, 10.
- 5) Lithobiidae gen. sp.: Grafitti 1993: 19, 20, 27.
- 6) Lithobiidae indet.: Grafitti 1994: 36.
- 7) Lithobiidae indet.: Grafitti 1995: 34.
- 8) Lithobiidae indet.: Mucedda & Grafitti 2001: 28.
- 9) Lithobiomorpha [indet.]: De Waele & Grafitti 2004: 71.
- 10) Lithobidae [sic]: Lana *et al.* 2006: 45.
- 11) Lithobiomorpha indet.: Grafitti 2007a: 385.
- 12) Lithobiidae indet.: Grafitti 2007a: 385, 389, 397.
- 13) Lithobiidae indet.: Grafitti 2007c: 69.

## Literature records

**General.** Sardinia (9).

**Epigeic.** No records.

**Cave.** Sassari prov.: Mara, “Grotta Sa Ucca de Filiestru” 179 Sa/SS (8, 13). Romana, “Sa Grutta de Santu Giagu” 260 Sa/SS (6). San Pietro di Sorres, Borutta, “Grotta Sa Rocca Ulari” 257 Sa/SS, 485 m (5). Nuoro prov.: Baunei, “Grotta di Mesu ‘e Monte” without cadastre number (12). Baunei, “Grotta Nurra Genna S’Armentu” 421 Sa/NU (4, 11). Baunei, “Grotta Nurra Su Lenzonargiu” [or “Nurra de Su Lenzonargiu”] 447 Sa/NU (3, 12). Perdasdefogu, “Grotta de Su Fenugu” 1935 Sa/NU (10). Urzulei, “Grutta de Monte Longos” or “Gotta Su Spiria” (12). Supramonte di Baunei, Codula Ilune, “Grotta di Monte Longos o Su Spiria” 1988 Sa/

NU (7). Cagliari prov.: Fluminimaggiore, “Grotta di San Pietro” 605 Sa/CA (1, 2). Fluminimaggiore, “Grotta di Su Mannau” 97 Sa/CA (1, 2).

**Remarks.** Quotations based on immature or mutilated specimens or on materials of uncertain identity. Most of these records probably belong to epigeic *Lithobius* species. The capture of a 6 cm long, blind and depigmented lithobiid centipede in the cave “Su Mannau” mentioned by Sanna *et al.* (1972: 100) and repeated by Rivalta (1982) requires confirmation.

The quotation of *Lithobiomorpha* by Grafitti (1989, 2007a) and De Waele and Grafitti (2004) almost certainly refer to species of *Lithobiidae*.

## Order SCOLOPENDROMORPHA Pocock, 1895

### Cryptopidae Kohlrausch, 1881

#### *Cryptops* Leach, 1815

##### Subgenus *Cryptops* Leach, 1815

#### 21. *Cryptops (Cryptops) hortensis* (Donovan, 1810)

- 1) ? *Cryptops hortensis* Leach: Silvestri 1898: 684 [pars].
- 2) ? *Cryptops hortensis* Leach: Verhoeff 1925a: 655 [pars].
- 3) ? *Cryptops hortensis* Leach: Attems 1949: 111 [pars].
- 4) ? *Cryptops hortensis* Leach, 1815: Minelli 1978a: 156 [pars].
- 5) *Cryptops hortensis* (Leach) [sic]: De Miranda Restivo 1982: 173.
- 6) *Cryptops hortensis* Leach, 1815: Foddai *et al.* 1995: 8.
- 7) *Cryptops hortensis* Leach, 1815: Grafitti & Zapparoli 1995: 122.
- 8) *Cryptops hortensis* Leach, 1815: Foddai *et al.* 1996: 360, tab. I.
- 9) *Cryptops hortensis*: Mucedda *et al.* 2002: 30.
- 10) *Cryptops hortensis* Leach, 1815: Zapparoli & Minelli 2005: CD [pars].

#### Literature records

**General.** Sardinia-Corsica (4). Sardinia (2, 3, 6, 8).

**Epigeic.** Nuoro prov.: Macomer, Monte Sant’Antonio, *Quercus ilex* wood (5). Cagliari prov.: Cagliari (1).

**Cave.** Sassari prov.: Pozzomaggiore, Valley of Androliga, “Grotta Androliga” 142 Sa/SS (7, 9, 10).

#### Material examined

**Epigeic.** Oristano prov.: Asuni: 29.III.2007, AC, 1 ex (CMZ).

**Cave.** No records.

**General distribution.** Europe: Albania, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark (mainland), Finland, France (mainland, Corsica), Germany, Great Britain, Greece (mainland, insular including Crete), Hungary, Iceland, Ireland, Italy (mainland, Sicily, Sardinia), Republic of Macedonia, Montenegro, Norway, Poland, Portugal (mainland, Azores Isl., Madeira Is.), Romania, Russia (European), Slovak Republic, Slovenia, Spain (mainland, Canary Isl.), Switzerland, Sweden, The Netherlands, Ukraine; North Africa: Morocco; West Asia: Armenia, Azerbaijan, Georgia, Turkey (northern), Tadjikistan, Turkmenistan, Uzbekistan; North America: Canada (introduced), USA (introduced); Atlantic islands: St. Elena Is. (introduced); Pacific islands: Hawaii Isl. (introduced).

**Chorotype.** Centralasiatic-European.

**Ecological notes.** No data on elevation range; one record from *Quercus ilex* wood; found also in caves (1 site; troglodene species). See also De Miranda Restivo (1982).

**Remarks.** Records from Sardinia (Cagliari and Flumentorgiu) published by Silvestri (1898), then copied by Verhoeff (1925a), Attems (1949) and Minelli (1978a), have been partly (Flumentorgiu) re-examined and must be referred partly to *C. punicus* Silvestri, 1896a, partly to *C. trisulcatus* Brölemann, 1902 (see below). Subgeneric assignment according to Attems (1930).

## 22. *Cryptops (Cryptops) punicus* Silvestri, 1896a

- 1) *Cryptops hortensis* Leach: Silvestri 1898: 684 [pars].
- 2) ? *Cryptops hortensis* Leach: Verhoeff 1925a: 655 [pars].
- 3) ? *Cryptops hortensis* Leach: Attems 1949: 110 [pars].
- 4) ? *Cryptops hortensis* Leach, 1815: Minelli 1978a: 156 [pars].
- 5) *Cryptops punicus* (Silvestri, 1896) [sic]: Minelli 1983a: 12.
- 6) *Cryptops punicus* Silv. 1896: Minelli 1983b: 407.
- 7) *Cryptops punicus* Silvestri, 1896: Minelli *et al.* 1994: 492.
- 8) *Cryptops punicus* (Silvestri, 1896) [sic]: Foddai *et al.* 1995: 8.
- 9) *Cryptops punicus* Silvestri, 1896: Grafitti & Zapparoli 1995: 122.
- 10) *Cryptops punicus* (Silvestri, 1896) [sic]: Foddai *et al.* 1996: 360, tab. I.
- 11) *Cryptops punicus*: Mucedda *et al.* 2002: 30.
- 12) *Cryptops punicus* (Silvestri, 1896) [sic]: Zapparoli & Minelli 2005: CD.
- 13) *Cryptops hortensis* (Donovan, 1810): Zapparoli & Minelli 2005: CD [pars].

### Literature records

**General.** Sardinia-Corsica (4). Sardinia (2, 3, 6, 8, 10).

**Epigeic.** Sassari prov.: Arzachena (12). Bono, Passo o'Uccaidu, [1000 m] (5, 12). Caniga (12). Il Toro Is. (7, 10, 12). Molarà Is. (7, 10, 12). Ittiri (5, 12). Between Luogosanto and Tempio Pausania (5, 12). Nughedu di San Nicolò, Monte Sefraigada, 1000 m (5, 12). Olmedo, 2 km W Olmedo (12). Oschiri, 646 m (5, 12). Ozieri (5, 12). Palmadula, between Argentiera and Palmadula (5, 12). Pattada, Cantoniera Osaspera (5, 12). Sassari (5, 12). Spargi Is. (7, 10, 12). Stintino (5, 12). Tavolara Is. (5, 7, 10, 12); *ibidem*, SW area (7, 12). Tempio Pausania (12). Nuoro prov.: Altopiano della Campeda (5, 12). Arcu Correboi, 1300 m (5, 12). Borore (5, 12). Bortigali, Mulargia, 600 m (5, 12). Catena del Marghine (5, 12). Dualchi, 400 m (12). Fonni (5, 12). Gairo (5, 12). Laconi (5, 12). Between Macomer and Mulargia (5). Marghine (5). Monte Spada, 1400 m (5, 12). Silanus, 400 m (5, 12). Oristano prov.: Asuni (5, 12). Fordongianus (12). Mal di Ventre Is. (7, 10, 12). Monte Arci (12). Oristano (5, 12). San Giovanni di Sinis (5, 12). Samugheo (12). Cagliari prov.: Flumentorgiu (1, 13). Near Gonnosfanadiga (5, 12). Guspini (5, 12). La Vacca Is. (7, 10, 12). Monte [dei] Sette Fratelli (5, 12). San Pietro Is. (10); *ibidem*, aqueduct reservoir (7, 12); *ibidem*, Guardia dei Mori [emendation for Mari] (7, 12); *ibidem*, pond of Cala Vinagra [emendation for Cala Vinogra] (7, 12); *ibidem*, pond of Vivagna (7). Between Sant'Anna Arresi and Teulada, humus and mosses under *Pistacia lentiscus* (5, 12). Sant'Antioco Is. (10); *ibidem*, Cannai (7, 12). Sardara (5, 12). Sardara, Rio Setti (12). Sarroch (12). Near Teulada (5, 12). Villamar (5, 12).

**Cave.** Sassari prov (11). Bonorva, "Grotta del Giardino Archeologico" without cadastre number, 500 m (9, 12).

### Material examined

**Epigeic.** Sassari prov.: Arzachena, near a small river: 28.I.1979, CU, 1 ex (CMZ\*). Buddusò, hand searching: 25.V.1980, CM, 1 ex (CMZ); 25.V.1980, MZ, 6 exx (CMZ). Buddusò, Nuraghe Loelle: 29.IV.2008, GA & GB, 3 exx (CMZ). Gallura, 2 km W Olmedo: 29.IV.1989, leg.?, 1 ex (CMZ\*). Tempio Pausania: 10.III.1968, RA, 1 ex (CMZ\*). Il Toro Is.: 10.V.1988, GO, 3 exx (CMZ\*); 14.VI.1989, GO, 3 exx (CMZ\*). Oschiri: 15.X.1989, MC, 1 ex (CMZ\*). Nuoro prov.: Nuraghe Loddune, surroundings, S.S. 389:

25.V.1980, AVT, 1 ex (CMZ). Oristano prov.: Asuni, Samugheo: 22.II.1971, AVT, 1 ex (CMZ\*). Fordongianus: 31.XI.1989, MC, 1 ex (CMZ\*). Monte Arci, garrigue: 1–4.III.1992, GC, 1 ex (CMZ\*). Monte Ferru, Rifugio La Madunnina, between Cuglieri and Santolussorgiu, 865 m, hand searching: 27.VI.2000, MZ, 1 ex (CMZ); 27.VI.2000, MB, 1 ex (CMZ). Cagliari prov.: Burcei, surroundings, 631 m, 32S 05228639 4356008, under stones, hand searching: 13.XI.2006, MZ, 1 ex (CMZ); ibidem, near Punta Serpeddi, 954 m, 32S 0525266 4356808, hand searching: 13.XI.2006, MZ, 6 ex (CMZ). Capoterra, soil washing and Berlese extraction: 4.X.2006, LF, 2 ex (CMZ). Castiadas, soil washing and Berlese extraction: 20.I.2008, LF, 1 ex (CMZ). Flumentorgiu: V.1894, SL, 3 ex “*Cryptops punctatus* Koch” F. Silvestri det. (MGE). Geremeas, soil washing and Berlese extraction: 12.VI.2003, LF, 1 ex (CMZ); 22.XII.2006, LF, 1 ex (CMZ). Sant’Antioco Is., Cala Luna: 13.VI.1989, GO, 1 ex (CMZ). San Pietro Is., Guardia dei Mori: 27.VI.1987, VV, 1 ex (CNBFVR). Sardara, Rio Setti: 12.IV.1971, AVT, 2 ex (CMZ\*). Serpentara Is.: 3.V.1988, GO & GR, 2 ex (CMZ). Sinnai, Burranca, S.S. 125, km 24: 27.III.2007, FF, 1 ex (CFF). Teulada: 12.IX.2004, LF, 1 ex (CMZ).

**Cave.** Nuoro prov.: Galtelli, Monte Tuttavista, Tres Puntas, “Pozzo N. 2 di Tres Puntas” 1151 Sa/NU, 750 m: 16.III.2008, PM, 1 ex (CMZ).

**Other.** Cagliari prov.: “*Cryptops hortensis* Leach/Flumentorgiu/(Sardegna) V–1894/Solari [leg.]”, “*Cryptops hortensis* Leach/Flumentorgiu (Sardegna)/Maggio [= May] 1894 Solari”, 2 imm. together with 1 ex of *C. trisulcatus* [in Silvestri 1898: 684 under *Cryptops hortensis* Leach] (MGE).

**General distribution.** Europe: Italy (Montecristo Is., Sardinia, Sicily and circumsicilian islands); North Africa: Algeria, Tunisia, Libya (Silvestri 1896a; Zapparoli and Minelli 2005; Akkari *et al.* 2008).

**Chorotype.** W-Mediterranean.

**Ecological notes.** 0–1400 m; the few records available are from Mediterranean habitats (*Pistacia lentiscus*, 1 site; garrigue, 1 site); occasionally in caves (2 sites, 500–750 m; troglone species). Three records from endogenous habitats. See also Minelli (1983a).

**Remarks.** Part of the records from Sardinia published by Silvestri (1898) under “*Cryptops hortensis* Leach” (three specimens from Flumentorgiu) have been re-examined and must be referred partly to this species, partly to *Cryptops trisulcatus* Brölemann, 1902 (see below). Generic quotations of *C. hortensis* from Sardinia published by Verhoeff (1925a), Attems (1949) and Minelli (1978a) probably derive from Silvestri’s (1898) records and must be, at least partly, assigned to this species. Subgeneric assignment according to Akkari *et al.* (2008).

### 23. *Cryptops (Cryptops) trisulcatus* Brölemann, 1902

- 1) *Cryptops hortensis* Leach: Silvestri 1898: 684 [pars].
- 2) ? *Cryptops anomalans* Newport: Silvestri 1898: 684.
- 3) ? *Cryptops punctatus* Koch: Verhoeff 1925a: 655 [pars].
- 4) *Cryptops hortensis* Leach: Verhoeff 1925a: 655 [pars].
- 5) ? *Cryptops (Cryptops) anomalans* Newp. 1844: Attems 1930: 221, figs 280–286 [pars].
- 6) ? *Cryptops anomalans* Newp.: Attems 1949: 111 [pars].
- 7) ? *Cryptops hortensis* Leach: Attems 1949: 111 [pars].
- 8) *Cryptops hortensis* Leach, 1815: Minelli 1978a: 156 [pars].
- 9) ? *Cryptops anomalans* Newport, 1844: Minelli 1978a: 156 [pars].
- 10) *Cryptops trisulcatus* Brölemann, 1902: Minelli 1978a: 156.
- 11) *Cryptops trisulcatus* Brölemann, 1902: Minelli 1983a: 11.
- 12) *Cryptops trisulcatus* Bröl. 1902: Minelli 1983b: 407.
- 13) *Cryptops trisulcatus*: Minelli & Iovane 1987: 28, 30.
- 14) *Cryptops trisulcatus*: Foddai *et al.* 1994: 14.
- 15) *Cryptops trisulcatus* Brolemann: Grafitti 1994: 36, 40.
- 16) *Cryptops trisulcatus* Brölemann, 1902: Minelli *et al.* 1994: 491.
- 17) *Cryptops trisulcatus* Brölemann, 1902: Foddai *et al.* 1995: 8.

- 18) *Cryptops trisulcatus* Brölemann, 1902: Grafitti & Zapparoli 1995: 122.  
 19) *Cryptops trisulcatus* Brölemann, 1902: Foddai *et al.* 1996: 360, tab. I.  
 20) *Cryptops trisulcatus*: Mucedda *et al.* 2002: 30.  
 21) *Cryptops trisulcatus* Brölemann, 1902: Zapparoli & Minelli 2005: CD.  
 22) *Cryptops hortensis* (Donovan, 1810): Zapparoli & Minelli 2005: CD [pars].

## Literature records

**General.** Sardinia-Corsica (8, 9, 10). Sardinia (3, 4, 5, 6, 7, 12, 17, 19). Circumsardinian islands (14).

**Epigeic.** Sassari prov.: Alghero (11, 21). Bisce Is. (16, 19, 21). Caprera Is. (16, 19, 21); *ibidem*, Monte Teialone (19, 21). Castelsardo (11, 21). Figarolo Is. (16, 19, 21). Il Toro Is. (16, 19, 21). Le Camere Isl., W[estern island] (16, 19, 21). Li Nibani Isl. (16, 19, 21). Maddalena Is. (19, 21); *ibidem*, La Trinità (16, 21); *ibidem* [emendation for Tavolara Is.], Penisola Abbatoggia, W[estern side] (16, 21); Molaria Is. (11, 16, 19, 21). Monte Limbara, Punta Balistreri, 1300 m (9, 21). Mortorio Is. (16, 19, 21). Olbia, Golfo Aranci (11, 21). *ibidem*, Porto San Paolo (11, 21). Pattada, Cantoniera Osaspera (11, 21). Piana dell'Asinara Is. (16, 19, 21). Razzoli Is. (16, 19, 21). Santo Stefano Is. (16, 19, 21). Soffi Is. (16, 19, 21). Spargi Is. (19, 21); *ibidem*, Cala Granara (16, 21). Tavolara Is. (19); *ibidem*, Spalmatore di Terra (16, 21). Nuoro prov.: Desulo (11, 21). Dorgali, Cala Gonone (11, 21). Dorgali, River Cedrino (21). Fonni, surroundings (11, 21). Genoni (2). Isili (2). Nuraghe Loddune (21). Villagrande Strisaili, Villanova Strisaili, *Quercus ilex*, 850 m (13, 21). Oristano prov.: Asuni, surroundings (11, 21). Monte Arci (21). Oristano (11, 21). Cagliari prov.: Budelli Is. (16, 19, 21). Cavoli Is. (16, 19, 21). Flumentorgiu (1, 22). Guspini, meadow with *Pistacia lentiscus* (11, 13, 21). La Vacca Is. (16, 19, 21). Paduleddu Is. (16, 19, 21). Stagno di Maracalagonis (11, 21). San Nicolò Gerrei (21); *ibidem*, Rio Mannu (11, 21). Sardara, Rio Setti (11, 21). Serpentara Is. (16, 19, 21).

**Cave.** Sassari prov.: Romana, Santu Giagu, "Sa Grutta de Santu Giagu" 260 Sa/SS, 370 m (15, 18, 21). Sassari province [generic quotation for the caves of the area] (20). Nuoro prov.: Lula, Monte Albo, "Grotta Conca 'e Crapa" 30 Sa/NU, 1040 m (21).

## Material examined

**Epigeic.** Sassari prov.: Arzachena: 17.IV.2001, LF, 12 exx (CMZ). Buddusò, hand searching: 25.V.1980, MZ, 1 ex (CMZ). Tempio Pausania: IV.1903, RG, 1 ex (MGE). Nuoro prov.: Desulo, 1000 m, *Quercus pubescens* wood, hand searching: 19.V.1994, MZ, 1 ex (CMZ). Dorgali, River Cedrino, hand searching: 24.V.1980, MZ, 1 ex (CMZ\*). Gavoi, Lago di Gusana, *Quercus suber* wood, hand searching: 19.V.1994, MZ, 2 exx (CMZ). Gennargentu: 24–25.I.1899, UL & GD, 1 ex (MGE). Monte Spada: 17.V.1982, GC, 1 ex (CMZ). Nuraghe Loddune, surroundings, S.S. 389, hand searching: 25.V.1980, AVT, 2 exx (CMZ\*); 25.V.1980, CM, 1 ex (CMZ\*); 25.V.1980, MB, 1 ex (CMZ\*); 25.V.1980, MZ, 1 ex (CMZ\*). Oristano prov.: Monte Arci, hand searching: 4.VII.2000, MZ, 1 ex (CMZ\*); *ibidem*, *Erica arborea* and *Arbutus unedo* shrub: 1–4.III.1992, GC, 1 ex (CMZ\*); *ibidem*, garrigue: 1–4.III.1992, GC, 2 exx (CMZ\*); *ibidem*, *Quercus ilex* wood: 1–4.III.1992, GC, 1 ex (CMZ\*). Monte Ferru, Rifugio La Madunnina, between Cuglieri and Santolussorgiu, 865 m, hand searching: 27.VI.2000, MB, 2 exx (CMZ); 27.VI.2000, MZ, 3 exx (CMZ). Cagliari prov.: Bolotana, soil washing and Berlese extraction: 6.II.2007, LF, 1 ex (CMZ). Capoterra, soil washing and Berlese extraction: 10.X.2006, LF, 1 ex (CMZ). Domusnovas, near Punta Planotzara, 309 m, 32S 0465718 4356515, leaf-litter sifting: 14.XI.2006, GN & MZ, 1 ex (CMZ); *ibidem*, under stones, *Quercus ilex* wood: 15.XI.2006, BNWZ, 1 ex (CNBFVR). Domusnovas, near Sa Duchessa, 320 m, 32S 04666164 4358209, leaf-litter sifting: 23.III.2006, BBCW, 2 exx (CMZ); *ibidem*, *ibidem* (road to Perda Niedda), 350 m, 32S 04666233 435905, leaf-litter sifting: 23.III.2006, BBCW, 1 ex (CMZ). Domusnovas, Valle di Oridda, 592 m, 32S 0466973 4362228, under *Alnus* sp., hand searching: 10.XI.2006, MZ, 1 ex (CMZ). Giara di Gesturi, 15.III.1994, LL, 1 ex (CMZ). Flumentorgiu: V.1894, 1 ex "?? *Geophilus cordylogaster* Latz." F. Silvestri det. (MGE). Gonnosfanadiga, soil washing and Berlese extraction: 9.II.2007, LF, 1 ex (CMZ). Gonnosfanadiga, Monte Linas, Genna Su Padenti, 853 m, 32S 0465485 4367656: 12.IX.2006, GN, 1 ex (CNBFVR). Iglesias, Case Marganai, 725 m, 32S 0463890 4355925, *Quercus ilex* wood, leaf-litter sifting: 10.XI.2006, MZ, 1 ex (CMZ). Iglesias, near "Colonia Beneck", 636 m, 32S 0462391 4355441, 6.IX.2007,

CP, 1 ex (CNBFVR). Iglesias, Punta San Michele, 906 m, 32S 0465910 4354561, hand searching: 10.XI.2006, MZ, 2 exx (CMZ). San Pietro Is., slopes of Guardia dei Mori: 13.V.1999, GR, 2 exx (CMZ). Surroundings of Sant'Anna Arresi, S.S. 195, 39° 59' 81'' N, 08° 39' 08'' E, m 67, garrigue with *Asphodelus* and *Carlina* on stony, shallow soil, in abandoned mine of *Trichoferus arenbergeri* (Coleoptera Cerambycidae) in *Carlina macrocephala* taproot: 24.III.2006, BI, 1 ex (CMZ). Sardara, Rio Setti, 12.IV.1971, AVT, 1 ex (CMZ). Siliqua, Orbai, soil washing and Berlese extraction: 20.III.2008, LF, 2 exx (CMZ). Uta, soil washing and Berlese extraction: 3.III.2003, LF, 2 exx (CMZ). Villacidro, Rio Cannisoni, 375 m, 32S 0468713 4362692, hand searching, under stones: 25.III.2006, BBCW, 1 ex (CNBFVR); ibidem, 390 m, 32S 0469095 4362383, leaf-litter sifting: 9.XI.2006, MZ, 1 ex (CMZ). Province ?. "Roja Manna (Sardegna)": V.1894, SL, 1 ex "*Cryptops hortensis* Leach" F. Silvestri det. (MGE).

**Cave.** No records.

**Other.** agliari prov.: "*Cryptops hortensis* Leach/Flumentorgiu/(Sardegna) V-1894/Solari [leg.]", "*Cryptops hortensis* Leach/Flumentorgiu (Sardegna)/Maggio [= May] 1894 Solari [leg.]", 1 ex together with 2 imm. of *C. punicus* [in Silvestri 1898: 684 under *Cryptops hortensis* Leach] (MGE).

**General distribution.** Europe: France (mainland, Corsica), Greece (Ionian Isl., Southern Sporades, Crete), Italy (mainland, Sicily, Sardinia), Maltese Archipelago, Portugal (mainland), Romania, Spain (mainland, Balearic Isl., Canary Isl.); North Africa: Algeria, Tunisia; West Asia: Turkey (south-east) (Zapparoli 2002; Zapparoli *et al.* 2004; Akkari *et al.* 2008).

**Chorotype.** Mediterranean.

**Ecological notes.** 0–1300 m; in open Mediterranean habitats, including maquis with *Erica arborea* and *Arbutus unedo* (1 site), *Pistacia lentiscus* (1 site) and garrigue (2 sites); also in oakwoods (*Quercus ilex*, 3 sites; *Q. pubescens*, 1 site; *Q. suber*, 1 site); in riparian habitats (under *Alnus* sp., 1 site); rarely in caves (2 sites, 370–1040 m; troglone species). Five records from endogenous habitats. See also Minelli (1983a) and Minelli and Iovane (1987).

**Remarks.** Silvestri's (1898) records of *C. anomalans* Newport, 1844 from Sardinia have been considered of uncertain identity by Minelli (1983b). However, they should be based on misidentified specimens of *C. trisulcatus*, maybe mistaken because of the broad resemblance in the arrangement of the sutures on tergite 1 of both species. Accordingly with this tentative interpretation, also the subsequent Sardinian generic quotations of *C. anomalans* published by Verhoeff (1925a, as *C. punctatus* C.L. Koch, 1847), Attems (1930, 1949) and Minelli (1978a), must be at least partly listed under *C. trisulcatus* (see also remarks on *C. breviunguis*). Part of the records from Sardinia published by Silvestri (1898) under "*Cryptops hortensis* Leach" (three specimens from Flumentorgiu) have been re-examined and must be referred partly to this species, partly to *Cryptops punicus* (see above). Subgeneric assignment according to Attems (1930).

## 24. *Cryptops (Cryptops) sp. A*

1) *Cryptops* sp.: Lana *et al.* 2007: 43.

### Literature records

**Cave.** Nuoro prov.: Baunei, [Codula di Sisine], "Grotta Su Tufu de Mangalistru" 422 Sa/NU, [320 m] (1).

### Material examined

**Epigeic.** No records.

**Cave.** Nuoro prov.: Baunei, Codula di Sisine, "Grotta Su Tufu de Mangalistru" 422 Sa/NU, 320 m: 17.VIII.2002, MP, 1 ex (CMZ).

**General distribution.** Europe: Italy (Sardinia).

**Chorotype.** Endemic, W-Mediterranean affinities.



**Remarks.** The specimen examined belongs to an undescribed troglobitic species still under study.

### *Cryptops (Cryptops) spp.*

- 1) *Cryptops* spp.: A. Costa 1884d: 48.
- 2) *Cryptops* sp.: De Miranda Restivo 1982: 174.

### Literature records

**General.** Sardinia (1§).

**Epigeic.** Nuoro prov.: Dorgali, Rio Flumineddu, under *Alnus* sp. and *Nerium oleander* (2).

**Remarks.** Quotations based on mutilated specimens or on materials of uncertain identity probably belonging to *C. hortensis*, *C. punicus* or *C. trisulcatus*, the sole species of the genus occurring in Sardinia.

### Plutoniumidae Bollman, 1893b

#### *Plutonium* Cavanna, 1881

#### 25. *Plutonium zwierleini* Cavanna, 1881

(Fig. 16)

- 1) *Plutonium Zwierleini* Cav.: A. Costa 1884b: 81.
- 2) *Plutonium Zwierleini*: A. Costa 1884d: 48.
- 3) *Plutonium Zwierleini* Cav.: A. Costa 1884e: 302.
- 4) *Plutonium zwierleinii* [sic] Cav.: Silvestri 1898: 685.
- 5) *Plutonium zwierleini* Cav.: Kraepelin 1903: 67, fig. 27.
- 6) *Plutonium Zwierleinii* [sic] Cav.: Gestro 1904: 325.
- 7) *Plutonium zwierleinii* [sic] Cav.: Verhoeff 1925a: 655.
- 8) *Plutonium zwierleini* [sic] Cav.: Berlese 1925: 138, fig. 148 b.
- 9) *Plutonium Zwielerleini* [sic]: Brölemann 1926a: 233.
- 10) *Plutonium zwierleinii* [sic] Cav.: Attems 1930: 254, figs 336–338.
- 11) *Plutonium zwierleinii* [sic]: Prunescu 1970: 115.
- 12) *Plutonium zwierleini* Cavanna, 1881: Würmli 1975: 209.
- 13) *Plutonium zwierleinii* [sic] Cavanna, 1889 [sic]: Minelli 1978a: 156.
- 14) *Plutonium* [sic] *zwierleinii* [sic]: Baccetti, 1983: 862.
- 15) *Plutonium zwierleinii* [sic] Cavanna 1881: Minelli 1983b: 407.
- 16) *Plutonium zwierleinii* [sic] Cavanna: Minelli 1984: 54.
- 17) *Plutonium zwierleinii* [sic] Cavanna, 1881: Foddai *et al.* 1995: 8.
- 18) *Plutonium zwierleinii* [sic] Cavanna, 1881: Foddai *et al.* 1996: 360, tab. I.
- 19) *Plutonium zwierleini* Cavanna: Shelley 1997: 65, 102, figs 42–44.
- 20) *Plutonium zwierleinii* [sic] Cavanna, 1881: Zapparoli & Minelli 2005: CD.
- 21) *Plutonium zwierleini* Cavanna, 1881: Edgecombe & Koch 2008: 874, figs 1g, 8, 18b.

### Literature records

**General.** Sardinia-Corsica (13). Sardinia (5, 7, 8, 9, 10, 12, 14, 15, 16, 17, 18, 19).

**Epigeic.** Sassari prov.: Lanusei (12, 19, 20). Sassari (21). Nuoro prov.: Aritzo (20). Desulo (1, 2, 3, 4, 6, 20). Oristano prov.: Asuni [emendation for Assuni] (19). Cagliari prov.: Sarrabus [area] (4, 6, 20).

**Cave.** No records.

## Material examined

**Epigeic.** Nuoro prov.: Aritzo, surroundings: 26.V.1909, leg ?, 1 ex (CMZ\*). Cagliari prov.: Esterzili: near houses, V.2003, IC & FF, 1 ex (CCA).

**Cave.** Nuoro prov.: Oliena, Supramonte di Oliena, cave “Nurra ‘e Pradu” Sa/NU 3083, 1220 m, in the small pit near the entrance (- 4 m): 9.XI.2008, L. Sanna vidit, 1 ex. Oliena, Cannagosula, “Grotta Su Guanu” or “Grotta del Guano” 103 Sa/NU, 95 m, in the second hall: IX.1960, CR, 1 ex 120 mm long (from the anterior margin of the head shield to the posterior end of the last pediferous segment) (GGNU).

**Other.** Cagliari prov.: “*Plutonium Zwierleini*, Cav./Sardegna: Sarrabus/G.B. Traverso [leg.]”, “Sardegna/(Sarrabus)/G.B. Traverso [leg.] 1878”, 1 ex 70 mm long [in Silvestri 1898: 685] (MGE). “*Plutonium Zwierleini*, Cav./Sardegna: Sarrabus/G.B. Traverso [leg.]”, “Sardegna/Sarrabus/G.B. Traverso [leg.] 1880”, 1 ex 84 mm long [in Silvestri 1898: 685] (MGE).

**General distribution.** Europe: Italy (southern regions, Sicily, Sardinia), Spain (mainland) (Würlmli 1975; Minelli 1984; Shelley 1997).

**Chorotype.** W-Mediterranean.

**Ecological notes.** 95–1220 m; no detailed records are available on the habitat of the epigeic populations of this species but the quotation from Desulo by Costa (1884d: “tra le macerie del paese” [= among the rubble of the village]) and the original record from Esterzili (near houses) suggest some tolerance for disturbed environments; two apparently unusual records from caves are also known (95 m and 1220 m a.s.l., respectively; troglone species). See also Würlmli (1975) and Minelli and Iovane (1987).

**Remarks.** Two of the three specimens of this species recorded by Silvestri (1898) from Sarrabus have been re-examined and their identification is confirmed. The record from cave “Nurra ‘e Pradu”, Oliena, was identified based on photo by L. Sanna (Gruppo Speleologico Sassarese) (Fig. 16).

## Scolopendridae Newport, 1844

### *Scolopendra* Linnaeus, 1758

#### 26. *Scolopendra oraniensis* Lucas, 1846

- 1) *Scolopendra dalmatica* (Koch) [sic]: Magretti 1878: 462.
- 2) *Scolopendra dalmatica* Koch: Pirotta 1878: 405.
- 3) *Scolopendra dalmatica* (Koch) [sic]: Magretti 1880: 22, 27, 34, 40.
- 4) *Scolopendra dalmatica* Koch: A. Costa 1882: 28.
- 5) *Scolopendra dalmatica* Koch: A. Costa 1883: 81
- 6) *Scolopendra dalmatica* Koch: Fanzago 1884c [paper not seen].
- 7) *Scolopendra dalmatica* Koch: Berlese 1888b: 1.
- 8) *Scolopendra clavipes* C. Koch: Silvestri 1898: 684.
- 9) *Scolopendra dalmatica* C. Koch: Kraepelin 1903: 245.
- 10) *Scolopendra oraniensis* Luc.: Kraepelin 1903: 246.
- 11) *Scolopendra dalmatica* C. Koch: Kraepelin 1904: 318.
- 12) *Scolopendra oraniensis lusitanica* Verh.: Verhoeff 1925a: 655.
- 13) *Scolopendra canidens oraniensis* H. Luc.: Attems 1930: 36.
- 14) *Scolopendra canidens oraniensis* (Lucas): Matic 1971: 245.
- 15) *Scolopendra canidens oraniensis* Lucas, 1846: Minelli 1978a: 156.
- 16) *Scolopendra oraniensis* Lucas, 1846: Würlmli 1980, fig. 27.
- 17) *Scolopendra canidens oraniensis* (Lucas) [sic]: De Miranda Restivo 1982: 173, 174.
- 18) *Scolopendra canidens oraniensis* Lucas, 1846: Minelli 1983a: 10.
- 19) *Scolopendra canidens oraniensis* Lucas 1846: Minelli 1983b: 407.
- 20) *Scolopendra oraniensis* (Lucas) [sic]: Lewis 1985: 128, map 2.

- 21) *Scolopendra canidens oraniensis*: Minelli & Iovane 1987: 30.
- 22) *Scolopendra canidens oraniensis*: Foddai *et al.* 1994: 14.
- 23) *Scolopendra oraniensis* Lucas 1846: Minelli *et al.* 1994: 490.
- 24) *Scolopendra oraniensis* Lucas, 1846: Foddai *et al.* 1995: 7.
- 25) *Scolopendra oraniensis* Lucas, 1846: Foddai *et al.* 1996: 360, tab. I.
- 26) *Scolopendra oraniensis* Lucas, 1846: Zapparoli & Minelli 2005: CD.
- 27) *Scolopendra oraniensis* H. Lucas, 1846: Iorio 2006: 48.
- 28) ? *Scolopendra cingulata*: Pinna *et al.* 2007: 254.
- 29) *Scolopendra oraniensis* Lucas, 1846: Edgecombe & Koch 2008: 875, fig. 5.
- 30) *Scolopendra oraniensis*: Simaiakis & Mylonas 2008: 42, fig. 1.
- 31) *Scolopendra oraniensis* Lucas, 1846: Koch *et al.* 2009: 270.

## Literature records

**General.** Sardinia-Corsica (15). Sardinia (4, 5, 9, 10, 12, 13, 16, 19, 20, 24, 25, 27, 28, 29, 30, 31). Circumsardinian islands (22).

**Epigeic.** Sassari prov.: Alghero, Fertilia (18, 26); ibidem, Porto Conte (18, 26). Asinara Is. (3, 11, 23, 26); ibidem, Rio Baddi Longa (23, 26); ibidem, between Campo Perdu and Diga Ruda (23, 26); ibidem, Cala Reale (23, 26); ibidem, Diga Ruda (23, 26). Bisce Is. (23, 25, 26). Bono, Passo o'Uccaidu, [1000 m] (18, 26). Bultei, 950 m (18, 26). Calangianus, 6 km ENE (18, 26). Capo Caccia (18, 26). Castelsardo (18, 26). Figarolo Is. (23, 25, 26). Ittiri (18, 26). Lago di Coghinas (26). Le Camere Isl., W[estern island] (23, 25, 26). Li Nibani Isl. (23, 25, 26). Maddalena Is. (25, 26); ibidem, Baia dell'Annegato (23, 26); ibidem, La Maddalena (23, 26); ibidem, La Trinità (23, 26); ibidem, [Penisola] Abbatoggia (23, 26). Molara Is. (18, 23, 25, 26). Monte Limbara (18, 26); ibidem, Punta Balistreri, 1300 m (18, 26). Mortorio Is. (23, 25, 26). Olbia, Porto San Paolo (18, 26). Olmedo, 2 km W (26). Oschiri, 646 m (18, 26). Ossi (26). Ozieri (18, 26). Palmadula (18, 26). Pattada, Cantoniera Osaspera (18, 26). Piana dell'Asinara Is. (23, 25, 26). Piana di Alghero Is. (23, 25). Razzoli Is. (23, 25, 26). Rocche Is. (23, 25, 26). Santa Maria Is. (23, 25, 26). Santa Teresa di Gallura (26). Sassari, surroundings (6, 26). Sennori, 5 km NNE (18, 26). Soffi Is. (23, 25, 26). Sorso, Rio Silis (26). Spargi Is. (25); ibidem, Cala Granara (23, 26). Spargiotto Is. (23, 25, 26). Stintino (18, 26). Tavolara Is. (18, 23, 25, 26). Trinità d'Agultu, Monte Tinnari (26). Nuoro prov.: Borore (18, 26). Bortigali, Mulargia, 600 m (18, 26). Campeda, Bolotana (18, 26). [Urzulei], Cantoniera Bidicolai (18, 26). Desulo, 2 km N (18, 26). Dorgali (18, 26); ibidem, River Cedrino (26); ibidem, Codule Ilune (26); ibidem, Rio Flumineddu, *Alnus* sp. and *Nerium oleander* (18). Dualchi, 400 m (26). Fonni, 4 km S (18, 26). Fonni, Nostra Signora del Monte, 1250 m (18, 26). Gairo Marina (18, 26). Gavoi, 3 km N (18, 26). Laconi (18, 26). Lago superiore del Flumendosa (18, 26). Lula, surroundings (18, 26). Macomer – Mulargia (18, 26). Macomer (18, 26); ibidem, Monte Sant'Antonio, *Quercus ilex* wood (18). Monte Spada, S slope (18, 26). Monte Turuddò (26). [Nuraghe] Loddune (18, 26). Orosei, Caletta di Osalla (26). Lago di Posada (26). Perdasdefogu (26). Punta Gurturgius, south of –, 300 m (26). Sarule, 2 km SSE, 650 m (18, 26). Sedilo, 2.5 km SE (18, 26). Silanus, 400 m (18, 26); ibidem, Su Padru, 360 m (18, 26). Siniscola, between La Caletta and Siniscola (26). Su Cologone (26). Oristano prov.: Asuni (18, 26); Baulaldo (3, 26). Is Arenas (18, 26). Is Arutas (26). Mal di Ventre Is. (23, 25, 26). Between Mistra and surroundings of Oristano (3). Monte Arci (26). Oristano (1, 7, 8, 18, 26). Paulilatino, Ponte Crabia (26). Samugheo (18, 26). San Giovanni di Sinis (18, 26). Cagliari prov.: Bruncu Cicillanu, N slope (18, 26). Budelli Is. (23, 25, 26). Cagliari (8, 18, 26); ibidem, surroundings (1); ibidem, Cala Salinas (7, 26). Cala di Torre Regina (18, 26). Corcelli Is. (23, 25, 26). Domusnovas (18, 26); ibidem, [Monte Acqua], near the entrance of the “Grotta di San Giovanni” [81 Sa/CA] (18, 26); ibidem, Valle di Oridda (26). Gonnosfanadiga (18, 26). Between Guasila and Furtei (18, 26). Iglesias (8, 26). Morgongiori (18, 26). Monte Sant'Elia (26). Montevecchio, surroundings of mine (3, 26). Muravera, Porto Corallo (18, 26). Musei (18, 26). Nuraminis, 2 km N (18, 26). Perdaxius, under *Pistacia lentiscus* (18, 21, 26). Piana di San Pietro Is. (23, 25, 26). Quirra, castle (26). San Pietro Is. (25, 26); ibidem, aqueduct reservoir (23, 26); ibidem, Carloforte (18, 26); ibidem, pond of Vivagna (23, 26). Sant'Antioco Is. (26); ibidem, Calasetta (23, 26). Vacca Is. (2, 9). Santa Gilla,

saltworks (26). Sardara (18, 26); ibidem, Rio Setti (18, 26). Sarrabus [area] (8, 26). Segariu (18, 26). Serpentara Is. (26). Villacidro (18, 26). Villamar (18, 26). Villasimius (14, 26).

**Cave.** Nuoro prov.: Lula, Monte Albo, “Grotta Conca ‘e Crapa” 30 Sa/NU, 1040 m (26).

### Material examined

**Epigeic.** Sassari prov.: Asinara Is., “Raccolte Zoologiche R.N.I. “Washington”, Com.te [= Captain] Cassanello”: IX.1893, 2 exx (MGE). Golfo Aranci: IV.1903, CF, 1 ex (MGE). Gulf of Arzachena, “Raccolte Zoologiche R.N.I. “Washington”, Com.te [= Captain] Cassanello”: X.1893, 5 exx (MGE). Lago di Coghinas: 7.VIII.1968, RA, 1 ex (CMZ\*). Maddalena Is., “Raccolte Zoologiche R.N.I. “Washington”, Com.te [= Captain] Cassanello”: X.1893, 7 exx (MGE); ibidem, Cala Francese: 25.V.1980, RA, 1 ex (CMZ\*). Olmedo, 2 km W: 29.IV.1989, leg.?, 1 ex (CMZ\*). Palau, between Capo d’Orso and Golfo delle Saline, 40 m: 15.IV.2001, AD, 1 ex (CMZ). Piras, surroundings, *Quercus suber* wood, hand searching: 22.V.1994, MZ, 1 ex (CMZ). Porto Conte-Capo Caccia, Regional Reserve, hand searching: 29.IX.2008, Mediterranean shrub, RAJ, 1 imm. (CMZ). Sassari, Scala di Giocca: I.1899, GD, 1 ex (MGE). Sassari, surroundings: XI.1993, MC, 4 exx (CMZ\*). Su Padru: 9.V.2002, leg.?, 1 ex (CMZ). Torralba, Nuraghe of S. Santina [= S. Antine], near the railway station: 14.I.1899, GD, 1 ex (MGE). Nuoro prov.: Desulo, 1000 m, *Quercus pubescens* wood, hand searching: 19.V.1994, MZ, 1 ex (CMZ). Dorgali, hand searching: 20.I.1979, MZ, 2 exx (CMZ\*); ibidem, River Cedrino, hand searching: 24.V.1980, CM, 2 exx (CMZ\*); 24.V.1980, MZ, 1 ex (CMZ\*); 24.V.1980, MB, 1 ex (CMZ\*). Fonni, 6 km S: 19.V.1994, MB, 1 ex (CMZ). Gennargentu, Bruncu Spina, 1300 m, hand searching: 22.V.1980, AVT, 1 ex (CMZ); 22.V.1980, MZ, 2 exx (CMZ); ibidem, Monte Cresia: I.1899, GD, 1 ex (MGE); [ibidem], Regione Laccheddi, 1400 m: 24.I.1899, GD, 1 ex (MGE). Gavoi, Lago di Gusana, *Quercus suber* wood, hand searching: 19.V.1994, MZ, 2 exx (CMZ). Nuraghe Ladduna, surroundings, S.S. 389, hand searching: 25.V.1980, MZ, 2 exx (CMZ); 25.V.1980, MB, 2 exx (CMZ); 25.V.1980, CM, multiple exx (CMZ). Oliena, Supramonte di Oliena, 5.VI.2008, MA, 1 ex (CNBFVR). Orosei, Caletta di Osalla: 21.V.1980, AVT, 1 ex (CMZ\*). Perdasdefogu, hand searching: 16.IV.1979, MZ, 1 ex (CMZ\*). Romana, slopes of Monte Frusciu: 29.IV.2008, RA, PM & ST, 3 exx (CMZ). Seui, Cantoniera Arqueri, north slope, 950 m, *Quercus* wood: 17.V.2006, GO, 1 ex (CMZ); Silanus, 400 m: 3.XII.1985, PL, 2 exx (MVR). Su Cologone, surroundings, hand searching: 18.IV.1979, MZ, 2 exx (CMZ\*). Oristano prov.: Is Arutas, beach: 20.V.1989, ML, 2 exx (CMZ\*). Monte Arci, hand searching: 4.VII.2000, MZ, 1 ex (CMZ\*); ibidem, garrigue: 1–4.III.1992, GC, 4 exx (CMZ\*). Cagliari prov.: Arbus, Capo Pecora, 15 m, 32S 446760 4367599, under stone, on the cliff: 13.VI.2004, GN, 1 ex (CNBFVR). Arbus, Piscinas: 30.XII.2007, DC & FF, 4 exx (CFF). Burcei, near Punta Serpeddi, 954 m, 32S 0525266 4356808, open habitat, hand searching: 13.XI.2006, MZ, 3 exx (CMZ); ibidem, ibidem, under stones: 13.XI.2006, GN, 1 ex (CNBFVR); 13.XI.2006, BNWZ, 1 imm. (CNBFVR). Cagliari, Cala Mosca: 5.XI.2007, FF, 1 ex (CFF). Capoterra, soil washing and Berlese extraction: 4.X.2006, LF, 2 exx (CMZ). Domusnovas, Gutturu Seu, 174 m, 32S 0471577 4355716, hand searching, under stones: 21.III.2006, BBCW, 1 ex (CNBFVR). Domusnovas, Lago Siuru, 322 m, 32S 0467069 4357916, under stones: 15.XI.2006, BNW, 1 ex (CNBFVR); ibidem, hand searching, under stones: 22.III.2006, BBCW, 1 ex (CNBFVR); 22.III.2006, BBCW, 1 ex (CNBFVR); 22.III.2006, BBCW, 1 ex (CNBFVR). Domusnovas, Sa Duchessa, 371 m, 32S 0464990 4358384, under stones: 7.IX.2006, GN, 2 exx (CNBFVR); ibidem, hand searching, under stones: 23.III.2006, BBCW, 4 exx (CNBFVR). Domusnovas, Valle di Oridda: 28.II.1971, AVT, 4 exx (CMZ\*). Flumentorgiu: without date, SL, 1 ex (MGE); ibidem: V.1894, SL, 2 exx “*Scolopendra dalmatica* Koch” F. Silvestri det. (MGE). Geremeas, soil washing and Berlese extraction: 22.XII.2006, LF, 2 exx (CMZ). Giara di Gesturi: 15.III.1994, LL, 2 exx (CMZ). Gonnosfanadiga, Monte Linas, Punta Su Filixi, 780 m, 32S 0465819 4368289: 12.IX.2006, DB, 1 ex (CNBFVR); 12.IX.2006, ABBN, 5 exx (CNBFVR). Iglesias, Case Marganai, 725 m, 32S 0463890 4355925, hand searching: 5.VI.2004, GN, 1 ex (CNBFVR); 8.IX.2006, GN, 1 imm. (CNBFVR). Iglesias, Punta San Michele, 906 m, 32S 0465910 4354561, hand searching: 10.XI.2006, MZ, 1 ex (CMZ). Iglesias, Cantoniera Marganai, 491 m, 32S 0462272 4354677, hand searching, under stones: 20.III.2006, BBCW, 3 exx (CNBFVR). Nuraminis: 20.IX.2007, leg.?, 2 exx (CFF). Sardara, Rio Setti: 12.IV.1971, 1 ex, AVT (CMZ\*). Sarroch, soil washing and Berlese extraction: 1.X.2006, LF, 1 ex (CMZ). Serpentara Is.: 9.VI.1989, 1 ex, ML

(CMZ\*). Sinnai, Sa Siliqua: 27.X.2007, DC & FF, 1 ex (CFF). Near Uta: 15.II.2006, FF, 1 ex (CFF). Villacidro, Punta Fenu, 300 m, 32S 0472097 4357122, hand searching: 11.XI.2006, MZ, 1 ex (CMZ). Villacidro, Rio Cannisoni, 375 m, 32S 0468713 4362692, under stones, hand searching: 24.III.2006, BBCW, 1 ex (CNBFVR); ibidem, 390 m, 32S 0469095 4362383, hand searching: 9.XI.2006, DW, 1 ex (CMZ). Villacidro, near River Leni, 300 m, 32S 0469793 4361088, under stones in *Eucalyptus* sp. plantation: 9.XI.2006, GN, 2 exx (CNBFVR). Villasor, vineyard Giviamolas (turfed), pitfall traps: 2.VII.2004, FS, 4 exx (IEASS). Villasor, vineyard Giviamolas (worked), pitfall traps: 2.VII.2003, FS, 3 imm. (IEASS); 30.VII.2003, FS, 1 ex (IEASS). Province ?. “Monte Nuovo (Sardegna)”: 1873, RG, 10 exx “*Scolopendra clavipes* C. Koch F. Silvestri det. (MGE).

**Cave.** No records.

**Other.** Cagliari prov.: “Isola Vacca sett. [= September] 1875/”Violante”/S. *dalmatica*–Koch/Pir. Ann. Mus. Civ. Gen. XI. p. 405”, 2 exx [in Pirotta (1878): 405, as *Scolopendra dalmatica* Koch] (MGE). “*Scolopendra/dalmatica* Koch/Cala Salinas (Sardegna)/IX–1876 “Violante” ”, “*Scolopendra dalmatica* Koch/Pirotta Ann. Mus. Civ. Gen. XI. p. 405/Cala Salinas (Sardegna) Nov. 1876 “Violante” ”, 2 exx [in Pirotta 1878: 405, as *Scolopendra dalmatica* Koch] (MGE). “*Scolopendra clavipes*, C. Koch/Cagliari”, 3 exx [in Silvestri 1898: 684, as *Scolopendra clavipes* C. Koch] (MGE).

**General distribution.** Europe: France (Corsica), Italy (mainland, Sicily, Sardinia), Malta, Portugal (mainland), Spain (mainland, Balearic Isl.); North Africa: Algeria, Morocco (Würmli 1980; Lewis 1985).

**Chorotype.** W-Mediterranean.

**Ecological notes.** 0–1400 m; mostly in open Mediterranean habitats, under *Pistacia lentiscus* (1 site), in garrigue (1 site) and other open habitats (2 sites), also on beaches (1 site) and in riparian habitats (*Alnus* sp. and *Nerium oleander*, 1 site); sometimes in oakwoods such as *Quercus ilex* (1 site), *Q. suber* (2 sites), *Q. pubescens* (1 site), *Quercus* sp. (1 site) woods, as well as in *Eucalyptus* sp. plantations (1 site) and agricultural habitats (vineyards, 2 sites); exceptionally in caves (1 site, 1040 m; troglone species). Three records from endogenous habitats. See also De Miranda Restivo (1982), Minelli (1983a) and Minelli and Iovane (1987).

**Remarks.** The records of *Scolopendra dalmatica* C.L. Koch, 1847 published by Pirotta (1878) from Sardinia have been re-examined and must be assigned to this species. The other 19<sup>th</sup> century literature records of *S. dalmatica*, as well as those of *S. clavipes* C. L. Koch, 1847, are here referred to this species according to Würmli (1980). The specimens from stomachs of Sardinian wild boars (*Sus scrofa meridionalis* Forsyth Major) identified by Pinna *et al.* (2007) as *S. cingulata* Latreille, 1829 – a Mediterranean species absent from Sardinia (e.g., Zapparoli & Minelli 2005; Simaiakis & Mylonas 2008) – probably also belong to this species.

## Order GEOPHILOMORPHA Pocock, 1895

### Himantariidae Cook, 1895

#### *Himantarium* C. Koch, 1847

##### 27. *Himantarium gabrielis* (Linnaeus, 1767)

- 1) *Geophilus Gabrielis* Fab. [sic]: Magretti 1880: 20, 27, 30, 34, 40.
- 2) *Geophilus Gabrielis* (Linneo): Fanzago 1881b: 15.
- 3) *Geophilus rugulosus* C. Koch: Fanzago 1881b: 15.
- 4) *Himantarium gabrielis* Lin. [sic]: A. Costa 1882: 28.
- 5) *Geophilus Gabrielis* Lin. [sic]: A. Costa 1883: 81.
- 6) *Himantarium rugulosum* [sic] C. Koch [sic]: Silvestri 1898: 685.
- 7) *Himantarium gabrielis* L. [sic]: Attems 1903: 175.
- 8) *Himantarium rugulosum* [sic] C. Koch [sic]: Attems 1903: 175.
- 9) *Himantarium rugulosum* [sic] C. K. [sic]: Chalande & Ribaut 1909: 240.

- 10) *Himantarium gabrielis* Latz. [sic]: Verhoeff 1925a: 656.
- 11) *Himantarium rugulosum* [sic] C. Koch [sic]: Brölemann 1930: 63.
- 12) *Himantarium gabrielis* (Linnaeus, 1767): Minelli 1978a: 156.
- 13) *Pseudohimantarium mediterraneum* (Meinert, 1870): Minelli 1978a: 156.
- 14) *Himantarium gabrielis* (Linnaeus, 1767): Minelli 1983a: 2.
- 15) *Himantarium gabrielis* (L. 1767): Minelli 1983b: 405.
- 16) *Himantarium gabrielis* (L.): Minelli *et al.* 1984: figs 2, 3.
- 17) *Himantarium gabrielis* L. [sic]: De Miranda Restivo & Guaita 1986: 32, 34, 36.
- 18) *Himantarium gabrielis* (Linnaeus, 1767): Minelli *et al.* 1994: 493.
- 19) *Himantarium gabrielis* (L.): Mucedda & Grafitti 1994: 30.
- 20) *Himantarium gabrielis* (Linnaeus, 1767): Foddai *et al.* 1995: 8.
- 21) *Himantarium gabrielis* (Linnaeus, 1767): Grafitti & Zapparoli 1995: 121.
- 22) *Himantarium mediterraneum* (Meinert, 1870): Foddai *et al.* 1995: 8 [pars].
- 23) *Himantarium gabrielis* (Linnaeus, 1767): Foddai *et al.* 1996: 361, tab. I.
- 24) *Himantarium mediterraneum* (Meinert, 1870): Foddai *et al.* 1996: 361, tab. I.
- 25) *Himantarium gabrielis*: Mucedda *et al.* 2002: 30.
- 26) *Himantarium gabrielis* (Linnaeus, 1767): Zapparoli & Minelli 2005: CD.

### Literature records

**General.** Sardinia-Corsica (12, 13). Sardinia (4, 5, 7, 8, 9, 10, 11, 15, 20, 22, 23, 24, 26).

**Epigeic.** Sassari prov.: Arzachena (14, 26). Asinara Is. (1, 26). Bono, Passo o'Uccaidu, [1000 m] (14, 26). Bonorva, surroundings (26). Caniga (26). Castelsardo (14, 26). Gallura, Berchidda, 3 km S (26). Giavese [= Giave area] (2, 26). Ittiri (14, 26). Monte Limbara, Cantoniera Gaddau (14, 26). Nughedu di San Nicolò, 700–800 m (14, 26); *ibidem*, Monte Sefraigada, 1000 m (14). Ozieri, near Nuraghe Chilivani (14, 26). Pattada, Cantoniera Osaspera (14, 26). [Perfugas], S.S. 127, near Cantoniera Coghinas (14, 26). Porto Torres, Pond of Pilo (14, 26). Porto Torres, surroundings (1, 26). Sassari, surroundings (2, 3, 26). Sennori, 5 km NNE (14, 26). Sorso (2, 26). Nuoro prov.: Aritzo (26). Bara, on Macomer railway (14, 26). Bara, Pond of Bara (14, 26). Dualchi, 400 m (26). Fonni, 4 km N (14, 26). Gavoi, 3 km N (14, 26). Laconi (14, 26). Macomer, Punta Gurturgius, 900 m (26). S'Arcu de Tascussi, 1000–1200 m (14, 26). Sargonu (26). Sarule, 2 km SSE, 650 m (14, 26). Sedilo, 2.5 km SE (14, 26). Silanus, 400 m (26). Silanus, Su Padru, 360 m (14, 26). [Gairo] Taquisara (6, 26). Tonara, 1.5 km W (14, 26). Oristano prov.: Baulaldo (1, 26). Between Mistra and surroundings of Oristano (1). Monte Arci (26). Monte Ferru (14). Oristano (14). Cagliari prov.: [Burcei], S.S. 125 near Cantoniera [Ovile] Cannas (14, 26). Cagliari (1, 26). Elmas, under bark of *Eucalyptus* sp. (14, 26). Gonnosfanadiga (14, 26). Guamaggiore, 2.5 km ESE (14, 26). Montevecchio, surroundings of mine (1, 26). Musei (14, 26). Nuraminis, 2 km N (14, 26). Quartu (6, 26). Serpentara Is. (18, 23, 26). S.S. 196 towards Villacidro, km 21 (14, 26). San Nicolò Gerrei, Rio Mannu, 258 m (26). Sardara, S.S. 131, km 59 (14). Sardara (14, 26). Sarroch (26). Silius (26). Near Siliqua (14, 26). Villacidro (26). Villaputzu, Castle of Ruirra (26).

**Cave.** Sassari prov.: Alghero, Maristella, “Grotta di Maristella” without cadastre number, 20 m (19, 21, 25, 26). Nuoro prov.: Dorgali, Monte Tiscali, dolina of Tiscali without cadastre number, 485 m (21, 26). Cagliari prov.: Iglesias, “Grotta di Santa Aintroxia” 129 Sa/CA (17). Iglesias, “Grotta I di Cuccuru Is Piras” 620 Sa/CA (17). Iglesias, “Grotta VI di Monte Figu” 637 Sa/CA (17).

### Material examined

**Epigeic.** Sassari prov.: Carceghe, soil washing and Berlese extraction: 23.XII.2006, LF, 1 ex (CMZ). Gallura, Berchidda, 3 km S: 24.IV.1989, leg.?, 1 ex (CMZ\*). Ittiri, soil washing and Berlese extraction: 10.I.2008, LF, 1 ex (CMZ). Sassari: X.1991, DE, 1 ex (CMZ\*). Torralba, Nuraghe of S. Santina [= S. Antine], near the railway station: 14.I.1899, GD, 1 ex (MGE). Vallicciola, 1000 m: 30.III.1972, PB, 1 ex (CMZ). Villanova, Monteleone, soil washing and Berlese extraction: 15.XI.2006, LF, 2 exx (CMZ). Nuoro prov.: Aritzo, surroundings: 31.XI.1989, MC, 2 exx (CMZ\*). From Aritzo to Gennargentu, 1400 m: 24.I.1899, GD, 1 ex (MGE). Arzana, Monte Tuvara, 1000 m: XI.2007, DC, 1 ex (CFF). Bolotana, 4 km N: VII.2000, MZ & MB, 1 ex (CMZ). Desulo, 1000 m, *Quercus pubescens* wood, hand searching: 19.V.1994, MZ, 1 ex (CMZ).

Gavoi, Lago di Gusana, *Quercus suber* wood, hand searching: 19.IV.1994, MZ, 1 ex (CMZ). Gennargentu, Monte Cressia: I.1899, GD, 3 exx (MGE). Lula, Monte Albo, NW side, Punta Catirina, 600 m, *Quercus ilex* wood: 29.IV.2008, GA, 1 ex (CMZ). Nuraghe Loddune, surroundings: 25.V.1980, CM, 3 exx (CMZ); 25.V.1980, MB, 1 ex (CMZ). Oristano prov.: Monte Arci, under *Erica arborea* and *Arbutus unedo*: 1–4.III.1992, GC, 1 ex (CMZ\*); ibidem, *Quercus ilex* wood: 1–4.III.1992, GC, 1 ex (CMZ\*). Cagliari prov.: Bolotana, soil washing and Berlese extraction: 6.II.2007, LF, 3 exx (CMZ). Buggerru, near Mine of San Luigi, 347 m, 32S 0452771 4358704, leaf-litter sifting: 11.XI.2006, MZ, 2 exx (CMZ). Burcei, near Punta Serpeddi, 785 m, 32S 0526996 4356738, *Quercus ilex* wood, hand searching: 13.XI.2006, MZ, 2 exx (CMZ); ibidem, ibidem, under stones, *Quercus ilex* wood: 13.XI.2006, BNWZ, 1 ex (CNBFVR). Cagliari, in the town, soil washing and Berlese extraction: 3.X.2006, LF, 1 ex (CMZ). Domusnovas, near Sa Duchessa, 320 m, 32S 0466164 4358209, *Quercus ilex* wood, leaf-litter sifting: 12.XI.2006, MZ, 2 exx (CMZ). Domusnovas, Lago Siuru, 322 m, 32S 0467069 4357916, hand searching: 12.XI.2006, MZ, 1 ex (CMZ); ibidem, hand searching, under stones: 22.III.2006, BBCW, 1 ex (CNBFVR). Geremeas, soil washing and Berlese extraction: 22.XII.2006, LF, 1 ex (CMZ). Gonnosfanadiga, soil washing and Berlese extraction: 9.II.2007, LF, 3 exx (CMZ). Iglesias, Mamenga, 610 m, 32S 462170 4356618, in calcareous soil (40–50 cm deep) in *Quercus ilex* wood, soil washing and Berlese extraction: 1.III.2006, LF, 1 ex, 1 imm. (CNBFVR). Iglesias, Cantoniera Marganai, 491 m, 32S 0462272 4354677, hand searching, under stones: 20.III.2006, BBCW, 1 ex (CNBFVR). Iglesias, near Punta Genna Ollioni, 650 m, 32S 0463293 4356570, under stones: 14.XI.2006, BNWZ, 1 ex (CNBFVR). San Vito, Monte Lora, soil washing and Berlese extraction: 19.XII.2006, LF, 1 ex (CMZ). Sinnai, Sa Siliqua: 27.X.2007, DC & FF, 1 ex (CFF). Villacidro, Rio Cannisoni, 375 m, 32S 0468713 4362692, hand searching, under stones: 24.III.2006, BBCW, 1 ex (CNBFVR); ibidem, 390 m, 32S 0469095 4362383, hand searching, under stones: 24.III.2006, BBCW, 1 ex (CNBFVR). Villasimius, soil washing and Berlese extraction: 22.III.2008, LF, 1 ex (CMZ).

**Cave.** No records.

**Other.** Nuoro prov.: “*Himantarium rugulosum* (C. Koch)/ [Gairo] Taquisara (Sardegna)”, 2 exx [in Silvestri 1898: 685, as *Himantarium rugulosum* C. Koch] (MGE).

**General distribution.** Europe: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, France (mainland, Corsica), Greece (mainland, insular excluding Crete), Italy (mainland, Sicily, Sardinia), Republic of Macedonia, Montenegro, Romania (southern), Slovenia, quoted from Portugal by Attems (1929) but not by Machado (1952), also in Central Europe according to Brölemann (1930); North Africa: Algeria, Morocco, Tunisia; Austral Africa: Madagascar (?), introduced (Lawrence 1960); West Asia: Turkey (western).

**Chorotype.** Mediterranean.

**Ecological notes.** 0–1200 m; mostly in oakwoods (*Quercus ilex*, 6 sites; *Q. pubescens*, 1 site; *Q. suber*, 1 site); under *Erica arborea* and *Arbutus unedo* (1 site), in *Eucalyptus* sp. plantations (1 site); also in caves (5 sites, 20–485 m; troglone species). Ten records from endogenous habitats.

**Remarks.** Part of the records from Sardinia published by Silvestri (1898) as *Himantarium rugulosum* C. L. Koch, 1841 (2 specimens from Gairo Taquisara) have been re-examined and must be assigned this species. Other records of *H. rugulosum* and *H. mediterraneum* (Meinert, 1870) refer to this species according to Minelli *et al.* (1984). Minelli *et al.* (1984) give 101–165 for males and 107–177 for females as variation of the pediferous segments for this species in Sardinia.

## *Stigmatogaster* Latzel, 1880

### 28. *Stigmatogaster gracilis* (Meinert, 1870)

- 1) *Geophilus laevipes* C. K.: Fanzago 1881b: 15.
- 2) *Stigmatogaster gracilis* Mein. [sic]: A. Costa 1885: 9.
- 3) *Stigmatogaster gracilis* (Mein.): Silvestri 1898: 685.

- 4) *Diadenoschisma gracile* Mein. [sic]: Verhoeff 1925a: 656.
- 5) *Stigmatogaster gracilis provincialis* Chal. & Rib.: Attems 1929: 39.
- 6) *Stigmatogaster gracilis* (Meinert, 1870): Minelli 1978a: 156.
- 7) *Stigmatogaster gracilis* (Meinert): De Miranda Restivo 1982: 173.
- 8) *Stigmatogaster gracilis*: Baccetti 1983: 862.
- 9) *Stigmatogaster gracilis* (Meinert, 1870): Minelli 1983a: 2.
- 10) *Stigmatogaster gracilis* (Mein. 1870): Minelli 1983b: 405.
- 11) *Stigmatogaster gracilis*: Minelli & Iovane 1987: 26, 28, 30.
- 12) *Stigmatogaster gracilis*: Foddai *et al.* 1994: 14.
- 13) *Stigmatogaster gracilis* (Meinert, 1870): Minelli *et al.* 1994: 493.
- 14) *Stigmatogaster gracilis* (Meinert, 1870): Foddai *et al.* 1995: 8.
- 15) *Stigmatogaster gracilis* (Meinert, 1870): Foddai *et al.* 1996: 361, tab. I.
- 16) *Stigmatogaster gracilis* (Meinert, 1870): Zapparoli & Minelli 2005: CD.

## Literature records

**General.** Sardinia-Corsica (6). Sardinia (4, 5, 8, 10, 14, 15). Circumsardinian islands (12).

**Epigeic.** Sassari prov.: Alghero, Fertilia (9, 16). Ardara, meadow (9, 16). Between Argentiera and Palmadula, humus of *Quercus ilex*, *Pistacia lentiscus*, and *Cistus* sp. (9, 16). Arzachena, Isuledda (16). Asinara Is. (9, 15, 16); *ibidem*, Diga Ruda (13, 16). Bisce Is. (13, 15, 16). Bono, Passo o'Uccaidu, [1000 m] (9, 16). Capo Caccia (9, 16). Caprera Is., Fonte Teialone (13, 15, 16). Castelsardo (9, 16). Figarolo Is. (13, 15, 16). Il Toro Is. (13, 15, 16). Between Luogosanto and Tempio Pausania (9, 16). Le Camere Isl., E[astern island] (13, 15, 16). Li Nibani Isl. (13, 15, 16). Maddalena Is. (15, 16); *ibidem*, *Cistus monspeliensis* (11); *ibidem*, Baia dell'Annegato (13, 16); *ibidem*, La Maddalena (13, 16); *ibidem*, La Trinità (13, 16). [Monte] Limbara (2). Between Mores and Ozieri, meadow with mosses and humus of *Quercus* sp. (9, 11, 16). Molarà Is. (13, 15, 16). Molarotto Is. (9, 13, 15, 16). Mortorio Is. (13, 15, 16). Olbia (9, 16); *ibidem*, 30 km SE (9, 16). Oschiri (9, 16). Pattada, Cantoniera Osaspera (9, 16). [Perfugas], S.S. 127, near Cantoniera Coghinas (9, 16). Porto San Paolo (9, 16). Razzoli Is. (13, 15, 16). San Pasquale (9, 16). Santa Teresa di Gallura (9, 16). Santo Stefano Is. (13, 15, 16). Sassari, surroundings (1, 9, 16). Spargiotto Is. (13, 15, 16). Tavolara Is. (9, 16). Tempio [Pausania] (2). Trinità d'Agultu, Monte Tinnari (16); *ibidem*, Paduledda (16). Nuoro prov.: Borore (16). Genoni (2, 16). Isili (2, 16). Monte Albo (9, 16). Bortigali, Mulargia, 600 m (9, 16). Desulo (2, 16); *ibidem*, 2 km from (9). Dorgali, 20 km S (9, 16). Dorgali, Codule Ilune (16). Dualchi, 400 m (16). Fonni (9, 16); *ibidem*, Nostra Signora del Monte, 1250 m (9, 16). Gairo Marina (9, 16). Gavoi, 3 km N (9, 16). Lago di Gusana, meadow and mosses (9). Near Laconi (9, 16). Lula (9, 16). Macomer, Monte Sant'Antonio, *Quercus ilex* wood (7). Oliena, Punta Sos Nidos, 1000 m, humus of *Quercus ilex* (9, 11, 16). Lanusei (9, 16); *ibidem*, S.S. 198, km 90, 600 m (9, 11, 16). Monte Albo, Monte Turuddò (16). Osini, *Quercus ilex* (11, 16). Sedilo, 2.5 km SE (9, 16). Silanus, 400 m (16). Silanus, Su Padru, 360 m (9, 16). Siniscola, Punta Gurturgius, 900 m (16). Siniscola, under *Quercus ilex* (9, 16). Tonara, 1.5 km N (9, 16). [Gairo] Taquisara (3, 16). Ulassai, 650 m (16). Oristano prov.: Asuni (9, 16). Monte Arci (16). Monte Ferru (9). Oristano (9). Cagliari prov.: Budelli Is.: Paduleddu Is. (13, 15, 16). Domusnovas (16). Flumentorgiu (3, 16). Between Guasila and Furtei (9, 16). Guspini, meadow under leaf-litter of *Pistacia lentiscus* (9, 11, 16). Near Iglesias, meadow and mosses (9, 16). Between Is Palaceris and Is Cannoneris (9, 16). Monte [dei] Sette Fratelli (3, 16); *ibidem*, Campu Omu, 300 m (16). Muravera, Porto Corallo (9, 16). Pantaleo, humus of *Quercus ilex* (9, 16). Perdaxius, meadow with mosses and leaf-litter of *Pistacia lentiscus* (9, 11, 16). Portoscuso (2). Quartu (3, 16). San Nicolò Gerrei (16). San Pietro Is. (15, 16); *ibidem*, Carloforte (9). Sant'Antioco Is. (13, 15, 16). Between Sant'Anna Arresi and Teulada, humus and mosses under *Pistacia lentiscus* (9, 16). Sardara (9, 16); *ibidem*, S.S. 131, km 59 (9). Sarrabus [area] (3, 16). Sarroch (16); *ibidem*, Rio Monte Nieddu (9, 16). Seddas Moddizzis, mosses (9, 16). Seddas Moddizzis, under *Quercus ilex* (9, 11, 16). Segariu (9, 16). Silius (16). Villacidro (16).

**Cave.** No records.



## Material examined

**Epigeic.** Sassari prov.: Arzachena: 17.IV.2001, LF, 2 exx (CMZ). Buddusò, hand searching: 25.V.1980, AVT, 1 ex (CMZ); 25.V.1980, MZ, 10 exx (CMZ). Buddusò, Nuraghe Loelle: 29.IV.2008, GA & GB, 1 ex (CMZ). Carceghe: 19.III.2002, leg.?, 1 ex (CMZ). Carceghe, soil washing and Berlese extraction: 23.XII.2006, LF, 2 exx (CMZ). Castelsardo, soil washing and Berlese extraction: 8.II.2007, LF, 4 exx (CMZ). Gallura, Golfo Aranci: 29.IV.1989, leg.?, 6 exx (CMZ). Gallura, Olmedo, 2 km W: 29.IV.1988, leg.?, 4 exx (CMZ). Giave, soil washing and Berlese extraction: 23.XII.2006, LF, 3 exx (CMZ). Il Toro Is.: 10.V.1988, GO, 1 ex (CMZ); 14.VI.1989, GO, 1 ex (CMZ). Ittiri, soil washing and Berlese extraction: 10.I.2008, LF, 2 exx (CMZ). Lago Baratz, soil washing and Berlese extraction: 15.VI.2003, LF, 3 exx (CMZ). Maddalena Is., “Raccolte Zoologiche R.N.I. “Washington”, Com.te [= Captain] Cassanello”: X.1893, 2 exx “*Stigmatogaster gracilis* (Mein.)” F. Silvestri det. (MGE). Molafà, soil washing and Berlese extraction: 7.II.2007, LF, 2 exx (CMZ). Monte Limbara: 20.IV.2003, LF, 2 exx (CMZ). Oschiri: 15.X.1989, MC, 1 ex (CMZ). Perfugas, 10 km E, 27.IV.1989, leg.?, 1 ex (CMZ). Putifigari, soil washing and Berlese extraction: 5.XII.2006, LF, 1 ex (CMZ); 10.I.2008, LF, 1 ex (CMZ). Romana, Rio Melas, soil washing and Berlese extraction: 23.XII.2006, LF, 1 ex (CMZ). Sedilo, 250 m: 14.XII.2003, AC, 3 exx (CMZ). Villanova, Monteleone, soil washing and Berlese extraction: 15.XI.2006, LF, 1 ex (CMZ); 10.I.2008, LF, 3 exx (CMZ). Nuoro prov.: Bolotana, 4 km N: VII.2000, MZ & MB, 3 exx (CMZ). Desulo, 1100 m, *Quercus pubescens* wood: 19.V.1994, MB, 1 ex (CMZ). Dorgali, Cala Gonone: 21.V.1980, AVT, 2 exx (CMZ). Fonni, 6 km S, *Quercus suber* wood, hand searching: 19.V.1994, MZ, 4 exx (CMZ). Gavoi, Lago di Gusana, *Quercus suber* wood, hand searching: 19.V.1994, MZ, 3 exx (CMZ). Gennargentu: 24–25.I.1899, UL & GD, 1 ex (MGE); ibidem, Monte Cresia: I.1899, GD, 1 ex (MGE). Monte Albo, between Siniscola and Lula, 900 m: 18.V.1994, GO, 1 ex (CMZ). Nuraghe Loddune, surroundings, S.S. 389: 25.V.1980, AVT, 8 exx (CMZ); 25.V.1980, MB, 2 exx (CMZ). Orgosolo, 800 m: 14.V.1982, GC, 1 ex (CMZ). Orotelli, soil washing and Berlese extraction: 4.XII.2000, LF, 1 ex (CMZ). Ottana, soil washing and Berlese extraction: 18.II.2003, LF, 2 exx (CMZ). Oristano prov.: Monte Arci, under *Erica arborea* and *Arbutus unedo*: 1–4.III.1992, GC, 1 ex (CMZ\*); ibidem, *Quercus ilex* wood: 1–4.III.1992, GC, 1 ex (CMZ\*). Monte Ferro, Rifugio la Madonnina, between Cuglieri and Santo Lussorgiu, 865 m, hand searching: 27.VI.2000, MB, 3 exx (CMZ); 27.VI.2000, MZ, 3 exx (CMZ). Monte Ferru, N slope, *Quercus ilex* wood, hand searching: 27.VI.2000, MZ & MB, 2 exx (CMZ). Montresta, soil washing and Berlese extraction: 7.II.2007, LF, 2 exx (CMZ). Ula Tirso, soil washing and Berlese extraction: 28.XII.2006, LF, 7 exx (CMZ). Cagliari prov.: Arbus, in the village, soil washing and Berlese extraction: 2.X.2006, LF, 6 exx (CMZ). Bolotana, soil washing and Berlese extraction: 6.II.2007, LF, 6 exx (CMZ). Burcei, near Punta Serpeddi, 785 m, 32S 0526996 4356738, *Quercus ilex* wood, hand searching: 13.XI.2006, MZ, 2 exx (CMZ). Cagliari, Cala Mosca: 5.XI.2007, FF, 1 ex (CFF). Cagliari, in the town, soil washing and Berlese extraction: 3.X.2006, LF, 1 ex (CMZ). Capoterra: 10.I.1998, LF, 1 ex (CMZ); ibidem, soil washing and Berlese extraction: 4.X.2006, LF, 1 ex (CMZ). Castiadas, soil washing and Berlese extraction: 20.I.2008, LF, 3 exx (CMZ). Chia, soil washing and Berlese extraction: 10.IV.2003, LF, 2 exx (CMZ). Domusnovas, Monte Acqua, surroundings of “Grotta di San Giovanni” 81 Sa/CA, 200 m, 32S 0467900 4354891, *Quercus ilex* wood, hand searching: 12.XI.2006, BNWZ, 1 ex (CNBFVR). Domusnovas, Lago Siuru, 322 m, 32S 0467069 4357916, under stones: 15.XI.2006, BNW, 1 ex (CNBFVR). Gonnosfanadiga, soil washing and Berlese extraction: 23.II.2004, LF, 2 exx (CMZ); 9.II.2007, LF, 3 exx (CMZ). Guspini, Monte Majori, soil washing and Berlese extraction: 16.X.2006, LF, 1 ex (CMZ). Iglesias, soil washing and Berlese extraction: 16.VI.2003, LF, 2 exx (CMZ); 10.II.2008, LF, 3 exx (CMZ). Iglesias, Case Marganai, 700 m, 32S 0462853 4355582, under stones: 10.XI.2006, BNWZ, 1 ex (CNBFVR). Iglesias, Mamenga, 610 m, 32S 462170 4356618, in calcareous soil (40–50 cm deep) in *Quercus ilex* wood, soil washing and Berlese extraction: 1.III.2006, LF, 1 ex (CNBFVR). Iglesias, Marganai, soil washing and Berlese extraction: 16.XII.2006, LF, 1 ex (CMZ). Muravera, San Priamo, soil washing and Berlese extraction: 25.XI.2006, LF, 1 ex (CMZ). Nuxis, Campanasissa, soil washing and Berlese extraction: 27.XII.2006, LF, 12 exx (CMZ). Pula, soil washing and Berlese extraction: 11.IV.2008, LF, 2 exx (CMZ). San Nicolò Gerrei: 12.II.1999, LF, 2 exx (CMZ). San Pietro Is., Guardia dei Mori: 27.VI.1987, VV, 1 ex (CNBFVR). Siliqua, Orbai, soil washing and Berlese extraction: 21.III.2008, LF, 3 exx (CMZ). Teulada, soil washing and Berlese extraction: 26.II.2003, LF, 1 ex

(CMZ). Uta, soil washing and Berlese extraction: 3.III.2003, LF, 3 exx (CMZ). Villacidro, near River Leni, 300 m, 32S 0469793 4361088, hand searching: 9.XI.2006, MZ, 1 ex (CMZ). Villacidro, Rio Cannisoni, 390 m, 32S 0469095 4362383, 20.V.2008, hand searching, NABT, 1 ex (CNBFVR). Villamassargia, Monte San Miai, soil washing and Berlese extraction: 9.II.2007, LF, 8 exx (CMZ).

**Cave.** No records.

**Other.** Nuoro prov.: “*Stigmatogaster gracilis* Mein./[Gairo] Taquisara (Sardegna)”, 1 ex [in Silvestri 1898: 685] (MGE). Cagliari prov.: “*Stigmatogaster gracilis* Mein./Flumentorgiu (Sardegna)/Maggio [= May] 1894 Solari [leg.]”, “*Stigmatogaster/gracilis* Mein./Flumentorgiu/V–1894/Sardegna”, 1 ex [in Silvestri 1898: 685] (MGE).

**General distribution.** Europe: Albania, Croatia, France (mainland, Corsica), Greece (mainland, insular excluding Crete), Italy (mainland, Sicily, Sardinia), Montenegro, Spain (Balearic Isl.); North Africa: Algeria, Tunisia.

**Chorotype.** Mediterranean.

**Ecological notes.** 0–1250 m; mostly in oakwoods (*Quercus ilex*, 12 sites; *Q. suber*, 2 sites; *Q. pubescens*, 1 site; *Quercus* sp., 1 site) but also in open and shrubby Mediterranean habitats (*Pistacia lentiscus*, 3 sites; *Cistus monspeliensis*, 1 site; *Erica arborea* and *Arbutus unedo*, 1 site; generic quotations from meadows, 2 sites, are also known); no records from caves. Thirty-five records from endogeous habitats. See also De Miranda Restivo (1982), Minelli (1983a) and Minelli and Iovane (1987).

**Remarks.** The records of *Geophilus laevipes* (C. L. Koch, 1847) and *Stigmatogaster gracilis provincialis* Chalande & Ribaut, 1909, quoted in Fanzago (1881b) and Attems (1929), respectively, refer to this species according to Minelli and Bonato (in press). Part of the records from Sardinia published by Silvestri (1898) under this species (two specimens from Gairo Taquisara and Flumentorgiu, respectively) have been re-examined and their identification is confirmed.

## 29. *Stigmatogaster sardoa* (Verhoeff, 1901)

- 1) *Haplophilus sardous* Verhoeff 1901: 411, tav. 17, figs 7, 8.
- 2) *Haplophilus sardous* Verh.: Attems 1903: 178.
- 3) *Haplophilus sardous* Verh.: Verhoeff 1925a: 656.
- 4) *Stigmatogaster sardous* (Verh.): Attems 1929: 41.
- 5) *Stigmatogaster* (*Haplophilus*) *sardoa* Verh. [sic]: Verhoeff 1938: 24.
- 6) *Haplophilous sardous* Verh.: Verhoeff 1951: 226.
- 7) *Stigmatogaster sardoa* Verh. [sic] subsp. *dorgalina* Manfredi 1956: 203.
- 8) *Stigmatogaster sardoa dorgalina* Manfr., 1956: Cerruti 1968: 231.
- 9) *Stigmatogaster sardoa dorgalina* Manfredi: Brignoli 1972: 198.
- 10) *Stigmatogaster sardoa dorgalina* Manfredi, 1956: Puddu & Pirodda 1974: 175.
- 11) *Stigmatogaster sardoa* Verh. [sic] subsp. *dorgalina* Manfredi, 1956: Manfredi 1976: 229.
- 12) *Haplophilus sardous* Verhoeff, 1901: Minelli 1978a: 156.
- 13) *Haplophilus sardous* Verhoeff: Moritz & Fischer 1979: 350.
- 14) *Stigmatogaster sardoa dorgalina* Manfredi, 1956: Cassola 1982: 707.
- 15) [*Stigmatogaster*] *dimidiatus*: Baccetti 1983: 862.
- 16) *Stigmatogaster sardous* (Verhoeff, 1901): Minelli 1983a: 3.
- 17) *Stigmatogaster dimidiatus sardous* (Verh. 1901): Minelli 1983b: 405.
- 18) *Stigmatogaster dimidiatus sardous* (Verhoeff, 1901): Minelli 1985: 31.
- 19) ? *Haplophilus subterraneus* Leach [sic]: De Miranda Restivo & Guaita 1986: 36.
- 20) *Stigmatogaster dimidiatus sardous*: Grafitti 1990b: 118.
- 21) *Stigmatogaster dimidiatus sardous* Verhoeff, 1901 [sic]: Foddai *et al.* 1995: 8.
- 22) *Stigmatogaster sardoa* Verh. subsp. *dorgalina* Manfredi, 1956: Leonardi 1995: 138.
- 23) *Stigmatogaster dimidiatus sardous* Verhoeff, 1901: Foddai *et al.* 1996: 361, tab. I.
- 24) Geophilidae indet.: Grafitti & De Waele 1996: 34.

- 25) *Stigmatogaster dimidiatus sardous*: Grafitti 1999a: 35.  
 26) *Stigmatogaster dimidiatus sardous*: Grafitti 2001a: 16.  
 27) *Stigmatogaster dimidiatus sardous* Verhoeff, 1901 [sic]: Zapparoli & Minelli 2005: CD.  
 28) *Stigmatogaster dimidiatus sardous* Verhoeff, 1901 [sic]: Grafitti & Merella 2008: 86, 93.

### Literature records

**General.** Sardinia-Corsica (12). Sardinia (type locality of *Haplophilus sardous* Verhoeff, 1901) (1§, 2, 3, 4, 5, 6, 13, 14, 15, 17, 21, 22, 23).

**Epigeic.** Nuoro prov.: Lago di Gusana, mosses and humus near the lake (16, 27).

**Cave.** Nuoro prov.: Dorgali [generic quotation for the caves of the area] (25). Dorgali, Monte Coazza [generic quotation for the caves of the area] (20). Dorgali, Monte Coazza, “Grotta Pisanu” 215 Sa/NU (type locality of *Stigmatogaster sardoa dorgalina* Manfredi, 1956) (7, 8, 9, 10, 11, 18, 26, 27). Cagliari prov.: Iglesias, “Grotta VI di Monte Figu” 637 Sa/CA (19). Iglesias, Corongiu de Mari, “Grotta della Sbarra” 1009 Sa/CA [= 1009 Sa/CI] (24, 28). Iglesias, Corongiu de Mari, “Grotta del Cannello” 1423 SA/CI (24, 28).

### Material examined

**Epigeic.** Sassari prov.: Romana, Rio Melas, soil washing and Berlese extraction: 23.XII.2006, LF, 1 ex (CMZ). Nuoro prov.: Gennargentu, Monte Cresia: I.1899, GD, 2 ♂♂ 97-99 lp, 2 ♀♀ 97-99 lp (MGE). Cagliari prov.: Arbus, in the village, soil washing and Berlese extraction: 2.X.2006, LF, 2 exx 121 lp (CMZ). Domusnovas, near Gutturu Abis, 580 m, 32S 0468140 4360761, under stones: 10.XI.2006, GN, 1 ♂ 119 lp (CMZ). Iglesias, soil washing and Berlese extraction: 16.VI.2003, LF, 1 ex (CMZ); 10.II.2008, LF, 2 exx (CMZ). Nuxis, Campanasissa, soil washing and Berlese extraction: 27.XII.2006, LF, 2 exx 121 lp (CMZ). San Vito, Monte Lora, soil washing and Berlese extraction: 19.XII.2006, LF, 1 ex (CMZ).

**Cave.** Nuoro prov.: Galtellì, Monte Tuttavista, Tres Puntas, “Pozzo N. 2 di Tres Puntas” 1151 Sa/NU, 750 m: 16.III.2008, PM, 1 ♀ 127 lp (CMZ). Ulassai, Truculu, “Grotta di Is Lianas” or “Sa Rutt’e Noa” or “Grotta Truculu” 193 Sa/NU, 905 m: 1995, GG, 1 f # 129 lp (CMZ).

**General distribution.** Europe: Italy (Sardinia).

**Chorotype.** Sardinian endemic, W-Mediterranean affinities (?).

**Ecological notes.** No detailed records on elevation range, but one site at 580 m a.s.l.; epigeic (3 sites) but also in caves (6 sites, 905–750 m; troglaxene species). Six records from endogeous habitats.

**Remarks.** Taxonomic status according to Minelli and Bonato (in press). The record of *Haplophilus subterraneus* (Shaw, 1789) [not Leach] from Iglesias, “Grotta VI di Monte Figu”, Cagliari province, quoted by De Miranda Restivo and Guaita (1986), is probably due to misdetermination and should refer to this species. The generic quotation of unidentified Geophilidae published by Grafitti and De Waele (1996) and those of *Stigmatogaster dimidiatus sardous* published by Grafitti and Merella (2008), both from Iglesias, Corongiu de Mari, “Grotta della Sbarra” 1009 Sa/CA, and Iglesias, Corongiu de Mari, “Grotta del Cannello” 1423 SA/CI, refer to the same material.

### 30. *Stigmatogaster superba* (Meinert, 1870)

- 1) *Meinertophilus superbus* (Mein.): Silvestri 1898: 685.
- 2) *Himantarium superbum* Mein.: Attems 1903: 175.
- 3) *Meinertophilus superbus* Mein. [sic]: Verhoeff 1925a: 656.
- 4) *Haplophilus superbus*: Brölemann 1926b: 231.
- 5) *Meinertophilus superbus* (Mein.): Attems 1929: 43, figs 58, 59.
- 6) *Haplophilus superbus* (Meinert, 1870): Minelli 1978a: 156.
- 7) *Meinertophilus supernus* [sic]: Baccetti 1983: 862.
- 8) *Meinertophilus superbus* (Meinert, 1870): Minelli 1983a: 2.
- 9) *Meinertophilus superbus* (Mein. 1870): Minelli 1983b: 405.

- 10) *Stigmatogaster superbus* (Meinert, 1870): Foddai *et al.* 1995: 8.  
 11) *Stigmatogaster superbus* (Meinert, 1870): Foddai *et al.* 1996: 361, tab. I.  
 12) *Stigmatogaster superbus* (Meinert, 1870): Zapparoli & Minelli 2005: CD.

#### Literature records

**General.** Sardinia-Corsica (6). Sardinia (2, 3, 4, 5, 7, 9, 10, 11).

**Epigeic.** Nuoro prov.: Gavoi, 3 km N (8, 12). Sarule, 2 km SSE, 650 m (8, 12). Cagliari prov.: Domusnovas (8, 12). Sarrabus [area] (1, 12).

**Cave.** No records.

#### Material examined

**Epigeic.** No records.

**Cave.** No records.

**Other.** Cagliari prov.: “*Meinertophilus superbus* (Mein.)”, “Sardegna/Sarrabus/Magg. [= May] 1872/R. Gestro [leg.]”, 1 ex [in Silvestri 1898: 685, as *Meinertophilus superbus* (Meinert)] (MGE).

**General distribution.** Europe: Italy (Sardinia, Sicily), Spain; North Africa: Algeria, Morocco (Brölemann 1921; Attems 1929; Zapparoli & Minelli 2005).

**Chorotype.** W-Mediterranean.

**Ecological notes.** No detailed records on elevation range but one site at 650 m a.s.l.; no epigeic habitat data; no records from caves.

**Remarks.** The record published by Silvestri (1898) has been re-examined and its identification is confirmed.

### Dignathodontidae Cook, 1895

#### *Dignathodon* Meinert, 1870

##### 31. *Dignathodon microcephalus* (Lucas, 1846)

- 1) *Geophilus crassicauda* A. Costa 1883: 81, 105.
- 2) *Geophilus crassicauda*: A. Costa 1884a: 340.
- 3) *Dignathodon microcephalum* (Luc.) Mein.: Berlese 1888c: 1.
- 4) *Dignathodon microcephalum* (Lucas): Silvestri 1898: 685.
- 5) *Dignathodon microcephalum* Lucas [sic]: Attems 1903: 273.
- 6) *Dignathodon microcephalum* Luc. [sic]: Verhoeff 1925a: 655.
- 7) *Dignathodon microcephalum* Luc. [sic]: Attems 1949: 110.
- 8) *Dignathodon microcephalum* (Lucas, 1846): Minelli 1978a: 159.
- 9) *Dignathodon microcephalus* (Lucas, 1846): Minelli 1983a: 10.
- 10) *Geophilus crassicauda* A. Costa, 1888 [sic]: Minelli 1983b: 402.
- 11) *Dignathodon microcephalus* Lucas 1846 [sic]: Minelli 1983b: 407.
- 12) *Dignathodon microcephalus*: Minelli & Iovane 1987: 28, 30.
- 13) *Dignathodon microcephalus* (Lucas, 1846): Minelli *et al.* 1994: 494.
- 14) *Dignathodon microcephalus* (Lucas, 1846): Foddai *et al.* 1995: 8.
- 15) *Dignathodon microcephalus* (Lucas, 1846): Foddai *et al.* 1996: 361, tab. I.
- 16) *Dignathodon microcephalus* (Lucas, 1846): Zapparoli & Minelli 2005: CD.

#### Literature records

**General.** Sardinia-Corsica (8). Sardinia (2, 3, 5, 6, 7, 10, 11, 14, 15).

**Epigeic.** Sassari prov.: Caprera Is., Ferraciolo (13, 15, 16). Osilo (9, 16). Pattada, Cantoniera Osaspera (9, 16). Santa Maria Is. (13, 15, 16). Spargi Is. (13, 15, 16). Nuoro prov.: Dualchi, 400 m (16). Silanus, 400 m (16). Cagliari prov.: Cagliari (type locality of *Geophilus crassicauda* A. Costa, 1883) (1, 4, 16). Fluminimaggiore (9, 16). Guspini, humus of *Quercus ilex* (9, 12, 16); ibidem, Ingurtusu (9, 16). Perdaxius, meadow with mosses and *Pistacia lentiscus* (9, 12, 16).

**Cave.** No records.

### Material examined

**Epigeic.** Sassari prov.: Carceghe, soil washing and Berlese extraction: 23.XII.2006, LF, 1 ♂ (CMZ). Romana, Rio Melas, soil washing and Berlese extraction: 23.XII.2006, LF, 2 exx (CMZ). Villanova, Monteleone, soil washing and Berlese extraction: 25.XI.2006, LF, 1 ♂ (CMZ). Nuoro prov.: Gennargentu: 24–25.I.1899, UL & GD, 1 ex (MGE). Ottana, soil washing and Berlese extraction: 18.II.2003, LF, 1 ♂ (CMZ). Oristano prov.: Ula Tirso, soil washing and Berlese extraction: 28.XII.2006, LF, 1 ♂ (CMZ). Cagliari prov.: Arbus, in the village, soil washing and Berlese extraction: 2.X.2006, LF, 1 ♂ (CMZ). Buggerru, near Mine of San Luigi, 347 m, 32S 0452771 4358704, leaf-litter sifting: 11.XI.2006, MZ, 1 ex (CMZ). Guspini, Monte Majori, soil washing and Berlese extraction: 16.X.2006, LF, 1 ♂ (CMZ). Iglesias, soil washing and Berlese extraction: 10.II.2008, LF, 1 ♂ (CMZ). Muravera, San Priamo, soil washing and Berlese extraction: 25.XI.2006, LF, 1 ♂ (CMZ). San Vito, Monte Lora, soil washing and Berlese extraction: 19.XII.2006, LF, 1 ♂ (CMZ). Teulada: 12.IX.2004, LF, 2 exx (CMZ).

**Cave.** No records.

**General distribution.** Europe: Albania, Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, France (mainland, Corsica), Greece (mainland, insular including Crete), Italy (mainland, Sicily, Sardinia), Luxembourg (introduced?), Montenegro, Portugal, Romania, Serbia, Slovak Republic, Spain (mainland, Balearic Isl.), Ukraine (Crimea); North Africa: Algeria, Morocco, Tunisia; West Asia: Jordan, Israel, Syria, Turkey.

**Chorotype.** Mediterranean.

**Ecological notes.** 0–400 m; few records from *Quercus ilex* woods (1 site) and under *Pistacia lentiscus* (1 site) for this thermophilous species; no records from caves. Ten records in endogenous habitats. See also Minelli (1983a) and Minelli and Iovane (1987).

**Remarks.** *Geophilus crassicauda*, described from Sardinia by Costa (1883, 1884a) and known only from the type locality (Cagliari), belongs to this species according to the identity established by Silvestri (1898).

### *Henia* C.L. Kock, 1847

#### Subgenus *Meinertia* Bollman, 1893a

### 32. *Henia* (*Meinertia*) *bicarinata* (Meinert, 1870)

- 1) *Henia bicarinata* (Meinert, 1870): Minelli 1978a: 158.
- 2) *Henia* (*Scotophilus*) *bicarinata* (Meinert, 1870): Minelli 1983a: 10.
- 3) *Henia* (*Scotophiuls*) *bicarinata* (Mein. 1870): Minelli 1983b: 406.
- 4) *Henia bicarinata*: Minelli & Iovane 1987: 28, 30.
- 5) *Henia* (*Scotophiuls*) *bicarinata* (Meinert, 1870): Minelli *et al.* 1994: 494.
- 6) *Henia* (*Scotophiuls*) *bicarinata* (Meinert, 1870): Foddai *et al.* 1995: 8.
- 7) *Henia bicarinata* (Meinert, 1870): Foddai *et al.* 1996: 361, tab. I.
- 8) *Henia* (*Scotophilus*) *bicarinata* (Meinert, 1870): Zapparoli & Minelli 2005: CD.

### Literature records

**General.** Sardinia-Corsica (1§). Sardinia (3, 6, 7).

**Epigeic.** Sassari prov.: Between Luogosanto and Tempio Pausania (2, 8). Molaria Is. (5, 7, 8). Poveri [Isl., Is. n.] 1 (5, 7, 8). Poveri [Isl., Is. n.] 2 (5, 7, 8). Santo Stefano Is. (5, 7, 8). Spargi Is. (7, 8); ibidem, Cala Granara (5). Tavolara Is. (5, 7, 8). Nuoro prov.: Bortigali, Mulargia (2, 8). Macomer (2, 8). Meana Sardo, [under] mosses (2, 8). Nuragus (2, 8). Silanus, 400 m (8). Siniscola (2, 8); ibidem, under *Quercus ilex* (2, 8). Tertenia, Barisoni (2, 8). Ulassai (8). Oristano prov.: Monte Arci (8). Cagliari prov.: Domusnovas, [Monte Acqua], entrance of the “Grotta di San Giovanni” [81 Sa/CA], humus of *Quercus ilex* (2, 4, 8). Guspini, meadow with leaf-litter of *Pistacia lentiscus* (2, 4, 8). Iglesias, Fluminimaggiore (2, 8). Near Perdaxius, under *Pistacia lentiscus* (2, 4, 8).

**Cave.** No records.

#### Material examined

**Epigeic.** Sassari prov.: Asinara Is., Cala Reale, under stranded *Posidonia*, m 0-1, hand searching: 21.X.2009, LP, 1 ex (CMZ); ibidem, Molo di Fornelli, under stranded *Posidonia*, m 0-1, hand searching: 20.X.2009, LP, 1 ex (CMZ). Nuoro prov.: Dorgali, Cala Gonone: 21.V.1980, AVT, 1 ex (CMZ). Oristano prov.: Monte Arci, *Quercus ilex* wood: 1–4.III.1992, GC, 1 ex (CMZ\*). Cagliari prov.: Buggerru, near Mine of San Luigi, 347 m, 32S 0452771 4358704, leaf-litter sifting: 11.XI.2006, MZ, 3 exx (CMZ). Capoterra, soil washing and Berlese extraction: 4.X.2006, LF, 1 ♀ (CMZ).

**Cave.** No records.

**General distribution.** Europe: Bosnia and Herzegovina, Bulgaria, Croatia, France (mainland, Corsica), Greece (mainland, insular including Crete), Hungary, Iberian Peninsula, Italy (mainland, Sicily, Sardinia), Macaronesia; North Africa: Maghreb; West Asia: Turkey, Caucasus (Minelli 1982a).

**Chorotype.** Mediterranean.

**Ecological notes.** 0–400 m; in *Quercus ilex* woods (2 sites), under *Pistacia lentiscus* (2 sites) and under stranded *Posidonia* (2 sites); no records from caves. One record from an endogenous habitat. See also Minelli (1983a) and Minelli and Iovane (1987).

**Remarks.** Subgeneric assignment according to Minelli (1982a).

#### Subgenus *Pseudochaetechelyne* Minelli, 1982

#### 33. *Henia (Pseudochaetechelyne) brevis* (Silvestri, 1896b)

- 1) *Henia (Pseudochaetechelyne) brevis* (Silvestri, 1896): Minelli 1982a: 260, 264.
- 2) *Henia (Pseudochaetechelyne) brevis* (Silvestri, 1896): Minelli 1983a: 9.
- 3) *Henia (Pseudochaetechelyne) brevis* (Silv. 1896): Minelli 1983b: 406.
- 4) *Henia (Pseudochaetechelyne) brevis* (Silvestri, 1896): Foddai *et al.* 1995: 9.
- 5) *Henia (Pseudochaetechelyne) brevis* (Silvestri, 1896): Grafitti & Zapparoli 1995: 122.
- 6) *Henia brevis* (Silvestri, 1896): Foddai *et al.* 1996: 361, tab. I.
- 7) *Henia (Pseudochaetechelyne) brevis* (Silvestri, 1896): Grafitti 1998: 58, 63.
- 8) *Henia brevis*: Mucedda *et al.* 2002: 30.
- 9) *Henia (Pseudochaetechelyne) brevis* (Silvestri, 1896): Zapparoli & Minelli 2005: CD.

#### Literature records

**General.** Sardinia (3, 4, 6).

**Epigeic.** Sassari prov.: Near Olbia (1, 2, 9). Cagliari prov.: Near Guspini, Ingurtusu, ferns and mosses (1, 2, 9).

**Cave.** Sassari prov.: Sedini, Conchi, “Grotta Conca II di Conchi” 168 Sa/SS (5, 7, 8, 9).

#### Material examined

**Epigeic.** Nuoro prov.: Monte Lollove, soil washing and Berlese extraction: 4.XII.2006, LF, 1 ♂ 57 lp (CMZ). Cagliari prov.: Guspini, Monte Majori, soil washing and Berlese extraction: 16.X.2006, LF, 2 ♂♂, 1

♂: 55 lp (CMZ). Iglesias, Mamenga, 610 m, 32S 462170 4356618, in calcareous soil (40-50 cm deep) in *Quercus ilex* wood, soil washing and Berlese extraction: 1.III.2006, LF, 1 ex 49 lp (CNBFVR). Nuxis, Campanassisa, soil washing and Berlese extraction: 27.XII.2006, LF, 1 ♀ 59 lp (CMZ). Villacidro, near Monte Anzeddu, 500 m, 32S 04669031 4361072, leaf-litter sifting: 10.XI.2006, MZ, 1 ex 49 lp (CMZ). Villamassargia, Monte San Miai, soil washing and Berlese extraction: 9.II.2007, LF, 1 ♀ 47 lp (CMZ).

**Cave.** No records.

**General distribution.** Europe: France (mainland), British Isl., Germany (south–west), Italy (mainland, Pantelleria Is., Sardinia), Moldava (Eason 1964; Minelli 1982a; Spelda 1991; Minelli 2006; Barber 2008).

**Chorotype.** S-European.

**Ecological notes.** 50?–600 m; epigeic species (one record from a *Quercus ilex* wood) also recorded in caves (1 site; troglaxene species). Five records from endogenous habitats.

**Remarks.** Subgeneric assignment according to Minelli (1982a). Specimens with 55-59 leg pairs are tentatively assigned to this species.

### Subgenus *Chaetechelyne* Meinert, 1870

#### 34. *Henia (Chaetechelyne) vesuviana* (Newport, 1845)

- 1) *Geophilus Canestrinii* Fedriz.: Fanzago 1881b: 13.
- 2) *Chaetechelyne vesuviana* Newp. [sic]: A. Costa 1885: 9.
- 3) *Chaetechelyne vesuviana* (Newp.) Mein.: Berlese 1888a: 1.
- 4) *Chatechelyne* [sic] *vesuviana* (Newp.): Silvestri 1898: 686.
- 5) *Chaetechelyne vesuviana* Newp. [sic]: Attems 1903: 280.
- 6) *Chaetechelyne vesuviana* Newp. [sic]: Verhoeff 1925a: 655.
- 7) *Chaetechelyne vesuviana* (Newp.): Attems 1929: 238.
- 8) *Chaetechelyne vesuviana* Newp. [sic]: Attems 1949: 110.
- 9) *Chaetechelyne vesuviana* (Newport, 1845): Minelli 1978a: 159.
- 10) *Henia (Chaetechelyne) vesuviana* (Newport, 1845): Minelli 1983a: 9.
- 11) *Henia (Chaetechelyne) vesuviana* (Newp. 1845): Minelli 1983b: 406.
- 12) *Henia vesuviana*: Minelli & Iovane 1987: 26, 28, 30.
- 13) *Henia (Chaetechelyne) vesuviana* (Newport, 1845): Minelli *et al.* 1994: 494.
- 14) *Henia (Chaetechelyne) vesuviana* (Newport, 1845): Foddai *et al.* 1995: 9.
- 15) *Henia vesuviana* (Newport, 1845): Foddai *et al.* 1996: 361, tab. I.
- 16) *Henia (Chaetechelyne) vesuviana* (Newport, 1845): Zapparoli & Minelli 2005: CD.

#### Literature records

**General.** Sardinia-Corsica (9). Sardinia (3, 5, 6, 7, 8, 11, 14, 15).

**Epigeic.** Sassari prov.: Bisce Is. (13, 15, 16). Bono, Passo o'Uccaidu, [1000 m] (10, 16). Caprera Is. (16); ibidem, Monte Teialone (13, 15, 16). Costa Smeralda, humus in maquis (10); ibidem, humus near small river (10). Figarolo Is. (13, 15, 16). Lago di Coghinas, humus of *Quercus* sp. and *Cistus* sp. (10, 16). Lago di Liscia, dam (10, 16). Le Camere Isl., E[astern island] (13, 15, 16). Li Nibani Isl., island n° 1 (13, 15, 16). Between Luogosanto and Tempio Pausania (10, 16). Maddalena Is. (15); ibidem, Penisola Abbatoggia, W[estern side] (13, 16). Molara Is. (10, 13, 15, 16). Monti, near Olbia, humus under *Cistus* sp. (10, 16). Between Mores and Ozieri, meadow with mosses and oak humus (10, 12, 16). Mortorio Is. (13, 15, 16). Nughedu di San Nicolò (10, 16); ibidem, Monte Sefraigada, 1000 m (10, 16). Oddastru, humus of *Pistacia lentiscus*, *Quercus ilex* and *Cistus* sp. (10, 16). Near Olbia (10, 16). Near Oschiri, mosses and humus (10, 16). Porto Cervo, Monte Villico (10, 16). San Pasquale (10, 16). Santa Teresa di Gallura (10, 16). Sant'Antonio, La Magione (= Maciona) (10, 16). Sassari, surroundings (1, 16). Spargi Is. (15); ibidem, Cala Granara (13, 16). Tempio Pausania (10, 16); ibidem, surroundings, meadow with mosses and humus of *Quercus ilex* (10, 16). Nuoro prov.: Near Aritzo,

mosses (10, 16). Arcu Correboi, mosses and meadow (10, 16); ibidem, under *Helichrysum* (10, 16). Bolotana (10, 16). Near Bolotana, mosses and lichens on oak stump (10, 16). Bortigali, Mulargia (10, 16). Desulo (2). Fonni, S'Arcu de Tascussi (10, 16). Gairo, Valle Riu Pardu, *Quercus ilex* (12, 16). Lago di Gusana, mosses and humus (10, 16). Park of Laconi, humus of *Acer* sp. (10, 16); ibidem, humus of *Quercus ilex* (10, 12, 16). Lanusei, S.S. 198, km 90, *Quercus ilex* (12, 16). Near Lanusei, 600 m (10, 16). Lula (10, 16); ibidem, Monte Turuddò, W slope (10, 16). Monte Spada (10, 16). Oliena, Punta Sos Nidos, 1000 m, humus of *Quercus ilex* (10, 12, 16). Punta Cupetti, N slope, 550 m (16). Seui, Monte Tonneri, 975 m, *Quercus ilex* (12, 16); ibidem, Monte Tonneri, N slope, 975 m (12, 16). Oristano prov.: Monte Arci (16). Cagliari prov.: Colle della Campanasissa (10, 16). Domusnovas (10, 16); ibidem, [Monte Acqua], entrance of the “Grotta di San Giovanni” [81 Sa/CA] (10, 16). Between Domus de Maria and Teulada, mosses and maquis (10, 16). Between Is Scattas and Is Carillus, under leaf-litter of *Pistacia lentiscus* (10, 16). Flumentorgiu (4, 16). Near Fluminimaggiore (10, 16). Fluminimaggiore, Rio Aretos, *Quercus ilex* (10, 12, 16). Guspini (10, 16); ibidem, meadow with mosses and *Nerium oleander* (10, 16); ibidem, *Quercus ilex* (10, 12, 16); ibidem, under *Pistacia lentiscus* (10, 12, 16); ibidem, Ingurtusu, humus of *Quercus ilex* (10, 16). Montevecchio, old mines (10, 16). Perdaxius, *Pistacia lentiscus* (10, 12, 16). San Nicolò Gerrei (16). Sarrabus [area] (4, 16). Sarrabus, 900 m (16). Sarroch, Rio Monte Nieddu (10, 16). Seddas Moddizzis, humus of *Quercus ilex* (10, 12, 16). Seddas Moddizzis, mosses (10, 16). Ussana (4, 16).

**Cave.** Nuoro prov.: Dorgali, “Grotta Pisanu” 215 Sa/NU, 400 m (16). Lula, Monte Albo, “Grotta Conca ‘e Crapa” 30 Sa/NU, 1040 m (16).

### Material examined

**Epigeic.** Sassari prov.: Buddusò: 25.V.1980, CM, 1 ex (CMZ). Cargeghe: 19.III.2002, leg.?, 2 exx (CMZ); ibidem, soil washing and Berlese extraction: 28.III.2006, LF, 2 ♀♀ (CMZ). Golfo Aranci: 3.IV.1902, DO, 1 ♀ (MGE). Monte Limbara: 20.IV.2003, LF, 3 exx (CMZ). Sedilo, 250 m: 14.XII.2003, AC, 3 exx (CMZ). Usini: 13.XI.2002, leg.?, 1 ex (CMZ). Nuoro prov.: Aritzo, surroundings: 1.XI.1989, MC, 1 ex (CMZ). Desulo, 1000 m, *Quercus pubescens* wood, hand searching: 19.V.1994, MZ, 1 ex (CMZ); ibidem, 1100 m, hand searching: 19.V.1994, MB, 3 exx (CMZ). Laconi: 4.XII.2001, LF, 1 ex (CMZ). Lula, Monte Albo, walk to Punta Ferulargiu, 850 m: 29.IV.2008, GA, 3 imm. (CMZ); ibidem, Monte Albo, NW side, Punta Catirina, 600 m, *Quercus ilex* wood: 29.IV.2008, GA, 1 ♂, 1 ♀ (CMZ). Monte Spada: 17.V.1982, GC, 3 exx (CMZ). Oristano prov.: Monte Arci, *Quercus ilex* wood: 1–4.III.1992, GC, 1 ex (CMZ\*). Monte Ferro, Rifugio La Madonnina, between Cuglieri and Santo Lussorgiu, 865 m, hand searching: 27.VI.2000, MZ, 1 ex (CMZ); MB, 1 ex (CMZ). Orune, Monte Nuschele, soil washing and Berlese extraction: 8.II.2007, LF, 4 exx (CMZ). Ottana, soil washing and Berlese extraction: 18.II.2003, LF, 1 ♀ (CMZ). Perdasdefogu, road to Tertenia (under a scrub): 4.IV.2008, CT, 1 imm. (CMZ). Cagliari prov.: Arbus, in the village, soil washing and Berlese extraction: 2.X.2006, LF, 2 ♂♂, 1 ♀ (CMZ). Bolotana, soil washing and Berlese extraction: 6.II.2007, LF, 1 ♂ (CMZ). Burcei, near Punta Serpeddì, 954 m, 32S 0525266 4356808, under stones: 13.XI.2006, BNWZ, 1 ♂ (CNBFVR). Capoterra, soil washing and Berlese extraction: 4.X.2006, LF, 2 ♀♀ (CMZ). Castiadas, soil washing and Berlese extraction: 20.I.2008, LF, 2 ♀♀ (CMZ). Chia, soil washing and Berlese extraction: 10.IV.2003, LF, 1 ♂ (CMZ). Gonnosfanadiga, soil washing and Berlese extraction: 23.II.2004, LF, 1 ex (CMZ). Guspini, Monte Majori, soil washing and Berlese extraction: 16.X.2006, LF, 3 exx (CMZ). Iglesias, soil washing and Berlese extraction: 10.II.2008, LF, 1 ex (CMZ). Nuxis, Campanasissa, soil washing and Berlese extraction: 27.XII.2006, LF, 1 ex (CMZ). San Nicolò Gerrei: 12.II.1999, LF, 1 ex (CMZ). San Vito, Monte Lora, soil washing and Berlese extraction: 19.XII.2006, LF, 1 ♂ (CMZ). Serri, soil washing and Berlese extraction: 13.IV.2005, LF, 2 exx (CMZ). Teulada, soil washing and Berlese extraction: 26.II.2003, LF, 1 ♀ (CMZ). Uta, soil washing and Berlese extraction: 3.III.2003, LF, 1 ex (CMZ). Villacidro, near Monte Anzeddu, 500 m, 32S 04669031 4361072, leaf-litter sifting: 10.XI.2006, MZ, 1 ex (CMZ).

**Cave.** No records.

**Other.** Cagliari prov.: “*Chaetochelyne vesuviana* New./Flumentorgiu (Sardegna)/Maggio [= May] 1894 Solari”, “*Chaetochelyne* [sic] *vesuviana* New./Flumentorgiu/ (Sardegna)–V-1894 Solari [leg.]”, 1 ♀ [in Silvestri 1898: 686, as *Chatechelyne* [sic] *vesuviana* (Newport)] (MGE).



**General distribution.** Europe: Croatia, France (mainland), Hungary (?), Italy (mainland, Sicily, Sardinia), Portugal (mainland), Romania (south–west?), Slovenia, Spain (mainland, Balearic Isl.), Switzerland (Minelli 1982a; Kos 1992; Stoev 1997); the species is probably present also in North Africa (Tunisia) and Corsica (*cf.* Minelli 1982a); records from Central Europe (Austria, Belgium, Germany, Great Britain, Luxemburg, The Netherlands) are mostly related to anthropogenic habitats (Remy & Hoffmann 1959; Eason 1964; Jeekel 1977; Barber 1985; Spelda 1991; Lock 2000; Spelda 2005; Lindner 2007); introduced in North America (Eason 1964). The European distribution of the species has been revised by Lindner (2007).

**Chorotype.** W-Mediterranean.

**Ecological notes.** 0–1100 m; mostly in oakwoods (*Quercus ilex*, 13 sites; *Quercus* sp., 3 sites; *Q. pubescens*, 1 site) but also in *Acer* sp. woods (1 site); often in open and shrub Mediterranean habitats (*Pistacia lentiscus*, 3 sites; maquis, 2 sites; *Cistus* sp., 1 site; under *Helichrysum* sp., 1 site; one generic record from meadows is also known); also in *Nerium oleander* shrubs (1 site); occasionally in caves (2 sites, 400–1040 m; troglone species). Sixteen records from endogenous habitats. See also Minelli (1983a) and Minelli and Iovane (1987).

**Remarks.** The record of *Geophilus canestrinii* Fedrizzi, 1876b quoted in Fanzago (1881b) refers to this species according to Attems (1929). Part of the records from Sardinia published by Silvestri (1898) under this species (1 specimens from Flumentorgiu) have been re-examined and their identification is confirmed. Subgeneric assignment according to Minelli (1982a).

## Schendylidae Verhoeff, 1908

### *Hydroschendyla* Brölemann & Ribaut, 1911

#### 35. *Hydroschendyla submarina* (Grube, 1872)

- 1) *Hydroschendyla submarina* (Grube, 1872): Minelli *et al.* 1994: 496.
- 2) *Hydroschendyla submarina* (Grube, 1872): Foddai *et al.* 1995: 9.
- 3) *Hydroschendyla submarina* (Grube, 1872): Foddai *et al.* 1996: 361, tab. I.
- 4) *Hydroschendyla submarina* (Grube, 1872): Zapparoli & Minelli 2005: CD.

#### Literature records

**General.** Sardinia (2).

**Epigeic.** Sassari prov.: Caprera Is. (1, 3, 4).

**Cave.** No records.

#### Material examined

**Epigeic.** Sassari prov.: Caprera Is., Cala Napoletana, sea level: 26.IV.2008, GA, 1 ♂, 2 ♀♀ (CMZ).

**Cave.** No records.

**General distribution.** Europe: Denmark (mainland), France (mainland), Great Britain (including Channel Isl.), Greece (mainland, Dodecanese Isl.), Ireland, Italy (southern regions, Tuscan Archipelago, circumsicilian islands, Sardinia), Sweden; North Africa (Brölemann & Ribaut 1912; Brölemann 1930, 1932; Eason 1964; Zapparoli 2002; Zapparoli & Minelli 2005; Andersson *et al.* 2008); also recorded from Bermuda Isl. (Eason 1964).

**Chorotype.** European.

**Ecological notes.** Only known near the seashore (2 sites). See also Minelli and Iovane (1987).

## *Schendyla* Bergsøe & Meinert, 1866

#### 36. *Schendyla armata* Brölemann, 1901

- 1) *Brachyschendyla armata* Brölemann, 1901 [sic]: Minelli 1983a: 4.
- 2) *Brachyschendyla armata* (Bröl. 1901): Minelli 1983b: 405.
- 3) *Brachyschendyla armata*: Minelli & Iovane 1987: 28.
- 4) *Brachyschendyla armata*: Foddai *et al.* 1994: 14.
- 5) *Brachyschendyla (Microschendyla) armata* (Brölemann, 1901): Minelli *et al.* 1994: 495.
- 6) *Schendyla armata* (Brölemann, 1901) [sic]: Foddai *et al.* 1995: 9.
- 7) *Brachyschendyla armata*: Foddai *et al.* 1996: 361, tab. I.
- 8) *Schendyla armata* (Brölemann, 1901) [sic]: Zapparoli & Minelli 2005: CD.

### Literature records

**General.** Sardinia (2, 6, 7).

**Epigeic.** Sassari prov.: Costa Smeralda, humus, maquis (1). Figarolo Is. (4, 5, 7, 8). Tempio Pausania, surroundings, meadow with mosses and humus of *Quercus suber* (1, 3, 8). Nuoro prov.: Dualchi (8). Cagliari prov.: Domusnovas, [Monte Acqua], entrance of the “Grotta di San Giovanni” [81 Sa/CA], humus of *Quercus ilex* (1, 3, 8). Guspini (1, 8); ibidem, mosses and maquis (1, 8); ibidem, Ingurtusu (1, 8). Montevecchio, mosses under *Quercus ilex* (1, 3, 8).

**Cave.** No records.

### Material examined

**Epigeic.** Cagliari prov.: Muravera, San Priamo, soil washing and Berlese extraction: 25.XI.2006, LF, 1 ex (CMZ).

**General distribution.** Europe: France (mainland), Italy (central regions, Sardinia) (Brölemann 1930; Zapparoli & Minelli 2005; Zapparoli in press).

**Chorotype.** W-Mediterranean.

**Ecological notes.** In Mediterranean shrub habitats and sclerophyllous woodlands (maquis, 2 sites; *Quercus ilex*, 2 sites; *Q. suber*, 1 sites); no records from caves. One record from an endogenous habitat. See also Minelli (1983a) and Minelli and Iovane (1987).

### 37. *Schendyla carniolensis* (Verhoeff, 1902)

- 1) *Schendyla carniolensis* (Verhoeff, 1902): Zapparoli & Minelli 2005: CD.

### Literature records

**General.** No records.

**Epigeic.** Nuoro prov.: Seui, Foresta di Montarbu (1).

**Cave.** No records.

### Material examined

**Epigeic.** Nuoro prov.: Lula, Monte Albo, NW slope, Punta Catirina, 600 m, *Quercus ilex* wood: 29.IV.2008, GA, 1 ex (CMZ).

**Cave.** No records.

**General distribution.** Europe: Austria, France (mainland), Italy (mainland, Sardinia), Romania (Dobruja), Serbia, Slovenia (Koren 1986; Kos 1992; Foddai *et al.* 1995; Stoev 1997; Iorio 2008).

**Chorotype.** S-European.

**Ecological notes.** Only records from woodlands (*Quercus ilex*, 1 site; forest of Montarbu, 1 site); no records from caves.

### 38. *Schendyla mediterranea* Silvestri, 1897

- 1) *Schendyla mediterranea* Silv.: Silvestri 1898: 685.
- 2) *Schendyla mediterranea* Silv.: Attems 1903: 188.
- 3) *Schendyla mediterranea* Silvestri, 1898 [sic]: Brölemann & Ribaut 1912: 145, figs 151–158.
- 4) *Schendyla mediterranea* Silv.: Verhoeff 1925a: 655.
- 5) *Schendyla (Echinoschendyla) mediterranea* Silv.: Attems 1929: 62.
- 6) *Schendyla (Echinoschendyla) mediterranea* Silvestri, 1898: Brölemann 1930: 91, figs 81–89.
- 7) *Schendyla (Echinoschendyla) mediterranea* Silvestri, 1898: Matic 1972: 46, fig. 16.
- 8) *Schendyla mediterranea* Silvestri, 1897: Minelli 1978a: 157.
- 9) *Schendyla mediterranea* Silvestri, 1897: Minelli 1983a: 4.
- 10) *Schendyla mediterranea* Silv. 1897: Minelli 1983b: 405.
- 11) *Schendyla mediterranea*: Minelli & Iovane 1987: 28.
- 12) *Schendyla mediterranea* Silvestri, 1897: Minelli *et al.* 1994: 494.
- 13) *Schendyla mediterranea* Silvestri, 1897: Foddai *et al.* 1995: 9.
- 14) *Schendyla mediterranea* Silvestri, 1897: Foddai *et al.* 1996: 361, tab. I.
- 15) *Schendyla mediterranea* Silvestri, 1897: Zapparoli & Minelli 2005: CD.

#### Literature records

**General.** Sardinia-Corsica (8). Sardinia (2, 3, 5, 6, 4, 7, 10, 13, 14).

**Epigeic.** Sassari prov.: Abealzu, between Sassari and Osilo, 400 m (15). Capo Caccia, humus and mosses under *Cistus* sp. and *Pistacia lentiscus* (9). Capo Caccia, under *Cistus* sp. and *Juniperus* sp. (9). Lago di Coghinas, humus of *Quercus* sp. and *Cistus* sp. (9). Maddalena Is. (14); ibidem, [Penisola] Abbatoggia (12). Razzoli Is. (12, 14). Semestene, 500 m (15). Spargiotto Is. (12, 14). Nuoro prov.: Bolotana (9). Catena del Marghine, Bolotana, 1000 m, mosses on stumps of *Quercus* sp. and *Taxus baccata* (9). Dualchi, 500 m (15). Silanus, 400 m (15). Cagliari prov.: Cagliari (1). Domusnovas, [Monte Acqua], near the entrance of the “Grotta di San Giovanni” [81 Sa/CA], humus of *Quercus ilex* (9, 11). Guspini, maquis with *Quercus ilex* and mosses (9, 11); ibidem, Ingurtusu, ferns and mosses (9). Between Is Palaceris and Is Cannoneris, humus of *Arbutus unedo* (9). Monte Sant’Elia (15). Montevecchio, mosses under *Quercus ilex* (9, 11). San Nicolò Gerrei (15). Sarroch (15); ibidem, Rio Monte Nieddu, mosses and *Juniperus* sp. (9); ibidem, Rio Monte Nieddu, mosses and leaves under *Quercus ilex* (9). Sant’Antioco Is. (12, 14). Silius (15). Villacidro (15).

**Cave.** No records.

#### Material examined

**Epigeic.** Sassari prov.: Arzachena: 17.IV.2001, LF, 12 exx (CMZ). Carceghe, soil washing and Berlese extraction: 23.XII.2006, LF, 14 exx (CMZ). Giave, soil washing and Berlese extraction: 23.XII.2006, LF, 2 exx (CMZ). Ittiri, soil washing and Berlese extraction: 10.I.2008, LF, 5 exx (CMZ); 15.I.2008, LF, 4 exx 51 lp (CMZ). Maddalena Isl., soil washing and Berlese extraction: 6.III.1999, LF, 1 ex (CMZ). Molafà, soil washing and Berlese extraction: 7.II.2007, LF, 4 exx (CMZ). Putifigari, soil washing and Berlese extraction: 5.XII.2006, LF, 2 exx (CMZ); 10.I.2008, LF, 6 exx (CMZ). Romana, Rio Melas, soil washing and Berlese extraction: 23.XII.2006, LF, 16 exx, 1 ex 51 lp (CMZ); 27.XII.2006, LF, 1 ex 47 lp (CMZ). Thiesi: 5.I.1991, LF, 2 exx (CMZ). Villanova, Monteleone, soil washing and Berlese extraction: 15.XI.2006, LF, 2 exx (CMZ); 10.I.2008, LF, 2 exx (CMZ). Nuoro prov.: Orotelli, soil washing and Berlese extraction: 4.XII.2000, LF, 1 ex (CMZ). Perdasdefogu, road to Tertenia (under a scrub): 4.IV.2008, CT, 2 exx (CMZ). Urzulei, soil washing and Berlese extraction: 8.I.2003, LF, 1 ex 51 lp (CMZ). Oristano prov.: Ula Tirso, soil washing and Berlese extraction: 28.XII.2006, LF, 11 exx (CMZ). Cagliari prov.: Arbus, in the village, soil washing and Berlese extraction: 2.X.2006, LF, 10 exx (CMZ). Buggerru, near Mine of San Luigi, 347 m, 32S 0452771 4358704, leaf-litter sifting: 11.XI.2006, MZ, 1 ex (CMZ). Burcei, near Punta Serpeddi, 954 m, 32S 0525266 4356808, under stones: 13.XI.2006, BNW, 1 ex (CNBFVR). Capoterra: 10.I.1998, LF, 1 ex (CMZ). Castiadas, soil washing and Berlese extraction: 20.I.2008, LF, 1 ex 51 lp, 2 exx 53 lp (CMZ). Dolianova, soil washing and

Berlese extraction: 13.XI.2001, LF, 1 ex (CMZ). Dolianova: 3.V.2002, LF, 22 exx (CMZ). Domusnovas, Lago Siuru, 322 m, 32S 0467069 4357916, leaf-litter sifting: 22.III.2006, MZ, 1 ex (CMZ). *ibidem*, under stones: 15.XI.2006, BNW, 1 ex (CNBFVR). Domusnovas, Monte Acqua, near “Grotta di San Giovanni” 81 Sa/CA, 325 m, 32S 0467900 4354891, *Quercus ilex* wood, leaf-litter sifting: 12.XI.2006, MZ & DW, 4 exx (CMZ). Domusnovas, near Gutturu Abis, 580 m, 32S 0468140 4360761, mixed *Quercus ilex* wood, leaf-litter sifting: 10.XI.2006, MZ, 10 exx (CMZ). Domusnovas, near Punta Planotzara, 309 m, 32S 0465718 4356515, leaf-litter sifting: 14.XI.2006, GN & MZ, 4 exx (CMZ). Domusnovas, near Sa Duchessa, 320 m, 32S 04666164 4358209, leaf-litter sifting: 23.III.2006, BBCW, 10 exx (CMZ). Domusnovas, Sa Duchessa (road to Perda Niedda), 350 m, 32S 04666233 435905, leaf-litter sifting: 23.III.2006, BBCW, 3 exx (CMZ). Geremeas, soil washing and Berlese extraction: 22.XII.2006, LF, 3 exx (CMZ). Gonnosfanadiga, soil washing and Berlese extraction: 9.II.2007, LF, 8 exx (CMZ). Guspini, Monte Majori, soil washing and Berlese extraction: 16.X.2006, LF, 4 exx (CMZ). Iglesias, soil washing and Berlese extraction: 16.VI.2003, LF, 1 ex (CMZ); 10.II.2008, LF, 1 ex (CMZ). Iglesias, Case Marganai, 700 m, 32S 0462853 4355582, Conecofor Plot, *Quercus ilex* wood, leaf-litter sifting: 10.XI.2006, GN, 1 ex (CNBFVR); *ibidem*, 725 m, 32S 0463890 4355925, *Quercus ilex* wood, leaf-litter sifting: 10.XI.2006, MZ, 1 ex (CMZ). Iglesias, Genna Bogai: 3.IV.2003, LF, 4 exx (CMZ). Iglesias, Mamenga, 610 m, 32S 462170 4356618, in calcareous soil (40–50 cm deep) in *Quercus ilex* wood, soil washing and Berlese extraction: 1.III.2006, LF, 1 ex (CNBFVR); *ibidem*, leaf-litter sifting: 1.III.2006, LF, 13 exx (CNBFVR). Iglesias, near Case Marganai, 660 m, 32S 0463341 4356196, leaf-litter sifting: 14.XI.2006, MZ, 1 ex (CMZ). Muravera, San Priamo, soil washing and Berlese extraction: 25.XI.2006, LF, 2 exx 53 lp, 16 exx 55 lp, 5 exx 57 lp, 2 exx 59 lp (CMZ). Nuxis, Campanassisa, soil washing and Berlese extraction: 27.XII.2006, LF, 4 exx (CMZ). Punta Genna Ollioni, surroundings, 650 m, 32S 0463293 4356570, leaf-litter sifting: 14.XI.2006, GN & MZ, 1 ex (CMZ). San Vito, Monte Lora, soil washing and Berlese extraction: 19.XII.2006, LF, 2 exx (CMZ). Siliqua, Orbai, soil washing and Berlese extraction: 21.III.2008, LF, 3 exx (CMZ). Uta, soil washing and Berlese extraction: 3.III.2003, LF, 1 ex (CMZ). Villacidro, Rio Cannisoni, 390 m, 32S 0469095 4362383, leaf-litter sifting: 9.XI.2006, MZ, 1 ex (CMZ). Villamassargia, Monte San Miai: 26.XII.2003, LF, 7 exx (CMZ). Villamassargia, Monte San Miai, soil washing and Berlese extraction: 9.II.2007, LF, 15 exx (CMZ). Villasimius, soil washing and Berlese extraction: 22.III.2008, LF, 1 ex (CMZ).

**Cave.** No records.

**General distribution.** Europe: France (mainland), Greece (mainland), Italy (mainland, Sicily, Sardinia) Spain (mainland) (Brölemann 1930; Zapparoli 2002; Zapparoli & Minelli 2005; Minelli 2006); also recorded from Romania (Dobrogea) (Matic 1972).

**Chorotype.** Mediterranean.

**Ecological notes.** 0–1000 m; mostly in oakwoods (*Quercus ilex*, 9 sites; *Quercus* spp., 2 sites) but also in Mediterranean shrub habitats (*Cistus* sp. and *Pistacia lentiscus*, 1 site; *Cistus* sp. and *Juniperus* sp., 1 site; *Arbutus unedo*, 1 site; *Juniperus* sp., 1 site); no records from caves. Thirty-one records from endogeous habitats. See also Minelli (1983a) and Minelli and Iovane (1987).

### 39. *Schendyla montana* (Attems, 1895)

#### Literature records

None.

#### Material examined

**Epigeic.** Cagliari prov.: Iglesias, Cantoniera Marganai, 490 m, 32S 0462272 4354677, *Quercus ilex* wood, leaf-litter sifting: 9.VI.2004, GN, 1 ♂ 45 lp, body length 10.0 mm (CMZ). Iglesias, Case Marganai, 700 m, 32S 0462853 4355582, Conecofor Plot, *Quercus ilex* wood, leaf-litter sifting: 10.XI.2006, GN, 1 ♂ 47 lp,

body length 7.5 mm (CMZ). Iglesias, Conca Margiani, 725 m, 32S 0462470 4357011, clearing, under stones: 15.XI.2006, BNW, 1 ♂ 49 lp, body length 15.5 mm (CMZ).

**Cave.** No records.

**General distribution.** Europe: Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, France (mainland), Greece (mainland), Italy (mainland, Sardinia), Republic of Macedonia, Romania, Slovenia, Hungary (Attems 1929; Brölemann 1930; Loksa 1956; Matic 1972; Kos 1992; Foddai *et al.* 1995; Stoev 1997, 2002; Tajovský 2001; Zapparoli 2002; Minelli 2006; Iorio 2008); recorded also from Tunisia and Sicily by Silvestri (1896a, 1897) and then copied by Attems (1929), records from Sicily are included in Foddai *et al.* (1995) but not in Zapparoli and Minelli (2005).

**Chorotype.** S-European.

**Ecological notes.** 490–720 m; in *Quercus ilex* woods (2 sites); no records from caves.

**Remarks.** No previous records of this species are known from Sardinia.

#### 40. *Schendyla nemorensis* (C.L. Koch, 1837)

- 1) *Schendyla nemorensis* C. Koch [sic]: Attems 1949: 107.
- 2) *Schendyla nemorensis* (C.L. Koch, 1836): Minelli 1978a: 156.
- 3) *Schendyla nemorensis* (C.L. Koch, 1836): Minelli 1983a: 3.
- 4) *Schendyla nemorensis* (C.L. Koch 1836): Minelli 1983b: 405.
- 5) *Schendyla nemorensis*: Minelli & Iovane 1987: 26, 28.
- 6) *Schendyla nemorensis* (C.L. Koch 1836): Minelli *et al.* 1994: 495.
- 7) *Schendyla nemorensis* (C.L. Koch, 1836): Foddai *et al.* 1995: 9.
- 8) *Schendyla nemorensis* (C.L. Koch, 1836): Foddai *et al.* 1996: 361, tab. I.
- 9) *Schendyla nemorensis* (C.L. Koch, 1836): Zapparoli & Minelli 2005: CD.

#### Literature records

**General.** Sardinia-Corsica (2). Sardinia (1§, 4, 7, 8).

**Epigeic.** Sassari prov.: Caprera Is., Monte Teialone (6, 8, 9). Figarolo Is. (6, 8, 9). Lago di Liscia, dam (3, 9). Maddalena Is. (6, 8, 9); *ibidem*, under *Cistus monspeliensis* (5, 9). Between Mores and Ozieri, small meadow with mosses and humus of *Quercus* sp. (3, 5, 9). Molaro Is. (6, 8, 9). Molarotto Is. (6, 8, 9). Oddastru, under *Pistacia lentiscus*, *Quercus ilex* and *Cistus* sp. (3, 9). Oschiri, Punta Limbara, humus of *Quercus ilex* (3, 5, 9). Near Porto Cervo, small meadow with *Pistacia lentiscus* (3, 9). Razzoli Is. (6, 8, 9). San Pasquale (3, 9). Santa Maria Is. (6, 8, 9). Sant'Antonio, La Magione (= Maciona) (3, 9). Santo Stefano Is. (6, 8, 9). Tavolara Is. (6, 8, 9). Tempio Pausania, surroundings, small meadow with mosses and humus of *Quercus ilex* (3, 9). Nuoro prov.: Arcu Correboi, meadow and mosses (3, 9). Near Aritzo, mosses (3, 9). Catena del Marghine, Bolotana (3, 9). Dorgali, Cala Gonone (3, 9). Gairo Marina (3, 9). Gairo, Valle Rio Pardu, *Quercus ilex* (5, 9). Gennargentu, Bruncu Spina (3, 9). Monte Spada (3, 9). Near Lanusei, under *Quercus ilex* (3, 9). Near Lanusei, S.S. 198, km 90, *Quercus ilex* (5, 9). Osini, *Quercus ilex* (5, 9). Oristano prov.: Bauladu, San Vittore, 150 m (9). Cagliari prov.: Cagliari (9). Guspini, meadow with ferns and mosses (3, 5, 9); *ibidem*, meadow with leaf-litter of *Pistacia lentiscus* (3, 5, 9). Iglesias, valley near -, meadow and mosses (3, 9). Between Is Scattas and Is Carillus (3, 9). Monte Nieddu (3, 9). Monte Sant'Elia (9). Perdaxius, under *Pistacia lentiscus* (3, 5, 9). Between Sant'Anna Arresi and Teulada (3, 9). Sarroch (9). Sant'Antioco Is. (6, 8, 9); *ibidem*, Cannai (3, 9). Seddas Moddizzis, mosses (3, 9).

**Cave.** Nuoro prov.: Dorgali, "Grotta Pisanu" 215 Sa/NU, 400 m (9).

#### Material examined

**Epigeic.** Sassari prov.: Argentiera, soil washing and Berlese extraction: 9.IV.2006, LF, 1 ex 41 pdz (CMZ). Cheremule: 20.XII.2002, leg.?, 1 ex (CMZ). Golfo Aranci, soil washing and Berlese extraction:

5.III.2000, LF, 2 exx (CMZ). Il Toro Is.: 10.V.1988, GO, 1 ex (CMZ). Maddalena Isl., soil washing and Berlese extraction: 6.III.1999, LF, 1 ex 35 lp (CMZ). Monte Limbara: 20.IV.2003, LF, 1 ex (CMZ). Putifigari, soil washing and Berlese extraction: 5.XII.2006, LF, 1 ex (CMZ). Trinità d'Agultu, soil washing and Berlese extraction: 7.II.2007, LF, 1 ex 41 lp (CMZ). Nuoro prov.: Arzana, Bruncu Spina, 1800 m, garrigue: 19.IV.1996, AVT, 1 ex (CMZ). Elini, "Bosco del Carmine", *Quercus ilex* wood: 1.IV.2008, CT, 26 exx (CMZ). Gennargentu, Bruncu Spina, soil washing and Berlese extraction: 1.V.2006, LF, 13 exx (CMZ). Lanusei, "Bosco di Selene", *Quercus ilex* wood on granite: 4.IV.2008, CT, 3 exx (CMZ). Monte Lollove, soil washing and Berlese extraction: 4.XII.2006, LF, 5 exx (CMZ). Orune, Monte Nuschele, soil washing and Berlese extraction: 8.II.2007, LF, 1 ex 41 lp, 4 exx 43 lp (CMZ). Perdasedfogu, near Monte Rasu, 600 m: 4.IV.2008, CT, 1 ex (CMZ). Villagrande Strisaili, "Bosco di Santa Barbara", *Quercus ilex* wood on granite: 2.IV.2008, CT, 3 exx, (CMZ). Oristano prov.: Monte Ferro, Rifugio la Madonnina, between Cuglieri and Santo Lussorgiu, 865 m, hand searching: 27.VI.2000, MB, 3 exx (CMZ); 27.VI.2000, MZ, 10 exx (CMZ). Seneghe, soil washing and Berlese extraction: 23.III.2006, LF, 3 exx (CMZ). Cagliari prov.: Cagliari, in the town, soil washing and Berlese extraction: 3.X.2006, LF, 1 ex (CMZ). Cala Regina: IV.2004, LF, 3 exx (CMZ). Castiadas, soil washing and Berlese extraction: 20.I.2008, LF, 1 ex 45 lp (CMZ). Dolianova, soil washing and Berlese extraction: 13.XI.2001, LF, 2 exx (CMZ). Flumentorgiu: V.1894, SL, 4 exx "*Schendyla nemorensis* Koch" F. Silvestri det. (MGE). Iglesias, Mamenga, 610 m, 32S 462170 4356618, in calcareous soil (40–50 cm deep) in *Quercus ilex* wood, soil washing and Berlese extraction: 1.III.2006, LF, 1 ex (CNBFVR). Iglesias, Marganai, soil washing and Berlese extraction: 16.XII.2006, LF, 5 exx (CMZ). Mamoiada: 13.III.2004, LF, 4 exx (CMZ). Masua, soil washing and Berlese extraction: 12.III.2003, LF, 1 ex (CMZ). Nuxis, Campanasissa, soil washing and Berlese extraction: 27.XII.2006, LF, 1 ex (CMZ). Pula, soil washing and Berlese extraction: 11.IV.2008, LF, 2 exx (CMZ). San Vito, Monte Lora, soil washing and Berlese extraction: 19.XII.2006, LF, 6 exx (CMZ). Serri, soil washing and Berlese extraction: 13.IV.2005, LF, 1 ex (CMZ). Villacidro, near Monte Anzeddu, 500 m, 32S 04669031 4361072, leaf-litter sifting: 10.XI.2006, MZ, 2 exx (CMZ). Villacidro, near Punta Piscina Argiolas, 282 m, 32S 04672049 4360081, leaf-litter sifting: 14.XI.2006, BNWZ, 1 ex (CNBFVR). Villacidro, Punta Fenu, 225 m, 32S 0471850 4356980, hand searching: 11.XI.2006, MZ, 2 exx (CMZ). Province ?. "Roja Manna (Sardegna)": V.1894, SL, 5 exx "*Schendyla nemorensis* Koch" F. Silvestri det. (MGE).

**Cave.** Nuoro prov.: Galtelli, Monte Tuttavista, Tres Puntas, "Pozzo N. 2 di Tres Puntas" 1151 Sa/NU, 750 m: 16.III.2008, PM, 1 ex (CMZ).

**General distribution.** Europe: Austria, Belgium, Bosnia and Herzegovina, Bulgaria (?), Croatia, Czech Republic, Denmark (mainland), Finland, France (mainland), Germany, Great Britain, Greece (including Crete), Ireland, Italy (mainland, Sicily, Sardinia), Norway, Poland, Portugal (Azores Isl.), Romania (?), Slovak Republic, Slovenia, Spain (Balearic Isl.), Sweden, The Netherlands; North Africa: Algeria, Morocco, Tunisia; North America: introduced. Records from Latvia have been published by Bonato *et al.* (2005).

**Chorotype.** European.

**Ecological notes.** 0–1800 m; mostly in oakwoods (*Quercus ilex*, 11 sites; *Quercus* sp., 1 site) but also in Mediterranean open and shrub habitats (*Cistus monspeliensis*, 1 site; *Pistacia lentiscus*, 3 sites; garrigue, 1 site; generic records from meadows, 3 sites, are also known); occasionally in caves (2 sites, 400–750 m; troglone species). Nineteen records from endogenous habitats. See also Minelli (1983a) and Minelli and Iovane (1987).

## Geophilidae Cook, 1895

### *Pachymerium* C.L. Koch, 1847

#### 41. *Pachymerium ferrugineum* (C.L. Koch, 1835)

- 1) ? *Geophilus flavus* (De Gr.): Fanzago 1881b: 12.
- 2) ? *Geophilus flavus*: Fanzago 1884a: 338.
- 3) ? *Geophilus flavus*: Fanzago 1884b: 300.
- 4) *Geophilus ferrugineum* C. Koch: A. Costa 1885: 9.
- 5) ? *Geophilus maxillaris* P. Gerv.: De Carlini 1885: 196.
- 6) *Pachymerium attenuatum* (Say): Silvestri 1898: 686.
- 7) *Pachymerium ferrugineum* Koch [sic]: Verhoeff 1925a: 655.
- 8) *Pachymerium ferrugineum* (C.L. Koch, 1835): Minelli 1978a: 159.
- 9) *Pachymerium ferrugineum* (C.L. Koch, 1835): Minelli 1983a: 9.
- 10) ? *Geophilus maxillaris* Gerv.: Minelli 1983b: 402.
- 11) *Pachymerium ferrugineum* (C.L. Koch 1835): Minelli 1983b: 406.
- 12) *Pachymerium ferrugineum*: Minelli & Iovane 1987: 30.
- 13) *Pachymerium ferrugineum*: Foddai *et al.* 1994: 14.
- 14) *Pachymerium ferrugineum* (C.L. Koch, 1835): Minelli *et al.* 1994: 497.
- 15) *Pachymerium ferrugineum* (C.L. Koch, 1835): Foddai *et al.* 1995: 9.
- 16) *Pachymerium ferrugineum* (C.L. Koch, 1835): Foddai *et al.* 1996: 361, tab. I.
- 17) *Pachymerium ferrugineum* (C.L. Koch, 1835): Zapparoli & Minelli 2005: CD.

### Literature records

**General.** Sardinia-Corsica (8). Sardinia (7, 10, 11, 15, 16). Circumsardinian islands (13).

**Epigeic.** Sassari prov.: Asinara Is. (3, 16, 17); *ibidem*, Cala Reale (14); *ibidem*, Rizzeddu (2). Bisce Is. (14, 16, 17). Camize Is., [a small island] W of Mortorio Is. (14, 16, 17). Caprera Is. (14, 16, 17). Figarolo Is. (14, 16, 17). Golfo Aranci (9, 17). Ittiri (9, 17). Le Camere Isl., E[astern Is.] (14, 16, 17). Li Nibani Isl. (14, 16, 17). Maddalena Is. (16, 17); *ibidem*, under *Cistus monspeliensis* (12, 17); *ibidem*, Baia dell'Annegato (14, 17); *ibidem*, La Maddalena (14, 17); *ibidem*, La Trinità (14, 17). Molarotto Is. (9, 14, 16, 17). Mortorio Is. (14, 16). Platamona (9, 17). Porto San Paolo (9, 17). Poveri [Isl., Is. n.] 1 (14, 16, 17). Poveri [Isl., Is. n.] 2 (14, 16, 17). Razzoli Is. (14, 16, 17). Santa Maria Is. (14, 16, 17). Sassari, surroundings (1). Soffi Is. (14, 16, 17). Spargi Is. (14, 16, 17). Spargiotto Is. (14, 16, 17). Tavolara Is. (14, 16, 17). Nuoro prov.: Bara, railway of Macomer (9, 17). Borore (17). Campeda, Bolotana (9, 17). Dualchi, 400 m (17). Gairo Marina (9, 17). Las Plassas, 1.5 km S (9, 17). Macomer, Mulargia (9). Macomer, Padru Mannu (9, 17). [Nuraghe] Loddune (9, 17). Nurallao, 1 km N (9, 17). Oristano prov.: Arborea (9, 17). Il Catalano Is. (14, 16, 17). Oristano (6, 9, 17). Su Pallosu (17). Cagliari prov.: Budelli Is. (14, 16, 17). Burcei, 1000 m (9, 17). Cagliari (6, 17); *ibidem*, on the beach (9, 17). Campidano di Cagliari (4). Cavoli Is. (14, 16, 17). Elmas (9, 17). Flumentorgiu (6, 17). Guamaggiore, 2.5 km SSE (9, 17). Between Is Scattas and Is Carillus, meadow (9, 17). Nuraminis, 2.5 km N (9, 17). Paduleddu Is. (14, 16, 17). Perdaxius, meadow, mosses and *Pistacia lentiscus* (9, 12, 17). Stagno di Maracalagonis (9, 17). Portoscuso (4). San Pietro Is. (5, 16); *ibidem*, Carloforte (9, 17). Between Sant'Anna Arresi and Teulada (9, 17). Sant'Antioco Is. (16); *ibidem*, Cussorgia (14, 17). Sant'Elia (9, 17). Torre Cala Regina (9, 17). Near Villacidro, S.S. 196, km 21 (9, 17).

**Cave.** No records.

### Material examined

**Epigeic.** Sassari prov.: Asinara Is., Cala Barbarossa, under stranded *Posidonia*, m 0-1, hand searching: 22.X.2009, LP, 1 ex (CMZ); *ibidem*, Cala Sant'Andrea, pitfall traps: 25/27.IX.2003, AM & AS, 1 ex (IEASS); *ibidem*, Cala Reale: 15.V.1988, leg.?, 1 ex (CMZ). Cargeghe: 19.III.2002, leg.?, 1 ex (CMZ). Golfo Aranci: 3.IV.1902, DO, 1 ex (MGE); IV.1903, DO, 1 ex (MGE); IV.1903, CF, 1 ex (MGE). Maddalena Is., Cala Francese: 25.V.1980, RA, 1 ex (CMZ). Nuoro prov.: Gairo, Monte Perda Liana, 1219 m, 32S 0535096 4417848, hand searching: 16.V.2008, NABT, 1 ex (CNBFVR). Orosei, Caletta di Osalla: 24.V.1980, RA, 1 ex (CMZ). Cagliari prov.: Capo Sant'Elia: 9.IX.2004, LF, 1 ex (CMZ). Burcei, near Punta Serpeddi, 954 m, 32S 0525266 4356808, open habitat, hand searching: 13.XI.2006, MZ, 1 ex (CMZ). Flumentorgiu: V.1894, SL, 3 exx "*Geophilus longicornis* Koch" F. Silvestri det. (MGE). Gonnosfanadiga, Monte Linas, Punta Su

Filixi, 780 m, 32S 0465819 4368289: 12.IX.2006, DB, 1 ex (CNBFVR); 12.IX.2006, GN, 1 ex (CNBFVR). Sarroch, soil washing and Berlese extraction: 1.X.2006, LF, 2 exx (CMZ).

**Cave.** No records.

**General distribution.** Europe: Albania, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark (mainland), European Russia, Finland, France (mainland, Corsica), Great Britain, Greece (mainland, insular including Crete), Hungary, Italy (mainland, Sicily, Sardinia), Latvia, Republic of Macedonia, Norway, Poland, Portugal (mainland, Azores Isl., Madeira Is.), Romania, Slovak Republic, Slovenia, Spain (mainland, Balearic Isl., Canary Isl.), Sweden, The Netherlands; North Africa: Algeria, Central Sahara, Libya, Morocco, Tunisia; West Asia: Caucasus, Iran, Palestine, Turkey, Uzbekistan; East Asia: Pribilof Is. (Russia), Japan (introduced); North America: Alaska, introduced elsewhere; Central America: Mexico (introduced); South America: Chile (Juán Fernández Is., introduced; Easter Is., introduced); Pacific islands: Hawaii Isl. (introduced).

**Chorotype.** W-Palaearctic.

**Ecological notes.** 0–1219 m; in open habitats (2 sites), under *Cistus monspeliensis* (1 site), *Pistacia lentiscus* (1 site), also on beaches (1 site) and under stranded *Posidonia* (1 site); no records from caves. One record from an endogenous habitat. See Minelli (1983a) and Minelli and Iovane (1987).

**Remarks.** Records of *Geophilus flavus* (De Geer, 1778) by Fanzago (1881b, 1884a, 1884b), *G. maxillaris* Gervais, 1837 by De Carlini (1885) and *Pachymerium attenuatum* (Say, 1821) by Silvestri (1898) are tentatively assigned to this species, following Minelli (1983b).

## ***Geophilus* Leach, 1814**

### **42. *Geophilus alpinus* Meinert, 1870**

- 1) *Geophilus proximus* C. K.: Fanzago 1881b: 12.
- 2) *Orinophilus Vinciguerrae* (Silv.): Silvestri 1898: 686.
- 3) *Geophilus vinciguerrae* Silv.: Attems 1903: 235.
- 4) *Orinophilus vinciguerrae* Silv. [sic]: Verhoeff 1925a: 655.
- 5) *Geophilus Henroti* Manfredi 1953: 204.
- 6) *Geophilus henroti* Manfr., 1953: Cerruti 1968: 231.
- 7) *Geophilus henroti* Manfredi, 1956: Puddu & Pirodda 1974: 175.
- 8) *Geophilus Henroti* Manfredi, 1953: Manfredi 1976: 229.
- 9) *Geophilus henroti* Manfredi, 1956: Minelli 1978a: 157.
- 10) *Geophilus insculptus* Attems, 1895: Minelli 1978a: 157.
- 11) *Geophilus vinciguerrae* Silvestri, 1865: Minelli 1978a: 158.
- 12) *Geophilus henroti* Manfredi, 1956: Minelli 1978b: 296.
- 13) *Geophilus henroti* Manfredi, 1956: Cassola 1982: 634, 670, 691, 707.
- 14) *Geophilus insculptus* Attems, 1895: Minelli 1983a: 5.
- 15) *Geophilus insculptus* Attems 1895: Minelli 1983b: 404, 406.
- 16) *Geophilus insculptus* Attems, 1895: Minelli 1985: 31.
- 17) *Geophilus insculptus*: Minelli & Iovane 1987: 28, 30.
- 18) *Geophilus insculptus* Attems, 1895: Minelli *et al.* 1994: 496.
- 19) *Geophilus insculptus* Attems, 1895: Foddai *et al.* 1995: 10.
- 20) *Geophilus henroti* Manfredi, 1956: Leonardi 1995: 137.
- 21) *Geophilus insculptus* Attems, 1895: Foddai *et al.* 1996: 361, tab. I.
- 22) *Geophilus insculptus* Attems, 1895: Zapparoli & Minelli 2005: CD.

## **Literature records**

**General.** Sardinia-Corsica (9, 10, 11). Sardinia (3, 4, 12, 15, 19, 20, 21).



**Epigeic.** Sassari prov.: Ardara, meadow (14, 22). Asinara Is., Rizzeddu (1, 22). Capo Caccia, humus under *Cistus* sp. and *Juniperus* sp. (14, 22). Figarolo Is. (18, 21, 22). Between Luogosanto and Tempio Pausania (14, 22). Monte Plebi, humus under *Pistacia lentiscus* (14, 22). Monte San Pietro (1, 22). Near Porto Cervo, small meadow with *Pistacia lentiscus* (14, 22). Santa Teresa di Gallura (14, 22). Sorsu [= Sorso] (1, 22). Spargi Is. (21); ibidem, Cala Granara (18, 22). Taniga (1, 22). Tempio Pausania (14, 22). Nuoro prov.: Bolotana (14, 22). Gairo (22). Near Lanusei (14, 22). Las Plassas, 1.5 km S (14, 22). Tonara, 1.5 km W (14, 22). Monte Spada (14, 22). Seui, Monte Tonneri, 975 m, *Quercus ilex* (17, 22). Gairo, Valle Rio Pardu, *Quercus ilex* (17). Oristano prov.: Bauladu, San Vittore, 150 m (22). Cagliari prov.: Burcei (2, 22). Domusnovas, [Monte Acqua], entrance of the “Grotta di San Giovanni” [81 Sa/CA], humus of *Quercus ilex* (14, 17, 22). Flumentorgiu (2, 22). Guspini, maquis and mosses (14, 22); ibidem, meadow with leaf-litter of *Pistacia lentiscus* (14, 17, 22); ibidem, Ingurtusu (14, 22); ibidem, Montevecchio [emendation for Portovecchio], old mines (14, 22). Stagno di Maracalagonis (14, 22). Nuxis, Monte Nieddu (14, 22). Perdaxius, under *Pistacia lentiscus* (14, 17, 22). San Nicolò Gerrei (22). San Pietro Is. (1). San Sperate (2, 22). Sant’Antioco Is. (14, 22).

**Cave.** Nuoro prov.: Oliena, Monte Corradi, “Grotta S’Abb’a Medica” 335 Sa/NU (type locality of *Geophilus henroti* Manfredi, 1956) (5, 6, 7, 8, 13, 16, 22). Lula, Monte Albo, “Grotta Conca ‘e Crapa” 30 Sa/NU, 1040 m (22).

### Material examined

**Epigeic.** Sassari prov.: Buddusò: 25.V.1980, MB, 1 ex (CMZ). Monte Limbara: 20.IV.2003, LF, 1 ex (CMZ). Thiesi: 5.I.1991, LF, 1 ex (CMZ). Nuoro prov.: Monte Spada: 17.V.1982, GC, 1 ex (CMZ). Nuraghe Loddune, surroundings, hand searching: 25.V.1980, AVT, 1 ex (CMZ); 25.V.1980, CM, 1 ex (CMZ); 25.V.1980, MB, 2 exx (CMZ); 25.V.1980, MZ, 6 exx (CMZ). Oristano prov.: Santa Caterina di Pittinurri, soil washing and Berlese extraction: 25.II.2008, LF, 1 ex (CMZ). Seneghe, soil washing and Berlese extraction: 23.III.2006, LF, 1 ex (CMZ). Cagliari prov.: Arbus, in the village, soil washing and Berlese extraction: 2.X.2006, LF, 3 exx (CMZ). Bolotana, soil washing and Berlese extraction: 6.II.2007, LF, 4 exx (CMZ). Domusnovas, near Gutturu Abis, 580 m, 32S 0468140 4360761, mixed *Quercus ilex* wood, leaf-litter sifting: 10.XI.2006, MZ, 1 ♂ (CMZ). Domusnovas, near Punta Planotzara, 309 m, 32S 0465718 4356515, leaf-litter sifting: 14.XI.2006, GN & MZ, 1 ♂ (CMZ). Gonnosfanadiga, soil washing and Berlese extraction: 9.II.2007, LF, 1 ex 41 lp (CMZ). Guspini, Monte Majori, soil washing and Berlese extraction: 16.X.2006, LF, 1 ex (CMZ). Iglesias, soil washing and Berlese extraction: 10.II.2008, LF, 6 exx (CMZ). Iglesias, Cantoniera Marganai, 491 m, 32S 0462272 4354677, *Quercus ilex* wood, leaf-litter sifting: 9.VI.2004, GN, 1 ♂ (CNBFVR). Iglesias, Case Marganai, 700 m, 32S 0462853 4355582, *Quercus ilex*, leaf-litter sifting: 9.VI.2004, MZ, 1 ♂, 1 ♀ (CMZ). Iglesias, near “Colonia Beneck”, 636 m, 32S 0462391 4355441, 6.IX.2007, CP, 1 ex (CNBFVR). Iglesias, Mamenga, 610 m, 32S 462170 4356618, in calcareous soil (40–50 cm deep) in *Quercus ilex* wood, soil washing and Berlese extraction: 1.III.2006, LF, 3 ♀♀ (CMZ). Iglesias, Marganai, soil washing and Berlese extraction: 16.XII.2006, LF, 4 exx (CMZ). Monti Mannu [Punta Piscina Argiolas], 282 m, small river near guestrooms, *Populus* sp., leaf-litter sifting: 14.XI.2006, MZ, 3 ♂♂ (CMZ). Muravera, San Priamo, soil washing and Berlese extraction: 25.XI.2006, LF, 1 ex (CMZ). San Nicolò Gerrei: 19.II.1991, LF, 6 exx (CMZ). San Vito, Monte Lora, soil washing and Berlese extraction: 19.XII.2006, LF, 1 ♀ (CMZ). Siliqua, Orbai, soil washing and Berlese extraction: 21.III.2008, LF, 1 ex (CMZ). Teulada, soil washing and Berlese extraction: 12.I.2008, LF, 2 ♂♂ 47 lp (CMZ). Villacidro, near River Leni, 300 m, 32S 0469793 4361088, hand searching: 9.XI.2006, MZ, 1 ♀ (CMZ).

**Cave.** Nuoro prov.: Galtelli, Monte Tuttavista, “Pozzo N. 1 di Tres Puntas” 1150 Sa/NU, 750 m: 9.III.2008, PM, 1 ♀ (CMZ).

**General distribution.** Europe: Austria, Bulgaria, Croatia, Denmark (mainland), European Russia, France (mainland, Corsica), Germany, Great Britain, Greece (mainland, Ionian Isl., Crete), Hungary, Ireland, Italy (mainland, Sicily, Sardinia), Montenegro, Norway, Poland, Romania, Slovenia, Sweden, The Netherlands; North Africa: Morocco, Tunisia.

**Chorotype.** European.

**Ecological notes.** 0–1000 m; in *Quercus ilex* woods (7 sites), in *Pistacia lentiscus* (3 sites), *Cistus* sp. and *Juniperus* sp. (1 sites) shrubs as well as in maquis (1 sites); one generic record from meadows is also known; also in riparian habitats (under *Populus* sp., 1 site); three records from caves (750–1040 m; troglodite species). Thirteen records from endogenous habitats. See also Minelli (1983a) and Minelli and Iovane (1987).

**Remarks.** *Geophilus insculptus* Attems, 1895 has recently been demonstrated to be identical to *G. alpinus* Meinert, 1870, and *G. alpinus* has been explicitly adopted as the valid name for this species (Spelda 1999, 2006). Records of *G. vinciguerrae* Silvestri, 1894, *G. proximus* C.L. Koch, 1847 and *G. henroti* Manfredi, 1953, referred by Minelli (1983b) to *G. insculptus*, are here referred to *G. alpinus*.

### 43. *Geophilus carpophagus* Leach, 1815

- 1) *Geophilus sodalis* Berg. Mein.: A. Costa 1885: 9.
- 2) *Geophilus carpophagus* Leach: Silvestri 1898: 686.
- 3) *Geophilus carpophagus* Leach: Attems 1903: 225.
- 4) *Geophilus carpophagus* Leach: Verhoeff 1925a: 655.
- 5) *Geophilus carpophagus* Leach: Attems 1929: 163, fig. 169.
- 6) *Geophilus carpophagus* Leach, 1815: Minelli 1978a: 157.
- 7) *Geophilus carpofagus* [sic] (Leach) [sic]: De Miranda Restivo 1982: 173.
- 8) *Geophilus carpophagus* Leach, 1815: Minelli 1983a: 4.
- 9) *Geophilus carpophagus* Leach 1815: Minelli 1983b: 406.
- 10) *Geophilus carpophagus* Leach: De Miranda Restivo & Guaita 1986: 34.
- 11) *Geophilus carpophagus*: Minelli & Iovane 1987: 28.
- 12) *Geophilus carpophagus* Leach, 1815: Foddai *et al.* 1995: 10.
- 13) *Geophilus carpophagus* Leach, 1815: Foddai *et al.* 1996: 361, tab. I.
- 14) *Geophilus carpophagus* Leach, 1815: Zapparoli & Minelli 2005: CD.

### Literature records

**General.** Sardinia-Corsica (6). Sardinia (3, 4, 5, 9, 12, 13).

**Epigeic.** Sassari prov.: Bono, Passo o'Uccaidu, [1000 m] (8, 14). Monte Limbara, meadow and mosses (8); *ibidem*, Punta Balistreri, 1300 m (8, 14). San Pasquale (8, 14). Tempio Pausania (8, 14). Nuoro prov.: Bolotana (8, 14). Near Bolotana, 1000 m, mosses and lichens on oak stumps (8, 14). Catena del Marghine, towards Bolotana, 1000 m, mosses on stumps of *Quercus* sp. and *Taxus baccata* (8). Fonni (1, 2, 14). Gairo Marina (8, 14). Gennargentu (2, 14); *ibidem*, Monte Spada (8, 14); *ibidem*, Monte Spada, near Fonni (8, 14). Macomer, Monte Sant'Antonio, *Quercus ilex* wood (7). Siniscola (8). Sorgono (14). Ulassai (14). Villagrande Strisaili, Villanova Strisaili, *Quercus ilex*, 850 m (11, 14). Oristano prov.: Monte Arci (14). Cagliari prov.: Domusnovas (8, 14). Guspini (8); *ibidem*, Ingurtusu (8, 14). Isili (2, 14). Monte Sant'Elia (14). Monte [dei] Sette Fratelli (2, 14). Montevecchio, old mines, *Quercus ilex* (8, 14). Quartu (2, 14). Ussana (2, 14).

**Cave.** Cagliari prov.: Iglesias, "Grotta I di Cuccuru Is Piras" 620 Sa/CA (10).

### Material examined

**Epigeic.** Sassari prov.: Monte Limbara: 20.IV.2003, LF, 3 exx 61–65 lp (CMZ). Villanova, Monteleone, soil washing and Berlese extraction: 15.XI.2006, LF, 1 ♂ (CMZ). Nuoro prov.: Belvì, hazel grove, pitfall traps: 21.IX.2005, leg.?, 1 ♀ (IEASS); 28.IX.2005, leg.?, 1 ♀ (IEASS). Bolotana, 4 km N, *Quercus ilex* wood: VII.2000, MZ & MB, 1 ♂, 1 ♀ (CMZ). Esterzili, soil washing and Berlese extraction: 1.XII.2006, LF, 2 ♀♀ (CMZ). Gennargentu, Bruncu Spina, 1800 m, garrigue: 19.IV.1996, AVT, 1 ♂, 5 ♀♀ (CMZ); *ibidem*, Bruncu Spina, 1800 m: 16.III.2000, GO, 2 ♂♂ 51 lp, 1 ♂ 53 lp, 1 ♀ 51 lp (CMZ); *ibidem*, top, 1850 m: 24.I.1899, GD, 1 ♂ 47 lp, 1 ♂ 49 lp, 3 ♂♂ 51 lp, 4 ♀♀ 53 lp (MGE). Fonni (refuge), Gennargentu, 1600 m, *Alnus* sp. shrub, pitfall traps: 9.V.2007, FI, 1 ♀ 53 lp (CMZ). Oristano prov.: Monte Arci, Ales, Serra Quaddaris, 630 m, 39° 46' 89" N, 08° 46' 19" E, in rotten wood block of *Pinus halepensis* (in pinewood near pastures): 25.III.2006,

BI, 2 ♂♂, 2 ♀♀ (CMZ). Monte Arci, *Quercus ilex* wood: 1–4.III.1992, GC, 1 ex (CMZ\*). Cagliari prov.: Arbus, in the village, soil washing and Berlese extraction: 2.X.2006, LF, 1 ♀ (CMZ). Bolotana, soil washing and Berlese extraction: 6.II.2007, LF, 1 ♂ (CMZ). Burcei, near Punta Serpeddì, 785 m, 32S 0526996 4356738, hand searching, *Quercus ilex* wood: 13.XI.2006, BNWZ, 1 ex 53 lp (CMZ). Gonnosfanadiga, soil washing and Berlese extraction: 9.II.2007, LF, 1 ♀ (CMZ). Vacca Is.: 14.VI.1989, GO, 1 ex (CMZ). Villacidro, near River Leni, 300 m, 32S 0469793 4361088, under stones in *Eucalyptus* sp. plantation: 9.XI.2006, GN, 2 exx (CNBFVR).

**Cave.** No records.

**Other.** Nuoro prov.: “*Geophilus carpophagus* Leach”, “M.te Gennargentu/Magg. [= May] 1871/R. Gastro [leg.]”, 1 ♂, 1 ♀ [in Silvestri 1898: 686] (MGE).

**General distribution.** Europe: Albania, Belgium, Croatia, Czech Republic, Denmark (mainland), Finland, France (mainland, Corsica), Germany, Great Britain, Greece (Ionian Isl., Southern Sporades, Crete), Ireland, Italy (mainland, Sicily, Sardinia), Latvia, Montenegro, Norway, Poland, Portugal (mainland, Azores Isl., Madeira Is.), Romania, Slovak Republic, Slovenia, Spain (mainland, Balearic Isl., Canary Isl.), Sweden, The Netherlands; North Africa: Algeria, Morocco, Tunisia; West Asia: Palestine, Turkey.

**Chorotype.** European.

**Ecological notes.** 300–1800 m; mostly in oakwoods (*Quercus ilex*, 5 sites; *Quercus* spp., 2 sites), also in pinewoods (1 site), garrigue (1 site) and montane formations (*Alnus* sp. shrubs, 1 site); vaguely quoted in open habitats (1 site); single records from *Eucalyptus* sp. plantations (1 site) and agricultural habitats (hazel groves, 1 site) are also known; rarely in caves (1 site; troglodyte species). Five records from endogenous habitats. See also De Miranda Restivo (1982), Minelli (1983a) and Minelli and Iovane (1987).

**Remarks.** The record of *Geophilus sodalis* Bergsøe & Meinert, 1866 published by Costa (1885) is referred to this species following Pocock (1890) and Attems (1929). Part of the records from Sardinia published by Silvestri (1898) under this species (two specimens from Gennargentu) have been re-examined and their identification is confirmed.

#### 44. *Geophilus fucorum* Brölemann, 1909a

- 1) *Geophilus fucorum* Brölemann, 1909: Minelli 1983a: 5 [pars?].
- 2) *Geophilus fucorum* Bröl. 1909 [sic]: Minelli 1983b: 406.
- 3) *Geophilus fucorum* (Brölemann, 1909) [sic]: Minelli *et al.* 1994: 496.
- 4) *Geophilus fucorum* Brölemann, 1909: Foddai *et al.* 1995: 10.
- 5) *Geophilus fucorum* Brölemann, 1909: Foddai *et al.* 1996: 361, 361, tab. I.
- 6) *Geophilus fucorum* Brölemann, 1909: Zapparoli & Minelli 2005: CD.

#### Literature records

**General.** Sardinia (2, 4, 5).

**Epigeic.** Sassari prov.: Molarotto Is. (1, 3, 6). Oddastru, humus of *Pistacia lentiscus*, *Quercus ilex* and *Cistus* sp. (1, 6). Olbia, surroundings (1, 6). Porto Cervo, Monte Villico (1, 6). San Pasquale, meadow with mosses and *Quercus ilex* (1, 6). Sant’Antonio, La Magione (= Maciona) (1, 6). Oristano prov.: Oristano (1, 6).

**Cave.** No records.

#### Material examined

**Epigeic.** Sassari prov.: Asinara Is., Cala Reale, under stranded *Posidonia*, m 0-1, hand searching: 21.X.2009, 1 ex, LP (CMZ); ibidem, Porto Pagliaccia, under stranded *Posidonia*, m 0-1, hand searching: 22.X.2009, 1 ex, LP (CMZ).

**Cave.** No records.

**General distribution.** Europe: France (mainland Mediterranean coast), Italy (mainland, Sicily, Sardinia) (Brölemann 1930; Zapparoli & Minelli 2005; Minelli 2006; Minelli & Bonato in press); also recorded from Majorca Is. (Balearic Isl., Spain) (Capuse 1975, as *Pachymerium dragani* Capuse, 1975; Minelli 2006); doubtfully quoted from the Devonshire coast (England) by Eason (1964). Minelli (2006) raised *Geophilus fucorum seurati* Brölemann, 1924, from Algeria, to species rank and stated that records from regions other than North Africa are uncertain.

**Chorotype.** W-Mediterranean.

**Ecological notes.** A littoral species (2 sites under stranded *Posidonia*), but two records from *Quercus ilex* woods are also known (Minelli 1983a).

**Remarks.** Records from non-littoral localities (Oddastru; Porto Cervo, Monte Villico; San Pasquale; Sant'Antonio, La Magione: Minelli 1983a) are uncertain and may refer to *G. osquidatum* Brölemann, 1909.

#### 45. *Geophilus minimus* Verhoeff, 1928

- 1) *Geophilus minimus* Verhoeff, 1928: Minelli 1983a: 8.
- 2) *Geophilus minimus* Verh. 1928 [sic]: Minelli 1983b: 406.
- 3) *Geophilus minimus* Verhoeff, 1928: Foddai *et al.* 1995: 10.
- 4) *Geophilus minimus* Verhoeff, 1928: Foddai *et al.* 1996: 361, tab. I.
- 5) *Geophilus minimus* Verhoeff, 1928: Zapparoli & Minelli 2005: CD.

#### Literature records

**General.** Sardinia (2, 3, 4).

**Epigeic.** Nuoro prov.: Arcu Correboi (1, 5). Cagliari prov.: Fluminimaggiore (1, 5). Silius (5).

**Cave.** No records.

#### Material examined

**Epigeic.** Nuoro prov.: Lula, Monte Albo, NW side, Punta Catirina, *Quercus ilex* wood, 600 m: 29.IV.2008, GA, 2 exx 37 lp (CMZ). Osini, near La Scala di San Giorgio, *Quercus ilex* wood on limestone: 1.IV.2008, CT, 1 ex 39 lp (CMZ). Perdasdefogu, road to Tertenia (under a scrub): 4.IV.2008, CT, 2 exx 35 and 37 lp (CMZ). Urzulei, *Quercus suber* with *Erica* sp. wood: 5.IV.2008, CT, 2 exx 33 and 35 lp (CMZ). Cagliari prov.: Dolianova: 3.V.2002, leg.?, 2 exx 37 and 39 lp (CMZ). Flumentorgiu: V.1894, leg.?, 1 ex 37 lp “? *Geophilus cordylogaster* Latz.” F. Silvestri det. (MGE). Iglesias, Cantoniera Marganai, 491 m, 32S 0462272 4354677, *Quercus ilex* wood, leaf-litter sifting: 9.VI.2004, GN, 1 ex 35 lp (CMZ).

**Cave.** Nuoro prov.: Lovettecannas, Supramonte di Baunei, “Grotta di Lovettecannas” 2642 Sa/NU, 930 m: 5.VI.2005, PM, 1 ♀ 9.5 mm long, 33 lp; antennae 3.0 mm long (CMZ).

**General distribution.** Europe: Italy (Liguria, Tuscany, Sardinia).

**Chorotype.** Tyrrhenian endemic, S-European affinities (?).

**Ecological notes.** 600-930 m; few data are available on this epigeic species: in *Quercus ilex* (2 sites) and in *Q. suber* with *Erica* sp. woods (1 site); occasionally in caves (1 site, 930 m a.s.l.; troglone species).

#### 46. *Geophilus osquidatum* Brölemann, 1909b

- 1) *Geophilus osquidatum* Brölemann, 1909: Minelli 1983a: 5.
- 2) *Geophilus osquidatum* Bröl. 1909: Minelli 1983b: 406.
- 3) *Geophilus osquidatum*: Minelli & Iovane 1987: 28, 30.
- 4) *Geophilus osquidatum* Brölemann, 1909: Minelli *et al.* 1994: 496.
- 5) *Geophilus osquidatum* Brölemann, 1909: Foddai *et al.* 1995: 10.

- 6) *Geophilus osquidatum* Brölemann, 1909: Foddai *et al.* 1996: 361, tab. I.  
7) *Geophilus osquidatum* Brölemann, 1909: Zapparoli & Minelli 2005: CD.

### Literature records

**General.** Sardinia (2, 5, 6).

**Epigeic.** Sassari prov.: Figarolo Is. (4, 6, 7). Lago di Liscia (1, 7). Between Luogosanto and Tempio Pausania (1, 7). Maddalena Is. (6, 7); *ibidem*, Baia dell'Annegato (4, 7); *ibidem*, Penisola Abbatoggia, W[estern side] (4, 7). Molaro Is. (4, 6, 7). Molarotto Is. (1, 7). Oschiri, surroundings (1, 7). Porto Cervo, Monte Villico (7). San Pasquale (7). Santa Maria Is. (4, 6, 7). Tavolara Is. (4, 6, 7). Tempio Pausania, *Quercus suber* (1, 3, 7). Nuoro prov.: Arcu Correboi (1, 7). Aritzo (1, 7). Baunei (7). Fonni, Taloro River (1, 7). Lago di Gusana (1, 7). Laconi (1, 7); *ibidem*, *Quercus ilex* (3, 7). Lula (7). Monte Spada (1, 7). Oliena, Punta Sos Nidos, 1000 m (1, 3, 7). Oniferi (1, 7). Sedilo, 2.5 km SE (1, 7). Seui, Foresta di Montarbu (7). Seui, Monte Tonneri, 975 m, *Quercus ilex* (3, 7). Silanus, 400 m (7). Monte Turuddò (7). Oristano prov.: Monte Arci, 800 m (7). Monte Ferru (1, 7). Cagliari prov.: Cagliari (7). Colle della Campanasissa (1, 7). Fluminimaggiore (1, 7); *ibidem*, Rio Aretos, *Quercus ilex* (3, 7). Guspini (1, 7); *ibidem*, *Pistacia lentiscus* (3). Near Iglesias (1, 7). Between Is Scattas and Is Carillus (1, 7). Montevecchio (1, 7); *ibidem*, *Quercus ilex* (3). San Nicolò Gerrei (7). Seddas Moddizzis (1, 7); *ibidem*, *Quercus ilex* (3). Villacidro (7).

**Cave.** Nuoro prov.: Dorgali, "Grotta Pisanu" 215 Sa/NU, 400 m (7).

### Material examined

**Epigeic.** Sassari prov.: Golfo Aranci, soil washing and Berlese extraction: 5.III.2000, LF, 2 exx 51 lp (CMZ). Ittiri, soil washing and Berlese extraction: 10.I.2008, LF, 1 ex 49 lp, 1 ex 51 lp (CMZ). Romana, Rio Melas, soil washing and Berlese extraction: 23.XII.2006, LF, 1 ex 45 lp (CMZ). Trinità d'Agultu, soil washing and Berlese extraction: 7.II.2007, LF, 1 ex 47 lp (CMZ). Nuoro prov.: Elini, "Bosco del Carmine", *Quercus ilex* wood: 1.IV.2008, CT, 1 ex 45 lp (CMZ). Lula, Monte Albo, walk to Punta Ferulargiu, 850 m: 29.IV.2008, GA, 2 ex 47 lp, 7 exx 49 lp, 1 ex 51 lp, 1 ex 47 lp and a rudimental claw on the last pair of legs (CMZ); *ibidem*, Monte Albo, NW side, Punta Catirina, 600 m, *Quercus ilex* wood: 29.IV.2008, GA, 9 exx (CMZ). Monte Lollove, soil washing and Berlese extraction: 4.XII.2006, LF, 2 exx 43 lp, 1 ex 45 lp (CMZ). Orune, Monte Nuschele, soil washing and Berlese extraction: 8.II.2007, LF, 2 exx 45 lp, 3 exx 47 lp, 1 ex 49 lp (CMZ). Oristano prov.: Sedilo, soil washing and Berlese extraction: 18.III.2006, LF, 1 ex 47 lp (CMZ). Seneghe, soil washing and Berlese extraction: 23.III.2006, LF, 1 ex 43 lp, 1 ex 45 lp, 3 exx 47 lp (CMZ). Ula Tirso, soil washing and Berlese extraction: 28.XI.2006, LF, 2 exx (CMZ). Cagliari prov.: Arbus, in the village, soil washing and Berlese extraction: 2.X.2006, LF, 1 ex 41 lp (CMZ). Bolotana, soil washing and Berlese extraction: 6.II.2007, LF, 3 exx 43 lp, 1 ex 45 lp (CMZ). Cagliari, in the town, soil washing and Berlese extraction: 3.X.2006, LF, 10 exx (CMZ). Gonnosfanadiga, soil washing and Berlese extraction: 23.II.2004, LF, 1 ex 41 lp, 1 ex 45 lp (CMZ). Guspini, Monte Majori, soil washing and Berlese extraction: 16.X.2006, LF, 1 ex 45 lp (CMZ). Iglesias, Cantoniera Marganai, 491 m, 32S 0462272 4354677, *Quercus ilex* wood, leaf-litter sifting: 9.VI.2004, GN, 1 ex 51 lp (CMZ). Muravera, San Priamo, soil washing and Berlese extraction: 25.XI.2006, LF, 32 exx (CMZ). Nuxis, Campanasissa, soil washing and Berlese extraction: 27.XI.2006, LF, 1 ex 45 lp (CMZ). Serri, soil washing and Berlese extraction: 13.IV.2005, LF, 1 ex 43 lp, 1 ex 45 lp (CMZ). Teulada, soil washing and Berlese extraction: 26.II.2003, LF, 1 ex 47 lp, 1 ex 49 lp (CMZ). Villamassargia, Monte San Miali, soil washing and Berlese extraction: 9.II.2007, LF, 1 ex 43 lp, 1 ex 45 lp (CMZ).

**Cave.** No records.

**General distribution.** Europe: Czech Republic, France (mainland), Germany, Great Britain (south-west), Italy (mainland, Sicily, Sardinia), Spain (see also Minelli 2006).

**Chorotype.** S-European.

**Ecological notes.** 0–1000 m a.s.l.; mostly in oakwoods (*Quercus ilex*, 7 sites; *Q. suber*, 1 site), also under *Pistacia lentiscus* (1 site); occasionally in caves (1 site, 400 m; troglone species). Nineteen records from endogenous habitats. See also Minelli (1983a) and Minelli and Iovane (1987).

#### 47. *Geophilus piae* Minelli, 1983

- 1) *Geophilus piae* Minelli, 1983a: 6, figs 1, 2.
- 2) *Geophilus piae*: Minelli 1983b: 406.
- 3) *Geophilus piae* Minelli, 1983: Foddai *et al.* 1995: 10.
- 4) *Geophilus piae* Minelli, 1983: Foddai *et al.* 1996: 361, tab. I.
- 5) *Geophilus piae* Minelli, 1983: Zapparoli & Minelli 2005: CD.

#### Literature records

**General.** Sardinia (2, 3, 4).

**Epigeic.** Sassari prov.: Lago di Coghinas, humus of *Quercus* spp. and *Cistus* sp. (1, 5). Oddastru, humus under *Pistacia lentiscus*, *Quercus ilex* and *Cistus* sp. (1, 5). San Pasquale (type locality of *Geophilus piae* Minelli, 1983a) (1, 5). Nuoro prov.: Punta Sos Nidos, 1000 m (1, 5). Cagliari prov.: Guspini, meadow with *Pistacia lentiscus* (1, 5). Iglesias (5).

**Cave.** No records.

#### Material examined

No records.

**General distribution.** Europe: Italy (Tuscan Archipelago: Giannutri Is., Sardinia, Sicily) (Minelli 1983a; Minelli & Iovane 1987).

**Chorotype.** Tyrrhenian endemic, S-European affinities (?).

**Ecological notes.** Only one record from 1000 m a.s.l. but the species is also present at lower elevations; two records from oakwoods (*Quercus ilex*, 1 site; *Quercus* spp., 1 site); also in open Mediterranean habitats with *Pistacia lentiscus* (1 site); no records from caves.

#### 48. *Geophilus punicus* Silvestri, 1896a

- 1) *Geophilus flavus* (De Geer) v. *punicus* Silv.: Silvestri 1898: 686.
- 2) ? *Geophilus flavidus* Koch: Verhoeff 1925a: 655.
- 3) *Geophilus longicornis* Leach: Attems 1929: 173 [pars].
- 4) *Geophilus longicornis longicornis* Leach: Attems 1949: 108.
- 5) *Necrophloeophagus longicornis* (Leach, 1815): Minelli 1978a: 157 [pars].
- 6) *Geophilus flavus* v. *punicus* Silv.: Minelli 1983b: 402.
- 7) *Geophilus flavus* (DeGeer, 1778): Foddai *et al.* 1995: 10 [pars].
- 8) *Geophilus flavus* (DeGeer, 1778): Foddai *et al.* 1996: 361, tab. I.
- 9) *Geophilus flavus* (DeGeer, 1778): Zapparoli & Minelli 2005: CD [pars].
- 10) *Geophilomorpha* [indet.]: Grafitti 2001b: 36.

#### Literature records

**General.** Sardinia-Corsica (5). Sardinia (2, 3, 4, 6, 7, 8).

**Epigeic.** Nuoro prov.: Fonni, Rio Taloro (9). Cagliari prov.: Guspini (9). Quartu (1). Ussana (1).

**Cave.** Oliena, Lanaittu, “Grotta di Sas Ballas” 106 Sa/NU (10).

### Material examined

**Epigeic.** Sassari prov.: Sedilo, 250 m: 14.XII.2003, AC, 1 ex 47 lp (CMZ).

**Cave.** Nuoro prov.: Oliena, Lanaittu, “Grotta di Sas Ballas” 106 Sa/NU: 28.VIII.1999, CO, 1 ♀ 49 lp (GSS) [in Grafitti 2001b: 36 under “Geophilomorpha”]; 28.VIII.1999, CO, 1 ♀ 49 lp (CMZ) [in Grafitti 2001b: 36 under “Geophilomorpha”].

**General distribution.** Europe: Italy (Sicily, Sardinia); North Africa: Tunisia (Silvestri 1896a, 1897, 1898).

**Chorotype.** W-Mediterranean.

**Ecological notes.** Only one record from 250 m a.s.l. of this epigeic species, the habitat preferences of which are unknown apart from one record from caves (trogloxene species).

**Remarks.** Originally described as *G. flavus* v. *punicus* by Silvestri (1896a), treated at species rank in the World Catalogue of Centipedes by Minelli (2006). The generic quotation of “*Geophilus flavidus* Koch” for Sardinia published by Verhoeff (1925a) is probably due to a misreading of Silvestri’s (1898) record of *Geophilus flavus punicus*. The two unidentified specimens of Geophilomorpha from Oliena, Lanaittu, “Grotta di Sas Ballas” 106 Sa/NU quoted by Grafitti (2001b) have been here examined and refer to this species.

### 49. *Geophilus richardi* Brölemann, 1904

- 1) *Geophilus richardi* Brölemann, 1904: Minelli 1983a: 8.
- 2) *Geophilus richardi* Bröl. 1904 [sic]: Minelli 1983b: 406.
- 3) *Geophilus richardi*: Minelli & Iovane 1987: 30.
- 4) *Geophilus richardi* (Brölemann, 1904) [sic]: Foddai *et al.* 1995: 10.
- 5) *Geophilus richardi* (Brölemann, 1904) [sic]: Foddai *et al.* 1996: 361, tab. I.
- 6) *Geophilus richardi* (Brölemann, 1904) [sic]: Zapparoli & Minelli 2005: CD.

### Literature records

**General.** Sardinia (2, 4, 5).

**Epigeic.** Sassari prov.: Tempio Pausania, small meadow with mosses and humus of *Quercus suber* (1, 3, 6). Cagliari prov.: Perdaxius, meadow with mosses and *Pistacia lentiscus* (1, 3, 6).

**Cave.** No records.

### Material examined

**Epigeic.** Cagliari prov.: Buggerru, near Mine of San Luigi, 347 m, 32S 0452771 4358704, leaf-litter sifting: 11.XI.2006, MZ, 10 exx (CMZ). Cala Regina: IV.2004, LF, 1 ex (CMZ).

**Cave.** No records.

**General distribution.** Europe: France (mainland), Greece (Ionian Isl.), Italy (mainland, Sicily, Sardinia).

**Chorotype.** Mediterranean.

**Ecological notes.** 0–350 m a.s.l.; only two records from *Quercus suber* and *Pistacia lentiscus*, respectively; no records from caves. See also Minelli (1983a) and Minelli and Iovane (1987).

### *Eurygeophilus* Verhoeff, 1899a

#### 50. *Eurygeophilus multistiliger* (Verhoeff, 1899a)

- 1) *Eurygeophilus multistiliger* (Verhoeff, 1889): Bonato *et al.* 2006: 435, figs 5–13, 19.
- 2) *Eurygeophilus multistiliger* (Verhoeff, 1889): Vadell & Pons 2008: 174.

### Literature records

**General.** No records.

**Epigeic.** Cagliari prov.: Sarrabus, Campu Omu (1, 2).

**Cave.** No records.

#### Material examined

**Epigeic.** Oristano prov.: Ula Tirso, soil washing and Berlese extraction: 28.XII.2006, LF, 1 ♂ 47 lp (CMZ).

**General distribution.** Europe: Iberian peninsula (including Balearic Isl.), France (eastern Pyrenees), Italy (Sardinia) (Verhoeff 1899a; Bonato *et al.* 2006; Vadell & Pons 2008).

**Chorotype.** W-Mediterranean.

**Ecological notes.** No data, the only specimen here examined was collected in an endogenous habitat.

**Remarks.** The single female recorded by Bonato *et al.* (2006) has 49 lp.

#### *Stenotaenia* C. L. Koch, 1847

##### 51. *Stenotaenia romana* (Silvestri, 1895)

- 1) *Geophilus romanus* Silvestri, 1896 [sic]: Minelli 1983a: 8.
- 2) *Geophilus romanus* Silv. 1896 [sic]: Minelli 1983b: 406.
- 3) *Geophilus romanus* Silvestri, 1896 [sic]: Foddai *et al.* 1995: 10.
- 4) *Geophilus romanus* Silvestri, 1896 [sic]: Foddai *et al.* 1996: 361, tab. I.
- 5) *Stenotaenia romana* (Silvestri, 1895): Bonato & Minelli 2008: 272, 285, figs 3, 5.

#### Literature records

**General.** Sardinia (2, 3, 4, 5).

**Epigeic.** Sassari prov.: Olbia (1, 5).

#### Material examined

No records.

**General distribution.** Europe: Italy (mainland, Sardinia) (Bonato & Minelli 2008).

**Chorotype.** W-Alpino-Apenninic endemic; European affinities.

**Ecological notes.** No data.

**Remarks.** Genus attribution according to Bonato and Minelli (2008). As the only known record of this species from Sardinia was collected near a port, its presence on the island may be related to unintentional introduction by humans.

##### 52. *Stenotaenia sorrentina* (Attems, 1903)

- 1) *Geophilus forficularius* Fanzago 1881a: 378.
- 2) *Geophilus forficularius* Fanzg.: Fanzago 1881b: 13.
- 3) *Clinopodes linearis* (C.L. Koch, 1835): Minelli 1978a: 158.
- 4) *Clinopodes linearis* (C.L. Koch, 1835): Minelli 1983a: 8.
- 5) *Clinopodes linearis* (C.L. Koch 1835): Minelli 1983b: 406.
- 6) *Geophilus linearis*: Minelli & Iovane 1987: 28.
- 7) *Geophilus linearis* (C.L. Koch, 1835): Minelli *et al.* 1994: 496.
- 8) *Geophilus abbreviatus* Verhoeff, 1925: Foddai *et al.* 1995: 9.
- 9) *Geophilus linearis* C.L. Koch, 1835: Foddai *et al.* 1995: 10.



- 10) *Geophilus abbreviatus* Verhoeff, 1925: Foddai *et al.* 1996: 361, tab. I.
- 11) *Geophilus linearis* C.L. Koch, 1835: Foddai *et al.* 1996: 361, tab. I.
- 12) *Geophilus abbreviatus* Verhoeff, 1925: Zapparoli & Minelli 2005: CD.
- 13) *Geophilus linearis* C.L. Koch, 1835: Zapparoli & Minelli 2005: CD.
- 14) *Stenotaenia sorrentina* (Attems, 1903): Bonato & Minelli 2008: 273, 286, fig. 6.

### Literature records

**General.** Sardinia-Corsica (3). Sardinia (5, 8, 9, 10, 11).

**Epigeic.** Sassari prov.: Maddalena Is. (4, 7, 11, 13). Monte Limbara, Punta Balistreri, 1300 m (4, 13, 14). Sant'Antonio, La Magione (= Maciona) (4, 14). Sassari, surroundings (1, 2). Nuoro prov.: Dualchi, 400 m (12). Silanus, 400 m (13). Oristano prov.: Monte Arci (13). Cagliari prov.: Guspini, mosses and humus of *Quercus ilex* (4, 6, 13). Between Is Palaceris and Is Cannoneris, mosses (4, 13). San Nicolò Gerrei (12).

**Cave.** No records.

### Material examined

**Epigeic.** Sassari prov.: Castelsardo, soil washing and Berlese extraction: 8.II.2007, LF, 3 exx (CMZ). Gallura, Olmedo, 2 km W: 29.IV.1989, leg.?, 1 damaged ex > 55 lp (CMZ). Ittiri, soil washing and Berlese extraction: 15.I.2008, LF, 1 ex 63 lp (CMZ). Monte Limbara: 20.IV.2003, LF, 1 ex 63 lp (CMZ). Romana, Rio Melas, soil washing and Berlese extraction: 23.XII.2006, LF, 6 exx 61 lp (CMZ). Nuoro prov.: Gennargentu, Bruncu Spina, soil washing and Berlese extraction: 1.V.2006, LF, 1 ex (CMZ). Oristano prov.: Monte Arci: 7.III.2003, LF, 1 ex 57 lp (CMZ); ibidem, under *Erica arborea* and *Arbutus unedo*: 1–4.III.1992, GC, 1 ex (CMZ\*). Ula Tirso, soil washing and Berlese extraction: 28.XII.2006, LF, 3 exx, 1 ex 61 lp (CMZ). Cagliari prov.: Dolianova: 3.V.2002, LF, 2 exx 57–59 lp (CMZ). Iglesias, Genna Bogai, soil washing and Berlese extraction: 5.II.2004, LF, 2 exx 61 lp (CMZ). Muravera, San Priamo, soil washing and Berlese extraction: 25.XI.2006, LF, 3 exx 61 lp, 1 ex 65 lp (CMZ). San Vito, Monte Lora, soil washing and Berlese extraction: 19.XII.2006, LF, 1 ex 61 lp (CMZ). Villacidro, Rio Cannisoni, 390 m, 32S 0469095 4362383, leaf-litter sifting: 9.XI.2006, MZ, 3 exx 61 lp (CMZ); ibidem, hand searching: 9.XI.2006, DW, 1 ex 61 lp (CMZ).

**Cave.** No records.

**General distribution.** Europe: Italy (mainland, Sardinia, Sicily?), France (Corsica?); records from other regions, mainly in the Balkans, need to be reassessed (Bonato & Minelli 2008).

**Chorotype.** Italian endemic; European affinities.

**Ecological notes.** 0–1300 m; in *Quercus ilex* woods (2 sites), under *Erica arborea* and *Arbutus unedo* (1 site); no records from caves. Eight records from endogenous habitats. See also Minelli (1983a) and Minelli and Iovane (1987).

**Remarks.** Genus attribution and synonymies of *Geophilus forficularius* Fanzago, 1881a and *G. abbreviatus* Verhoeff, 1925c according to Bonato and Minelli (2008). The generic quotation for Sardinia of *Geophilus linearis* C.L. Koch, 1835 published by Minelli (1978a, 1983b, in both cases as *Clinopodes l.*) and Foddai *et al.* (1995, 1996) as well as the records of Minelli (1983a, as *Clinopodes l.*, partly re-examined by Bonato & Minelli 2008), Minelli and Iovane (1987), Minelli *et al.* (1994) and Zapparoli and Minelli (2005) are also referred to this species following Bonato and Minelli (2008).

### Tuoba Chamberlin, 1920

#### 53. *Tuoba poseidonis* (Verhoeff, 1901)

- 1) *Clinopodes poseidonis* (Verhoeff, 1901): Minelli 1978a: 158.
- 2) *Clinopodes poseidonis* (Verhoeff, 1901): Minelli 1983a: 8.
- 3) *Clinopodes poseidonis* (Verh. 1901): Minelli 1983b: 406.

- 4) *Geophilus poseidonis*: Foddai *et al.* 1994: 14.
- 5) *Clinopodes poseidonis* (Verhoeff, 1901): Minelli *et al.* 1994: 497.
- 6) *Geophilus poseidonis* Verhoeff, 1901: Foddai *et al.* 1995: 10.
- 7) *Geophilus poseidonis* Verhoeff, 1901: Foddai *et al.* 1996: 361, tab. I.
- 8) *Geophilus poseidonis* Verhoeff, 1901: Zapparoli & Minelli 2005: CD.

#### Literature records

**General.** Sardinia-Corsica (1§). Sardinia (3, 6).

**Epigeic.** Sassari prov.: Figarolo Is. (4, 5, 7, 8). Nuoro prov.: Dorgali, Cala Gonone (2, 8). Oristano prov.: Is Arenas, beach (2, 8).

**Cave.** No records.

#### Material examined

**Epigeic.** Sassari prov.: Asinara Is., Cala Sant'Andrea, pitfall traps: 15/17.V.2004, AM & AS, 7 exx (IEASS); 25/27.IX.2003, AM & AS, 3 exx (IEASS); ibidem, Cala Arena, pitfall traps: 15/17.V.2004, AM & AS, 1 ex (IEASS); ibidem, Cala Reale, m 0-1, hand searching: 21.X.2009, LP, 1 ex (CMZ).

**Cave.** No records.

**General distribution.** Europe: Finland, France (mainland, Corsica), Greece (mainland, insular), Italy (mainland, Sicily, Sardinia), Slovenia; North Africa: Egypt (Red Sea); Westa Asia: Jordan (Dead Sea); Austral Africa: Somalia.

**Chorotype.** Mediterranean.

**Ecological notes.** Sea level; all records have been collected along the sea coast under stranded *Posidonia* sp. or debris.

#### 54. *Geophilidae* sp. nov.

#### Material examined

**Epigeic.** Cagliari prov.: Iglesias, Mamenga, 610 m, 32S 462170 4356618, in calcareous soil (40–50 cm deep) in *Quercus ilex* wood, soil washing and Berlese extraction: 1.III.2006, LF, 1 ex (CMZ).

**Cave.** No records.

**Remarks.** A specimen with 91 pairs of legs belonging to an undescribed species of uncertain identity, not included in the *Geophilidae* fauna of the island, and collected in an endogenous habitat, has been examined.

#### *Geophilomorpha* indet.

- 1) *Geophilus* sp.: A. Costa 1882: 28.
- 2) *Geophilus* sp.: A. Costa 1883: 81.
- 3) *Geophilidae* indet.: Cherri 1977: 19.
- 4) *Geophilus* sp.: De Miranda Restivo & Guaita 1986: 35.
- 5) *Geophilidae* indet.: Grafitti & De Waele 1996: 33.
- 6) *Geofilomorfi*: Lana *et al.* 2006: 45.
- 7) *Geophilidae* [indet.]: Grafitti 2007b: 224, 226, 227.

#### Literature records

**General.** No records.

**Epigeic.** Sassari prov.: Monte Limbara (2). Tempio [Pausania] (1).

**Cave.** Oristano prov.: Cuglieri, Monte Santu, “Grotta di Monte Santu” 206 Sa/OR, 41 m (7). Cagliari prov.: Iglesias, “Grotta III di Monte Figu” 631 Sa/CA (4). Iglesias, “Grotta del Pipistrello” 310 Sa/CA (3, 5). Santadi, “Grotta Risorgente di Su Buddidroxu” 2704 Sa/CA (6).

**Remarks.** Quotations based on specimens of uncertain identity.

### Unreliable records

The following species and records are not included in the present catalogue for the reasons discussed below.

### Chilopoda indet.

- 1) Chilopoda indet.: Altara 1968: 24.
- 2) [Chilopoda indet.]: Puddu 1980: 47.
- 3) [Chilopoda indet.]: De Waele 1996: 4.
- 4) Chilopoda indet.: Grafitti 2007a: 395.

### Literature records

**General.** No records.

**Epigeic.** No records.

**Cave.** Nuoro prov.: Ulassai, “Grotta di Su Marmori” or “Grutta de Su Marmuri” 55 Sa/NU [880 m] (1, 3). Ulassai, “Grotta di Lecorci” 660 SA/NU (2). Ulassai, “Grotta del Porcellino” 692 SA/NU (4). Nuoro prov./Cagliari prov.: Monte Cardiga, Su Pranu, “Grotta S’Angurtigorgiu Mannu” 4 Sa/CA–NU, 470 m (2).

**Remarks.** The record of a single unidentified specimen collected in a crack of a wall 400 m from the entrance in “Grotta di Su Marmori” Ulassai (Nuoro province), quoted and defined as troglobitic by Altara (1968), probably belongs to *Lithobius doderoi*, the only species of centipede known to date from the cave. The same can be said of the generic record of centipedes quoted by De Waele (1996). The quotation of depigmented centipedes in “Grotta S’Angurtigorgiu Mannu” 4 Sa/CA–NU by Puddu (1980) probably refers to *Lithobius doderoi* or to *L. sardous*, recorded in the cave by Grafitti and Zapparoli (1995) (see above).

### *Lithobius (Lithobius) calcaratus* C.L. Koch, 1844

- 1) *Lithobius calcaratus* C. Koch: Fanzago 1881b: 7.
- 2) *Lithobius (Archilithobius) calcaratus* C. Koch: Silvestri 1898: 683.
- 3) *Lithobius calcaratus* Koch: Verhoeff 1925a: 656.
- 4) *Lithobius calcaratus* C. Koch: Attems 1949: 116.
- 5) *Lithobius (Lithobius) calcaratus* C. L. Koch, 1844: Minelli 1978a: 154.
- 6) *Lithobius calcaratus* Koch 1844: De Miranda Restivo 1983: 113.
- 7) *Lithobius calcaratus* C.L. Koch 1844: Minelli 1983b: 408.
- 8) *Lithobius calcaratus* C.L. Koch, 1844: Foddai *et al.* 1995: 5.
- 9) *Lithobius calcaratus* C.L. Koch, 1844: Foddai *et al.* 1996: 360, tab. I.
- 10) *Lithobius lapidicola* Meinert, 1872: Zapparoli & Minelli 2005: CD [pars].

### Literature records

**General.** Sardinia-Corsica (5). Sardinia (3, 4, 7, 8, 9).

**Epigeic.** Sassari prov.: Sassari, surroundings (1, 2, 6). Sant’Anatolia (1, 2, 10).

**Remarks.** A W-European species quoted in Italy from mainland regions only, mostly in xerophilous habitats (Minelli & Iovane 1987; Minelli & Zapparoli 2005; Zapparoli 2006). Although repeated by the subsequent Authors (Silvestri 1898; De Miranda Restivo 1983), the old quotations of *Lithobius calcaratus* from Sassari province by Fanzago (1881b) have never been confirmed in spite of the fact the species was included in all the lists of Sardinian centipedes published to date (Verhoeff 1925a; Minelli 1978a, 1983b; Foddai *et al.* 1995, 1996). Zapparoli and Minelli (2005) tentatively assigned the record from Sant'Anatolia to *Lithobius lapidicola*, but all of Fanzago's (1881b) records are uncertain and must be referred to a different unidentified species of the same genus.

### ***Lithobius (Lithobius) dentatus* C.L. Koch, 1844**

- 1) *Lithobius* (s. s.) *dentatus* C. Koch: Fanzago 1881b: 3.
- 2) *Lithobius* (s. s.) *dentatus* C. Koch: Silvestri 1898: 681.
- 3) *Lithobius dentatus* Koch: Verhoeff 1925a: 656.
- 4) *Lithobius dentatus* C. Koch: Attems 1949: 114.
- 5) *Lithobius dentatus* Koch 1844: De Miranda Restivo 1983: 114 [pars].

#### **Literature records**

**General.** Sardinia (3, 4).

**Epigeic.** Sassari prov.: Bunnari (1, 2, 5). Giave (1, 2, 5). Osilo (1, 2, 5). Porto Torres (1, 2, 5). Sant'Anatolia (1, 2). Sassari, surroundings (1, 2, 5). Sorso (1, 2, 5).

**Remarks.** A Central European species, mostly associated in Italy to the coniferous and broadleaved forests of the northern regions (Minelli & Iovane 1987; Minelli & Zapparoli 2005). Although Fanzago (1881b) quoted this species from many localities of the province of Sassari (see also Silvestri 1898; De Miranda Restivo 1983), its presence in Sardinia has never been confirmed by more recent data (Foddai *et al.* 1995; Zapparoli & Minelli 2005), even though the species was included in the lists of Sardinian centipedes published by Verhoeff (1925a) and Attems (1949). Old literature records must be referred to a different unidentified species of *Lithobius*, except those from Tempio Pausania published by De Miranda Restivo (1983), here re-examined and referred to *L. turritanus* (see above).

### ***Lithobius (Lithobius) erythrocephalus* C.L. Koch, 1847**

- 1) *Lithobius erythrocephalus* C. Koch: Fanzago 1881b: 8.
- 2) *Lithobius (Archilithobius) erythrocephalus* C. Koch: Silvestri 1898: 683.
- 3) *Lithobius erythrocephalus* Koch: Verhoeff 1925a: 656.
- 4) *Lithobius erythrocephalus* C. Koch: Attems 1949: 113.
- 5) *Lithobius (Lithobius) erythrocephalus* C. L. Koch, 1847: Minelli 1978a: 154.
- 6) *Lithobius erythrocephalus* Koch 1847: De Miranda Restivo 1983: 114.
- 7) *Lithobius erythrocephalus* C. Koch: Minelli 1983b: 403.
- 8) *Lithobius erythrocephalus* C. L. Koch, 1847: Foddai *et al.* 1995: 6.
- 9) *Lithobius erythrocephalus* C. L. Koch, 1847: Foddai *et al.* 1996: 360, tab. I.

#### **Literature records**

**General.** Sardinia-Corsica (5). Sardinia (3, 4, 7, 8, 9).

**Epigeic.** Sassari prov.: Sassari, surroundings (1, 2, 6).

**Remarks.** A European species, mostly spread in the whole continent except for its western part; also present in Near and Middle East; introduced in Iceland and in Saudi Arabia; known in Italy from all regions (Zapparoli and Minelli 2005; Zapparoli 2006); records from Azores Isl., Great Britain, Madeira Is., Spain and North Africa are not reliable and due to misdeterminations (Eason & Serra 1981; Barber 1985; Eason 1985). Although repeated by the subsequent Authors (Silvestri 1898; Verhoeff 1925a; Attems 1949; Minelli 1978a; De Miranda Restivo 1983; Foddai *et al.* 1995, 1996), the single quotation from Sardinia by Fanzago (1881b) has never been confirmed (see also Minelli 1983b) and probably refers to *Lithobius turritanus*.

#### ***Lithobius (Lithobius) infossus* Silvestri, 1894**

- 1) *Lithobius dahli* Verh.: Manfredi 1956: 207.
- 2) *Lithobius dahli* Ver.: Cerruti 1968: 231, fig. 12.
- 3) *Lithobius dahli* Verhoeff: Puddu and Pirodda 1974: 176.
- 4) *Lithobius (Lithobius) dahli* Verhoeff, 1925: Minelli 1978a: 155.
- 5) *Lithobius dahli* Verhoeff: Cassola 1982: 670, 695, 707.
- 6) *Lithobius dahli* Verh. 1925: De Miranda Restivo 1983: 114 [pars].
- 7) *Lithobius dahli* Verh. 1925: Minelli 1983b: 408.
- 8) *Lithobius (Lithobius) dahli* Verhoeff, 1925: Minelli 1985: 40 [pars].
- 9) *Lithobius dahlii* Verhoeff, 1925: Foddai *et al.* 1995: 6 [pars].
- 10) *Lithobius dahlii* Verhoeff, 1925: Foddai *et al.* 1996: 360, tab. I. [pars].
- 11) *Lithobius dahlii* Verhoeff, 1925: Zapparoli & Minelli 2005: CD [pars].

#### **Literature records**

**General.** Sardinia-Corsica (4). Sardinia (5, 7, 9, 10).

**Epigeic.** Nuoro prov.: Nuoro (6).

**Cave.** Nuoro prov.: Oliena, Monte Corراسi, "Grotta S'Abb'a Medica" 335 Sa/NU (1, 2, 3, 8, 11).

**Remarks.** The identity of *Lithobius infossus* with *L. dahlii* has been recently stated (Zapparoli 2006). The geographic range of this species includes Peninsular Italy, from Liguria to Basilicata, and Sicily, where it is common in *Quercus* woodlands but also in other epigean habitats as well as in caves (Minelli & Iovane 1987; Zapparoli 2006); single records from northern Italy are also known (Lombardy, Venetia), probably associated to introduced populations. Few data have been also published from Sardinia, related to three caves (Manfredi 1956; Zapparoli 1982, both as *L. dahlii*; De Miranda Restivo & Guaita 1986, as *L. pilatoi* Matic, 1968) and one epigeic site (De Miranda Restivo 1983, as *L. dahlii*). Cassola (1982: 670), who quoted the species under *L. dahlii*, considered the presence of *L. infossus* in Sardinia as uncertain but provided no evidence strengthening this opinion. However, the first Sardinian record of this species, published from a cave of the Nuoro province under *L. dahlii* by Manfredi (1956), seems really unreliable as based on one immature male and one larva. Moreover, subsequent records from a cave near Corongiu de Mari (Cagliari province), published by Zapparoli (1982) under *L. dahlii* and then copied by Grafitti and Zapparoli (1995) and Grafitti and De Waele (1996), here re-examined, must be referred to *L. nuragicus* (see above); to this species also probably belong the records from a nearby cave of the same karst area published by De Miranda Restivo and Guaita (1986) under *L. pilatoi* (= *L. dahlii* according to Zapparoli 1982). The assumption of Cassola (1982) seems therefore confirmed, as no consistent data are available for this species in Sardinia, in spite of the probably erroneous epigean quotation from Nuoro by De Miranda Restivo (1983) under *L. dahlii*.

Although they almost certainly belong to one or two different species of *Lithobius*, the identity of the Sardinian records of *L. dahlii* published by Manfredi (1956), then copied in many checklists and catalogues of the local subterranean and epigeic centipede fauna (Cerruti 1968; Puddu & Pirodda 1974; Minelli 1978a; Cassola 1982; De Miranda Restivo 1983; Minelli 1983b, 1985; Foddai *et al.* 1995, 1996; Zapparoli & Minelli 2005), still have to be checked, as well as those by De Miranda Restivo (1983).

### ***Lithobius (Lithobius) lucifugus* L. Koch, 1862**

- 1) *Lithobius lucifugus* L. Koch: Fanzago 1881b: 9.
- 2) *Lithobius (Archilithobius) lucifugus* L. Koch: Silvestri 1898: 683.
- 3) *Lithobius lucifugus* Mein (?): Verhoeff 1925a: 656.
- 4) *Lithobius lucifugus* C. Koch: Attems 1949: 113.
- 5) *Lithobius lucifugus* Koch 1862: De Miranda Restivo 1983: 115.
- 6) *Lithobius lucifugus* L. Koch: Minelli 1983b: 402.

#### **Literature records**

**General.** Sardinia (3, 4, 6).

**Epigeic.** Sassari prov.: Sassari (1, 2, 5).

**Remarks.** A European species mostly related, in Italy, to alpine and sub-alpine habitats of the northern regions (Minelli & Iovane 1987; Zapparoli & Minelli 2005). The single record by Fanzago (1881b) from a low altitude area of Sardinia (Sassari, see also Silvestri 1898 and De Miranda Restivo 1983) is unreliable, even though the species was included in the list of the Sardinian centipede fauna published by Verhoeff (1925b). Minelli (1983b) suggested that this record could be based on misidentified specimens of *Lithobius pilicornis* but, as in Sardinia this species is confined to the Gennargentu area between 800 and 1300 m (see above), this interpretation is rejected. The Sardinian record of *L. lucifugus* probably refers to *L. turritanus*.

### ***Lithobius (Lithobius) melanops* Newport, 1845**

- 1) *Lithobius melanops* Newp.: De Miranda Restivo 1986: 45.

#### **Literature records**

**Epigeic.** Cagliari prov.: Monte [dei] Sette Fratelli, NW slope, *Quercus ilex* and *Phyllirea*, 500 m (1).

**Remarks.** A European species. The above-mentioned record from Monte Sette Fratelli published by De Miranda Restivo (1986) needs to be confirmed.

### ***Lithobius (Lithobius) mutabilis* L. Koch, 1862**

- 1) *Lithobius mutabilis* L. Koch: Fanzago 1881b: 10.
- 2) *Lithobius (Archilithobius) mutabilis* L. Koch: Silvestri 1898: 683.
- 3) *Lithobius mutabilis mutabilis* L. Koch: Attems 1949: 115.
- 4) *Lithobius (Lithobius) mutabilis* L. Koch, 1862: Minelli 1978a: 154.
- 5) *Lithobius mutabilis* Koch 1862: De Miranda Restivo 1983: 116.
- 6) *Lithobius mutabilis* C. Koch: Minelli 1983b: 403.
- 7) *Lithobius mutabilis* Koch: De Miranda Restivo 1986: 44.

#### **Literature records**

**General.** Sardinia-Corsica (4). Sardinia (3, 6).

**Epigeic.** Sassari prov.: Sassari, surroundings (1, 2, 5). Cagliari prov.: Monte [dei] Sette Fratelli, maquis, 300 m (7).

**Remarks.** A Central European species, mostly related to mesophilous woodlands, recorded in Italy in almost all regions except the western Alps and Sicily (Minelli & Iovane 1987; Minelli & Zapparoli 2005; Zapparoli 2006). Although Fanzago (1881b) and, recently, De Miranda Restivo (1986) quoted this species from the

provinces of Sassari (without a clearly defined number of specimens examined) (see also Silvestri 1898; De Miranda Restivo 1983) and Cagliari (a female), respectively, its presence on the island is not confirmed (see also Minelli 1983b); all the Sardinian records must be referred to an unidentified species of *Lithobius*.

### ***Lithobius (Lithobius) muticus* C.L. Koch, 1847**

- 1) *Lithobius muticus* C. Koch: Fanzago 1881b: 10.
- 2) *Lithobius (Archilithobius) muticus* C. Koch: Silvestri 1898: 683.
- 3) *Lithobius muticus* C. Koch: Attems 1949: 115.
- 4) *Lithobius (Lithobius) muticus* C. L. Koch, 1847: Minelli 1978a: 155.
- 5) *Lithobius muticus* C. Koch: Minelli 1983b: 402.
- 6) *Lithobius muticus* C.L. Koch, 1847: Foddai *et al.* 1995: 6.

#### **Literature records**

**General.** Sardinia-Corsica (4). Sardinia (3, 5, 6).

**Epigeic.** Sassari prov.: Sassari, surroundings (1, 2).

**Remarks.** A European species recorded in Italy only in northern regions, where it is associated with woodlands, open alpine habitats and caves (Minelli & Iovane 1987; Minelli & Zapparoli 2005). Although Minelli (1978a) and Foddai *et al.* (1995) generically quoted *L. muticus* from Sardinia, the single record by Fanzago (1881b), copied in Silvestri (1898), has never been confirmed. The species is not included in the most updated checklists of the centipede fauna of the island (Minelli 1983b; Zapparoli & Minelli 2005) and the old literature records must be referred to a different unidentified species of *Lithobius*.

### ***Lithobius (Lithobius) ribauti* Chalande, 1907**

- 1) *Lithobius ribauti* Ch.: De Miranda Restivo 1978: 41.

#### **Literature records**

**Epigeic.** Cagliari prov.: Monte [dei] Sette Fratelli, 300 m (1).

**Remarks.** Species only known from south-western France (Pyrenees, Montagne Noire) (Chalande 1907; Brölemann 1930). The record from Sardinia, based on three unsexed specimens quoted in a congress abstract (De Miranda Restivo 1978) but not confirmed in the subsequent paper *in extenso* (De Miranda Restivo 1986), is unreliable and should refer to an abnormal specimen of *Lithobius castaneus*.

### ***Lithobius (Lithobius) stygius* Latzel, 1880**

- 1) *Lithobius stygius* Latz.: De Miranda Restivo & Guaita 1986: 32.

#### **Literature records**

**Cave.** Cagliari prov.: Iglesias, “Grotta di Santa Aintroxia” 129 Sa/CA (1).

**Remarks.** Species known only from Balkan caves (Latzel 1880; Stoev 2001b). The record from Sardinia, based on a single female, is unreliable and due to a misidentification. From the same cave De Miranda Restivo and Guaita (1986) also quoted *Lithobius alpicosiensis*, another unreliable record probably due to a misidentification, here referred to *L. turritanus* (see above).

***Monotarsobius turritanei* Restivo De Miranda i. l. in Cassola, 1982 (*nomen nudum*)**

- 1) *Monotarsobius turritanei* n. sp. Restivo de Mir. i. l.: Cassola 1982: 708.
- 2) *Lithobius turritanei* n. sp.: Grafitti 1987: 36.

**Literature records**

**General.** Sardinia (1).

**Cave.** Sassari prov.: Muros, Monte Tudurighe, “Grotta dell’Inferno” or “Grotta del Diavolo” 48 Sa/SS, 320 m (2).

**Remarks.** This binomial has been quoted in two general papers on the Sardinian cave fauna (Cassola 1982; Grafitti 1987). It refers to an unsexed specimen from “Grotta dell’Inferno”, Muros, Monte Tudurighe, Sassari province (Grafitti 1987), collected on June 2<sup>nd</sup>, 1974, about 150 m from the entrance, in the principal branch under a stone on moist soil by Sardinian biospeleologist G. Grafitti (G. Grafitti pers. comm.). The formal description of this specimen has never been published and no specimens seem preserved under this name in the collection of the institution where M.A. Restivo de Miranda worked since the end of her career, the Dipartimento di Biologia Animale ed Ecologia, Parassitologia (formerly Istituto di Zoologia), Università degli Studi, Cagliari (F. Fois, pers. comm.). *Monotarsobius turritanei* is therefore here considered a *nomen nudum*. In the same cave from where the original specimen was collected, two males of *L. turritanus* were also collected in 1899 by G. Doria (see above).

***Scolopendra cingulata* Latreille, 1829**

- 1) *Scolopendra cingulata* Latreille, 1829: Minelli 1978a: 156.

**Literature records**

**General.** Sardinia-Corsica (1).

**Remarks.** Although widespread in the Mediterranean region, this species has never been quoted from either Sardinia or Corsica (Brölemann 1930; Foddai *et al.* 1995, 1996; Simaiakis & Mylonas 2008). The generic record for this area in Minelli (1978a) is certainly due to a misprint.

***Henia montana* Meinert, 1870**

- 1) *Chaetechelynae montana* Mein., 1870: Attems 1929: 240.
- 2) *Chaetechelynae montana* Mein., 1870: Attems 1949: 110.
- 3) *Chaetechelynae montana* Meinert, 1870: Minelli 1978a: 159.

**Literature records**

**General.** Sardinia-Corsica (3). Sardinia (1, 2).

**Remarks.** Species known from Croatia, France (mainland, Corsica?) and Italy (mainland) (Brölemann 1930; Kos 1992; Stoev 1997; Zapparoli & Minelli 2005). The only records for *H. montana* in Sardinia are the generic quotations by Attems (1929, 1949) and the mention by Minelli (1978a) in the centipede fauna of the Sardinia-Corsica geographic complex. As in his revision of the geophilomorph centipedes belonging to *Henia* and *Chaetecheline*, Minelli (1981) did not unequivocally include Corsica and Sardinia in the range of the species, and as its presence has not been confirmed by recently collected materials, in spite of the intensive research, records of *H. montana* in Sardinia are here considered unreliable.



## Species inquirendae

### *Cryptops (Cryptops) breviunguis* A. Costa, 1882

- 1) *Cryptops breviunguis* A. Costa 1882: 28, 40.
- 2) *Cryptops punctatus* Koch: Verhoeff 1925a: 655 [pars].
- 3) *Cryptops (Cryptops) anomalans* Newp. 1844: Attems 1930: 221, figs 280–286 [pars].
- 4) *Cryptops anomalans* Newp.: Attems 1949: 111 [pars].
- 5) *Cryptops anomalans* Newport, 1844: Minelli 1978a: 156 [pars].
- 6) *Cryptops breviunguis* Costa, 1882: Minelli 1983b: 402.

### Literature records

**General.** Sardinia-Corsica (5). Sardinia (2, 3, 4, 6).

**Epigeic.** Cagliari prov.: Cagliari area (type locality of *Cryptops breviunguis* A. Costa, 1882) (1).

**Cave.** No records.

**Remarks.** *Cryptops breviunguis* was established on an undetailed number of specimens from the Cagliari area (Sardinia) and originally compared with *C. punctatus* C.L. Koch, 1847, from Dalmatia (Croatia), by Costa (1882). The original description of the new taxon is very defective and its type locality is the only collecting site known.

Silvestri (1898) supposed *C. breviunguis* to be a junior synonym of *C. hortensis* (at that time believed to have been described by Leach, 1815 instead of Donovan, 1810, see Jeekel (1999)) but, in his monograph on the world Scolopendromorpha, Kraepelin (1903: 45) later considered *C. breviunguis* and *C. punctatus* as junior synonyms of *C. anomalans* Newport, 1844, disregarding Silvestri's (1898) proposal. Prior to Kraepelin (1903), the only records of *C. anomalans* from Sardinia were those published by Silvestri (1898), later assumed of uncertain identity by Minelli (1983b) or based on misidentified specimens of *C. trisulcatus* (see above).

The generic quotations of *C. anomalans* from Sardinia (Verhoeff 1925a, as *C. punctatus* C.L. Koch, 1847; Attems 1930, 1949; Minelli 1978a) refer therefore either to the unreliable records of Silvestri (1898) or, as Kraepelin's (1903) taxonomic view was followed by all subsequent authors (e.g., Attems 1930; Brölemann 1930; Matic 1972), to the original description of *C. breviunguis* by Costa (1882).

Although *C. breviunguis* has been considered an unrecognizable species by Minelli (1983b), its identity with *C. anomalans* is currently accepted in the World Catalogue of Centipedes by Minelli (2006). However, this interpretation should be rejected as *C. anomalans* has never been found in Sardinia in spite of intensive faunistic research (Zapparoli & Minelli 2005), and its presence on the island must be excluded.

An alternative interpretation of the taxonomic identity of *C. breviunguis* cannot be easily suggested. According to Minelli (1983b), the original description of this species could be based on specimens of *C. punicus* or *C. trisulcatus*, the two most common species of *Cryptops* in Sardinia, both of which have precedence over *C. breviunguis*. A critical reading of Costa's (1882) paper suggests that *C. breviunguis* may be based on specimen/s belonging to a *Cryptops* currently known as *C. trisulcatus*, as tarsus 2 of the 21<sup>st</sup> leg is described as thin ("gracile"), a condition usually found in the Sardinian specimens of this taxon. *C. breviunguis* cannot, however, be proposed with confidence as a senior synonym of *C. trisulcatus*. The type material of Costa has in fact presumably been lost (N. Maio *in verbis* 2006), as it is not present in the collections of the Zoological Museum, "Federico II" University of Naples (Italy) where the zoological material that he collected is usually stored (Maio *et al.* 1995). Besides, *C. punicus* and *C. trisulcatus*, often syntopic in Sardinia, could both occur in the vaguely indicated type locality of *C. breviunguis*, the original habitat of which has been in addition deeply modified or destroyed by the intensive urbanization which occurred in the past 60 years. *Cryptops breviunguis* is therefore considered *species inquirenda*.

## A Checklist of the centipedes of Sardinia

The present-day centipede fauna of Sardinia is summarized in the checklist below. E = endemic to Sardinia, \* = epigeic but also occurring in caves, (\*) = only in caves, i = introduced, i? = probably introduced.

Order SCUTIGEROMORPHA Pocock, 1895

Scutigeridae Gervais, 1837

*Scutigera* Lamarck, 1801

1. *Scutigera coleoptrata* (Linnaeus, 1758) \*

Order LITHOBIOMORPHA Pocock, 1895

Henicopidae Pocock, 1901

*Lamyctes* Meinert, 1868

2. *Lamyctes emarginatus* (Newport, 1844) i

Lithobiidae Newport, 1844

*Eupolybothrus* Verhoeff, 1907 subgenus *Eupolybothrus*

3. *Eupolybothrus (Eupolybothrus) fasciatus* (Newport, 19845) i?

*Eupolybothrus* subgenus *Allopolybothrus* Verhoeff, 1907

4. *Eupolybothrus (Allopolybothrus) nudicornis* (Gervais, 1837) \*

*Lithobius* Leach, 1814 subgenus *Lithobius*

5. *Lithobius (Lithobius) aligherus* Manfredi, 1953 (\*)E
6. *Lithobius (Lithobius) castaneus* Newport, 1844 \*
7. *Lithobius (Lithobius) doderoi* Silvestri, 1908 (\*)E
8. *Lithobius (Lithobius) forficatus* (Linnaeus, 1758) \*i
9. *Lithobius (Lithobius) inermis* L. Koch, 1856
10. *Lithobius (Lithobius) lapidicola* Meinert, 1872 \*
11. *Lithobius (Lithobius) molophai* Restivo De Miranda, 1978 (\*)E
12. *Lithobius (Lithobius) nuragicus* Zapparoli, 1997 \*E
13. *Lithobius (Lithobius) pilicornis* Newport, 1844 \*
14. *Lithobius (Lithobius) sardous* Silvestri, 1898 E
15. *Lithobius (Lithobius) sardus* Manfredi, 1956 (\*)E
16. *Lithobius (Lithobius) sbordonii* Matic, 1967 (\*)E
17. *Lithobius (Lithobius) turritanus* Fanzago, 1881 \*E

*Lithobius* subgenus *Sigibius* Chamberlin, 1913

18. *Lithobius (Sigibius) micropodus* Matic, 1980 \*
19. *Lithobius (Sigibius) microps* Meinert, 1868

*Lithobius* subgenus *Monotarsobius* Verhoeff, 1905

20. *Lithobius (Monotarsobius) crassipes* L. Koch, 1862 \*

Order SCOLOPENDROMORPHA Pocock, 1895

Cryptopidae Kohlrausch, 1881

*Cryptops* Leach, 1815 subgenus *Cryptops*

21. *Cryptops (Cryptops) hortensis* (Donovan, 1810) \*i?
22. *Cryptops (Cryptops) punicus* (Silvestri, 1896) \*
23. *Cryptops (Cryptops) trisulcatus* Brölemann, 1902 \*
24. *Cryptops (Cryptops) sp. A* (\*E)

Plutoniumidae Bollman, 1893b

*Plutonium* Cavanna, 1881

25. *Plutonium zwierleini* Cavanna, 1881 \*

Scolopendridae Newport, 1844

*Scolopendra* Linnaeus, 1758

26. *Scolopendra oraniensis* Lucas, 1846 \*

Order GEOPHILOMORPHA Pocock, 1895

Himantariidae Cook, 1895

*Himantarium* C. Koch, 1847

27. *Himantarium gabrielis* (Linnaeus, 1767) \*

*Stigmatogaster* Latzel, 1880

28. *Stigmatogaster gracilis* (Meinert, 1870)
29. *Stigmatogaster sardoa* (Verhoeff, 1901) \*E
30. *Stigmatogaster superba* (Meinert, 1870)

Dignathodontidae Cook, 1895

*Dignathodon* Meinert, 1870

31. *Dignathodon microcephalus* (Lucas, 1846)

*Henia* C.L. Koch, 1847 subgenus *Meinertia* Bollman, 1893a

32. *Henia (Meinertia) bicarinata* (Meinert, 1870)

*Henia* subgenus *Pseudochaetechelyne* Minelli, 1982

33. *Henia (Pseudochaetechelyne) brevis* (Silvestri, 1896) \*

*Henia* subgenus *Chaetechelyne* Meinert, 1870

34. *Henia (Chaetechelyne) vesuviana* (Newport, 1845) \*

Schendylidae Verhoeff, 1908

*Hydroschendyla* Brölemann & Ribaut, 1911

35. *Hydroschendyla submarina* (Grube, 1872)

- Schendyla* Bergsøe & Meinert, 1866  
36. *Schendyla armata* Brölemann, 1901  
37. *Schendyla carniolensis* (Verhoeff, 1902)  
38. *Schendyla mediterranea* Silvestri, 1897  
39. *Schendyla montana* (Attems, 1895)  
40. *Schendyla nemorensis* (C.L. Koch, 1837) \*

Geophilidae Cook, 1895

- Pachymerium* C.L. Koch, 1847  
41. *Pachymerium ferrugineum* (C.L. Koch, 1835)

- Geophilus* Leach, 1814  
42. *Geophilus alpinus* Meinert, 1870 \*  
43. *Geophilus carpophagus* Leach, 1815 \*  
44. *Geophilus fucorum* Brölemann, 1909  
45. *Geophilus minimus* Verhoeff, 1928 \*  
46. *Geophilus osquidatum* Brölemann, 1909 \*  
47. *Geophilus piae* Minelli, 1983  
48. *Geophilus punicus* Silvestri, 1896 \*  
49. *Geophilus richardi* (Brölemann, 1904)

- Eurygeophilus* Verhoeff, 1899  
50. *Eurygeophilus multistiliger* (Verhoeff, 1899)

- Stenotaenia* C.L. Koch, 1847  
51. *Stenotaenia romana* (Silvestri, 1895) i?  
52. *Stenotaenia sorrentina* (Attems, 1903)

- Tuoba* Chamberlin, 1920  
53. *Tuoba poseidonis* (Verhoeff, 1901)

54. Geophilidae sp. nov. E

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