European Journal of Taxonomy 1043: 244–286
https://doi.org/10.5852/ejt.2026.1043.3221
europeanjournaloftaxonomy.eu
ISSN 2118-9773
2026 · Ballarin F. *et al.*

Received: 31 August 2025 • *Accepted: 12 November 2025* • *Published: 17 March 2026*

Topic editor: Magalie Castelin • *Section editor: Arnaud Henrard* • *Desk editor: Chris Le Coquet-Le Roux*

Research article

urn:lsid:zoobank.org:pub:31AB292F-9FFF-4DBF-8FBC-BF05C05BE99E

From folkloric origins to scientific systematics: the first detailed redescription of the type species of *Lycosa* Latreille, 1804 with insight into the genus (Araneae: Lycosidae)

Francesco BALLARIN [1,*], Yuri M. MARUSIK [2], Paolo PANTINI [3] & Anton A. NADOLNY [4,**]

[1] Systematic Zoology Laboratory, Department of Biological Sciences, Tokyo Metropolitan University, 1–1 Minami-Osawa, Hachioji-shi, 192-0397, Tokyo, Japan.
[1] Department of Zoology, Museo di Storia Naturale of Verona, Lungadige Porta Vittoria, 9, I-37129, Verona, Italy.
[2] Institute for Biological Problems of the North, FEB RAS, Portovaya Str., 18, RF-685000, Magadan, Russia.
[2] Department of Zoology and Entomology, University of the Free State, 9300, Bloemfontein, South Africa.
[3] Museo Civico di Scienze Naturali "Enrico Caffi", Piazza Cittadella, 10, I-24129, Bergamo, Italy.
[4] A.O. Kovalevsky Institute of Biology of the Southern Seas, Nakhimov Ave., 2, Sevastopol, Crimea.

[*] Corresponding author: ballarin.francesco@gmail.com
[2] Email: yurmar@mail.ru
[3] Email: paolo.pantini@comune.bergamo.it
[**] Co-corresponding author: nadolnyanton@ibss-ras.ru

Abstract. The genus *Lycosa* has often served as a wastebasket taxon for species whose systematic position within the Lycosidae remains unclear. This is partly due to the lack of clear information regarding the diagnostic characters of its nominal species, the southern European *Lycosa tarantula* (Linnaeus, 1758). Despite being known for centuries by both academics and the general public, with the earliest published depictions dating back to the late 16th century, the taxonomy of this species has long been neglected. In this study, we redescribe *L. tarantula* based on samples from its '*terra typica*' in southern Italy. We provide detailed photographs and illustrations of the diagnostic characters of both the copulatory organs and the habitus of the species, along with remarks about its ecology, distribution, and historiography. Additionally, we designate a neotype using a sample from the type locality, the Taranto area, and provide its molecular barcode. Two subspecies, *L. tarentula carsica* Caporiacco, 1949 syn. nov. and *L. tarantula cisalpina* Simon, 1937 syn. nov., are synonymized with *L. tarantula* based on the absence of morphological differences. Finally, since *Lycosa* is considered polyphyletic and in urgent need of a proper revision, we provide notes on *Lycosa* s. str. restricting it to 23 putative species. We believe that this information will support future taxonomic and systematic studies on the genus.

Keywords. Aranei, Italy, *Lycosa tarantula*, neotype, new synonym.

Ballarin F., Marusik Y.M., Pantini P. & Nadolny A.A. 2026. From folkloric origins to scientific systematics: the first detailed redescription of the type species of *Lycosa* Latreille, 1804 with insight into the genus (Araneae: Lycosidae). *European Journal of Taxonomy* 1043: 244–286. https://doi.org/10.5852/ejt.2026.1043.3221

Introduction

Lycosidae Sundevall, 1833, commonly known as wolf spiders, is a megadiverse family currently comprising 139 genera plus one extinct genus, *Dryadia* Zhang, Sun & Zhang, 1994, with 2507 species and subspecies, and six fossil species (Dunlop *et al.* 2023; WSC 2025). This makes Lycosidae the fifth largest family within the order Araneae Clerck, 1757 and one of the largest within the "RTA clade", surpassed in species count only by Salticidae Blackwall, 1841 and nearly on a par with Gnaphosidae Banks, 1892, which include 6896 and 2500 species, respectively, plus several fossil species (WSC 2025). Wolf spiders exhibit a wide range of body sizes, from very small species measuring only 2–3 mm in body length (*Minocosa* Alderweireldt & Jocqué, 2007) to large ones reaching up to 30–35 mm. Their ecology is also diverse. Most species are typically ground-dwelling, cursorial, or burrowing hunters, but some can be arboreal, have a semiaquatic lifestyle or build funnel/sheet webs. Lycosidae have a worldwide distribution, ranging from equatorial regions to the high Arctic (up to 82° N, Ellesmere Island; Leech & Ryan 1972). They inhabit most terrestrial environments, particularly open habitats, such as seashores, riverbanks, bogs, grasslands, dry meadows, deserts, mountain screes, and forest edges. Nevertheless, a few forest-dwelling taxa are also known (Piacentini & Ramírez 2019).

The phylogenetic position of Lycosidae has been examined in several studies (see for example Polotow *et al.* 2015; Wheeler *et al.* 2017; Piacentini & Ramírez 2019; Kulkarni *et al.* 2023). While the family was often recovered as a well-supported monophyletic clade within the superfamily Lycosoidea, these studies have also revealed numerous taxonomic and systematic issues, with certain genera and subfamilies being found to be either paraphyletic or polyphyletic. *Lycosa* Latreille, 1804, the type genus of the family, currently includes 213 valid species, five subspecies, and five fossil species (Dunlop *et al.* 2023; WSC 2025). The large-sized and charismatic Southern-European "true tarantula", *Lycosa tarantula* (Linnaeus, 1758) (=*Aranea tarantula* Linnaeus, 1758), serves as both the type species of the genus and the family. Since its establishment, *Lycosa* has often served as a wastebasket taxon for large wolf spider species whose systematic placement within the family remained uncertain. Consequently, over time, numerous *Lycosa* have undergone systematic rearrangements with as many as 218 species transferred to other genera and 81 names currently considered either synonyms (33), nomina dubia (38), nomina nuda (7), or replaced homonyms (3) (WSC 2025). The genus is currently considered polyphyletic, still encompassing medium- to large-sized species that exhibit a wide variation in the morphology of copulatory organs (Dondale 1986; Murphy *et al.* 2006) or show high molecular divergence (Piacentini & Ramírez 2019). One of the main difficulties in properly diagnosing the genus lies in the absence of a detailed description of the type species *L. tarantula,* for which the proper identification of its diagnostic characters has been, and continues to be, a source of confusion among arachnologists (Nadolny & Zamani 2020).

With its large size, colorful pattern, and menacing appearance – despite being basically harmless to humans – *L. tarantula* has long attracted the attention of many people, including academics, enthusiastic zoologists, and the general public. This spider holds an important place in Italian folklore, particularly in southern Italy, where it has inspired countless legends, popular beliefs, and shamanic rituals (e.g., the "tarantism"; see Pepe 2005), as well as folk dances and festivals such as the famous "tarantella" and "pizzica". It is also one of the first spider species for which we have a clear record in written literature. The earliest published references containing detailed descriptions and illustrations that allow this species to be recognized date back to the late 16th and early 17th centuries. These include the dissertations *Dell'Historia Naturale* by Ferrante Imperato (1599), *Magnes sive de Arte Magnetica* by Athanasius Kircher (1641), and *Gottorfische Kunst-Cammer* by Adam Olearius (1666), thus predating by more than a century and a half the official description of the species by Linnaeus (1758). Yet, despite its popularity, *L. tarantula* remains a mysterious and poorly studied subject among modern spider taxonomists.

As is common with spider species described by Linnaeus, the types of *L. tarantula* are either missing or were never designated, and a neotype of the species has not yet been established. Furthermore, the

original description lacks illustrations. Until relatively recently (Pepe 2005), no accurate figures or drawings of the copulatory organs of specimens from its '*terra typica*', the Taranto area of the Puglia (= Apulia) region in southern Italy from which its specific name is derived, were available.

Detailed illustrations highlighting the diagnostic characters of the species, including pictures of the habitus and pattern, based on topotype specimens, are still unavailable. Additionally, much of the limited taxonomic information available is outdated. For instance, among the 29 taxonomic entries of *L. tarantula* listed in the WSC (2025), 22 are based on studies predating the 1980s, and 19 lack any illustrations of diagnostic characters of the epigyne or male palp, with some even featuring figures based on misidentified specimens (e.g., Logunov 2010: figs 1–2, 9, 16–17, 27, 50 illustrating *L. fasciiventris* Dufour, 1835 from Spain, later reproduced by Nadolny & Zamani 2020: fig. 32). The remaining ten references refer to *L. narbonensis* Walckenaer, 1806, a species originally described from southwestern France (Narbonne), more than 1200 km from the type locality of *L. tarantula*. These two species were recently synonymized based solely on molecular data (Planas *et al.* 2013), without reporting any proper morphological comparison.

Given these issues and the significance of *L. tarantula* for systematics and taxonomy of the genus *Lycosa* and Lycosidae, we believe that a detailed redefinition of the species is urgently needed. Accordingly, this study aims to: 1) designate a neotype of *L. tarantula* based on a specimen from its '*terra typica*', and 2) provide detailed morphological descriptions and illustrations of the species' diagnostic characters based on the neotype and paraneotypes from central-south Italy. Additionally, we provide 3) the molecular barcode for *L. tarantula* based on the neotype from Taranto, serving as a reference for future molecular-based studies of this species. Finally, 4) we include insights into the ecology and historiography of *L. tarantula,* exploring its significance for early scholars and Italian culture, and 5) we discuss the boundaries of *Lycosa* s. str. and the species currently, and sometimes improperly, included in this genus.

Material and methods

Morphological analysis

The specimens used in this study were obtained from museum and personal collections. Additional specimens were hand-collected directly in the field from southern Italy, including the surroundings of Taranto city. Old samples were preserved in 70% ethanol, while newly collected samples were preserved in pure ethanol for molecular studies. Morphological examinations were carried out using a Nikon SMZ1270 stereo microscope at Tokyo Metropolitan University, Japan, and with an MBS-1 microscope and a Hitachi SU3500 scanning electron microscope at the Institute of Biology of the Southern Sea, Sevastopol. Copulatory organs were dissected with the help of a sharp needle before observations. Dishes containing white sand were used to keep the studied parts in the correct position. Epigynes were cleared by boiling them for several minutes in a 20% KOH solution to make the internal structures visible. Photographs were taken with a Canon EOS Kiss X8i digital camera mounted on the same stereo microscope used for observations. Final images were assembled with Helicon Focus ver. 7 image stacking software (https://www.heliconsoft.com) and edited with Adobe Photoshop CC ver. 20.0.6 (https://www.photoshop.com/). Pictures of the spination and the ventral side of leg I of both a male and female are provided since in Lycosidae these legs often play an important role in mating and have diagnostic taxonomic significance. Measurements of leg segments were obtained by observing the legs from the lateral side and are reported as follows: total length (femur, patella, tibia, metatarsus, and tarsus). All measurements in the text are given in millimeters. The distribution map was created using QGIS ver. 3.40 (https://qgis.org/) including records obtained from the examined material, the literature, and iNaturalist (https://www.inaturalist.org/), with questionable or potentially misidentified records being excluded. Elevation data and the corresponding elevation profile were generated using GPS Visualizer (https://www.gpsvisualizer.com/), based on the coordinates of all records included in the distribution map.

Institutional abbreviations

ATPC = A. Trotta personal collection
MSNB = Civic Natural Science Museum of Bergamo, Italy
MSNT = Civic Museum of Natural History of Trieste, Italy
MSNV = Civic Museum of Natural History of Verona, Italy
MSNP = Museum of Natural History of the University of Pavia

Morphological abbreviations

Eyes

ALE = anterior lateral eye
AME = anterior median eye
PLE = posterior lateral eye
PME = posterior median eye

Copulatory organs

Ae = anterior elevation of epigyne
Ao = anterior outgrowth at receptacle base
Cd = copulatory duct
Cn = conductor
Co = copulatory opening
Ct = crest of tegular apophysis
Em = embolus
Et = tip of embolus
Fd = fertilization duct
Hr = head of receptacle
Mf = median furrow of septum
Pl = palea
Pp = pars pendula
Sb = septal base
Se = synembolus
Sm = stalk of septum
Sr = stalk of head of receptacle
St = subtegulum
Ta = tegular apophysis
Tf = internal furrow of tegular apophysis
Tg = tegulum
Tp = distal process of tegular apophysis
Tr = terminal apophysis of embolic division
Ts = tegular stalk

Legs and spination

d = dorsal
Fe = femur
Mt = metatarsus
p = prolateral

Pa	=	patella
r	=	retrolateral
Sc	=	setae of scopula
Sp	=	spinules
Ta	=	tarsus
Ti	=	tibia
v	=	ventral

Molecular analysis

To facilitate identifications, future comparisons, and molecular-based analyses of *Lycosa* species, we provide the COI barcode sequences (=the Folmer region, ca 650 bp) from the *L. tarantula* newly designated neotype and paraneotype from Taranto, Puglia, and individuals from Calabria. The complete genomic DNA was extracted from the muscle tissue of a leg fragment. The barcode was amplified using the standard Folmer primers LCO1490 and HC02198 (Folmer *et al.* 1994). DNA extraction, amplification, and sequencing protocols follow the methodology described in Ballarin & Eguchi (2023). The sequences were visually inspected and translated into proteins using MEGA 12 ver. 12.0.11 (Kumar *et al.* 2024) to avoid the presence of potential stop codons before depositing them in GenBank (https://www.ncbi.nlm.nih.gov/genbank/).

To verify the accuracy of molecular sequences available in public online databases, we constructed a phylogenetic tree using all available COI barcodes of specimens identified as *L. tarantula* in the BOLD online database (https://boldsystems.org/). These include samples from Italy, southern France, North Macedonia, Greece, and Turkey. The barcodes were compared with that of our designated neotype and with representatives of the closely related species *L. bedeli* Simon, 1876, *L. oculata* (Simon, 1876), and *L. munieri* Simon, 1876. The tree was rooted with *Hogna radiata* (Latreille, 1817). All sequences were aligned using the online version of MAFFT software ver. 7 (https://mafft.cbrc.jp/alignment/server/) under the G-INS-I method. We reconstructed the phylogenetic tree using a maximum likelihood (ML) analysis with the online version of the IQ-TREE web service (http://iqtree.cibiv.univie.ac.at/), assessing branch support with 1000 replicates for both Ultrafast Bootstrap and SH-aLRT methods. The substitution model selection was set as automatic, and all other parameters were set to default. The resulting tree was visualized using FigTree ver. 1.4.4 (http://tree.bio.ed.ac.uk/software/figtree/).

Based on the results of the phylogenetic analysis, we further conducted an uncorrected pairwise genetic distance analysis to test the genetic diversity of the species using only the barcodes that could be confidently attributed to *L. tarantula* and removing the others. We performed the pairwise analysis in MEGA 12 using a Kimura-2 parameter model with all other settings left as default. All barcodes used in the analyses and their related GenBank accession codes are listed in Table 1.

Results

Taxonomic account

Class Arachnida Cuvier, 1812
Order Araneae Clerck, 1757
Family Lycosidae Sundevall, 1833

Genus ***Lycosa*** Latreille, 1804

Type species

Aranea tarantula Linnaeus, 1758 from Puglia Region, Italy.

Table 1 (continued on next page)**.** List of *Lycosa* Latreille, 1804 barcodes and corresponding BOLD accession codes used in the phylogenetic analysis. Asterisks indicate newly amplified sequences. The neotype individual is highlighted in red.

Species	BOLD accession code	Code	Locality	Remarks
Hogna radiata	SPIEU1410	–	Romania	–
Lycosa bedeli	GBCH10904	–	Morocco	–
Lycosa munieri	GBCH10856	–	Italy	–
Lycosa oculata	GBCH10945	–	Tunisia	–
Lycosa sp. (as *L. tarantula*)	SPIEU229	–	Resen (North Macedonia)	Misidentification (possibly referring to *L. praegrandis*)
Lycosa sp. (as *L. tarantula*)	SPIEU230	–	Resen (North Macedonia)	Misidentification (possibly referring to *L. praegrandis*)
Lycosa sp. (as *L. tarantula*)	SPIEU231	–	Resen (North Macedonia)	Misidentification (possibly referring to *L. praegrandis*)
Lycosa sp. (as *L. tarantula*)	SPIEU233	–	Resen (North Macedonia)	Misidentification (possibly referring to *L. praegrandis*)
Lycosa sp. (as *L. tarantula*)	SPIEU234	–	Resen (North Macedonia)	Misidentification (possibly referring to *L. praegrandis*)
Lycosa sp. (as *L. tarantula*)	TURAR078	–	Van (Turkey)	Misidentification (possibly referring to *L. praegrandis*)
Lycosa sp. (as *L. tarantula*)	TURAR079	–	Van (Turkey)	Misidentification (possibly referring to *L. praegrandis*)
Lycosa sp. (as *L. tarantula*)	TURAR080	–	Van (Turkey)	Misidentification (possibly referring to *L. praegrandis*)
Lycosa sp. (as *L. tarantula*)	TURAR1255	–	Muğla (Turkey)	Misidentification (possibly referring to *L. praegrandis*)
Lycosa sp. (as *L. tarantula*)	TURAR1287	–	Kayseri (Turkey)	Misidentification (possibly referring to *L. praegrandis*)
Lycosa sp. (as *L. tarantula*)	TURAR355	–	Dytiki Attiki (Greece)	Misidentification (possibly referring to *L. praegrandis*)
Lycosa sp. (as *L. tarantula*)	TURAR412	–	Manisa (Turkey)	Misidentification (possibly referring to *L. praegrandis*)
Lycosa sp. (as *L. tarantula*)	TURAR836	–	Muğla (Turkey)	Misidentification (possibly referring to *L. praegrandis*)
Lycosa sp. (as *L. tarantula*)	TURAR838	–	Igdir (Turkey)	Misidentification (possibly referring to *L. praegrandis*)
Lycosa sp. (as *L. tarantula*)	TURAR843	–	Konya (Turkey)	Misidentification (possibly referring to *L. praegrandis*)
Lycosa tarantula	PX470703*	Lyco11	Taranto, Puglia (Italy)	Neotype
Lycosa tarantula	PX470704*	Lyco12	Taranto, Puglia (Italy)	Topotype

Table 1 (continued)**.** List of *Lycosa* Latreille, 1804 barcodes and corresponding BOLD accession codes used in the phylogenetic analysis. Asterisks indicate newly amplified sequences. The neotype individual is highlighted in red.

Species	BOLD accession code	Code	Locality	Remarks
Lycosa tarantula	PX470705*	Lyco37	Frascineto, Calabria (Italy)	–
Lycosa tarantula	PX470706*	Lyco38	Frascineto, Calabria (Italy)	–
Lycosa tarantula	GBCH10954	–	Otranto, Puglia (Italy)	–
Lycosa tarantula	GBCH10955	–	Pisa, Toscana (Italy)	–
Lycosa tarantula	GBCH10956	–	Pisa, Toscana (Italy)	–
Lycosa tarantula	GBCH10957	–	Otranto, Puglia (Italy)	–
Lycosa tarantula	GBCH10958	–	Otranto, Puglia (Italy)	–
Lycosa tarantula	GBCH10959	–	Boulbon, Bouches-du-Rhône (France)	–
Lycosa tarantula	GBCH10960	–	Boulbon, Bouches-du-Rhône (France)	–

Lycosa tarantula (Linnaeus, 1758)
Figs 1–16

Aranea tarantula Linnaeus, 1758: 622.
Aranea dalmatica tarantula Martini & Goeze, 1778: 285.
Lycosa tarentula narbonensis Walckenaer in Latreille, 1806: 119.
Lycosa melanogaster Latreille, 1817: 291.
Lycosa narbonensis Walckenaer, 1837: 282 (♂♀).
Lycosa tarantula apuliae Walckenaer, 1837: 281.
Lycosa rubiginosa C.L. Koch, 1838: 121, fig. 416 (♀).
Lycosa narbonensis cisalpina Simon, 1937: 1091, 1131 (♀). **Syn. nov.**
Lycosa tarentula carsica Caporiacco, 1949: 143 (♂♀, syntype ♂ examined). **Syn. nov.**

Aranea tarentula – Villers 1789: 100.
Aranea tarantula – Rossi 1790: 132. — Petagna 1792: 436, pl. 6 fig. 6.
Lycosa tarentula – Latreille 1806: 119. — Bonnet 1957: 2625.
Lycosa tarantula – Hahn 1833: 95, fig. 73 (♀). — C.L. Koch 1838: 112, fig. 413 (♂). — Simon 1876b: 65, pl. 3 figs 16–17 (♀). — Zyuzin 1985: 42, fig. 1 (eyes only). — Pepe 2005: 49, pl. 1 figs 1–5 (♂♀). — Planas, Fernández-Montraveta & Ribera 2013: 426. Synonym of *L. narbonensis* (based on molecular data only). — Nadolny & Zamani 2020: 206, fig. 17 (♀).
Lycosa narbonensis – C.L. Koch 1847: 145, fig. 1375 (♀). — Simon 1876a: 241, pl. 13 figs 1–2 (♂♀). — Simon 1876b: 78, pl. 3 figs 1–2. — Simon 1937: 1091, 1131, figs 1696–1697 (♂♀). — Guy 1966: 83, figs 9–11, 73 (♂♀). — Zyuzin & Logunov 2000: 307, fig. 3a (♂♀).

Tarentula apuliae – C.L. Koch 1850: 33.
Tarentula rubiginosa – Simon 1864: 350.
Tarentula melanogaster – Thorell 1870: 192.
Tarentula fasciiventris – Thorell 1873: 526.
Tarentula narbonensis – Thorell 1875: 162. — Strand 1908: 297, pl. 8 fig. 18 (♀).

Diagnosis

Note: the diagnosis is limited by the general lack of detailed morphological information, such as photos or drawings, for most of the other *Lycosa* s. str. species closely related to *L. tarantula*.

Males of *L. tarantula* can be identified from males of other *Lycosa* s. str. species by the general shape of the palp and particularly by the different shape of the tegular apophysis (Ta). A narrower Ta, with shorter or sturdier distal process is present in *L. fasciiventris*, *L. bedeli*, and in other eastern Mediterranean congeners (cf. Figs 2A–B, 4A, 5A–G vs Guy 1966: fig. 13; Barrientos 2004: fig. 6; Armiach Steinpress *et al.* 2022: fig. 2A–E). The shape of the synembolus and the course of the embolus are probably also good diagnostic characters to separate closely related congeners, but these structures have not yet been illustrated in most of the other Mediterranean *Lycosa* species.

Females of *L. tarantula* are distinguished from those of other *Lycosa* s. str. species by the general shape of the septum (Sm), which is relatively long, gradually narrowing in the central-distal part, and ending with a barbed arrowhead-like basal part (Sb) with small and narrow pockets of the copulatory openings (Co). In other congeners these structures differ, e.g., with a shorter, longer, or wider septum, a sudden narrowing in the central part or lacking a central narrowing, with a different shape of the basal part and, often, with larger and differently shaped copulatory openings (cf. Figs 3A–D, 4C–D vs Nadolny & Zamani 2020: figs 18–31; Armiach Steinpress *et al.* 2022: fig. 9A–M). Other diagnostic characters are the relatively small, rounded or slightly oval head of the receptacle (Hr) and the relatively narrow and long stalk (Sr) with a characteristic course. Other species have larger, longer, or a differently shaped Hr, with a wider, shorter, or differently shaped stalk (cf. Figs 3E, 4E–F, 7G–H vs Nadolny & Zamani 2020: figs 33–35; Armiach Steinpress *et al.* 2022: fig. 10A–M).

Additionally, the dorsal and ventral pattern and in particular the width and shape of the black ventral abdominal stripe, the annulation of legs, as well as the size of PME, may also help to separate *L. tarantula* from congeners. For example, a wider black stripe is present in *L. baulnyi* Simon, 1876, *L. fasciiventris*, *L. hispanica* (Walckenaer, 1837), and *L. oculata* (cf. Figs 9A, D, 12B, D vs Simon 1876b: figs 4, 13, 18, 20; Barrientos 2004: fig. 5). The lack of black marks on femurs is reported in *L. bedeli* (see Simon 1876b: 82). Wider PMEs are found in some species like *L. oculata,* and *L. macrophthalma* Nadolny & Zamani, 2020 (cf. Fig. 8C vs Nadolny & Zamani 2020: fig. 2).

Type material

Neotype (designated here)

ITALY – **Puglia** • ♀; Taranto, Foggiano, San Crisperi; 40.40788° N, 17.4104° E; 150 m a.s.l.; 2 Nov. 2021; F. Milazzo leg.; dry meadow; MSNB, MSNB-Ar-53211; GenBank accession number: PX470703 (n.b. a female neotype was designated due to its better overall preservation compared to the other male specimens available from the type locality).

Other material examined

ITALY – **Lombardia** • 1 ♂ (sub *Tarentula apuliae*); Pavia, Varzi, Pietragavina, Gerbidi di Pietragavina; 20 Jul. 1885; F. Mazza leg.; MSNP, MSNP-Ar-jar431. – **Toscana** • 1 ♂, 1 ♀; Livorno, Pianosa Is.,

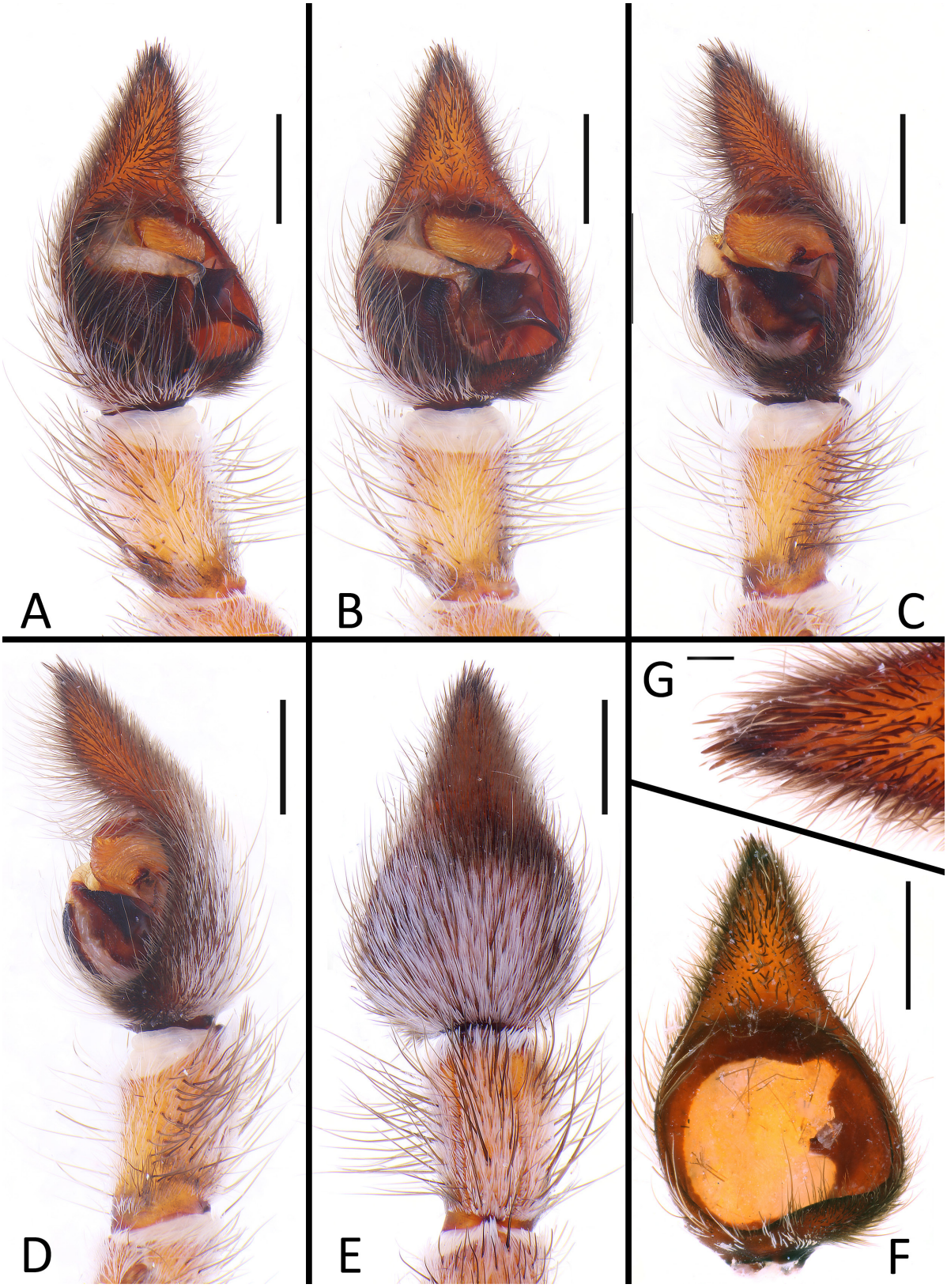

Fig. 1. Male palp of *Lycosa tarantula* (Linnaeus, 1758) from Subiaco (MSNB-Ar-11601). **A**–**E**. Whole palp. **A**. Ventro-prolateral. **B**. Ventral. **C**. Ventro-retrolateral. **D**. Retrolateral. **E**. Dorsal. **F**. Cymbium, ventral. **G**. Cymbium tip, ventral. Scale bars: A–F = 1 mm; G = 0.2 mm.

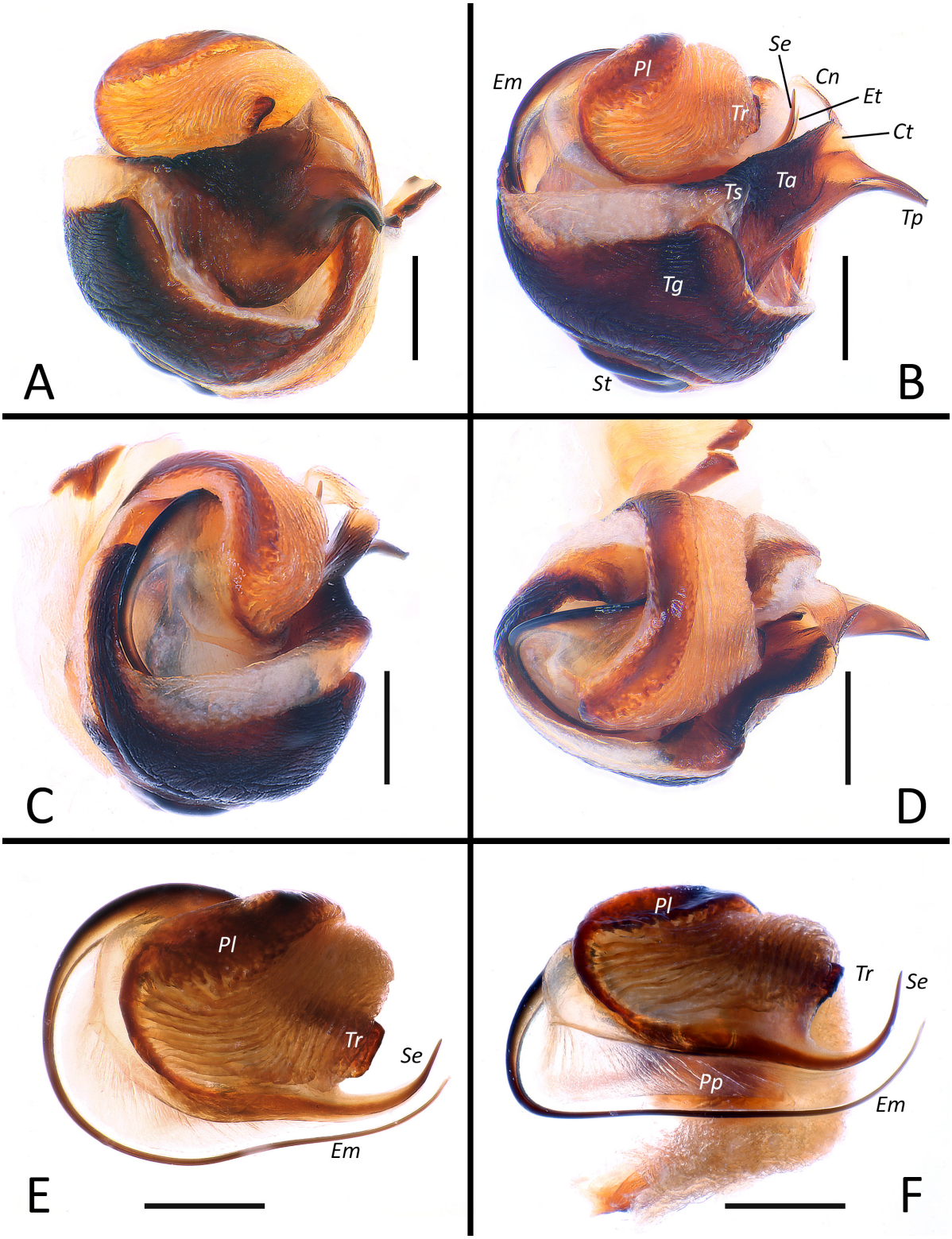

Fig. 2. Male palpal bulb and embolic division of *Lycosa tarantula* (Linnaeus, 1758) from Subiaco (MSNB-Ar-11601). **A**–**D**. Palpal bulb. **A**. Ventro-prolateral. **B**. Ventral. **C**. Ventro-retrolateral. **D**. Anterior. **E**–**F**. Embolic division. **E**. Anterior. **F**. Ventral. Abbreviations: see Material and methods. Scale bars: A–D = 0.5 mm; E–F = 0.2 mm.

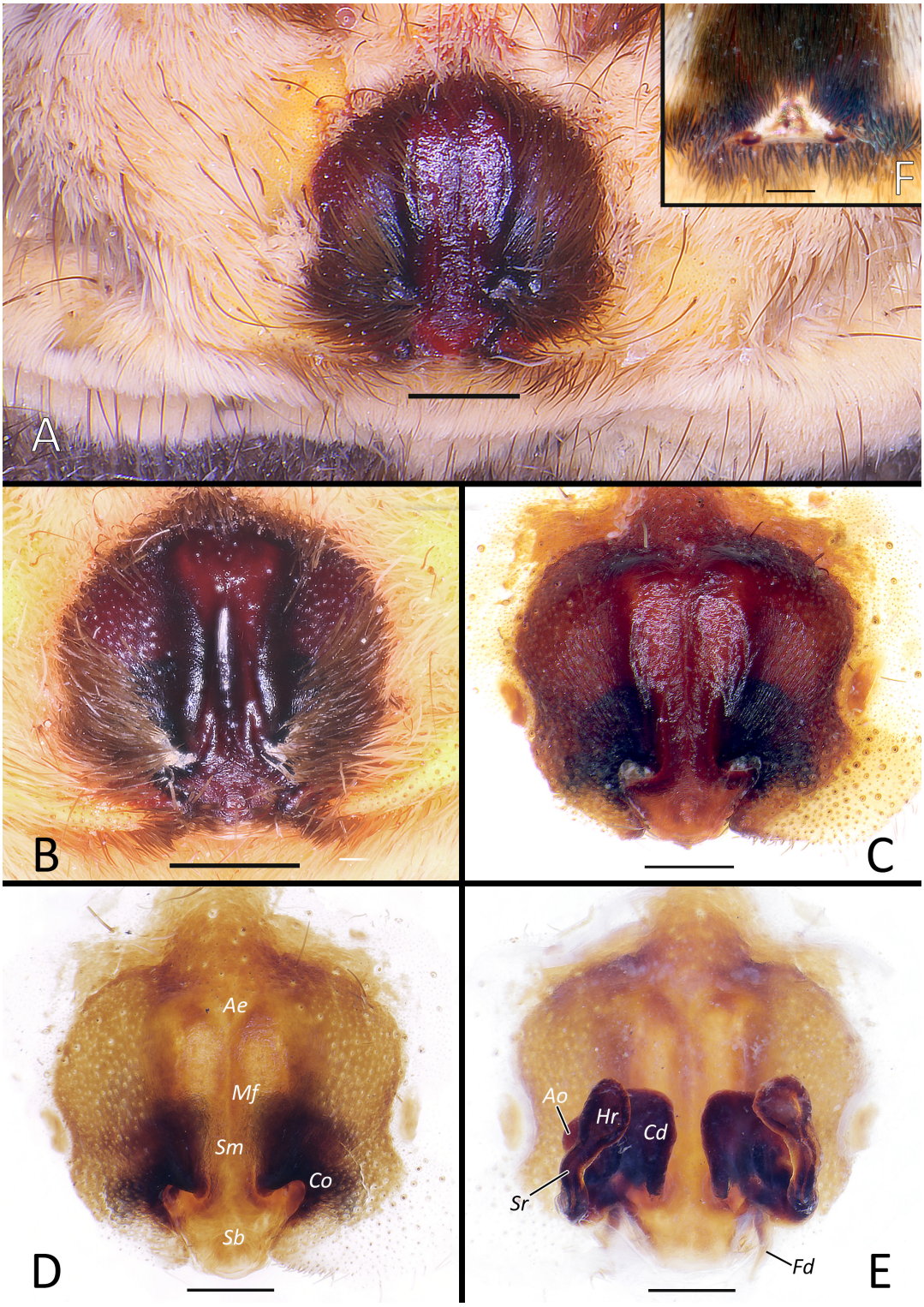

Fig. 3. Epigyne, vulva, and epiandrus of *Lycosa tarantula* (Linnaeus, 1758) from Puglia, Italy. **A**–**B**. Epigyne, ventral. **C.** Epigyne after dissection and with setae removed, ventral. **D**. Epigyne after maceration, ventral. **E**. Vulva after maceration, dorsal. **F**. Epiandrus. **A**. Neotype from Taranto (MSNB-Ar-53211). **B**. From Tremiti Is. (MSNV-Ar-jar24). **C**–**E**. From Ostuni areas (MSNV-Ar-jar21). **F**. Male from Subiaco (MSNB-Ar-11601). Abbreviations: see Material and methods. Scale bars: A–E = 0.5 mm; F = 0.2 mm.

Campo nell'Elba, Torretta San Marco; 14 Jun. 1966; P. Tongiorgi leg.; MSNB, MSNB-Ar-AR-53760. – **Marche** • 2 ♂♂; Macerata, Mt Sibillini, Pintura di Bolognola; 1300–1500 m a.s.l.; 25 Jun. 1995; S. Ruffo and Biancheri leg.; MSNV, MSNV-Ar-jar6. – **Umbria** • 2 ♂; Perugia, Lippiano; Jul.–Aug. 1923; A. Andreini leg.; MSNB, MSNB-Ar-53744 • 1 ♂; same locality as for preceding; Sep. 1929; A. Andreini leg.; MSNB, MSNB-Ar-53745 • 2 ♂♂; Perugia, Mt Sibillini, Piana di Castelluccio; 1300 m a.s.l.; 29 Jun. 1967; G. Papini leg.; MSNB, MSNB-Ar-53752 • 1 ♂, 1 ♀; Assisi, Mt Subasio; 10 Jun. 2007; A. Trotta and A. Pesce leg.; dry meadow; ATPC. – **Abruzzo** • 2 juvs; L'Aquila, road toward Collepietro village; 800 m a.s.l.; 11 Jun. 1971; unknown leg.; MSNB, MSNB-Ar-53754. – **Lazio** • 1 juv.; Rieti, Amatrice, Capricchia, Sacro Cuore; 1500 m a.s.l.; Sep. 1968; G. Osella leg.; MSNB, MSNB-Ar-53753 • 3 ♂♂, 1 ♀; Roma, Subiaco, Mt Simbruini, Monte Livata; 6 Jul. 2009; F. La Casella leg.; MSNB, MSNB-Ar-11601. – **Campania** • 1 ♀, 1 juv.; Avellino, Mt Piacentini, Valle Piana; 13 Jun. 1956; S. Ruffo leg.; MSNV, MSNV-Ar-jar15 • 1 ♂ subad.; same locality as for preceding, Piano Laceno; 16 Jun. 1956; S. Ruffo leg.; MSNV, MSNV-Ar-jar15. – **Puglia** • 2 ♀♀; Brindisi, Ostuni; Oct. 1950; unknown leg.; under stones; MSNV, MSNV-Ar-jar21 • 10 ♀♀, 5 juvs; Foggia, Tremiti Islands, San Domino Is.; 23 Sep. 1965; P. Tongiorgi leg.; cattle pasture; MSNB, MSNB-Ar-53742 • 3 ♀♀; same locality as for preceding; 16 Apr. 1966; unknown leg.; cattle pasture; MSNB, MSNB-Ar-53747 • 5 ♀♀, 5 juvs; same locality

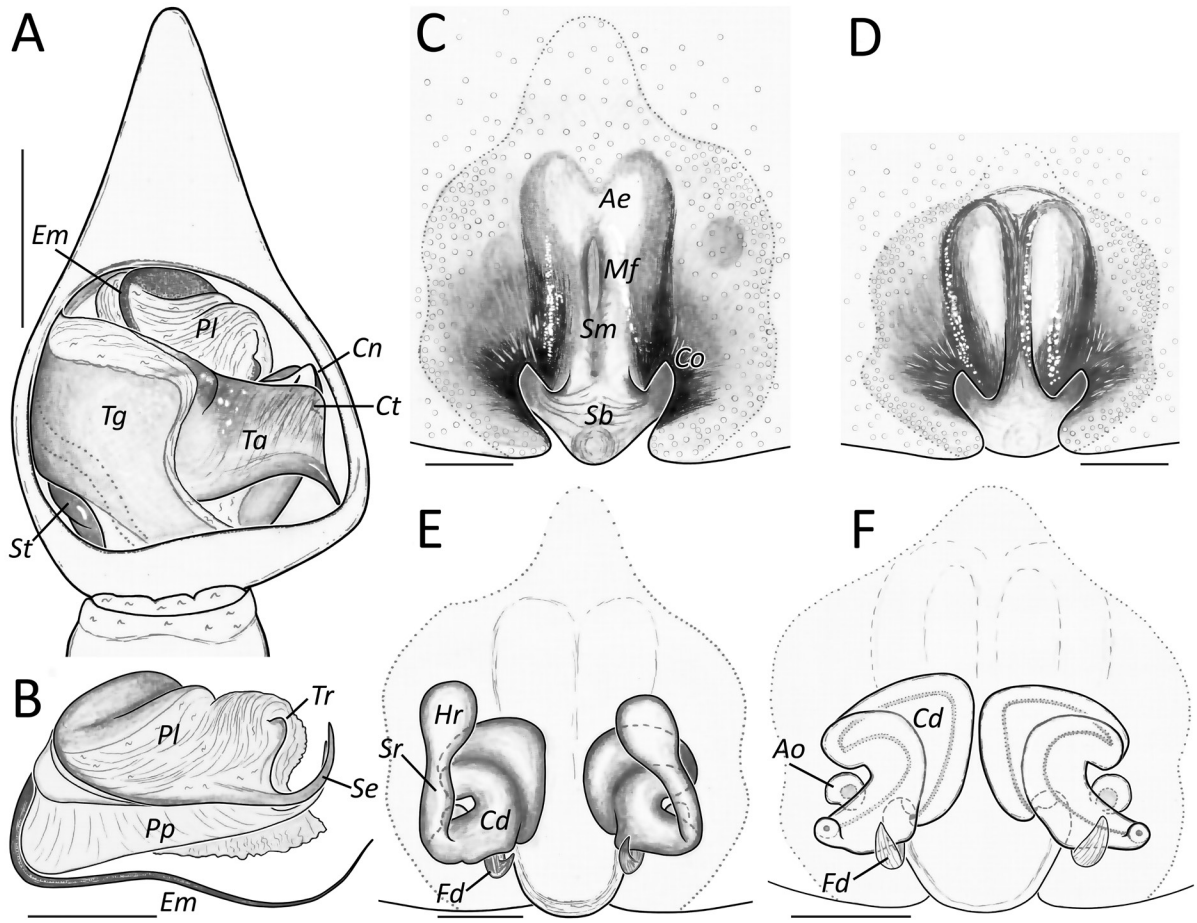

Fig. 4. Details of male and female copulatory organs of *Lycosa tarantula* (Linnaeus, 1758) from southern Italy. **A**. Cymbium and bulb, ventral view. **B**. Embolic division, ventral view. **C**–**D**. Epigyne, ventral view. **E**. Vulva, ventral view. **F**. Ditto with head of receptacles removed. Abbreviations: see Material and methods. Scale bars: A = 1 mm; B = 0.2 mm; C–F = 0.5 mm.

as for preceding, Piana Piccola; 24 Sep. 1965; unknown leg.; MSNB, MSNB-Ar-53746 • 1 ♀, 1 juv.; same locality as for preceding, Punta Diamante; 25 Sep. 1965; S. Ruffo leg.; MSNV, MSNV-Ar-jar24 • 1 ♀; same locality as for preceding; 21 Apr. 1966; unknown leg.; MSNB, MSNB-Ar-53748 • 1 ♂; same data as for neotype; collected juv., adulthood reached on 11 Aug. 2022; MSNB, MSNB-Ar-53741. – **Calabria** • 1 ♂, 1 ♀; Cosenza, Frascineto, Petrosa; 39.8414° N, 16.2563° E; 541 m a.s.l.; 24 Jun. 2022; P. Rizzo leg.; dry meadow; MSNB, MSNB-Ar-53212.

SLOVENIA – **Littoral** • 1 ♂; Brje [Carso Triestino, Berje]; Jun. 1913; Müller leg.; syntype of *L. tarentula carsica*; MSNT, MSNT-Ar743.

Description

Female neotype

Measurements. Total length 24.0. Carapace 14.2 long, 9.5 wide.

Carapace. Brown, with faint lighter radii at center and yellowish marginal borders; well-defined, winding whitish-yellowish marginal stripes starting from lateral sides of cephalic area and bordering whole carapace; central longitudinal stripe of same color on posterior half, enlarging in fainter, light-brownish wider stripe in anterior half (Fig. 8D–E). Cephalic area not elevated, covered with numerous whitish setae (Fig. 8D–F). Paturon distally black, proximal half covered with yellowish setae (Fig. 8F), 3 teeth

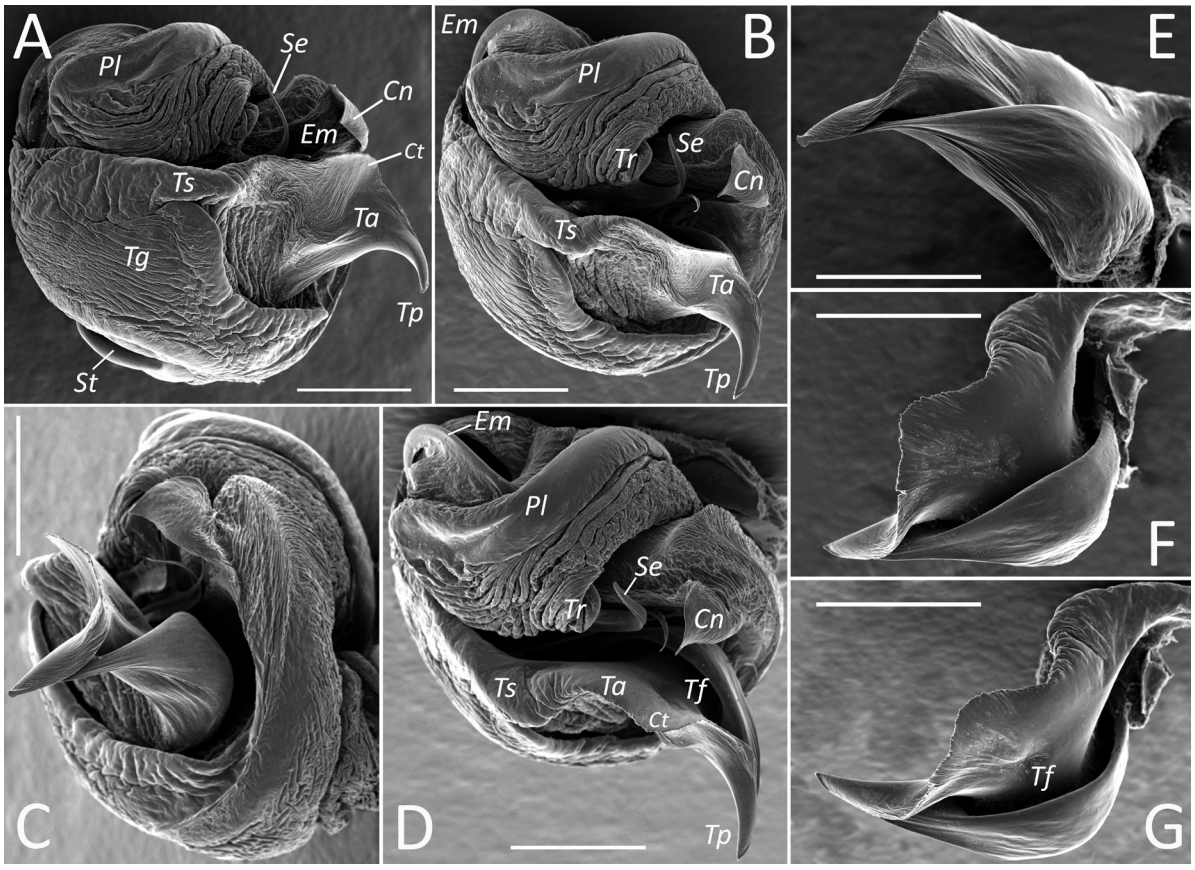

Fig. 5. Details of the bulb of *Lycosa tarantula* (Linnaeus, 1758) from Subiaco (MSNB-Ar-11601). **A**–**D**. Whole bulb. **A**. Ventral. **B**. Ventro-anterior. **C**. Retrolateral. **D**. Anterior. **E**–**G**. Tegular apophysis. **E**. Dorsal. **F**. Dorso-anterior. **G**. Anterior. Abbreviations: see Material and methods. Scale bars: A–G = 0.5 mm.

on both promargin and retromargin. Promarginal central tooth larger than others. All retromarginal teeth of same size, as long as promarginal central tooth. Sternum brownish with 8 whitish marks, 1 at center, others all around with radial pattern; maxillae and labium uniformly black. Palps uniformly yellowish with darker femora and tip of metatarsi. Eye sizes and interdistances: AME 0.54; ALE 0.56; PME 1.26; PLE 1.05; AME–AME 0.25; AME–ALE 0.12; ALE–ALE 1.4; AME–PME 0.36; ALE–PME 0.4; PME–PME 0.98; PME–PLE 1.42; PLE–PLE 2.75.

Legs. Brown, covered with numerous whitish setae on dorsal side; ventral coxa and trochanter uniformly dark brown; patella uniformly yellowish. Ventral femur and tibia with clear yellowish and black annulations: femur with 3 black marks, 1 small at proximal tip, 1 large at central and distal parts (Fig. 11D); tibia with 2 large black marks at proximal and distal tips (Fig. 9H–J). Tarsi and metatarsi uniformly brown with ventral scopula (Sc) and spinules, ventral basal part of tarsus with narrow, yellowish annulation (Fig. 9L). Setae of scopula with whitish bristles. Spinules (Sp) black, without bristles. Number of scopula setae decreasing from leg I to leg IV, while number of spinules increasing. Tarsus I with well-developed scopula and small group of spinules on the distalmost part. Tarsus IV with spinules along entire length and with poorly developed scopula forming two lateral groups of setae.

Opisthosoma. Dorsally brownish with dark brown chevrons bordered posteriorly with white setae (Fig. 9C). Ventrally uniformly yellow with darker areas covering lungs at both sides of epigyne and well-defined black transversal stripe, shaped as inverted trapezoid with angles of shorter side slightly protruding posteriorly (Figs 9D, 11A). Spinnerets brownish.

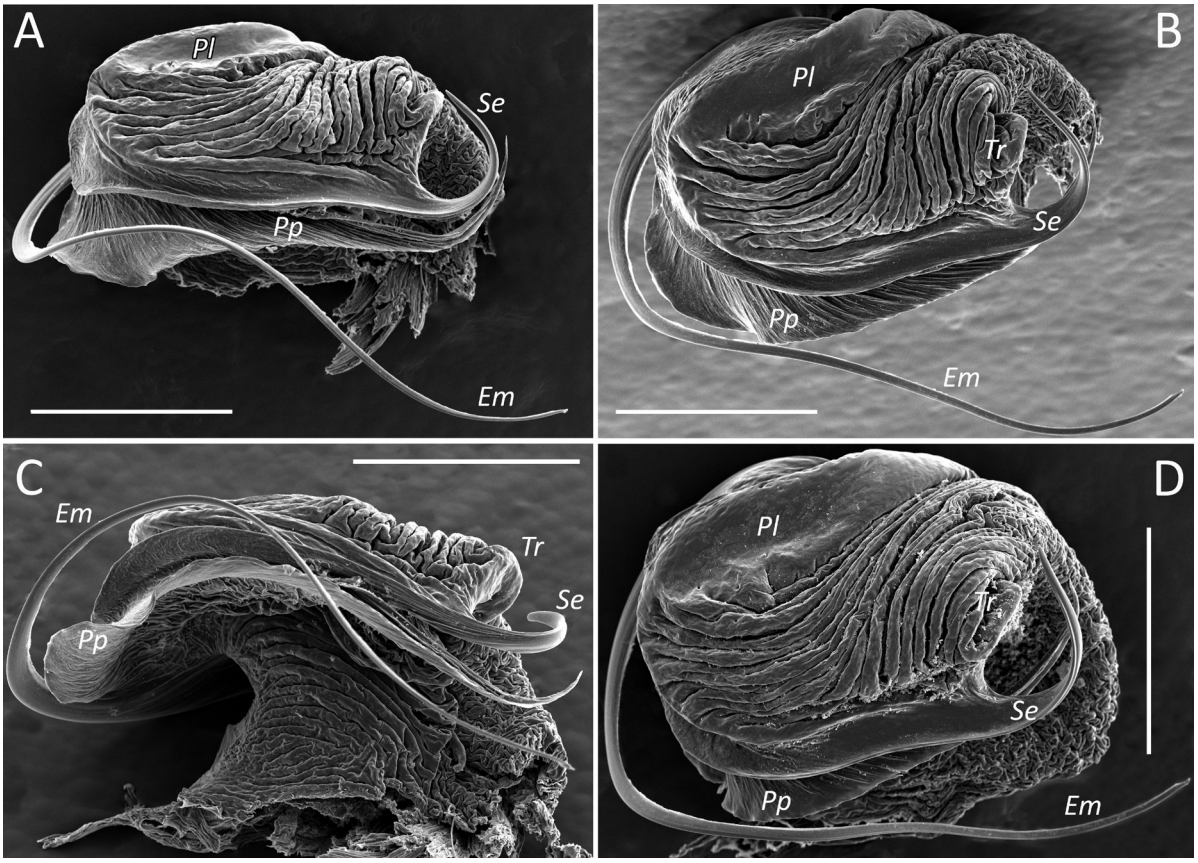

Fig. 6. Embolic division of *Lycosa tarantula* (Linnaeus, 1758) from Subiaco (MSNB-Ar-11601). **A**. Ventro-posterior view. **B**, **D**. Ventral views. **C**. Posterior view. Abbreviations: see Material and methods. Scale bars: A–D = 0.5 mm.

Epigyne (Figs 3A–D, 4C–D, 7A–F). Epigynal plate with arrow-like septum (Sm), strongly sclerotized, ca 2.5 times as long as wide, with anterior elevation (Ae), gradually narrowing toward septal base in central part. Median furrow (Mf) well-defined, covering ⅔ of septum. Septal base (Sb) shaped as barb arrowhead, ca as wide as anterior part of septum, ending with rounded tip. Copulatory openings (Co) at lateral corners of septal base (= barbs of arrowhead), opening at end of small and narrow pockets. Vulva as in Figs 3E, 4E–F, 7G–H. Copulatory ducts (Cd) strongly sclerotized, with sinuous course (Fig. 4F); enlarging in spherical anterior outgrowth (Ao) and continuing with long and relatively narrow stalk (Sr) until reaching base of head of receptacle. Head of receptacle (Hr) oval or subspherical, ca 2 times as wide as stalk, separated from each other ca 2.5 times their width; fertilization ducts (Fd) short, membranous, headed ventrally.

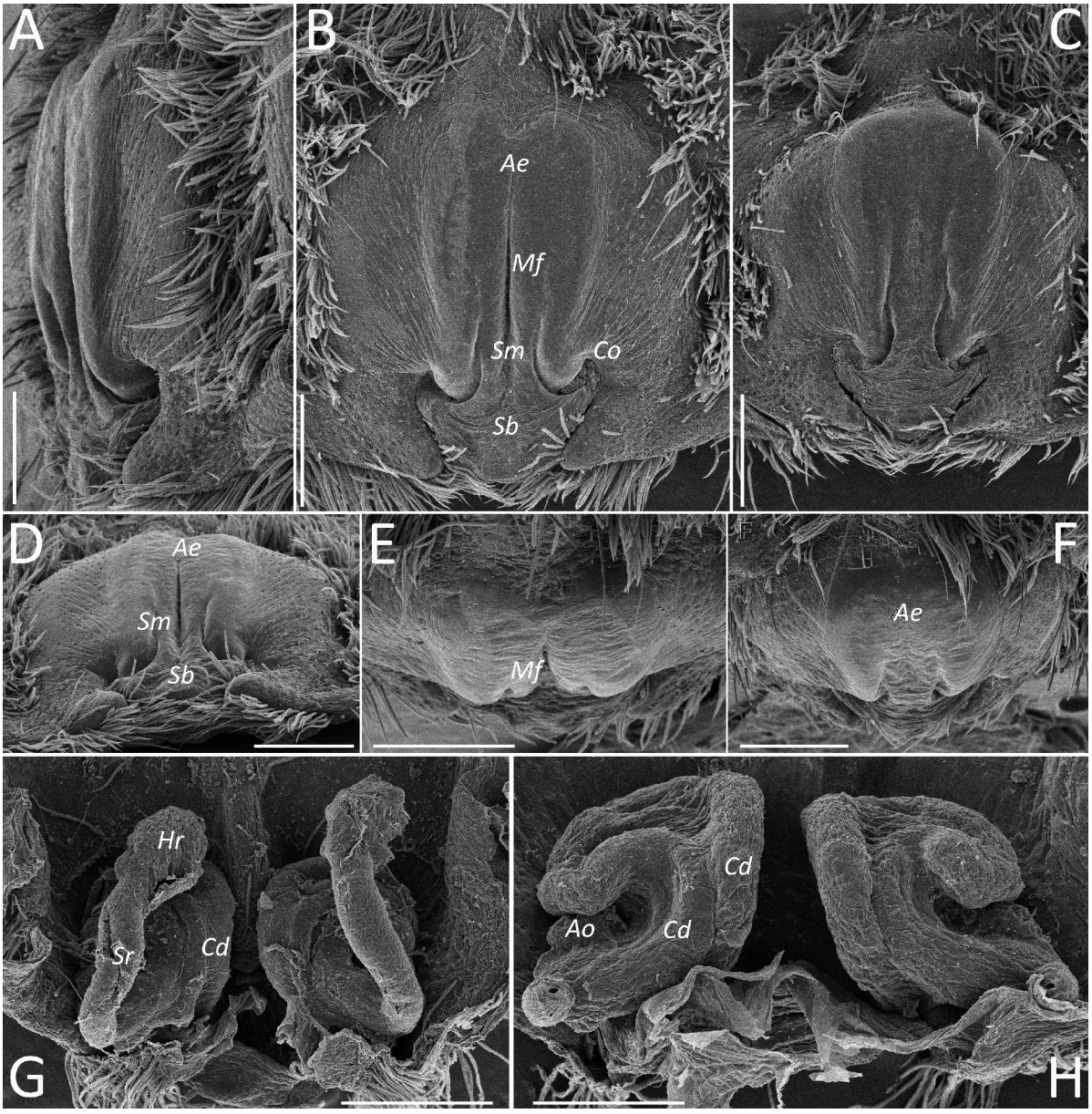

Fig. 7. A–**F**. Epigyne. **A**. Lateral view. **B**–**C**. Ventral views. **D**. Posterior view. **E**–**F**. Anterior views. **G**–**H**. Vulva. **G**. Dorsal view. **H**. Dorsal view with head of receptacles removed. **A**–**B**, **D**–**E**, **H**. From Tremiti Islands (MSNV-Ar-jar24). **C**, **F**–**G**. From Taranto (MSNB-Ar-53211) and Ostuni (MSNV-Ar-jar21) areas. Abbreviations: see Material and methods. Scale bars: A–H = 0.5 mm.

Fig. 8. Male and female prosoma of *Lycosa tarantula* (Linnaeus, 1758) from Italy. **A**–**C**. Prosoma of male. **A**. Lateral view. **B**. Dorsal view. **C**. Frontal view. **D**–**F**. Prosoma of female. **D**. Lateral view. **E**. Dorsal view. **F**. Frontal view. **A**–**C**. From Subiaco (MSNB-Ar-11601). **D**–**F**. From Ostuni (MSNV-Ar-jar21). Scale bars: A–F = 3 mm.

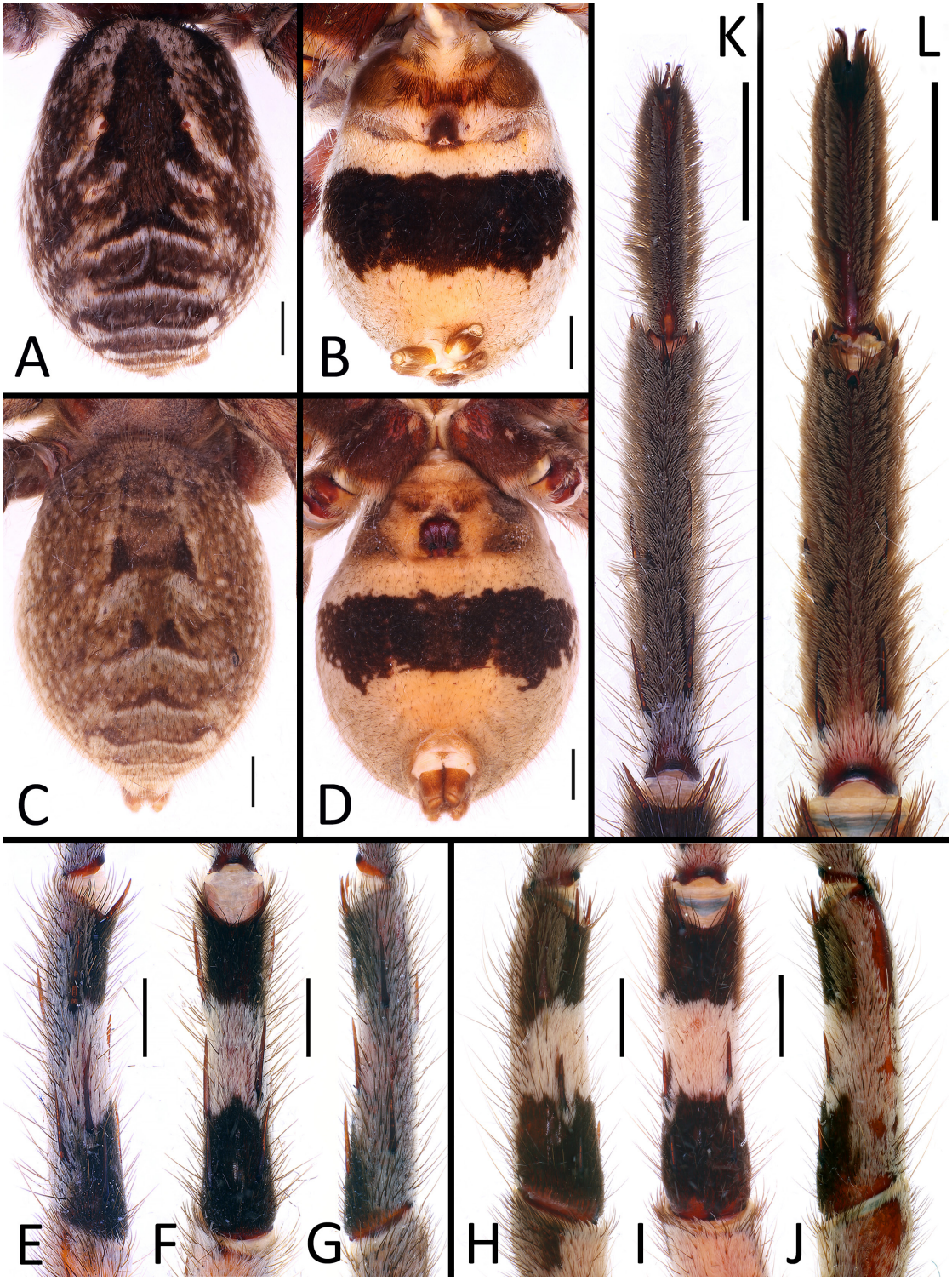

Fig. 9. Male and female opisthosoma and legs I of *Lycosa tarantula* (Linnaeus, 1758) from Italy. **A**–**B**. Opisthosoma of male. **A**. Dorsal. **B**. Ventral. **C**–**D**. Opisthosoma of female. **C**. Dorsal. **D**. Ventral. **E**–**G**. Male tibia I. **E**. Prolateral. **F**. Ventral. **G**. Retrolateral. **H**–**J**. Female tibia I. **H**. Prolateral. **I**. Ventral. **J**. Retrolateral. **K**. Male tarsus I and metatarsus I, ventral. **L**. Ditto, female. **A**–**B**, **E**–**G**, **K**. From Subiaco (MSNB-Ar-11601). **C**–**D**, **H**–**J**, **L**. From Ostuni (MSNV-Ar-jar21). Scale bars: A–J = 2 mm; K–L = 1 mm.

Coloration in vivo. General coloration more vivid, with dorsal and ventral patterns more clearly visible (Figs 12D–F, 13A–E). Carapace dark brown; lateral and longitudinal stripes of carapace bright yellow (Figs 12D–E, 13A–C). Sternum light brown-greyish; basal half of chelicera, central segments of palps, and dorsal side of legs dark orange (Fig. 13C–D). Ventral legs annulations and ventral opisthosoma with clearly visible pattern. Annulation of ventral femur, and tibia bright yellow and shining black, patella bright yellow, tarsus and metatarsus bright black; ventral opisthosoma bright yellow or orange, sometimes light grey in some individuals, with bright black transversal stripe (Figs 12F, 13E).

Male

Measurements. Total length: 21.0. Carapace 10.5 long, 7.5 wide.

Carapace. General pattern and coloration as in female but lighter, more greyish, and with more distinct pattern (Fig. 8A–C). Eye sizes and interdistances: AME 0.42; ALE 0.36; PME 0.92; PLE 0.74; AME–AME 0.17; AME–ALE 0.11; ALE–ALE 1.05; AME–PME 0.32; ALE–PME 0.36; PME–PME 0.75; PME–PLE 1.02; PLE–PLE 2.01.

Legs. General coloration, development of scopula and spinules, and other characters as in female. Ventral annulation of femur and tibia more greyish rather than yellowish like in female (Fig. 9E–G). Tibia and metatarsus as in female but slimmer (Fig. 9K). Scopula and spinules as in Fig. 10A–E.

Opisthosoma. Coloration and pattern similar to female but chevrons larger, darker, and partially merged to each other (Fig. 9A). Ventral coloration yellowish as in female but lighter and with wider black transversal stripe (Fig. 9B).

Palp (Figs 1A–G, 4A). Femur length/width 3.2, patella length/width 1.7, tibia 2 times as long as wide. Femur dark brown; patella, and tibia yellowish, covered with long dark setae, particularly numerous on retrolateral side; dorsal side covered with numerous short whitish adpressed setae. Cymbium asymmetric, with bulge on retrolateral side (Figs 1B, E–F, 4A); 1.6 times as long as wide, more than 2 times as wide

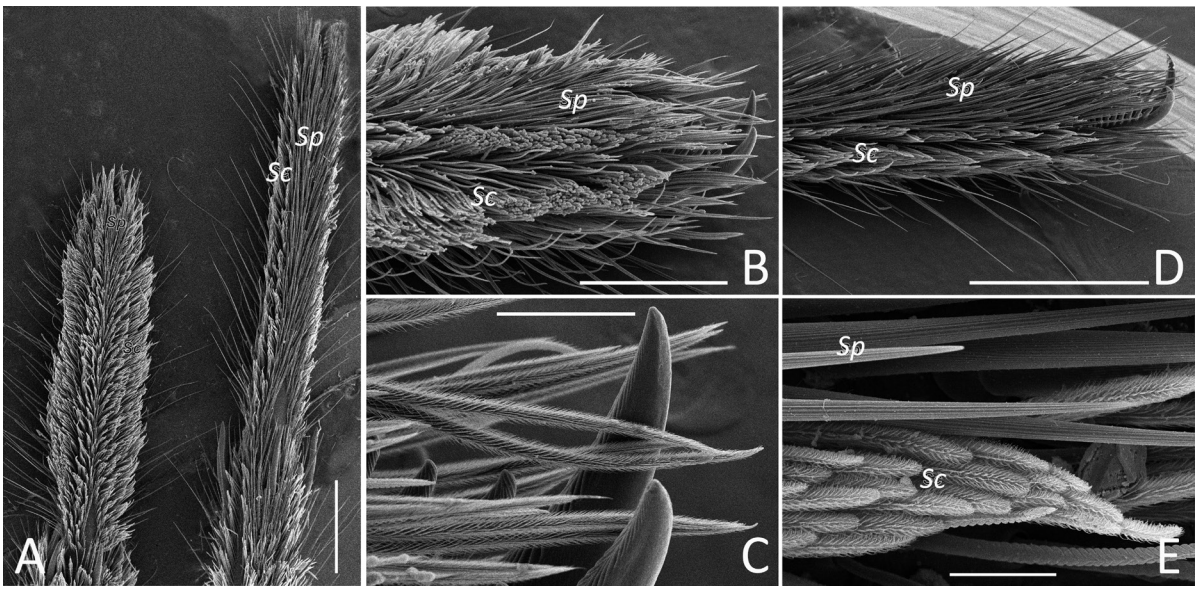

Fig. 10. Male tarsi of *Lycosa tarantula* (Linnaeus, 1758) from Subiaco (MSNB-Ar-11601). **A**. Tarsi I and IV, ventral. **B**. Tip of tarsus I, ventral. **C**. Ditto, detail of claws. **D**. Tip of tarsus IV, ventral. **E**. Ditto, detail of scopula. Abbreviations: see Material and methods. Scale bars: A = 1 mm; B, D = 0.5 mm; C = 0.1 mm; E = 0.05 mm.

as tibia. Dorsal basal part of cymbium covered with dense, long, white setae, anterior half brown covered with brownish relatively short setae (Fig. 1E). Tip of cymbium about 0.4 times as long as cymbium, bearing 2 short claws hidden among short setae (Fig. 1G). Bulb as in Figs 2A–D, 5A–D. Bulb (excluding tegular apophysis) oval, slightly longer than wide; subtegulum (St) postero-prolateral, partly visible in ventral view; tegulum (Tg) hemispheric, length/width in ventral view 1.5. Tegular stalk (Ts) clearly distinct. Tegular apophysis (Ta) as in Figs 2A–B, 4A, 5A–G, trapezoidal, large, as wide as tibia, flat, slightly longer than wide, folded on itself forming an internal furrow (Tf) (Fig. 5E–G); crest of tegular apophysis (Ct) well developed, forming a wide rounded lobe on antero-retrolateral corner of tegular apophysis; distal process of tegular apophysis (Tp) thin and sharp, slightly bent postero-retrolaterally. Conductor (Cn) ribbon-like, transparent, distal part ending with a sharp tip bent ventrally. Embolic division as in Figs 2E–F, 4B, 6A–D. Palea (Pl) almost twice as wide as long with short and stumpy, trapezoidal terminal apophysis (Tr) on retrolateral side; synembolus (Se) well-developed, basal part following curvature of embolus, terminal part hook-like, tip thin and sharp, headed dorsally. Pars pendula (Pp) transparent, attached at basal part of embolic division and base of synembolus, following course of embolus (detached from embolus in the photographed sample); embolus (Em) long and filamentous originating at ca 11 o'clock position when observing embolic division anteriorly (Fig. 6A–D).

Coloration in vivo. General coloration more grayish, pattern more clearly visible (Figs 12A–B, 13F). Carapace light brownish, lateral and longitudinal stripes light grey (Fig. 12A–B); sternum light orange,

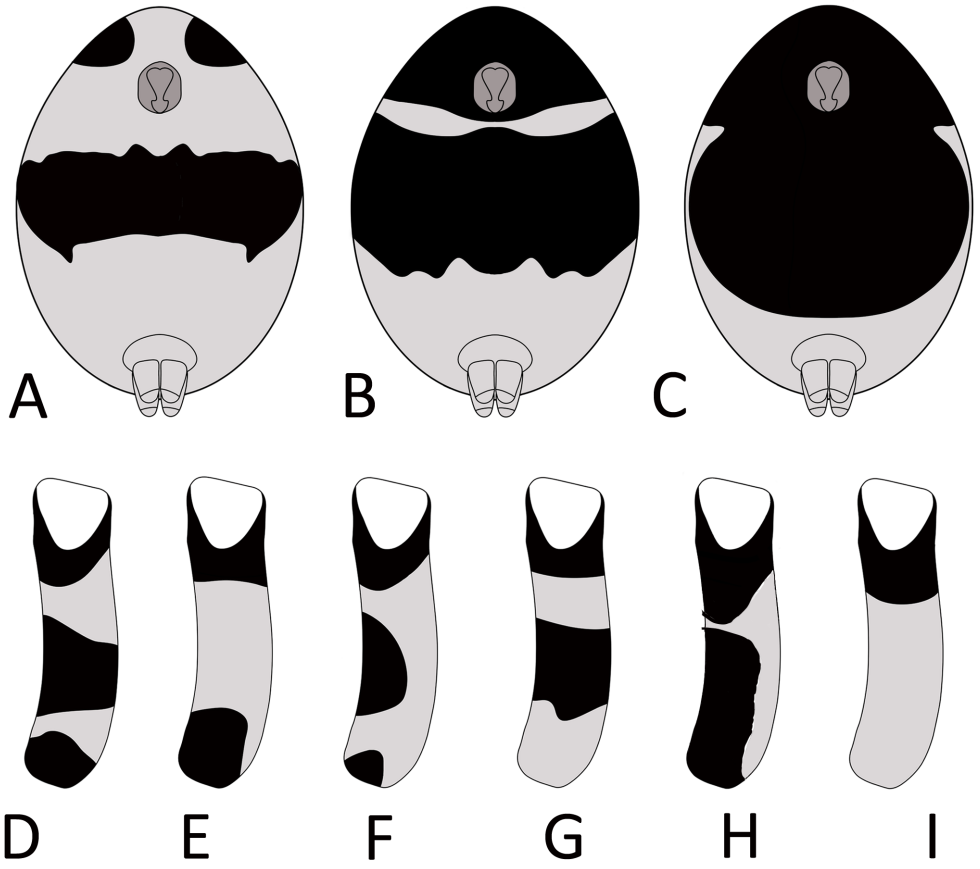

Fig. 11. Variation of the ventral pattern of the opisthosoma and femur I in different populations of *Lycosa tarantula* (Linnaeus, 1758). **A**, **D**–**E**. From southern Italy. **B**. From the northern Balkans. **F**. From Italy and the northern Balkans. **G**. From Italy and southern France. **C**, **H**–**I**. From southern France.

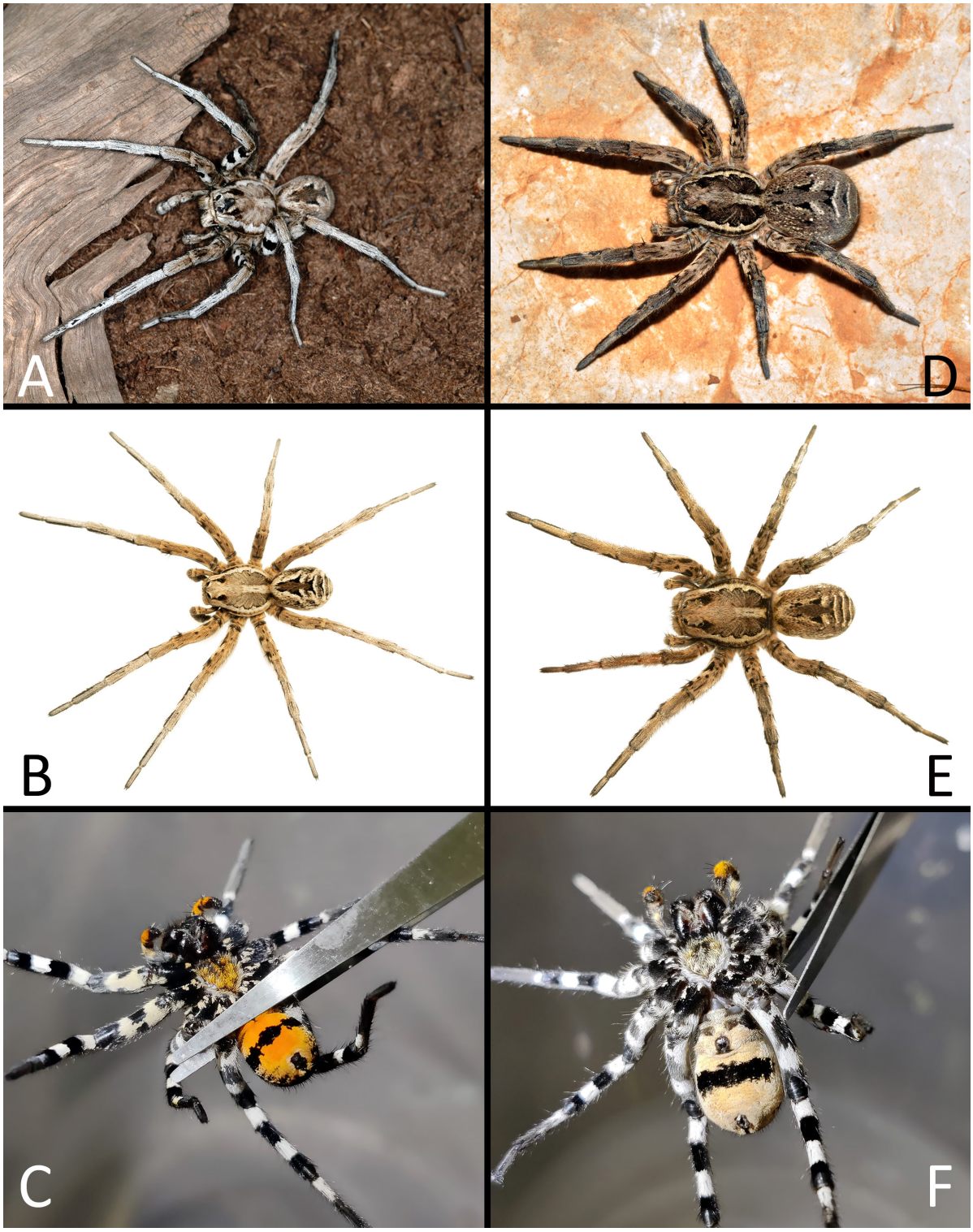

Fig. 12. Habitus of *Lycosa tarantula* (Linnaeus, 1758) from southern Italy in life. **A**–**C**. Habitus of adult male. **A**–**B**. Dorsal views. **C**. Ventral view. **D**–**F**. Habitus of adult female. **D**–**E**. Dorsal views. **F**. Neotype from Taranto (MSNB-Ar-53211), ventral view. **A**, **D**. Photos by R. Addante. **B**, **E**. Photos by P. Rizzo. **C**, **F**. Photos by P. Pantini.

Fig. 13. *Lycosa tarantula* (Linnaeus, 1758) from southern Italy in its natural habitat. **A–B**. Female neotype from Taranto (MSNB-Ar-53211) near its burrow. **C**. Female near its burrow's entrance. **D**. Female with offspring inside its burrow. **E**. Female in threat pose. **F**. Adult male, frontal view. **A–B**. Photos by F. Milazzo. **C–F**. Photos by R. Addante.

proximal part of chelicera faint yellowish (Fig. 13F). Palp light grey. Dorsal side of tibia, metatarsus, and tarsus light grey, ventral annulations with light grey and bright black marks, clearly visible. Ventral opisthosoma bright orange, transversal stripe bright black (Fig. 12C).

Habitat

The species primarily inhabits arid meadows (Fig. 15). See ecological remarks in the discussion.

Distribution

The presence of *L. tarantula* is currently confirmed only in Italy, Slovenia, Croatia, and Southern France (Fig. 16). See remarks in the discussion.

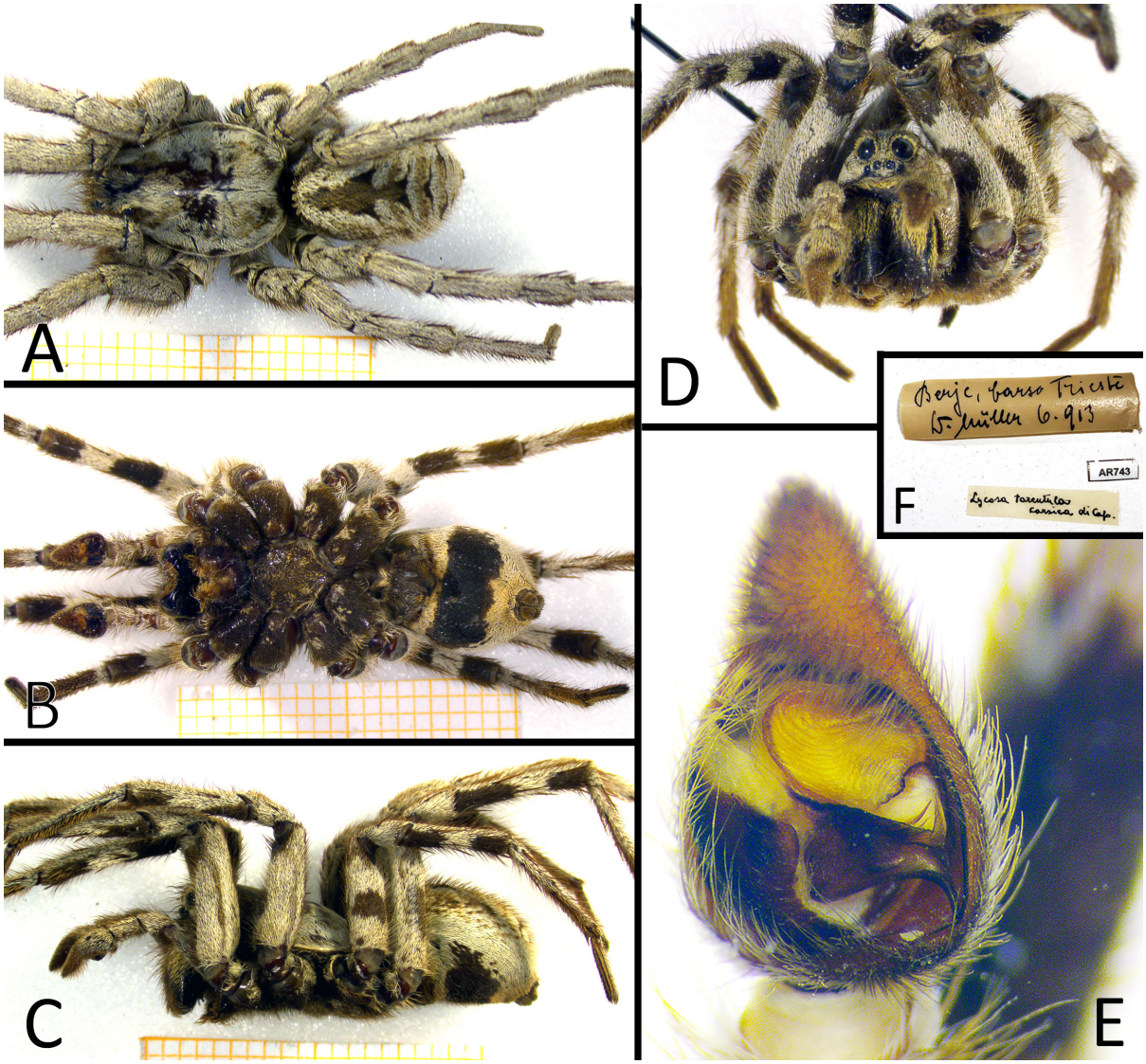

Fig. 14. Male syntype of *Lycosa tarantula carsica* Caporiacco, 1949 (MSNT-Ar743). **A**–**D**. Habitus. **A**. Dorsal view. **B**. Ventral view. **C**. Lateral view. **D**. Frontal view. **E**. Palp, ventral view. **F**. Original label. **A**–**E**. Photos by P. Pantini. Graph paper square: 1 mm.

Remarks on variation

Size variation: males (n = 7): carapace length 10.5–11.0 and width 7.5–8.5, length of femur I 7.8–8.6; females (n = 10): carapace length 10.5–17.1 and width 7.3–11.4, length of femur I 6.8–10.4. There is intraspecific variation in the shape of the epigyne. Particularly, the median furrow of the epigynal septum can be more or less distinct and is sometimes absent (Fig. 3A−C). The heads of the receptacles may also slightly vary in shape, appearing more or less rounded or oval, and the copulatory ducts can be more or less closely spaced. In both sexes, different populations and sometimes even single individuals, show variation in the ventral pattern, particularly in the width and shape of the transverse black stripe of the opisthosoma and of the lung marks (Fig. 11A–C). The number and shape of black marks on the ventral side of the femora are also highly variable (Fig. 11D–H). In contrast, the tibial pattern appears more consistent even among different populations. The sternum may be uniformly black or bear more or less distinct yellow-orange markings. Populations from southern France tend to have an overall darker body coloration with a black sternum, a nearly entirely black ventral opisthosoma, and black markings on the femora of variable size (Fig. 11C, G–H). Although this darker pattern appears dominant, it is not present in all individuals, occurring in ca 80% of the specimens (Jean-Philippe Taberlet, in litteris). Populations from Croatia also appear to have a darker venter, with a broader black stripe compared to the Italian populations (Fig. 11B). As in females, individual males or populations may exhibit minor variation in the ventral pattern of legs and opisthosoma.

Remarks on the synonymization of *L. tarentula carsica* and *L. tarantula cisalpina* with *L. tarantula*

In 1949, Caporiacco described a subspecies, *L. tarentula carsica* Caporiacco, 1949, based on specimens collected in the northernmost part of the Dinaric Alps. He reported one male from the island of Lošinj

Fig. 15. Example of natural habitats of *Lycosa tarantula* (Linnaeus, 1758) in southern Italy. **A**. From Taranto, Puglia. **B**–**D**. From Frascineto, Calabria. **A**. Photo by F. Milazzo. **B**–**D**. Photos by P. Rizzo.

(now Croatia) and several females collected near the village of Brje in the Carso Triestino area (now Slovenia). Caporiacco erected the subspecies based on small differences in pattern and coloration compared to the nominal species: the epigastric area of the male black except for narrow yellow stripes near the epiandrus (vs yellow); the female's ventral opisthosoma yellow (vs black and red-orange); the basal half of the chelicera yellow-orange (vs yellow); and femora I bearing a longer black proximal mark merged to the central one (vs separated black marks) (Caporiacco 1949: 143). No additional records of this subspecies have been reported since.

We examined the syntype male of *L. tarentula carsica* preserved in the collections of the Civic Museum of Natural History of Trieste, Italy (Fig. 14A–E). The female specimens were not found. After a detailed analysis of the diagnostic characters of the palp (Fig. 14E) and the general body coloration (Fig. 14A–D), we found no significant differences from *L. tarantula.* We consider the minor differences reported by Caporiacco to fall within the range of intraspecific variation and not sufficient to justify a subspecies.

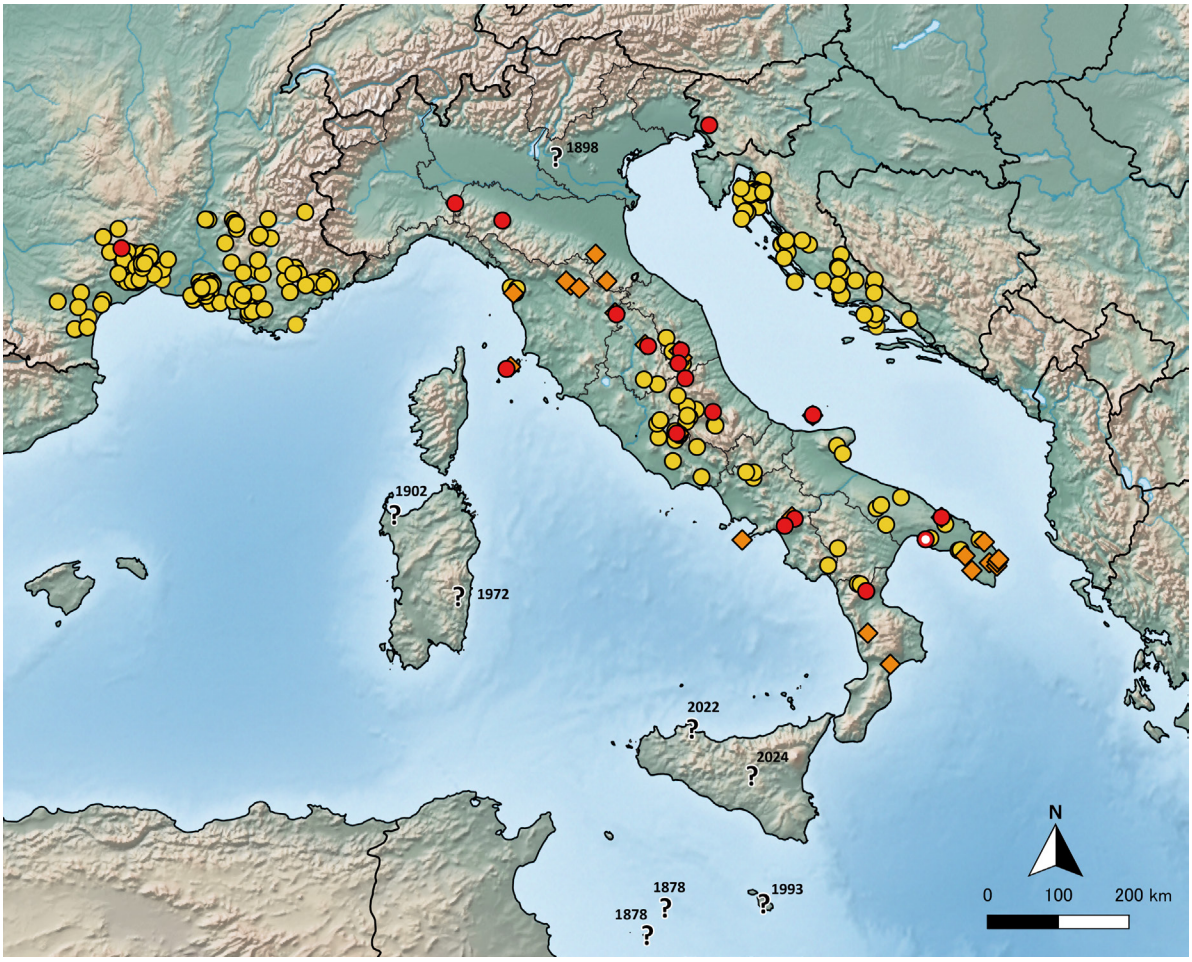

Fig. 16. Distribution of *Lycosa tarantula* (Linnaeus, 1758) in southern Europe. Red dots represent examined material (through direct examination or photographs); the type locality (Taranto) is highlighted with a white dot within; orange diamonds represent known records from the literature (Italy only); yellow dots represent records from iNaturalist (https://www.inaturalist.org/); question marks represent doubtful records reported in the literature that require confirmation (the year of the record is shown). Map created using QGIS software (https://qgis.org/).

Another subspecies, *L. tarantula cisalpina* (= *L. narbonensis cisalpina* Simon, 1937), was established by Simon (1937) based on females from the Maritime Alps (Sospel, Col de Tende), on the border between France and Italy. No additional records have been recorded since the original description. As in the previous case, the subspecies was established based on minor differences from *L. narbonensis*, including the shape of the black leg markings (femora III and IV with one ventral mark instead of two) and the shape of the black stripe on the ventral opisthosoma (wider, with a blunt posterior indentation) (Simon 1937: 1091). We were unable to examine the syntypes, and it is unknown to us whether they are still preserved in the collections of the Natural History Museum of Paris, where most of Simon's material is housed. Nevertheless, we believe that the coloration differences reported by Simon are commonly found within *L. tarantula* populations and are not sufficient to justify a subspecies. Furthermore, Simon himself stated that he was unable to properly determine whether the subspecies was more closely related to *L. narbonensis* or *L. tarantula* (Simon 1937: 1131), two taxa now considered synonyms.

Based on these considerations, we hereby propose the synonymization of *L. tarantula carsica* and *L. tarantula cisalpina* with *L. tarantula*.

Molecular account

The phylogenetic relationships among *L. tarantula* BOLD barcodes are reported in Fig. 18B. Italian and French specimens, including the neotype from Taranto, form a clear monophyletic clade, clearly distinct from other *Lycosa* species. In contrast, specimens from North Macedonia, Greece, and Turkey cluster in a distant, unrelated clade, suggesting misidentification. This further supports the need for clear diagnostic and molecular characters for accurate identification of *L. tarantula*.

Intraspecific genetic divergence within *L. tarantula* (Table 2) ranges from 0.0% to 0.8%, with a mean of 0.48%. suggesting relatively limited population structuring within the species. Interestingly, the southern Italian population differs from the French ones by only 0.5%, while the highest COI divergence is observed between the northern Italian and French populations and the southern and northern Italian populations.

Discussion

Distribution of *L. tarantula*

According to the WSC (2025) and Nentwig *et al.* (2025) *L. tarantula* is reported to occur across the Mediterranean region, with its range extending from southern France to North Africa, the Balkans, and the Middle East. Earlier authors frequently mentioned the distribution of the species as ranging from Italy to Eastern Europe, the eastern Mediterranean and in some cases even to Russia. For example, although Laxmann (1770) described a large lycosid from northeastern Kazakhstan as *Aranea singoriensis*, many subsequent authors continued to report *Aranea tarentula* from Russia (then the Russian Empire), and some even erroneously extended its range from Apulia to Siberia (Jördens 1801: 232). Bonnet (1957: 2625–2629) also reported *L. tarantula* from Italy, Hungary, the Balkans, Austria, Crete, and Dalmatia. However, *L. tarantula* has often been misidentified in the past due to the lack of clear diagnostic characters to distinguish it from other closely related congeners. Consequently, old and/or sparse literature or photographic records from North Africa, the eastern Mediterranean, eastern Europe, and the Middle East should be treated with caution, as they likely refer to other, similar *Lycosa* species. For example, records from Bosnia and Herzegovina (Komnenov 2010), North Macedonia (Deltshev *et al.* 2013), Turkey (Danışman *et al.* 2025), and Iran (Nadolny & Zamani 2020; see also Nentwig *et al.* 2025). Our molecular analysis also supports the misidentifications of specimens recently attributed to *L. tarantula* from North Macedonia, Greece, and Turkey (see Fig. 18B, Table 1).

Table 2. Result of the COI uncorrected pairwise genetic distance analysis among *L. tarantula* (Linnaeus, 1758) populations. The neotype individual is highlighted in red.

		1	2	3	4	5	6	7	8	9	10	11
1	*L. tarantula* Taranto (Lyco11 PX470703)	–	–	–	–	–	–	–	–	–	–	–
2	*L. tarantula* Taranto (Lyco12 PX470704)	0.000	–	–	–	–	–	–	–	–	–	–
3	*L. tarantula* Frascineto (Lyco37 PX470705)	0.000	0.000	–	–	–	–	–	–	–	–	–
4	*L. tarantula* Frascineto (Lyco38 PX470706)	0.000	0.000	0.000	–	–	–	–	–	–	–	–
5	*L. tarantula* Otranto (GBCH10954)	0.003	0.003	0.003	0.003	–	–	–	–	–	–	–
6	*L. tarantula* Otranto (GBCH10958)	0.003	0.003	0.003	0.003	0.000	–	–	–	–	–	–
7	*L. tarantula* Otranto (GBCH10957)	0.003	0.003	0.003	0.003	0.000	0.000	–	–	–	–	–
8	*L. tarantula* Pisa (GBCH10955)	0.008	0.008	0.008	0.008	0.005	0.005	0.005	–	–	–	–
9	*L. tarantula* Pisa (GBCH10956)	0.008	0.008	0.008	0.008	0.005	0.005	0.005	0.000	–	–	–
10	*L. tarantula* Boulbon (GBCH10959)	0.005	0.005	0.005	0.005	0.003	0.003	0.003	0.008	0.008	–	–
11	*L. tarantula* Boulbon (GBCH10960)	0.005	0.005	0.005	0.005	0.003	0.003	0.003	0.008	0.008	0.000	–

Based on current evidence, we can confidently confirm the presence of *L. tarantula* only in southern Europe, where the species shows a disjunct distribution, occurring in three areas: the Italian Peninsula, southern France, and the northern coastal region of the Balkans (Fig. 16). These findings are in line with those of Planas *et al.* (2013), which restricted the distribution of *L. tarantula* to "the Italian Peninsula

and in the Mediterranean-influenced zone of France". Our preliminary molecular analysis (see Fig. 18B, Table 2) reveals a low level of genetic divergence, consistent with a single, widespread species exhibiting limited population structuring. Nonetheless, slight genetic differences are observed between individuals from different areas, even those in close geographic proximity such as Otranto and Taranto, suggesting a possible reduction in gene flow among different populations and some degree of local geographic isolation.

Our photographic examination of *L. tarantula* specimens from southern France, including habitus and copulatory organs (courtesy of J.-P. Taberlet; see also https://araneae.nmbe.ch/gallery/photos/3977), failed to reveal any clear morphological differences with the Italian populations, except for a general darker ventral coloration (Fig. 11C; see also remarks on variation). The conspecificity also seems supported by molecular evidence (Planas *et al.* 2013; see also Fig. 18). However, it is worth noting that such comparisons did not involve specimens from the Narbonne area, from where the original samples used to describe *L. narbonensis* were likely collected. Due to the proximity of Narbonne to areas where other, similar *Lycosa* species are distributed (e.g., *L. fasciiventris* from Spain), the possibility that the original *L. narbonensis* refers to a species other than *L. tarantula* cannot be entirely excluded. A more detailed investigation involving specimens from Narbonne is needed in the future to confirm the synonymy.

In Italy, the species is distributed throughout the whole central and southern part of the peninsula, reaching as far north as the northern part of the Tuscan-Emilian Apennines (Pantini & Isaia 2019; this work; see also Fig. 16). The northernmost records that we were able to confirm are those from the Val Staffora area by Mazza (1888) previously considered uncertain (Isaia *et al.* 2007) and, photographically, from Mt Prinzera (44.6441° N, 10.0801° E, courtesy of G. Rabusin). The species seems absent from northereastern Italy, with only a very old and doubtful record from the Veneto region by Garbini (1898, sub *Tarentula narbonensis*), probably a misidentification of *Hogna radiata* (Ballarin *et al.* 2011).

The presence of *L. tarantula* in Sardinia, Sicily, Lampedusa, Linosa, and Malta remains uncertain, being based only on sparse records, generally outdated, or not properly confirmed by morphological comparisons. Examples include Garneri (1902) and Thermes (1972) for Sardinia; Dentici (2022) and Dentici & Amata (2024) for Sicily; Pavesi (1878) and Pesarini (1995) for Lampedusa and Linosa, as well as Baldacchino *et al.* (1993) for Malta (Fig. 16). Given the proximity of these islands to mainland areas where the species is recorded, its presence cannot be entirely excluded. However, it is more likely that *L. tarantula* is replaced on these islands by other, similar and poorly known congeners of North African origin, such as *L. oculata*, *L. munieri*, and *L. bedeli* (Planas *et al.* 2013; Pantini & Isaia 2019). The presence of *L. oculata* and *L. munieri* in Sardinia has been confirmed through molecular data (Planas *et al.* 2013), while *L. bedeli* has been reported from Sicily (Pesarini 1994). However, all these species remain poorly studied and illustrated, and are in urgent need of taxonomic revision. They continue to be misidentified and lack clear diagnostic characters. Our preliminary examination of individuals from Sicily identified as *L. tarantula* suggests the hypothesis of misidentifications, but given the limited number of specimens examined, we prefer to defer this matter to a future study.

Ecology and seasonality

Lycosa tarantula occurs from sea level up to approximately 1600 m a.s.l. (Fig. 18A), with the highest elevation records documented in the Apennines. It typically inhabits xeric open habitats, particularly sunny, arid meadows with rocks and sparse, low herbaceous vegetation, which provide suitable conditions for juveniles and adults to dig burrows and freely roam when hunting (Pepe 2005; and pers. obs.). The species is generally uncommon, yet when environmental conditions are favorable, it can become locally abundant, occurring at high densities within relatively small areas. In such conditions,

the entrances of the burrows are often found close to one another (R. Addante and A. Trotta, in litteris). Adults and juveniles tend to remain hidden inside their ground burrows during the day, which consist of silk-lined tubes approximately 2–3 cm in diameter and extending 20−40 cm deep into the ground (Pepe 2005; and pers. obs.). The entrance of the burrow is typically covered with plant debris, such as

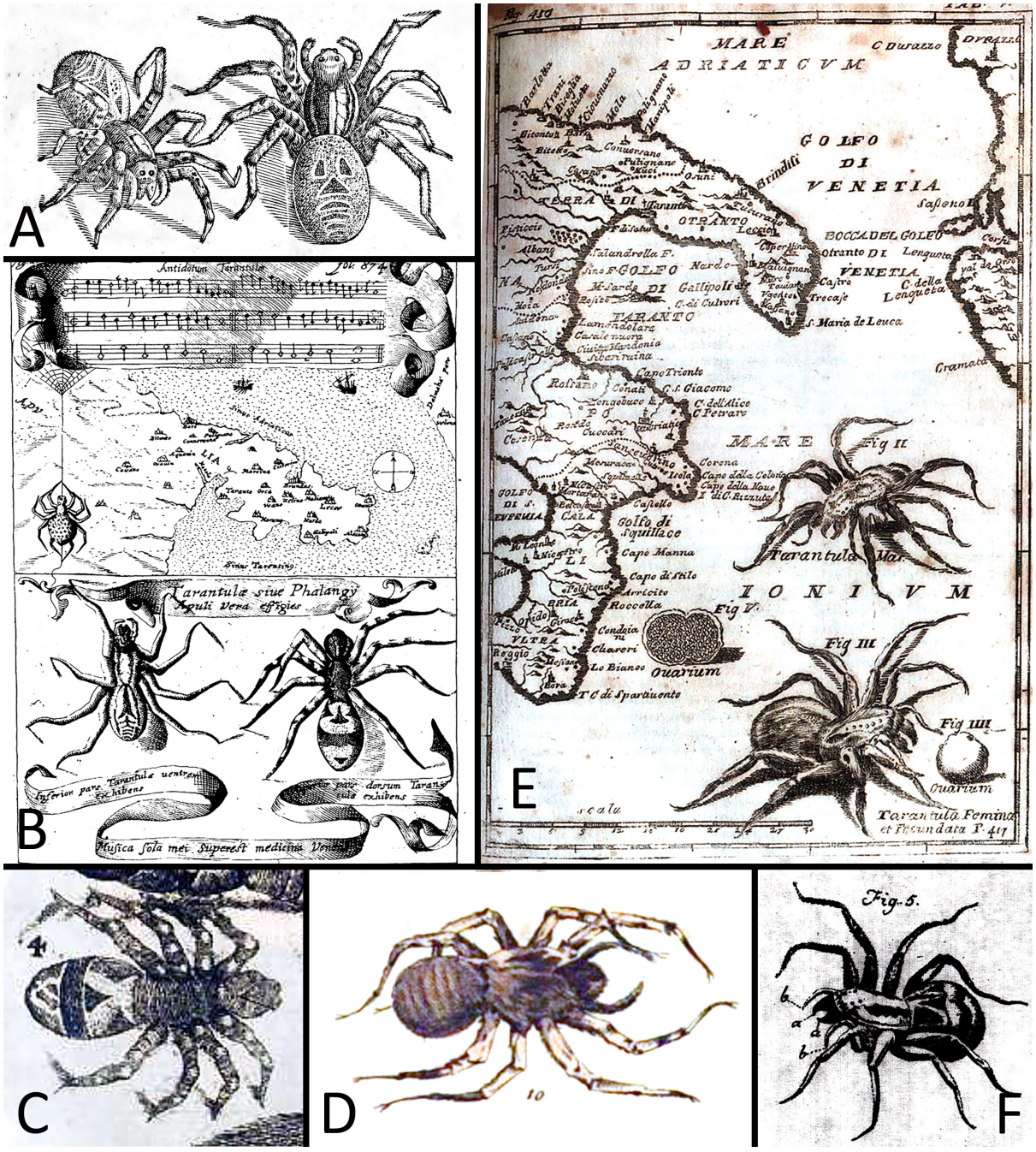

Fig. 17. The earliest known published representations of *Lycosa tarantula* (Linnaeus, 1758) from the 16th and 17th centuries. **A**. *Dell'historia naturale di Ferrante Imperato napolitano libri XXVIII* by Ferrante Imperato (1599). **B**. *Magnes sive de Arte Magnetica* by Athanasius Kircher (1641). **C**. *Gottorffische Kunst-Cammer* by Adam Olearius (1666). **D**. *A Philosophical Account of the Works of Nature* by Richard Bradley (1721). **E**. *Dissertatio IV de historia, anatome, morsu et effectibus tarantulae* by Giorgio Baglivi (1737). **F**. *Mechanica expositio venenorum variis dissertationibus* by Richard Mead (1752).

dead leaves or small twigs, woven with silk to form a slightly elevated ring structure (see Fig. 13B–D). During dusk or nighttime hours, individuals can be observed wandering freely on the ground, either hunting or, in the case of mature males, in search of females to mate with. As in other wolf spiders, females carry the egg sac and continue to transport the spiderlings for a period after hatching. Based on available observations (e.g., Pepe 2005; iNaturalist; and pers. obs.), the species is active from spring to autumn, with a peak of activity in early summer, particularly in June, followed by a gradual decline in late summer and autumn.

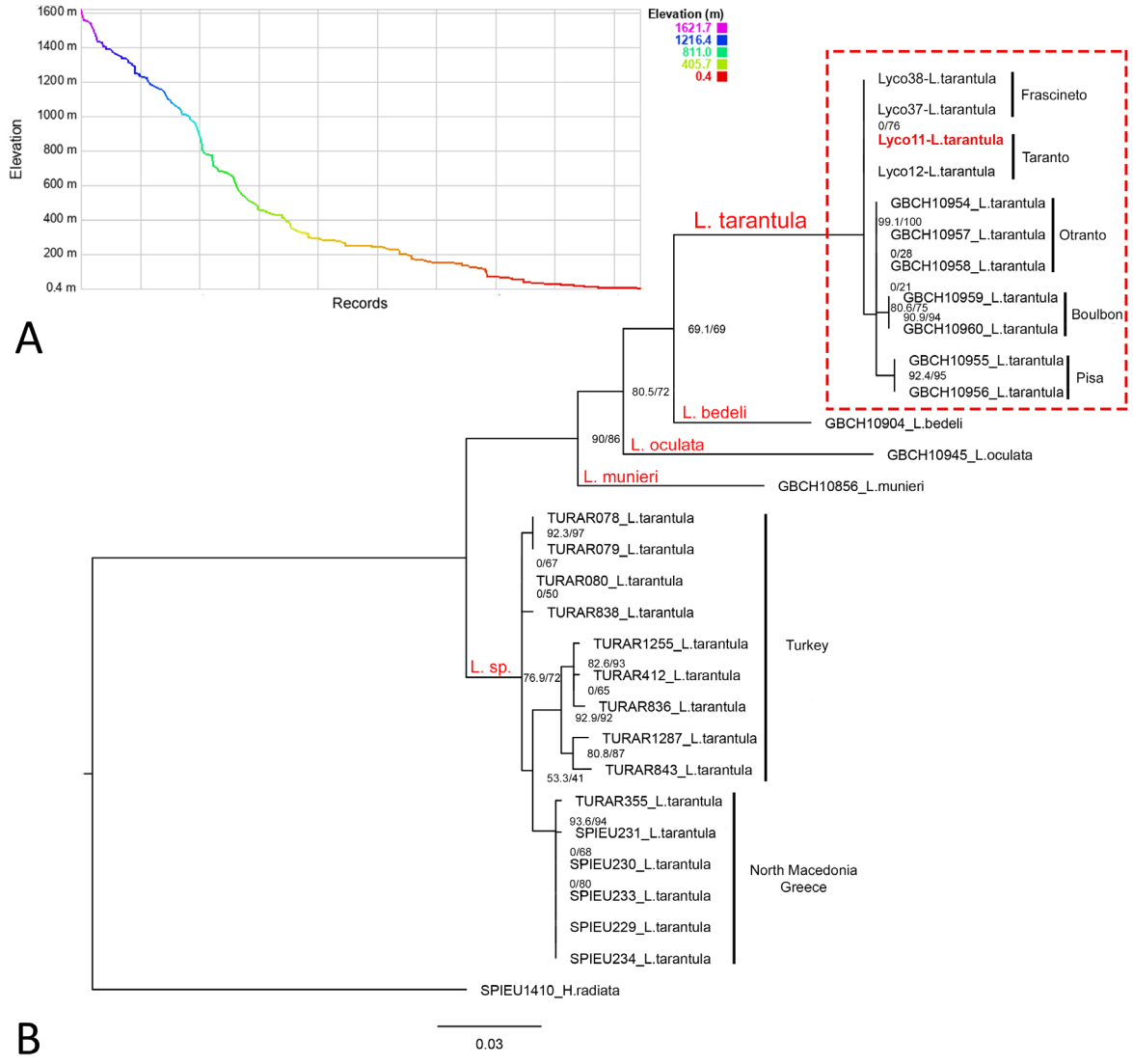

Fig. 18. Elevation records and phylogeny of *Lycosa tarantula* (Linnaeus, 1758). **A**. Profile plot of known elevation records of *L. tarantula* (generated with GPS Visualizer). **B**. Phylogenetic tree based on COI barcodes reconstructed using maximum likelihood analysis in IQ-TREE. Support values are indicated near each node (left: Ultrafast Bootstrap; right: SH-aLRT). Branch lengths are scaled to the number of substitutions per site. The *L. tarantula* clade is highlighted with a red dashed line, with the neotype from the Taranto area indicated in red. The tree is rooted with *Hogna radiata* (Latreille, 1817).

Pre-Linnean historiography and cultural background

Lycosa tarantula is not only an important spider species from a biological and scientific perspective but also holds a prominent place in cultural history and local traditions, particularly in southern Italy, having fascinated and influenced scholars, researchers, and the general public for centuries.

The earliest known published references specifically referring to this species date back to the late 15th and 16th centuries, appearing in works by authors such as Niccolò Perotto (1429–1480) in Cornucopiae (Perotto 1489) and Pietro Andrea Mattioli (1501–1578). In his Discorsi (Mattioli 1555), mentioned a spider known as "tarantola" as a venomous spider of Apulia whose bite causes severe illness, reportedly curable with music (Canestrini & Pavesi 1868: 3). By the end of the 16th century, we also have the first detailed illustration of a wolf spider resembling *L. tarantula*, published by Ferrante Imperato (1525?−1615) in his *Dell'Historia Naturale* (Imperato 1599; Fig. 17A).

The earliest visual and descriptive record in which the leg bands and the characteristic dorsal and ventral abdominal patterns of the species are clearly depicted appeared in the 17th century, when the Jesuit scholar Athanasius Kircher (1601−1680) commissioned his confrères Gallimberto and Nicolello, rectors of the colleges of Taranto and Lecce, to collect information on the phenomenon of tarantism. It is probably to them that we owe the illustrations reproduced in *Magnes sive de Arte Magnetica* (Kircher 1641; Fig. 17B), which present both the dorsal and ventral views of the species, together with a map of its area of distribution (Apulia) and the musical score used to cure its bite.

A similar image of the spider was later reused by other subsequent authors, such as in *Elysium Britannicum* (Evelyn [ca] 1650) by John Evelyn (1620−1706) and *Gottorfische Kunst-Cammer* (Olearius 1666) by Adam Olearius (1599?−1671). In his dissertation, Olearius not only illustrated the species (Fig. 17C), but also described it as typical of the Salento area and also present in Sardinia, Calabria, and the Near East, as well as reporting both the effects of its bite and the associated musical therapy. Additional illustrations clearly referring to *L. tarantula* were later provided by Richard Bradley (1688−1732) in *A Philosophical Account of the Works of Nature* (Bradley 1721; Fig. 17D) and Giorgio Baglivi (1668−1707) in his *Dissertatio IV de historia, anatome, morsu et effectibus tarantulae* (Baglivi 1737; Fig. 17E). Baglivi, in particular, published a dissertation specifically on the action of the tarantula's venom and the treatment of tarantism according to the principles of 17th century experimental philosophy, based on clinical observation of eight cases of tarantati (people affected by tarantism) and on direct experimentation (see Pennuto 2002). Similarly, Richard Mead (1673−1754) in his dissertation *Mechanica expositio venenorum variis dissertationibus* (Mead 1752), not only provided a detailed illustration of the species, highlighting some of its morphological characteristics (Fig. 17F), but also detailed information on its ecology and the related tarantism. Other subsequent authors continued to report records and illustrate the species, albeit often less detailed, until the first formal scientific description of the species by Linnaeus in 1758. Linnaeus also acknowledged its connection with tarantism: "*rabida sub canicula morsu excitat famosum tarantismum musica medendum*" meaning "fierce beneath the summer heat, its bite provokes the famous tarantism, which can be cured by music".

All these historical references point to tarantism, a complex historical-religious phenomenon whose origins date back to the Middle Ages and which persisted in southern Italy until the second half of the 19th century. As described by De Martino (1961) in his multidisciplinary study, tarantism can be considered a mythical-ritual institution of magical character, superficially absorbed into Catholicism. It was predominantly associated with the rural society of Salento (De Martino 1961), but with local variation was also present throughout southern Italy, in Sicily, and Sardinia.

This phenomenon is characterized by the symbolism of the spider's poisonous bite and of the related music, dances, and lore believed to cure the victim and relieve the pain. The spider thus became a mythical and a symbolic representation of the poisoning (De Martino 1961). This practice gradually declined in

modern times and, as understood by De Martino, may no longer exist today in its original form. However, in the 21st century, tarantism, the tarantula, and the associated music and dances like the tarantella and pizzica, have gained new life through a deliberate cultural reinterpretation, progressively transformed into a new commercialized product and a successful national and international brand (Pizza 2015: 15). This transformation is epitomized by the Festival della Taranta (https://www.lanottedellataranta.it/), which since 1998 has enlivened the summer nights of Salento, attracting artists of national and international renown and, indirectly, bringing renewed public attention to the spider its symbolizes.

Remarks on the Genus *Lycosa* and *Lycosa* s. str.

Lycosa is one of the largest and most diverse genera within Lycosidae, and has a nearly global distribution. It is also among the earliest spider genera to be formally described, being one of the first 18 genera ever established. Before Latreille's work, all spiders were classified under either *Araneus* Clerck, 1757 or *Aranea* Linnaeus, 1758. As a result, many early-described wolf spiders, including *Aranea tarantula* Linnaeus, 1758, were initially placed in these broad genera. Following the establishment of *Lycosa* by Latreille in 1804, most wolf spider species were subsequently assigned to this genus, often regardless of their true morphological characters. Consequently, *Lycosa* became a wastebasket genus and a taxonomic repository of wolf spider species of uncertain belonging/position.

Over time, new studies have gradually transferred many species formerly placed in *Lycosa* to different or newly erected genera. For example, Bonnet (1957) listed 681 valid *Lycosa* species, and an additional 1174 as 'synonyms', mostly species reassigned to other genera. In recent years, the integration of molecular data with traditional morphological approaches has provided new insight into the phylogeny of *Lycosa*, further confirming its polyphyly and highlighting the misplacement of numerous species (see for example Murphy *et al.* 2006; Piacentini & Ramírez 2019; Kulkarni *et al.* 2023). In this context, Planas *et al.* (2013) were the first to analyze the phylogeny of Western Mediterranean *Lycosa* using molecular data, including sequences of the type species and contributing to 18 important nomenclatural changes. These taxa were later included in broader phylogenies by Crespo *et al.* (2022) and Kulkarni *et al.* (2023), where they clustered in a clear monophyletic lineage. Such preliminary results suggest that *Lycosa* s. str. may represent a relatively well-defined taxonomic group. Nonetheless, the systematic and true composition of the genus remains largely unresolved, lacking well-defined morphological characters and boundaries.

At present, following the results of this work, *Lycosa* comprises 213 valid species and 3 subspecies distributed almost worldwide (Table 3, Supp. file 1). Of these, 71 (ca 33% of the total) are known by both sexes. The wide majority, 137 species and subspecies (ca 63%), remain known from a single sex only, with 119 based on females and 18 on males. An additional seven species (ca 3.2%) are still based on juvenile specimens, while one species (*L. articulata* Costa, 1875 from Israel) is based on specimens of unknown sex (WSC 2025; this work). These data highlight the urgent need for a comprehensive, integrative revision of the genus to clarify its boundaries and resolve longstanding taxonomic ambiguities among its species.

Although assessing relationships based solely on descriptions and illustrations of copulatory organs is challenging, our preliminary comparative analysis based on bibliographic data suggests that the majority of the globally distributed *Lycosa* species do not appear to be closely related to the generotype (Table 4). Based on the morphological characters of the copulatory organs, we consider that only 23 species can be confidently treated as *Lycosa* s. str. (sensu Zyuzin & Logunov 2000) (Table 5). The remaining species currently assigned to the genus exhibit a wide range of differences in the diagnostic characters that suggest they belong to several different taxa, including: 1) *Allohogna* Roewer, 1955 (see Logunov 2010); 2) Australian genera like *Dingosa* Roewer, 1955, *Tasmanicosa* Roewer, 1959, or *Venator* Hogg, 1900; 3) tribe Trochosini Zyuzin, 1990 (= *Trochosa* group sensu Dondale 1986); 4) subfamily Lycosinae, excluding *Lycosa* s. str. or Trochosini; 5) *Pardosa* s. lato, mostly of the *P. nebulosa* species group (sensu Zyuzin

Table 3. Numbers for species-level names of genus *Lycosa* Latreille, 1804 recorded in different parts of the world, based on the WSC (2025).

Geographic area	Accepted names		Nomina dubia	
	Species	Subspecies	Species	Subspecies
Europe, Northern Africa to Caucasus, Iran	31	2	15	1
Palaearctic Asia	36	0	3	0
Tropical Asia	39	1	3	0
Nearctic	9	0	1	0
Neotropics	62	0	6	0
Australasia	19	0	5	0
Sub-Saharan Africa	17	0	3	0
Hawaii	3	0	1	0

1979 and Marusik & Ballarin 2011); 6) subfamily Piratinae (= Zoicinae sensu Piacentini & Ramírez 2019); as well as 7) species for which there are no illustrations of copulatory organs or the illustrations are very schematic, here considered as incertae sedis. A summary of this preliminary classification is reported in Table 4 and, with further details, in the Supp. file 1. This information may serve as a stepping stone for future, more comprehensive revisions of the systematics of the genus *Lycosa*.

The current core distribution of *Lycosa* s. str. spans the southern arid region of the West Palaearctic, including the Mediterranean basin, the Middle East, and Central Asia. This area ranges approximately from southern France, Ukraine, and the European part of Russia and Kazakhstan in the north, to North Africa and Iran in the south, and from Morocco and Portugal in the west to Kazakhstan and Tajikistan in the east, with *L. praegrandis* C.L. Koch, 1836 and the newly described *L. kuryk* Esyunin & Efimik, 2025 representing the easternmost distributed species (Nadolny & Zamani 2020; Armiach Steinpress *et al.* 2022; Esyunin *et al.* 2025; WSC 2025; this work; see also Table 5). *Lycosa wadaiensis* Roewer, 1960 from Chad may represents the only sub-Saharan exception to this distribution, as the general dorsal pattern and shape of the epigyne resemble those of the *Lycosa* s. str. However, Roewer's original illustrations (1960: fig. 305a, b) are insufficient for a reliable identification, and we were unable to examine the holotype preserved in the Senckenberg Museum collections. Therefore, the inclusion of this species in *Lycosa* s. str. remains tentative.

An additional species that exhibits clear morphological characters of *Lycosa* s. str. but represents a distributional outlier is *Lycosa pia* (Bösenberg & Strand, 1906) from Japan (see Tanaka 1990: fig. 9). The species was originally described based on a single male specimen collected in the Saga area, northern Kyushu, in 1906. Despite extensive subsequent surveys by Japanese arachnologists, no further records have been reported. Based on the morphology of the copulatory organs, *L. pia* has no close relatives among the endemic Japanese or East Asian lycosid species, and is likely a mislabeled or introduced specimen (A. Tanikawa, in litteris).

Although recent molecular and morphological studies have helped redefine the boundaries among some *Lycosa* s. str. species (e.g., Planas *et al.* 2013; Armiach Steinpress *et al.* 2022), the vast majority still lack proper taxonomic information and are in need of a thorough revision. Their identification often relies solely on very outdated descriptions and poorly detailed illustrations that fail to clearly depict the diagnostic characters. This makes it difficult to distinguish the species from one other and from other congeners of *Lycosa* s. lato. For example, among the 26 *Lycosa* species and subspecies

Table 4 (continued on next page)**.** Provisional taxonomic placement of species presently included in the genus *Lycosa* Latreille, 1804.

Taxonomic position (number of species)	Species
Lycosa s. str. (23)	*L. abnormis* Guy, 1966; *L. aragogi* Nadolny & Zamani, 2017; *L. baulnyi* Simon, 1876; *L. bedeli* Simon, 1876; *L. bonneti* Guy & Carricaburu, 1967; *L. elymaisa* Zamani & Nadolny, 2022; *L. fasciiventris* Dufour, 1835; *L. gesserit* Armiach Steinpress *et al.*, 2022; *L. hispanica* (Walckenaer, 1837); *L. hyraculus* Armiach Steinpress *et al.*, 2022; *L. kuryk* Esyunin & Efimik, 2025; *L. macrophthalma* Nadolny & Zamani, 2020; *L. munieri* Simon, 1876; *L. oculata* Simon, 1876; *L. pia* (Bösenberg & Strand, 1906); *L. piochardi* Simon, 1876; *L. praegrandis* C. L. Koch, 1836; *L. soboutii* Shafaie, Nadolny & Mirshamsi, 2022; *L. suboculata* Guy, 1966; *L. tarantula* (Linnaeus, 1758); *L. uzbekistanica* Logunov, 2023; *L. vachoni* Guy, 1966; *L. wadaiensis* Roewer, 1960
Allohogna (5)	*L. gobiensis* Schenkel, 1936; *L. immanis* L. Koch, 1879; *L. ishikariana* (Saito, 1934); *L. shansia* (Hogg, 1912); *L. singoriensis* (Laxmann, 1770)
Australian genera (7)	*L. ariadnae* McKay, 1979; *L. australicola* (Strand, 1913); *L. koyuga* McKay, 1979; *L. leucophaeoides* (Roewer, 1951); *L. tula* (Strand, 1913); *L. woonda* McKay, 1979; *L. yalkara* McKay, 1979
Lycosinae (25)	*L. approximata* (O. Pickard-Cambridge, 1885); *L. canescens* Schenkel, 1963; *L. capensis* Simon, 1898; *L. choudhuryi* Tikader & Malhotra, 1980; *L. coreana* Paik, 1994; *L. danjiangensis* Yin, Zhao & Bao, 1997; *L. ferriculosa* Chamberlin, 1919; *L. futilis* Banks, 1898; *L. gigantea* (Roewer, 1960); *L. indagatrix* Walckenaer, 1837; *L. interstitialis* (Strand, 1906); *L. japhlongensis* Biswas & Raychaudhuri, 2014; *L. labialis* Mao & Song, 1985; *L. labialisoides* Peng, Yin, Zhang & Kim, 1997; *L. lambai* Tikader & Malhotra, 1980; *L. leucogastra* Mello-Leitão, 1944; *L. leucotaeniata* (Mello-Leitão, 1947); *L. magallanica* Karsch, 1880; *L. mexicana* Banks, 1898; *L. mukana* Roewer, 1960; *L. phipsoni* Pocock, 1899; *L. salvadorensis* Kraus, 1955; *L. storeniformis* Simon, 1909; *L. thoracica* Patel & Reddy, 1993; *L. yerburyi* Pocock, 1901
Pardosa s. lat. (4)	*L. barnesi* Gravely, 1924; *L. carmichaeli* Gravely, 1924; *L. moulmeinensis* Gravely, 1924; *L. terrestris* Butt, Anwar & Tahir, 2006
Piratinae (1)	*L. trichopus* (Roewer, 1960)

Table 4 (continued)**.** Provisional taxonomic placement of species presently included in the genus *Lycosa* Latreille, 1804.

Taxonomic position (number of species)	Species
Trochosini (87)	*L. abidae* Sherwood, 2025; *L. auroguttata* (Keyserling, 1891); *L. australis* Simon, 1884; *L. beihaiensis* Yin, Bao & Zhang, 1995; *L. bistriata* Gravely, 1924; *L. boninensis* Tanaka, 1989; *L. brunnea* F. O. Pickard-Cambridge, 1902; *L. caenosa* Rainbow, 1899; *L. cerrofloresiana* Petrunkevitch, 1925; *L. coelestis L. Koch*, 1878; *L. connexa* Roewer, 1960; *L. corallina* McKay, 1974; *L. cretacea* Simon, 1898; *L. dilatata* F. O. Pickard-Cambridge, 1902; *L. emuncta* Banks, 1898; *L. erjianensis* Yin & Zhao, 1996; *L. erythrognatha* Lucas, 1836; *L. falconensis* Schenkel, 1953; *L. fernandezi* (F. O. Pickard-Cambridge, 1899); *L. formosana* Saito, 1936; *L. fuscana* Pocock, 1901; *L. geotubalis* Tikader & Malhotra, 1980; *L. gibsoni* McKay, 1979; *L. goliathus* Pocock, 1901; *L. grahami* Fox, 1935; *L. hickmani* (Roewer, 1955); *L. hildegardae* Casanueva, 1980; *L. horrida* (Keyserling, 1877); *L. howarthi* Gertsch, 1973; *L. implacida* Nicolet, 1849; *L. indomita* Nicolet, 1849; *L. inviolata* Roewer, 1960; *L. iranii* Pocock, 1901; *L. isolata* Bryant, 1940; *L. kempi* Gravely, 1924; *L. laeta L. Koch*, 1877; *L. lativulva* F. O. Pickard-Cambridge, 1902; *L. leucophthalma* Mello-Leitão, 1940; *L. liliputana* Nicolet, 1849; *L. longivulva* F. O. Pickard-Cambridge, 1902; *L. madani* Pocock, 1901; *L. magnifica* Hu, 2001; *L. mahabaleshwarensis* Tikader & Malhotra, 1980; *L. masteri* Pocock, 1901; *L. matusitai* Nakatsudi, 1943; *L. muntea* (Roewer, 1960); *L. niceforoi* Mello-Leitão, 1941; *L. nigricans* Butt, Anwar & Tahir, 2006; *L. nigromarmorata* Mello-Leitão, 1941; *L. nigrotaeniata* Mello-Leitão, 1941; *L. nigrotibialis* Simon, 1884; *L. nordenskjoldi* Tullgren, 1905; *L. pachana* Pocock, 1898; *L. palliata* Roewer, 1960; *L. patagonica* Simon, 1886; *L. pictula* Pocock, 1901; *L. poliostoma* (C. L. Koch, 1847); *L. poonaensis* Tikader & Malhotra, 1980; *L. porteri* Simon, 1904; *L. praestans* Roewer, 1960; *L. proletarioides* Mello-Leitão, 1941; *L. prolifica* Pocock, 1901; *L. punctiventralis* (Roewer, 1951); *L. rimicola* Purcell, 1903; *L. rufisterna* Schenkel, 1953; *L. salifodina* McKay, 1976; *L. separata* (Roewer, 1960); *L. septembris* (Strand, 1906); *L. serranoa* Tullgren, 1901; *L. shahapuraensis* Gajbe, 2004; *L. shaktae* Bhandari & Gajbe, 2001; *L. shillongensis* Tikader & Malhotra, 1980; *L. signata* Lenz, 1886; *L. signiventris* Banks, 1909; *L. sigridae* (Strand, 1917); *L. subfusca* F. O. Pickard-Cambridge, 1902; *L. suzukii* Kishida, 1960; *L. tista* Tikader, 1970; *L. transversa* F. O. Pickard-Cambridge, 1902; *L. vellutina* Mello-Leitão, 1941; *L. ventralis* F. O. Pickard-Cambridge, 1902; *L. vittata* Yin, Bao & Zhang, 1995; *L. wangi* Yin, Peng & Wang, 1996; *L. wroughtoni* Pocock, 1899; *L. wulsini* Fox, 1935; *L. yizhangensis* Yin, Peng & Wang, 1996; *L. yunnanensis* Yin, Peng & Wang, 1996
Incertae sedis (61)	*L. accurata* (Becker, 1886); *L. adusta* Banks, 1898; *L. affinis* Lucas, 1846; *L. apacha* Chamberlin, 1925; *L. arambagensis* B. Biswas & K. Biswas, 1992; *L. articulata* Costa, 1875; *L. aurea* Hogg, 1896; *L. balaramai* Patel & Reddy, 1993; *L. bezzii* Mello-Leitão, 1944; *L. biolleyi* Banks, 1909; *L. carbonelli* Costa & Capocasale, 1984; *L. chaperi* Simon, 1885; *L. cingara* (C. L. Koch, 1847); *L. contestata* Montgomery, 1903; *L. cowlei* Hogg, 1896; *L. dacica* (Pavesi, 1898); *L. dimota* Simon, 1909; *L. discolor* Walckenaer, 1837; *L. eutypa* Chamberlin, 1925; *L. gravelyi* Biswas & Raychaudhuri, 2014; *L. guayaquiliana* Mello-Leitão, 1939; *L. illicita* Gertsch, 1934; *L. impavida* Walckenaer, 1837; *L. infesta* Walckenaer, 1837; *L. injusta* Banks, 1898; *L. innocua* Doleschall, 1859; *L. inornata* Blackwall, 1862; *L. insulana* (Bryant, 1923); *L. insularis* Lucas, 1857; *L. intermedialis* Roewer, 1955; *L. jagadalpurensis* Gajbe, 2004; *L. lebakensis* Doleschall, 1859; *L. mackenziei* Gravely, 1924; *L. madagascariensis* Vinson, 1863; *L. maya* Chamberlin, 1925; *L. minae* (Dönitz & Strand, 1906); *L. mordax* Walckenaer, 1837; *L. nigropunctata* Rainbow, 1915; *L. pampeana* Holmberg, 1876; *L. paranensis* Holmberg, 1876; *L. parvipudens* Karsch, 1881; *L. pavlovi* Schenkel, 1953; *L. perkinsi* Simon, 1904; *L. perspicua* Roewer, 1960; *L. philadelphiana* Walckenaer, 1837; *L. picta* Biswas & Raychaudhuri, 2014; *L. pictipes* (Keyserling, 1891); *L. pintoi* Mello-Leitão, 1931; *L. pulchella* (Thorell, 1881); *L. quadrimaculata* Lucas, 1858; *L. russea* Schenkel, 1953; *L. sabulosa* (O. Pickard-Cambridge, 1885); *L. sericovittata* Mello-Leitão, 1939; *L. similis* Banks, 1892; *L. sochoi* Mello-Leitão, 1947; *L. sylvatica* (Roewer, 1951); *L. tarantuloides* Perty, 1833; *L. tasmanicola* Roewer, 1960; *L. teranganicola* (Strand, 1911); *L. tetrophthalma* Mello-Leitão, 1939; *L. u-album* Mello-Leitão, 1938

Table 5 (continued on next page)**.** Provisional members of *Lycosa* s. str. based on currently available morphological and molecular information.

Species names	Known sex	Distribution	Additional references other than the original description
L. abnormis Guy, 1966	♀	Morocco	–
L. aragogi Nadolny & Zamani, 2017	♂♀	Iran	Logunov 2023
L. baulnyi Simon, 1876	♂♀	Morocco, Algeria, Tunisia	Guy 1966
L. bedeli Simon, 1876	♂♀	Morocco, Algeria, Tunisia	Guy 1966
L. bonneti Guy & Carricaburu, 1967	♀	Algeria	–
L. elymaisa Zamani & Nadolny, 2022	♂	Iran	–
L. fasciiventris Dufour, 1835	♂♀	Morocco, Portugal, Spain, South France	Simon 1876; Guy 1966; Barrientos 2004; Planas *et al.* 2013. See also WSC 2025 and Nentwig *et al.* 2025
L. gesserit Armiach Steinpress *et al.*, 2022	♂	Israel	–
L. hispanica (Walckenaer, 1837)	♀	Morocco, Portugal, Spain	Simon 1876; Planas *et al.* 2013; See also WSC 2025 and Nentwig *et al.* 2025
L. hyraculus Armiach Steinpress *et al.*, 2022	♂♀	Israel	–
L. kuryk Esyunin & Efimik, 2025	♀	Kazakhstan	–
L. macrophthalma Nadolny & Zamani, 2020	♀	Iran	–
L. munieri Simon, 1876	♀	Algeria, Tunisia, Spain (Balearic Is.), Italy (Sardinia)	Guy 1966; Roewer 1960; Planas *et al.* 2013. See also WSC 2025 and Nentwig *et al.* 2025
L. oculata Simon, 1876	♂♀	Morocco, Algeria, Tunisia, France (Corsica), Italy (Sardinia)	Guy 1966; Planas *et al.* 2013. See also WSC 2025 and Nentwig *et al.* 2025
L. pia (Bösenberg & Strand, 1906)	♂	Japan	–

Table 5 (continued)**.** Provisional members of *Lycosa* s. str. based on currently available morphological and molecular information.

Species names	Known sex	Distribution	Additional references other than the original description
L. piochardi Simon, 1876	♂♀	Turkey, Egypt, Israel, Palestine, Jordan, Lebanon, Syria, Iraq, Iran	Armiach Steinpress *et al.* 2022; Al-Khazali *et al.* 2023; Logunov 2023. See also WSC 2025 and Nentwig *et al.* 2025
L. praegrandis C. L. Koch, 1836	♂♀	Albania, North Macedonia, Bulgaria, Greece, Turkey, Levant, Ukraine (south part near the seas), Russia (south of European part), Azerbaijan, Armenia, Kazakhstan, Uzbekistan, Turkmenistan, Tajikistan, Iran	Zyuzin & Logunov 2000; Armiach Steinpress *et al.* 2022; Logunov 2023; Esyunin *et al.* 2024. See also WSC 2025 and Nentwig *et al.* 2025
L. soboutii Shafaie, Nadolny & Mirshamsi, 2022	♂♀	Georgia, Iran	Logunov 2023; Seropian *et al.* 2024
L. suboculata Guy, 1966	♀	Morocco	Planas *et al.* 2013
L. tarantula (Linnaeus, 1758)	♂♀	South France, Italy mainland (central-south), Slovenia, Croatia. Questionable records are discussed in the text	Pepe 2005; Planas *et al.* 2013; this study. See also WSC 2025 and Nentwig *et al.* 2025
L. uzbekistanica Logunov, 2023	♀	Uzbekistan	–
L. vachoni Guy, 1966	♀	Algeria, Tunisia	Planas *et al.* 2013
L. wadaiensis Roewer, 1960	♀	Chad	–

currently recorded in the Mediterranean region, only six (23%) have proper illustrations of the habitus and copulatory organs of both sexes, while the remaining 20 lack illustrations suitable for morphological identifications (see Nentwig *et al.* 2025). Of these, 11 species and subspecies are represented only by poor illustrations, usually limited to the epigyne alone: *L. abnormis* Guy, 1966, *L. baulnyi*, *L. bonneti* Guy & Carricaburu, 1967, *L. interstitialis* (Strand, 1906), *L. suboculata* Guy, 1966, and *L. vachoni* Guy, 1966 from northwestern Africa; *L. bedeli* from northwestern Africa and Sicily; *L. munieri* and *L. oculata* from northwestern Africa and Sardinia; *L. hispanica* and *L. hispanica dufouri* (Simon, 1876) from the Iberian Peninsula. Three additional species only have illustrations of the habitus but lack those of copulatory organs: *L. affinis* Lucas, 1846 and *L. sylvatica* (Roewer, 1951) from Algeria; and *L. cingara* (C.L. Koch, 1847) from Egypt. Three more lack illustrations altogether: *L. dacica* (Pavesi, 1898) from Romania;

L. intermedialis Roewer, 1955 from Libya; and *L. praegrandis discoloriventer* Caporiacco, 1949 from Albania. Lastly, two more species, *L. cretacea* Simon, 1898 from North Africa, and *L. erythrognatha* Lucas, 1836, possibly introduced from South America, in addition to poor drawings, show copulatory organs with no clear affinities to the morphology of *Lycosa* s. str. suggesting that they belong to other lycosid genera, such as *Hogna*.

Conclusions

Lycosa tarantula has long been considered a problematic and confusing species, lacking proper illustrations and clear diagnostic characters, despite being one of the oldest spider species ever documented in the literature and enjoying widespread popularity among the general public. This lack of reliable data has posed significant challenges for the systematic taxonomy of the genus *Lycosa* and the family Lycosidae in general, leading to numerous misidentifications. With this study, we aimed to shed new light on this generotype and to provide a preliminary classification of the worldwide *Lycosa* species, laying the groundwork for future integrative research on the taxonomy and systematics of the genus. However, many uncertainties remain. A comprehensive revision of *Lycosa* is still urgently needed, as several species still await proper revision and reassessment within the family. Among these are several *Lycosa* s. str. species distributed in the Mediterranean region, which remain poorly studied and lack detailed redescription, illustrations of copulatory organs, and updated distributional data. These issues should be carefully considered and properly addressed in future studies on this genus.

Acknowledgments

We are particularly thankful to Leonardo Latella and Roberta Salmaso (Verona, Italy) for loaning the *L. tarantula* specimens preserved in the Natural History Museum of Verona. We are equally grateful to Andrea Colla (Trieste, Italy) and Stefano Maretti (Pavia, Italy) for granting access respectivelly to the *L. tarantula carsica* samples preserved at the Civic Museum of Natural History of Trieste and the *Tarantula apuliae* sample of the Pavesi collection hosted at the Museum of Natural History "Kosmos" of the University of Pavia. Many thanks also to Jean-Philippe Taberlet (France) for providing detailed photographs and information on *L. tarantula* from Southern France, and to Katsuyuki Eguchi (Tokyo, Japan) for providing support and access to laboratory facilities at the Tokyo Metropolitan University. We are further thankful to all collaborators who kindly provided additional specimens, photographs, or information on *L. tarantula* used in this study, in particular: Rocco Addante, Fabio Milazzo, Giovanni Rabusin, Pierluigi Rizzo, and Alessio Trotta. We also thank the editor Arnaud Henrard and the three anonymous reviewers for their useful suggestions and advice, which helped to improve the article. This work has been partially funded by the Fund for the Promotion of Joint International Research (Fostering Joint International Research (B), JSPS KAKENHI, no. 22KK0087, leader: Katsuyuki Eguchi, FY2022–2025). The research conducted by A.A. Nadolny was performed as part of the State research assignment of the IBSS (no. 124022400148-4).

References

Al-Khazali A.M., Al-Abbad M.Y.M., Fomichev A.A. & Kachel H.S. 2023. New data on the wolf spiders (Araneae: Lycosidae) of Iraq. *Ecologica Montenegrina* 67: 101–116 https://doi.org/10.37828/em.2023.67.12

Armiach Steinpress I., Cohen M., Pétillon J., Chipman A.D. & Gavish-Regev E. 2022. *Lycosa* Latreille, 1804 (Araneae, Lycosidae) of Israel, with a note on *Geolycosa* Montgomery, 1904. *European Journal of Taxonomy* 832: 1–54. https://doi.org/10.5852/ejt.2022.832.1877

Baglivi G. 1737. *Dissertatio IV de historia, anatome, morsu et effectibus tarantulae*. Rome.

Baldacchino A.E., Dandria D., Lanfranco E. & Schembri P.J. 1993. Records of spiders (Arachnida: Araneae) from the Maltese Islands (Central Mediterranean). *The Central Mediterranean Naturalist* 2 (2): 37–59.

Ballarin F. & Eguchi K. 2023. Integrative taxonomic revision of the genera *Nesticella* and *Howaia* in Japan with the description of five new species (Araneae, Nesticidae, Nesticellini). *ZooKeys* 1174: 219–272. https://doi.org/10.3897/zookeys.1174.101251

Ballarin F., Pantini P. & Hansen H. 2011. Catalogo ragionato dei ragni del Veneto – Spider Catalogue of Veneto Region, Italy. *Memorie del Museo Civico di Storia Naturale di Verona 2ª serie, Sezione Scienze della Vita* 21: 1–1200.

Barrientos J.A. 2004. *Lycosa ambigua* sp. nov. (Araneae, Lycosidae), una nueva "tarántula" para la fauna ibérica. *Revista Ibérica de Aracnología* 9: 23–29.

Bonnet P. 1957. *Bibliographia araneorum. Analyse méthodique de toute la littérature aranéologique jusqu'en 1939. Vol. 2: Systématique des araignées (Étude par ordre alphabétique) (3me partie: G–M)*. Douladoure, Toulouse.

Bösenberg W. & Strand E. 1906. Japanische Spinnen. *Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft* 30: 93–422.

Bradley R. 1721. *A Philosophical Account of the Works of Nature: Endeavouring to Set Forth the Several Gradations Remarkable in the Mineral, Vegetable, and Animal Parts of the Creation, Tending to the Composition of a Scale of Life: to which is Added, an Account of the State of Gardening, as it is Now in Great Britain, and Other Parts of Europe: Together with Several New Experiments Relating to the Improvement of Barren Ground, and the Propagating of Timber-trees, Fruit-trees, etc.* J. and J. Pemberton, London. https://doi.org/10.1037/11759-000

Canestrini G. & Pavesi P. 1868. Araneidi italiani. *Atti della Società Italiana di Scienze Naturali* 11: 738−872.

Caporiacco L. di 1949. Aracnidi della Venezia Giulia. *Atti del Museo Civico di Storia Naturale di Trieste* 17: 137–151.

Crespo L.C., Silva I., Enguídanos A., Cardoso P. & Arnedo M.A. 2022. Island hoppers: integrative taxonomic revision of *Hogna* wolf spiders (Araneae, Lycosidae) endemic to the Madeira islands with description of a new species. *ZooKeys* 1096: 77−135. https://doi.org/10.3897/zookeys.1086.68015

Danışman T., Kunt K.B., Özkütük R.S. & Coşar İ. 2025. The Checklist of the Spiders of Turkey. Version 2025. Available from http://www.spidersofturkey.info [accessed 20 Oct. 2025].

De Martino E. 1961. *La terra del rimorso: contributo a una storia religiosa del Sud*. Giulio Einaudi editore, Torino.

Deltshev C., Komnenov M., Blagoev G., Georgiev T., Lazarov S., Stojkoska E. & Naumova M. 2013. Faunistic diversity of spiders (Araneae) in Galichitsa Mountain (FYR Macedonia). *Biodiversity Data Journal* 1: e977. https://doi.org/10.3897/BDJ.1.e977

Dentici A. 2022. Araneofauna (Arachnida, Araneae) of Mount Pellegrino (Sicily, Italy). Fourth contribution to knowledge of the Sicilian spider fauna. *Biodiversity Journal* 13 (3): 641–650. https://doi.org/10.31396/Biodiv.Jour.2022.13.3.641.650

Dentici A. & Amata C. 2024. New data on the Arachnofauna (Arachnidae Araneae Opiliones) of Enna and surrounding areas (Sicily, Italy) with some first reports for Sicily. *Biodiversity Journal* 15 (2): 363–375. https://doi.org/10.31396/Biodiv.Jour.2024.15.2.363.375

Dondale C.D. 1986. The subfamilies of wolf spiders (Araneae: Lycosidae). *In*: Barrientos J.A. (ed.) *Actas X Congreso Internacional de Aracnologia, Jaca (España)* 1: 327–332. Juvenil, Barcelona.

Dunlop J.A., Penney D. & Jekel D. 2023. A summary list of fossil spiders and their relatives. *In*: World Spider Catalog. Ver. 26. Natural History Museum Bern. Available from http://wsc.nmbe.ch [accessed 20 Oct. 2025].

Esyunin S.L., Ponomarev A.V. & Kabdrakhimov A.A. 2024. The spider fauna (Aranei) of Zapadno-Kazakhstanskaya Oblast of Kazakhstan. New records and taxonomic remarks. *Euroasian Entomological Journal* 22: 317–325. https://doi.org/10.15298/euroasentj.22.06.07. [In Russian.]

Esyunin S.L., Efimik V.E., Nekhaeva A.A., Kim L.V., Valuev V.A., Kabdrakhimov A.A., Tuneva T.K. & Akhmedenov K.M. 2025. New data on the spider (Arachnida: Aranei) fauna of Mangystau Oblast, Kazakhstan. *Arthropoda Selecta* 34 (3): 426−446. https://doi.org/10.15298/arthsel.34.3.15

Evelyn J. 1650. *Elysium Britannicum, The Gardens Trust*. Edited by J.E. Ingram 2001, University of Pennsylvania Press, Philadelphia.

Folmer O., Black M., Hoeh W., Lutz R. & Vrijenhoek R. 1994. DNA primers for amplification of mitochondrial cytochrome c oxidase subunit I from diverse metazoan invertebrates. *Molecular Marine Biology and Biotechnology* 3 (5): 294–299.

Garbini A. 1898. Arachnida. *In*: Sormani Moretti L. (ed.) *La provincia di Verona: monografia statistica, economica, amministrativa raccolta e coordinata dal Conte Luigi Sormani Moretti senatore del Regno*: 321–322. Stabilimento Tipo-Litografico G. Franchini, Verona.

Garneri G.A. 1902. Contribuzione alla fauna sarda. Aracnidi. *Bollettino della società zoologica italiana* 2 (3): 57−103.

Guy Y. 1966. Contribution à l'étude des araignées de la famille des Lycosidae et de la sous-famille des Lycosinae avec étude spéciale des espèces du Maroc. *Travaux de l'Institut scientifique chérifien et de la Faculté des Sciences, Série Zoologie, Rabat* 33: 1−174.

Hahn C.W. 1833. *Die Arachniden*. C. H. Zeh'sche Buchhandlung, Nürnberg.

Imperato F. 1599. *Historia Naturale di Ferrante Imperato Napolitano. Libri XXVIII: nella quale ordinatamente si tratta della diuersa condition di miniere e pietre: con alcune historie di piante & animali, sin'hora non date in luce*. Porta Reale per Costantino Vitale, Naples. https://doi.org/10.5962/bhl.title.102903

Isaia M., Pantini P., Beikes S. & Badino G. 2007. Catalogo ragionato dei ragni (Arachnida, Araneae) del Piemonte e della Lombardia. *Memorie dell'Associazione Naturalistica Piemontese* 9: 9161.

Jördens J.H. 1801. *Entomologie und Helminthologie des menschlichen Körpers; oder, Beschreibung und Abbildung der Bewohner und Feinde desselben unter den Insekten und Würmern*. Hof, Grau. https://doi.org/10.5962/bhl.title.49694

Kircher A. 1641. *Magnes sive De Arte Magnetica: Opvs Tripartitvm, Quo Praeterqvam Qvod Vniversa Magnetis Natura. Vol. 3*. Ludouici Grignani ed., Roma.

Koch C.L. 1838. *Die Arachniden.* C. H. Zeh'sche Buchhandlung, Nürnberg. https://doi.org/10.5962/bhl.title.43744

Koch C.L. 1847. *Die Arachniden.* J. L. Lotzbeck, Nürnberg. https://doi.org/10.5962/bhl.title.43744

Koch C.L. 1850. *Übersicht des Arachnidensystems*. Fasc. 5. J. L. Lotzbeck, Nürnberg. https://doi.org/10.5962/bhl.title.39561

Komnenov M. 2010. Checklist of spiders (Araneae) of Bosnia and Herzegovina. *Uzizaž i Biospeld* 5 (2009): 51–69.

Kulkarni S., Wood H.M. & Hormiga. G. 2023. Advances in the reconstruction of the spider tree of life: a roadmap for spider systematics and comparative studies. *Cladistics* 39 (6): 479–532. https://doi.org/10.1111/cla.12557

Kumar S., Stecher G., Suleski M., Sanderford M., Sharma S. & Tamura K. 2024. MEGA12: Molecular Evolutionary Genetic Analysis Version 12 for Adaptive and Green Computing. *Molecular Biology and Evolution* 41 (12): 1−9. https://doi.org/10.1093/molbev/msae263

Latreille P.A. 1804. Tableau méthodique des insectes. *Nouveau dictionnaire d'histoire naturelle, Paris* 24: 129−295.

Latreille P.A. 1806. *Genera crustaceorum et insectorum secundum ordinem naturalem in familias disposita, iconibus exemplisque plurimis explicata. Vol. 1*. Arnand Koenig, Paris. https://doi.org/10.5962/bhl.title.65741

Latreille P.A. 1817. Articles sur les araignées. *In*: *Nouveau dictionnaire d'histoire naturelle, appliquée aux arts, à l'agriculture, à l'économie rurale et domestique, à la médecine, etc. Vols 7–11, 13, 17–18*. Nouvelle Édition. Deterville, Paris. https://doi.org/10.5962/bhl.title.20211

Laxmann E. 1770. Novae insectorum species. *Novi Commentarii Academiae Scientiarum Imperialis Petropolitanae* 14: 593–604.

Leech R.E. & Ryan J.K. 1972. Notes on Canadian Arctic spiders (Araneida), mainly from Devon Island, N.W.T. *The Canadian Entomologist* 104 (11): 1787–1791. https://doi.org/10.4039/Ent1041787-11

Linnaeus C. 1758. *Systema naturae per regna tria naturae, secundum classes, ordines, genera, species cum characteribus differentiis, synonymis, locis.* Editio decima, reformata. Laurentius Salvius, Holmiae. https://doi.org/10.5962/bhl.title.542

Logunov D.V. 2010. On new central Asian genus and species of wolf spiders (Araneae: Lycosidae) exhibiting a pronounced sexual size dimorphism. *Proceedings of the Zoological Institute of the Russian Academy of Sciences* 314: 233–263. https://doi.org/10.31610/trudyzin/2010.314.3.233

Logunov D.V. 2023. Further notes on the fossorial wolf spiders of Middle Asia and the Near East (Aranei: Lycosidae). *Arthropoda Selecta* 32 (34): 475–512. https://doi.org/10.15298/arthsel.32.4.12

Martini F.H.W. & Goeze J.A.E. 1778. *D. Martin Listers Naturgeschichte der Spinnen überhaupt und der Engelländischen Spinnen insbesonderheit, aus dem Lateinischen übersetzt, und mit Anmerkungen vermehrt. Mit 5. Kupfertafeln*. Christoph August Reußner, Quedlinburg & Blankenburg.

Marusik Y.M. & Ballarin F. 2011. Redescription of the Himalaian *Pardosa flavisterna* Caporiacco, 1935 (Aranei: Lycosidae) with notes of the *Pardosa nebulosa* species-group. *Proceedings of the Zoological Institute of the Russian Academy of Sciences* 315: 63−69. https://doi.org/10.31610/trudyzin/2011.315.1.63

Mattioli P.A. 1555. *Petri Andreae Matthioli Medici Senensis Commentarii, in Libros sex Pedacii Dioscoridis Anazarbei, de Materia Medica: adjectis quam plurimis plantarum & animalium imaginibus, eodem authore*. Vincenzo Valgrisi, Venice.

Mazza F. 1888. *Note faunistiche sulla Val-Staffora (Provincia di Pavia): 2 e 3. Imenotteri e Aracnidi.* Tip. Dell'istituto Sordomuti, Genova.

Mead R. 1752. *Mechanica expositio venenorum variis dissertationibus*. Grund Et Holle ed., Hamburg.

Murphy N.P., Framenau V.W., Donnellan S.C., Harvey M.S., Park Y.C. & Austin A.D. 2006. Phylogenetic reconstruction of the wolf spiders (Araneae: Lycosidae) using sequences from the 12S rRNA, 28S rRNA, and NADH1 genes: implications for classification, biogeography, and the evolution of web

building behavior. *Molecular Phylogenetics and Evolution* 38: 583–602. https://doi.org/10.1016/j.ympev.2005.09.004

Nadolny A.A. & Zamani A. 2020. A new species of wolf spiders of the genus *Lycosa* (Aranei: Lycosidae) from Iran. *Zoosystematica Rossica* 29 (2): 205–212. https://doi.org/10.31610/zsr/2020.29.2.205

Nentwig W., Blick T., Bosmans R., Hänggi A., Kropf C. & Stäubli A. 2025. Spiders of Europe. Ver. 07.2025. Available from https://doi.org/10.24436/1 [accessed 20 Oct. 2025].

Olearius A. 1666. *Gottorfische Kunst-Cammer, worinnen allerhand ungemeine Sachen, so theils die Natur theils künstliche Hände hervor gebracht und bereitet: Vor diesem aus allen vier Theilen der Welt zusammen getragen und vor einigen Jahren beschrieben auch mit behörigen Kupffern gezieret*. Schleswig. https://doi.org/10.5962/bhl.title.127552

Pantini P. & Isaia M. 2019. Araneae.it: the online Catalog of Italian spiders with addenda on other Arachnid Orders occurring in Italy (Arachnida: Araneae, Opiliones, Palpigradi, Pseudoscorpionida, Scorpiones, Solifugae). *Fragmenta Entomologica* 51 (2): 127−152. Available from www.araneae.it [accessed 20 Oct. 2025].

Pavesi P. 1878. Nuovi risultati aracnologici delle crociere del Violante. Aggiunto un catalogo sistematico degli aracnidi di Grecia. *Annali del Museo civico di Storia naturale di Genova* 11: 337−396.

Pennuto C. 2002. Casi di tarantati studiati dal Baglivi nel ‘600. *In*: Pepe R., Fortuna M. & Belmonte G. (eds) *Tarante veleni e guarigioni. Atti del convegno Interdisciplinare (Lecce, 31 ottobre 2000)*. Ideemultimediali edizioni, Nardò (LE).

Pepe R. 2005. Basi zoologiche-naturalistiche del tarantismo nel Salento. *Thalassia Salentina* 27: 47–62.

Perotto N. 1489. *Cornucopiae: sive linguae Latinae commentarii*. Pyrrhus Perottus ed., Venice.

Pesarini C. 1994. Arachnida Araneae. *In*: Minelli A., Ruffo S. & La Posta S. (eds) *Checklist delle specie della fauna italiana*: 1–42. Calderini, Bologna.

Pesarini C. 1995. Araneae. *Naturalista Siciliano* 19 (supp.): 51–62.

Petagna V. 1792. *Institutiones entomologicae*. Cajetani Raymundi, Naples.

Piacentini L.N. & Ramírez M.J. 2019. Hunting the wolf: A molecular phylogeny of the wolf spiders (Araneae, Lycosidae). *Molecular Phylogenetics and Evolution* 136: 227–240. https://doi.org/10.1016/j.ympev.2019.04.004

Pizza G. 2015. *Il tarantismo oggi. Antropologia, politica, cultura*. Carocci ed., Rome.

Planas E., Fernández-Montraveta C. & Ribera C. 2013. Molecular systematics of the wolf spider genus *Lycosa* (Araneae: Lycosidae) in the western Mediterranean basin. *Molecular Phylogenetics and Evolution* 67 (2): 414–428. https://doi.org/10.1016/j.ympev.2013.02.006

Polotow D., Carmichael A. & Griswold C.E. 2015. Total evidence analysis of the phylogenetic relationships of Lycosoidea spiders (Araneae, Entelegynae). *Invertebrate Systematics* 29 (2): 124−163.

Roewer C.F. 1960. Araneae Lycosaeformia II (Lycosidae) (Fortsetzung und Schluss). *Exploration du Parc national de l’Upemba, Mission G. F. de Witte* 55: 519–1040.

Rossi P. 1790. *Fauna etrusca: sistens insecta quae in Provinciis Florentina et Pisana praesertim collegit. Vol. 2*. Thomae Masi & Sociorum, Liburni. https://doi.org/10.5962/bhl.title.15771

Seropian A., Bulbulashvili N., Makharadze G. & Baznikin A. 2024. New and interesting spiders (Arachnida, Araneae) from Vashlovani National Park and Chachuna Managed Reserve (Georgia). *Caucasiana* 3: 183–213. https://doi.org/10.3897/caucasiana.3.e132501

Simon E. 1864. *Histoire naturelle des araignées (aranéides)*. Roret, Paris. https://doi.org/10.5962/bhl.title.47654

Simon E. 1876a. *Les arachnides de France. Vol. 3*. Roret, Paris.

Simon E. 1876b. Études arachnologiques. 4e mémoire. VII. Révision de espèces européennes du groupe de la *Lycosa tarentula* Rossi. *Annales de la Société entomologique de France* (5) 6: 57–91.

Simon E. 1937. *Les arachnides de France. Synopsis générale et catalogue des espèces françaises de l'ordre des Araneae. Vol. 6: 5e et dernière partie*. Roret, Paris.

Strand E. 1908. Nordafrikanische, hauptsächlich von Carlo Freiherr von Erlanger gesammelte Lycosiden. *Archiv für Naturgeschichte* 73 (I, 3, 1907): 291−376.

Tanaka H. 1990. Lycosid spiders of Japan III. The genus *Lycosa* Latreille. *Sonoda Women's College Studies* 24: 193–213. https://doi.org/10.2476/asjaa.39.21

Thermes G. 1972. Primo contributo alla conoscenza della fauna araneologica della Sardegna (Fauna ipogea ed epigea). *Bollettino della Società Sarda di Scienze Naturali* 11: 29−48.

Thorell T. 1870. On European spiders. Review of the European genera of spiders, preceded by some observations on zoological nomenclature [second part]. *Nova Acta Regiae Societatis Scientiarum Upsaliensis* (3) 7 (II, 1): 109–242.

Thorell T. 1873. *Remarks on synonyms of European spiders. Part IV.* C. J. Lundström, Uppsala. https://doi.org/10.5962/bhl.title.69282

Thorell T. 1875. Descriptions of several European and North African spiders. *Kongliga Svenska Vetenskaps-Akademiens Handlingar* 13 (5): 1−204.

Villers C. de (1789). *Caroli Linnaei entomologia, faunae Suecicae descriptionibus aucta; DD. Scopoli, Geoffroy, de Geer, Fabricii, Schrank, etc., speciebus vel in systemate non enumeratis, vel nuperrime detectis, vel speciebus Galliae australis locupletata, generum specierumque rariorum iconibus ornata. Tomus Quartus.* Piestre et Delamolliere, Lyon. https://doi.org/10.5962/bhl.title.12476

Walckenaer C.A. 1837. *Histoire naturelle des insectes. Aptères. Vol. 1*. Roret, Paris. https://doi.org/10.5962/bhl.title.61095

Wheeler W.C., Coddington J.A., Crowley L.M., Dimitrov D., Goloboff P.A., Griswold C.E., Hormiga G., Prendini L., Ramírez M.J., Sierwald P., Almeida-Silva L.M., Álvarez-Padilla F., Arnedo M.A., Benavides L.R., Benjamin S.P., Bond J.E., Grismado C.J., Hasan E., Hedin M., … & Zhang J.X. 2017. The spider tree of life: phylogeny of Araneae based on target-gene analyses from an extensive taxon sampling. *Cladistics* 33 (6): 576−616. https://doi.org/10.1111/cla.12182

WSC 2025. World Spider Catalog. Ver. 26. Natural History Museum Bern. Available from https://doi.org/10.24436/2 [accessed 20 Oct. 2025].

Zyuzin A.A. 1979. A taxonomic study of Palearctic spiders of the genus *Pardosa* (Aranei, Lycosidae). Part 1. The taxonomic structure of the genus. *Entomologicheskoe Obozrenie* 58: 431−447. [In Russian.]

Zyuzin A.A. 1985. Generic and subfamilial criteria in the systematics of the spider family Lycosidae (Aranei), with the description of a new genus and two new subfamilies. *Trudy Zoologicheskogo Instituta Akademii Nauk SSSR* 139: 40−51. [In Russian.]

Zyuzin A.A. & Logunov D.V. 2000. New and little-known species of Lycosidae from Azerbaijan, the Caucasus (Araneae, Lycosidae). *Bulletin of the British Arachnological Society* 11 (8): 305–319.

Printed versions of all papers are deposited in the libraries of two of the institutes that are members of the *EJT* consortium: Muséum national d'Histoire naturelle, Paris, France and Royal Museum for Central Africa, Tervuren, Belgium. The other members of the consortium are: Royal Belgian Institute of Natural Sciences, Brussels, Belgium; Meise Botanic Garden, Meise, Belgium; Natural History Museum of Denmark, Copenhagen, Denmark; Naturalis Biodiversity Center, Leiden, the Netherlands; Museo Nacional de Ciencias Naturales-CSIC, Madrid, Spain; Leibniz Institute for the Analysis of Biodiversity Change, Bonn – Hamburg, Germany; National Museum of the Czech Republic, Prague, Czech Republic; The Steinhardt Museum of Natural History, Tel Aviv, Israël.

Supplementary file

Supp. file 1. Annotated checklist and taxonomic notes on the genus *Lycosa* Latreille, 1804 (Araneae: Lycosidae). https://doi.org/10.5852/ejt.2026.1043.3221.14273