

## A synthesis of the genus *Palliduphantes* Saaristo & Tanasevitch, 2001 in Italy, with a description of two new species (Araneae: Linyphiidae: Micronetinae)

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### Abstract

The genus *Palliduphantes* Saaristo & Tanasevitch, 2001 is revised in the fauna of Italy. For each species, all known localities, new records, and remarks are provided. A synonymy of *P. garganicus* (Caporiacco, 1951) with *P. istrianus* (Kulczyński, 1914) **syn. n.** is proposed on the basis of a morphological comparison. Two new species, *P. murphyi* **sp. n.** (♂♀) and *P. robertsi* **sp. n.** (♂♀), are described from southern Italy. The new species are named after the prominent British arachnologists John Murphy and Mike Roberts, recently passed away.

**Keywords:** Apennines • caves • endemic species • Italian Peninsula • new synonymy

### Introduction

*Palliduphantes* Saaristo & Tanasevitch, 2001 is a rather large genus of the family Linyphiidae Blackwall, 1859, mainly distributed in the western Palaearctic, and currently accounting for 74 species (World Spider Catalog 2022). The majority of the species (68) are characterized by restricted distribution in Europe (Nentwig *et al.* 2022). Only a few species are widespread in the western, south-western, or central Palaearctic, e.g. *P. alutacius* (Simon, 1884), *P. antroniensis* (Schenkel, 1933), *P. ericaeus* (Blackwall, 1853), *P. insignis* (O. Pickard-Cambridge, 1913) *P. khorbarum* (Charitonov, 1947), and *P. pallidus* (O. Pickard-Cambridge, 1871). Outside Europe, small groups of species are endemic to north Africa, including the Maghreb: *P. kalaensis* (Bosmans, 1985), *P. tricuspis* Bosmans, 2006, *P. yakourensis* Bosmans, 2006, *P. labilis* (Simon, 1913), *P. banderolatus* Barrientos, 2020, *P. megascapus* Barrientos, 2020, and *P. chenini* Bosmans, 2003; Madeira and the Azores: *P. schmitzi* (Kulczyński, 1899); and the Canary Islands: *P. baeumeri* Wunderlich, 2020, *P. longiscapus* (Wunderlich, 1987), *P. palmensis* (Wunderlich, 1992), *P.*

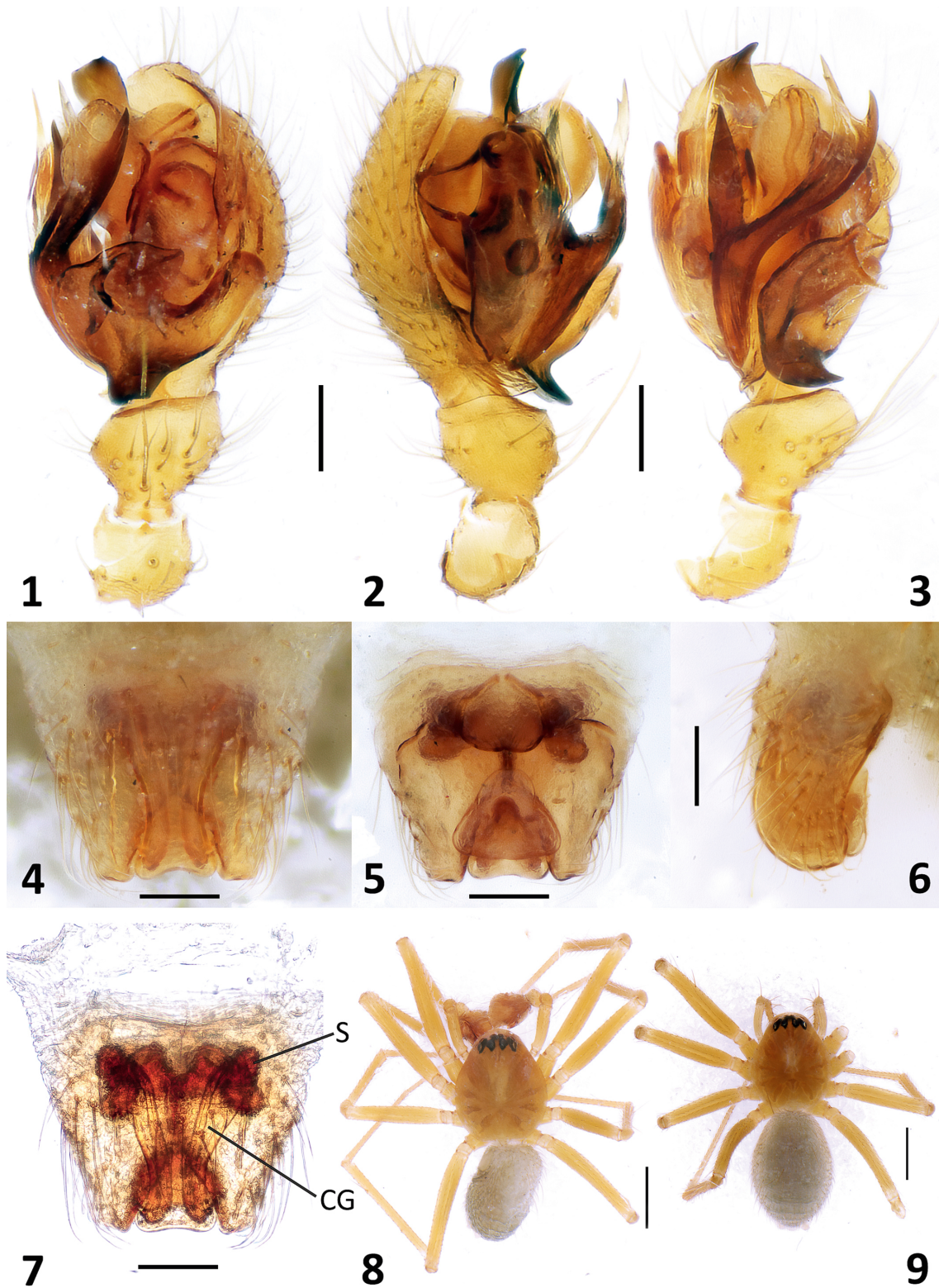
*rubens* (Wunderlich, 1987), and *P. tenerifensis* (Wunderlich, 1992). A few other species have an Asian origin, including *P. minimus* (Deeleman-Reinhold, 1986) from Cyprus, *P. bayrami* Demir, Topçu & Seyyar, 2008 in Turkey, *P. elburz* Tanasevitch, 2017 and *P. sbordonii* (Brignoli, 1970) from Iran, *P. solivagus* (Tanasevitch, 1986) from Kyrgyzstan, *P. altus* (Tanasevitch, 1986) from Central Asia, and *P. theosophicus* (Tanasevitch, 1987) from Nepal (World Spider Catalog 2022).

In Italy, the genus *Palliduphantes* numbers 16 species: *P. angustiformis* (Simon, 1884), *P. antroniensis* (Schenkel, 1933), *P. byzantinus* (Fage, 1931), *P. carusoi* (Brignoli, 1979), *P. conradini* (Brignoli, 1971), *P. eleonora* (Wunderlich, 1995), *P. florentinus* (Caporiacco, 1947), *P. garganicus* (Caporiacco, 1951), *P. insignis* (O. Pickard-Cambridge, 1913), *P. istrianus* (Kulczyński, 1914), *P. liguricus* (Simon, 1929), *P. longiseta* (Simon, 1884), *P. montanus* (Kulczyński, 1898), *P. pallidus* (O. Pickard-Cambridge, 1871), *P. petruzzielloi* Bosmans & Trotta, 2021, and *P. salffi* (Dresco, 1949) (Pantini & Isaia 2019). Of these, 11 species (~70%) are endemic to the Italian peninsula and show a restricted distribution, often limited to few localities or a single mountain chain. Four additional species, *P. alutacius* (Simon, 1884), *P. culicinus* (Simon, 1884), *P. dentatidens* (Simon, 1929), and *P. gladiola* (Simon, 1884) are known from old and unconfirmed data or proven to be misidentifications, and hence their presence in Italy is considered doubtful (Pantini & Isaia 2019).

While studying linyphiid material preserved in the collections of the Museo Civico di Scienze Naturali “E. Caffi” of Bergamo and the Museo Civico di Storia Naturale of Verona, Italy, we found several *Palliduphantes* specimens collected from central and southern Italy. A detailed morphological analysis of the samples allows us to diagnose two species as new to science. In addition, we have found new records of a number of poorly known Italian species. The present work aims to describe the two new species and to provide a synopsis of the genus *Palliduphantes* in the fauna of Italy.

### Material and Methods

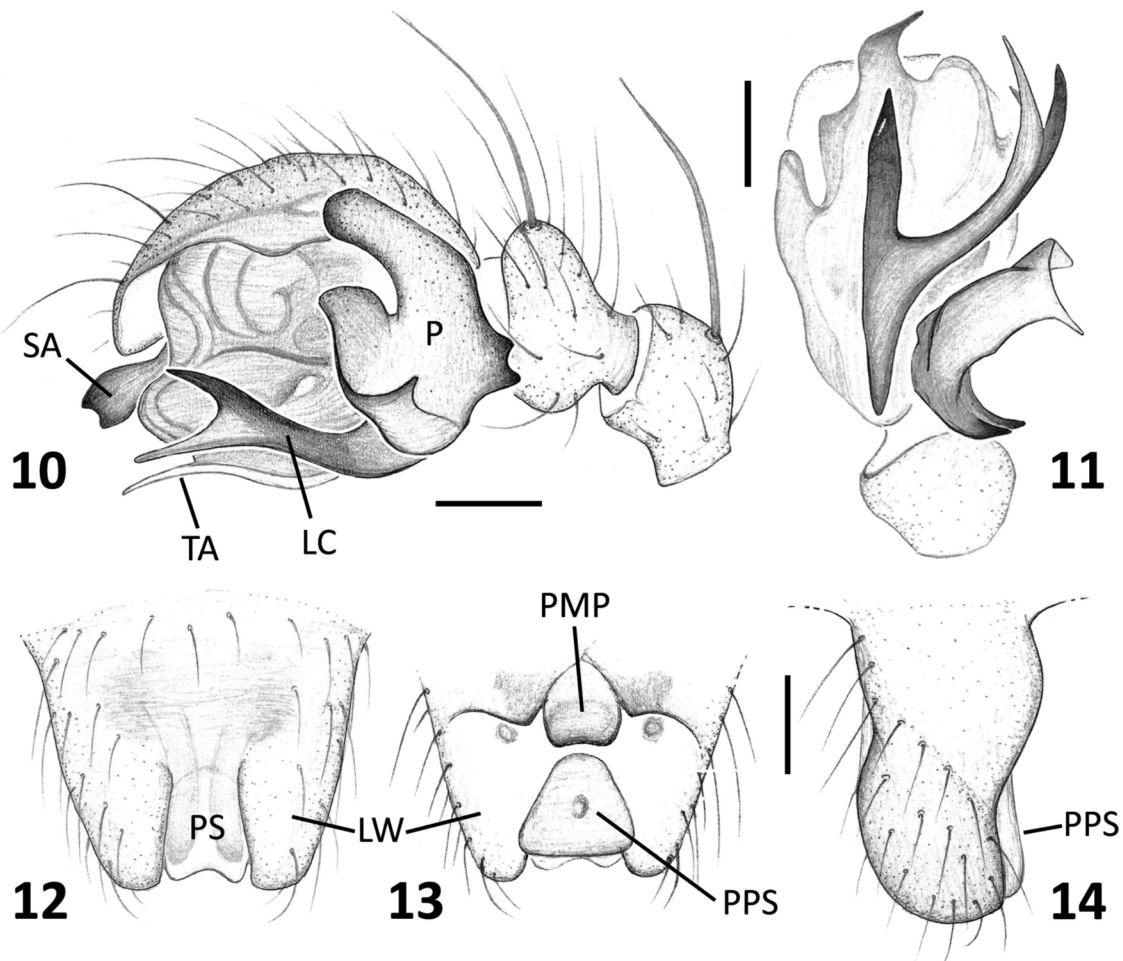
New material was hand picked or collected by pitfall traps in several field trips to central/southern Italy organized by the Museo Civico di Scienze Naturali “E. Caffi” of Bergamo. Additional material was found in the collections of the Museo Civico di Storia Naturale of Verona and in the personal collection of the first author. All specimens used in this study are preserved in 75% ethanol. Samples were examined using an Optika SZM stereomicroscope at the MSNBG and photographed with a Canon EOS 60D digital camera mounted on a Nikon SMZ 1270 stereomicroscope or a Nikon Optiphot 2 microscope at the Systematic Zoology Laboratory, Tokyo Metropolitan University, Japan. Photographs were merged using Helicon Focus 6 image stacking software and improved with Adobe Photoshop CC. Left male palps are illustrated. Female copulatory organs



Figs. 1–9: *Palliduphantes murphyi* sp. n. **1** male holotype, palp, retrolateral view; **2** same, prolateral view; **3** same, ventral view; **4** female paratype, epigyne, ventral view; **5** same, dorsal view; **6** same, lateral view; **7** vulva, ventral view; **8** male habitus; **9** female habitus. CG = copulatory grooves, S = spermathecae. Scale bars = 0.1 mm (1–7), 0.5 mm (8–9).

were removed with a sharp needle and treated with lactic acid to show the internal structures. All measurements are in millimetres. Leg measurements are as follows: total length (femur, patella, tibia, metatarsus, tarsus). Abbreviations used in the text and figures are as follows: CG = copulatory grooves, IO = inner outgrowth at the base of the scapus, LC = lamella characteristica, LW = lateral walls (*sensu* Saaristo

& Tanasevitch 1996), MM = median membrane (*sensu* Helsdingen 1965), P = paracymbium, PMP = posterior median plate (*sensu* Helsdingen, Thaler & Deltshv 1977), PS = proscapus (*sensu* Saaristo & Tanasevitch 1996), PPS = proximal part of the scapus (*sensu* Saaristo & Tanasevitch 1996), S = spermathecae, SA = distal suprategular apophysis (*sensu* Hormiga 2000), ST = stretcher (*sensu* Saaristo



Figs. 10–14: *Palliduphantes murphyi* sp. n. **10** male holotype, palp, retrolateral view; **11** same, ventral view; **12** female paratype, epigyne, ventral view; **13** same, dorsal view; **14** same, lateral view. LC = lamella characteristica, LW = lateral walls, P = paracymbium, PMP = posterior median plate, PS = proscapus, PPS = proximal part of the scapus, SA = distal suprategular apophysis, TA = terminal apophysis of the embolic division. Scale bars = 0.1 mm.

& Tanasevitch 1996); TA = terminal apophysis of the embolic division (*sensu* Merrett 1963); Tml = position of trichobothrium on metatarsus I. Collections: FBPC = Francesco Ballarin personal collection, MMUE = Manchester Museum, University of Manchester, UK, MSNBG = Museo di Scienze Naturali of Bergamo, Italy, MSNVR = Museo Civico di Storia Naturale of Verona, Italy.

## Linyphiidae Blackwall, 1859

### Micronetinae Hull, 1920

#### *Palliduphantes* Saaristo & Tanasevitch, 2001

*Type species: Linyphia pallida* O. Pickard-Cambridge, 1871; by original designation.

#### *Palliduphantes murphyi* sp. n. (Figs. 1–14, 37)

*Types:* Holotype ♂ (MSNBG, Ar30111), ITALY: Calabria, Reggio Calabria, Santo Stefano in Aspromonte, between Gambarie and Montalto, ~38.14°N 15.853°E, 1500 m, pitfall traps, June 1990–June 1991, G. Buttarelli, E. Ghi-

lardi, P. Pantini & M. Valle. Paratypes: 6♂, 10♀ (MSNBG, Ar43080), 2♂, 2♀ (MSNVR, Ar 21–24), 2♂, 2♀ (MMUE, G7676.1), together with the holotype.

*Other material:* ITALY: Basilicata: 6♂, 1♀ (MSNBG), Potenza, Viggianello, Piano Visitone, 1400 m, 38.9384°N 16.1496°E, pitfall traps, June 1990–June 1991, G. Buttarelli, E. Ghilardi, P. Pantini & M. Valle; 1♀ (MSNBG), Potenza, Chiaromonte, Pollino Mt., Bosco di Chiaromonte, 1800 m, 16 May 1990, R. Cerbino & M. Valle.

*Etymology:* The specific epithet is a patronym in honor of the late British arachnologist John Murphy (1922–2021), well known for his major contributions to the study of spider taxonomy worldwide.

*Diagnosis:* The male of the new species can easily be distinguished from those of the closely related *P. alutacius*, *P. pallidus*, and *P. petruzzelloi*, as well as from the newly described *P. robertsi* sp. n. (see below), by the following combination of characters: lamella characteristica (LC) bifurcate with a long and thick ventral branch (thicker and shorter in *P. alutacius* and *P. pallidus* or filiform in *P. robertsi* sp. n.) and a dorsal branch ending with two sharp prongs (ventral prong of the dorsal branch ending bifid in *P. petruzzelloi*), a flat, shovel-like distal suprategular apophysis (SA) (sharper and hook-like or furcated in the other

species), and the shape of the paracymbium (P) bearing 2 small teeth on a bulge in the posterior edge and one longer on the lateral edge (a single denticles on the posterior edge in *P. alutacius*, *P. pallidus*, and *P. petruzzelloi* or a different arrangement of denticles in *P. robertsi* sp. n.) (cf. Figs. 1, 3, 10–11 with 15, 17, 24–25). The female of *P. murphyi* sp. n. can be separated from those of the similar *P. alutacius*, *P. pallidus*, and *P. petruzzelloi* by the different shape of the posterior median plate (PMP): shorter and more rectangular compared to the longer, antero-posteriorly elongated or rhomboid PMP in the other three species. It can be separated from females of other congeners including *P. robertsi* sp. n. (see below) by the unique shape of the epigyne: trapezoid and stocky when observed dorsally (often elongated, rectangular or triangular in other Italian *Palliduphantes* species) (cf. Figs. 4–6, 12–14 with 18–20, 26–28).

**Distribution:** Known only from the Aspromonte and Pollino massifs in the Calabrian Apennines, Basilicata and Calabria Regions, Italy (Fig. 37).

**Habitat:** Broadleaf litter in mountain forests, from 1400 to 1800 m.

**Description of holotype male:** habitus as in Fig. 8. Total length 1.71, carapace 0.92 long, 0.74 wide. Female (one of the paratypes): habitus as in Fig. 9. Total length 2.09, prosoma 0.98 long, 0.73 wide. Chelicera with stridulatory ridges on the lateral margin. 3 teeth at the anterior margin of the fang groove, posterior margin with 4–5 small denticles. Colouration: carapace, yellow brownish, with a lighter area in the center. Chelicera, maxillae, labium, and sternum of the same colour. Legs uniformly yellowish. Opisthosoma uniformly greyish. Legs: Femur I with 1 prolateral spine. Tibial spine formula: 2.2.2.2. TmI = 0.14. Metatarsus IV without trichobothrium. Leg formula: I, IV, II, III. Measurements, male: I: (1.08+0.25+1.08+0.92+0.67), II: 3.74 (0.98+0.27+1.01+0.86+0.66), III: 2.88 (0.82+0.21+0.74+0.66+0.45), IV ? (1.04+0.24+missing); female: I: ? (1.02+0.25+missing), II: ? (1.08+0.29+missing), III: ? (0.92+0.24+missing), IV 4.16 (1.18+0.28+1.10+0.93+0.67). Male palp as in Figs. 1–3, 10–11. Patella and tibia with one long spine each on the dorsal side. Tibia swollen dorsally. Posterior edge of the paracymbium (P) with a sclerotized bulge bearing two short denticles, lateral edge with a single, long and slim tooth. Distal suprategular apophysis (SA) flat, shovel-like with a short, stocky distal apophysis. Terminal apophysis of the embolic division (TA) thin and sharp. Lamella characteristica (LA) formed by two branches, one thick ventral branch ending with a single sharp point and one dorsal branch ending V shaped with two prongs, the ventral prong longer than the dorsal. **Paratype female:** epigyne as in Figs. 4–6, 12–14. Proscapus (PS) slightly shorter than lateral walls (LW) when seen ventrally, flat and rectangular, with a concave postero-median border. Proximal part of the scapus (PPS) triangular when seen dorsally, with all the sides approximately of the same length. Posterior median plate (PMP) ovate, with a flat distal side. Vulva as in Fig. 7. Spermathecae small, kidney-like, copulatory grooves wide, slightly convergent to each other in the center, following the

course of the scapus until ending in copulatory openings near the tip of the PPS.

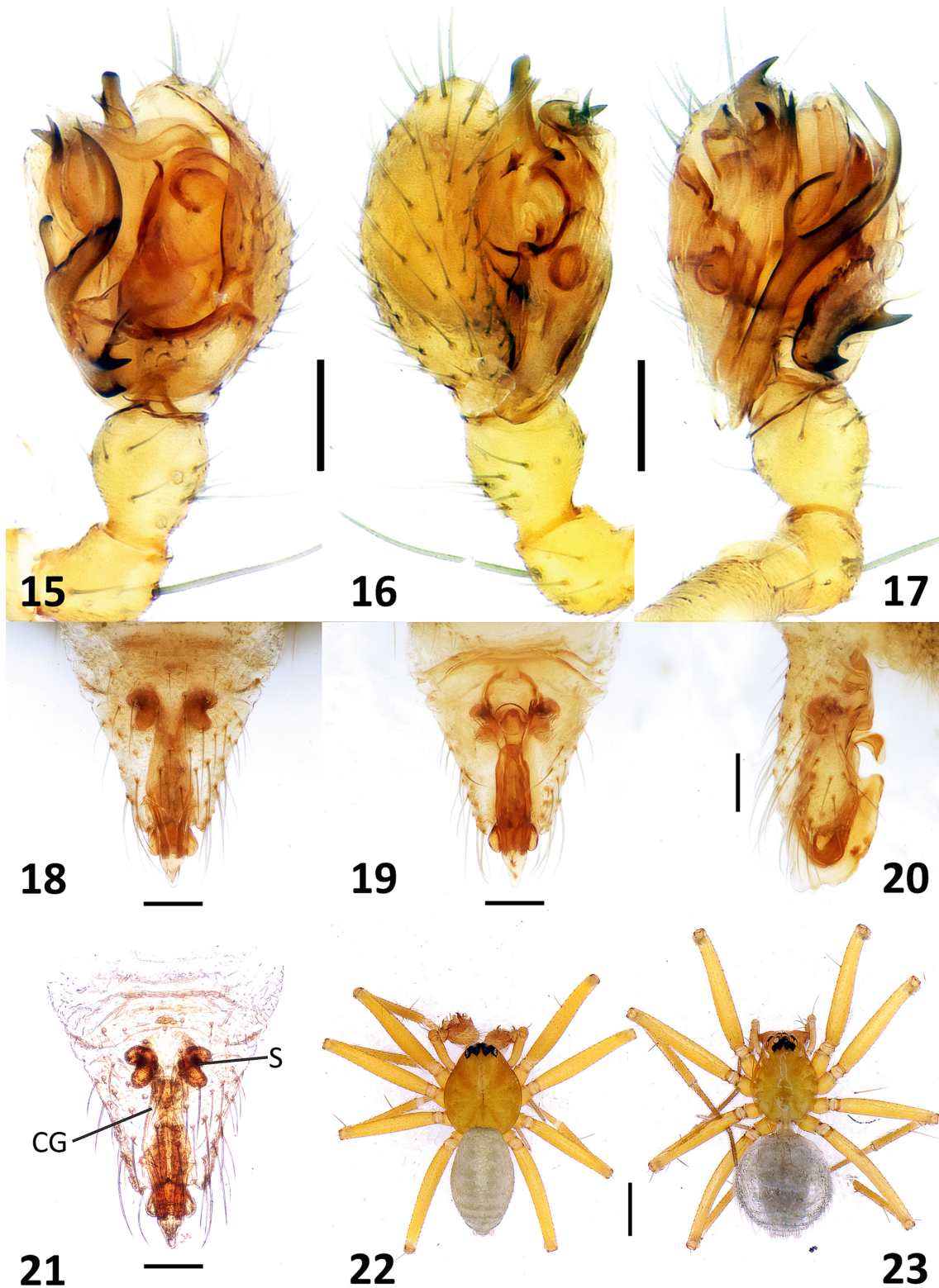
### *Palliduphantes robertsi* sp. n. (Figs. 15–28, 38)

**Types:** Holotype ♂ (MSNBG, Ar43084), ITALY: Calabria, Cosenza, Aquappesa, Valle dei bagni, ~150 m, pitfall traps, August 2015–May 2016, M. Valle. Paratypes: 8♂, 5♀ (MSNBG, Ar30112), together with the holotype; 16♂, 9♀ (MSNBG, Ar43083), 2♂, 2♀ (MSNVR, Ar 25–28), 2♂, 2♀ (MMUE, G7676.2), Reggio Calabria, Santo Stefano in Aspromonte, Ponte Sant'Antonio, Vallone di Pilima, 1260 m, November 2013–October 2014, E. Castiglione & F. Manti.

**Other material:** ITALY: Toscana: 2♂ (MSNBG), Livorno, Capraia island, toward Laghetto, 280 m, pitfall traps, April–June & July–December 1993, P. Pantini & M. Valle. Calabria: 1♂, 2♀ (MSNBG), Cosenza, Aquappesa, Valle dei Bagni, ~150 m, pitfall traps, August 2013–August 2014, coll.?.; 2♂ (MSNBG), same locality, May–August 2015, coll.?.; 1♂ (MSNBG), same locality, August 2015–August 2016, coll.?.; 1♂, 2♀ (MSNBG), same locality, August 2016–May 2017, coll.?.; 3♂, 1♀ (MSNBG), same locality, June–August 2017, coll.?.; 5♂, 4♀ (MSNBG), Cosenza, Fagnano Castello, Lago Trifoglietti, 1050 m, pitfall traps, August 2013–August 2014, M. Valle; 1♂, 1♀ (MSNBG), same locality, August 2014–May 2015, M. Valle; 1♂ (MSNBG), same locality, May–August 2015, M. Valle; 1♂, 1♀ (MSNBG), same locality, August 2015–August 2016, M. Valle; 3♂ (MSNBG), same locality, August 2016–May 2017, M. Valle; 1♂ (MSNBG), same locality, June 2016–August 2017, M. Valle; 3♂, 7♀ (MSNBG), Reggio Calabria, Bagaladi, Nucarelle, 1100 m, pitfall traps, June–October 2014, E. Castiglione & F. Manti; 1♂, 6♀ (MSNBG), Reggio Calabria, Serra Juncari, 1700 m, pitfall traps, November 2013–June 2014, E. Castiglione & F. Manti; 4♂, 1♀ (MSNBG), same locality, June 2016–October 2017, E. Castiglione & F. Manti; 5♂, 9♀ (MSNBG), Reggio Calabria, Santo Stefano in Aspromonte, Gambarie, 1300 m, pitfall traps, June 1990–June 1991, G. Buttarelli, E. Ghilardi, P. Pantini & M. Valle.

**Etymology:** The specific epithet is a patronym in honour of the late British arachnologist Michael Roberts (1945–2020), who was renowned for his taxonomic studies on spiders, including Linyphiidae.

**Diagnosis:** The male of *P. robertsi* sp. n. can be distinguished from those of the closely related *P. istrianus* and the newly described *P. murphyi* sp. n. by the length and shape of the lamella characteristica (LC), with a long and slim ventral branch, in contrast with a shorter ventral in *P. istrianus* or much thicker in *P. robertsi* sp. n. and by the thin terminal apophysis of the embolic division (TA) (lanceolated and serrated in *P. istrianus*). In addition, the new species can be separated from other congeners by the paracymbium (P) with three robust denticles, two on the lateral edge and one on the posterior edge (in contrast with smaller or different number of teeth in other species) (cf. Figs. 15, 17, 24–25

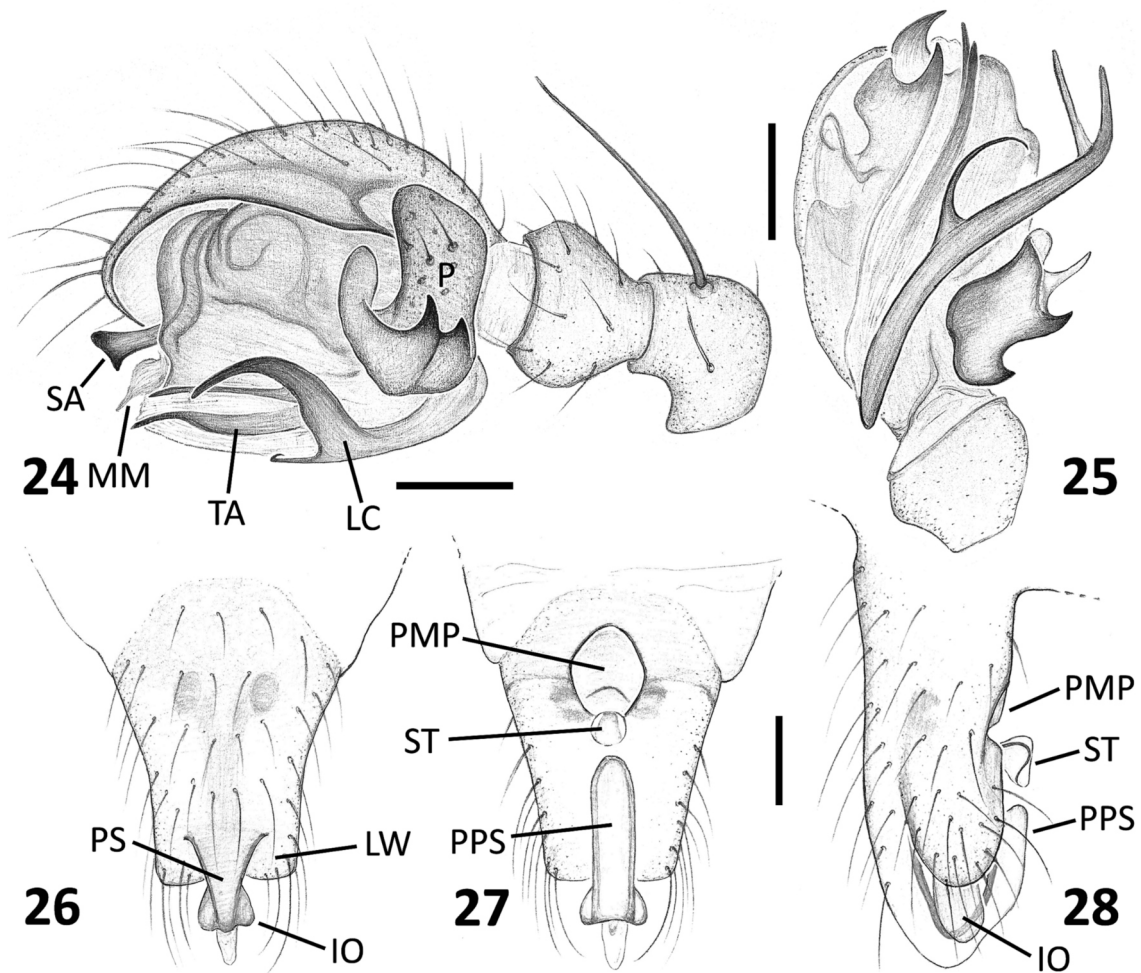


Figs. 15–23: *Palliduphantes robertsi* sp. n. **15** male holotype, palp, retrolateral view; **16** same, prolateral view; **17** same, ventral view; **18** female paratype, epigyne, ventral view; **19** same, dorsal view; **20** same, lateral view; **21** vulva, ventral view; **22** male habitus; **23** female habitus. CG = copulatory grooves, S = spermathecae. Scale bars = 0.1 mm (15–21), 0.5 mm (22–23).

with 1, 3, 10–11). The female of *P. robertsi* sp. n. can be easily separated from that of *P. istrianus* by the longer proximal part of the scapus (PPS) and the smaller stretcher (ST) (respectively shorter and smaller in *P. istrianus*). It can also be separated from females of other congeners, including *P. murphyi* sp. n., by the unique elongated shape of the epigyne with a thin, triangular proscapus (PS) when seen ventrally

(usually thicker or longer in other Italian species), with two well-developed inner outgrowth (IO) at its base and a visible stretcher (ST) (often lacking in other species) (cf. Figs 18–20, 26–28 with 4–6, 12–14).

*Distribution:* Central and south Italy. Mainly distributed along the Calabrian Apennines in the Calabria region,



Figs. 24–28: *Palliduphantes robertsi* sp. n. **24** male holotype, palp, retrolateral view; **25** same, ventral view; **26** female, paratype, epigyne, ventral view; **27** same, dorsal view; **28** same, lateral view. IO = inner outgrowth at the base of the scapus, LC = lamella characteristic, LW = lateral walls, MM = median membrane, P = paracymbium, PMP = posterior median plate, PS = proscapus, PPS = proximal part of the scapus, SA = distal suprategular apophysis, ST = stretcher, TA = terminal apophysis of the embolic division. Scale bars = 0.1 mm.

known in Central Italy from the Isola of Capraia Island only. Probably a Tyrrhenian endemic (Fig. 38).

*Habitat*: Broadleaf forest litter, from 150 to 1700 m.

*Description of holotype male*: habitus as in Fig. 22. Total length 1.80, carapace 0.86 long, 0.71 wide. Female: Habitus as in Fig. 23. Total length 1.93, prosoma 0.88 long, 0.63 wide. Chelicerae with stridulatory ridges on the lateral margin. 3 teeth at the anterior margin of the fang groove, posterior margin with 5 small denticles. Colouration: prosoma yellow brownish. Chelicera, maxillae, labium, and sternum of the same colour. Legs uniformly yellowish. Opisthosoma uniformly greyish. Legs: femur I with 1 prolateral spine. Tibial spine formula: 2.2.2.2. TmI = 0.14. Metatarsus IV without trichobothrium. Leg formula: I, IV, II, III. Leg measurements, male: I: 3.68 (0.93+0.22+0.98+0.90+0.65), II: 3.32 (0.86+0.21+0.87+0.79+0.59), III 2.69 (0.70+0.20+0.66+0.67+0.46), IV 3.56 (0.89+0.21+0.95+0.91+0.60); female: I: ? (1.11+0.23+missing), II: 3.9 (1.03+0.26+1.01+0.94+0.66), III: 3.18 (0.88+0.22+0.77+0.78+0.53); IV 4.13 (1.10+0.23+1.09+1.03+0.68). Male palp as in Figs. 15–17, 24, 25. Patella and tibia with one long spine each on the dorsal side. Posterior edge of the paracymbium (P) bearing one robust and strongly sclerotized sharp tooth.

Lateral edge with two teeth, the distal thinner and less sclerotized than the latter, more clearly visible when the palp is observed ventrally (see Fig. 17). Distal suprategular apophysis (SA) ending bifid with a lobate distal branch and a small ventral tooth headed ventrally. Terminal apophysis of the embolic division (TA) thin, ending sharp. Lamella characteristic (LA) with two branches, ventral branch long and filiform, headed distally. Dorsal branch ending bifid with two rather long prongs, the dorsal prong hook-like and bent ventrally, the ventral prong thinner and straight. *Paratype female*: epigyne as in Figs. 18–20, 26–28, strongly protruding from the abdomen. Proscapus (PS) triangle shaped when seen ventrally, short but protruding over the shorter lateral walls (LW), with two well developed inner outgrowth (IO) at its base. Proximal part of scapus (PPS) rectangular when observed dorsally. Stretcher (ST) clearly visible, small, round when seen dorsally. Posterior median plate (PMP) rhomboidal. Vulva as in Fig. 21. Spermathecae small, kidney-like, copulatory grooves narrow, rather parallel to each other, following the course of the scapus until ending in copulatory openings near the tip of the PPS.

### Notes on *Palliduphantes* species in Italy

Here, the *Palliduphantes* species recorded in Italy are briefly discussed. For each species the type locality, the general distribution based on World Spider Catalog (2022), all known records from Italy based on published data and new records are provided.

#### *Palliduphantes angustiformis* (Simon, 1884)

*Type locality*: France: Corsica, Porto Vecchio and Bonifacio.

*Distribution*: France, Italy.

*Known records in Italy*: Sardegna: Cagliari, Nuria, Sta Lucia SW, Monte Arcuso (Bosmans & Colombo 2015); Carbonia-Iglesias, Fluminimaggiore S, Grotta Su Mannau, 200 m (Bosmans & Colombo 2015); Carbonia-Iglesias, Iglesias, Marganai (Bosmans & Colombo 2015); Carbonia-Iglesias (Trotta 2011); Carbonia-Iglesias, Domusnovas, Grotta di S. Giovanni Sa 81 (Brignoli 1971; Puddu & Pirodda 1974); Carbonia-Iglesias, Grotta del Torpado Corongiu de Mari (Brignoli 1971; Puddu & Pirodda 1974); Carbonia-Iglesias, Narcao, Grotta di Perda Carcina (Brignoli 1979); Carbonia-Iglesias, Grotta Risorgente di Rio Murtas (Brignoli 1979); Medio Campidano, Barumini, Su Nuraxi, 200 m, under stones around car park (Bosmans & Colombo 2015); Medio Campidano, “Montevecchio-Ingurtosu” mining district (Mann *et al.* 2020); Medio Campidano, Arbus, Ingurtosu, Naracauli (Pantini, Sassu & Serra 2013); Medio Campidano, Guspini, Montevecchio, Piccalinna (Pantini Sassu & Serra 2013); Nuoro, Monti del Gennargentu (Wunderlich, 1995); Nuoro, Belvi, Antonitzò, 683 m, cherry-orchard (Pantini Sassu & Serra 2013); Nuoro, Belvi, Canale e’ Figu, 576 m, walnut-orchard (Pantini, Sassu & Serra 2013); Nuoro, Belvi, Mannaritzò, 706 m, cherry orchard (Pantini, Sassu & Serra 2013); Nuoro, Belvi, Su Enazzu, m 550, hazelnut orchard (Pantini, Sassu & Serra 2013); Nuoro, Fonni, Gennargentu, mountain refuge, 1550 m, alder grove (Pantini, Sassu & Serra 2013); Nuoro, Tonara, Su Azzime, 682 m, walnut orchard (Pantini, Sassu & Serra 2013); Ogliastra, 4 km NW Villanova (Wunderlich 1995); Olbia-Tempio, Passo del Limbara, 680 m, stones in *Pinus* forest (Bosmans & Colombo 2015); Olbia-Tempio, Olbia, Isola Molarotto (Pantini Sassu & Serra 2013); Olbia-Tempio, Santa Teresa Gallura (Wunderlich 1995); Oristano, Cabras W, Punta is Arutas, 15 m, litter in dune forest (Bosmans & Colombo 2015); Sassari, Argentiera E, 80 m; Sassari, Lago di Baratz, 55 m, *Pinus* forest; Sassari, Maristella N, 35 m, *Pinus* forest; Sassari, Pozzo San Nicola, 35 m, *Arbutus unedo* litter in hedges in grasslands; Sassari, road Tempio–Pausania (Bosmans & Colombo 2015); Sassari (Garneri 1902); Sassari, Laerru, Grotta Su Coloru (Brignoli 1979); Sassari, Porto Torres, Asinara Island, Cala Sant’Andrea (Pantini & Sassu 2009). Toscana: Firenze, Fiesole, San Domenico, 148 m (Caporiacco 1923) (Fig. 35).

*New material examined*: ITALY: Liguria: 1♀ (MSNBG), Imperia, Prino, 50 m, meadow with eucalyptus trees, 24 September 2005, R. Fabbri; 5♂, 2♀ (MSNBG), same local-

ity, pitfall traps, 24 September 2005–27 April 2006, R. Fabbri; 2♂, 4♀ (MSNBG), same locality, 27 April–3 June 2006, R. Fabbri; San Lorenzo al Mare, Torrente Inferno valley, 50 m, dry meadow, pitfall traps, 2♀, 2 June–15 July 2004, R. Fabbri (Fig. 35).

*Remarks*: The only record of this species from the Italian Peninsula by Caporiacco (1923), based on a single female from Fiesole near Firenze, Toscana Region, was considered unreliable (Pantini & Isaia 2019). The new records from Liguria Region presented here have confirmed the presence of this species in mainland Italy and supported the idea of the species to be a Tyrrhenian endemic.

#### *Palliduphantes antroniensis* (Schenkel, 1933)

*Type locality*: Switzerland: Wallis, Saas-Tal, Weg von Zermeiggern nach Furggalp, oberer Teil (aus Siebsel).

*Distribution*: Europe to West Siberia.

*Known records in Italy*: Lombardia: Sondrio, Valfurva, Sobrettina, 2175 m (Pantini *et al.* 2020). Trentino-Alto Adige: Bolzano, Valle di Antersasc/Zwischenkofel Tal (Dolomiti, Parco Nazionale Puez-Odle), 1490–2100 m (Zingerle 1997) (Fig. 35).

*Remarks*: In Italy, known only from two localities in high mountains of the Central Eastern Alps.

#### *Palliduphantes byzantinus* (Fage, 1931)

*Type locality*: Turkey: Istanbul, Yarem-Bourgas cave.

*Distribution*: Italy, Romania, Bulgaria, North Macedonia, Greece, Turkey.

*Known records in Italy*: Basilicata: Matera, Marina di Pisticci (IJland & Helsdingen 2016) (Fig. 38).

*Remarks*: Known only from a single locality in Basilicata Region, southern Italy.

#### *Palliduphantes carusoi* (Brignoli, 1979) (Figs. 29–34)

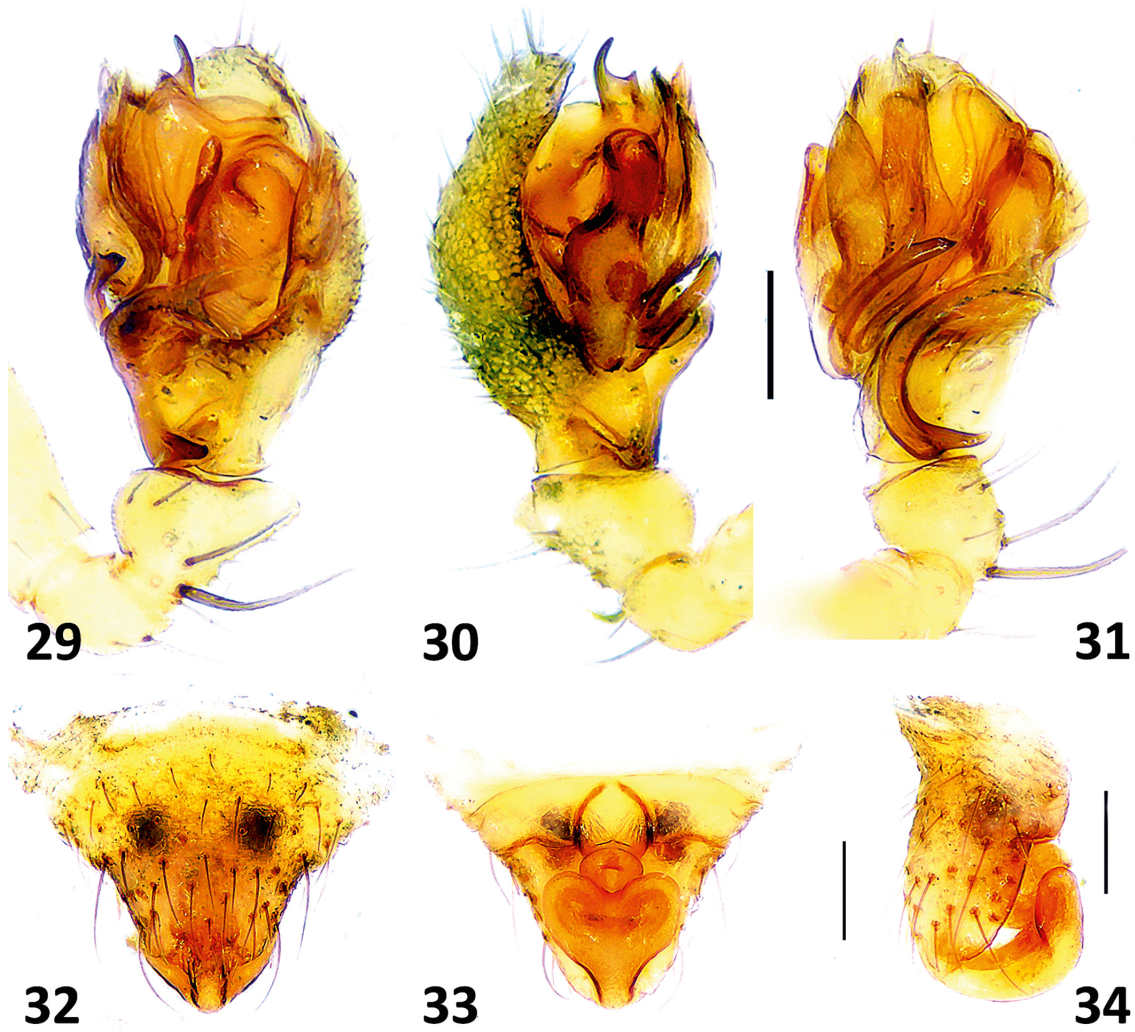
*Type locality*: Italy: Sicilia, Siracusa, Grotta Palombara (7001Si/SR).

*Distribution*: Italy (Sicilia).

*Known records in Italy*: Sicilia: Catania, Grotta Nuovalucello; Siracusa, Grotta Palombara; Siracusa, Grotta Pellegrino (Brignoli 1979) (Fig. 38).

*New material examined*: ITALY: Sicilia: 1♀ (MSNVR), Catania, Randazzo, Cerani, 10 January 1977, P. Alicata; Catania, Vizzini, Valle del Risicone, 1♂ (MSNVR), 10 March 1963, P. Alicata; 1♂ (MSNVR), Messina, Monti Nebrodi, Monte Soro, near Cesarò, 1850 m, 25 October 1981, G. Osella; 1♀ (MSNVR), Siracusa, Belvedere, 5 April 1963, P. Alicata; 1♂, 4♀ (MSNVR), Siracusa, surroundings of Grotta Palombara, 15 January 1963, P. Alicata; 3♀ (MSNVR), 12 April 1963, P. Alicata (Fig. 38).

*Remarks*: Endemic to Sicily. So far this species was known from a few records from caves only. Our new records suggest that *P. carusoi* is more widely distributed in



Figs. 29–34: *Palliduphantes carusoi* (Brignoli, 1979). **29** male palp, retrolateral view; **30** same, prolateral view; **31** same, ventral view; **32** female epigyne, ventral view; **33** same, dorsal view; **34** same, lateral view. Scale bars = 0.1 mm.

eastern Sicily, occurring in both subterranean and epigeal habitats.

*Palliduphantes conradini* (Brignoli, 1971)

*Type locality*: Italy: Abruzzo, L'Aquila, Grotta di Verrecchie (2 A/AQ).

*Distribution*: Italy.

*Known records in Italy*: Abruzzo: L'Aquila, Grotta di Verrecchie (2 A/AQ), (Brignoli 1971); L'Aquila, Parco Nazionale, Campomizzo, Grotta di Fonte Padura, 1400 m; L'Aquila, Lecce nei Marsi, Grotta di Valle delle Vacche (67 A/AQ) (Brignoli 1979); Teramo, Valle Castellana, Parco Nazionale Gran Sasso e Monti della Laga, 850 m (Isaia, Osella & Pannunzio 2009). Lazio: Viterbo, olive tree grove near Viterbo (Thaler & Zapparoli 1993) (Fig. 36).

*New material examined*: ITALY: Abruzzo: 1♂ (MSNBG), L'Aquila, Pescasseroli, Forca d'Acero, 1500 m, July 1992, R. Bacchetta & C. Bianchessi. Lazio: 1♂, 1♀ (MSNBG), Roma, Canale Monterano Regional Natural Reserve of Monterano, Diosilla, 255 m, pitfall traps, 18

April–15 May 2007, V. Rizzo & A. Vigna-Taglianti. Umbria: 1♂ (MSNBG), Perugia, Nocera Umbra, Colle Aprico, 700 m, 14 June 1992, G. Buttarelli, P. Pantini & M. Valle (Fig. 36).

*Remarks*: The species is endemic to the Central Apennines, previously known only from few localities. New records confirm *P. conradini* to be a Central Apennines endemic. For a controversy regarding the taxonomic status of *P. conradini* and other closely related species see Brignoli (1979), Polenec & Thaler (1980), and Deeleman-Reinhold (1986).

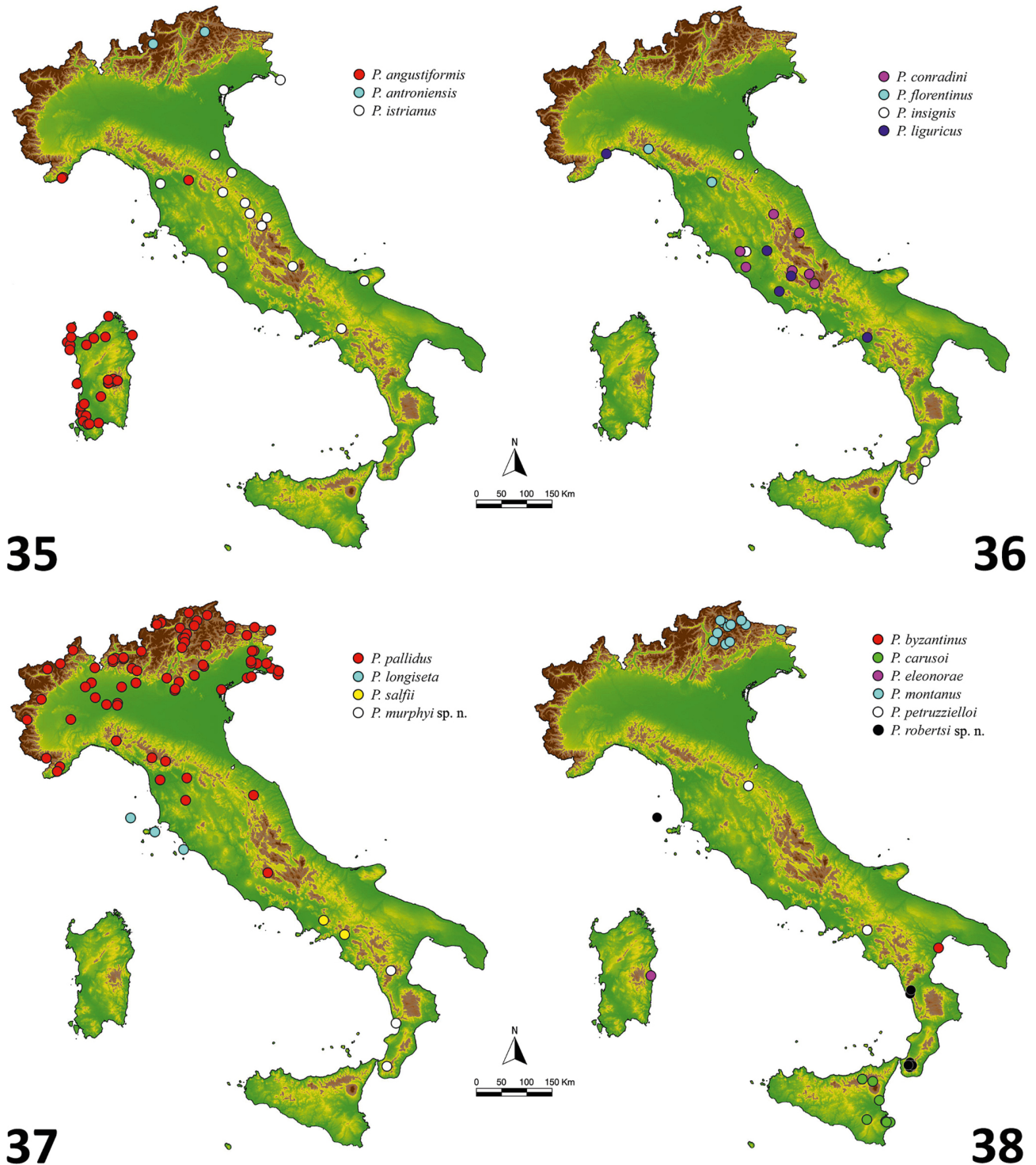
*Palliduphantes eleonora* (Wunderlich, 1995)

*Type locality*: Italy: Sardegna, Ogliastra, Baunei, Golgo 1700 m.

*Distribution*: Italy (Sardegna).

*Known records in Italy*: Sardegna: Ogliastra, Baunei, Golgo, 1700 m (Wunderlich 1995) (Fig. 38).





Figs. 35–38: Distribution of *Palliduphantes* species in Italy.

*Remarks:* Endemic to Sardinia, only known from the type locality and never recorded after the original description.

*Palliduphantes florentinus* (Caporiacco, 1947)

*Type locality:* Italy: Tuscany, Florence, Spelunca delle Pile (1 T/FI).

*Distribution:* Italy.

*Known records in Italy:* Toscana: Florence, Spelunca delle Pile (1 T/FI) (Caporiacco 1947; Lanza 1947) (Fig. 36).

*New material examined:* ITALY: Liguria: 1♂ (MSNBG), La Spezia, Varese Ligure, Passo Cento Croci, 1000 m, pit-fall traps, September 1991–May 1992, G. Buttarelli, R. Cerbino, P. Pantini & M. Valle (Fig. 36).

*Remarks:* The species is endemic to the northern Apennines, previously known from the type locality and until now has never been recorded after the original description. The present record extends the species distribution by

approximately 150 km to the north-west. Drawings of the female redescribed by van Helsdingen (1982) seem to be different from those provided by Caporiacco in the original description.

*Palliduphantes insignis* (O. Pickard-Cambridge, 1913)

*Type locality*: United Kingdom: Wareham, Bloxworth, Waterley wood.

*Distribution*: Europe.

*Known records in Italy*: Calabria: Reggio di Calabria, Bova Marina, Contrada Spina Santa; Locri, Contrada Pagnara, citrus orchards (Di Franco & Benfatto 2002). Emilia-Romagna: Forlì-Cesena, Forlì, San Martino di Villafranca, peach orchards (Paoletti *et al.* 1993). Lazio: Viterbo, olive tree grove near Viterbo (Thaler & Zapparoli 1993). Trentino-Alto Adige: Bolzano/Bozen, Valgenaua/Valgenäun, arable land, 970 m (Steinberger 2010) (Fig. 36).

*Remarks*: Known in Italy from few localities scattered along the whole peninsula. All known Italian records are reported from farmlands rather than natural habitats, thus suggesting a possible artificial introduction of the species.

*Palliduphantes istrianus* (Kulczyński, 1914)

*Lepthyphantes garganicus* Caporiacco, 1951: 99, fig. 8a–d (D♀), **syn. n.**; the type series was not examined.

For a complete set of reference see World Spider Catalog (2022).

*Type locality*: Italy: Friuli Venezia Giulia, Trieste, Sgonico, Grotta delle Druse (21 VG/TS), 274 m.

*Distribution*: The Balkans, Greece, Italy, Ukraine.

*Known records in Italy*: Campania: Avellino, Montella, Grotta del Caprone (Bosmans & Trotta 2021). Emilia-Romagna: Forlì-Cesena, Forlì, San Martino di Villafranca, peach orchards (Paoletti *et al.* 1993). Friuli Venezia Giulia: Trieste, Basovizza, Gabria Jama (32 VG/TS) (Roewer 1931; Polenec & Thaler 1980); Trieste, Carso Triestino, Grotta delle Druse (Kulczyński 1914); Trieste, Pozzo dei Colombi (33 VG/TS) (Roewer 1931); Trieste, San Servolo (Polenec & Thaler 1980); Trieste, San Dorligo della Valle, Grotta delle Gallerie (420 VG/TS) (Gasparo 1993); Trieste, Sgonico, Grotta Gigante (2 VG/TS) (Gasparo 1998). Lazio: Viterbo, olive tree grove near Viterbo (Thaler & Zapparoli 1993). Puglia: Foggia, Grotta di Montenero (201 PU/FO) (Caporiacco 1951: sub *P. garganicus*). Toscana: Monte Pisano (Picchi 2020). Veneto: Venezia, urban greenplace (Hansen 1995); Venezia Isola S. Giorgio, Parco Fondazione Cini (Hansen 1996), Venezia, Fusina, cassa di colmata A (Celano & Hansen 1999); Venezia, Barena di Campalto, argine canale Osellino (Ballarin, Pantini & Hansen 2011) (Fig. 35).

*New material examined*: ITALY: Abruzzo: 1♀ (MSNBG), L'Aquila, Valle Peligna, pitfall traps, 18 January 1992, M. Riti & G. Osella; 1♂, 1♀ (MSNBG), same locality, 23 February 1992, M. Riti & G. Osella; 1♀ (MSNBG), same locality, 27 February 1992, M. Riti & G. Osella; 2♀

(MSNBG), same locality, 19 March 1992, M. Riti & G. Osella. Lazio: 1♂, 3♀ (MSNBG), Roma, Canale Monterano, Regional Natural Reserve of Monterano, Ara del Tufo, 258 m, pitfall traps, 15 May–15 June 2007, V. Rizzo & A. Vigna-Taglianti; 1♀ (FBPC), same locality, 15 February–14 March 2007, V. Rizzo & A. Vigna-Taglianti; 1♀ (FBPC), same locality, 18 September–16 October 2007, V. Rizzo & A. Vigna-Taglianti; 1♀ (FBPC), same locality, 15 February–14 March 2008, V. Rizzo & A. Vigna-Taglianti; 1♀ (FBPC), Roma, Canale Monterano, Regional Natural Reserve of Monterano, Mola Ceccarelli, 250 m, beech wood, pitfall traps, 18 March–15 April 2007, V. Rizzo & A. Vigna-Taglianti; 1♂ (FBPC), same locality, 18 April–15 May 2007, V. Rizzo & A. Vigna-Taglianti; 3♂, 1♀ (FBPC), same locality, 14 December 2007–15 January 2008, V. Rizzo & A. Vigna-Taglianti; 1♂ (FBPC), Roma, Canale Monterano, Regional Natural Reserve of Monterano, Guallo, 179 m, pitfall traps, 15 January–15 February 2008, V. Rizzo & A. Vigna-Taglianti. Marche: 2♀ (MSNBG), Macerata, Castelsantangelo sul Nera, near Rapegna, 850 m, pitfall traps, January–June 1992, P. Pantini & M. Valle; 1♂ (MSNBG), Macerata, Fiuminata, Passo Cornello, 800 m, pitfall traps, June–December 1991, P. Pantini & M. Valle; 1♀ (MSNBG), Macerata, Fiuminata, along the road to Passo Cornello, 600 m, pitfall traps, June–December 1991, P. Pantini & M. Valle; 1♀ (MSNBG), Macerata, Sarnano, Colle, 550 m, uncultivated meadow, pitfall traps, 23 June–27 July 2004, M. Rismondo & M. Fabbri, 1♀ (MSNBG), same locality, mixed wood, pitfall traps, 01 September–07 October 2004, M. Rismondo & M. Fabbri. Puglia: 2♂, 4♀ (MSNBG), Foggia, San Marco in Lamis, surrounding of Grotta di Monte Nero, wood, pitfall traps, September 1988–June 1989, M. Valle; 3♂, 5♀ (FBPC), same locality, March–April 1988, M. Valle; 1♂ (MSNBG), Foggia, San Marco in Lamis, Grotta di Monte Nero, 850 m, 3 March 1988, M. Valle. Toscana: 2♂, 2♀ (MSNBG), Pisa, Buti, Monti Pisani Mts., olive tree grove, pitfall traps, 29 June 2010, Picchi. Umbria: 1♀ (MSNBG), Perugia, Sigillo, toward Mt. Cucco, 800 m, pitfall, June–December 1991, G. Buttarelli, E. Ghilardi, P. Pantini & M. Valle; 3♂, 6♀ (MSNBG), Perugia, San Giustino, near Lama, 400 m, pitfall traps, January–June 1992, P. Pantini & M. Valle. REPUBLIC OF SAN MARINO: 1♂ (MSNBG), San Marino, Mulini, fosso di Canepa, 300 m, wood, pitfall traps, 26 April–25 May 2010, R. Fabbri; 1♂ (MSNBG), 250 m, river bank, pitfall traps, 25 May–12 July 2010, R. Fabbri; 1♂ (MSNBG), 12 July–11 August 2010, R. Fabbri (Fig. 35).

*Remarks*: Distributed along the whole Italian Peninsula. *P. garganicus* was described by Caporiacco (1951: sub *Lepthyphantes g.*) based on a few female specimens from the cave “Grotta di Montenero (201 PU/FG)” near San Marco in Lamis, Foggia, Puglia Region. The species has never been recorded after the original description. We have examined some males and females of *Palliduphantes* from near the type locality, including a male collected inside the cave. A detailed morphological comparison with the similar and widespread *P. istrianus* has shown no significant differences in diagnostic characters of both the palp and the epigyne,

thus rejecting the idea of *P. garganicus* to stand as a distinct species. Based on these results, the synonymy of *P. garganicus* with *P. istrianus* is herein proposed.

*Palliduphantes liguricus* (Simon, 1929)

*Type locality*: France: Alpes-Maritimes, Monaco, Menton.

*Distribution*: France, Italy, Hungary(!).

*Known records in Italy*: Campania: Salerno, Olevano sul Tusciano, Grotta di S. Michele Arcangelo (20 CP/SA) (Dresco 1949). Lazio: Latina, Cori, Ovisio dei Maiali (254 La) (Brignoli 1979; Latella 1995); Rieti, Configni, Pozzo di Mezzo (350 LA/RI) (Brignoli 1979); Roma, Casate, Pozzo Piscianeglio, 760 m (Brignoli 1979); Roma, Vallepietra, Pozzo Cornetto (509 LA/RO), 1230 m (Brignoli 1979). Liguria: Savona, Albissola Marina (Groppali *et al.* 1996) (Fig. 36).

*Remarks*: Apparently distributed from the Alpes Maritimes across the entire Apennines. *P. liguricus* was originally described by Simon (1929) from south-east France (Alpes-Maritimes) and reported as occurring along the Ligurian coast, from Monaco and Menton to Genoa. Brignoli (1979) recorded this species from central Italy, although having reported morphological differences in the shape of the paracymbium. Brignoli's illustrations show the paracymbium armed with only two teeth instead of three teeth clearly visible in the original drawing by Simon. The paracymbium with three teeth is also reported by Saaristo & Tanasevitch (2001: 11): "Lateral edge of the paracymbium has three tooth-like extensions", with a note that it is typical for the *spelaorum* species-group which includes *P. liguricus*. The specimens examined by us also show only two teeth on the paracymbium thus supporting the possibility that central Italian specimens may belong to a different species. Due to these uncertainties we are reluctant to report on new records of *P. liguricus* for now. A careful re-examination of the type of *P. liguricus* by Simon or new materials from the Ligurian coast is necessary to verify the present identification. See also Polenec & Thaler (1980) and Brignoli (1979) for a controversial situation with the *liguricus* complex. The record of *P. liguricus* from Hungary (Loksa 1966) lies outside the natural range of this species and seems to be a misidentification of another *Palliduphantes* species.

*Palliduphantes longiseta* (Simon, 1884)

*Type locality*: France: Corsica

*Distribution*: France, Italy.

*Known records in Italy*: Toscana: Grosseto, Monte Argentario, Maremma, 280–400 m (Tanasevitch 2011); Livorno, Isola di Capraia (Pantini & Isaia 2008); Livorno, Porto Azzurro, Isola d'Elba pozzo Acqua Cavalla (Brignoli 1979) (Fig. 37).

*Remarks*: A Tyrrhenian endemic, known in Italy only from a few localities near Grosseto and in the islands of the Tuscan Archipelago.

*Palliduphantes montanus* (Kulczyński, 1898)

*Type locality*: Austria: Niederösterreich, Semmering-Pass, 915–1030 m

*Distribution*: Germany, Austria, Italy.

*Known records in Italy*: Friuli Venezia Giulia: Udine, Pontebba, Torbiera di Pramollo, 1518 m (Hansen 2011). Trentino-Alto Adige: Bolzano/Bozen, Plose oberhalb Brixen, 1500 m (Thaler 1973); Bolzano/Bozen, Naturpark Sextner Dolomiten (Zingerle 1999); Bolzano/Bozen, Toblach, 1310 m, riparian forest on the river Rienz (Steinberger 2007); Bolzano/Bozen, Corno Bianco/Weisshorn (Zingerle 2000a); Bolzano/Bozen, Novacella/Neustif (Noflatscher 1991); Bolzano/Bozen, Parco Naturale Sciliar-Catinaccio (Steinberger 2008); Bolzano/Bozen, Valle di Antersasc/Zwischenkofel-Tal, 1490–2100 m (Zingerle 1997); Bolzano/Bozen, La Valle-Wengen (Ballini, Stauder & Steinberger 2014); Trento, Parco Naturale Panaveggio-Pale di San Martino, 1890–2200 m (Zingerle 2000b). Veneto: Belluno, Dolomiti, Valle di Gares (Vanin & Turchetto 2007) (Fig. 38).

*Remarks*: Endemic to the eastern Alps.

*Palliduphantes pallidus* (O. Pickard-Cambridge, 1871)

*Type locality*: United Kingdom: Wareham, Bloxworth.

*Distribution*: Europe.

*Known records in Italy*: Widespread along the north and central part of the Italian Peninsula, absent from the south and main islands. Numerous records are known from Friuli Venezia Giulia, Lazio, Liguria, Lombardia, Marche, Piemonte, Toscana, Trentino-Alto Adige, Valle d'Aosta and Veneto regions. See Pantini & Isaia (2019) for a detailed list of its records (Fig. 37).

*Palliduphantes petruzzielloi* Bosmans & Trotta, 2021

*Type locality*: Italy, Campania, Salerno, Acerno, Grotta Strazzatrippa, 40°45'45"N 15°06.0084E, 1125 m.

*Distribution*: Italy.

*Known records in Italy*: Campania: Salerno, Acerno, Grotta Strazzatrippa, 1125 m (Bosmans & Trotta 2021) (Fig. 38).

*New material examined*: ITALY: Umbria: 1♂ (MSNBG), Perugia, San Giustino, Monte Moriccio, 900 m, pitfall traps, June 1991–December 1991, P. Pantini & M. Valle; 1♂, 1♀ (MSNBG), same locality, January–June 1992, P. Pantini & M. Valle.

*Remarks*: Endemic to the central-southern Apennines. Previously known only from the type locality, our new records extend the species range to central Italy (Fig. 38).

*Palliduphantes salffi* (Dresco, 1949)

*Type locality*: Italy: Campania, Salerno, Olevano sul Tusciano, Grotta San Michele Arcangelo (20 CP/SA).

*Distribution*: Italy.

*Known records in Italy*: Campania: Napoli, Roccarainola, cantine (Brignoli 1971); Salerno, Olevano sul Tusciano, Grotta di S. Michele Arcangelo (20 CP/SA) (Dresco 1949) (Fig. 37).

*Remarks*: Endemic to the south Apennines. Known only from the type locality and a single locality near Roccarainola. See Polenec & Thaler (1980) and Brignoli (1979) for the controversial situation of the *istrianius-liguricus-salffi-conradini* complexes. Male unknown.

**Uncertain records of *Palliduphantes* species from Italy***Palliduphantes alutacius* (Simon, 1884)

*Type locality*: France: Seine-et-Oise, Aigremont, and Aube, bois de Chappes.

*Distribution*: Europe to Middle Siberia

*Known records in Italy*: Toscana: Grosseto, Isola del Giglio Island (Dalmas 1922).

*Remarks*: The species records from Lombardy (Pesarini 2002, Ciocca & Pantini 2011) have been checked and reported as misidentification of *P. pallidus*. The record from Isola del Giglio needs to be verified. An additional specimen reported from the Carnia region by Caporiacco (1927) was not found when the original material was revised by Helsing (1982) and thus remains uncertain. The presence of *P. alutacius* in Italy needs further confirmation.

*Palliduphantes culicinus* (Simon, 1884)

*Type locality*: France: Somme, bois de Cise près le Tréport; Aisne: la Ferté-Milon; Seine, la Glacière; Seine-et-Oise: les Fonceaux, Chaville, Aigremont, Bouray; Ois: forêt de Compiègne, Mortefontaine (Sédillot); Aub: Troyes; Seine-el-Marne: forêt de Fontainebleau.

*Distribution*: France, Switzerland, Italy? Possibly endemic to the western Alps.

*Known records in Italy*: Friuli Venezia Giulia: Udine, Forni Avoltri, Casera Valz, 1200 m; Tarvisio, Weissenfels, Fusine in Valromana, 950 m (Caporiacco 1927).

*Remarks*: According to Maurer & Hänggi (1990), it is a *species inquirenda*. Described by Simon (1884) from France and Switzerland, and lacking any recent records. The records from the Carnia area in north-eastern Italy by Caporiacco (1927) seem to lie outside the natural range of the species and thus are considered uncertain.

*Palliduphantes dentatidens* (Simon, 1929)

*Type locality*: France: Alpes-Maritimes, Baume Granet, commune de Roquefort.

*Distribution*: France, Italy?

*Remarks*: Endemic to the Maritime Alps. The citation for Italy by Brignoli (1979: 321, Alpi Marittime) refers to the French territory. Nevertheless, due to the proximity of the French records to the Italian border, the presence of this species in Italy seems possible.

*Palliduphantes gladiola* (Simon, 1884)

*Type locality*: France: Hautes-Alpes, Briançon, and Corse, montagnes de l'intérieur.

*Distribution*: France (incl. Corsica), Italy?

*Known records in Italy*: Friuli Venezia Giulia: Sappada (Caporiacco 1927).

*Remarks*: Known from France (Corsica), the record from Italy (Sappada, Caporiacco 1927: 95) is doubtful and needs confirmation.

**Discussion**

Despite including numerous species described more than a century ago, *Palliduphantes* remains poorly studied by experienced arachnologists. Consequently, the information available on several Italian species is also unsatisfactory. Some species have never been collected after original descriptions (e.g. *P. carusoi*, *P. eleonora*, *P. florentinus*, and *P. garganicus*). Others show systematic and taxonomic uncertainties and are in need of a proper revision; see Polenec & Thaler (1980) and Brignoli (1979) for the controversies related to the *istrianius-liguricus-salffi-conradini* complexes. Furthermore, new *Palliduphantes* species can still be found in the Italian Peninsula (e.g. Bosmans & Trotta 2021 and two new species described herein), which means that a true diversity of the genus is still far from being adequately disclosed. Our work extends the knowledge on this genus, clarifying records of many species and paving the way for future research on the genus by Italian and foreign arachnologists. Yet, unresolved questions still remain on distribution, systematics and taxonomy of some Italian species (e.g. *P. liguricus*). New studies on the Italian *Palliduphantes* fauna and especially new field works in poorly surveyed regions of the country could bring new findings and discoveries of new species, thus helping to further revise the diversity of the genus in Europe.

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