Theridion conigerum Simon — rediscovered in Austria (Araneida: Theridiidae)

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Summary

A rare European theridiid species, *Theridion conigerum* Simon, is redescribed from new captures (♂♀) in Northern Tyrol, Austria. Its vulval structures are shown for the first time, together with notes on distribution, habitat and life cycle.

Introduction

The minute spider *Theridion conigerum* Simon apparently is one of the rarest theridiid species of mid-Europe and probably for that reason was not included in Heimer & Nentwig (1991). For many decades it was known only from allegedly immature females and juveniles recorded by Simon (1914) from France, Basses-Pyrénées and Alpes-Maritimes, and from Germany (Bonn). Recently 3 males collected in Germany and Sweden (Wunderlich, 1973; Holm, 1977; Heimer, 1980) by different sampling methods have been assigned to this species. Also its generic combination has been in debate (Wiehle, 1937; Heimer, 1980). In 1991 an apparently flourishing population was discovered in Northern Tyrol, providing evidence of correct matching of the sexes and the habitat of the species. A redescription of *T. conigerum* is therefore presented, together with comparative remarks on the reference specimens available and some biological observations.

Abbreviations: CTh = Thaler collection; MHNG = Muséum d'Histoire naturelle, Genève; MHNP = Muséum national d'Histoire naturelle, Paris; NMW = Naturhistorisches Museum Wien; SMD = Staatliches Museum für Tierkunde, Dresden; SMF = Forschungsinstitut Senckenberg, Frankfurt; ZMU = Zoological Museum, Uppsala.

Theridion conigerum Simon, 1914 (Figs. 1–14, Map 1)

Euryopis pyramidalis Simon, 1879: 255; ♀, n.sp. Type locality La Rhûne, Basses-Pyrénées, habitat "sous les pierres" in a chestnut-wood.

Lasaeola pyramidalis; Simon, 1881: 151; ♀. Also recorded from Alpes Maritimes, Sospel.

Dipoenura pyramidalis; Simon, 1908: 95.

Theridion conigerum Simon, 1914: 261, 297; ♀ immature, new name (not *T. pyramidale* L. Koch, 1867 from Australia). Further records: Basses-Pyrénées, Vallée d'Aspe; Germany, Bonn (leg. Bertkau); habitat "sur les buissons" (MHNP AR 2764, 2765, examined).

T. conigerum; Wiehle, 1937: 160; description taken from Simon (1914).

Achaearanea conigera; Levi & Levi, 1962: 44; fig. 81.

T. conigerum; Wunderlich, 1973: 406, figs. 1–9; ♂ from Rottweil, Germany, in pitfall trap (examined).

T. conigerum; Holm, 1977: 17, fig. 2; ♂ from Kullaberg, Sweden, swept from heather (examined).

Chrysso conigerum; Heimer, 1980: 179, figs. 1–3; ♂ from Oberharz, Germany, from spruce (examined).

Material examined:

Austria, Nordtirol, Ötztal, Längenfeld/Espan, 1200–1400 m: 1♀, 11 Aug. 1991; 9♀, 9 juv., 16 Aug. 1991; 3♀, 3 subad.♂, 2 juv., 2 Nov. 1991; 2 subad.♂, 2 juv., 1 March 1992; 3 subad.♂, 1 juv., 14 April 1992 (3♂ matured 25 and 28 April 1992); 2♂, 9♀, 1 subad.♂, 23 May 1992; 3♀, 21 June 1992; 3♀, some juv., 8 Aug. 1992. Deposited in MHNG (1♂, 2♀), MHNP (2♀), NMW (1♂, 2♀), SMF (2♀) and CTh (1♂, 2♀).

1♀, 1 juv., MHNP (AR 2764), "France"; 8 juv., MHNP (AR 2765), "St. Christand", leg. Simon; 1♂ (without palps), SMF 25115/1, Germany, Rottweil, June 1970 (Wunderlich, 1973); 1♂, SMD, Oberharz, Ilsenhütte, June 1972 (Heimer, 1980); 1♂, ZMU, Sweden, Skåne, Kullen, Mölle, 4 June 1942 (Holm, 1977).

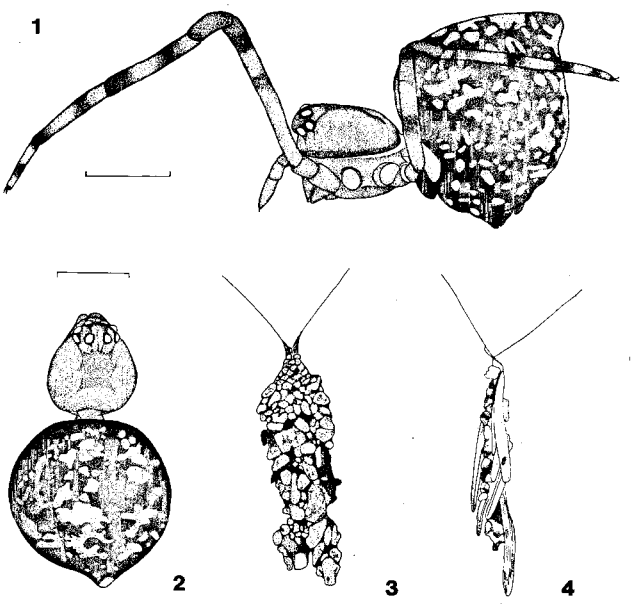
Habitus, colour and pattern (♂♀): Prosoma of ♂ as in ♀ (Figs. 1, 2). Opisthosoma with characteristic posterior tubercle. Prosoma brown, with dark margin; ocular region dark. Opisthosoma dark, irregularly speckled with pale yellowish spots, which group into two longitudinal strings on dorsum. Seen from behind a light median area extends from tubercle to spinnerets. Venter black with 3 white spots forming a triangle; further light dots arranged in a circle around spinnerets. Legs annulated. — The pattern therefore corresponds fully with the detailed description in Simon (1879). Profile of ♂ prosoma as in Wunderlich (1973) and Holm (1977), but not in Heimer (1980; fig. 1); cephalic area in Heimer's specimen is not prominent.

Female: Measurements (mm, $n = 6$): total length 1.4–1.6; carapace 0.55–0.74 long, 0.47–0.66 wide; length femur I 0.90–1.13; length tibia I 0.59–0.66.

Epigyne/vulva (Figs. 5–8): Epigyne not sclerotised, indistinct, only the genital openings showing clearly (Figs. 5, 6), posterior margin with a slight median notch. Copulatory ducts long, strongly coiled. — The specimens correspond to the single female present in the Simon collection. Presumably this was mistaken as immature by Simon owing to its indistinct epigyne.

Male: Measurements (mm, $n = 5$): total length 1.2–1.5; carapace 0.59–0.70 long, 0.51–0.63 wide; length femur I 0.90–1.21; length tibia I 0.59–0.74.

Palpus (Figs. 9–12): Tip of cymbium with a furrow, paracymbium indistinct (Fig. 11). Conductor conspicuous, embolus protected by its distal lobes (Figs. 10, 12).



Figs. 1–4: *Theridion conigerum* Simon. **1** Female, lateral view; **2** Female, dorsal view; **3, 4** Retreat, length 24 mm (3) and 20 mm (4). Scale lines = 0.5 mm.

Embolus distinct, with broad base, its distal part slender and straight. Sperm duct opens at tip of embolus. Median apophysis sickle-shaped, partially concealed by cymbium. Radix inconspicuous. Identification of palpal sclerites according to Levi (1957), Levi & Levi (1962); in Coddington (1990) the "radix" is named "tegular apophysis". — The palpal organs correspond fully to the figures given by Wunderlich (1973) and Heimer (1980).

Discussion

The recent captures of both sexes in Tyrol clearly demonstrate the identity of the males of Wunderlich, Holm and Heimer with the single *conigerum* female in the Simon collection. Differences between the males of Heimer and Wunderlich as suggested by Heimer (1980) have not been confirmed. This *conigerum* female of Simon is without exact locality and there have been no further captures in the Pyrenees for many decades (Bosmans & De Keer, 1985). Fortunately, on 1 June 1991 J. & F. Murphy found by shaking heather at a scar near Pause de Saut (St. Giron, Ariège, 700 m) a female which is clearly conspecific with the specimens from Tyrol (Murphy, in litt.).

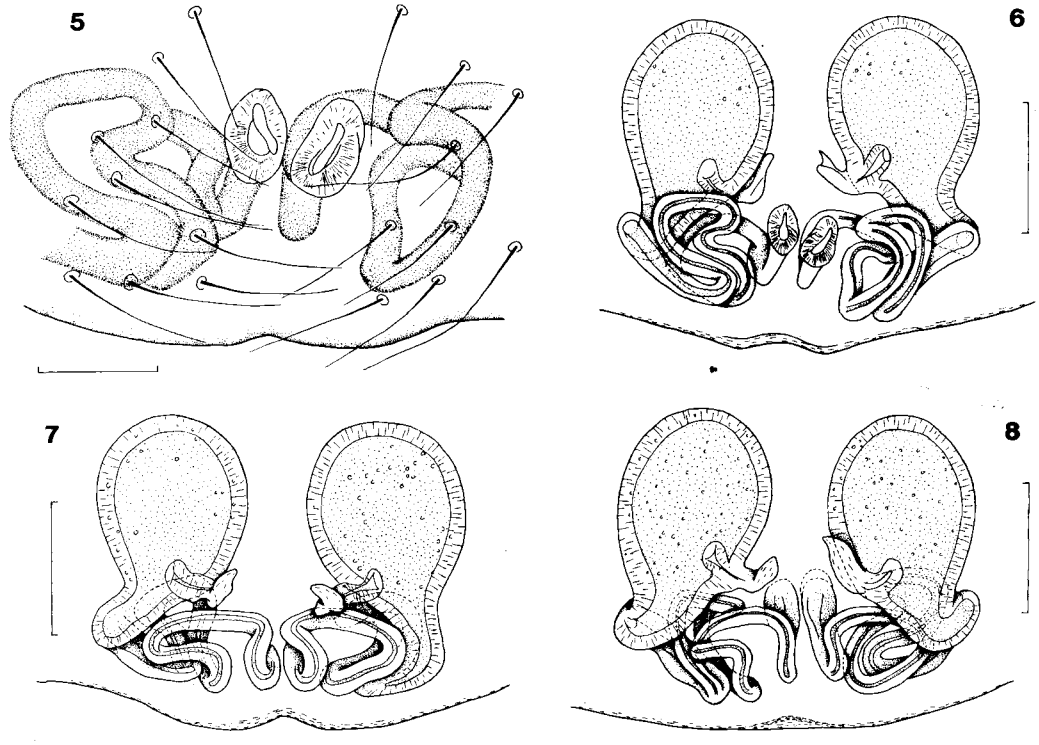
As can be seen from the list of synonyms, *T. conigerum* has been placed into various genera. The early combination with *Euryopis* and "*Lasaeola*" cannot be accepted as there is only one pair of seminal receptacles. In Levi's comprehensive revisionary studies on American Theridiidae no convincing argument was found to combine this species either with *Chrysso* (Levi, 1955a) or with *Achaearanea* (Levi, 1955b, 1959, 1963). The structure of the palpal organ does not support such a combination, although the shape of the abdomen may resemble some *Achaearanea* species. At the moment it may be best therefore to leave this species in *Theridion*, although it cannot be placed among the species groups currently accepted (Wiehle, 1937; Levi, 1957; Locket & Millidge, 1953).

Distribution (Map 1)

T. conigerum was first discovered (1879) in the West Pyrenees. In the final edition of *Arachnides de France* (1914) Simon mentioned this species from Basses Pyrénées, Alpes Maritimes and from Germany (Bonn, leg. Bertkau), suggesting an Atlantic (West-European) distribution area. As indicated by Bonnet (1959), Bertkau himself did not mention this species. Recent captures come from Germany (1973, 1980), southern Sweden (1977), Austria and again the Pyrenees (1991, leg. J. & F. Murphy). Apparently the species is distributed widely also in mid-Europe and may have been overlooked owing to its small size and inconspicuous epigyne.

Biological observations

Habitat: *T. conigerum* was found at 3 places in the Ötztal valley near Längenfeld (1200–1400 m), on slopes facing south and west, with sparse spruce and pine trees, and ground cover of *Calluna, Vaccinium* and numerous rocks and stones. Retreats were placed under stones, even 5–6 together (Fig. 13), maximal distance from the soil surface 6–7 cm. This is in accordance with Simon's note (1879) "sous les pierres dans un bois des châtaigners" and with the males recorded by Wunderlich and by Holm which were trapped in a pitfall and swept from heather respectively. The Murphys' female was taken by shaking clumps of heather in a sweeping net. The record "sur les buissons" in Simon (1914) and the male found by Heimer from spruce must now be regarded as exceptional.



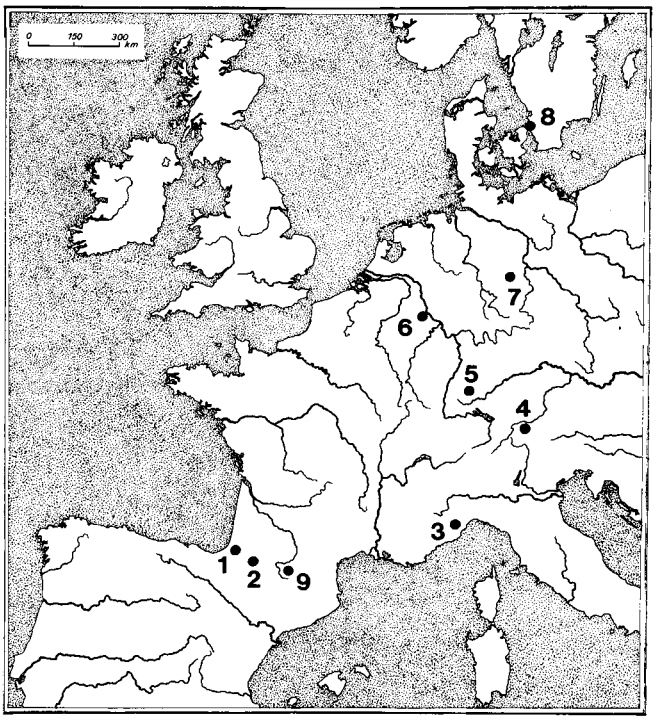
Figs. 5–8: *Theridion conigerum* Simon. **5** Epigyne, ventral view; **6** Vulva, ventral view; **7, 8** Vulva, dorsal view. Figs. 5, 6, 8 taken from the same specimen. Scale lines = 0.05 mm (5), 0.1 mm (6–8).

Retreat (Figs. 3, 4, 13): Females enlarge retreats during summer: retreat length in May/June 9 mm ($n=4$), in August 11 mm ($n=16$), in Sept./Nov. 18 mm ($n=6$), diameter 4–5 mm. Retreat tube-like, resembling those of *Achaearanea riparia* (Blackwall), suspended from the cover stone by a strong, forked thread and several very fine threads. They consist of earth particles, grains of sand, plant material and animal remnants (see "prey"), also some spider exuviae (1 Salticidae, 1 *Xysticus* sp.), loosely woven together. Egg-sacs are deposited in the retreat. 30 retreats collected in mid-August contained 0–4 egg-sacs, i.e. 3 with 0, 14 with 1, 10 with 2, 1 with 3, 2 with 4 cocoons.

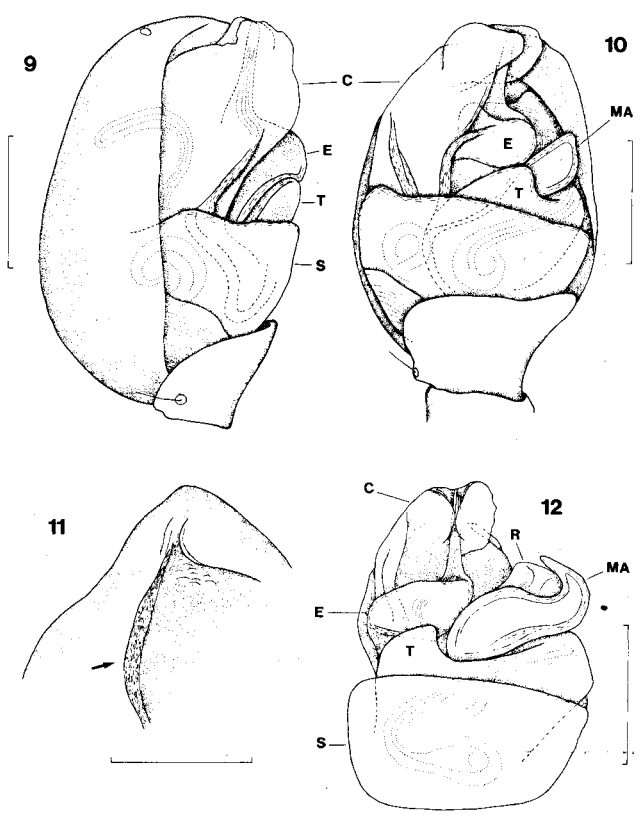
Egg-sac: Diameter 1.4–2.2 mm ($n=6$), white, globular, woolly. The eggs are wrapped sparingly in silk, and are visible through the cocoon. Average number of eggs 10 (range 6–14), egg diameter 0.54 mm ($n=6$).

Prey: Captive *T. conigerum* did not accept most of the prey offered: small ants, various mites (Oribatei, Gamasina, Parasitengona) and arthropleoneous Collembola. Only 3 prey items were captured: 1 early instar harvestman (Phalangiidae), 1 Chironomidae and 1 *Sminthurus* (Collembola, Sminthuridae). Nevertheless, animal remnants present in the retreat cover may indicate possible prey: ants, Collembola, Oribatei (e.g. Belbidae), small Coleoptera (1 elytra, larvae), Hymenoptera (1 wing), legs of Linyphiidae.

Life cycle (Fig. 14): Males of *T. conigerum* mature at the end of April and are stenochronous. The males recorded by Wunderlich, Holm and Heimer were taken in June. Eggs are laid from the end of May onwards, and by August most of the cocoons were empty. First instar individuals appear in early August and stay together in the retreat for 1–2 weeks. They pass 1–2 moults before hibernation. The exact number of instars has not been defined properly. Probably there are only four, as in *T. pallens* Blackwall, unlike the 5 instars of most theridiids (Toft, 1976). Apparently some specimens hibernate already in the subadult stage. Hibernating spiders were found free under bare stones, protected by a few threads, rarely in old retreats. The data in Fig. 14 are based on hand-sampling and may be incomplete. They indicate nevertheless an annual life cycle pattern for *T. conigerum*.



Map 1: Distribution of *Theridion conigerum* Simon. 1 = La Rhûne (Simon, 1879, type locality), 2 = Vallée d'Aspe (Simon, 1914), 3 = Sospel (Simon, 1914), 4 = Längenfeld (Ötztal), 5 = Rottweil (Wunderlich, 1973), 6 = Bonn (Simon, 1914), 7 = Oberharz (Heimer, 1980), 8 = Skåne, Kullen (Holm, 1977), 9 = St. Giron, Pause de Saut (Ariège, 1♀ leg. J. & F. Murphy, 1 June 1991).



Figs. 9–12: *Theridion conigerum* Simon. **9** Right ♂ palp, retrolateral view; **10** Ditto, ventral view; **11** Tip of cymbium, ventral view, with paracymbium (arrow); **12** Bulbus, prolateral view. Scale lines = 0.1 mm. C = conductor, E = embolus, MA = median apophysis, R = radix, S = subtegulum, T = tegulum.

Fig. 13: Five retreats of *Theridion conigerum* suspended under a stone (Northern Tyrol, Ötztal, Längenfeld, Aug. 1991).

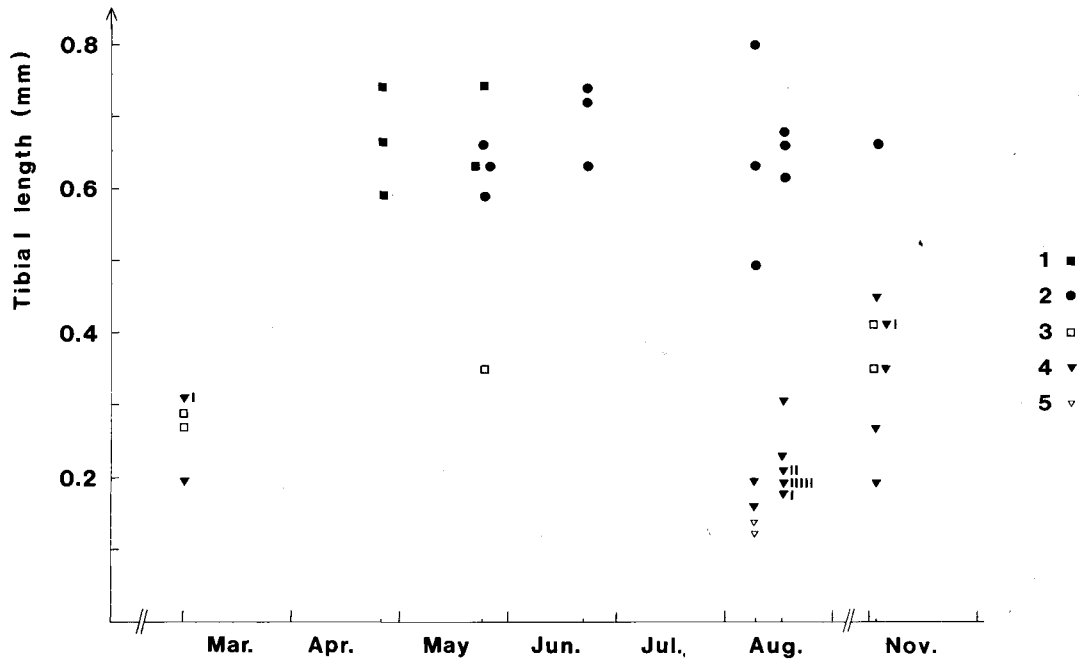


Fig. 14: *Theridion conigerum*, postembryonic development: tibia I length of specimens hand-collected in 1991/1992. 1 = adult ♂, 2 = adult ♀, 3 = subadult ♂, 4 = immature instars not separated into stadia, 5 = incomplete stage. Vertical lines indicate further specimens of the same size.

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