

***Steatoda incomposita* (Denis) from southern Europe, a close relative of *Steatoda albomaculata* (Degeer) (Araneae: Theridiidae)**

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**Summary**

The poorly known *Steatoda incomposita* (Denis, 1957) was recollected at its type locality (Sierra Nevada, Spain) and at further localities in the Iberian Peninsula and in Corsica. A redescription is presented, which includes also the hitherto unknown male and comparative remarks on genital morphology. *S. incomposita* and its close relative *S. albomaculata* (Degeer, 1778) are related to the *fulva* species group of *Steatoda*.

**Introduction**

The genus *Steatoda* Sundevall, 1833, in the broad sense of Levi (1957), includes the former genera *Asa-gena*, *Lithyphantes* and *Teutana*, and is well represented in central Europe by 6 species (Wiehle, 1937). In southern Europe several less known species occur. Those from the eastern Mediterranean were recently considered in a revisional study (Levy & Amitai, 1982). The western Mediterranean *S. incomposita* (Denis, 1957) is known from its holotype female only. No further records could be found in the literature available. The following redescription is based on specimens collected in the type locality, which include also the previously unknown male. Subsequent inquiries produced additional material in museum collections. Therefore a wider distribution of the species in south-western Europe seems likely.

Abbreviations: CTh=Thaler collection; MHNG= Muséum d'Histoire naturelle, Genève; NMB= Naturhistorisches Museum Basel; NMW= Naturhistorisches Museum Wien. C=conductor, E=embolus, G=anchoring groove, M=membranous fold on TA 2, Pc=paracymbium, S=subtegulum, T=tegulum, TA 1,2=tegular apophysis 1,2, x=additional sclerite on embolar base.

***Steatoda incomposita* (Denis, 1957) (Figs. 1–5, 9–11)**

*Lithyphantes incompositus* Denis, 1957: 294, figs. 18, 19; ♀, n.sp. Type locality Picacho de Veleta, Sierra Nevada, Spain, 2620 m, leg. Janetschek, 21 July 1954 (not examined).

**Material examined:** SPAIN: Sierra Nevada, Veleta street, 2800 m, 1♂ 3♀, 2 penultimate ♀ (CTh), 18 July 1982, leg. Thaler; Malaga, 1♀ (MHNG), 22 June 1953, leg. Comellini; Lerida, Castellnou, 1♂ (MHNG), 8 June 1955, leg. Comellini; Zaragoza, 1♀ (MHNG), 9 June 1953, leg. Comellini. GIBRALTAR: 1♂ (MHNG), 20 June 1953, leg. Comellini. CORSICA: Ajaccio-Porto, Col de Sevi, 1100–1600 m, 1♀ (NMW), 27 September 1974, leg. Thaler.

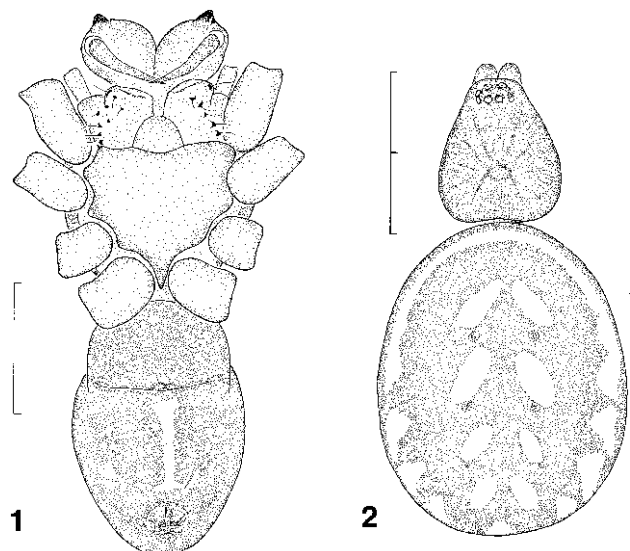
**Diagnosis:** Both sexes of *S. incomposita* differ from *S. albomaculata* by genital structures only. The cymbium is less tapering than in *S. albomaculata*, the TA 2 is hooked

and less prominent, and the process of the embolar base is short and pointed (Fig. 10 cf. Fig. 13). The epigyne is less bulging than in *S. albomaculata*, with small anchoring grooves at its straight posterior border (Fig. 3 cf. Fig. 6); the conspicuous posterior projections of *albomaculata* are absent. Males of both species differ from other *Steatoda* species in having endites with tubercles and chelicerae with a frontal tooth (Fig. 1).

**Habitus, colour and pattern** (♂♀, Figs. 1, 2): Abdomen dark with white pattern which resembles *S. albomaculata*. There is an anterior white belt, broken laterally into single spots, and two median rows of pale spots. Venter dark, with white median line, and two weak paramedian lines which fuse in front of the spinnerets as shown by Denis (1957: fig. 18). Branchial opercula dark, sides of abdomen with variable light markings. There is no difference from the pattern of *S. albomaculata* (Levi, 1957; Levy & Amitai, 1982).

**Female:** Measurements (mm,  $n=6$ ): total length 4.1–5.9; carapace length 1.56–1.76, width 1.29–1.41; femur I length 1.68–1.96; tibia I length 1.33–1.53. Epigyne (Fig. 3): with a transverse bridge, which is not bulging and without posterior projections, as previously shown by Denis (1957: fig. 19); posterior margin straight, with two paramedian anchoring grooves. Vulva (Figs. 4, 5): at each anterior-lateral margin of the bridge there begins a half-open canal which later closes and leads into the median copulatory duct; these first run caudally, then turn to the side and finally reach the receptacula after one ventral coil. Fertilisation ducts emerge dorsally. As in many other *Steatoda* species the dorsal view of the vulva is not very distinctive.

**Male:** Measurements (mm,  $n=3$ ): total length 2.9–4.4; carapace length 1.25–2.03, width 1.02–1.64; femur I length 2.00–2.58; tibia I length 1.68–2.07. Endites with numerous large tubercles (Fig. 1) which are the bases of hairs. Chelicerae with one frontal tooth and with a large prong on their inner side, as in *S. albomaculata* (Levi, 1957: fig. 63; Levy & Amitai, 1982: fig. 4). Posterior declivity of prosoma with stridulatory files. Palpus



Figs. 1–2: *Steatoda incomposita* (Denis). 1 Male, ventral view; 2 Female, dorsal view. Scale lines=1 mm (1), 2 mm (2).

(Figs. 9–11): Tibia: 3 trichobothria, 2 retrolateral, 1 dorsal. Cymbium distally less tapering than in *S. albomaculata* (Fig. 10 cf. Fig. 13). Paracymbium hooked, situated in dorsal-prolateral position and anchoring to concavity of TA 1. Tegulum itself not visible in unexpanded palp, with conductor and two apophyses (TA 1, 2). Conductor lamellate, pointed, with ventral furrow for embolus. TA 1 (=median apophysis *sensu* Levi, 1957) prolateral, elongate, with rounded ventral part accompanying the embolus and a dorsal part which anchors to the paracymbium when expanded. TA 1 also contains a loop of the sperm duct. TA 2 (=radix *sensu* Levi, 1957) characteristically hooked and less prominent than in *S. albomaculata*, bearing a rounded membranous fold (M, Figs. 10, 11) at its base. Embolus: base with a short pointed process (Fig. 10, arrow) and an additional sclerite (x, Fig. 11) attached to it, its distal part filiform. Three palpal structures support the embolic part: TA 1, membranous fold of TA 2, and conductor.

**Habitat:** Dry stony fields of the Mediterranean, with low and sparse vegetation, from lowland up to 2800 m altitude. Specimens have been taken under stones.

**Distribution, synonymy:** *S. incomposita* is known only from the western Mediterranean. There are a few records from the Iberian Peninsula, from Gibraltar and Sierra Nevada in the south to Zaragoza and Lerida in the north, and a further locality in Corsica. Presumably its distribution area is wider and the species may have been confused previously with *S. albomaculata*. Early records of *albomaculata*, especially from the Iberian peninsula (Bonnet, 1957), should be re-evaluated. *S. incomposita* is a conspicuous species, so possibly an

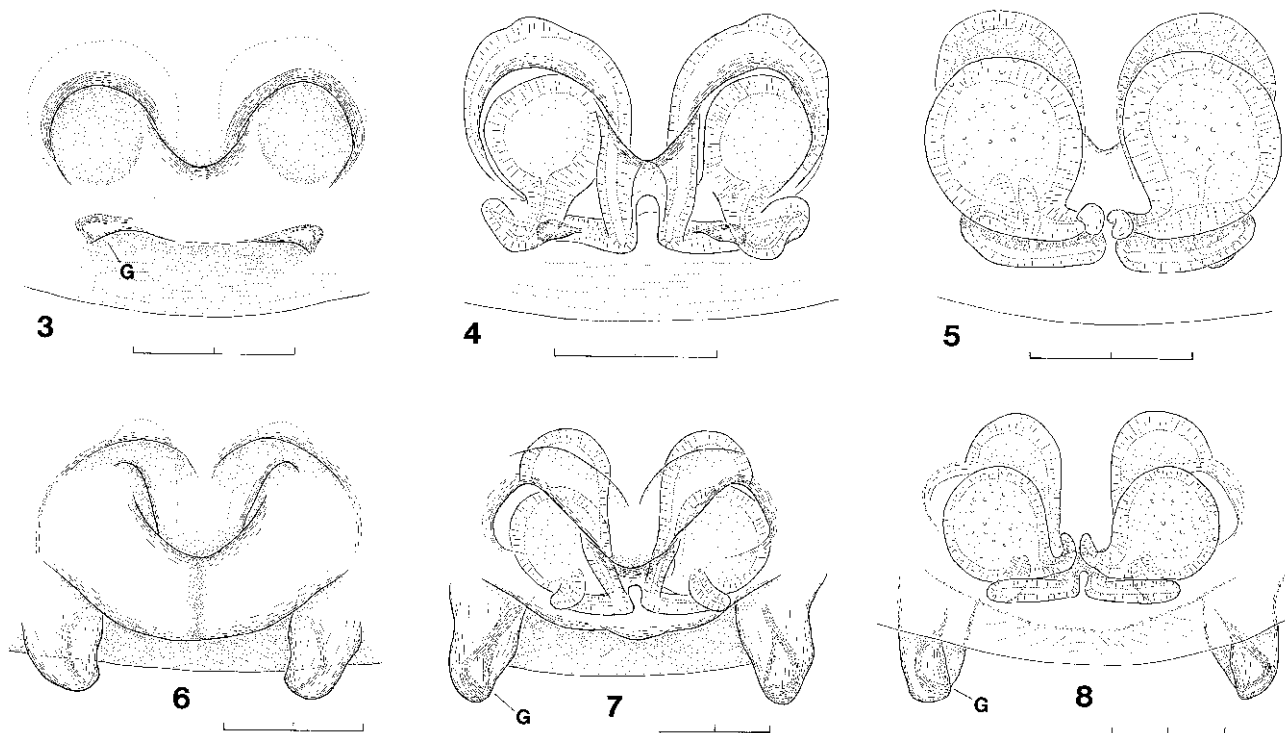
older synonym might exist. *Lithyphantes latrodectoides* Franganillo, 1913, from Spain is probably a different species as it is more than twice as long as *incomposita*, total length c. 14 mm, and its abdomen is marked with red dots.

***Steatoda albomaculata* (Degeer, 1778) (Figs. 6–8, 12–21)**

Wiehle (1937), Locket & Millidge (1953), Levi (1957), Levy & Amitai (1982).

**Material examined:** AUSTRIA: Northern Tyrol, Ötztal, Brunau, 2♂ 5♀ (CTh), 2 July 1968 (Thaler, 1985); Lechtal, Weissenbach, 1♀, 25 July 1992, leg. Knoflach. SWITZERLAND: Zermatt, 4♂ 5♀ (MHNG), 12 July 1909, leg. de Lessert. FRANCE: Ain, Vesancy, 4♀ (MHNG), 7 July 1958, leg. Comellini. CROATIA: Biograd, 1♀ (CTh), 21 August 1966, leg. Hofer. GREECE: Peloponnese, Githion, 1♂, 27 September 1992, leg. Knoflach. RUSSIA: Walouyky, 1♂ 1♀ Isad♂ (NMW), leg. Velitchkovsky (Kulczynski, 1913). TURKEY: Constantinople, Olympus Bithynicus, 1600 m, 4♀ (NMW), 28 July, leg. Werner (Kulczynski, 1903); Brussa, 1♂ 1♀ (NMW), 1863, leg. Mann. AFGHANISTAN: Ghazni near Kabul, 2500 m, 1♀ (CTh), 22 July 1969, leg. Aichhorn; Hindukush Mts., Quazi-Deh valley, 4300 m, glacial moraine, 1♂ (CTh), 12 August 1969, leg. Aichhorn. SAUDI ARABIA: Hofuf, 1♀ (NMB), 3 January 1980, leg. Büttiker.

**Female:** Measurements (mm,  $n=7$ ): length 5.5–6.5; carapace length 1.8–2.4, width 1.4–2.0; femur I length 2.0–2.7; tibia I length 1.4–2.0. Epigyne/vulva (Figs. 6–8, 15, 16): Transverse bridge elevated, with median furrow (Figs. 6, 15), posterior border convex. Anchoring grooves (G, Fig. 7) situated on distinct posterior projections. Vulva similar to *S. incomposita*, but opening of canal more in frontal than in lateral position and ventral coil of copulatory duct shorter than in *S. incomposita* (Fig. 7 cf. Fig. 4).



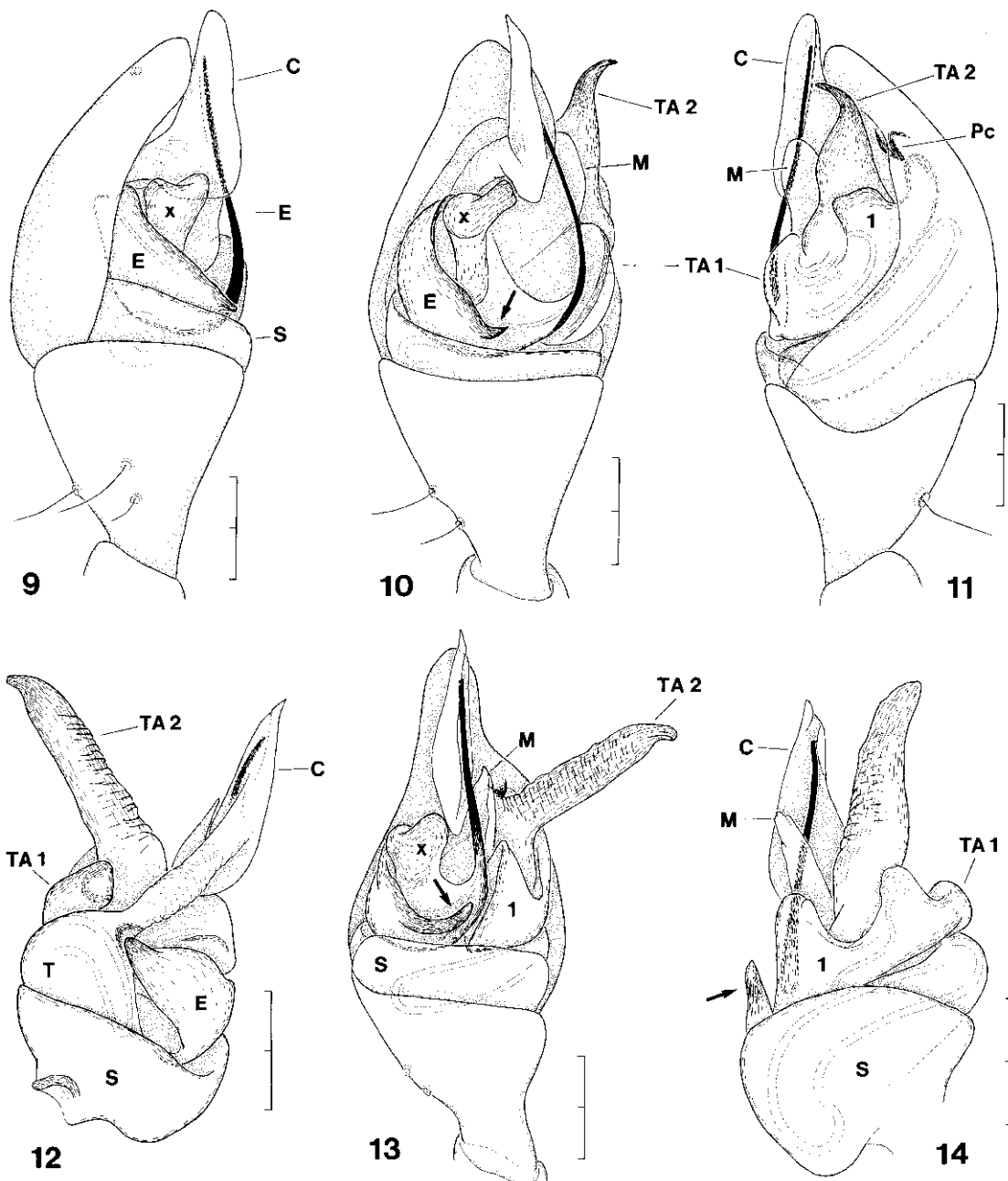
Figs. 3–5: *Steatoda incomposita* (Denis). 3 Epigyne, ventral view, Sierra Nevada; 4 Vulva, ventral view, Corsica; 5 Vulva, dorsal view, Sierra Nevada. Scale lines=0.2 mm.

Figs. 6–8: *S. albomaculata* (Degeer). 6 Epigyne, ventral view, Kabul; 7 Vulva, ventral view, Hofuf; 8 Vulva, dorsal view, Hofuf. Scale lines=0.2 mm.

**Male:** Measurements (mm,  $n=6$ ): total length 3.3–5.8; carapace length 1.4–3.0, width 1.1–2.2; femur I length 1.9–3.2; tibia I length, 1.5/2.5. Chelicerae and endites sexually dimorphic as in *S. incomposita* (Figs. 17, 18, 21). Palpus (Figs. 12–14, 19, 20): Tibial trichobothria and paracymbium as in *S. incomposita*. Cymbium tapering. Subtegulum clearly visible in unexpanded palp, tegulum small, dorsal, normally hidden under cymbium. As in *incomposita* the conductor is a dorsal projection of the tegulum (Fig. 12). It is provided with a basal concavity, into which fits the dorsal edge of the embolar base (Fig. 12). TA 1 similar to *S. incomposita*, but with angular ventral part. TA 2 prominent, digitiform, its membranous fold (M, Fig. 14) triangular. Embolus:

ventral process of embolar base long and curved (Fig. 13).

**Biology:** Habitat, form of web, egg-sac and prey of *S. albomaculata* have been described by various authors (Nielsen, 1932; Wiehle, 1937; Nørgaard, 1948; Hirschberg, 1969; Braun & Rabeler, 1969; Bauchhenss, 1990). The species lives in open dry areas, in stony or sandy fields with low and scattered vegetation. The preferred habitat shows strong daily fluctuation of temperature in summer, on one day in Denmark from 10 to 45°C (Nørgaard, 1948). According to this author, the preferred temperature ranges from 35–45°C, and thermal death is at 50°C. In Finland the species lives mostly near the seashore, by lakesides and on riverbanks



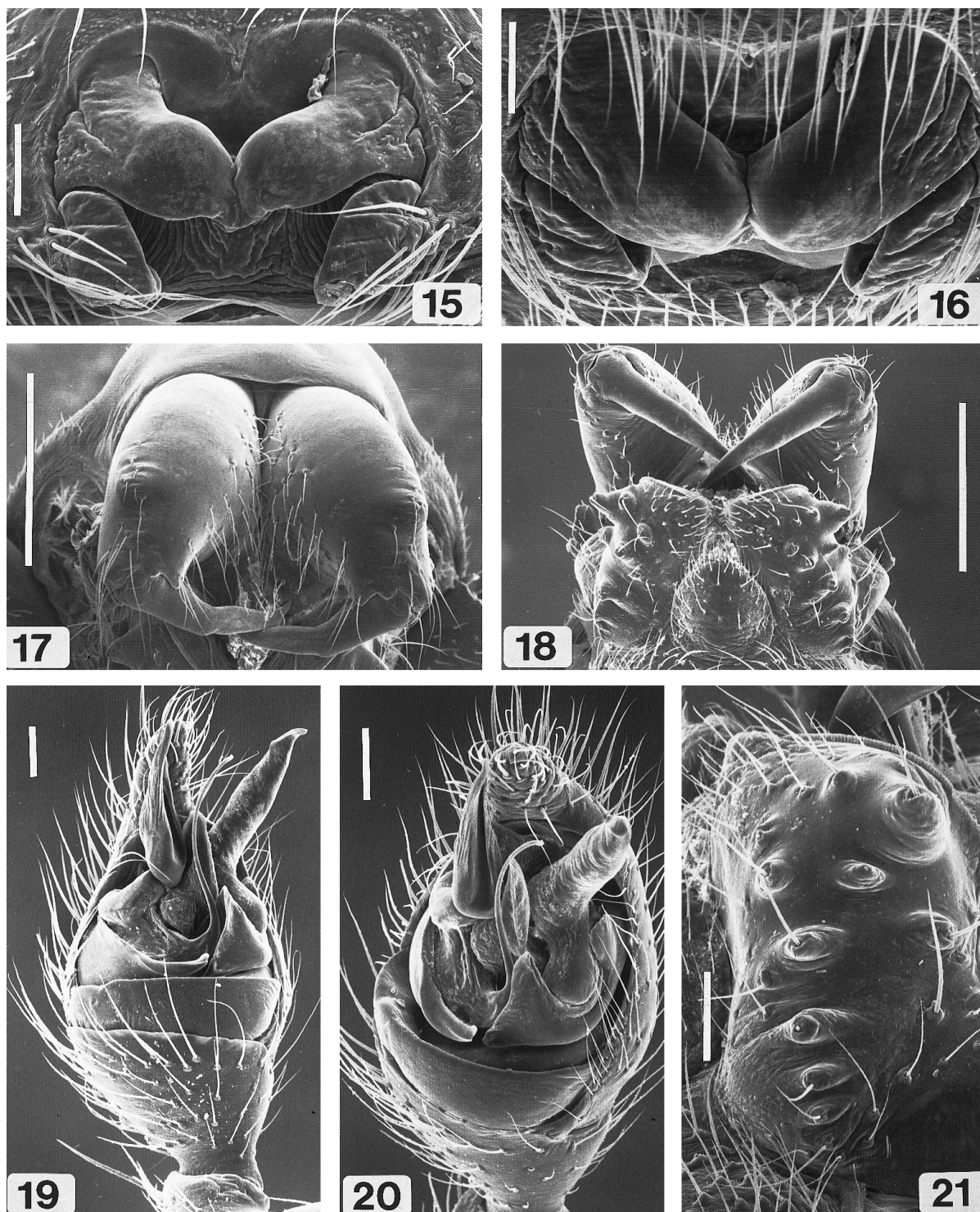
Figs. 9–11: *Steatoda incomposita* (Denis), right male palp, Sierra Nevada. **9** Retrolateral view; **10** Ventral view; **11** Prolateral view. Scale lines=0.2 mm.

Figs. 12–14: *S. albomaculata* (Degeer), right male palp, Quazi-Deh. **12** Bulbus, dorsal view; **13** Ventral view; **14** Bulbus, prolateral view. Scale lines=0.2 mm.

(Palmgren, 1974). In the south, it occurs across a wide range of altitude, from lowlands up to the alpine zone. In the Pyrenees, *S. albomaculata* has been found up to 1800–2600 m (Bosmans & De Keer, 1985), in the Western Alps, Zermatt, at 2200–2600 m (Schenkel, 1927). From the Hindukush Mts., it was recorded herein at 4300 m.

*S. albomaculata* preys upon various insects, grasshoppers, beetles, ants and moths. A list of prey remains found in two webs is provided by Nørgaard (1948). Prey

remnants of 2♀ snares examined in Northern Tyrol, Weissenbach were as follows: ants dominant (c. 40 *Myrmica* sp., 1 *Formica* sp.), also 3 beetles (1 Elateridae: *Zorocheilus meridionalis* (Laporte de Castelnau), 1 Lagriidae: *Lagria hirta* (L.), 1 Chrysomelidae: *Altica* sp.), 2 Heteroptera (Miridae: *Trigonotylus coelestialium* (Kirkaldy) 1♂, *Plagiognathus* sp. 1♀), 2 Cicadina, various Diptera (e.g. 1 Chloropidae: *Thaumatomyia* sp., 1 Tephritidae: *Dithryca guttularis* (Meigen), 1 Syrphidae), 1 Apidae.



Figs. 15–21: *Steatoda albomaculata* (Degeer), Brunau. **15** Epigyne, ventral view; **16** Ditto, frontal view; **17** Male chelicerae, frontal view; **18** Male endites and labium, ventral view; **19** Male right palp, ventral view; **20** Ditto, frontal-prolateral view; **21** Male left endite, lateral view. Scale lines=0.1 mm (15, 16, 19–21), 0.5 mm (17, 18).

**Distribution:** Holarctic. Widespread in Eurasia (Bonnet, 1957), but also common in North America: south to central Mexico, north to Great Slave Lake (Levi, 1957). In Europe, its northernmost records are from Norway (Northern Finnmark, Hauge, 1989) and from Finland, near the timberline (Palmgren, 1974). Recent records from Spain in Vanuytven *et al.* (1994).

## Discussion

According to their genital morphology, both *S. incomposita* and *S. albomaculata* are close to the *fulva*-group of *Steatoda* described by Levi (1957) and Gertsch (1960). They have the following palpal structures in common: paracymbium prolateral, ventral part of TA 1 with furrow, conductor elongate and pointed, embolar base with process, embolic part filiform. The epigyne with a pair of anchoring grooves is also shared. In *S. bipunctata* (L.), *S. grossa* (C. L. Koch) and allied species the paracymbium is in a retrolateral position, TA 1 lacks an embolic furrow, the conductor is rounded, the embolar base lacks a process, and the embolic part is shorter. The epigyne is provided with a posterior sclerotised ridge, and anchoring grooves are absent.

*S. incomposita* and *S. albomaculata* are clearly closely related, as can be seen from corresponding palpal characters mentioned in the diagnosis given for *incomposita*, but also from the secondary characters present on the endites and chelicerae of the male. The form of TA 2 is apparently correlated with the development of the anchoring grooves in the epigyne. Presumably TA 2 anchors at these grooves during mating (Gertsch, 1960), as has been observed in *Crustulina* (Knoflach, 1994). Both species differ also in distribution: *S. albomaculata* has a large holarctic range, while *S. incomposita* is confined so far to the western Mediterranean region. It will be interesting to know, whether both are true vicariants and possibly sister species.

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