Nemesia sanzoi Fage, 1917 (Araneae, Nemesiidae): first description of the male and some additional information on the female, distribution and biology of the species

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Summary

The male of *Nemesia sanzoi* Fage, 1917, recently collected in Sicily, is described for the first time. Additional information on the morphology of the female is given, as well as new data on the distribution and biology of the species. The relationship of *N. sanzoi* to apparently related species is discussed.

Introduction

Of the forty-nine Mediterranean *Nemesia* species and subspecies, listed in Platnick's (2003) internet catalogue, eighteen (37%) have only one reference in the literature. Roewer's (1942) catalogue shows a somewhat similar list (40 *Nemesia* species and 6 subspecies named, 16 with only one reference, 35%). Bonnet's (1958) catalogue gives more references per species, including those in the other catalogues, but also has only two or three references for eleven out of 36 species (31%).

Various factors, all resulting from our poor state of knowledge of the genus *Nemesia*, seem to underlie this particular feature of the major araneological species lists. Lack of taxonomic revisions, problems of relating conspecific males and females, rich species diversity owing to strong regional endemism (Decae, in prep.), and poorly accessible or very limited collections available for study, all seem to contribute to the fact that many *Nemesia* species appear only once or a very few times in the literature. Our poor knowledge of *Nemesia* and many other Mediterranean spider groups (e.g. Thaler, 2000) is unfortunate because knowledge of species diversity is of growing importance, not only from a general scientific point of view, but also in relation to current efforts to advance nature conservation in the Mediterranean region (Decae & Cardoso, in prep.).

Nemesia sanzoi was described by L. Fage (1917) on the basis of five females collected near Girgenti (Agrigento), Sicily (Fig. 1). No new information on the species has since been reported and the name *N. sanzoi* only has one reference in the catalogues of Roewer (1942), Bonnet (1958) and Platnick (2003). In a recent collecting programme in the nature reserve "Zingaro" (Trapani), carried out by F. Di Franco and researchers from the University of Palermo, four males of *N. sanzoi* were collected, providing the opportunity to confirm the status of this species and to describe the male for the first time. The new information on the female morphology presented below is based on the study of two specimens, presumably of Fage's original collection (in the Museum National d'Histoire Naturelle, Paris), although no definite identification could be found.

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Material and methods

The four males of *N. sanzoi* were collected by F. Di Franco by hand and in pitfall traps two-thirds filled with acetic acid and 5% formalin; the traps, replaced every 15 days, were used for one year from July 2001. This material was studied and illustrated by A. E. Decae with the aid of a CETI-MEDO 2 stereomicroscope equipped with an ocular micrometer, a drawing mirror and a cold light source. All specimens were studied fully submerged in 70% ethanol, fixed in position by supporting them with entomological pins stuck in the polystyrene bottom of a small dish. Measurements of body parts were taken by positioning that part horizontally with respect to the microscope's objective and having both points of measurement simultaneously in sharp focus. The female spiders in the collection of the MNHN were studied in a similar way, but with the aid of a Leica MZ 125 microscope. Abbreviations used are largely standard in current arachnological literature (e.g. Raven, 1985; Goloboff, 1995). All measurements not being ratios are given in mm.

Nemesia sanzoi Fage, 1917 (Figs. 1–16, 18)

Nemesia sanzoi Fage, 1917: 483–484 (D♀).

Material examined: SICILY: *Trapani*: near Trapani, nature reserve "Zingaro", 3♂, pitfall traps, 30 August–15 September 2001; 1♂, hand-collected, 30 May 2003. *Agrigento*: near Girgenti, 2♀, presumably coll. Fage (MNHN AR4342, AR4345).

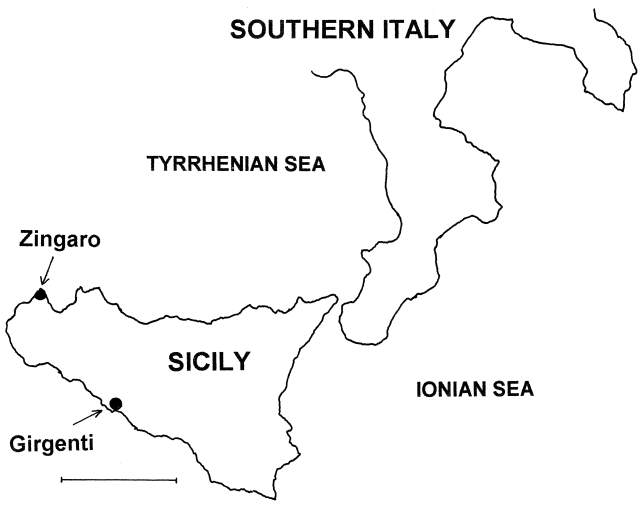
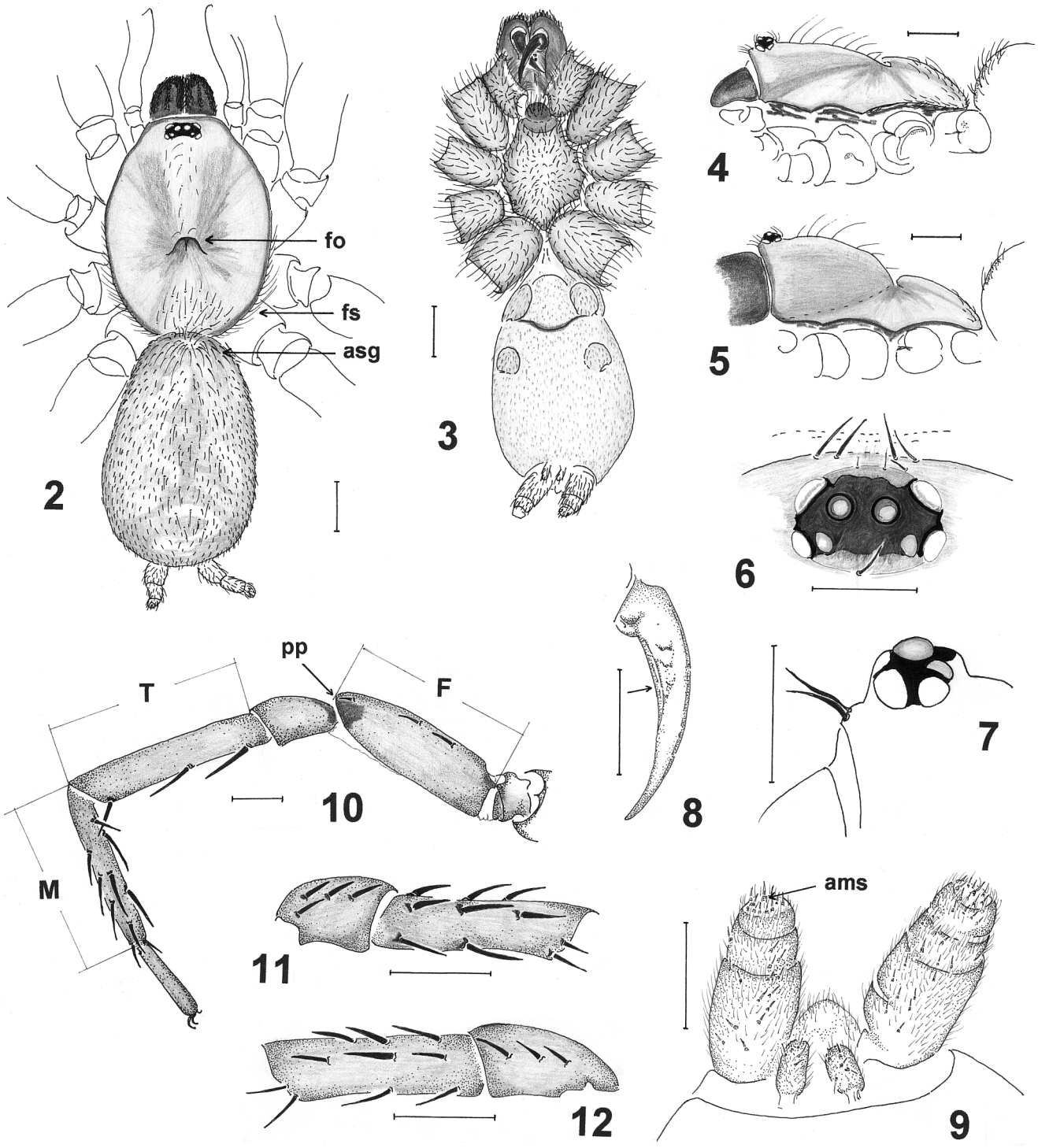


Fig. 1: Collection sites of *Nemesia sanzoi* in Sicily up to 2003. Scale line = 100 km.

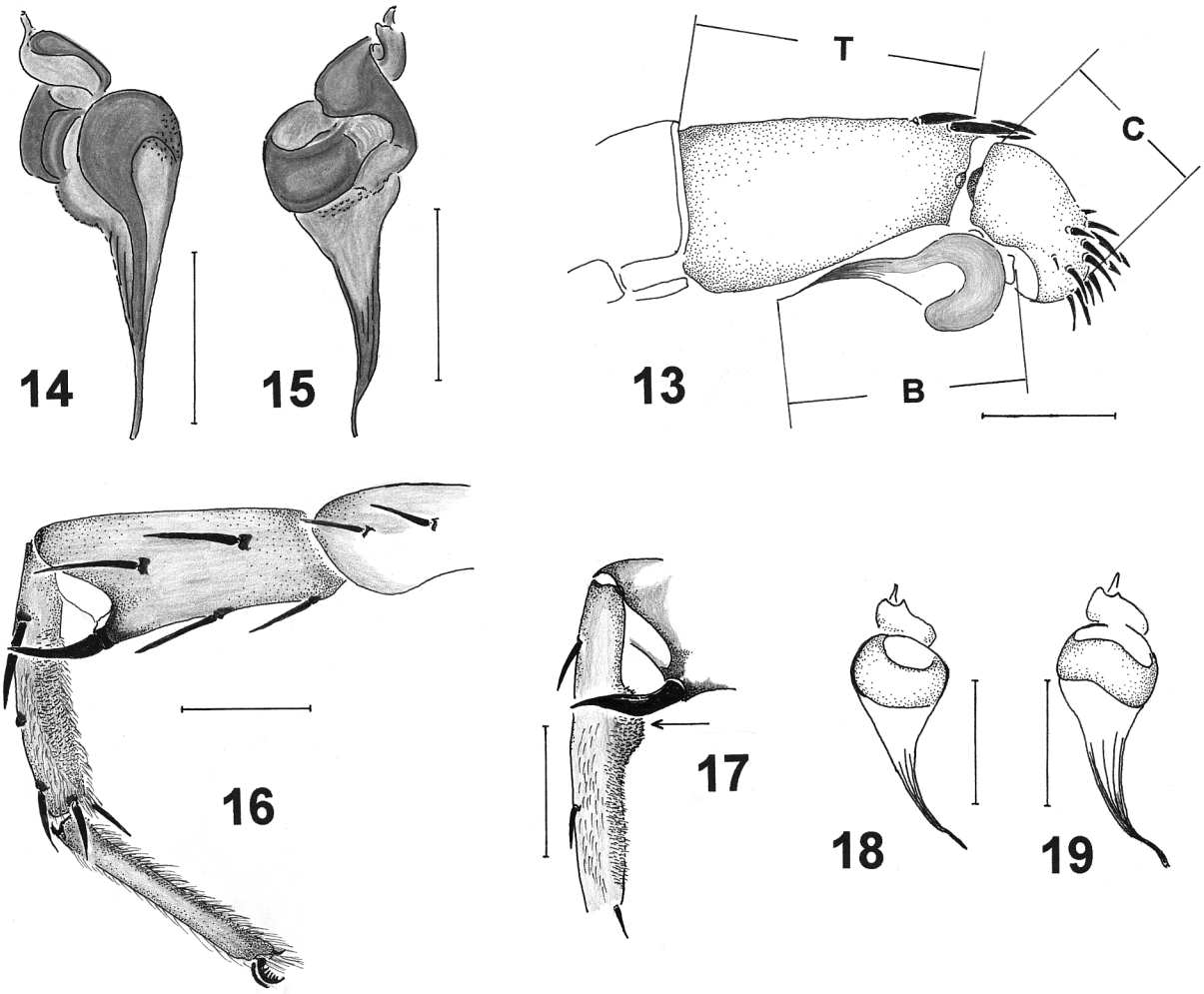
Diagnosis: *Nemesia sanzoi* is close to *N. maculatipes* (Doleschall), reported from Corsica and Sardinia (further research into the distribution of *N. maculatipes* is needed), but can be distinguished by the more slender and less sigmoid shape of both the tibial spur (Figs. 16–17) and the embolus (Figs. 18–19), the absence of a mammiform process in the clasper field ventrally on metatarsus I (Figs. 16–17; see also Simon, 1914: fig. 28), the absence of a dark pigmented patch prolaterally on the basal segment of the PLS in the male, and the usually T-shaped fovea (Fig. 2).

Description: *Male* (n=4): Total length 9.2–10.9. Carapace length 4.0–4.6, width 2.8–3.5. *Carapace* (Figs. 2–4): Length/width=1.34–1.41. Yellow with conspicuously dark border, cervical and radial grooves orange-brown, head region anteriorly and laterally greyish, dorsally lighter and yellowish. Crest of caput lighter than flanks and carries central longitudinal row of



Figs. 2–12: *Nemesia sanzoi*. **2** Male body, dorsal view (asg=abdominal setae group, fo=T-shaped fovea, fs=fringe setae); **3** Male body, ventral view; **4** Male carapace, lateral view; **5** Female carapace, lateral view; **6** Male eye-formation, dorsal view; **7** Ditto, lateral view; **8** Male fang, lateral view, showing smooth keel (arrow); **9** Male spinnerets, ventral view (ams=apical macro-spigot); **10** Male leg IV, prolateral view, showing relative lengths of metatarsus (M), tibia (T), femur (F), pp=pigmented patch (see text); **11–12** Variable spine patterns on patella and tibia III in one male, prolateral views. Scale lines=1.0 mm (2–5, 10–12), 0.5 mm (6–9).

bristles. Most of carapace covered with fine whitish grey pubescence. Setae on caput crest comparatively thin (stronger in most *Nemesia* species). Fringe setae (Fig. 2: fs) restricted to posterior edge of carapace (in males of some *Nemesia* species such setae are set along most of carapace edge). Caput low, clypeus narrow (Fig. 4). *Fovea*: Strongly recurved and usually (3 out of 4 specimens studied, and in the 2 females seen) with median longitudinal groove, giving "T-shaped fovea" (Fig. 2: fo). *Eyes*: In compact group, W/L = 1.79–1.96 (Fig. 6), on distinctly elevated process (Fig. 7). ALE generally largest; PME smallest but well developed. Periocular pigmentation unbroken (Fig. 6). Lateral eyes pearly, medians greyish (PME pearly in most *Nemesia* species). *Chelicerae*: Comparatively weak, uniformly brown, with dorsal and lateral glabrous zones equal in width. Setae, denticles, and scopulae typical for genus. Rastellum of 4–6 strong teeth along apex of basal segment. *Fang* (Fig. 8): Brown, sharp, with smooth ventral keel (in many *Nemesia* species ventral keel distinctly serrated). *Sternum* (Fig. 3): Uniformly yellow, with evenly distributed setae of different sizes, stronger along edges, comparatively weaker in middle. Three pairs of sternal slit-organs, anterior and middle pair oriented transversely, posterior pair longitudinally. One or two pairs of sigilla visible: anterior pair consists of marginally positioned oval patches opposite coxae II; posterior pair placed marginally between coxae III and IV. *Labial furrow* (Fig. 3): Broad, shallow, brown and fully glabrous. *Labium* (Fig. 3): Greyish brown, twice as wide as long, with shallow median invagination in anterior margin (heart-shaped labium), no cuspules, lateral setae stronger than median setae. *Maxillae* (Fig. 3): Yellowish brown, with small distal lobe and short row of 3–4 cuspules on anterior proximal edge. *Abdomen* (Figs. 2–3): Grey, with pattern of darker brown irregular patches and chevrons dorsally. Particularly strong setae grouped in dorsal anterior area (Fig. 2: asg), otherwise evenly covered with fine hairs and dispersed thin setae dorsally and fine hairs ventrally. *Spinnerets* (Fig. 9): Two pairs, PLS and PMS. Creamy white, evenly covered with fine hairs. PMS well developed (reduced, vestigial or absent in other *Nemesia* species), club-shaped, carrying several fine spigots. PLS with basal segment almost twice as long as median and distal segments together. Fine spigots evenly distributed over ventral surfaces of all three segments. Distal segment short, dome-shaped, with one apical macro-spigot



Figs. 13–19: **13–16, 18** *Nemesia sanzoi*. **13** Male palp, retrolateral view, showing spine pattern on tibia and cymbium, and ratio measurements on tibia (T), cymbium (C) and bulb (B) to distinguish *N. sanzoi* from *N. maculatipes*; **14** Palpal bulb, retrolateral view; **15** Ditto, prolateral view; **16** Male leg I clasper morphology, prolateral view; **18** Male palpal bulb, anterior view. **17, 19** *Nemesia maculatipes*. **17** Male leg I clasper morphology, showing mammiform process (arrow); **19** Male palpal bulb, anterior view. Scale lines = 1.0 mm (16–17), 0.5 mm (13–15, 18–19).

(Fig. 9: ams). *Trichobothria*: Typical for genus, all filiform. One zigzag line of trichobothria dorsally on tarsi and cymbium (distals longer than proximals), similar line formation on metatarsi but here broken up into two groups of longer distal and shorter proximal trichobothria (compact distal group and more elongated proximal group). Two roughly parallel rows dorsally on all tibiae. *Claws*: Paired claws with well-developed double rows of teeth, third claw smooth. *Legs*: All yellowish brown, grading from slightly darker proximally to lighter distally. Thin undivided scopulae on tarsi I and II (only few spiny setae ventrally in undivided scopulae). Ventral scopula on metatarsus I modified into clasper field of short stiff setae (Fig. 16). Ventral scopula on metatarsus II normally developed. Femur IV with distinct distal prolateral dark patch (Fig. 10: pp). Tibia IV longer than metatarsus IV, Ta/Mt = 1.11–1.17, femur IV and metatarsus IV equal in length (Fig. 10). *Spination*: Femora with three parallel dorsal longitudinal rows of spines, median row with five spines, both more lateral rows with fewer spines. Patellae with two prolateral spines on I and II, three or four on III (Figs. 11–12), none on IV; retrolaterally with no spines on I–II, one on III–IV; dorsally only patella III has two spines. Tibiae with no dorsal spines on I, II, IV, three longitudinal parallel rows of strong spines on III; longitudinal rows of spines ventrally, pro- and retrolaterally on all tibiae. Metatarsi with spines on all faces, particularly numerous on III and IV. Tarsi spineless except for one small dorsal prolateral spine in one specimen. *Palps*: Colour as legs, tibia with distal dorsal field of strong spines; shorter, weaker spines on cymbium dorsally and distally (Fig. 13). *Palpal bulb* (Figs. 14–15): With long, slender, slightly curved embolus ornamented with several fine longitudinal ridges. *Tibial spur* (Fig. 16): Spur on tibia I smoothly curved upwards, metatarsal clasper-field with only short stiff setiform structures.

Female ($n = 2$): Total length 14.0–15.5. Carapace length 5.3–5.4, width 4.1–4.3. *Remarks*: The study of Fage's specimens in the collection of MNHN showed that his 1917 description of the species is accurate and up to date. Here we provide some additional information on the characters that are of diagnostic importance in *Nemesia* taxonomy at the species level and that are not mentioned in Fage's original description. *Caput*: High, elevated well above thoracic region (Fig. 5), distinct from morphology of male. *Fang*: Smooth ventral keel as in male (Fig. 8). *Leg scopulae*: On legs I–II scopulae extend proximally over tibiae and patellae. *Spinnerets*: As described and illustrated for male (Fig. 9). *Spermathecae*: Unfortunately these parts were missing (lost) from the specimens studied, so no information on their structure can be given here.

Distribution

Nemesia sanzoi may be considered an endemic species of Sicily. The males described here were all collected in the nature reserve "Zingaro" (Trapani) and represent the second record of the species. The first record was that of Fage (1917) who collected five females near Girgenti (Agrigento). Figure 1 shows the locations where *N. sanzoi* has been found.

Biology

Fage (1917) reported that *N. sanzoi* builds a forked wafer burrow without an internal door, the side digging of which ends in a "cul-de-sac". Apparently this dead-ended burrow shaft acts as a refuge for the spider when threatened, because Fage found all his spiders there when he was digging-up the nests. Our new information indicates that this species prefers warm and dry habitats, sparsely covered with typical Mediterranean vegetation such as garigue, scrub and grassland. The specimens included in this study were collected from the following sites:

Near Trapani, nature reserve "Zingaro":

(a) Surroundings of the visitor centre (Scopello), 40 m a.s.l., rocky ground, Mediterranean garigue with dwarf palm (*Chaemerops humilis*): 30 August–15 September 2001, 2♂, pitfall traps.
(b) Path to Pizzo del Corvo (Scopello), 50 m a.s.l., rocky ground, grassland of *Ampelodesanos mauretanicus*, 30 August–15 September 2001, 1♂, pitfall trap.
(c) Contrada Uzzo (S. Vito Lo Capo), 30 m a.s.l., rocky ground, Mediterranean scrub with *Euphorbia arborescens*, *Crataegus anonogyna*, *Spartium junceum* and *Erica multiflora*, 30 May 2003, 1♂, hand-collecting.

Males of *Nemesia* species usually wander in search of females in late autumn (October and November) when the first heavy rains mark an end to the hot and dry Mediterranean summer. The behaviour of *N. sanzoi*, however, seems different. Three males were captured in pitfall traps in early September (between 30 August and 15 September), but the fourth male was collected at the end of May! It is very unusual to find *Nemesia* males in early summer, although R. Bosmans (pers. comm.) has collected 7 adult males of an as yet unidentified *Nemesia* species in April near Malaga, Spain.

In the area of the nature reserve "Zingaro" (Trapani), *N. sanzoi* appears to occur sympatrically with trapdoor spiders of the genus *Cyrtauchenius* Thorell, 1869.

Discussion

Nemesia sanzoi seems to be a member of a group of small *Nemesia* species (body lengths of adults between approx. 9 and 16 mm) that are distributed on the islands around the Tyrrhenian Sea. *Nemesia maculatipes* (Doleschall, in Ausserer, 1871) of Sardinia (also reported from Corsica (Simon, 1914)) is probably the best known of these species. The group may also include *N. albicormis* Simon, 1914, *N. arenicola* Simon, 1892, *N. corsica* Simon, 1914, *N. fertoni* Simon, 1914 and *N. kahmanni* Kraus, 1955, and maybe other species such as a recently found new species from Majorca (Decae, in prep.). New collections and revisions of these species are however needed in order to clarify the taxonomy, distribution and interspecific relationships within this group

of *Nemesia* species. Nevertheless, specimens labelled *N. maculatipes* in Simon's collection in the MNHN, studied in relation to *N. sanzoi*, allow a preliminary discussion.

Nemesia maculatipes is a very distinct species, immediately recognisable by the conspicuously dark brown pigmented patches on the external surfaces of leg and palp segments and on the basal segment of the PLS (*pedibus rufis, irregulariter fusco maculatis* in Doleschall's original description; see also Simon, 1914: figs. 23–24). *Nemesia athiasi* Franganillo, 1920 from Portugal is the only other species so far described that shows similar pigmented patches, but other aspects of its morphology suggest that it is not closely related to *N. maculatipes* (Decae & Cardoso, in prep.). However, *N. sanzoi* also shows traces of a similar pigment pattern as *N. maculatipes* and resembles this species in several other morphological characters. Particularly the broadly similar morphology of the bulb of the male palp (Figs. 18–19), ornamented with typical striae (fine ridges) on the embolus, provides a strong argument for relating *N. sanzoi* to *N. maculatipes* and probably also to *N. kahmanni* (see Kraus, 1955: figs. 3–4). Another character of diagnostic significance in *Nemesia* taxonomy at the species level on which *N. sanzoi* and *N. maculatipes* agree is the typical dark bordering of the carapace (also seen in several other *Nemesia* species, including some apparently more distantly related species such as *N. athiasi*, *N. unicata* Bacelar and *N. fagei* Frade & Bacelar from Portugal). The smooth ventral keel on the fang (contrary to Raven, 1985, not a diagnostic character at the genus level), the relative length of tibia IV (longer than both metatarsus IV and femur IV), the strong development of the PMS and their furnishing with several fine spigots, the one macro-spigot on the apex of the distal segment of the PLS, and the presence of three or more prolateral spines on patella III are all characters of diagnostic value in *Nemesia* in which *N. sanzoi* and *N. maculatipes* are similar. The comparatively small size of adult spiders (9.0–15.5 in *N. sanzoi*; 9.0–13.5 in *N. maculatipes*) is another character in which the two species agree. They can, however, be distinguished by the characters described in the diagnosis.

As an additional distinction between the males of *N. sanzoi* and *N. maculatipes* the relative lengths of the bulb, cymbium and palpal tibia (Fig. 13) may be of significance. In *N. sanzoi* ($n=4$) it was found that T/B varies from 1.2 to 1.4 and C/B=0.6, whereas in *N. maculatipes* ($n=1$) T/B=1.5 and C/B=0.8; however, the small sample size and probable variation prevent any firm conclusions at this stage.

Unfortunately no information on the morphology of the spermathecae of either species could be obtained. Considering the morphological differences described here, however, we regard the two species as distinct and *N. sanzoi* to be endemic to Sicily.

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