

A new wolf spider of the genus *Alopecosa* Simon from Greece (Araneae: Lycosidae)

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Summary

A new species of lycosid spider, *Alopecosa dryada*, new species, has been discovered in montane woodlands of Greece. In general appearance the living male resembles that of *Alopecosa taeniata*. The female resembles *A. pulverulenta*. The male copulatory organ of the new species shows similarities to those of the *pulverulenta* species group but differs from these by having an acute projection at the tip of the tegular apophysis. In the female epigynum the posterior part of the T-shaped septum is considerably wider than the corresponding part in females of the *pulverulenta* group. *A. dryada* inhabits montane woodlands at elevations around 1000 m above sea level and higher, and matures in May–June. The new species shows some resemblance to members of the *pulverulenta* group as well as to certain *Alopecosa* species described from Asia.

Introduction

Since the revisionary work of Lugetti & Tongiorgi (1969), the wolf spider species of the genus *Alopecosa* have been comparatively well known in Europe. Some of the remaining taxonomic uncertainties have been clarified in the following years: Kronstedt (1979, 1990) as regards *Alopecosa taeniata* (C. L. Koch) being a distinct species, Dahlem *et al.* (1987) and Cordes & v. Helversen (1990) regarding the distinction between *Alopecosa accentuata* (Latreille) and *A. barbipes* (Sundevall). A complete revision of the *A. accentuata* group is in preparation (Cordes, in prep.). As most of the scientific work was done in Central and Northern Europe, it is not surprising that new species can still be found in the more southern parts of the continent. The species described here seems to be very abundant in Greece, and perhaps in the whole eastern Mediterranean region. It was discovered while observing the courtship behaviour of the males. A subsequent morphological study revealed clear structural differences from all known *Alopecosa* species.

Alopecosa dryada, new species (Figs. 1–3)

Etymology: The species name refers to a fabulous figure in Greek mythology — a nymph living in the woods.

Types: Holotype male, Thessalía, Nomos Tríkala, Katára-Pass, beech wood, 1450 m (leg. as subadult, raised to adult stage), 9 June 1993 (H. Braun, A. Horstmann, F. Neuhäuser-Wespy & M. Steger leg.; Coll. Cordes). Paratypes: 13 adult ♂♂, 7 adult ♀♀ (all leg. as subadults), same data. All will be deposited in Naturhistorisches Museum, Basel.

Diagnosis: The general habitus of the male is characterised by the narrow median band on the opisthosoma (Fig. 1), present in all collected specimens. The male looks similar to that of *Alopecosa taeniata*, but the forelegs are darkened up to the proximal half of the tibia. Females and immatures resemble those of *A. pulverulenta* (Clerck). The major differences can be found in the morphology of the copulatory organs (Fig. 2a–c). In the male bulb the tip of the tegular apophysis has an acute projection (Fig. 2a,b). This character is easy to see when looking along the ventral side of the palp from the tip of the cymbium (Fig. 2b). The female epigynum is comparatively small (Fig. 3b) and differs from epigynes of species in the *pulverulenta* group by having the anterior narrow part of the median septum connected directly to the border of the anterior cavity of the epigynum (Fig. 2c) instead of reaching under it as in the *pulverulenta* species group.

Description: **Male holotype:** Prosoma 4.3 mm long, 3.1 mm wide, dark (Fig. 1); median band narrow with parallel borders, with contrasting white hairs in living specimen; narrow lateral band of white hairs; pars cephalica more extended than usually found in the genus (Fig. 1). Sternum dark brown. Opisthosoma dorsally dark with median band narrow and light greyish; lateral markings near cardiac mark more or less reduced or dark, variable. Venter light brown. Legs yellowish with

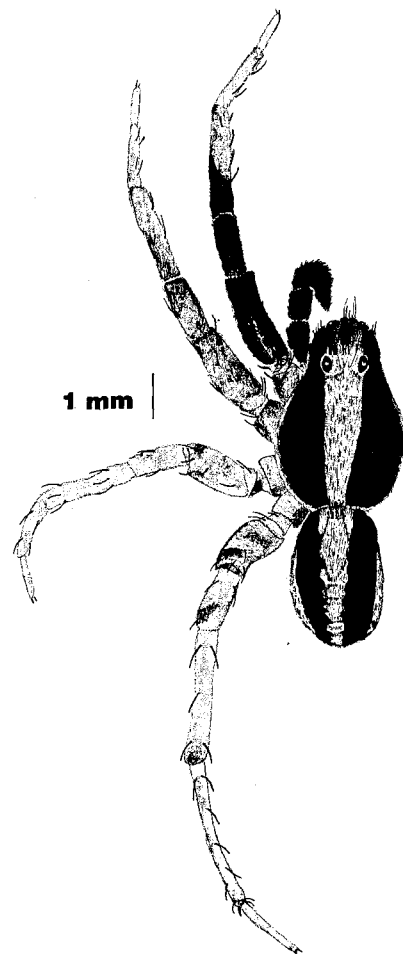


Fig. 1: *Alopecosa dryada*, new species. Habitus of living male spider (paratype).

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reduced annulations; femora, patellae and proximal half of tibiae of leg I dark brown to black, densely covered with short black hairs, annulations not visible. Coxae light, yellowish. Measurements, see Table 1. Palp (Fig. 2a) darkened, tibia and cymbium covered with black hairs. Tegular apophysis (Fig. 2b) in general shape similar to that of all members of the *pulverulenta* group but characterised by an acute projection at its tip.

Female paratype: Prosoma 5.2 mm long, 3.6 mm wide, medium to dark brown; median light band with parallel borders, covered with lighter hairs; lateral band indicated by spots of light hairs. Sternum dark brown. Opisthosoma dorsally brown with considerable variation in pattern; median band only slightly indicated by thin dark lines, with interior distinctly lighter brown bordered by dark spots. Venter light brown. Legs yellowish brown, annulated. Measurements, see Table 1. Epigynum (Fig. 2c) comparatively small, median septum T-shaped, anterior part of septum connected directly to rim of anterior pocket, dividing epigynum into two clearly separated cavities.

Morphometry: Fig. 3 shows morphometric data on the prosoma length and the length of the epigynum, tibia I and tibia IV relative to prosoma length. The measurements of *A. dryada* are compared with four members of the *A. pulverulenta* group from Swedish populations (cf. Kronstedt, 1990) and populations from Austria and Germany (Fig. 3b in part., Coll. Cordes). The large difference in prosoma length between males and females of *A. dryada* (Fig. 3a) is noteworthy. This character ($\text{♀ length} - \text{♂ length}$) differs significantly between the new species (mean: 0.92 mm) and the members of the *pulverulenta* group (mean: 0.53 mm for *A. taeniata*, 0.43 mm for *A. pulverulenta*, 0.36 mm for *A. aculeata* (Clerck) and 0.26 mm for *A. cuneata* (Clerck); Student's t-test: $p \leq 0.01$ for all *pulverulenta* group species tested against *dryada*). While males of the new species have almost the same prosoma length as *A. aculeata* and *A. taeniata* (see

	Fe	Pa	Ti	Mt	Ta	Total
Male						
Leg I	3.2	1.5	2.7	2.8	1.8	12.0
Leg II	3.0	1.4	2.5	2.9	1.6	11.4
Leg III	2.9	1.4	2.2	3.2	1.5	11.2
Leg IV	3.7	1.6	3.1	4.7	2.0	15.1
Female						
Leg I	3.5	1.9	2.7	2.7	1.7	12.5
Leg II	3.5	1.8	2.5	2.6	1.6	12.0
Leg III	3.3	1.6	2.4	3.0	1.5	11.8
Leg IV	4.3	1.8	3.6	4.9	2.2	16.8

Table 1: *Alopecosa dryada*, leg measurements of male holotype and female paratype.

dotted line, Fig. 3a), the females are comparatively much larger than females of the latter two species. The ratio of epigynum length to prosoma length is smallest in *A. dryada* compared with that in the other four species (Fig. 3b). Also quite different is the relative tibia length of *A. dryada* males compared with the males of the four *pulverulenta*-group species. *A. dryada* males have the longest fore and hind tibiae in relation to their prosoma length. The closest corresponding values to the new species are those of *A. taeniata*, the males of which have almost the same prosoma length (Fig. 3a,c). Differences in leg length of females are generally not so striking; however, the five species may be divided into two groups, one with relatively long tibiae (*A. dryada*, *aculeata*, *taeniata*) and one with relatively short tibiae (*A. pulverulenta*, *cuneata*) (Fig. 3c,d). The dotted lines in Fig. 3c,d mark the values for *dryada* females, which lie close to the relative tibia length values of *taeniata* and *aculeata*, especially for tibia IV. In contrast, *A. pulverulenta* and *cuneata* females have relatively short fore and hind tibiae.

Material examined: GREECE Thrákiá, Nomos Kavála, oak wood (800 m), 2♂♂, 18 June 1972, O. v. Helversen leg. (Coll. v. Helversen); Peloponnissos, Nomos Messiniá, near Bassai (1100 m), oak wood, 5♂♂ subad., 1♀ subad., ♂♂ raised to adult stage, 4 April 1992 (D. Cordes leg. & Coll.); Thessaliá, Nomos Tríkala, Katára-Pass, beech wood (1450 m); 1♂ subad., 1♀ subad., ♂ raised to adult stage, 27 April 1992 (D. & B. Cordes leg. & Coll.); Peloponnissos, Nómoos Ahaíá, Taygetos-Oros, pine wood at 1000 m near village Ilias, 1♂, 6/7 June 1993 (H. Metzner leg./Coll.).

Ecology: All specimens were found in montane woodlands around and over 1000 m above sea level. The type locality is a montane beech wood with different exposures to the sun (NE to SE). The spiders at the locality near Bassai were found in an oak wood. Pine wood also belongs to the range of preferred habitats. Specimens were mostly collected at the borders of wood patches while running among the leaf litter. The collecting data indicate that the period of maturity is in June and July. All specimens collected in April were subadult or immature and their final moult occurred in June. Because all spiders found at one time were of approximately the same age, the species can be expected to have a one-year life cycle. The species was found to be associated with *Pardosa alacris* C. L. Koch (*sensu* Kronstedt, 1992), an undescribed species of the

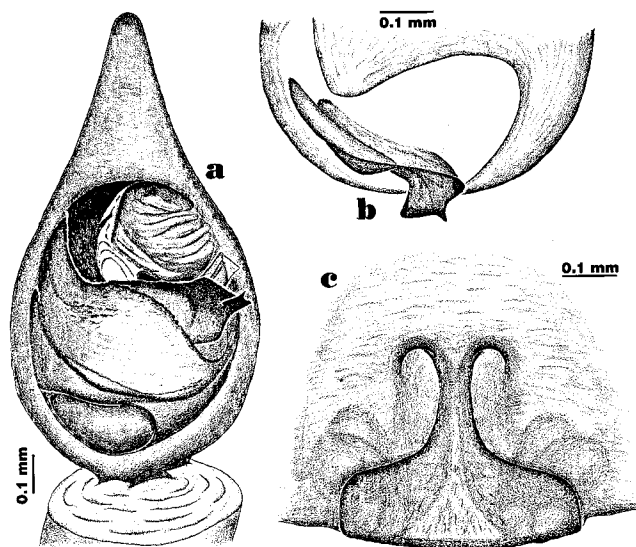


Fig. 2: *Alopecosa dryada*, new species. **a** Right palp of male holotype, ventral view; **b** Tegular apophysis of same palp, view from distal tip of cymbium to show typical shape of tegular apophysis with its acute projection; **c** Epigynum of female paratype, ventral view.

Pardosa lugubris (Walck.) group (Töpfer-Hofmann & v. Helversen, in prep.) and *P. hortensis* (Thorell), three species of wolf spiders that seem to be common in oak and beech woodlands in the south-eastern European and Mediterranean region.

Relationships: The new species may be compared with representatives of the *Alopecosa pulverulenta* group as well as with species from Asia described by Schenkel (1953, 1963). Some of the Asian species show similarities that strongly indicate an affinity to *A. dryada*. The new species may be regarded as a bio-species; behavioural experiments regularly resulted in copulations.

***Alopecosa pulverulenta* group:** One major difference in *A. dryada* is the shape of the male prosoma with its strongly extended pars cephalica, indicated in Fig. 1. A further difference can be seen in the shape of the tegular apophysis with the projection at its tip. The front legs of the male are characterised by dark coloration, similar to *A. pulverulenta*, *A. aculeata* and *A. taeniata*. The difference in *A. dryada* is that the proximal half of the tibia is also darkened, in contrast to *A. taeniata*, whose tibiae are hardly darkened at all, and *A. aculeata* and *A. pulverulenta*, whose tibiae are almost completely dark-

ened. The female of *A. dryada* differs mainly in the connection of the anterior part of the median septum of the epigynum to the rim of the anterior cavity. This structural character stands in contrast to all species of the *pulverulenta* group.

Schenkel (1963) describes *Tarentula potanini* [= *A. sibirica* (Kulczyński, 1908) *sensu* Song, 1986] and *T. kratochvili* from East Asia. These species, although larger, also have a projection at the end of the tegular apophysis. The similarity in the shape of the tegular apophysis shows that related species may occur in central Asia. Forms related to *A. dryada* can also be found among species described by Schenkel only from females: *Tarentula licenti* (1953), *T. orbiculata* (1963) and *T. bipennis* (1963) [Both *A. orbiculata* and *A. bipennis* were placed as synonyms of *A. licenti* by Song (1986)]. In general, the epigyna of these species look very similar but show distinct differences in the shape of the T-shaped median septum and the proportions of the cavities. The general appearance of *A. dryada* is, in my opinion, more related to these species than to the *pulverulenta*-type epigynum. No record of other similar forms has been published from eastern Asia (Paik, 1988; Song, 1986; Tanaka, 1987).

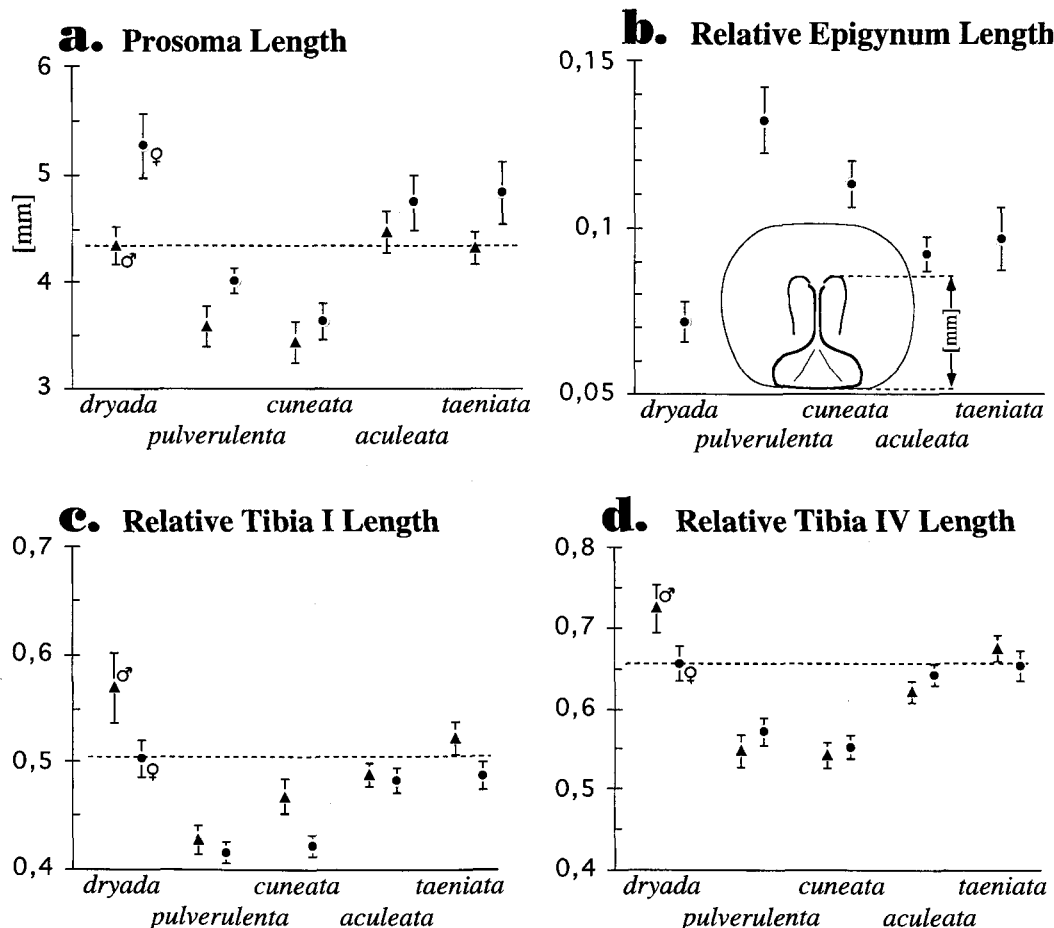


Fig. 3: Morphometry: All measurements are given with arithmetic mean and standard deviation (\pm SD). In the graphs showing the data relative to body length, all measurements were calculated in [mm]. **a** Prosoma length of *A. dryada* and four species from *pulverulenta* group: sexual dimorphism is most pronounced in the new species; **b** Relative epigynum length (epigynum length/prosoma length): *A. dryada* has the smallest epigynum; **c, d** Comparison of tibia I and tibia IV length relative to prosoma length: tibiae I and IV of *A. dryada* males are the longest compared with the other species. In females the five species can be divided into two groups having similar values, *A. dryada*, *aculeata* and *taeniata* with comparably long tibiae and *A. pulverulenta* and *cuneata* with short tibiae. Morphometric data on the *pulverulenta* group species are taken from populations from Sweden (cf. Kronstedt, 1990), Austria and Germany (Coll. Cordes).

Alopecosa species with relatively complicated tegular apophysis tips have also been found in the fauna of the Macaronesian Islands (see Wunderlich, 1991). The female genitalia also show some resemblance to the new species; but all of these species appear to have a completely different habitus — with annulate legs in males, and specimens have significantly larger or smaller body lengths.

A clear decision as to which species group *A. dryada* should be placed in cannot yet be made. On one hand the habitus and leg lengths are close to those of *A. taeniata* and *A. aculeata*; but this may be an adaptational trait correlated with the similar preferred micro-habitat structure in the three species. Additionally, the male bulb shows considerable similarities to those of the *pulverulenta* group. However, the descriptions of the Asian species show that there may be more forms with a tegular tip similar to *A. dryada*, so this species may be a member of a poorly known *Alopecosa* group occurring mainly in central Asia.

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References

- CORDES, D. & HELVERSEN, O. von 1990: Indications for the existence of *Alopecosa barbipes* (Sundevall 1832) as a "sibling species" to *Alopecosa accentuata* (Latreille 1817). *Bull. Soc. europ. Arachnol.* **1**: 70–74.
- DAHLEM, B., GACK, C. & MARTENS, J. 1987: Balzverhalten von Wolfspinnen der Gattung *Alopecosa*. *Zool. Beitr. (N.F.)* **31**(2): 151–164.
- KRONSTEDT, T. 1979: Etologiska karaktärer vid taxonomiska studier av vargspindlar. *Ent. Tidskr.* **100**: 194–199.
- KRONSTEDT, T. 1990: Separation of two species standing as *Alopecosa aculeata* (Clerck) by morphological, behavioural and ecological characters, with remarks on related species in the *pulverulenta* group (Araneae, Lycosidae). *Zoologica Scr.* **19**(2): 203–225.
- KRONSTEDT, T. 1992: The identity of *Pardosa alacris* (C. L. Koch 1833) (Arachnida: Araneae: Lycosidae). *Senckenberg. biol.* **72**(1/3): 179–182.
- LUGETTI, G. & TONGIORGI, P. 1969: Ricerche sul genere *Alopecosa* (Simon) (Araneae, Lycosidae). *Atti Soc. tosc. Sci. nat. (B)* **76**: 1–100.
- PAIK, K. Y. 1988: Korean spiders of the genus *Alopecosa* (Araneae: Lycosidae). *Korean Arachnol.* **4**(2): 85–111.
- SCHENKEL, E. 1953: Chinesische Arachnoiden aus dem Museum Hoangho-Peiho in Tientsin. *Bolm. Mus. nac. Rio de J. (N.S., Zool.)* **119**: 1–108.
- SCHENKEL, E. 1963: Ostasiatische Spinnen aus dem Muséum d'Histoire Naturelle de Paris (suite et fin). *Mém. Mus. natn. Hist. nat. Paris (N.S.) (A, Zool.)* **25**(2): 289–481.
- SONG, D. X. 1986: A revision of the Chinese wolf spiders of the genus *Alopecosa* described by Schenkel (Araneae: Lycosidae). *Sino-zool.* **4**: 73–82.
- TANAKA, H. 1987: A newly recorded species of the genus *Alopecosa* Simon 1885, (Araneae: Lycosidae) from Japan. *Atypus* **89**: 17–19.
- WUNDERLICH, J. 1991: Die Spinnen-Fauna der Makaronesischen Inseln. Taxonomie, Ökologie, Biogeographie und Evolution. *Beitr. Araneol.* **1**: 1–621.