

Indications for the existence of *Alopecosa barbipes* (Sundevall 1832) as a 'sibling species' to *Alopecosa accentuata* (Latreille 1817) - Results of morphological, ethological and biogeographical studies

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At least since DAHL (1908) the two species *Lycosa accentuata* LATREILLE 1817 and *Lycosa barbipes* SUNDEVALL 1832 were regarded as synonyms. As a result of his studies DAHL (1908) assumed differences in characters such as the tibial hair-brush of the first leg in *Lycosa barbipes* lying within biological variability of one species. Therefore he took the name *accentuata* as a synonym of *barbipes* and used *barbipes* as valid name for the species because the description of SUNDEVALL 1832 was much more detailed. According to SUNDEVALL (1833) DAHL placed this species into the genus *Tarentula*. Later authors (SIMON 1937, TONGIORGI 1969) adopted the synonymy of *Tarentula accentuata/barbipes*, but followed LATREILLE (1817) and SIMON (1885) taking *Alopecosa accentuata* as the valid name for the species. First critical comments on this synonymy were published by DAHLEM et al. (1987).

Our investigations on a larger material of *Alopecosa 'accentuata'* from southern and northern Germany showed that two different forms, in morphological as well as in ethological characters, do exist. These two forms should be regarded as two different species, as a pair of 'sibling species'.

Although the studies are not yet accomplished, the main differences to distinguish between the two species will be described below.

MORPHOLOGY

Up to now more than 500 specimen of *Alopecosa 'accentuata'* from Museum- and private collections have been reviewed and led to the following diagnosis. In contrast to DAHL's opinion (1908) all the male specimen could be classified into two distinct morphological groups.

Males (alive):

Mature male individuals are well distinguishable with help of characters of their general outer appearance and coloration. The body of *Alopecosa barbipes*-males is covered with dark hairs and a light median band dorsally on the prosoma and opisthosoma; in general it resembles males of the *Alopecosa pulverulenta* group. *Alopecosa accentuata*-males are of light colour with narrow dark markings dorsally on prosoma and opisthosoma. Despite a great variability these characters of coloration were always species-specific so that identification was always possible. Unfortunately most specimen preserved in alcohol loose most of their typical coloration patterns.

The difference always remaining for distinguishing between the two species is the existence or absence of the tibial hair-brush at the ventral side of the first leg. The front-leg of *A. barbipes* has been described and drawn in LOCKET & MILLIDGE (1951) (see *Tarentula barbipes*).

Females:

In preserved individuals determination of female Alopecosa accentuata and A.barbipes was almost impossible, because the only difference (the whole body of living Alopecosa accentuata-females is covered with light hairs) between the species gets lost. A certain identification of both species therefore is only possible with collected males.

Genitalia are quite similar and up to now cannot serve as a taxonomic tool.

COURTSHIP BEHAVIOUR

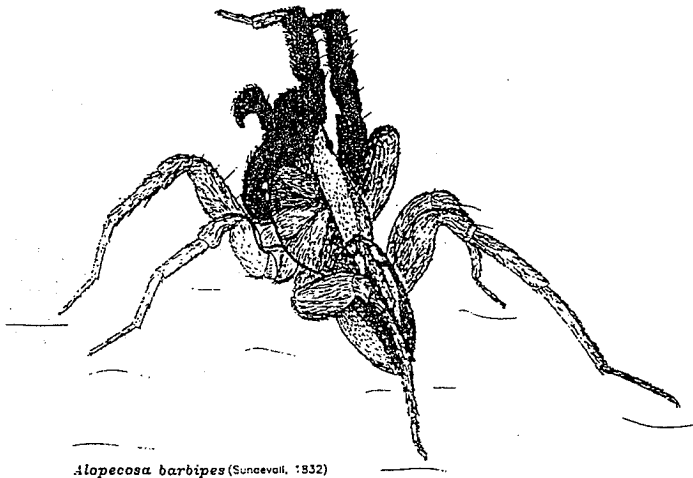


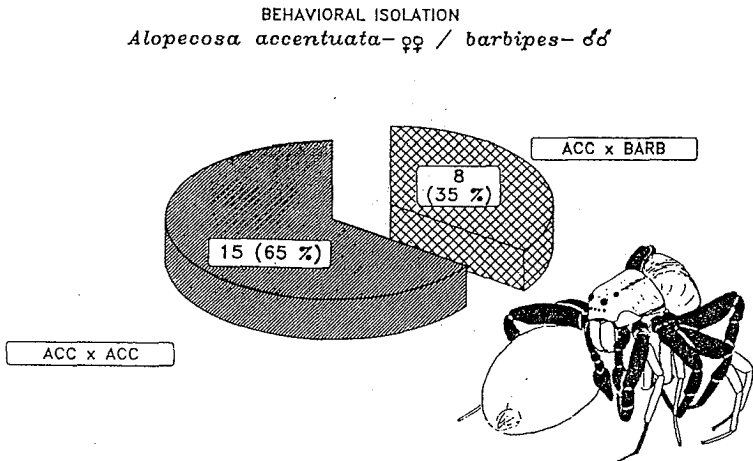
FIG. A Main courtship posture of the male

Detailed studies on the courtship behaviour show striking differences in display attitudes as well as in quantitative parameters of behaviour. Especially one movement is of taxonomic value: During their courting walk A.barbipes-males rise their cephalothorax and lift their front-legs high above the body. So the darkened parts of cephalothorax and front-legs are emphasised (see FIG. A). In accentuata-males the homologous posture is much less distinctive (see DAHLEM et al. 1987).

BEHAVIOURAL ISOLATION

Behavioural isolation of the two species was investigated by using a crossing experiment, so far only in one direction. Virgin accentuata-females were confronted with a heterospecific male and the male was allowed to court at least 10-15 times in direct contact to the female. If the female accepted copulation the test was counted as 'acceptation'. If the male was rejected, it was removed and exchanged for a conspecific one. Only if the female accepted this male for copulation, this test was regarded as 'rejection' of the heterospecific male.

In 23 experiments the females rejected in only 15 cases and accepted the barbipes-male in 8 cases.



GEOGRAPHIC DISTRIBUTION

Geographic distribution pattern indicate that the two species are geographically separated, possibly by differences in climatic conditions. In Germany Alopecosa barbipes is living in open heathlands of the atlantic north, Alopecosa accentuata is inhabiting open dry and warm areas of the middle high mountains of southern and central Germany. Syntopic or sympatric occurrence is not yet found. Few data indicate the following distribution pattern: POLAND (accentuata and barbipes), CZECHOSLOVAKIA (accentuata), HUNGARY (accentuata), AUTRICHE (accentuata), SWITZERLAND (accentuata), FRANCE (accentuata and barbipes), BELGIUM (accentuata and barbipes), NETHERLANDS (barbipes), GREAT BRITAIN (barbipes) and SCANDINAVIA (barbipes). So A.barbipes seems to be restricted to regions with oceanic climate, while A.accentuata inhabits the central part of Europe with more continental climate.

PHENOLOGY

Although the life-cycle of both species is lasting for a one year period, great differences were observed concerning the mating season.

Alopecosa barbipes seems to be 'diplochrone' (def.: DAHL 1923 / TRETZEL 1954; see also MERRETT 1968). The individuals grow mature in late August or September. They are active and mate up to the beginning of the cold season, overwinter and in most years mature males and females can be found until spring and summer of the following year. Alopecosa accentuata is a stenochrone species, the mating period lasting from March to May. In Central Europe mature Alopecosa accentuata-males were never found in late summer or autumn. Mature females do occur until July the same year.

CONCLUSIONS

According to MAYR (1975) A.accentuata and A.barbipes can be classified as parapatric sibling species. Data available at present indicate a geographical separation of populations of both species. Separation seems to be supported by premating isolating mechanisms including differences in mating season, habitat preferences and - to some extent - an ethological isolation. Taxonomical identification of living males is possible with help of the general outer appearance and the black tibial hair-brush on the front-legs, always present in A.barbipes, always absent in A.accentuata. Also the main courtship posture shows great differences between the species and allows determination. Mature male individuals, found in autumn will belong to A.barbipes.

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