

Some observations of taxonomic importance on the family Chernetidae (Pseudoscorpiones)

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Introduction

The family Chernetidae is represented in the British fauna by six genera (*Lamprochernes*, *Pselaphochernes*, *Allochernes*, *Toxochernes*, *Chernes* and *Dendrochernes*) totalling ten species (Evans and Browning, 1954). Four of these genera are represented by single species, *Lamprochernes* and *Allochernes* each by three species.

Evans and Browning's (1954) generic key to this family has been corrected and modified by Vachon (1957). The latter separates the British genera by a number of characters included among which are the absence or presence or position of tactile setae (= "poil tactile ou pseudotactile" of Vachon) on the various podomeres of legs III and IV, and the form of the female spermathecae. The use of his key depends partly on the following observations:—

1. Single tactile seta present on each of femur 2 (pars tibialis), tibia and tarsus of legs III and IV in the genus *Lamprochernes* (Fig. 1 (a)).

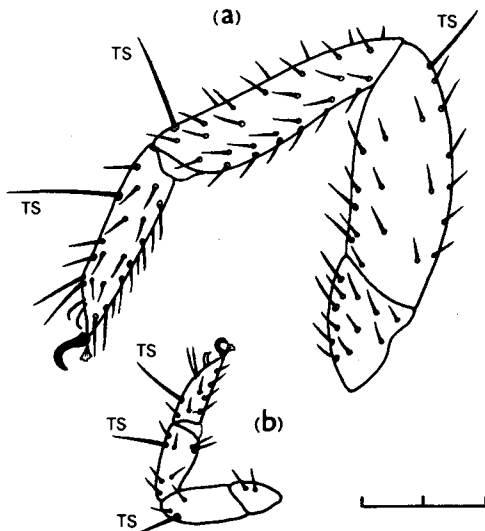


Fig. 1. *L. nodosus*. Leg IV. (a) male (b) protonymph. (TS = tactile seta) (Scale: 1 division = 0.1 mm)

2. Single tactile seta present only on the tarsus of legs III and IV in the genera *Pselaphochernes*, *Toxochernes* and *Dendrochernes*. Separation of these genera depends, in part, on the position of the tactile seta on tarsus IV, medial in *Pselaphochernes* (Fig. 2(a)) and distal in *Toxochernes* (Fig. 3(a)) and *Dendrochernes*.

3. Single tactile seta absent from any of the podomeres of legs III and VI in the genera *Allochernes* and *Chernes*.

It must be emphasised that Vachon's (1957) generic key applies only to adults of British species. Some characters used are not valid generically in the wider context of the European fauna. For instance Vachon indicates that *Chernes rufeolus* (Simon) has, whereas *Toxochernes montigenus* (Simon) has not, a tactile seta on tarsus III and IV.

The purpose of this paper is firstly, to express in quantitative terms the position of tactile setae on the podomeres, and secondly, to extend this analysis to all the post-embryonic stages in order to assess the value of such characters in keys to the nymphs of species of Chernetidae.

Materials and Methods

All post-embryonic stages, protonymphs, deutonymphs, tritonymphs and adults, of three species, *Lamprochernes nodosus* (Schrank), *Pselaphochernes scorpioides* (Hermann) and

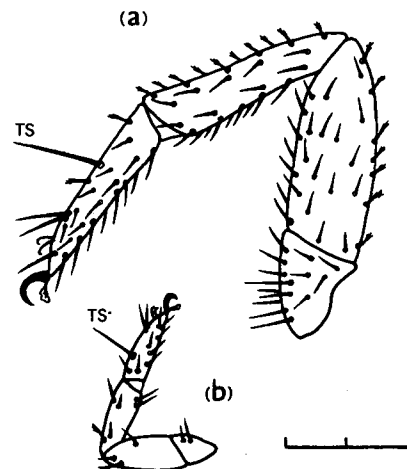


Fig. 2. *P. scorpioides*. Leg IV. (a) female (b) protonymph. (TS = tactile seta) (Scale: 1 division = 0.1 mm)

Toxochernes panzeri (C. L. Koch) have been examined.

The legs of each of fifteen specimens of all stages of these three species were removed and mounted in Berlese's fluid (containing 33% chloral hydrate) with the single exception of the protonymphs of *P.scorpioides* where only eight were available for study. Measurements were taken with a filar eyepiece.

The position of tactile setae on each of the podomeres of legs III and IV is expressed in terms of a ratio. This ratio a/b , here designated as the TS ratio, is calculated by dividing the distance (a) of the tactile seta from the proximal end of the podomere by the total length (b) of the podomere. It corresponds, in definition, to the Tm ratio quoted for the position of the trichobothrium on the metatarsus of the Linyphiidae (Araneae). Thus ratios of 0 and 1 represent, respectively, tactile setae placed extreme proximal and extreme distal.

The only British representative of another genus carrying a tactile seta on the tarsus, *Dendrochernes cyrneus* (L.Koch), has not been available for study. However, it is relevant to note that all stages of *Allochernes dubius* (O.P.-Cambridge), *Allochernes wideri* (C. L. Koch) and *Chernes cimicoides* (Fabricius) have been examined and tactile setae are not present on any of the podomeres of legs III and IV in any of the nymphs or adults.

Results

Tactile setae occur distally on femur 2 and tibia of legs III and IV in all stages of *L.nodosus*. On both appendages the TS ratios are very similar, for the corresponding stages, and, in addition, each shows a similar progression (Table 1). The average protonymphal TS ratios are lower than those of the adults and thus the tactile seta on tibia IV is placed within the distal third of the podomere in protonymphs (Fig. 1(b)) rather than within the distal tenth in adults (Fig. 1(a)). The corresponding TS ratios for deutonymphs and tritonymphs are intermediary (Table 1).

Tactile setae occur on the tarsi of legs III and IV of all stages of *L.nodosus*, *P.scorpioides* and *T.panzeri*. For each species the TS ratios are very similar on each of the legs for the corresponding stages (Table 2). In both *P.scorpioides* and *T.panzeri* the tactile seta is placed more proximal in protonymphs (Figs. 2(b) and

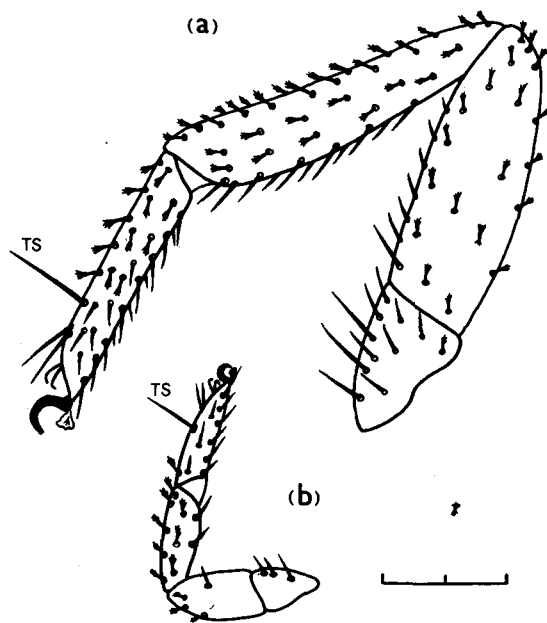


Fig. 3. *T.panzeri*. Leg IV. (a) female (b) protonymph. (TS = tactile seta) (Scale: 1 division = 0.1 mm)

3(b)) than in adults (Figs. 2(a) and 3(a)) and the intervening deutonymphal and tritonymphal TS ratios illustrate this distal progression (Table 2). However in protonymphs the tactile seta on tarsus III and IV (Table 2) is placed more proximal in *P.scorpioides* (Fig. 2(b)) than in *T.panzeri* (Fig. 3(b)) and thus eventually in adults the tactile seta lies within the proximal half in *P.scorpioides* (Fig. 2(a)) but within the distal third (approximately) in *T.panzeri* (Fig. 3(a)). By contrast, the tactile setae on tarsus III and IV of *L.nodosus* occupy the same relative positions (Table 2), approximating to the proximal third of the podomere in all stages (Figs. 1(a) and 1(b)).

Discussion

The post-embryonic stages of pseudoscorpions can be easily determined by the number of trichobothria carried on the movable and fixed fingers of the pedipalpal chela: 1 and 3 in protonymphs, 2 and 6 in deutonymphs, 3 and 7 in tritonymphs and 4 and 8 in adults respectively. Difficulties arise in allocating nymphal stages to genera and species. The present study gives rise to some optimism in the eventual solution of this problem.

For instance, the distinction made in couplet 1 of Vachon's (1957) key between adults of the genus *Lamprochernes* and the remaining genera of the family applies to all nymphs of *L.nodosus*. Thus a chernetid nymph possessing tactile setae on femur 2, tibia and tarsus of legs III and IV could probably be allocated to the genus *Lamprochernes*. Confirmation is needed from a study of all stages of the remaining British species of this genus, *Lamprochernes godfreyi* (Kew) and *Lamprochernes chyzeri* (Tömösvary). In addition the constancy of the TS ratios on tarsus III and IV of *L.nodosus* may well be of taxonomic significance.

In the same way the absence of tactile setae on tarsus III and IV, an important distinction at couplet 2 in Vachon's (1957) key to separate *Allochernes* and *Chernes* from the remaining three genera, is valid for all stages of two species of *Allochernes* (*A.dubius* and *A.wideri*) and *C.cimicoides*. Confirmation is required for all stages of the remaining species *Allochernes powelli* (Kew).

Similarly the mere presence of a tactile seta only on tarsus III and IV of a chernetid nymph may indicate its inclusion in any one of the remaining three genera (*Pselaphochernes*, *Toxochernes* and *Dendrochernes*) providing that this can be confirmed by a study of all stages of *D.cyrneus*. The medial, as opposed to the distal, position of the tactile seta on tarsus IV in the adults of *P.scorpioides*, is used by Vachon (1957) in couplet 4 to separate this genus

	Femur 2		Tibia	
	average ratio	ratio range	average ratio	ratio range
Leg III				
protonymph	0.82	0.77 - 0.84	0.76	0.72 - 0.80
deutonymph	0.85	0.82 - 0.87	0.83	0.79 - 0.86
tritonymph	0.90	0.88 - 0.92	0.87	0.85 - 0.90
male	0.92	0.90 - 0.94	0.90	0.88 - 0.94
female	0.92	0.90 - 0.94	0.91	0.87 - 0.93
Leg IV				
protonymph	0.82	0.79 - 0.85	0.76	0.72 - 0.80
deutonymph	0.86	0.83 - 0.89	0.84	0.81 - 0.88
tritonymph	0.91	0.88 - 0.93	0.86	0.83 - 0.89
male	0.94	0.93 - 0.95	0.90	0.88 - 0.92
female	0.93	0.91 - 0.95	0.90	0.88 - 0.93

Table 1. *L.nodosus*. The average and range of the TS ratio for each of the tactile setae present on femur 2 and tibia of legs III and IV.

	Tarsus III		Tarsus IV	
	average ratio	ratio range	average ratio	ratio range
<i>L. nodosus</i>				
protonymph	0.36	0.33 - 0.40	0.34	0.32 - 0.38
deutonymph	0.35	0.32 - 0.39	0.34	0.30 - 0.37
tritonymph	0.36	0.31 - 0.40	0.32	0.29 - 0.37
male	0.35	0.32 - 0.39	0.32	0.29 - 0.35
female	0.35	0.31 - 0.39	0.31	0.29 - 0.33
<i>P. scorpioides</i>				
protonymph	0.39	0.37 - 0.43	0.38	0.36 - 0.40
deutonymph	0.40	0.36 - 0.43	0.39	0.36 - 0.43
tritonymph	0.42	0.39 - 0.44	0.40	0.37 - 0.44
male	0.45	0.42 - 0.49	0.43	0.39 - 0.49
female	0.48	0.45 - 0.50	0.44	0.40 - 0.47
<i>T. panzeri</i>				
protonymph	0.48	0.45 - 0.51	0.51	0.48 - 0.54
deutonymph	0.55	0.53 - 0.58	0.57	0.53 - 0.59
tritonymph	0.60	0.56 - 0.63	0.62	0.58 - 0.64
male	0.68	0.65 - 0.71	0.70	0.67 - 0.74
female	0.66	0.63 - 0.69	0.68	0.65 - 0.73

Table 2. The average and range of the tarsal TS ratios is shown for three species, *L.nodosus*, *P.scorpioides* and *T.panzeri*.

from the remaining two genera. Table 2, however, shows that the TS ratio of tarsus IV in protonymphs and deutonymphs of *T.panzeri* approximates to 0.5 and thus a similar couplet in a nymphal key would need revision. In the absence of data from *D.cyrneus*, it is too early to suggest a modified key but hopefully it can be concluded, on the evidence from *P.scorpioides* and *T.panzeri*, that these three genera may be delimited ultimately in the nymphal stages by their TS ratios.

In conclusion it is interesting to speculate on the cause of the different TS ratios among the post-embryonic stages of a single species. Gabbutt (1969), in a study of the trichobothria on the pedipalpal chela of all stages of five species belonging to the family Neobisiidae, explained the successive position of named trichobothria, from one stage to the next, in terms of a simple model which implied a medial growth zone. If this interpretation is correct then the progressive increase in the TS ratios of nymphs and adults of *P.scorpioides* and *T.panzeri* (Table 2) may well be a manifestation of the same phenomenon. If the majority of the increment is added proximal to the tactile seta in each podomere then this would explain its distal displacement and

hence the progressive increase in the TS ratios during the post-embryonic stages. By the some token the constancy of the TS ratios for tarsus III and IV of *L.nodosus* (Table 2) suggests that the increment is added proportionately at each stage so that the relative position of the tactile seta remains unchanged.

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Further examples of environmental associations between different species of spiders

J. Crocker and C. Felton

Since the observations of M. J. Roberts were reported in the Bulletin (p.63 vol.1) in 1969, three more examples of spiders in the webs of other species have been noted.

On several occasions in July and August 1970, a number of female *Diplocephalus latifrons* (O.P.-C.) were collected from the web-strands of *Coelotes atropos* (Walck.) under shale boulders at Knowsley Park, near Liverpool, Lancashire. Of these, two specimens were taken inside a semi-transparent silk sac containing fairly large *Coelotes* juveniles. Otherwise, the remainder were found walking among the strands apparently indifferent to the presence of the larger species.

On 29 July 1971, several immature *Nesticus cellulanus* (Clk.) were found foraging amongst litter on a particularly large occupied *Tegenaria saeva* Blk. web at the entrance to a disused sewer at Kirkby, Lancashire. The litter, comprising the remains of ants, moths, butterflies and other small insects, pieces of dirt, small feathers and a cocoon, was caught up in a

whitish tangle of web underneath and at one side of the sheetweb. Many small *Tegenaria* spiderlings were present near the cocoon. The main *Nesticus* colony was below the *Tegenaria* web, at the bottom of the sewer shaft.

Of particular interest, is the record of adult *Tmeticus affinis* (Blk.) females in the webs of immature *Tetragnatha striata* L.Koch at Groby Pool, Leicestershire, on 30 July and 31 July 1971. Many cases were observed around midnight, with the aid of a torch, along the edge of reed-beds. Two generations of *T.striata* were present; adults of both sexes in typical webs a few inches above the water, and immatures 3-5 mm in length, in smaller webs, usually higher up in the vegetation. Many *Tmeticus* of both sexes were noted on *Phragmitis* stems and leaves, and some were running around in the webs of immature *Tetragnatha*, attacking dipterous prey caught in the webs. Three female *Tmeticus* were noted in one web, two of which were engaged with a trapped mosquito. The owner of the web, cowed in one corner, appeared to be intimidated by the intruders. In some webs, both species were observed feeding separately on small diptons, in others, *Tmeticus* was alone in an otherwise deserted web. Nine individual specimens of *T.affinis* were collected for identification; all were females.