

NOTES ON THE IDENTIFICATION OF THE PSEUDOSCORPIONS *CHTHONIUS*
TETRACHELATUS AND *C. KEWI* (PSEUDOSCORPIONES: CHTHONIIDAE)

Dick van den Tooren

In pseudoscorpions identification to the species level can be difficult. In some genera, such as in *Chthonius*, chaetotaxy is a necessary tool to be able to differentiate between closely related species. The key characters to separate the closely related *Chthonius tetrachelatus* and *C. kewi* which were used until now turn out to be incorrect. In this paper new characters are proposed. Study of this group revealed that *C. kewi*, originally described from Britain, is probably not present in the Netherlands. Material identified previously as *C. kewi*, proved to belong to *C. tetrachelatus*. In this contribution an update of the key to the pseudoscorpion species of the Netherlands is presented. The total number of Dutch species is now 22.

INTRODUCTION

Chthonius tetrachelatus (Preyssler, 1790) and *Chthonius kewi* Gabbutt, 1966 are both included in the checklist of pseudoscorpions of the Netherlands (Van den Tooren 2005). In the key to adults of British pseudoscorpions (Legg & Jones 1988), these species are separated on the number of setae present at the anterior margin of the genital operculum and the posterior margin of the cephalothorax. The males of *C. tetrachelatus* bear 10–12 setae on the anterior genital operculum, while the females have 9–10 setae on the anterior genital operculum. The posterior margin of the cephalothorax has four setae (two long and two short). In *C. kewi* the anterior genital operculum of the male and female have 9–11 and 9–10 setae respectively. The posterior margin of the cephalothorax usually has four setae (two long and two short), sometimes three or five setae (one or three short). The presence of short lateral setae (so called micro setae) on the posterior margin of the cephalothorax as a character for *C. kewi* was introduced by Gabbutt (1966).

It is remarkable that already in 1987, a year before the publication of his key, Legg (1987) going up to the key characters of *Chthonius* species stated: ‘Doubt is cast upon the presence of *Chthonius (Ephippiochthonius) tetrachelatus* (Preyssler, 1790)

sensu stricto in Britain. *Chthonius kewi* Gabbutt, 1966 is considered to be a good species, but close to *tetrachelatus*. And further: ‘Therefore, it is possible that *Chthonius tetrachelatus* sensu stricto does not occur in Britain and the animal found here should be regarded as *C. kewi*. There has also been doubt about the usefulness of the key characters mentioned by Duchác (2004). Duchác studied 30 specimens (29 ♂, 1 ♀) of *C. tetrachelatus* collected from Helgoland, Germany. It appears that only seven specimens of this population showed micro setae along the posterior margin of the posterior segment of the cephalothorax, of which in one specimen a lateral seta on both sides was inserted, i.e. a character considered as a key character in *C. kewi*!

MATERIAL

The uncertainty about the identification of these two *Chthonius* species has been the motivation to a scrupulous investigation of the chaetotaxy of the cephalothorax (in particular of the posterior segment) of all Dutch specimens of *C. tetrachelatus* deposited in the collection of the natural history museum NCB Naturalis at Leiden. The material re-examined was collected from nine localities in the Netherlands (table 1).

Table 1. The material of *Chthonius* from the Netherlands which was studied for this paper.
Tabel 1. Het Nederlandse *Chthonius*-materiaal dat bestudeerd is voor dit artikel.

| Original name | Specimens | Locality | Date | Leg |
|-------------------------|-----------|---------------|--------------|----------------|
| <i>C. tetrachelatus</i> | 2 | Terschelling | 29.VIII.1940 | Brongersma |
| <i>C. kewi</i> | 2 | Vlieland | 23.I.2000 | Noordam |
| <i>C. tetrachelatus</i> | 2 | Baarn, kassen | 8.IV.1949 | van der Hammen |
| <i>C. tetrachelatus</i> | 5 | Leiden, idem | 12.IX.1942 | van der Hammen |
| <i>C. tetrachelatus</i> | 20 | Rotterdam | 1976-1977 | Molin |
| <i>C. tetrachelatus</i> | 1 | Berkel | 25.IX.1982 | Molin |
| <i>C. kewi</i> | 1 | Zierikzee | 20.IV.2002 | Faasse |
| <i>C. tetrachelatus</i> | 1 | Neercanne | 11.V.1951 | van den Tooren |

RESULTS AND DISCUSSION

After examination of the material it became clear that micro setae on the cephalothorax in pseudoscorpions can often be lost, especially in older material. However, in spite of this the number of setae can always be recorded because the original place of insertion of the setae is indicated by the presence of the areoles, visible as a bowl-like depressions in the cuticula. This knowledge leads to the perfection of the chaetotaxy of the entire cephalothorax in freshly collected animals (fig. 1).

Chaetotaxy of the posterior genital operculum of *Chthonius tetrachelatus* from Dutch locations:

| | male | female |
|--------------|------|--------|
| Rotterdam | 18 | 8 |
| Zierikzee | 18 | |
| Terschelling | | 6 |
| Vlieland | | 8 |

Based on the examination of the Dutch material the chaetotaxy of the cephalothorax in *C. tetrachelatus* is as follows: four setae on the anterior segment, six setae on the ocular segment, four setae on the median segment, four setae on the intermediate segment, and 2 (2) setae on the posterior segment. In total 18 (+2) setae, i.e. equal to that of *C. kewi*!

Summarizing the results of this examination *C. tetrachelatus* and *C. kewi* show no difference in the chaetotaxy on the posterior segment of the cephalothorax. The separation of both species is only possible using the number of setae at the posterior genital operculum in males (18 setae in *C. tetrachelatus*, 9-11 setae in *C. kewi*, and in females (6)7-8 in *C. tetrachelatus*, 11-13 in *C. kewi*). On the basis of these data the occurrence of *C. kewi* in the Netherlands cannot be confirmed and this species should therefore be deleted from the Dutch species list.

It is concluded that in the first part of the key characters the option between two versus four setae on the posterior margin of the cephalothorax to separate *C. tetrachelatus* and *C. kewi* can not be used, as the number of setae in both species is equal. It is remarkable that no more attention has been paid to the first description of *C. tetrachelatus*, published as *Scorpio tetrachelatus*, supplied with a copper-plate copy of the animal on which on the posterior part of the cephalothorax two micro setae are visible (Preysslser 1790).

Also the second part of the key characters, the number of setae on the anterior genital operculum is not really discriminating: 10-12 versus 9-11 setae

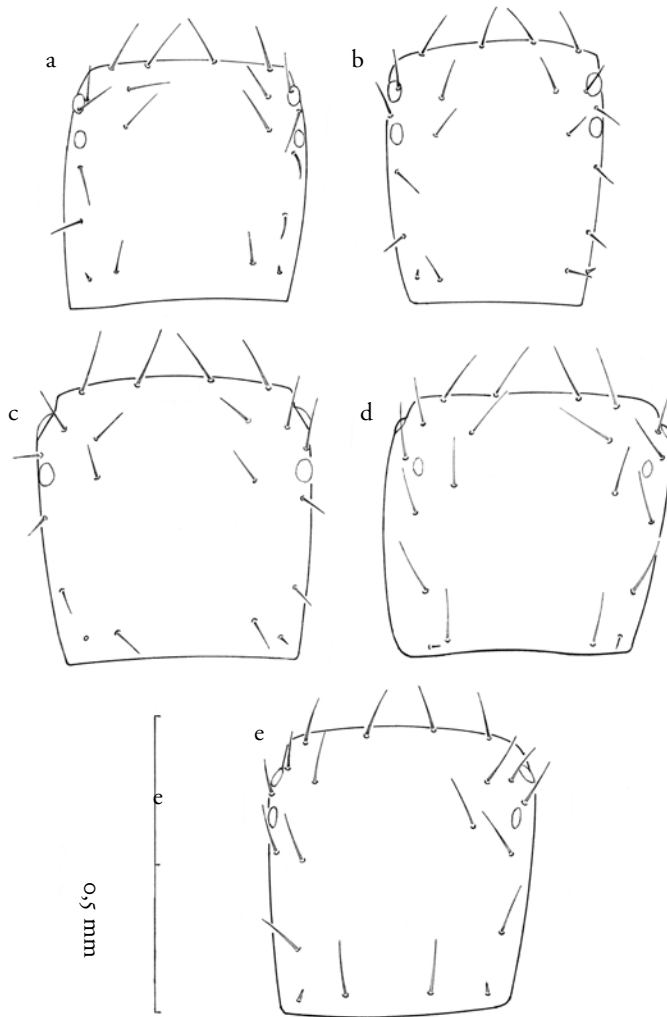


Figure 1. Chaetotaxy of the cephalothorax of *Chthonius tetrachelatus*, a. ♂ from Zierikzee, b. ♂ from Rotterdam, c. ♀ from Vlieland, d. ♀ from Terschelling, e. ♀ from Neercanne near Maastricht. Special attention for the presence of microchaetae near the posterior margin of the cephalothorax.

Figuur 1. Chaetotaxie van de cephalothorax van *Chthonius tetrachelatus*, a. ♂ van Zierkzee, b. ♂ van Rotterdam, c. ♀ van Vlieland, d. ♀ van Terschelling, e. ♀ van Neercanne bij Maastricht. Speciale aandacht voor de aanwezigheid van microsetae bij de achterrand van de cephalothorax.

in the males of *tetrachelatus* and *kewi* respectively and 9-10 setae in the females of both species. On the other hand the chaetotaxy of the posterior genital operculum do provide key characters: male: 16-18 setae in *tetrachelatus* versus 9-11 setae in *kewi*, female: 7-8 setae in *tetrachelatus* versus 11-13 setae in *kewi*.

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SAMENVATTING

Determinatie van de pseudoschorpioenen *Chthonius tetrachelatus* en *C. kewi* (Pseudoscorpiones: Chthoniidae)

Legg & Jones (1988) geven verschillen om *Chthonius tetrachelatus* en *C. kewi* te onderscheiden. *Chthonius tetrachelatus* zou twee setae langs de achterrand van de cephalothorax hebben en 10-12 en 9-10 setae op het voorste genitale operculum bij respectievelijk mannetjes en vrouwtjes. *Chthonius kewi* heeft volgens Legg & Jones vier setae (twee lang en twee kort) langs de achterrand van de cephalothorax, en 9-11 en 9-10 setae op het voorste genitale operculum bij respectievelijk mannetjes en vrouwtjes. Nader onderzoek aan Nederlands materiaal van *C. tetrachelatus* heeft uitgewezen dat in alle gevallen de aanwezigheid van vier setae (twee lang, twee kort) bij dieren in ongeschonden staat kan worden vastgesteld (fig. 1), identiek aan de situatie bij *C. kewi*. Verder zijn de door Legg & Jones gegeven aantallen setae op het voorste genitale operculum van *C. tetrachelatus* en *C. kewi* dermate overlappend dat ook hier geen elkaar uitsluitende kenmerken kunnen worden vastgesteld (respectievelijk bij mannetjes en vrouwtjes 10-12 en 9-10 versus 9-11 en 9-10). Echter de door hen vermelde chaetotaxie op het achterste genitale operculum (bij mannetjes 9-11 en bij vrouwtjes 11-13 setae) geeft wel een aanknopingspunt. Uit dit onderzoek blijkt, dat het aantal setae op het achterste genitale operculum bij mannetjes 16-18 en bij vrouwtjes (6)7-8 bedraagt. Beide soorten kunnen als volgt onderscheiden worden:

- Achterste genitale operculum bij mannetjes met 16-18 setae, bij vrouwtjes met (6)7-8 setae
..... *Chthonius tetrachelatus*
- Achterste genitale operculum bij mannetjes met 9-11 setae, bij vrouwtjes met 11-13 setae
..... *Chthonius kewi*

Er is geen bewijs voor het voorkomen van *C. kewi* in Nederland en deze soort moet geschrapt uit de Nederlandse naamlijst. Het aantal uit Nederland bekende pseudoschorpioensoorten komt daarmee op 22.

D. van den Tooren
Van de Geerstraat 6
4021 BX Maurik
vandentooren@kpnmail.nl