Pauropoda (Myriapoda), a class new to the Dutch fauna, with the description of a new species

Pauropoda are tiny, whitish and blind myriapods with antennae which are peculiarly branched. They are soil and litter dwelling and can be collected from litter or under logs and stones on hill slopes and ditches. Movements resemble those of a mouse: short rushes with occasional stops. They can turn their body in a u-shape, which distinguishes them from equally sized springtails. Pauropods are difficult to spot due to their small body size and aggregated occurrence. For the first time a collection of Pauropoda has been brought together from natural sites in The Netherlands. The collection contains 265 specimens of eight species of the genus *Allopauropus*, all new to the fauna of The Netherlands. One species, *Allopauropus (Decapauropus) montidiabolus* Scheller is new to science and is described below. One species is reported damaging plants in a greenhouse.

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Introduction

Pauropoda is one of the four classes in the Myriapoda. Pauropods are elongate, 0.3-1.7 mm long, blind, progoneate, with antennae which are peculiarly branched (figure 1). The group was discovered by Sir John Lubbock in his own garden in England in 1866 (Lubbock 1867) and has long been considered to be rare. At the beginning of the 20th century, when two reviews had been published (Hansen 1902, Silvestri 1902), the number of species had reached about 40, a figure now risen to over 700. The world fauna comprises two orders with five families and 30 genera.

Pauropods are identified on basis of their external structure. Characters of primary importance are the chaetotaxy and the shape and relative proportions of several organs: i.e. the head with antennal branches, the flagella and temporal organs, the collum segment, the tergites, bothriotricha, pygidium and legs (figures 2-13). Identification is laborious. A specimen under study has to be examined at high magnification (1000x) in oil immersion, if possible with phase contrast. All pauropods have an anal plate, a most peculiar and taxonomically valuable structure which projects backward from the posteromedian part of the pygidial sternum (figure 13). Even in the immature stages almost every species has a characteristic plate of its own, which often helps to immediately identify a species. However, despite good characters, the lack of good keys is a huge obstacle to master pauropod study. In the present state of things almost every identified specimen has to be checked with original descriptions spread over a lot of papers in many journals. This is necessary not only as a consequence of the lack of reliable keys, but also because new species frequently emerge in most collections.

Pauropods belong to the cryptozoic fauna and live mainly in the soil, but occur sometimes in litter too. They inhabit a variety of plant communities and soil types, including agricultural habitats, and they occur on decaying logs or under bark and moss. They are most abundant near the soil surface to 10-20 cm depth, but can penetrate into deep subsoil layers. Their occurrence is most often very patchy and the populations are sparse.

The free-living pauropod fauna of The Netherlands has not been investigated and as far as we know no record has been published previously. We have visited twelve locations

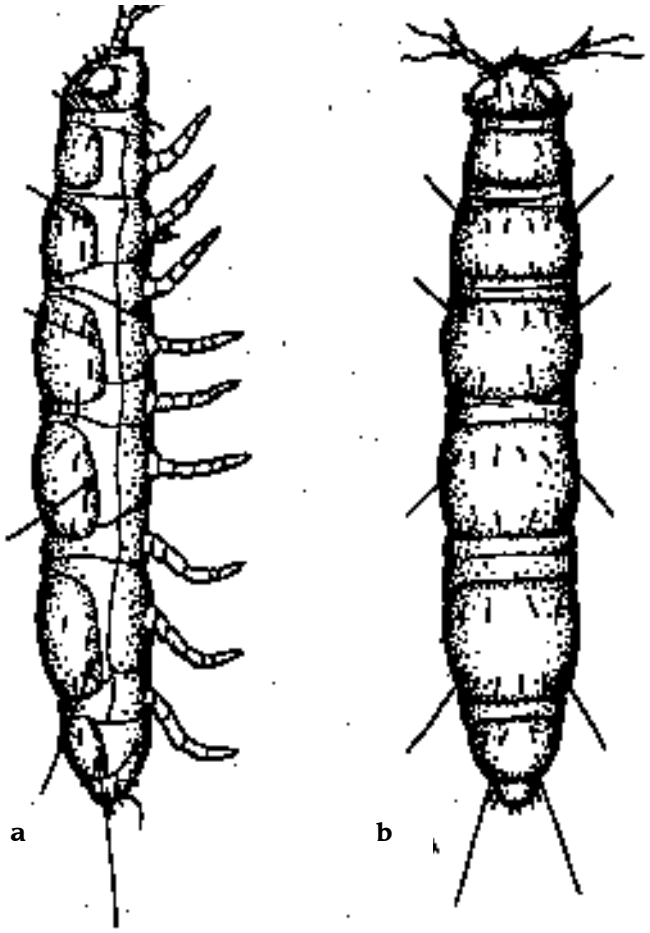

Figure 1. Habitus of a Pauropoda. **a** lateral view, **b** dorsal view.
*Habitus van een vertegenwoordig van de Pauropoda. **a** zijaanzicht, **b** bovenaanzicht.*

in The Netherlands in search for pauropods. We collected 265 specimens belonging to eight species. All species of the Dutch fauna belong to the order Tetramerocerata, characterised by antennae with a four-segmented stalk. They are white or whitish with a thin cuticle and belong to the family Pauropodidae. Members of other families can be creamy or brownish. The Dutch species have three, five or six pairs of legs as juveniles, eight pairs of legs in the subadult stage, and nine or ten pairs of legs as adults. Due to the recent collecting we are able to present a first review of Pauropoda in The Netherlands.

Sampling

As part of a Collembola survey the second author collected, more or less by chance, the first specimens of pauropods for The Netherlands in April 1994 in a garden at Sassenheim, Zuid-Holland. At home, while studying the material under the microscope, the pauropods were noticed among the large numbers of Collembola. Unable to identify the specimens to the species level the material was stored in alcohol. After a visit to the first author in Sweden in 1998 it became clear where to search for Pauropoda, after which collected material from various places was sent to Sweden for identification. In 1999 the first author came over to The Netherlands. In April of that year forested hills near Rhenen, Nijmegen, both in Gelderland, and Maastricht, Limburg, were visited. At the lower end of the slopes individual specimens were collected *in situ*. They were picked from the underside of moist stones, bark-less logs and branches with a fine brush. The majority of the species move quickly and intermittently and are easy to distinguish from other small soil-living arthropods, except a few collembolans. Specimens were transferred to small glass tubes filled with 70% ethanol. In addition to collection by hand a few soil core samples (10 cm diameter, to a depth of 5 cm) were taken per site and pauropods were extracted during three weeks in Tullgren funnels (Van Straalen & Rijninks 1982). From 1994-2000 pauropods have been collected from twelve locations in The Netherlands (figure 14).

List of Dutch species

The first author has identified eight species now known to occur in The Netherlands. One of the species is new to science and is described below. In order to promote further studies on pauropods the original literature with a description has been given for each of the species. Detailed infor- mation on the sample location (name and UTM co-ordinates), sample date (day, month, year), habitat, and number, stage and sex (between brackets, male (♂), female (♀)) of specimens is given. The known general distribution of the species involved is condensed from literature (Scheller 1990, 1996, 1998). These eight species are probably only a fraction of the species belonging to the Dutch fauna. Judging from the distribution of pauropods in Scandinavia (twelve species), England (23), Belgium (twelve), Germany (23) and France (69 species) (http://www.faunaeur.org) many more species are expected to occur in The Netherlands. All species listed below, with the exception of *Allopauropos tenuis* and *A. montidiabolus*, have been recorded in the countries surrounding The Netherlands.

Abbreviations of provinces

GE = Gelderland, LI = Limburg, NB = Noord-Brabant, NH = Noord-Holland, UT = Utrecht

Order Tetramerocerata
Family Pauropodidae
Subfamily Pauropodinae

Genus *Allopauropus* Silvestri, 1902
Subgenus *Allopauropus* Silvestri, 1902
***Allopauropus (A.) danicus* (Hansen, 1902)**

Videnskabelige Meddelelser fra Dansk naturhistorisk Forening i Kjøbenhavn 1901: 376-378, pl. 3, fig. 4a-f.

UT: Rhenen, Grebbeberg, 27.iv.1999, in litter on loamy sand, 1 ad., 9 leg pairs (♂), UTM FT 7859, M.P. Berg.

Allopauropus danicus was collected only at one location, with one specimen, half way on the slope on the south side of the lateral moraine Grebbeberg, at Rhenen. The habitat consisted of mixed deciduous forest on sandy clay. The moist to dry litter was on average 7-8 cm thick. It was found together with *A. gracilis*.

Allopauropus danicus is widely distributed in Europe and may be subcosmopolitan.

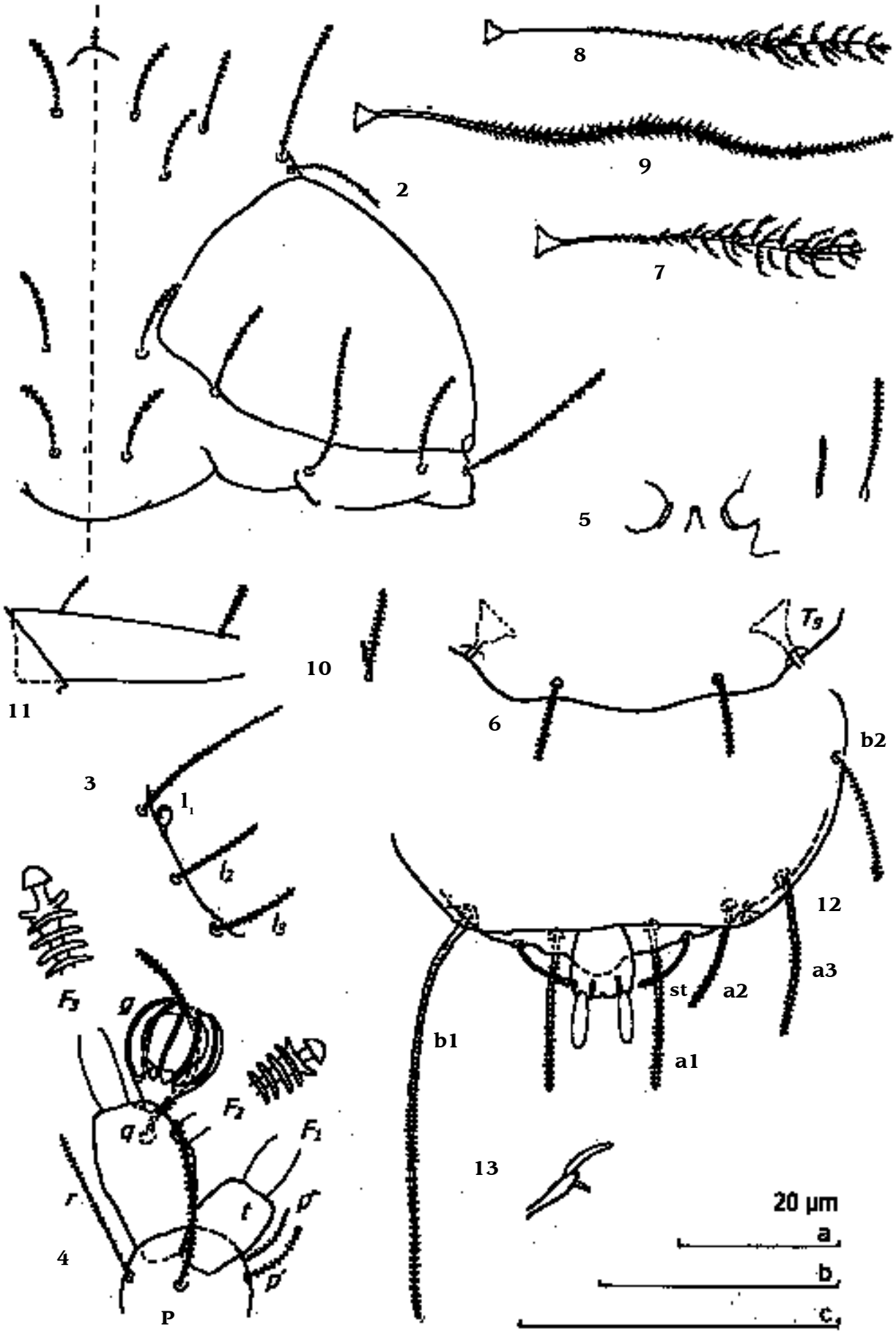
8
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Figure 14. Sample locations of Pauropoda in The Netherlands.
Locaties in Nederland waar Pauropoda zijn verzameld.

Subgenus *Decapauropus* Remy, 1957
Allopauropus (D.) cuenoti (Remy, 1931)

Archives de Zoologie expérimentale et générale 71: 67-83, figs. 1-3, 6-12.

NH: Amsterdam, Amstel, 30.i.2000, under log on clay, 1 ad. 9 leg pairs (♀), 1 subad. 8 leg pairs (♀), UTM FU 3000, M.P. Berg – GE: Ubbergen, Duivelsberg, 28.iv.1999, under bark of log, 1 ad. 10 leg pairs (♀), 1 ad. 9 leg pairs (♀), 1 juv. 3 leg pairs, GT 0245, M.P. Berg & U. Scheller; Ubbergen, Duivelsberg, 17.x.1999, under log on loamy sand, 1 subad. 8 leg pairs (♀), 3 juv. 6 leg pairs, GT 0245, M.P. Berg – NB: Werkendam, Lage Hof, 10.viii.2001, river floodplain in clay, 3 subad. 8 leg pairs (♀), UTM FT 2136, M.P. Berg – LI: Maastricht, ENCI-bos, 29.iv.1999, under stone on loess, 1 ad. 9 leg pairs (♂), UTM FS 8833, M.P. Berg & U. Scheller.

In total thirteen specimens were collected from four sites spread over the country. Most specimens were collected by hand from under logs. What they prefer in general we do not know, but here they were found on smooth parts of logs without bark, on the border between the dry and moist part of the log. This part of the log is frequently covered with dense fungal mycelium, one of their food items. Often several individuals of subsequent life stages were observed together.

The species is common in Europe and more often found in the north than in the south. It is also known from North Africa, the Mascarenes (Réunion), and the USA. Its distribution is at least Holarctic.

Allopauropus (D.) distinctus Remy, 1936

Zoologischer Anzeiger 116: 313, fig. 1.

LI: Maastricht, ENCI-bos, 29.iv.1999, under stone on loess,1 juv. 6 leg pairs, UTM FS 8833, M.P. Berg & U. Scheller.

Only one specimen was collected from the ENCI-forest near Maastricht. It was collected at the lower end of a steep slope of this deciduous forest. The stones were located at the edge of the forest, in rather moist loess. A scarce litter layer was present and an under-storey layer was absent. Other species present were *A. cuenoti*, *A. gracilis* and *A. multiplex*.

Allopauropus distinctus has a wide range and has been collected in many European countries and in North Africa and North America.

Allopauropus (D.) gracilis (Hansen, 1902)

Videnskabelige Meddelelser fra Dansk naturhistorisk Forening i Kjøbenhavn 1902: 395-397, pl. 5, fig. 3a-f.

NH: Amsterdam, Amstel, 30.i.2000, under bark of log, 4 ad. 9 leg pairs (♂), 1 juv. 6 leg pairs, UTM FU 3000, M.P. Berg; Amsterdam, Amstel, 30.i.2000, under log on clay, 12 ad. 9 leg pairs (4m, 8f), 1 subad. 8 leg pairs (♂), 3 juv. 6 leg pairs, UTM FU 3000, M.P. Berg – UT: Utrecht, Amelisweerd, 13.ii.2000, forest edge near small stream, under log, 2 ad. 9 leg pairs (♀), 2 juv. 6 leg pairs, UTM FT 4771, M.P. Berg; Maarn, de Zanderij, 19.x.2001, sandy slope with mixed forest, flotation of litter, 7 ad. 9 leg pairs (3m, 4f), 7 subad. 8 leg pairs (3m, 3f,1 sex. m), 1 juv. 6 leg pairs, 7 juv. 5 leg pairs, 1 juv. 3 leg pairs, UTM FT 6070, M.P. Berg; Abcoude, de Gein, 2.iv.1999, under bark of willow, 2 ad. 9 leg pairs (♀), UTM FT 3795, M.P. Berg; Rhenen, Grebbeberg, 27.iv.1999, under log on loamy sand, 4 ad. 9 leg pairs (2m, 2f), UTM FT 7859, M.P. Berg & U. Scheller – GE: Deurningen, Oosterveld, 27.ix.1998, in litter of mixed deciduous forest, 1 ad. 9 leg pairs (♀), UTM LC 5495, M.P. Berg; Deurningen, Oosterveld, 27.ix.1998, in litter of mixed deciduous forest, 2 subad. 8 leg pairs (♀), UTM LC 5495, M.P. Berg; Ubbergen, Wijlerberg, 28.iv.1999, under log on clay, 1 ad. 9 leg pairs (♀), UTM GT 0245, M.P. Berg & U. Scheller; Ubbergen, Duivelsberg, 28.iv.1999, under log on clay, 4 ad. 10 leg pairs (♀), 8 ad. 9 leg pairs (1m, 7f), UTM GT 0245, M.P. Berg & U. Scheller; Ubbergen, Duivelsberg, 28.iv.1999, under stone on path, 1 ad. 9 leg pairs (♀), UTM GT 0245, M.P. Berg & U. Scheller; Ubbergen, Duivelsberg, 17.x.1999, under log on loess, 11 ad. 9 leg pairs (6m, 5♀), 4 subad. 8 leg pairs (1m, 3♀), M.P. Berg & R.M.J.C. Kleukers; Ubbergen, Duivelsberg, 28.iv.1999, deep in loess soil, 1 ad. 10 leg pairs (♀), 13 ad. 9 leg pairs (9m, 4♀), 2 juv. 6 leg pairs, 1 juv. 3 leg pairs, UTM GT 0245, M.P. Berg & U. Scheller; Ubbergen, 16.x.1999, under log on beech litter, 1 ad. 10 leg pairs (♀), 19 ad. 9 leg pairs (8m, 11♀), 9 subad. 8 leg pairs (4m, 5♀), 9 juv. 6 leg pairs, 2 juv. 5 leg

Figures 2-13. *Allopauropus (Decapauropus) montidiabolus* Scheller n. sp., holotype. **2** Head, median and right half, tergal view. **3** Temporal organ, posterior part, right side, lateral view. **4** Left antenna, sternal view. **5** Collum segment, median and left part, sternal view. **6** Tergite VI, posterior part. **7** *T1*. **8** *T3*. **9** *T5*. **10** Seta on coxa of leg 9. **11** Tarsus of leg 9. **12** Pygidium, sternal view. **13** Anal plate, lateral view. Scale a (20 μm): figures 7-10; scale b (20 μm): figures 5, 11; scale c (20 μm): figures 2-4, 6, 12, 13.
Allopauropus (Decapauropus) montidiabolus *Scheller n. sp., holotype.* ***2*** *Kop, mediaan en rechter helft, dorsaal.* ***3*** *Temporaal orgaan, posterieur, rechterkant, lateraal.* ***4*** *Linker antenne, ventraal.* ***5*** *Collum segment, mediaan and linker deel, ventraal.* ***6*** *Tergiet VI, posterieur.* ***7*** *T1.* ***8*** *T3.* ***9*** *T5.* ***10*** *Seta op coxa van poot 9.* ***11*** *Tarsus van poot 9.* ***12*** *Pygidium ventraal.* ***13*** *Anaalplaat, lateraal. Schaal a (20 μm): figuren 7-10; schaal b (20 μm): figuren 5, 11; schaal c (20 μm): figuren 2-4, 6, 12, 13.*

pairs, UTM GT 0245, M.P. Berg – NB: Werkendam, Lage Hof, 10.vi-ii.2001, river flood-plain, in clay, 1 ad. 10 leg pairs (♀), 1 ad. 9 leg pairs (♀), 1 subad. 8 leg pairs (♀), 1 juv. 6 leg pairs, 5 juv. 5 leg pairs, 1 juv. 3 leg pairs, UTM FT 2136, M.P. Berg – LI: Maastricht, St. Pietersberg, 29.iv.1999, under stone on loess, 1 ad. 10 leg pairs (♀), UTM FS 8932, M.P. Berg & U. Scheller; Maastricht, ENCI-bos, 29.iv.1999, under stone in loess, 2 ad. 9 leg pairs (♂, ♀), UTM FS 8833, M.P. Berg & U. Scheller.

In total 162 specimens were collected from all visited sites, with the exception of site Huissen (figure 14). *Allopauropus gracilis* appears to be a eurytopic species. It was collected in road margins, forests, grasslands, gardens and a river flood plain, in litter or from under logs or stones located in sand, loamy sand, clay or loess. Very often high numbers could be collected, up to 41 specimens at Wijlerberg, near Nijmegen, Gederland. At many sites it was the only pauropod present.

Allopauropus gracilis seems to have a (sub)cosmopolitan distribution. It is one of the species most often found in Europe, but it has also been reported from Africa, South Asia and the Americas.

Allopauropus (D.) multiplex Remy, 1936

Vogesia 2: 1-2; Zoologischer Anzeiger 116: 315-316, fig. 3.

LI: Maastricht, ENCI-bos, 29.iv.1999, under stone in loess, 1 ad. 9 leg pairs (♂), UTM FS 8833, M.P. Berg & U. Scheller.

One adult male was collected from the ENCI-forest near Maastricht. It was found at the same site as *A. distinctus*, also under a stone. Other species recorded at this site were *A. cuenoti* and *A. gracilis*.

The species is distributed over the West Palaearctic and Nearctic regions. *Allopauropus multiplex* is nowhere abundant.

Allopauropus (D.) tenuis Remy, 1948

Mémoires de la Société national d'Histoire naturelle, Paris 27(5): 131-132, fig. 12.

GE: Huissen, commercial greenhouse, 23.ix.1998, on *Saintpaulia* cuttings, 23 ad. 9 leg pairs (♀), 6 juv. 6 leg pairs, 1 juv. 5 leg pairs, UTM GT 0157, M.G.M. Jansen.

Allopauropus tenuis was found in large numbers by the third author on *Saintpaulia* cuttings in a greenhouse in Huissen. The occurrence is of special interest because this is the first time pauropods have been observed to attack crops. They were found on cuttings, both on roots and between young leaves, and caused severe damage (Jansen 2000). The infested plants were much darker than usual and the roots shortened, and the growth was stunted (figure 15). Some plants even died. The young leaves were deformed and wrinkled. Leaves and stems showed many brownish stripes and sclerosis. It is evident that these pauropods, though very tiny creatures with weak mouth parts, may cause damage of economic importance when they occur in large numbers.

Pauropods have not often been reported from greenhouses, but in a more than 60 years old paper Remy (1940) reported *Stylopauropus pedunculatus* (Lubbock), *A. danicus* and *A. proximus* Remy from the hothouses of the Natural History Museum in Paris. Later - in 1957 - he found these three species and *A. maoriorum* Remy and *A. alsiosus* Remy & Balland in the hothouses of the Botanical Garden in Geneva. A third report came from Remy & Balland (1958) from a hothouse in the Botanical Garden in Montpellier, from where they reported *A. pseudomillotianus* Remy & Balland and *A. alsiosus*. These greenhouse species have their origin either in the native fauna of the area (*A. danicus, S. pedunculatus*), or they were introduced from tropical or subtropical areas (*A. maoriorum, A. proximus* and *A. tenuis*), or their provenience is at present unknown (*A. pseudomillotianus, A. alsiosus*). *Allopauropus tenuis* is widely distributed in the tropical belt, particularly in Africa, but is also known from Asia, the Americas and Australia.

Figure 15. Young plants of *Saintpaulia*. Top. Two healthy plants. Bottom: three plants injured by *Allopauropus tenuis*. The roots are stunted or completely destroyed. Photo: W.A. van Lienden
*Jonge Kaapse viooltjes (*Saintpaulia*). Boven: twee gezonde planten. Onder: drie door* Allopauropus tenuis *beschadigde planten. De wortels zijn afgegraasd of compleet vernietigd.*

Allopauropus (D.) vulgaris (Hansen, 1902)

Videnskabelige Meddelelser fra Dansk naturhistorisk Forening i Kjøbenhavn 1901: 392-395, pl. 5, fig. 2a-g.

NH: Amsterdam, Amstel, 30.i.2000, under log on clay,1 ad. 9 leg pairs (♀), 1 subad. 8 leg pairs (♀),UTM FU 3000, M.P. Berg – GE: Ubbergen, Duivelsberg, 17.x.1999, under log on loess, 1 subad. 8 leg pairs (♀), 3 juv. 6 leg pairs, UTM GT 0245, M.P. Berg & R.M.J.C. Kleukers; Ubbergen, Duivelsberg, 28.iv.1999, under log deep in loes soil, 3 ad. 9 leg pairs (2m, 1f), 4 subad. 8 leg pairs (2m, 2f), 5 juv. 6 leg pairs, 9 juv. 5 leg pairs, 8 juv. 3 leg pairs, UTM GT 0245, M.P. Berg & U. Scheller; Ubbergen, Duivelsberg, 28.iv.1999, under log on loess, 6 ad. 9 leg pairs (1m, 5f), UTM GT 0245, M.P. Berg & U. Scheller; Ubbergen, Duivelsberg, 28.iv.1999, under bark of log, 1 ad. 9 leg pairs (♀), 1 juv. 5 leg pairs, 1 juv. 3 leg pairs, M.P. Berg & U. Scheller – LI: Maastricht, St. Pietersberg, 29.iv.1999, under stone on path, 3 ad. 9 leg pairs (1m, 2f), M.P. Berg & U. Scheller.

In total 47 specimens were sampled from three locations, Amsterdam, Ubbergen and Maastricht, from under logs and, occasionally, stones. Most records come from forests, although the species was also found near a road at Amsterdam. *Allopauropus vulgaris* was often collected in sites with heavy soils such as clay and loess.

Allopauropus vulgaris is widely distributed in Europe, where it seems to be most frequent in the west and north. Outside Europe it has been reported from Africa, Sri Lanka and North America.

Allopauropus (D.) montidiabolus Scheller n. sp.

Type locality Duivelsberg, Ubbergen, Gelderland, The Netherlands, 17.x.1999, UTM GT 0245.

Type material Holotype: ad. 9 leg pairs (♀), under bark of log, M.P. Berg & U. Scheller; paratypes: 2 ad. 9 leg pairs (♀), 5 juv. 6 leg

pairs, 1 juv. 3, ibidem, same locality and date as holotype. *Other material*. Duivelsberg, Ubbergen, 17.x.1999, under log in loess, 1 subad. 8 leg pairs (♂), UTM GT 0245, M.P. Berg & R.M.J.C. Kleukers. Type specimens are lodged in the collections of the Natural History Museum, Geneva.

Etymology From the Latin *mons, montis*, mountain and *diabolus*, devil. The name refers to the site where the specimens were collected, the Duivelsberg or devil's mountain.

Diagnosis The new species is well defined by the following combination of characters: antennal globulus *g* proportionally large, bothriotricha *T1-T4* with pubescent branches not arranged in whorls, anal plate with four appendages, two of them large and fusiform and two short, thin and cylindrical. It shows some affinity with *A. brincki* Scheller (Scheller 1962) from Madeira, which has a proportionately large antennal globulus and similar bothriotricha, pygidial setae and anal plate. The new species is easily distinguished from *A. brincki* by the following characters: **1** size and shape of the tergal antennal branch (*t* small compared to *s*, length ratio *t/s* 0.6-0.7 in *A. montidiabolus*, *t* as long as *s* in *A. brincki*); **2** pubescence on the bothriotricha *T1-T4* (not in whorls in *A. montidiabolus*, in whorls in *A. brincki*); **3** shape of the appendages of the anal plate (longest appendages straight, fusiform, glabrous, and shortest appendages cylindrical in *A. montidiabolus*, but longest appendages curved inwards, clavate, and shortest appendages conical in *A. brincki*).

Description (range of variation in adult paratypes given in brackets)

Length Length of body without antennae 0.54 mm (0.49-0.63 mm).

Head Setae short, somewhat clavate, and annulate on central part of tergal side (figure 2). Sublateral and lateral setae (except *a3* of second row) all of medium length, cylindrical, annulate, and blunt. Relative lengths of setae: first row *a1* = 10, *a2* = 10 (9); second row *a1* = 9 (10), *a2* = 18, *a3* = 12 (13); third row *a1* = 11, *a2* = 12 (11); fourth row *a1* = 10 (11), *a2* = 22 (20), *a3* = 12, *a4* = 22 (21); lateral group *l1* = 22 (27), *l2* = 16 (18), *l3* = 16 (15). The ratio *a1/a1 - a1* in first row 1.0, in second row 0.5, in third row 0.8 and in fourth row 1.1. Length of temporal organs 2.1 (2.3) times as long as their shortest distance apart (figure 2). A small posterolateral aperture visible in the cuticle near *l1*. Head cuticle and temporal organs glabrous.

Antennae Segment 4 with four setae, cylindrical, annulate (figure 4). Seta *p* thickest, *r* very thin and very densely annulate. Relative lengths of setae *p* = 100, *p'* = 50 (54), *p''*= 50 (42), *r* = 100 (92). Neither *p'''* nor *u* present. Tergal seta *p* 1.7 (2.0) times as long as tergal branch *t*. The latter 1.3 (1.2) times as long as its greatest diameter. Branch *t* 0.6 (0.7) times the length of sternal branch *s.* Sternal branch *s* 1.7 (1.6) times as long as its greatest diameter. Its anterodistal corner distinctly truncate. Seta *q* cylindrical, striate, 1.4 (1.3) times as long as *s*. Relative lengths of flagella (base segments included) and base segments: *F1* = 100, *bs1* = 9 (10); *F2* = 32 (31-34), *bs2* = 5 (4); *F3* = 93 (88), *bs3* = 11 (10). The *F1* 7.0 (6.8) times as long as *t, F2* and *F3* 1.3 (1.5) and 3.8 (3.7-4.1) times as long as *s,* respectively. Distal calyces of flagella helmet-shaped, those of *F2* somewhat smaller than the others. Distal part of flagella axes invertedly conical. Globulus *g* proportionately large, almost (as wide as long) 1.2 times as long as its greatest diameter. There are 11 bracts. Capsule spherical. Diameter of *g* 1.3 (1.1) times as long as the greatest diameter of *t*. Antennae glabrous.

Trunk Setae of collum segment are simple, cylindrical, densely striate, and blunt. The submedian one is very thin (figure 5). Sublateral seta 3.5 to 3.8 times as long as the submedian one. Sternite process small, the anterior end with very shallow incision. Appendages small, barrel-shaped, with flat caps. Process and appendages are glabrous.

Setae on tergites cylindrical, striate and blunt. There are 4+4 setae on tergite I, 6+6 on tergite II-IV or even V. There are 4+2 setae on tergite VI (figure 6). Posterior setae on tergite VI 0.5 times their distance apart and 0.6 times the length of pygidial *a1*.

Relative lengths of bothriotricha *T1* = 100, *T2* = 117 (106), *T3* = 122 (113-142), *T4* = 110 (119), *T5* = 163 (151) (figures 7, 8, 9). They have simple, straight and thin axes, thickest in *T5*. The *T1 - T4* subsimilar is with short oblique simple hairs on the proximal part, but has long curved and partly branched hairs on the distal part. These distal hairs with short oblique pubescence. On *T1, T2* and *T4* the curved hairs cover the distal half of the bothriotricha and are longer than on *T3* where they take up the distal third.

Genital papillae were studied only in a subadult specimen. They are narrowly conical and glabrous.

Legs Setae on coxa and trochanter of leg 9 similar, furcate, striate, and blunt. Secondary branch much thinner and shorter than primary one (figure 10). More anteriorly these setae are simple. Tarsus of leg 9 tapering, 2.8-3.2 times as long as its greatest diameter, and glabrous. Setae cylindrical, striate, and blunt (figure 11). Proximal seta thin, somewhat curved, length 0.2 times the length of tarsus and 0.8-0.9 times the length of distal seta.

Pygidium

Tergum Posterior part between *st* roundly triangular with three lobes, median one largest (figure 12). Relative lengths of setae *a1* = 10, *a2* = 8, *a3* = 11 (12), *st* = 6 (7). All cylindrical, blunt, somewhat curved inwards. First three setae striate, *a1* and *a3* directed posteriorly, *a2* converging. Setae *st* almost glabrous and strongly converging. Distance *a1 - a1* 0.9 times the length of *a1*; distance *a1 - a2* 1.4 (1.5) times as long as distance *a2 - a3*; distance *st - st* 2.2 (2.1) times as long as *st* and 1.3 (1.6) times as long as distance *a1 - a1*. Tergum glabrous.

Sternum Posterior margin *b1* almost straight. Relative lengths of setae *a1* = 10; *b1* = 30 (27-31), *b2* = 10. *b1* thin, cylindrical, proximal part striate, distal part annulate. *b2* cylindrical, annulate, diverging. The *b1* 1.5 (1.4) times as long as their distance apart. *b2* 0.7 of distance *b1 - b2*. Anal plate narrowest anteriorly, subrectangular, and 1.1 times as long as its greatest width, with convex lateral margins and almost straight posterior margin. It has four appendages of which two large, 0.8 of length of plate, posteriorly directed, fusiform and protruding from posterior part of tergal side. Two are thin, short and protruding downwards from the posterior part of the sternal side. Plate and appendages glabrous.

Discussion

As far as we know, the Dutch Pauropoda belong to one genus in Pauropodidae: *Allopauropus*. This genus has an almost worldwide distribution and so have some of its species.

Among the Dutch species, *A. danicus* and *A. gracilis* seem to be subcosmopolitan and *A. distinctus, A. multiplex* and *A. vulgaris* may be nearly so (Scheller 1990, 1996, 1998). Two more species have very large ranges: *A. cuenoti,* which appears to be Holarctic, and *A. tenuis*, which is widely distributed in the tropics and subtropics. The single deviating species in this respect is *A. montidiabolus*, which may belong to a geographically more restricted element.

Two sites in The Netherlands are particular rich in species: Duivelsberg, near Nijmegen, and the ENCI-forest near Maastricht. From both forests four species could be collected. Compared to other soil fauna groups four species does not seem to be much. However, other rich sites in Europe also contain no more than four or five species. Pauropods inhabit microclimatological stable habitats which are well drained, shaded, and often have a neutral to high pH. They cannot burrow and are therefore most abundant in coarsely structured soils, rich in stones and with a high calcium content. This preference explains why pauropods prefer forested hill sites on clay or loess. Along the hill slope they can move up or down to a favourable spot.

Very dynamic sites with lots of disturbance, sites with a low pH, peaty soils, and sites with a fine-textured soil are less favourable to pauropods. As far as we know they are not wind-borne and they are very susceptible to desiccation. This results in a low dispersal capacity and might partly explain the low diversity of pauropods in the western part of the country. These are not the best localities to search for the other remaining species in The Netherlands. Hill slopes, covered with forest on nutrient rich soils give much better chances to encounter pauropods. Spring and autumn are probably the best months to search for new species of Pauropoda for the Dutch fauna.

The Pauropoda fauna of Denmark, Germany, Great Britain and Belgium is relatively adequately investigated. Given the distribution of Pauropoda in these countries *Pauropus lanceolatus* Remy, 1956, *Stylopauropus pedunculatus* (Lubbock, 1867) and *Allopauropus helveticus* (Hansen, 1902) probably also occur in The Netherlands.

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Samenvatting

Pauropoda (Myriapoda), een nieuwe klasse voor de Nederlandse fauna, met de beschrijving van een nieuwe soort

Pauropoda zijn kleine, witte, blinde myriapoden met een typisch gevorkte antenne. Ze leven in de bodem tussen strooisel of onder kale boomstronken en stenen, met name op beboste heuvels met een goede drainage en een bodem van klei of kleiig zand. Voor de eerste keer is in ons land een collectie van vrijlevende soorten bijeengebracht: in de periode 1994-2000 zijn 265 individuen van acht soorten verzameld van twaalf locaties in Nederland. Alle soorten behoren tot het genus *Allopauropus* en zijn nieuw voor de Nederlandse fauna. Een soort, *Allopauropus (Decapauropus) montidiabolus* Scheller is nieuw voor de wetenschap en wordt hier beschreven. Een soort is gevonden in een tropische kas waar hij schade veroorzaakte aan Kaaps viooltje (*Saintpaulia*). Van alle acht soorten is een verwijzing opgenomen naar de literatuur waarin de soort wordt beschreven. Gedetailleerde informatie over de vindplaatsen en de verspreiding in Europa wordt per soort gegeven.