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THE ISOPODA AND TANAIDACEA OF THE NETHERLANDS, INCLUDING THE DESCRIPTION OF A NEW SPECIES OF LIMNORIA

by

L. B. HOLTHUIS

(With four textfigures)

The Isopod and Tanaidacean Crustacea of the Netherlands have not been treated as a whole since 1889, when Hoek published the second part of his Crustacea Neerlandica dealing with the Isopoda and Amphipoda. Hoek in this paper mentioned 25 species of Isopoda, 9 of which are marine forms, 1 a freshwater form and 15 terrestrial, no Dutch Tanaidacea were known to Hoek. At present we know 49 species of Dutch Isopoda, of which 20 are marine, 2 are freshwater forms and 27 are terrestrial, furthermore three species of Tanaidacea are known from this country.

The present paper is an enumeration of all Dutch species of the two above mentioned groups, with their distribution within our country and, if necessary, with remarks on their synonymy and ecology. A volume on the Isopoda and Tanaidacea for the series "Fauna van Nederland", written in the Dutch language is now ready for the press and will be published in the course of time; in this volume a complete bibliography of the Dutch Isopoda is given, so that in the present paper only the most necessary references are made.

The Isopoda found in Dutch greenhouses and those belonging to the family Armadillidiidae are treated here only summarily, as they have been dealt with more extensively in previous papers (Holthuis, 1946a, b).

The species *Limnoria quadripunctata* new species, *Sphaeroma hookeri*

Leach, *Dynamene bidentata* (Adams), *Idotea granulosa* Rathke, *Porcellium conspersum* (Koch), *Armadillidium pictum* Brandt, *Athelges paguri* (Rathke) and *Apseudes talpa* (Mont.) are recorded here for the first time as belonging to the Dutch fauna.

ISOPODA

Paragnathia formica (Hesse)

In his "Natuurkundige Verlustigingen" Slabber (1769-1778, p. 71, pl. 9 figs. 1, 2) described and figured a Praniza stage of a Gnathiid under the name *Oniscus Marinus*. Many later authors identified Slabber's specimens with *Gnathia maxillaris* (Montagu), but Monod (1926, p. 547) showed that the identity of Slabber's specimens with Montagu's species is very improbable, as the latter does not occur farther north than the English southcoast and the Irish Sea. The French author thought it more probable that Slabber's specimens belong to *Gnathia oxyuraea* (Lilljeb.) as this species is found in the North Sea. In my opinion, however, the identity of Slabber's species with *Paragnathia formica* (Hesse) is far more probable than that with either of the two *Gnathia* species mentioned above. Slabber's specimens namely were collected near the island of Walcheren (province Zeeland), probably in more or less brackish water. *Gnathia oxyuraea* now is only known from the northern part of the North Sea (there is no reliable record of this species from the North Sea south of Banff, Scotland); furthermore *Gnathia oxyuraea* is a typical marine form and is not found in brackish waters. *Paragnathia formica,* on the contrary, indeed is known from various localities in the extreme southern part of the North Sea, so Omer-Cooper (1917) reports upon this species from Norfolk, while Giltay (1927) records a specimen from the Scheldt near Antwerp. Furthermore the Praniza from the Belgian coast identified by Van Beneden (1861) with Slabber's species and named by the Belgian author *Anceus marinus* (Slabber), distinctly belongs to *Paragnathia formica,* as is shown by the fact that the apex of the telson is rounded and that the antennal flagellum is 8 jointed; the identity of the adult male described and figured by Van Beneden (1861) and brought by him to the same species as the larva, can not be made out with certainty. Monod (1926) brings both Van Beneden's specimens with some doubt to *Gnathia oxyuraea.* As the distribution of *Paragnathia formica* thus makes it almost certain that this species also occurs in Dutch waters and as no other Gnathiid is known with certainty from the southern North Sea, the identity of Slabber's specimens with *Paragnathia formica* is most probable. I therefore, at least provisionally,

consider Slabber's specimens to belong to *Paragnathia formica* (Hesse). We only can get final certainty when more data of the Gnathiid fauna of the southern North Sea and especially of the Zeeland waters are known. After Slabber published his book, no Gnathiidae have been recorded from Dutch waters, this is the more remarkable since Slabber stated that he found this species during four months of the summer and then in rather large quantities [1]).

Monod (1926, p. 547) remarked that when the identity of Slabber's species was finally settled, Slabber's name *marinus* has to be used for the species: "Si un jour la certitude était acquise que seul *G. oxyuraea* existe en Hollande il faudrait reprendre en l'espèce le nom de SLABBER, le plus ancien nom jamais attribué à un Gnathiidé". This, however, is not quite correct. Slabber's (1769-1778) name *Oniscus Marinus* for this species, namely, is preoccupied by the name *Oniscus marinus* Linnaeus (1758), and therefore may not be used. Monod (1926, p. 537), however, thinks the name *Oniscus marinus* L. a nomen nudum, following Dahl (1916) in this respect. This is not true as *Oniscus marinus* really has been described by p. 174). It is evident therefore that Slabber's name *marinus* may not be used Linnaeus. Linnaeus's species at present is named *Idotea marina* (L.) (vid. for any Gnathiid.

Cyathura carinata (Krøyer)

This species is rather common in the brackish waters of the province Noord-Holland and also along the coasts of the Zuiderzee, it once has been recorded from the Spui, Meuse estuary (province Zuid-Holland). After the closure of the Zuiderzee in 1932 the species remained in this lake (IJselmeer), in which it was found up to 1939 and was rather common there, especially in the southern part, resisting thus with good result the diminishing salinity of the water.

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1) Since the above was written, a Praniza was found in a collection of zoological material presented by the Zoölogical Laboratory of the University at Utrecht to the Rijksmuseum van Natuurlijke Historie at Leiden. This Praniza was collected at Vere in the northern part of the island of Walcheren (province Zeeland) by the late prof. dr. P. N. van Kampen at an unknown date. The specimen, apart from being the first Gnathiid recorded from Dutch waters since the publication of Slabber's book, is of special interest as it is collected in the same island from where Slabber obtained his material and therefore may be considered a topotype of *Oniscus Marinus* Slabber. The examination of the specimen proved the above supposition to be true, as it belongs to *Paragnathia formica*. We therefore confidently may consider *Oniscus Marinus* Slabber to be identical with *Paragnathia formica* (Hesse).

Aega rosacea (Risso) (fig. 1)

A specimen of this species, which up till now was not known from the North Sea, was captured in March, 1938 near the mouth of the Nieuwe Waterweg, off Hoek-van-Holland. This specimen differs from the figure given by Schiœdte & Meinert (1879) of *Aega rosacea* from the Mediterranean by having the outer margin of the uropodal endopod not excavate before the apex. Bate & Westwood (1868) gave a figure of the type specimen of *Aega bicarinata* Leach, which species generally is identified with *Aega rosacea* (Risso). Like in my specimen, the excavation of the outer margin of the endopod of the uropod is not visible in Bate & Westwood's figure. Furthermore the difference in the breadth of the exo- and endopod of the uropod in the type of *Aega bicarinata* and in my specimen is not so large as figured by Schiœdte & Meinert for *Aega rosacea*. It is possible therefore that the specimens from the British and Dutch coasts brought to *Aega rosacea* are specifically distinct from the Mediterranean specimens of the typical *Aega rosacea*. If this is true then the name *Aega bicarinata* Leach has to be used for the British and Dutch specimens. As the above mentioned specimen from Hoek-van-Holland is the only representative of "*Aega rosacea*" at my disposal, I am not able to decide this question and therefore provisionally will use the name *Aega rosacea*.

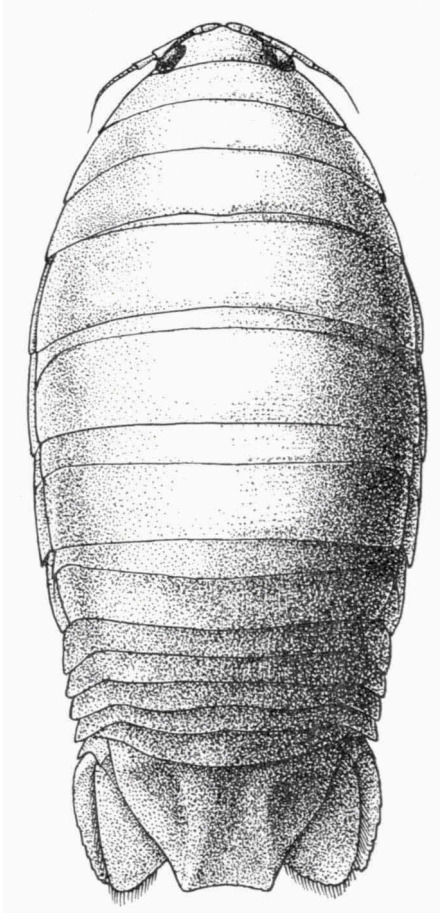

Fig. 1. *Aega rosacea* (Risso). Specimen from Hoek-van-Holland, dorsal view. × 3.

Aega psora (L.)

Maitland (1874) recorded this species from Den Helder, but his record was doubted by Hoek (1889). That the species, however, really belongs to

the Dutch fauna is proven by a specimen from IJmuiden in the collection of the Zoölogical Museum at Amsterdam.

Eurydice pulchra Leach

This species is common along the entire North Sea coast of the Netherlands, from the Frisian Island of Rottum to Flushing. It was recorded already by Slabber (1769-1778), who was the first author to describe the species.

Limnoria lignorum (Rathke)

The gribble is found all along our coasts, where wood is present, and where the salinity of the water is not too low. In an extensive report of the Netherlands Academy of Sciences (Hoek, 1893) it is shown that the species avoids water with too low salinity as for instance the Wester Scheldt, the brackish parts of the estuaries of the large rivers and the southern part of the Zuiderzee (south of the narrowest part of this inland sea). After the closure of the Zuiderzee it totally disappeared there.

Limnoria quadripunctata new species

Limnoria lignorum Kofoid & Miller, a.o., 1927, in Hill & Kofoid, Marine Borers Pacific Coast, p. 306 (p.p.), fig. 124.

The body is elongate ovate in outline, being 1 mm broad and 3 mm long. Like in *Limnoria lignorum* the head is rounded, with the front somewhat emarginate; the head partly is covered by the anterior part of the first free thoracic segment. This anterior part of the first thoracic segment is separated from the posterior part by a rather distinct transverse groove. The following segments are distinctly shorter than the first. The coxal plates are like in *Limnoria lignorum,* those of the second and third free thoracic segments namely are elongate quadrangular, those of the posterior segments end in a distinct posteriorly directed point. The thoracic segments consist of a smooth anterior half, and a posterior part, which is covered with numerous short and stiff setae. The abdomen in the fully stretched specimen is about ¾ of the length of the thorax (head excluded). The abdominal segments are about as broad as the thoracic segments. The first four of them are very short, in the median line the fifth is more than thrice as long as the fourth. The epimera of the 5 segments are well developed and end in a blunt posteriorly directed point. The epimera stand almost at right angles to the upper surface of the segments, so that they are not visible in dorsal view. The fifth segment is provided with a

strong median carina, which is single in its posterior part, but forms a fork anteriorly. The dorsal surface of the fifth segment at each side of the carina is deeply hollowed. As the epimera are a little excavate too, the line between the epimera and the segment proper is strongly pronounced. The telson is distinctly broader than long. Like in the other species of *Limnoria* the posterior margin is evenly and broadly convex. The upper surface is deeply concave, especially in the anterior part. The anterior part of the lateral margin is broadened and rather high. In the middle of the basal part of the telson four sharp tubercles are present. They are arranged in two submedian longitudinal rows. The two anterior tubercles are placed close near the anterior margin of the telson at each side of the median line. These anterior tubercles are very strong. The posterior pair is situated somewhat behind the anterior pair, they are about as far removed from the median line of the telson as the anterior tubercles are. Behind each of the posterior tubercles a rather indistinct longitudinal ridge is present. Laterally of the tubercles an oblique ridge may be seen at each half of the telson, starting from slightly behind the anterior margin of the telson near the base of the anterior tubercles and gently curving sidewards and backwards. Short stiff hairs are present all over the abdominal segments and the telson.

The eyes are distinct and are provided with about seven ocelli. The antennulae and antennae do not differ from those of *Limnoria lignorum*. The mouthparts too resemble those of that species; the mandible has a distinctly three-jointed palp; in the maxilliped the epipod is even shorter than that of *Limnoria lignorum*, resembling more that of *Limnoria septima* Barnard. The legs also show much resemblance to those of *Limnoria lignorum*. The first leg has several tubercles on the inner side of the merus and the ischium and a few on the outer side of the basis. In the third leg there is one distinct tubercle at the inner side as well as on the outer margin of the ischium; the merus bears on its inner margin one strong proximal and some rather indistinct distal tubercles, three tubercles are present on the inner margin of the carpus. The outer margin of basis and ischium is not serrate as it is in *L. septima*. The seventh leg strikingly resembles that of *L. lignorum*. The uropods have the same general shape as in *L. lignorum*. The exopod is hook-shaped, it is, however, distinctly smaller than in Rathke's species. The outer margin of the peduncular segment of the uropods is not crenulate as in *L. lignorum*, but smooth, showing only a broad and blunt tubercle just before the base of the exopod. Barnard's description of the uropod in *L. septima* agrees good with that of the present species.

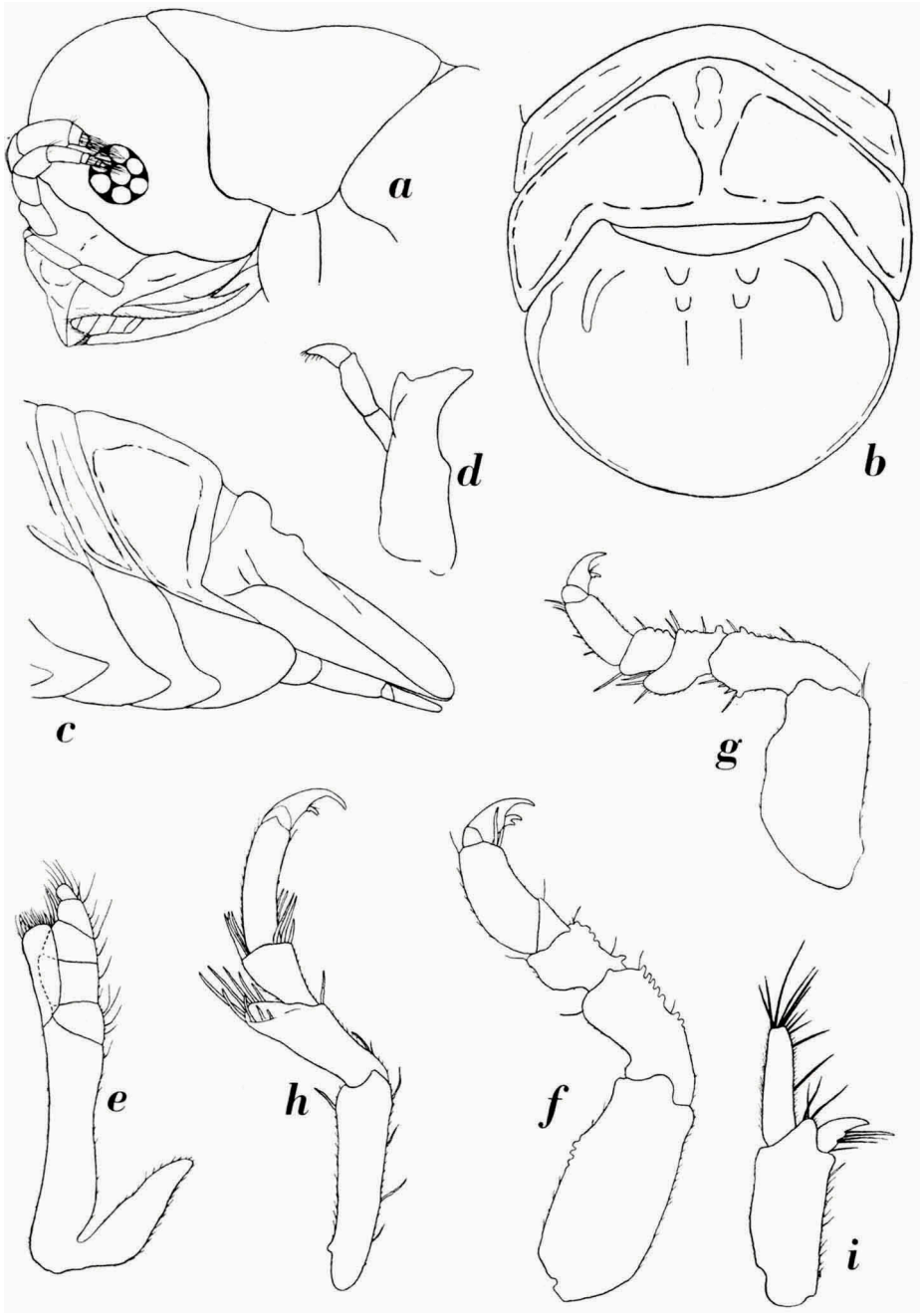

Fig. 2. *Limnoria quadripunctata* new species. a, anterior part of the body in lateral view; b, posterior part of the body in dorsal view; c, posterior part of the body in lateral view; d, mandible; e, maxilliped; f, first pereiopod; g, third pereiopod; h, seventh pereiopod; i, uropod. a-c, × 60; d-i, × 90.

The animals in life are whitish, with irregular markings of darker pigment, strongly resembling *L. lignorum*.

Up till now seven distinct species of *Limnoria* are accepted by most carcinologists. These species are: *Limnoria lignorum* (Rathke, 1799), *L. japonica* Richardson (1909), *L. septima* Barnard (1936), *L. segnis* Chilton (1883), *L. antarctica* Pfeffer (1887), *L. pfefferi* Stebbing (1904), and *L. andrewsi* Calman (1910). The present form belongs to the group containing *L. lignorum, L. septima* and (probably) *L. japonica*. The species of this group differ from the other four species by having the epipod of the maxilliped shorter than the second joint of the maxilliped. *Limnoria quadripunctata* differs from *Limnoria lignorum, L. septima* and *L. japonica* most conspicuously in the arrangement of the tubercles and ridges of the fifth abdominal segment and the telson. *Limnoria lignorum* has the fifth abdominal segment with a single and rather indistinct longitudinal median carina. A short longitudinal median carina is present in the basal part of the telson. These carinae are well shown in Harger's (1880, pl. 9 fig. 55) figure and are described by him (p. 375) as follows: "the first four segments [of the abdomen] are of equal length; the fifth is longer with a median elevation and a transverse depression on each side. The last segment is transversely oval or subcircular, broader than long, with the anterior margin raised, especially at the middle, where the elevation is continued a short distance on the segment, but posteriorly it is flattened." This description agrees with all specimens of *Limnoria lignorum* seen by me (originating from the Dutch coasts and from Curaçao). The basal median carina on the telson also is given in the figures of Bate & Westwood (1868, vol. 2, p. 351) and of Omer-Cooper & Rawson (1934, p. 29, pl. 1 fig. 4), it is mentioned in the description by the former two authors. The figures given by Hoek (1893, pl. 1 fig. 1) and Sars (1897, pl. 31) do not show this median carina at all, probably it is omitted by error. The presence or absence of such carinae is not discussed in Hoek's or Sars's descriptions of *Limnoria lignorum*, and it is very well possible that the carina was obscured in their specimens by dirt, clinging to the hairs of the telson. *Limnoria lignorum* furthermore differs from *Limnoria quadripunctata* in the third maxilliped, which has the epipod reaching farther forwards than in the present species, in the tuberculation of the pereiopods and in the shape of the uropod, which has the exopod larger and the outer margin of the peduncular segment crenulate.

Limnoria japonica shows more ornamentation on the fifth abdominal segment and telson than *L. lignorum*, but the arrangement of the ridges and tubercles is quite different from that of *L. quadripunctata*. According to

Richardson (1909, p. 95) the fifth abdominal segment "has two low median tubercles in longitudinal series", though she only figures one tubermedian tubercles in longitudinal series", though she only figures one tubercle there. The telson "has a large prominent tubercle in the median line near the base, and two prominent tubercles, close together, one on either side of the median line, about one-third the distance between the anterior and the posterior margin. These tubercles are continued in two low parallel ridges." The outer margin of the peduncular segment of the uropods is shown to be serrate in Richardson's figure of *L. japonica,* while it is entire in the present form.

In *Limnoria septima* Barnard (1936, p. 175, figs. 11, 12) the present species has its closest relative. The two species resemble each other in the shape of the uropods, but differ widely in the ornamentation of the fifth abdominal segment and the telson. Barnard describes these two joints as follows: "Segment 5 dorsally with 2 pairs of longitudinal ridges, the posterior pair joined behind, forming a U-shaped ridge. Telson concave, except in the centre where it is slightly convex, with strongly raised marginal rim; at the base a ∩-shaped ridge, followed by a pair of elongate longitudinal ridges; on either side of the ∩-shaped ridge a small tubercle, from which radiate short vermiculiform ridges."

Limnoria lignorum (Rathke) generally lives in wood near the low water mark, though it is recorded from depths up to 10 fms. The species has a worldwide distribution, it is known from the coasts of the Atlantic Ocean from the Gulf of St. Lawrence, Iceland, N. Norway and the White Sea to the Falkland Islands and S. Africa, it also is reported from the Baltic, the Mediterranean and the Black Sea. Furthermore it is known from the Red Sea, Australia, New Zealand, Hawaii, Bering Island, and the Pacific coast of America from Kodiak, Alaska to San Diego, Calif. It is possible, however, that some of the records are based on specimens of other species.

Limnoria japonica Richardson is recorded "from crevices in water-logged fragment of bamboo" at a depth of 163 fms., from the Japanese Sea off the eastcoast of Honshu (37° 23′ N, 137° 36′ E).

Limnoria septima Barnard too is reported from deeper water (185 and 250 fms.). It was collected from two localities within the Andaman Archipelago. It is not mentioned by Barnard whether the species is boring in wood or not.

The specimens on which the description of the present new species is based, were found living in an algae covered piece of driftwood (a small wooden board of 60 × 5.5 × 2 cm), which was washed ashore on the North Sea coast of the Dutch province of Zuid-Holland between the villages Kat-

wijk and Noordwijk, not far from Leiden (October 24, 1948, S. Kroonenberg & L. B. Holthuis leg.). The animals, more than 100 in number, were still alive when collected. After the description was made I could examine through the courtesy of Mr. J. A. W. Lucas a dried piece of wood collected by him on the North Sea shore between the villages Noordwijk and Noordwijkerhout (September 20, 1948). This piece of wood was heavily infested with a species of *Limnoria*, which also proved to belong to *Limnoria quadripunctata*. On September 20, 1948, as well as on October 24 of the same year many pieces of wood and other floating objects were washed ashore on the North Sea shore of the province Zuid-Holland by S. W. storms.

Limnoria quadripunctata seems to occur also in San Francisco Bay. Fig. 124 in Kofoid & Miller's treatise on the biology of the marine borers in Hill & Kofoid's (1927) "Marine Borers and their Relation to marine Construction on the Pacific Coast", distinctly shows that the specimens figured (at least those numbered 8 and 10) belong to *Limnoria quadripunctata*. The sculptation of the fifth abdominal segment and the telson being especially distinct in the figure of animal 10. The occurrence of the present species at two localities so widely apart as the Californian and the Dutch coasts makes it very probably that *Limnoria quadripunctata* occurs at several other localities but up till now has been overlooked or considered to be *Limnoria lignorum*.

Sphaeroma rugicauda Leach

Up till now all specimens of *Sphaeroma* collected in the Netherlands were brought to this species (with the exception of some records of *Sphaeroma serratum*, vid. there). Examination of the rather extensive *Sphaeroma* material from various parts of our country present in the collections of the Rijksmuseum van Natuurlijke Historie at Leiden and the Zoölogical Museum at Amsterdam showed, however, that except the well known *Sphaeroma rugicauda*, also *Sphaeroma hookeri* is a common inhabitant of the Dutch waters. Several records in Dutch literature dealing with *Sphaeroma "rugicauda"* entirely or partly are based on material of *Sphaeroma hookeri*.

Sphaeroma rugicauda is known from the former Zuiderzee, from where it disappeared after the closure, only some specimens were found in 1937 near the large sluices in the closing dam, where the salinity of the water is rather high. The species was known also from the brackish inland waters of the province Noord-Holland, but disappeared there too after the closure of the Zuiderzee, as the salinity of these waters then diminished considerably. *Sphaeroma rugicauda* also is found in the estuary of the Meuse in the provinces Zuid-Holland and Zeeland, where the water is brackish, but here too the salinity may not be too low.

Sphaeroma hookeri Leach

As already pointed out above, in Dutch literature this species has not been separated from the former. The species is rather common in our country and generally occurs in localities in which the salinity of the water is lower than in those where *S. rugicauda* is living. So for instance *Sphaeroma hookeri* was found in the Zuiderzee till long after the closure (in 1937 for instance several specimens have been found at the coast of the IJselmeer some distance north of Amsterdam). The species also occurs in the brackish inland waters of the province Noord-Holland and was found there long after *S. rugicauda* had disappeared. But *Sphaeroma hookeri* is most common in the brackish water ditches of the various islands of the provinces Zuid-Holland and Zeeland. It is found in these ditches together with the prawn *Palaemonetes varians* (Leach) and the Isopod *Idotea chelipes* (Pallas) (= *I. viridis*).

The specimens described by Pallas (1766) as *Oniscus conglobator* and in 1772 by the same author as *Oniscus globator* to all probability belong to the present species. Pallas namely stated that he found his species together with *Oniscus chelipes* (= *Idotea chelipes* = *I. viridis*) in brackish water ditches of England. In my material only *Sphaeroma hookeri* is found together with *I. chelipes* and never *S. rugicauda,* so that the identity of Pallas's species with *S. hookeri* becomes very probable. Pallas's descriptions and figures bring not much light in this question, from them one only can conclude that the species belongs either to *S. hookeri* or to *S. rugicauda.* This evidence I think not sufficient to change the name *hookeri* into *conglobator*; therefore Leach's name is still used here.

Sphaeroma serratum (Fabr.)

It still remains an open question whether *Sphaeroma serratum* really belongs to the Dutch fauna or not. Ritzema Bos (1874) reported *Sphaeroma serratum* from a pool on the beach of the Frisian Island of Ameland. According to the locality this specimen hardly can belong to another *Sphaeroma* species, as both *S. rugicauda* and *S. hookeri* do not occur in pure sea water. Hoek (1889) brings Ritzema Bos's specimen to *S. rugicauda,* without, however, giving the reasons for this. As Ritzema Bos's material is no longer extant, we can not control the correctness of either his or Hoek's identification.

In 1944 Schuurmans Stekhoven recorded *Sphaeroma serratum* from Elburg at the southcoast of the Zuiderzee, where it was collected in 1932. Too all probability Schuurmans Stekhoven's specimens do not belong to

Sphaeroma serratum at all, but to *Sphaeroma hookeri,* as the salinity of the water at Elburg at the time when Schuurmans Stekhoven's specimens were collected was very low (0.532 $^0/_{00}$ Cl) and as in specimens of *Sphaeroma hookeri* the teeth at the outer margin of the uropodal exopod often are much more distinct than in *S. rugicauda.* Final certainty in this matter, however, cannot be obtained as Schuurmans Stekhoven's specimens at present can not be found.

Dynamene bidentata (Adams)

One male specimen of this species was collected October 21, 1948 by Mr. A. Bloklander on the North Sea shore of the province Zuid-Holland, south of The Hague, between the villages Kijkduin and Terhei. The specimen was found in a bunch of corks of a kind which are generally used by French fishermen to float their nets. The corks probably were driven from the N.W. coast of France through the Channel by a heavy S.W. storm. The specimen is in a good condition. This is the first record of the species from the Dutch coasts and also I believe from the North Sea.

Idotea marina (L.)

Though the name *Idotea balthica* (Pall.) often is used for the present species, the name *Idotea marina* is the correct one. *Oniscus marinus* of Linnaeus is certainly no nomen nudum as Monod thought (vid. p. 165). Linnaeus's (1758) description runs as follows:
"O. [niscus] semicylindricus, cauda ovato-oblonga integra. *It. wgoth.* 190. *Habitat in* Oceano *Norvegico.*"

On p. 190 of his "Wästgöta-Resa" Linnaeus (1747) gives a more extensive description of his *Oniscus marinus*:

"ONISCUS semicylindraceus, caudae segmento ovato oblongo integro, är en liten Gråsugga; har 7 fötter på hwardera sidan, men dermed skiljes hon ifrån de andra, at hon icke är oval, utan lik en half Cylinder, dertil med föga större, än en lus. Stjerten består af et enda aflångt stycke, som är utan fötter." (Oniscus ... is a small woodlouse; it has seven legs at each side, but differs from the other species in that it is not oval, but like a half cylinder, and moreover is slightly larger than a louse. The tail consists of a single elongate piece, which bears no legs.)

Miers (1881) reports a specimen of the present species, which was present in the Linnean Cabinet of the Linnean Society of London; this specimen was provided with a label bearing the name *marinus* in the handwriting of Linnaeus. Herewith the identity of Linnaeus's *Oniscus marinus*

is finally settled. Dahl (1916) does not agree with Miers and uses the name *marinus* for *Jaera albifrons,* which he, following Sars (1897) in this respect, named *Jaera marina*; moreover Dahl remarks that the definition of Linnaeus fits best for *Limnoria lignorum.* Dahl doubtless supposed that Linnaeus with his: "cauda ovato-oblonga integra" meant to describe a telson without teeth, in my opinion, however, Linnaeus meant to indicate that the "tail" was not segmented, that it consisted of only one piece, as also is stated in his Swedish description and which agrees good with the *Idotea* species. *Oniscus marinus* was already identified with *Oniscus balthicus* Pallas by Fabricius (1781, 1787, 1793, 1798) and Gmelin (1789).

Rathbun (1904, p. 171) shows that the name *Idotea* Weber (1795) was published before *Idotea* Fabricius (1798) and that the two species included by Weber in his genus: *I. adactila* and *I. armigera* belong to *Hippa adactyla* and *Emerita emerita* respectively; they belong to the Crustacea Decapoda Anomura. The name *Idotea* is, however, not used for these Anomura as both the names *Hippa* Fabricius (1787) and *Emerita* Meuschen (1778) are older than the name *Idotea.* Rathbun put forward the opinion that *Idotea* Weber is a synonym of *Emerita* and therefore may not be used for the present Isopod genus. Here, however, she makes a mistake: Weber's name can not preoccupy that of Fabricius, as it is not valid. Article 25 of the International Rules of Zoological Nomenclature namely states that a generic name only is valid, when it is published and accompanied by an indication, or a definition, or a description. Weber's names are neither accompanied by a description nor by a definition. Opinion 1 of the International Rules of Zoological Nomenclature gives an explanation of the word indication, which "With regard to generic names [is] (1) a bibliographic reference, or (2) a definite citation of an earlier name for which a new name is proposed, or (3) the citation or designation of a type species." As Weber's name is not proposed for an older name, and he, moreover, gives no bibliographic reference to a description or definition and does not indicate a type species, his name is invalid (a similar case, namely of the genus *Pallinurus* Weber, 1795, has been extensively dealt with by Hemming, 1944, p. 82). There is no reason therefore not to use the name *Idotea* Fabricius (1798) for the present genus. The name *Idothea* Fabricius (1796) used by Fabricius in the index to the Entomologia systematica is a nomen nudum, as it refers to the then unpublished Supplementum.

The name *Oniscus tridens* Scopoli (1763) often is regarded a synonym of the present species. This is not true, however, as Scopoli's specimens came from the Adriatic, and therefore belong to the species named generally at present *Idotea basteri* Audouin (1826). As Scopoli's name is

older than that of Audouin, it has to be used for the Mediterranean species, which thus has to bear the name *Idotea tridens* (Scopoli, 1763).

Idotea marina is one of the most common Isopods of our coasts. It occurs all along the Dutch North Sea coast, furthermore it is found also in the Waddenzee and the northern part of the Zuiderzee, from the latter locality it disappeared after the closure.

Idotea chelipes (Pallas)

Idotea chelipes, perhaps better known as *I. viridis,* is reported from various brackish waters in our country, such as the coasts of the Zuiderzee before and a short time after the closure; the species is most common, however, in the brackish water ditches of the islands in the estuaries of the Meuse and the Scheldt in the provinces Zuid-Holland and Zeeland. In these inland ditches the species occurs together with *Sphaeroma hookeri* and the prawn *Palaemonetes varians.*

The specimen recorded by Schuurmans Stekhoven (1944) as *Idothea pelagica* Leach from Enkhuizen (Zuiderzee), does not belong to that species but to *Idotea chelipes,* as I could ascertain when examining Schuurmans Stekhoven's material.

The trivial name *chelipes* is used here because *Oniscus chelipes* described by Pallas (1766) without any doubt is identical with the present species, to which mostly the name *Idotea viridis* (Slabber) is given. Pallas gave the following description:

"*Corpus* semipollicare, subsemicylindricum, seu lineari-depressum, segmentorum 7; e quibus primum & ultimum paulo breviora.

Caput corpore angustius. *Antennae* exteriores dimidio corpore breviores, 4 articulorum, praeter filum setaceum terminale. *Intermediae* minimae.

Caudae segmenta exilia 3, subaequalia. *Scapha* oblonga, convexa, apice obsoletissime tridentata. *Valvulae* subtus lanceolatae, exterius per totam longitudinem adnatae, arcteque conniventes, & includentes *vesiculas* scapha breviores, oblongo-cylindricas, obtusas, numerosas.

Pedes septem parium, omnes subparalleli, longiusculi, articulo subcheliformi, nec tamen tumidiore terminati, subaequales; sex tamen postici sensim paulo longiores, retrorsumque versi.

Color fuscescens, magis minusve cinereo dilutus; fascia plerumque dorsali pallida. Longitudo 6½‴."

The most characteristic feature is the obsolete tridentate telson, which is essential for the present species. The fact that Pallas described his specimens from brackish water ditches in England and Zeeland entirely confirms the identity of *Oniscus chelipes* with *Idotea viridis.* Pallas (1772)

brings his species later to *Oniscus linearis*, this, however, is not correct as is distinctly shown by the shape of the telson and the antennae; this error is not so strange, because *I. chelipes* is very slender in shape (Sars for instance figured the species as new under the name *Idothea angusta*), also some later authors made the same error.

The name *Oniscus chelipes* Pallas (1766) is older than the name *Oniscus viridis* Slabber (1769-1778) and therefore the former name has to be used. The name of the present species thus becomes *Idotea chelipes* (Pallas).

Idotea granulosa Rathke

This species is recorded here for he first time from the Dutch coast; it is, however, not rare there. It is known from the entire North Sea coast, from Den Helder to Flushing and Breskens. Up till now it was generally confounded by various Dutch authors with either *I. marina* or *I. chelipes*.

Idotea pelagica Leach

Up till now this species is not known from the Netherlands. Schuurmans Stekhoven's (1944) record of "*Idothea pelagica*" from Enkhuizen (captured in 1932) is not correct as the specimens identified by this author as *I. pelagica* in reality belong to *I. chelipes*, a species rather common in the Zuiderzee (vid. p. 176).

Idotea emarginata (Fabr.)

Maitland (1874) reported this species from the Dutch North Sea coast near Katwijk (in the province Zuid-Holland, near Leiden), but the correctness of his identification was doubted by Hoek (1889). In the collection of the Rijksmuseum van Natuurlijke Historie at Leiden a specimen of this species from Den Helder is present. Furthermore the author collected a large specimen of this species on the beach between the villages Katwijk and Noordwijk on the North Sea shore. There is therefore no reason whatever to doubt Maitland's identification as long as his material cannot be examined. The species now at least is positively established as belonging to the Dutch fauna.

Idotea linearis (Linn.)

The species is common all along our coasts, where the salinity is not too low. It is known from the entire North Sea coast, from the Frisian island of Rottum to the island of Walcheren (province Zeeland); it furthermore occurs in the Waddenzee and was present in the northern part of the Zuiderzee before the closure.

Asellus aquaticus (L.)

Asellus aquaticus is common in fresh and sometimes in slightly brackish waters throughout the country; it has been found in all provinces.

The specimens recorded by Schuurmans Stekhoven (1944) from a ditch of the island of Schokland in the IJselmeer (collected in 1939) under the name *Janira maculosa* do not belong to that species, but to *Asellus aquaticus* as was shown by examination of Schuurmans Stekhoven's material. It would be very peculiar that a species as *Janira maculosa,* which lives at rather large depths in the sea should be found in a fresh water ditch of an island in the former Zuiderzee more than 7 years after the closure.

Asellus meridianus Racov.

This species up till 1919, when Racovitza described it as new, was not separated from *Asellus aquaticus.* In 1933 it was recorded for the first time from the Netherlands. At present it is known from a large part of our country, namely from all provinces except Groningen, Drente and Zeeland. This species and the previous often are found living together.

Janira maculosa Leach

Koumans (1928) reported upon material of this species from Walcheren (province Zeeland), it is to be regretted that Koumans's material can no longer be found in the Rijksmuseum van Natuurlijke Historie at Leiden. As already pointed out under *Asellus aquaticus,* the specimens recorded by Schuurmans Stekhoven (1944) as *Janira maculosa* from Schokland in reality belong to *Asellus aquaticus.* The only Dutch record therefore remains that of Koumans. Hoek (1889) recorded the species from Borkum (German Frisian Islands).

Jaera albifrons Leach

This species is very common in salt and brackish water, it even occurs in water with a very low salinity. In our country it is known from the entire North Sea coast, from brackish water in the N.W. part of the province Friesland, from the coasts of the Zuiderzee before and after the closure (till 1937), from the more or less brackish inland waters of the provinces Noord- and Zuid-Holland and from the brackish water ditches of the various islands of the province Zeeland.

Ligia oceanica (L.)

Ligia oceanica is known from many places on the Dutch coasts of the

North Sea and Waddenzee, from Delfzijl (province Groningen) to Breskens (province Zeeland), it also lived in the Zuiderzee, up to 4 years after the closure, while in the brackish inland waters of the province Noord-Holland it was met with a long time (till 1939).

Ligia exotica Roux

In the unidentified collection of the Rijksmuseum van Natuurlijke Historie at Leiden a jar labelled "In house, Amsterdam, March, 1936" was present. This jar contained a specimen of *Oniscus asellus* L. and one of *Ligia exotica* Roux. The latter species certainly does not belong to the Dutch fauna, but may have been introduced by means of ships into the Amsterdam harbour.

Ligidium hypnorum (Cuv.)

This species is known from the southern and central provinces of the Netherlands, up till now it has not yet been recorded from the provinces Friesland, Groningen and Overijsel.

Trichoniscus pusillus Brdt.

Trichoniscus pusillus is found in the provinces Groningen, Drente, Gelderland, Noord-Holland, Zuid-Holland, Noord-Brabant and Limburg. It probably also occurs in the other provinces, but may have been overlooked by its small size.

Trichoniscus pygmaeus Sars

One specimen of this species has been found in the greenhouses of the Royal Palace "Het Loo" near Apeldoorn (province Gelderland), and three in greenhouses of the "Laboratorium voor Technische Botanie" (Laboratory for Technical Botany) at Delft.

Cordioniscus stebbingi (Patience)

Cordioniscus is known in our country only from greenhouses (Amsterdam, Leiden, The Hague, Delft and Baarn).

Hyloniscus riparius (Koch)

Like the previous species also this form is known only in the Netherlands from greenhouses (Utrecht).

Trichoniscoides leydigii (Weber)

This species is only known from Weber's (1881 a, b) description and figures of material from the coast of the Zuiderzee near Amsterdam. No specimen of this species nor of the genus has afterwards been found in the Netherlands and no additional information can be given of this species, as the type material is no longer extant.

Androniscus dentiger Verhoeff (fig. 3)

When Verhoeff in 1908 erected the genus *Androniscus,* the species *A. dentiger* and *A. weberi* were inserted by him in that genus as new species. *Androniscus weberi* was based on the specimens described by Weber (1881 a, b) as *Trichoniscus roseus.* Verhoeff thought this species to differ from *A. dentiger* by missing the tooth at the inner margin of the endopod of the second pleopod of the male, as this tooth was not figured by Weber. Verhoeff is followed by Wächtler (1937) in this respect, though Dahl (1916) supposed the two species to be identical, as he thought it probable that Weber had overlooked the tooth in his material. The specimens described by Weber as *Trichonicus roseus* still are extant, they are preserved in the Zoölogical Museum at Amsterdam. Examination of this material clearly showed that Dahl was right, as a distinct tooth is present at the endopod of the second pleopod of the male specimens of the type material (fig. 3). The identity of *A. weberi* with *A. dentiger* thus is finally settled and the name *A. weberi* must fall.

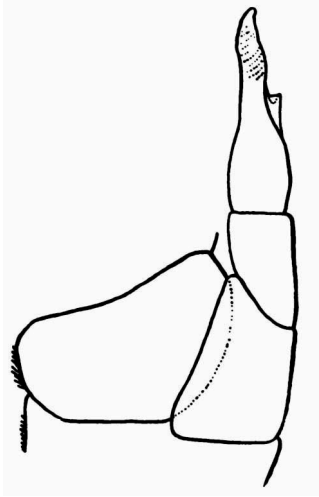

Fig. 3. *Androniscus dentiger* Verh. Second pleopod of male type specimen of *Androniscus weberi* Verh. × 75.

Androniscus dentiger is known in our country in the open air from the shore of the Zuiderzee (Weber, 1881 b) and from Leiden. It also has been found in the greenhouses of the Botanical Gardens of the Leiden and Amsterdam Universities.

Haplophthalmus danicus Budde-Lund

This species is known from five localities in our country in the open air, namely from the provinces Gelderland, Noord-Holland (Amsterdam), and Zuid-Holland (near Leiden and The Hague). It also is found in

numerous greenhouses. The species was recorded by Weber (1881 a, b) and Hoek (1889) under the name *Haplophthalmus mengei,* this latter species, however, so far has not been found in the Netherlands.

Oniscus asellus L.

A very common species, which is found in all provinces of the Netherlands, often in large numbers.

Philoscia muscorum (Scop.)

Also *Philoscia muscorum* is met with throughout our country, it is known from all provinces.

Halophiloscia couchii (Kinahan)

It is not certain whether this species belongs to the Dutch fauna or not. Ritzema Bos (1874) namely, in a study on Isopoda and Amphipoda of the Netherlands, mentions a specimen of *"Philoscia muscorum",* which he found in a brackish water ditch close near the northcoast of the province Groningen; this specimen was more elongate and also lighter in colour than typical specimens of *Philoscia muscorum.* Hoek (1889) pointed to the probability that Ritzema Bos's specimen should belong to *Halophiloscia couchii.* As, however, this latter species up till now has not been recorded from our country and as Ritzema Bos's specimen is no longer extant, no certainty can be obtained in the question if *Halophiloscia couchi* is a Dutch species or not.

Chaetophiloscia balssi Verhoeff

This species has been found in the greenhouses of the Amsterdam Botanical Gardens.

Platyarthrus hoffmannseggii Brdt.

Platyarthrus hoffmannseggii is known from several provinces of the Netherlands (Utrecht, Noord-Holland, Zuid-Holland, Zeeland, and Limburg), while it, moreover, was found in 1943 in the newly won land in the N.E. part of the Zuiderzee (Noordoost polder). It probably will be found in many other provinces too, but so far perhaps is overlooked there. Many observations on the biology of this species have been made by Wasmann, who worked especially on material from the province Limburg. *Platyarthrus* is found in the Netherlands in the nests of the following species of ants: *Formica rufa* L., *Formica sanguinea* Latr., *Formica fusca* L., *Formica*

rufibarbis Fabr., *Formica pratensis* Deg., *Lasius fuliginosus* (Latr.), *Lasius niger* (L.), *Lasius flavus* (Fabr.), *Lasius umbratus* (Nyl.), *Lasius brunneus* (Latr.), *Myrmica scabrinodus* Nyl., *Myrmica laevinodus* Nyl. and *Tetramorium caespitum* (L.).

Trichorhina monocellata Meinertz

Only found in greenhouses in Utrecht, and in Amsterdam.

Nagurus new genus

Nagurus cristatus (Dollf.)

This species too is known in our country only from greenhouses. In my 1946 paper I have recorded it under the name *Nagara cristata* from greenhouses in Amsterdam and Rotterdam. Since the publication of that paper a specimen of this species has come to hand, which was collected in October, 1944 in the greenhouses of the "Cultuurtuin voor Technische Gewassen" at Delft.

In 1908 Budde-Lund erected a new genus *Nagara* of which *Porcellio cristatus* Dollfus was the type. The species afterwards generally was named *Nagara cristata* (Dollfus). The generic name *Nagara,* however, may not be used for the present genus, as it is used as early as 1865 by Walker for a genus of Lepidoptera. As, as far as I can ascertain, no other name has been given to the present genus, a new one is needed, for which I propose his paper on the Kew Isopoda mentions a species as being "probably referable to *Nagurus cristatus,* B.-L." He obviously meant to indicate the present species with this name, but this cannot be made certain as he gave no further *Nagurus* nom. nov. This name is chosen here, because Bagnall (1909) in indications, so that his name *Nagurus* either is a clerical error or a nomen nudum, and there is no objection whatever to use it here as a new name for the genus. The type species of this genus is: *Porcellio cristatus* Dollfus, 1889, Notes Leyden Mus., vol. 11, p. 91, pl. 5 fig. 2.

Cylisticus convexus (De Geer)

Budde Lund (1885) was the first to record this species from the Netherlands. Some living specimens of this species were captured in the building of the Zoölogical Museum at Amsterdam.

Trachelipus rathkei (Brandt)

The generic name *Trachelipus* is seldom used for this species, which more often is named *Tracheoniscus rathkei.* Nevertheless *Trachelipus* is

the correct name. In 1908 namely Budde-Lund divided the genus *Porcellio* into several subgenera, one of which he named *Trachelipus* and for which he indicated as type *Porcellio rathkei* Brdt. Van Name (1936) already pointed out that the name *Trachelipus* Budde-Lund (1908) is older than the name *Tracheoniscus* Verhoeff (1917); the American author, however, nevertheless uses Verhoeff's name because Budde-Lund "gave no diagnosis or reasons for the separation of the group".

According to Article 25 of the International Rules of Zoological Nomenclature a generic name, published before January 1, 1930 is valid, if it is published and accompanied by an indication, or a definition, or a description, if this is the first valid name for the genus and if the author has applied the principles of binary nomenclature. All these 3 conditions are fulfilled in the present case. The new subgeneric name, though not accompanied by a description or definition is provided with an indication because Budde-Lund indicated the type species (cf. Opinion 1 of the International Commission on Zoological Nomenclature). As far as I know no other generic or subgeneric name is given to this group before 1908. Budde-Lund's name *Trachelipus* therefore is valid and has to be used. The changing of *Tracheoniscus* into *Trachelipus* will not cause much confusion, as the name *Tracheoniscus* was rather recently proposed by Verhoeff.

Trachelipus rathkei is known from several localities throughout our country (from the provinces Friesland, Overijsel, Gelderland, Noord-Holland, Zuid-Holland, Zeeland, Noord-Brabant, and Limburg). It is, however, much less common than *Oniscus asellus* or *Porcellio scaber*.

Porcellionides pruinosus (Brdt.)

I follow Van Name (1936) in using the name *Porcellionides* Miers (1877) here instead of the name *Metoponorthus* Budde-Lund (1885) as Miers's name is older.

This species is known from various localities in the provinces Friesland, Groningen, Noord-Holland, Zuid-Holland, Zeeland, Noord-Brabant, and Limburg.

Porcellio spinicornis Say

This species is rather common throughout the country (it is known from all provinces except Drente), where it often is found within houses.

Porcellio scaber Latr.

With *Oniscus asellus* this is the most common woodlouse of the Nether-

lands. It may be found almost everywhere and often occurs in large numbers. It is known from all provinces.

Porcellio dilatatus Brandt

The species is found throughout the country, but is much less common than the previous species and generally occurs in human settlements. It is not yet recorded from the provinces Drente, Overijsel and Zeeland.

Porcellium conspersum (Koch)

This species is recorded here for the first time from the Netherlands. It was found in humid woods in the southern and central part of the province Limburg.

Armadillidium album Dollfus

Only found twice on the North Sea coast of the Frisian Island of Texel.

Armadillidium pictum (Brdt.)

Since the publication of my paper on the Dutch Armadillidiidae a sixth species of the genus *Armadillidium* has been found in the Netherlands. In June 1946 namely several specimens were collected by Dr. C. O. van Regteren Altena near the village of Geulem in the southern part of the province Limburg. In August of that same year a number of specimens of that same species were found in the same general region, namely near the village of St. Gerlach (L. van der Hammen & L. B. Holthuis leg.). Finally several specimens of the species were collected near Vlodrop in the central part of the province Limburg in September, 1948 during an excursion organized by the Rijksmuseum van Natuurlijke Historie at Leiden. The species was already known from Belgium and W. Germany, but now for the first time is recorded from the Netherlands.

Armadillidium pulchellum (Zenker)

This species has been found in the eastern part of the province Overijsel and the central and southern parts of the province Noord-Brabant.

Armadillidium vulgare (Latreille)

Common throughout the country (only not yet found in the province Drente).

Armadillidium opacum (Koch)

Only known from the southern part of the province Limburg, but rather common there.

Armadillidium nasutum B.-L.

Very common in greenhouses, once recorded from the open air in the southern part of the province Limburg.

Bopyrus squillarum Latreille

Though this species has once been recorded in literature from the Netherlands, I did not find any specimen in all the Dutch Palaemonid material present in the various Musea of the Netherlands.

Athelges paguri (Rathke)

An adult female of this species, carrying a male at the abdomen was found on the soft abdomen of a specimen of *Pagurus bernhardus* (L.) from the Oostgat, a deep close near the S.W. shore of the Island of Walcheren (province Zeeland). This is the first time that the species is recorded from the Dutch coast.

Prodajus ostendensis Gilson

When describing this species as new Gilson (1908) mentioned the occurrence of it along the westcoast of the European continent from Hoek-van-Holland to Cape Griz Nez (N. France). The species thus belongs to the Dutch fauna. I have seen no specimens of it.

TANAIDACEA

Apseudes talpa (Montagu, 1808) (fig. 4)

Two females of this species, one being ovigerous, were found alive on a piece of cork, which was washed ashore on the beach north of Scheveningen, in January, 1949, by Mr. A. Bloklander. This is the only find of this species in the Netherlands.

The specimens agree perfectly with Walker's (1897) description and figures of *Apseudes hibernicus* and differ from Sars's (1886) description and figures of *Apseudes talpa*. The differences between *Apseudes talpa* of Sars and *Apseudes hibernicus* have been pointed out by Walker (1897) and Monod (1925). According to the data given by these two authors my material belongs to *Apseudes hibernicus*.

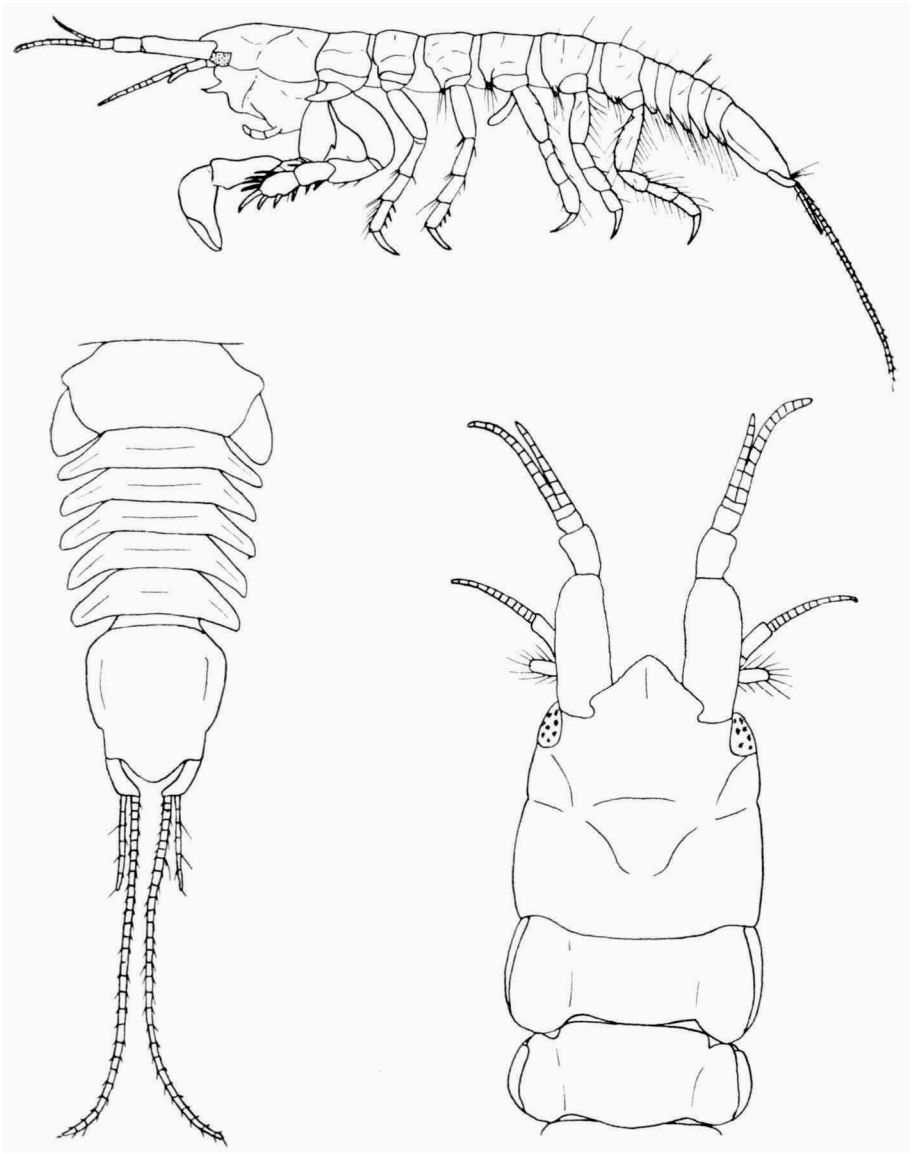

Fig. 4. *Apseudes talpa* (Montagu). Above: female in lateral view. Below: left fig., abdomen of female in dorsal view: right fig., anterior part of body of female in dorsal view. Upper fig., × 15; lower figs., × 24.

The figure given by Montagu (1808) of his *Cancer* (*Gammarus*) *talpa* is very poor and quite insufficient to identify his material. Fortunately, however, H. Milne Edwards (1837, vol. 18, pl. 62 fig. 1) gives a new and

better figure of Montagu's type. This figure shows that the specimen has the telson rather short and broad and tapering posteriorly like in *Apseudes hibernicus*. I am therefore quite certain that Montagu's and Walker's specimens belong to one and the same species, which thus has to bear the name *Apseudes talpa* (Mont.). Walker's name *Apseudes hibernicus* becomes a synonym of Montagu's name. The specimen described and figured by Sars (1886) under the name *Apseudes talpa* belongs to a species, which is distinct from the real *Apseudes talpa*. No name is available for Sars's species, so that I propose here the name **Apseudes sarsi** nom. nov. for it.

The differences between the two above mentioned species are:

Apseudes sarsi nom. nov.	*Apseudes talpa* (Mont.)
Rostrum with a spinous point.	Rostrum ending in a blunt point.
Ventral spines on all thoracic segments.	Ventral spines on last thoracic segment only.
Oostegites on third, fourth and fifth thoracopods.	Oostegites on sixth thoracopod.
Telson twice as long as broad.	Telson slightly longer than broad.
Telson of the same breadth throughout its length or even widening posteriorly.	Telson narrowing posteriorly.
Length up to 10 mm.	Length 5 to 6 mm.

Apseudes talpa is known at present with certainty only from the west-coast of Ireland (Walker, 1897; Tattersall, 1905), from the English south-coast (Montagu, 1808; Bate & Westwood, 1868), from the Dutch coast (present record) and from the northwest coast of France (Monod, 1925). *Apseudes sarsi* is known with certainty from the coast of Morocco (Monod, 1925) and from Sicily (Sars, 1886). It is possible that *Apseudes talpa* is a northern form and *A. sarsi* a southern.

Tanais cavolinii H. Milne Edwards

The only Dutch specimen of this species known at present is that recorded by Koumans (1928) from the Scheldt (province Zeeland).

Heterotanais oerstedi (Krøyer)

This species has been recorded only from the brackish waters of the northern part of the province Noord-Holland.

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1) The dates of publication of the various parts of Sars's monograph are as follows:
1896: pp. 1-40, pls. 1-16.
1897: pp. 41-144, pls. 17-64.
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1899: pp. i-x, 233-270, pls. 97-100, suppl. pls. 1-4.