NOTES ON TERRESTRIAL ISOPODA COLLECTED IN DUTCH GREENHOUSES

by

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On the initiative of Dr. A. D. J. Meeuse investigations were made on the fauna of the greenhouses of several Botanic Gardens in the Netherlands; material was also collected in greenhouses of other institutions and in those kept for commercial purposes. The isopods contained in the collection afforded many interesting species, so for instance six of the species are new for the Dutch fauna, viz., *Trichoniscus pygmaeus* Sars, *Hyloniscus riparius* (Koch), *Cordioniscus stebbingi* (Patience), *Chaetophiloscia balssi* Verhoeff, *Trichorhina monocellata* Meinertz and *Nagara cristata* (Dollfus). Before the systematic review of the species a list of the localities from which material was obtained is given here with enumeration of the collected species.

1. Greenhouses of the Botanic Gardens, Amsterdam; October 24, 1942; leg. A. D. J. Meeuse (*Cordioniscus stebbingi, Chaetophiloscia balssi, Porcellio scaber, Nagara cristata, Armadillidium vulgare*).

2. Greenhouses of the "Laboratorium voor Bloembollenonderzoek" (Laboratory for Bulb Research), Lisse; June 13, 1943; leg. A. D. J. Meeuse (*Oniscus asellus, Porcellio scaber, Porcellionides pruinosus, Armadillidium vulgare, Armadillidium nasutum*).

3. Greenhouses of the Botanic Gardens, Leiden; May, 1924-November, 1942. leg. H. C. Blöte, L. B. Holthuis, F. P. Koumans, A. D. J. Meeuse, A. L. J. Sunier and W. Vervoort (*Androniscus dentiger, Cordioniscus stebbingi, Haplophthalmus danicus, Oniscus asellus, Porcellio scaber, Porcellionides pruinosus, Armadillidium vulgare, Armadillidium nasutum*).

4. Greenhouses of the Zoological Gardens, The Hague; November 4, 1942; leg. A. D. J. Meeuse (*Cordioniscus stebbingi, Oniscus asellus, Porcellio dilatatus*).

5. Greenhouse for grape culture, Loosduinen, near The Hague; October 30, 1942; leg. A. D. J. Meeuse (*Porcellio scaber*).

6. Greenhouses of the "Cultuurtuin voor Technische Gewassen behoo-

rende bij het Laboratorium voor Technische Botanie" (Garden for technical important plants of the Laboratory for Technical Botany), Delft; September-December, 1942; leg. A. D. J. Meeuse, B. J. D. Meeuse and G. van Rossem (*Cordioniscus stebbingi, Haplophthalmus danicus, Porcellio scaber, Armadillidium vulgare, Armadillidium nasutum*).

7. Greenhouses of the experimental garden „Naaldwijk", Naaldwijk (province South Holland); August 17, 1944; leg. A. D. J. Meeuse (*Asellus aquaticus, Oniscus asellus, Porcellio scaber, Porcellionides pruinosus, Armadillidium vulgare*).

8. Greenhouses of the Zoological Gardens „Blijdorp", Rotterdam; October, November, 1942; leg. L. P. Pouderoyen (*Porcellio scaber, Nagara cristata, Armadillidium vulgare, Armadillidium nasutum*).

9. Greenhouses of the "Cantonspark", Baarn; January 30, 1943; leg. J. van Dalsum (*Cordioniscus stebbingi, Haplophthalmus danicus, Porcellio dilatatus*).

10. Greenhouses of the Botanic Gardens, Utrecht; September-December, 1942; leg. J. van Dalsum, R. A. Maas Geesteranus and A. D. J. Meeuse (*Hyloniscus riparius, Oniscus asellus, Trichorhina monocellata, Porcellio scaber, Armadillidium vulgare*).

11. Greenhouses of the Arboretum, Wageningen; October, 1942-January, 1943; leg. A. F. H. Besemer and A. D. J. Meeuse (*Armadillidium nasutum*).

12. Greenhouses of the Royal Palace "Het Loo", Apeldoorn; August 19, 1944; leg. B. J. D. Meeuse (*Trichoniscus pygmaeus, Porcellio dilatatus, Armadillidium vulgare*).

Systematic Review of the Species

ASELLIDAE

Asellus aquaticus (L.)

Oniscus aquaticus Linnaeus, 1758, Syst. Nat., ed. 10, p. 637.
Naaldwijk: 1 specimen.

Specimens of an *Asellus* species were also observed by Dr. A. D. J. Meeuse in waterbasins of the greenhouses of the Botanic Gardens at Leiden. As no material was collected the identity of the specimens is not known with certainty. *Asellus aquaticus* is recorded by Holzapfel (1932) from greenhouses at Bern. The species is an inhabitant of North, Central and Western Europe. It is common throughout the Netherlands and often is found together with *Asellus meridianus* Racov.

TRICHONISCIDAE

Trichoniscus pygmaeus G. O. Sars

Trichoniscus pygmaeus G. O. Sars, 1899, Account Crust. Norway, vol. 2, p. 162, pl. 72 fig. 2.
Apeldoorn: 1 specimen.

The present species, which up till now was not yet recorded from the Netherlands, is represented by one male specimen only. In literature the species is recorded from greenhouses in the following localities: Denmark (Meinertz, 1932), Bonn (Graeve, 1914, as a separate variety *Tr. pygmaeus* var. *horticola*), Bern (Holzapfel, 1932, as *Tr. horticola*), London, Kew (Bagnall, 1909a), Dublin (Bagnall, 1909b), Belfast (Foster, 1911a). In the open the species is known from Northern and Central Europe.

Hyloniscus riparius (Koch)

Itea riparia Koch, 1838, in Panzer, Deutschlands Insekten, pt. 162, p. 17.
Utrecht: 12 specimens.

The species is rather abundant in the material from the greenhouses of the Botanic Gardens at Utrecht, while it is entirely absent in the materials from the other places. The form often is reported from greenhouses: Warsaw and Posen (Moszynski & Urbanski, 1932), Berlin (Boettger, 1929), Greifswald (Herold, 1925), Copenhagen (Meinertz, 1932), Zürich and Geneva (Carl, 1911), Bern (Holzapfel, 1932). The species was named by Carl (1911) *Trichoniscus* (*Hyloniscus*) *montanus*, while Holzapfel (1932) and Meinertz (1932) both followed Verhoeff (1908c) in using the name *Hyloniscus vividus* (Koch), which according to Dahl (1916a) and Méhely (1929) has to be used for another species.

Outside hothouses the species is known from Poland, Hungary, the northern Balkan, Austria, South, Central and East Germany and from Switzerland.

Androniscus dentiger Verhoeff

Androniscus dentiger Verhoeff, 1908, Zool. Anz., vol. 33, p. 139, fig. 10.
Leiden: 22 specimens.

Except in the hothouses, this species was also collected in the Botanic Gardens of Leiden in the open. The species is reported by Weber (1881) and Hoek (1889) as *Trichoniscus roseus* (Koch) from the coast of the Zuiderzee and from a garden in Leiden. The records from greenhouses are: Denmark (Meinertz, 1932), Berlin (Boettger, 1929), Bern (Holzapfel, 1932), Geneva (Carl, 1911). Carl mentions the species under the

name *Trichoniscus* (*Androniscus*) *alpinus*; according to Dahl (1916a), however, *T. alpinus* is a synonym of *T. dentiger*.

In the open the species is known from Austria, Switzerland, Italy, N. France, Luxemburg, Belgium, Holland, England.

Cordioniscus stebbingi (Patience)

Trichoniscus stebbingi Patience, 1907, Journ. Linn. Soc. Lond., Zool., vol. 30, p. 42, pl. 7.
Amsterdam: 9 specimens; Leiden: about 70 specimens; The Hague: 3 specimens; Delft: 5 specimens; Baarn: 2 specimens.

This species is, except one record from near Glasgow in the open, only known from greenhouses. The records are: Berlin (Boettger, 1929, as a separate variety *Cordioniscus stebbingi* var. *boettgeri* Verhoeff), Bonn (Graeve, 1914, as a separate variety *Cordioniscus stebbingi* var. *rhenana* Graeve), Brussels (Bagnall, 1908), London, Kew (Bagnall, 1909a), Glasgow (Patience, 1907), Dublin (Bagnall, 1909b), Hillsborough and Belfast (Foster, 1911a), Cambridge, Mass. (Van Name, 1936).

Haplophthalmus danicus B.-L.

Haplophthalmus danicus Budde-Lund, 1885, Crust. Isop. terr., p. 250.
Leiden: 31 specimens; Delft: 4 specimens; Baarn: 1 specimen.

This small species very often is reported from greenhouses: Warsaw and Posen (Moszynski & Urbanski, 1932), Berlin (Dahl, 1916b; Boettger, 1932), Denmark (Meinertz, 1932), Hamburg (Michaelsen, 1897), Bonn (Graeve, 1914), Pratteln (Dollfus, 1897), Bern (Holzapfel, 1932), Paris (Dollfus, 1896), London, Kew (Bagnall, 1909a), Dublin (Bagnall, 1909b). In the open the species is recorded from southern Europe up to Scandinavia and from North America (Maryland, New Jersey, Indiana). American specimens were described by Hay (1899) as *Haplophthalmus puteus* Hay.

ONISCIDAE

Chaetophiloscia balssi Verhoeff

Chaetophiloscia balssi Verhoeff, 1929, Zool. Jb. Syst., vol. 56, p. 170, figs. 84, 85.
Amterdam: 12 specimens.

The specimens at my disposal, among which some males are present, agree in all respects with Verhoeff's description. As Verhoeff already remarked the general features of the species show a strong resemblance to *Chaetophiloscia piligera* Verhoeff, material of which species I could examine; it differs in the shape of the first pereiopods and first pleopods

of the male; the shape of these appendages in my male specimens shows perfect resemblance to Verhoeff's figures.

As far as I know the species is only known in literature from the original description. Verhoeff's specimens were captured in greenhouses in Munich, where they were found to live in large quantities during several years. Also in the Amsterdam greenhouses the species was rather common; the specimens were noted to be very agile. As Verhoeff remarked, the species probably originates from the Mediterranean region like all other species of the genus *Chaetophiloscia,* but till now it was never found outside greenhouses.

Oniscus asellus L.

Oniscus Asellus Linnaeus, 1758, Syst. Nat., ed. 10, p. 637.
Lisse: 2 specimens; Leiden: 29 specimens; The Hague: 4 specimens; Naaldwijk: 1 specimen; Utrecht: 6 specimens.

This very common and widely distributed species (also known under the name *Oniscus murarius* Cuv.) is recorded from many greenhouses: Krakow, Warsaw and Posen (Moszynski & Urbanski, 1932), Berlin (Dahl, 1916a; Boettger, 1929 and 1932), Swinemünde and Greifswald (Herold, 1925), Oslo (Sars, 1899), Bern (Holzapfel, 1932), Paris (Dollfus, 1896), London, Kew (Bagnall, 1909a), Dublin (Bagnall, 1909b), Belfast (Foster, 1911a), North America (Richardson, 1905; Van Name, 1936). In the open the species is known from entire Europe, from Iceland and Greenland and from North America. It always lives in the neighbourhood of man.

PORCELLIONIDAE

Trichorhina monocellata Meinertz

Trichorhina monocellata Meinertz, 1934, Zool. Jb. Syst., vol. 66, p. 256, fig.
Utrecht: 3 specimens.

This small species is recorded twice in literature from European greenhouses: Berlin (Verhoeff, 1937, under the name *Trichorhina vannamei* n. sp.) and Copenhagen (Meinertz, 1934). The species has not yet been reported from the open. The genus *Trichorhina* is circumtropical, it is known from South and Central America, from Oceania and from Madagascar. A second species of the present genus too is known from greenhouses, viz., *Trichorhina thermophila* (Dollfus), which is recorded from greenhouses at Hamburg (Kraepelin, 1901), Paris (Dollfus, 1896), London, Kew (Budde-Lund, 1912) and Belfast (Foster, 1911b, as *T. tomentosa*) and originates

from South America. *Trichorhina thermophila,* the type of the genus *Trichorhina* [1]), differs from *T. monocellata* by having the telson longer and more semicircular and the uropodal endopoda shorter. In *T. thermophila* namely the telson fully covers the uropodal endopods, while in *T. monocellata* these endopods distinctly reach beyond the tip of the telson. In *T. thermophila* the endopods of the uropods reach scarcely if at all beyond the base of the exopod, while in *T. monocellata* they reach beyond the middle of the exopod. Moreover the antennae in Dollfus's figure of *T. thermophila* are drawn much longer and more slender than they are in *T. monocellata*; this difference, however, may be due to the incorrectness of Dollfus's figure, as the antennae of *Haplophthalmus danicus* figured by Dollfus on the same page as his *Trichorhina,* too are drawn too slender. I think it not impossible even, that *Trichorhina thermophila* and *T. monocellata* will prove to belong to the same species; it is very well probable at least that some or all of the specimens recorded in literature under the name *Trichorhina thermophila* from greenhouses in reality belong to the present species.

Verhoeff (1937) gave a review of the genus *Trichorhina,* with a key to all species known to him; *Trichorhina monocellata,* however, was omitted in this key. The species described by Verhoeff in the same publication under the name *Trichorhina vannamei* no doubt is identical with *T. monocellata,* as was already supposed by Wächtler (1937).

Porcellio scaber Latr.

Porcellio scaber Latreille, 1804, Hist. nat. Crust. Ins., vol. 7, p. 45.
Amsterdam: 1 specimen; Lisse: 7 specimens; Leiden: 3 specimens; Loosduinen: 1 specimen; Delft: 1 specimen; Naaldwijk: 7 specimens; Rotterdam: 1 specimen; Utrecht: 3 specimens.

With *Oniscus asellus* this is the most common terrestrial isopod of our country. It is frequently reported from greenhouses: Warsaw, Krakow and Posen (Moszynski & Urbanski, 1932), Berlin (Dahl, 1916a; Boettger, 1929 & 1932), Swinemünde (Herold, 1925), Hamburg (Kraepelin, 1901), Bern (Holzapfel, 1932), Paris (Dollfus, 1896), London, Kew (Bagnall, 1909a), Dublin (Bagnall, 1909b), Belfast (Foster, 1911a), North America (Richardson, 1905). The species is cosmopolitan, it always lives in the neighbourhood of man.

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1) Budde-Lund (1908) as well as Verhoeff (1908a) created a new genus for the reception of *Bathytropa thermophila* Dollfus, which they named *Trichorhina* and *Bathytropina* respectively. I follow Van Name (1936) in using Budde-Lund's name.

Porcellio dilatatus Brandt

Porcellio dilatatus Brandt, 1833, Bull. Soc. Nat. Moscou, vol. 6, p. 176.
The Hague: 3 specimens; Baarn: 4 specimens; Apeldoorn: 8 specimens.

This species is rather often recorded from greenhouses: Posen (Moszynski & Urbanski, 1932), Swinemünde (Herold, 1925), Oslo (Sars, 1899), Denmark (Meinertz, 1934), The Hague (Hoek, 1889), Bonn (Graeve, 1914), Paris (Dollfus, 1896), London, Kew (Bagnall, 1909a), Dublin (Bagnall, 1909b), Belfast (Foster, 1911a). The species originates from southern Europe, but at present is almost cosmopolitan. It is interesting to note that in the Dutch greenhouses *Porcellio scaber* and *P. dilatatus* never have been found together.

Porcellionides pruinosus (Brandt)

Porcellio pruinosus Brandt, 1833, Bull. Soc. Nat. Moscou, vol. 6, p. 181.
Lisse: 23 specimens; Leiden: 4 specimens; Naaldwijk: 11 specimens.

The species often is recorded from greenhouses: Warsaw and Posen (Moszynski & Urbanski, 1932), Berlin (Boettger, 1932), Swinemünde and Greifswald (Herold, 1925), Copenhagen (Meinertz, 1934), Hamburg (Michaelsen, 1897; Kraepelin, 1901), Paris (Dollfus, 1896), Rome, Naples and Palermo (Boettger, 1930), London, Kew (Bagnall, 1909a), Dublin (Bagnall, 1909b), Belfast (Foster, 1911a), North America (Richardson, 1905). The species is cosmopolitan, it always lives in the neighbourhood of man. The name *Metoponorthus pruinosus* is often used for the present species; the generic name *Porcellionides* Miers (1877), however, has priority over *Metoponorthus* Budde-Lund (1885).

Nagara cristata (Dollfus)

Porcellio cristatus Dollfus, 1889, Notes Leyden Mus., vol. 11, p. 91, pl. 5 fig. 2a-d.
Amsterdam: 1 specimen; Rotterdam: 1 specimen.

Except Budde-Lund's (1908) record, that he has seen *Nagara cristata* from Hamburg, introduced with plants, the species hitherto is not known from greenhouses. It must be noted, however, that Bagnall (1909a) mentions a specimen as *Porcellio* sp. from greenhouses of Kew Gardens and makes the annotation "probably referable to *Nagurus cristatus* B.-L." The species was first described by Dollfus (1889) after specimens from Surinam. The type specimens are in the collection of the Rijksmuseum van Natuurlijke Historie at Leiden and could be studied by me for comparison. The distribution of the species in the open is circumtropic. Foster (1911b) reports an allied species, *Nagara nana* B.-L. from a greenhouse in Belfast.

ARMADILLIDIIDAE

Armadillidium vulgare (Latr.)

Armadillo vulgaris Latreille, 1804, Hist. nat. Crust. Ins., vol. 7, p. 48.
Amsterdam: 9 specimens; Lisse: 1 specimen; Leiden: 23 specimens; Delft: 1 specimen; Naaldwijk: 14 specimens; Rotterdam: 1 specimen; Utrecht: 2 specimens; Apeldoorn: **2 specimens.**

Armadillidium vulgare (Latr.) (= *A. cinereum*) is reported from several greenhouses: Hamburg (Kraepelin, 1901), Rome, Naples and Palermo (Boettger, 1930), London, Kew (Bagnall, 1909a), North America (Richardson, 1905; Van Name, 1936). In the open the species is known throughout Europe, N. Africa, W. Asia; it is introduced in America (Mexico to S. Canada), Madeira, St. Helena, Cape Province, Australia and New Zealand.

Armadillidium nasutum B.-L.

Armadillidium ***nasutum*** **Budde-Lund, 1885, Crust. Isop. terr., p. 51.**
Lisse: 10 specimens; Leiden: 150 specimens; Delft: 18 specimens; Rotterdam: 17 specimens; Wageningen: 6 specimens.

The species is reported from the following greenhouses: Warsaw, Krakow and Posen (Moszynski & Urbanski, 1932), Berlin (Dahl, 1916a; Boettger, 1929 & 1932), Copenhagen (Meinertz, 1934), Hamburg (Michaelsen, 1897), Leiden and The Hague (Koumans, 1928), Brussels (Bagnall, 1907), Bonn (Graeve, 1914), Bern (Holzapfel, 1932), Paris (Dollfus, 1896), London, Kew (Bagnall, 1909a), Dublin (Bagnall, 1909b), Belfast (Foster, 1911a), North America (Richardson, 1905; Van Name, 1936). In the open the species is known from Austria, Switzerland, Italy, France, Spain and S. England; Koumans (1928) found the species in the open in Limburg, the southernmost province of the Netherlands. American specimens were described as new by Stoller (1902) under the name *Armadillidium quadrifrons*.

The following species of isopods not yet recorded from Dutch greenhouses, have been found in greenhouses in foreign countries:

Trichoniscidae

Trichoniscus pusillus Brandt: London, Kew (Bagnall, 1909a), Dublin (Bagnall, 1909b), Belfast (Foster, 1911a).

Androniscus roseus (Koch): Hamburg (Michaelsen, 1897), Paris (Dollfus, 1896), London, Kew (Bagnall, 1909a), Dublin (Bagnall, 1909b), Belfast (Foster, 1911a).

Trichoniscoides albidus B.-L.: Berlin (Dahl, 1916b), Copenhagen (Meinertz, 1932), London, Kew (Bagnall, 1909a).

Trichoniscoides sarsi (Patience): Copenhagen (Meinertz, 1932).

Miktoniscus linearis (Patience): Berlin (Kesselyák, 1930), London, Kew (Bagnall, 1909a).

Cordioniscus spinosus (Patience): Glasgow (Patience, 1907).

Haplophthalmus mengei (Zadd.): Bern (Holzapfel, 1932), London, Kew (Bagnall, 1909a), Dublin (Bagnall, 1909b).

Oniscidae

Philoscia (*Philoscia*) *affinis* Verhoeff: Rome (Boettger, 1930).

Philoscia (*Philoscia*) *muscorum* (Scop.): London, Kew (Bagnall, 1909a).

Philoscia (*Balloniscus*) *maculata* (B.-L.): Hamburg (Kraepelin, 1901).

Philoscia (*Benthana*) *olfersii* Brandt: Hamburg (Kraepelin, 1901).

Philoscia (*Benthana*) *picta* Brandt: Hamburg (Kraepelin, 1901).

Philoscia (*Tiroloscia*) *pygmaea* B.-L.: Rome (Boettger, 1930).

Philoscia patiencei Bagnall: London, Kew (Bagnall, 1909a).

Chaetophiloscia elongata (Dollfus): Rome (Boettger, 1930).

Chaetophiloscia glandulifera Verhoeff: Rome (Boettger, 1930).

Chaetophiloscia piligera Verhoeff: Naples (Boettger, 1930).

Porcellionidae

Trichorhina thermophila (Dollfus): Hamburg (Kraepelin, 1901, as *Bathytropa thermophila*), Paris (Dollfus, 1896, as *Bathytropa thermophila*), London, Kew (Budde-Lund, 1912, as *T. tomentosa*), Belfast (Foster, 1911b, as *T. tomentosa*).

Arhina porcellioides B.-L.: Copenhagen (Budde-Lund, 1904), Hamburg (Kraepelin, 1901, as *Alloniscus cornutus* B.-L.).

Porcellium conspersum (Koch): Warsaw (Moszynski & Urbanski, 1932).

Porcellio laevis Latr.: Swinemünde (Herold, 1925), Hamburg (Kraepelin, 1901), Paris (Dollfus, 1896), Rome, Naples and Palermo (Boettger, 1930).

Porcellio napolitanus Verh.: Naples (Boettger, 1930).

Porcellio spinicornis Say: Warsaw and Posen (Moszynski & Urbanski, 1932), Paris (Dollfus, 1896, as *Porcellio pictus* Br.).

Porcellionides major (Dollf.): Posen (Moszynski & Urbanski, 1932, as *Metoponorthus major*).

Porcellionides sexfasciatus (B.-L.): Naples (Boettger, 1930, as *Metoponorthus sexfasciatus*).

Agabiformius lentus (B.-L.): Rome, Naples and Palermo (Boettger, 1930).

Leptotrichus panzeri (Aud.): Rome and Naples (Boettger, 1930).

Nagara nana B.-L.: Belfast (Foster, 1911b).

Cylisticus convexus (De Geer): Warsaw and Posen (Moszynski & Urbanski, 1932).

Tracheonisccus rathkei (Brandt): Posen (Moszynski & Urbanski, 1932, as *Porcellio rathkei*), Swinemünde and Greifswald (Herold, 1925), Hamburg (Kraepelin, 1901, as *Porcellio rathkei*), Bern (Holzapfel, 1932), North America (Richardson, 1905, as *Porcellio rathkei*).

Armadillidae

Armadillo officinalis Dum.: Berlin (Boettger, 1929, as *Pentheus globator*), Naples (Boettger, 1930).

Reductoniscus costulatus Kesselyák: Berlin (Kesselyák, 1930).

Reductoniscus fritschii Verh.: Berlin (Verhoeff, 1937).

Armadillidiidae

Armadillidium decorum Brandt: Palermo (Boettger 1930).

Armadillidium depressum Brandt: Rome (Boettger, 1930).

Armadillidium sorrentinum Verh.: Naples and Palermo (Boettger, 1930).

Armadillidium speyeri Jackson: London, Kew (Jackson, 1923).

LITERATURE

BAGNALL, R. S., 1907. On some terrestrial Isopod Crustacea new to the Fauna of Belgium. Ann. Soc. zool. malac. Belg., vol. 42, pp. 263-266.

——, 1908. On the Occurrence in Belgium of a recently described terrestrial Isopod, Trichoniscus stebbingi Patience. Ann. Soc. zool. malac. Belg., vol. 43, pp. 127-129.

——, 1909a. Terrestrial Isopod Crustacea. Additions to the Wild Fauna and Flora of the Royal Botanic Gardens Kew: IX. Bull. misc. Inf. Kew, 1909, pp. 244-246.

——, 1909b. On some terrestrial Isopods from the Glasnevin Botanic Gardens, Dublin. Irish Nat., vol. 18, pp. 42-44.

BOETTGER, C. R., 1929, Eingeschleppte Tiere in Berliner Gewächshäusern. Zeitschr. Morph. Oekol. Tiere, vol. 15, pp. 674-704.

——, 1930. Untersuchungen über die Gewächshausfauna Unter- und Mittelitaliens. Zeitschr. Morph. Oekol. Tiere, vol. 19, pp. 534-590.

——, 1932. Die Besiedlung neu angelegter Warmhäuser durch Tiere. Ein Beitrag zur Frage der Bildung von Gewächshausfaunen. Zeitschr. Morph. Oekol. Tiere, vol. 24, pp. 394-407.

BUDDE-LUND, G., 1885. Crustacea Isopoda terrestria per Familias et Genera et Species descripta, pp. 1-319.

——, 1893. Landisopoder fra Venezuela indsamlede af Dr. Fr. Meinert. Ent. Medd., 1893, pp. 111-129.

BUDDE-LUND, 1904. A Revision of Crustacea Isopoda Terrestria with Additions and Illustrations. II, Spherilloninae, III, Armadillo, pp. 33-144, pls. 6-10.

——, 1908. Isopoda von Madagaskar und Ostafrika. Mit Diagnosen verwandter Arten. In: A. Voeltzkow, Reise in Ostafrika in den Jahren 1903-1905 mit Mitteln der Hermann und Elise geb. Heckmann Wentzel-Stiftung ausgeführt, vol. 2, pp. 265-308, pls. 12-18.

——, 1912. Terrestrial Isopoda, particularly considered in relation to the Distribution of the southern Indopacific Species. Trans. Linn. Soc. Lond., Zool., ser. 2 vol. 15, pp. 367-394, pls. 20-22.

CARL, J., 1911. Isopodes. Catalogue des Invertébrés de la Suisse, pt. 4, pp. i-vi, 1-68, figs. 1-64.

DAHL, F., 1916a. Die Asseln oder Isopoden Deutschlands, pp. i-vi, 1-90, figs. 1-107.

——, 1916b. Die Verbreitung der Landasseln in Deutschland. (Eine tiergeographische Studie). Mitt. zool. Mus. Berlin, vol. 8, pp. 149-201.

DOLLFUS, A., 1889. Sur quelques Isopodes du Musée de Leyde. Notes Leyden Mus., vol. 11, pp. 91-94, pl. 5.

——, 1896. Crustacés Isopodes terrestres. Recherches zoologiques dans les serres du Muséum de Paris. III. Feuill. jeun. Nat., ser. 3 vol. 26, pp. 93, 94, figs. 1, 2.

——, 1897. Liste des Mollusques testacés terrestres et des Crustacés isopodes recueillis aux environs de Pratteln (Jura bâlois). Feuill. jeun. Nat., ser. 3 vol. 28, pp. 10-12.

FOSTER, N. H., 1911a. Trichoniscus Stebbingi in Down and Antrim. Irish Nat., vol. 20, p. 95.

——, 1911b. On two exotic Species of Woodlice found in Ireland. Irish Nat., vol. 20, pp. 154-156, 184.

GRAEVE, W., 1914. Die in der Umgebung von Bonn vorkommenden landbewohnenden Crustaceen und einiges über deren Lebensverhältnisse. Verh. naturh. Ver. Rheinl. Westfalens, vol. 70, pp. 175-248, figs. 1-21.

HAY, W. P., 1899. Description of a new Species of subterranean Isopod. Proc. U. S. Nat. Mus., vol. 21, pp. 871, 872, pl. 86.

HEROLD, W., 1925. Untersuchungen zur Oekologie und Morphologie einiger Landasseln. Zeitschr. Morph. Oekol. Tiere, vol. 4, pp. 337-415, figs. 1-6, pls. 11, 12.

HOEK, P. P. C., 1889. Crustacea Neerlandica. Nieuwe Lijst van tot de Fauna van Nederland behoorende Schaaldieren, met Bijvoeging van enkele in de Noordzee verder van de Kust waargenomen Soorten. II. Tijdschr. Nederl. dierk. Ver., ser. 2 vol. 2, pp. 170-234, pls. 7-10.

HOLZAPFEL, M., 1932. Die Gewächshausfauna der Berner Botanischen Gartens. Rev. Suisse Zool., vol. 39, pp. 325-374.

JACKSON, H. G., 1923. On a new Species of Armadillidium. Ann. Mag. nat. Hist., ser. 9 vol. 11, pp. 224-227, figs. 1-5.

KESSELYÁK, A., 1930. Ueber Isopoden. Zool. Anz., vol. 91, pp. 50-66, figs. 1-24.

KOUMANS, F. P., 1928. Neue oder merkwürdige Isopoden für die niederländische Fauna. Zool. Meded., vol. 11, pp. 199-205, fig. 1.

KRAEPELIN, K., 1901. Ueber die durch den Schiffsverkehr in Hamburg eingeschleppten Tiere. Mitt. naturh. Mus. Hamb., vol. 18, pp. 183-209.

MÉHELY, L., 1929. Species Generis Hyloniscus. Studia Zoologica, vol. 1, pp. 1-75, pls. 1-9.

MEINERTZ, T., 1932. Die Landisopoden Dänemarks. I. Die Ligiiden und Trichonisciden. Zool. Jb. Syst., vol. 63, pp. 352-406, figs. 1-18.

——, 1934. Die Landisopoden Dänemarks. II. Die Onisciden. Zool. Jb. Syst., vol. 66, pp. 211-284, figs. 1-31.

MICHAELSEN, W., 1897. Land- und Süsswasser-Asseln aus der Umgebung Hamburgs. Mitt. naturh. Mus. Hamb., vol. 14, pp. 119-134.

MOSZYNSKI, A. & J. URBANSKI, 1932. Étude sur la faune des serres de Poznan (Pologne). Bull. biol. France Belg., vol. 66, pp. 45-76.

PATIENCE, A., 1907. On a new British Terrestrial Isopod. Journ. Linn. Soc. Lond., Zool., vol. 30, pp. 42-44, pl. 7.

RICHARDSON, H., 1905. A Monograph on the Isopods of North America. Bull. U. S. Nat. Mus., vol. 54, pp. i-liii, 1-727, figs. 1-740.

SARS, G. O., 1899. An Account of the Crustacea of Norway. II. Isopoda, pp. i-x, 1-270, pls. 1-100, suppl. pls. 1-4.

STOLLER, J. H., 1902. Two new Land Isopods. Rep. New York State Mus., vol. 54, pp. 1208-1213, figs. 1, 2.

VAN NAME, W. G., 1936. The American Land and Freshwater Isopod Crustacea. Bull. Amer. Mus. nat. Hist., vol. 71, pp. i-vii, 1-535, figs. 1-323.

VERHOEFF, K. W., 1908a. Ueber Isopoden. 12. Aufsatz: Neue Oniscidea aus Mittel- und Südeuropa und zur Klärung einiger bekannter Formen. Arch. Naturgesch., vol. 74 pt. 1, pp. 163-198.

——, 1908b. Neue Isopoden-Gattungen. Zool. Anz., vol. 33, pp. 520-525.

——, 1908c. Über Isopoden: 15. Aufsatz. Arch. Biontol., vol. 2, pp. 335-387, pls. 29-31.

——, 1929. Über alpenländische und italienische Isopoden. 37. Isopoden-Aufsatz. Zool. Jb. Syst., vol. 56, pp. 93-172, figs. 1-85.

——, 1937. Ueber einige neue und bekannte Isopoda terrestria. 61. Isopoden-Aufsatz. S. B. Ges. naturf. Fr. Berlin, 1936, pp. 411-430, figs. 1-22.

WÄCHTLER, W., 1937. Isopoda (Asseln). In: P. Brohmer, P. Ehrmann & G. Ulmer, Die Tierwelt Mitteleuropas, vol. 2, pp. 225-317, textfigs. 1-121, 1 pl.

WEBER, M., 1881. Ueber einige neue Isopoden der Niederländischen Fauna. (Ein Beitrag zur Dunkelfauna). Tijdschr. Nederl. dierk. Ver., vol. 5, pp. 167-195, pl. 5.