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Exotic Millipedes (Diplopoda) in New Zealand

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Ten years ago when, at the sugestion of Dr. R. R. Forster, I was beginning a study of New Zealand millipedes, great difficulty was experienced in the ready identification of the most commonly distributed forms, those of the " juloid " kind with a circular cross-sectional appearance. Although my work has now led me along other paths since that time, I have been particularly concerned with the distribution of exotic millipedes and ants throughout New Zealand, and, thanks to the assistance of overseas colleagues, I am now able to give identifications of some of these species, and to offer some information about the introduction of certain European millipedes into New Zealand.

In a forthcoming basic checklist and bibliography of the Diplopoda of New Zealand further comments will be made, but, meanwhile, the publication of these records may stimulate those interested in the question of the wanderings of invertebrate " tramps " to make collections in suitable places. I would be very glad indeed to have specimens of such millipedes, preferably preserved in 70% alcohol and glycerine, from any part of the country, especially from the major ports of entry. Material may be sent to me at D.S.I.R., 177 Thorndon Quay, Wellington, and such assistance will be greatly appreciated.

Apart from the recent work on the oniscomorph millipedes by Holloway (1956) and the description of a new pselaphognath, *Propolyxenus forsteri,* by Condé (1951), the latest records of millipede distribution in New Zealand are to be found in Chamberlin's (1920) account of the " myriapods " of the Australian region. This forms the basis for a new study of New Zealand millipedes, although Chamberlin has omitted reference to a number of earlier described forms and appears to have incorrectly transcribed some locality labels, in two cases resulting in the incorrect formation of specific names. His list, together with the earlier overlooked species and the recently described forms, brings the known millipede fauna of New Zealand to a total of some 48 species. Some

of these are undoubtedly synonymous, and a number of new, supposedly indigenous, species await description, judging from material in hand.

Chamberlin (1920: 113–4, 158) has recorded the following exotic species in the New Zealand fauna: *Orthomorpha gracilis* (Koch, 1847), and *Ophyiulus pilosus* (Newport, 1842). Previous to this, Colenso (1894) had described *Spirostreptus fijiensis,* which had been found at Dannevirke among bananas from Fiji. It seems likely, however, that Colenso's specimen belonged to an already described Fijian species. Other spirostreptid and iulid millipedes have been described from New Zealand at various times and it again seems likely that they may belong to known European species. They include *Iulus berardi* Walckenaer & Gervais, 1847, *Spirostreptus antipodarum* Newport, 1844, *S. striatus* (Hutton, 1877). Similarly, the polyzonid *Rhinotus bivittatus* (Pocock, 1898), collected by Thilenius at Tauranga, and the polydesmid *Scynotus caesius* Karsch 1881, may not be indigenous species, but the specimens, at one time in the Berlin Museum, cannot be traced at present.

Preliminary remarks and results from a few collections are as follows:

Orthomorpha gracilis (Koch, 1847) [Polydesmidae], the cosmopolitan "hothouse millipede". Chamberlin (1920: 114) has recorded it from New Zealand: "Rotorna [*sic*] (W. M. Wheeler)." Causey (1943: 671), in her study of the ecology of the hothouse millipede, has given other details of interest and has included New Zealand within its range. Other details of its cosmopolitan distribution, morphology, and figures of the gonopods, may be found in Schubart's monograph (1934: 175–6, Figs: 282–3).

Nopoiulus venustas (Meinert 1868) [Blaniulidae]. Collected in grounds of Animal Ecology Section, Sydney Street, Wellington, by R. E. Brockie in the summer of 1957. Schubart (1934: 189–91, Figs. 302–4) recorded it as widely distributed in Europe, eastern U.S.A., Mexico and Chile, and he has provided figures of the gonopods and other morphological details.

Cylindroiulus britannicus (Verhoeff 1891) [Iulidae]. From leaves in garden litter, Waltham, Christchurch, by R. G. Frean, July 31, 1951; native bush, Kaituna Valley, Banks Peninsula, E. W. Dawson, April 26, 1953; native forest, Chandler's Mill, near Reefton, E. W. Dawson, June, 1955; grounds of Animal Ecology Section, Sydney Street, Wellington, R. E. Brockie, summer, 1957. Schubart (1934: 228–9, Fig. 361) gave the range of this species as including Europe, South Africa and India. These are the first known records from New Zealand. Figures of the gonopods and vulvae may be found in Schubart's account, and particularly in Rolfe's "Notes" (1937; 1938).

Ophyiulus pilosus (Newport 1842) = *O. fallax* (Meinert 1868); see Rolfe, 1934: 202 [Iulidae]. Records: "Wellington, Day's Bay, Rotorna [*sic*], Lake Takopema [*sic*], near Auckland, August, 1914 (W. M. Wheeler)" (Chamberlin 1920: 158); native bush, Kaituna Valley, Banks Peninsula, E. W. Dawson, April 26, 1953; native forest, Chandler's Mill, near Reefton, E. W. Dawson, June, 1955; grounds of Animal Ecology Section, Wellington, R. E. Brockie, summer, 1957. Schubart (1934: 268–72, Figs. 442–6) gave the range of this species showing that it is widely distributed in Europe. The general distribution includes Canada, the U.S.A., New Zealand, Tasmania (Schubart, *pers. comm.,* 1957), and India (Blower, *pers. comm.,* 1957).

Distribution and Economic Significance

The well known hothouse millipede, *Orthomorpha gracilis,* is "now widely distributed in greenhouses and is sometimes a serious pest" in England (Rolfe, 1937: 102). No information is available on the habitat of the specimens which Wheeler collected at what is, presumably, meant to be Rotorua, but the indications are that it was "out of doors".

Blower (1953: 313) has said of *Cylindroiulus britannicus,* a "reasonably common" millipede in Britain, that it has ". . . a distribution which often appears to indicate some connection with the influence of man. Hothouses, grave-yards, gardens and similar situations . . . seems to provide suitable habitats . . . There are exceptions to this type of distribution, however, and particularly so in Britain. *C. britannicus,* whilst almost exclusively confined to greenhouses, compost heaps and so forth in Germany (see Schubart, 1934) has been recorded from open country several times in Britain." Rolfe (1937: 102) has also recorded that this species "inhabits greenhouses and frames where it may be present in very large numbers". It has, according to Blower, "at some time or other, been accused of attacking crops".

Judging from this general association, the distribution of *C. britannicus* in New Zealand is rather curious and further collecting will, no doubt, make clear the details of this.

Rolfe (1934: 192) has called *Ophyiulus pilosus* "a fairly common British millipede", and has said that "All members of the Iulidae feed very largely on decaying vegetable matter, and when they occur as pests they are very often intensifying damage attributable primarily to some other cause" (1937: 103).

Recently, Helson (1955: 5) listed the occurrence of two specimens only of millipedes which had been intercepted by the Plant Quarantine Service between 1950 and 1953, and no millipedes at all are mentioned in lists of interceptions for 1951 to 1953 identified at the Plant Diseases Division (Jacks, 1953*a, b*; 1954). This may indicate that millipedes are not often accidentally intro-

duced into this country, but it appears clear that some of the common European potentially-harmful millipedes have been here for some time and are now well established although they do not, as yet, appear to have claimed the attention of those responsible for agricultural pest control.

It can be concluded, then, that the commoner millipedes of our towns and gardens are likely to prove to be introduced European or cosmopolitan species, and even in the native bush in parts of the country remote from ports of entry introduced forms may occur in abundance. Indeed, the figure of a "very common" New Zealand millipede given by Powell (1947: 42–3, Fig. 207) in his "*Native Animals of New Zealand*" appears to illustrate a European Iulid. A watch must be kept on the further spread of these and other overseas species, particularly with regard to their relation to our agricultural economy.

It remains for me, now, to express my thanks to Dr. Otto Schubart and Mr. J. Gordon Blower for help with identifications and literature, to Mr. Robert Brockie for specimens, and to Mrs. N. B. Causey, Dr. R. V. Chamberlin and Mr. S. W. Rolfe for literature.

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