

Records of Diplopoda of the order Polydesmida from the Fiji Islands

by

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ABSTRACT. — Report on a collection made in 1979, consisting of three species of the family Paradoxosomatidae, one of which, *Desmoxytes planata* (Pocock), is recorded from the Fijis for the first time, one species of the family Cryptodesmidae s.l., and one species of the family Haplodesmidae. Some comments are given relating the classificatory status of the enigmatic genera *Pilochilus* Chamberlin, *Phlyctodesmus* Chamberlin and *Fijiodesmus* Chamberlin.

During a collecting trip to the Fiji Islands in 1979, Dr. and Mrs. J. P. Duffels payed more than incidental attention to the diplopod fauna of the islands, and brought together a fairly varied amount of material. The present paper reports on the species of the order Polydesmida. The remainder of the collection, consisting predominantly of spirobolids of the family Rhinocricidae, may be treated in a future contribution.

Apart from some isolated descriptions in the earlier literature by L. Koch (1865), Karsch (1881) and Silvestri (1897), and later by Brölemann (1913), the only substantial and latest contribution to our knowledge of the Diplopoda of the Fijis was made by Chamberlin (1920), and was based on the extensive collections made by W. M. Mann. Unfortunately, owing to the absence of illustrations, the many species described by Chamberlin are for the greater part unrecognizable, so that virtually the fauna of the islands is unknown, except for the few Rhinocricidae described and illustrated by Brölemann and some recorded circumtropical ubiquists.

As far as known, the diplopod fauna of the Fijis is made up of Polyzooniida, Polydesmida of the suborders Polydesmidea and Paradoxosomatidea, Spirostreptida of the suborder Cambalidea, and Spirobolida. Especially the latter order seems to occur in a great variety of forms of the family Rhinocricidae, apparently the dominating group of endemic millipedes.

Not so long ago, the Paradoxosomatidae of the Fiji Islands were discussed (Jeekel, 1972), and it was shown that this family is an introduced element in the fauna of the islands. Five species were known: *Gyrodrepanum lamprum* (Chamberlin, 1920), *Oxidus gracilis* (C. L. Koch, 1847), *Anoplodesmus saussurii* (Humbert, 1865), *Chondromorpha xanthotricha* (Attems, 1898), and *Orthomorpha coarctata* (De Saussure, 1860). In the collection under report *A. saussurii* and *O. coarctata* are well-represented, together with material of a third species, *Desmoxytes planata* (Pocock, 1895), previously recorded from some isolated localities in the Oriental region and thus far not known to have established itself permanently elsewhere.

The other Polydesmida of the Fijis belong to the large and heterogeneous family Cryptodesmidae sensu lato, and were described by Chamberlin under the generic names of *Aipotropis* Chamberlin, 1920 (4 species), *Pilochilus* Chamberlin, 1920 (2), *Lophodesmus* Pocock, 1894 (1), *Treseolobus* Attems, 1907 (2), *Euporodesmus* Chamberlin, 1920 (1), *Phlyctodesmus* Chamberlin, 1920 (1) and *Fijiodesmus* Chamberlin, 1920 (1). Among them there may be some introduced or wide-spread species not yet recognized. In the present collection only one species each of the genera *Pilochilus* and *Phlyctodesmus* was represented, and these will be discussed hereunder.

A striking phenomenon of the present collection is the abundancy of Paradoxosomatidae, and although this may have been caused partly by their conspicuity, there is little doubt that this introduced family has managed to establish itself firmly on the islands and has become a dominant element, next to the Rhinocricidae, of the Fiji millipede fauna of today. Paradoxosomatidae were observed not only in and immediately around human settlements, but seem to have penetrated deep into the natural habitats and appear far more abundant than the endemic Polydesmida.

The material treated in this paper is preserved in the Zoological Museum at Amsterdam. For a list of the collecting stations the reader is referred to Duffels (1979).

Orthomorpha coarctata (De Saussure), var. *gigas* Attems

Polydesmus coarctatus De Saussure, 1860: 297, pl. 18 fig. 18.

Orthomorpha coarctata; Chamberlin, 1920: 112.

Orthomorpha coarctata var. *gigas* Attems, 1927: 63.

Previous record: Fijis: Suva, Wainunu, Nasoqo, Nansori, Somo Somo, Munia, Labasa, Levuka, Waiyanitu, Lasema (Chamberlin, 1920).

Material examined: Stat. 32, Vanua Levu, Savundrondro, near Savundrondro dam of the water reservoir, 5 km NEE of Savusavu, 100 m, 13.II.1979, disturbed rainforest and some secondary growth with adjacent cultivated land, 7 ♂, 8 ♀; Stat. 37, Taveuni, Songgulu, 10 km SW of Waiyevo, 18.II.1979, disturbed rainforest and adjacent coconut plantation, 2 ♀; Stat. 70, Ovalau, Lovoni, Central Ovalau, 28-29.III.1979, rainforest and adjacent gardens, 2 ♂, 2 ♀.

Remarks: From the island of Teun in the Banda Sea, East Indonesia, Attems has described a population of very large specimens of this common circumtropical ubiquitous. The males were characterized as reaching a width of 2.5 mm, the females of 3.0 mm. Otherwise the morphology was stated to agree with the typical form.

The present material is similarly conspicuous by the large size of the specimens, which at first sight gave the impression of a different species being involved. The width of the males varies between 2.3 and 2.4 mm, that of the females between 2.5 and 3.0 mm.

Of course it is very unlikely that the Fiji populations from which the samples were taken have any direct genetic relationship to the population occurring on Teun island. The use of the variety name in the present case, therefore, is merely to emphasize a phenetic similarity. Although populations of *O. coarctata* may show differences in their mean size, the incidental occurrence of such relative giants is remarkable and has not been explained. Perhaps an examination of the chromosome numbers could give a solution of this problem.

Chamberlin (1920) recorded *O. coarctata* from several localities in the Fiji islands, including the islands of Viti Levu, Vanua Levu, Taveuni and Ovalau, but did not comment on the size of his material.

The relative rarity of this species in the present collection may have been caused partly by its being less conspicuous than e.g. *Anoplodesmus*, but it seems to indicate also that it has not been able to penetrate far into the natural habitats on the islands.

Anoplodesmus saussurii (Humbert)

Polydesmus Saussurii Humbert, 1865: 26, pl. 2 fig. 8.

Prionopeltis dasys Chamberlin, 1920: 131.

Anoplodesmus saussurii; Jeekel, 1972: 5.

Previous record: Fijis: Viria, Ruva river (Chamberlin, 1920).

Material examined: Stat. 1, Viti Levu, Tholoisuva, 10 km N of Suva, 150 m, 18.I.1979, lowland rainforest and road side, 18 ♂, 10 ♀; Stat. 2, Viti Levu, Tholoisuva, near Forestry Station, 10 km N of Suva, 100 m, 19.I.1979, lowland rainforest, 1 ♀; Stat. 4, Viti Levu, Nakauvandra Range, Vatukathevatheva, 10 km SW of Rakiraki, 400-500 m, 21.I.1979, low stocked forest, partly disturbed, and gardens adjacent to grassland along creek on precipitous slope, 12 ♂, 9 ♀; Stat. 45, Viti Levu, Tholoisuva, 10 km N of Suva, 150 m, 26-27.II.1979, rainforest mahogany plantation, 15 ♂, 8 ♀; Stat. 46, SE of Viti Levu, 10 km W of Naimasimasi, 20 km NNW of Nausori, SE of the Tailevu (Mahogany) Forest Plantation, 28.II.1979, primary lowland rainforest, 4 ♂, 2 ♀; Stat. 52, Viti Levu, Nandarivatu, Southern Ridge Road, 800 m, 6.III.1979, primary montane forest, 3 ♂, 2 ♀, 4 juv. ♀ (19 somites).

Remarks: This species was previously known from the Fiji Islands only by a single female specimen described by Chamberlin under the name of *Prionopeltis dasys*, and identified as *A.*



Fig. 1. Aggregation of *Anoplodesmus saussurii* on decaying tree-stem along creek in the forest of stat. 48, Viti Levu, Rewasa, 5 km SE of Rakiraki, 300-400 m, 3.III.1979.

Photo M. J. Duffels-van Egmond.

saussurii subsequently by Jeekel (1972). The present material definitely confirms the presence of *A. saussurii* on Viti Levu. In the males the legs of the 6th somite have the characteristic large ventral femoral protuberances. The 2nd pair of the 5th somite has the femur slightly incrassate halfway: an abortive homolog of the large swellings in the subsequent two pairs of legs. The width of the males varies between 4.8 and 6.2 mm, that of the females between 5.1 and 7.1 mm; the juveniles much smaller: 3.6 tot 3.8 mm.

Considering the fact that the extensive collection of myriapods from the Fiji Islands made by Mann contained only one single specimen (*Viria*, situated quite close to Stat. 46 of the present collection), the abundance of material of *A. saussurii* in the collection under report is quite remarkable. In 1979 the species was met with not only in sites relatively close to human settlements, but also in undisturbed habitats far away from human influence. The species was often seen in the open, crawling in great abundance on leaf litter; it was not observed climbing tree-stems as many *Rhinocricidae* apparently do (fig. 1).

It is clear that *A. saussurii* since its introduction on Viti Levu (the collectors did not observe this species on the other visited islands) has been able to penetrate natural habitats on a scale rarely recorded for diplopods. Similar known cases concern the occurrence of *Cylindroiulus latestriatus* (Curtis) on Tristan da Cunha (Jeekel, 1954) and the recently reported explosive spreading of *Ommatoiulus moreletii* (Lucas) in South Australia (Baker, 1978).

Desmoxytes planata (Pocock)

Prionopeltis planatus Pocock, 1895: 829, fig. 21.

Desmoxytes planata; Jeekel, in press.

Material examined: Stat. 1, Viti Levu, Tholoisuva, 10 km N of Suva, 150 m, 18.I.1979, lowland rainforest and road side, 1 ♀; Stat. 10, Viti Levu, Nandarivatu, trail to Nanggaranambululi, 2 km

E of Nandarivatu, 1000-1100 m, 25.I.1979, montane rainforest, partly disturbed, and trail sides, 6 ♂; Stat. 21, Vanua Levu, Saivou along the new road to Savusavu, 20 km S of Nanduri, 250 m, 3.II.1979, garden with adjacent rainforest, 1 ♂; Stat. 45, Viti Levu, Tholoisuva, 10 km N of Suva, 150 m, 26-27.II.1979, rainforest mahogany plantation, 1 ♀; Stat. 56, Viti Levu, Nandarivatu, trail to Nanggaranambululi, 2 km E of Nandarivatu, 1000-1100 m, 9.III.1979, montane rainforest partly disturbed, *Pinus* plantations and trail sides, 1 ♀.

Remarks: In a recent paper (Jeekel, in press) the genus *Desmoxytes* Chamberlin, 1923, was synonymized with *Pratinus* Attems, 1937, and the species *Desmoxytes coniger* Chamberlin, 1923, *Euphyodesmus greeni* Attems, 1936, and *Euphyodesmus (Ceylonesmus) vector* Chamberlin, 1941, were brought into the synonymy of *Prionopeltis planatus* Pocock, 1895. It was pointed out that we are dealing here with a species with an, apparently not previously recognized, erratic and anthropochorous distribution (Ceylon, Andaman Islands, Java). Confirmation of this conclusion is found in the new record from the Fiji Islands.

The collected specimens agree with the available descriptions, in particular with regard to the structure of the gonopods and the incrassate femora of the 5th and 6th pairs of legs of the male. The males are measuring 1.8 to 2.0 mm in width, the females 2.2 to 2.5 mm, which agrees fairly well with the recorded measurements of material from elsewhere.

According to the collectors the localities in the Fiji Islands where *D. planata* was taken are more or less natural habitats not remote from human settlements. Apparently this species is able to penetrate natural biotopes once it has been introduced, but either its possibilities in this respect are restricted, or perhaps the introduction took place in a relatively recent period.

From the occurrence of *D. planata* on two islands of the Fiji archipelago we may conclude that this species can be expected to occur under similar situations throughout the Indo-Australian region and, in fact, may be discovered sooner or later in tropical countries elsewhere.

Pilochilus cynephor Chamberlin

Pilochilus cynephor Chamberlin, 1920: 151.

Previous record: Fijis: Nadarivatu, Nasoqo.

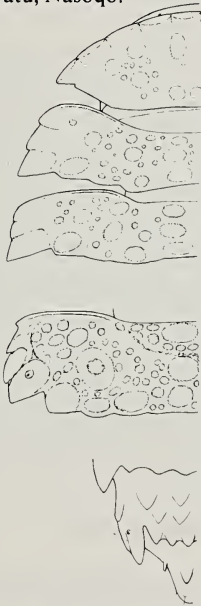


Fig. 2. *Pilochilus cynephor* Chamberlin, ♀. Dorsal aspect of left side of collum, 2nd and 3rd somites, 10th somite and 19th and 20th somites.

Material examined: Stat. 10, Viti Levu, Nandarivatu, trail to Nanggarambululi, 2 km E of Nandarivatu, 1000-1100 m, 25.I.1979, montane rainforest partly disturbed and trail sides, 1 ♀.

Remarks: This single, probably topotypical, specimen agrees very well with the description given by Chamberlin. The measurements are somewhat larger than those given by Chamberlin: length 17 mm, width 2.8 mm, compared with 15 mm and 2.5 mm respectively for a typical female.

Since the external morphology in cryptodesmid millipedes is of great importance for the identification and classification the dorsal aspect of a number of somites of the specimen is illustrated herewith to supplement Chamberlin's description (fig. 2). From the external characters it is clear that *Pilochilus* belongs to the Cryptodesmidae in a more restricted sense, and that the genus is a valid one and probably endemic to the Fiji Islands. Considering the present highly unsatisfactory classification of the family, a more definite statement with regard to the taxonomic relationship is impossible.

Phlyctodesmus myrmecophor Chamberlin

Phlyctodesmus myrmecophor Chamberlin, 1920: 121.

Previous record: Fijis: Nadarivatu.

Material examined: Stat. 53, Viti Levu, Nandrau Plateau, 5 km NW of Monasavu, 900 m, 7.III.1979, very wet moss forest, 2 ♀, 1 juv. ♀ (19 somites).

Remarks: The available material tallies with the description of Chamberlin and there can be hardly any doubt that it belongs to the monotypical genus *Phlyctodesmus*. The adult specimens are, however, somewhat larger than the types, measuring 1.6 to 1.7 mm in width, whereas Chamberlin gives a width of 1.4 mm for the female. The juvenile female has a width of 1.1 mm. Differences in colour may be due to the state of preservation of the type material. The present specimens have a brown collum with the anterior and lateral borders margined pale yellowish. The somites are brown, but the prosomites have a broad medio-dorsal yellowish spot, parted in the middle by a fine dark median line. The lateral sides of the prosomites also have a yellowish spot. Anal somite paler brown than the metasomites.

The taxonomic position of *Phlyctodesmus* is rather dubious. Chamberlin (1920: 120) apparently related it to the Paradoxosomatidae, but it was removed from that family by Jeekel (1963: 9) and referred subsequently to the suborder Polydesmidea (Jeekel, 1971: 345). Judging from the external morphology *Phlyctodesmus* must be very closely related to the genus *Cylindrodesmus* Pocock, 1889, from which it differs only in the absence of elevations bearing the pores in the poriferous somites. Possibly there are also important differences in the gonopods, judging from the description by Chamberlin, but these have not been illustrated. It seems likely that *Phlyctodesmus* and *Cylindrodesmus* belong to the same family for which the name Haplodesmidae Cook, 1895 (= *Cylindrodesmidae* Pocock, 1898) is available.

In connection with the examination of material of *Phlyctodesmus* it has become possible to throw some light on the identity of the monotypical and equally enigmatic genus *Fijiodesmus* Chamberlin, 1920: 121. *Fijiodesmus suprenans* Chamberlin, 1920, was described and recorded from five localities on the Fiji Islands. Chamberlin compared the genus with *Phlyctodesmus*, and distinguished it from that genus on account of the stalked pores and the different appearance of the gonopods. In both these characters *Fijiodesmus* agrees with *Cylindrodesmus* and it seems very likely indeed that *Fijiodesmus* is a synonym of *Cylindrodesmus*, and that *F. suprenans* is the same as the wide-spread *C. hirsutus* Pocock, 1889.

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Volume 7 van Fauna entomologica scandinavica behandelt de Homoptera, onderorde Auchenorrhyncha. Het volume zal uit drie deeltjes bestaan waarvan het eerste nu verschenen is. Naast de inleidende hoofdstukken worden in dit deeltje behandeld de families Cixiidae, Delphacidae, Achilidae en Issidae die tezamen de groep der Fulgoromorpha vormen, waarvan uit Denemarken en Fennoscandia 88 soorten bekend zijn (uit Nederland zijn \pm 70 soorten bekend).

In de loop van 1980 zal deeltje 2, omvattende de families Cicadidae, Cercopidae, Membracidae en Cicadellidae met uitzondering van de Deltocephalinae, verschijnen. Het derde over de subfamilie Deltocephalinae volgt in 1982.

Het literatuuroverzicht zal in het derde deeltje worden opgenomen. Dit heeft het grote bezwaar dat nu in het eerste deeltje weliswaar per soort verwezen wordt naar de literatuur, middels auteur, jaartal en pagina, maar dat de literatuurlijst nog moet komen. Ook de index tot de geslachten en de soorten ontbreekt in dit eerste deeltje. Vooral voor de beginner in de studie van de cicaden is dit zeer onhandig.

Toch wordt dit keurig verzorgde boekje van harte aanbevolen. Het bevat van alle soorten goede beschrijvingen, zeer duidelijke tekeningen, vooral van de mannelijke genitaliën en van het vrouwelijk abdomen. De tabellen maken het mogelijk tot op de soort te determineren. — J. P. Duffels.