Arthropoda of the subantarctic islands of New Zealand *7. Orthoptera: Rhaphidophoridae†

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Ischyroplectron isolatum (Hutton) is redescribed from the Bounty Islands, south-east of New Zealand. The relationships of the subantarctic Orthoptera are discussed. A key is given to the four genera of Rhaphidophoridae.

INTRODUCTION

The Bounty Is (47°49′S, 179°E) consist of about 20 islands and rocks ranging to nearly 88.4 m in height, and extending about 4.8 km in an east-west direction and 3 km north-south. With the Antipodes Is, the Auckland Is, Campbell I., and The Snares, they comprise the subantarctic islands of New Zealand. The Bounty Is are very wind-swept and barren. Hutton (1895) describes Bounty I., the main island, as being about 3 km long, not more than 30.5 m high, composed of volcanic rocks, and without any trees, shrubs, or soil [the island is actually about 1.6 km long]. The only terrestrial invertebrates recorded are a few insects and spiders and an amphipod (Chilton 1909).

The various biological expeditions to the subantarctic islands have been discussed, and the orthopteran fauna of the Auckland Is, Campbell I., and The Snares described (Richards 1964, 1970); no Orthoptera are known from the Antipodes Is. This paper redescribes the single species of Rhaphidophoridae from the Bounty Is, and summarises existing systematic and zoogeographic knowledge of the subantarctic Orthoptera.

Ischyroplectron isolatum (Hutton) from Bounty I. was the first orthopteran to be recorded from New Zealand's subantarctic islands. It was collected by Captain Fairchild, of the New Zealand Government steamer *Hinemoa*, and a specimen was presented to the Canterbury Museum in 1894. The rocks under which the specimens were found were continually covered with sea spray (Hutton 1895).

In 1907, a major scientific expedition visited the subantarctic islands; there is no evidence that further rhaphidophorid specimens were collected from the Bounty Is. Hudson (1909) referred briefly to *I. isolatum* as being endemic to the Bounty Is. Because of the inhospitable nature of the islands, they have not been visited by biologists more recently, in spite of renewed interest in the subantarctic islands' fauna. Consequently, no new specimens of *I. isolatum* have been collected. Fresh material is urgently required, as, although the species

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is redescribed and illustrated here, little is known about the female, and the type male is badly damaged.

The habits of *I. isolatum* are so poorly known that it is not possible to compare them with those of the other three rhaphidophorid genera. In morphological affinities *Ischyroplectron* Hutton is closest to *Insulanoplectron* Richards from The Snares, but the relationships are slight. Its affinities with the fauna of Stewart I. and the South I. of New Zealand cannot be assessed until the Rhaphidophoridae of these regions are better known.

Genus ***Ischyroplectron*** Hutton

Ischyroplectron Hutton, 1897: 227–8.

In 1897 Hutton erected the genus *Ischyroplectron* for the species *isolatum*. Two years previously he had "temporarily" placed it in the genus *Ceuthophilus* Scudder until the New Zealand wetas became better known. Although several specimens are recorded as having been collected from under rocks on Bounty I., only one, a male, was presented to the Canterbury Museum; it is now the type. The other specimens have since been lost. The female of this species, presumably also from Bounty I., was described from a specimen in the Otago University Museum. This specimen has also been lost. No further material has been collected, and the type is badly damaged, with several portions missing. Hutton's generic description is not as complete as it could be, and the description of the male subgenital plate is inaccurate, but adequate revision is not possible until fresh material is obtained. The apical spination of the legs is correctly described.

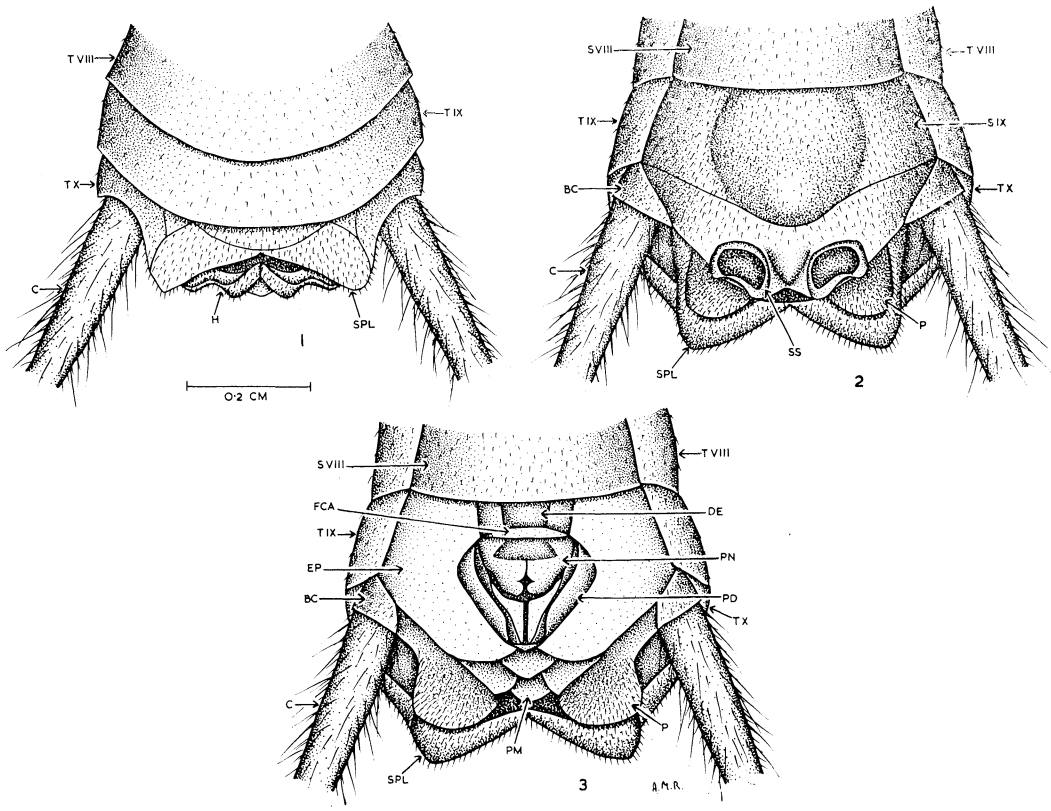
Ischyroplectron isolatum (Hutton) (Figs 1–3)

Ceuthophilus(?) *isolatus* Hutton, 1895: 175–6.
Ischyroplectron isolatum (Hutton), 1897: 228–9.

Basic colour dark brown; pronotum, mesonotum, metanotum, and abdominal tergites mottled with mid brown; all femora and tibiae mid brown mottled with dark brown, all tarsi mid brown.

MALE. Length 26 mm. Cerci short (0.3 × body length), thickly clothed with long and short setae. Fastigium as high as long. Metasternum with median tubercle. Antennae broken, but as in Hutton's generic description; scape missing; third segment on dorsal aspect 1.2 × as long as pedicel, and on ventral aspect subequal in length to pedicel. Fore and middle legs subequal in length, hind leg 1.8 × length of fore and middle legs. No linear spines on fore femora; middle femora with 1 prolateral linear spine beneath, or spines absent; hind femora with 8 or 9 prolateral and 37 or 40 retrolateral linear spines beneath. Fore and middle tibiae each with 3 prolateral and 3 retrolateral linear spines beneath; hind tibiae armed above with 19 or 21 prolateral and 20 or 24 retrolateral linear spines. Fore and middle tarsi unarmed; hind tarsi missing. Apical spines constant in number, as in generic description. Ratios of leg length to body length: fore leg 1.5 : 1; middle leg 1.5 : 1; hind leg 2.5 : 1.

GENITALIA. Suranal plate (Fig. 1: SPL), convex laterally, thickly clothed with setae; distal margin deeply emarginate and notched medially, curved over ventrally. Subgenital plate (Fig. 1: H), triangulate, 1.4 × as wide as long, convex laterally, tapering towards apex, thickly clothed with setae, except for keel which is glabrous; distal margin emarginate; distal portion of plate keeled medially, proximal portion raised medially; on ventral surface plate curved over a short distance anteriorly and clothed with setae. Styli missing, but



FIGS 1–3—*Ischyroplectron isolatum* (Hutton), ♂ genitalia: (1) dorsal view; (2) ventral view; (3) ventral view, subgenital plate removed to expose structures beneath. (BC, basal segment of cercus; C, cercus; DE, ductus ejaculatorius; E, endapophysis; EP, endoparamere; H, subgenital plate; P, paramere; PD, pseudosternite; PM, perianal membrane; PN, penis; SS, stylus socket; S VIII, S IX, sternites VIII, IX; SPL, suranal plate; T VIII, T IX, T X, tergites VIII, IX, X.)

sockets (Fig. 2: SS) located close together subapically on subgenital plate, on either side of keel. Parameres (Figs 2, 3: P) elongate, rounded at apex, twice as long as wide, lateral and distal portions thickly clothed with setae. Pseudosternite (Fig. 3: PD) 1.3 × as wide as long, convex laterally, tapering to a pointed apex distally. Penis (Fig. 3: PN) bilobed, each lobe 1.2 × as long as wide.

FEMALE. Not examined.

MATERIAL EXAMINED. Holotype ♂: Bounty I., under rocks, *c.* 1894, Captain Fairchild (Canterbury Museum, Christchurch).

REMARKS. Although differing in the apical spination of the fore and hind femora, the genus *Ischyroplectron* shows some affinities with *Insulanoplectron* from The Snares in the structure of the male genitalia. It shows no relationship with the other known genera of Macropathinae. Its main distinguishing characters are the apical spination of the legs and the structure of the genital plates.

Ischyroplectron isolatum was described from two specimens, the above male and a female, since lost. The tube containing the badly damaged male carries the Canterbury Museum label "Hutton's type *Ischyroplectron isolatum*" and "No. 368" written in an

unknown hand. There is no locality label, name of collector, or date of collection. The original description says the specimen was collected by Captain Fairchild of the New Zealand Government steamer *Hinemoa* about 1894.

A comparison of the type with Hutton's description has revealed several inaccuracies. One middle femur has a prolateral linear spine, which Hutton failed to record. He gives the number of linear spines on the hind femur as 6 prolateral spines and "numerous small denticulations" retrolaterally, whereas there are 8 or 9 prolateral and 37 or 40 retrolateral spines. He lists 11 to 13 spines on the hind tibia, whereas there are 19 or 21 prolateral and 20 or 24 retrolateral spines. The body length is given as 34 mm, but today it is 26 mm; this is probably owing to shrinkage of the abdomen caused by long immersion in alcohol. Lengths given for pronotum, thorax, hind femur, and hind tibia all agree with the type. The colour was originally light brown on the body with darker legs, but over the years it has darkened to a uniform dark brown. Hutton's description of the male genitalia is inadequate and inaccurate. The apex of the subgenital plate is described as trilobed, but is in fact emarginate. The suranal plate is not described, and the female genitalia are not mentioned.

Relationships of Subantarctic Islands Orthoptera

The subantarctic islands Orthoptera comprise one species of Henicidae and four monotypic genera of Rhaphidophoridae. The henicid, *Zealandosandrus subantarcticus* Salmon, occurs on The Snares, about 104 km south-west of Stewart I. This appears to be the furthest south this family has been recorded. *Z. subantarcticus* occurs in petrel burrows, but on the Auckland Is this habitat is occupied by rhaphidophorids. Three other species of *Zealandosandrus* Salmon occur in the south-west of the South I. of New Zealand (Salmon 1950).

Apart from the Antipodes Is, from which no Orthoptera are known, the Auckland Is, Campbell I., the Bounty Is, and The Snares each have a monotypic genus of Rhaphidophoridae (Richards 1964, 1970). These genera are not closely related, though a slight similarity in genital structure has been demonstrated between *Ischyroplectron* and *Insulanoplectron*. *Zealandosandrus subantarcticus* and *Insulanoplectron* are more closely related to Fiordland species, which is not surprising considering their close geographic proximity. *Insulanoplectron* is also distantly related to *Tasmanoplectron* Richards, from Tasman I., Tasmania (Richards 1971). This suggests a long period of isolation for the other three rhaphidophorid genera. However, it must be remembered that, although Orthoptera are very poorly represented on the subantarctic islands, large numbers of species occur in the South I. of New Zealand and Stewart I., many of which have yet to be described. Consequently it is possible that further affinities may yet be demonstrated between the New Zealand and subantarctic islands faunas.

Key to Subantarctic Genera of Rhaphidophoridae

1. Fore femur with apical spines 2
   —Fore femur without apical spines ..... ***Notoplectron*** Richards
2. Fore femur with two apical spines 3
   —Fore femur with one prolateral apical spine ..... ***Insulanoplectron*** Richards
3. Hind femur unarmed ..... ***Dendroplectron*** Richards
   —Hind femur with one prolateral apical spine ..... ***Ischyroplectron*** Hutton

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