Revision of the Rhaphidophoridae (Orthoptera) of New Zealand. Part II.

The Genus *Macropathus* Walker in the British Museum (Nat. Hist.) Collection.

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Abstract

The synonymy of the genus *Macropathus* Walker is discussed and the confusion between the two genera *Macropathus* Walker and *Pachyrhamma* Brunner is clarified. The genus and type species for the genus are redefined.

Introduction and Acknowledgments

The genus *Macropathus* was the first of the New Zealand genera of Rhaphidophoridae to be described, but since then no further specimens of this genus have been collected. In 1869, Walker records the genus as occurring in New Zealand " in caves, half a mile within " The failure of this genus to reappear is perhaps due to our lack of knowledge of the cave fauna of this country and the fact that no definite type locality was named.

I wish to express by thanks to Dr. D. R. Ragge, curator of Orthoptera at the British Museum (Nat. Hist.) for permission to examine Walker's original type material; and to Dr. J. T. Salmon, Zoology Department, Victoria University, under whose supervision this work was carried out. I also wish to thank the Photographic Department at the British Museum (Nat. Hist.) for the excellent photographs of *Macropathus filifer.*

Genus Macropathus Walker, 1869.

1869 *Macropathus* Walker, *Cat. Derm. Salt. Blat.*, p. 206.
1888. *Pachyrhamma* Brunner, *Monog Steno. Gryll Verh z-b* Wien, XXXVIII, p. 302.
1897 *Macropathus* (nec Walker) Hutton, *Trans. N Z. Inst*, 29, p. 239

Several years ago I revised Walker's genus *Macropathus* (Richards, 1954) and added a new species to it. Since then, having had the opportunity to examine Walker's original type material in the British Museum (Nat. Hist.), I have discovered that his descriptions were totally inadequate as well as unillustrated Walker placed three species in his genus, which I synonymised as *Macropathus filifer.* Now it appears that *M. filifer,* the type species for the genus, is a monotypic species and the other two species, which were correctly synonymised as *M. fascifer,* must be placed in another genus. The generic differences between *filifer* and *fascifer* lie in the apical spination of the legs and in the shape of the external genitalia, neither of which characters was described by Walker.

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In 1888, as I have shown in a previous paper (Richards, 1954), Brunner took Scudder's species *Hadenoecus edwardsii* and made it the type species for his new genus *Pachyrhamma,* not realising that he was redescribing Walker's genus *Macropathus.*

In 1897, Hutton redescribed the two genera *Macropathus* Walker and *Pachyrhamma* Brunner. As Hutton's description of the genus *Pachyrhamma* does not agree with the specimens I have examined, I redescribed the genus in 1954 as *Macropathus,* but, although this generic description still stands, the name must now be changed back to *Pachyrhamma.* Hutton's redescription of the genus *Macropathus* differs markedly from Walker's material. He says, " I have had to reconstruct this genus in order that it may be understood. It is very different from *Pachyrhamma,* but closely allied to *Pharmacus".* Strangely enough he says, " Fore coxae not spined ", whereas that character appears to be constant for the sub-family Macropathinae at least. He also says, " None of the femora with apical spines ", while all of them possess apical spines. Of the apical spination of the fore and middle tibiae he says, " Each with a pair of inferior spines and a single superior one on the posterior side ", while they both have two pairs, one pair inferior and the other pair superior.

The genus *Macropathus* Walker therefore must now be redefined as follows:

Body with dorsal surface sparsely clothed with short setae and ventral surface thickly clothed with short setae. Legs long and slender. Antennae very long and tapering; almost touching at their bases; from fourth segment onwards segments unequal in length, although steadily decreasing in size. A single anterior, white, median ocellus only. Fastigium rises abruptly, convex, ridged medianly and longitudinally with base touching scapes of antennae. Fore coxae each armed with a spine. Apical spines on femora, tibiae and first and second proximal segments of hind tarsi constant in number. Fore femur bears one apical spine prolaterally; fore tibia bears four apical spines, one above and one beneath, both prolaterally and retrolaterally; fore tarsus unarmed. Middle femur bears one apical spine prolaterally; middle tibia bears four apical spines, one above and one beneath, both prolaterally and retrolaterally, middle tarsus unarmed. Hind femur bears one apical spine prolaterally; hind tibia bears a pair of apical spurs above, a pair of apical spines beneath, and a pair of subapical spines beneath, one from each pair being prolateral and the other retrolateral, two proximal segments of hind tarsus each bear two apical spines above, one prolateral and one retrolateral; other two segments unarmed. Subgenital plate of female tapering to a rounded apex distally. Subgenital plate of male triangulate with a rounded apex; medianly the plate is strongly keeled. Proximo-laterally the plate bears two small styli, one to each side.

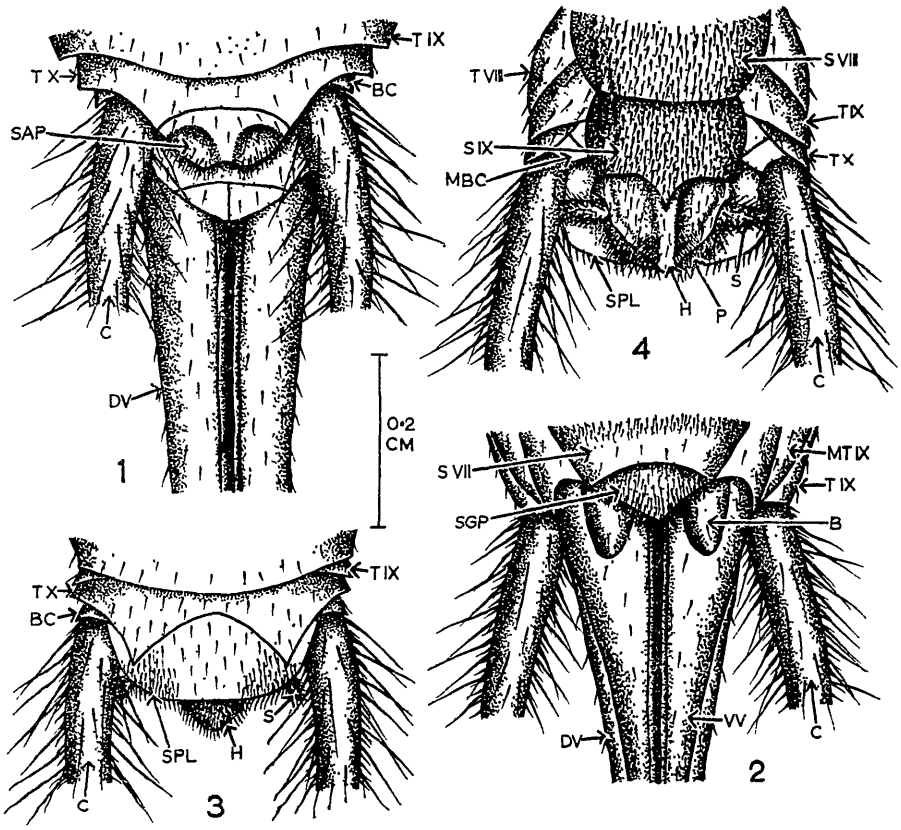
Type species for the genus: *Macropathus filifer* Walker.

Macropathus filifer Walker, 1869.

1869. *Macropathus filifer* Walker, *Cat Derm Salt. Blat.,* p. 206.
1869. *Hadenoecus edwardsii* Scudder, *Proc Bost. Soc. Nat. Hist.* 12, pp. 408–409.
1888. *Pachyrhamma edwardsii* (Scudd., 1869), Brunner, *Monog. Steno. Gryll Verh z-b* Wien, XXXVIII, p. 302.
1897. *Macropathus filifer* (nec Walker, 1869), Hutton, *Trans. N Z. Inst.,* 29, pp. 239–240, Figs. 20, 20a.
1954. *Macropathus filifer* Walker, Richards, *Trans. Roy. Soc. N.Z.* 82, pp. 740–755. Plate 30, Figs. 1, 2. Text-figure 1 Figs. 1–4

In 1869, Walker made *Macropathus filifer* the type species of his new genus *Macropathus* and placed two other species in the genus as *M. fascifer* and *M. altus.* Although he had two males and a female, his description of *M. filifer* is based almost entirely on the male. *M. fascifer* is described from a male, and *M. altus* from a female. From the similarity of their descriptions, Hutton, in 1897, was able to synonymise *M. fascifer* and *M. altus* as *M. fascifer, fascifer* having page priority over *altus.* My examination of Walker's original material shows this to be correct. *M. filifer,* however, is very different from *M. fascifer* and must be separated generically from it.

In 1869, Scudder described "A New Cave Insect from New Zealand " as *Hadenoecus edwardsii.* It was described from one rather badly damaged specimen, and his account of it is totally inadequate. In 1888, as I have already shown (Richards, 1954), Brunner took *H. edwardsii* and made it the type species of his new genus *Pachyrhamma,* placing in it two species, *P. edwardsii* (Scudd., 1869) and *P. novae-*



TEXT-FIG. 1. *Macropathus filifer* Walker.—Fig 1—Female genitalia, dorsal view. Fig. 2—Female genitalia, ventral view. Fig. 3—Male genitalia, dorsal view. Fig. 4—Male genitalia, ventral view.

INDEX TO TEXT-FIG. 1 —B—basivalvula. BC—basal segment of cercus. C—cercus. DV—dorsal valve H—hypandrium (subgenital plate, male) MBC—membrane of basal segment of cercus. MT IX—membrane tergite IX. P—paramere. S—stylus SAP—suranal plate female SGP—subgenital plate female. SPL—suranal plate male. S VII, S VIII, S IX—sternite VII, VIII, IX T VIII, T IX, T X—tergite VIII, IX, X. VV—ventral valve

seelandiae n.sp. However, by comparison of Brunner's and Walker's descriptions *P. edwardsii* and *P. novae-seelandiae* have been synonymised with *Macropathus filifer* and *M. fascifer* respectively. Brunner illustrated his new species *P. novae-seelandiae* with a line drawing from which it is possible to confirm its identity with Walker's *M. fascifer*.

In 1897, Hutton used the species *fascifer* to redescribe the genus *Pachyrhamma* and placed in it three species, *P. speluncae, P. novae-seelandiae* and *P. fascifer,* all of which have been synonymised as *P. fascifer* (Richards, 1954). He also used the species *filifer* to redescribe the genus *Macropathus.*

Hutton placed two species in the genus *Macropathus, M. filifer* and *M. edwardsii.* He synonymised *Pachyrhamma edwardsii* Brunner with *M. filifer* Walker, but placed *Hadenoecus edwardsii* Scudder in a separate species as *M. edwardsii* (Scudd.). Hutton admitted he had seen no specimens of *M. edwardsii* (Scudd.), but separated it from *M. filifer* Walker because of " the absence of spines from the hind femur and its great length of leg ". Although Scudder gave the measurement of the length of the fore and hind tibiae in his original description, there is no mention of the spination of the legs. His very inadequate description, based on a single imperfect specimen, is not sufficient to warrant erecting a new species for it. Hutton doubtfully

synonymised *Ceuthophilus lanceolatus* Walker with *M. edwardsii,* but examination of the original material has now shown that *C. lanceolatus* was placed in the wrong family and belongs to the Henicidae.

Hutton must have been doubtful about the validity of the species *M. edwardsii,* as he wrote to Scudder asking him to re-examine the type material. Scudder replied that the type of *Hadenoecus edwardsii* did not agree with either Brunner's description of *Pachyrhamma edwardsii* or Hutton's of *Macropathus edwardsii,* but was closer to *Pleioplectron.* In 1899, Hutton published this as a note and the species *M. edwardsii* may now be removed from the genus *Macropathus.*

Hutton described *M. filifer* as having antennae " nine or ten times the length of the body ". This is a very bad character, as the antennae are very brittle and are usually imperfect. He says, " Legs very hairy ", while Walker's specimens are sparsely clothed with setae. The number of linear spines he records from the hind femora and tibiae do not agree with Walker's specimens. For the hind femora he says " six small spines on the inner and two on the outer edge near the middle ", while they average five on the inner and four on the outer. For the hind tibiae he says " about 30 spines in the outer and 25 in the inner row ", while they average 43 in the inner and 44 in the outer row (Table 1). Making allowances for the range of variation which occurs in the number of linear spines in members of the Rhaphidophoridae, I feel that the discrepancy here is too large. Hutton's redescription of *M. filifer* is based on a single male specimen collected by G. V. Hudson from a limestone cave near Mt. Arthur, Nelson, and if his generic and specific descriptions are accurate, then his species *M. filifer* does not belong to Walker's genus *Macropathus.* Kirby also realised this, as when he published his " synonymic Catalogue of Orthoptera " in 1906, he changed the name of Hutton's species *Macropathus filifer* Hutton (nec Walker) to *M. huttoni* Kirby. In the Hudson Collection in the Dominion Museum are three specimens, two males and a female, from the Mount Arthur Tableland, Nelson, labelled by G. V. Hudson as *Macropathus filifer.* There is no record that either of the males was the one described by Hutton, and they do not agree with his description. Although fairly closely related to *M. filifer,* differences in the spination and genitalia place them all in another species at least, and one male possibly in a new genus. Thus it appears that the holotype of Hutton's species *M. filifer,* now *M. huttoni* Kirby, has been lost and no further specimens of it collected.

The species *Macropathus filifer* Walker is now redefined as follows:

Colour. Basic colour deep ochrous, with pronotum, mesonotum, metanotum and abdominal terga irregularly mottled with light brown; femora and tibiae ochrous, light brown at their junctions; hind femora with colour pattern poorly defined in pale and deeper ochrous; tibiae and tarsi pale ochrous at their junctions; tarsi pale ochrous; antennae light brown proximally, changing to deep ochrous distally; ovipositor light reddish-brown, dark at tip.

Body. Length up to 22 mm. Dorsal surface of body sparsely clothed with setae; ventral surface thickly clothed with setae. Ovipositor 0.9 as long as body. Antennae broken in female, in male seven times as long as body. Maxillary palps with third and fourth segments subequal in length. Pronotum and mesonotum distinctly margined laterally and posteriorly. Cerci long, tapering, slightly crescent-shaped. Bodies of male and female subequal.

Antennae. As in generic description. Scape about four times as large as pedicel, which is narrower than scape, but broader than other segments; third segment narrower than pedicel, on dorsal aspect half as long again, and on ventral aspect 0 25 as long again as pedicel Scape and pedicel thickly clothed with short setae, next 14 segments sparsely clothed with setae, remaining segments of flagellum thickly clothed with setae. Sexual dimorphism present in antennae, male possessing longer, stouter antennae than female; no spines present on flagellum of male or female.

Legs. Long and slender. Fore and middle legs subequal, with hind leg 1.4 length of fore and middle legs. Sexual dimorphism is shown by fore legs of female being 0.84 as long as those of male; middle legs of female 0.8 as long as those of male; and hind legs of female 0.78 as long as those of male. Fore and middle femora without linear spines. Hind femora, fore, middle and hind tibiae and two proximal segments of hind tarsi armed with variable numbers of linear spines (Table I) No spines occur on fore and middle tarsi. Apical spines

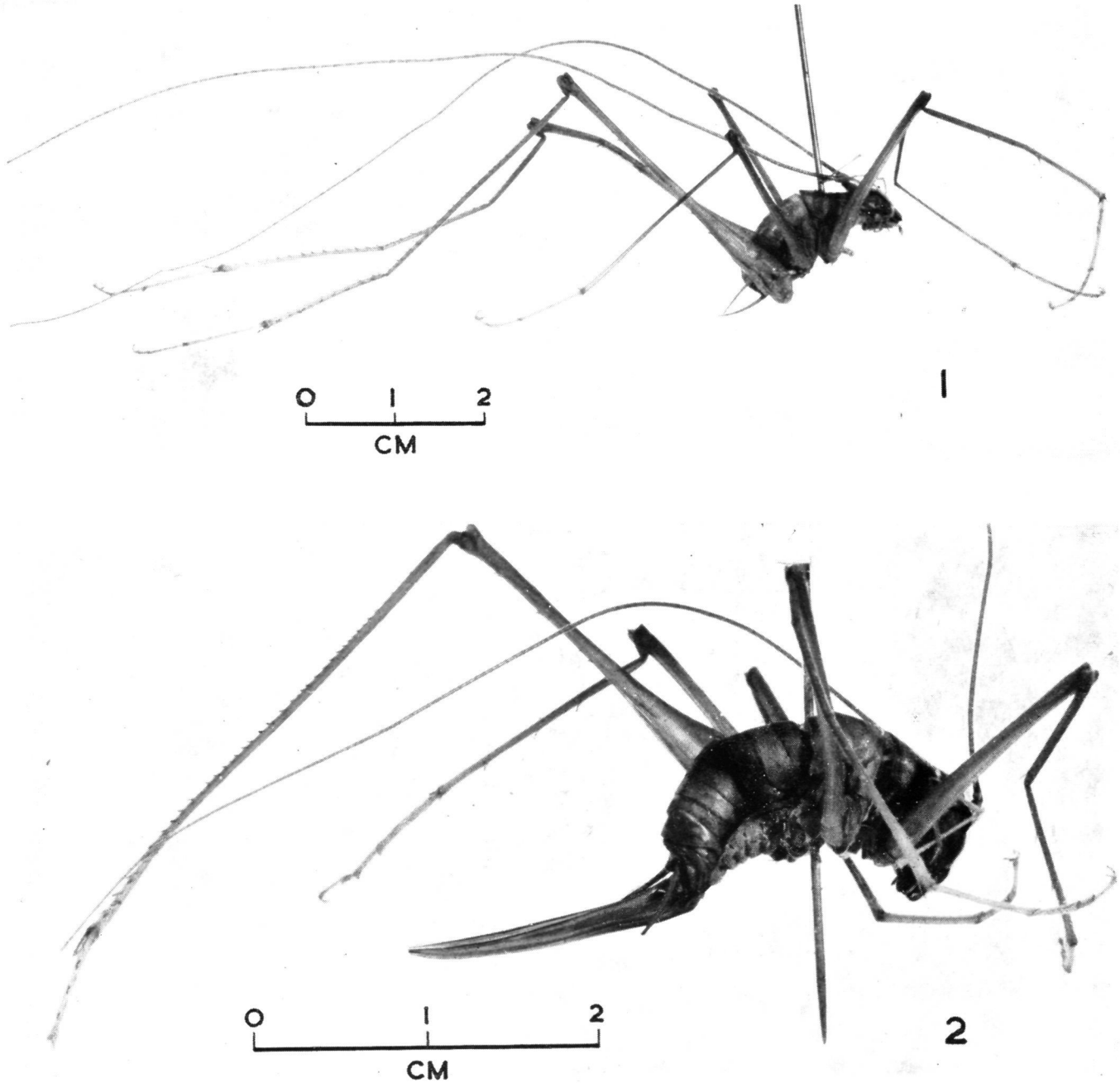


FIG. 1—*Macropathus filifer* Paratype male, lateral view. FIG. 2—*M. filifer* Lectotype female, lateral view.
Photos by courtesy British Museum (Nat. Hist.)

TABLE I.—VARIABILITY IN LINEAR SPINES ON THE LEGS.
MACROPATHUS FILIFER WALKER.

		Arith. Mean	Std Dev.	No. of Specimens
Prolat.	Fore Femur	0 – 0	0 – 0	3 – 3
Retrolat	Inf	0 – 0	0 – 0	3 – 3
Prolat.	Fore Tibia	4 – 4	0 – 0	3 – 3
Retrolat.	Inf.	3 – 3	0 – 0	3 – 3
Prolat	Fore Tarsus	0 – 0	0 – 0	3 – 3
Retrolat.		0 – 0	0 – 0	3 – 3
Prolat.	Mid Femur	0 – 0	0 – 0	3 – 2
Retrolat.	Inf.	0 – 0	0 – 0	3 – 2
Prolat.	Mid Tibia	0 – 0	0 – 0	3 – 2
Retrolat.	Sup.	0 – 0	0 – 0	3 – 2
Prolat.	Mid Tibia	3 – 3	0 – 0	3 – 2
Retrolat.	Inf.	4 – 4	0 – 0	3 – 2
Prolat.	Mid. Tarsus	0 – 0	0 – 0	3 – 1
Retrolat.		0 – 0	0 – 0	3 – 1
Prolat.	Post. Femur	5 – 5	0 – 1	3 – 2
Retrolat.	Inf.	4.6 – 4	0.47– 1	3 – 2
Prolat.	Post. Tibia	42 – 43.5	1 – 0 5	2 – 2
Retrolat.	Sup.	44 – 44	1 – 2	2 – 2
Prolat.	Post. Tarsus	2 – 1	0 – 0	2 – 2
Retrolat.	1 Sup	1.5 – 1.5	0.5 – 0.5	2 – 2
Prolat.	Post Tarsus	2 – 1	0 – 0	1 – 2
Retrolat.	2 Sup.	0 – 0 5	0 – 0 5	1 – 2

INDEX TO TABLE I.—Arith. Mean—arithmetic mean. Std. Dev—standard deviation. No of Specimens—number of specimens.

constant in number as in generic description Ratio of length of legs to length of body: Fore leg, male 2 8:1; female 2.6:1. Middle leg, male 2.86:1; female 2.52:1. Hind leg, male 4.59:1, female 3.95:1.

GENITALIA. *Female*: Suranal plate, Fig. 1 (SAP), with lateral margin slightly rounded, distal margin emarginate; disto-laterally the margin bears a number of setae, rest of plate sparsely clothed with setae. Subgenital plate, Fig. 2 (SGP), concave laterally tapering to a rounded apex; thickly clothed with setae. *Male*: Suranal plate, Fig. 3 (SPL), slightly convex laterally and distally; distal margin with a fringe of setae; disto-laterally plate bears two thick groups of setae, one on each side; rest of plate sparsely clothed with setae. Subgenital plate (hypandrium), Fig. 4 (H), triangulate 1.1 as wide as long; sides notched proximally changing to convex laterally and tapering to a rounded apex; medianly the plate is strongly keeled, dorsal surface with two groups of setae on either side of and at apex, rest of plate bears a few setae, apical portion of ventral surface thickly clothed with setae. Subgenital plate completely covers genitalia. It bears proximo-laterally two styli (S), one on each side, thickly clothed with short setae, length of styli being 0 3 length of sternite IX Parameres almost completely covered by subgenital plate; thickly clothed with setae.

LOCALITY. From inside caves, New Zealand, coll. H. Drew. No further occurrence of this species has been recorded since.

TYPES. Lectotype female and two paratype males in British Museum (Nat. Hist.) Collection.

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