FIRST RECORDS AND A NEW SPECIES OF *PHYLLOGNATHOPUS* (COPEPODA; HARPACTICOIDA) IN NEW ZEALAND

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SUMMARY

The discovery in New Zealand of the harpacticoid *Phyllognathopus viguieri* is recorded, and a description of *P. volcanicus* sp. nov., from the sands of some lake beaches in North Island is given.

INTRODUCTION

The genus *Phyllognathopus* Mrázek, 1893, because of its large mandibular palp, peculiar maxillary gland and separation of the first thoracic segment from the head, is considered one of the most primitive genera of all the Harpacticoida. It is widely distributed geographically: Europe, North America, North Africa, Malay Archipelago, Brazil, New Guinea, and Patagonia. Members are exclusively freshwater animals, the most usual habitats being in leaf axils of some tropical plants (Bromeliaceae) and in damp moss. They have been recorded in the interstitial environment by several authors including Pennak (1940—*P. paludosus*), Neel (1948—*Phyllognathopus* sp.), and Dussart (1963, 1966—*P. viguieri*).

In New Zealand I have now found two species, one living in damp moss, the other living interstitially in the sands along the shores of lakes in the Rotorua-Taupo district. Before this there had been no records of this genus in the country.

Specimens were obtained by vigorously washing small quantities of either moss or lake sand in water and filtering the liquid through fine bolting silk. The animals were preserved in 60% alcohol and dissections were done in polyvinyl alcohol with a little chlorazol black added. The author made the collections, unless otherwise stated.

DESCRIPTIONS

Family Phyllognathopodidae Gurney, 1932

Genus **Phyllognathopus** Mrázek, 1893

Syn. *Viguierella* Maupas, 1893

Pigmentary eyes absent. Body not distinctly divided into cephalothorax (6 segments) and abdomen (4 segments in female, 5 in male). First antennae 8-segmented, those of male only slightly geniculate. Second antennae 4-segmented, appendage of 1 segment bearing 5 hairs. Mandibular palp large, biramous; maxillules and maxillae well developed. Maxillipeds reduced and flattened with a series of marginal setae. First thoracic segment differentiated from head and bearing first pair of swimming legs. Legs 1–3 with 3-segmented exopodites and endopodites, leg 4 with 3-segmented expodite and usually 2-segmented endopodite (3 in *P. chappuisi*). These legs identical in both sexes. Fifth leg of both sexes 1-segmented; bilobed in the female, the outer lobe bearing 4 spines or setae, the inner 2 long spines. The male has 1 modified inner spine, the outer lobe usually with 6 setae. Anal plate semicircular. Egg sacs absent; eggs are deposited free.

Phyllognathopus viguieri (Maupas, 1892) (Fig 1)

This species can be recognised by the peculiar swollen bases of the apical caudal setae of the females (*see* Fig. 1b), those of the male being normal in their development. The caudal rami in both sexes are scarcely longer than wide.

DISTRIBUTION: Wet moss at base of gravel piles, Ardmore, 21.4.68 (♀), 23.6.68 (numerous ♂♂ and ♀♀).

REMARKS: This cosmopolitan species has been recorded from a variety of habitats overseas: decaying vegetation, lake shores, springs, wet moss and in leaf axils of Bromeliaceae. The Ardmore specimens were collected in terrestrial moss at the foot of gravel piles. This moss is relatively dry most of the year, but during wet weather is subject to a stream of surface run-off water and becomes very soggy for some time during winter. During this period *Phyllognathopus* and a small cyclopoid copepod, *Bryocyclops* sp. become very numerous.

Phyllognathopus volcanicus sp.nov. (Figs 2 and 3)

FEMALE: Body of 6 cephalothoracic and 4 abdominal segments. Length 0.58–0.62 mm, excluding caudal setae. Pigmentary eye absent. Anal plate semicircular, with fine marginal hairs. Caudal rami elongate, about as long as the last abdominal segment and almost twice as long as wide; slight ridge present, extending from the outer anterior margin to a position just in from the central seta, with a slightly curved row of fine spinules projecting from the posterior end. Another row of fine spinules extends from the dorsal seta to the inner margin of the ramus. Median apical seta well developed, about five times the length of the ramus. Inner apical seta very small, outer approximately equal to the furcal ramus in length. First antenna 8-segmented, sensory club not extending past the terminal segment. Second antenna 4-segmented, exopodite 1-segmented, bearing 5 setae. Mouthparts typical of the genus with a large, biramous palp on the mandible, each ramus being 1-segmented, well developed maxillae and reduced maxilliped. Legs

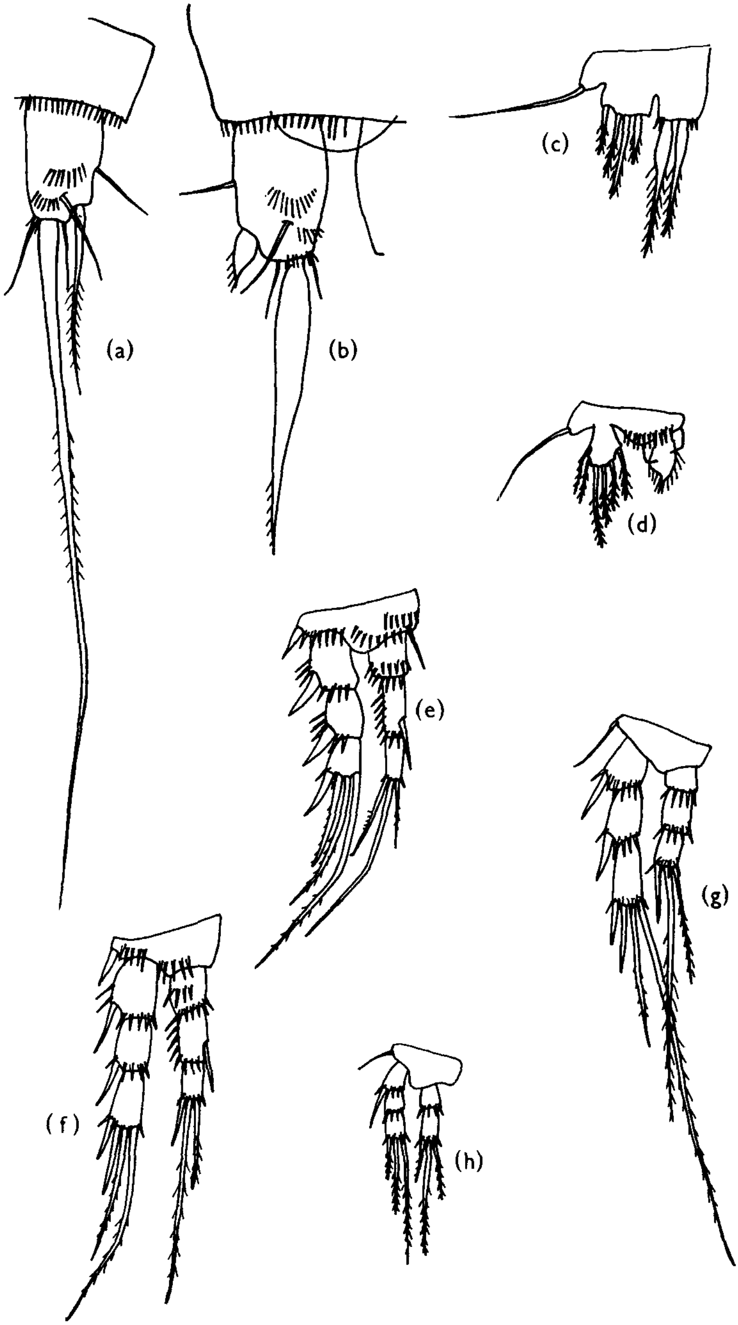

FIG. 1—*Phyllognathopus viguieri* (a). Caudal ramus, male; (b). caudal ramus, female; (c). leg 5, female; (d). leg 5, male; (e). leg 1; (f). leg 2; (g). leg 3, (h). leg 4.

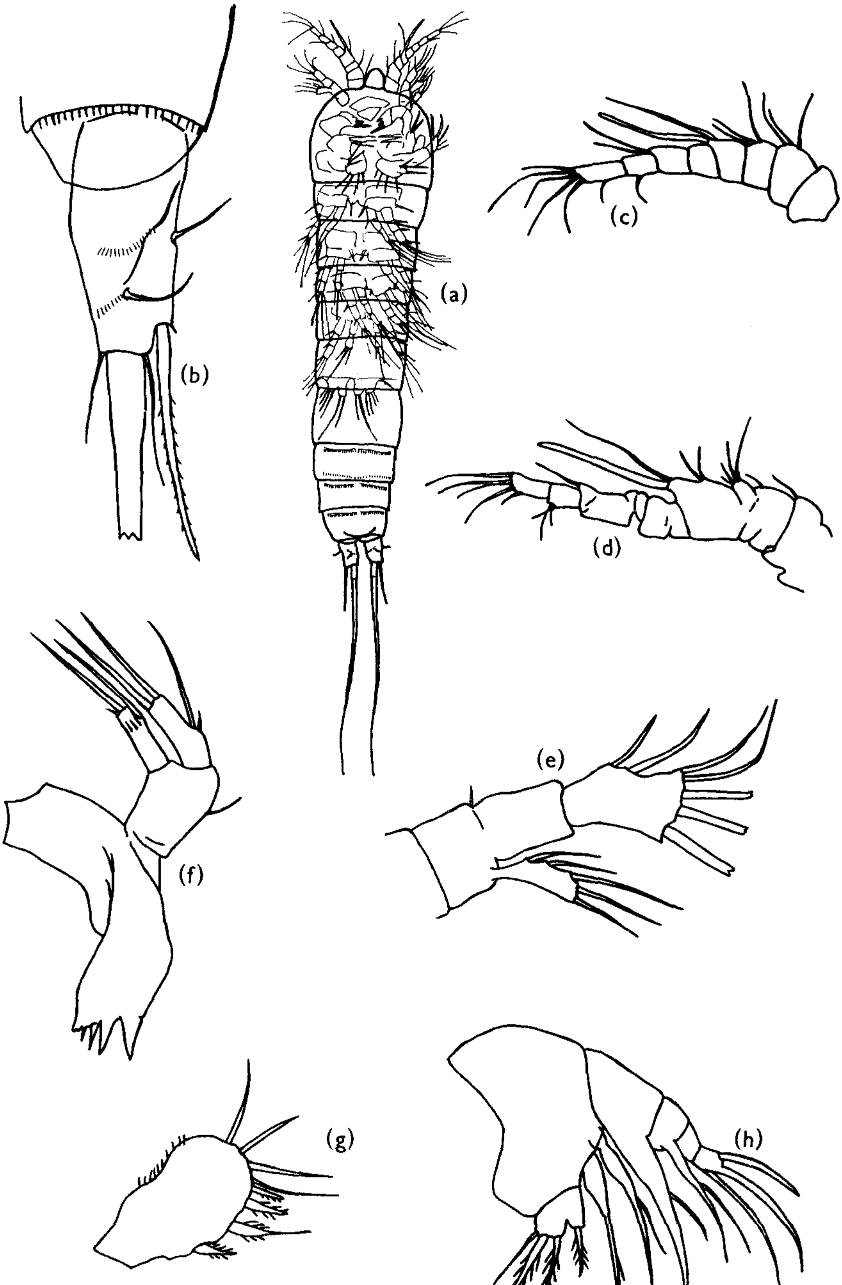

FIG. 2—*Phyllognathopus volcanicus* sp.nov. (a). Female; (b). caudal ramus, female; (c). first antenna, female; (d). first antenna, male; (e). second antenna; (f). mandible; (g). maxilliped; (h). maxilla.

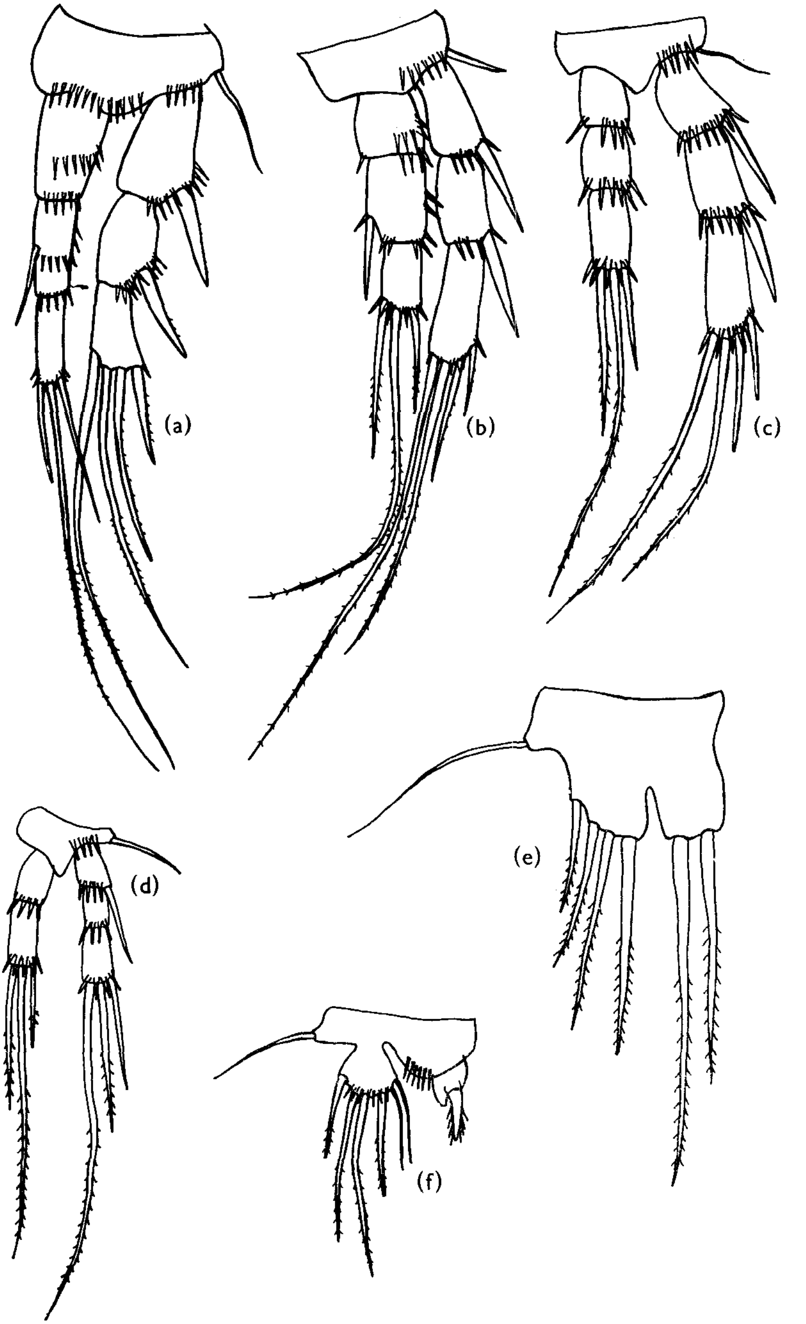

FIG. 3—*Phyllognathopus volcanicus* sp.nov. (a). Leg 1; (b). leg 2; (c). leg 3; (d). leg 4; (e). leg 5, female; (f). leg 5, male.

1–4 each with 3-segmented exopodites and legs 1–3 with 3-segmented endopodites. Leg 4 endopodite 2-segmented. Endopodite of leg 1 extends just beyond the exopodite. Leg 4 small, with no outer spine on exopodite segment 2. Chaetotaxy of legs 1–4 is shown in Table 1. Leg 5 one segmented, the outer lobe bearing 4 setae increasing in length from the outer margin inwards, the inner lobe with 2 long spines, the outer being the longest. No egg sac formed; the eggs are laid free.

TABLE 1—Leg Formulae (After Gurney 1932) Si = setae of inner margin; S = setae; Sp = spines; Spo = outer spines; St = apical setae

	Endopodite Segments				*Exopodite Segments*						
	1	2	3		1		2		3		
	Si	Si	S	Sp	Si	Spo	Si	Spo	Si	St	Sp
Leg 1	0	1	2	1	0	1	0	1	0	1	3
Leg 2	0	1	2	1	0	1	0	1	0	1	3
Leg 3	0	0	2	1	0	1	0	1	0	1	3
Leg 4	0		2	1	0	1	0	0	0	1	2

MALE: Body of 6 cephalothoracic and 5 abdominal segments, a little smaller in length than the female (0.55–0.58 mm), otherwise form essentially the same. First antenna slightly geniculate. Mouthparts and swimming legs similar to the female. Leg 5 much reduced, 1-segmented, the outer lobe with 4 pinnate setae of which the third is the longest, and 2 fine setae, with the inner lobe bearing a single modified spine together with a basal row of spinules.

DISTRIBUTION: Vegetation in warm swamp, Lake Rotoehu, 5.7.66 (1 ♀, 1 ♂); shore sand, Lake Tarawera, 17.10.66, 6.12.66, 20.4.67, 13.9.67, 5.12.67; shore sand, Lake Rotoiti, 20.4.67, 5.12.67; shore sand, Lake Tikitapu, 5.12.67; shore sand, Holden's Bay, Lake Rotorua, 20.3.68; shore sand, Lake Okataina, 20.3.68; shore sand, Lake Taupo, 4.12.66 (coll. J. G. Pendergrast 1 ♀).

TYPES: The holotype female was taken from shore sand at Rahuiroa Bay, Lake Tarawera (298.5 metres A.S.L.) on 17.10.66. This, together with 5 ♀ paratypes and 5 ♂ paratypes from the same locality have been lodged in the Dominion Museum, Wellington.

REMARKS: This species is a successful inhabitant of lake shores in the Rotorua district. At Lake Tarawera, where the animals were most numerous, individuals were recorded 2 metres shoreward of the water line and several metres out from shore in submerged sand. Specimens were found in sand to a depth of 8 cm, with a maximum in the 3–4 cm layer; some were netted while swimming clumsily just above the sand. Two were found amongst dense vegetation in a warm swamp (29°c) on the edge of Lake Rotoehu, but the species was not encountered in this locality on subsequent sampling.

DISCUSSION

The systematics of this genus are confused. Chappuis (1928), Gurney (1932), and Borutsky (1964) recognise several different species. However, Lang (1948), followed by Wilson and Yeatman (1959), groups all known forms as *P. viguieri* (Maupas, 1892). Menzel (1924, 1925) described three new forms from the Malay Archipelago, but left them unnamed, although one has since been described as a variety of *P. viguieri* by Chappuis (1924). Bozic (1966) has shown that at least two of Menzel's forms appear to be true species because interbreeding does not take place. This demonstrates the need for similar work to be carried out on the other "forms" of the genus. Until results of such work are known I follow Gurney (1932) in recognising the species *P. viguieri, P. paludosus* Mrázek, 1894, and *P. chappuisi* Delachaux, 1924, and I also recognise *P. insularis* Chappuis, 1940, and *P. camptoides* Bozic, 1965.

New Zealand examples of *P. viguieri* fit the description of the species well. *P. volcanicus* seems closest in form to *P. paludosus* because the female has long caudal rami, each of which has apical setae 2 and 4 normal in shape, compared with the expanded bases of these setae in *P. viguieri*. The main difference between the species is in the structure of the female fifth leg. In *P. paludosus* and *P. viguieri* the longest seta on the outer lobe is the third, but in *P. volcanicus* it is the fourth, inner seta which is longest.

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