

TRICHOPTERA OF THE AUCKLAND ISLANDS

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Abstract. Of four species of Trichoptera now known from the Auckland Is., two are described as new in the genera *Costachorema* and *Tiphobiosis* (Family Rhyacophilidae), and two are recorded in the genera *Oxyethira* and *Paroxyethira* (Family Hydroptilidae), the last being an undetermined species known only from larval-pupal cases.

Four species of two families of Trichoptera have been collected in the Auckland Is. Two of these appear to be widespread within this island group, a third species is represented only by a unique adult and a fourth by a few larval-pupal cases taken in one stream.

Specimens examined are from the collections of the Bernice P. Bishop Museum, Honolulu (B.P.B.M.), Dominion Museum, Wellington (D.M.), Entomology Division, Nelson (E.D.), and Canterbury Museum, Christchurch (C.M.). A representative series has been lodged in the Auckland Museum.

Family RHYACOPHILIDAE

Genus *Costachorema* McFarlane, 1939*Costachorema notoptera* Wise, sp.n.

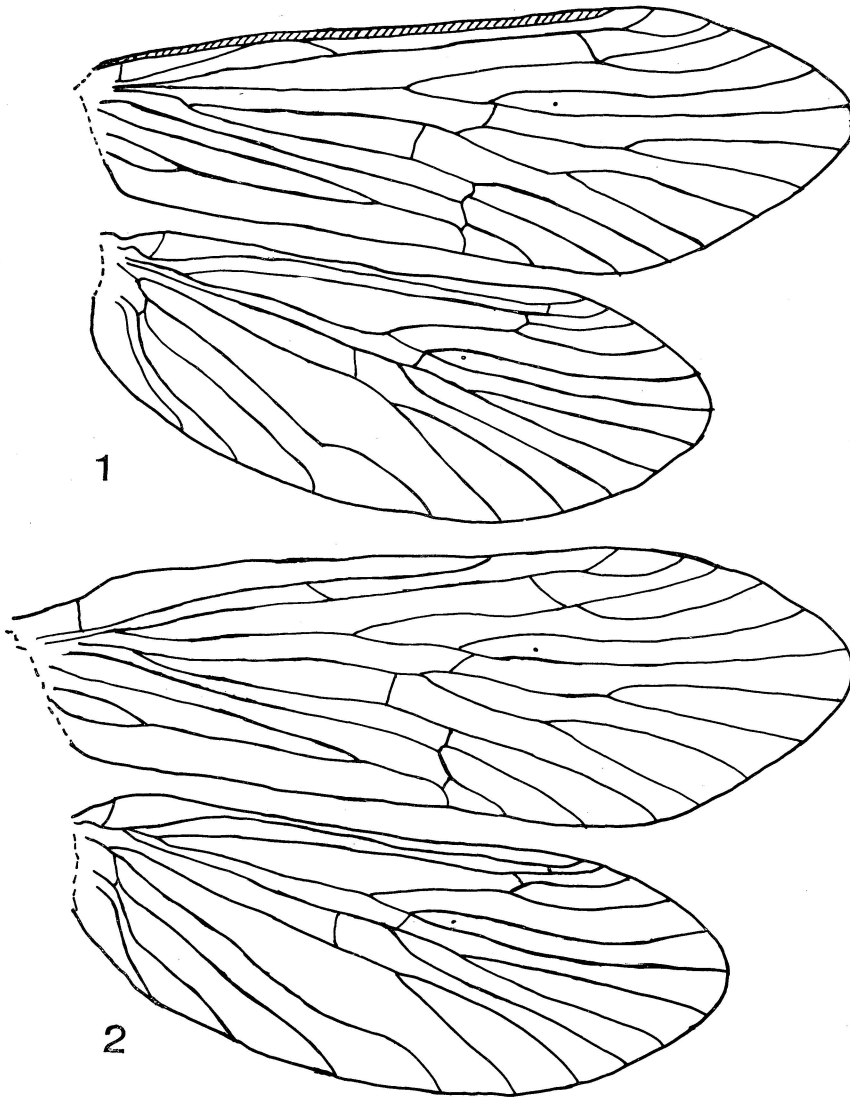
(Figs. 1 - 16)

A medium-sized species with pale brown wings longer than body, hairs of head all dark brown.

Wings, ♂♀ (Figs. 1-2). Venation normal for genus.

Abdomen and genitalia, ♂ (Figs. 3-7). Segment VII with ventral process; dorsal posterior margin of VIII straight, membranous or lightly sclerotised mid-dorsally. Segment IX membranous dorsally. Segment X (dorsal plate) membranous with two apical concavities distally. Superior appendages rounded apically, a pair of long elongate processes beneath them, each process expanded apically with a basal dorsal stout process, an adjacent short narrow process internally. Inferior appendages stout, two-jointed, basal joint somewhat rounded apically, distal joint leaf-like, approximately half length of basal. Aedeagus as figured (Figs. 6-7).

Abdomen and genitalia, ♀ (Figs. 8-11). Abdomen V with minute ventral tooth in lateral view; tooth broad, rounded in ventral view; line of tooth extending as oval line on sternite. Abd. VI with short ventral tooth; VII without tooth. Abd. VIII strongly chitinised, annular about abdomen; sternite extending posteriorly to upturned distal point, the posterior extension supporting a fleshy lobe. Beyond Abd. VIII, a large dorsal chitinised shield (Abd. IX?), with a fleshy apical lobe (Abd. X?) bearing a dorso-lateral pair of tubercles and a pair of minute distal tubercles.

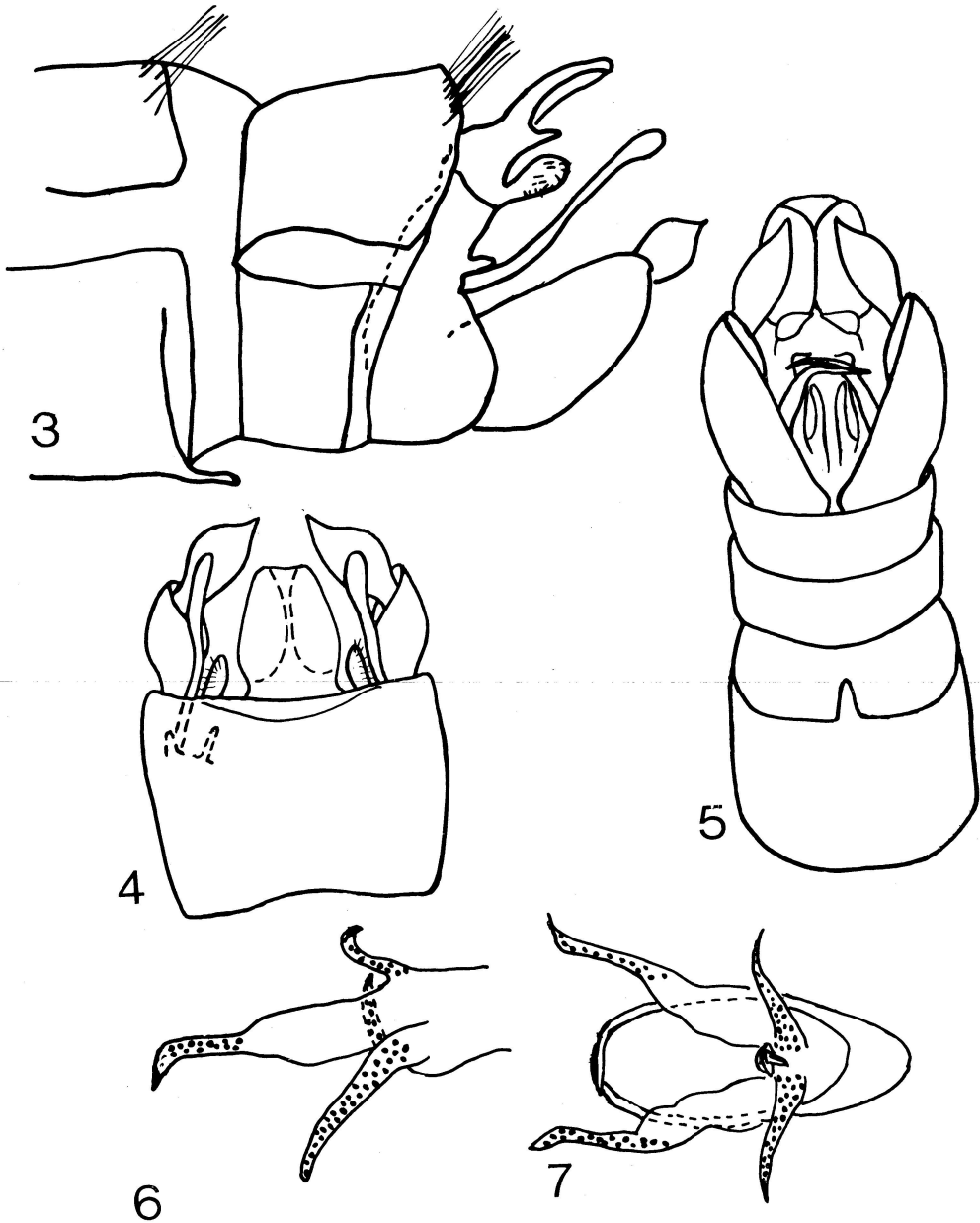


Figs. 1, 2. *Costachorema notoptera* Wise, n. sp. 1. ♂ wings. 2. ♀ wings.

Measurements. Anterior wing, ♂ ♂ 10.5 - 11.25 mm, ♀ ♀ 12.5 - 13 mm; head + body, ♂ ♂ 8.25-8.5 mm, ♀ ♀ 9.5-10 mm.

LARVA (Figs. 12-16)

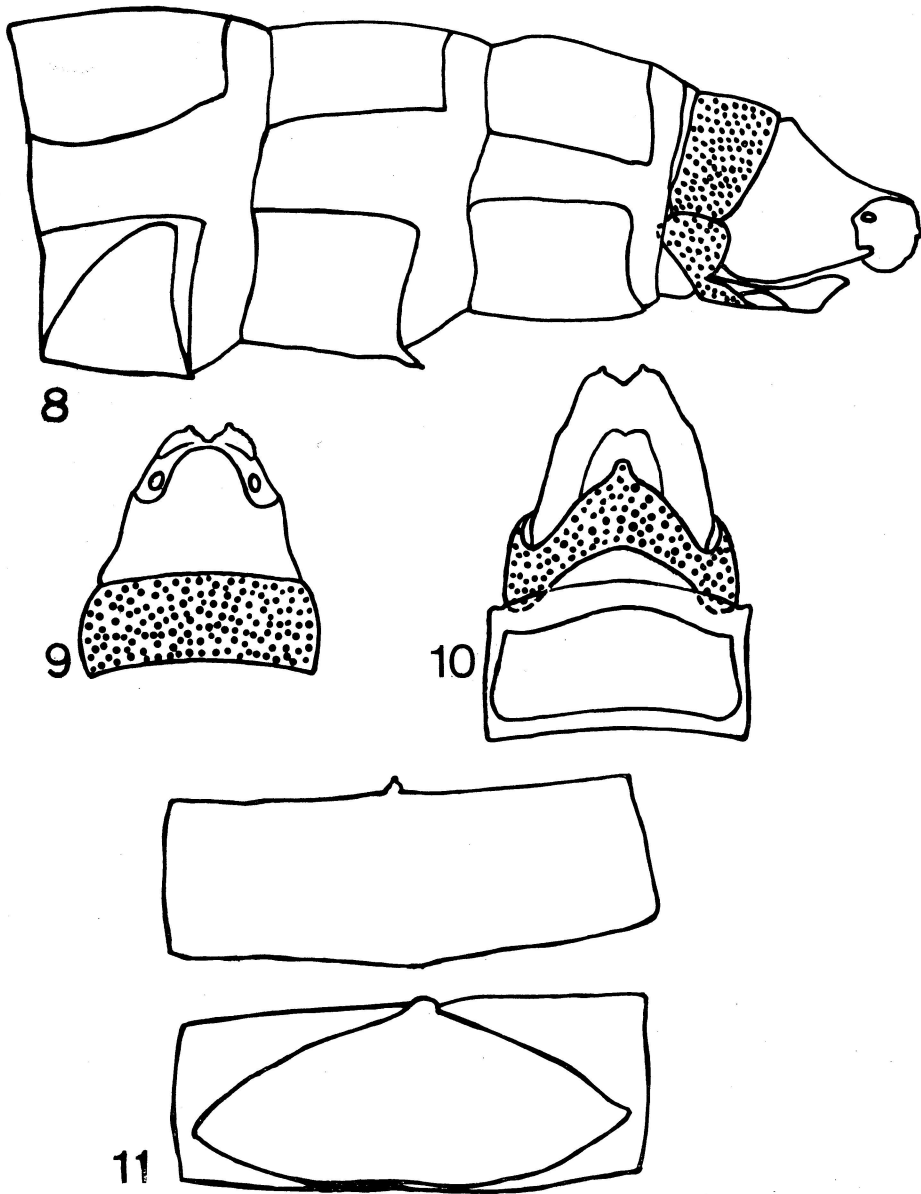
Pale purple; head light brown, with darker median longitudinal band and latero-ventral posterior patches, dark median band containing several pale spots; pronotum pale yellowish-brown with three darker dorsal patches posteriorly, each patch containing paler spots; legs pale yellowish-brown.



Figs. 3-7. *Costachorema notoptera* Wise, n. sp. 3. ♂ genitalia, lateral. 4. ♂ genitalia, dorsal. 5. ♂ genitalia, ventral. 6. Aedeagus, lateral. 7. Aedeagus, dorsal.

Prothorax (Figs. 13-14). Pronotum broader than long. Prosternum consisting of median element, rounded posteriorly, with two lateral triangular pieces.

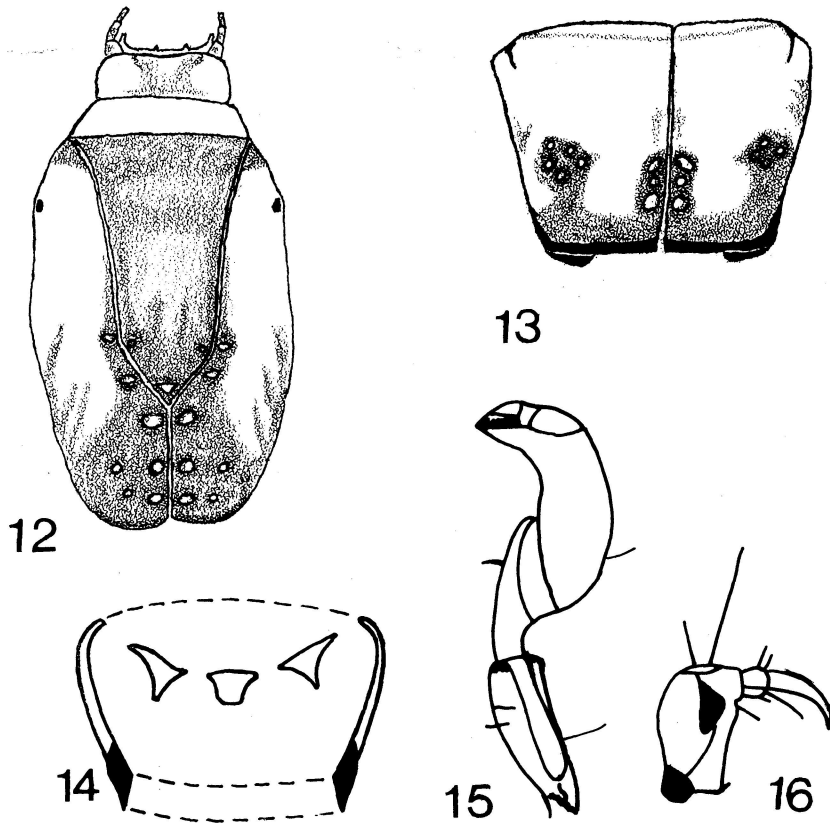
Prothoracic legs (Fig. 15). Massive.



Figs. 8-11. *Costachorema notoptera* Wise, n. sp. 8. ♀ abdomen and genitalia, lateral. 9. ♀ genitalia, dorsal. 10. ♀ genitalia, ventral. 11. ♀ abdominal segments V (bottom) and VI (top), ventral view.

Pygopods (Fig. 16). Massive.

Measurements. Length, 25 mm; head, length 2 mm, width 1.25 mm; pronotum, length 1 mm, width 1.4 mm.



Figs. 12-16. *Costachorema notoptera* Wise, n. sp. Larva. 12. Head, dorsal. 13. Pronotum. 14. Prothorax, ventral. 15. Prothoracic leg. 16. Pygopod.

Specimens examined. AUCKLAND IS. Holotype ♂. S.E. Enderby I: ex pond stream, 10.30 p.m.-12 midnight, 17.I.1963, K. A. J. Wise. Allotype ♀. Same data as holotype. Both lodged in Auckland Museum, Auckland, N.Z.

Paratypes. (B.P.B.M.) S.E. Enderby I: ex pond stream, 10.30 p.m.-12 midnight, 17.I.1963, (16), Wise. (E.D.) Auckland I: Ranui Cove, 4.I.1963, (1); Ranui Stream, swept, 12.I.1963, (1); L. J. Dumbleton. (C.M.) Adams I: Fairchild's Garden, in stream gut at night, 28.I.1966, (1), P. M. Johns.

Immatures. (B.P.B.M.) Enderby I: ex stream from biggest pond, 2.I.1963, 6 larvae, 6 pupal cases; Sandy Bay, ex stream near boatshed, 16.I.1963, 1 larva; Wise; 31.XII. 1962, 1 larva, 6 pupal cases, J. L. Gressitt. Adams I: L. Turbott, on stones in outlet stream, in pools with slimweed, 27.I.1966, 2 larvae; L. Turbott, on stones in outlet stream, 27.I.1966, 1 larva; Wise. (E.D.) Enderby I: stream from lake, 2.I.1963, 13 larvae, 18 pupal cases; Dumbleton. Auckland I: Ranui stream, 28.XII. 1962, 3 larvae, 31.XII.1962, 1 larva; Grey Duck Creek, 9.I.1963, 1 pupa; Deas Head, 19.I.1963, 1 larva; Dumbleton.

This species is closest to *Costachorema psaroptera* McFarlane, 1939, from

which it differs in lacking white hairs on the head, and in the form of the δ genitalia; the basal joint of the inferior appendages is somewhat rounded apically and the distal joint is approximately half its length thereby being intermediate in proportion between *C. psaroptera* and *Costachorema xanthoptera* McFarlane, 1939.

The larva is close to the larva of *C. psaroptera* as described and figured by McFarlane (1951).

All immature specimens taken by me were near sea-level (under 10 m a.s.l.) in streams in the open close to the shore (within 10 m of beach or shore platform); but others may have taken them from partially shaded streams.

The species is named for its southern occurrence.

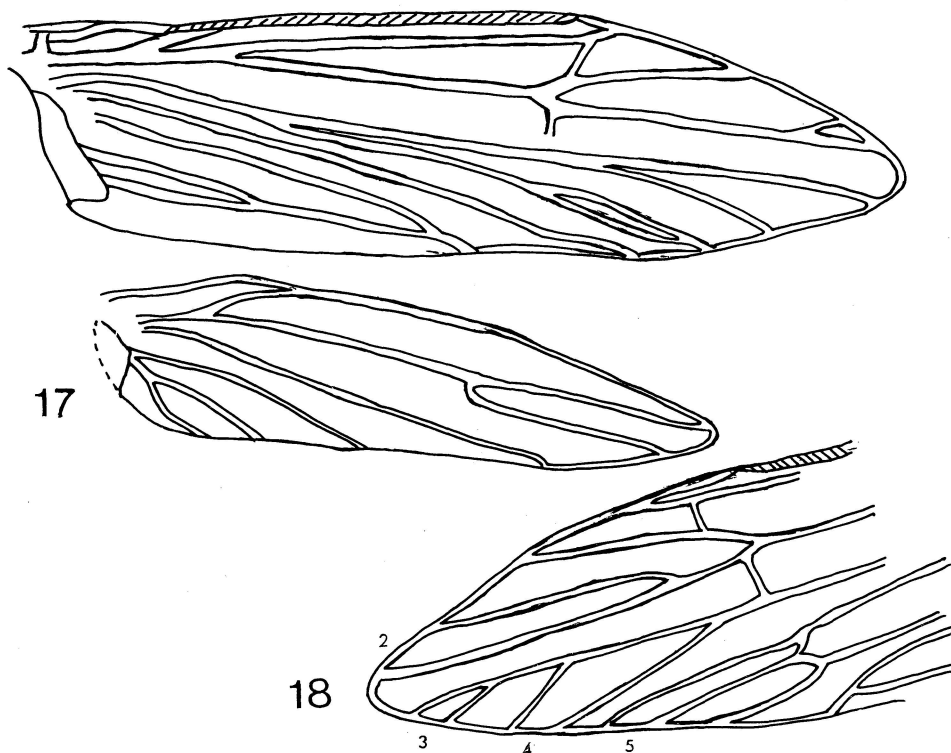
Genus **Tiphobiosis** Tillyard, 1924

Wings, δ . Wings and venation reduced in a southern islands species, with apical fork 1 absent from both anterior and posterior wings.

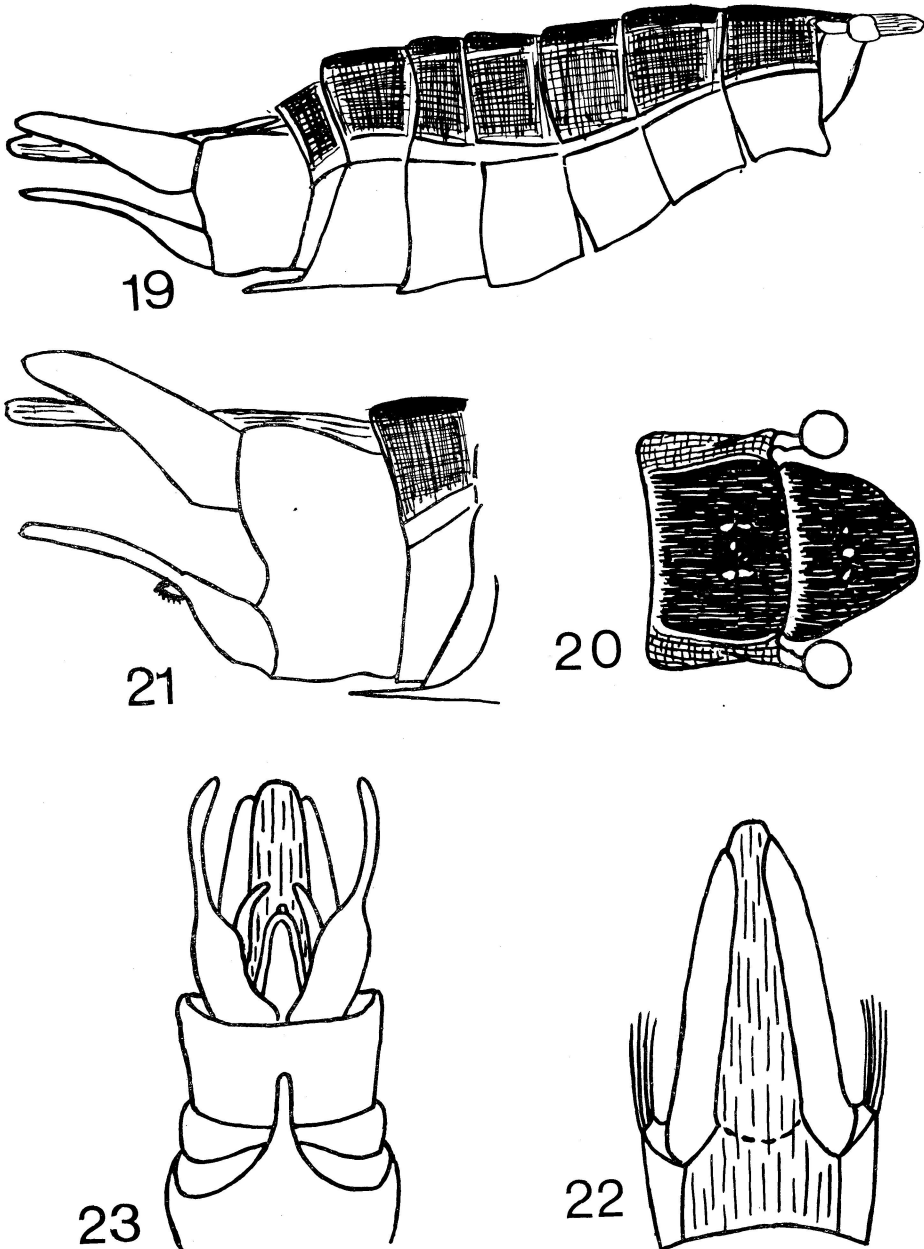
Tiphobiosis kuscheli Wise, n.sp.

(Figs. 17-23)

A small pale species with dark dorsal surface of abdomen, known only from the unique δ holotype.



Figs. 17, 18. *Tiphobiosis kuscheli* Wise, n. sp. 17. δ right wings. 18. δ left anterior wing, apical half.



Figs. 19-23. *Tiphobiosis kuscheli* Wise, n. sp. 19. ♂ abdomen, lateral. 20. ♂ abdominal segments I, II, dorsal. 21. ♂ genitalia, lateral. 22. ♂ genitalia, dorsal. 23. ♂ genitalia, ventral.

Wings, ♂ (Figs. 17, 18). Reduced, not reaching beyond end of abdomen. Costa of anterior wing with fold. Venation reduced, particularly in posterior wings and in right

anterior wing of holotype. Discoidal cell of anterior wing open. Apical fork 1 absent from all wings; apical forks 2, 3, 4, 5 present in left anterior wing of holotype. Posterior wings narrow, elongate, without apical forks.

Abdomen, ♂ (Figs. 19, 20). Segment II with a pair of sensory organs, VII with a long ventral process, VIII slightly produced mid-ventrally. Segments I-VIII dark above, with fine transverse and longitudinal striae dorso-laterally.

Genitalia, ♂ (Figs. 21-23). Segment IX membranous dorsally. Segment X continuous dorsally with IX in a long narrow process (dorsal plate). Superior appendages large, almost as long as dorsal plate, each with basal inwardly curved process. Inferior appendages as long as superior appendages, each consisting of basal portion from which arise a narrow elongate distal process and short internal basal process, both processes curved inwards, internal basal process with ventrally-turned setose apex. Aedeagus with blunt upturned point.

Measurements. Anterior wing, ♂ 3.5 mm; head + body, ♂ 4 mm.

Specimen examined. AUCKLAND IS. Holotype ♂. Adams I: Magnetic Station Cove, leaf litter, 29.I.1966, G. Kuschel. Lodged in Entomology Division, Nelson, N.Z.

Tiphobiosis kuscheli is separated from other species of the genus by the reduction in wings and venation, the lack of apical fork 1 in all wings and by the form of the ♂ genitalia; in particular, it is separated from *T. plicosta* McFarlane, 1960, by the form of the inferior appendages in lateral view, the distal process being narrow throughout its length and not expanded distally as in *plicosta*.

This species obviously belongs to the *Tiphobiosis* group and despite the lack of apical fork I in the anterior wing, I have decided to place it in the genus *Tiphobiosis*. If there was to be any separation of the species known at present, it might be more appropriate to place *kuscheli* and *plicosta* in one group on the grounds of the presence of the costal fold in the anterior wing and the sensory processes of Abd. II, of males, rather than separate *kuscheli* from the others. However, reduction of wings, and consequently venation, is well-known in insects of southern islands and I prefer to widen the scope of the genus rather than describe a new one. The present species traces to *Tiphobiosis* in the Mosely & Kimmins key to genera of Hydrobiosinae (Mosely & Kimmins 1953) and all that is required to include it in that genus is to record the possible reduction of wing venation and absence of apical fork 1.

The species is named in honour of the collector, Dr. G. Kuschel, who has done much collection and research of southern faunas.

Family HYDROPTILIDAE

Genus **Oxyethira** Eaton, 1873

Oxyethira albiceps (McLachlan, 1862)

(Fig. 24)

Hydroptila albiceps McLachlan, 1862, Trans. Ent. Soc. Lond. 3 (1): 304.

LARVAL-PUPAL CASES (Fig. 24)

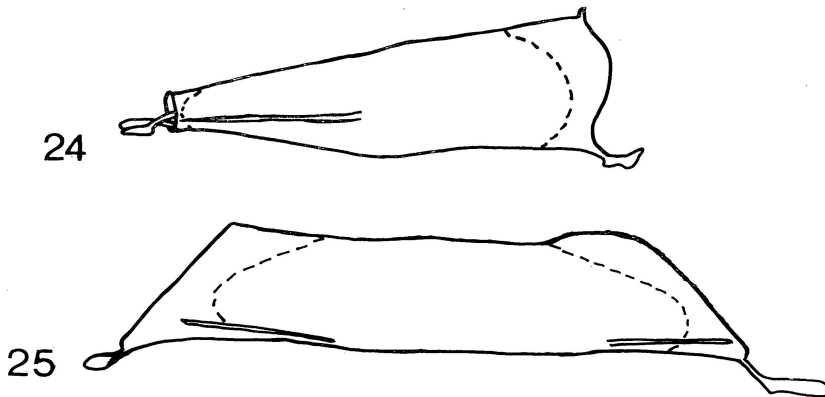
Bottle-shaped, with short non-projecting ridge on each side at narrow end; narrow end with distal rim. Small larval cases without holdfasts, larval-pupal cases with 2-4, usually 3 or 4 at pupal stage.

Measurements. Pupal cases, length 4-5 mm.

Specimens examined. AUCKLAND IS. (B.P.B.M.) Auckland I: Tucker Point, on surface of rock pool on shore platform, 15.I.1963, 1 ♀; Tucker Point, on surface of pools in rock platform, 19.I.1963, 18 ♂ ♂ ♀ ♀; Tucker Point, about rock pools on shore platform, 19.I.1963, 7 ♂ ♂ ♀ ♀; Wise. Adams I: L. Turbott, swept beside inlet stream, 26.I.1966, 9 ♂ ♂ ♀ ♀, Wise.

Immatures. (B.P.B.M.) Auckland I: Tucker Pt., ex pools in rock platform, 19.I.1963, 97 larval-pupal cases, Wise. Adams I: L. Turbott, on stones in outlet stream, in pools with slimweed, 27.I.1966, 4 larval-pupal cases, Wise.

A previous record of this species on Auckland I. (Wise, 1964), was based on the above specimens collected in 1963.



Figs. 24, 25. Larval-pupal cases. 24. *Oxyethira albiceps* (McL., 1862). 25. *Paroxyethira* sp.

Genus **Paroxyethira** Mosely, 1924**Paroxyethira** sp.

(Fig. 25)

PUPAL CASE (Fig. 25)

Purse-shaped, with short ridge on each side at each end of long edge; each ridge extending as a projection towards adjacent end of case. Two holdfasts, one at each end of long edge.

Measurements. Pupal cases, length 5-6 mm.

Specimens examined. AUCKLAND IS. Immatures. (B.P.B.M.) Adams I: L. Turbott, on stones in outlet stream, in pools with slimweed, 27.I.1966, 7 larval-pupal cases, Wise.

The larval-pupal cases are of typical shape for the genus *Paroxyethira* and are quite distinct from those of *Oxyethira albiceps*.

ECOLOGY

Some description of aquatic environments, and lists of aquatic insects, have already been given by Gressitt & Wise (1971).

On Enderby I, *Costachorema notoptera* immatures occurred in short open streams above the southern shore-line. In one pond near the shore (Fig. 26) no insects were found, but in the short open outlet stream, flowing from the pond to the nearby shore platform (Fig. 27), immatures were numerous together with immature Diptera: Simuliidae and Plecoptera. Immatures of this caddis species were taken from a similar short, open rocky outlet stream at L. Turbott on Adams I. but were also found in some partially shaded streams on the main Auckland I.

At the north end of Auckland I, immatures of *Oxyethira albiceps* were present in an unusual situation in seepage pools on the open shore rock platform (Figs. 28, 29). There was no flow of water through these pools at the time but rain, which is frequent in the area, would provide this, and slimweed, on which this species lives, was thick in the pools. Immatures also occurred in pools with flowing water and slimweed at the head of the outlet stream of L. Turbott.

One adult *Tiphobiosis kuscheli* was extracted from a leaf litter sample, of long grasses mixed with other plants, taken in Magnetic Cove on the north side of Adams I (Fig. 30), and it can be presumed that this individual had originated from some nearby stream before falling to the ground or into the sample. However, no immature Trichoptera were found in streams examined on the north side of Adams I, although a mature *Costachorema notoptera* was collected at the west end of the island.

On the southern side of Adams I, L. Turbott lies at the bottom of a small glacial valley (Fig. 31), approximately 6 m above sea-level. *Oxyethira albiceps* was flying over the shaded inlet stream (Fig. 32), and pools with slimweed may occur further upstream. Midges, sandflies, mayflies, and stoneflies were also flying about the inlet stream and lake. The lake outlet stream flows rapidly in a short, steep rocky bed to the sea, but from the lake edge (Fig. 33) the stream flows more slowly at the sides through pools with slimweed. Here, immatures of *Costachorema notoptera*, *Oxyethira albiceps*, and *Paroxyethira* sp., were found together with immatures of Plecoptera, Diptera: Simuliidae and Chironomidae, and also with Acari and freshwater Mollusca.

Most *Costachorema*, *Tiphobiosis*, and *Paroxyethira* are coldwater species found in the South I of New Zealand, but some occur in the North I and *Oxyethira albiceps* is widely distributed throughout both.

Acknowledgements. Dr J. Linsley Gressitt, Bernice P. Bishop Museum, Honolulu, supplied opportunities for both collecting and examining much of the above material; other specimens were supplied by Dr G. Kuschel, Entomology Division, Nelson, L. J. Dumbleton, Entomology Division, Lincoln, and P. M. Johns, University of Canterbury, Christchurch. Figures have been prepared for publication by Mrs A. McBirney and Miss J. Bertrand, Auckland Institute and Museum.



Fig. 26. Enderby I. Pond on south side. (Photo: Wise, 18.I.1963.)

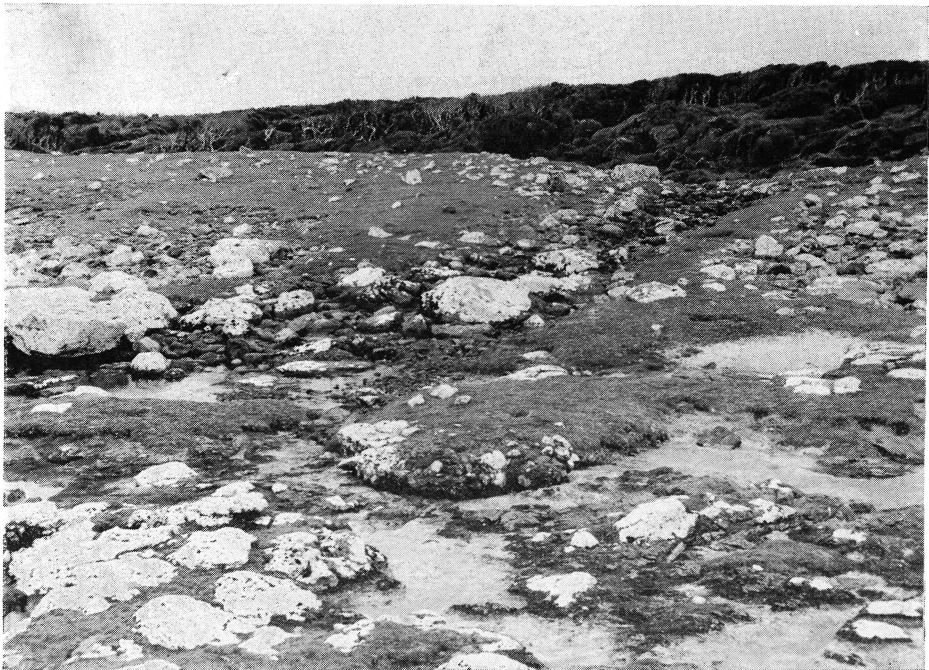


Fig. 27. Enderby I. Outlet stream from pond to shore platform. (Photo: Wise, 18.I.1963.)



Fig. 28. Auckland I. C. Crozier. Pool on shore platform. (Photo: Wise, 20.I.1963.)



Fig. 29. Auckland I. C. Crozier. Shore platform. (Photo: Wise, 20.I.1963.)



Fig. 30. Adams I. View of northern coast with Magnetic Cove right of centre.
(Photo: Wise, 4.II.1966.)

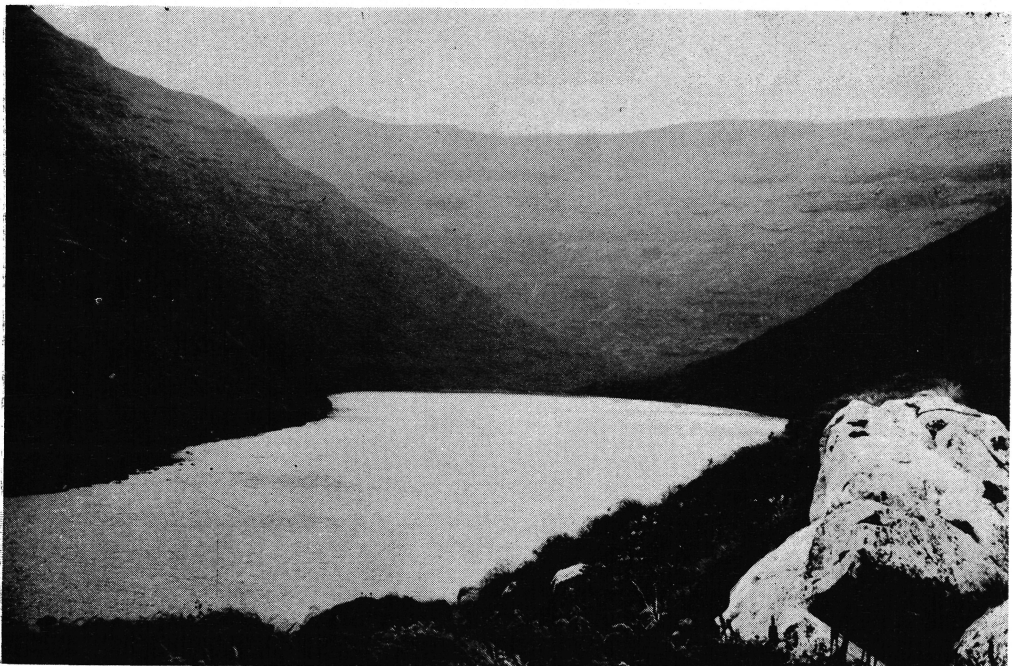


Fig. 31. Adams I. L. Turbott in glacial valley on southern side. (Photo: Wise, 27.I.1966.)



Fig. 32. Adams I. Head of L. Turbott (right) with shaded inlet stream (entering from left).
(Photo: Wise, 26.I.1966.)



Fig. 33. Adams I. Outlet of L. Turbott. (Photo: Wise, 27.I.1966.)

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