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*(The pages of the publication follow this cover sheet)*

HABITAT AND BREEDING OF THE FRESHWATER SHRIMP,PARATYA CURVIROSTRIS

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The life history and habitat of the freshwater shrimp, *Paratya curvirostris*, has been studied in North Canterbury.

In most streams the shrimps live in terrestrial vegetation that grows out across the water, although they are sometimes found in beds of *Elodea* and *Myriophyllum*. Shrimps avoid regions of fast water and the populations were greatly reduced by floods. Most adult shrimps live in freshwater but a few live in estuarine areas in salinities up to 20‰.

In Saltwater Creek the adults appear to live for 18 months to 2 years. Recruitment of first post larval stage occurs in brackish water in autumn. The animals gradually move upstream as they grow. The peak of the breeding occurs in spring and early summer, each female carrying, on average, 2 000 eggs for about 28 days. The zoea is mixohaline, occurring in the Ashley Estuary at salinities of about 5 to 15‰.

*P. curvirostris* has proved to be protandrous, the first species of the Atyidae in which the phenomenon has been discovered. The animals have an androgenic gland which causes the gonad to become testis, but which disappears after a while, thus allowing the gonad to become ovary. The secondary sexual characters of both male and female are distinct. Inter-sex animals can be recognised. About 1.5% of the sample in this study did not go through a male phase; these are known as primary females. Histological study of the gonad of large males has shown that oocytes were present, but were not found in smaller males.

LIFE HISTORIES OF FOUR MAYFLY SPECIES IN NORTHERN NEW ZEALAND(EPHEMEROPTERA : LEPTOPHLEBIIDAE)

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Life histories of four mayfly species of the leptophlebiid genus *Deleatidium* were studied in the Waitakere River and Cascade Stream near Auckland. The species were *Deleatidium myzobranchia* and *D. lillii* and two undescribed species; *Deleatidium* sp. C and *D.* sp. E. Mayflies were obtained from a riffle and a cascade in the Cascade Stream, and a riffle in the Waitakere River. *Deleatidium* sp. E. and *D. myzobranchia* were dominant in the cascade, although *D.* sp. E was only present during winter.

*Deleatidium myzobranchia*, *D. sp. C* and *D. lillii* occurred together in the riffles, with *D. myzobranchia* most abundant in the Cascade Stream and *D. lillii* in the Waitakere River.

Three types of life cycle were recognised:

*Deleatidium myzobranchia* was acyclic with hatching and emergence throughout the year. *Deleatidium sp. E* and *D. lillii* both appeared to be univoltine, although *D. sp. E* were only obtained as late instar larvae. *Deleatidium sp. C* appeared to be bivoltine, with a rapid summer generation produced within the study area and a slow winter generation recruited from outside.

Comment was also made on different size distributions of *D. myzobranchia* in cascade and riffle biotopes. The implications of apparent overlap of size range, habitat, hatching and emergence of *Deleatidium myzobranchia*, *D. sp. C* and *D. lillii* were also discussed.

#### THE LITTORAL AND BENTHIC FAUNA OF LAKE WAAHI

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Lake Waahi is a shallow (3-4 m deep) highly eutrophic lake near Huntly. The bottom is of soft mud, covered with a dense growth of *Egeria densa*, with some *Lagarosiphon major* in places, and occasional plants of *Potamogeton*. Monthly samples of the bottom deposits are being taken with a corer and of the weed fauna by sweeping with a hand net.

At open water stations there are generally few animals present on the weeds which are up to 2 metres below the surface. Virtually no animals are found in the bottom deposits which are overlain by anaerobic water for most of the summer, although they are flushed by oxygenated water occasionally during storms.

At sites close to the shore in water of 1-2 m depth where weeds grow close to the surface very large numbers of animals occur. The fauna is numerically dominated by snails, (*Potamopyrgus*, *Physa*, *Limnaea*, *Gyraulus*, *Ferrissia*) and by chironomids (including *Polypedilum*, *Chironomus*, *Paratanytarsus*, *Synericotopus* and another species of Orthoclaadiinae). Purse caddis larvae, the caterpillar *Nymphula*, flatworms and a nemertine worm (?*Prostoma*) also occur. Mysid shrimps (*Tenagomysis*) are also present, and a variety of copepods and Cladocera. Even in these sites the benthic fauna is often sparse, presumably because of low oxygen conditions in these very dense weed beds. However, some chironomids and at