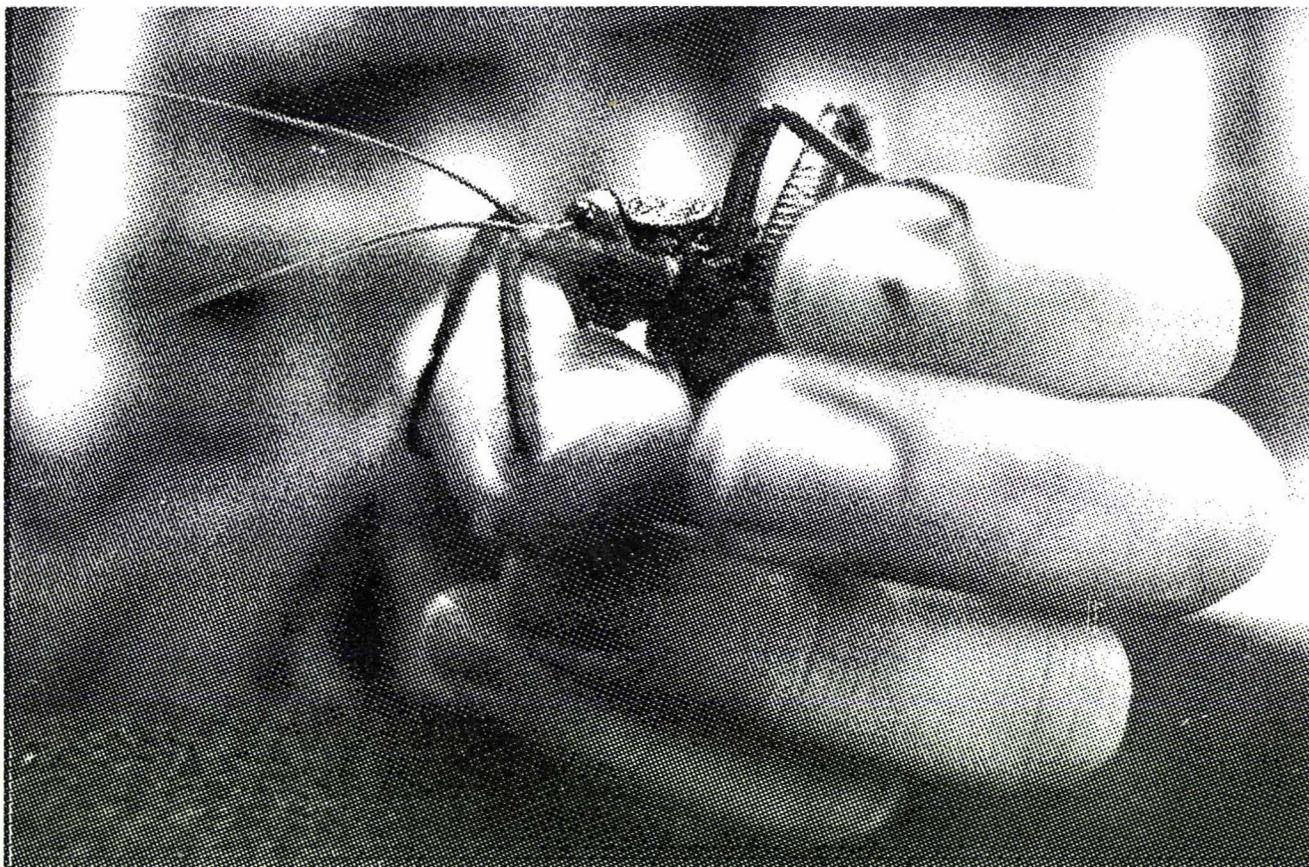


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Reproduction and behaviour of the Mahoenui Weta, *Deinacrida* n.sp.

A thesis presented in partial fulfilment of the requirements for the degree of Masterate of Science in Ecology at Massey University.



Sub adult female Mahoenui weta *Deinacrida* n.sp. in hand (Photograph by Penny Aspin).

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Abstract

The morphology and histology are described for the entire male internal reproductive organs of the *Mahoenui weta*. These show many similarities to other *Stenopelmatidae*. Testes follicles of *Mahoenui weta* have the usual structure for *Stenopelmatidae* with basal sections surrounding the ends of the vasa efferentia. Epithelial cells of the vasa efferentia, vasa deferentia and seminal vesicle have similar basophilic cytoplasm. Muscle layers are best developed around the seminal vesicle and the accessory glands. The ejaculatory duct has a cuticular intima and is enclosed by a muscular sheath. The development of the external genitalia from the 8th to the 10th instar is followed and discussed. The morphology of the external reproductive genitalia is close in form to that of the *Rhaphidophoridae*.

The morphology and histology of the entire female reproductive organs of the *Mahoenui weta* are described. The morphology and histology of female *Mahoenui weta* are very similar to those of other *Orthoptera*. The histology is particularly close to that of the *Acrididae*. Ovaries and ovarioles have the usual structure for *Stenopelmatidae*. The follicles are enclosed within a follicular epithelium and the ovarioles are enclosed within an outer ovariole sheath layer of connective tissue. The epithelial cells of the ovarioles and lateral oviducts have basophilic cytoplasm. The vagina is lined with a cuticular intima and is surrounded by a muscular sheath. The external genitalia are described from 8th to 10th instar *Mahoenui weta* and their probable functions are discussed.

The behaviour of captive *Mahoenui weta* was observed, using infra-red time lapse video. Data were recorded from the months of December, January, February, March and July. *Weta* ate most often in January, March and July, and most mating activity occurred during January. *Mahoenui weta* were consistently most active at 60-80% of total night-time and showed less activity closer to sunrise or sunset. Mating and moulting are discussed.

Incubation time of *Mahoenui weta* eggs was recorded using eggs laid in a previous study (Richards 1994). The time of hatching and the behaviour of newly hatched nymphs was recorded over several days using video equipment. All eclosion occurred at night, with time of eclosion ranging from 8 pm to 3.30 am over the three

nights. Weta were free of the egg and walked within 17 minutes of the egg appearing on the soil surface. All hatched weta died within three days of eclosion. The external appearance and histology of eggs is described. Mahoenui weta eggs have many features in common with other Orthoptera.

Mahoenui weta were exposed to 12 different plant species commonly fed to them in captivity, and present in the Mahoenui weta reserve. The weight of plant material eaten was recorded to determine which species of plant the weta preferred. Mahoenui weta showed the greatest preference for kowhai followed by gorse, broom, buttercup, tawa, karaka, coprosma, camellia, lemonwood, mahoe, houhere and hoheria. There was a marked preference for legume plant species over non-legumes.

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