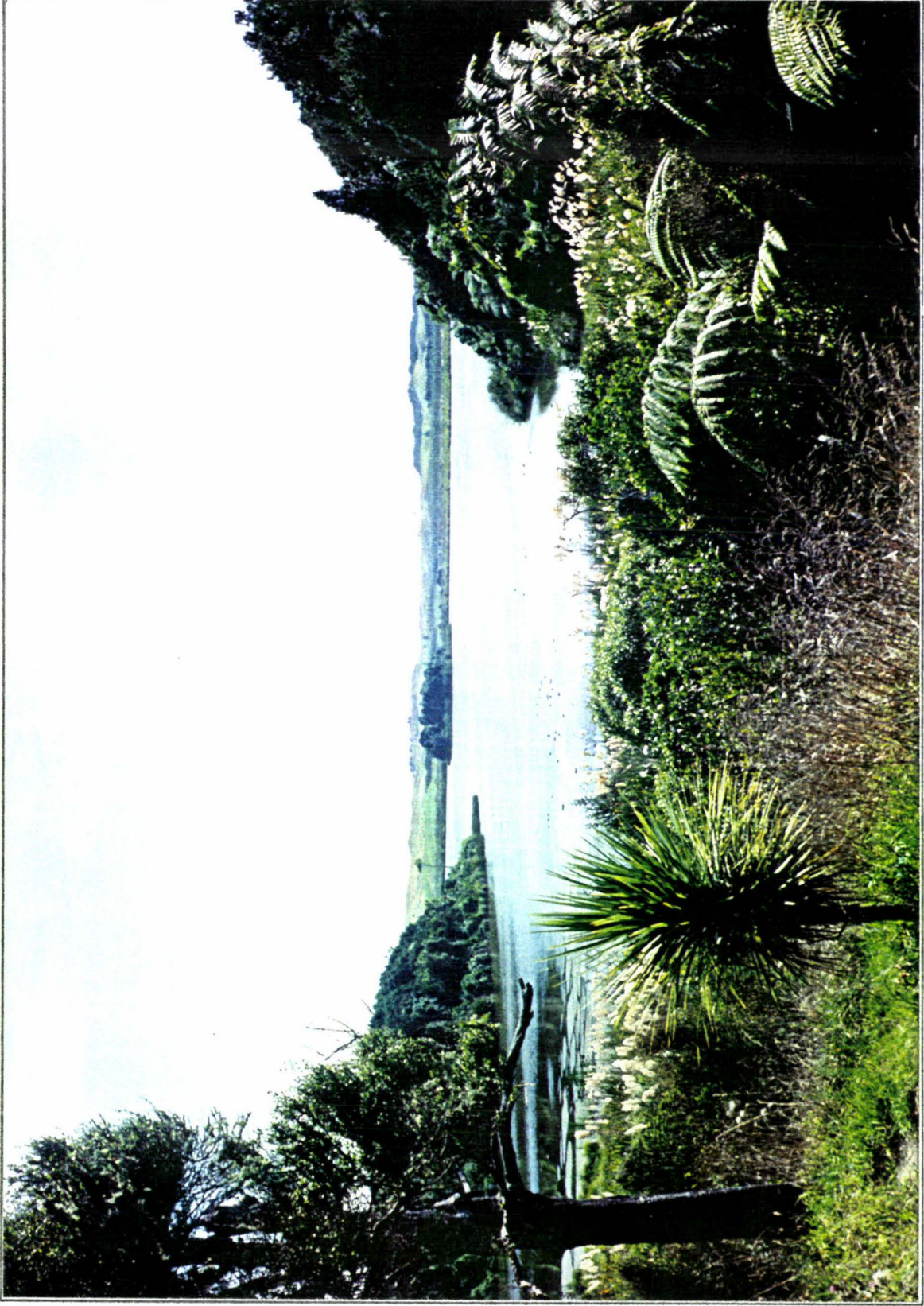


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Some aspects of behaviour and ecology of the land snail
***Powelliphanta traversi traversi* Powell**
(Rhytididae: Rhytidinae)

A Thesis presented in partial fulfilment of the requirements for the degree of
Master of Science in Zoology at Massey University

Christopher Denis Devine
1997



Lake Papatonga viewed from the southern end

Abstract:

Powelliphanta traversi traversi Powell was studied at two sites in the Horowhenua. The use of an harmonic radar allowed the snails to be relocated, and followed for 20 months in their natural habitat. Morphometrics, population sizes, diet, movement, dispersal, and predation were examined. Different formae (morphs) lived at each site but mean shell lengths (43.2 mm at Papaitonga, 42.41 mm at Makahika) did not significantly differ. Frequency histograms of shell length for live and dead *P. t. traversi* were of similar shapes and there were few small shells. This could suggest that mortality was constant regardless of age, that young grow rapidly, or they live for a long time once full sized. The mean growth of new shell to the lip of the shell was found to be 1.71 mm (range 0.11 - 6.82 mm). The densities were not significantly different at each study site at 282 snails ha⁻¹ for Papaitonga and 300 snails ha⁻¹ at Makahika. A significantly positive correlation was found between *P. t. traversi* presence and leaf litter depth. Karaka (*Corynocarpus laevigatus*) was the only plant that was consistently found in quadrats with high snail numbers. The number of empty shells in a quadrat was a poor predictor of the number of live snails present. *P. t. traversi* were nocturnal and moved slowly in comparison to the garden snail *H. aspersa*. *P. t. traversi* were not active continuously though the night, and moisture related factors were the only significant predictors of movement. The most active snail moved 152 m in 107 days. Maximum displacement from point of origin averaged 49.8% of total movement. I suggest movement could be random, but appeared to adhere to a home-range. Limited dispersal suggested that fragmented *P. t. traversi* colonies should be considered discrete populations. The primary predator of *P. t. traversi* was the ship rat *Rattus rattus*. There was no evidence of predation from the brushtail possum, *Trichosurus vulpecula*, an important *Powelliphanta* predator in other localities. Diet and water uptake of *P. t. traversi* was examined in the laboratory. *P. t. traversi* appeared not to drink, but rather obtained water via integumentary absorption. Full hydration was reached in around three hours. Earthworms were the only food items consumed in this study. The snails did not forage in dry conditions.

Prologue:

This thesis deals with several aspects of the ecology and behaviour of *Powelliphanta traversi traversi*. Each chapter is intended to encompass a subject area and stand alone. For brevity, and to reduce repetition, reference will be made to other chapters where appropriate. Because of this format, relevant literature reviews and references are included in each chapter rather than together at the end of the thesis in their own respective sections. This will enable all the information in a subject area to be presented where most appropriate.

Acknowledgments:

I always intended to do as much of this thesis as independently as possible. For this reason it is somewhat of a surprise to see how many people have aided me in the quest for the final product. I do not want to dwell too much on individuals, not because their input was not important, but because it is all too easy to leave out someone who played an important role. It is also difficult to say who helped the most, from those who spent a great deal of their own time to come into the field with me, to the people who cheered me up with a quick comment when times were difficult.

Ideas gained in 'time wasting' conversations with students in TVL and the postgrad room helped create new directions of study and improved much of the work I did. These conversations also showed me that if you desire creativity then you must nurture it by allowing freedom and time to think. In my time in the Ecology Department I have been fortunate to associate with creative people, even if they are yet to recognise this quality in themselves yet. Creativity is a rare and important trait that is not always rewarded in today's time pressured academic world, but I am sure will pay off for these people in time.

For those who are not listed below but have helped, I am truly sorry and in no way does this detract from the assistance you have given me.

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leads to the question, is this thesis a means to an end or a end unto itself?
Well, I don't know, but at least its over.

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