BIOLOGY AND ECOLOGY OF THE SHIP RAT *RATTUS RATTUS RATTUS* (L.) IN MANAWATU (N.Z.) FORESTS

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Ship rat, "frugivorus" morph
(Half natural size)

ABSTRACT

Ship rats in Manawatu lowland forest were studied by snap and cage trapping for one year, and by tracking. The results are very similar to those of previous New Zealand studies. Rat density was low. Only 3.9 rats per 100 trap nights were trapped at Tiritea and the estimated mean density at Keeble's Bush was 2.8 rats per hectare. Although males with mature sperm were trapped all year round, pregnant females were trapped from mid-September to mid-April, except for one in June. The mean number of embryos per female was 4.95 and females produced up to four litters each. Annual mortality calculated from cage grid disappearances was 96% for both sexes combined, although the factors causing mortality were unknown. Four ectoparasite species and two stomach nematode species were identified. Large numbers of nematodes (up to 84) per stomach did not significantly reduce the weight of rats of a given length.

The stomach analysis of 178 ship rats showed that arthropods (mostly wetas) occurred in 88% of stomachs. Predominantly animal foods were eaten overall, but plant foods predominated in autumn and winter. Feathers were in few stomachs (5%) but their appearance in rats trapped only during the nesting season suggests that rat predation could be strategically severe at this time. Kiekie and kawakawa fruits were the commonest plant diet items. Rat damage to fruits and leaves of species found in the study areas is described in the thesis, and an index of palatability is given. An exclosure study in Keeble's Bush suggested that rats did not remove significant numbers of fallen titoki and tawa fruits. No plant species seems likely to have its regeneration endangered directly because of ship rat damage to its seeds. Some seeds are dispersed by rats.

A technique for tracking rats is described. Five toe-clipped ship rats were tracked for seven months on smoked kymograph paper inserted in special tunnels. Twenty tunnels, of which ten were on sloping branches in trees, were used in the .22 ha study area. Smoked paper was an ideal tracking surface, and rats were tracked at up to 16 locations in one night. Baiting the platforms significantly increased the rate of tracking and did not cause rats to leave their home ranges. Concurrent cage trapping produced inadequate data for home range determination and was insensitive in detecting changes in home range areas. All five rats were to some extent trap shy. Cage trapping is considered to be an inadequate technique for determining rat movement and perhaps population density. Tracking-

revealed home ranges were stable, and one was seemingly exclusive to the ranges of other rats. Smoked paper tracking has considerable promise as a technique in population ecology.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF PLATES

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