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(The pages of the publication follow this cover sheet)

INVERTEBRATES OF MOTUOPAO ISLAND, NORTHLAND, NEW ZEALAND

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SUMMARY

Eighteen species or subspecies of land snails are listed from Motuopao Island. Sixteen of these are indigenous and two introduced from Europe. Three species or subspecies are currently considered endemic to the island. Twenty species of insects are also listed.

INTRODUCTION

Motuopao Island (Lat. 34°28'S, Long. 172°38'E) lies 350 metres northwest of Cape Maria van Diemen, New Zealand (Fig 1). It is approximately 30

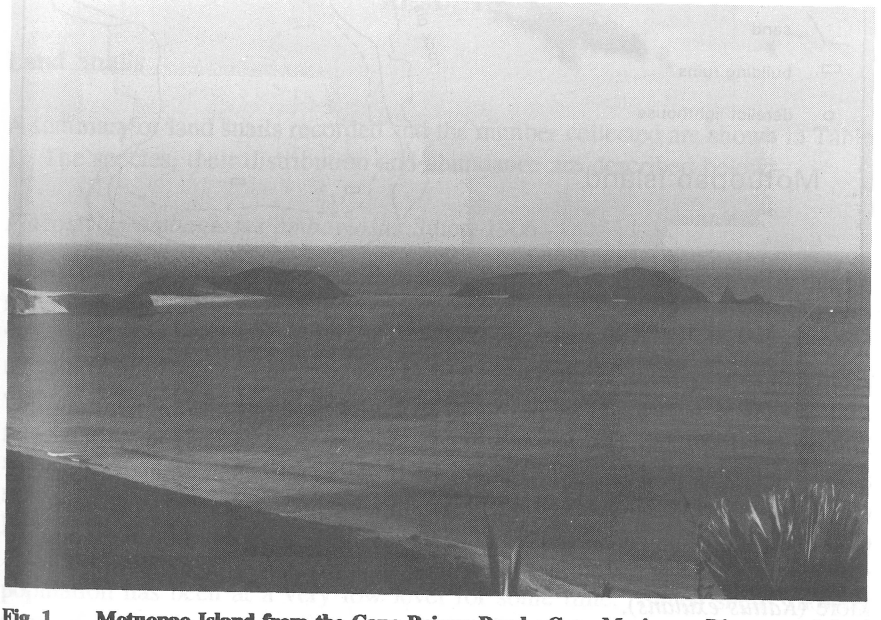

Fig. 1 **Motuopao Island from the Cape Reinga Road. Cape Maria van Diemen on left of picture.**

hectares in size and rises to 110 metres at its highest point (Fig 2). The island is composed of Tangihua complex pillow basalt sheets of the Cretaceous/lower Cenozoic age and has two hills linked by a low saddle of Holocene coarse sand with lithic talus deposits overlying the basalt sheets (Brook 1989).

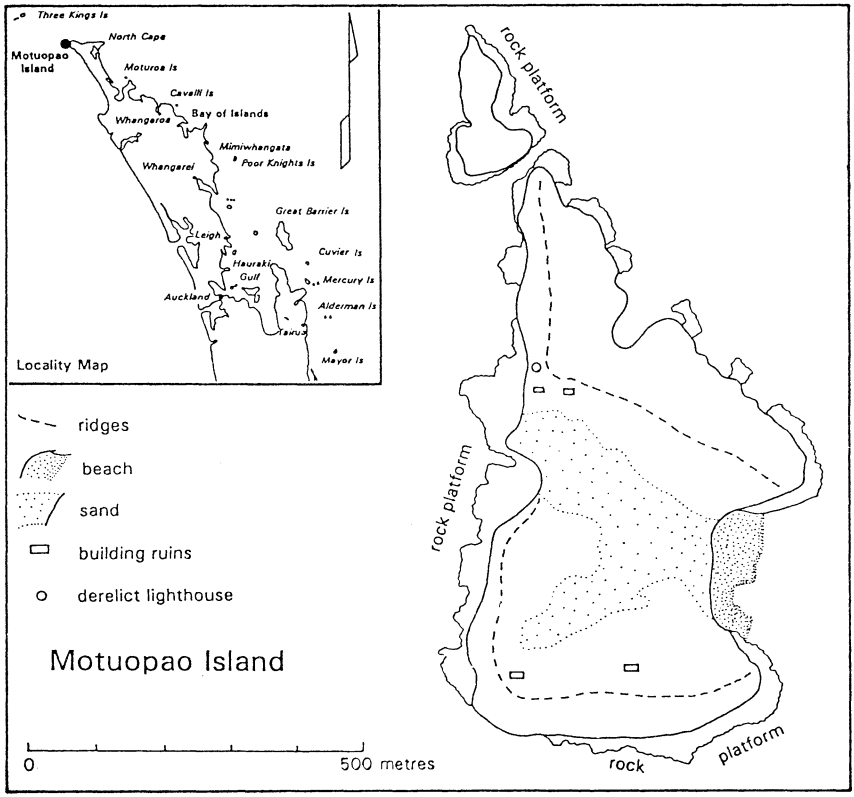

Fig. 2 Map of Motuopao Island. (Insert shows location of Motuopao Island off the west coast of Northland).

Four visits were made to the island on 26-28 September 1988, 6-11 and 18-20 October 1989 and 1-4 February 1990. The purpose of the first visit was to assess the status of *Placostylus ambagiosus ambagiosus*, determine the species of rodents present (Anderson 1982 unpublished report, Department of Conservation, Whangarei) and conduct surveys of other species of fauna and the vegetation. The last three visits were made to assist in a programme to eradicate kiore (*Rattus exulans*).

Collections and/or observations were made on the composition, abundance and distribution of land snails and insects of the island.

METHODS

Approximately 10 hours were spent searching for *P. a. ambagiosus* mainly along the southern cliffs where the subspecies distribution was described by Powell (1947). Minute land snails were individually collected by hand in litter beneath broadleaf shrubs and flax.

Some litter (approximately 0.5 litre) was collected and removed from the island for later sorting for minute land snails. Subfossil shells were collected by hand in deflating sand dunes in the centre of the island.

Observations were made on *Helix aspersa* numbers and distribution at night and by day. Specific identification or confirmation of identification of the minute land snails were made by Dr F Climo of the National Museum and some specimens are lodged at that museum.

While searching litter for land snails and moving around the island we collected or noted any insects found on an ad-hoc basis.

RESULTS

Land Snails

A summary of land snails recorded and the number collected are shown in Table 1. The species, their distribution and abundance are described below:-

Placostylus ambagiosus ambagiosus Suter, 1906 -

Four live snails were found. Two were found on the southwest cliffs during specific snail searches while two others were found accidentally. The first two were located beneath flax (*Phormium tenax*), hangehange (*Geniostoma rupestre*), taupata (*Coprosma repens*) and kawakawa (*Macropiper excelsum*) in the south western corner of the island while the latter two were discovered in deep buffalo grass (*Stenotaphrum secundatum*) on top of the southern hill top ridge and on short clover (*Trifolium* sp.) on the northern hill's southern face. An intensive search within flax clumps in the vicinity of this last site failed to reveal any other live snails or shells.

Empty shells were very rare with c.20 being found suggesting that the population has been at a very low level for some time. Seven shells showed signs of having been preyed on by rodents. On the September 1988 trip, seven kiore were caught (Parrish 1988, unpublished report, Department of

Conservation, Whangarei; Sherley and Parrish 1989). These rats were sent to M Roberts at Auckland University who examined the gut contents and found the remains of a snail radula in one sample. This radula was identified as being from a juvenile of *Placostylus* (F Climo pers. comm. to M Roberts).

During a subsequent later visit to the island in January 1992 several old shells were found in the island's southwestern corner and 3 freshly dead large juvenile shells and 5 old adult shells were found on the northern hill's southern face but no live snails were found (F Brook pers. comm.).

P. a. hinemoa Powell, 1947 -

Many thousands of subfossil shells have eroded out of the consolidated sand dunes in the central saddle of the island.

Table 1. Land snails of Motuopao Island

Species	Number
Omphalorissa purchasi	1
**Liarea aupouria aupouria*	few
Cytora hispida	1
Cytora tepakiensis	60
Lamellidea novoseelandica	24
Paracharopa delicatula	10
Mocella n. sp. cf *manawatawhia*	3
Phenacohelix tholoides	70
Allodiscus basiliratus	18
punctum n. sp No. 24	78
Phrixgnathus n. sp. cf *alfredi* group	4
Paralaoma caputspinulae	2
Delouagapia cordelia	22
**Rhytida (Amborhytida) duplicata*	Hundreds
Placostylus ambagiosus ambagiosus	4 live
**Placostylus ambagiosus hinemoa*	Thousands
Helix aspersa	Thousands
Cochlicopa lubrica	17

* subfossil

Liarea aupouria aupouria Powell, 1954, *Rhytida (Amborhytida) duplicata* Suter, 1904 -

These two species appear to be extinct on the island since no live specimens were located. Subfossil examples of both these species were found in the consolidated dunes with *P. a. hinemoa*. Both species occur on the adjacent mainland in moist areas of broadleaf forest and scrub.

Lamellidea novoseelandica (Pfeiffer, 1853); *Cytora tepakiensis* Gardner, 1967; *Allodiscus basiliratus* Gardner, 1967; *Phenacohelix tholoides* (Suter, 1907), punctum n. sp no. 24; *Delouagapia cordelia* (Hutton, 1883) -

These six species were common beneath the broadleaf shrub and flax vegetation on the southern cliffs. Many more specimens than those recorded in Table 1 were seen but not collected.

Omphalorissa purchasi (Pfeiffer, 1862); *Cytora hispida* Gardner, 1967; *Paracharopa delicatula* Climo, 1983; *Mocella* n. sp cf *manawatawhia* (Powell, 1935); *Paralaoma caputspinulae* (Reeve, 1852) -

These species were also found along the southern cliffs but were much rarer than those listed above. The numbers shown in Table 1 are the total numbers found.

Phrixgrathus n. sp of *alfredi* group (Suter, 1909) -

Four specimens of this undescribed and previously unrecorded species were located in the litter layer on the southern cliffs. One specimen was found on the September 1988 visit and specific searches were made in October 1989 and three more specimens were found. In a letter listing identifications from the island Dr F Climo described this species "biogeographically, a very significant specimen" because its closest relative, also undescribed, has been collected only from Puketi and Waima Forests, and at Maungataipa Scenic Reserve and Waiotemarama, (F Climo pers. comm.) (letter, 26 September 1991).

Helix aspersa (Muller, 1774), *Cochlicopa lucrica* (Muller, 1774) -

Both these species are introduced from Europe and probably arrived on the island during the period 1879 to 1941 when lighthouse keepers and their families lived and farmed on the island. *Helix aspersa* is extremely abundant throughout the extensive grassland but is scarce or absent where the broadleaf shrubs and flax form a dense canopy. On the first night spent on the island there was a very heavy dew and in some places it was virtually impossible to walk without

squashing the snails. During the kiore poisoning operation *H. aspersa* ate the bromodialone laced kibbled wheat and wax blocks and probably consumed more than the kiore, with no noticeable detrimental effect. Up to 60 snails were found sheltering inside the 50cm x 110mm Novaflow plastic drain pipe bait stations with similar numbers sheltering beneath.

Cochlicopa lubrica was found beneath taupata shrubs alongside and on the benched cutting of the old tramway.

Insects

Twenty species of insects were recorded on the island. Unfortunately, as the insects were not curated sufficiently well, identification beyond the family level was not possible for three species. The list of insects recorded are shown in Table 2.

Table 2. Terrestrial arthropods found on Motuopao Island

Order	Family	Common Name or Species
Lepidoptera	Nymphalidae	*Bassaris gonerilla gonerilla*
	Lycaenidae	*Lycaena salustius*
		Zizina otis labradus
		Pieris rapae
Hymenoptera	Sphecidae	Wasp sp
		Polistes chinensis
	Apidae	*Apis mellifera*
	Bombinae	*Bombus terrestris*
Odonata	Anisoptera	*Uropetala carovei*
Orthoptera	Acridiidae	*Locusta migratoria*
		Teleogryllus commodus
		Xiphidium semiwittafum
Coleoptera	Scarabaeidae	*Pericoptus truncatus*
		Mimopeous elongata
Dermaptera	Labiduridae	*Forficula auricularia*
Hemiptera	Cicadidae	Cicada
Diptera	Asilidae	Crane fly
	Muscidae	*Musca domestica*
	Culicidae	*Opifex fuscus*
Blattodea	Blattidae	*Platyzosteria novaeseelandiae*

DISCUSSION

Land Snails

Motuopao Island has a long history of human occupation dating back to pre-European times when the island was used as a fishing camp by local Maori people. The island's vegetation was probably burnt by Maori and grazed by Europeans (Forester 1993; Shirley 1985). This would have had a devastating effect on the island's fauna. However, the island still supports a significant invertebrate fauna.

The combined effects of vegetation clearance and predation by kiore has resulted in the apparent near extinction of *P. a. ambagiosus*. The regeneration of the island's vegetation has been very slow since the cessation of human occupation in 1941 (Forester, 1993) and it will be many years before conditions are ideal for *P. a. ambagiosus* and other invertebrates. The rarity of *P. a. ambagiosus* means that mating will be infrequent and it may be some time before a recovery in the population is noticeable.

The extremely high numbers of *H. aspersa* may retard the recovery of *P. a. ambagiosus* as there may be competition for the same food source. *Helix aspersa* have been observed feeding on species known to be preferred by *Placostylus* eg. *Coprosma macrocarpa, Geniostoma rupestre, Macropiper excelsum* (pers. obs.). Numbers of *H. aspersa* may increase following the eradication of kiore.

Of the eighteen species or subspecies recorded, 17% (*Placostylus a. ambagiosus, P. a. hinemoa* and *Phrixgnathus* n. sp. cf *alfredi* group) are apparently endemic to the island, 28% (*Liarea a. aupouria, Cytora hispida, C. tepakiensis, Allodiscus basiliratus, Rhytida (A.) duplicata)* are endemic to the Cape Maria van Diemen - North Cape block, 17% (*Phenacohelix tholoides, Paracharopa delicatula* and punctum n. sp. No. 24) are Northland endemics, 28% (*Lamellidea novoseelandica, Omphalorissa purchasi, Mocella* n. sp. cf *manawatawhia, Paralaoma caputspinulae* and *Delouagapia cordelia*) are widespread in the New Zealand geographical region and 11% (*Helix aspersa* and *Cochlicopa lubrica)* are introduced.

Insects

The list is not comprehensive because no attempt was made to systematically collect insects using standard methods such as pit-fall traps, malaise traps or light traps. With the eradication of kiore, the islands invertebrate fauna will be free of a major predator. This combined with vegetation regeneration should allow the

insect fauna to increase. However, as no pre-poisoning survey was undertaken, no comparisons can be made with any future surveys.

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