Ants (Hymenoptera: Formicidae) from the Three Kings Islands, New Zealand

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ABSTRACT

Ants collected during an expedition to the Three Kings Islands in 1970, organised by the former Systematics Section, Entomology Division, DSIR, have been determined and the results along with habitat data are presented. A species list, incorporating two new records, and a key are also included. The origin and relationships of the ant fauna are discussed. All eight species recorded on the group are established on the adjacent New Zealand mainland.

Keywords: Three Kings Islands, New Zealand, Hymenoptera, Formicidae, ant fauna, new records.

INTRODUCTION

The Three Kings Is (Fig. 1) lie to the north-west of the New Zealand mainland, some 60 km from Cape Reinga. The group comprises one large island (Great I.), three smaller islands (West, South West and North East Is) and a group of rocky islets (Princes Is). Ants have been collected on Great I. and, to a much lesser extent, on South West I. Taylor (1962) examined ants collected from both these islands in 1946, 1951, 1952 and 1953 and deposited in the Auckland Institute and Museum. The ants reviewed in this paper were collected during an expedition to the Three Kings Is in 1970, organised by the Systematics Section, Entomology Division, D.S.I.R., Auckland, New Zealand (now Landcare Research, Auckland). The specimens examined are deposited in the New Zealand Arthropod Collection. Most of the specimens were extracted from leaf litter, moss and soil samples. Each of these samples was assigned an accession number (year/sample number). A few specimens were collected as strays, by sweeping or beating, from under logs or stones, or from the nest debris of ground-nesting birds. Some samples were not given an accession number; habitat details are included with the specimen data below. In order to avoid repetition, habitat data pertaining to samples with accession numbers are listed separately. All the localities on Great I. from which specimens were obtained are shown in Fig. 2. The following abbreviations of collectors' names appear with the habitat and specimen data: F. C. (F. Climo), E. G. (E. S. Gourlay), G. K. (G. Kuschel), J. M. (J. G. R. McBurney), L. P. (L. Price), G. R. (G. W. Ramsay).

Geological history, climate, vegetation

Since the above topics have been covered in some detail in the literature (see Brook & Laurenson 1992, text and references), only outlines are provided here. According to Hayward & Moore (1987), when the Three Kings area became land is unknown. The geological evidence indicates a long period of isolation of several million years. However, lowered sea levels during the more recent Pleistocene glacial periods narrowed the gap between the islands and the adjacent Northland coast, perhaps to as little as 10 km. In addition, under those conditions it is concluded that the Three Kings group would have been part of a single land mass of about 120 km² in area.

The climate of the Three Kings group, not unexpectedly given its location, is warm and humid. The November 1970 expedition recorded daily average maximum and minimum temperatures of 21.1°C and 13.5°C respectively (Ramsay 1971). Cranwell (1962) referred to the presence of a warm current, "so that the climate is humid, with much mist and fog conducive to a dense plant cover . . .".

Fig. 1: Map of Three Kings Islands. Inset: Location of Three Kings Islands off northern New Zealand.

Fig. 2: Map of Great Island, showing localities from which ants were collected.

The original cover on the larger islands was mixed broadleaf forest (Baylis 1951; Brook & Laurenson 1992). Maori occupation and, more recently, feral goats have contributed to a radical modification of the vegetation on Great I. Baylis noted that "a period of regeneration, probably impeded to a small extent by goats, followed the departure of the Maoris about 1840, so that by 1889 a variety of shrubs and small trees mingled with a general covering of *Leptospermum*"¹. A marked increase in the goat population, however, prevented the re-establishment of broadleaf species and saw the development of a kanuka-dominated subclimax. Since the extermination of the goats in 1946, a substantial regeneration of several plant species has occurred. Ramsay (1971) referred to the difficulty of access to most parts of the island because of "the dense undergrowth". He noted that "tall kanuka trees remain but numerous *Cordyline* and *Meryta* plants are now present underneath". Unlike Great I., South West I. has escaped any large scale interference. Baylis (1958) recognised two major plant communities—a coastal zone of *Meryta sinclairii* (pukanui) and an inland zone of mixed forest with a rich flora.

RESULTS

An updated list of the ants is given in Table 1 and species can be readily identified by the key which follows.

Table 1: List of the ants of the Three Kings Islands. Entries prefixed by * denote new records.

Ponerinae

Amblyopone australis Erichson

**Amblyopone saundersi* Forel

Heteroponera brouni (Forel)

**Hypoponera eduardi* (Forel)

Myrmicinae

Monomorium antarcticum (Smith)

Monomorium smithii Forel

Strumigenys perplexa (Smith)

Formicinae

Prolasius advena (Smith)

Key to the ants (workers only) of the Three Kings Islands

1	Pedicle ("waist") consisting of a single segment, the petiole	2
	Pedicle consisting of two segments, the petiole and postpetiole	6
2	With sting	Ponerinae 3
	Without sting	<i>Prolasius advena</i>
3	Petiole with broad attachment to gaster	<i>Amblyopone</i> 4
	Petiole with narrow attachment to gaster	5
4	Larger, head width 1.5 mm or more	<i>Amblyopone australis</i>
	Smaller, head width 1.3 mm or less	<i>Amblyopone saundersi</i>
5	Petiole with an overhanging posterodorsal face	<i>Heteroponera brouni</i>
	Petiole without an overhanging posterodorsal face	<i>Hypoponera eduardi</i>
6	Antenna 6-segmented	<i>Strumigenys perplexa</i>
	Antenna 12-segmented	<i>Monomorium</i> 7
7	Larger, head width 0.60-0.88 mm	<i>Monomorium antarcticum</i>
	Smaller, head width 0.50-0.56 mm	<i>Monomorium smithii</i>

¹ In this paper *Leptospermum ericoides* has been updated to *Kunzea ericoides*. *Leptospermum* on its own has not been changed although in most cases it probably refers to *K. ericoides* rather than *L. scoparium*.

MATERIAL EXAMINED

(Symbols used: ♀ = queen, ♂ = worker)

Great Island

Amblyopone australis

5 ♀ ♀, Castaway Camp, litter, 70/192; 2 ♀ ♀, 350 m N.E. Castaway Camp, litter, 70/194; 1 ♀, same locality, litter, 70/196; 1 ♀, Tasman Valley, litter, 70/214; 1 ♀, Tasman Valley, Mouth, litter, 70/215; 1 ♀, South Point, litter, 70/217; 2 ♀ ♀, Landing Beach, litter, 70/222; 1 ♀, Tasman Valley, litter, 70/223; 1 ♀, 350 N.E. Castaway Camp, litter, 70/226; 1 ♀, West Gully, litter, 70/230; 1 ♀, Castaway Camp, litter, 70/233; 11 ♀ ♀, 29 larvae, Hapuka Point, ex nest galleries under bark of partly dead *Leptospermum*, -xi.70, J.W.; 1 ♀, Castaway Dept, *Cyperus ustulatus*, -xi.70, J.B.; 1 ♀, Tasman Valley, -xi.70, G.K.; 15 ♀ ♀, North Slope, *Cyperus ustulatus*, -xi.70, G.K.; 8 ♀ ♀, 16 pupae, Summit, 270 m, ex nest under stone, -xi.70, J.W.; 27 ♀ ♀, 60 larvae, 4 pupae, Castaway Camp, -xi.70, G.R.

Amblyopone saundersi

1 ♀, Castaway Camp, litter, 70/192; 1 ♀, Beacon Knob, litter, 70/200; 2 ♀ ♀, Summit, litter, 70/202; 1 ♀, Tasman Valley, litter, 70/223; 1 ♀, West Gully, litter, 70/230; 1 ♀, Castaway Camp, litter, 70/233; 2 ♀ ♀, 350 m N.E. Castaway Camp, litter, 70/234.

Heteroponera brouni

4 ♀ ♀, Castaway Camp, litter, 70/183; 4 ♀ ♀, same locality, litter, 70/184; 5 ♀ ♀, same locality, litter, 70/190; 1 ♀, same locality, litter, 70/191; 27 ♀ ♀, same locality, litter, 70/192; 8 ♀ ♀, 350 m N.E. Castaway Camp, litter, 70/194; 14 ♀ ♀, same locality, litter, 70/195; 25 ♀ ♀, same locality, litter, 70/196; 1 ♀, South Point, litter, 70/198; 10 ♀ ♀, Beacon Knob, litter, 70/199; 1 ♀, same locality, litter, 70/200; 2 ♀ ♀, Summit, litter, 70/203; 12 ♀ ♀, same locality, litter, 70/204; 11 ♀ ♀, same locality, moss, 70/205; 7 ♀ ♀, Summit, northern slope, litter, 70/207; 1 ♀, Tasman Valley, debris from hole in stream bank, 70/208; 29 ♀ ♀, same locality, moss, 70/209; 3 ♀ ♀, same locality, litter, 70/210; 38 ♀ ♀, same locality, litter, 70/211; 39 ♀ ♀, same locality, litter, 70/213; 11 ♀ ♀, West Gully, litter, 70/219; 3 ♀ ♀, Tasman Valley, litter 70/223; 6 ♀ ♀, 450 m N.E. Castaway Valley, litter, 70/224; 7 ♀ ♀, same locality, litter, 70/226; 33 ♀ ♀, West Gully, litter, 70/229; 12 ♀ ♀, same locality, litter, 70/230; 2 ♀ ♀, Castaway Camp, litter and debris, shearwater colony, 70/231; 38 ♀ ♀, same locality, litter, 70/233; 36 ♀ ♀, 350 m N.E. Castaway Camp, litter, 70/234; 18 ♀ ♀, Castaway Camp, litter, 70/235; 2 ♀ ♀, same locality, -xi.70, G.R.; 80 ♀ ♀, same data; 13 ♀ ♀, same data; 2 ♀ ♀, same data except G.K.; 6 ♀ ♀ same data; 1 ♀, no locality, beating at night, -xi.70, J.W.

Hypoponera eduardi

11 ♀ ♀, Tasman Valley, Mouth, litter, 70/216; 1 ♀ (ergatoid), 2 ♀ ♀, South Point, litter, 70/217; 3 ♀ ♀, Castaway Camp, -xi.70, G.R.; 1 ♀ (ergatoid), 5 ♀ ♀, same data; 1 ♀, same locality, under *Cyperus ustulatus*, -xi.70, G.K.

Monomorium antarcticum

8 ♀ ♀, Castaway Camp, litter, 70/184; 1 ♀, same locality, litter, 70/185; 45 ♀ ♀, North Slope, soil, 70/188; 6 ♀ ♀, same locality, soil, 70/189; 3 ♀ ♀, Castaway Camp, litter, 70/190; 2 ♀ ♀, same locality, litter 70/192; 15 ♀ ♀, 350 m N.E. Castaway Camp, litter, 70/196; 16 ♀ ♀, Summit, northern slope, litter, 70/207; 8 ♀ ♀, Tasman Valley, debris from hole in stream bank, 70/208; 4 ♀ ♀, Tasman Valley, Mouth, litter, 70/216; 100 ♀ ♀, Landing Beach, litter, 70/222; 2 ♀ ♀, 350m N.E. Castaway Camp, litter, 70/224; 2 ♀ ♀, same locality, litter, 70/226; 6 ♀ ♀, West Gully, litter, 70/229; 2 ♀ ♀, same locality, litter, 70/230; 2 ♀ ♀, 350 m N.E. Castaway Camp, litter 70/234; 1 ♀, Castaway Camp, -xi.70, G.K.; 1 ♀, same data; 6 ♀ ♀, same data; 4 ♀ ♀, same data except *Phormium tenax* litter; 30 ♀ ♀, same data except under *Cyperus ustulatus*; 16 ♀ ♀, Castaway Camp, -xi.70, G.R.; 6 ♀ ♀, same locality, G.K.; 1 ♀, 16 ♀ ♀, Tasman Valley, -xi.70, G.R.; 25 ♀ ♀, larvae, pupae, Castaway Depot, *Myoporum laetum*, -xi.70, J.M.; 2 ♀ ♀, no locality, sweeping in *Hebe* sp., -xi.70, J.M.; 1 ♀, Tasman Valley, ex *Leptospermum* log, -xi.70, J.W.; 70 ♀ ♀ no locality, ex nest under *Leptospermum* bark, -xi.70, J.W.; 1 ♀, no locality, under *Leptospermum* bark, -xi.70, J.W.; 3 ♀ ♀, no locality, under bark, dead *Metrosideros excelsa*, -xi.70, J.W.

Monomorium smithii

6 ♀ ♀, Castaway Camp, litter, 70/183; 5 ♀ ♀, same locality, litter, 70/184; 2 ♀ ♀, same locality, litter, 70/185; 51 ♀ ♀, same locality, moss, 70/186; 2 ♀ ♀, Tasman Valley, moss, 70/187; 1 ♀,

North Slope, soil, 70/189; 9 ♀ ♀, Castaway Camp, litter, 70/191; 3 ♀ ♀, same locality, litter, 70/192; 1 ♀, Beacon Knob, litter, 70/199; 1 ♀, same locality, litter, 70/200; 2 ♀ ♀, Summit, litter, 70/203; 7 ♀ ♀, same locality, moss, 70/205; 2 ♀ ♀ Tasman Valley, moss, 70/209; 5 ♀ ♀, South Point, litter, 70/217; 3 ♀ ♀, Tasman Valley, litter, 70/223; 3 ♀ ♀, West Gully, litter, 70/230; 1 ♀, Castaway Camp, litter, 70/233; 2 ♀ ♀, same locality, litter, 70/235; 5 ♀ ♀, same locality, *Cyperus ustulatus*, -xi.70, G.K.; 3 ♀ ♀, same locality, -xi.70, G.K.; 4 ♀ ♀, same locality, xi.70, G.R.; 19 ♀ ♀, same data; 2 ♀ ♀, North Slope, *Cyperus ustulatus*, -xi.70, G.K.

Strumigenys perplexa

1 ♀, Castaway Camp, litter, 70/184; 1 ♀, same locality, moss, 70/186; 1 ♀, North Slope, soil, 70/189; 3 ♀ ♀, Castaway Camp, litter, 70/192; 3 ♀ ♀, 53 ♀ ♀, 350 m N.E. Castaway Camp, litter, 70/195; 1 ♀, same locality, litter, 70/196; 5 ♀ ♀, 6 ♀ ♀, South Point, litter, 70/198; 62 ♀ ♀, Beacon Knob, litter, 70/199; 2 ♀ ♀, same locality, litter, 70/200; 2 ♀ ♀, Summit, litter, 70/202; 1 ♀, 88 ♀ ♀, same locality, litter, 70/203; 17 ♀ ♀, same locality, litter, 70/204; 2 ♀ ♀, 50 ♀ ♀, same locality, moss, 70/205; 1 ♀ (alate), 2 ♀ ♀, Summit, northern slope, litter, 70/206; 2 ♀ ♀, same locality, litter, 70/207; 17 ♀ ♀, Tasman Valley, moss, 70/209; 1 ♀, 53 ♀ ♀, same locality, litter, 70/210; 18 ♀ ♀, same locality, litter, 70/211; 2 ♀ ♀, same locality, litter, 70/213; 9 ♀ ♀, same locality, litter, 70/214; 14 ♀ ♀, 155 ♀ ♀, Tasman Valley, Mouth, litter, 70/215; 1 ♀, South Point, litter, 70/217; 3 ♀ ♀, 37 ♀ ♀, West Gully, litter, 70/219; 13 ♀ ♀, Landing Beach, litter, 70/222; 3 ♀ ♀, 50 ♀ ♀, Tasman Valley, litter, 70/223; 6 ♀ ♀, 104 ♀ ♀, 350 m N.E. Castaway Camp, litter, 70/224; 7 ♀ ♀, 108 ♀ ♀, same locality, litter, 70/226; 1 ♀, 1 ♀, Castaway Camp, burrow linings of shearwater, 70/228; 6 ♀ ♀, West Gully, litter, 70/230; 18 ♀ ♀, Castaway Camp, litter, 70/233; 1 ♀, 350 m N.E. Castaway Camp, litter, 70/234; 2 ♀ ♀, 14 ♀ ♀, Castaway Camp, litter, 70/235; 4 ♀ ♀, 1 larva, 2 pupae, same locality, ex nest inside rhizome of *Cyperus ustulatus*, -xi.70, G.K.; 1 ♀, same locality, *Phormium tenax* litter, -xi.70, G.K.; 38 ♀ ♀, same locality, in dead *Cyperus ustulatus*, -xi.70, G.K.; 6 ♀ ♀, same locality, -xi.70, G.R.

Prolasius advena

1 ♀, Castaway Camp, moss, 70/186; 2 ♀ ♀, Tasman Valley, moss, 70/187; 2 ♀ ♀, Castaway Camp, litter, 70/192; 1 ♀, Beacon Knob, litter, 70/200; 7 ♀ ♀, Summit, moss, 70/205; 4 ♀ ♀, Tasman Valley, moss, 70/209; 25 ♀ ♀, Summit, moss, 70/218; 6 ♀ ♀, Castaway Camp, -xi.70, G.K.; 6 ♀ ♀, same locality, -xi.70, G.R.; 51 ♀ ♀, same data; 1 ♀, Tasman Valley, -xi.70, G.R.; 9 ♀ ♀, Hapuka Point, ex nest galleries under bark, partly dead *Kunzea ericoides*, -xi.70, J.C.W.; 1 ♀, same locality, under bark, partly dead *K. ericoides*, -xi.70, J.W.; 32 ♀ ♀, no locality, same data; 1 ♀, no locality, beating at night, -xi.70, J.W.; 6 ♀ ♀, same data.

South West Island

Amblyopone australis

1 ♀, 70/237; 3 ♀ ♀, litter, 70/238; 1 ♀, litter and soil, 70/240; 2 ♀ ♀, 1.xii.70, G.R.; 2 ♀ ♀, 1.xii.70, J.W.

Amblyopone saundersi

1 ♀, Summit Ridge, litter, 70/241.

Heteroponera brouni

21 ♀ ♀, litter, 70/237; 4 ♀ ♀, litter, 70/238; 23 ♀ ♀, litter and soil, 70/239; 18 ♀ ♀, litter and soil, 70/240; 16 ♀ ♀, litter, 70/241; 7 ♀ ♀, N.E. Slope, litter, 70/243; 1 ♀, 1.xi.70, G.R.

Monomorium antarcticum

13 ♀ ♀, litter, 70/237; 9 ♀ ♀, litter, 70/238; 4 ♀ ♀, litter and soil, 70/240; 3 ♀ ♀, larvae, pupae, 1.xii.70, G.R.

Monomorium smithii

2 ♀ ♀, litter, 70/238.

Strumigenys perplexa

3 ♀ ♀, 56 ♀ ♀, litter and soil, 70/239.

Samples with accession numbers—Habitat data

The number of ant species obtained from each sample is given in parentheses; the altitude is given where available.

Great Island: 70/183 (2) Castaway Camp, 85 m, 12.xi.70, G.K., small unsieved litter sample under *Brachyglottis arborescens*; 70/184 (4) same data except unsieved litter under *Meryta sinclairii*, *Melicope ternata*, *Planchonella costata*, *Paratrophis smithii*; 70/185 (2) same data except unsieved litter from base of *Phormium tenax*, *Carex* sp.; 70/186 (3) same data except fine, dry moss; 70/187 (2) Tasman Valley, 14.xi.70, G.K., moss from thick soft mat in *Kunzea ericoides* forest; 70/188 (1) North Slope, 80 m, 16.xi.70, G.K., sieved soil from large *Bromus cartharticus* in front of petrel burrows; 70/189 (3) same data except sieved soil from *Cyperus ustulatus* roots and clusters; 70/190 (2) Castaway camp, 85 m, 16.xi.70, G.K., sieved litter under *Planchonella costata* with some *Melicope ternata* and *Meryta sinclairii*, dry; 70/191 (2) same data except sieved litter under *Meryta sinclairii* with *Melicope ternata*; 70/192 (7) same data except sieved *Paratrophis smithii* litter with *Meryta sinclairii* and *Melicope ternata*; 70/194 (2) 350 m N.E. Castaway Camp, 80 m, 16.xi.70, G.K., thick litter by base of large rock with *Metrosideros excelsa*, *Melicope ternata*, *Meryta sinclairii*, *Geniostoma ligustrifolium*, *Litsaea calicaris*, ground dry, no cover; 70/195 (2) same data except thick litter in dense forest with *Kunzea ericoides*, *Meryta sinclairii*, *Hiemerliodendron brunonianum*, *Litsaea calicaris*, *Tetrapathea telandra*, *Melicope ternata*, *Melicytus ramiflorus*, ground damp, bare; 70/196 (4) 350 N.E. of Castaway Camp, 80 m, 22.xi.70, G.K., litter in dense, dark bush with *Kunzea ericoides*, *Meryta sinclairii*, *Litsaea calicaris*, *Melicope ternata*, *Paratrophis smithii*, ground wet, litter abundant in *Placostylus bollonsi* (Mollusca) colony; 70/198 (2) South Point, 22.xi.70, F.C., unsieved litter under *Metrosideros excelsa*; 70/199 (3) Beacon Knob, 240 m, 23.xi.70, G.K., partly sieved dry sparse litter amongst *Phymatodes diversifolium* under *Kunzea ericoides* with very little *Coprosma rhamnoides*, *C. macrocarpa*, *Meryta sinclairii*, *Cordylina australis*; 70/200 (5) same data except 260 m, unsieved damp litter under regenerating vegetation on cleared top—*Arthropodium cirrhatum*, *Meryta sinclairii*, *Coprosma macrocarpa*; 70/202 (2) Summit, 275 m, 23.xi.70, G.K., partly sieved litter under *Kunzea ericoides* canopy, ground cover fairly dense with *Carex* sp., some *Haloragis procumbens*; 70/203 (3) same data except partly sieved damp litter under *Pittosporum fairchildii*, some *Carex* sp., *Scirpus* sp., *Meulenbeckia complexa*, *Pteris comans*; 70/204 (2) same data except partly sieved litter under *Kunzea ericoides*, *Pittosporum fairchildii*, *Melicytus ramiflorus*, *Meuhlenbeckia complexa*, *Doodia media*, *Pteris comans*, *Carex* sp., *Nertera* sp.; 70/205 (4) same data except fairly dry moss and *Nertera* sp. under dense *Kunzea ericoides* canopy; 70/206 (1) Summit, northern slope, 200 m, 23.xi.70, G.K., unsieved *Plectomirtha baylisiana* litter with some *Muehlenbeckia complexa*; 70/207 (3) same data except unsieved *Gymnelaea apetala* litter with some *Melicytus ramiflorus*, *Plectomirtha baylisiana*, *Metrosideros excelsa*, all on large stones; 70/208 (2) Tasman Valley, 22.xi.70, J.W., debris from hole in stream bank, probably nest of *Ninox novaezelandiae* (morepork); 70/209 (4) Tasman Valley, 24.xi.70, G.K., moss forming thick mats on roots of living *Kunzea ericoides* with *Coprosma rhamnoides*, *Doodia media*, *Carex* sp.; 70/210 (2) same data except partly sieved litter under *Tecomanthe speciosa*, *Litsaea calicaris*, *Cyathea medullaris*, *Blechnum capense*, *Ucinia uncinata*; 70/211 (2) same data except partly sieved litter (abundant) under *Litsaea calicaris*, *Hedycarya arborea*, *Paratrophis smithii*, *Cordylina* sp., *Entelea arborescens*, *Colensoa physaloides*; 70/213 (2) same data except partly sieved litter of *Cyathea medullaris* in small grove of tree ferns; 70/214 (2) same data except partly sieved litter under *Melicope ternata*, *Paratrophis smithii*, *Clematis* sp., *Meryta sinclairii* with *Doodia media* on ground; 70/215 (2) Tasman Valley, Mouth, 25.xi.70, G.K., unsieved litter of *Coprosma repens*; 70/216 (2) same data except unsieved litter under *Myoporum laetum*, *Cyperus ustulatus*, *Arthropodium cirrhatum*; 70/217 (4) South Point, 25.xi.70, G.R., dry litter under old *Metrosideros excelsa* and regenerating *Meryta sinclairii*, *Cordylina* sp., *Phormium tenax*; 70/218 (1) Summit, 275 m, 25.xi.70, J.W., thick moss mats under *Kunzea ericoides* canopy; 70/219 (2) West Gully, 240 m, 25.xi.70, J.W., unsieved litter under *Melicope ternata*, *Brachyglottis arborescens*, *Pittosporum fairchildii*; 70/222 (3) Landing Beach, 26.xi.70, G.K., unsieved litter under *Hebe insularis*, *Meryta sinclairii*; 70/223 (5) Tasman Valley, 26.xi.70, J.W., litter in remnant forest under *Melicytus ramiflorus*, *Entelea arborescens*, *Kunzea ericoides*, *Colensoa physaloides*; 70/224 (3) 350 m N.E. Castaway Camp, 27.xi.70, G.K., unsieved litter from base of *Paratrophis smithii* and *Melicytus ramiflorus*; 70/226 (4) same data except unsieved litter in dense, dark forest of *Melicytus ramiflorus*, *Melicope ternata*, *Paratrophis smithii*, *Meryta sinclairii*; 70/228 (1) Castaway Camp, 28.xi.70, J.W., burrow linings of *Puffinus gavia* (shearwater); 70/229 (2) West Gully, 28.xi.70, G.R., litter under *Vitex lucens*, *Paratrophis smithii*, *Pittosporum fairchildii*; 70/230 (6) same data except litter under *Brachyglottis arborescens*, *Pittosporum fairchildii*, *Kunzea ericoides*; 70/231 (1) Castaway Camp, 29.xi.70, J.W., litter and debris from burrows and vicinity in *Puffinus gavia* (shearwater) colony; 70/233 (5) Castaway Camp, 29.xi.70, G.R., litter of *Litsaea calicaris*; 70/234 (4) 350 m N.E. Castaway Camp, 29.xi.70, G.R., litter under dense forest of *Litsaea calicaris*, *Paratrophis smithii*, *Hiemerliodendron brunonianum*; 70/235 (3) Castaway Camp, 26.xi.70, J.W., litter of *Vitex lucens*, *Litsaea calicaris*.

South West Island: 70/237 (3) 1.xii.70, G.K., unsieved litter under dense canopy of *Meryta sinclairii* and *Hiemerliodendron brunonianum* with some *Coprosma repens*, *Metrosideros excelsa*, *Macropiper excelsum*, *Carex* sp., ground very dry, steep, stony; 70/238 (4) same data except unsieved litter mostly in bottom of generally dry water-course, *Meryta sinclairii*, *Metrosideros excelsa*, *Myoporum laetum*, *Coprosma repens*; 70/239 (2) 1.xii.70, G.R., litter and soil accumulations on steep slope at base of bluffs,

under stones, amongst *Carex* sp., *Meryta sinclairii*, *Hiemertiodendron brunonianum*, *Paratrophis smithii*, *Macropiper excelsum*; 70/240 (3) same data; 70/241 (2) Summit Ridge, 220 m, 1.xxi.70, J.W., litter under mature *Meryta sinclairii*, *Cordyline kaspar*, *Carex* sp.; 70/243 (1) N.E. Slope, 180 m, 1.xii.70, J.W., litter under *Hiemertiodendron brunonianum*, *Meryta sinclairii*, *Carex* sp.

DISCUSSION

Origin and relationships of the Three Kings Islands ant fauna

In addition to the six species previously identified by Taylor (1962) two further species, *Amblyopone saundersi* and *Hypoponera eduardi*, represent new records for the Three Kings group. The ant fauna on the group is very similar in species composition to that on the adjacent mainland. Seven of the eight species known to be established on the Three Kings Is have been recorded from the Cape Reinga North Cape area. The exception, *Hypoponera eduardi*, has been recorded on the mainland as far north as the Bay of Islands. This species is probably a comparatively recent addition to the mainland fauna and distribution records indicate that it is gradually extending its range. It is likely to be a recent arrival on the Three Kings group. On the other hand, *Amblyopone saundersi* was probably present but not collected on earlier expeditions. A widespread New Zealand endemic, it forms only small colonies and nests in soil, leaf litter or rotting logs in forests.

Four other species, *Discothyrea antarctica* Emery, *Mesoponera* sp., *Monomorium antipodum* Forel and *Iridomyrmex glaber* (Mayr), are known to be established in the Cape Reinga North Cape area; they have not been recorded on the Three Kings Is. The 160 km of beaches and sand dunes to the north of Kaitia seem to have formed an effective barrier to the northward dispersal of several other ant species, notably *Ponera leae* Forel, *Huberia brouni* Forel, *Huberia striata* (Smith), *Orectognathus antennatus* Smith, *Pheidole vigilans* (Smith) and *Technomyrmex albipes* (Smith).

A high degree of endemism is a feature of the terrestrial biota of the Three Kings Is (Brook & Laurenson 1992). With reference to insects, this phenomenon applies particularly to flightless species (Ramsay 1971). All the ant species recorded possess winged queens. With respect to the six species which he identified, Taylor (1962) favours a chance derivation for the ant fauna of the group. The presence of *Hypoponera eduardi* as a more than likely recent addition would tend to support this conclusion. Nevertheless, in light of the geological evidence, it is still conceivable that the Three Kings Is may have received a "core" of ant species (i.e. species endemic to New Zealand) during a period when the island group was much closer to the mainland (see Introduction). Under such conditions a Three Kings "archipelago" could be considered biotically as part of the New Zealand mainland and the aforementioned "endemic core" may thus represent an isolated remnant of the mainland ant fauna as it existed during Pleistocene times.

Ecology

Baylis (1948) noted that only a few relics (in the form of small groves) of the original forest on Great I. survived the activities of Maori settlers and goats. According to the distribution data these relics are high in ant species e.g. five of the eight species recorded were extracted from one litter sample (70/223) collected in an original forest relic in Tasman Valley. It seems almost certain that, by providing refuges for ants and other invertebrates, these groves of original forest ensured the subsequent exploitation of regenerated broadleaf habitats. Also worthy of mention is the association of two ant species, *S. perplexa* (70/228) and *H. brouni* (70/231) with shearwater burrows.

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Biology of *Ancistrocerus gazella* (Hymenoptera: Vespoidea: Eumenidae) in New Zealand

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ABSTRACT

Ancistrocerus gazella (Panzer, 1798) is common in Central Otago, New Zealand. Details are provided of its typically tubular, generally multicelled nests in hollow stems, artificial trap nests, abandoned wood-boring insect galleries, cracks and holes in stone walls and old nail and bolt holes in cement, concrete and wood. After an egg is suspended by a slender thread from the roof of the cell near its inner end, 2-19 (mode=8) lightly paralysed lepidopterous larvae are placed in the cell. The cell is then sealed with a plug of moulded mud. Host species so far identified are *Planotortrix octo* Dugdale, *Ctenopseustis obliquana* (Walker), *Epiphyas postvittana* Walker, *Eurythecta zelaea* Meyrick, *Harmologa amplexana* (Zeller), *H. sisyrana* Meyrick, *Harmologa* sp., *Crociosema plebejana* Zeller, *Pyrgotis plagiatana* (Walker) (all Tortricidae), an unidentified species of Gelechiidae, *Epiphthora melanombra* Meyrick (Gelechiidae) and *Chloroclystis filata* Guenée (Geometridae).

Keywords: Hymenoptera, Eumenidae, *Ancistrocerus gazella*, biology, nests, host records, New Zealand.