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Notes on insects of the Chatham Islands

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Abstract

Notes are given on 92 species recorded from the Chatham Islands during January 1976, with particular reference to those likely to be natural enemies of other insects. Attention is drawn to the absence of some economically important pest species.

INTRODUCTION

There is no general account of the insect fauna or recent list of the species that occur on the Chathams. Nomenclatural changes and the scattered nature of recent literature hampers an appreciation of the status of economic entomology there and any zoogeographic comparisons. Recent literature deals with the insect fauna of the southern offshore islands more comprehensively than for the Chathams (e.g., Gressitt 1964; Gressitt *et al.* 1971; Wise 1973a, 1977; Harrison 1976).

These notes give a general interim outline of the composition of the insect fauna of the Chathams. Previous studies often listed species, but gave few collection details (Hutton 1898; Meyrick 1902, 1925; Broun 1909, 1911; Myers 1924; Brookes 1925; Lysaght 1925; Lindsay 1930; Miller 1950). Additional insect records were given by Harrison (1959), Hoy (1962), Dumbleton (1967), Holloway (1970), Kuschel (1969, 1971), Dugdale (1971), Wise (1973a, 1977), Knight (1976), Spencer (1977), Thornton *et al.* (1977), Early (1978), and Mound (1978). Madden (1955), Smith (in prep.), and Macfarlane (in prep.) give accounts of the history of a few economic insects and pollination. These last three authors and Madden & Healy (1959) also provide some appreciation of general agriculture and the adventive flora of the Chathams.

METHODS

Collections were made at 11 localities on the main island, Chatham Island (44°S, 176°W), between 16–22 January 1976. Six were collections in the north and northeast from Tioriori to Kaingaroa, and 5 were in the west and southwest from Te One to Moriori Creek. I concentrated on flies and insect species I thought likely to be involved in pollination or to be natural enemies of other insects. The main types of areas or plants examined were sand dunes, flowers, pastures, vegetables, ornamentals, and fruit trees. A few insects were collected in woodlands. In 2 places the underside of rocks were examined. Livestock instructors and two meat inspectors of the Ministry of Agriculture & Fisheries were questioned to check for the presence of insect pests of sheep.

Specimens on which this paper is based are deposited in the New Zealand Arthropod Collection held at Entomology Division, DSIR, Auckland. The common names used for insect species follow Ferro *et al.* (1977).

RESULTS AND DISCUSSION

Over 40 of the 92 species I found on Chatham Island were new records for the literature, but about 30 of these "new" records had been found in the 1967 and 1970 Entomology Division, DSIR, expeditions. At least 19 of these 92 species have good powers of dispersal and establishment, because they are found on one or more of the 5 southern groups of offshore islands as well as the main islands of New Zealand (Table 1). Now about 400 species are known from the Chathams (Table 1). This can be compared to the 9 500+ species recorded from the main islands of New Zealand (Watt 1975; Wise 1977). My collection gives an indication on which endemic species are more readily observed.

Table 1: Species collected on Chatham Island, January 1976, and the relative size of its known fauna. In square brackets after order names are 2 numbers, the 1st giving the total number of species recorded from the Chathams, and the 2nd giving the total number of species recorded from the main islands of New Zealand. (Number of Chatham Island Mallophaga species supplied by R. L. Palma (pers. comm.) and Lepidoptera species supplied by J. S. Dugdale (pers. comm.).) Symbols following taxon name: * = new record; 1 = endemic to the Chatham Islands; 2 = present on the Chathams and the main islands of New Zealand; 3 = present on the Chathams and one or more of the southern offshore islands (Antipodes, Auckland, Bounties, Campbell and Snares) in addition to the main islands of New Zealand. Species without a symbol may have been listed in the literature and occur on other islands of New Zealand.

COLLEMBOLA [1, 344]*
Sminthuridae*; *Bourletiella ?arvalis* (Fitch)*[2]

ODONATA [3, 12]
Coenagrionidae: *Xanthocnemis zealandica* (McLachlan)[2]
Lestidae: *Austrolestes colensonis* (White)[2]
Corduliidae: *Procordulia smithii* (White)[2]

PLECOPTERA (Present, Gressitt 1961)

BLATTODEA [1, 9]
Blattidae: *Celatoblatta brunni* (Alfken)[1]

ISOPTERA [1, 12]

MANTODEA [1, 2]* (Establishment uncertain)

DERMAPTERA [2, 21]
Forficulidae: *Forficula auricularia* Linnaeus[2]

ORTHOPTERA [4, 95]
Acrididae*; 1 sp.*

PHASMATODEA [2, 30]

PSOCOPTERA [2, 45]

MALLOPHAGA [28, 56]

HEMIPTERA [23, 670]
Undetermined: 1 sp.
Aphrophoridae: *Carystosterpa fingens* (Walker)[2]
Cicadidae: *Kikihia longula* (Hudson)[1]
Cicadellidae: *Zygina zealandica* (Myers)*[2]
Arawa novella (Metcalf)[2]
Aphididae*: *Macrosiphum euphorbiae* (Thomas)*[3]
Brevicoryne brassicae (Linnaeus)*[2]
Miridae*: *Calocoris norvegicus* (Gmelin)*[2]
Stenotus binotatus (Fabricius)*[2]
Saldidae*: *Salda*, 1 sp.*
Lygaeidae: *Nysius huttoni* (F. White)[2]

THYSANOPTERA [2, 50]
Terebrantia: 1 sp.*

NEUROPTERA [2, 12]
Hemerobiidae: *Micromus tasmaniae* (Walker)[3]

TRICHOPTERA [5, 130]

LEPIDOPTERA [111, 1 490]
Tortricidae: *Ctenopseustis obliquana* (Walker)[2]
Carposinidae: *Carposina adreptella* (Walker)*[2]
Galleriidae*: ?*Galleria mellonella* (Linnaeus)*[2]
Pyralidae: *Crambus*, 1 sp.[3]
Nymphalidae: *Bassaris gonerilla ida* Alfken[1]
Geometridae: *Helastia rosearia* Doubleday[2]
Arctiidae: *Nyctemera annulata* Boisduval[3]
Noctuidae: 2 spp.

DIPTERA [67, 1 870]
Tipulidae: 2 spp.
Psychodidae*: 1 sp.*
Anisopididae*: 1 sp.*
Sciaridae*: *Sciara*, 1 sp.*
Stratiomyidae: *Beris*, 1 sp.*
Eulalia chathamensis (Hutton)[1]
Asilidae: *Saropogon chathamensis* Hutton[1]
Empididae*: ?*Hilarempis*, sp.*
Dolichopodidae: *Chrysosoma*, 1 sp.*
dolichopodid, 1 sp.
Phoridae*: *Megaselia impariseta* Bridarolli*[2]
Syrphidae: *Melanostoma fasciatum* (Macquart)*[3]
Melangyna novaezealandiae (Macquart)[3]
Helophilus hochstetteri Nowicki*[3]
H. chathamensis Hutton[1]
Eristalis tenax (Linnaeus)[2]
Lonchopteridae*: *Lonchoptera dubia* Curran*[3]
Sciomyzidae*: *Neolimnia striata* (Hutton)*[2]
Lauxaniidae: *Poecilohetaerella bilineata* (Hutton)[3]
Coelopidae: *Chaetocoelopa littoralis* (Hutton)[3]
Heleomyzidae: *Prosopantrum flavifrons* (Tonnoir and Malloch)*[3]
Sphaeroceridae: *Leptocera thomasi* Harrison*[3]
Ephydridae: *Hecamede femoralis* Malloch[2]
Hydriellia tritici Coquillett*[3]
H. enderbii (Hutton)[3]
Scatella nitidithorax Malloch*[2]
?Canaceidae*: ?n. sp.*
Drosophilidae: *Scaptomyza graminum* (Fallen)*[3]
Agromyzidae: *Cerodontha australis* Malloch[3]
Chloropidae: *Conioscinella*, n. sp.*
Sarcophagidae*: *Hybopygia varia* (Walker)*[2]
Calliphoridae: *Calliphora stygia* Fabricius[3]
Calliphora, 1 sp.[2]
Muscidae: 2 spp.*
Tachinidae*: *Pales*, 1 sp.*

HYMENOPTERA [20, 400]
Ichneumonidae: *Aucklandella*, 2 spp.*
Degithina, 1 sp.*
Diadegma, 1 sp.*
Diplazon laetatorius (Fabricius)[2]
Hemitilini, 1 sp.*
Braconidae: 2 spp.
Diapriidae: 1 sp.*

Formicidae*: *Chelaner antarcticus* (White)*[2]
Sphecidae: *Tachysphex nigerrimus* Smith*[2]
Colletidae: *Hylaeus relegatus* (Smith)[2]
Apidae: *Apis mellifera* Linnaeus[2]

COLEOPTERA [131, 4 300]
Dytiscidae*: 1 n. sp. *[1]
Staphylinidae: 1 sp.
Helodidae: *Cyphon*, 1 sp.
Elateridae: 1 sp.
Phycosecidae: *Phycosecis limbata* (Fabricius)[2]
Melyridae: *Dasytes* sp.
Coccinellidae: *Coccinella undecimpunctata* Linnaeus[2]
Lathridiidae*: *Cortinicara hirtalis* (Broun)[2]
Tenebrionidae: *Amerosoma simulans* Redtenbacher[2]
Oedemeridae: *Thelyphassa*, 1 sp.
Cerambycidae: *Zorion opacum* Sharp[2]
Curculionidae: *Sitophilus oryzae* (Linnaeus)*[3]
Pentartharum, 1 sp.[3]
Rhinanisus, 1 sp.*

Collembola seem to be either under-collected or under-represented. No Anoplura or Siphonaptera have been recorded from the Chathams (Wise 1977), but some probably have been collected.

Aquatic insects

Two species of damselflies, a dragonfly, a moth fly, and a diving beetle were observed during my trip (Table 1). The Odonata were common.

In addition Wise (1973b) recorded a species of predatory water striding bug, 2 species of mosquitoes, 5 species of caddisflies, and some syrphid and crane fly larvae, and Gressitt (1961) recorded Plecoptera.

There are apparently no Simuliidae, Blephariceridae, Chironomidae, Ceratopogonidae, Ephemeroptera, Mecoptera, or Megaloptera.

Minor terrestrial orders

I found *Bourletiella ?arvalis*, some thrips, and the Tasmanian lacewing, *Micromus tasmaniae*, in pasture or in flowers. The only shorthorned grasshopper I saw escaped when I bent down to examine it.

Several *Celatoblatta brunni* were found under tree fern logs. The European earwig, *Forficula auricularia*, was observed readily in several places including around hives and under logs.

An egg case of the praying mantis, *Orthodera ministralis*, was found on the beach near Wharekauri, but may have come off driftwood. Its establishment is doubtful, because to date no nymphs or adults have been found there.

Palma (pers. comm.) noted that 27 species of biting lice have been collected from 19 of the 58 species of birds that live there.

Two species of stick insects, an earwig, another lacewing, and 3 wetas including *Novoplectron serratum* (Hutton)[1] (Wise 1977) have been recorded from the Chathams.

No redclover thrips, *Haplothrips niger* (Osborn), were found in red clover racemes at Te One.

Hemiptera

The wheat bug, *Nysius huttoni*, was common in open dry sandy areas. A shore bug, *Salda* sp., was common in the vicinity of a seepage area by a beach near Wharekauri. The Chatham's cicada, *Kikihia longula*, was most common in dune areas with grasses and herbs, but could also be heard in other grasslands.

Two species of leafhoppers were collected from grasslands, and the slender crop mirid, *Stenotus binotatus*, was seen once in a pasture.

The potato bug, *Calocoris norvegicus*, was numerous on thistle flowers and amongst garden plants. The garden aphid, *Macrosiphum euphorbiae*, and the cabbage aphid, *Brevicoryne brassicae*, were collected from roses and cabbages respectively. Generally few aphids were observed on garden or other plants during my visit, but aphids were seen on potatoes.

Nymphs of the spittle bug, *Carysterpa fingens*, were common on Compositae shrubs, but adults were active on a wider range of woody plants including *Coprosma.*

Three other species of leafhoppers including *Novothymbris solitaria* Knight[1], the scale of ngaio, *Eriococcus chathamensis* Hoy[1], the psyllid from Ake Ake, *Trioza dentiforceps* Dumbleton[1], 3 other bugs (Wise 1977), and at least 4 more species of aphids (Deitz pers. comm.) are known from the Chathams.

I found no Australian crop mirids, *Sidnia kinbergi* (Stal), brown shield bugs, *Dictyotus caenosus* (Westwood), or *Nabis* spp. There were none of these species in the collection at Auckland.

Diptera

The small hover fly, *Melanostoma fasciatum*, and possibly 2 new species of acalypterates were among the few flies that had not been collected by previous expeditions. Only 1 specimen of the small hover fly was collected. It was much less common than the large hover fly, *Melangyna novaezealandiae*, or the drone fly, *Eristalis tenax*. These flies together with blue blow flies, *Calliphora* sp., and the soldier fly, *Eulalia chathamica*, made up a common group of flies in a garden at Kiawhata (Kaingaroa). There were no effective species of bees to pollinate fruit trees in this location, but rather poor pollination had been effected except for trees like plums which required visitation between trees (Macfarlane in prep.). A smaller grey ?canaceid (possibly an undescribed species) was common on flowers of *Sonchus littoralis* Kirk on the foredune near Ocean Mail Point.

Adults of the brown blow fly, *C. stygia*, were collected, and struck sheep were also observed during my visit. The sheep ked, *Melanophagus ovinus* (Linnaeus)*, was found in only one of the 54 flocks examined in February 1972 (O'Brien pers. comm.). The sheep nasal bot fly, *Oestrus ovis* Linnaeus*, is also present (Freeman & Leishman pers. comm.).

The Chathams are known to have a further 29 species of flies including 9 more endemic species (Miller 1950; Harrison 1959; Spencer 1977).

Hymenoptera

I searched for active aculeate Hymenoptera and their nest sites especially on beaches. The black cockroach hunter, *Tachysphex nigerrimus*, was common in sand dune areas. I found no Vespidae or Pompilidae. None of the 30 or more soil-dwelling native bees from the main islands occur on the Chathams. For *Leioproctus* spp. some of the most important host plants – *Meterosideros, Leptospermum, Carmichaelia, Cassinia,* and *Raoulia* – are absent (Madden 1955; Allan 1961). Also *Hebe* is not generally common. Several bees of *Hylaeus relegatus* were collected off blackberry flowers. The collection at Auckland contained all these aculeates plus another ant*, a mason wasp, *Pison morosus* Smith, and at least one species of policeman wasp, *Podagrites/Rhophalum**.

I found no Chalcidiodea or Cynipoidea, but these groups are reasonably well represented in the collection at Auckland.

Lepidoptera

Caterpillars of 3 species that consume weeds were collected: the raspberry bud moth; *Carposina adreptella*, in blackberry stems, the Chatham Island red admiral, *Bassaris gonerilla ida*, on stinging nettle leaves, and the magpie moth, *Nyctemera annulata*, from cineraria foliage. No *Tebenna bradleyi* Clarke were found in thistly areas (mainly winged and scotch thistles).

Caterpillars of 3 other pests were recorded; the Chatham Island variety of the brownheaded leafroller, *Ctenopseustis obliquana*, was feeding on *Hebe* and pelargoniums, and it was common around Waitangi; *Helastia rosearia* was feeding on cabbages at Te One; and 1 of the 12 honey bee hives inspected was abandoned, and its comb was affected by wax moth.

Clover case bearer adults, *Coleophora* spp., were not detected in three stands of white clover checked with a sweep net.

Coleoptera

Only 4 of the 15 species of beetles I found were numerous enough to collect in any numbers in a short time. One was *Phycosecis limbata* found on a beach at Wharekauri. The others were *Dasytes* spp. on flowers, the elevenspotted ladybird, *Coccinella undecimpunctata*, and *Zorion opacum* associated with blackberries. Other species of ladybirds occur in the Auckland collection.

The more notable pests recorded from the Chathams by previous observers were: the black vine weevil, *Otiorhynchus sulcatus* (Fabricius) and the grass grub, *Costelytra zealandica*

(White) (Broun 1909), *Irenimus* spp. (Kuschel 1969), and the Argentine stem weevil, *Hyperodes bonariensis* Kuschel* (Kuschel pers. comm.). I did not manage to collect or assess the status of these pests for several reasons. My sampling excluded soil, grass tillers, and night collections, and the time of the year was unfavourable to observe pasture damage by the grass grub.

CONCLUSIONS

Some thought should be given to restricting, treating, or even banning soil from being shipped to the Chathams from the main islands of New Zealand. Enough collecting and observing has been done to show some important soil-inhabiting pasture pests, e.g., porina, *Wiseana*, other soil-inhabiting beetles, and most crickets and grasshoppers have yet to reach the Chathams. About 37 species of exotic weevils (Kuschel 1972), *Odontria* spp., and *Pyronota* are some of the most significant species that are absent from the Chathams.

Care must be taken in transferring plant foliage, seeds, hay, and timber in both directions between the Chathams and the main islands of New Zealand. For example, the Chathams have two different types of leafrollers; an endemic species of *Epiphyas*, and a distinct subspecies of the greenheaded leafroller, *Planotortrix excessana* (Walker) (Dugdale pers. comm.) apart from the cutworm, *Graphania mutans bromias* (Meyrick), and other endemic species. Conversely, many of the pests and better known species recorded from the mainland (Ferro 1976; Ferro *et al.* 1977) could be or are absent from the Chathams.

Generally pests of horticulture, agricultural crops, livestock, and stored products have been examined superficially. The three main pests of brassicas are there: the cabbage aphid, the white butterfly, *Pieris rapae* (Linnaeus), and the diamondback moth, *Plutella xylostella* (Linnaeus). In 1971 and 1972 livestock instructors examined all the flocks of sheep. In February 1972 they found the sheep body louse, *Damalinia ovis* (Schrank)* (Phthiraptera: Trichodectidae), present in 34 of 54 flocks inspected (O'Brien pers. comm.).

Pests and nuisance insects that are almost certainly absent include: the green blow fly, *Lucilia sericata* (Meigen), black flies, *Austrosimulium* spp., the German wasp, *Vespula germanica* (Fabricius), the codling moth, *Laspeyresia pomonella* (Linnaeus), the flax notcher, *Tmetolophota steropastis* (Meyrick), the potato tuber moth, *Phthorimaea operculella* (Zeller), the cherryslug, *Caliroa cerasi* (Linnaeus), and the onion fly, *Delia platura* (Meigen).

There are a number of beneficial species that could warrant the cost of introduction to the Chathams. However, each case would require separate evaluation due to a variety of factors. Some of these are the impact such species could have on the endemic fauna and flora, the cost of collection, the likely benefits to the Chathams Islands, and the need to send over specimens free of diseases and parasites. Bumbles bees, *Bombus* spp., and the gorse seed weevil, *Apion ulicis* (Forster), are examples of such insects. Pasture and crop pests are almost free of other natural enemies. There are no *Neoitamus* larvae to consume grass grub larvae. There are few parasitic Hymenoptera and Tachinidae or predatory bugs to affect aphids, caterpillars, blow fly maggots, and other pests.

It is suspected that the small hover fly, the slender mirid, and the yellow pasture leafhopper *Zygina zealandica* have arrived only recently (late 1960's to 1975) at the Chathams. These species were still uncommon compared to populations I have experienced in the South Island, and they had not been collected before in the Chathams.

In only a few days of general collecting I managed to find 10 or more species of insects that had not been taken by previous collectors. This illustrates that considerably more collecting is required before the true size of the fauna of the Chathams is known with certainty.

About 10% of the insect fauna on the Chathams appears to be endemic based on the minor orders and Diptera (Miller 1950; Wise 1977; Table 1). However, there are no such current checklists for Coleoptera, Hymenoptera, or Lepidoptera, meaning that the percentage endemism to the Chathams for these groups can not be calculated.

Most groups with their immature stages in the soil (including native bees and wasps), and which also rely on either insect hosts or flowers are represented only poorly in terms of both the number of genera and species. This also applies to the aquatic insects.

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A review of entomophagous insects in the Cook Islands

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Abstract

Available information concerning entomophagous insects introduced to the Cook Islands is summarized. Host-parasite associations determined through rearing field-collected insects from Rarotonga and Aitutaki, October 1975, are given; other parasites and predators known to occur in the Cook Islands are listed.

INTRODUCTION

The Cook Islands (Fig. 1) are divided into two distinct groups: the Northern Cooks with 7 atolls and the Southern Cooks with 2 atolls and 8 islands of volcanic origin. Rarotonga, the largest island, has a mountainous interior and peripheral lowland areas of agriculture (Fig. 2).

Information concerning entomophagous insects in the Cooks is sparse: Lever (1938) reported on some beneficial insects sent from Fiji to various Pacific Islands; Dumbleton

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