

A LIST OF THE PHYTOPHAGOUS HYMENOPTERA IN NEW ZEALAND

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INTRODUCTION

The Order Hymenoptera is divided into the Sub orders Symphyta and Apocrita.

Symphyta, including the Sawflies (Tenthredinoidea), Woodwasps (Siricoidea) and Stem sawflies (Cephoidea) are almost entirely phytophagous in habit. The family Orussidae is exceptional in being parasitic on the larvae of wood boring beetles.

Apocrita are predominantly parasitic (except for the group Aculeata) but some families are either wholly plant feeding, viz. Agaonidae (fig caprifera) or have some members with phytophagous habit, viz. Cynipidae, Eulophidae, Eurytomidae, Perilampidae and Torymidae. The group Aculeata, the fossorial wasps, ants and bees, does not contain truly phytophagous forms although certain ants use plant material for the culture of fungus and bees, etc., collect pollen to provision larval cells.

One of the features of the New Zealand indigenous hymenopterous fauna is the poor representation of the sub order Symphyta, only two genera, **Xiphydria** (Xiphydriidae) and **Guiglia** (Orussidae) occurring here. This is in marked contrast to other regions where sawflies and woodwasps number many hundreds of species. Another notable absence is of the gall producing forms of the Cynipoidea.

As far as is known **Xiphydria decepta** (Smith) and **X. duniana** Gourlay are the only native plant feeding Hymenoptera. The other sixteen phytophagous species recorded are all introduced.

SIRICOIDEA, Woodwasps

Family: SIRICIDAE.

Sirex noctilio Fabricius. Hosts: **Pinus** spp. (also Spruce, **Picea** and Larch, **Larix**).

Introduced into New Zealand early in this century **Sirex** became a serious pest in the exotic pine forests, reaching epidemic proportions in the late 1940's. There is an extensive literature recording the research on this pest, its effects on trees and timber production and the development of biological control measures.

The female wasp in depositing its eggs introduces a symbiotic fungus **Amylosternum** sp., which rots the wood around the oviposition site and provides nutriment for the developing **Sirex** larva. If the tree is susceptible to infection it may be killed by the fungus. Gilmour (1965) describes (and figures) the anatomy of **Sirex** and the means by which the fungus is transferred from one generation to the next.

A measure of control is achieved by the introduced parasites, *Rhyssa* spp. and *Ibalia leucospoides* Hochenwein, and a nematode parasite, *Deladenus siricidicola* Bedding, which infests the reproductive organs of both sexes, causing a sterilization, is responsible for significant reductions in populations.

Parasites: Ibalidae; *Ibalia leucospoides* Hochenwein. Ichneumonidae; *Rhyssa lineolata* (Kirby), *R. persuasoria persuasoria* (Linnaeus). Orussidae; *Guiglia schauinslandi* (Ashmead). Nematoda: Neotylenchidae; *Deladenus siricidicola* Bedding.

Family: XIPHYDRIIDAE.

Xiphydria duniana Gourlay. Host: *Nothofagus fusca* (Hook. F.) Oerst., *N. menziesii* (Hook. F.) Oerst.

Larvae feed in twigs and stems, development similar to that of *Sirex*. No parasites are known.

Xiphydria decepta (Smith). Host: *Coprosma robusta* Raoul.

TENTHREDINOIDEA, Sawflies

Family: TENTHREDINIDAE.

Caliroa cerasi (de Geer), the Pear or Cherry slug. Hosts: Pear, *Pyrus communis* Linnaeus, Plum, Cherry, and other *Prunus* species, Beech, *Betula alba* Linnaeus (R.Zondag, pers. comm.), Hawthorn, *Crataegus oxycantha* Linnaeus.

This pest was introduced into New Zealand in the early years of settlement, probably in the soil around the roots of seedling fruit trees. It is widely distributed throughout the country and although not of great significance in commercial orchards which are routinely sprayed, it causes a great deal of damage to domestic fruit trees and hawthorn hedges. Eggs are inserted under the epidermis of the leaf and the larvae feed on the upper surface of the leaves. (Fig. 1). Mature larvae drop to the ground where they pupate. In New Zealand there are two generations, the first in spring and the second from January to March, the pupae from which overwinter in the soil.

Parasites: Ichneumonidae; *Lathrolestes luteolator* (Gravenhorst) (= *Perilissus*).

Predators: Pentatomidae; *Cermatulus nasalis* Westwood, *Glaucius amyoti* (White). Vespidae; *Polistes humilis*, Fabricius.

Pontania proxima (Lepel), Willow leaf sawfly. Host: *Salix* spp. including *Salix babylonica* Linnaeus (leaves).

First recorded from New Zealand in 1929 and at that time appeared to be restricted to South Canterbury. Eggs are laid in the leaf tissue around which gall tissue develops before they hatch. The larva feeds inside a hollow gall with a small hole at one end through which excrement is passed. (Fig. 2). The fully fed larva emerges from the gall to construct a cocoon on the leaf surface.



Fig. 1: Larvae of **Caliroa cerasi** (de Geer) feeding on the leaves of **Crataegus oxycantha** Linnaeus.

Priophorus tener Zaddach, Raspberry sawfly. Host: **Rubus idaeus** Linnaeus.

This insect which is common on **Rubus** spp. in Europe was first recorded as damaging raspberries in South Canterbury in 1936.

Females deposit their eggs in stems and larvae feed on the leaves, initially chewing holes and eventually the whole leaf so that only the midrib is left intact. There are two generations in the year; the first Spring-Summer generation begins in September and a second forms overwintering prepupae in March.

Jeffereys (1939) describes and illustrates all larval stages and adult. Gun (1954) records its occurrence in the North Island and its spread to other South Island areas outside the original locality of discovery. It is not a pest of economic importance.



Fig. 2: Galls of **Pontania proxima** (Lepel) in the leaves of **Salix** sp.

Antholcus varinervis Spinola a sawfly which feeds on **Acaena** spp. in Chile was introduced into New Zealand in 1930 as a possible biological control of Bidi-bidi (**Acaena** spp.). It proved to be easily reared in the insectary and large numbers were released. In some areas the populations persisted for up to four years but these eventually dwindled and the species is not known to have survived in this country.

CHALCIDOIDEA

The families of Chalcidoidea are predominantly parasitic except for the Agaonidae (fig caprifiers) all members of which are presumed to be phytophagous. Other species which are plant feeding are closely related to groups which are mostly parasitic on gall forming or seed feeding insects.

Family: EULOPHIDAE.

Flockiella (sp.n.). Host: **Eucalyptus** sp., **E. radiata** Sieb. (seed capsule) .

The genus **Flockiella** was erected for the species **eucalypti** Timberlake (1957) reared from the seed capsules of **Eucalyptus umbellata** (Gaertn.) Domin. in California. Many species of **Eucalyptus** in California were established from seed and in this way the rich eucalyptus insect fauna of their native Australian region was largely left behind. It is of interest that at the time of its discovery it was the first record of an **Eucalyptus** insect that must have been introduced with its host plant. (Flock 1957).

Eggs are laid in small flower buds, each larva inducing a sac-like gall in one of the four cells of the developing bud. Adults may emerge from the unopened seed capsule or from exposed galls in open capsules. (Flock 1957).

A second species was discovered in New Zealand in capsules of **Eucalyptus** sp. (collected by P. Fitzgerald, Bankside, 1.6.59) and capsules of **E. radiata** (collected by L. J. Dumbleton, Riccarton, 10.9.62). The writer acknowledges Mr. Dumbleton for this record.

Richnopeltella eucalypti Gahan, Blue gum gall chalcid. Host: **Eucalyptus globulus** Labill (and probably other species with similar succulent young growth) (leaves and stems).

This species of Australian origin, was described in 1922 from specimens reared by David Miller from galls in **Eucalyptus globulus** Labill (?stems). Eggs are laid in soft new stems and leaves. When laid in twigs or mid-rib of leaves the developing larvae induce coalescing swellings and when laid in the leaf tissue the individual "pimple galls" are well separated from each other (Fig. 3). Adult wasps which emerge from pimple galls are always of a much smaller size than those from stem galls, but these are typically small specimens of the species and not a different species as is commonly believed. Emergence of adults begins in early December (in Nelson) and oviposition takes place almost immediately. Larval development and pupation occupy the rest of the year.

In 1900 Ashmead described the species **Pteroptrix maskelli** (Aphelinidae) from a single female supposedly reared from the **Eucalyptus** psyllid **Ctenarytaina eucalypti** (Maskell), collected at Wellington (? New Zealand) but it is probable that the specimen was in fact from a pimple gall of **R. eucalypti**. If this should prove to be the case the species names must be recombined as **Rhichnopeltella maskelli** (Ashmead).

Rhichnopeltella sp.

A second, unidentified, species of **Rhichnopeltella** which forms pimple galls in the leaves of **Eucalyptus globulus** is known to occur in Nelson.

Parasites: Two (unidentified) Eulophid parasites are known to attack **Rhichnopeltella** in New Zealand. One develops in larvae in both stem and pimple galls and the other apparently only in pimple galls on the leaves.



Fig. 3: *Rhynopeltella eucalypti* Gahan galls on leaves of *Eucalyptus globulus* Lahill, photographed in ~January. The lower leaf shows new galling; the upper leaf, galls of the previous year.

Family: EURYTOMIDAE.

Bruchophagus gibbus Boheman, Clover seed chalcid. Host:
Trifolium repens Linnaeus (seed).

B. gibbus is of almost cosmopolitan distribution and an important pest in red clover seed crops. The female oviposits in the newly formed seed, one larva developing in each seed, completely

consuming the contents. There are two and possibly three generations per year. Its economic significance in New Zealand has not been accurately assessed but it is probably of importance in reducing red clover seed yields.

Parasites: Eulophidae; **Tetrastichus bruchophagi** Gahan, **Habrocytus medicaginis** Gahan, Torymidae; **Liodontomerus longfellowi** (Girault).

Bruchophagus roddi (Guss.) Lucerne seed chalcid. Host: **Medicago sativa** (seed).

Until recent years this species was confused with **B. gibbus** but it is morphologically and biologically distinct. Development is similar to that of **B. gibbus**, the female ovipositing in the green seed pod. One larva feeds within a single seed. Three or possibly four generations occur each year.

Parasites: Probably the same as for **B. gibbus**.

Eurytoma acaciae Cameron, Acacia seed chalcid. Host: **Acacia decurrens** Willdenow (seed).

This insect, of Australian origin, was described in 1910 from specimens reared by F. W. Hilgendorf, from **Acacia decurrens** seed in Canterbury. Its present distribution is not known, but it also occurs in Nelson.

Females oviposit in developing seeds in November-December, one larva occupying a single seed. Larvae overwinter in the seeds and adults emerge in the Spring.

Systole geniculata Foerster, Fennel seed chalcid. Host: **Foeniculum officinale** Linnaeus, **Conium maculatum** Linnaeus (seed).

Recorded by Gourlay (1930) from the seeds of Hemlock, **Conium maculatum** Linnaeus and Fennel, **Foeniculum officinale** Linnaeus. The life cycle and number of generations have not been determined. Habits and development would be similar to the other seed infesting Eurytomidae.

Parasite: **Tetrastichus bruchophagi** Gahan.

Tetramesa sp. Cereals or other grasses (stems).

The larvae of this genus infest the stems of wheat, barley and various grasses. One unidentified species has been collected occasionally by sweeping over grasses in Nelson. It appears to be associated with Couchgrass, **Agropyron repens**.

Family: TORYMIDAE.

Megastigmus aculeatus Swederus, Rose hip chalcid. Host: **Rosa rugosa** Thunberg (seed).

M. aculeatus Swederus probably originating in Europe, but known also from North America and Asia was first recorded in New Zealand literature by Molloy (1964) who reared it from Sweet Brier fruits in Canterbury. Its distribution and importance is not known. Its destruction of seed may be significant in restricting the spread of this weed.

Megastigmus spermotrophus Wachtl., Fir seed chalcid. Host:
Pseudotsuga menziesii (Mirb.) Franco (seed).

This pest probably became established in New Zealand in the 1920's, being introduced in the seed of Douglas Fir. Females oviposit in the seeds when the cones are small and green, in September-October. Larvae consume the contents of the seed and overwinter as prepupae until the following spring when after a short pupal stage, adults emerge to reinfest newly set seed.



Fig. 4: Galls of **Aylax hypochaeridis** Keiffer in the stems of **Hypochaeris radicata** Linnaeus.

Syntomaspis varians (Walker) (= **Torymus druparum** Boheman), Apple seed chalcid. Hosts: **Crataegus crus-galli** Linnaeus and **C. oxycantha** Linnaeus.

Females oviposit in green fruits during December. Gourlay (1930) gives a detailed account of the process of oviposition. It is not known to infest apples in New Zealand, confining its attention to Hawthorn **Crataegus oxycantha** L. and Cockspearthorn **C. crus-galli** L.

CYNIPOIDEA

Family: CYNIPIDAE.

Aylax hypochaeridis Keiffer, Catsear gall wasp. Host: **Hypochaeris radicata** Linnaeus (stems).

This appears to be the only representative in New Zealand of the very large sub family of gall forming wasps, the Cynipinae. Galls in the stems (Fig. 4) of Catsear contain large numbers of cynipid larvae which develop in individual "cells". Prepupae overwinter in dried galls.

Parasites: Eupelmidae; **Macroneura vesicularis** (Retzius), Peteromalidae; one species provisionally identified as **Stinoplus ?pervasus** (Walker), (Z. Boucek, in lit.).

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