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Some Common Species of *Apanteles* Occurring in New Zealand
with a Catalogue of Australian and New Zealand Species of the
Genus *Apanteles* Foerster

By ARTHUR W. PARROTT,

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Abstract

THE principal diagnostic characters used in the identification of species of the genus *Apanteles* are given for the seven species so far recorded from New Zealand. The taxonomy of the genus is difficult, and some of the more useful morphological characters used in the present paper have been defined and illustrated. A key is included to assist in preliminary identification. As it is very likely that additional species will be found in New Zealand, a catalogue of known Australian and New Zealand species of the genus is included.

INTRODUCTION

THE purpose of the following notes is to facilitate the identification of some common species of the braconid genus *Apanteles* that occur in New Zealand. Species of *Apanteles* are received for identification and much difficulty has been experienced in correctly determining their specific status, and much time is spent in obtaining and studying the scattered literature dealing with the genus.

These notes are based on the examination of specimens contained in the collections of the Cawthron Institute and Entomological Research Station, Nelson, the Plant Diseases Division, Auckland, and in the author's collection. A large collection of Australian species has been examined and compared with the New Zealand material.

Through the kindness of Mr G. E. J. Nixon, Commonwealth Institute of Entomology, who has verified some of the specimens submitted to him, I have been able to construct a key to assist the non-specialist in the determination of the more common species. The above collections contain several specimens determined by the late D. S. Wilkinson, and these also have been of assistance in the construction of the key. Long series of several species have been studied and the results included in the key and descriptions that follow. The key is entirely artificial and final determination should be checked with the original descriptions.

Mr Frank Wilson, principal research officer, and Dr M. Fielding, of the Division of Entomology, C.S.I.R.O., Canberra, have kindly checked my key with Australian specimens of *A. plutellae* and *A. glomeratus* and supplied information on the establishment of *A. rubecula* in Australia. The latter species is not included in this paper as I have been unable to identify it from material collected in New Zealand, and I am doubtful if it does occur in this country.

After using the key and checking the determinations with the characters given under the various species, further reference should be made to the very full descriptions and figures given by Wilkinson and other authors, listed in the catalogue at the end of this paper.

The catalogue includes indigenous species from New Zealand and Australia, together with exotic species that have been recorded from these countries. It is possible that some unrecorded or undescribed species may run out in the key to *glomeratus* and particular care should be taken in determining this species. This applies to a lesser extent to other species, especially *tasmanica*, where there are closely related species that may occur in New Zealand, but so far have not been recognised in the material studied.

The species of *Apanteles* dealt with in the present paper may be divided into two groups, depending on whether the 2nd tergite is strongly transverse or not. This is a character easily observed and is illustrated in Figs. 4 and 5.

The degree of punctation is always difficult to describe and after examining large numbers of specimens of various species an endeavour has been made to express the degree of punctation qualitatively by the following expressions, which are diagrammatically represented in Figs. 1, 2 and 3.

- (1) *Closely and strongly punctate*. Punctures are deep and close together, much less than their diameter apart and when coalescent form rugose-punctate areas (Fig. 1).
- (2) *Closely and weakly punctate*. Punctures are relatively close together and very shallow, and when coalescent do not form rugose-punctate areas (Fig. 2).
- (3) *Sparsely or obsoletely punctate*. Punctures are generally small or minute and shallow and are either spaced apart by more than their diameter or irregularly over the surface. In extreme cases only a few obsolete punctures are scattered over the entire segment (Fig. 3).

Although the limits of the three types of punctation are somewhat vague, the more typical examples may at once be recognised. To establish the practical application of the above categories and to appreciate the almost imperceptible degrees of punctation it is necessary to examine a large series of individuals.

In species of *Apanteles* all shades of colour occur from light testaceous to jet black. The following five expressions describe the various degrees of darkening from light testaceous to black.

- (1) *Light testaceous*. Clear without any indication of infuscation.
- (2) *Dark testaceous*. A deep brown colour and in some cases a very slight indication of infuscation.
- (3) *Infuscated*. Definite indications of darkening but much testaceous colour occurring.
- (4) *Strongly infuscated*. Where little testaceous colour is apparent, a very deep black-brown.
- (5) *Black*. Where there is no indication of a brownish tinge, usually described as jet-black or blue-black.

The sculpture of the propodeum is apparently very variable and suitable characters are rarely found in this segment for species differentiation. The shape of the propodeum, however, is much more important than its sculpture. Although not used in this paper, the form of the scutellum, its adjacent lateral areas combined with their punctation, the scutellar fovea and its crenulations, all may be found useful characters for specific determinations. The venation of the wings may provide characters of specific value and have been used by Wilkinson and Nixon. The present paper uses only the relative length of the 1st abscissa of the radius to the intercubital vein, and the angle, if any, at the junction of these two veins.

Sexual dimorphism must be taken into account when assessing the value of a character for specific determination. In some cases males are definitely darker than females, while the reverse may be the case in other species. There are also indications that the punctation may show constant differences between the sexes. For instance, sexual dimorphism occurs in *Apanteles tasmanica*, the legs of the females are generally darker than those of the males. Wilkinson (1928, p. 120) states that the sexes of this species may be incorrectly associated, but I do not think so, as I have examined a series of specimens reared from the same host, which all emerged about the same time, and the males and females showed striking differences in the colour of their legs.

KEY TO SPECIES OF APANTELES OCCURRING IN NEW ZEALAND

- | | |
|---|--------------------------|
| 1. 2nd abdominal tergite strongly transverse (Fig. 5) | 2 |
| 2nd abdominal tergite not strongly transverse, although usually somewhat shorter than the 3rd tergite (Fig. 4) | 5 |
| 2. Mesonotum finely but closely punctate, the punctures distinct (Figs. 1 and 2) | 3 |
| Mesonotum with shallow and more widely spaced punctures, in places obsolete, the punctures minute; legs mainly blackish or strongly infuscated (Fig. 3) | <i>demeter</i> Wlk. |
| 3. Tegulae testaceous; anterior coxae dark testaceous, sometimes strongly infuscated; legs mainly dark testaceous; mesonotum coarsely and closely punctate. | <i>tasmanica</i> Cam. |
| Tegulae strongly infuscated or black; all coxae either entirely black or entirely testaceous; mesonotum more finely punctate | 4 |
| 4. All coxae entirely black; tegulae black; all legs almost entirely infuscated, save for apical quarter of anterior femur; metacarp equal to length of stigma | <i>sicarius</i> Marsh. |
| All coxae testaceous; tegulae strongly infuscated or black; legs entirely testaceous; metacarp longer than stigma | <i>carposinae</i> Wlk. |
| 5. Hind coxae rugosely punctate above; tegulae testaceous | 6 |
| Hind coxae finely punctate above, never rugosely so; tegulae strongly infuscated or black | <i>glomeratus</i> (Linn) |
| 6. Anterior and middle coxae mainly testaceous, although sometimes infuscated; 3rd tergite virtually impunctate, save for a single transverse row of minute punctures; cocoon white | <i>ruficrus</i> (Hal.) |
| Anterior and middle coxae strongly infuscated or entirely black; 3rd tergite with minute punctation; cocoon pale cream | <i>plutellae</i> Kurdj. |

Apanteles demeter Wilkinson.

Apanteles demeter Wilkinson, *Stylops* 3 (7); 154; 1934.

Described by Wilkinson from specimens collected by D. Miller and L. J. Dumbleton near Palmerston North in the North Island of New Zealand. This species, which was reared from *Tortrix* sp. (Lepidoptera), belongs to a group of species that have the thorax compressed dorso-ventrally and the mesonotum, scutellum, metanotum and the anterior part of the propodeum virtually on the

same plane. Eight species are referred to this group by Wilkinson, one occurring in New Zealand and one in Australia (*A. flavipes*).

The following combination of characters will serve to characterise this species:

2nd tergite transverse and much shorter than the 3rd; anterior half of propodeum on about the same plane as mesonotum, scutellum, and metanotum; mesonotum finely punctured, the punctures small and widely spaced, shallow, the whole surface shining; scutellum very sparsely punctate; ovipositor sheaths short; anterior and middle coxae dark, testaceous, posterior coxae black at base, lighter towards apex; legs evenly and strongly infuscated, with the posterior femur and tibia mainly black; tegulae dark testaceous; stigma light testaceous.

A. demeter is closely allied to *A. flavipes* Cameron, an Australian species, but according to Wilkinson it may be separated from the latter species by the minute punctation on the mesonotum (save around the anterior border), and the colour of the hind coxae, which in *flavipes* are testaceous. In colour *A. demeter* is rather variable, usually the legs are mainly strongly infuscated, but in some females recorded by Wilkinson the scape and the whole of the legs are testaceous.

DISTRIBUTION. Originally described from Baines, near Palmerston North, New Zealand, but it is here recorded for the first time from the Whangamoia and the Cainan Track in the Nelson Province in the South Island.

Host. *Tortrix* sp.

COCOON. White.

***Apanteles tasmanica* Cameron**

Apanteles tasmanica Cameron, Proc. Linn. Soc. N.S.W. 37: 196; 1912.

Apanteles tasmanica Dumbleton, N.Z. J. Sci. Tech. 17: 572-6; 1935.

Apanteles tasmanica Dumbleton, N.Z. J. Sci. Tech. A 21: 325; 1940.

Originally described from Launceston, Tasmania, by Peter Cameron. Dumbleton (1935) described the larval stages and biology and later (1940) gave further information, including notes on its distribution and abundance in New Zealand.

The following combination of characters will assist to separate this species from allied forms occurring in New Zealand:

2nd tergite transverse, much shorter than 3rd tergite; propodeum usually with an areola, never with a longitudinal carina; 1st tergite in female rugose-punctate; tegulae and legs testaceous, all coxae, apex of hind tibia and tarsus always more or less infuscated, coxae may be entirely black; mesonotum coarsely and distinctly punctate; scutellum usually impunctate, except around the sides; 2nd tergite shining, very sparsely punctate, in some specimens almost impunctate; tegulae sometimes lightly infuscated, but never black; metacarp longer than the stigma, nearly reaching the apex of the obsolete apical abscissa of the radius; ovipositor sheaths longer than hind tibia.

This species may be distinguished from *A. sicarius* by the 2nd tergite, being more or less impunctate, or at least much more sparsely and finely punctate than the 1st tergite and also by the testaceous legs and tegulae and the strongly punctate, sometimes rugosely so, 1st tergite. From *A. carposinae* by the four anterior coxae more or less testaceous and by the testaceous tegulae.

DISTRIBUTION. This species appears to be common in the Nelson District of the South Island and is probably generally distributed throughout New Zealand. Dumbleton (1940; 325) states "The species is already present in New Zealand, where it is the dominant parasite of *Tortrix postvittana* and is responsible for a much higher percentage of parasitism than in Tasmania."

Host. *Tortrix postvittana* Walk. A parasite of the larvae.

COCOON. Opaque white, 3.5 mm long and 1.2 mm wide, subcylindrical, somewhat rounded and narrowed at the caudal end and subtruncated at the cephalic

end. The cocoon itself is composed of only one envelope, but may be enclosed in a loose and irregularly shaped white webbing (Dumbleton, 1940: 325).

HYPERPARASITE. Dumbleton (loc. cit.) bred a species of *Hemiteles* (Ichneumonidae) from a cocoon collected in Tasmania.

Apanteles sicarius Marshall

Apanteles sicarius Marshall, Trans. ent. Soc. Lond. for 1885, p. 209.

This almost cosmopolitan species occurs in New Zealand. The following combination of characters will serve to distinguish *A. sicarius* from allied species so far recorded from New Zealand.

2nd tergite transverse, much shorter than 3rd tergite; propodeum with an areola, often obscurely marked and without a median longitudinal carina; 2nd and 3rd tergites similarly punctured; propodeum obsoletely punctate; mesonotum finely and closely punctate; scutellum shining, much more sparsely punctate than the mesonotum, punctures shallow and obsolete; stigma piceous or blackish; legs mainly black, coxae entirely black; ovipositor sheaths longer than hind tibia; 1st tergite in female finely punctate; metacarp about equal to length of stigma, the distance to apex of obsolete apica; abscissa of radius longer than 1st abscissa of radius.

This species may be distinguished from *A. tasmanica* by the finely punctate 1st tergite, which is never rugosely punctate and by the black tegulae. From *A. carposinae* it may be recognised by the entirely black coxae as well as by the shape of the 1st tergite.

DISTRIBUTION. A number of specimens have been collected by sweeping pastures and cultivated crops in the Nelson district, but it does not appear to be common. Odd specimens have occurred in Canterbury and Auckland provinces.

HOSTS. There are two specimens in the Cawthron Institute collections bred from *Epiphthora melanombra* (Gelechiidae: Lepidoptera) which are tentatively placed in this species. Outside New Zealand the following hosts have been recorded, *Diasemia litterata* Scop. (Phralid), *Elachista magerlella* stn. (Tineid) and *Plutella maculipennis* Curt. (Tineid).

COCOON. Pure white.

Apanteles carposinae Wilkinson

Apanteles carposinae Wilkinson, Bull. ent. Res. 29; 247; 1938.

This species was described by Wilkinson from specimens reared from the raspberry bud moth (*Carposina adreptella*) collected in Nelson, New Zealand.

The following combination of characters will serve to separate *A. carposinae* from other closely related species:

2nd tergite transverse, much shorter than the 3rd tergite; propodeum usually with areola distinct but never with a median longitudinal carina; ovipositor sheaths longer than posterior tibia; metacarp longer than stigma, distance from apex of obsolete apical abscissa of radius shorter than the 1st abscissa of radius; wings infumated evenly throughout; four anterior coxae largely red-testaceous; legs mainly testaceous, tarsi lightly infuscated, and there may be slight darkening mainly on the posterior femur and tibia, in the males the legs may be somewhat darker; mesonotum closely but weakly punctate, the punctures shallow; scutellum similarly punctate; tegulae dark testaceous; anterior and middle coxae mainly testaceous; posterior coxae black, except beneath at apex.

A. carposinae therefore differs from *A. sicarius* by having the four anterior coxae largely red-testaceous and the metacarp longer than the stigma; from *A. tasmanica* by the black tegulae and by the much more narrowed apical margin of the 1st tergite.

DISTRIBUTION. The only specimens I have seen from New Zealand were reared by Miss F. J. Jeffreys in 1938 and are in the Cawthron Institute collections. Included in this collection are a series of paratypes named by Wilkinson in 1938. Although I have collected extensively in the Nelson District over the past ten years I have not come across this species in the field.

HOST. Raspberry Bud Moth (*Carposina adreptella*). (Nelson District.) This species is reported to be a solitary parasite.

COCOON. The cocoons have not been described.

Apanteles ruficrus (Haliday)

Microgaster ruficrus Haliday, Ent. mon. Mag. 2; 253; 1835.

Apanteles antipoda Ashmead, Proc. Linn. Soc. N.S.W. 25: 355; 1900.

Apanteles manilae Ashmead, N.Y. ent. Soc. 12; 19; 1904. (nec. *Glyptapanteles manilae* Ashmead, 1905)

Apanteles sydneyensis Cameron, Proc. Linn. Soc. N.S.W. 36; 642; 1913.

Apanteles (Protapanteles) narangae Viereck, Proc. U.S. nat. Mus. 44; 642; 1913.

Apanteles ruficrus (Haliday) Gahan, ent. Res. 19; 256; 1928. Wilkinson, Trans. ent. Soc. Lond. for 1929, p. 108; 1929. Parrott, Pacif. Sci. 7 (2); 201; 1953. Parrott, N.Z. Ent. 2 (3); 20; 1955.

This European species was described over one hundred years ago and is found today practically throughout the world. Ashmead was the first to record it from Australia under the name *A. antipoda*, while eleven years later Cameron described it as new from specimens collected at Sydney, N.S.W., under the name *A. sydneyensis*.

This variable species may be characterised by the following combination of characters:—

2nd tergite not transverse, although shorter than the 3rd tergite; 1st and 2nd tergites rugosely punctate; scutellum punctate, the punctures somewhat larger than, but not so definite as, those on the mesonotum; tegulae testaceous; anterior and middle coxae testaceous, sometimes infuscated, posterior coxae black, save at extreme apex; stigma light testaceous.

A. ruficrus varies in colour. Wilkinson has pointed out that in Australian forms the 3rd tergite (usually) and the 5th and 6th (sometimes) are completely testaceous, although usually there are indications of darkening. The New Zealand specimens that I have examined usually show some testaceous colouring on 3rd tergite, but this is seldom entirely testaceous.

This species resembles *A. plutellae* in having the hind coxae strongly and rugosely punctate above and the tegulae testaceous, but differs in having the anterior and middle coxae mainly testaceous and the 3rd tergite impunctate, save for a single transverse row of minute punctures, which in some specimens are difficult to detect.

DISTRIBUTION. This species appears to be common and widely distributed throughout New Zealand. I have seen specimens from many localities in both the North and South Islands, and there can be no doubt that it is generally distributed throughout cultivated areas in both islands.

HOST. A wide variety of hosts have been recorded for this cosmopolitan species. In New Zealand it has been recorded from *Plusia chalcites* Esper. and *Tortrix* sp. In Australia it has been recorded as a parasite from the following noctuid moths, *Agrotis* sp. *Naranga diffusa* Walk. and *Spodoptera mauritia* Bois.

COCOON. White, similar to those recorded from Sydney, but Wilkinson records cocoons found in Formosa as yellowish-brown.

Apanteles plutellae Kurdjumov

Apanteles plutellae Kurdjumov, Rev. Russe Ent. 12; 226; 1912.

Apanteles plutellae Wilkinson, Bull. ent. Res. 30; 80; 1939.

Apanteles plutellae Parrott, N.Z. Ent. 2 (3); 20; 1955.

Apanteles ruficrus Haliday, Bignall, Trans. Devon Ass. Adv. Sci. 33; 669; 1901.
(In part.)

Kurdjumov in 1912 described *A. plutellae* from western Europe as a parasite of *Plutella maculipennis* Curt. and much doubt had existed as to the correct identification of this species, until Wilkinson redescribed it in 1939.

The following characters will assist in differentiating *A. plutellae* from allied forms in New Zealand and Australia.

2nd tergite not transverse, a little shorter than the 3rd tergite; propodeum coarsely reticulately rugose; ovipositor sheaths shorter than combined lengths of basal and 2nd segments of hind tarsus; 1st tergite rugose-punctate with irregular longitudinal striae; 2nd tergite similarly sculptured; 3rd tergite smooth with minute punctures scattered irregularly over the surface, leaving impunctate areas; metacarp about equal to length of stigma; mesonotum and scutellum coarsely and in places rugose-punctate; tegulae testaceous; four anterior coxae mainly black; legs mainly testaceous, usually with the apex of middle and posterior femora and apex of posterior tibia and posterior tarsus infuscated.

This species superficially resembles *A. ruficrus* but may be distinguished by the darkening of the anterior coxa and by the minute punctation on the 3rd tergite. This very minute punctation is difficult to see unless examined under good light.

DISTRIBUTION. *A. plutellae* does not appear to be common in New Zealand. Three specimens, without data, are in the Cawthron Institution collections, and I have taken it only once in the Nelson District. According to Mr Frank Wilson, this species is established in Australia.

HOST. Recorded in Europe as a parasite of the Diamond-backed Moth (*Plutella maculipennis*) and Mr Wilson informs me that it is a solitary parasite of the Diamond-backed moth in Australia. No host records are known from New Zealand, but it has probably become established with the Diamond-backed moth which is abundant throughout New Zealand.

COCOON. Pale cream.

Apanteles glomeratus (Linnaeus)

Ichneumon glomeratus Linnaeus, Syst. Nat. Ed. 10, p. 568, 1758.

Microgaster glomeratus (Linnaeus) Haliday, Ent. mon. Mag. 1; 262; 1833.

Apanteles glomeratus (Linnaeus), Wilkinson, Trans. ent. Soc. Lond. 80; 334; 1932.
Muggeridge, N.Z. Sci. Tech. A 25: 1-30; 1943.

This widespread parasite of *Pieris rapae* was first introduced from England into New Zealand during 1932 by J. Muggeridge, who gives a full account of that undertaking in 1943 (*loc. cit.*) The English material was liberated in Hawke's Bay but failed to establish; in 1939 David Miller, Director, Entomological Research Station, Nelson, received material from the United States which was widely distributed throughout New Zealand, and from these liberations *Apanteles glomeratus* has become established in the Nelson District at least. This species may be easily confused with the closely related species *A. rubecula* and further studies on long series of individuals bred from *Pieris rapae* would be necessary to establish whether *A. glomeratus* is the main species involved in the control of the White Butterfly in this country.

The following combination of characters will assist to separate *A. glomeratus* from several closely allied forms occurring in New Zealand.

2nd tergite not strongly transverse, coarsely punctate, with deep lateral oblique foveae, deeper at base than at apex; 1st tergite sub-parallel sided, not closely or rugosely punctate; propodeum rugosely punctate; mesonotum closely but shallowly punctate; scutellum sparsely punctate, with the basal fovea deep with strong transverse striae; tegulae strongly infuscated or black; 3rd tergite virtually impunctate, shining; hind coxa finely punctate above, never rugosely so; all coxae strongly infuscated almost black.

DISTRIBUTION. Widely distributed throughout Europe, North America, Asia, Australia and New Zealand. Originally from Europe, it has been introduced for biological control of *Pieris rapae* or has been accidentally introduced with the spread of its host.

HOSTS. This is a polyphagous species with a wide range of host species.

COCOON. Yellow to pale yellow.

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To Mr Frank Wilson, Principle Research Officer, Division of Entomology, C.S.I.R.O., Canberra, Australia my thanks are due for checking the key published in the present paper with Australian specimens of two species of *Apanteles* and for information on the distribution and establishment of *A. rubecula* in Australia.

I wish to thank Dr David Miller, formerly Director of the Cawthron Institute and the Entomological Research Station, Nelson, for information on the introduction of American specimens of *A. glomeratus* into New Zealand.

For the drawings illustrating this paper I am indebted to Mr Bruce Given, Entomologist, Entomological Research Station, D.S.I.R., Nelson.

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A CATALOGUE OF AUSTRALIAN AND NEW ZEALAND SPECIES
OF THE GENUS *APANTELES* FOERSTER

anthelae Wilkinson

Wilkinson, *Trans. ent. Soc. Lond.* 80: 335; 1932.

LOCALITY. Victoria, Australia.

TYPE. British Museum.

HOST: *Anthela ocellata* (Anthelidae: Lepidoptera)

australiensis Ashmead

Ashmead, *Proc. Linn. Soc. N.S.W.* 25: 356; 1900.

Wilkinson, *Bull. ent. Res.* 21: 485; 1930.

Wilkinson, *Trans. ent. Soc. Lond.* 80: 334; 1932.

LOCALITY. New South Wales, Victoria, Australia.

TYPE. U.S. Nat. Mus. (No. 4913).

HOST. *Antheraea eucalypti* (Saturnidae: Lepidoptera).

biroi Szepligeti

Szepligeti, *Ann. Hist-Nat. Mus. Hungr.* 3: 49; 1905.

Wilkinson, *Bull. ent. Res.* 19: 121; 1928.

Wilkinson, *Trans. ent. Soc. Lond.* 80: 337; 1932.

LOCALITY. Sydney, New South Wales, Australia.

TYPE. National Museum, Hungary.

HOST. Unknown.

carposinae Wilkinson

Wilkinson, *Bull. ent. Res.* 29: 247; 1938.

LOCALITY. Nelson, New Zealand.

TYPE. British Museum.

HOST. *Carposina adreptella* Walk. (Raspberry bud-moth.)

deliadis Bingham

Bingham, *Trans. ent. Soc. Lond.* for 1906, p. 125; 1906.

Wilkinson, *Trans. ent. Soc. Lond.* 80: 334; 1932.

LOCALITY. Townsville, N. Queensland, Australia.

TYPE. Hope Department, Oxford, England.

HOST. *Delias argenthona* Fabr. (Pieridae; Lepidoptera.)

demeter Wilkinson

Wilkinson, *Stylops* 3 (7): 154; 1934.

LOCALITY. Baines, New Zealand.

TYPE. British Museum.

HOST. *Tortrix* spp.

flavipes (Cameron)

Cameron, *Mem. Manchr. lit. phil. Soc.* (4) 4: 185; 1891.

Olliff, *Agric. Gaz. N.S.W. for 1893*, p. 381; 1893.

Wilkinson, *Bull. ent. Res.* 19: 93; 1928.

LOCALITY. India, Formosa and Australia.

TYPE. British Museum.

HOSTS. *Nonagria exitiosa* (Noctuidae: Lepidoptera); *Phragmatiphile truncata* Walk. (Noctuidae: Lepidoptera).

glomeratus Linnaeus

Linnaeus, *Syst. Nat. Ed. 10*; 568; 1758.
 Wilkinson, *Trans. ent. Soc. Lond.* 80: 334; 1932.

LOCALITY. Almost cosmopolitan.

TYPE. Not known.

Many hosts, including *Pieris rapae* Linn.

guyanensis Cameron

Cameron, *Proc. Linn. Soc. N.S.W.* 36: 327; 1911.
 Wilkinson, *Bull. ent. Res.* 21: 483; 1930.

LOCALITY. British Guiana; Western Australia.

TYPE. British Museum.

HOST. Probably *Utethesia pulchella* Lis. (Arctriidae).

philocampus Cameron

Cameron, *Proc. Linn. Soc. N.S.W.* 36: 342; 1911.
 Wilkinson, *Bull. ent. Res.* 19: 96; 1928.
 Wilkinson *Trans. ent. Soc. Lond.* 80: 333; 1932.

LOCALITY. Wattle Flat, N.S.W., Australia.

TYPE. British Museum.

HOST. Unknown.

plutellae Kurdjumov

Kurdjumov, *Rev. Russe Ent.* 12: 226; 1912.
 Wilkinson, *Bull. ent. Res.* 30: 84; 1939.
 Parrott, *N.Z. Ent.* 1(3): 20; 1955.

LOCALITY. Europe, Australia and New Zealand.

TYPE. Institution in which type deposited unknown.

HOSTS. Many hosts including *Plutella maculipennis* Curtis., *Pieris rapae* and *P. brassicae*. Linn.

radiantis Wilkinson

Wilkinson, *Trans. ent. Soc. Lond.* 77: 110; 1929.
 Wilkinson, *Ibid.* 80: 334; 1932.

LOCALITY. Gatton, Queensland, Australia.

TYPE. British Museum.

HOST. *Euxoa radians* Guen. (Noctuid; Lepidoptera).

rubecula Marshall

Marshall, *Trans. ent. Soc. Lond. for 1885*: 175; 1885.
 Wilkinson, *Ibid.* 80: 334; 1932.

LOCALITY. Europe, Australia.

TYPE. British Museum.

HOSTS. Many hosts, including *Pieris rapae* Linn.

ruficrus (Haliday)

Haliday, *Ent. Mag.* 2: 253; 1835. (*Microgaster*)
 Ashmead, *Proc. Linn. Soc. N.S.W.* 25: 355; 1900. (*Apanteles antipoda*)
 Cameron, *Proc. Linn. Soc. N.S.W.* 36: 342; 1911. (*Apanteles sydneyensis*)
 Gahan, *Bull. ent. Res.* 19: 256; 1928.
 Wilkinson, *Trans. ent. Soc. Lond.* 77: 108; 1929.

LOCALITY. Almost cosmopolitan, including Australia and New Zealand.

TYPE. Not known. (Type of *antipoda* U.S. Nat. Mus. No. 4912.)

HOSTS. *Haliotis armigera* Hubn. (Noctuid), *Agrotis* sp. and probably *Plusia* sp.

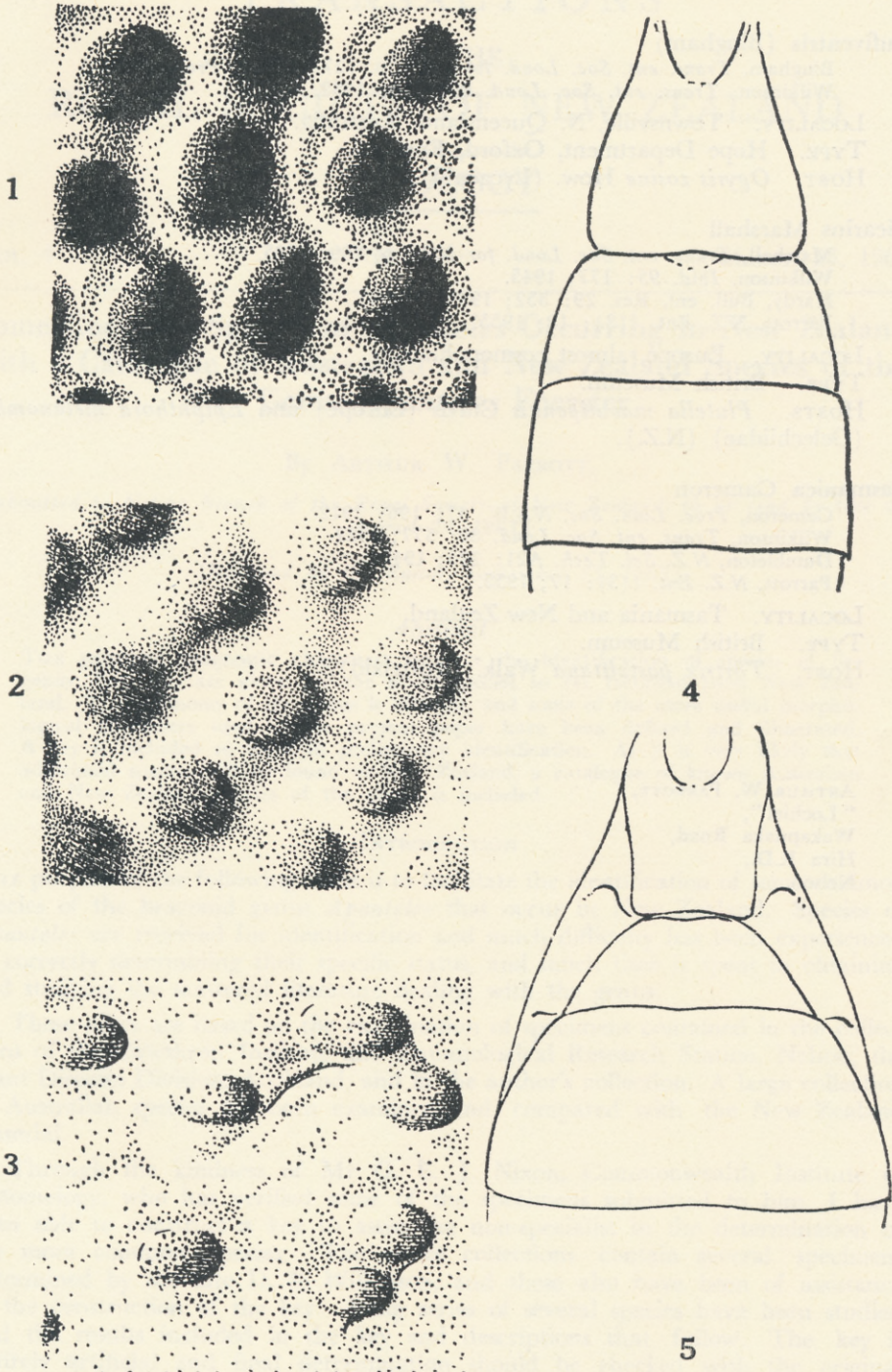


FIG. 1.—Diagram illustrating a closely and strongly punctate surface.

FIG. 2.—Diagram illustrating a closely but weakly punctate surface.

FIG. 3.—Diagram illustrating a sparsely and obsolete punctate surface.

FIG. 4.—Dorsal view of basal three segments of the abdomen, showing the 2nd tergite not strongly transverse.

FIG. 5.—Dorsal view of basal three segments of abdomen showing the 2nd tergite strongly transverse.

rufiventris (Bingham)

Bingham, *Trans. ent. Soc. Lond. for 1906*, p. 127; 1906. (*Protapanteles*)
Wilkinson, *Trans. ent. Soc. Lond.* 80: 335; 1932.

LOCALITY. Townsville, N. Queensland, Australia.

TYPE. Hope Department, Oxford, England.

HOST. *Ogyris zosine* How. (Lycaenid).

sicarius Marshall

Marshall, *Trans. ent. Soc. Lond. for 1885*, p. 209; 1885.

Wilkinson, *Ibid.* 95: 177; 1945.

Hardy, *Bull. ent. Res.* 29: 352; 1938 (Hosts).

Parrott, *N.Z. Ent.* 1(3): 19; 1955.

LOCALITY. Europe, almost cosmopolitan.

TYPE. British Museum.

HOSTS. *Plutella maculipennis* Curtis (Europe) and *Epiphthora melanombra* (Gelechiidae) (N.Z.).

tasmanica Cameron

Cameron, *Proc. Linn. Soc. N.S.W.* 37: 196; 1912.

Wilkinson, *Trans. ent. Soc. Lond.* 80: 377; 1932.

Dumbleton, *N.Z. Sci. Tech.* A21: 325; 1940.

Parrott, *N.Z. Ent.* 1(3): 17; 1955.

LOCALITY. Tasmania and New Zealand.

TYPE. British Museum.

HOST. *Tortrix postvittana* Walk. (Tortrixid).

ARTHUR W. PARROTT,
"Lochiel",
Wakapuaka Road,
Hira R.D.,
Nelson.