

# The Immature Stages of Some New Zealand Longhorn Beetles (Coleoptera-Cerambycidae)

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## Abstract

THE larvae of 20 species—two Prionine, 13 Cerambycine and 5 Lamiine—are described, figured and keyed. The eggs of six and the pupae of ten species are also described.

THE following descriptions of the immature stages of some longhorn beetles form a preliminary contribution to the study of the New Zealand Cerambycid fauna. These insects are injurious in the larval stage and as the rearing of adults is often a lengthy and difficult process it is desirable that the species should be identifiable in the larval stage. The keys to the species described in this paper are entirely artificial and meant only to draw attention to the salient points of difference between the species. Reference should be made to the paper by Craighead (1923) on North American Cerambycid Larvae for full diagnoses of the family and subfamily characters and the nomenclature of larval structures. The following characters which do not appear to have been used previously have been found of use in separating genera or groups of genera: *epipharyngeal setae*—the disposition of these is useful in separating species of *Didymocantha* from those of *Oemona* and *Navomorpha*; *spiracular pecten*—a comb-like structure consisting of a variable number of bars or teeth arising from the wall of the atrial chamber and extending a short distance downward from the rim of the atrial orifice is useful for the separation of *Oemona* and *Navomorpha*; *thickening of intima of hind intestine*—present in some species of Cerambycinae but absent in those representatives of the Prioninae and Lamiinae which have been examined.

The identifications were checked by the rearing of adults. The descriptions of larvae were based on specimens preserved in alcohol, the head capsules being dissected out in order to describe the shape before distortion occurred. The body and head were then treated with KOH for further examination and later stained with acid fuchsin and mounted if the examination of microscopic detail was necessary.

## KEY TO SUBFAMILIES OF THE FAMILY CERAMBYCIDAE

Adapted from Boving and Craighead, 1931: 61.

- 1 Head oblong, sides parallel or converging behind; epistoma never projecting; tentorial cross arm internal; epipleurum protuberant on several or all abdominal segments; legs usually absent  
Head transverse, wider behind the middle *Lamiinae* (2)
2. Epistoma projecting over clypeus; frons projecting over epistoma, dentate or carinate; mandible with oblique cutting edge; tentorial cross arm in the same plane as the hypostoma and forming a bridge behind it; legs present.  
Neither epistoma nor frons projecting; mandible with rounded gouge-like cutting edge; tentorial cross arm in the same plane as hypostoma and forming a bridge behind it; clypeus filling space between dorsal articulations of mandibles; epipleurum protuberant only on the last three abdominal segments; legs present or absent *Prioninae*  
*Cerambycinae*

## Subfamily PRIONINAE

## KEY TO LARVAE OF SPECIES TREATED IN THIS PAPER

- Antennae 2-jointed; eusternum not defined anteriorly from presternum; pigmented spinules absent . . . *Paroplites australis* Er.  
 Antennae 3-jointed; eusternum distinct from presternum anteriorly; pigmented spinules present on body segments *Prionoplus reticularis* White.

## GENUS PAROPLITES LAMEERE

*Paroplites australis* (Erichson) (Figs. 1-3).

**MATURE LARVA.** Form robust, cylindrical, tapering slightly posteriorly. Colour white. Length, 55-70 mm.

Head (Fig. 1) widest posteriorly. Posterior margin of epicranium not as deeply emarginate as in *Prionoplus*. Anterior foramen subtriangular. Dorsal plate of mandible (Figs. 2 and 3) with a longitudinal groove. Labrum transverse, suborbicular. Clypeus membranous, unpigmented. Epistoma produced on each side into a wide, blunt process. Front produced over epistoma in a non-dentate carina which is not continuous across the median line. Setae absent behind frontal carina. Post-condylar carina curved, no setae arising from it. Two setae anterior to the carina. Front behind carina with sparse short setae. Median impressed line distinct, frontal sutures not distinct. Antennae 2-jointed, with basal membrane. Joints subequal in length, 1st cylindrical, slightly longer than wide, 2nd tapering to apex which is obliquely truncate and bears on the top the supplementary joint. Ocelli three, indistinctly visible. Subfossal process obtuse. Genae with sparse setae. Maxillary sclerite with a number of short setae. Maxillary palpi 3-jointed, 1st transverse, 2nd subglobose, 3rd elongate slightly longer than last joint of labial palp. Mala with dense stout setae. Mentum produced at anterior angles which bear setae and with a single seta on each side posteriorly. Submentum with a single seta on each side at mid-length. Ligula with dense stout setae. Labial stipes pigmented posteriorly on each side and bearing a few setae anteriorly on each side. Gula not distinct. Hypostoma without setae.

**THORAX.** Eusternum not distinct from presternum anteriorly. Legs well developed, 4-jointed, 2nd and 3rd joints sclerotized and pigmented. Setae stronger and denser than in *Prionoplus*. No spinules anteriorly on epipleurum.

Abdominal segments with sparse moderately fine setae but without pigmented spinules. Ampullae unarmed. Pleural discs on segments 1-6 indistinct. Spiracles large, oval, with pecten occupying part of posterior margin of mesothoracic and abdominal spiracles. No sclerotized thickening of hind intestine.

Specimens of larvae and adults of this Australian beetle were sent by the Public Works Department, from imported power poles in the Manawatu and Waikato districts. It is likely that these poles were infested prior to their arrival in New Zealand as the larval period of the Prioninae may be as much as four years. The species is recorded from *Banksia*, elm, and willow in Australia, and it is probable that this beetle could easily become established in New Zealand.

## GENUS PRIONOPLUS White

*Prionoplus reticularis* White (Figs. 4-7)

**EGG.** Fusiform, 3.0 mm long and 1.2 mm wide, colour white, chorion not sculptured.

**FIRST STAGE LARVA.** Resembles the mature larva in form but differs in that the triangular processes of the epistoma, the frontal carina and the post condylar carina are absent.

**MATURE LARVA.** Form robust, cylindrical, slightly tapering posteriorly. Colour creamy-white. Length, 50-70 mm.

Head (Fig. 4) widest behind mid-length, posterior margin of epicranium deeply emarginate. Anterior foramen subtriangular. Mandible (Figs. 5 and 6) triangular, black and shining, basal half rugose and bearing a number of setae on the outer face, ventral apex produced acute, dorsal plate finely striate. Labrum subcordate, castaneous, slightly longer than wide, anterior margin densely setose and with several setae on each side of the disc. Clypeus membranous and unpigmented. Epistoma produced on each side into a small triangular lobe projecting over the posterior angle of the clypeus. Front produced over the epistoma in an obscurely dentate carina which is not continuous across the median line. Post-condylar carina with three or four setae arising from it near the inner end and with two setae anterior to the curve at the lateral extremity behind and between the antenna and the dorsal condyle of the mandible. Front behind carina with short sparse setae. Median impressed line and frontal sutures distinct. Antennae 3-jointed with a basal membrane, 1st joint transverse, 2nd joint subglobose bearing supplementary joint on apex, third joint minute subcylindrical less than half as long as 2nd and much narrower. Ocelli absent, no corneal lens but three pigmented spots may be indistinctly



TEXT-FIG. 1.—*Paroplites australis*. Fig. 1—Larva, head. Fig. 2—Larva, mandible, external face. Fig. 3—Larva, mandible, buccal face. *Prionoplus reticularis*. Fig. 4—Larva, head. Fig. 5—mandible, buccal face. Fig. 6—Larva, mandible, external face. Fig. 7—Larva, prosternum.

visible beneath the gena. Sub-fossal process obtuse. Genae with sparse moderately stout setae and a number of shorter setae. A number of setae along anterior margin of epicranium behind frontal suture. Maxillary sclerite with a number of short setae. Maxillary palpi 3-jointed conical, 1st joint slightly transverse, 2nd slightly quadrate, 3rd subconical shorter than 2nd and subequal to last joint of labial palp. Mala with dense stout setae. Mentum bearing a number of setae. Submentum not sharply defined from mentum, somewhat pigmented anteriorly. Ligula twice as wide as long with moderately dense stout setae, pigmented posteriorly on each side. Labial stipes bearing about six setae on each side. Gula not distinct. Hypostoma without setae.

**THORAX.** The thoracic segments bear sparse short setae, the meso- and meta-thorax and the eusternum, sternellum, coxal lobes and hypopleura of the prothorax bear short pigmented spinules. The presternum (Fig. 7) of the prothorax bears no pigmented spinules except in the posterior angles and is distinctly separated from the eusternum. The epipleurum bears a few spinules in the posterior ventral angle. The legs are well developed and 5-jointed. The coxal lobe is bounded anteriorly by the eusternum and the epipleurum and posteriorly by the sternellum; trochanter annular, mesally with 2 long and one short setae; femur subglobose with about 12 setae on apical half; tibia subcylindrical with about 10 setae on distal half; tarsus subconical. Femur and tibia unpigmented. The mesothoracic spiracle is large and oval with the pecten consisting of about 40 teeth occupying the dorsal half of the posterior margin.

The abdominal segments, including the ampullae, bear sparse short setae and short pigmented spinules. The pleural discs are present on segments 1-6 but are most prominent on the first three segments. Spiracles large, oval, with the pecten occupying the whole posterior margin. Sclerotized and pigmented thickening of the intima of the hind intestine absent.

**PUPA.** Form as in adult. Length, 35-40 mm. Head with sparse short setae. Pronotum with short setae and a blunt tubercle at midlength on lateral margin. Mesonotum with sparse pigmented setigerous spinules and a posterior median tubercle. Metanotum with sparse pigmented setigerous spinules and a small rounded tubercle on each side close to the anterior margin. Triangular processes are present on the trochanters, small on the anterior, larger on the middle and largest on the hind trochanters.

Abdominal segments 1-8 dorsally beset with short pigmented setigerous spinules and short hairs, smaller and sparser on the 8th than on preceding segments. The dorsal tubercles are indistinct on the 1st segment, more strongly developed on 2nd and 3rd, prominent and bituberculate on segments 4-6, and poorly developed on the 7th. Posteriorly the abdomen ends in two conical horns which are slightly pigmented at the apices.

The larvae of this beetle infest the dead trunks and stumps of native podocarps and exotic conifers such as *Pinus radiata*. It is occasionally recorded as damaging structural timber, but this seems to occur only when the timber is in a damp situation. The female has been observed (by J. G. Myers) to lay as many as 570 eggs. These are deposited in large numbers in cracks and crevices. The larval period is not definitely known but is probably in excess of two years. This species is the only native representative of the subfamily Prioninae.

#### Subfamily CERAMBYCINAE

##### KEY TO LARVAE OF SPECIES TREATED IN THIS PAPER

- |   |      |  |
|---|------|--|
| 1. Ocelli present   | .... | (2)  |
| Ocelli absent   | .... | (3)  |
| 2. One ocellus  | .... | (4)  |
| Three ocelli  | .... | (6)  |
| 3. Legs vestigial   | .... |  |
| Legs well developed, 4-jointed  | .... | <i>Eburilla sericea</i> White<br><i>Ambeodontus tristis</i> Fab. |
| 4. Maxillary palp 3-jointed, no sclerotized thickening of intima of hind-intestine  | .... | (5)  |
| Maxillary palp 2-jointed, sclerotized thickening of intima of hind-intestine present  | .... | <i>Zorion minutum</i> Fab.                                       |
| 5. Anterior margin of glabrous plates on eusternum slightly rugose and pigmented, no tubercle on gena                                   | .... | <i>Liogramma zealandica</i> Blanch.                              |
| Eusternum without rugosity or pigmentation, prominent tubercle on gena  | .... | <i>Coptocercus rubripes</i> Boisd                                |
| 6. No process on dorsum of anal segment   | .... | (7)  |
| Horn-like process present on anal segment   | .... | <i>Gastrosarus nigricollis</i> Bates                             |
| 7. Genal setae sparse and fine, no sclerotized thickening of intima of hind-intestine   | .... | (8)  |
| Genal setae dense and stout, sclerotized thickening of intima of hind-intestine present   | .... | <i>Stenopotes pallidus</i> Pascoe                                |
| 8. Metanotum with X-shaped lines  | .... | (10)   |
| Metanotum with transverse line  | .... | (9)  |
| 9. Genae shouldered, sparse short setae on mentum   | .... | <i>Didymocantha sublineata</i> White                             |
| Genae not shouldered, dense long setae on mentum  | .... | <i>Didymocantha picta</i> Bates                                  |
| 10. Ampullae without pigmented spinules   | .... | (11)   |
| Ampullae with pigmented spinules  | .... | <i>Ochrocydus huttoni</i> Pascoe                                 |
| 11. Posterior foramen widest anteriorly or sides parallel, prothoracic spiracle with pecten on posterior margin                         | .... | (12)   |
| Posterior foramen widest behind mid-length, spiracle with pecten on dorsal margin   | .... | <i>Oemona hirta</i> Fab.   |
| 12. Head transverse, slightly wider anteriorly; tubercle present on gena; sides of foramen sub-parallel; pronotum twice as wide as long | .... | <i>Navomorpha sulcatum</i> Fab.                                  |
| Head sub-circular; no tubercle on gena; sides of foramen converging behind mid-length; pronotum not twice as wide as long               | .... | <i>Navomorpha lineatum</i> Fab.                                  |

## Genus AMBEODONTUS Lacordaire

*Ambeodontus tristis* (Fabricius) (Figs. 8–12).

EGG. Ovoid, 1.8 mm long, yellowish, with smooth shell.

MATURE LARVA. Form cylindrical, tapering posteriorly. Length, 25 mm. Colour, white. Body setae slender, light coloured.

Head (Fig. 8) subcircular, widest at mid-length, slightly emarginate on the posterior dorsal margin. Occipital foramen widest behind mid-length. Mandible (Fig. 9) short, robust, basal portion transversely striate, narrowed toward apex, cutting edge gouge-like. Labrum oval, transverse, nearly twice as wide as long, anterior margin setose, setae on each side extending back to two-thirds, median area non-setose. Maxillary palpi (Fig. 10) 3-jointed, longer than femur plus tibia, 3rd joint longer than 2nd, process well developed on palpifer and 1st joint. Mala with setae on apex short, sparse and slender. Labial palpifer with three setae. Mentum with three setae on each side, submentum with one seta on each side. Maxillary sclerite with three or four setae. Epistoma not emarginate in middle. Anterior half of front with moderately dense short hairs. Frontal sutures indistinct. Lens of ocellus absent but dark pigment may show under the head capsule. Genal setae moderately dense, light coloured and slender. Hypostoma without setae.

THORAX. Pronotum (Fig. 11) not twice as wide as long, anterior two-thirds with moderately dense setae, posterior third striate with a few sparse setae posteriorly, notal spots pale yellow. Post-notal fold present. Mesonotum without X-shaped lines. Presternum and epipleurum fused, presternum setose, eusternum smoother with short setae and not distinct from presternum anteriorly. Legs 4-jointed, well developed. Peritreme of spiracle without pecten.

Abdomen with pleural tubercles present but pleural discs not evident. Ampules not prominent, alutaceous. Three anal lobes. Spiracles oval. Hind intestine with a sclerotized thickening (Fig. 12) of the intima.

PUPA. Form as in adult Head with two setae on each side between the antennal bases, three across the front, one on each side near base of labrum and three small setae on each side near apex of labrum. One seta on mandible, none on gena. Pronotum with four setae in a row across the anterior margin, none on the lateral margin. A group of setae on each side of the median line about mid-length, scattered setae posterior to these. Mesonotum with a group of about 20 setae posteriorly on each side of the median line. Abdomen with segments 1–6 with a single posterior row of pigmented setigerous spines, 7th with 6 or 7 recurved setigerous pigmented spines posteriorly on each side, 8th with 4 or 5 pigmented spines on each side at mid-length and about 4 pigmented setigerous spines on each side of the posterior margin. Femora with one or two pigmented spines near distal end. Elytra with sparse setae on apical half.

The adults are found from February to June. The eggs are laid in cracks or crevices of the wood or may be affixed to the surface, the larvae boring through the shell into the wood. This species is very destructive to structural timber in dwellings. In the native forest it breeds in dead podocarp timber, while in settled areas it is commonly found in the dead wood of *Cupressus macrocarpa*. The record of the European longhorn *Hylotrupes bajulus* L. from New Zealand is based on a misidentification of *Gracilia minuta* F. (Blair, 1937: 266). This species does damage similar to that of *Ambeodontus*, but the larvae may be separated by the presence in *H. bajulus* of three distinct ocelli on each side of the head.

## Genus COPTOCERCUS Hope

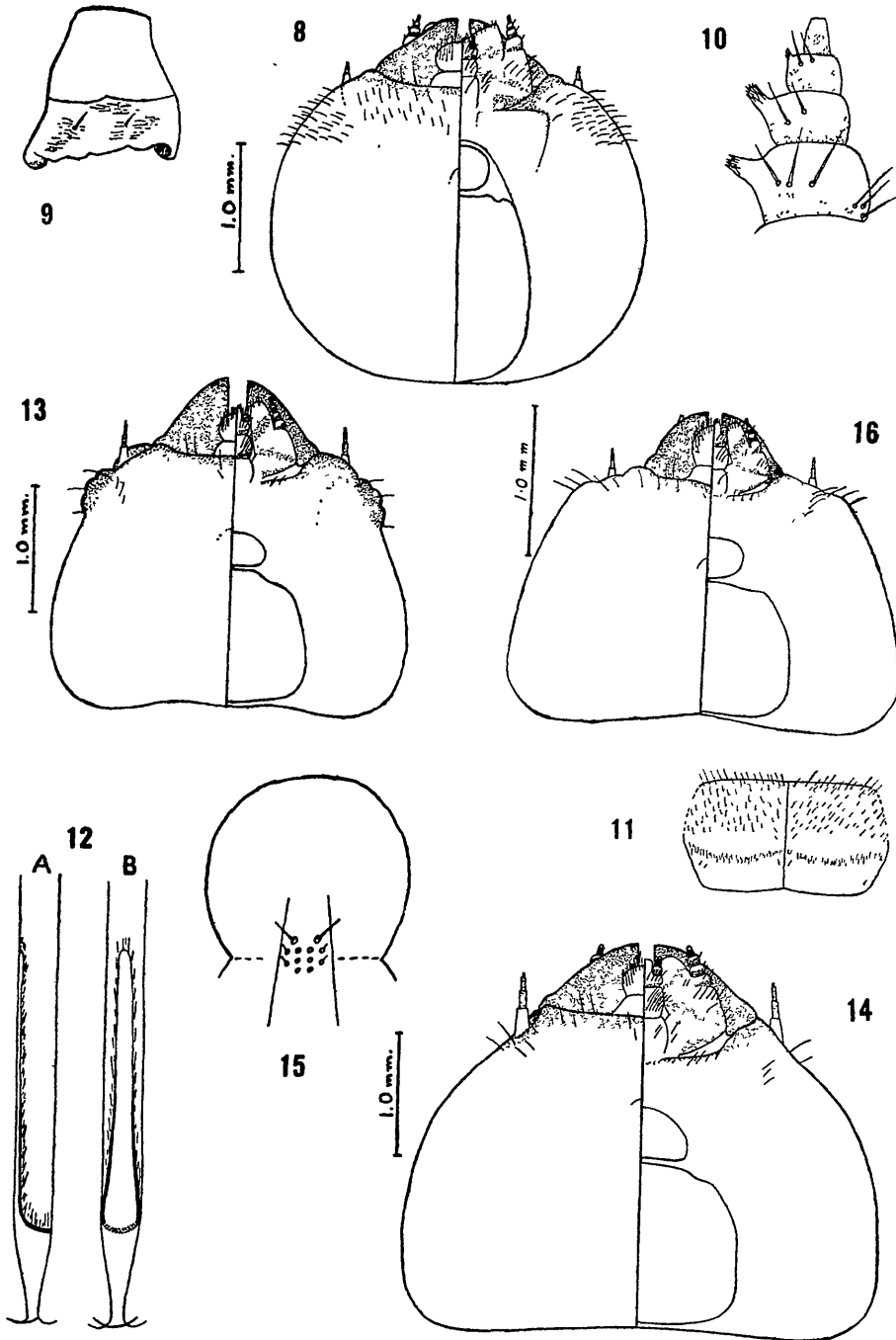
*Coptocercus rubripes* (Boisduval) (Fig. 13).

LARVA. Form stout, tapering posteriorly. Length, 15 mm. Colour, white, integument shining. Body covered with fine, long, light-coloured setae.

Head (Fig. 13) transverse, widest posteriorly, posterior margin slightly concave. Occipital foramen widest posteriorly. Mandible short, stout, apex rounded, slightly constricted before apex. Labrum transverse. Maxillary palp and femur plus tibia sub-equal in length. Maxillary palp with process on palpifer and smaller one on 1st joint, 2nd and 3rd joints sub-equal. Last joints of labial and maxillary palps sub-equal. Epistoma not emarginate. One ocellus close to base of antenna. Genae strongly shouldered, produced into an abrupt pigmented tubercle caudad of ocellus. Hypostoma with one or two setae on each side.

THORAX. Pronotum nearly twice as wide as long, setose on anterior half, striate on posterior half, notal spots very faint. Presternum and epipleurum fused. Eusternum and presternum fused. Two glabrous para-median areas on eusternum not pigmented or rugose anteriorly. Legs 4-jointed, well developed.

Abdomen with pleural discs not evident. Spiracles oval. Three anal lobes. Hind-intestine with no thickening of intima.



TEXT-FIG. 2.—*Ambeodontus tristis*. Fig. 8—Larva, head. Fig. 9—Larva, mandible, external face. Fig. 10—Larva, maxilla, lateral view showing processes of palpifer and basal joint of palp. Fig. 11—Larva, pronotum. Fig. 12—Larva, hind-intestine, showing sclerotized thickening of intima in lateral (A) and dorsal (B) views. *Coptocercus rubripes*. Fig. 13—Larva, head. *Didymocantha picta*. Fig. 14—Larva, head. Fig. 15—Larva, epipharynx. *Didymocantha sublineata*. Fig. 16—Larva, head.

This Australian insect was found to be infesting *Eucalyptus obliqua* at Nelson in 1931. The larvae bore between the bark and the wood and the pupal chambers are constructed in the solid wood. Adults were taken from September to November. The species would appear to infest trees which are already dying from some other cause.

#### Genus DIDYMOGANTHA Newman

##### *Didymocantha picta* Bates (Figs. 14 and 15).

**MATURE LARVA.** Form cylindrical, tapering posteriorly. Colour white. Body setae fine, light castaneous. Length, 15 mm.

**Head** (Fig. 14) transverse, widest posteriorly, slightly concave on posterior margin. Occipital foramen widest posteriorly. Mandible normal gouge-like type. Labrum transverse, ovoid, rounded anteriorly, setose on anterior margin and laterally on the anterior half. Epipharynx (Fig. 15) with two para-median setae anteriorly, two pairs of smaller setae caudad and three pairs of para-median sensillae mesad of the smaller setae. Maxillary palp longer than femur plus tibia, processes well developed on palpifer and first joint, 3rd joint slightly longer than 2nd and slightly shorter than 2nd joint of labial palp. Mentum with fairly dense and long setae. Submentum with one or two setae on each side. Maxillary sclerite with one or two setae. Epistoma almost straight. Frontal suture not evident. Antennae with basal membrane salient, 1st joint slightly longer than 2nd and 3rd joint half as long as 2nd. Three ocelli. Genae not distinctly shouldered as in *sublineata*. Genal setae sparse and fine. Hypostoma with 4-6 setae on each side.

**THORAX.** Pronotal plate nearly twice as long as wide, setose on anterior half, striate posteriorly, notal spots distinct yellowish castaneous. Median impressed line present. Post-notal fold present. Transverse line on metanotum. Presternum with moderately dense setae, fused with epipleurum anteriorly, separated by notch posteriorly. Eusternum with two glabrous, somewhat striate, para-median areas fused posteriorly. Legs four-jointed, well-developed. Mesothoracic spiracle with pecten dorsal.

**ABDOMEN.** Pleural tubercles and discs not evident. Ampullae finely granulate, not strongly projecting. Spiracles oval. Anus three-lobed. No thickening of intima of hind-intestine.

Distinguishable from *D. sublineata* by the more numerous and longer setae on the mentum, the genae not being conspicuously shouldered, the ampullae being granulate and the head being larger and not so transverse.

Adults, prepupae and mature larvae were collected from a dead log of *Nothofagus solandri* in the Ronga Valley in September. The larvae were feeding in the cambial region, chiefly on the bark but the pupal cells were about half an inch deep in the wood. Prepupae and adults were present in the cells.

##### *Didymocantha sublineata* (White) (Fig. 16).

**MATURE LARVA.** Form slightly flattened, tapering posteriorly. Colour white. Body setae fine, light coloured. Length, 17 mm.

**Head** (Fig. 16) transverse, widest posteriorly, slightly emarginate on posterior margin of dorsum. Occipital foramen widest posteriorly. Mandible tapering, not constricted before the rounded apex. Labrum transverse, rounded anteriorly. Maxillary palp longer than femur plus tibia. Processes well developed on palpifer and first joint of palp, third joint slightly longer than 2nd and slightly shorter than 2nd joint of labial palp. Epistoma slightly emarginate at middle. Antennae salient, 1st and 2nd joints equal, 3rd half as long as 2nd. Three ocelli. Genae shouldered. Genal setae sparse and fine. Hypostoma with 3 or 4 hairs on each side.

**THORAX.** Pronotum twice as wide as long. Median impressed line distinct, anterior two-thirds with sparse setae, posterior third finely striate, pronotal spots yellowish. Post-notal fold present. Transverse line on metanotum. Presternum with moderately dense setae, fused with epipleurum anteriorly but separated by a short notch posteriorly. Eusternum with two smoother glabrous spots posteriorly. Legs 4-jointed, well developed, Mesothoracic spiracle with pecten dorsal.

Abdomen with pleural tubercles present but discs not evident. Ampullae alutaceous, not strongly projecting. Spiracles oval. Three anal lobes. No chitinised thickening of intima of hind-intestine.

The larvae bore broad shallow mines on the surface of the sapwood of *Leptospermum* but enter the wood to pupate. The pupal chamber shows a characteristic radial sculpturing. Adults were present in the pupal chambers in May, but probably would not emerge till spring.

Genus *EBURILLA* Aurivillius*Eburilla sericea* (White) (Figs. 17-19).

**MATURE LARVA.** Form elongate, slender, body tapering posteriorly. Colour white. Integument thin, beset with minute spinules. Body setae slender and light coloured. Length, 11 mm.

**Head** (Fig. 17) transverse, sides diverging posteriorly to mid-length, thence sub-parallel, widest posteriorly. Mandible short, stout, trapezoidal. Labrum sub-circular, unpigmented, with sparse setae. Maxillary palpi 3-jointed, palpifer and 1st joint with minute processes, third joint as long as second joint of labial palp. Epistoma not emarginate in the middle. Frontal sutures not evident, median line present. Ocelli absent. Genae not shouldered, with dense moderately stout setae. Hypostoma without setae.

**THORAX.** Pronotum not twice as wide as long. Notal spots and alar plates pale yellow. Anterior half of pronotum setose, posterior half glabrous except for a few setae along the posterior margin. Post-notal fold absent. Metanotum without X-shaped lines. Presternum setose, fused with epipleurum. Eusternum (Fig. 18) with a transverse smooth glabrous plate posteriorly. In the median line at the anterior margin of this plate is a slightly rugose pigmented area. Legs vestigial, reduced to small tubercles bearing four small setae.

**ABDOMEN.** Pleural discs not evident. Ampullae not prominent, finely granulate. The ventral ampulla on the 7th abdominal segment has a well defined fold at the anterior margin. Spiracles sub-circular. Sclerotized thickening of intima of hind-intestine present (Fig. 19).

Larvae were taken from the dead branches of *Thuja plicata* at Rotorua in early March, and adults emerged a month later. The larvae burrow between bark and wood, but enter the wood to pupate. The ichneumonid parasite *Mesostenus albopictus* Smith was taken from the larval burrows.

Genus *GASTROSARUS* Bates*Gastrosarus nigricollis* Bates (Figs. 20 and 21).

**Egg.** Length, 1.7 mm; width, 0.6 mm; yellow, elongate ovoid, chorion not sculptured.

**MATURE LARVAE.** Form cylindrical slender, up to 27 mm in length. Colour distinctly yellow. Body setae castaneous.

**HEAD** (Fig. 20) sub-circular, widest at mid-length. Occipital foramen widest before mid-length. Mandible of normal cerambycine type with faint longitudinal groove on outer face. Labrum sub-orbicular. Maxillary palp and femur plus tibia sub-equal. Process present on palpifer but small on first joint of palp. Last joints of labial and maxillary palps sub-equal in length. Submentum longitudinally striate. Epistoma emarginate in median line. Genal setae sparse and fine. Three ocelli. Hypostoma with three or four setae on each side.

**THORAX.** Pronotum slightly wider than long. Notal spots distinct, castaneous. Anterior half of pronotum setose, posterior half striate. Metanotum with simple transverse line. Presternum yellow, sparsely setose, not fused with epipleurum. Eusternum white, sparsely setose anteriorly and distinct from presternum except anteriorly. A protuberant spinulose area posteriorly on each side between presternum and epipleurum. Legs 4-jointed, well developed.

**ABDOMEN.** Pleural discs not evident. Ampullae projecting, finely granulate. Ventral ampulla on 7th segment with a transverse fold, others with 2 para-median longitudinal grooves. Ampullae projecting, finely granulate. Penultimate segment with a fringe of setae on posterior margin of dorsum. A fleshy, backwardly-directed horn (Fig. 21) on the dorsum of the anal segment. Intestine with a simple ring around it near anus.

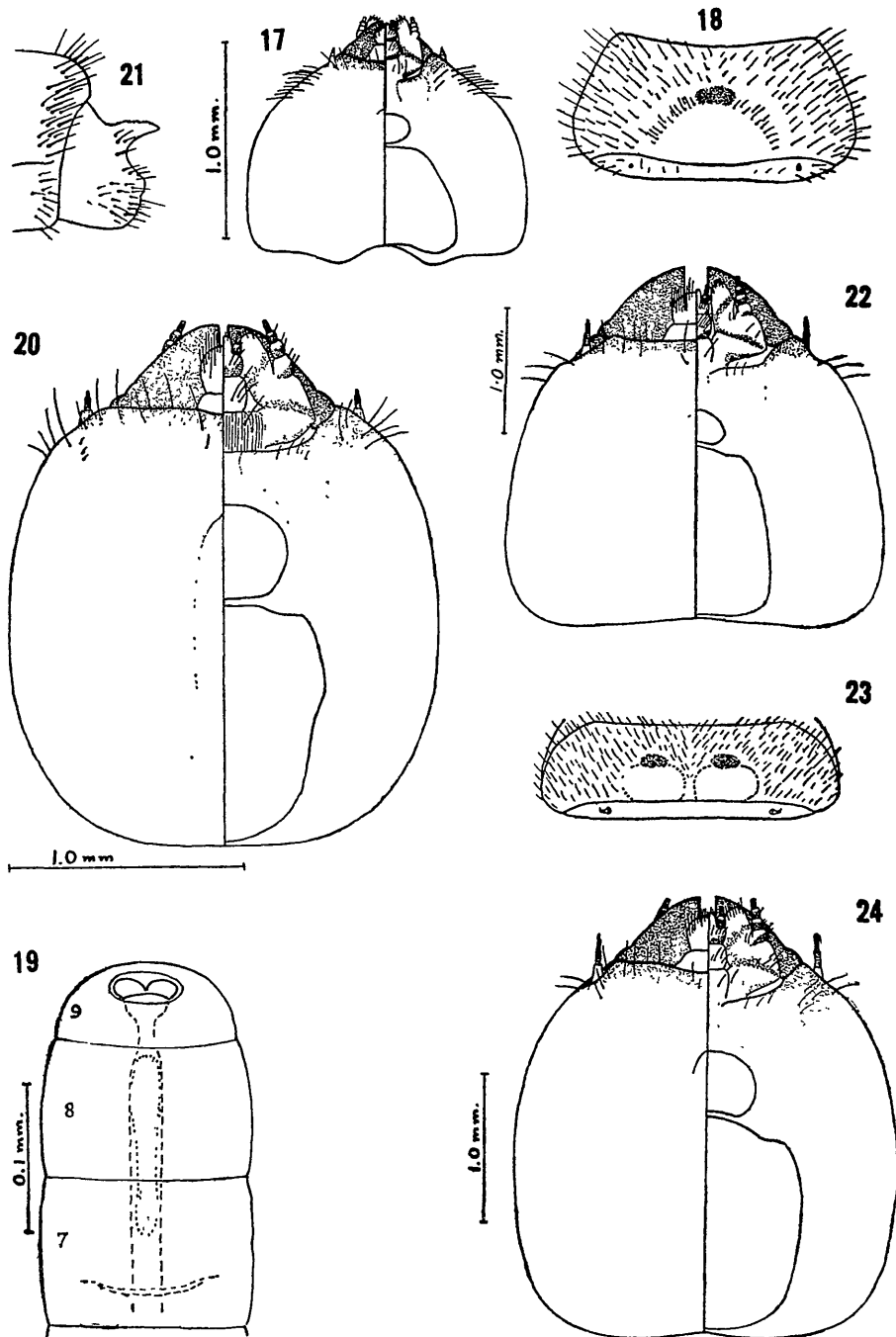
**PUPA.** Form as in adult. Colour yellow. Head front and clypeus with a few small setae. Pronotum with a band of small setae across disc anterior to mid-length and about six setae in posterior angle on each side. Mesonotum with 4 or 5 setae on each side. Metanotum with about six setae on each side of posterior half. First abdominal segment with a transverse band of setae and poorly developed spines. Segments 2-6 with sparse small spines; 7th with spines most strongly developed, a group of three or four on each side anteriorly, 5 or 6 in a median group posteriorly and two lateral on each side. Femora, tibiae and elytra without setae. No process on trochanter.

Larvae were taken from Hawthorn, in Nelson, adults emerging in mid-September. Eggs deposited in the laboratory were affixed to the surface of the bark. The larvae bore down the centre of the small branches but later construct a circular burrow which so weakens the branch that it may break. The species is also recorded from *Nothofagus* and *Leptospermum*.

Genus *LIOGRAMMA* Bates*Liogramma zealandica* (Blanchard) (Figs. 22 and 23).

**MATURE LARVA.** Form cylindrical, body tapering posteriorly, length 15 mm. Colour white. Body setae light coloured, fine.





TEXT-FIG. 3.—*Eburilla sericea*. Fig. 17—Larva, head. Fig. 18—Larva, prosternum. Fig. 19—Larva, posterior part of abdomen in dorsal view to show sclerotized thickening of intima of hind-intestine and fold in sternite seven. *Gastrosarus nigricollis*. Fig. 20—Larva, head. Fig. 21—Larva, process on last abdominal segment, lateral view. *Liogramma zealandica*. Fig. 22—Larva, head. Fig. 23—Larva, prosternum. *Navomorpha lineatum*. Fig. 24—Larva, head.

Head (Fig. 22) transverse, widest posteriorly, slightly emarginate on posterior dorsum. Occipital foramen widest behind mid-length. Mandible short, stout, not constricted before rounded apex. Labrum sub-circular, wider than long, densely setose anteriorly. Maxillary palpi with process on palpifer and smaller one on 1st joint. Last joints of maxillary and labial palps sub-equal. Maxillary palp longer than femur plus tibia. No setae on maxillary sclerite, many on labial palpifer and mentum. Epistoma not emarginate. One ocellus. Genae distinctly shouldered, genal setae sparse and slender. Hypostoma with two or three setae.

THORAX. Pronotum nearly twice as wide as long. Anterior half setose, posterior half striate, notal spots light castaneous. Mesonotum with transverse line. Presternum setose, fused with epipleurum anteriorly. Eusternum (Fig. 23) with two smooth glabrous plates each with a rugose pigmented spot anteriorly. Legs well-developed, 4-jointed.

ABDOMEN. Pleural discs not evident. Ampullae alutaceous, moderately protuberant. Spiracles oval. Three anal lobes. Hind-intestine without sclerotized thickening of intima.

PUPA. Pronotum beset with pigmented spines and setae, most dense along the anterior margin, sparser along the lateral margins; a transverse line of spines anterior to mid-length, posterior half of disc glabrous. Meso- and meta-thorax glabrous except for sparse short setae. First abdominal segment with single spine at mid-length on the lateral margin. Segments 2-6 beset with backwardly directed spines and setae forming an almost continuous line along the posterior margin, sparsely setose anteriorly enclosing a transverse oval glabrous area in the middle of the segment. Pleural margins with three or four long setae. Seventh segment with a transverse row of three or four spines anteriorly, two larger hooked lateral spines inwardly directed behind mid-length, four or five large forwardly directed spines in a transverse line posteriorly, Eighth segment with two large hooked spines posteriorly, directed forward and inward.

Larvae, pupae and adults were taken from dead branches of *Quercus* at Hastings in January. The species has also been taken from Rimu flooring at Nelson.

#### Genus NAVOMORPHA Blanchard

*Navomorpha lineatum* (Fabricius) (Figs. 24 and 25).

Egg. Length, 2.2 mm; width, 0.9 mm; elongate-ovoid, white. Chorion with close set papillae or aciculae.

MATURE LARVA. Cylindrical, elongate, length up to 38 mm. Colour white. Body setae fairly stout and castaneous.

Head (Fig. 24) sub-quadrate, slightly emarginate on posterior margin of dorsum. Anterior foramen twice as wide as long. Posterior foramen widest at mid-length or anteriorly. Mandible normal. Clypeus trapezoidal, unpigmented. Labrum transverse, oval. Epipharynx similar to *Oemona hirta*. Maxillary palp and femur plus tibia sub-equal in length. Second and third joints sub-equal. Maxillary sclerite with one or two setae. Palpifer and first joint of palp with processes. Epistoma with two setae. Front with setae as in *Oemona*. Epistoma shallowly emarginate in front. Antennae prominent, 1st and 2nd joints subequal, 3rd about half as long. Three ocelli. Genae shouldered, genal setae sparse and fine. Hypostoma with two or three setae on each side.

THORAX. Pronotum about one and a-half times as wide as long. Notal spot and median line present, anterior half setose, posterior third striate, post-notal fold present. Metanotum with X-shaped line. Presternum fused with epipleurum, setose. Eusternum not defined anteriorly where it bears a few setae, posteriorly divided into two smoother plates. Legs 4-jointed, well developed. Prothoracic spiracle (Fig. 25) with pecten on posterior margin.

ABDOMEN with epipleurum protuberant on the last three segments. Pleural tubercles present, discs not evident. Ampullae coarsely tuberculate, moderately projecting. Spiracles oval. Hind intestine without sclerotized thickening of intima.

PUPA. Mandible with four or five setae at mid-length on outer margin. Clypeus with one or two on each side near base of mandible. A group of setae on each side of front in a half circle round the base of the antenna and two smaller para-median groups between these. Gena with 3 or 4 setae. Outwardly directed conical process on distal end of basal joint of antenna. Short pigmented asperities on dorsa of abdominal segments. About six well-developed, recurved, pigmented spines on posterior margin of 7th dorsum. Apex of hypopygium with small pigmented spines.

Larvae were taken from living branches of Douglas Fir (*Pseudotsuga taxifolia*) at Rotorua in January, and adults emerged in November. Adults have been taken in the field in the same locality in December and January. In the laboratory the eggs were deposited in crevices in the wood. It is not thought that the insect can attack healthy trees, and there is evidence that conditions suitable for oviposition are furnished by the oviposition scars of the cicada *Melampsalta cingulata* (Fabr.) which

expose the wood. *Cryptomeria japonica* attacked by this species at Whangamomona had also been damaged by the cicada. The larvae bore down the centre of living branches up to one inch in diameter and before pupating often construct a circular tunnel round the branch and so weaken it that it is easily broken by wind. Pupation occurs in a tunnel which is blocked fore and aft by shredded wood.

**Navomorpha sulcatum** (Fabricius) (Fig. 26).

EGG. Length, 1.5 mm, ovoid, micropylar end more rounded, white, chorion papillose.

MATURE LARVA. Length, up to 19 mm. Smaller than *N. lineatum* or *Oemona hirta*. Body cylindrical but tapering posteriorly from thorax. Body setae moderately stout and castaneous. Colour, white.

Head (Fig. 26) transverse. Anterior foramen twice as wide as long. Posterior foramen with sides straight and sub-parallel, widest about mid-length. Mandible of normal cerambycine type. Maxillary palp slightly longer than femur plus tibia. Palpifer with process and smaller process on 1st joint of palp. One or two setae on maxillary sclerite. Epistoma with two setae. Margin of epistoma slightly emarginate. Frontal setae normal. Three ocelli. Genae shouldered, with distinct blunt tubercle caudad of antenna and dorsad of ocelli. Genal setae sparse and fine. Hypostoma with two or three setae.

THORAX. Pronotum twice as wide as long. Metanotum with X-shaped lines. Presternum and epipleurum fused. Presternum and apex of eusternum setose. Base of eusternum with two indistinct smoother and shining plates. Legs 4-jointed, well developed. Prothoracic spiracle with comb on posterior margin.

ABDOMEN. Pleural tubercles present. Pleural discs not evident. Ampullae coarsely tuberculate, not projecting. Spiracles oval. No sclerotized thickening of hind-intestine.

PUPA. Form as in adult, but with conical process directed laterad from distal end of first joint of antenna. Head with long setae; six on each side of vertex behind antenna, about 7 on each side of front between antenna, four on gena, two on each side of clypeus and two or three on mandible. Pronotum with long setae across anterior margin, across disc before mid-length and in posterior angles. Mesonotum with two setae on each side. Metanotum with one or two small setae. First segment of abdomen almost unarmed except for two or three faint spines. Spines increasing in number and size on segments 2-6. Seventh with about six recurved spines on each side. Eighth with two recurved points at mid-length and one at each posterior angle. Femora, tibiae, and elytra without spines, trochanters without processes. Similar to pupa of *N. lineatum*, which has more spines on segment 7 and lacks the prominent spines on segment 8.

Larvae were taken from dead branches of *Pinus radiata* at Nelson. Pupae were present in May and adults emerged in July. Eggs were laid during August. The larvae tunnel between the bark and the wood and also through the wood.

Genus OCHROCYDUS Pascoe

**Ochrocydus huttoni** Pascoe (Fig. 27).

EGG. (Ovarian) fusiform, length 5 mm.

MATURE LARVA. Form stout, cylindrical, length up to 60 mm. Colour creamy yellow. Body covered with short castaneous setae and sparse longer and stouter hairs.

Head (Fig. 27) sub-quadrate, sides sub-parallel, slightly wider behind mid-length. Occipital foramen with sides sub-parallel, widest anteriorly. Mandible normal. Labrum slightly wider than long. Maxillary palp longer than femur plus tibia, processes on palpifer and basal joint of palp, last joint about half as long as 2nd and slightly shorter than last joint of labial palp. Labial palp with joints subequal. Epistoma slightly emarginate. Antennae partially retractile, first and second joints subequal, 3rd half length of 2nd. Three ocelli. Genal setae sparse and stout. Hypostoma with two or three setae on each side.

THORAX. Pronotum transverse but not twice as wide as long, beset with dense stout setae across anterior margin and sparser setae behind the notal spots, which are prominent and castaneous. Notal plate white posteriorly. Two or three setae in posterior angles of pronotum. Post-notal fold present. Metanotum with X-shaped suture. Presternum fused with epipleurum and with eusternum. Legs well developed, 4-jointed.

ABDOMEN with neither pleural tubercles nor discs evident. Ampullae broad, sub-tuberculate, contrasting with the integument owing to the minute and dense pigmented spinules with which they are beset. Spiracles large, oval. Three anal lobes. Hind-intestine without sclerotized thickening of intima.

PUPA. Form as in adult. Head with a few poorly developed setae, six small setae on front, two on clypeus, one on mandible and none on gena. Pronotum with a median group of setae anteriorly and scattered setae on disc. Mesonotum with sparse small setae. Metanotum with

sparse small setae posteriorly. First abdominal segment with a posterior row of setigerous spines and three or four on each side of median line anteriorly. Segments 2-6 with a more or less complete oval ring of setigerous spines formed by the joining of the anterior and posterior rows, and a group of three or four setae on each side at mid-length. Seventh with a number of setigerous spines forming a rough ring. Eighth with five or six setigerous spines. Femora, tibiae, and elytra without setae. Trochanters without processes.

Larvae and pupae were taken from *Nothofagus solandri* at Wakefield in September. This species causes extensive damage to the timber of living beech trees by boring between the bark and the wood and constructing tunnels over half an inch in diameter in the wood. When ready to pupate the larva constructs a vertical pupal chamber which is about 5 inches in length and opens by a horizontal passage to the outside. The pupal chamber is blocked at both ends by very coarse shreds of wood. Infested trees show the exit holes and often an accumulation of sawdust-like frass at the base of the tree. Isolated trees, such as those left after bush felling, are commonly attacked.

#### Genus OEMONA Newman

*Oemona hirta* (Fabricius) (Figs. 28-30).

**MATURE LARVA.** Form stout, cylindrical, length 25-30 mm. Colour creamy white. Body setae castaneous, fairly short and stout.

**Head** (Fig. 28) sub-quadrate, sides sub-parallel, very slightly emarginate on posterior margin of dorsum. Occipital foramen widest posteriorly. Mandible normal cerambycine type. Labrum transverse sub-orbicular. Epipharynx (Fig. 29) with one pair of larger para-median anterior setae, four smaller setae caudad of these in a transverse row and six sensillae also in a more or less transverse row. Maxillary palp and femur plus tibia sub-equal in length. Processes present on palpifer and first joint of palp. Second joint of labial palp slightly longer than third joint of maxillary palp. Base of mentum pigmented. Mentum with three large and one small seta on each side. Submentum with one seta on each side. One seta on maxillary sclerite. Epistoma emarginate in middle. Antennae partially retractile, joints one and two sub-equal, 3rd slightly more than half as long as second. Three ocelli. Genal setae sparse and moderately stout. Hypostoma with two setae on each side.

**THORAX.** Pronotum transverse, one and a-half times as wide as long, notal spot distinct castaneous. Pronotum with short stout setae across anterior margin, middle third sparsely setose and posterior third striate. Post-notal fold present. Metanotum with X-shaped lines. Presternum with castaneous setae, fused with episternum. Posterior notch absent. Eusternum with sparse setae anteriorly, glabrous and slightly rugose posteriorly but not divided into two plates. Legs 4-jointed, well developed. Prothoracic spiracle (Fig. 30) with pecten dorsal.

**ABDOMEN.** Pleural tubercles present but discs not evident. Ampullae broad, moderately projecting, wrinkled, sub-tuberculate. Spiracles oval. Anus three lobed. No sclerotized thickening of intima of hind intestine.

**PUPA.** Form as in adult except that the mesothorax has a small tubercle at mid-length on the lateral margin. Head nearly glabrous with a few minute setae. Pronotum with a number of setae across middle of anterior margin and a transverse band across disc. Meso- and metathorax practically glabrous, one or two minute setae on each. First abdominal segment with a few setigerous pigmented spines. Segments 2-6 with strong pigmented spines forming an oval enclosure. Seventh segment with strongly developed spines, a row of 9 or 10 across posterior margin, a band of smaller ones anteriorly and 4 or 5 enclosed by the ring about mid-length. Eighth segment with about six spines. Femora, tibiae, and elytra without spines. Trochanter without process.

Larvae, pupae and adults taken in stems of living Gorse (*Ulex*) at Foxton in September. Commonly found in *Citrus*.

#### Genus STENOPOTES Pascoe

*Stenopotes pallidus* Pascoe (Fig. 31).

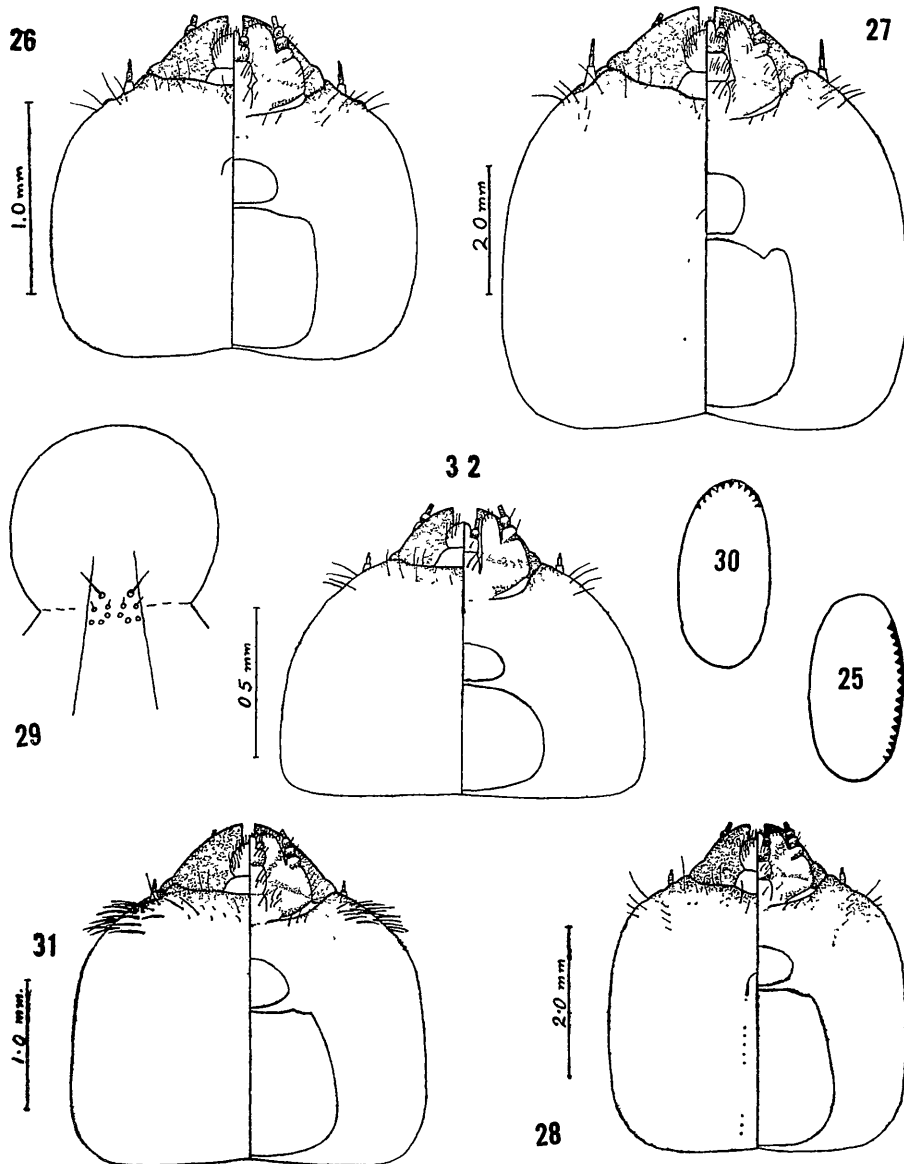
**MATURE LARVA.** Form stout, tapering posteriorly. Length, 16 mm. Colour, creamy-white. Body setae castaneous.

**Head** (Fig. 31) transverse, slightly wider posteriorly, slightly concave on posterior dorsal margin. Occipital foramen wider behind mid-length. Mandible of normal type. Labrum transverse, densely setose. Maxillary palp longer than femur plus tibia. Last joints of labial and maxillary palps sub-equal. Palpifer and first joints of maxillary palp with process. Three ocelli. Genae shouldered, genal setae dense and stout. A blunt tubercle present dorsad of the ocelli. Antennal ring bisected by frontal suture. Hypostoma with two or three setae on each side.

**THORAX.** Pronotum nearly twice as wide as long, anterior half sparsely setose, striate posteriorly, notal spots distinct castaneous. Metanotum with transverse line. Presternum fused with epipleurum and with long setae laterally. Eusternum not defined anteriorly from presternum, with sparse setae anteriorly. Legs well developed, 4-jointed. Prothoracic spiracle with pecten dorsal.

**ABDOMEN.** Pleural tubercles distinct, discs not evident. Ampullae tuberculate, moderately projecting. Three anal lobes. Sclerotized thickening of intima of hind-intestine present.

Larvae and living adults of this species were taken from dead *Pinus radiata* at Katikati in January and were found in the same food plant on the Moutere Hills.



TEXT-FIG 4.—*Navomorpha lineatum*. Fig. 25—Larva, prothoracic spiracle. *Navomorpha sulcatum*. Fig. 26—Larva, head. *Ochrocydus huttoni*. Fig. 27—Larva, head. *Oemona hirta*. Fig. 28—Larva, head. Fig. 29—Larva, epipharynx. Fig. 30—Larva, prothoracic spiracle. *Stenopotes pallidus*. Fig. 31—Larva, head. *Zorion minutum*. Fig. 32—Larva, head.

The larvae make broad shallow mines between the bark and the wood, but enter the wood to a depth of up to one inch to pupate, blocking the exit hole with coarse shreds of wood.

#### Genus ZORION Pascoe

##### *Zorion minutum* (Fabricius) (Fig. 32).

**MATURE LARVA.** Form small, slender, cylindrical, tapering posteriorly. Length, 7 mm. Colour, white. Body setae slender, light coloured.

**Head** (Fig. 32), transverse, widest posteriorly, sub-truncate behind. Posterior foramen transverse, widest at mid-length. Mandible short, stout, not constricted before rounded apex. Labrum transverse, nearly twice as wide as long. Maxillary palpi 2-jointed, second joint longer than first. Palpifer with small process. Labial palp with second joint shorter than 2nd joint of maxillary palp. Epistoma not emarginate in middle. Two ocelli. Genal setae sparse and fine. Hypostoma without setae.

**THORAX.** Pronotum twice as wide as long, posterior third striate, anterior two-thirds setose, notal spots pale yellow. Metanotum without X-shaped lines. Presternum setose, fused with epipleurum. Eusternum not well defined, setae sparser. Legs vestigial.

**ABDOMEN.** Pleural discs not evident. Ampullae finely granulate, not prominent. Spiracles oval. Hind-intestine with sclerotized thickening of intima.

**PUPA.** Form as in adult. Head with three setae on each side of front below antennal insertion, one on each side between antennal insertions, two on each side of clypeus and one or two on mandible. Gena with three or four setae. Prothorax with about 8 setae across anterior margin, a row of 6 across disc before mid-length, and one on each side posterior to mid-length. Mesothorax with one seta on each side. Metathorax with one seta on each side. First abdominal segment with one seta on each side. Segments 2-6 with about 8 small pigmented setigerous spines posteriorly, 7th with two larger paramedian spines posteriorly and about 5 smaller ones on each side. Last segment with one or two spines on each side anteriorly, a row of about 5 at mid-length, and two pigmented spines at the posterior angle on each side with two smaller ones anterior to these. Femora with one or two setae at distal end. Elytra and tibiae without setae.

Reared from branches of Hawthorn, Elm and *Sequoia gigantea*. in Nelson. Pupae were present in September. The adults were abundant in early November. The adults frequent flowers and closely mimic in shape and coloration the native Clerid beetle, *Phymatophaea ignea*.

#### ZORION GUTTIGERUM Westwood

The adults of this species were reared from larvae which were tunnelling in the bases of Flax (*Phormium tenax*) leaves at Blenheim. I am unable to separate the larvae from those of *Z. minutum*.

#### Subfamily LAMIINAE

##### KEY TO LARVAE OF SPECIES TREATED IN THIS PAPER

- |   |                                      |
|---|--------------------------------------|
| 1. Median dorsal process present on penultimate abdominal segment               | (2)                                  |
| Median dorsal process absent  | (3)                                  |
| 2. Process bifurcated forming two para-median spines, maxillary palpi 2-jointed | <i>Hybolasius genalis</i> Broun      |
| Process not bifurcated, palpi 3-jointed   | <i>Somatidia antarctica</i> White    |
| 3. Hypostoma flat posteriorly   | (4)                                  |
| Hypostoma with transverse ridge posteriorly                                     | <i>Hexatricha pulverulenta</i> Westw |
| 4. Front heavily pigmented to mid-length, head widest at mid-length             | <i>Xyloteles griseus</i> Fab.        |
| Front entirely pigmented, head widest anteriorly                                | <i>Tetrorea ciliipes</i> White       |

#### Genus HEXATRICHA Lacordaire

##### *Hexatricha pulverulenta* (Westwood) (Figs. 33-36).

**EGG.** Length, 3 mm; width, 1 mm; white, chorion unsculptured.

**FIRST STAGE LARVA.** Length, 5 mm. Differs from the mature larva in the following points: Spiracles biforous, a small conical pigmented sclerotized process dorsad of the spiracle and bearing a long seta at its base, sides of the head diverging posteriorly, head widest at mid-length, hypostoma flat without setae, fewer setae on front, labrum with three or four setae on each side about mid-length.

**MATURE LARVA.** Length, up to 35 mm. Body slightly flattened, tapering posteriorly. Body setae castaneous. Colour white.

Head (Fig. 33) elongate, sides sub-parallel to past mid-length, then tapering and rounded posteriorly. Heavily pigmented to mid-length. Mandible (Figs. 34 and 35) elongate, with two setae, cutting edge oblique, sharply angulate and distally produced into an acute tooth. Clypeus membranous, trapezoidal. Labrum transverse, anterior margin rounded, posterior half pigmented. Maxillary palpi 3-jointed, borne on palpifer with the finger-like mala. First joint of labial palp nearly twice as long as second. Joints of maxillary palp sub-equal in length and decreasing slightly in width. Mentum distinct, short, transverse, with three or four setae on each side. Epistoma with three setae. Apex of labial palpifer with 7 or 8 setae. Front clearly defined by frontal sutures, heavily pigmented and bearing a number of setae. Antennae retractile, antennal ring bisected by frontal suture. One ocellus. Hypostoma with a number of setae extending behind the anterior margin and on each side of the median suture; gular sutures not evident; rising posteriorly to a semi-circular ridge with prominent shoulders laterally at mid-length.

**THORAX** (Fig. 36). Pronotum transverse, not twice as wide as long, not separated anteriorly from pro-alar area, striate posteriorly. Mesonotum with a row of setae. Metanotum with a double row of tubercles. Presternum not separated from epipleurum, setose. Eusternum not very distinct, setose anteriorly. Legs vestigial, reduced to ring of short setae. Spiracles oval, not projecting into prothorax.

Abdomen with epipleurum developed on all segments. Pits not evident on pleural tubercles. Ampullae tuberculate, ventral ampullae with tubercles in two rows. No caudal spine present. Spiracles oval.

**PUPA.** Form as in adult. Head with three setigerous papillae on each side of vertex between antennal insertions, three large and one small papilla on each side of front between the eyes, three on gena, two on mandible, three on each side of base of clypeus and two small ones on each side of apex of labrum. Pronotum with a continuous row of setigerous papillae across anterior margin, a small sub-circular area of setigerous spines on disc, anterior lateral margins somewhat tuberculate and with setigerous papillae, scattered setigerous papillae in posterior angles. Mesonotum with a semi-circular group of setigerous papillae posteriorly. Metanotum with four or five setigerous papillae on each side. First abdominal segment with a single row of pigmented spines. Segments 2-6 with anterior and posterior rows. Segment 7 with a transverse group of setigerous spines at one-third length and a number posterior to these. Eighth segment with three setae anteriorly on each side, posteriorly with a median conical process with a pigmented point produced dorsad and bearing cephalad on the base two smaller spines; posterior and lateral margins bear on each side about ten pigmented setigerous spines and there are two para-median pigmented spines on the posterior face. Femora with a number of setae on the distal half; none on tibiae. Small processes on the three pairs of trochanters.

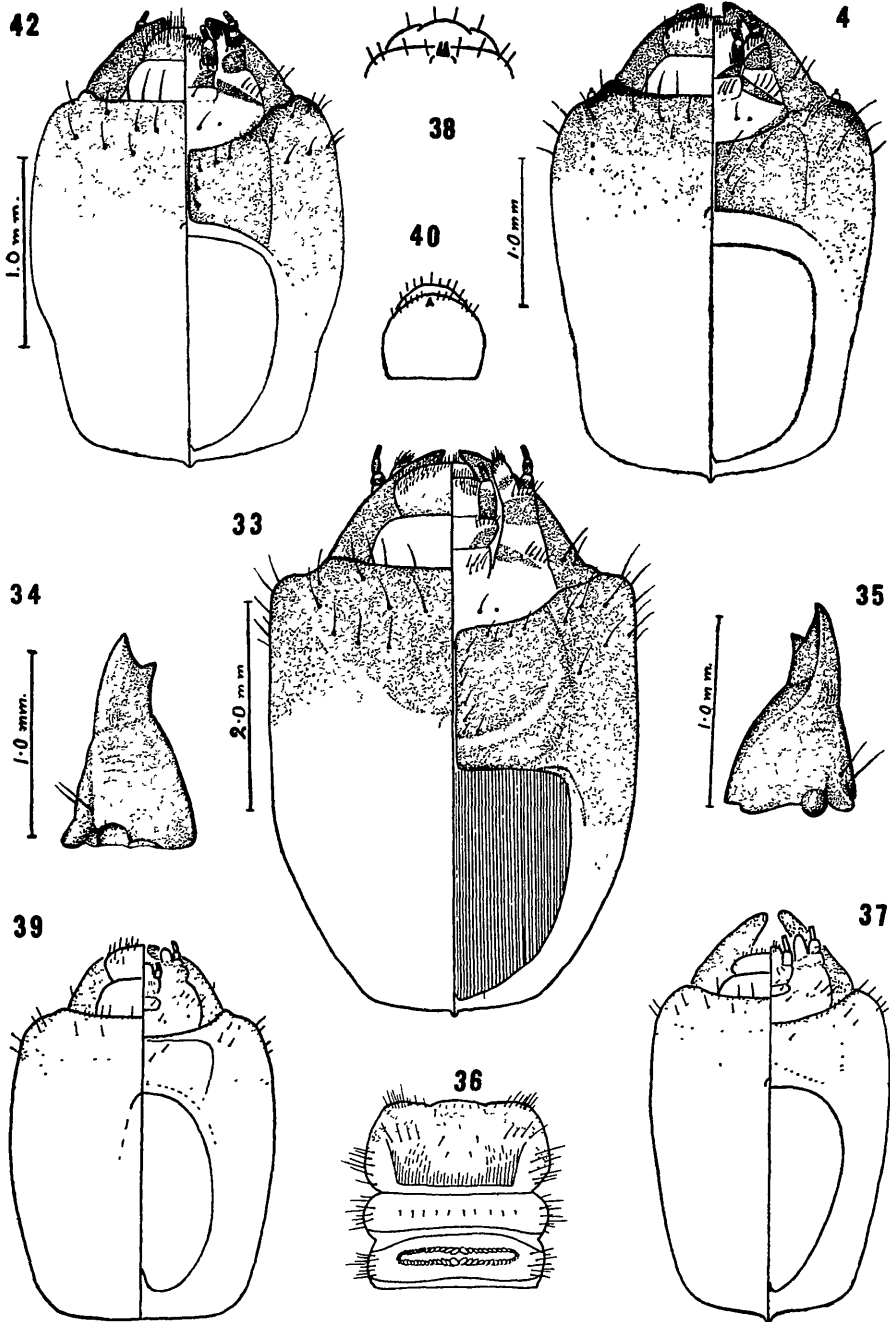
This species breeds in abundance in dead *Pinus radiata* on the Moutere Hills, Nelson, and has been found on the same food plant at Rotorua. It has also been found in dead *Nothofagus*. The pine tree is attacked shortly after death. The female beetle bites an oviposition hole 2-3 mm deep in the bark, inserts her ovipositor and deposits an egg between the bark and the wood. Usually only one egg is laid, but as many as four have been found. When the bark of the pine is more than one quarter of an inch in thickness the female chooses a fissure in the bark in which to make the oviposition hole. The hole is sealed with a secretion after the deposition of the egg. Eggs laid in the laboratory hatched in 19 days. They have been found in the field from October to April. The young larvae bore shallow tunnels between the bark and the wood. Pupation may occur in a shallow cell excavated between the bark and the wood and formed of coarse shreds of wood, or in a vertical pupal chamber 1-2 inches deep in the wood. Pupae have been found from mid-November to the end of February. The pupal period lasted 30 days. The adult emerges from an irregular oval hole in the bark. Adults have been found in the field from October to April. They have been observed to feed on pine bark in captivity. The cocoons of the parasitic ichneumonid *Mesostenus albopictus* Smith have been found in the larval burrows.

#### Genus HYBOLASIUS Bates

*Hybolasius genalis* Broun (Figs. 37 and 38).

**MATURE LARVA.** Length up to 10 mm. Slender, elongate, tapering posteriorly. Colour white.

Head (Fig. 37) elongate, widest at mid-length, tapering posteriorly, not pigmented to mid-length. Mandible of normal Lamiinae type. Clypeus trapezoidal. Labrum transverse.



TEXT-FIG 5.—*Hexatricha pulverulenta*. Fig. 33—Larva, head. Fig. 34—Larva, mandible, external face. Fig. 35—Larva, mandible, buccal face. Fig. 36—Larva, thorax dorsal. *Hybolasius genalis*. Fig. 37—Larva, head. Fig. 38—Larva, abdomen penultimate segment dorsal. *Somatidia antarctica*. Fig. 39—Larva, head. Fig. 40—Larva, abdomen penultimate segment dorsal. *Tetroria cilipes*. Fig. 41—Larva, head. *Xyloteles griseus*. Fig. 42—Larva, head.



Maxillary palp 2-jointed, joints sub-equal in length, second joint slightly shorter than second joint of labial palp. Mentum distinct, short, transverse, bearing one seta on each side. Submentum with one seta on each side near anterior angle. Epistoma straight, with three setae on each side. Front pigmented to mid-length, with 3 or 4 setae. Antennae retractile, antennal ring not bisected by frontal suture. One ocellus. Hypostoma with one seta on each side of median suture. Gular sutures not evident.

**THORAX.** Pronotum transverse but not twice as wide as long, separated anteriorly from pro-alar area, notal spots not distinct, obscurely striate posteriorly. Presternum fused with epipleurum. Eusternum not distinct. Legs vestigial.

Abdomen with epipleurum protuberant on last three or four segments. Pleural tubercle distinctly sclerotized and pigmented at ventral end. Ampullae indistinct, poorly developed, irregularly tuberculate or finely alutaceous. Two pigmented para-median spines close together on posterior margin of 9th tergum (Fig. 38).

This species was found under the bark of dead *Pinus radiata* at Waitapu. Larvae, pupae and adults were present in February.

#### Genus SOMATIDIA Thomson

*Somatidia antarctica* (White) (Figs. 39 and 40).

**MATURE LARVA** Length up to 12 mm. Form cylindrical, tapering posteriorly. Body hairs castaneous. Colour white.

Head (Fig. 39) elongate, widest at mid-length, behind which it is slightly constricted and tapering. More than half as deep as wide. Mandible short, stout, cutting edge oblique but not angulate. Clypeus trapezoidal. Labrum transverse, rounded anteriorly. First and second joints of maxillary palp sub-equal, third longer. Joints of labial palp subequal. Three or four setae at base of labial palp. Mentum distinct with one long and one short seta on each side. Epistoma straight, with three setae. Front pigmented to mid-length, with three setae. One ocellus. Antennae retractile, antennal ring bisected by frontal suture. Hypostoma with one or two setae on each side. Gular suture not evident.

**THORAX.** Pronotum not twice as wide as long, posteriorly striate, notal spots distinct. Presternum setose, fused with epipleurum. Eusternum fairly distinct, with sparse setae. Legs vestigial. Spiracles oval.

**ABDOMEN.** Epipleurum developed on all segments. Pleural tubercles without distinct sclerotized pigmented pits. Ampullae tuberculate with tubercles in two rows. A single small pigmented spine on 9th tergum (Fig. 40). Three anal lobes. Spiracles sub-circular.

Reared from Larch (*Larix* sp.) from Dusky Forest.

#### Genus TETROREA White

*Tetrorea cilipes* White (Fig. 41).

**MATURE LARVA.** Length up to 20 mm. Stout, cylindrical, slightly tapering posteriorly. Colour white. Body setae castaneous.

Head (Fig. 41) elongate, widest anteriorly, tapering posteriorly and slightly constricted behind mid-length, depth less than half width. Mandible with two setae, cutting edge oblique, molar part not angulate. Clypeus trapezoidal. Labrum transverse, with four large setae at mid-length, two para-median and one sub-lateral on each side; rounded anteriorly, pigmented posteriorly. Maxillary palp three-jointed, second and third joints sub-equal in length. Labial palp with second joint shorter than first. Four or five setae at base of labial palp. Mentum distinct, with one large and two or three smaller setae on each side. Epistoma straight, with three setae. Front heavily pigmented to mid-length, with about six setae on each side anteriorly. Antennae retractile, antennal ring bisected by frontal suture. One ocellus. Hypostoma with five or six setae on each side.

**THORAX.** Pronotum transverse, nearly twice as wide as long, not separated anteriorly from pro-alar area, feebly striate posteriorly. Presternum and epipleurum fused, the latter setose. Eusternum not distinct, setose. Legs vestigial. Spiracles ovoid.

**ABDOMEN.** Epipleurum protuberant on last six or seven segments. Pits not evident on pleural tubercles. Ampullae with two rows of tubercles. No caudal spine. Spiracles sub-circular.

**PUPA.** Form as in adult. Head with the following setae: Seven round each antennal insertion, two para-median on front, seven across clypeus, four across apex of labrum, two on mandible and six on gena. Pronotum with a row of setae across anterior margin, a transverse row of four anterior to mid-length, two posterior to this and a row of eight across posterior margin. Lateral margin with a conical tubercle bearing a number of setae. Metathorax with a V-shaped group of setae. Abdomen with segments one to six with a posterior row of pigmented spines which are setigerous on segments two to six. Seventh with a transverse row of setigerous pigmented spines at one-third length and a number on the posterior half. Eighth with row of setigerous pigmented spines anteriorly, posteriorly with a median spine directed dorsad,

two pigmented spines just cephalad of the base of this and three setigerous spines on each side of the posterior margin. Femora with a number of setae on the distal half. Anterior tibiae with two setae at mid-length, middle and hind tibiae with a single seta. Middle and hind trochanters with a conical process directed caudad, largest on hind trochanter.

Larvae and pupae of this species were taken from dead branches of *Nothopanax arboreum* at Nelson in November. The larva bore between the bark and the wood, but enter the wood to pupate. The larvae and pupae were parasitised by the larvae of the Colydiid beetle *Bothrideres obsoletus* Broun. These feed ectoparasitically and spin a buff coloured cocoon in which to pupate.

#### Genus XYLOTELES Newman

*Xyloteles griseus* (Fabricius) (Fig. 42).

**MATURE LARVA.** Length, up to 15 mm. Cylindrical, tapering posteriorly. Colour, white. Body setae castaneous.

**Head** (Fig. 42) elongate, widest at mid-length, tapering and slightly constricted behind mid-length, half as deep as wide. Mandible long, slender, cutting edge oblique, molar part not angulate, two setae on outer face. Clypeus trapezoidal. Labrum transverse, rounded anteriorly, pigmented on posterior half. Maxillary palp three-jointed, last joint longer than second. Second joint of labial palp slightly shorter than first. Three or four setae at base of labial palpifer. Mentum not very distinct, with one large and one or two smaller setae on each side. Epistoma straight, with three setae. Front entirely pigmented, with six or seven setae anteriorly on each side. Antennae retractile, antennal ring bisected by frontal suture. One ocellus. Hypostoma flat, with five or six setae on each side.

**THORAX.** Pronotum transverse, nearly twice as wide as long, not separated anteriorly from pro-alar area, posterior area feebly striate, notal spots not distinct. Presternum fused with epipleurum setose. Eusternum not well defined, setose. Legs vestigial. Spiracles oval.

**ABDOMEN.** Epipleurum protuberant on last six or seven segments. Pits not evident on pleural tubercles. No caudal spine. Spiracles sub-circular. Ampullae with two rows of tubercles.

**PUPA.** Form as in adult. Head with the following setae: Six setae around antennal insertion, six across clypeus, two on mandible, none on labrum and gena. Pronotum with a row of six setae across anterior margin and a row across disc anterior to mid-length with a median group of five or six posterior to this and about twelve setae in posterior angles. Mesonotum with three setae on each side and metanotum with three or four on each side. A single row of short setigerous pigmented spines posteriorly on abdominal segments one and two. Segments three to six with anterior and posterior rows. Seventh with a group of three setae on each side at one-third length and 16-18 setae across posterior half. Eighth segment with three setae on each side near anterior margin, posterior margin with a median pigmented process directed dorsad and two pigmented spines on each side. Femora with a number of setae on distal half. Tibiae without setae. Small processes on trochanters.

Larvae, pupae and adults were present in dead branches of Elm (*Ulmus*) at Nelson in December. The adults emerge in December and early January. An oviposition hole is bitten through the bark and the egg is deposited between the bark and the wood. The larvae bore between the bark and the wood but enter the wood to pupate.

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