

NOTES AND RECORDS OF NEW ZEALAND SCARABAEIDAE (COLEOPTERA)

J. G. BROWN,

Entomology Division, D.S.I.R., Nelson.

ABSTRACT

Sericospilus intermediatus Given is newly recorded from the South Island. The cosmopolitan species **Trox scaber** (L.) and the circumpacific species **Aphodius pseudolividus** Balthasar are recorded from New Zealand for the first time. The status of the two New Zealand species of **Phycochus** Broun is discussed, distribution and habitat records are presented, and the suggested cosmopolitan status of the genus mentioned. The first occurrence of **Aphodius tasmaniae** Hope in New Zealand is noted and four years' light trap records of the species in Canterbury are given. Feeding damage by adult **Ocnodus** sp. is reported and new locality records given. Tachinid parasites of three species of Melolonthinae are noted and two carabid predators of Melolonthinae—**Metaglymma tibiale** Castelnau) and **Mecodema crenicolle** Castelnau—are recorded. A first record of **Cordyceps** fungus parasitic mites from **Chlorochiton** and **Pericoptus** larvae and instances of phoresy by mites on adults of **C. zealandica** are noted. A method for distinguishing the sexes of pupae of **C. zealandica** and **Pyronota festiva** (Fab.) is described.

SERICOSPILUS INTERMEDIATUS GIVEN MELOLONTHINAE
: NEW RECORD

S. intermediatus was described from the unique holotype collected from Mt. Egmont (Given, 1952). A South Island record can now be added: Craigieburn and Broken River Catchments, Canterbury, no date, 1 ♂ (collected by Forest and Range Experiment Station personnel). A further specimen in the Entomology Division Collection has the following data: Stratford, Mt. Egmont, 28.xi.48, 1 ♂ (R. A. Cumber).

TWO NEW RECORDS FOR NEW ZEALAND

***Trox scaber* (L.) (Troginae)**

Hutton (1904) records a *Trox* "sp." as present in New Zealand. A specimen with the following data: Rotorua, in garden, 30.x.64 (L. W. Newman), was sent by Mr. R. Zondag for identification and was determined by Mr. E. S. Gourlay from a specimen in his collection with the following data: Whangarei, under skin of long dead cow, 25.xii.26 (E. Fairburn) as the cosmopolitan species *T. scaber*. It is probable that this is the same species as recorded by Hutton (loc. cit.). Britton (1965) records its habitat as "dry animal remains, wood mould in oaks and elms and birds' nests." A figure description and habits of *T. scaber* are given by Dillon and Dillon (1961).

***Aphodius* (*Nialus*) *pseudolividus* Balthasar APHODIINAE**

Balthasar, V., 1941: *Atti. Soc. ital. Sci. nat.* **80**: 148,
type locality Paraguay.

Petrovitz, R., 1961: *Ent. Arb. Mus. George. Frey.* **12**: 105.

Petrovitz (1961) increased to ten the species of the *Aphodius lividus* group, formerly regarded as one cosmopolitan species, *A. lividus* Oliv. Specimens from the Entomology Division, Nelson collections, collected in New Zealand most closely correspond in morphology to *A. pseudolividus*. The male parameres of the specimens examined are not identical, but closely similar to those figured by Petrovitz (1961). Petrovitz (loc. cit.) gives the distribution of this species as: "North and South America, Australia, Oceania, South Africa. Also a circumpacific species. One male from Semirjchensk, Talas Valley, represents an isolated specimen and cannot at this stage be regarded as definite proof that *pseudolividus* occurs in Asia."

It is not within the scope of this note to question the status of species of the *A. lividus* complex but it should be mentioned that Landin (1963) states in this context: "The judgement of the taxonomic levels involved, however, would seem to be a very precarious task. Petrovitz has split *lividus* into ten species, most of which show an allopatric distribution. Whether some of the populations involved should be treated on subspecific rather than specific level remains an open question."

The following specimens have been examined:
 D'Urville Island, under cowdung and flying in daylight,
 23.ii.42, 10 specimens, (E. S. Gourlay).
 Wellington, Window of Store, 3.vi.38, 1 specimen.
 Locality and date unknown, 1 specimen.
 Total examined: 12.

THE GENUS **PHYCOCHUS** BROUN (APHODIINAE)

Two species of the blind, wingless, seashore dwelling genus **Phycochus** Broun have been described from New Zealand; **P. graniceps** Broun (1886) and **P. lobatus** Broun (1893). The former also occurs in Tasmania (Lea, 1905). They were each described from single specimens. Broun's characters for separating the species have been known to occur in independent assortment in specimens examined and it appears likely that **lobatus** is a synonym of **graniceps**. The major characters are tabulated below:

| | graniceps | lobatus |
|--|--|---------------------|
| Elytra | without striae | with striae |
| Middle of posterior margin of pronotum | slightly incurved | lobate |
| Head | two broad oblique depressions on the head marking off the granulate from the smooth portion. | no such depressions |

At my request Dr. E. B. Britton compared the holotypes of the two species in the British Museum and also examined other specimens. He also expressed doubts about the distinctness of the two species, and pointed out that specimens of **graniceps** affinity appeared to have 'notch' at the junction of the clypeus and the frons on each side of the head. I did not find this character to be significant in specimens of **Phycochus** examined by myself.

Published and unpublished locality and habitat records of **Phycochus** have been collated and are presented below:

Maunganui Bluff Beach, North Wairoa, lupin litter on foreshore; Bayley's Beach, Dargaville, under weeds, sand dunes; north of Whangarei Harbour, seaweed; Taranaki, seashore; Himatangi Beach, Manawatu, sandy pasture behind dunes; Lyall Bay, Wellington, damp saline places; Westport, under logs just above high tide mark; Moeraki and Port Chalmers, Otago; Sandy Bay, Hobart, Tasmania, close to sea beach at roots of plants, usually bracken fern.

Landin (1960) considers **Phycochus** to be a relict cosmopolitan genus, arising from the Aegialiini and giving rise to the Psammodiini. He divides the genus into three sugenera: **Phycochus** S.S. containing **P. graniceps**; **Brindalis** Landin containig **P. sulcipennis** Lea from Tasmania and **P. azoricus** Landin from the Azores and **Sicardia** Reitt. (reduced from generic containing **P. psammodiformis** Reitt. from Tunisia. Considerations are carefully discussed and the species figured in detail. Balthasar (1964) (quoted in Landin, 1965) strongly criticises Landin's concepts stating they are invalid on toxonomic and zoogeographical grounds and Landin (1965) answers these criticisms.

TASMANIAN GRASS GRUB, **APHODIUS TASMANIAE** HOPE APHODIINAE

A specimen of **A. tasmaniae** in the Canterbury Museum has the following data: Mt. Grey, Canterbury, 9.xi.16 (**S. Lindsay**). This is the earliest record of the species in New Zealand. Previous to this the earliest record was of a specimen from Hoon Hay, Christchurch, dated 1920 (Lowe, 1961).

Since February 6, 1962, a light trap powered by a 200 watt white bulb has been operated at Lincoln College and weekly records kept of catches of insects. From these records the following catches of **A. tasmaniae** have been extracted.

1962: Feb. 8, 28.

1963: Jan. 25-27, 1; Jan. 30, 3; Feb. 8-10, 1; Feb. 15-18, 30;
Feb. 20-21, 1.

1964: Jan. 24-26, 1; Feb. 7-9, 2; Feb. 10-11, 1; March 3, 1.

1965: Jan. 14, 1; Jan. 20, 3; Jan. 28, 5; Jan. 29-31, 5; Feb.
4, 3; Feb. 11, 4.

In 1965 the light trap was not working from Feb. 12-21 and no further specimens were taken after these dates.

Lowe (loc. cit.) mentions a large flight of **A. tasmaniae** following a very hot day. On the two occasions when relatively large numbers of beetles were trapped, weather conditions at the Lincoln Meteorological Station were as follows:

Feb. 8, 1962: Maximum temperature 8.1°F, southwest - northwest wind in afternoon, very warm.

Feb. 15-18: It is most likely that the beetles were trapped on Feb. 15th and 16th as temperatures on Feb. 17th and 18th were much cooler.

Feb. 15: Maximum temperature 87.0°F, fine, hot with moderate northwest wind.

Feb. 16: Maximum temperature, 88.6°F, overcast and mild, moderate northerly breeze.

OCNODUS SP. (MELOLONTHINAE) : NEW RECORDS AND NOTE OF FEEDING DAMAGE

Nine adults of *Ocnodus* sp. were sent by Mr. G. D. Miller, Department of Agriculture, Kaitaia, to Entomology Division for identification. The specimens were green dorsally in contrast to the usual black or brown colouration and with a brown antennal club in contrast to the usual black club. Given (1954) has expressed doubts about the distinctness of the two New Zealand species of this genus; *O. piceus* (Broun) and *O. brookesi* (Broun) and it appears to the writer more likely that they comprise one variable species.

The beetles were reported as damaging stems and leaves in a vegetable garden at Kaeo in March, 1965. They fed in considerable numbers at night. *Ocnodus* has been previously recorded from the West Coast of Northland: Auckland City, Tiritiri Island, Mokohinau Island, Whangarei and the Three Kings Islands. Between the latter two localities Kaeo can now be added. Other new records from specimens in the Entomology Division Collections are Tairua and Mt. Maunganui.

Nothing has previously been recorded of the biology of the genus, but it is now known that the adults do feed, that they feed at night and that they can be added to the list of endemic Melolonthinae which can have minor pest status.

NATURAL ENEMIES

Tachinid Parasites of Melolonthinae

Thomas (1963) first recorded the tachinid *Proscissio cana* Hutton as a parasite of *Costelytra zealandica*. The writer has now reared this species from three other localities; Moonlight near Middlemarch and Hindon near Dunedin Otago, and the Land and Survey Department's 'Boundary' Block, Te Anau, Southland, all from third instar larvae. In addition *P. cana* was reared from a third instar larva of *Odontria striata* White from L. Te Anau and *Proscissio cana* var. *valida* (Malloch) from a second instar *Odontria halli* Broun larva* from L. Rotoiti, Nelson.

All parasitised *Costelytra* larvae were collected in June, 1963, and laboratory reared in Nelson. Parasites emerged from mid-September to early November. Pupal period of the parasite was five to six weeks in contrast to the observations of Thomas (loc. cit.) who noted that it occupied three to four weeks. Of the larvae successfully reared to September the following numbers were parasitised:

| | | |
|-----------------|-------|-------------|
| from Moonlight | | 7 out of 15 |
| from Hindon | | 4 out of 11 |
| from 'Boundary' | | 5 out of 22 |

*The larva of this species has not been described but is known to the writer.

One example of parasitism of a **Costelytra** larva from McRae's Flat near Moonlight was also noted, but the adult fly did not emerge. No examples of parasitism of **Costelytra** were found in larvae collected from the 'Takitimu' Block, near 'Boundary' Block. Several examples of parasitism of **O. striata** larvae from 'Boundary' were noted, but only one adult fly was successfully reared.

The tachinid adults were determined by Mr. J. S. Dugdale.

Carabid Predators

Metaglymma tibiale: Large numbers of this species in a **Wisecana** and **Costelytra** infested pasture had been noted by Mr. M. Stockdill, Instructor in Agriculture at Palmerston. Adults of **M. tibiale** could be obtained by digging a spade square almost anywhere in the field and this Mr. Stockdill demonstrated to Mr. D. C. F. Perrott and myself in June, 1964.

Mecodema crennicolle: Occasional adults of this species were found in a heavily **Costelytra** and **Pyronota** infested pasture, Baton Valley, Nelson, in the summer of 1964-65. Two specimens caged in the laboratory fed voraciously on larval and adult **Costelytra** offered them until their abdomens were grossly distended.

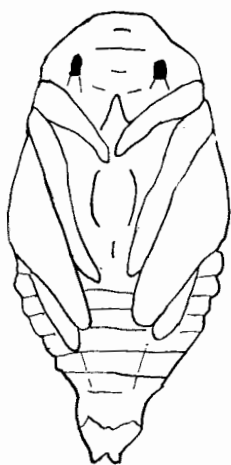
Cordyceps Fungus on **Costelytra zealandica**

A larva of **Costelytra zealandica** collected in June, 1964, at Moonlight, Otago, and reared in the laboratory was observed in September to have a small **Cordyceps** stalk growing from it. The specimen was sent to Miss Joan Dingley, Plant Diseases Division, D.S.I.R., Auckland, who informed me that a specific name could not be given as it was immature and the conidial form was not a characteristic one. It was not the same species, **Cordyceps aphodii** Mathieson found by Kelsey on Tasmanian Grass Grub, **Aphodius tasmaniae** Hope at Ellesmere, Canterbury, and recorded by Lowe (1961). It could have been the cosmopolitan species, **C. entomorrhiza** (Dicks.) Fries.

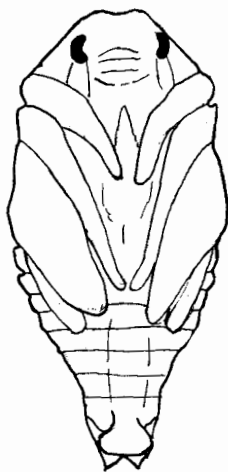
Three examples of the hypopus stage of mites of the family Tyroglyphidae attached to the abdomen of **Costelytra zealandica** adults from Nelson were found. One specimen belonged to the genus **Acotyledon** Oud., the other two specimens to the genus **Caloglyphus** Berlese.

Heavy infestations of presumably ectoparasitic mites of the family Laelaptidae, subfamily Hypoaspidae were noted on larvae of **Chlorochiton suturalis** (F.) and **Pericoptus** sp. (probably **P. truncatus** (F.)). Mites were numerous in folds of the skin, especially near the head. The third instar **C. suturalis** larvae were collected from Cobb Dam, Nelson, and the second and third instar **Pericoptus** larvae from Tahunanui (Nelson), Pakawau (Golden Bay) and Paraparaumu (Wellington). The mites comprised two distinct species, one on each host.

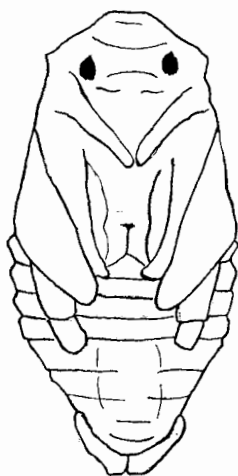
Mite determinations were made by Dr. G. W. Ramsay.



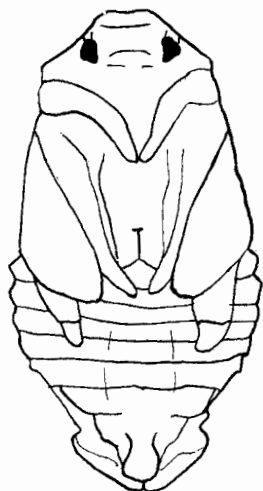
A



B



C



D

Fig. 1. A. *Pyronota festiva* pupa, female.
B. *Pyronota festiva* pupa, male.
C. *Costelytra zealandica* pupa, female.
D. *Costelytra zealandica* pupa, male.

SEX IDENTIFICATION IN PUPAE OF *COSTELYTERA ZEALANDICA* (WHITE) AND *PYRONOTA FESTIVA* (FAB.)

Elliott (1964) showed that the sexes could be distinguished in larvae of *C. zealandica*, *Pyronota* sp. and three other scarabaeid species. Kelsey (1965) noted that male and female adults of *C. zealandica* could be distinguished with ease. It has also been found possible to sex pupae of *C. zealandica* and *P. festiva*. In the male a distinct bulge or "codpiece" is visible at the posterior end of the pupa on the ventral side (Figs. 1B and 1D). This bulge is caused by the male genitalia, the parameres and basal plate of which are already sclerotised in the pupa. In the female (Figs. 1A and 1C) the bulge is absent, and in its place is a small vertical slit surrounded by lips and not clearly visible to the naked eye.

It can be noted from figure 1 that shape of the posterior portion of the pupa differs in *C. zealandica* and *P. festiva*. In the former it is broad and flanged, in the latter narrow and pointed. *Costelytra* pupae are also broader and larger than those of *Pyronota* and in the latter the prominent metasternal process can be seen.

When examining live pupae the cast larval skin can be easily lifted or removed entirely from the posterior end of the pupa without damage to the specimen.

ACKNOWLEDGMENTS

I wish to acknowledge the help of the following people who provided assistance, information or determinations: Miss Margaret Blackmore, Dr. E. B. Britton, Miss Joan Dingley, Mr. J. S. Dugdale, Mr. E. Fairburn, Mr. J. Fitzharris, Mr. B. B. Given, Mr. E. S. Gourlay, Dr. R. A. Harrison, Mrs. Brenda May, Mr. R. Ordish, Mr. D. C. F. Perrott, Dr. G. W. Ramsay, Mr. M. Stockdill, Mr. J. I. Townsend.

REFERENCES

- BALTHASAR, V., 1964: "Monographie der Scarabaeidae und Aphodiinae der palaarktischen und orientalischen Region". Verlag der Tschechoslowakischen Akademie der Wissenschaften, Prague. Vol. 3: 652 p.p. (original not seen, relevant parts quoted in Landin (1965)).
- BRITTON, E. B., 1956: "Coleoptera, Scarabaeoidea (Lucanidae, Trogidae, Geotrupidae, Scarabaeidae)" Royal Entomological Society of London Handbook for the identification of British Insects 5 (11): 29 pp. — p. 6.
- BROUN, T., 1886: "Manual of the New Zealand Coleoptera" Pts. 3 and 4, Govt. Printer, Wellington — pp. 770-771.
1893: *Ibid* Pt. 5: p. 1114.

- DILLON, E. S.; and DILLON, L. S., "A manual of Common Beetles of Eastern North America" Row, Peterson and Co., Evans-ton, Ill, and Elmsford, N.Y. 884 pp. — pp. 559-563.
- ELLIOTT, 1964: Recognition of the Sexes in some Scarabaeid Lar-vae. **N.Z. Jl. Sci.** 7: 181-187.
- GIVEN, B. B., 1952: A Revision of the Melolonthinae of New Zea-land. Part I. The Adult Beetles. **Bull. N.Z. Dep. Scient. Ind. Res.** 102: pp. 32-33.
- 1954: Melolonthinae (Coleoptera) from the Three Kings Islands. **Rec. Auckland Inst. Mus.** 4 |5 : 267-270.
- HUTTON, F. W., 1904: "Index Faunae Novae Zealandiae" Dulau and Co., London. 372 pp.
- KELSEY, J. M., 1965: Notes on Morphological Differences Between Sexes of Adult *Costelytra zealandica* (White). **N.Z. Jl. Sci.** 8: 173.
- LANDIN, B. O., 1960: The Lamellicorn Beetles of the Azores (Col-eoptera) with some Reflections on the Classification of Certain Aphodiini. **Bolm Mus. munic. Funchal.** No. 13: 49-84.
- 1963: The Lamellicorn Beetles of the Cape Verde Islands. With Some Biographical Aspects. **Commentat. Biol.** 26 (2): 27 pp.
- 1965: Dr. V. Balthasar's Monographie der Scarabaeidae und Aphodiidae der palearktischen und orientalischen Region 1-3. A Critical Review. **Opusc. ent.**30: 175-182.
- LEA, A. M., 1905: The Blind Coleoptera of Australia and New Zea-land. **Trans. ent. Soc. Lond.**, 1905. pp. 365-368.
- LOWE, A. D., 1961: *Aphodius tasmaniae* Hope in Canterbury. **N.Z. Ent.** 2 (6): 16-17.
- PETROVITZ, R., 1961: Neue und verkannte Aphodiinae aus allen Erdteilen (Col. Scarab.). **Ent. Arb. Mus. Georg Frey** 12: 99-135. (Seen in original translation).
- THOMAS, W. P., 1963: A Natural Enemy of the Common Grass Grub, *Costelytra zealandica* White. **N.Z. Ent.** 3 (2): 15-18.