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Survey of Lepidoptera at Tara Hills Research Station

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ABSTRACT

Year-round light-trapping at 2 sites at Tara Hills Research Station supplemented by diurnal records from the environs of these sites produced 125 species of Lepidoptera. This information is of potential use to the agricultural research station there. Although the fauna is not large by New Zealand standards it is characteristic of the Omarama Ecological District and Mackenzie Ecological Region in which the study sites are situated. Some biogeographical relationships of this fauna are discussed. One new species (*Loxostege* sp.) was discovered while several others (*Dichromodes* sp., *Harmologa* sp., *Ichneutica* sp.) may prove to be new also. The rare geometrid *Theoxena scissaria* was recorded. The seasonality of all species collected is presented and some conspicuous absences noted.

Keywords: Lepidoptera, light-trapping, Tara Hills, Omarama Ecological District, Mackenzie Ecological Region, diurnal species, new species, absences, seasonality, biogeography, New Zealand.

INTRODUCTION

Tara Hills Agricultural Research Station (44°32′ South, 169°53′ East) is situated in the Mackenzie Country south of Omarama. It is within the Omarama Ecological District of the Mackenzie Ecological Region (McEwen 1987) which was surveyed as part of the Protected Natural Areas Programme (Espie *et al.* 1984). The light-trap site on the Ewe Range is on the boundary with the Hawkdun Ecological District of the Waitaki Ecological Region. The survey described below is the first attempt to provide a list of the Lepidoptera of the Mackenzie Country.

The vegetation of the low-alpine site is a depleted grassland with many *Raoulia* cushions, exotic grasses and herbs, and emergent lichen-encrusted rocks. Native grasses present include *Poa cita, Festuca* spp, and *Elymus rectisetus*. In the surrounding gullies are sparse shrubs of *Olearia odorata, Hymenanthera alpina, Pimelea traversii* and *Corokia cotoneaster.*

The valley floor vegetation has a high component of exotics not only because of the activities of the agricultural research station but because of extensive pastoralism over the past 130 years. These activities combined with a low rainfall (< 500 mm) have produced a sparse vegetation except in the intensively managed experimental areas. Native species present include *Vittadinia australis, Poa* spp, *Raoulia* spp and *Epilobium* spp.

METHODS

From 1 December 1984 to 6 June 1986 a light-trap using an 8W ultra-violet tube and powered by a 12V battery was operated at an altitude of 950 metres on the Ewe Range,

Tara Hills Research Station. This same arrangement was then operated down on the valley floor, beside the headquarters, at 500 m altitude from 11 August 1986-31 March 1987. From the 22 October 1987-16 May 1988 the trap continued to be run at this later site but this time with a 125 W ballasted bulb powered by 240V AC. At all sites the traps were emptied weekly and periodically sent to me, in separate bags, for analysis. Daytime collections were made in the environs of both trap sites in October, November and late January. Lepidoptera specimens are stored in my collection, but some duplicates, especially of the hepialids, have already been lodged in the National Arthropod Collection, Entomology Division, DSIR, Auckland.

RESULTS

The following species were collected: (* indicates collected in daytime only)

Family and species	950 m site	500 m site
Hepialidae		
Wiseana copularis (Meyrick)		very common mid Nov.-mid Feb.
W. mimica (Philpott)	common Nov.-early Dec.	common Oct.-early Nov.
W. umbraculata (Guenee)		common mid-Nov.-early Jan.
Tortricidae		
Capua semiferana (Walker)	Nov.-Jan.	very common Oct.-April esp. Oct. and late Jan. mid-Feb.
Crocodosema plebejana (Zeller)		March
Eurythecta zelaea Meyrick		common Oct.-Jan.
Epichorista siriana (Meyrick)		Dec.
Epiphyas postivittana (Walker)		not common late Jan.-Mar.
Harmologa sp. nr. *sisyrana* Meyrick	Dec.-May	Dec.-Feb.
Harmologa sp.		rare Feb.
Merophyas leucaniana (Walker)		uncommon Jan.
"Tortrix" sp. nr. *sphenias* (Meyrick) is recorded from White Rock Station (J. S. Dugdale pers. comm.)		
Yponomeutidae		
Plutella psammochroa Meyrick		Sept., rare
P. antiphona (Meyrick)		Sept.
Glyphipterigidae		
Glyphipterix cionophora (Meyrick)	March	Feb.
G. nephoptera Meyrick	Feb.-May	
Tineidae		
Monopis crocicapitella (Clemens)	April	
M. ethelella (Newman)	Dec.-May	Nov.-Feb.
Coleophoridae		
Coleophora trifolii (Curtis)	Feb.	
Gelechiidae		
Kiwaia lithodes (Meyrick)		Oct.
Oecophoridae		
Atomotricha lewisi Philpott	May-June	
A. sordida (Butler)	Sept.	
Hierodoris atychioides (Butler)	Jan.-Feb.	
Oxythecta austrina (Meyrick)		Oct.-Dec.
Phaeosaces apocrypta Meyrick	Dec.	
Tingena honesta (Philpott)	Dec.-Jan.	Nov.-Dec.
T. maranta (Meyrick)		Oct.-Nov.

RESULTS — *continued*

Family and species	950 m site	500 m site
Lycaenidae		
**Lycaena boldenarum* White		Oct.-Feb.
**Lo salustius* (Fabricius)		Dec.
Zizina oxleyi Felder & Rogenhofer	May	Oct.-May
Pieridae		
**Pieris rapae* (Linnaeus)	Nov.	Oct.-May
Nymphalidae		
**Bassaris gonerilla* (Fabricius)		Oct.-April
Satyridae		
Argyrophenga antipodum Doubleday	Nov.-March	Oct.-April
Pterophoridae		
Pterophorus innotatalis (Walker)		Oct.
Pyralidae		
Crocydophora cinigerella (Walker)		very common Jan.-May
**Loxostege* new species		Oct.-Jan.
**Sporophylla oenospora* (Meyrick)		Jan.-Feb.
Crambidae		
Diasemia grammalis Doubleday		Oct.-Dec.
Eudonia atmogramma (Meyrick)		Nov.
E. axena (Meyrick)	Dec.	
E. cataxesta (Meyrick)		Oct.-April
E. critica (Meyrick)	Jan.	
E. diptheralis (Walker)		Nov.-Jan.
E. indistinctalis (Walker)		late Jan.-Feb.
E. leptalaea (Meyrick)		Nov.-May
E. oculata (Philpott)	Dec., rare	
E. psammitis (Meyrick)		Oct.-March
E. sabulosella (Walker)	Nov.-Feb.	Oct.-Feb.
E. submarginalis (Walker)		common, Nov.-early April
Gadira acerella Walker		Dec., rare
Mnesictena flavidalis (Doubleday)	Jan.	Oct.-March
Orocrambus crenaeus (Meyrick)	Jan.	
O. cyclopicus (Meyrick)		very common Jan.-May, esp. March
O. corruptus (Butler)		Oct.-Nov.
O. enchophorus (Meyrick)		rare April
O. flexuosellus (Doubleday)	Jan., rare	very common Nov.-April, esp. Feb.
O. lewisi Gaskin	Nov.-March	common Nov.-April, esp. March
O. lectus (Philpott)		Nov.-Feb.
O. ramosellus (Doubleday)	Dec.-Jan.	late Oct.-Feb.
O. vittellus (Doubleday)	Jan., rare	common Jan.-March, esp. Feb.
O. vulgaris (Butler)		common mid-March-mid-April
Scoparia autumna Philpott		March, rare
S. chalara (Meyrick)	Nov.	
S. exilis Knaggs	Nov.-Dec.	
S. niphospora (Meyrick)	Jan.	
S. rotuella (Feld & Rogen)		March
Tawhitia pentadactyla (Zeller)	March-April	March-April
Uresphita maorialis (Feld & Rogen)		Oct.
Geometridae		
Anachloris subochraria (Doubleday)	Dec., rare	Oct.-Feb.
Asaphodes abrogata (Walker)	March-May	March
A. clarata (Walker)		Feb., rare

RESULTS — *continued*

Family and species	950 m site	500 m site
A. recta (Philpott)		March, rare
Arctesthes catapyrrha (Butler)	Dec.	Oct.-March
Austrocidaria gobiata (Feld & Rogen)		Nov., uncommon
Chloroclystis sphragitis (Meyrick)		March, rare
Dichromodes sphaeriata (Felder & Rog)	Dec.-May	Dec.-April
Dichromodes sp		Feb., April, rare
Epyaxa lucidata (Walker)		mid Dec.,-Jan. & mid March-mid Apr.
E. rosearia (Doubleday)		Oct.-early May
Helastia christinae Craw		April, rare
H. cinerearia (Doubleday)		March, rare
H. corcularia (Guenee)	Dec.-March	Oct.-April, very common Nov.
H. cryptica Craw		Dec., rare
Hydriomena deltoidata (Walker)		Jan.
H. rixata (Feld & Rogen)		late Nov.-Feb.
**Notoreas paradelpha* (Meyrick)	Nov.	
**N. perornata* (Walker)		Oct.
Paranotoreas brephosata (Walker)		Oct.-March
Scopula rubraria (Doubleday)		Oct.-Feb.
Theoxena scissaria (Guenee)	Jul., Sept., Dec., rare	
Xanthorhoe orophylla (Meyrick)		early March, rare
Zermizinga indocilisaria Walker		Aug.-Feb.
Arctiidae		
Nyctemera annulata (Boisduval)		Oct.
Noctuidae		
Agrotis ipsilon aneituma (Walker)	Jan., rare	Oct., Dec. and May, rare
Aletia cuneata Philpott	Feb.	Nov., uncommon
A. inconstans (Butler)		Nov., rare
A. moderata (Walker)	March	Oct.-April
A. sistens (Guenee)	March-mid-April	late-Feb.-April
Euxoa admirationis (Guenee)	late Nov.-Jan.	Oct.-April
Graphania agorastis (Meyrick)		Feb., rare
G. disjungens (Walker)	Nov.-Jan.	Oct.-early Jan.
G. lignana (Walker)		Feb.-March, uncommon
G. lithias (Meyrick)	Dec.-Jan.	Nov.-Feb., uncommon
G. morosa (Butler)		Feb., rare
G. mutans (Walker)	Nov.-March	Oct.-May, very common
G. omoplaca (Meyrick)		Nov., rare
G. paracausta (Meyrick)	Nov.-Dec.	
G. plena (Walker)		Aug.-Sept, uncommon
G. phricias (Meyrick)		Oct.-May
G. rubescens (Butler)		late Feb.-mid-March
G. scutata (Meyrick)		late Feb.-April
G. ustistriga (Walker)		Nov., rare
Helicoverpa armigera conferta (Walker)	Nov. & April, rare	
Ichneutica new sp. nr. *homerica* Howes		Nov., rare
Meterana coelono (Hudson)		Oct.
M. ochthistis (Meyrick)		Dec., March, April, uncommon
Physetica caerulea (Guenee)		Feb.-March
Persectania aversa (Walker)	Dec.-Jan.	Oct.-Dec. and mid-Feb.-April
Rictonis comma (Walker)	Nov.-Jan.	late Nov.-Dec.
Tmetolophota acontistis (Meyrick)	Nov.-early Jan.	Nov.-Dec., uncommon
T. arotis (Meyrick)		Oct.
T. atristriga (Walker)	Jan.	Jan.-Feb.
T. propria (Walker)	Jan.-March	Jan.-March
T. toroneura (Meyrick)	late Nov.-early Jan.	Nov.-early Jan.
T. unica (Walker)	late Nov.-mid Jan.	Nov.-Dec.

Fig. 1: The adult male of the apparently new species of *Ichneutica* captured in the light-trap at 500 m in November. Wingspan 38 mm.

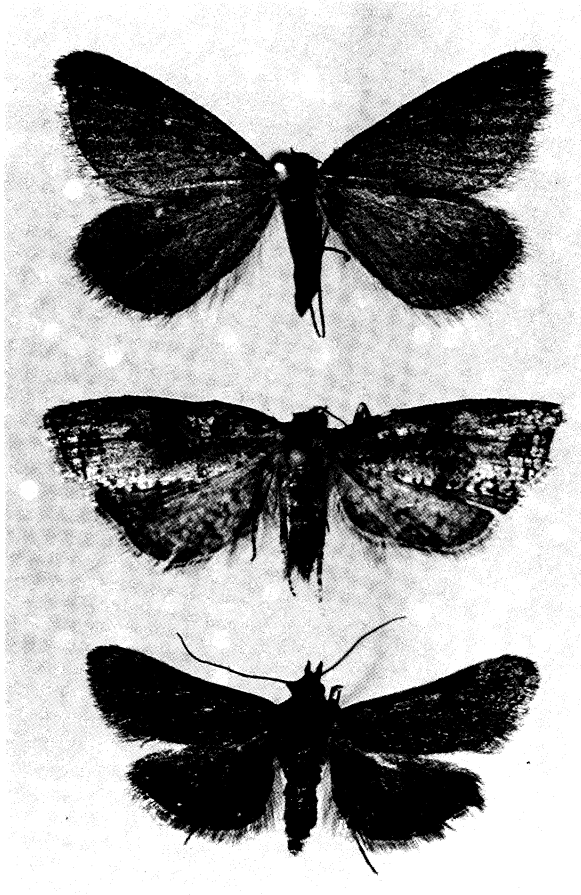

Fig. 2: Undescribed species that were found included (from the top) *Dichromodes* sp., *Harmologa* sp. and *Loxostege* sp. (wingspan 16 mm)

DISCUSSION

The 125 species of Lepidoptera in 18 families that are recorded from the sites on Tara Hills Research Station is a small number compared with those from places with more diverse plant communities such as Fiordland and Dunedin. The relatively few species recorded does reflect the condition of the vegetation in this particular part of the Mackenzie Country, which is depleted and with a low component of natives. The Lepidoptera fauna, although small, is highly characteristic, containing not only nationally rare species *(Theoxena scissaria)* but its own endemics as well (*Tingena honesta, Ichneutica* sp.). Several species have their type locality in various parts of the Mackenzie Country:

Kiwaia lenis (Philpott 1929)	Lake Pukaki
Orocrambus fugitivellus (Hudson 1950)	Mackenzie Country
Scoparia parachalca Meyrick 1901	Lake Tekapo shore
S. gyrotoma Meyrick 1909	Lake Tekapo shore
Tmetolophota toroneura (Meyrick 1901)	Lake Pukaki
Tingena honesta (Philpott 1929)	Lake Tekapo
Orocrambus lectus (Philpott 1929)	Lake Tekapo

The first 4 of these were not recorded in this survey with its emphasis on nocturnal species, probably because they are typically diurnal.

Biogeographically, the fauna of the Mackenzie Country has much in common with that of Central Otago from which it is separated by the St Bathans and Hawkdun Ranges. Species with restricted ranges that are shared between these 2 areas include; *E. zelaea, A. lewisi, S. oenospora, A. recta, S. gyrotoma* and undescribed species of *Dichromodes, Harmologa* and *Loxostege*. Others, including *T. toroneura, T. pentadactyla, C. cinigerella* and the rare *T. scissaria*, are typical of intermontane basins and eastern foothills and plains from north Canterbury to Otago. All of these and others like *P. caerulea, H. christinae, W. mimica, A. sistens, E. admirationis, O. lewisi* and *C. plebejana* give this area a distinctive Lepidoptera fauna quite unlike that of areas further west or of the south-eastern region of the South Island.

Such a meagre fauna obviously lacks many species but some absences are particularly striking. Among the noctuids, the absence of *G. insignis* and the low level of prevalence of *G. ustistriga* and *G. plena* is hard to explain as they are ubiquitous over so much of lowland to montane New Zealand, and often the commonest noctuids in light-traps in such areas. In the tortricids, similarly ubiquitous species groups such as *Ctenopseustis* and *Planotortrix* are also apparently absent even though suitable hosts for these occur in the study area.

At the family level the Crambidae, Geometridae and Noctuidae (typically for New Zealand) form the bulk of the species present, while the Tortricidae and especially the Oecophoridae are less well represented. This reflects the total lack of forest, and the paucity of shrubland in the study area. Few species that are normally considered pests appeared in large enough numbers to affect agriculture. Exceptions were the Southern army worm *(P. aversa)*, while 2 species that were bred from *Lotus* may also be regarded as pests, as they are very common in the area, ie, *E. zelaea* and *Z. indocilisaria*, both with females incapable of flight.

Among the significant discoveries in this survey was a new species tentatively assigned to the genus *Loxostege*. The plain grey-brown adults are fast flyers over bare ground. The species has since been found commonly in saline areas of the Upper Clutha and Manuherikia where the larvae feed on *Atriplex buchananii* growing on the barest areas. The distinct new species of *Dichromodes* may be identical to that recently found near Cromwell and Luggate. It appears to feed on lichens on the ground as opposed to lichens on rock surfaces, as in the rest of the genus in New Zealand. The undescribed species of *Harmologa* although rare, has been found in widely scattered parts of Otago and has been bred from *Hymenanthera*. The trapping of 2 males of an *Ichneutica* species was a surprise as the genus is typically alpine, although *I. ceraunias* occurs at sea-level near Invercargill and at 250 m near Alexandra. The new species is close to *I. homerica* but is smaller.

In summary the Tara Hills trapping results show the Lepidoptera fauna of this part

of the Mackenzie Country, although not diverse, is highly distinctive, containing not only many species typical of the inland South Island but species endemic to the Mackenzie Country.

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Effect of temperature and host plant on development of three species of leafrollers (Lepidoptera: Tortricidae)

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ABSTRACT

Three species of leafrollers were reared to maturity on fresh leaves or diets prepared from freeze-dried leaves of various host plants. Linear relationships were found between development rate and temperature for brownheaded (*Ctenopseustis* sp.) and greenheaded leafroller *(Planotortrix excessana)* larvae and pupae reared at 11.5, 18.0 and 22.5°C. Rate of pre-imaginal development was affected by insect sex and species and larval host plant. Greenheaded leafroller developed faster than the brownheaded leafroller. Males of all 3 leafroller species developed faster than females for larvae, while the reverse applied for pupae. Leafrollers developed relatively faster on some host plants and produced relatively larger insects, e.g., lightbrown apple moth *(Epiphyas postvittana)* on broadleaved dock *(Rumex obtusifolius).* Insects developed more slowly on diets based on freeze-dried leaves to produce heavier individuals than insects reared on fresh leaves of the same hosts.

Keywords: Leafroller, larvae, pupae, adults, development, size, temperature, host plant, *Epiphyas postvittana, Ctenopseustis* sp., *Planotortrix excessana.*

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