

THE BUTTERFLIES AND MOTHS (LEPIDOPTERA)
OF THE CANADIAN SHIELD NATURAL REGION OF ALBERTA:
Preliminary Survey of the Richardson Dunes, Maybelle River,
and Marguerite Crag & Tail Wildland Parks

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The Butterflies and Moths (Lepidoptera) of the Canadian Shield Natural Region of Alberta:

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Introduction

The Canadian Shield ecoregion is one of six natural regions found in Alberta. It is restricted to the extreme northeastern part of the province (Strong & Leggat 1992). This region is further divided into the Kazan Upland and Athabasca Plain that are located north and south of Lake Athabasca, respectively. Although the Lepidoptera are one of the dominant insect groups of the Boreal Plain (Danks 1979), very few accounts of local butterfly inventories are available (Bird et al. 1995), and no published inventories of moths exist for any given site in Alberta. The recently established parks within the Athabasca Plain subregion, consisting of the Richardson River Dunes Wildland Park, Marguerite Crag & Tail Wildland Park, Maybelle River Wildland Park and Athabasca Dunes Ecological Reserve, encompass a unique sand dune complex. Typical boreal habitats are also represented. The purpose of this report is to provide a summary of the Lepidoptera species found to date within the new parks and adjacent areas, with a brief synopsis of species' distribution patterns and conservation status.

Methods & Materials

The core study area consisted of the Richardson Dunes Wildland Park, Maybelle River Wildland Park, and adjacent areas which were accessible by quad ATV's. Some sampling was also conducted in Marguerite Crag & Tail Wildland Park, but was limited due to helicopter-only access. Unique habitat elements consist of extensive stabilized and active sand dunes, and exposed bedrock outcrops (Strong & Leggat 1992). Field work was conducted from June 11 - 15, 2000 and August 21 - 26, 2000 by members of the Alberta Lepidopterists' Guild: Andrew Mitchell, Greg Pohl, Chris Schmidt (June) and Dave Lawrie, Doug Macaulay (August).

Sampling was conducted by active netting during the day for diurnal species. Light trapping was conducted using a combination of 12 watt DC ultraviolet light traps (BioQuip Products, Gardena, CA. 12V, 7 Amp-hour Rocket rechargeable battery, Global & Yuasa Battery Co., Korea) and 175 watt mercury vapour sheet traps at night (powered by 350-watt Honda generator). Sites were chosen to maximize habitat diversity. The habitats sampled consisted of open jack pine forest and stabilized dunes (JP1), mature closed canopy jack pine forest with a shrub understory (JP2), active sand dunes (SD), riparian shrub / woodland (RP), open black spruce / peatlands (PL), open mixed wood uplands (UL), and willow/ sedge fens (WF). Sampling localities representative of each habitat are given in Table 1.

Specimens were identified using pertinent literature sources and the private collections of members of the Alberta Lepidopterists' Guild. Some species determinations were confirmed by Gary Anweiler (Edmonton), J. Donald Lafontaine (Ottawa) and Jim Troubridge (Langley, B.C.). Nomenclature follows that of Lafontaine et al. (2000), and common names, where available, follow Bird et al. (1995), Covell (1981) and Jones (1951).

Table 1: Habitat and location of collection sites.

Habitat	Location	Co-ordinates
JP1	Richardson air strip, km 76 Ft. Chipewyan Rd. Release Lake camp, 3.1km W Ft. Chipewyan Rd.	57° 53.0' N, 111° 2.0' W 58° 4.4' N, 110° 54.4' W
PL/JP1	km 83, Ft. Chipewyan Rd.	57° 57.2' N, 111° 4.0' W
RP/JP1	Embarras airstrip, old winter road Ft. Chipewyan rd. at Richardson R.	58° 10.3' N, 111° 11.0' W 58° 3.5' N, 110° 55.8' W
SD	Athabasca Dunes	58° 9.0' N, 110° 54.3' W
UL/PL	Marguerite Crag & Tail Wildland Park	57° 34.0' N, 110° 47.0' W
WF/JP2	15 km E. Embarras air strip	58° 10.3' N, 111° 11.0' W

Annotated list of the Macrolepidoptera

A list of the species of butterflies and larger moths recorded thus far is given below. Notes on the significance of these new records are given. Annotations for the microlepidoptera are excluded, since data on the biology and distribution is not known for many of these. Specific date and locality data is given in Appendix 1. We have tried to comment on the abundance of each species in the study area, but because of the time-limited collecting this is not always possible. This is especially true for nocturnal moths, where many variables can affect light trap performance between sites and sampling times. Furthermore, many of the moths were represented by only one or two specimens.

I. BUTTERFLIES

HESPERIIDAE

Amblyscirtes vialis (W.H. Edwards) Common Roadside Skipper

A widespread species, but at the northernmost limits of its range in northeastern Alberta. Prefers moist woods and riparian habitats. Several individuals were found at the Richardson River crossing.

Carterocephalus palaemon mandan (W.H. Edwards) Arctic Skipper

Common and widespread throughout the boreal forest. Found in one locality in the study area, in grassy openings near aspen stands along the Embarras road.

Erynnis icelus (Scudder & Burgess) **Dreamy Duskywing**

Common throughout the study area where aspen occurs. Widespread throughout the boreal forest.

PAPILIONIDAE

Papilio canadensis **Rothschild & Jordan** **Canadian Tiger Swallowtail**

Found at several sites where aspen and willow occur. Probably more common than the current records indicate, as the peak flight had not yet occurred. Transcontinental distribution, north to tree line.

PIERIDAE

Colias interior **Scudder** **Pink-edged Sulphur**

Widespread throughout the boreal forest, but at the northern edge of its North American range in the study area.

Euchloe creusa (Doubleday) **Northern Marble**

Uncommon at one site in the study area, where the habitat consisted of mature jack pine forest with an alder understory. There are very few known boreal forest populations of this species. It is not known why these populations are so localized. This species is more common in the mountains and foothills.

LYCAENIDAE

Callophrys augustinus augustinus (Westwood) **Brown Elfin**

Widespread throughout the boreal forest. Uncommon in the study area, but this may reflect the earlier flight season of this species.

Callophrys niphon clarki (Freeman) **Pine Elfin**

Primarily a species of eastern North America, it is near the northwestern limits of its range in the study area. Only one specimen recorded, but this undoubtedly reflects the earlier flight season, since the larval host plant, jack pine, is abundant.

Callophrys polia obscura (Ferris & Fischer) **Hoary Elfin**

Common throughout the boreal forest and the study area.

Celastrina ladon lucia (Kirby) Spring Azure

Probably more common earlier in the season; several slightly worn specimens were recorded from moist wooded areas. Widespread throughout the boreal forest.

NYMPHALIDAE

Boloria chariclea (Schneider) Arctic Fritillary

Common and widespread throughout most of the boreal and subarctic regions of North America.

Boloria eunomia (Esper) Bog Fritillary

A widespread, but local and uncommon species of the boreal forest. Only recorded once in the study area in a muskeg (peatland), which is the preferred habitat.

Boloria freija freija (Thunberg) Freija Fritillary

Common and widespread throughout the study area.

Boloria frigga saga (Staudinger) Frigga Fritillary

Common, but localized. Found in a willow-sedge fen along the Embarras road.

Nymphalis vau-album (Dennis & Schiffermueller) Compton Tortoiseshell

A widespread boreal species. The Compton Tortoiseshell is well known for its large population fluctuations, and is extremely rare in some years and common in others.

Polygonia faunus rusticus (W.H. Edwards) Green Comma

One record of this species from the Richardson River crossing. Widespread in coniferous and mixed wood forests throughout the boreal region.

Polygonia gracilis (Grote & Robinson) Hoary Comma

Recorded once from the Richardson river crossing. Widespread across the boreal region of North America.

Polygonia satyrus (W.H. Edwards) Satyr Comma

Widespread throughout the boreal forest. Near the northern extent of its range here.

SATYRIDAE

Erebia mancinus **Doubleday & Hewitson** **Taiga Alpine**

Uncommon and localized. This species is restricted to black spruce-sphagnum bogs, but is widespread across the northern boreal forest.

Oeneis chryxus caryi **Dyar** **Chryxus Arctic**

One specimen recorded from the Richardson airstrip. Although the open jack pine forest habitat this species prefers is widespread, this species is apparently not common. The boreal populations (subspecies *caryi*) are known from less than ten localities in Alberta.

Oeneis jutta ridingiana **Chermock & Chermock** **Jutta Arctic**

Uncommon and localized in spruce bogs. Widespread throughout the boreal forest.

II. MOTHS

GEOMETRIDAE

Anticlea multiferata **(Wlk.)** **Many-lined Carpet**

Widespread throughout the boreal forest (Lafontaine & Wood 1997).

Carsia sororiata **(Hbn.)** **Alpine Carpet**

Widespread in peatland habitats throughout Boreal and subarctic Canada.

Cladara limitaria **(Wlk.)** **Black-angled Wave**

Transcontinental in distribution, but the presence of this species in the study area represents a significant northward extension of its known range; at the northern limits of its range here.

Cyclophora pendulinaria **(Gn.)** **Pearly-grey Wave**

Boreo-transcontinental in distribution.

Dysstroma citrata **(L.)** **Dark Marbled Carpet**

A common species with a transcontinental distribution.

Ennomos magnaria Gn. **The Notched Wing**

A widespread species which is generally common, but at the northern edge of its known range in northern Alberta.

Epelis truncataria (Wlk.) **Black-banded Orange**

Common in peatland habitats in the study area. Widespread throughout the boreal plain.

Epirrhoe sperryi **Herbulot**

Widespread throughout the boreal forest.

Eufidonia discospilata (Wlk.) **Brown-spotted Wave**

Transcontinental boreal distribution, but not previously known to occur this far north in western Canada.

Eufidonia convergaria (Wlk.)

Although not unexpected, the presence of this species in the study area is a substantial northward range extension from central Alberta (McGuffin 1977). The larvae feed on pines, presumably jack pine in the northern boreal forest.

Eulithis testata (L.) **The Chevron**

A widespread boreal species.

Eulithis xyliana (Hulst) **The Phoenix**

Widespread throughout the boreal region.

Eupithecia columbiata (Dyar)

A boreal transcontinental species; northern range extension from central Alberta (Bolte 1990).

Eupithecia nimbicolor (Hulst)

Widespread across Canada, north to Alaska (Bolte 1990).

Eupithecia russeliata Swett

The presence of this species represents a substantial range extension from southeastern Saskatchewan, and is a new addition to the Alberta fauna (Bolte 1990). The Larvae have been recorded to feed on *Kalmia* and *Rhodora*, so this is probably an inhabitant of peatlands.

Eupithecia satyrata (Dyar)

Widespread across Canada, north to the Yukon (Bolte 1990).

Horisme intestinata (Gn.) **Many-lined Pug**

The many-lined pug occurs throughout the boreal region, but is at the northern limits of its known range here.

Hydriomena ruberata (Freyer)

Widespread throughout the boreal forest.

Lobophora nivigerata Wlk. **Powdered Bigwing**

Significant northward range extension, previously known to occur as far north as central Alberta.

Mesothea incertata (Hulst) **Plain Emerald**

Widespread throughout the boreal forest. Common in peatlands throughout the study area.

Metarranthis duaria (Gn.) **Canadian Thorn**

This species was previously known only from the southern edge of the boreal forest; current records represent a significant range extension northward from central Alberta.

Nepytia canosaria (Wlk.)

This species was previously known to occur as far west as eastern Saskatchewan (McGuffin, 1987), and records from the study area represent a northwest range extension. The first time this species has been recorded from Alberta.

Prochoerodes transversata (Drury)

A typical boreal species, but the study represents a significant range extension northward.

Rheumaptera hastata (L.) **The Argent & Sable**

Widespread throughout the boreal forest.

Semiothisa neptaria (Gn.) **Dark-bordered Granite**

Widespread throughout the boreal forest.

Semiothisa unipunctaria (W.S. Wright) **Pebble Granite**

Widespread throughout the boreal forest.

LASIOCAMPIDAE

Malacosoma disstria (Hbn.) **Forest Tent Caterpillar**

A ubiquitous species found throughout most of North America, but restricted to deciduous forests. Near the northern edge of its range in the study area.

Phyllodesma americana (Harris) **American Lappet**

Widespread throughout the boreal forest.

SPHINGIDAE

Sphinx poecila Steph. **Larch Sphinx**

A relatively rare species of boreal forest wetlands where the larval host plant, larch, is common. Although expected to occur throughout most of the boreal region, the current record represents the northernmost record for this species in North America (Riotte 1980).

Hemaris thysbe (F.) **Hummingbird Moth**

Widespread throughout the boreal forest.

Lapara bombycoides Wlk. **Northern Pine Sphinx**

This species was not known to occur in Alberta until recently. It is at its western range limit here. Although there are only about 3 localities from which it is known in Alberta, it is expected that it will be found throughout the northeastern part of the province where the larval host, jack pine, is common. The northernmost known population in North America.

Smerinthus jamaicensis (Drury) **Twinspot Sphinx**

Widespread throughout the boreal forest.

NOTODONTIDAE

Furcula occidentalis (Lintner) Willow Kitten

Widespread throughout deciduous forest habitats in the boreal forest, although it is near the northern limits of its range in the study area.

ARCTIIDAE

Crambidia impura B. & McD.

This species is known from two widely separated populations, one in the southern Rocky Mountain states and one in northern B.C. and Yukon territory. The presence of this species in the study area is the first record for Alberta, and represents a marked extension in the known range of the Yukon/B.C. population.

Cisseps fulvicollis (Hbn.) Yellow-collared Scape Moth

A widespread, boreal species but only known as far north as Ft. Smith, N.W.T.

Spilosoma virginica (F.) Virginia Tiger

Previously only known to occur as far north as central Alberta. Widespread throughout most of North America.

NOCTUIDAE

Abagrotis brunneipennis (Grt.)

This species is widespread across the southern boreal forest, but is relatively rare. It has only recently been added to the Alberta fauna, and is known from less than five localities. The study site represents a significant range extension, and is the northernmost known locality for this species in North America.

Abagrotis placida (Grote)

This species occurs across much of Canada, and inhabits dry or open forested areas.

Acrionicta grisea Wlk. Gray Dagger Moth

Widespread throughout deciduous forest habitats in the boreal forest, although it is near the northern limits of its range in the study area.

Acronicta obliquata (J.E. Sm.) **Smearred Dagger Moth**

Widespread throughout wetland habitats in the boreal forest. Current records indicate a significant northward extension of the known range (Prentice 1962).

Agrotis obliqua (Sm.)

Widespread in open, dry habitats throughout the boreal forest.

Agrotis vetusta (Wlk.) **Old Man Dart**

Widespread across much of boreal North America, although it prefers dry, open habitats more typical of the transition and prairie zones. Usually the most common member of its genus.

Aletia oxygala (Grote)

A widespread and common species, but at the northern limits of its known range here.

Amphipoea americana (Speyer) **American Ear Moth**

Transcontinental distribution, but near the northern limits of its known range in the study area.

Anarta luteola G. & R.

A boreal species which is widespread but uncommon and specialized to peat bogs.

Anartomima secedens (Wlk.)

A northern boreal species of coniferous forests. Occurs as far south as southern Alberta (Lafontaine & Wood 1997).

Anathix puta (G. & R.) **Poplar Catkin Moth**

A common species with a transcontinental distribution.

Androloma maccullochi (Kirby) **MacCulloch's Forester**

This species is widespread across the boreal forest, but the study area is likely at the northernmost edge of its known range.

Andropolia contacta (Wlk.) **Canadian Giant**

A common species with a transcontinental distribution.

Apamea devastator (Brace) Destructive Quaker

A common species with a transcontinental distribution.

Apharetra dentata (Grote)

An uncommon species with a transcontinental distribution. Restricted to boreal forests.

Archanara subflava (Grote)

A species typical of wetlands. At the northern limits of its known range in the study area.

Brachylomia algens (Grote)

Uncommon but widespread across the boreal region.

Caradrina montana (Bremer)

A common species of open forests throughout the boreal and transition zones.

Catocala briseis Edwards Briseis Underwing

A relatively common species of deciduous forests, but northern Alberta is the northernmost extent of its known distribution. This may be the northernmost member of its genus in North America.

Celaena reniformis (Grote) Kidney-spot Rustic

A widespread species, but the study area is well north of its known range.

Chortodes defecta (Grote)

An uncommon species of wetland habitats. At the northernmost extent of its known range in the study area.

Drasteria adumbrata (Behr) Shadowy Arches

The boreal populations of *D. adumbrata* (subspecies *alleni* (Grote)) are at their western range limit in eastern Alberta. The only other known locality for this species in Alberta is a historical record from the Wainwright area, dating back at least fifty years (Bowman 1951). The presence of this species in the study area represents a significant range extension from Wainwright and Lac La Ronge, SK (Hooper 1990).

Drasteria hudsonica (G. & R.) Northern Arches

A western species, occurring from Alaska south along the Rocky Mountains to New Mexico, and east to Manitoba (Lafontaine & Wood 1997). The occurrence of the Northern Arches in the study area is significant because this is the first record from the boreal plains region of the province; the nearest known populations occur in the prairies to the south (Wainwright area), and the foothills. This species was also recorded from the Bitumont airstrip (G. Pohl), so it is probably more widespread in dry, boreal forest habitats of northeastern Alberta. The boreal specimens appear to be closest to the nominate subspecies from the foothills, not to subspecies *heathi* (B. & McD.) Of the prairies.

***Eurois occulta* (Linnaeus) Great Grey Dart**

A common species which occurs throughout most of Canada and the western U.S.

***Euxoa cursoria wirima* Hardwick**

The presence of this species is not unexpected, since the subspecies was described from Ft. Smith, N.W.T. However, the North American distribution of this holarctic species is limited to the southern Yukon and southeastern N.W.T., with one population known from the Jasper Lake Dunes in Jasper National Park. This species is specialized to habitats associated with active sand dunes.

***Euxoa detersa* (Wlk.) Rubbed Dart**

This species is typical of areas with loose, sandy soil. It is generally common, and is known as far north as Ft. Smith, N.W.T.

***Euxoa perpolita* (Morr.) Polished Dart**

The Polished Dart is also restricted to dry, sandy habitats. The study area represents a significant northern range extension, but it is unlikely this population is disjunct. The nearest known populations occur in open jack pine forests in central Alberta, and this habitat type occurs throughout the northeastern and east-central part of the province.

***Fishia enthea* Grote**

This species occurs across most of southern Canada, but is very rare and localized. It is known primarily from the southern boreal forest and aspen parkland; the study area represents the northernmost record for North America.

***Hemipachnobia monochromatea* (Morrison)**

The occurrence of this species in the study area represents the northernmost range extension in North America. It is known from only one other locality in Alberta, although it is expected the apparent rarity of this species is a result of little collecting having been done in peatlands, which is the habitat of this species (Lafontaine 1998).

Hillia iris (Zetterstedt)

A common species with a transcontinental distribution.

Hypena humuli Harris Hop-vine Snout

An uncommon but widespread species, not previously known to occur in the northern boreal forest.

Idia aemula Hbn. Powdered Snout

A common species of coniferous forests with a transcontinental distribution.

Ipimorpha pleonectusa Grote Even-lined Sallow

A species of deciduous boreal forests, at the northern edge of its known range here.

Lacanobia radix (Wlk.)

Widespread and common throughout the boreal forest, although it is near the northern limits of its range in the study area.

Lacinipolia anguina (Grote) Snaky Arches

Widespread throughout the boreal forest, although it is probably near the northern limits of its range in the study area.

Leucania insueta Gn.

Widespread and common throughout most of Canada.

Lithacodia albidula (Gn.) Common Midget

Widespread throughout deciduous forest habitats in the boreal forest, although it is probably near the northern limits of its range in the study area.

Litholomia napaea (Morrison)

A common species, but previously only known as far north as central Alberta.

Lithomoia germana (Morr.)

A common and widespread boreal species.

Oligia egens (Wlk.)

Primarily a western species, known to inhabit open, sandy areas in the prairie and aspen parkland regions. The study area is well north of its known range, but intervening populations likely occur in sandy jack pine forests.

Oligia illocata (Wlk.) **Wandering Brocade**

Widespread throughout the boreal forest.

Oligia mactata (Gn.) **Prairie Brocade**

Common, but at the northern edge of its known range in the study area.

Paradiarsia littoralis (Pack.) **Labrador Dart**

Common and widespread throughout most of Canada.

Parastichtis suspecta (Hbn.)

Common and widespread.

Protolampra rufipectus (Morrison)

A common species which occurs throughout most of Canada and the western U.S.

Protorthodes oviduca (Gn.) **Ruddy Quaker**

Widespread throughout the boreal forest, although it is probably near the northern limits of its range in the study area.

Sunira verberata (Smith)

Primarily a species of western North America. A significant northward range extension.

Syngrapha epigaea (Grote) **Narrow Silver Y**

The known distribution of this species includes southern Canada and the Yukon, and was not previously known from the intervening area. This is a relatively rare species but typical of boreal forest, and it is expected it will eventually be found throughout the northern boreal forest.

Syngrapha octoscripta (Grote) **Dusky Silver Y**

A widespread and common species.

Syngrapha viridisigma (Grote)

A common species widespread throughout the boreal region.

Xanthia sp. nr. togata

Pink-barred Sallow

A widespread species with a transcontinental distribution.

Xestia imperita (Hübner)

A species which is restricted to boreal and montane habitats, and is generally uncommon. Typical of dry, open boreal forest, and the study area is well within the known range.

Xestia praevia Lafontaine

Widespread across central Canada, but restricted to areas where the larval host plants (conifers, primarily pines) occur. The study area represents the northernmost locality known for this species' distribution.

Xestia smithii (Snellen)

Smith's Dart

A widespread and common species.

Xylotype capax (Grote)

Broad Sallow

A relatively rare species of open boreal forest where *Vaccinium*, it's larval hostplant, occurs. At the northern edge of its known range in the study area.

Zale duplicata (Bethune)

Banded Zale

This species occurs throughout much of the boreal forest where pines, the larval host plants, occur. The record of this species from the study area represents the northernmost extent of its known range.

DISCUSSION

Species richness

Using butterfly species richness as an index of how many species likely inhabit the parks, we can extrapolate an estimate of the total lepidopteran species richness. With the distributions and habitats given by Bird et al. (1995), approximately 60 butterfly species should occur in the greater parks area. Since butterflies comprise about 4.5% of the total Lepidoptera fauna in northern temperate regions (Varis et al.1987), we can further extrapolate this to mean that a total of about 1300 species should be expected to occur in the parks. The relative faunal compositions

can be further broken down to proportions to estimate species richness of the major family groups (Table 2). Overall, about 20% of the butterfly and moth species expected to occur in the Athabasca Plain have been recorded from the parks.

Table 2: Number of species of Lepidoptera known and expected to occur within the Athabasca Plain natural region.

	Taxonomic group	Known # spp.	Expected # spp.	% known
Butterflies	All Families	22	60	36.7
Macro - moths	Noctuidae	55	167	22.9
	Geometridae	27	240	16.2
	Remaining families	9	67	13.5
Micro - moths	All families	62	800	7.8
	TOTAL	175	1333	13.1

To date, 175 species of Lepidoptera have been recorded from the parks and adjacent areas of the Athabasca Plain, about 37% and 15% of the butterfly and moth species which are expected to occur here, respectively (Table 2). A higher proportion of the total butterfly fauna has been recorded because they can easily be seen and sampled during the day, and they are less diverse than the moths. The micro-moths are extremely species-rich group, and their biology and taxonomy remains poorly known; as a result, over 90% of the micro-moth fauna of the greater parks region remains to be discovered.

Additional efforts to inventory the Lepidoptera should be conducted during the periods which were not sampled here, namely late June to early August. Since species assemblages change dramatically over the course of the summer, most species which would occur in the study area were not detected during the two brief sampling periods.

Distribution patterns & taxa of special interest

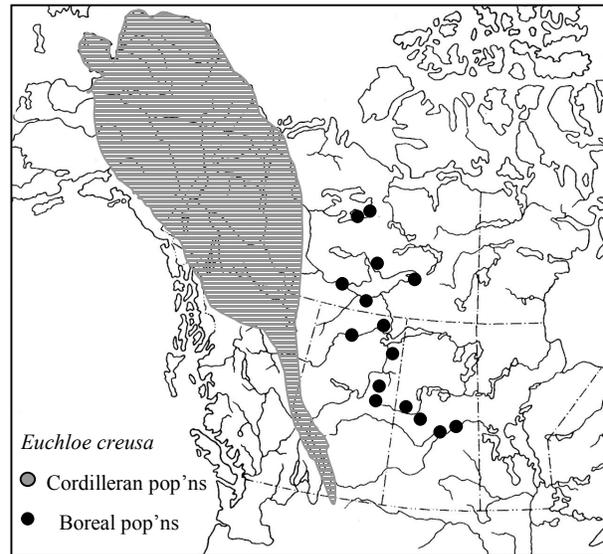
Most of the species recorded to date are characteristic of transcontinental boreal habitats, and these species occur across much of northern North America. Many species recorded from the study area represent substantial (>200km) range extensions, and provide valuable information on species biogeography.

Several species recorded from the study area appear to be widely disjunct from the nearest known populations, but this is likely an artifact of very limited sampling throughout much of the northern boreal forest (with the possible exception of *Crambidia impura* and *Oligia egens*, see below). A good example of this is the noctuid *Hemipachnobia monochromatea*, which is restricted to peatland habitats. Although the nearest known populations occur in central Alberta and western Ontario, the required habitat is more or less continuous in the intervening areas. As such, no species endemic to the study area or obviously disjunct from their known range have so

far been confirmed. However, several species are noteworthy from a conservation standpoint, which are discussed below:

Northern Marble (*Euchloe creusa* (Doubleday))

Although this species is widespread in the foothills and mountains, boreal populations are very localized and apparently not continuous with the mountain populations. There are only 6 sites in the boreal forest where this species has been collected in Alberta (Layberry et al. 1998). Our data indicates that this species may be restricted to habitats associated with mature, closed canopy pine forest, as this was the only site where it occurred. Adults were relatively common here, but absent at all other localities.

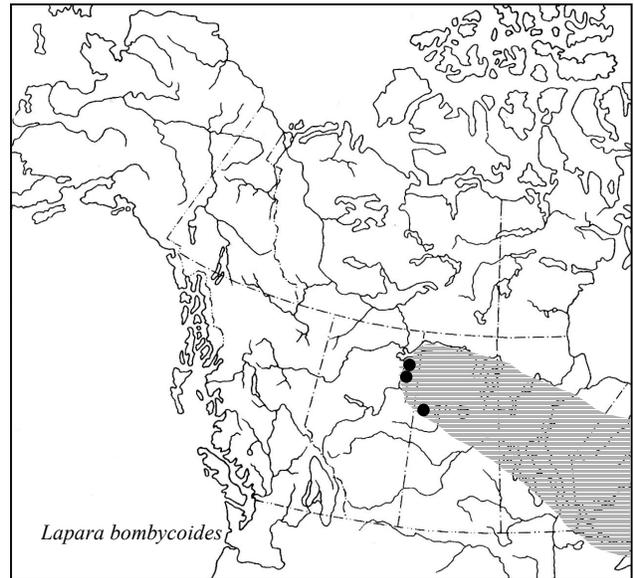


Chryxus Arctic (*Oeneis chryxus caryi* Dyar)

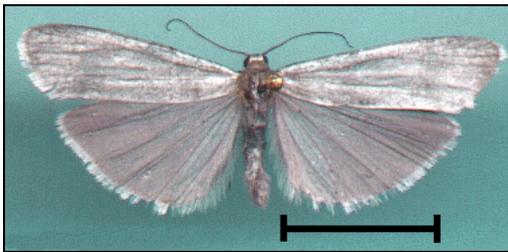
This subspecies is widely distributed throughout the boreal forest north to treeline, although it is rare in Alberta. Because of the few known populations in Alberta, this species is currently considered 'vulnerable' (Fownes 2000). It is currently ranked as S1/S2 by ANHIC. It is likely a species which is inherently rare, since the open jack pine forest it inhabits is quite widespread. Only one specimen was recorded, despite extensive surveying in the appropriate habitat.

Northern Pine Sphinx (*Lapara bombycoides*)

The Northern Pine Sphinx is known from only three sites in Alberta, two of them within the study area. Despite the apparent rarity of this species, it is likely more widespread throughout northeastern Alberta, where the larval host plant, jack pine, is common. At the northwestern limit of its known range.

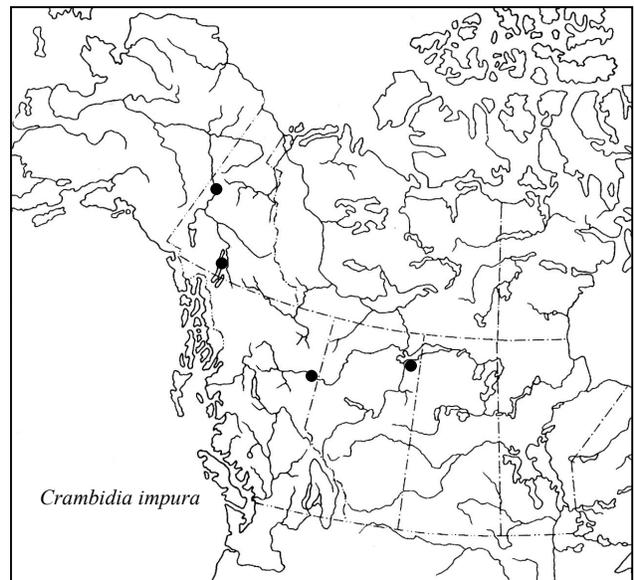


Crambidia impura Barnes & McDunnough



Crambidia impura. Richardson River crossing, 23 Aug. 2000. D. Lawrie, coll.

This small lichen moth is an unusual addition to the fauna of the Athabasca Plain. Its known populations are widely separated, as it occurs in the southern Rocky Mountain States, northern B.C. and the Yukon (Ferguson et al. 2000). Lichen Moths, as the name suggests, feed on lichens as larvae, and typically occur in dry, open habitats. There is a small possibility that the Athabasca population is disjunct from the B.C. and Yukon population, but sampling in intervening areas is needed. This is the first time this species has been recorded for Alberta. It almost certainly occurs in the Peace River valley of Alberta, as it is known from the B.C. side (D. Lafontaine, pers. comm.).



Shadowy Arches (*Drasteria adumbrata alleni*)



The boreal populations of this species occur from Quebec west to Alberta. The Shadowy Arches is known from only one other locality in Alberta (Bowman 1951), and it has not been recorded in recent years (Alberta Lepidopterists' Guild, unpubl. data). It is apparently a rare species of open jack pine forests. The presence of this species in the study area represents a range extension to the northwestern limits of its range. Subspecies *saxea* occurs in the Crowsnest Pass area (Bowman 1951) west to B.C.

Euxoa cursoria wirima

This cutworm is a holarctic species, but its North American distribution is restricted to the Yukon and southwestern N.W.T. (Lafontaine 1987), with one population (possibly disjunct) known from Jasper National Park (J. Troubridge, pers. comm.). This species warrants further tracking, as its North American range is relatively restricted, and it occurs only in sand dune habitats. The study area is one of only two localities where this species has been found in the province; the nearest known population is found at the Jasper Lake dunes, over 700km southwest of the Athabasca Dunes.

Oligia egens

The presence of this species is somewhat unusual, since it is typically a species of the prairie and transition zones to the south, and found only in the prairie provinces in Canada. *O. egens* is an uncommon to rare species, which prefers open, wooded areas with light or sandy soil. Because of its localized distribution and scarcity, it may warrant further tracking.

Conclusion

The inventory work conducted in the parks of the Athabasca Plain catalogued 113 species of macrolepidoptera, and 62 microlepidoptera. This is about 13% of all the species expected to occur in this region; because of the difference in peak flight periods, many species could not be sampled during the two brief inventory periods. Of the 20 butterfly species recorded, *Oeneis chryxus caryi* is currently ranked as 'sensitive' in the province (Fownes 2000). Three of the macro-moths (*Nepytia canosaria*, *Eupithecia russeliata*, *Crambidia impura*) are new additions to the provincial fauna (Lafontaine *et al.* 2000); information on the biology, taxonomy and

distribution for many of the microlepidoptera is sparse or lacking, but some of these will undoubtedly prove to be new to Alberta as more information becomes available.

With the possible exception of the Northern Marble (*Euchloe creusa*), the taxa of special interest mentioned above are all restricted to habitats associated with stabilized and active sand dunes and open jack pine forest. The fauna is dominated by boreo-transcontinental species, although many are at the northern edge of their known North American range. Because of the limited sampling period of this study, additional species specialized to sand dune habitats undoubtedly await discovery.

Recommendations

Future research - Additional survey work in the parks should be conducted between late June and August, since no collections were made during this time period. The peak in moth species diversity occurs in mid to late July, while butterfly diversity is usually greatest in late June. Sampling during these time periods would therefore substantially increase the known fauna of the parks with the least field work effort.

The habitats sampled during this study focused on those unique to the parks, primarily those associated with active and stabilized sand dunes. Although these habitats are relatively species-poor compared to mixed wood and deciduous forests, the sand dune habitats yielded several species which warrant further investigation. Additional field work is needed to determine the geographical distribution of *Euxoa cursoria wirima*, *Crambidia impura* and *Oligia egens* in Alberta. The presence of these species in the study area may represent disjunct populations. Further surveying of boreal forest populations of *Oeneis chryxus caryi* and *Euchloe creusa* should be conducted to determine distributions and population sizes, before management recommendations or status assessments can be made.

The old-growth jack pine stand and adjacent wetlands approximately 15km east of the Embarras airstrip (Richardson Dunes Wildland Park, see Table 1 for co-ordinates) was particularly rich in day-flying butterflies and moths. The large number of species present here is the result of diverse habitats and plants favoured by Lepidoptera occurring in close proximity. The closed forest canopy has resulted in a high diversity of associated understory plants, which are in turn larval food plants for many species. The open willow-sedge fens which occur here also support several species not seen anywhere else which are dependent on this habitats. Any management strategies should ensure these plant communities are maintained, particularly the mature jack pine stand.

Logistics - Several improvements for future inventory field work have been suggested by those who participated in the insect inventory work. These include:

- 1) Maps - researchers participating in inventory work should have maps of the entire study area prior to arriving at the field camp. We would recommend 1:250,000 topo maps, with the target study areas and primary access routes delineated. The 1:50,000 maps provided to research parties at camp were too cumbersome (too fine of a scale, and too many sheets) for navigation, and

copies were not available for every party member. Some people also expressed concern about being unable to locate the field camp and lack of directions, so detailed directions and coordinates would resolve this.

Vegetation polygon maps made available to party members, and distributed well ahead of the field trip, would be very useful for researchers focusing on insects, as the areas most likely to be productive can often be spotted on these maps. This would save valuable time spent scouting for different habitats and collecting sites.

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