

The butterfly fauna of the eastern coast of Hudson Bay and James Bay (Canada), with particular reference to the Holarctic element

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Summary

Twenty-four butterfly and three skipper species were collected at Kuujjuarapik (55°17'N, 77°48'W), in the forest tundra zone of northern Québec, in 1985, 1990 and 1991. This material markedly extends the known northern limit of many species, including *Clossiana bellona* (Fabricius, 1775), *Vanessa atalanta* (Linnaeus, 1758), *Incisalia polios* Cook & Watson, 1907, *Polygonia gracilis* (Grote & Robinson, 1867), *Lycaeides idas* (Linnaeus, 1761) and *Celastrina ladon* (Cramer, 1780). A massive migration of *Vanessa cardui* (Linnaeus, 1758) was observed in 1991. Certain northern species, such as *Colias nastes* Boisduval, 1832 and *Clossiana polaris* (Boisduval, 1828), are at their southern limit at Kuujjuarapik. The total fauna on the eastern coast of James Bay - central Hudson Bay, Québec (between 51°30' and 57°15'N; up to 100 km inland of the coast) comprises 41 species of butterflies and skippers. The proportion of circumpolar (Holarctic) species increases with the latitude. The approximate percentage of Holarctic species at James Bay sites is 50%, at Kuujjuarapik 75% and at more northern sites on Hudson Bay 90%.

Introduction

The Lepidoptera fauna of the eastern coast of Hudson Bay is rather poorly known. Thus, in the recent handbooks by LAPLANTE (1985) and SCOTT (1986), the maps and other data on the distribution of butterflies in Nouveau-Québec are highly generalized. Only a few papers on the butterflies of the eastern coastal area of Hudson Bay and of James Bay have been published (FREEMAN, 1949 ; LAFLAMME & PERRON, 1983 ; GAUTHIER & KOPONEN, 1987 ; COMTOIS & NÉRON, 1987 ; LAYBERRY, 1988 ; NÉRON, 1990 ; KOPONEN, 1992). No detailed study of the butterfly fauna of any restricted locality in the Hudson Bay area is available.

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This article presents the butterfly and skipper species found by the author around the village of Kuujjuarapik (Whapmagoostui/Poste-de-la-Baleine/Great Whale) during three summers (1985, 1990 and 1991). Data on their flying periods and habitat preferences in the area are given. The known butterfly and skipper fauna of the southeastern coasts of Hudson Bay is also discussed.

Study area, material and methods

The Kuujjuarapik area (55°17'N, 77°48'W) belongs to the southern forest tundra zone (PAYETTE, 1983) (Fig. 1). Three conifer tree species, white spruce, black spruce and tamarack grow there at their arctic-maritime limit. Alder and dwarf birch shrubs are typical of the area. There are also small bogs and moist meadows. Open hills, barren or covered by alpine heath, are rather low, the highest summit being about 230 m. Vast alpine tundra areas are absent around Kuujjuarapik. The village is located on a sandy terrace between the Great Whale River and Hudson Bay.

Butterflies and skippers were collected and observed around the village. Lepidopterans were observed in 1985 whenever the weather permitted ; species were caught by netting, and abundant ones also recorded without catching. The study period consisted of two periods, 18th June - 8th July and 2nd August - 2nd September 1985 ; the total number of observation days was 34. In 1990 collecting was less intensive ; the main observation period was 13th July - 21st August, but some collecting was also done around mid-June. The collecting period in 1991 was short, 5th-11th July.

The author collected butterflies at Lake Ekomiak (53°23'N) 60 km south of Radisson (La Grande) in July 1990, and between Rupert River (51°30'N) and Lake Ekomiak on the James Bay Highway in July 1991. Information on collections by LAYBERRY (1988 and unpubl.) in 1986-87 in the James Bay Highway area (between 51°30' and 53°45'N), has been included in this paper. Collections between 53°10' and 57°15'N, presented by GAUTHIER & KOPONEN (1987), are also included.

The system and nomenclature is mainly based on LAPLANTE (1985) ; however, all subspecific and other infraspecific names have been omitted.

Results

1. Fauna of Kuujjuarapik

Altogether, 24 species of butterflies and three skippers were found at Kuujjuarapik (Table 1). The butterfly material included twelve Nymphalidae, five Lycaenidae, four Satyridae and three Pieridae species.

Most species were collected or observed frequently ; only *Incisalia polios* Cook & Watson, 1907 and *Speyeria atlantis* (Edwards, 1862) in 1985, *Colias nastes* Boisduval, 1832 in 1990, and *Clossiana bellona* (Fabricius, 1775), in 1991, were observed once. The species observed most often in 1985 were *Epidemia*

dorcas (Kirby, 1837), which was seen on 20 of the total 34 observation days, and *Lycaeides idas* (Linnaeus, 1761) (18), both flying mainly in August, *Colias pelidne* Boisduval & Leconte, 1829 (14) with a very long flying period, *Oeneis taygete* Geyer, 1830 (14) and *Celastrina ladon* (Cramer, 1780) (13) flying in June-July. *Nymphalis antiopa* (Linnaeus, 1758), *Clossiana titania* (Esper, 1793), *C. selene* (Denis & Schiffermüller, 1775) and *C. frigga* (Thunberg, 1791) were also seen frequently.

Three species not found in 1985 were collected in 1990 : *Colias nastes*, and the skippers *Hesperia comma* (Linnaeus, 1758) and *Pyrgus centaureae* (Rambur, 1839) ; and one in 1991 : *Clossiana bellona*. The skippers were markedly abundant, and their absence in 1985 is presumably due to their flying pattern : only or dominantly in even years at Kuujjuarapik. The same is true for *Clossiana polaris* (Boisduval, 1828).

A massive migration of *Vanessa cardui* (Linnaeus, 1758) was observed in July 1991. More than 20 specimens were seen at Kuujjuarapik and five captured, 5th-11th July.

Moist swampy meadows were the preferred flying sites of many species at Kuujjuarapik. Species collected frequently in moist meadows and bogs were *Clossiana frigga*, *C. freija* (Thunberg, 1791), *C. titania*, *Procllossiana eunomia* (Esper, 1799), *Oeneis taygete*, *O. jutta* (Hübner, 1806), *Coenonympha inornata* Edwards, 1861, *Epidemia dorcas*, *Carterocephalus palaemon* (Pallas, 1771), *Hesperia comma* and *Pyrgus centaureae*. Species typically observed in forested sites were *Nymphalis antiopa* and *Polygonia gracilis* (Grote & Robinson, 1867), and also *Clossiana titania* and *Lycaeides idas*. Some species, such as *Vanessa atalanta* (Linnaeus, 1758), *Colias pelidne*, *Clossiana polaris*, *Agriades franklinii* (Curtis, 1798), *Oeneis taygete* and *O. melissa* (Fabricius, 1775) were often seen on open, windy hills and also on the open Hudson Bay shores. The most eurytopic species at Kuujjuarapik seemed to be *Colias pelidne*, *Pieris napi* (Linnaeus, 1758), *Clossiana selene*, *C. titania*, *Vanessa atalanta*, *Lycaeides idas*, *Celastrina ladon* and *Hesperia comma*.

2. Fauna of the eastern coast of James Bay - Hudson Bay

Altogether, 41 butterfly and skipper species are known from the coastal area between southern James Bay and central Hudson Bay (Table 1). This area is situated between Rupert River, 51°30'N, and Lake Minto, 57°16'N (Fig. 1). Thirteen species not caught at Kuujjuarapik in 1985, 1990 and 1991 are known from the James Bay area. *Papilio machaon* Linnaeus, 1758 and the migrating *Danaus plexippus* (Linnaeus, 1758) were mentioned by FREEMAN (1949) from the southernmost locality included, Fort Rupert (Waskaganish). The same is true for *Incisalia augustus* (Kirby, 1837), reported by LEBLANC (1985) at Rupert River. Other species, known to occur in the James Bay area (LAYBERRY, 1988 ; SCOTT, 1985), but not found by the present author include *Colias interior* Scudder, 1862, *Oeneis chryxus* (Doubleday & Hewitson, 1849), *Erebica disa* (Thunberg, 1791) and *Epidemia epixanthe* (Boisduval & Leconte, 1833).

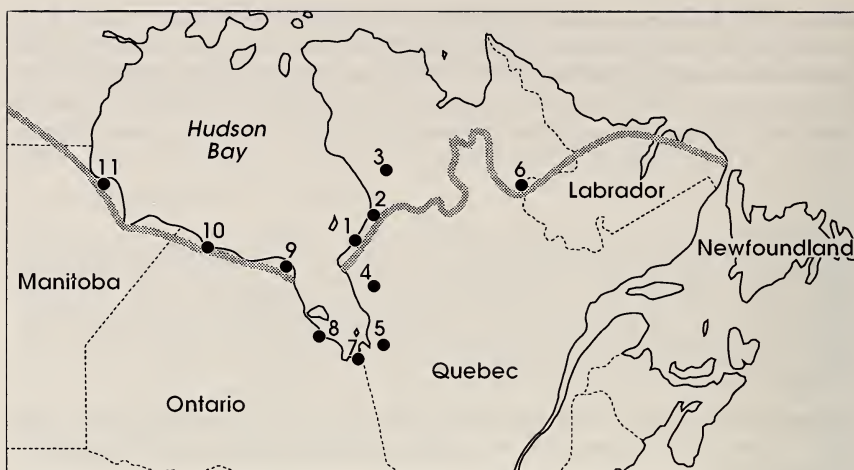


Fig. 1. Study localities in northeastern Canada. 1. Kuujjuarapik, 2. Richmond Gulf, 3. Lake Minto, 4. Lake Ekomiak, 5. Rupert River, 6. Schefferville, 7. Missisicabi River, 8. Fort Albany, 9. Cape Henriette Maria, 10. Fort Severn, 11. Churchill. Gray line indicates the northern forestline.

The author collected the skippers *Polites mystic* (Edwards, 1863), *Erynnis icelus* (Scudder & Burgess, 1870) and *Thymelicus lineola* (Ochsenheimer, 1808) at Rupert River, the southernmost study site. Of these, *T. lineola*, an introduced European species, was abundant. *Pterourus glaucus* (Linnaeus, 1758), *Phyciodes morpheus* (Fabricius, 1775) and *Basilarchia arthemis* (Drury, 1773) were caught as far north as Lake Ekomiak (53°23'N). *Vanessa cardui* occurred in great numbers along the James Bay Highway at all suitable sites in early July 1991 (see KOPONEN, 1992).

Of the 41 species found between Rupert River and Lake Minto, 27 have been observed by the present author at Kuujjuarapik. The number of species caught at the James Bay sites, north of Rupert River, is 32 and 19 are known from the northern forest tundra, between Richmond Gulf (17 species) and Lake Minto (Table 1).

Discussion

1. Kuujjuarapik

Up to now, 17 butterfly species have been reported from Kuujjuarapik (FREEMAN, 1949; LAFLAMME & PERRON, 1983; GAUTHIER & KOPONEN, 1987; NÉRON, 1990). The present material includes all of these, plus the following seven butterflies which have not been found earlier at Kuujjuarapik (see KOPONEN, 1992): *Colias nastes*, *Clossiana bellona*, *Speyeria atlantis*, *Vanessa atalanta*, *Polygonia gracilis*, *Incisalia polios*, and *Celastrina ladon*. The skip-

Table 1

Butterflies and skippers known from three areas on the eastern coast of James Bay - Hudson Bay (51°30'-57°15'N), based on the present material, GAUTHIER & KOPONEN (1987)¹, LAYBERRY (1988 and unpublished)², FREEMAN (1949)³, COMTOIS & NÉRON (1987)⁴, SCOTT (1986)⁵, and LEBLANC (1985)⁶. The observation periods at Kuujjuarapik were 18th June - 8th July and 2nd August - 2nd September 1985, mid-June and 13th July - 21th August 1990, and 5th-11th July 1991. **JB** = James Bay (boreal forest zone), **KU** = Kuujjuarapik (southern forest tundra), **RM** = Richmond Gulf - Lake Minto (northern forest tundra)

Species	JB	KU	RM	flight at Kuujjuarapik
<i>Papilio machaon</i>	+ ³	-	-	-
<i>Pterourus glaucus</i>	+	-	-	-
<i>Colias interior</i>	+ ²	-	-	-
<i>Colias pelidne</i>	+	+	+ ¹	28.6.-26.8.
<i>Colias nastes</i>	-	+	+ ¹	04.8.
<i>Pieris napi</i>	+	+	+ ¹	18.6.-01.8.
<i>Clossiana selene</i>	+	+	+ ¹	30.6.-13.8.
<i>Clossiana bellona</i>	+	+	-	05.7.
<i>Clossiana frigga</i>	+	+	+ ¹	23.6.-08.7.
<i>Clossiana polaris</i>	-	+	+ ¹	22.6.-02.8.
<i>Clossiana freija</i>	+ ¹	+	+ ¹	22.6.-16.7.
<i>Clossiana titania</i>	+	+	+ ¹	05.7.-22.8.
<i>Proclossiana eunomia</i>	+	+	+ ¹	29.6.-06.8.
<i>Speyeria atlantis</i>	+	+	-	05.8.
<i>Phyciodes morpheus</i>	+	-	-	-
<i>Vanessa atalanta</i>	-	+	-	09.6.-01.7.
<i>Vanessa cardui</i>	+	+	-	05.7.-11.7.
<i>Nymphalis antiopa</i>	+	+	+ ⁴	18.6.-15.7.
<i>Polygonia gracilis</i>	-	+	-	21.6.-29.6.
<i>Polygonia sp.</i>	+	-	-	-
<i>Basilarchia arthemis</i>	+	-	-	-
<i>Danaus plexippus</i>	+ ³	-	-	-
<i>Coenonympha inornata (tullia)</i>	+	+	-	08.7.-05.8.
<i>Oeneis chryxus</i>	+ ²	-	-	-
<i>Oeneis taygete (bore)</i>	-	+	+ ¹	18.6.-01.8.
<i>Oeneis jutta</i>	+ ²	+	+ ¹	26.6.-27.7.
<i>Oeneis melissa</i>	-	+	+ ¹	22.6.-01.8.
<i>Oeneis polixenes</i>	-	-	+ ¹	-
<i>Erebia disa</i>	+ ⁵	-	-	-
<i>Incisalia polios</i>	-	+	-	21.6.
<i>Incisalia augustus</i>	+ ⁶	-	-	-
<i>Epidemia dorcas</i>	+	+	-	28.7.-02.9.
<i>Epidemia epixanthe</i>	+ ²	-	-	-
<i>Lycaeides idas</i>	+	+	+ ¹	05.7.-02.9.
<i>Agriades franklinii (glandon)</i>	+ ¹	+	+ ¹	30.6.-12.8.
<i>Celastrina ladon (argiolus)</i>	+ ¹	+	-	18.6.-08.7.
<i>Polites mystic</i>	+	-	-	-
<i>Hesperia comma</i>	+ ²	+	+ ¹	14.7.-12.8.
<i>Thymelicus lineola</i>	+	-	-	-
<i>Carterocephalus palaemon</i>	-	+	+ ¹	02.7.-08.7.
<i>Pyrgus centaureae</i>	-	+	+ ¹	15.7.-04.8.
<i>Erynnis icelus</i>	+	-	-	-
Total No. of species : 41	32	27	19	

pers *Carterocephalus palaemon*, *Hesperia comma* and *Pyrgus centaureae* are also new to Kuujjuarapik ; however, all these skippers have been recorded north of Kuujjuarapik (GAUTHIER & KOPONEN, 1987).

According to LAPLANTE (1985), many of the present species have a southern range in Québec, and their occurrence at Kuujjuarapik on the Hudson Bay coast is somewhat unexpected. LAPLANTE (1985) regarded *Clossiana bellona*, *Vanessa atalanta*, *Incisalia polios*, *Speyeria atlantis* and *Carterocephalus palaemon* as species of the temperate-boreal forest zone. GAUTHIER & KOPONEN (1987) already reported *C. palaemon* from Richmond Gulf, north of Kuujjuarapik. The following species also have a southern (boreal) distribution ; their range, according to LAPLANTE (1985), in the Québec-Labrador peninsula extends to the forest tundra area only in its maritime southeastern part on the Labrador coast (see LAPLANTE 1985 : 218-219 ; note that Fort Rupert in his map on p. 219 should be Fort George) : *Nymphalis antiopa*, *Polygonia gracilis*, *Epidemia dorcas*, *Lycaeides idas* and *Celastrina ladon*. Of these, NÉRON (1990) has already reported *Nymphalis antiopa* and *Epidemia dorcas* from Kuujjuarapik. Many of the above southern species have been reported from comparable areas on the western coast of Hudson Bay in Ontario and Manitoba (RIOTTE, 1971 ; KLASSEN, 1984 ; KLASSEN *et al.*, 1989). DANKS (1981) mentioned *Clossiana polaris*, *Colias nastes* and *Agriades franklinii* as butterfly species occurring in the Canadian High Arctic. Of the northern species, *Colias nastes*, *Clossiana polaris* and *Oeneis melissa* seem to reach the southern limit of their range around Kuujjuarapik. *Oeneis polixenes* (Fabricius, 1775) has been collected north of Kuujjuarapik (GAUTHIER & KOPONEN, 1987). Its absence from Kuujjuarapik is probably explained by the absence of large-scale tundra areas around the village.

The special flying pattern, only or predominantly in alternate years in the north (cf. SCOTT, 1981 ; FERRIS *et al.*, 1983) can explain the uneven occurrence of some species in 1985 and 1990. Thus *Clossiana polaris* (only one specimen in 1985 and none in 1991), and *Hesperia comma* and *Pyrgus centaureae* (not found in 1985 or 1991) were markedly abundant in 1990. The opposite seemed to be true for *Clossiana freija*, *Oeneis jutta*, and *Carterocephalus palaemon*. No evidence of alternate year flight was found for the more abundant *Oeneis* species, *O. taygete* and *O. melissa* (cf. SCOTT, 1981 ; 1986). The data from Schefferville, central Québec-Labrador peninsula (ANTHONY, 1969 ; KOPONEN, 1980) support the even-year flying pattern of *Hesperia comma* and *Pyrgus centaureae* there as well. *Clossiana polaris* seems to be more common in even years on the Hudson Bay coast (GAUTHIER & KOPONEN, 1987 ; NÉRON, 1990) and near Schefferville (ANTHONY, 1969 ; KOPONEN, 1980). Due to this flying pattern, a study of butterflies in the north during one summer only may give greatly biased results.

2. Eastern coast of James Bay - Hudson Bay

RIOTTE (1971) reported 37 species from the closely comparable areas of northern Ontario : Missisicabi River - Fort Albany on James Bay and Cape

Henriette Maria - Fort Severn on Hudson Bay (51° 15' - 53° N ; Fig. 1). Twenty-five of these were found on the eastern coast of James Bay - Hudson Bay, between Rupert River and Lake Minto (Soerensen's quotient of similarity ; see e.g. MAGGURAN, 1988, QS = 0.64). KLASSEN *et al.* (1989) reported 45 species from northernmost Manitoba ; 33 of the 41 species on the eastern coast of James Bay - Hudson Bay were also mentioned for northern Manitoba (QS = 0.77). MORRIS (1980) listed 37 species of butterflies and skippers found on the Labrador coast, of these 31 were common with the present study area (QS = 0.79).

The proportion of circumpolar, Holarctic species increases with the latitude. The percentage of Holarctic species at James Bay sites is 53%, at Kuujuarapik 74% and at more northern sites on Hudson Bay (Richmond Gulf - Lake Minto) 89%. Of the present total material, between Rupert River and the Ungava peninsula, the percentage of Holarctic species is about 60%.

The proportion of Holarctic species in the total Québec butterfly and skipper fauna is only 26% (LAPLANTE, 1985). On the island of Newfoundland this proportion is 46% and on the Labrador coast as high as 67% (MORRIS, 1980). Around Churchill, northern Manitoba on the western coast of Hudson Bay, the percentage of Holarctic species is about 57% (KLASSEN *et al.*, 1989).

The known northern limit of many species approaches the southern end of James Bay (SCOTT, 1986) and thus several species not mentioned in the present paper probably also occur in the southern James Bay area. Two northern butterflies, *Colias hecla* Lefebvre, 1836 and *C. palaeno* (Linnaeus, 1761), known from the Ungava peninsula (LAPLANTE, 1985 ; SCOTT, 1986), possibly occur in the northernmost parts of the present study area.

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References

- ANTHONY, G. S., 1969. Notes on the butterflies of the Schefferville region, northern Quebec. *McGill Subarctic Res. Paper* 24 : 46-54
- COMTOIS, P. & NÉRON, D., 1987. *Nymphalis antiopa antiopa* (Linné) (Lepidoptera : Nymphalidae) au-delà de la limite des forêts : un essai inusité de colonisation. *Faberies* 13 : 41-44.
- DANKS, H. V., 1981. Arctic arthropods. Entomological Society of Canada, Ottawa. 608 pp.

- FERRIS, C. D., DOS PASSOS, C. F., EBNER, J. A. & LAFONTAINE, J. D., 1983. An annotated list of the butterflies (Lepidoptera) of the Yukon Territory, Canada. *Can. Ent.* 115 : 823-840.
- FREEMAN, T. N., 1949. Field season summary 8. Far North. *The Lepidopterists' News* 3 : 101-102.
- GAUTHIER, R. & KOPONEN, S., 1987. Lépidoptères diurnes capturés sur la côte est des Baies d'Hudson et de James, Nouveau-Québec. *Géogr. phys. et Quatern.* 41 : 171-175.
- KLASSEN, P., 1984. Checklist of Manitoba butterflies (Rhopalocera). *Journ. Lep. Soc.* 38 : 32-39.
- KLASSEN, P., WESTWOOD, A. R., PRESTON, W. B. & MCKILLOP, W. B., 1989. The butterflies of Manitoba. Manitoba Museum of Man and Nature, Winnipeg. 290 pp.
- KOPONEN, S., 1980. Butterflies from the Schefferville area of the central Quebec-Labrador peninsula. *McGill Subarctic Res. Paper* 30 : 62-64.
- KOPONEN, S., 1992. New records of butterflies and skippers (Lepidoptera) from Kuujjuarapik and the James Bay area. *Fabriques* 17 : 55-57.
- LAFLAMME, M. & PERRON, J.-M., 1983. Liste partielle des lépidoptères et des odonates du Nouveau-Québec. *Fabriques* 9 : 76-80.
- LAPLANTE, J.-P., 1985. Papillons et chenilles du Québec et de l'est du Canada. France-Amérique, Montréal. 280 pp.
- LAYBERRY, R., 1988. Season summary 1987. Zone 7 Ontario/Quebec. *News of Lepidopterists' Soc.* 2/1988 : 30-31.
- LEBLANC, A., 1985. Les Lycénidés (Lepidoptera : Lycaenidae) du Québec. *Fabriques*, Suppl. 4 : 1-66.
- MAGGURRAN, A. E., 1988. Ecological diversity and its measurement. Chapman and Hall, Princeton University Press. 179 pp.
- MORRIS, R. F., 1980. Butterflies and moths of Newfoundland and Labrador. The Macrolepidoptera. Research Branch, Agriculture Canada, Publ. 1691. 407 pp.
- NÉRON, D., 1990. Captures de Lépidoptères diurnes en juin et août à Kuujjuarapik (Territoire du Nouveau-Québec). *Fabriques* 15 : 53-58.
- PAYETTE, S., 1983. The forest tundra and present tree-lines of the northern Québec-Labrador peninsula. *Nordicana* 47 : 3-23.
- RIOTTE, J. C. E., 1971. Butterflies and skippers of northern Ontario. *Mid-Continent Lep. Ser.* 2 (21) : 1-20.
- SCOTT, J. A., 1981. Hibernial diapause of North American Papilionoidea and Hesperioidea. *J. Res. Lepid.* 18 : 171-200.
- SCOTT, J. A., 1986. The butterflies of North America. A natural history and field guide. Stanford Univ. Press. 583 pp.

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