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Curatorial Report Number 46

Provisional Notes on the Rare and Endangered Plants and Animals of Nova Scotia

By Wendy Isnor
September, 1981

Nova Scotia Museum
1747 Summer St.
Halifax, Nova Scotia, Canada
B3H 3A6

Hepatica americana

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NOVA SCOTIA MUSEUM

Curatorial Reports

The Curatorial Reports of the Nova Scotia Museum contain information on the collections and the preliminary results of research projects carried out under the program of the museum. The reports may be cited in publications but their manuscript status should be clearly indicated.

Abstract

During the summer of 1981 a program was supported by the Environmental Protection Service, Environment Canada, to research data on the occurrence and distribution of rare and endangered plant and animal species in Nova Scotia. The research was carried out at the Nova Scotia Museum, by using its files and records to obtain most of the data which have been compiled in this report. Species of plants, insects, crustaceans, molluscs, fishes, amphibians, reptiles, mammals and birds were selected upon the advice of specialists. The distribution and habitat of each species is briefly described along with comments on its vulnerability and maps indicating sites at which it is known to occur. For birds, only a species list has been produced because the time available to produce this report was insufficient to deal with the vast amount of available information. The main purpose of this report is to provide guidance to those involved in writing or reviewing impact assessments of various environmental activities in Nova Scotia and to those concerned with protecting the natural environment of Nova Scotia.

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particular thanks are given to the various experts who contributed their knowledge and assistance in preparing species lists, advising on distributions and reviewing early drafts of this report. Among these are Barry Wright, Alex Wilson and John Gilhen of the Nova Scotia Museum, D. Dodds of Acadia University, P. Austin-Smith of Department of Lands and Forests, and A. Erskine of Canadian Wildlife Service.

INTRODUCTION

Under normal conditions, each species of plant and animal reaches a state of harmony with its environment. Through continued adaptation it must adjust to continual changes. However, now that man is able to make rapid alterations in the environment, the survival of many species is becoming more and more dependent upon man's actions.

The purpose of this report is to present up-to-date information on the native, rare, endangered, or limited-distribution species of plants and animals in Nova Scotia, with special reference to their vulnerabilities. This information should be of use to those concerned with the protection of rare and endangered species and the natural environment. The data are based almost entirely on the Nova Scotia Museum records and collections, which may not include all known localities for some species. In many groups there is a lack of distributional and ecological information. The species lists and distributions have been discussed with various authorities in the museum, in provincial and federal government agencies, and at universities in Nova Scotia.

A distribution map is provided for each species to show the localities where the species has been found in Nova Scotia. The information in this report can be accessed either by looking up a particular species or by scanning the distribution maps for references to a location.

"Rare" species either occupy an extremely restricted habitat or are low in numbers. "Endangered" species, on the other hand, are species which are in danger of extirpation throughout all or a significant portion of their range in the province. The species included in this report are those which are rare or endangered in Nova Scotia although they may be common elsewhere. The Nova Scotian populations may be genetically different from other populations and if eliminated, they will be gone forever.

Due to the limited time available for preparation, this report deals only with freshwater and terrestrial species. Marine species are not included, and a brief introduction and species list is all that is provided for the birds.

In this report the account of each species is arranged as follows:

Identification The reference where a classification and description of the species can be located.

Distribution The Nova Scotian distribution along with the distribution outside the province. The distribution map number is given which leads to a map of recorded Nova Scotian localities.

Habitat A description of habitat(s) the species is known to occupy in Nova Scotia.

Vulnerability A description of the species' vulnerability, insofar as it can be assessed. For some species such an assessment is not possible at present.

The various groups dealt with in this report are: plants, freshwater crustacea, insects, land and freshwater gastropods, freshwater bivalves, fishes, amphibians, reptiles, and mammals. The collecting effort varies greatly within these groups. For example, the birds are the best known vertebrates followed by the reptiles and amphibians, while the mammals and freshwater fishes are the least known. For the invertebrates, insects in particular, the state of knowledge in declining order is Lepidoptera, Odonata, Coleoptera, Diptera and Hymenoptera.

It should be emphasized that this is only a preliminary report. We are looking forward to receiving comments and suggestions which will be kept on file at the Nova Scotia Museum in anticipation that revised versions may be published in the future.

PLANTS

There are approximately two thousand species of plants in Nova Scotia, eighty-two of which are included in this report. Some Nova Scotian populations are almost certainly genetically different from other populations and once a plant becomes rare, a few simple events such as a new pasture or new house can destroy its habitat and eliminate the species from the province.

The vascular plants included in this report were chosen from the introduction of "The Rare Vascular Plants of Nova Scotia"; an article from Conservation entitled "Endangered Wild Plants of N.S. by Paul Keddy; Ecological Reserves in the Maritimes, and check sheets of the International Biological Programme - Conservation of Terrestrial Communities (IBP-CT).

The Bryophyta have been excluded because certain experts feel that there is just not enough data available at this time to allow an accurate decision to be made on what is rare or endangered.

Roland and Smith's publication, The Flora of Nova Scotia, has been used extensively as a reference for identification and for its written records of distribution localities.

Information on rarity is scarce and there is a great need for taxonomic and phytogeographic research on the rare plants. There is also a real need to undertake further field research in order to map the present-day distribution.

LYCOPODIINAE

(Spikemosses)

Family SELAGINELLACEAE

There are two species in Nova Scotia, one of which is considered significant in this report.

● Selaginella rupestris (Linnaeus) Spring. Rock Spikemoss..

Identification Refer to Roland and Smith (1969) p. 20.

Distribution (See Map 1) Nova Scotia to Manitoba. Reported in Nova Scotia from the summit of Shobel's Mtn., Sandy Cove, Digby Neck and on rock outcrops east of Centreville, Digby Neck, by J.S. Erskine in 1955.

Habitat Dry exposed rocks and sandy sterile soil.

Vulnerability Possibly vulnerable to over collecting.

FILICINAE
(Ferns)

Family SCHIZAEACEAE

Only one species in Nova Scotia.

●**Schizaea pusilla** Pursh. Curly Grass Fern.

Identification Refer to Roland and Smith (1969) p. 26.

Distribution (See Map 2) Newfoundland; Nova Scotia; southern New Jersey; Bruce Peninsula, Ontario. Recorded in Nova Scotia from Brier Island and at Comeau Hill, Yarmouth Co.; Ingonish Barren and Mary Ann Trail, Victoria Co.; Broad River, Queen's Co.; Spruce Hill Lake, Peggy's Cove, Duncan's Cove and Grand Lake, Halifax Co.; Half Island Cove, Guysborough Co.; Scatari Island and Little Lorambec, Cape Breton Co.; French Mountain, Inverness Co.

Habitat Sphagnum bogs, peaty borders of lakes, and in wet undrained depressions.

Vulnerability May be vulnerable to cottage development and sudden disruptions in the environment which would cause water levels to change.

Family POLYPODIACEAE

There are thirty-two species in Nova Scotia, five of which are considered significant in this report.

●**Cystopteris bulbifera** (Linnaeus) Bernh. Bulblet Fern.

Identification Refer to Roland and Smith (1969) p. 30.

Distribution (See Map 3) Newfoundland to Manitoba south to Georgia and Arizona. Found in Nova Scotia from Antigonish Co.; Kings Co.; Victoria Co.; Inverness Co.; Guysborough Co.; Hants Co.; Halifax Co. and Pictou Co.

Habitat Rich or calcareous areas. Often on gypsum outcrops.

Vulnerability Probably vulnerable to habitat disturbances such as logging.

●**Pteretis pensylvanica** (Willd.) Fern. Ostrich Fern.

Identification Refer to Roland and Smith (1969) p. 31.

Distribution (See Map 4) Newfoundland to Alaska south to Virginia and Missouri. Localities in Nova Scotia include Five Mile River and Newport, Hants Co.; Island Point and North River, Victoria Co.; West River and Salt Springs, Pictou Co.; Brierly Brook, Antigonish Co.; Lawrencetown, Annapolis Co. and McGahey Brook, Cumberland Co. Rare in southwestern Nova Scotia and absent from acid regions.

Habitat Rich soil and alluvial ground beside streams and near limestone and gypsum outcrops.

Vulnerability Probably vulnerable to acid rain, cottage development, agriculture, logging, recreation and tourism.

● **Asplenium viride** Huds. Green Spleenwort.

Identification Refer to Roland and Smith (1969) p. 37.

Distribution (See Map 5) Nova Scotia and Newfoundland to Wisconsin and Colorado northwest to Alaska; Greenland and Eurasia. In Nova Scotia it was collected by Macoun at Big Intervale in July 1898. It has also been collected from Grande Anse Brook, Pleasant Bay, Bridgend Brook, Skye Glen and Big Southwest Brook, Inverness Co. It is found from Jeffer's Brook and one old record of MacKay's is from Moose River, Cumberland Co. From Colchester Co. it has been found along the east branch of the Five Islands River. One of the rarest plants of the province.

Habitat Damp shaded cliffs or rock crevices.

Vulnerability Protected within the Highlands National Park, but could be vulnerable to extensive fire and recreational use of the park.

● **Woodwardia areolata** (Linnaeus) Moore. Dwarf Chain Fern.

Identification Refer to Roland and Smith (1969) p. 38.

Distribution (See Map 6) Florida to Texas north to Massachusetts and Nova Scotia; rare inland to Michigan. Reported in Nova Scotia from Pubnico Lake, Butler's Lake, Argyle Head and Tusket Valley, Yarmouth Co.; Tobeatic Game Sanctuary, Sand Lake and Lake Rossignol, Queens Co.; Middle Ohio, Clyde River, Roseway River and Shelburne River, Shelburne Co.

Habitat Swamps, wet woods, bogs and shorelines.

Vulnerability Impossible to assess at present.

● Adiantum pedatum Linnaeus. Maidenhair Fern.

Identification Refer to Roland and Smith (1969) p. 39.

Distribution (See Map 7) Nova Scotia to Minnesota south to Georgia and Oklahoma. Records from Nova Scotia are mainly from the center of the province and one northern Cape Breton record was from along a brook behind St. Margaret's Village.

Habitat Rich woods in gypsum areas or alkaline soils.

Vulnerability Probably vulnerable to habitat destruction by agriculture or clearcutting. This species has not been collected in recent years and may be extinct in Nova Scotia.

MONOCOTYLEDONAE
(Flowering Plants)

Family ZOSTERACEAE

There are twenty-five species in Nova Scotia, one of which is considered significant in this report.

● Potamogeton oblongus Viviana.

Identification Refer to Roland and Smith (1969) p. 58.

Distribution (See Map 8) Eastern Newfoundland, St. Pierre and Miquelon, and Sable Island which is the only known Nova Scotian locality.

Habitat Shallow freshwater ponds.

Vulnerability May be vulnerable to disturbances of habitat by the Sable Island horses, economic development, and human pressures from recreational and commercial uses.

Family GRAMINEAE

There are approximately one hundred and thirty-three species in Nova Scotia, seven of which are considered significant in this report.

● Festuca obtusa Biehler. Nodding Fescue.

Identification Refer to Roland and Smith (1969) p. 76.

Distribution (See Map 9) Nova Scotia to Manitoba south to Florida. Localities in Nova Scotia include New Prospect and Refuge Cove, Cumberland Co.; Cape Blomidon, Kings Co. and Five Mile River, Hants Co.

Habitat Rich woods.

Vulnerability May be vulnerable because it is known from only a few localities. Probably vulnerable to the clearing of intervales and other rich soils.

● Poa alpina Linnaeus. Alpine Bluegrass.

Identification Refer to Roland and Smith (1969) p. 86.

Distribution (See Map 10) Newfoundland to Oregon; Eurasia. Recorded in Nova Scotia only from Ciboux Island, Victoria Co.

Habitat Reported from calcareous shores and ledges, Cape Breton Island.

Vulnerability Possibly vulnerable to recreation and tourism, cultivation and permanent habitation.

● Poa glaucantha Gaudin.

Identification Refer to Roland and Smith (1969) p. 86.

Distribution (See Map 11) Newfoundland to Quebec, Minnesota, Montana and Wyoming; Europe. Reported in Nova Scotia from Amethyst Cove on the outer edge of Cape Blomidon (Smith and Erskine, 1954); Isle Haute (Schofield, 1955); Lockhart Brook, Salmon River; Skye Glen and Big Southwest Brook, Inverness Co.; Burnt Mtn., Grey Glen and Cape North, Victoria Co.

Habitat Cliffs and talus slopes.

Vulnerability Possibly vulnerable to fire, introductions of new plant species, recreation and tourism.

● Calamagrostis inexpansa Gray.

Identification Refer to Roland and Smith (1969) p. 106.

Distribution (See Map 12) Greenland to Alaska south to northern New England and New Mexico. Only one locality known in Nova Scotia: Lockhart Brook, Salmon River, Victoria Co., Cape Breton.

Habitat Wet cliff face.

Vulnerability Possibly vulnerable to destuction of the habitat at the only known locality for the species in Nova Scotia.

● Milium effusum Linnaeus, var. cisatlanticum Fern.

Identification Refer to Roland and Smith (1969) p. 113.

Distribution (See Map 13) Newfoundland to Minnesota south to Delaware; Eurasia. Localities in Nova Scotia include Cape Blomidon, Kings Co., Middle Margaree River, Inverness co.; McGahey Brook, West Advocate, Cape Chignecto and New Prospect, Cumberland Co.; Five Mile River, Hants Co.

Habitat Rich hardwood stands.

Vulnerability Probably vulnerable to habitat destruction such as clearcutting.

● Panicum dichotomiflorum Michx. var. geniculatum (Wood) Fern. Panic Grass.

Identification Refer to Roland and Smith (1969) p. 124.

Distribution (See Map 14) Florida north to Nova Scotia and inland to Minnesota. Locations in Nova Scotia include Tusket Valley, Ellenwood Lake, Yarmouth Co.; Harper and Welshtown Lakes, Shelburne Co.

Habitat Sandy, gravelly shores of lakes and borders of savannahs.

Vulnerability Possibly vulnerable to disturbance of habitat by dam construction, cottage development or recreational use of the park at Ellenwood Lake.

● Panicum longifolium Torr.

Identification Refer to Roland and Smith (1969) p. 125.

Distribution (See Map 15) Florida to Texas north to Ohio, Massachusetts and Nova Scotia. Reported here from Ponhook Lake, Queens Co.; Tusket River and Butler's (Gavelton) Lake, Yarmouth Co.

Habitat Sandy or gravelly beaches and peaty margins of lakes.

Vulnerability This rare coastal plain species may be vulnerable to dam construction, recreation and tourism.

Family CYPERACEAE

There are approximately one hundred and forty-eight species in Nova Scotia, six of which are considered significant in this report.

● Eleocharis pauciflora (Lightf.) Link, var. fernaldii Svenson.

Identification Refer to Roland and Smith (1969) p. 133.

Distribution (See Map 16) Nova Scotia, Newfoundland to James Bay south to New Jersey, Ohio and Iowa. Localities in Nova Scotia include Frenchvale, Cape Breton Co.; Baddeck Bay, Victoria Co.; Black River, Inverness Co. and Sandy Cove, Digby Co.

Habitat Alkaline marshes and bogs. Occasionally on Maritime cliffs.

Vulnerability Possibly vulnerable to any type of soil disturbances.

● Scirpus olneyi Gray.

Identification Refer to Roland and Smith (1969) p. 141.

Distribution (See Map 17) Nova Scotia to Gulf of Mexico, rarely inland; on the Pacific coast. Localities in Nova Scotia include: Argyle Head, Chebogue, Wedgeport, Abram River, Sand Beach, Arcadia, Tusket and Eel Lake, Yarmouth Co. These are the only known localities in Canada.

Habitat Salt and brackish marshes and swales.

Vulnerability This rare coastal plain species, which is restricted in Canada to the southern tip of Nova Scotia, may be vulnerable to disruptions of habitat by dam construction.

● Rhynchospora capillacea Torr.

Identification Refer to Roland and Smith (1969) p. 148.

Distribution (See Map 18) Newfoundland to Saskatchewan in calcareous locations south to Tennessee. Reported in Nova Scotia from Black River at the southern end of Lake Ainslie, Inverness Co. (Smith and Schofield, 1952). The only record from this province.

Habitat Alkaline sphagnum bogs.

Vulnerability Possibly vulnerable to habitat destruction such as soil disturbances. Communities similar to Black River bog are infrequent in Nova Scotia.

● Carex gynocrates Wormsk.

Identification Refer to Roland and Smith (1969) p. 152.

Distribution (See Map 19) Greenland to Alaska south to New York and British Columbia; also Eurasia. Two localities are known from Nova Scotia: St. Paul's Island, off Cape North, Victoria Co. (Perry, 1931) and Black River, Inverness Co. (Smith, 1959).

Habitat Sphagnum bogs.

Vulnerability Probably vulnerable to habitat disturbances.

● Carex aurea Nutt.

Identification Refer to Roland and Smith (1969) p. 167.

Distribution (See Map 20) Newfoundland to Alaska south to Pennsylvania, Ohio and California. Found in Nova Scotia at Baddeck, Victoria Co.; Brooklyn and Shubenacadie, Hants Co.; Corney Brook, Inverness Co.; Isle Haute, Cumberland Co. and Scots Bay, Kings Co.

Habitat Wet meadows and banks.

Vulnerability Probably vulnerable to habitat disturbances such as logging, cultivation, drainage and other soil disturbances.

● Carex plantaginea Lam.

Identification Refer to Roland and Smith (1969) p. 178.

Distribution (See Map 21) Nova Scotia; New Brunswick to Manitoba and Alberta. Brookside, near Truro, Colchester Co. is the only known Nova Scotian locality. This species is rare in Nova Scotia.

Habitat Rich deciduous woods.

Vulnerability Probably vulnerable to disturbances of the habitat such as logging or agriculture.

Family ARACEAE

There are four species in Nova Scotia, one of which is considered significant in this report.

● Symplocarpus foetidus (Linnaeus) Nutt. Skunk Cabbage.

Identification Refer to Roland and Smith (1969) p. 189.

Distribution (See Map 22) Nova Scotia to Manitoba south to Georgia and Iowa. Reported in Nova Scotia from Pembroke, Argyle Head, Big Tusket Island, Yarmouth Co.; Tiddville, Digby Co.

Habitat Springy swales, open bogs, mossy sphagnum woods and wet thickets.

Vulnerability Impossible to assess at present.

Family JUNCACEAE

There are twenty-eight species in Nova Scotia, one of which is considered significant in this report.

● Juncus bulbosus Linnaeus.

Identification Refer to Roland and Smith (1969) p. 201.

Distribution (See Map 23) Southeastern Newfoundland; St. Pierre and Miquelon; Sable Island; Europe and northern Africa. In Nova Scotia found only on Sable Island.

Habitat Marshy borders of freshwater ponds.

Vulnerability Possibly vulnerable to economic development, human pressures from recreational and commercial uses and may be vulnerable to disturbances caused by the Sable Island horses.

Family LILIACEAE

There are twenty-four species in Nova Scotia, four of which are considered significant in this report.

● Tofieldia glutinosa (Michx.) Pers. False Asphodel.

Identification Refer to Roland and Smith (1969) p. 205.

Distribution (See Map 24) Newfoundland to Manitoba south to New York and Georgia. Collected once in Nova Scotia by W.G. Dore from the region of Cheticamp, Inverness Co.

Habitat Peaty and boggy soil.

Vulnerability May be vulnerable because it has been found in only one locality in the province.

● Allium tricoccum Ait. Wild Leek.

Identification Refer to Roland and Smith (1969) p. 206.

Distribution (See Map 25) Minnesota, southern Quebec, Nova Scotia south to Iowa, Illinois, Maryland, in mountains to Georgia. Found in Nova Scotia at Cape Blomidon, Cambridge and Brooklyn Corner in Kings Co.; Kemptown, Colchester Co.

Habitat Rich hardwoods and intervales.

Vulnerability Probably vulnerable to habitat destruction by clearcutting, agriculture, etc.

●Lilium canadense Linnaeus. Canada Lily.

Identification Refer to Roland and Smith (1969) p. 206.

Distribution (See Map 26) Ontario, Quebec and Nova Scotia; south to New England, eastern Maryland, Pennsylvania, South Carolina; Florida west to Alabama; north to southern Indiana. In Nova Scotia reported from Kings, Cumberland, Antigonish, Hants, Pictou, Guysborough and Colchester counties. One specimen from each county.

Habitat Rich hardwoods, intervales and stream banks.

Vulnerability Probably vulnerable to habitat disturbances such as the clearing of intervales for agricultural purposes, and to over-collecting.

●Erythronium americana Ker. Dog's Tooth Violet.

Identification Refer to Roland and Smith (1969) p. 207.

Distribution (See Map 27) Nova Scotia to Minnesota south to Georgia. Recorded in Nova Scotia from Kings Co., Cumberland Co., Colchester Co. and Hants Co.

Habitat Upland woods of beech and maple and along the edges of intervales.

Vulnerability Probably vulnerable to habitat disturbances such as recreation and tourism, logging, cultivation, drainage and other soil disturbances.

Family HAEMODORACEAE

There are two species in Nova Scotia, both of which are considered significant in this report.

●Lachnanthes tinctoria (Walt.) E11. Redroot.

Identification Refer to Roland and Smith (1969) p. 123.

Distribution (See Map 28) Nova Scotia and Massachusetts south to Florida, Louisiana and Cuba. In Nova Scotia known from the shores of Ponhook and Beartrap Lakes, Queens Co.

Habitat Peaty shores or lake-side marshes, usually found near the shoreline.

Vulnerability Probably vulnerable to habitat destruction through the building of dams, cottages, etc.

●Lophiola americana (Pursh) Wood. Golden Crest.

Identification Refer to Roland and Smith (1969) p. 214.

Distribution (See Map 29) Nova Scotia and bogs in the pine barrens of New Jersey. Found in Nova Scotia along Little River, west of Tiddville, Digby Neck; Brier Island; Ponhook Lake, Queens Co. and Fancy Lake in Lunenburg Co.

Habitat Peaty and boggy shorelines.

Vulnerability Probably vulnerable to development in southwestern Nova Scotia.

Family IRIDACEAE

There are eight species in Nova Scotia, one of which is considered significant in this report.

●Iris prismatica Pursh. Slender Blue Flag.

Identification Refer to Roland and Smith (1969) p. 216.

Distribution (See Map 30) Nova Scotia to Georgia. Reported in Nova Scotia from Louisburg, Cape Breton Co. and Kenloch, Inverness Co. (July 19, 1965).

Habitat Wet ground near the coast.

Vulnerability This species is presumed extinct in Nova Scotia or in general. The cause is unknown.

Family ORCHIDACEAE

There are thirty-four species in Nova Scotia, six of which are considered significant in this report.

●Cypripedium arietinum R.Br. Ram's Head Lady's Slipper.

Identification Refer to Roland and Smith (1969) p. 217.

Distribution (See Map 31) Nova Scotia and southern Quebec to Manitoba south to Massachusetts and Wisconsin. Localities in Nova Scotia include: Wentworth, Hants Co. (Erskine, J.S., 1954); Ellershouse Brook, St. Croix.

Habitat Open woods over gypsum outcrops.

Vulnerability Possibly vulnerable to grazing, logging and being collected as a garden plant.

● Cypripedium calceolus Linnaeus. Yellow Lady's Slipper.

Identification Refer to Roland and Smith (1969) p.218.

Distribution (See Map 32) Newfoundland to British Columbia south to mountains of Georgia; west to Texas, Arkansas and Kansas. Found in Nova Scotia in Kings Co., Pictou Co., Hants Co., Guysborough Co. and Inverness Co.

Habitat Dry open woods, usually over gypsum.

Vulnerability Possibly vulnerable to over-picking, garden transplanting and habitat destruction.

● Cypripedium reginae Walt. Showy Lady's Slipper.

Identification Refer to Roland and Smith (1969) p. 218.

Distribution (See Map 33) Eastern Saskatchewan, Nova Scotia and Newfoundland; south through New England to the mountains of North Carolina and Tennessee; northwest to North Dakota. In Nova Scotia there are widely scattered records from Hants Co. to northern Cape Breton.

Habitat Swamps and alkaline bogs.

Vulnerability Possibly vulnerable to over-picking, garden transplanting and habitat destruction.

● Platanthera flava (Linnaeus) Lindl. Pale Green Orchis.

Identification Refer to Roland and Smith (1969) p. 220.

Distribution (See Map 34) Texas and Florida north to New Jersey and Nova Scotia. Recorded here from Salmon Lake and Tusket Lake, Yarmouth Co.; Lower Medway, Queens Co. and Clark's Harbour, Cape Sable Island, Shelburne Co.

Habitat Gravelly or peaty shorelines.

Vulnerability This rare coastal plain species may be vulnerable to habitat destruction.

● Calapogon puchellus (Salisb.) R. Br. Calapogon, Grass Pink.

Identification Refer to Roland and Smith (1969) p. 225.

Distribution (See Map 35) Minnesota, Ontario to Nova Scotia and Newfoundland to southern United States. Found in Nova Scotia from Queens Co.; Halifax Co.; Yarmouth Co.; Inverness Co.; Pictou Co.; Hants Co.; Shelburne Co.; Richmond Co.; Lunenburg Co.; Digby Co.; Victoria Co.; Kings Co. and Guysborough Co.

Habitat Mature bogs and swamps or wet meadows. Acid, sandy or gravelly sites.

Vulnerability Possibly vulnerable to habitat destruction caused by road construction at the West Light Road, Brier Island location. Also probably vulnerable to fire, permanent habitation, recreation and tourism.

● Arethusa bulbosa Linnaeus. Arethusa, Dragon's Mouth.

Identification Refer to Roland and Smith (1969) p. 225.

Distribution (See Map 36) Newfoundland to Minnesota south to Pennsylvania and the mountains of South Carolina. Recorded in Nova Scotia from French Mountain, Inverness Co.; Neils Harbour and Oregon, Victoria Co.; Brier Island, Digby Co.; Peggy's Cove, Eastern Passage and Upper Musquodoboit, Halifax Co.; Sable River and Barrington, Shelburne Co.; Spicer's Cove, Cumberland Co.; West Pubnico, Yarmouth Co. and St. Peters, Richmond Co.

Habitat Acid peat bogs. Around the coast of the province.

Vulnerability Probably vulnerable to cottage development, construction work, fire, recreation and tourism.

DICOTYLEDONAE
(Flowering Plants)

Family SALICACEAE

There are twenty-six species in Nova Scotia, two of which are considered significant in this report.

● **Salix uva-ursi** Pursh. Bearberry Willow.

Identification Refer to Roland and Smith (1969) p. 325.

Distribution (See Map 37) Greenland and Baffin Island south to the barrens of Newfoundland, Nova Scotia and the alpine areas of Quebec, New England and New York. Collected by Perry and Roscoe on St. Paul Island off Cape North, Victoria Co., in 1930.

Habitat Exposed barrens.

Vulnerability Possibly vulnerable to habitat destruction because it is known from only one locality in the province.

● **Salix candida** Flugge. Hoary Willow.

Identification Refer to Roland and Smith (1969) p. 327.

Distribution (See Map 38) Labrador to British Columbia south to Newfoundland, Pennsylvania and Iowa. Nova Scotian localities include Black River Bog, Inverness Co. and Mount Uniacke, Hants Co.

Habitat Alkaline bogs.

Vulnerability Possibly vulnerable to acid rain or other disturbances of the soil habitat. Similar communities to Black River Bog are infrequent in the province.

Family CORYLACEAE

There are nineteen species in Nova Scotia, two of which are considered significant in this report.

● **Betula pumila** Linnaeus. Bog Birch.

Identification Refer to Roland and Smith (1969) p. 338.

Distribution (See Map 39) Newfoundland and Labrador to Michigan, south to New Jersey and Ohio. Reported in Nova Scotia from St. Paul's Island, French Mountain, Inverness Co. and Oregon, Victoria Co.

Habitat Sphagnum bogs, meadows and alder thickets.

Vulnerability Similar communities to French Mountain are infrequent in the province. Possibly vulnerable to the digging of drainage ditches and fire. The Oregon locality may be vulnerable to logging, recreation and tourism.

● Betula michauxii Spach.

Identification Refer to Roland and Smith (1969) p. 338.

Distribution (See Map 40) Labrador and northern Quebec south to Newfoundland and the coast of Nova Scotia. There are only three localities known in Nova Scotia: first collected by E.R. Faribault in 1884 near Liscomb River in Guysborough Co.; a single colony near the mouth of Gaspereaux Brook in the same county; Big Meadow, Brier Island, Digby Co. (Smith and Erskine, 1954).

Habitat Wet sphagnum bogs.

Vulnerability Probably vulnerable to habitat destruction through cottage development.

Family SANTALACEAE

There are three species in Nova Scotia, one of which is considered significant in this report.

● Comandra richardsiana Fern. Bastard Toadflax.

Identification Refer to Roland and Smith (1969) p. 346.

Distribution (See Map 41) Newfoundland, the Magdalen Islands, Prince Edward Island and Cape Breton west to northern Vermont, Kentucky and Kansas. Found in northern Cape Breton Island: collected by Macoun in 1883, Sydney Mines, Victoria Co; also Black Point, South Pond, Aspy Bay and one mile south of Black Brook mouth (Smith and Erskine, 1954).

Habitat Exposed coastal areas.

Vulnerability Possibly vulnerable to road construction, research work being done in the area, recreation and tourism.

Family CARYOPHYLLACEAE

There are thirty-three species in Nova Scotia, one of which is considered significant in this report.

● Arenaria groenlandica (Retz.) Spreng. Mountain Sandwort.

Identification Refer to Roland and Smith (1969) p. 376.

Distribution (See Map 42) Northwest Territories, Quebec, Nova Scotia to Labrador; south to New England, Tennessee and South Carolina. Known in the Maritimes only from Kidston Lake, Geizer Hill, Gibralter Rock and Flagmast Hill, Halifax Co.

Habitat Rocky granite barrens.

Vulnerability Impossible to assess at present.

Family RANUNCULACEAE

There are twenty-six species in Nova Scotia, three of which are considered significant in this report.

● Hepatica americana (DC) Ker. Round-lobed Hepatica.

Identification Refer to Roland and Smith (1969) p. 393.

Distribution (See Map 43) Nova Scotia to southern Manitoba south to Florida. Records for Nova Scotia are from Stewiacke, Falmouth, Bridgewater, Windsor, Pictou and Antigonish.

Habitat Rich hardwoods.

Vulnerability Possibly vulnerable to erosion, landscaping or agriculture.

● Anemone canadensis Linnaeus. Canada Anemone.

Identification Refer to Roland and Smith (1969) p. 394.

Distribution (See Map 44) Gaspé Peninsula to British Columbia south to Nova Scotia, New Jersey and Montana. Localities in Nova Scotia include Cape Jack and near Havre Boucher, Antigonish Co.; Cheticamp, Inverness Co.; and Bay St. Lawrence, Presquile, Cape North and Capstick, Victoria Co.

Habitat Wet meadows.

Vulnerability Possibly vulnerable because of its restricted range in Nova Scotia.

● Caltha palustris Linnaeus. Marsh Marigold.

Identification Refer to Roland and Smith (1969) p. 395.

Distribution (See Map 45) Labrador to Alaska south to South Carolina. Reported in Nova Scotia from the coastal plain of northern Inverness Co.: Mabou; Northeast Margaree; Margaree River near Margaree Harbour; Terre Noire; St. Joseph du Moine; Cheticamp; Grand Anse Brook and Pleasant Bay (Smith and Erskine, 1954).

Habitat Marshes.

Vulnerability Possibly vulnerable because of its restricted range.

Family BERBERIDACEAE

There are three species in Nova Scotia, one of which is considered significant in this report.

● Caulophyllum thalictroides (Linnaeus) Michx. Blue Cohosh.

Identification Refer to Roland and Smith (1969) p. 398.

Distribution (See Map 46) Nova Scotia to Manitoba south to the mountains of South Carolina. In Nova Scotia reported from Kemptown, Colchester Co.; Cambridge and Brooklyn Corner, Kings Co.; Elgin, Pictou Co. and Melford, Inverness Co.

Habitat Rich woods and intervales.

Vulnerability May be vulnerable to habitat destruction through clearcutting, agriculture, destruction of hardwood forests, etc.

Family PAPAVERACEAE

There are four species in Nova Scotia, one of which is considered significant in this report.

● Sanguinaria canadensis Linnaeus. Bloodroot.

Identification Refer to Roland and Smith (1969) p. 399.

Distribution (See Map 47) Across Canada to Nova Scotia; south from New England to Florida; west to eastern Texas; north to Manitoba. Found in Nova Scotia from Big Baddeck and Northeast Margaree in Cape Breton; Kemptown, North River, Upper Stewiacke, Tatamagouche River, Waugh's River and around Truro, Colchester Co.; Meander River and Cambridge, Hants Co.; Middle River, Glengarry-Eureka Rd., Union Centre and Glencoe, Pictou Co.; Mapleton, Cumberland Co.

Habitat Low ground near streams and in rich intervales, usually in shade; often growing just above high water level along the rivers.

Vulnerability Possibly vulnerable to habitat disturbances such as cultivation and logging.

Family FUMARIACEAE

There are five species in Nova Scotia, one of which is considered significant in this report.

● **Dicentra cucullaria** (Linnaeus) Bernh. Dutchman's Breeches.

Identification Refer to Roland and Smith (1969) p. 400.

Distribution (See Map 48) Southeastern Canada, northern United States (west to North Dakota); south in mts. to Georgia. Reported in Nova Scotia from Kings Co., Inverness Co., Pictou Co. and Colchester Co.

Habitat Rich woods, intervales and hardwood hillsides.

Vulnerability Possibly vulnerable to habitat destruction through logging, agriculture and cultivation.

Family CRUCIFERAE

There are forty-eight species in Nova Scotia, one of which is considered significant in this report.

● **Cardamine parviflora** Linnaeus, var. **arenicola** (Britt.) O.E. Schulz.

Identification Refer to Roland and Smith (1969) p. 418.

Distribution (See Map 49) Florida to Texas, north to Nova Scotia, Ontario and Minnesota. Localities in Nova Scotia include Rocky Brook, Ciboux Island and Bird Island, Victoria Co.; Halifax, Halifax Co.; Cape Blomidon, Kings Co.; Brier Island, Digby Co. and Cape D'Or, Cumberland Co.

Habitat Dry woods, ledges and sandy places.

Vulnerability Probably vulnerable to disturbances of habitat through recreation and tourism, cultivation and permanent habitation.

Family DROSERACEAE

There are three species in Nova Scotia, one of which is considered significant in this report.

● **Drosera filiformis** Raf. Thread-leaved Sundew.

Identification Refer to Niering and Olmstead (1979) p. 494.

Distribution (See Map 50) Southwestern Nova Scotia; Massachusetts to southern New Jersey and from South Carolina to northern Florida; west to Louisiana. The only known locality in Nova Scotia is Barrington, Shelburne Co.

Habitat Wet bog depressions.

Vulnerability May be vulnerable because it is known in only one locality in the province.

Family SAXIFRAGACEAE

There are eleven species in Nova Scotia, three of which are considered significant in this report.

● Saxifraga aizoides Linnaeus. Yellow Mountain Saxifrage.

Identification Refer to Roland and Smith (1969) p. 424.

Distribution (See Map 51) Arctic Regions south to Cape Breton, northern Vermont and New York; Alberta to British Columbia. Known from but one place in the province: Inverness Co., Big Southwest Brook (Smith and Schofield, 1952).

Habitat Dripping cliffs.

Vulnerability Probably vulnerable because it is known from only one locality in the province.

● Saxifraga aizoon Jacq., var. neogaea Butters.

Identification Refer to Roland and Smith (1969) p. 425.

Distribution (See Map 52) Arctic Regions south to Nova Scotia, Vermont, Michigan and Ontario. Nova Scotian localities include: 2 miles south of Cape Split (Schofield, 1955); Cape D'or; Indian Brook and Gray Glen Brook, Victoria Co.; Big Southwest Brook (Smith and Schofield, 1952) and Cheticamp, Inverness Co.

Habitat Cliffs, often calcareous.

Vulnerability Possibly vulnerable to habitat destruction through erosion.

● Tiarella cordifolia Linnaeus. False Miterwort.

Identification Refer to Roland and Smith (1969) p. 425.

Distribution (See Map 53) Nova Scotia to Minnesota south to Georgia and Arkansas. Nova Scotian localities include Earltown, Colchester Co. and Huntington Point, Kings Co.

Habitat Rich hardwoods and intervales.

Vulnerability May be vulnerable to the clearing of rich soils and intervales for agriculture.

Family ROSACEAE

There are approximately ninety-nine species in Nova Scotia, one of which is considered significant in this report.

● Geum peckii Pursh.

Identification Refer to Roland and Smith (1969) p. 452.

Distribution (See Map 54) White Mountains of New Hampshire and Brier Island at the end of Digby Neck. These are the only two locations known for this species in the world.

Habitat Sphagnum bogs and boggy meadows.

Vulnerability Certainly vulnerable to habitat destruction by the locality being developed into a cottage area.

Family LEGUMINOSAE

There are forty-three species in Nova Scotia, four of which are considered significant in this report.

● Astragalus robbinsii (Oakes) Gray.

Identification Refer to Roland and Smith (1969) p. 478.

Distribution (See Map 55) Maine, Vermont and New Hampshire. Found in Nova Scotia only at Cape D'Or, Cumberland Co.

Habitat Open slopes at the top of cliffs.

Vulnerability Possibly vulnerable to disruptions of the habitat. Similar communities are infrequent in the province. Exploration pits have been blasted from the cliff edge in places. Also could be vulnerable to collectors of rare plant species.

● Oxytropis johannensis Fern.

Identification Refer to Roland and Smith (1969) p. 478.

Distribution (See Map 56) Western Newfoundland to Manitoba south to northern Maine and the St. John Valley in New Brunswick. Localities in Nova Scotia include the northeast end of St. Paul Island, off Cape North, Victoria Co. (Perry, 1931); Cape D'Or in Cumberland Co. (Schofield, 1955) and Cape Split, Kings Co.

Habitat Exposed grassy cliffs by the sea.

Vulnerability Cape Split locality is probably vulnerable to fire, introductions of new plant species, recreation and tourism. Cape d'Or locality is probably vulnerable to disturbances such as the collecting of rare plants and exploratory mining.

● Desmodium glutinosum (Muhl.) Wood.

Identification Refer to Roland and Smith (1969) p. 479.

Distribution (See Map 57) Nova Scotia, New Brunswick and central Maine to Minnesota south to Florida and Texas. Known in Nova Scotia from along the Gaspereau River about 2 miles above White Rock, Kings Co.; Halfway River, Hants Co. (Erskine); collected by J.F. Donly near the fish hatchery, Grafton, Queens Co.

Habitat Deciduous woods.

Vulnerability Due to preferential clearing of intervales and other rich soils for agriculture, this species may have been eliminated from many former locations and may be in danger of further disruption in surviving localities.

● Desmodium canadense (Linnaeus) DC. Canada Tick Clover.

Identification Refer to Roland and Smith (1969) p. 479.

Distribution (See Map 58) Across southern Canada to Nova Scotia; New England south to Virginia; west to Missouri and Oaklahoma; north to Canada. Found in Nova Scotia from Kejimkujik Lake, Queens Co.; from the river above Truro and from the three Pictou rivers.

Habitat Rich moist open woods.

Vulnerability May be vulnerable to habitat disturbances such as destruction of hardwood forests, clearcutting, agriculture, etc.

Family RHAMNACEAE

There are three species in Nova Scotia, one of which is considered significant in this report.

● **Rhamnus alnifolia** L'Her. Alder-leaved Buckthorn.

Identification Refer to Roland and Smith (1969) p. 507.

Distribution (See Map 59) Newfoundland to British Columbia south to Pennsylvania and California. Reported in Nova Scotia from Springhill, Cumberland Co.; Inverness Town, Orangedale and Black River, Inverness Co., Boularderie Island, Victoria Co.

Habitat Swampy woods and boggy meadows.

Vulnerability Probably vulnerable to habitat disturbances such as logging.

Family VIOLACEAE

There are seventeen species in Nova Scotia, one of which is considered significant in this report.

● **Viola canadensis** Linnaeus. Canada Violet.

Identification Refer to Roland and Smith (1969) p. 522.

Distribution (See Map 60) Nova Scotia; New Hampshire to Ontario and Montana south to Alabama and Iowa. Known only from Newport, Hants Co. in Nova Scotia.

Habitat Deciduous woods on gypsum outcrops.

Vulnerability May be vulnerable because it is known from only one locality in the province.

Family THYMELAEACEAE

There are two species in Nova Scotia, one of which is considered significant in this report.

● **Dirca palustris** Linnaeus. Leatherwood.

Identification Refer to Roland and Smith (1969) p. 523.

Distribution (See Map 61) Nova Scotia to Ontario and Minnesota south to Florida. Extremely rare in Nova Scotia with Newport and Shubenacadie, Hants Co. being the only two known localities.

Habitat Rich deciduous mixed woods.

Vulnerability Probably vulnerable to logging.

Family UMBELLIFERAE

There are thirty-five species in Nova Scotia, two of which are considered significant in this report.

● Hydrocotyle umbellata Linnaeus. Water Pennywort.

Identification Refer to Roland and Smith (1969) p. 542.

Distribution (See Map 62) Florida and Texas north to Massachusetts and Nova Scotia; British Columbia southward. Only two known localities in Nova Scotia: Kejimkujik National Park, Annapolis Co. and St. John (Wilson's) Lake, Yarmouth Co.

Habitat Lake and river shores.

Vulnerability Although protected within the park it may still be vulnerable to fire, recreation and tourism. The St. John (Wilson's) Lake locality should also be protected from habitat destruction.

● Lilaeopsis chinensis (Linnaeus) Ktze.

Identification Refer to Roland and Smith (1969) p. 548.

Distribution (See Map 63) Nova Scotia to Florida and west to Mississippi along the coast. Known in Canada only from the banks of the Tusket River, at Tusket, Yarmouth Co. and about the estuary of the Medway River in Queens Co. This species is rare from a national context.

Habitat Brackish marshes.

Vulnerability Probably vulnerable to habitat destruction because of its restricted distribution.

Family CLETHRACEAE

Only one species in Nova Scotia.

● Clethra alnifolia Linnaeus. Sweet Pepperbush.

Identification Refer to Niering and Olmstead (1979) p. 468.

Distribution (See Map 64) Coastal, from southern Maine south to Florida, west to eastern Texas. The only known locality in Canada is Belliveau Lake, Digby Co., Nova Scotia. This species is rare in Canada.

Habitat Wetlands, especially swamps, lake edges and sandy woods. Mostly near the coast.

Vulnerability The lake is spring fed and the water level remains virtually constant. There are no known similar communities in the province. Possibly vulnerable to logging and damming.

Family PYROLACEAE

There are ten species in Nova Scotia, one of which is considered significant in this report.

● Pyrola minor Linnaeus. Small Wintergreen.

Identification Refer to Roland and Smith (1969) p. 57.

Distribution (See Map 65) Greenland to Alaska south to Nova Scotia, New England and Michigan. Localities in Nova Scotia include North Aspy River and Upper Salmon River, Victoria Co.; Gulliver's Cove, Digby Co. and Pollett Cove, Inverness Co.

Habitat Cold coniferous woods.

Vulnerability May be vulnerable to road construction, recreation and tourism.

Family ERICACEAE

There are thirty species in Nova Scotia, two of which are considered significant in this report.

● Vaccinium uliginosum Linnaeus, var. alpinum Bigel. Alpine Whortleberry.

Identification Refer to Roland and Smith (1969) p. 567.

Distribution (See Map 66) Circumboreal; ranging south to northern New England, New York and North Michigan. Found in Nova Scotia at Duncan's Cove, Halifax Co. This is the only mainland site for the species in the province. Also recorded from Cape Breton Co. and Victoria Co., Cape Breton Island.

Habitat Barrens and bogs.

Vulnerability Probably vulnerable to fire, permanent habitation, recreation and tourism.

● Vaccinium cespitosum Michx. Dwarf Bilberry.

Identification Refer to Roland and Smith (1969) p. 567.

Distribution (See Map 67) Labrador to Alaska south to northern New England, New York and North Michigan. Records from Nova Scotia include: Black River and Indian Brook, Kings Co.; Middle Branch North River and Indian Brook, Victoria Co.; Cheticamp River, Inverness Co. (Smith and Schofield, 1952).

Habitat Cliffs, ledges and old pastures.

Vulnerability Impossible to assess at present.

Family DIAPENSIACEAE

Only one species in Nova Scotia.

● Diapensia lapponica Linnaeus.

Identification Refer to Roland and Smith (1969) p. 571.

Distribution (See Map 68) Arctic regions south to mountains of New England and New York; Eurasia. Found in Nova Scotia in Victoria Co. at Lockhart Brook, Salmon River (Smith and Erskine, 1954).

Habitat Projecting shoulders and in crevices of cliff slopes.

Vulnerability Possibly vulnerable to destruction of the habitat of the only known locality for the species in the province.

Family PRIMULACEAE

There are fourteen species in Nova Scotia, two of which are considered significant in this report.

● Primula mistassinica Michx. Bird's-Eye Primrose.

Identification Refer to Roland and Smith (1969) p. 573.

Distribution (See Map 69) Labrador to Alaska south to Nova Scotia, northern Vermont, Wisconsin and Iowa. Localities in Nova Scotia include Clifford Brook, Salmon River and Upper Stewiacke, Colchester Co.; Cape North and St. Paul Island, Victoria Co.; Cheticamp River, Inverness Co.

Habitat Stream banks and wet ledges.

Vulnerability Impossible to assess at present.

● Samolus parviflorus Raf. Water Pimpernel, Brookweed.

Identification Refer to Roland and Smith (1969) p. 576.

Distribution (See Map 70) Florida to California north to Nova Scotia and Ontario. Reported in Nova Scotia from Pleasant Lake and Tusket River, Yarmouth Co.; Bridgewater and Antigonish.

Habitat Brackish meadows, tidal banks and edges of salt marshes.

Vulnerability Impossible to assess at present.

Family GENTIANACEAE

There are seven species in Nova Scotia, one of which is considered significant in this report.

● **Sabatia kennedyana** Fern. Plymouth Gentian.

Identification Refer to Roland and Smith (1969) p. 579.

Distribution (See Map 71) Southwestern Nova Scotia; eastern Massachusetts and Rhode Island. Recorded in Nova Scotia from Tusket River Valley and Kempt area, Yarmouth Co.

Habitat Cobbly and sandy beaches, peaty margins of rivers, lakes and boggy savannahs.

Vulnerability Probably vulnerable to habitat destruction through dam construction or cottage development.

Family SCROPHULARIACEAE

There are forty species in Nova Scotia, one of which is considered significant in this report.

● **Gerardia maritima** Raf. Seaside Gerardia.

Identification Refer to Roland and Smith (1969) p. 620.

Distribution (See Map 72) Nova Scotia; Maine to North Carolina. Known in Nova Scotia from along the Argyle River at Argyle Head (Fernald, 1922) and Wedgeport, Yarmouth Co. Restricted to the southern tip of Nova Scotia.

Habitat Saline marshes along the coast.

Vulnerability This coastal plain species may be vulnerable because of its restriction to the southern tip of Nova Scotia.

Family LENTIBULARIACEAE

There are twelve species in Nova Scotia, two of which are considered significant in this report.

● Pinguicula vulgaris Linnaeus. Butterwort.

Identification Refer to Roland and Smith (1969) p. 629.

Distribution (See Map 73) Alaska to Labrador, south to Nova Scotia, northern New York and Michigan. Localities in Nova Scotia include: Bittle Lake, St. Paul Island, Cheticamp River and Big Southwest Brook, Inverness Co.

Habitat Moist ledges and shorelines.

Vulnerability Impossible to assess at present.

● Utricularia radiata Small.

Identification Refer to Roland and Smith (1969) p. 627.

Distribution (See Map 74) Florida to Texas north to Nova Scotia, southern Maine, Pennsylvania and Indiana. Reported in Nova Scotia from Lake Sawlor, near Hubbards, Halifax Co.

Habitat Submerged in ponds and quiet lakes.

Vulnerability This coastal plain species may be vulnerable to any disturbances which would cause water levels to change.

Family RUBIACEAE

There are seventeen species in Nova Scotia, one of which is considered significant in this report.

● Galium tinctorium Linnaeus. Small Bedstraw.

Identification Refer to Roland and Smith (1969) p. 637.

Distribution (See Map 75) Newfoundland to Nebraska south to South Carolina and Texas. Recorded in Nova Scotia from Kings Co., Queens Co., Guysborough Co., Cumberland Co., Hants Co., Shelburne Co., Halifax Co., Richmond Co., Victoria Co., Inverness Co., Lunenburg Co., Annapolis Co. and Yarmouth Co.

Habitat Lows areas, along brooks, marshes and bogs.

Vulnerability Possibly vulnerable to habitat destruction such as soil disturbances and fire.

Family CAPRIFOLIACEAE

There are fourteen species in Nova Scotia, two of which are considered significant in this report.

● **Triosteum aurantiacum** Bickn. Feverwort.

Identification Refer to Roland and Smith (1969) p. 643.

Distribution (See Map 76) Nova Scotia to western Ontario, Minnesota, Wisconsin, Michigan and Massachusetts south. Recorded in Nova Scotia from north of Truro and at Kemptown, Colchester Co.; near New Glasgow and Glencoe, Pictou Co. and in central and northern Cape Breton.

Habitat Intervales or rich soil along rivers. Growing on limestone banks in one locality.

Vulnerability Probably vulnerable to habitat destruction, especially in the river intervale ecosystems of Kemptown and Glencoe. These may be vulnerable to logging and cultivation.

● **Viburnum edule** (Michx.) Raf. Cranberry Bush.

Identification Refer to Roland and Smith (1969) p. 645.

Distribution (See Map 77) Newfoundland and Labrador to Alaska south to Pennsylvania, Iowa and Washington. Recorded in Nova Scotia from French Mountain, Inverness Co.

Habitat Cool woods and along streams.

Vulnerability Possibly vulnerable to the digging of man made ditches for drainage.

Family COMPOSITAE

There are approximately one hundred and sixty-five species in Nova Scotia, five of which are considered significant in this report.

● Eupatorium dubium Willd. Joe-Pye-Weed.

Identification Refer to Roland and Smith (1969) p. 655.

Distribution (See Map 78) Nova Scotia and southwestern Maine south to South Carolina. Localities in Nova Scotia include Salmon Lake, Pleasant Lake, Frenchman Point and Tusket River Dam, Yarmouth Co.

Habitat Rocky lakeshores. Coastal plain species.

Vulnerability Possibly vulnerable to disturbances of the habitat through dam construction.

● Erigeron hyssopifolius Michx. Fleabane.

Identification Refer to Roland and Smith (1969) p. 674.

Distribution (See Map 79) Newfoundland to MacKenzie south to Nova Scotia, central Maine, northern New York and Michigan. Nova Scotia localities include Brierly Brook, Antigonish Co.; South Maitland, Five Mile River and Windsor, Hants Co.; Southwest River, Cape North and Port Bevis, Victoria Co.

Habitat Gypsum outcrops and damp cliffs.

Vulnerability Probably vulnerable to habitat destruction such as logging, cultivation, drainage, other soil disturbances, recreation and tourism.

● Coreopsis rosea Nutt. Pink Coreopsis.

Identification Refer to Roland and Smith (1969) p. 685.

Distribution (See Map 80) Nova Scotia, eastern Massachusetts to eastern Maryland. Recorded in Nova Scotia from Tusket Valley, Salmon Lake, Pleasant Lake, Wilsons Lake and Gavelton, Yarmouth Co.

Habitat Gravelly or peaty shorelines.

Vulnerability Probably vulnerable to habitat destruction through dam or cottage development in southwestern Nova Scotia.

● Arnica chionopappa Fern.

Identification Refer to Roland and Smith (1969) p. 696.

Distribution (See Map 81) Newfoundland, Gaspé Peninsula, Anticosti Island and Cape Breton Island. Found in Nova Scotia at Grand Anse River (Smith and Schofield, 1952) and Big Southwest Brook (Hounsell and Smith, 1966) Inverness Co.

Habitat Cool wet cliffs.

Vulnerability There are no similar communities to Grand Anse River in the province. Possibly vulnerable to recreation and tourism.

● Senecio pseudo-arnica Less. Beach-Senecio.

Identification Refer to Roland and Smith (1969) p. 698.

Distribution (See Map 82) Newfoundland and Labrador to the lower St. Lawrence south to Nova Scotia and southwest New Brunswick; Alaska and British Columbia. Reported in Nova Scotia from Sable Island; Rousseau found it at Canso in 1938. It has also been found at Sand Beach, Yarmouth Co.; Bird Island, Victoria Co.; Long Island, Halifax Co. and Bras d'Or Lake, Cape Breton Co.

Habitat Gravel and sand beaches along the coastline.

Vulnerability Possibly vulnerable to erosion, recreation or landscaping.

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FRESHWATER CRUSTACEA

The freshwater crustacea of Nova Scotia are mostly planktonic and meiobenthic forms. They include the small common copepods, ostracods and cladocerans. It is also possible that there are some arctic residual species in Cape Breton Island.

There are three known species of freshwater Malacostraca in Nova Scotia, one of which is of concern to this report. There is one amphipod, Hyalella azteca, which is common and widespread while there is one isopod, Asellus communis, which has a very limited distribution and is found locally only in southwestern Nova Scotia. It has therefore been included in this report. The other amphipod, Gammarus sp., has been found isolated in ponds near the sea but is actually an estuarine species and not truly freshwater.

CRUSTACEA

Family ASELLIDAE

There is only one species in Nova Scotia, but there are two species which have been tentatively identified and more research is being carried out on them. These species are: Asellus aquaticus and Asellus intermedius.

● **Asellus communis** Say, 1818.

Identification Refer to Van Name (1936) p. 453.

Distribution (See Map 83) Eastern half of the United States, also in southern Canada (Ontario, Quebec, and Nova Scotia). Reported in Nova Scotia from Lake Kejimkujik, Queens Co.; Ogden Lake, Shelburne Co.; Ellenwood Lake, Mingo Beck Lake and Killam Lake, Yarmouth Co.

Habitat Freshwater lakes, ponds and running streams, especially where there are water plants.

Vulnerability For climatic reasons this species is limited to areas in southwestern Nova Scotia where waters are quite acidic. It could therefore be vulnerable to acid rain and to the addition of lime to the water as a treatment against acid rain.

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INSECTS

Although insects constitute a major part of the Natural History collections at the Nova Scotia Museum, they are poorly known when compared with vertebrate groups. There are approximately 10,000 species in the province but only 1,500 or 15% are well enough known for an assessment of their rarity or vulnerability to be made. Insects may be rare for a number of reasons: they may be occasional strays from other areas, widely distributed in other areas but at the limit of their range in this province or difficult to collect by conventional methods. They may occur in poorly collected habitats, or be restricted to a small part of the province. Only those species or subspecies which are confined to small areas of Nova Scotia and are rare or absent elsewhere have been included in this report. Sable Island and Cape Breton Island are of particular interest in this respect.

Included are twelve Lepidoptera, one Coleoptera and one Diptera. The Lepidoptera have received the most collecting effort in Nova Scotia, whereas the other twenty six orders of insects are not as well known. The Halifax area and the more central areas in Nova Scotia have received the most attention from insect collectors, while the areas with difficult access still remain relatively under-sampled. In many cases the habitat is difficult to assess but the food plants of species are indicated where known.

LEPIDOPTERA

Family PAPILIONIDAE

There are four species in Nova Scotia, one of which is considered significant in this report.

● **Papilio brevicauda bretonensis** McDunnough. Shorttailed Swallowtail.

Identification Refer to Morris (1980) p. 33.

Distribution (See Map 84) Maritime Provinces. In Nova Scotia, restricted to Cape Breton Island. Reported from Cheticamp, Terre Noire, St. Paul Island, Eel Cove and Baddeck.

Habitat A coastal species, though adults may be taken inland when hilltopping. Larva feeds on Scotch Lovage, Ligusticum scothicum.

Vulnerability The Nova Scotian subspecies is difficult to collect because the populations move from place to place each year and are difficult to find. Not considered vulnerable.

Family SATYRIDAE

There are five species in Nova Scotia, one of which is considered significant in this report.

● Oeneis jutta ridingiana Chermock and Chermock. Jutta Arctic.

Identification Refer to Klots (1951) p. 74.

Distribution (See Map 85) Manitoba and eastward. Reported in Nova Scotia from Mount Uniacke, Halifax Co. and French Mountain, Inverness Co.

Habitat Open sunny glades, among black spruces, in wet locations bordering sphagnum bogs. Larva feeds on wild grasses.

Vulnerability This is a difficult species to collect; flying early in the season and in places which are not easily accessible. It is definitely not vulnerable.

Family LYCAENIDAE

There are seventeen species in Nova Scotia, two of which are considered significant in this report.

● Incisalia lanoraieensis Sheppard 1934. Bog Elfin.

Identification Refer to Klots (1951) p. 148.

Distribution (See Map 86) Eastern Canada and Maine. Recorded in Nova Scotia from Gold River and Bridgewater, Lunenburg Co.

Habitat Acid, black spruce - tamarack - sphagnum bogs. Larva feeds on black spruce (Lanoraie, Quebec and Maine). In Nova Scotia - dry heath barrens among scattered white pine and spruce.

Vulnerability This species is rare in collections and was only recently discovered in Nova Scotia. Though it apparently occurs only in the South Shore area it is probably more widespread and not vulnerable.

● Erora laeta (Edwards) 1862. Early Hairstreak.

Identification Refer to Klots (1951) p. 142.

Distribution (See Map 87) Eastern Canada and New England, south to Kentucky. Chiefly in Canadian zone forest, mountains southward. From Nova Scotia at Mt. Beaman, Digby Co., and Armdale, Halifax Co., May 14, 1944 (Ferguson).

Habitat Shaded trails and "woodroads" where beech trees occur.

Vulnerability This species is extremely rare in collections though it is widespread in distribution. Not considered vulnerable.

Family NOCTUIDAE

There are three hundred and ninety-two species in Nova Scotia, seven of which are considered significant in this report.

● Agrotis sp. nr. volubilis Harvey.

Identification Refer to Morris (1980) p. 99. This species is being described by K. Neil as Agrotis arenarius.

Distribution (See Map 88) Found only on Sable Island.

Habitat This cutworm probably feeds on beach grass, Ammophila breviligulata.

Vulnerability Vulnerable due to its restricted distribution and habitat.

● Xestia sp. (c-nigrum complex).

Identification The Sable Island population is distinct from North American forms and closest to European. It has yet to be examined by specialists and is probably an undescribed species. For a description of Xestia c-nigrum (Linnaeus) refer to Heath (1979) p. 179.

Distribution (See Map 89) Sable Island, Nova Scotia.

Habitat Larva is a cutworm feeding on low weedy plants at night.

Vulnerability Vulnerable due to its restricted distribution.

● Oncocnemis piffardi (Walker).

Identification Refer to Rockburne and Lafontaine (1976) p. 128 (Fig. 246).

Distribution (See Map 90) Nova Scotia, Quebec, Ontario, Maine, New Hampshire, Adirondacks, New York, Manitoba, Saskatchewan and Alberta. Rare in collections. Records in Nova Scotia are from Digby, August 28, 1937; Halifax; Truro, August 20, 1922; Debert, September 12, 1952; Chester, August 29, 1968; and Beaver Mt. Rd., Antigonish Co.

Habitat Food plant unknown.

Vulnerability Though rare in collections it is not considered vulnerable.

● Papaipema sp. nr. nelita (Strecker).

Identification Refer to Rockburne and Lafontaine (1976) p. 78. This undescribed species is being described as new by Eric Quinter of New York.

Distribution (See Map 91) Found only on Sable Island, Nova Scotia.

Habitat The larva of nelita feeds in the stems of burdock; the food plant of the Sable Island species is unknown.

Vulnerability Vulnerable due to its restricted distribution and habitat.

● Syngrapha surena (Grote).

Identification Refer to Morris (1980) p. 177.

Distribution (See Map 92) Newfoundland, Labrador, northern Quebec and northern Ontario. Specimens have been taken on French Mountain, August 20, 1952 (W. Harrington) and Big Barren, Cape Breton Island. This species is rare in collections.

Habitat High ground barrens in Cape Breton.

Vulnerability This is definitely a rare species but is not considered vulnerable.

● Catocala semirelicta Grote.

Identification Refer to Rockburne and Lafontaine (1976) p. 155 (Fig. 612).

Distribution (See Map 93) Maine, Ontario and Manitoba. Recorded in Nova Scotia from Middle River, Victoria Co. and Great Village, 1945.

Habitat Balsam poplar stands in river valleys.

Vulnerability The identification of the Nova Scotia populations in Cape Breton Island is uncertain. This species would be endangered by the removal of balsam poplar.

● Orgyia leucostigma sablensis Neil. White Marked Tussock Moth.

Identification For Orgyia leucostigma refer to Morris (1980) p. 195.

Distribution (See Map 94) This subspecies is found only on Sable Island.

Habitat The larva feeds principally on bayberry but may be found on iris, rushes and practically any green plant.

Vulnerability Vulnerable due to its restricted distribution.

Family COLEOPHORIDAE

There are approximately sixty species in Nova Scotia, one of which is considered significant in this report.

● Coleophora vacciniella McDunnough.

Identification Larva in long, narrow holster case on blueberry in fall and first two weeks after buds open in spring.

Distribution (See Map 95) Point Pleasant Park in Halifax. Known only from this locality.

Habitat Feeds on blueberry on hillside facing east.

Vulnerability Though known only from one adult specimen it is probably rare only because it is difficult to detect and collect. Not considered vulnerable.

COLEOPTERA

Family CHRYSOMELIDAE

There are approximately sixty-five species in Nova Scotia, one of which is considered significant in this report.

● Pyrrhalta sablensis Brown (1969).

Identification Refer to Howden, Martin, Bousfield and McAllister, (1970) p. 18.

Distribution (See Map 96) Found only on Sable Island, Nova Scotia.

Habitat Adults and larva found feeding on large cranberry (Vaccinium macrocarpon).

Vulnerability Vulnerable due to its restricted distribution.

DIPTERA

Family TABANIDAE

There are approximately forty-four species in Nova Scotia, one of which is considered significant in this report.

● Haematopota rara Johnson.

Identification Refer to Pechuman (1972) p. 21.

Distribution (See Map 97) New Jersey, Pennsylvania and Ohio. A disjunct population of this rare northeastern species is found in the Cape Breton Highlands at Big Barren, Victoria Co., the only known locality.

Habitat No information on habitat available.

Vulnerability Impossible to assess.

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LAND AND FRESHWATER GASTROPODS

Of a total of twenty five species of freshwater gastropods six are included in this report as being rare in Nova Scotia. These gastropods are found in fairly alkaline waters where there is a lot of vegetation and high productivity. They could be quite sensitive to water level changes as a result of flooding or drainage.

There are fifty four species of land snails and slugs in Nova Scotia and at least three native species can be considered rare in Nova Scotia. A number of introductions of land snails and slugs from outside the province have caused competition with native species, especially in new habitats such as meadows. The three native species inhabit old forests and other undisturbed natural sites which if destroyed, e.g., through stream modification, pollution, forestry or building projects, could mean elimination of these species.

GASTROPODA

Family VALVATIDAE

Only one species in Nova Scotia

● **Valvata sincera** Say. True Valve Snail.

Identification Refer to Emerson and Jacobson (1976) p. 294.

Distribution (See Map 98) Maine to Newfoundland and northern Quebec, west to Minnesota and Alberta. In Nova Scotia found only at Ingonish, on Cape Breton Island.

Habitat Chiefly in lakes with muddy bottoms and vegetation present.

Vulnerability Its limited distribution could make it vulnerable to sudden environmental changes such as water pollution or changes in water levels.

Family PHYSIDAE

There are three species in Nova Scotia, one of which is considered significant in this report.

● Aplexa hypnorum (Linnaeus). Polished Tadpole Shell.

Identification Refer to Clarke (1973) p. 383.

Distribution (See Map 99) New England to District of Columbia, west to the Cascade Mountains, north to James Bay, and northwest to Victoria Island, Banks Island, and Arctic Alaska. Recorded in Nova Scotia from Caribou River, Pictou Co.; Lake Killarney and Tidnish, Cumberland Co.

Habitat Freshwater pond or swamp with vegetation such as cattails and a mud bottom.

Vulnerability Possibly vulnerable to destruction of roadside habitats through developmental changes, such as road construction.

Family PLANORBIDAE

There are seven species in Nova Scotia, three of which are considered significant in this report.

● Planorbula jenksii H.C. Carpenter (Planorbula armigera (Say)). Jenks' Ram's Horn.

Identification Refer to Emerson and Jacobson (1976) p. 314.

Distribution (See Map 100) New Brunswick west to southeastern Ontario, then west to Saskatchewan and northwest to the Mackenzie River system. Reported in Nova Scotia from Lake Egmont, Halifax Co.; McCloskey Brook, Cumberland Co.; Musquodoboit River, Halifax Co. (Shell only).

Habitat Slow moving brooks or lakes among vegetation.

Vulnerability Possibly vulnerable to changes in water levels and other disruptions of the surrounding habitat.

● Gyraulus parvus (Say). Lesser Ram's Horn.

Identification Refer to Clarke (1973) p. 400.

Distribution (See Map 101) North America, east of the Rocky Mountains and south to South Carolina. In Nova Scotia reported from Barrett Lake and Dutch Settlement, Halifax Co. In Cumberland Co., from Tidnish.

Habitat In ponds or slow flowing brooks attached to floating wood, cattails, lily pads and leaves. Bottom type most frequently mud.

Vulnerability Possibly vulnerable to changes in water levels by flooding or drainage.

● Micromenetus dilitatus (Gould). Dilated Ram's Horn.

Identification Refer to Emerson and Jacobson (1976) p. 313.

Distribution (See Map 102) Throughout the eastern United States. In Nova Scotia, reported from Grand Lake, Lake William, Fletcher Lake, and Lake Thomas, Halifax Co. From Lunenburg Co. at Gold River and from a pond at Waternish, Guysborough Co.; Porcupine Lake, Digby Co.

Habitat Quiet pools and ponds on stones or vegetation.

Vulnerability Possibly vulnerable to habitat destruction.

Family PUPILLIDAE

There are nine species in Nova Scotia, one of which is considered significant in this report.

● Pupilla muscorum (Linnaeus). The Moss Pupa Snail.

Identification Refer to Burch (1962) p. 55.

Distribution (See Map 103) Canada and Maine to New Jersey and westward to Oregon and New Mexico. Reported in Nova Scotia from Crystal Cliffs and Arisaig, Antigonish Co.; Carter's Beach, Queen's Co.; Caribou River, Pictou Co. and Conrad Beach, Halifax Co.

Habitat On the ground under wood and stones and among leaves. The Nova Scotian localities were all coastal and many were in sandy areas such as sand dunes behind beaches.

Vulnerability Habitat destruction, e.g., recreational use.

Family PHILOMYCIDAE

There are two species in Nova Scotia, one of which is considered significant in this report.

● Philomycus carolinianus flexuolaris (Rafinesque).

Identification Refer to Burch (1962) p. 71.

Distribution (See Map 104) Nova Scotia west to Ontario and south to Virginia and Louisiana. Scattered areas of mainland Nova Scotia with one location on Cape Breton Island at the summit of Kellys Mountain, Victoria Co.

Habitat Moist places under logs, etc., in old forest habitats.

Vulnerability A representative species of the land gastropods which inhabit old forests. This slug could be vulnerable to the destruction of its native woodland habitat by clearcutting or development.

Family ZONITIDAE

There are twelve species in Nova Scotia, one of which is considered significant in this report.

● Hawaiia minuscula (Binney).

Identification Refer to Burch (1962) p. 106.

Distribution (See Map 105) North America from Alaska and Maine to Costa Rica. In Nova Scotia only from South Maitland, Hants Co.

Habitat Old forest habitat and nearby grass, meadow or leaf litter, usually near a river.

Vulnerability Possibly vulnerable through destruction of its native woodland habitat.

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FRESHWATER BIVALVES

In Nova Scotia there are approximately sixty-seven species of bivalves, nineteen of which are freshwater. Two groups included in this report are the unionacean and the sphaeriacean clams.

The unionids have a peculiar characteristic of their reproductive process. The eggs do not hatch directly into young, but into larval forms called "glochidia". These must attach themselves to the skin, gills or fins of fish where they undergo a period of parasitic existence. The young, called naiads, drop to the bottom and develop to maturity far from their place of birth. The unionids are usually found in alkaline waters and could be quite vulnerable to acid rain or anything which would cause the sediment to become an unsuitable habitat for the clams.

Of the sphaeriid clams, Sphaerium simile has been included by reason of its rarity in Nova Scotia. The sphaeriids are ovoviviparous in that the egg develops within the maternal body but without additional nourishment from the parent. The destruction of habitat is the main problem facing the survival of these sphaeriid clams.

BIVALVIA

Family MARGARITIFERIDAE

Only one species in Nova Scotia.

● **Margaritifera margaritifera** (Linnaeus) 1958. Pearl Mussel.

Identification Refer to Burch (1975a) p. 29 (Fig. 13).

Distribution (See Map 106) Occurs in Europe and Asia as well as in North America. In this continent it is known from both sides of the Gulf of St. Lawrence south to Pennsylvania and from Anticosti Island and Newfoundland. Throughout the province except in southwestern Nova Scotia.

Habitat Mainly in streams or rivers with moderate to quite rapid current and sand or gravel bottoms. Salvelinus fontinalis is probable host for glochidia larvae of Margaritifera.

Vulnerability Absence from the acidic waters found in southwestern Nova Scotia indicates that the species might be vulnerable to acid rain or other such alterations in their habitat.

Family UNIONIDAE

There are nine species in Nova Scotia, three of which are considered significant in this report.

● Alasmidonta varicosa (Lamarck) 1819.

Identification Refer to Burch (1975a) p. 80 (Fig. 127).

Distribution (See Map 107) In the Atlantic drainage from Nova Scotia and New Brunswick to South Carolina. Mainly in central Nova Scotia from Wallace River, East River and St. Mary's River.

Habitat Occurs only in moderately to rapidly flowing streams; often in riffles or rapids, and in sand or among gravel or rocks. Host for glochidia larvae unknown.

Vulnerability Its restricted range makes it vulnerable to sudden change in water quality.

● Lampsilis ochracea (Say) 1817. Ocher Lamp Mussel.

Identification Refer to Burch (1975a) p. 136 (Fig. 251).

Distribution (See Map 108) Quite sporadic in its distribution. Has been recorded from New Brunswick (Athearn, 1961) south to the Ogeechee River, Georgia. Found in Nova Scotia at River Hebert, Lake Placid and Sydney River.

Habitat Occurs in ponds, lakes and slow flowing rivers on sandy or muddy bottoms. Most abundant in ponds near the sea coast. Host for glochidia larvae unknown.

Vulnerability Its restricted range makes it vulnerable to sudden environmental change or water pollution resulting in decreased water quality.

● Lampsilis cariosa (Say) 1817. Yellow Lamp Mussel.

Identification Refer to Burch (1975a) p. 136 (Fig. 250).

Distribution (See Map 109) From Maine to Georgia in the Atlantic coastal drainage. Known in Canada only from the Sydney River, a few miles from Sydney on Cape Breton Island. This species is rare in Canada.

Habitat Freshwater rivers with slow currents and muddy sand bottoms.

Vulnerability Its restricted range makes it vulnerable to sudden environmental change, or chronic water pollution and reduction in water quality.

Family SPHAERIIDAE

There are eight species in Nova Scotia, one of which is considered significant in this report.

● Sphaerium simile (Say) 1816.

Identification Refer to Burch (1975b) p. 10 (Fig. 6).

Distribution (See Map 110) Southern Canada from New Brunswick to northern and central British Columbia, south to Virginia, Iowa and Wyoming. In Nova Scotia reported from Ibbitson Brook, La Planche River and John Smith Brook, Cumberland Co.; Lake Egmont, Halifax Co.

Habitat Large or small lakes, or in slow water in rivers and brooks. In Canada, Clarke (1973: 143) found that "submerged vegetation was present at all sites and bottom deposits were of all types, with mud or sand or both the most frequent". Not found in temporary waters, ponds or swamps.

Vulnerability Possibly vulnerable to loss of habitat through development.

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FISHES

According to Gilhen (1974) there are thirty-seven species of fishes in Nova Scotia's lakes and streams. Six of these are considered rare and are included in this report.

The greatest number of freshwater species in Nova Scotia is found in Cumberland County and the least number at either extremity of the province.

There is still a great deal to be learned about Nova Scotia freshwater fishes and in many cases accurate information on habitats is not available. Eight species common in New Brunswick have not been recorded from Nova Scotia and it is possible that some of these fish were overlooked during fish surveys in the past.

The freshwater fishes in Nova Scotia could be vulnerable to: rivers becoming fouled with poisonous chemicals and sewage; hydro dams without adequate fish passage facilities, and in some cases destruction of spawning grounds when gravel beds become covered with silt, sawdust and other debris as a result of logging operations.

OSTEICHTHYES

Family CLUPEIDAE

There are three species in Nova Scotia, one of which is considered significant in this report.

● **Alosa aestivalis** (Mitchill). Blue Back Herring.

Identification Refer to Scott and Crossman (1973) p. 119.

Distribution (See Map 111) In Canada the species is not common. Specimens have been collected in the Kennebecasis River, King's Co., N.B. In Nova Scotia specimens are known from the Bras d'Or Lakes on Cape Breton Island; and in the Shubenacadie and Stewiacke Rivers.

Habitat No information on habitat in the province. This species is anadromous.

Vulnerability Probably vulnerable because of its limited distribution.

Family SALMONIDAE

There are seven species in Nova Scotia, two of which are considered significant in this report.

● Salvelinus namaycush (Walbaum). Lake Trout.

Identification Refer to Scott and Crossman (1973) p. 220.

Distribution (See Map 112) Southwestern Nova Scotia, New Brunswick, north throughout Quebec and Labrador, west throughout Ontario, northern Manitoba and Saskatchewan, southwestern and northeastern portions of Alberta and northern British Columbia. Records in the Nova Scotia Museum are from Pockwock Lake, Dollar Lake and Wright Lake, Halifax Co.; Nine Mile Lake and Sherbrooke Lake, Lunenburg Co.

Habitat Cool deep waters of lakes and sometimes rivers.

Vulnerability Possibly vulnerable because of its limited distribution.

● Coregonus canadensis Scott. Atlantic Whitefish.

Identification Refer to Scott and Crossman (1973) p. 281.

Distribution (See Map 113) Restricted entirely to Nova Scotia where it is known to occur at the headwater of the Petite Riviere and Leipsigate Lake (Millipsigate Lake), Lunenburg Co. From Yarmouth Co. it has been recorded only once from Yarmouth Harbour and from the Tusket River system. Not reported from any other location in the world.

Habitat No information on habitat in the province. The whitefish is anadromous.

Vulnerability Its numbers have been greatly reduced as a result of dams and by heavy exploitation. It could be vulnerable to hydroelectric development.

Family CYPRINIDAE

There are nine species in Nova Scotia, two of which are considered significant in this report.

● Rhinichthys atratulus (Herman). Blacknose Dace.

Identification Refer to Scott and Crossman (1973) p. 491.

Distribution (See Map 114) Ranges from eastern Lake Ontario, east through southern Quebec, into New Brunswick and Nova Scotia. In Nova Scotia it was reported in Cumberland Co. from River Philip, Shinimicas River, Sutherland Lake, Portapique River, Wallace River, Atkinson Brook, and a stream near Dewar Lake; in Colchester Co. from French River.

Habitat Fast flowing streams and cool, clear lakes.

Vulnerability Possibly vulnerable to alteration of stream water quality due to development or logging.

● Semotilus corporalis (Mitchill). Fallfish.

Identification Refer to Scott and Crossman (1973) p. 511.

Distribution (See Map 115) South from New Brunswick, Quebec, and Ontario, east of the Appalachians, to Virginia. In Nova Scotia, only one specimen has been found in a stream coming from Marsh Lake, Halifax Co.

Habitat Clear, flowing, gravel bottomed streams, rivers and also lakes. Frequents eddies at the foot of falls and rapids.

Vulnerability Possibly vulnerable to pollution or alteration of its single reported locality in Nova Scotia.

Family GASTEROSTEIDAE

There are four species in Nova Scotia, one of which is considered significant in this report.

● Culaea inconstans (Kirtland). Brook Stickleback.

Identification Refer to Scott and Crossman (1973) p. 661.

Distribution (See Map 116) From Nova Scotia and New Brunswick west, barely entering British Columbia, and north to the Hudson and James Bay drainages of Quebec, Ontario, and Manitoba, and the Hay River region of Great Slave Lake. In Nova Scotia it has been reported only from Cumberland Co. at Ibbitson Brook, River Philip, Shinimicas, and La Planche watersheds (Gilhen, 1978, unpublished).

Habitat Densely vegetated waters of small streams and spring fed ponds, or small bog lakes. Strictly a freshwater fish.

Vulnerability Probably vulnerable because of its limited distribution.

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AMPHIBIANS AND REPTILES

Of a total of twenty-five species (thirteen amphibians and twelve reptiles) known to occur in Nova Scotia, three of each group are included in this report because of their apparent rarity. Destruction of habitat is perhaps the greatest danger to their continued survival.

There are large portions of Nova Scotia where the amphibians and reptiles are inadequately known. Parts of the mainland east of Halifax and north of Minas Basin particularly need investigation, as do virtually all the inshore and offshore islands along the coast.

AMPHIBIA

Family AMBYSTOMIDAE

There are two species in Nova Scotia, one of which is considered significant in this report.

● Ambystoma laterale Hallowell, 1858. Blue Spotted Salamander.

Identification Refer to Conant (1958) p. 210.

Distribution (See Map 117) From eastern Manitoba to Nova Scotia, Prince Edward Island, and extreme eastern Quebec; northward in Ontario to James Bay in the east; to Goose Bay in Labrador. The Nova Scotia mainland north of Kentville and Halifax; a few widely separated localities on Cape Breton Island. The triploid form is known only from Cumberland Co., notably the Shinimicas River watershed (Gilhen, 1974).

Habitat Woodlands adjacent to aquatic breeding sites, which include alder swamps, ponds (particularly shallow roadside ponds) and slow, vegetated streams. Primarily on red soils overlying sandstone, conglomerate and shale.

Vulnerability The triploid form could be vulnerable because of its limited distribution.

Family PLETHODONTIDAE

There are two species in Nova Scotia, both of which are considered significant in this report.

● Plethodon cinereus (Green). 1818. Eastern Redback Salamander.

Identification Refer to Bishop (1947) p. 232.

Distribution (See Map 118) Found in the Gaspé Peninsula and Cape Breton Island west to Fort William, Ontario, south to Dallas, Georgia, Missouri, and Arkansas. Three color phases are recognized: the red-backed phase is dominant and is common throughout the province; the lead-backed phase is common in the coastal spruce-fir and mixed woodlands; it becomes less common in the highlands and seems to be replaced by an all-red (erythristic) phase which is found on North Mountain, the Cobequid Highlands and the Pictou-Antigonish Highlands. The all-red (erythristic) phase is the reason for including this species in the report.

Habitat Mature deciduous woods, notably stands of sugar maple.

Vulnerability The erythristic phase could suffer if hardwoods are destroyed. For example in the past decade many acres of forest have been cleared to establish blueberry fields and now softwood is being cleared for the pulp and paper industry.

● Hemidactylium scutatum (Schlegel). 1838. Four-Toed Salamander.

Identification Refer to Bishop (1947) p. 306.

Distribution (See Map 119) Southern Ontario and Maine westward to Wisconsin, south to Georgia and Alabama; also Arkansas, Missouri, and Illinois. Scattered records throughout Nova Scotia. Most known localities are represented by a single specimen.

Habitat During the spring, adults inhabit sphagnum bogs and sphagnaceous margins of slow moving streams. Following the breeding season they inhabit the adjacent woodlands.

Vulnerability None at present. This species appears to be quite rare but in the future it may be found to be more common and widespread than present records indicate.

REPTILIA

Family EMYDIDAE

There are three species in Nova Scotia, two of which are considered significant in this report.

● Clemmys insculpta (Le Conte) 1830. Wood Turtle.

Identification Refer to Ernst and Barbour (1972) p. 80.

Distribution (See Map 120) From Nova Scotia to northern Virginia and west through southern Ontario and New York to northeastern Ohio, Michigan, Wisconsin, eastern Minnesota, and northeastern Iowa. Found on the northern mainland of Nova Scotia and southern Cape Breton Island, notably the River Inhabitants watershed.

Habitat Slow moving meandering streams through fertile valleys. Wood turtles nest on sloping sand or gravel river banks. During the day they may move away from stream banks to meadows, fields or along roadsides, returning to the stream at night.

Vulnerability Nesting sites are few on each stream and are easily destroyed by gravel removal. Adults and juveniles are frequently taken from natural sites, kept for a time in captivity, and released far removed from the breeding population.

● Emydoidea blandingii (Holbrook). Blanding's Turtle.

Identification Refer to Ernst and Barbour (1972) p. 179.

Distribution (See Map 121) Southern Ontario south through the Great Lakes region and west to eastern Nebraska. Also in scattered localities in eastern New York, Massachusetts, southern New Hampshire and Nova Scotia. Reported in Nova Scotia from Kejimkujik National Park, especially West River, Little River, Kejimkujik Lake, Grafton Lake, and Mersey River.

Habitat Slow boggy streams near lakes and boggy lake coves. Nests on sandy beaches of lake shores.

Vulnerability Protected within the park but could be vulnerable to any disturbance of the nesting sites through recreational use of the park or by the building of new nature trails.

Family COLUBRIDAE

There are five species in Nova Scotia, one of which is considered significant in this report.

● **Thamnophis sauritus septentrionalis** Rossman. Northern Ribbon Snake.

Identification Refer to Froom (1972) p. 69.

Distribution (See Map 122) Ontario (south of the Muskoka district) to the Gulf states and east to southern Maine. There is a disjunct population in southwestern Nova Scotia, particularly in the vicinity of Caledonia and Kempt in Queens Co.

Habitat Vegetated shallows of ponds, lakes shores and stream banks; and also in meadows.

Vulnerability Cottage development exposes them to human predation.

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BIRDS

According To Tufts, (1973) there are 377 different species of birds in Nova Scotia, 163 of which have been known to breed here. It is difficult to assess the bird populations because so many are migratory.

After contacting various bird resource people (Ian McLaren, Tony Erskine, Peter Austin-Smith, Anne Green and Tony Lock) a list of rare bird species has been compiled. It contains only resident species and those which breed or have bred in Nova Scotia. Due to a limited time available it was not possible to supply the detail that is provided in the previous sections of the report.

It should be emphasized that this is only a preliminary list which is open for comments, corrections, additions or deletions.

PRELIMINARY LIST OF RARE BIRDS IN NOVA SCOTIA

1. Pied-billed Grebe Podilymbus podiceps podiceps (Linnaeus).
2. Gadwall Anas strepera Linnaeus.
3. Shoveler Spatula clypeata (Linnaeus).
4. Peregrine Falcon Falco peregrinus anatum Bonaparte.
5. Yellow Rail Coturnicops noveboracensis (Gmelin).
6. American Coot Fulica americana americana Gmelin.
7. Semipalmated Plover Charadrius semipalmatus Bonaparte.
8. Piping Plover Charadrius melodus melodus Ord.
9. Greater Yellowlegs Totanus melanoleucus (Gmelin).
10. Least sandpiper Erolia minutilla (Vieillot).
11. Laughing Gull Larus atricilla Linnaeus.
12. Black-legged Kittiwake Rissa tridactyla tridactyla (Linnaeus).
13. Roseate Tern Sterna dougallii dougallii Montagu.
14. Razorbill Alca torda torda Linnaeus.

15. Common Puffin Fratercula arctica arctica (Linnaeus).

16. Mourning Dove Zenaidura macroura carolinesis (Linnaeus).

17. Pileated Woodpecker Dryocopus pileatus abieticola (Bangs).

18. Great Crested Flycatcher Myiarchus crinitus boreus Bangs.

19. Eastern Phoebe Sayornis phoebe (Latham).

20. Purple Martin Progne subis subis (Linnaeus).

21. Mockingbird Mimus polyglottos polyglottos (Linnaeus).

22. Wood Thrush Hylocichla mustelina (Gmelin).

23. Eastern Bluebird Sialia sialis sialis (Linnaeus).

24. Loggerhead Shrike Lanius ludovicianus migrans Palmer.

25. Eastern Meadowlark Sturnella magna magna (Linnaeus).

26. Baltimore Oriole Icterus galbula (Linnaeus).

27. Ipswich Sparrow Passerculus princeps Maynard.

28. Fox Sparrow Passerella iliaca iliaca (Merrem).

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MAMMALS

There are approximately fifty-five species of land mammals in Nova Scotia comprising a total of ten groups. There are three groups which are relatively poorly known and it is difficult to gather up-to-date information on them: the bats, insectivores and small rodents. The other mammals are important as game species, fur bearers or as species of economic importance, and they are relatively well known. There are fourteen species of mammals included in this report which are considered to be rare, endangered or to have significantly limited distributions in Nova Scotia. These species can be destroyed through damage or modification of their environment and preservation of their habitats is vital to their survival.

MAMMALIA

Family SORICIDAE

There are seven species in Nova Scotia, two of which are considered significant in this report.

● **Sorex gaspensis** Anthony and Goodwin, 1924. Gaspé Shrew.

Identification Refer to Banfield (1974) p. 19.

Distribution (See Map 123) Gaspé Peninsula and the eastern townships, Quebec; northern New Brunswick. Apparently restricted to Cape Breton Island in Nova Scotia. Found there at Kelly's Mountain, Wreck Cove Brook, Lewis Brook, the valley of the northeast Margaree opposite Sugarloaf Mtn., and in three locations within the Cape Breton Highlands National Park.

Habitat Transition-zone yellow birch/sugar maple/balsam fir forests (Kirkland and van Deusen, 1979) on slopes flanking the rivers which drain the Cape Breton Highlands. Large boulders seem to be a requirement, along with leaf litter and abundant ferns, mosses and forbs. Most specimens collected have been trapped within a few meters of running water.

Vulnerability High at present, especially if restricted to the 7 known localities. Three of these are in a national park but are by no means safe from such threats as fire. The 4 localities outside the park are also vulnerable to logging or other human disturbance. In all 7 known localities, overtrapping by mammalogists is a serious threat.

On the mainland, suitable habitats occur locally on North Mountain, in the Cobequids and in the Pictou-Antigonish Highlands. Every effort should be made to protect these sites of suitable habitat, at least until they can be thoroughly investigated.

● Microsorex hoyi thompsoni (Baird) 1858. Pygmy Shrew.

Identification Refer to Banfield (1974) p. 6 and 20.

Distribution (See Map 124) The Maritimes and eastern townships of Quebec. Throughout Nova Scotia, uncommon to rare and local. In Cape Breton Island at Ingonish and Ingonish Center, Victoria Co., and Cheticamp River Valley, Inverness Co.

Habitat Hardwood forest, dry upland old fields, bogs and wet meadows.

Vulnerability Impossible to assess at present.

Family VESPERTILIONIDAE

There are six species in Nova Scotia, four of which are considered significant in this report.

● Lasionycteris noctivagans (Le Conte) 1831. Silver Haired Bat.

Identification Refer to Banfield (1974) p. 6 and 52.

Distribution (See Map 125) Across southern Canada from Nova Scotia to Vancouver Island and northward to Moosonee, Ontario, the Peace River district, and the Queen Charlotte Islands. A single record from Nova Scotia in Kejimkujik National Park in July 1950 (Bleakney, 1965). The rarest bat in the province.

Habitat The specimen was shot in flight over a forest road. There is no other information on Nova Scotian populations.

Vulnerability Impossible to assess.

● Pipistrellus subflavus subflavus (Cuvier) 1833. Eastern Pipistrelle.

Identification Refer to Banfield (1974) p. 57.

Distribution (See Map 126) Southern Ontario and southeastern Quebec. Uncommon to rare in Queens, Kings, Hants and Colchester Counties of Nova Scotia.

Habitat Two specimens have been collected over lake shores in Nova Scotia. This species is a cave hibernator in winter and has been found in Hayes Cave, Frenchman's Cave (both in Hants Co.) and Gays River gold mines in Colchester Co.

Vulnerability Any disturbance of present hibernacula could cause dispersal to less favourable sites and probably would lead to increased winter mortality. In the case of Hayes Cave the hibernating bats are subject to air pollution, loud noise, and to being burned off the walls with improvised wood, tarpaper or plastic torches. Nursery colonies in buildings, especially homes, are vulnerable when residents cannot tolerate the presence of bats, and call in exterminators to get rid of them.

● Lasiurus borealis borealis (Muller) 1776. Red Bat.

Identification Refer to Banfield (1974) p. 6 and 61.

Distribution (See Map 127) Eastern and central Canada. There are three records from boats off the Nova Scotia coast to the south or west of Yarmouth (Bleakney, 1965; Peterson, 1970) and one from Sable Island (July 1976). Rare.

Habitat No information on summer habitat in the province.

Vulnerability Impossible to assess.

● Lasiurus cinereus (Palisot de Beauvois) 1796. Hoary Bat.

Identification Refer to Banfield (1974) p. 6 and 64.

Distribution (See Map 128) From Halifax, Nova Scotia, to Vancouver, British Columbia. Also occupies the northern boreal forests as far north as Great Slave Lake. Two records from Halifax (Nov 17, 1909 and Nov. 2, 1980), one from Dartmouth (Oct. 22, 1917) and one from Seal Island, Yarmouth Co. (Sept. 2, 1971) are in the Nova Scotia Museum collection. This species must be considered rare.

Habitat No information on summer habitat in the province.

Vulnerability Impossible to assess.

Family SCIURIDAE

There are five species in Nova Scotia, one of which is considered significant in this report.

● Glaucomys volans volans (Linnaeus) 1958. Southern Flying Squirrel.

Identification Refer to Banfield (1974) p. 143.

Distribution (See Map 129) Southern Ontario and the eastern United States. A relict and disjunct population occurs in Nova Scotia, known only from Kejimkujik National Park, where it was discovered in 1971 (Wood and Tessier, 1974). Within the park it appears to be generally distributed in the southeastern half.

Habitat Recorded in mixed forest, a stand of red oak and a campsite.

Vulnerability Protected within the park, but could be vulnerable to extensive fire and possibly over trapping by mammalogists.

Family CRICETIDAE

There are six species in Nova Scotia, three of which are considered significant in this report.

● Peromyscus leucopus caudatus R. W. Smith, 1939. White Footed Mouse.

Identification Refer to Banfield (1974) p. 135 and 172.

Distribution (See Map 130) One reason for including the white footed mouse in this report is to emphasize the existence of two isolated populations in Guysborough Co. which could be quite vulnerable to large scale developments. In eastern North America it extends only as far north as southern Ontario and Quebec, and southern Maine. Occurrence in the Maritimes is restricted to southwestern and central Nova Scotia, excepting the isolated Guysborough populations.

Habitat Mature and second growth coniferous, deciduous and mixed forests; black spruce swamps; forest edges; regenerating burns; barrens; old fields, clear cut areas; roadside verges; stream and river banks; lake shores and bog margins; coastal beaches; wooded urban parks. Often enters buildings.

Vulnerability None in central and western Nova Scotia. Populations in Guysborough Co., if proven to be isolated, could be vulnerable to large scale development e.g. housing tracts or shopping centers.

● Synaptomys cooperi Baird, 1857. Southern Bog Lemming.

Identification Refer to Banfield (1974) p. 187.

Distribution (See Map 131) Southeastern Canada from the Maritime Provinces to southeastern Manitoba. Absent on Prince Edward Island, Anticosti Island, and Newfoundland. Throughout Nova Scotia in suitable habitats. Uncommon to rare. Most records are from southwestern Nova Scotia.

Habitat Pure stands of white pine, balsam fir and hemlock; mixed forest; stream banks in mixed forest; wooded talus slopes, sphagnum bogs.

Vulnerability Impossible to assess.

● Microtus chrotorrhinus chrotorrhinus (Miller) 1894. Rock Vole.

Identification Refer to Banfield (1974) p. 218.

Distribution (See Map 132) Northern New Brunswick, the Gaspé Peninsula, the north shore of the St. Lawrence River, central Quebec, and Ontario, south through New England to West Virginia. In Nova Scotia apparently restricted to Cape Breton Island being recorded first from Cape Breton Highlands National Park in 1974 (Roscoe and Majka, 1976) and later in the northeast Margaree Valley. Found also at Lewis Brook and Wreck Cove Brook in 1981.

Habitat On the steep slopes of river valleys draining the Cape Breton Island plateau, usually where there are large boulders. In two of six known localities it was collected near running water.

Vulnerability The localities within the national park are vulnerable to fire and over-trapping. The other localities are vulnerable to logging and other human disturbances as well.

Family MUSTELIDAE

There are six species in Nova Scotia, one of which is considered significant in this report.

● Martes americana americana (Turton) 1806. Marten.

Identification Refer to Banfield (1974) p. 315.

Distribution (See Map 133) Throughout eastern Canada with the exception of the northernmost part of Ungava Peninsula of Quebec and the Cape Henrietta Maria section of Ontario. Rocky mountains of eastern British Columbia and southwestern Alberta. Newfoundland and Labrador. Now extinct on Prince Edward Island. Recent records for Nova Scotia include Ingonish, Ingonish Ferry and northeast Margaree.

Habitat Mature coniferous forests. The main prey species are voles, deer mice and jumping mice, red squirrels, flying squirrels and snowshoe hares; birds are also eaten.

Vulnerability Possibly vulnerable to excessive trapping, extensive burning, logging and settlement.

Family FELIDAE

There are three species in Nova Scotia, two of which are considered significant in this report.

● Felis concolor cougar Kerr, 1792. Cougar.

Identification Refer to Banfield (1974) p. 346.

Distribution New Brunswick and northern and western Ontario, British Columbia and in the Rocky Mountains of Alberta. No specimen has yet been taken in Nova Scotia. Cougar sightings since 1970 are shown on Map 134.

Habitat Variety of habitats from swamps and wooded river valleys to dense coniferous forests.

Vulnerability Impossible to completely assess but they would be vulnerable to anything which would diminish the deer population and to disturbances by human encroachment such as roads, vehicles and logging.

● Lynx lynx canadensis , 1792. Lynx.

Identification Refer to Banfield (1974) p. 349.

Distribution Newfoundland to Yukon Territory. Reported in Nova Scotia from Halifax Co., Victoria Co., Richmond Co., Inverness Co. and Cape Breton Co.

Habitat Wooded, swampy areas. Main food is snowshoe hare.

Vulnerability Possibly vulnerable to the harvesting of pulpwood on Cape Breton Island, excessive hunting and competition with the bobcat, which is more aggressive than the lynx. Climate change to light winter snowfall would also favor the bobcat over the lynx.

Family EQUIDAE

Only one species in Nova Scotia.

● Equus caballus Linnaeus. Sable Island Horse.

Identification Refer to Peterson (1970) p. 313.

Distribution (See Map 135) Found only on Sable Island, Nova Scotia.

Habitat Vegetated parts of Sable Island.

Vulnerability Vulnerable to reduction of their food supply on the island and to extreme weather conditions.

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DISTRIBUTION MAPS

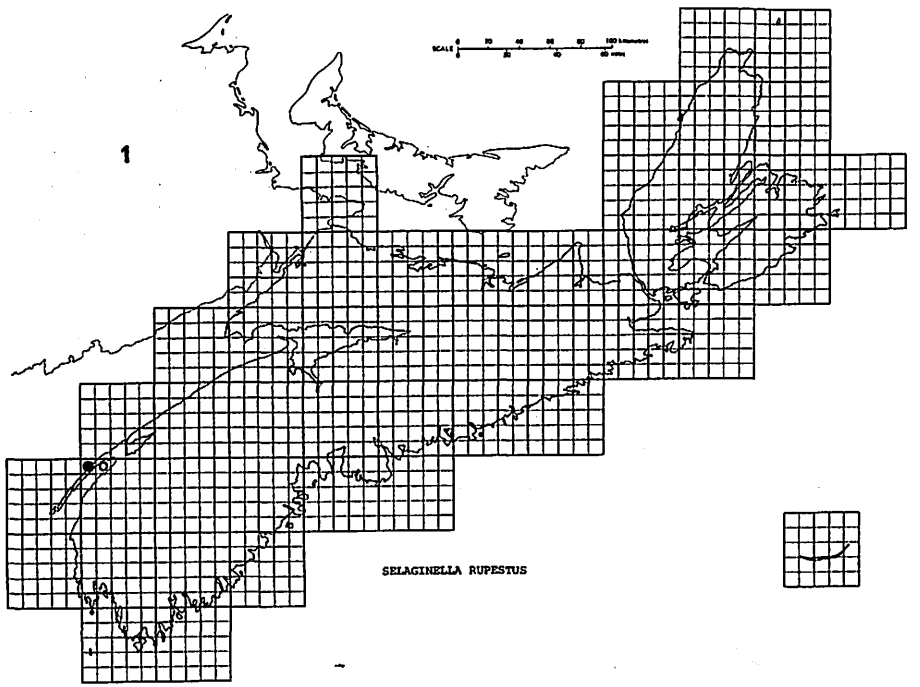
The map used to plot the species' localities has a ten kilometer square grid. It was prepared by MRMS for the Nova Scotia Museum and is based on the national grid system as published in the Nova Scotia Map Book, 1979. The large squares are pages of the map book which should be used to find locality names. Further data on the records shown can be obtained from the Nova Scotia Museum.

The following symbols are used on the maps:

●	N.S. Museum collections and records
X O	Published records
A	Acadia University collections

Each dot or other symbol means that the species concerned has been recorded from that square on the map, and may represent more than one collection.

Reference: Map of Nova Scotia. 1979. Province of Nova Scotia and Dept. Regional Economic Expansion. 46 p.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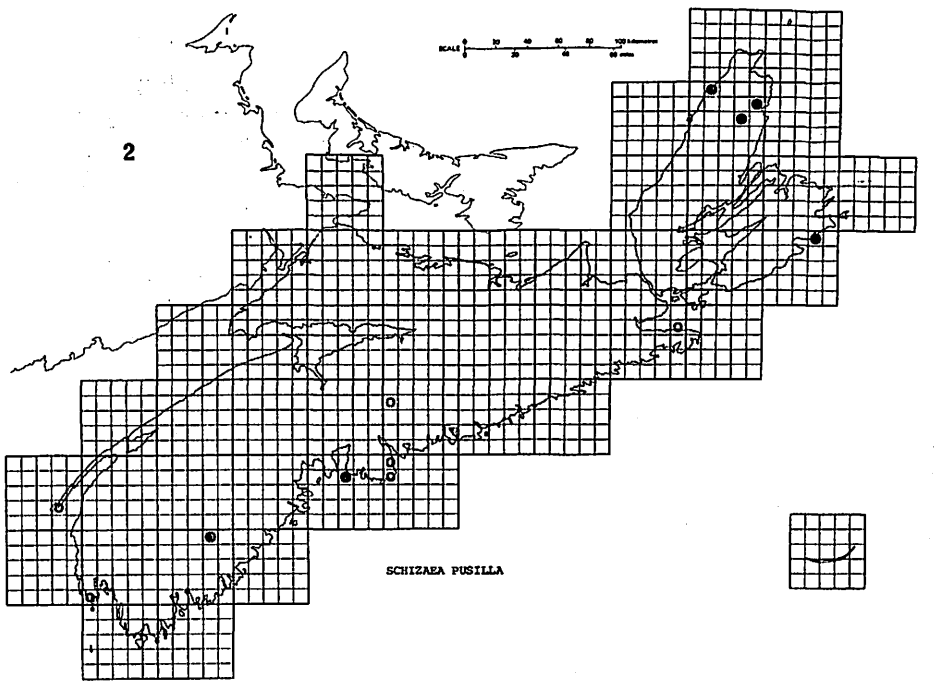
SELAGINELLA RUPESTUS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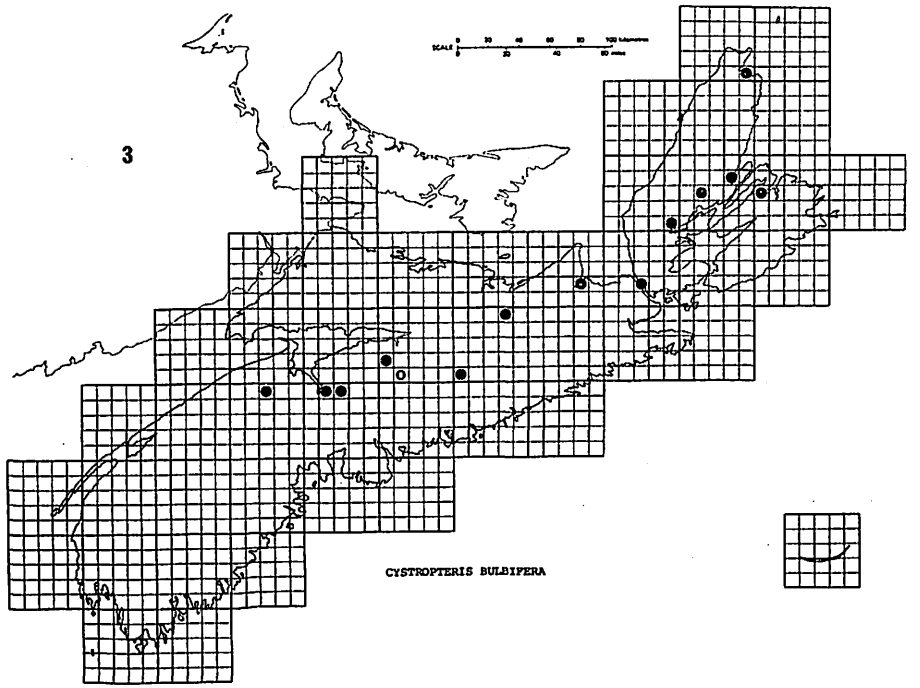
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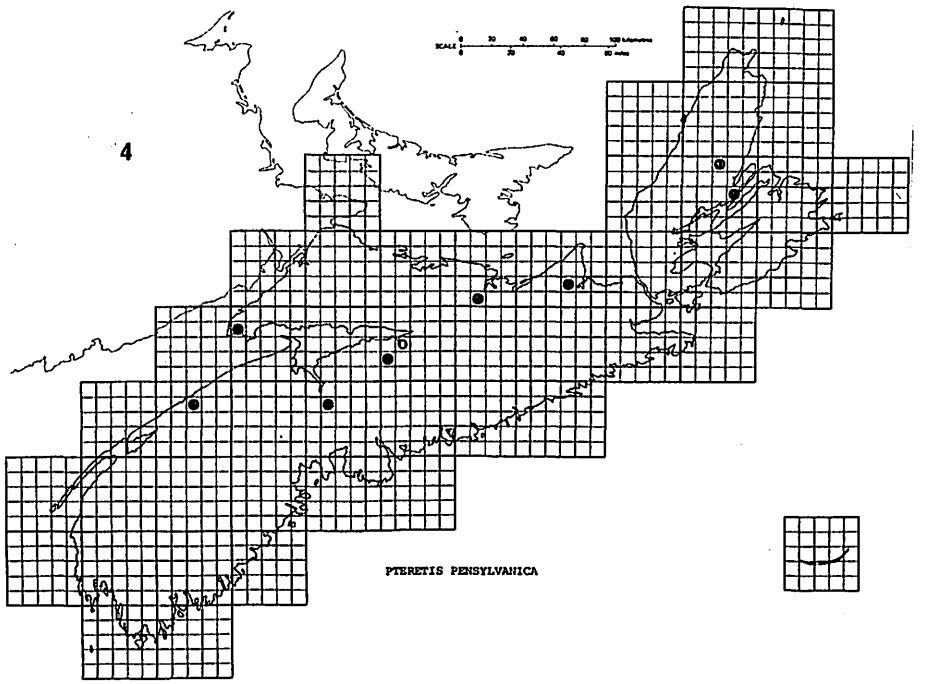
CYSTROPTERIS BULBIFERA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PTERETIS PENSYLVANICA

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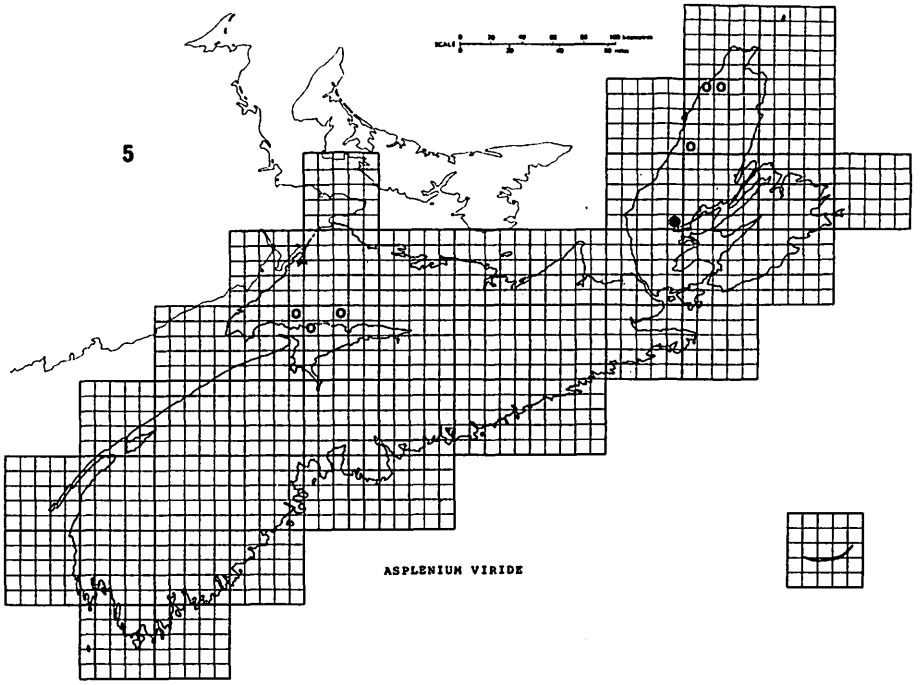

ASPLENIUM VIRIDE

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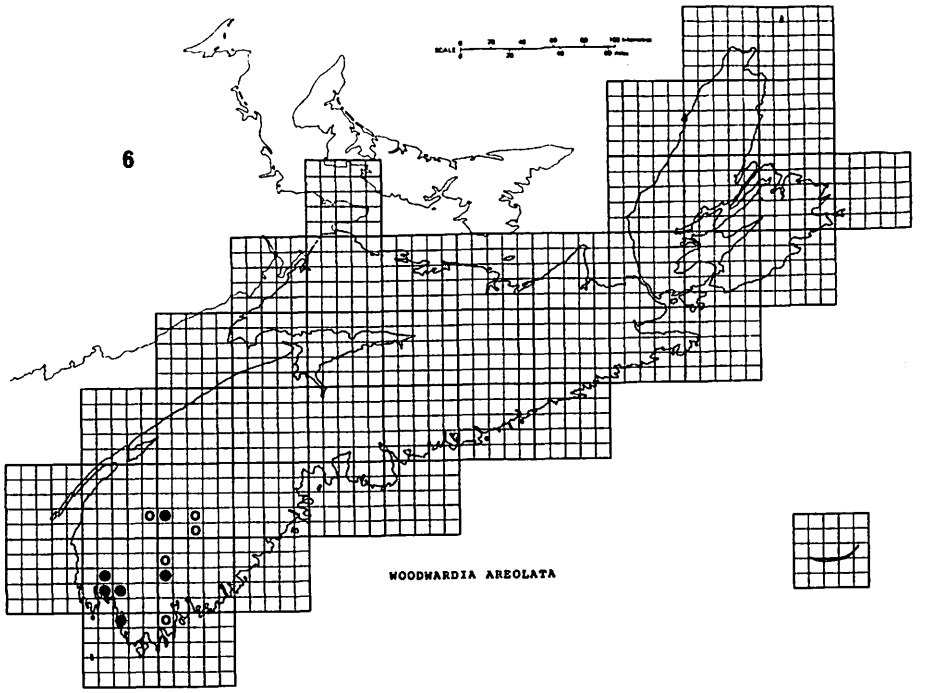

WOODWARDIA AREOLATA

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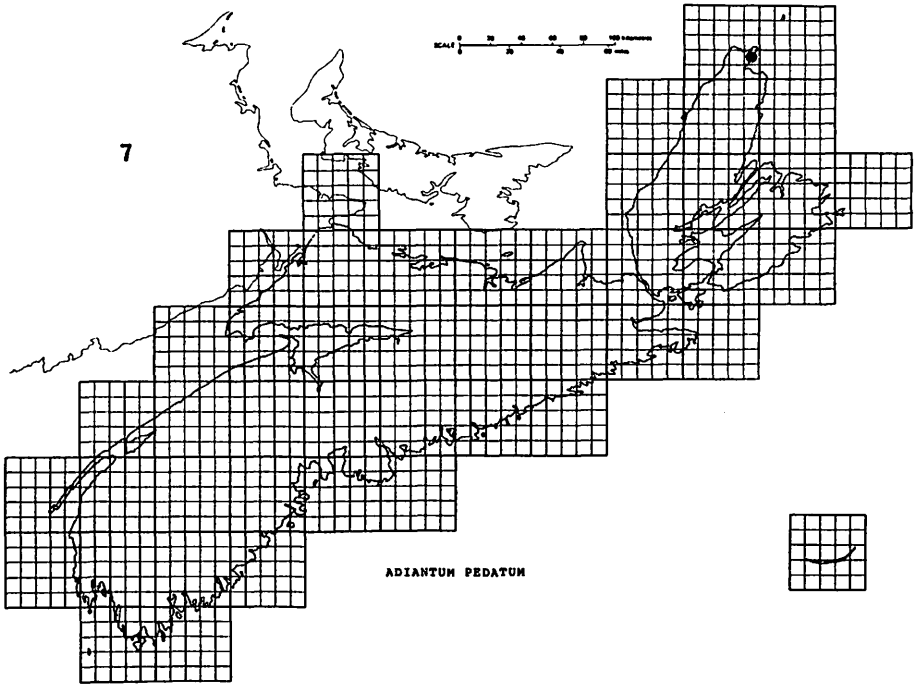

ADIANTUM PEDATUM

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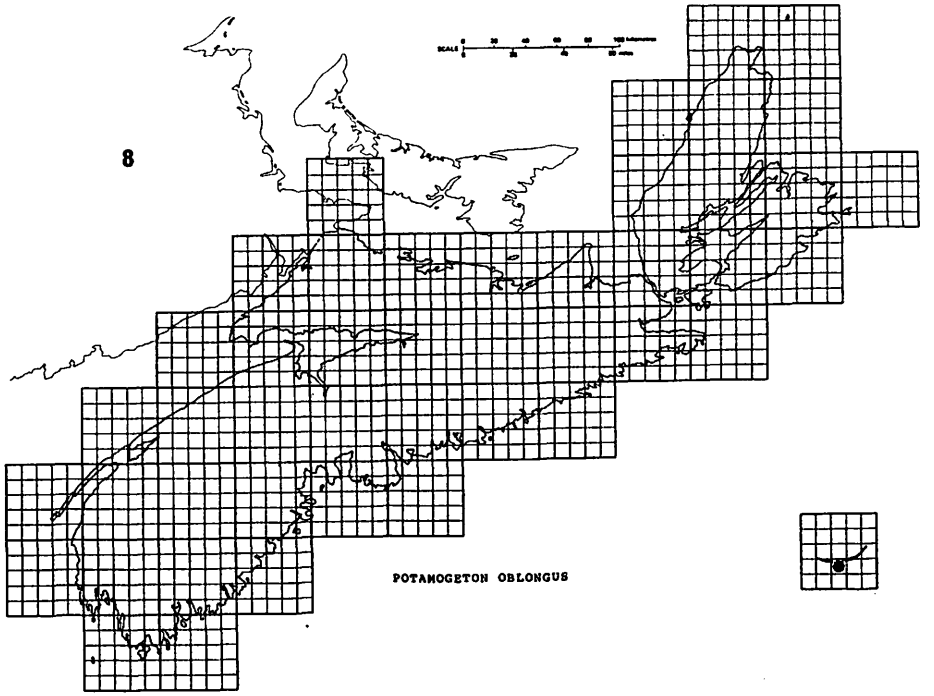

POTAMOGETON OBLONGUS

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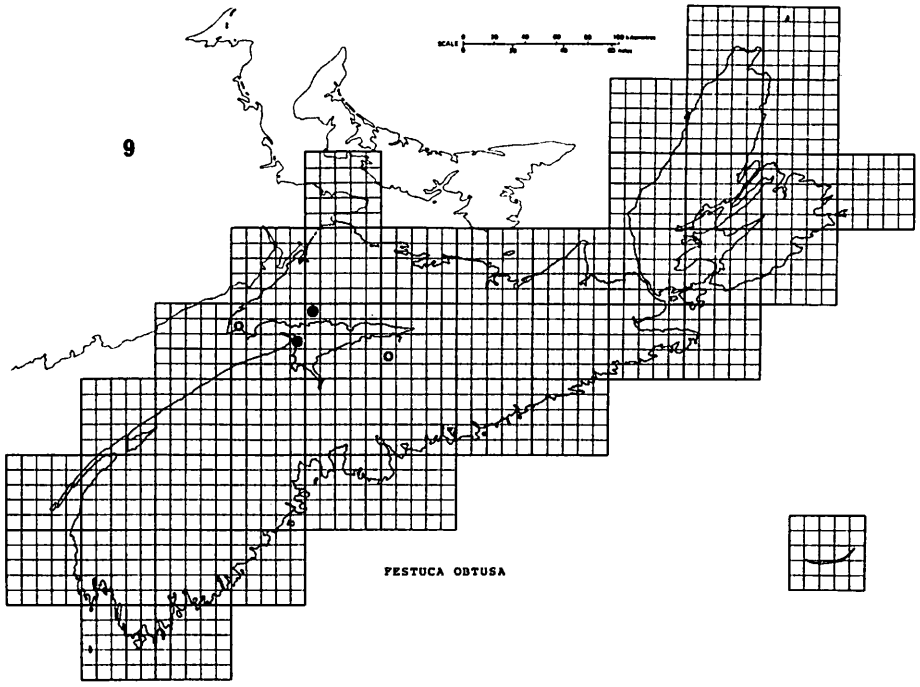

FESTUCA OBTUSA

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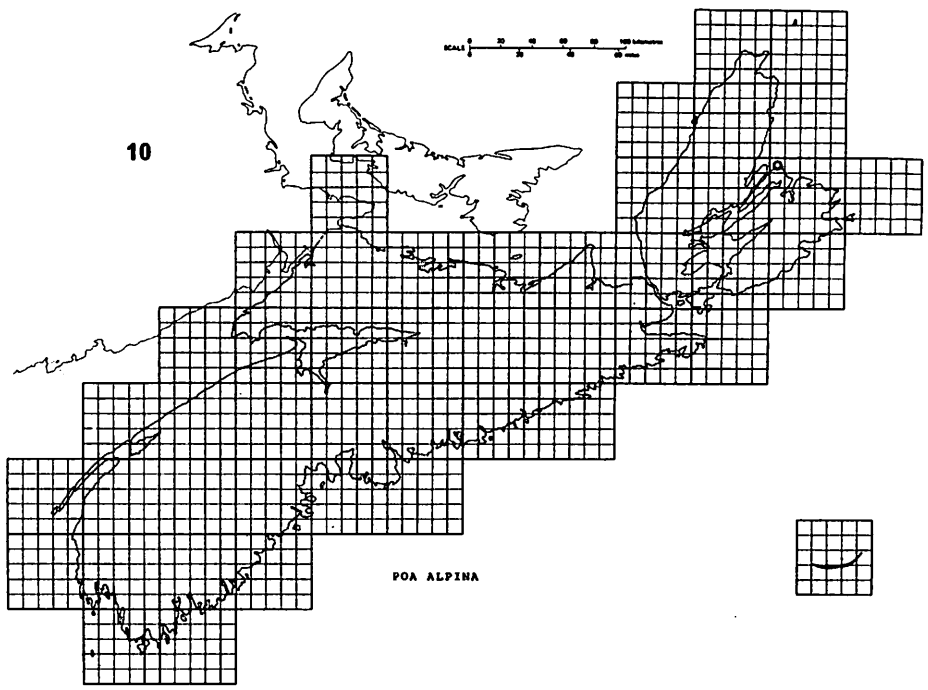

POA ALPINA

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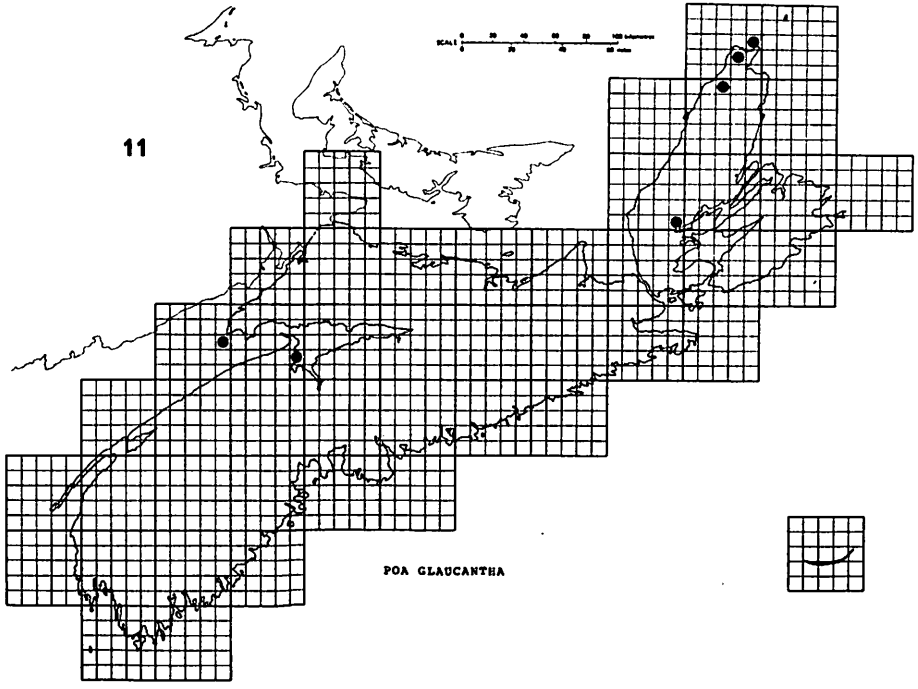

POA GLAUCANTHA

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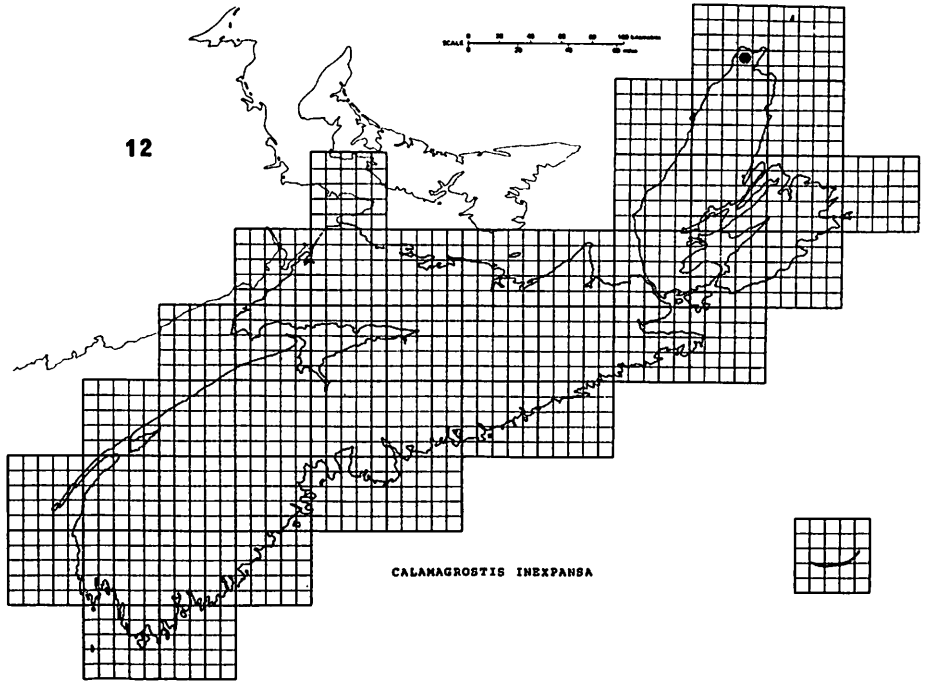

CALAMAGROSTIS INEXPANSA

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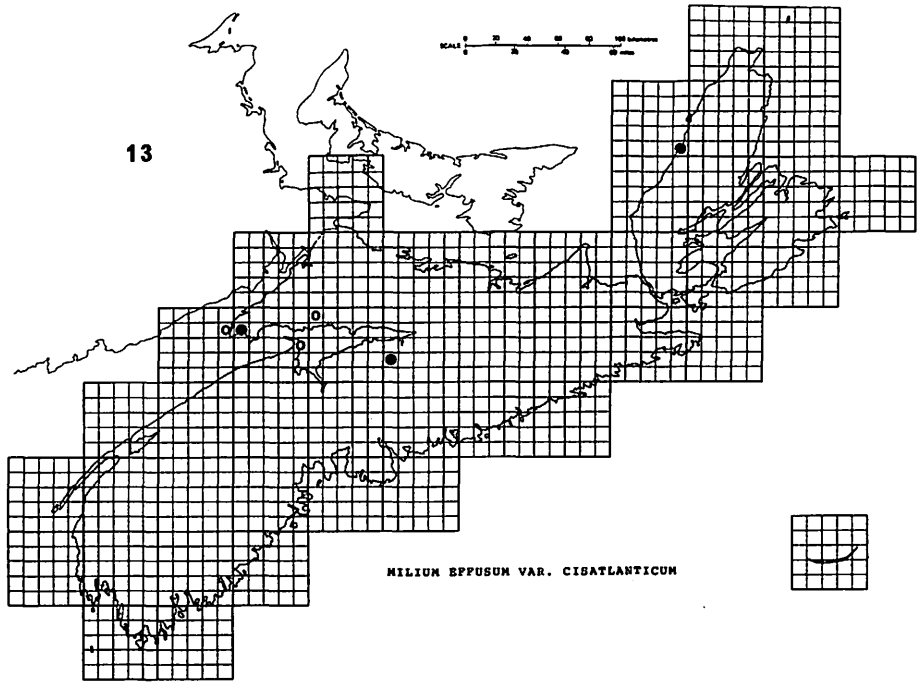
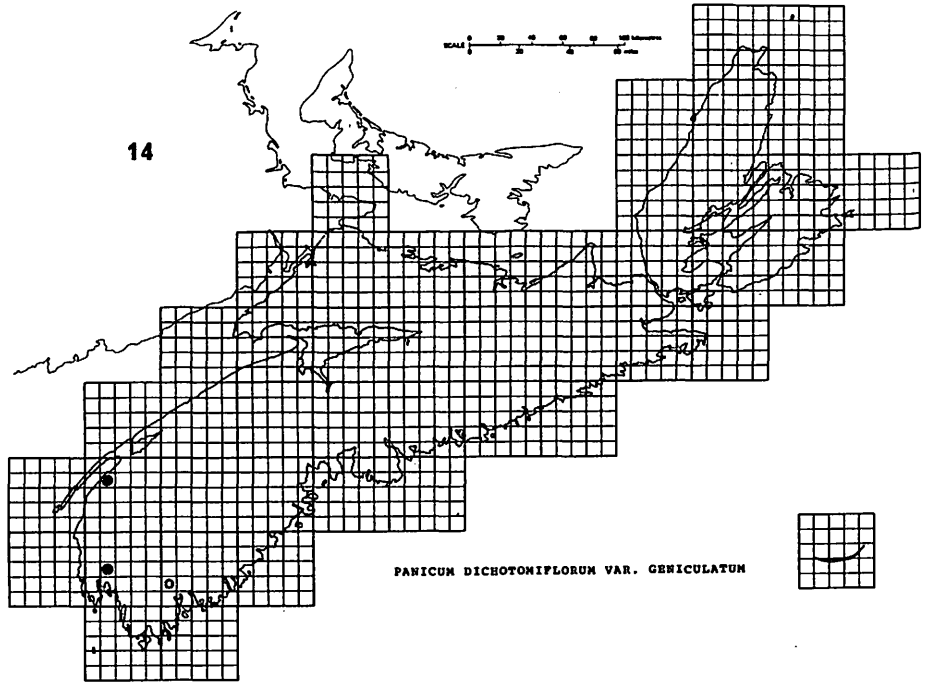


MILIUM EFFUSUM VAR. CISATLANTICUM

14



PANICUM DICHOTOMIFLORUM VAR. GENICULATUM

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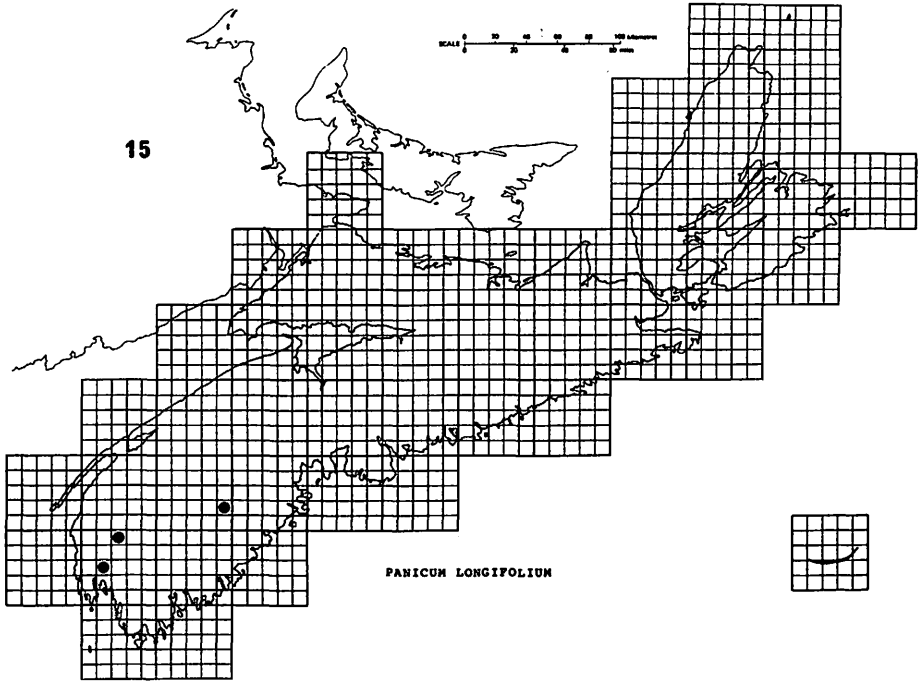

PANICUM LONGIFOLIUM

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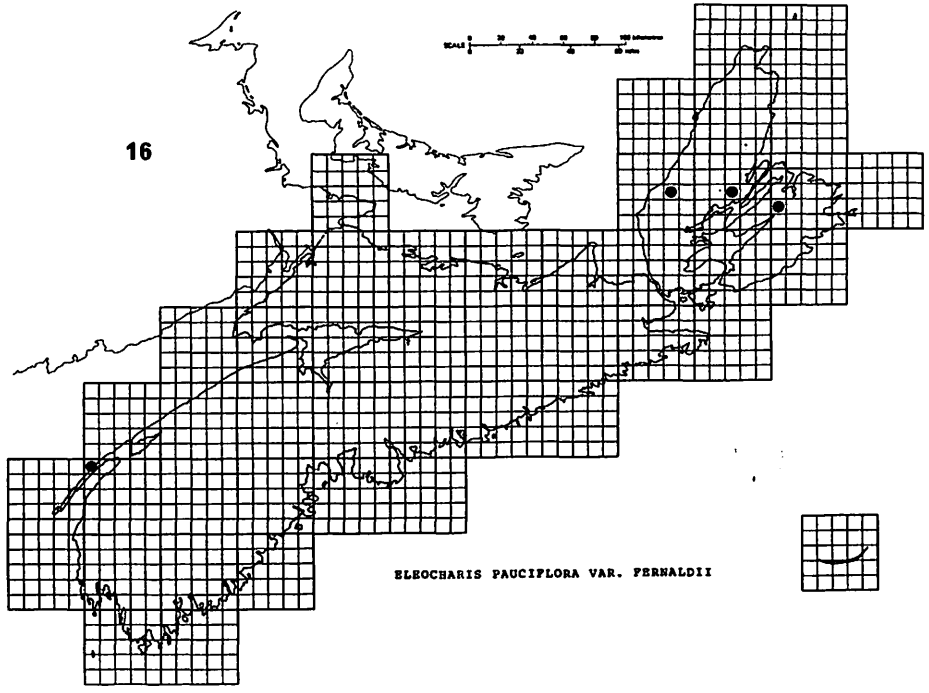

ELEOCHARIS PAUCIFLORA VAR. FERNALDII

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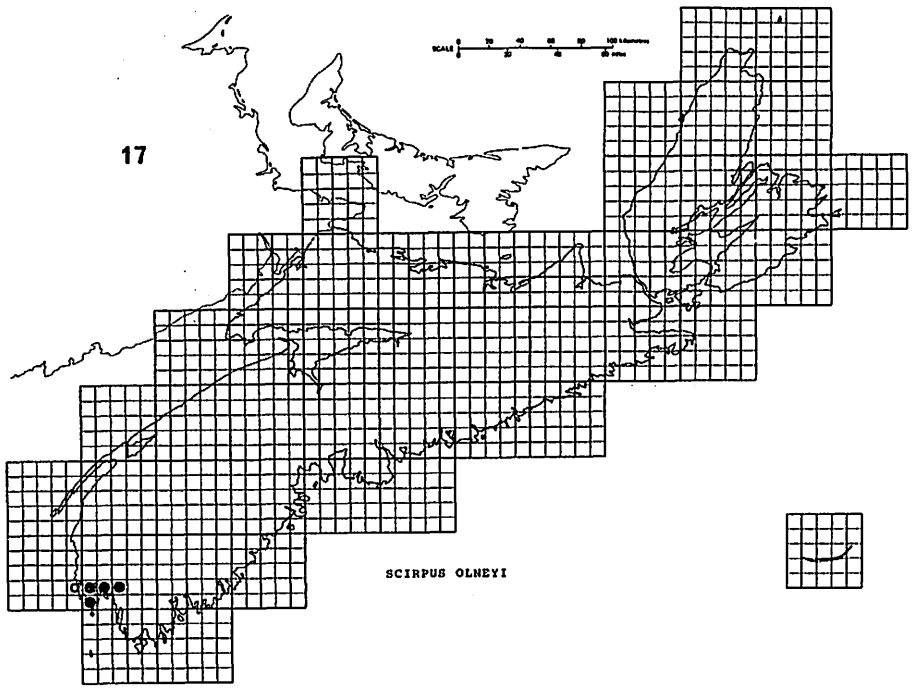
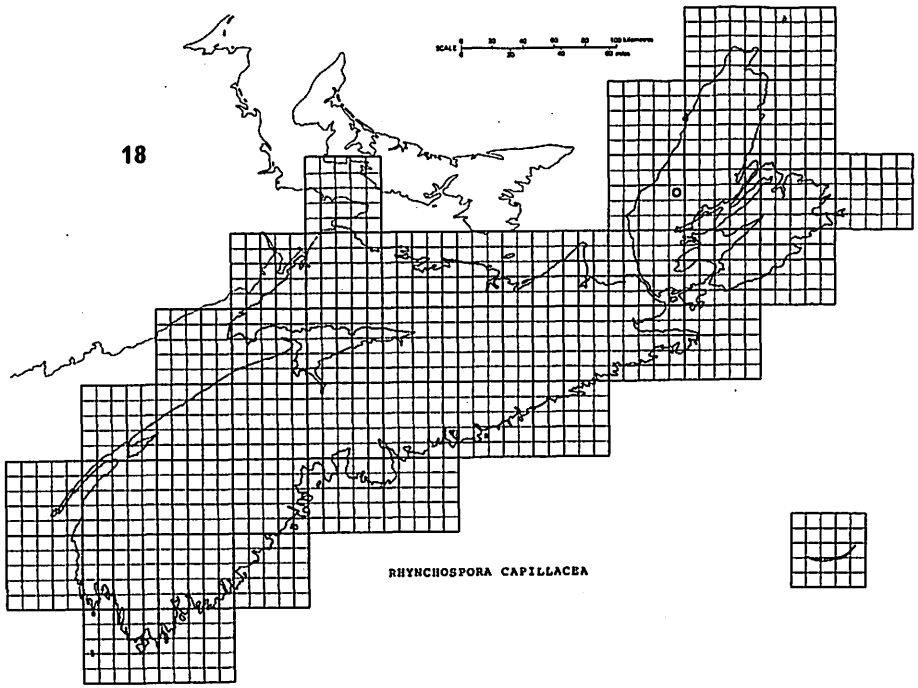


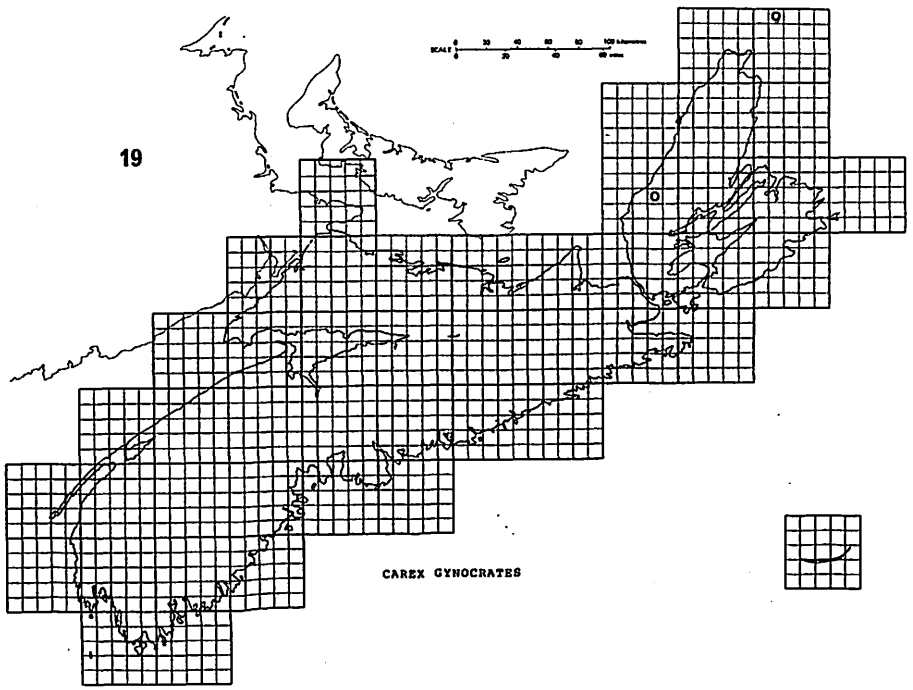
SCIRPUS OLNEYI

18



RHYNCHOSPORA CAPILLACEA

19



CAREX GYNOCRATES

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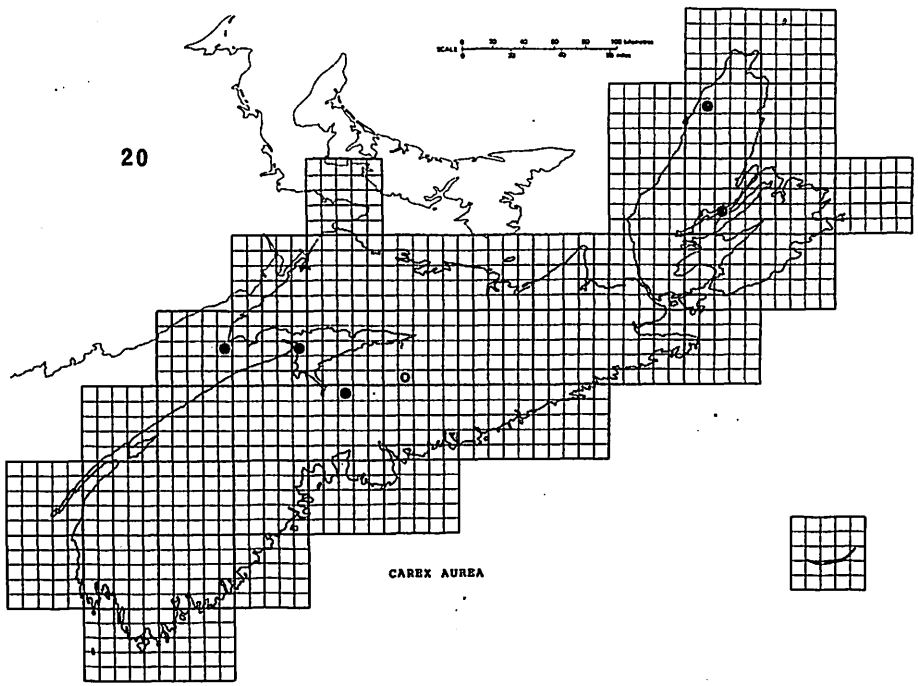

CAREX AUREA

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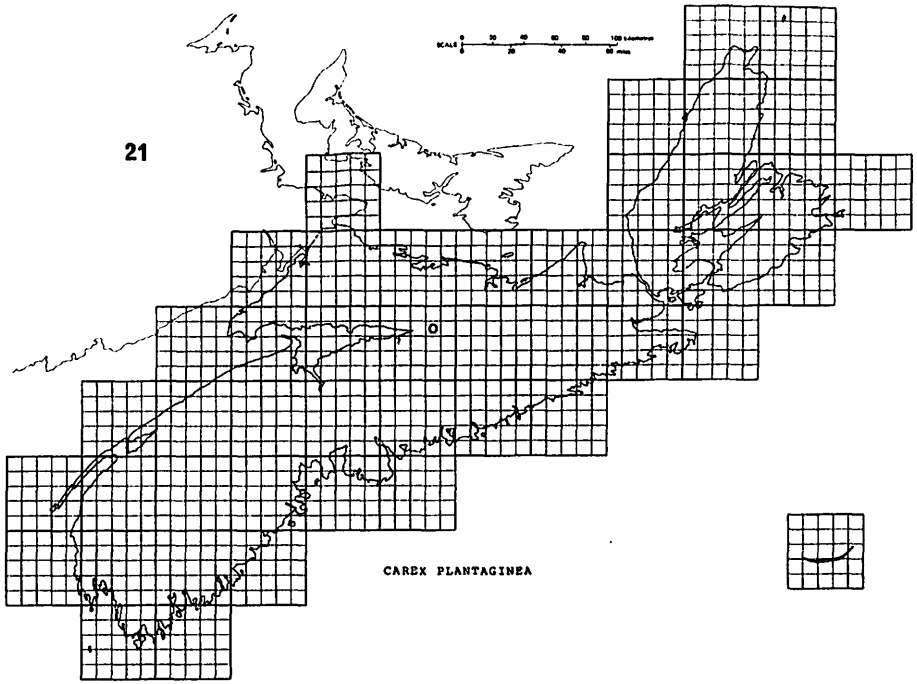

CAREX PLANTAGINEA

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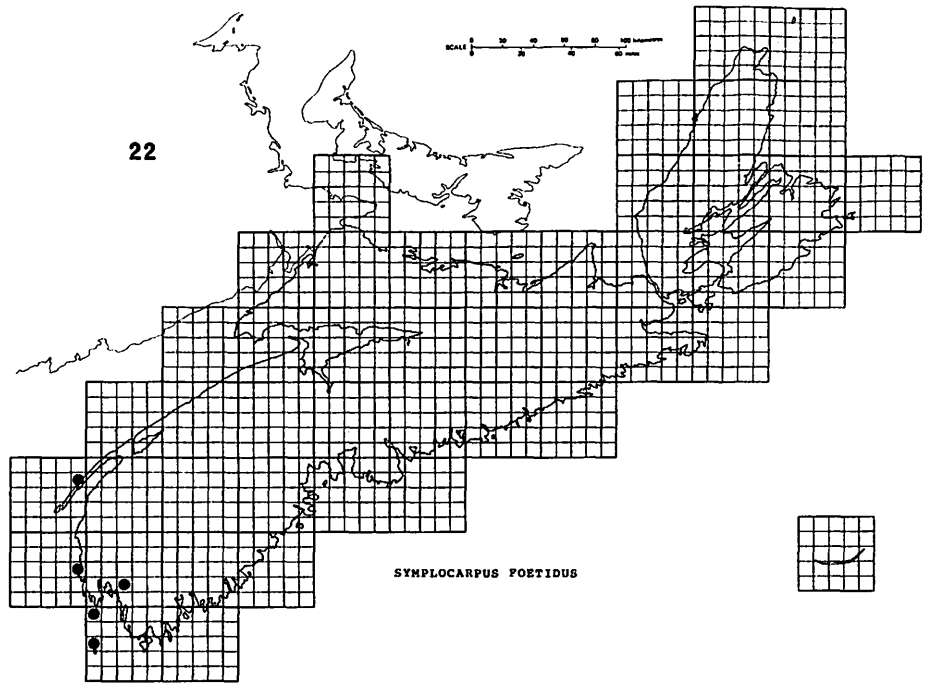
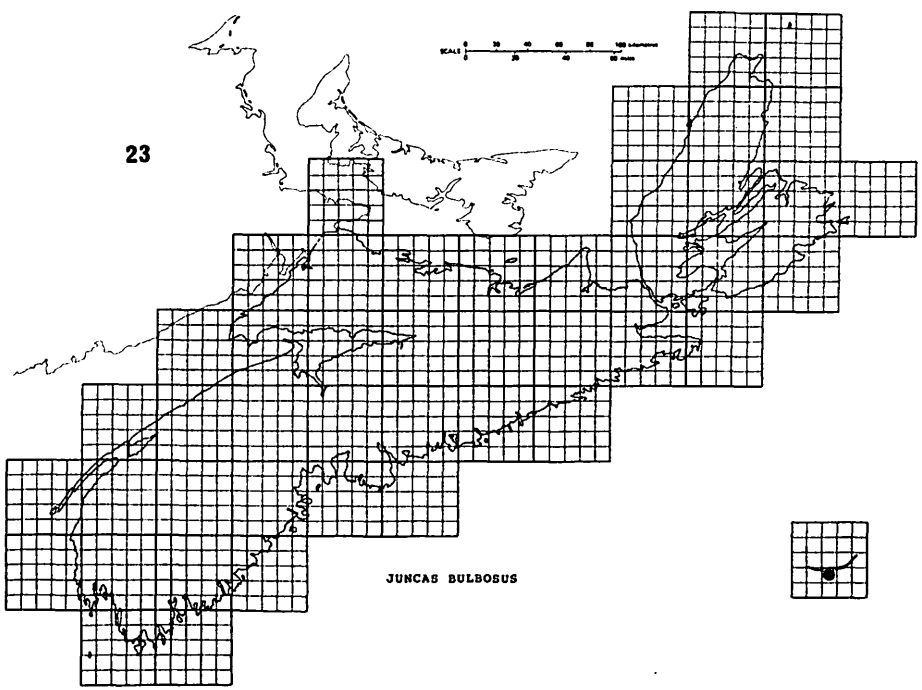


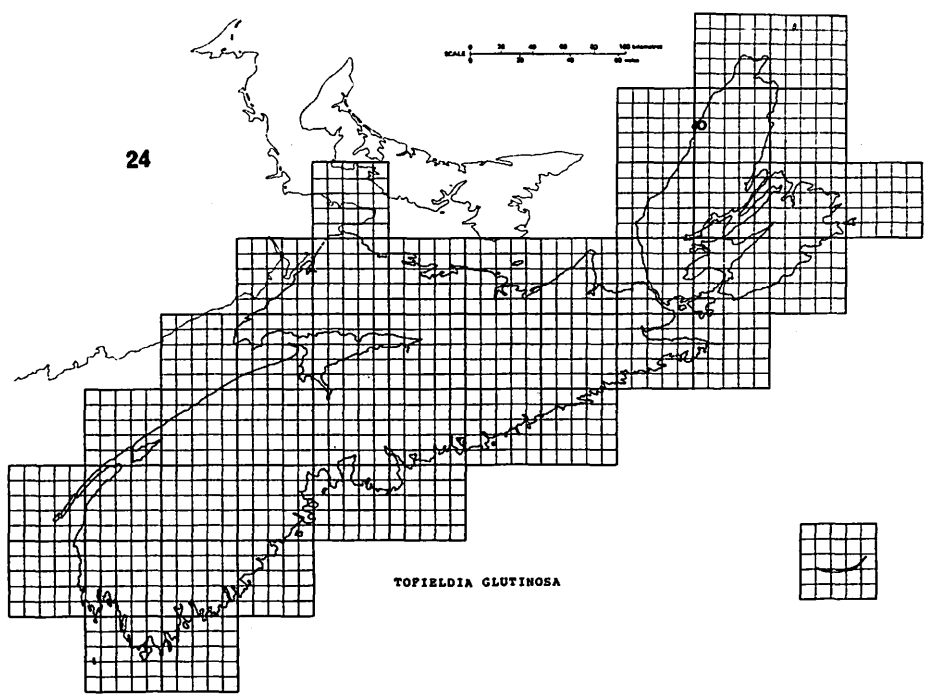
SYMPLOCARPUS FOETIDUS

23



JUNCAS BULBOSUS

24



TOFIELDIA GLUTINOSA

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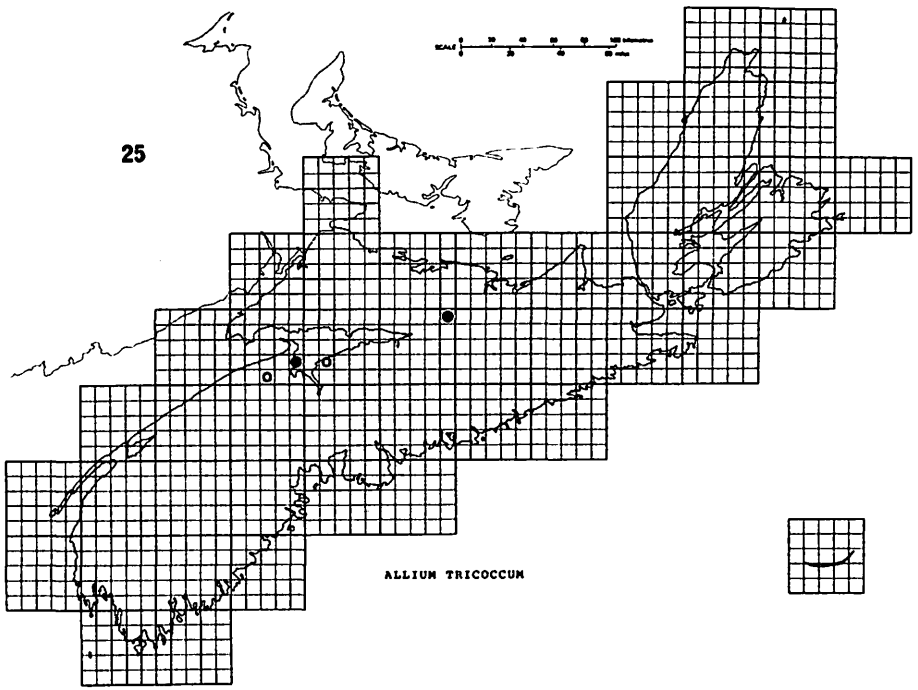
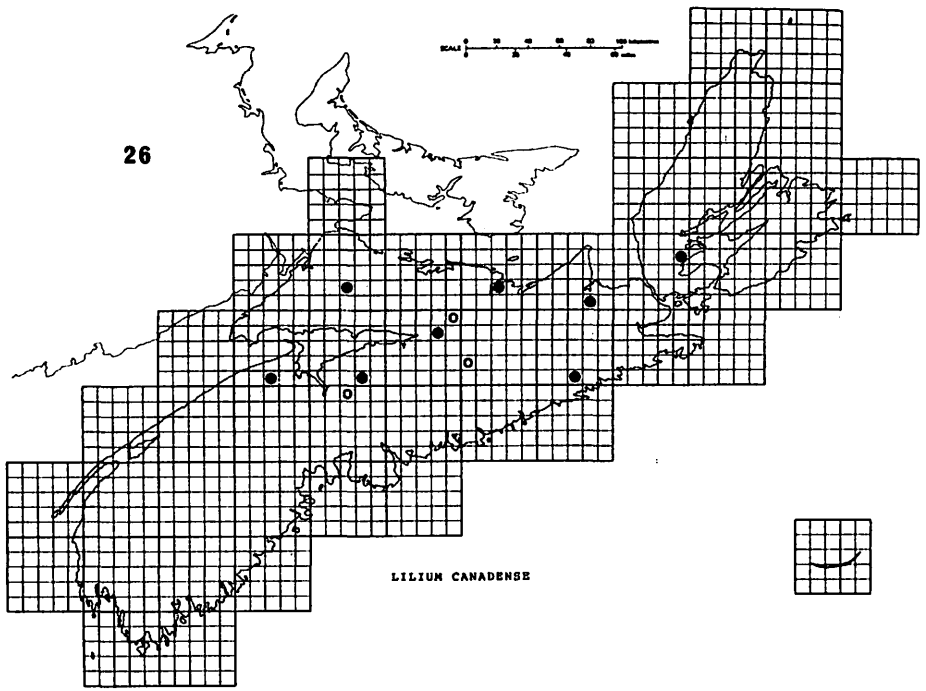


ALLIUM TRICOCCUM

26



LILIUM CANADENSE

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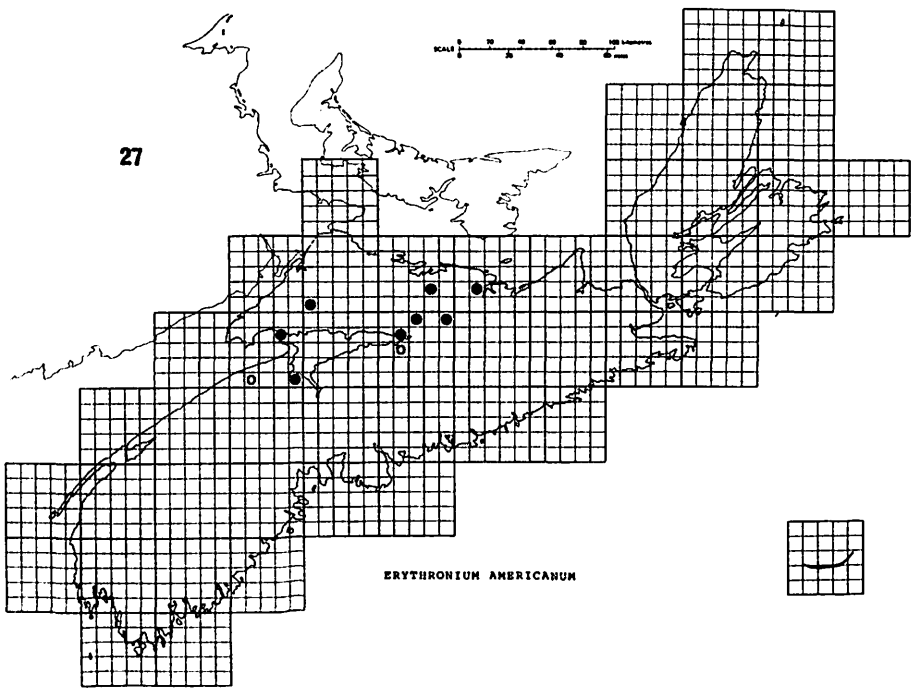

ERYTHRONIUM AMERICANUM

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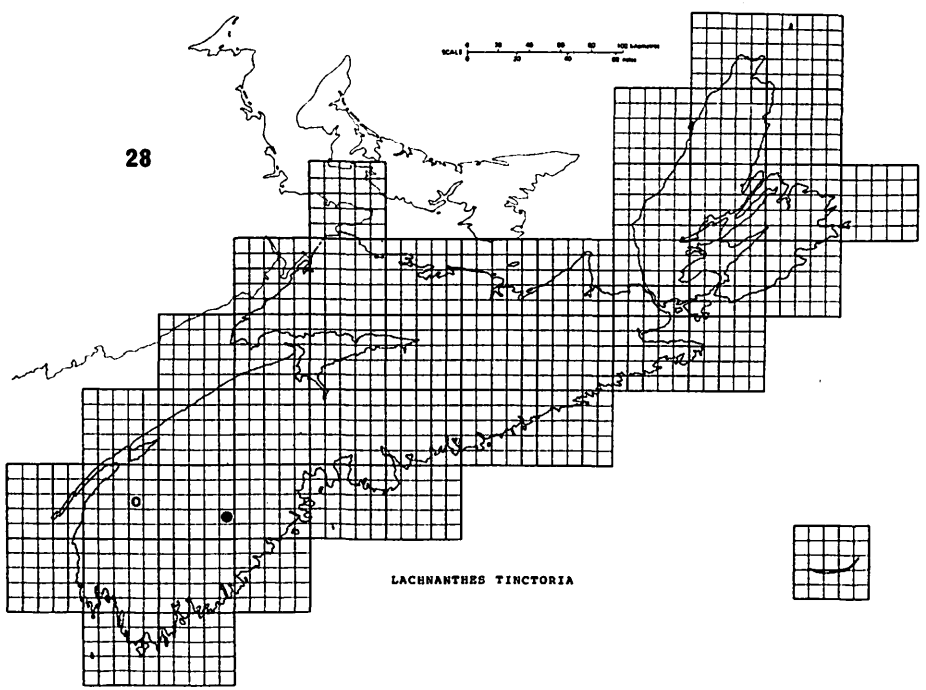

LACHNANTHES TINCTORIA

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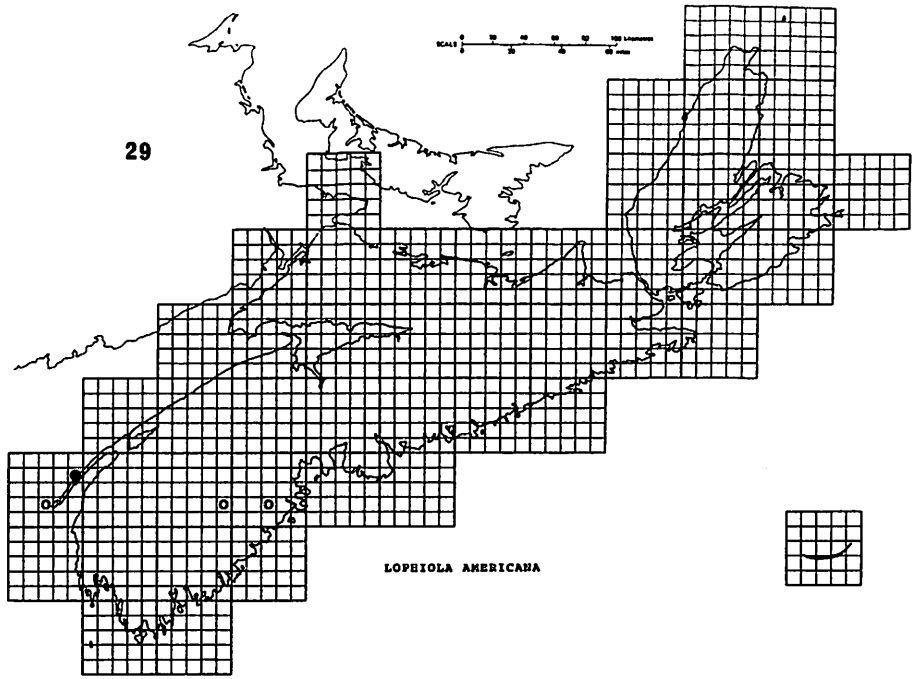

LOPHIOLA AMERICANA

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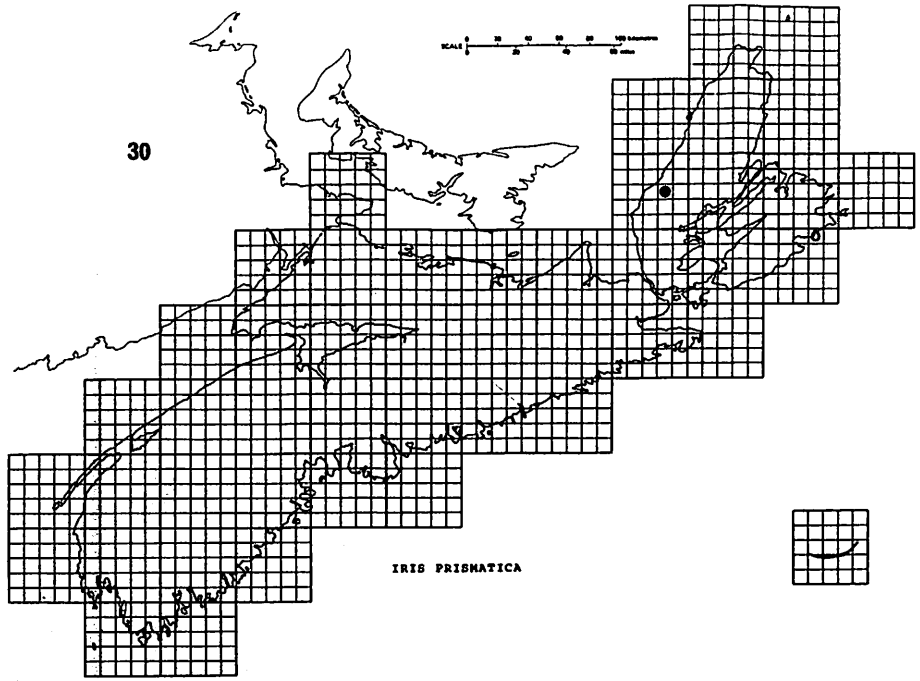

IRIS PRISMATICA

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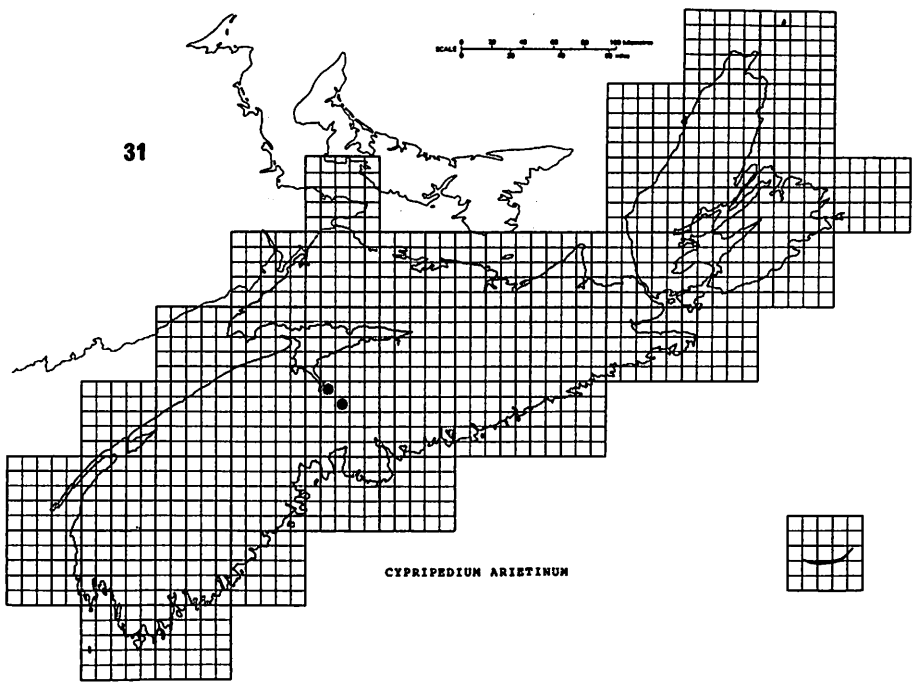

CYPRIPEDIUM ARIETINUM

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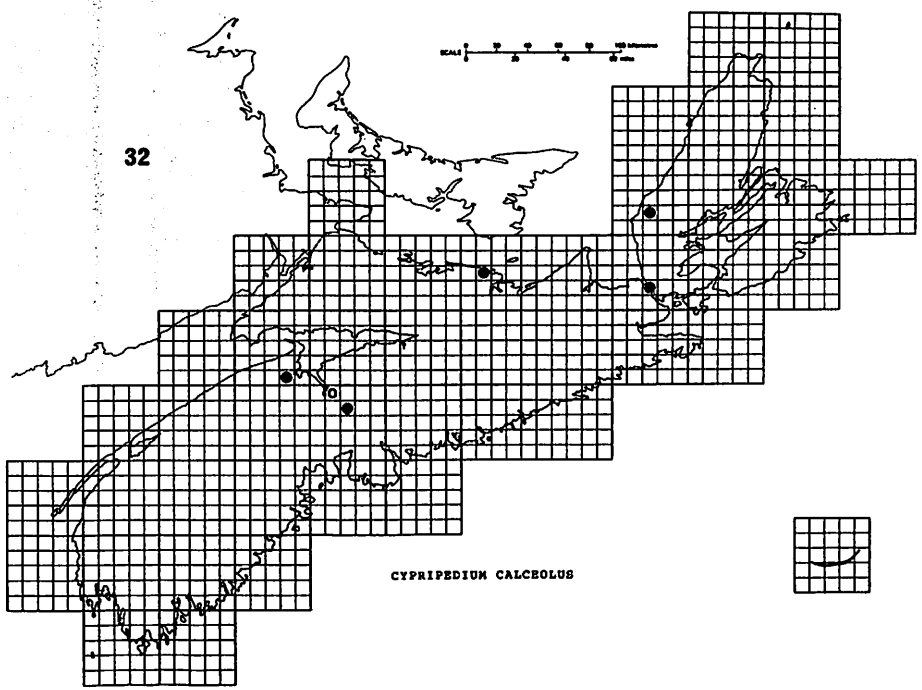

CYPRIPEDIUM CALCEOLUS

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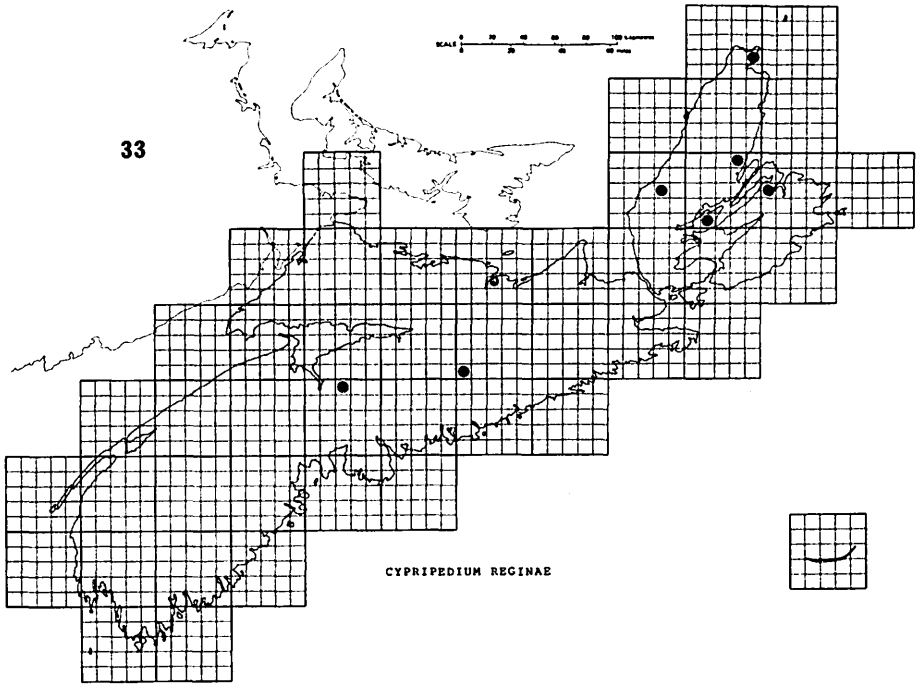

CYPRIPEDIUM REGINAE

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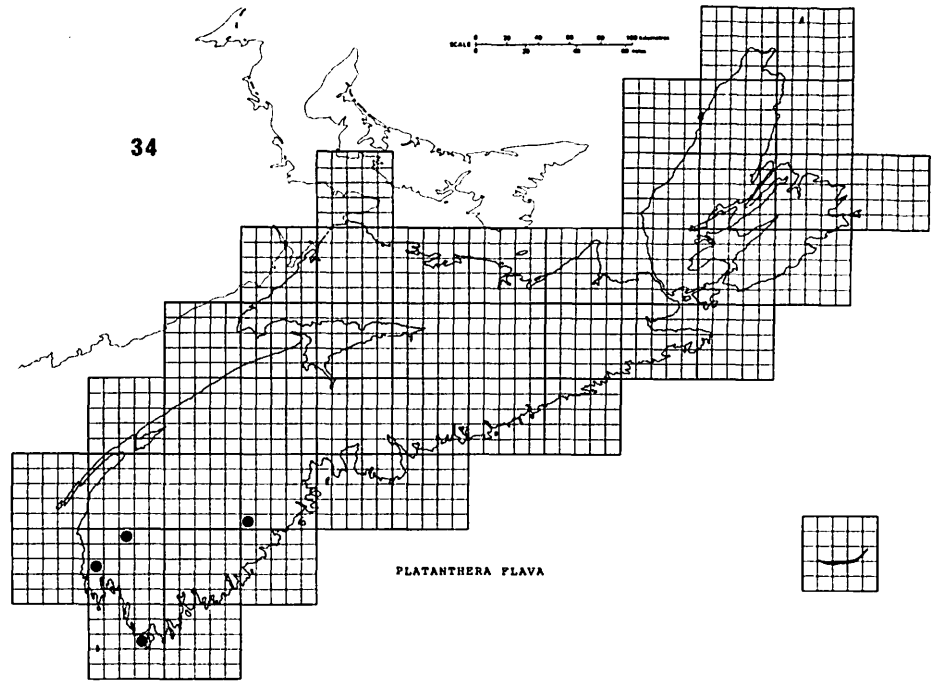

PLATANTHERA FLAVA

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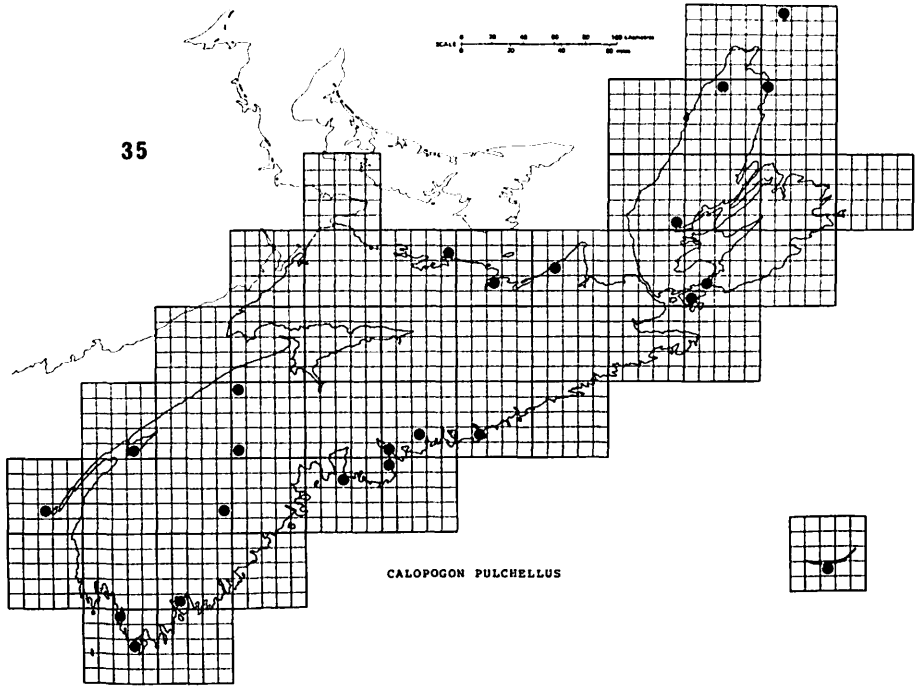
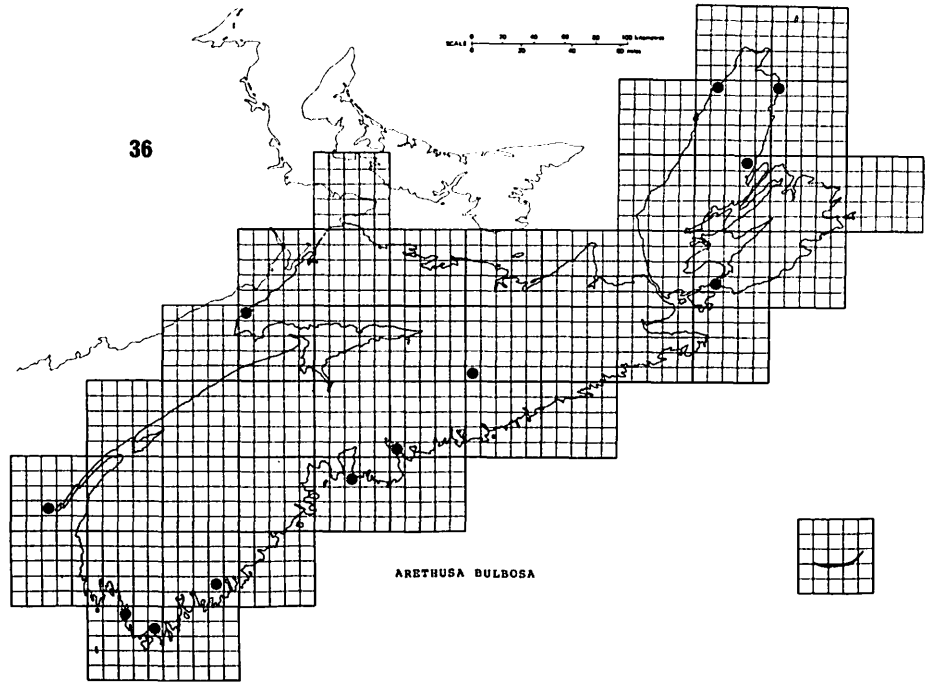


CALOPOGON PULCHELLUS

36



ARETHUSA BULBOSA

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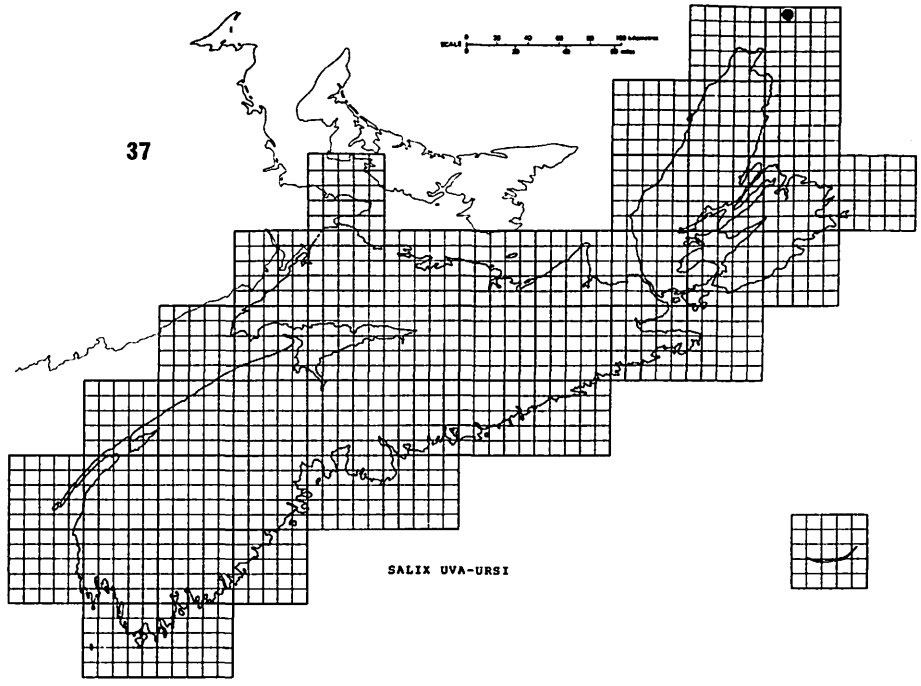
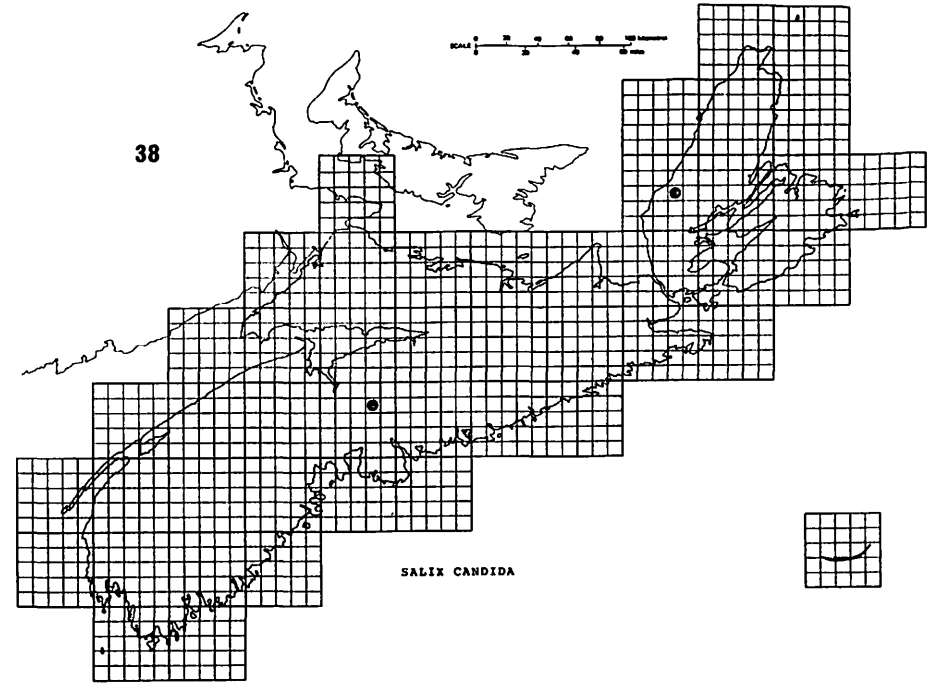


SALIX UVA-URSI

38



SALIX CANDIDA

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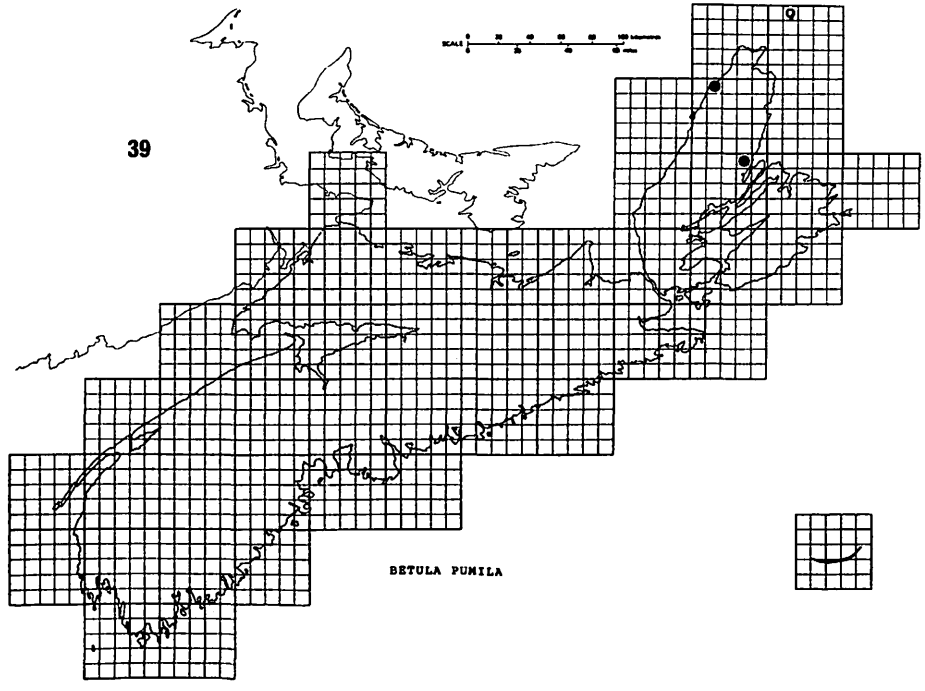

BETULA PUMILA

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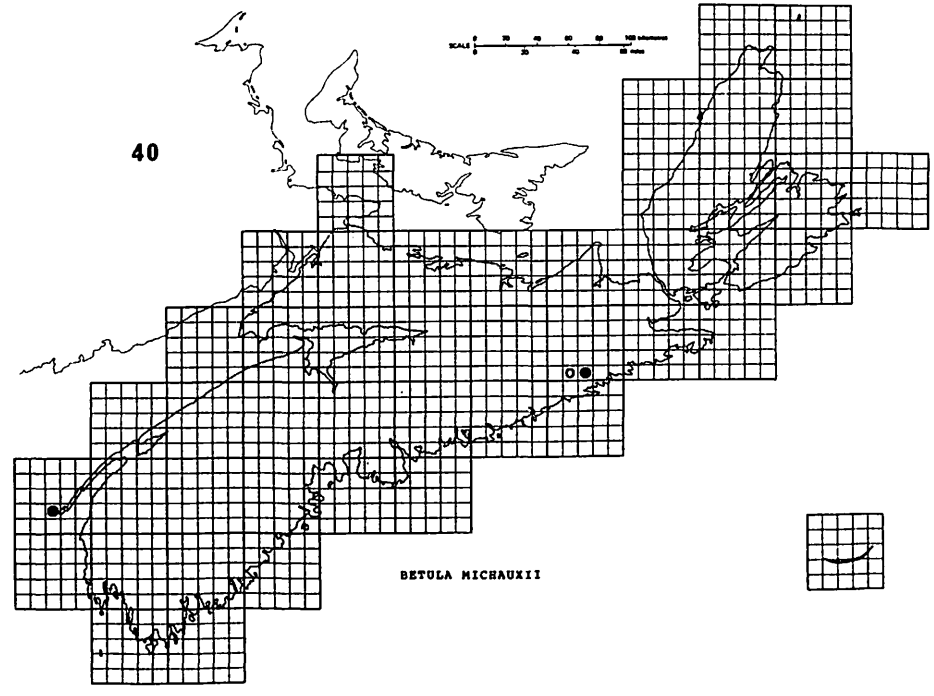
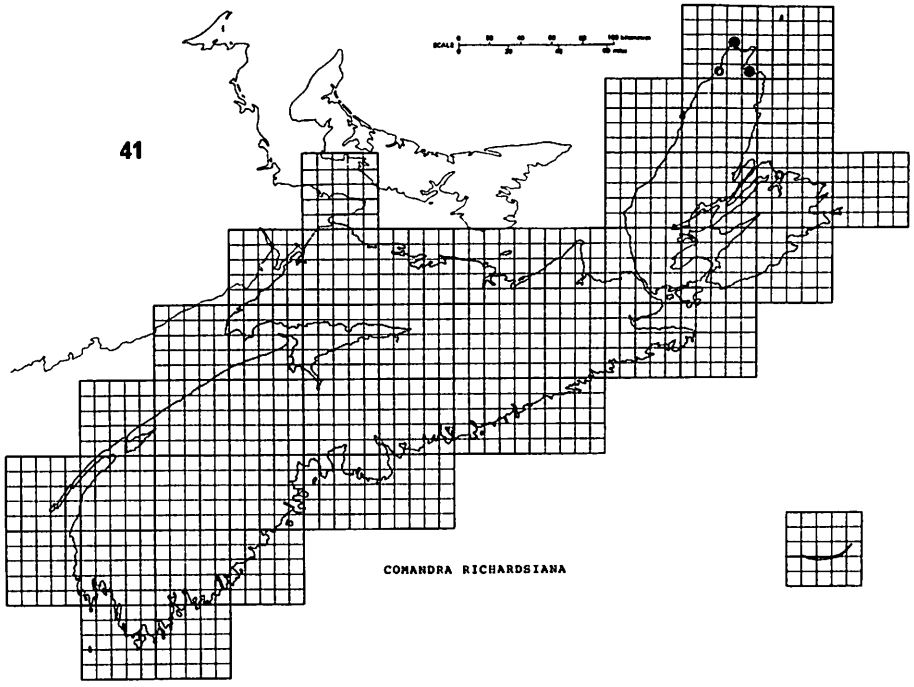


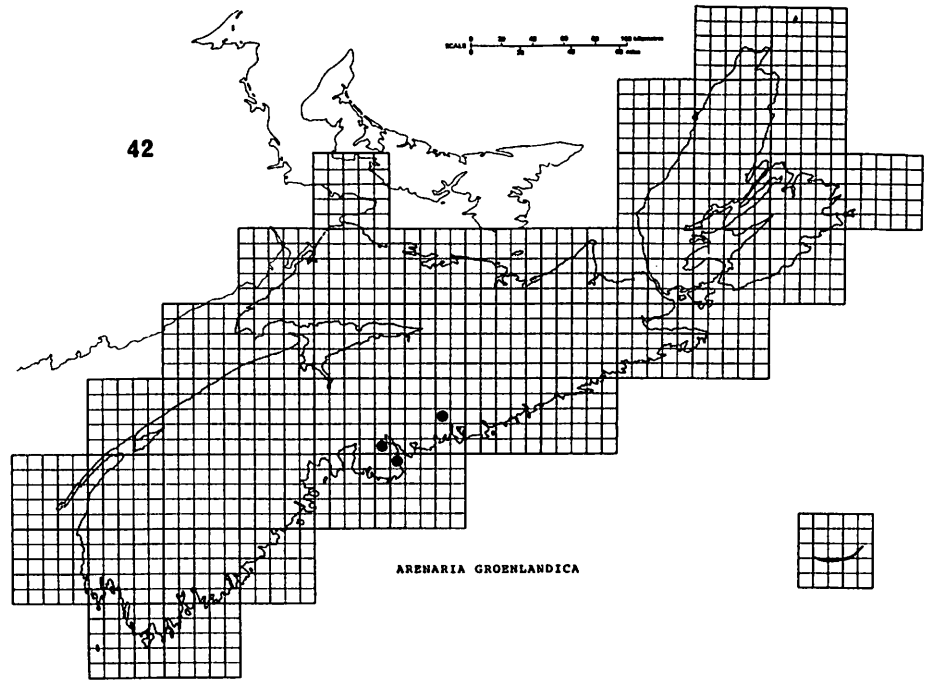
BETULA MICHAUXII

41



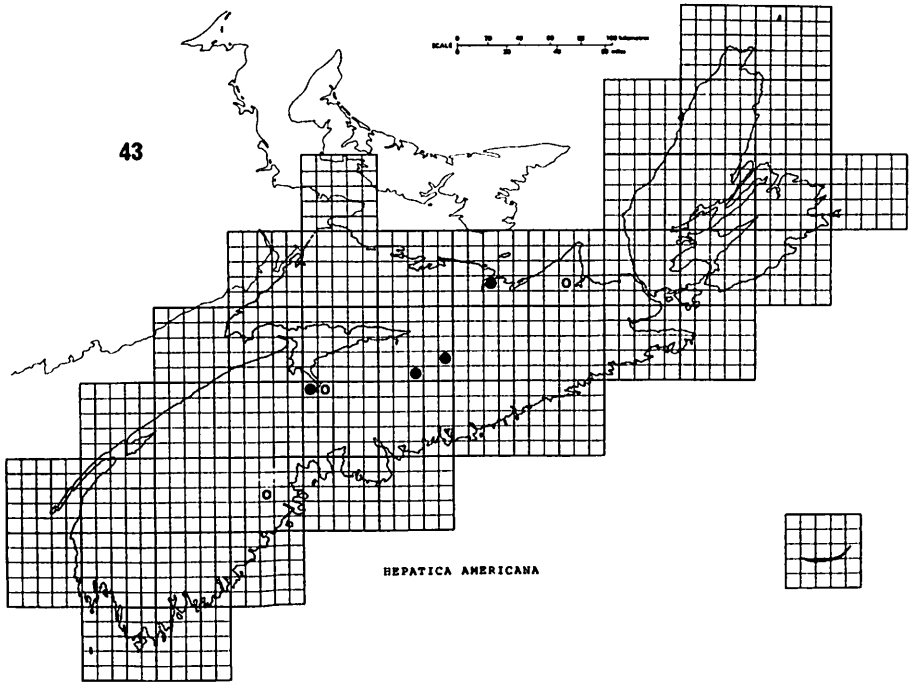
COMANDRA RICHARDSIANA

42



ARENARIA GROENLANDICA

43



HEPATICA AMERICANA

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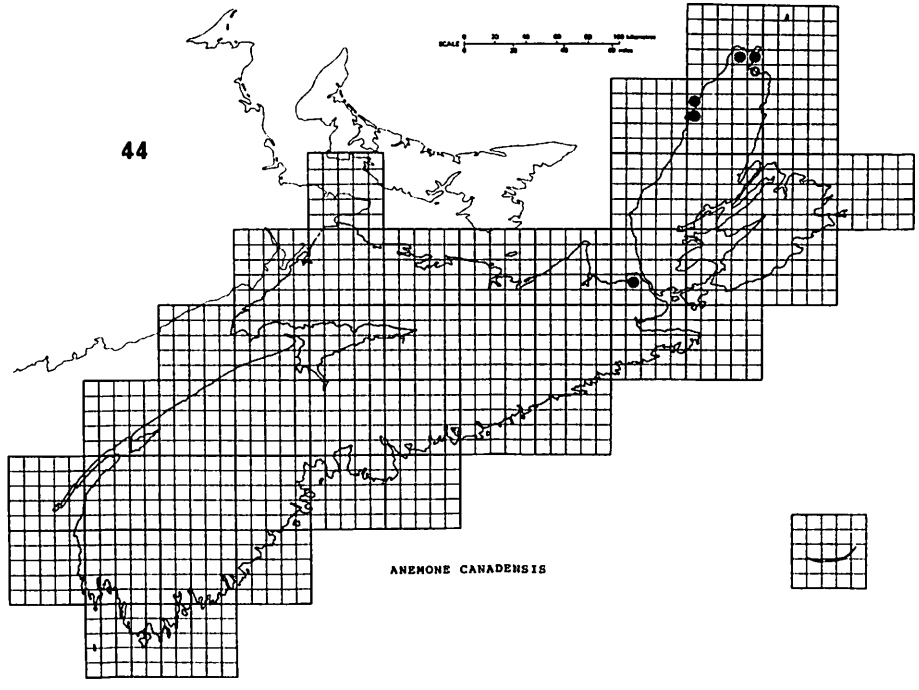
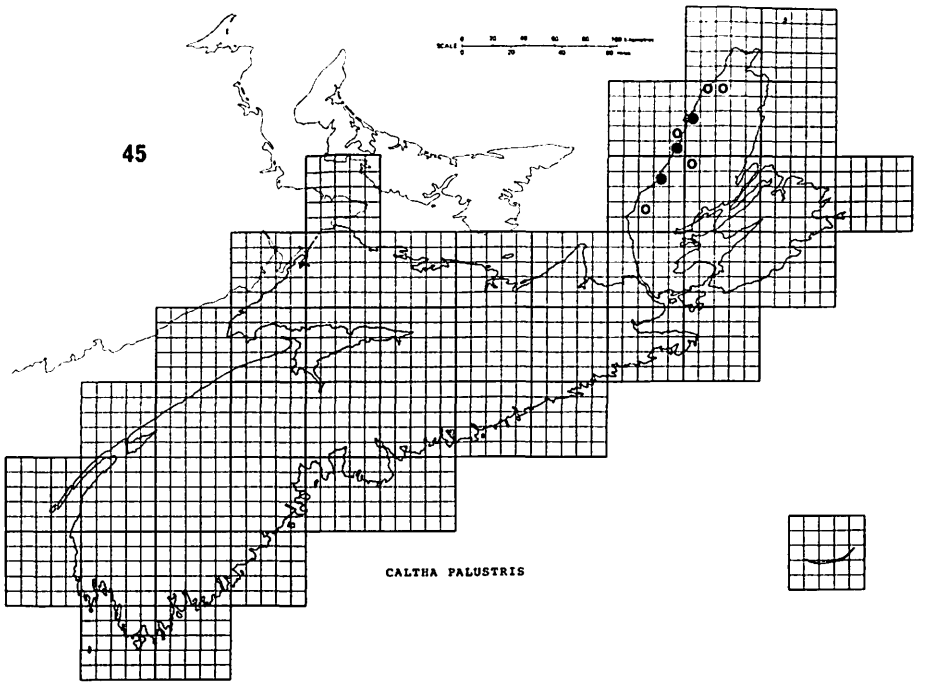


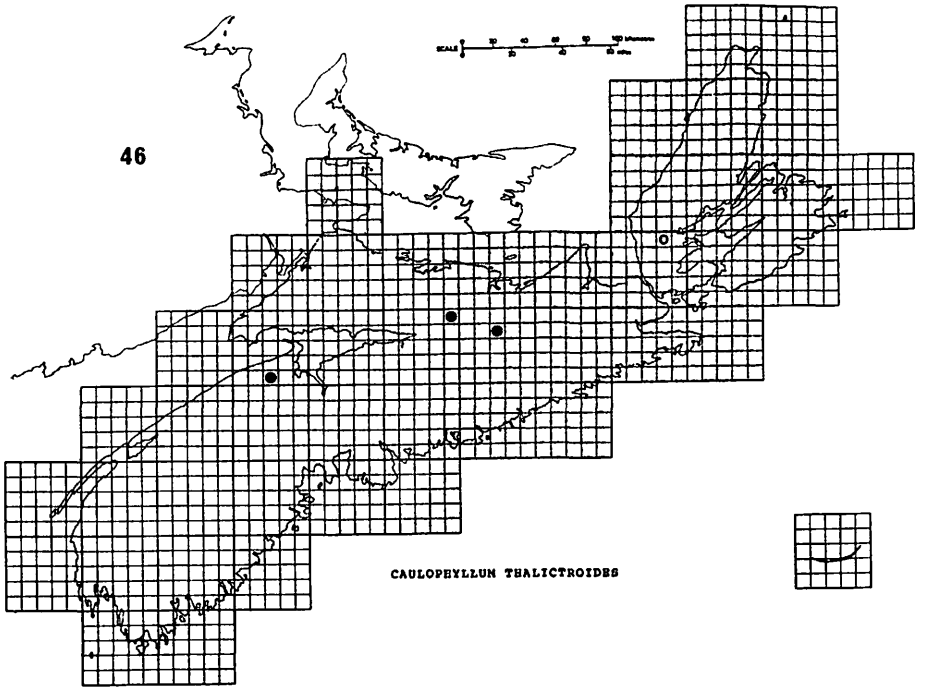
ANEMONE CANADENSIS

45



CALTHA PALUSTRIS

46



CAULOPHYLLUN THALICTROIDES

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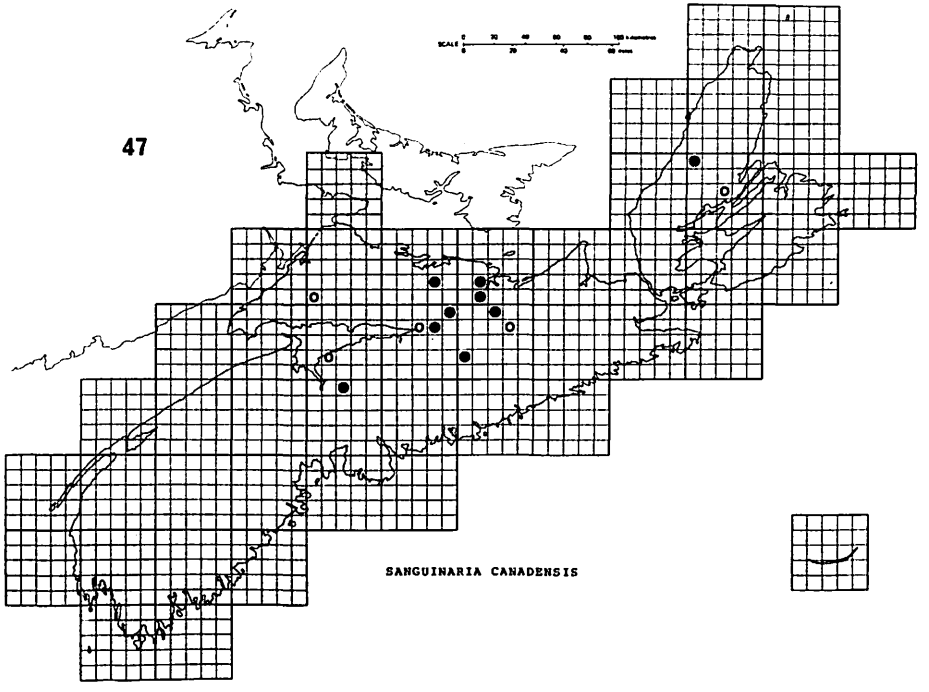
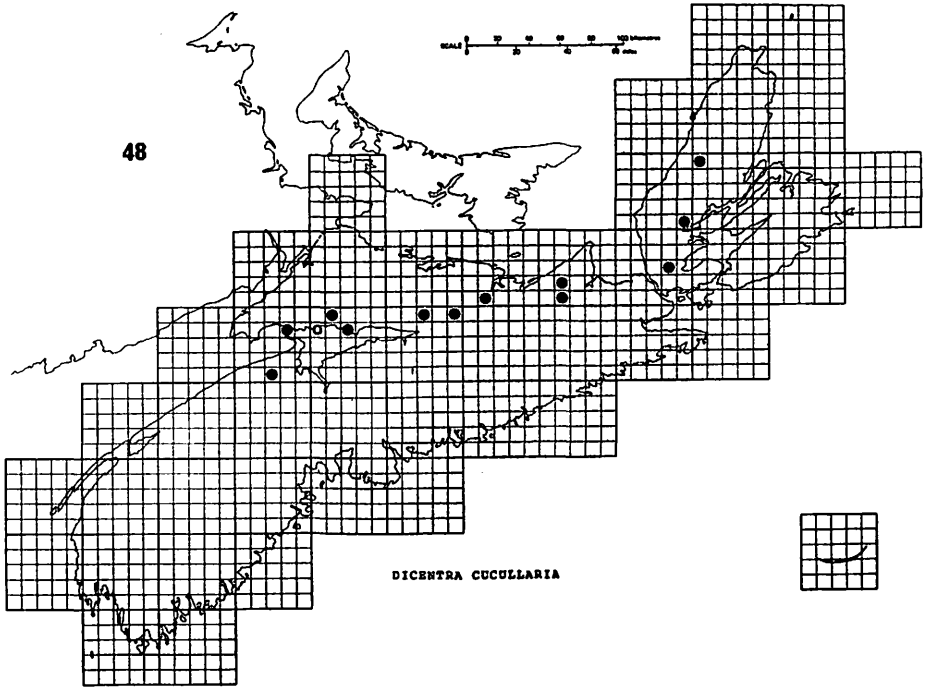


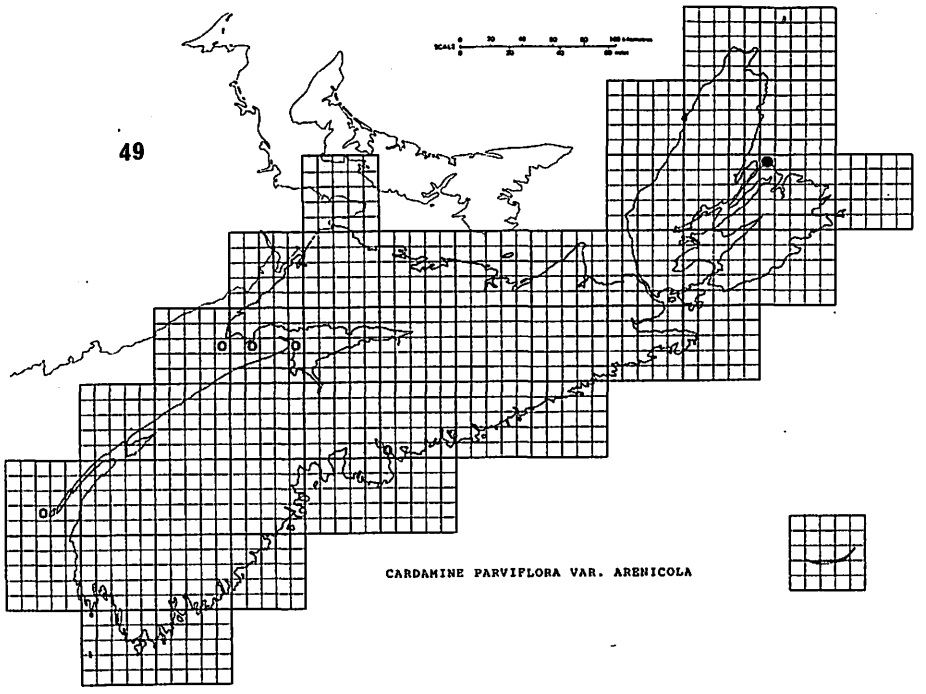
SANGUINARIA CANADENSIS

48



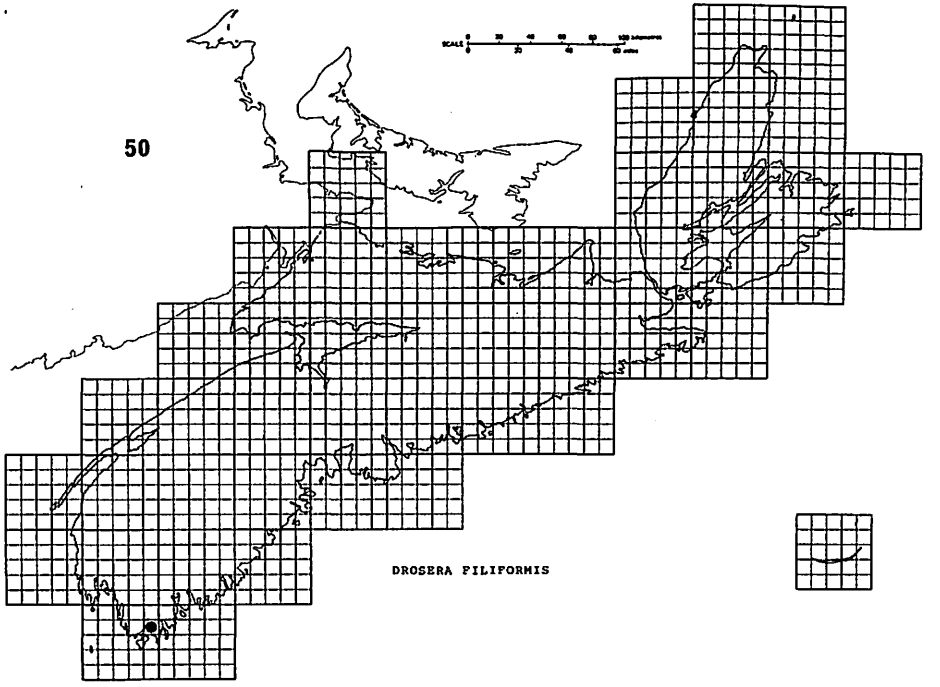
DICENTRA CUCULLARIA

49



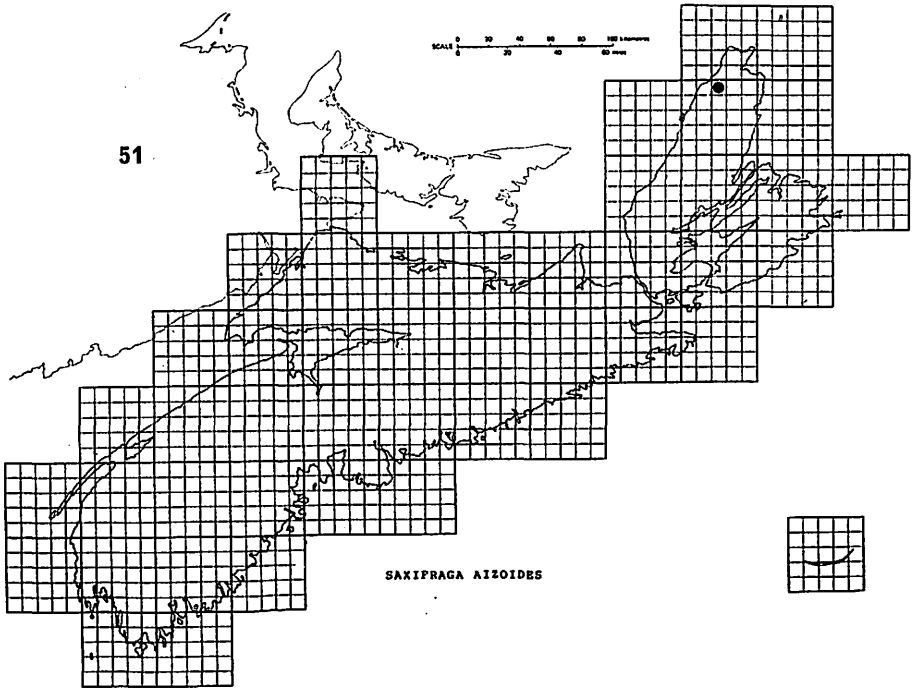
CARDAMINE PARVIFLORA VAR. ARENICOLA

50



DROSERA FILIFORMIS

51



SAXIFRAGA AIZOIDES

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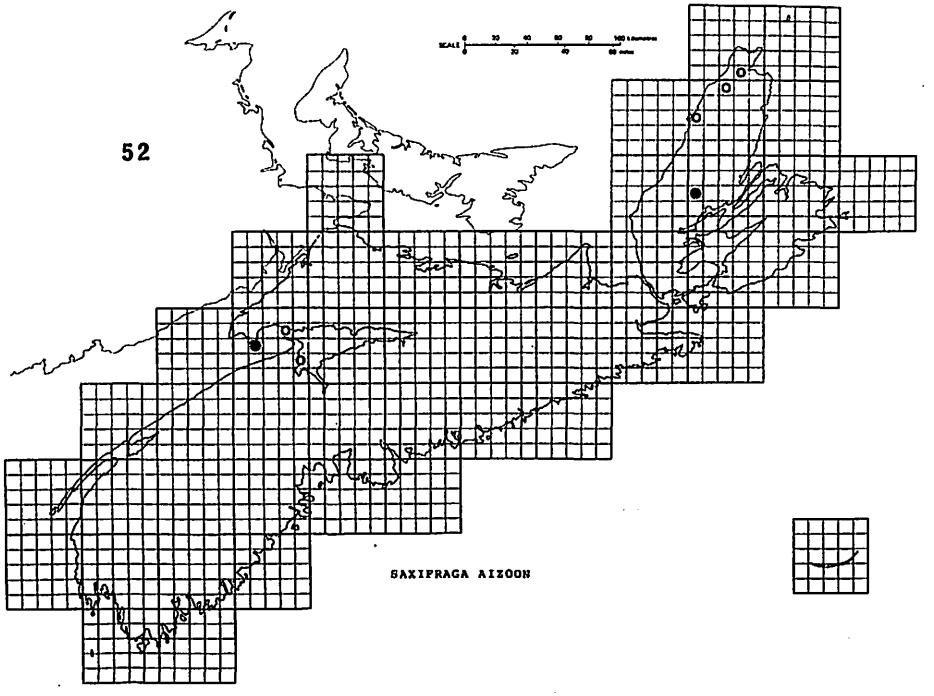

SAXIFRAGA AIZOON

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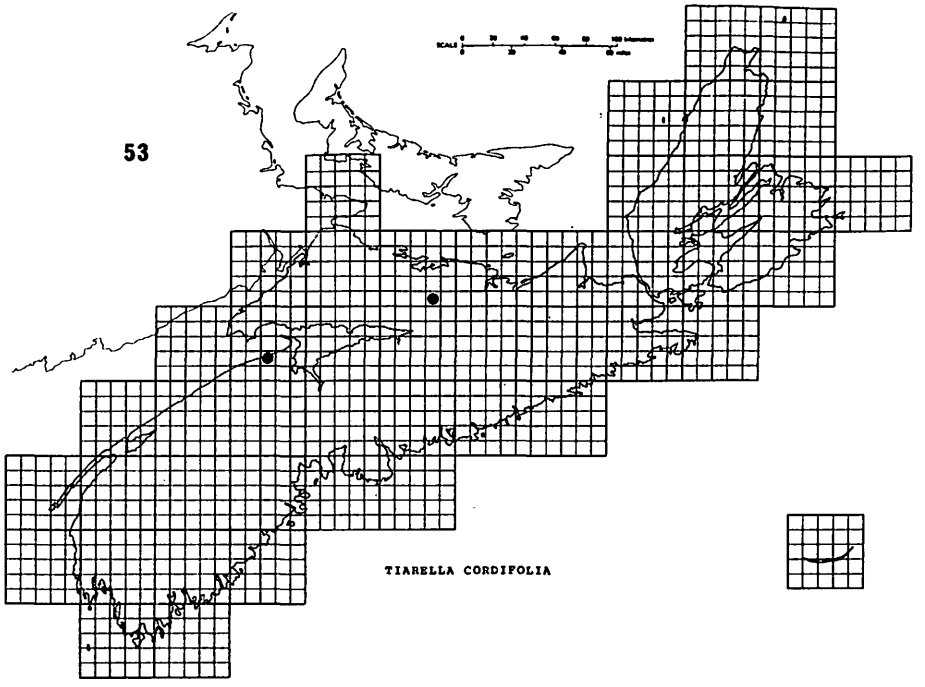

TIARELLA CORDIFOLIA

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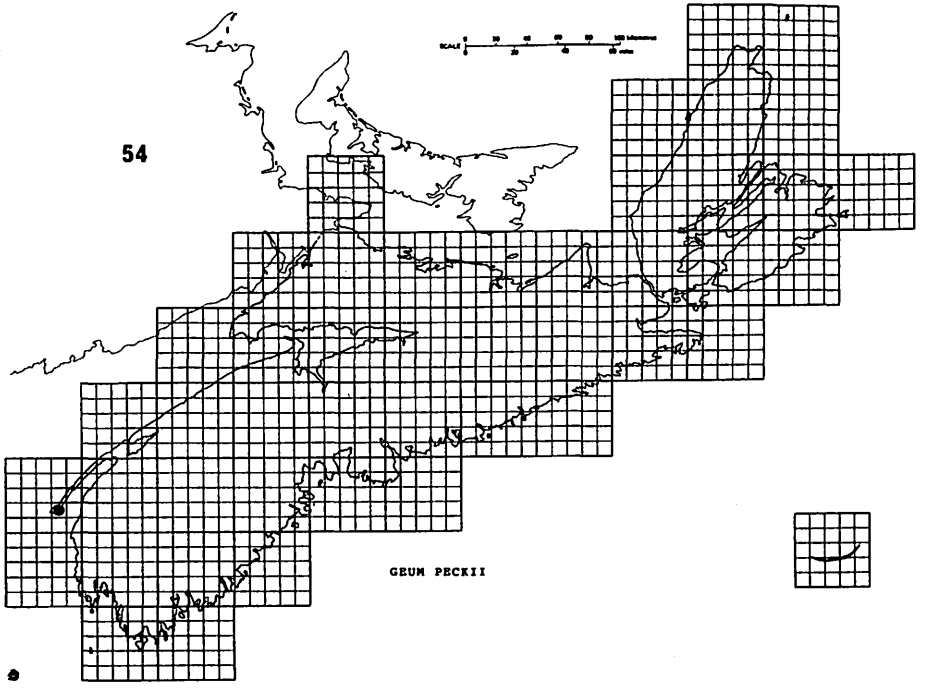

GEUM PECKII

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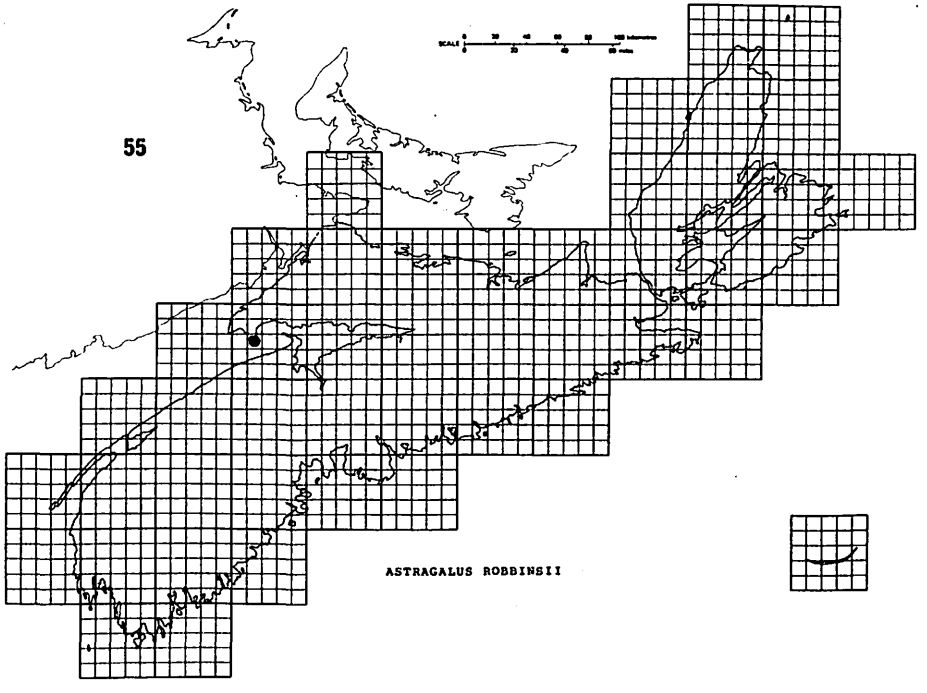
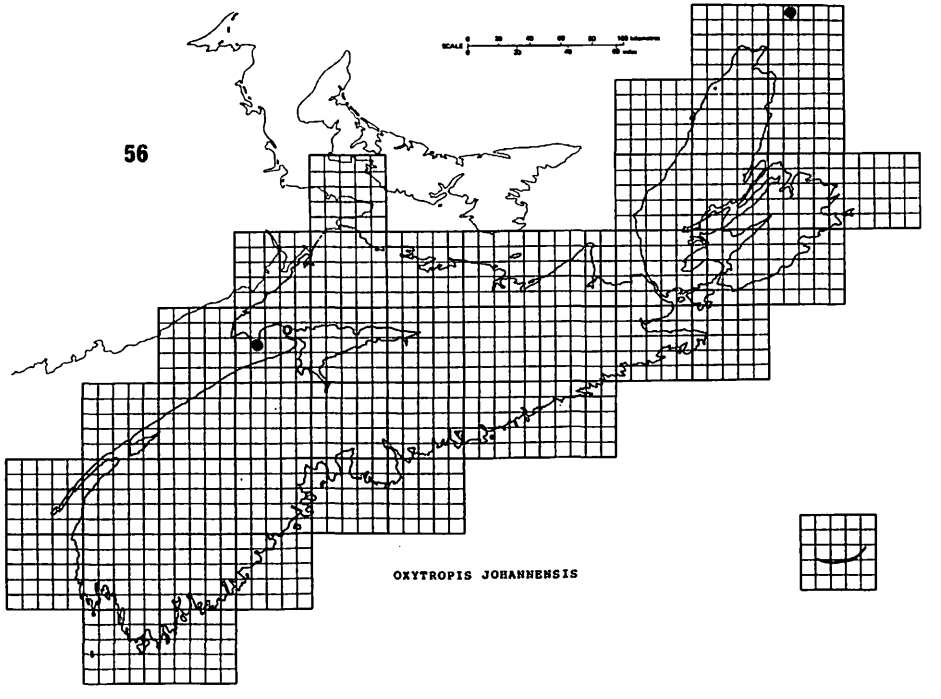


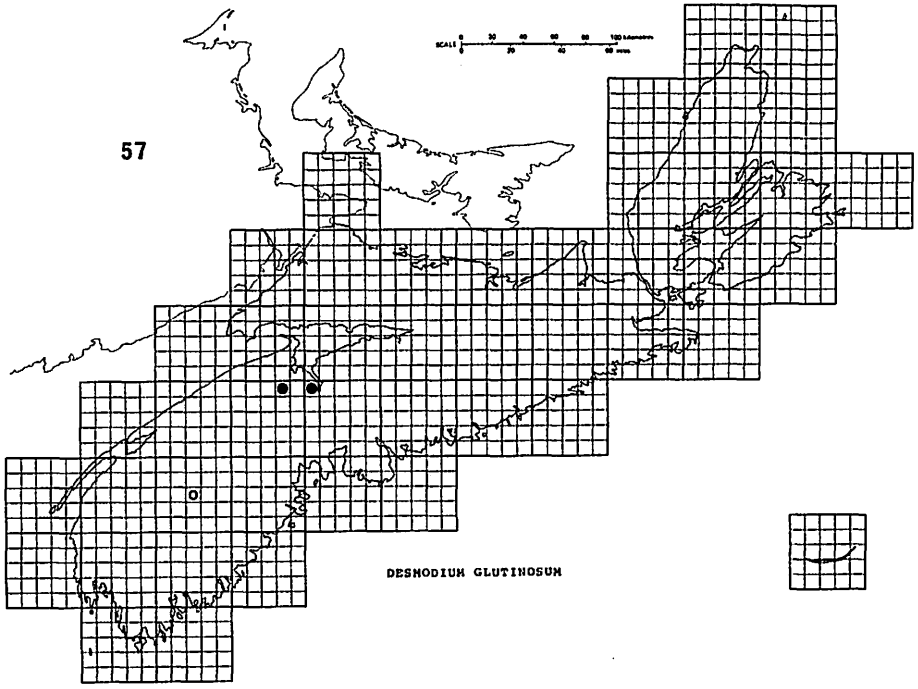
ASTRAGALUS ROBBINSII

56



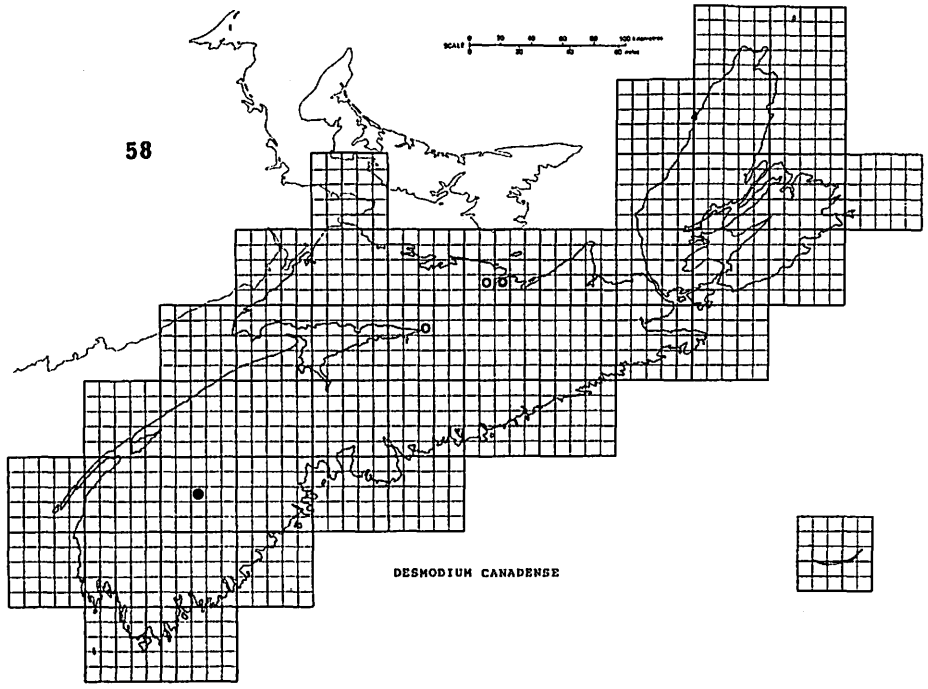
OXYTROPIS JOHANNENSIS

57



DESMODIUM GLUTINOSUM

58



DESMODIUM CANADENSE

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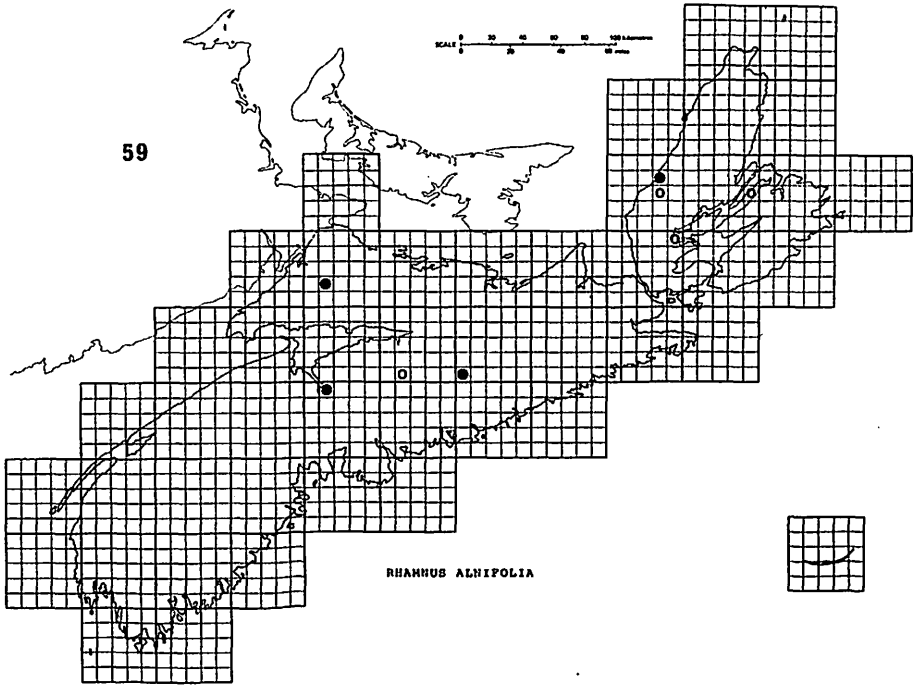

RHAMNUS ALNIFOLIA

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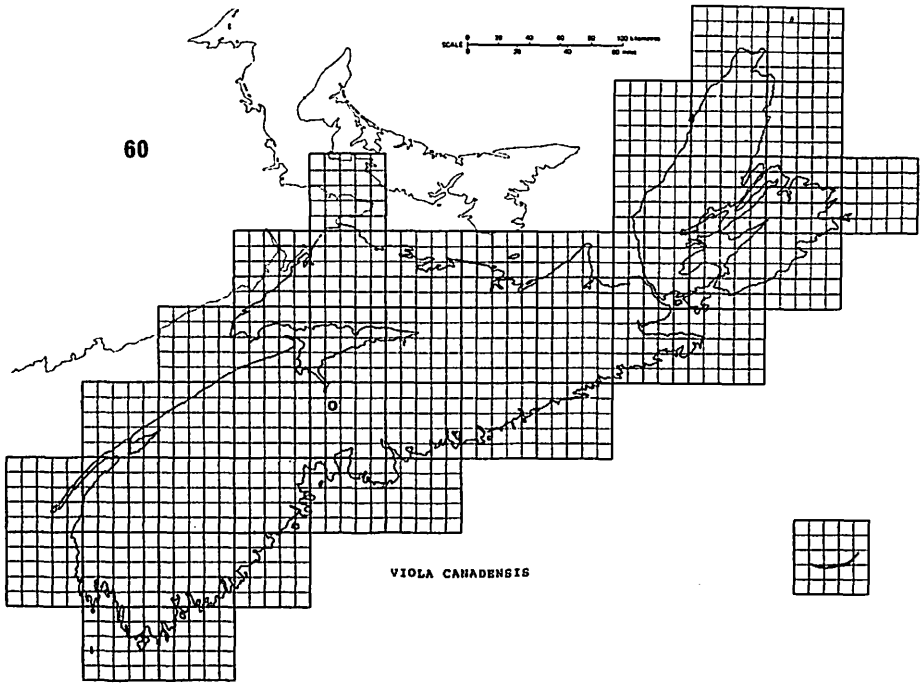
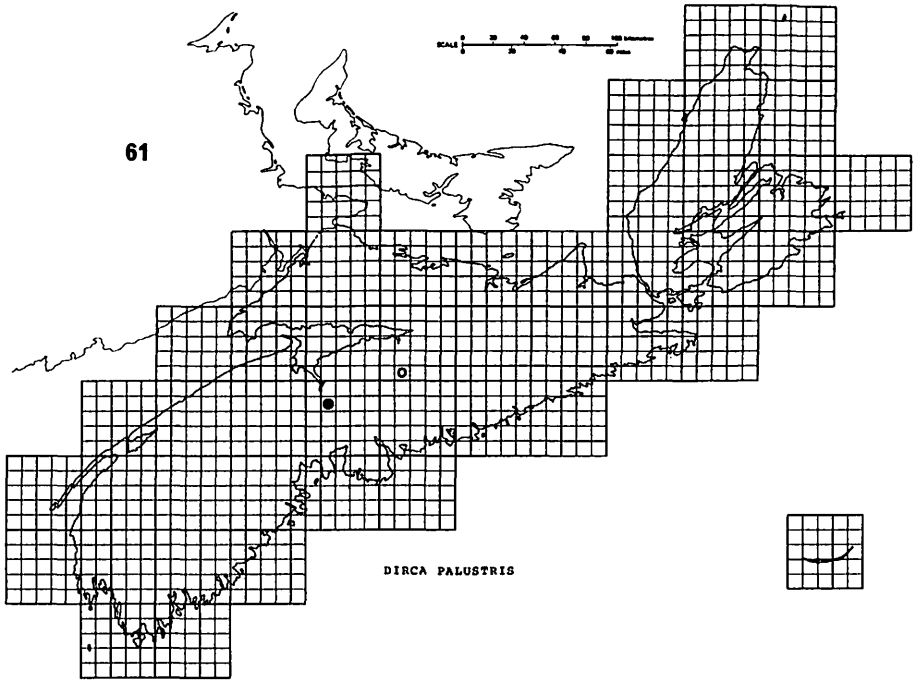


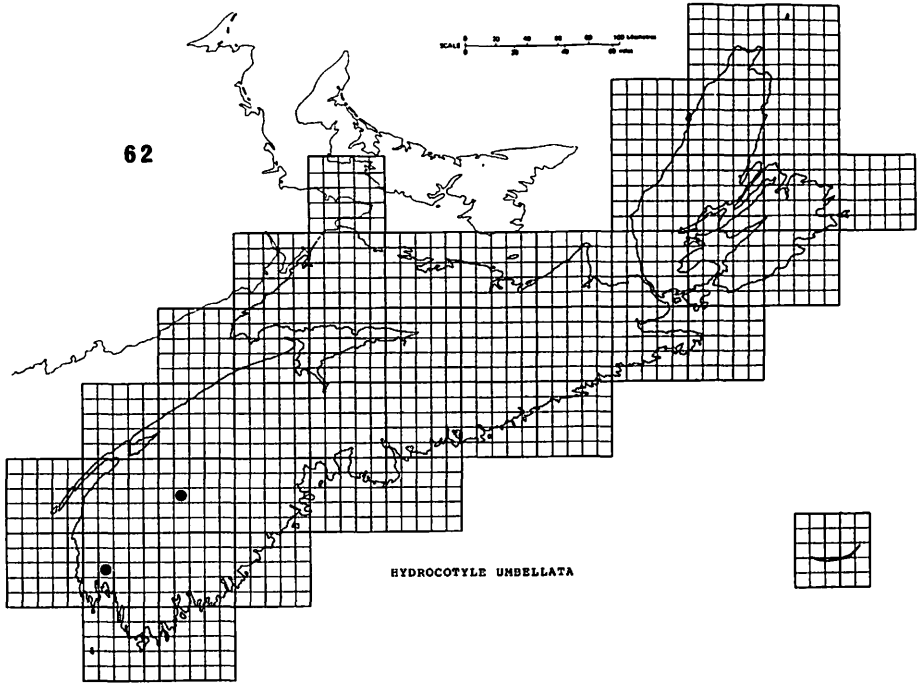
VIOLA CANADENSIS

61



DIRCA PALUSTRIS

62



HYDROCOTYLE UMBELLATA

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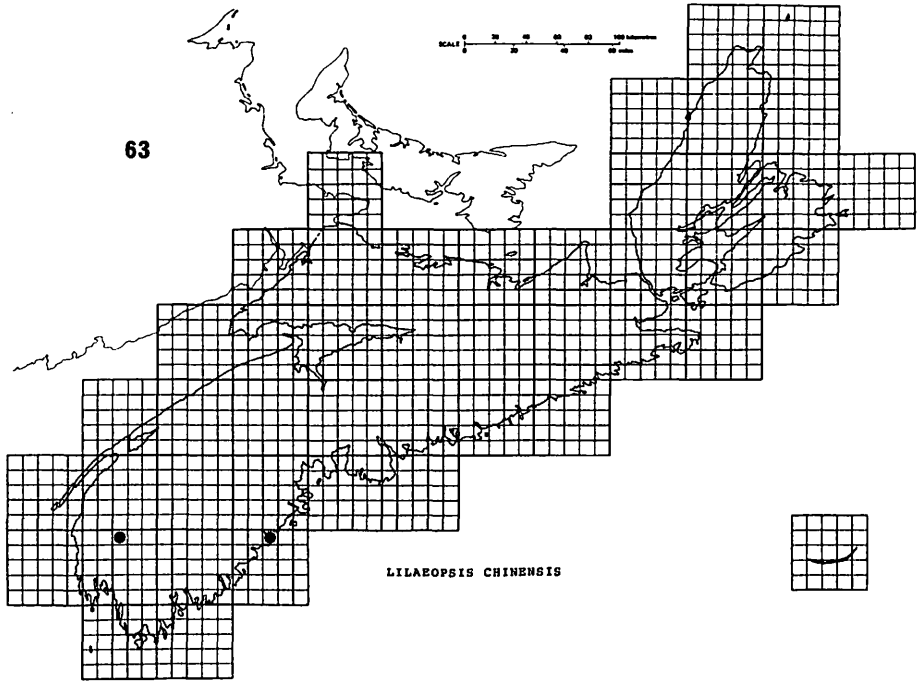
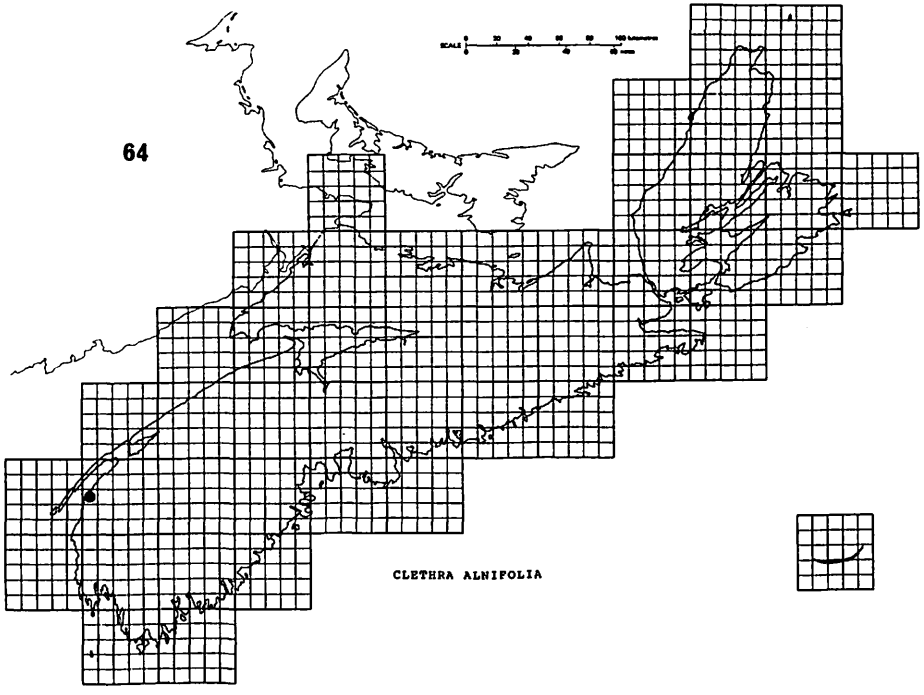


LILAEOPSIS CHINENSIS

64



CLETHRA ALNIFOLIA

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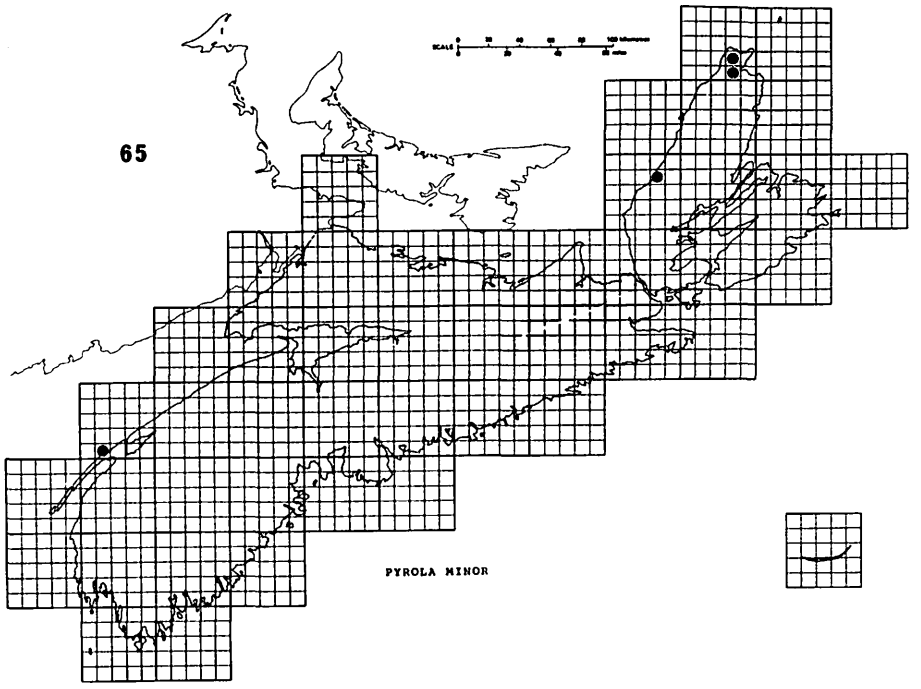
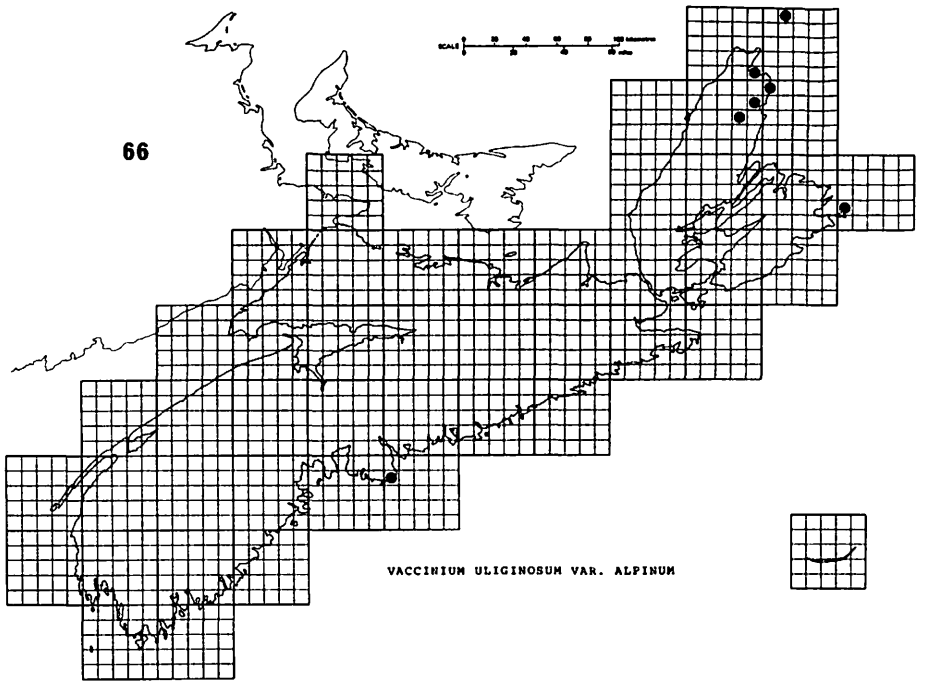


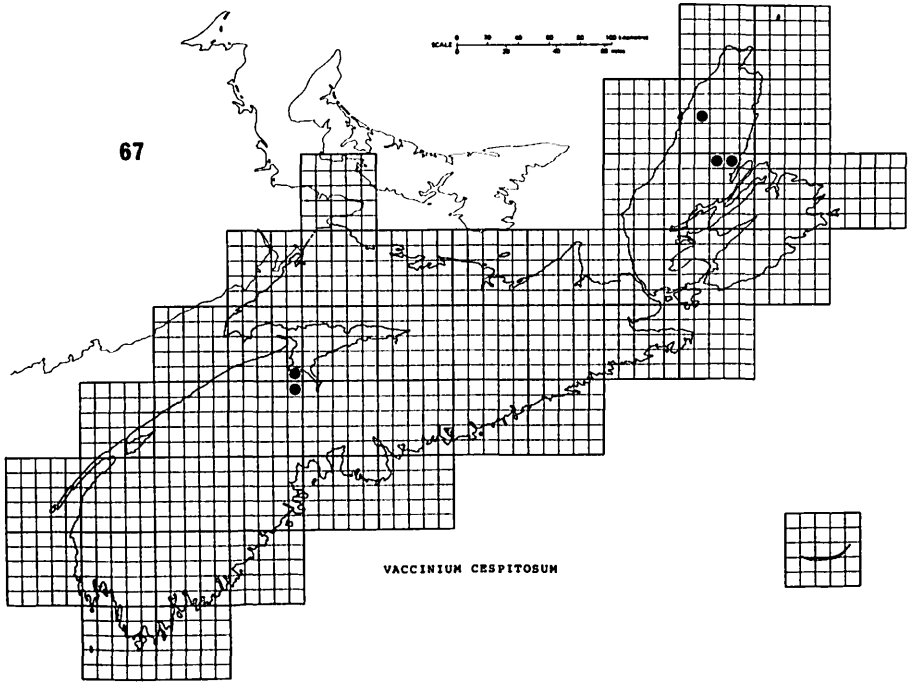
PYROLA MINOR

66



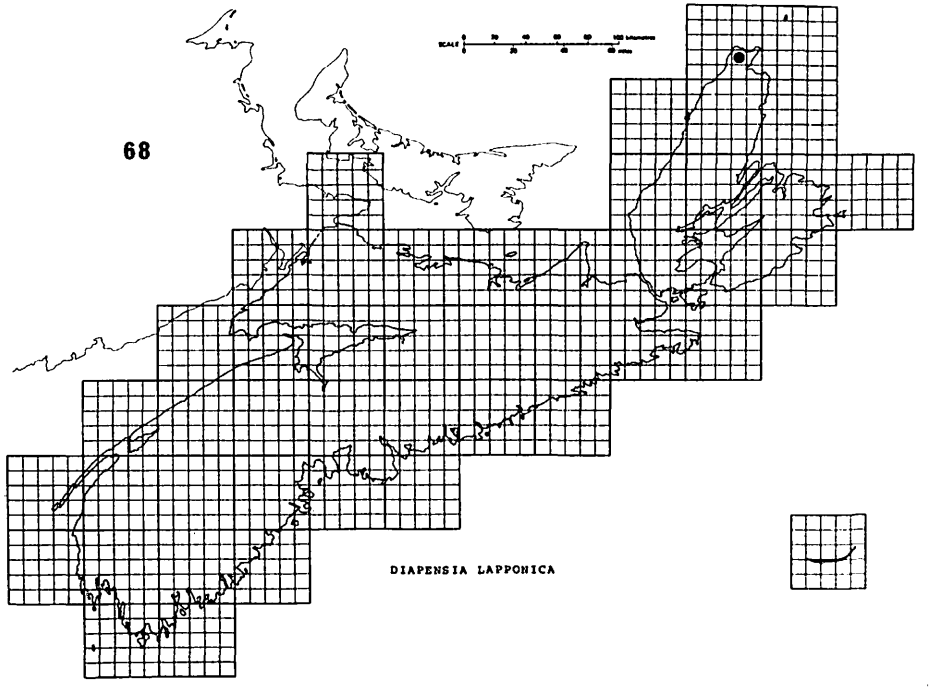
VACCINIUM ULIGINOSUM VAR. ALPINUM

67



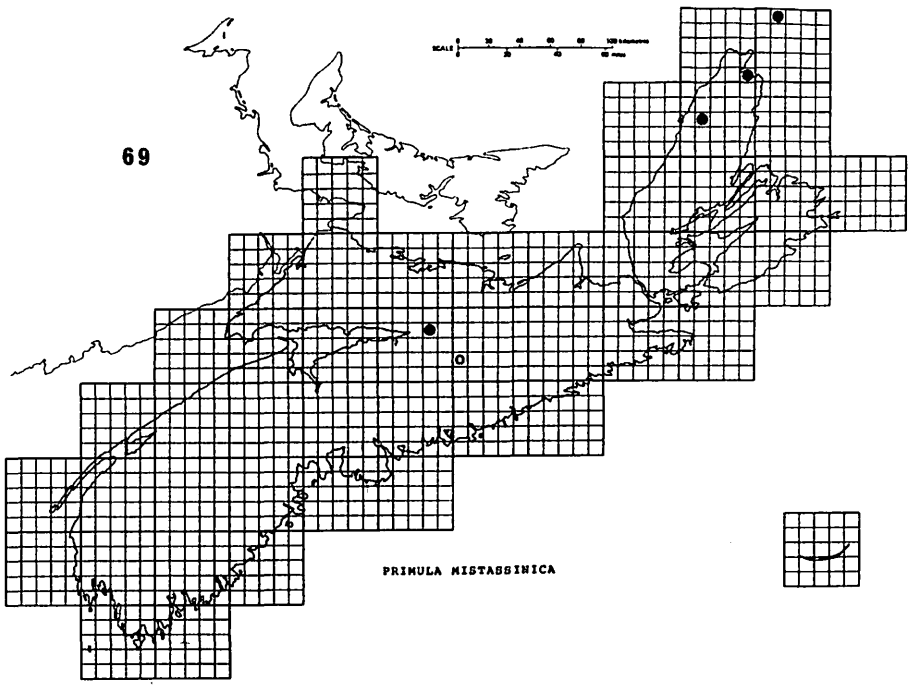
VACCINIUM CESPITOSUM

68



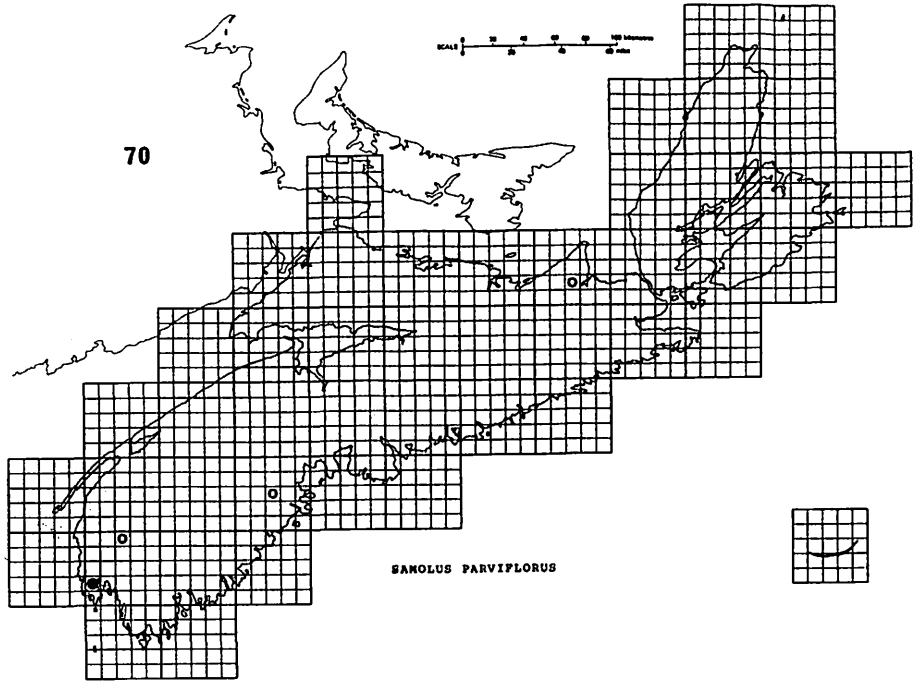
DIAPENSIA LAPPONICA

69



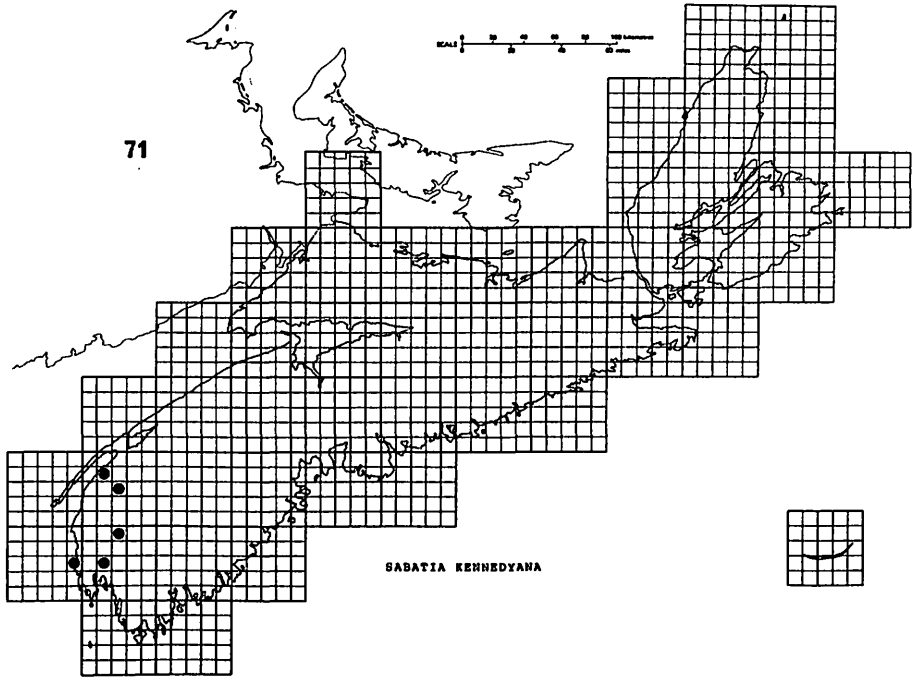
PRIMULA MISTASSINICA

70



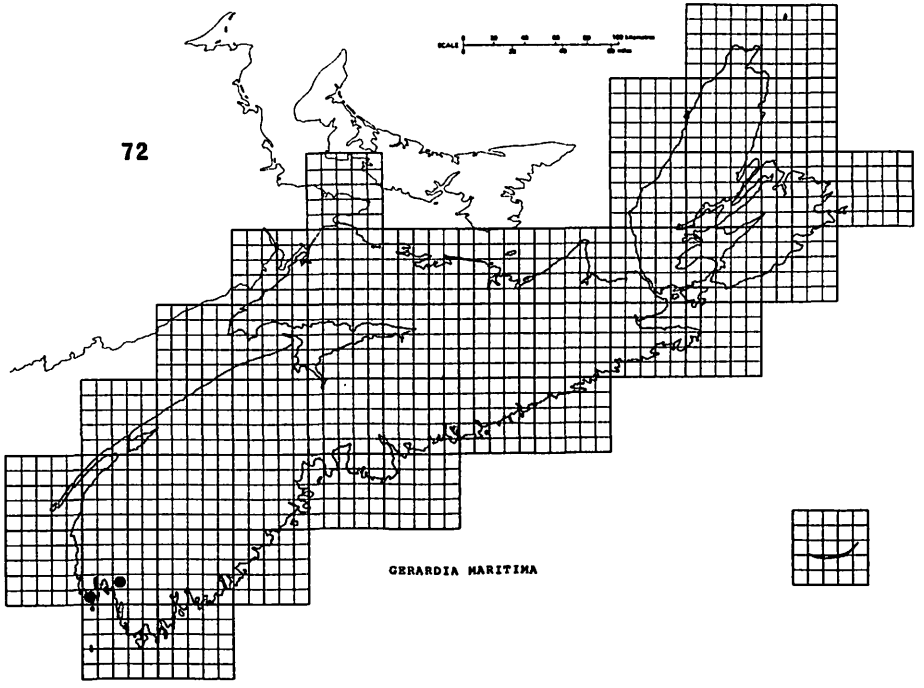
SAMOLUS PARVIFLORUS

71



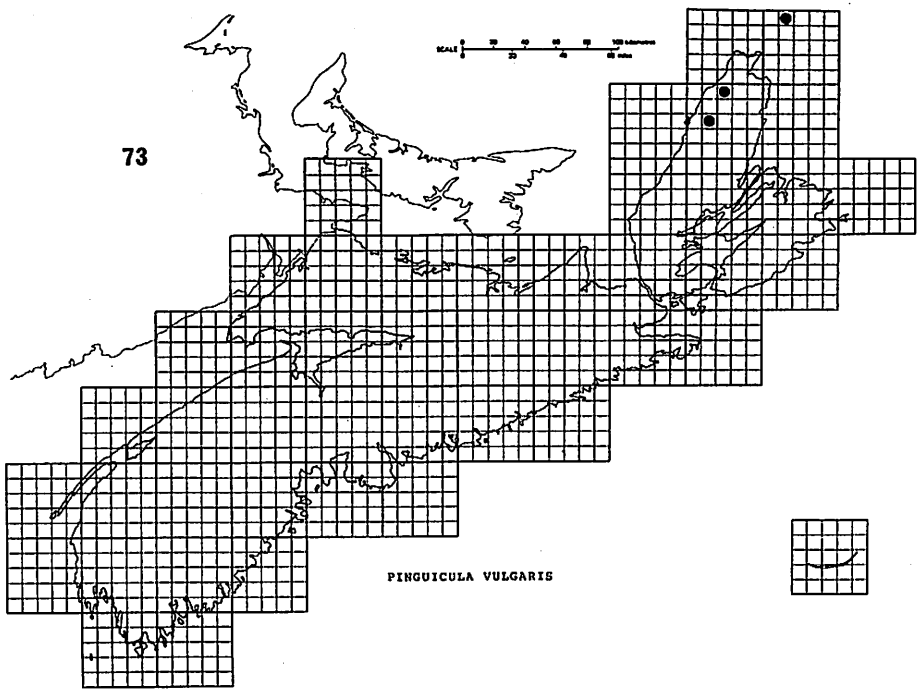
SABATIA KENNEDYANA

72



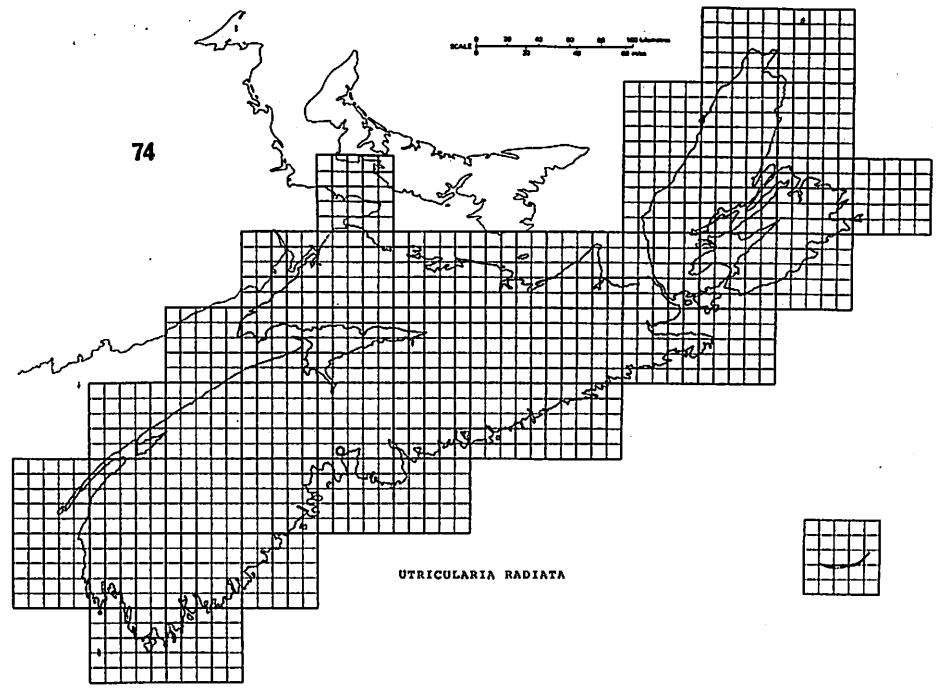
GERARDIA MARITIMA

73



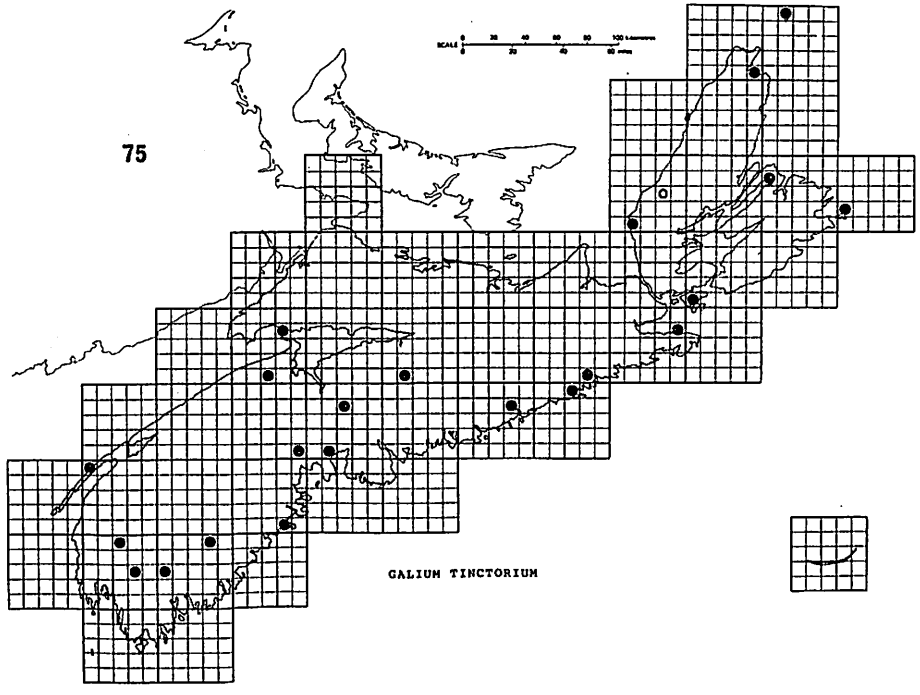
PINGUICULA VULGARIS

74



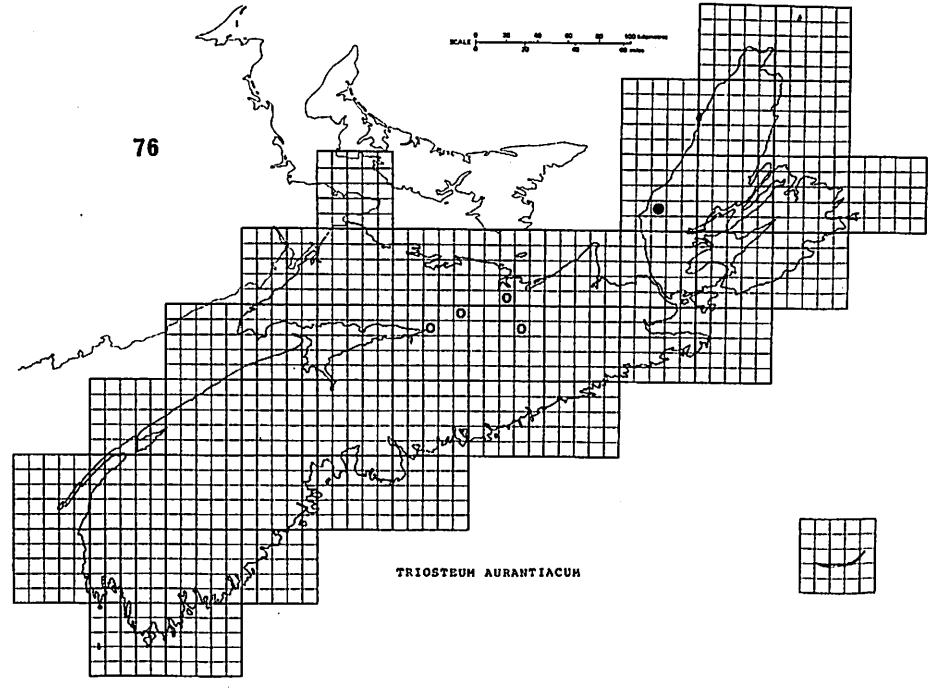
UTRICULARIA RADIATA

75



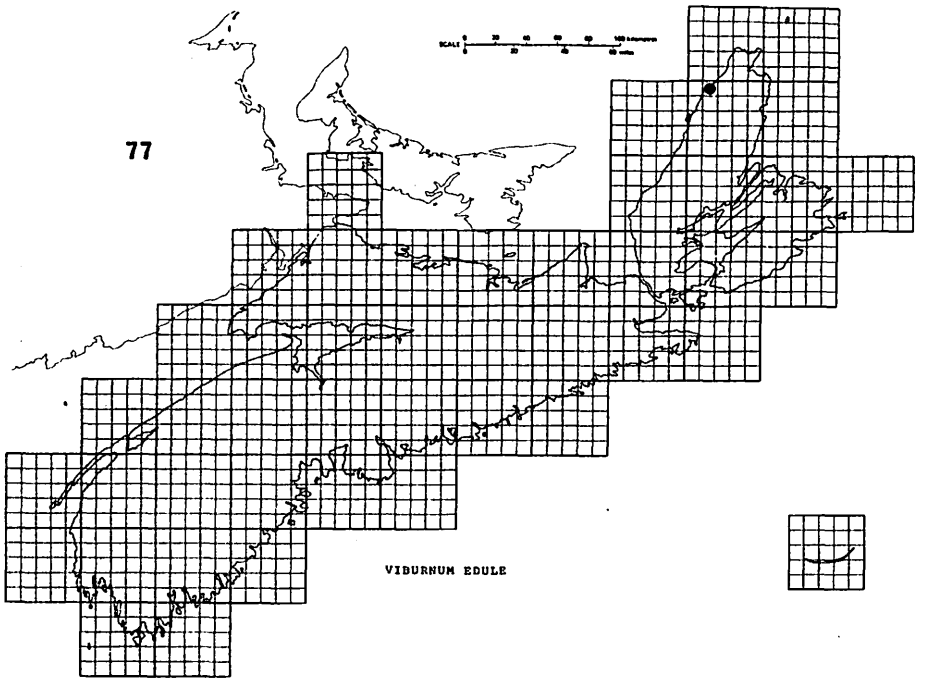
GALIUM TINCTORIUM

76



TRIOSTEUM AURANTIACUM

77



VIBURNUM EDULE

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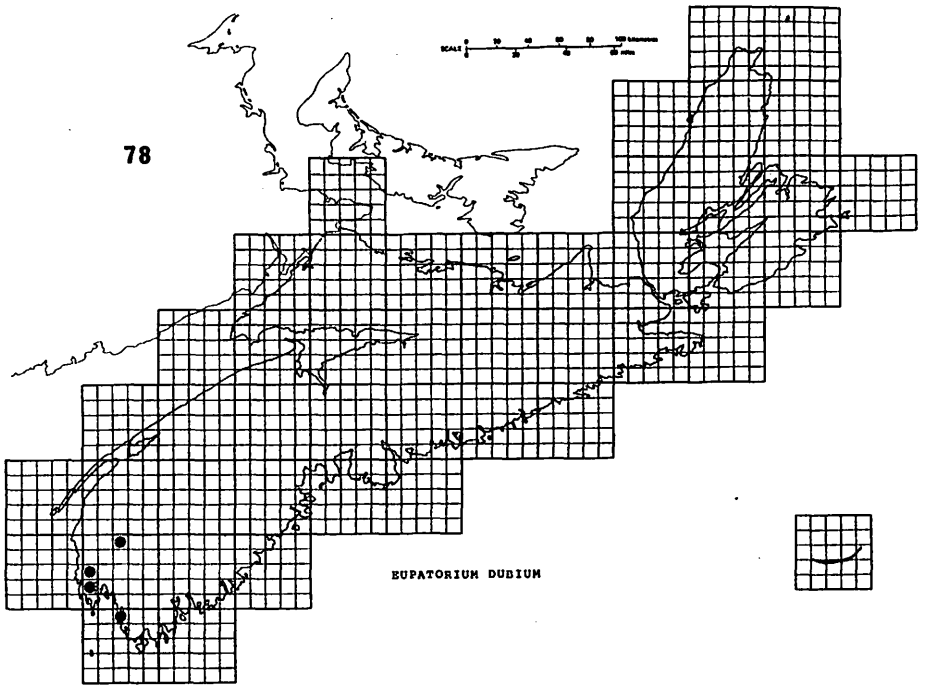
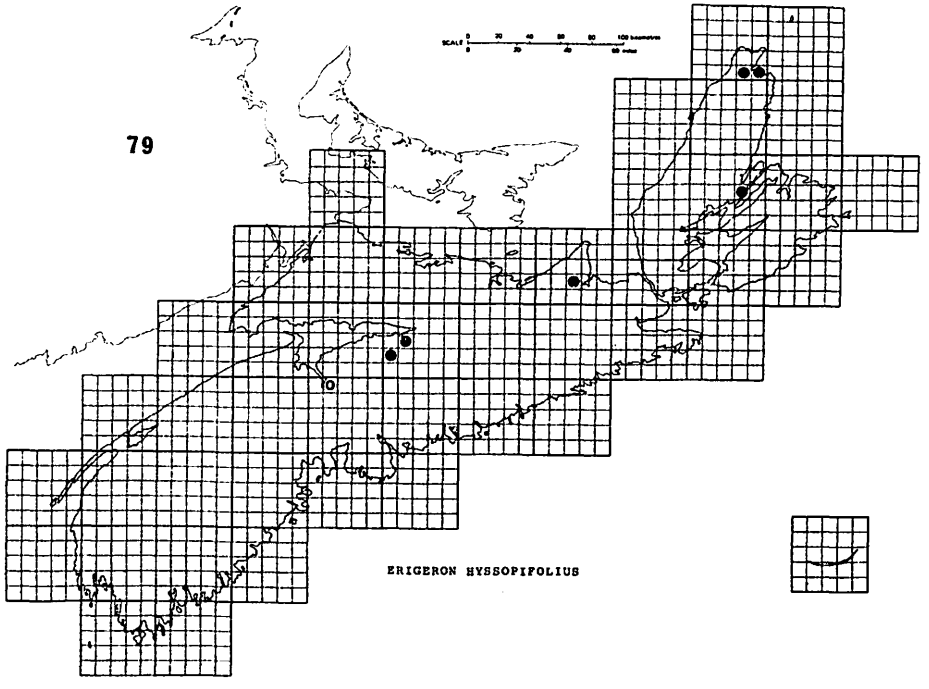


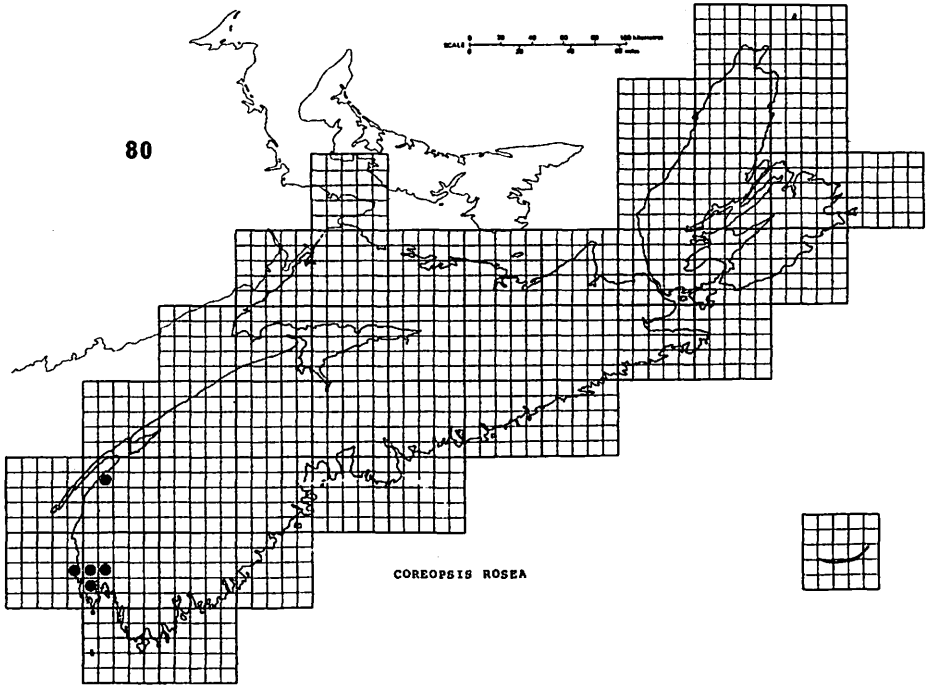
EUPATORIUM DUBIUM

79



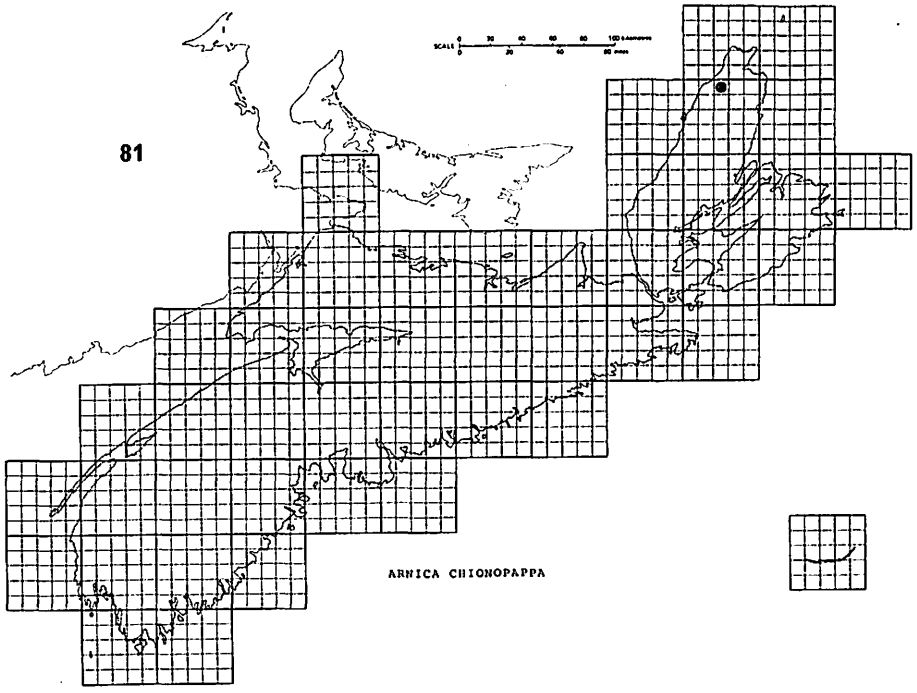
ERIGERON HYSSOPIFOLIUS

80



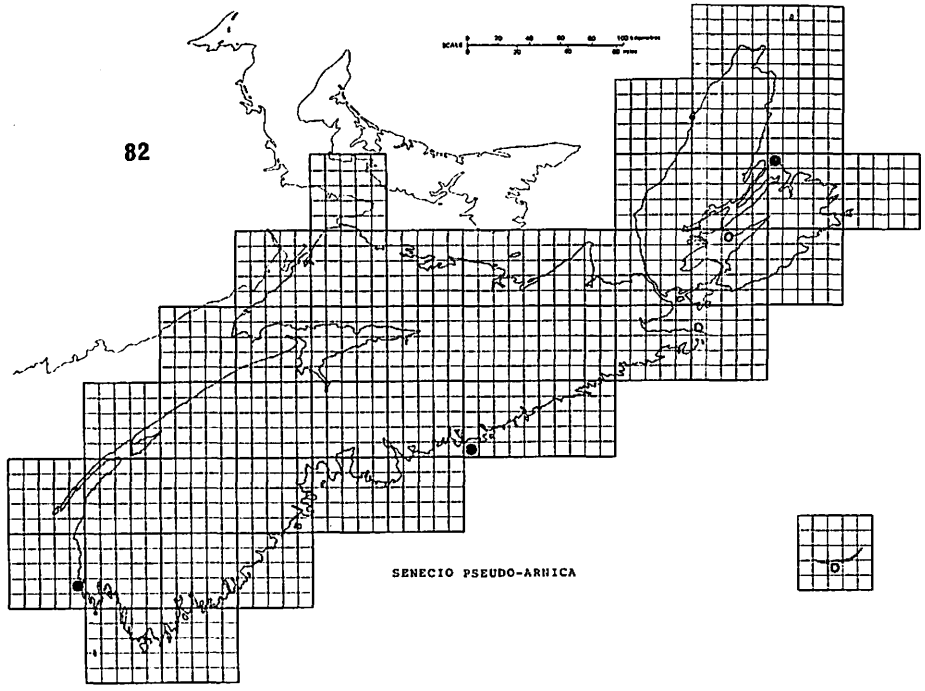
COREOPSIS ROSEA

81



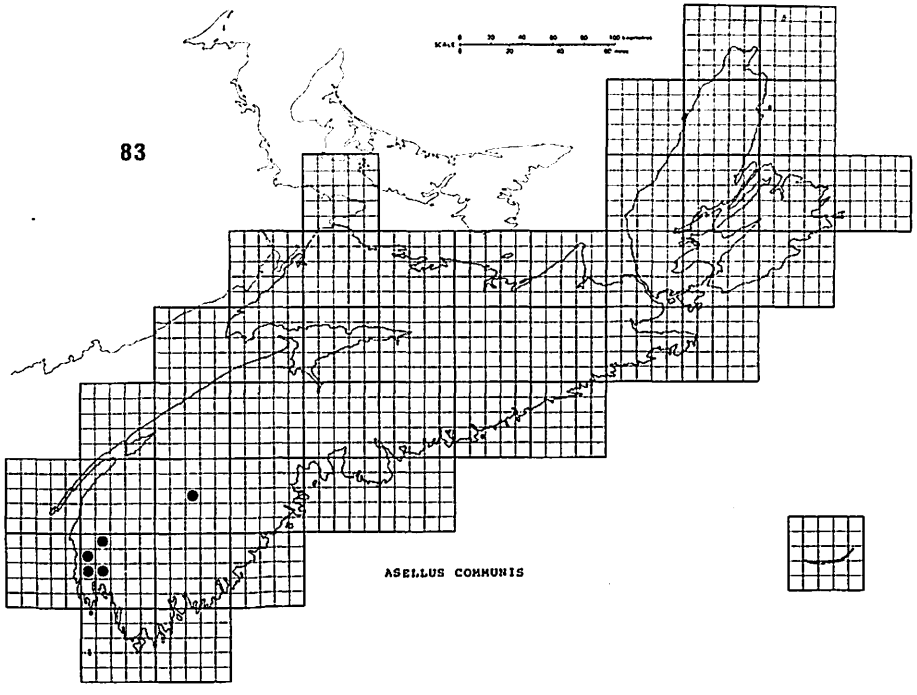
ARNICA CHIONOPAPPA

82



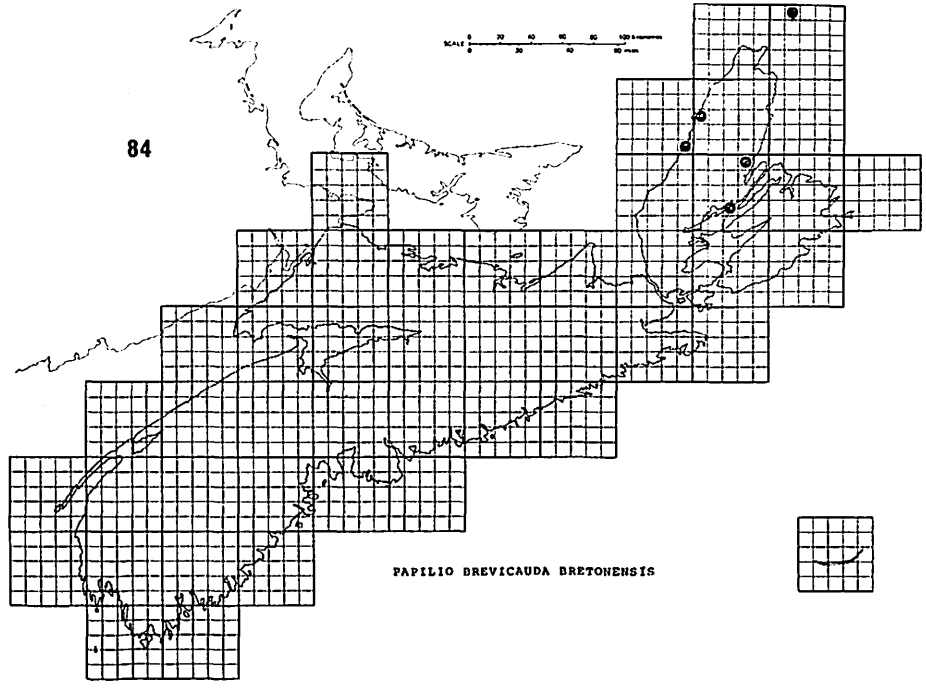
SENECIO PSEUDO-ARNICA

83

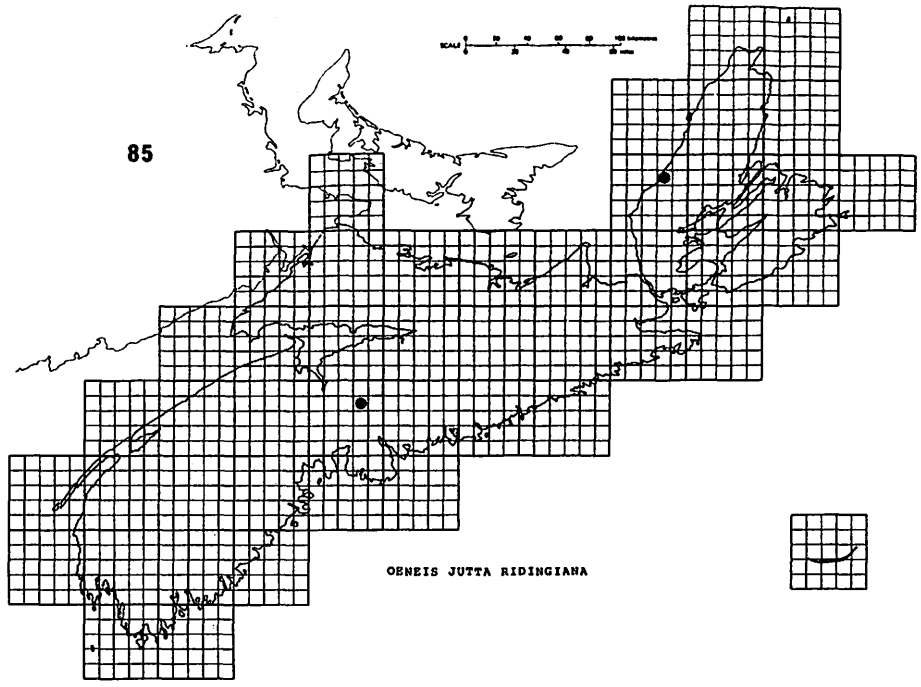


ASELLUS COMMUNIS

84



PAPILIO BREVICAUDA BRETONENSIS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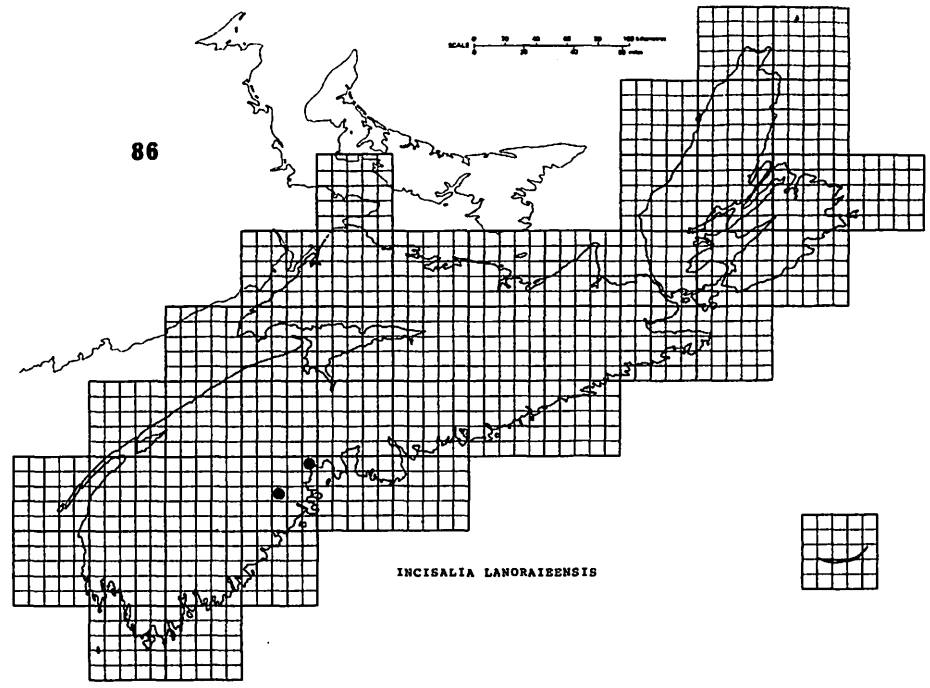
OENEIS JUTTA RIDINGIANA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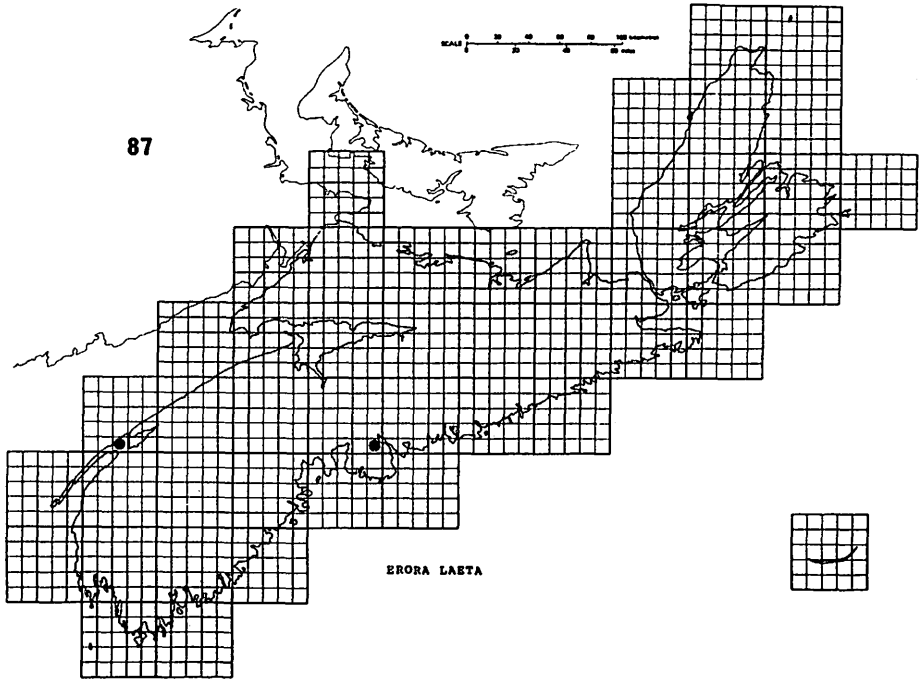
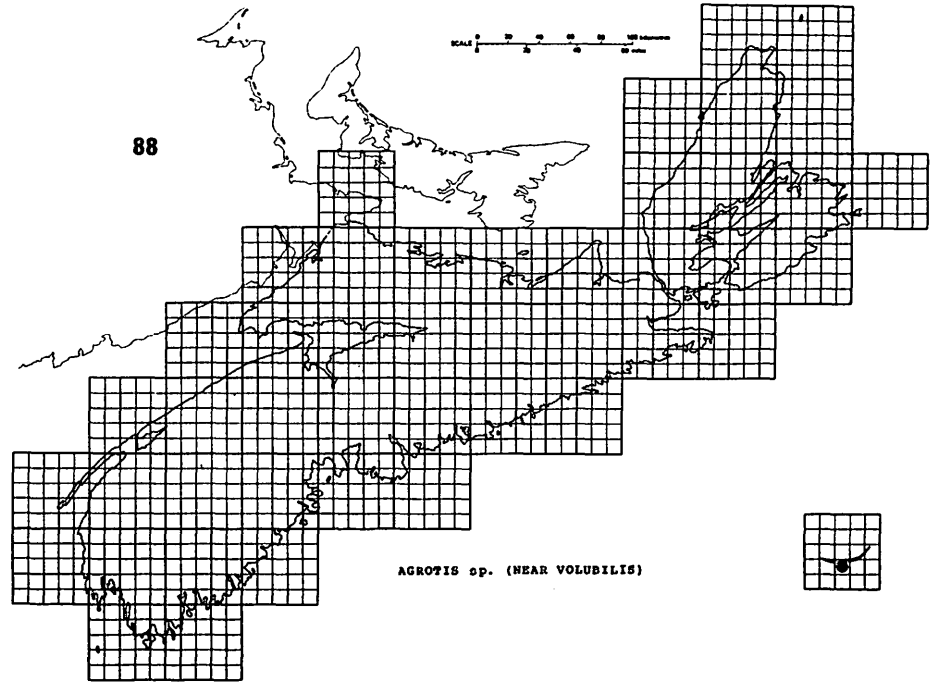
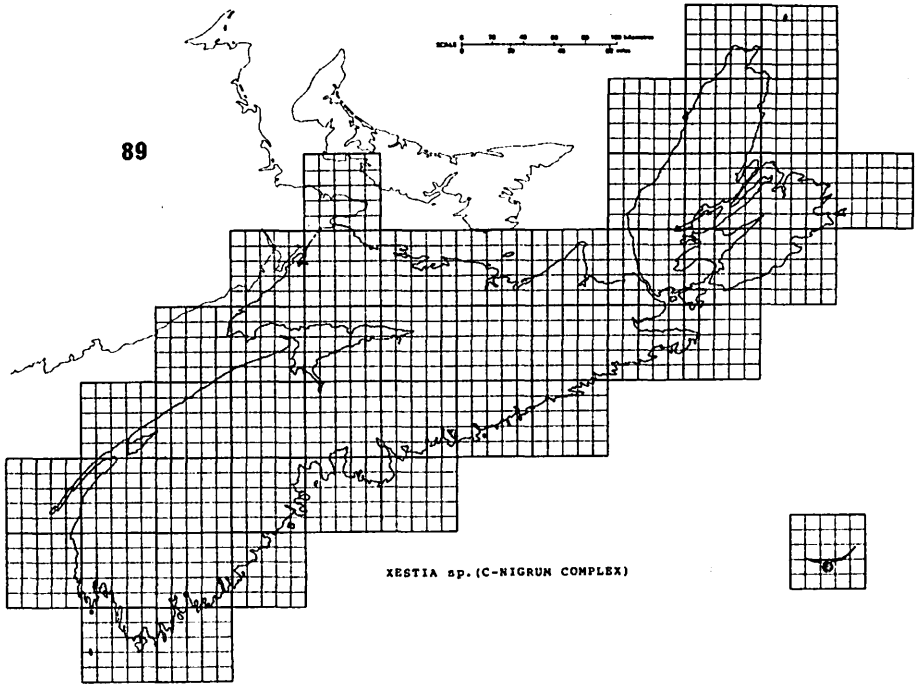
INCISALIA LANORAIEENSIS


87
ERORA LAETA

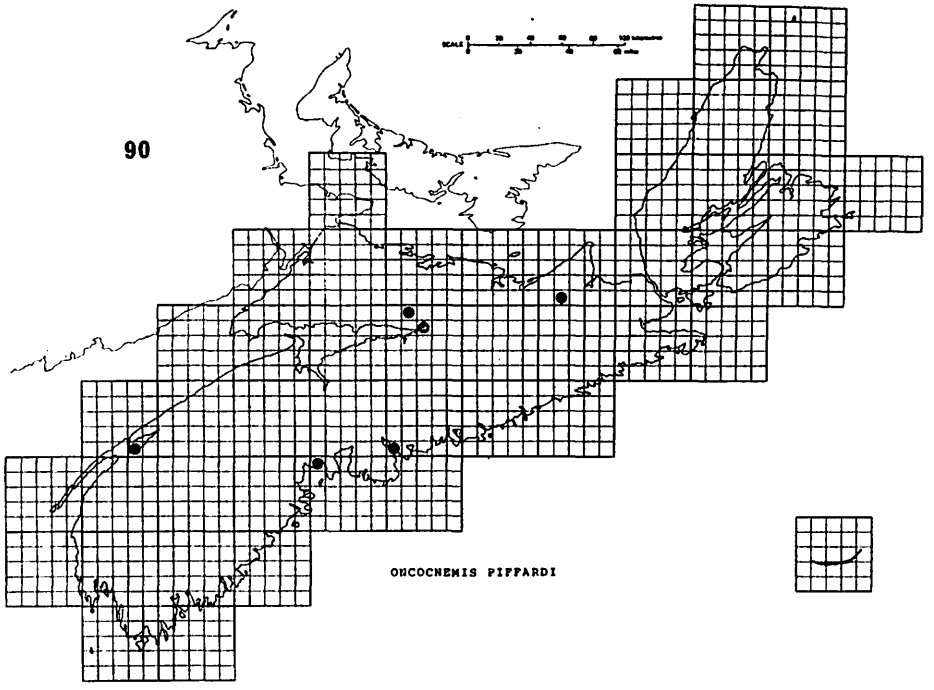

88
AGROTIS sp. (NEAR VOLUBILIS)

89



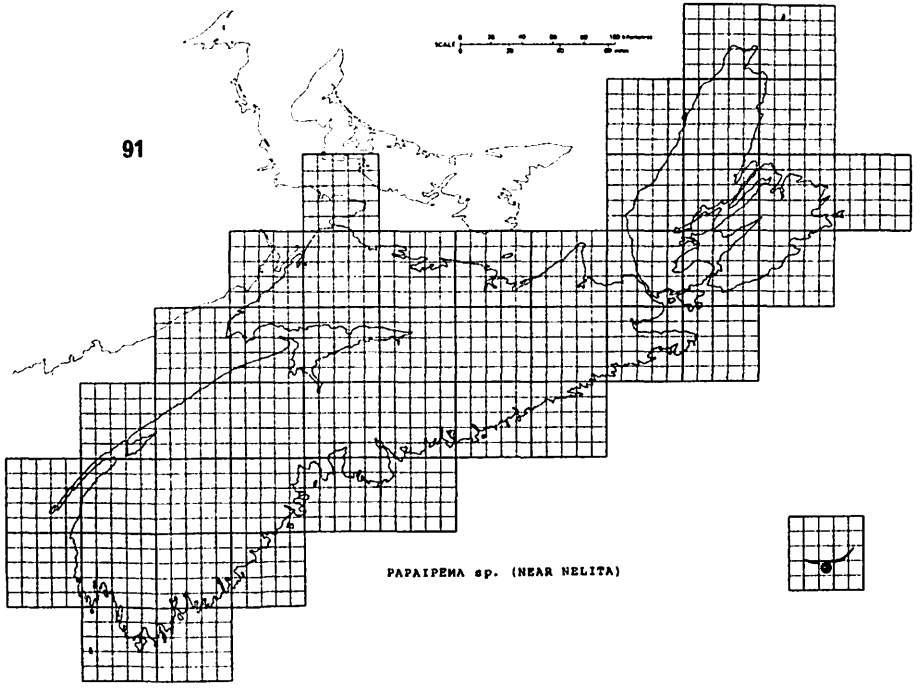
XESTIA sp.(C-NIGRUM COMPLEX)

90



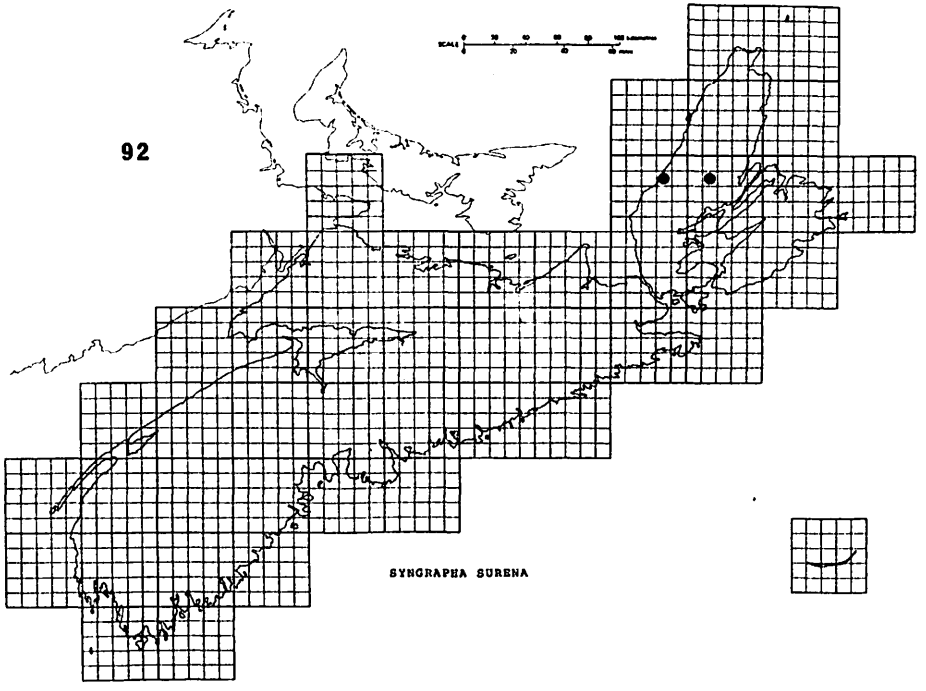
ONCOCNEMIS PIFFARDI

91



PAPAIPEMA sp. (NEAR NELITA)

92



SYNGRAPHA SURENA

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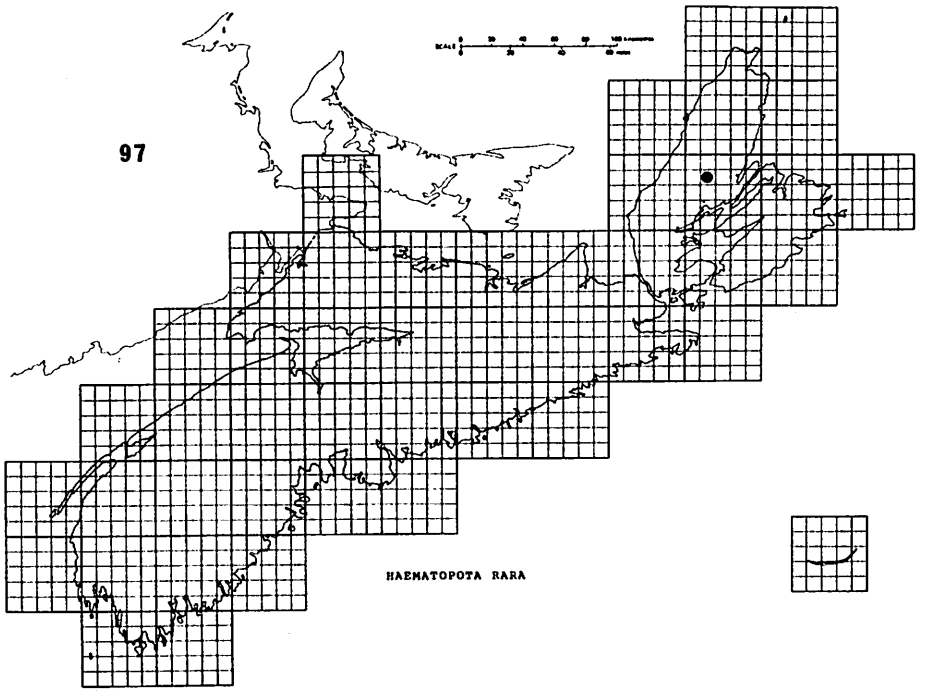
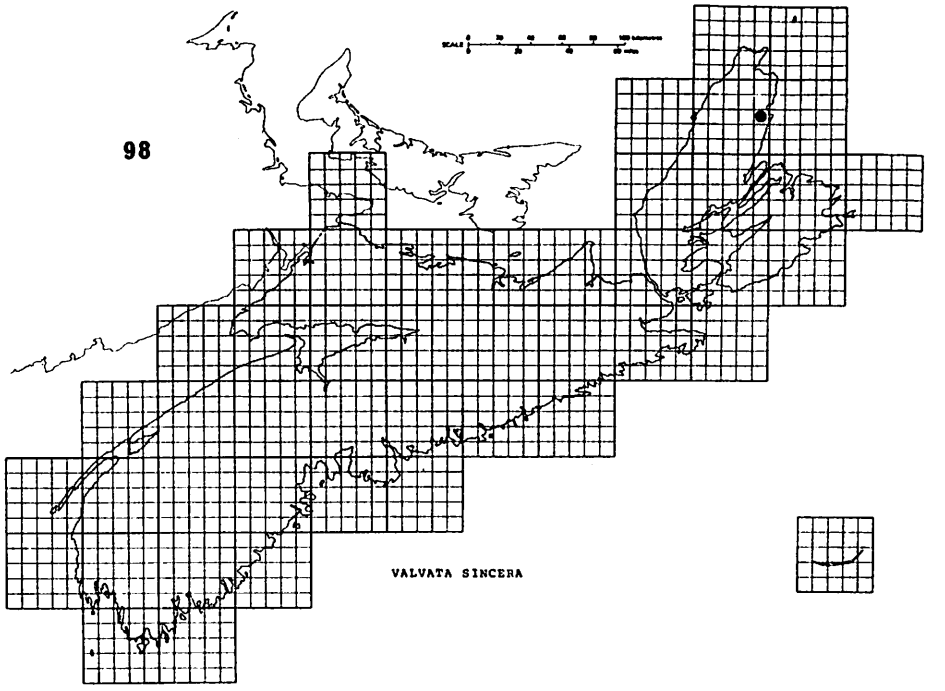


HAEMATOPOTA RARA

98



VALVATA SINCERA

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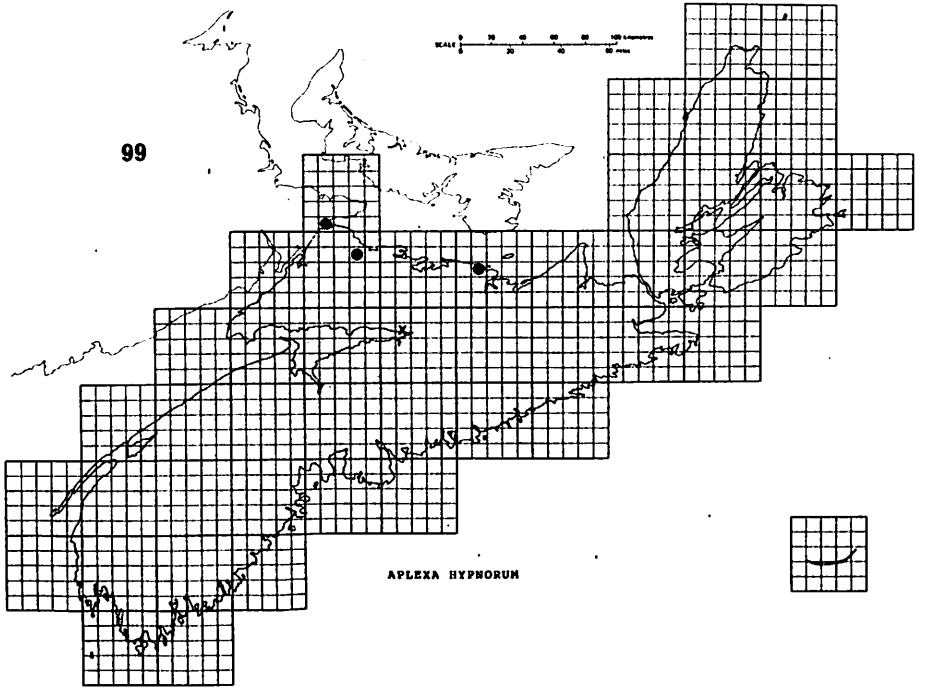
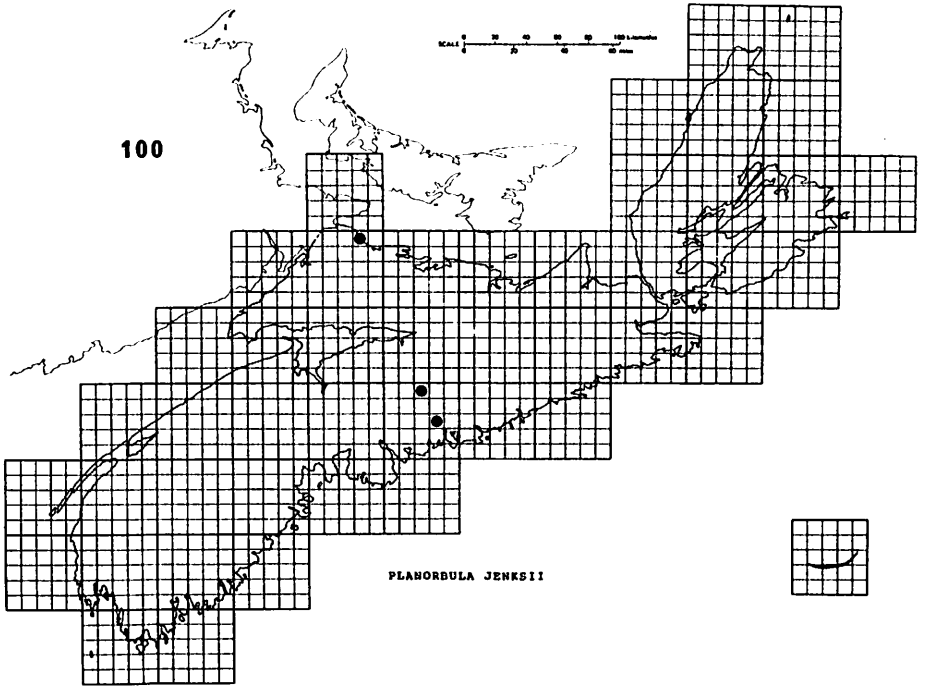


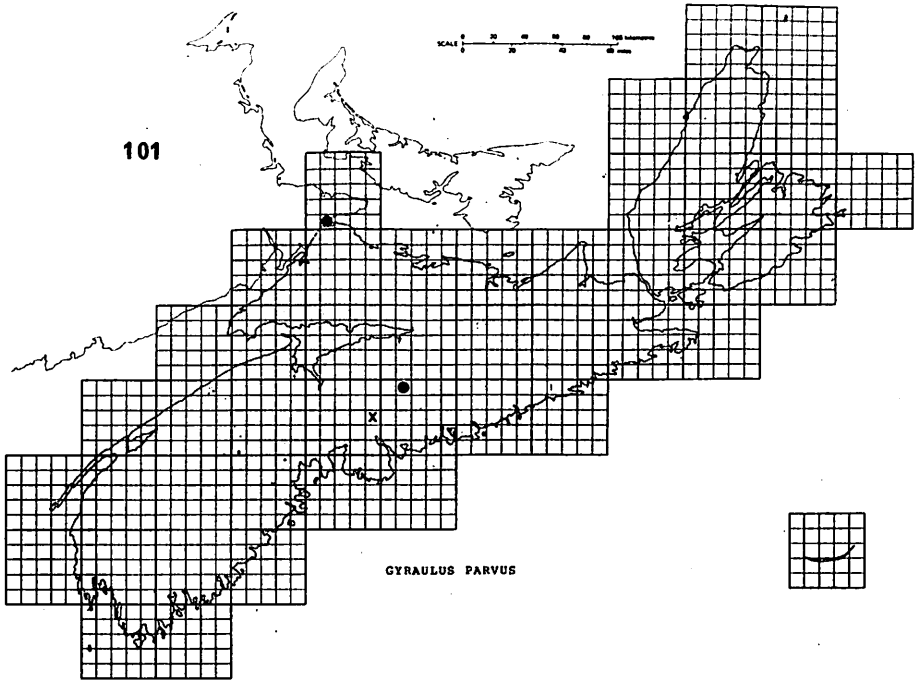
APLEXA HYPNORUM

100



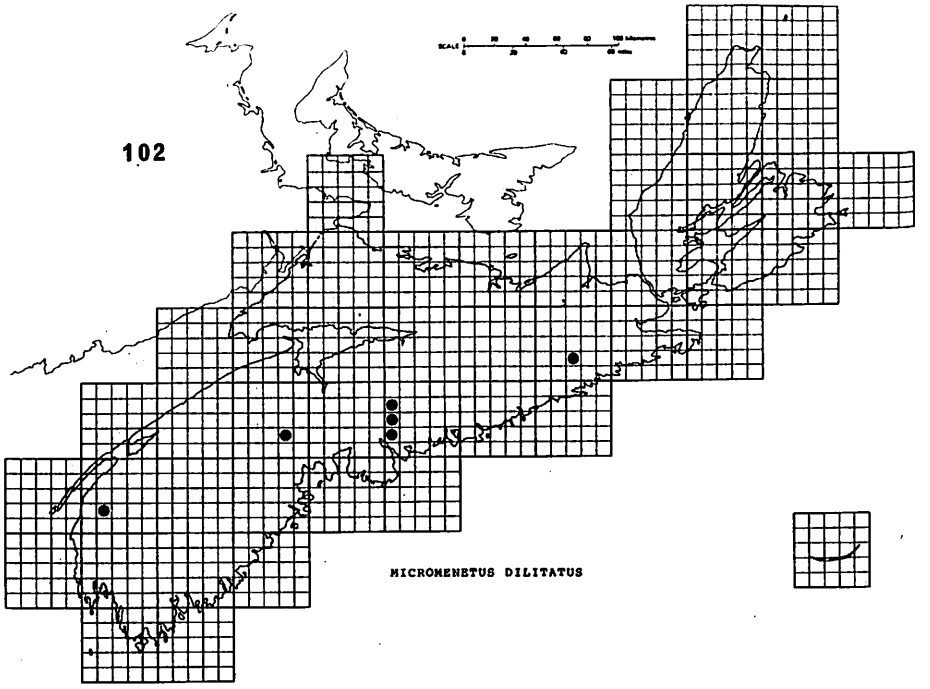
PLANORBULA JENKSII

101



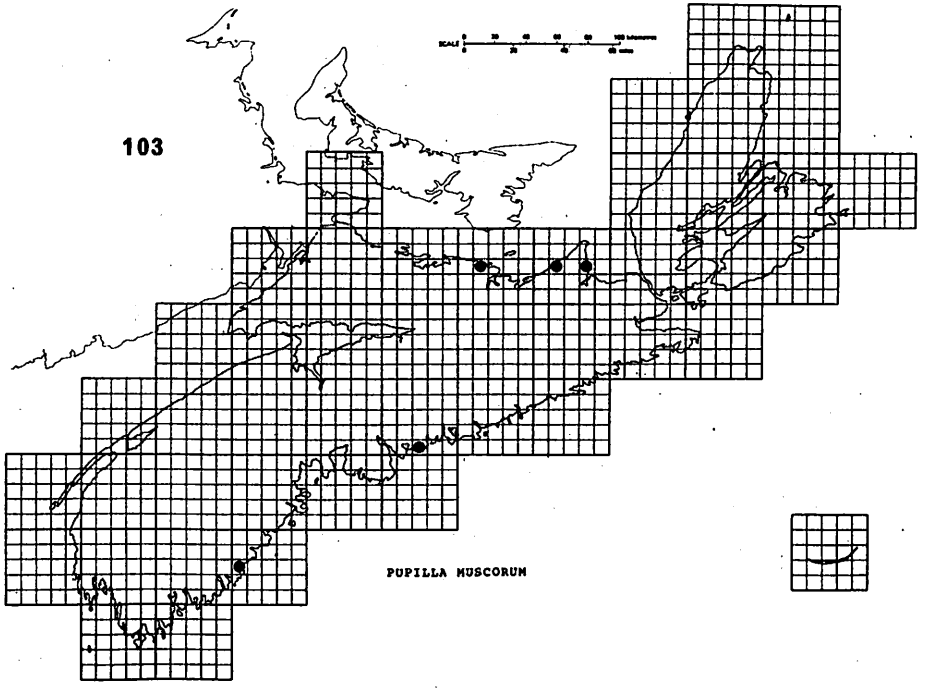
GYRAULUS PARVUS

102



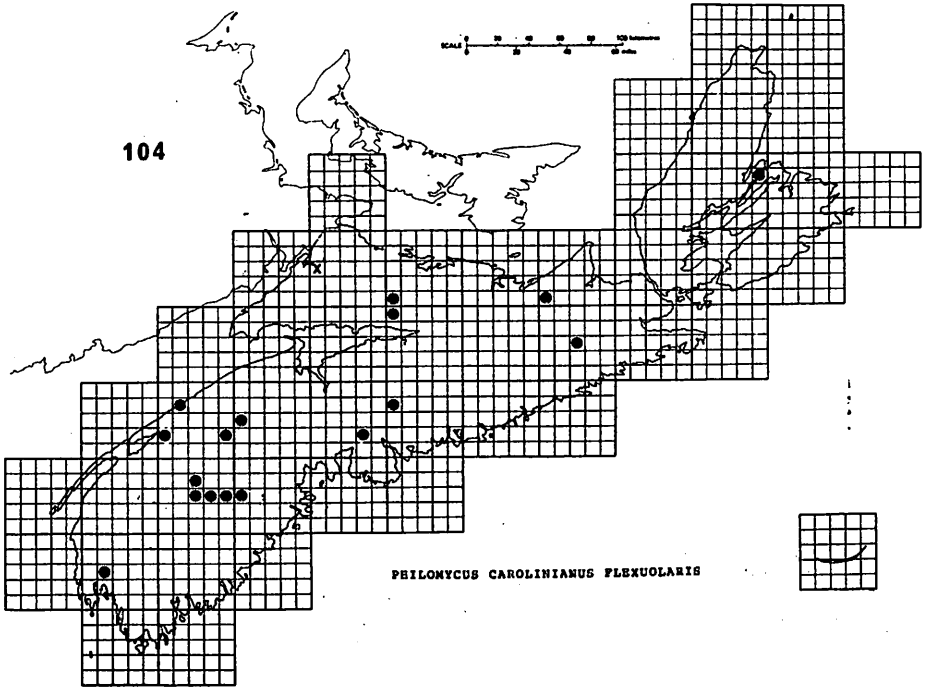
MICROMENETUS DILITATUS

103



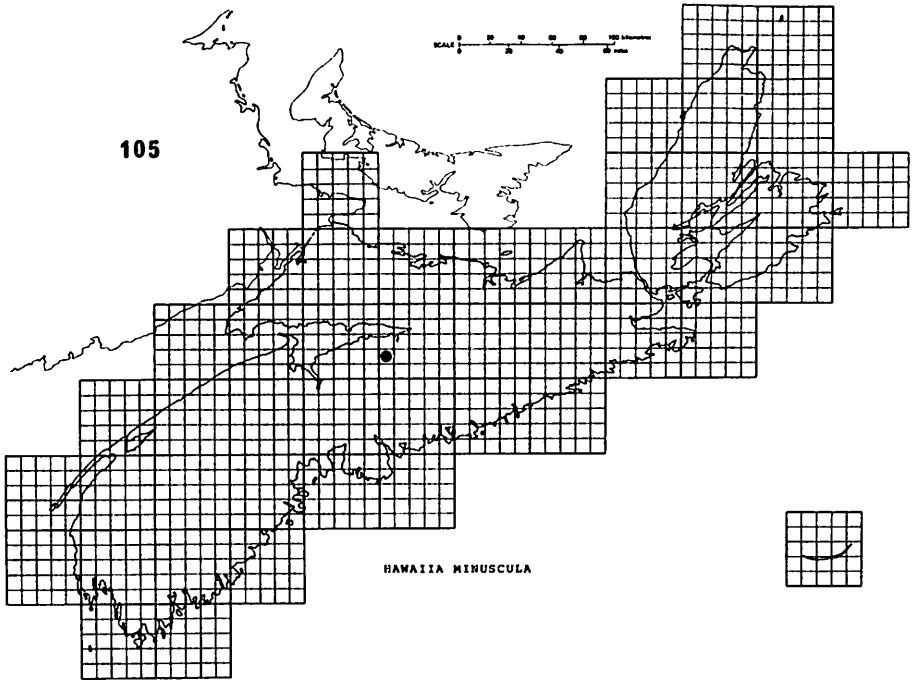
PUPILLA MUSCORUM

104



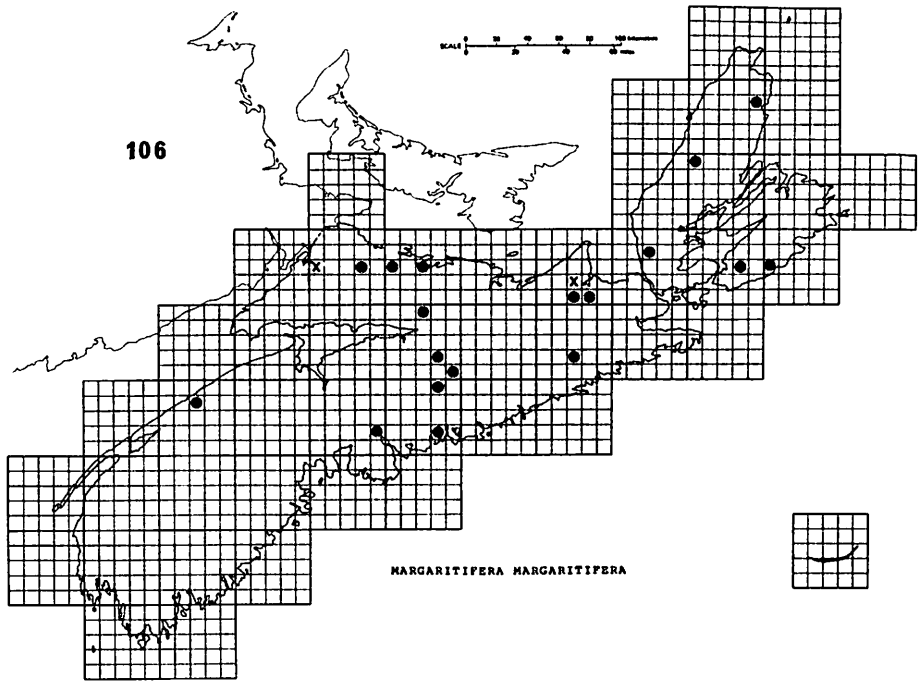
PHILOMYCUS CAROLINIANUS FLEXUOLARIS

105



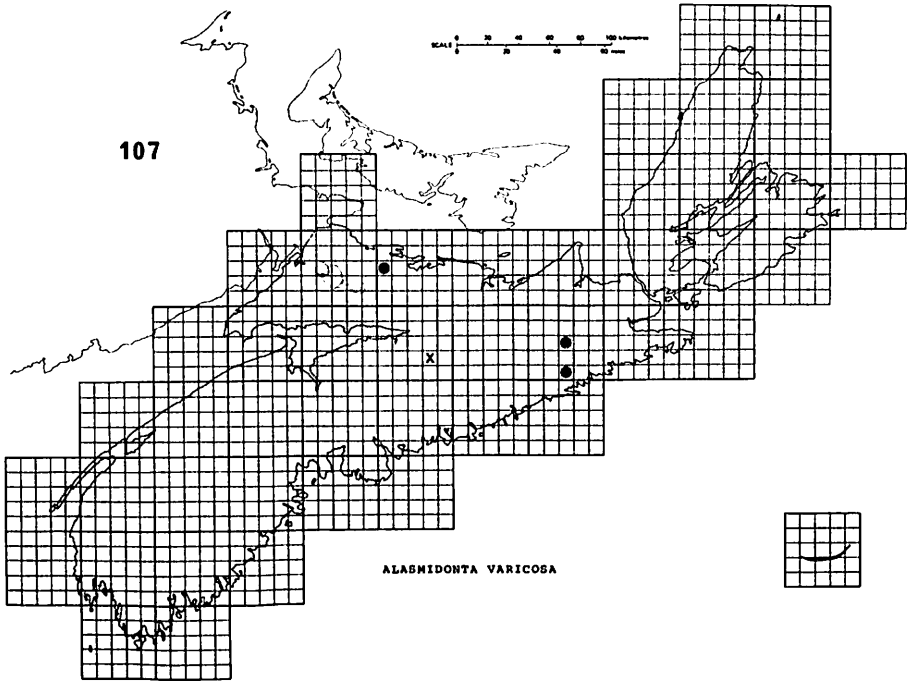
HAWAIIA MINUSCULA

106



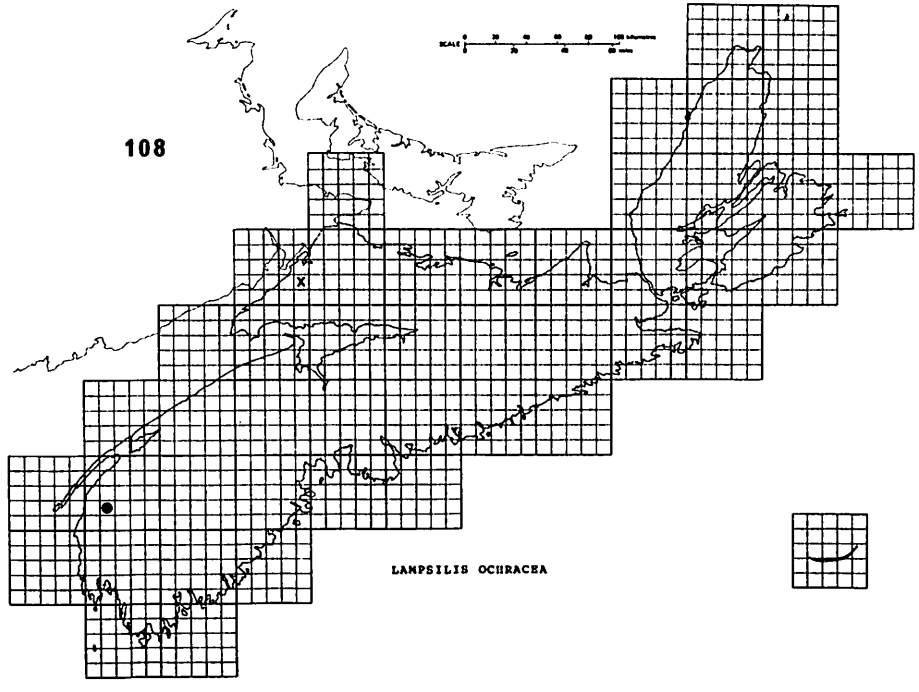
MARGARITIFERA MARGARITIFERA

107



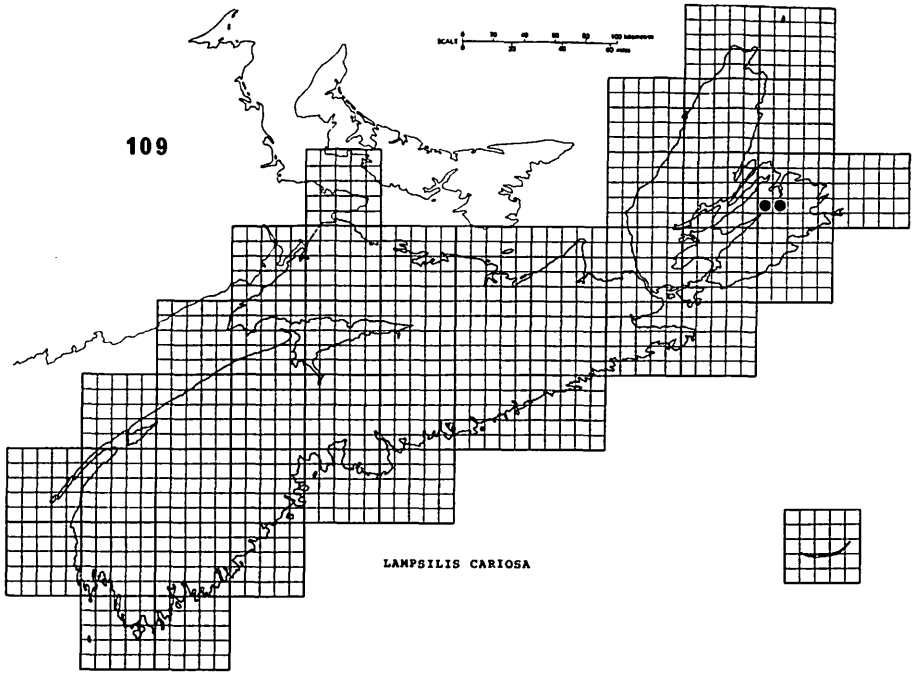
ALASMIDONTA VARICOSA

108



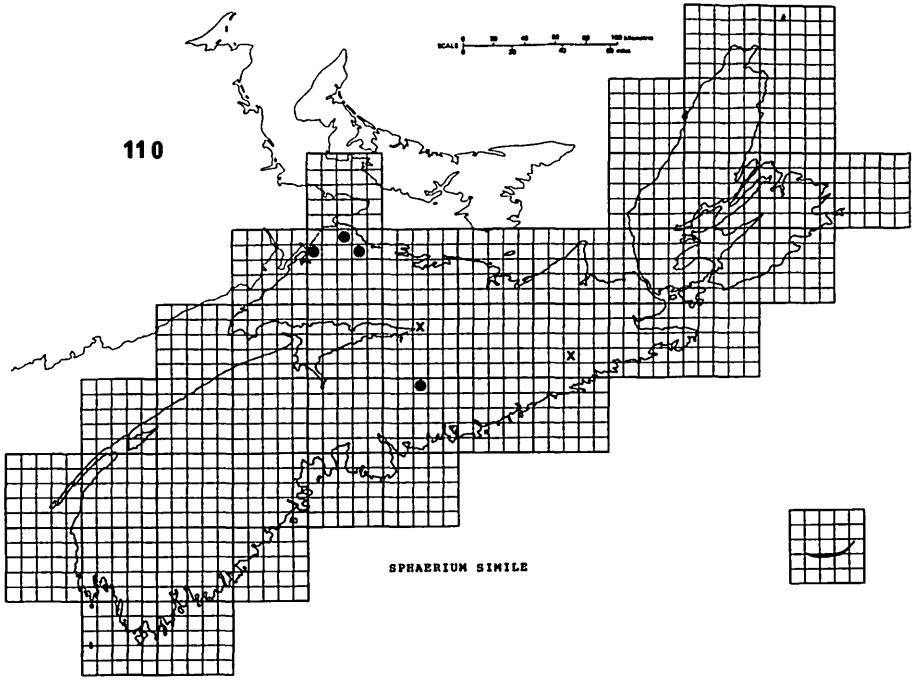
LAMPSILIS OCHRACEA

109



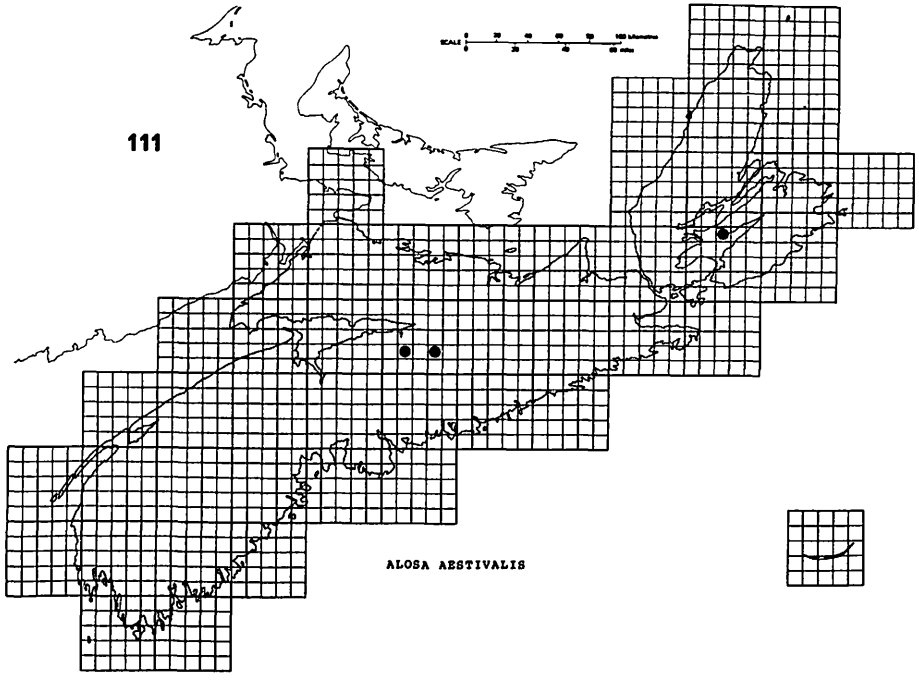
LAMPSILIS CARIOSA

110



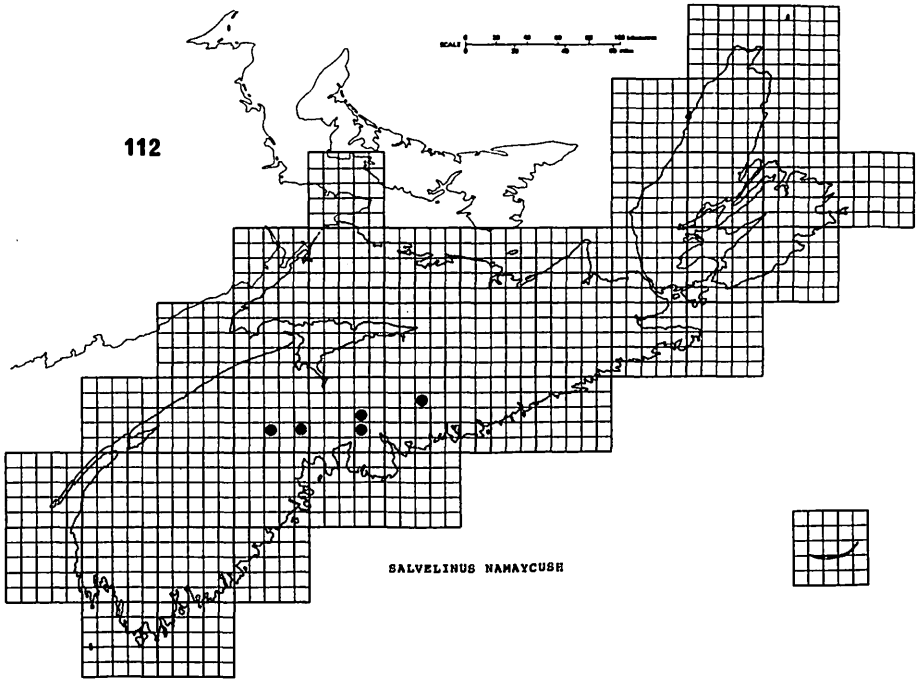
SPHAERIUM SIMILE

111



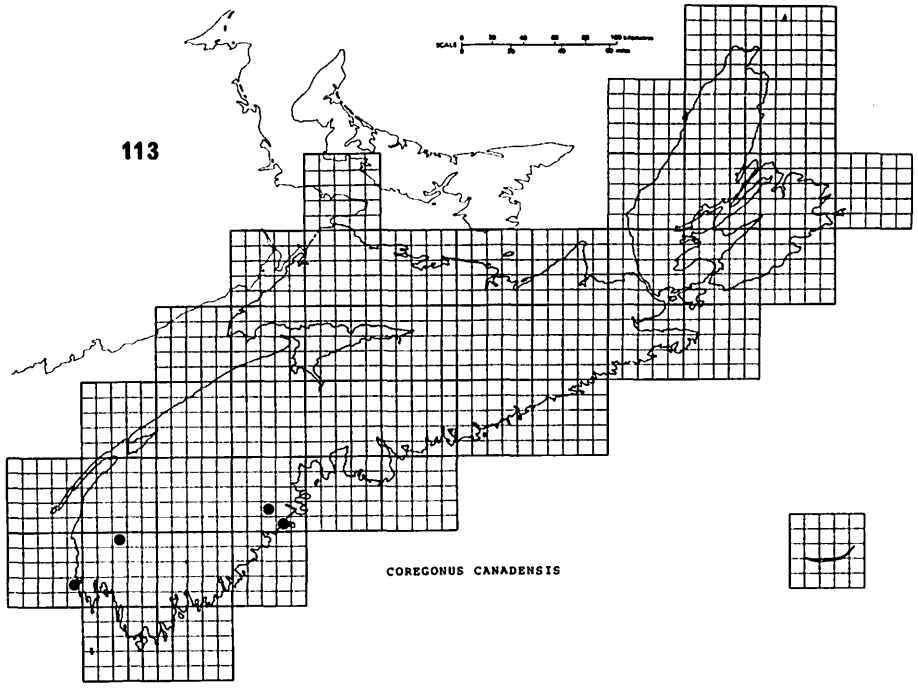
ALOSA AESTIVALIS

112



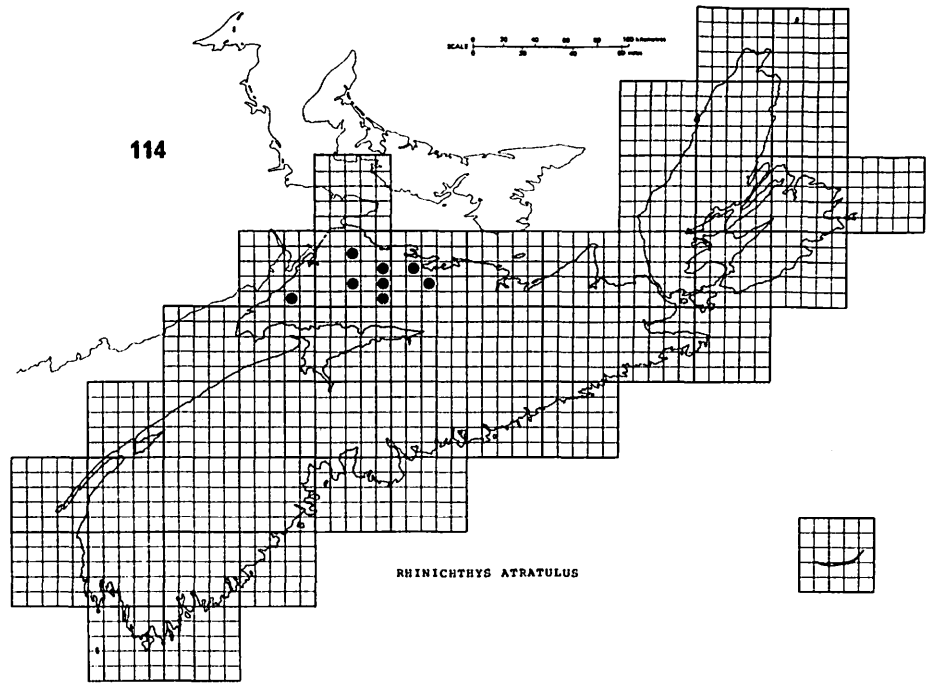
SALVELINUS NAMAYCUSH

113



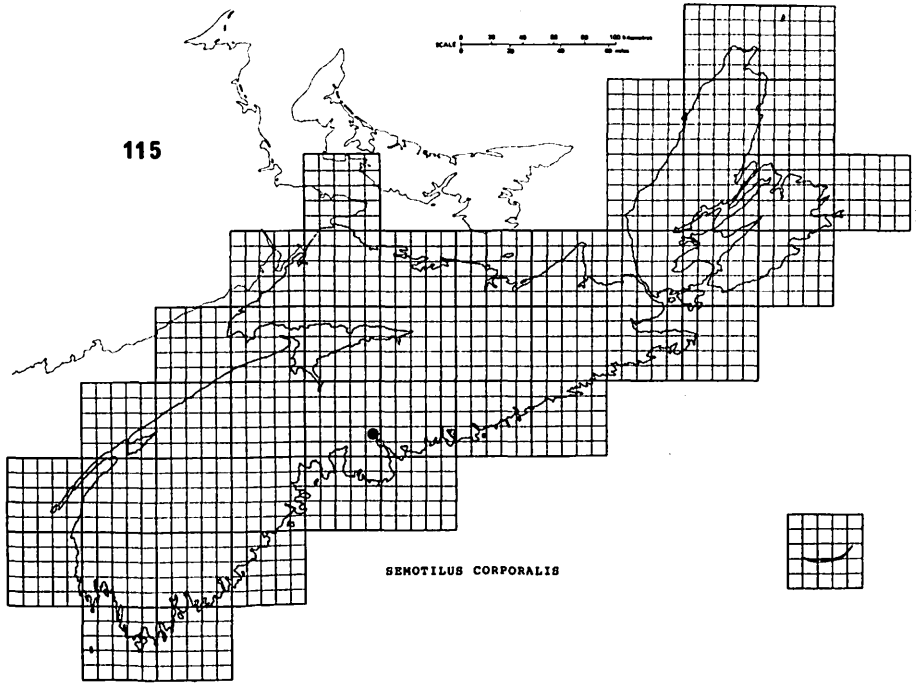
COREGONUS CANADENSIS

114



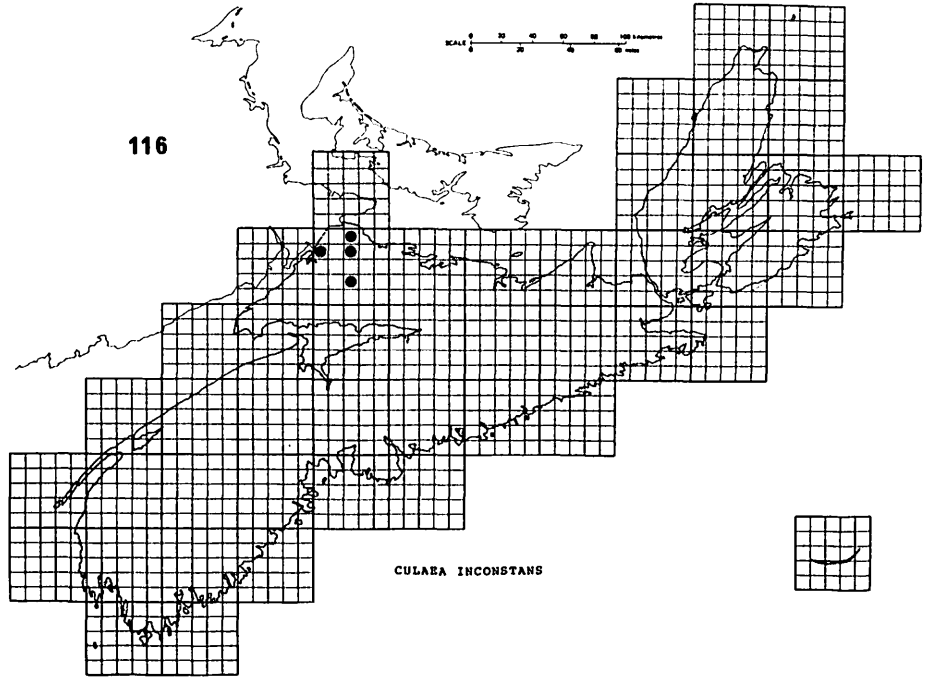
RHINICHTHYS ATRATULUS

115



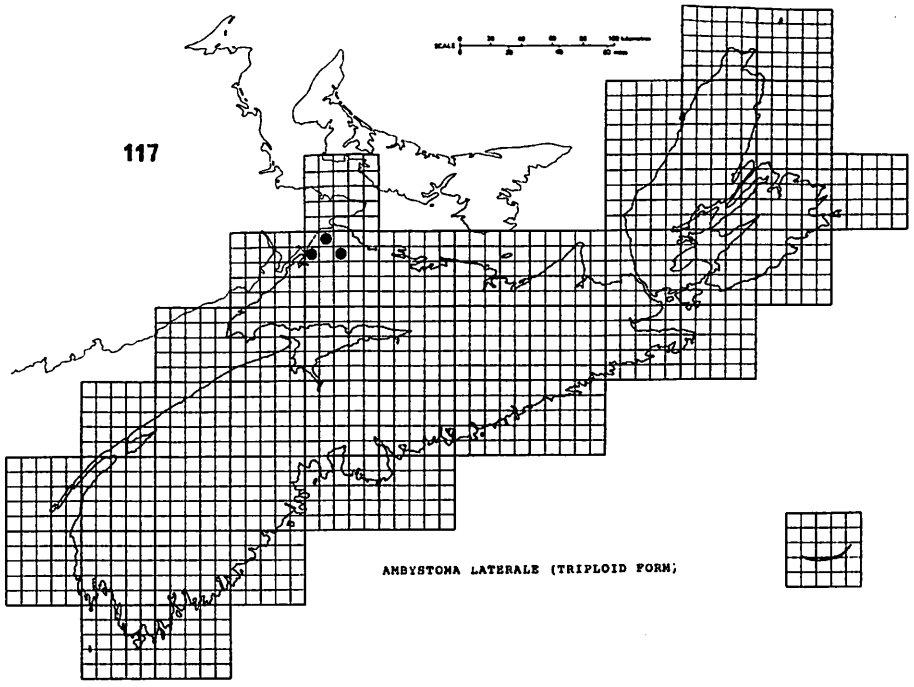
SEMOTILUS CORPORALIS

116



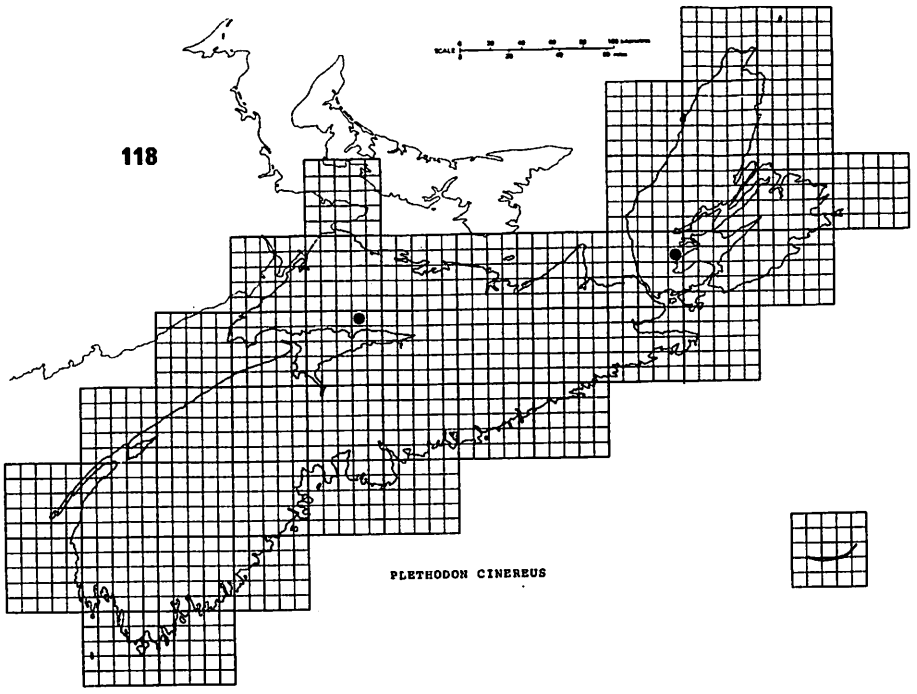
CULAEA INCONSTANS

117



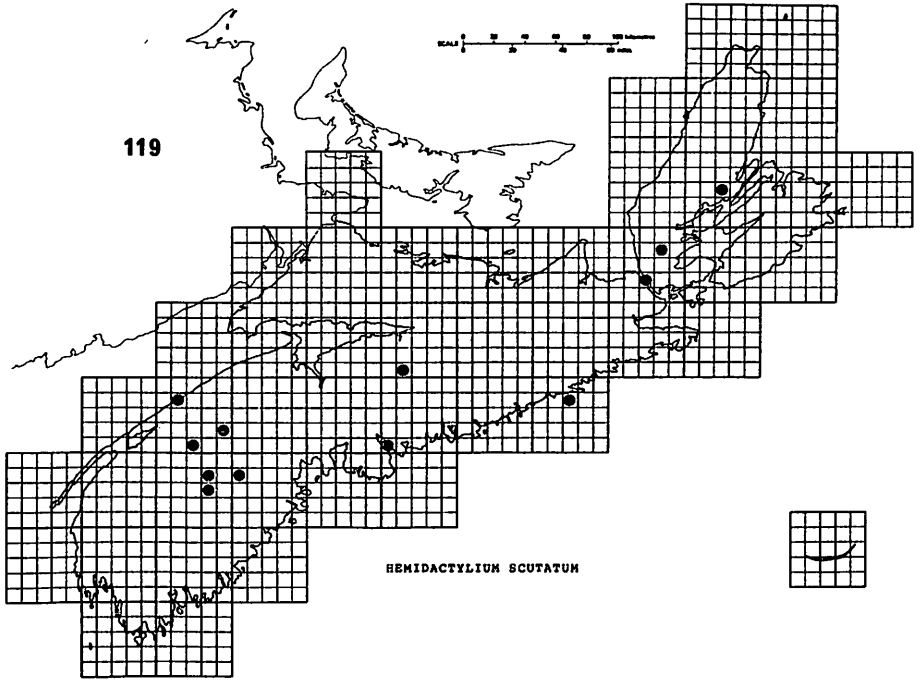
AMBYSTOMA LATERALE (TRIPLOID FORM)

118



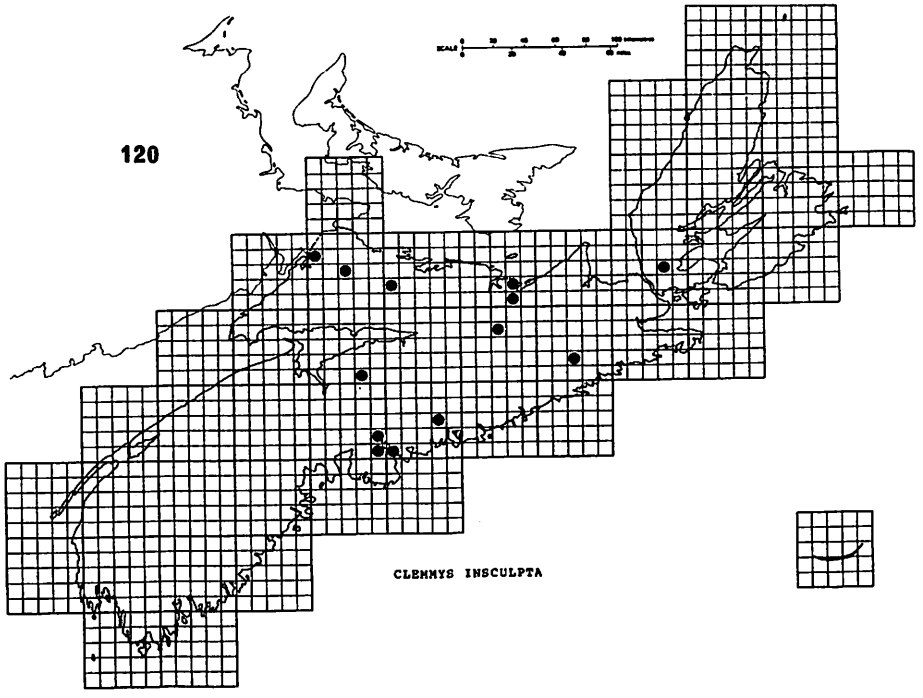
PLETHODON CINEREUS

119



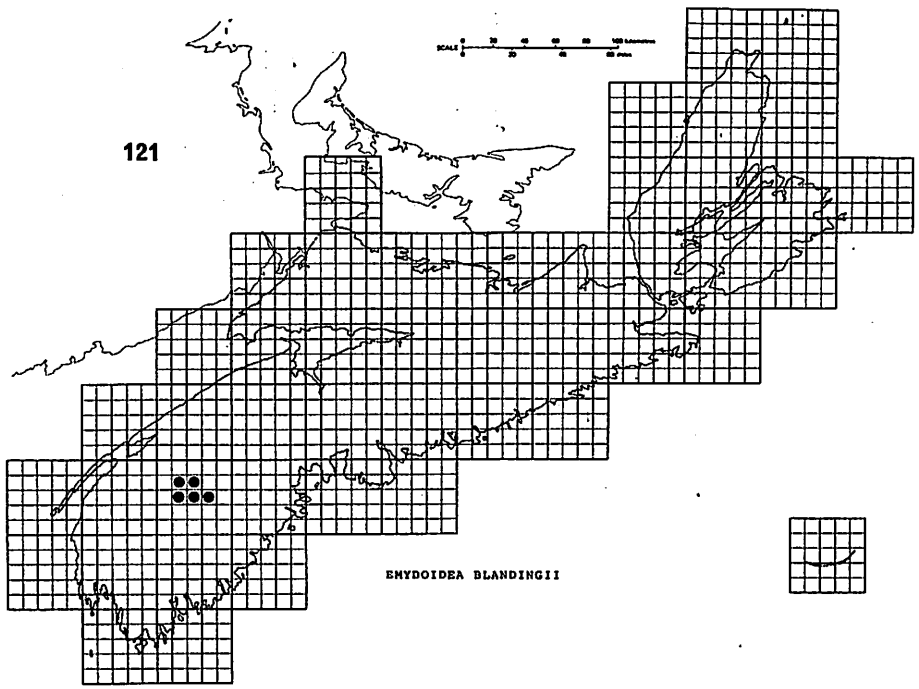
HEMIDACTYLIUM SCUTATUM

120



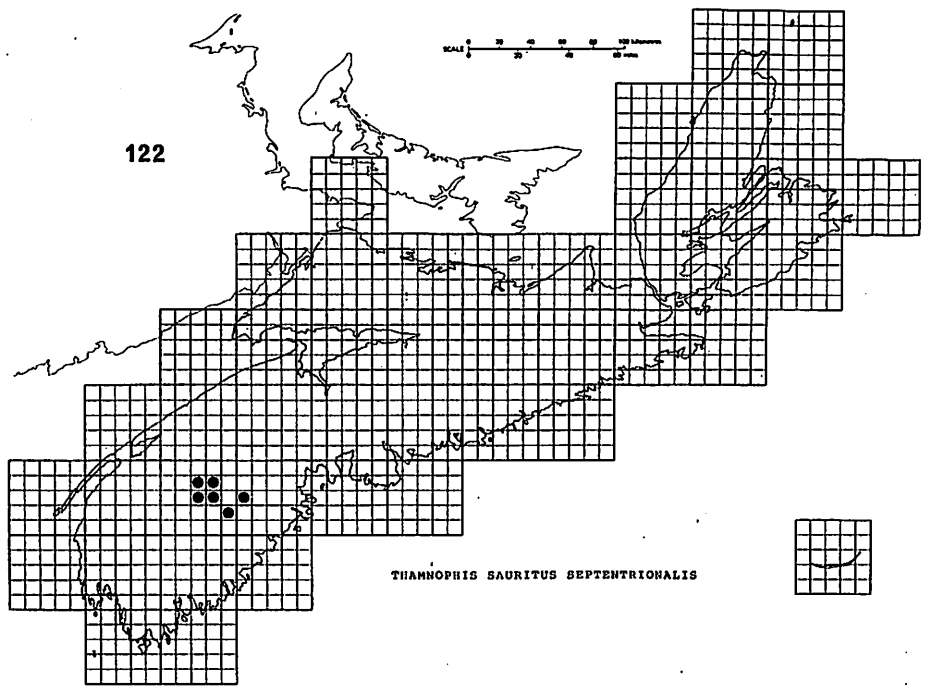
CLEMMYS INSCULPTA

121



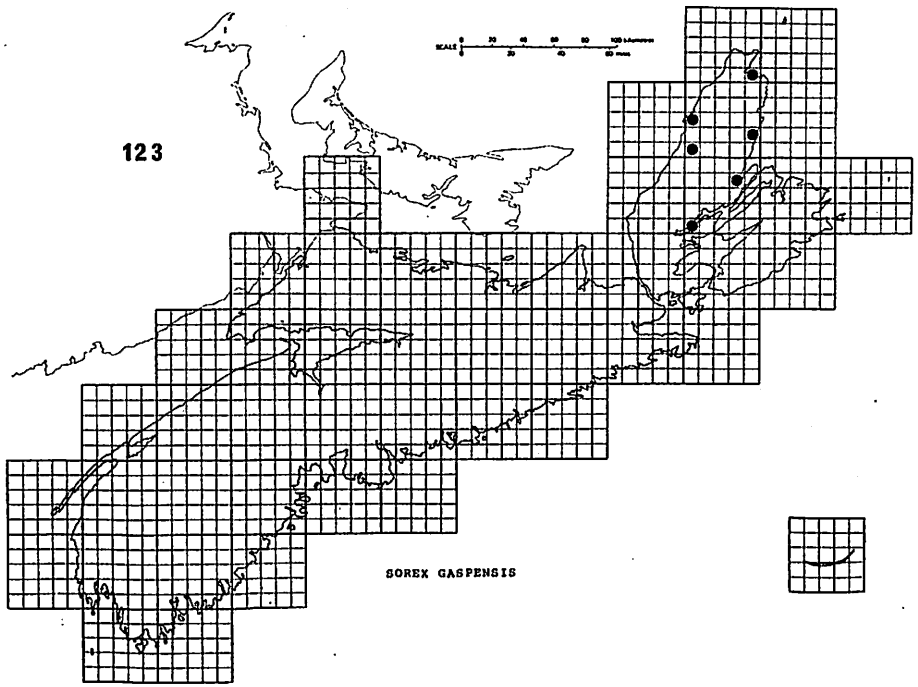
EMYDOIDEA BLANDINGII

122



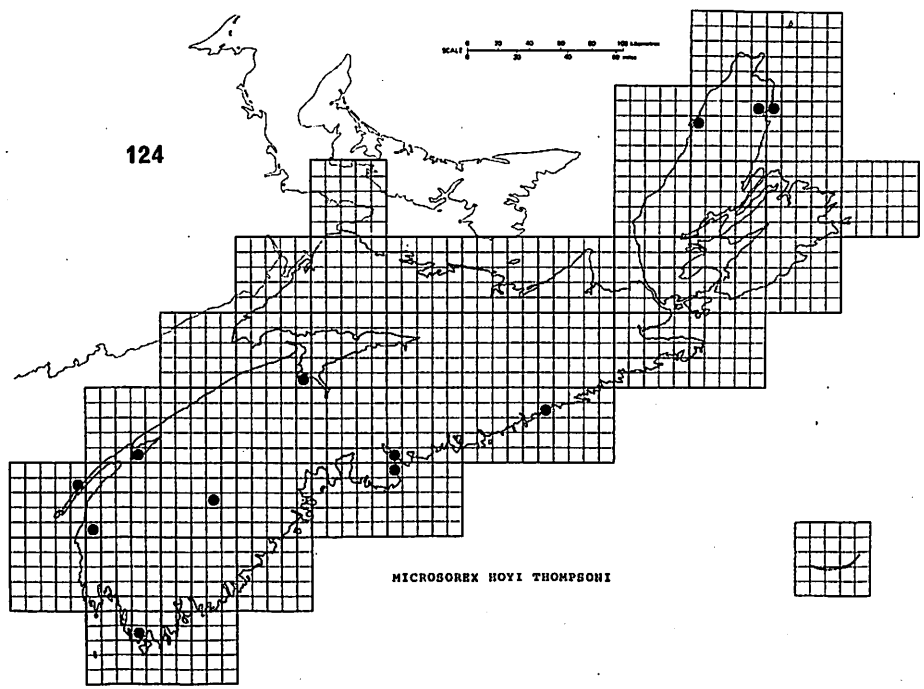
THAMNOPHIS SAURITUS SEPTENTRIONALIS

123



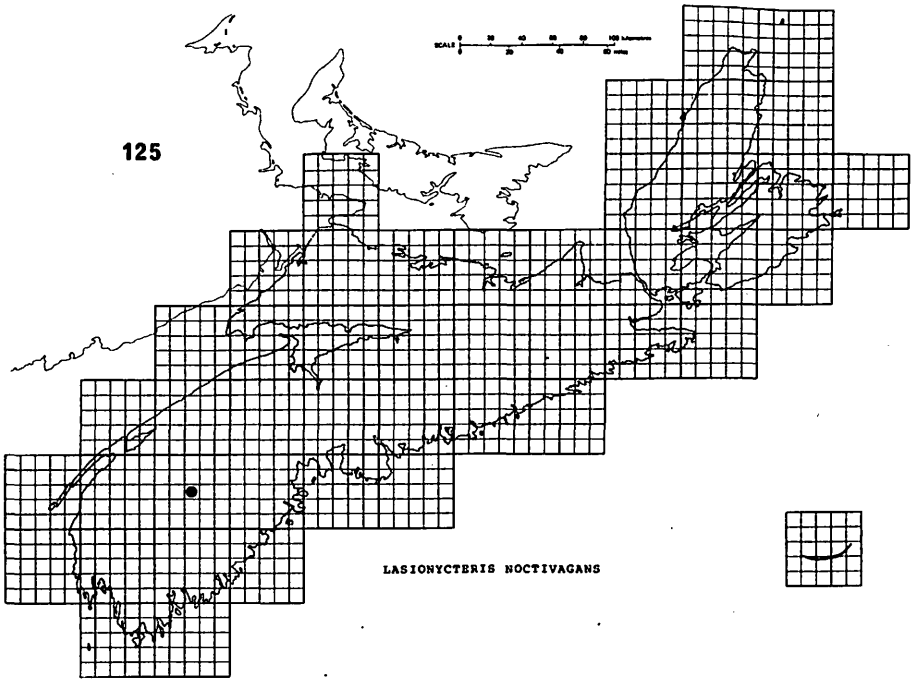
SOREX GASPENSIS

124



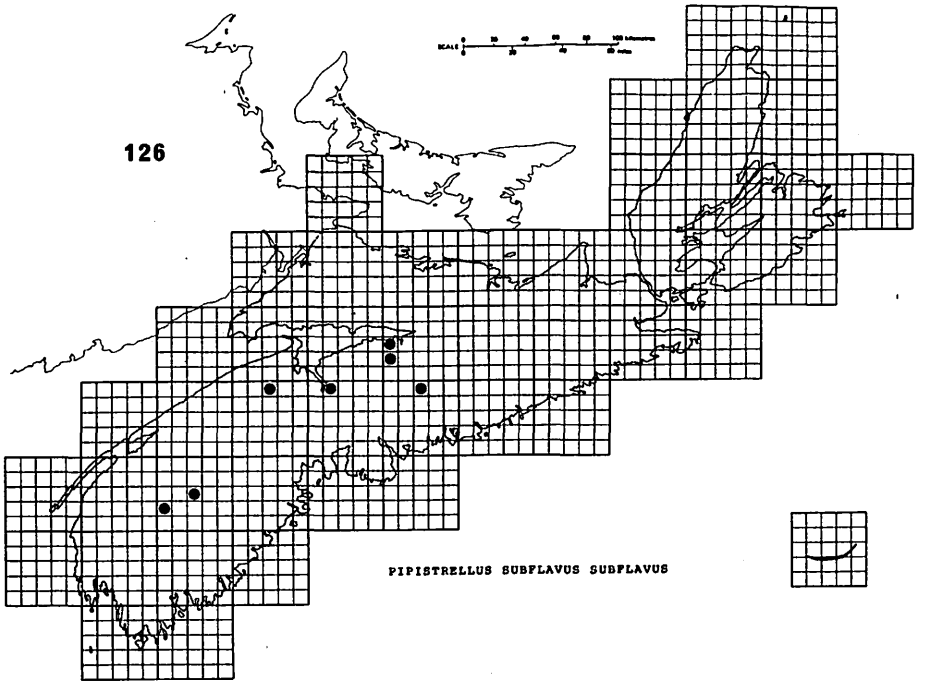
MICROSOREX HOYI THOMPSONI

125



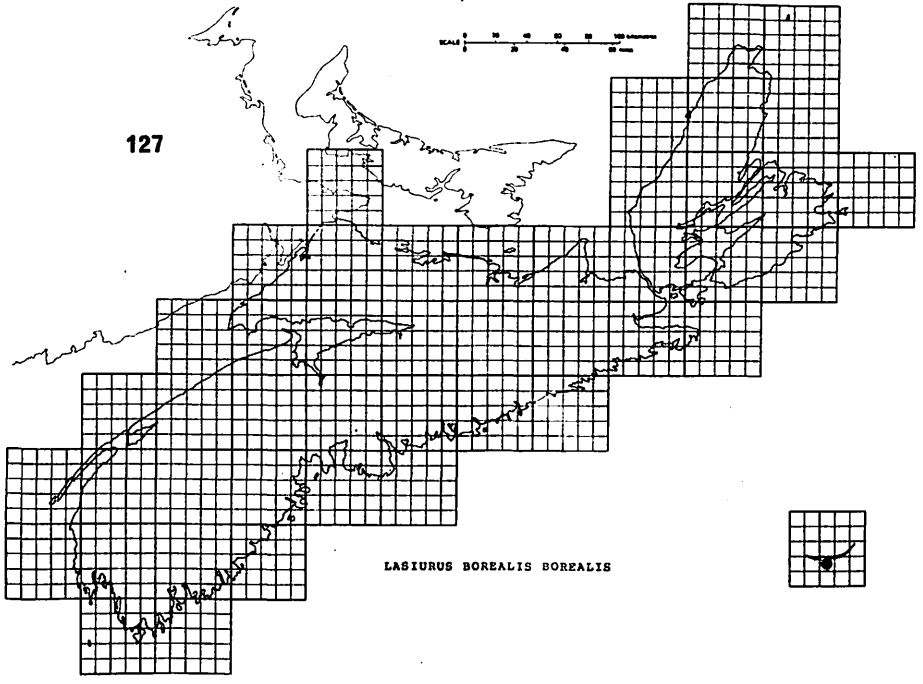
LASIONYCTERIS NOCTIVAGANS

126



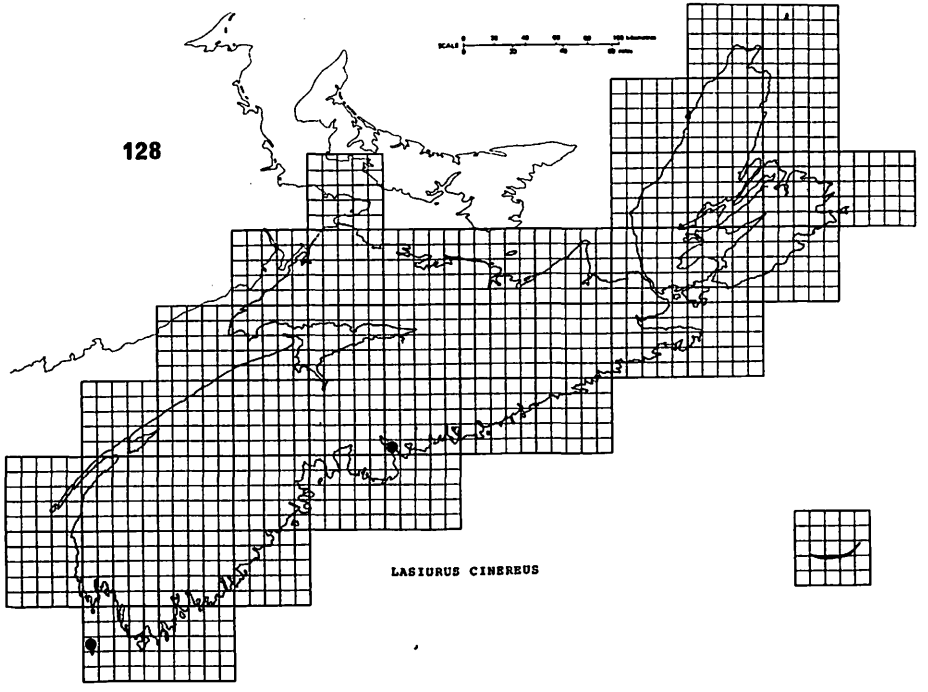
PIPISTRELLUS SUBFLAVUS SUBFLAVUS

127



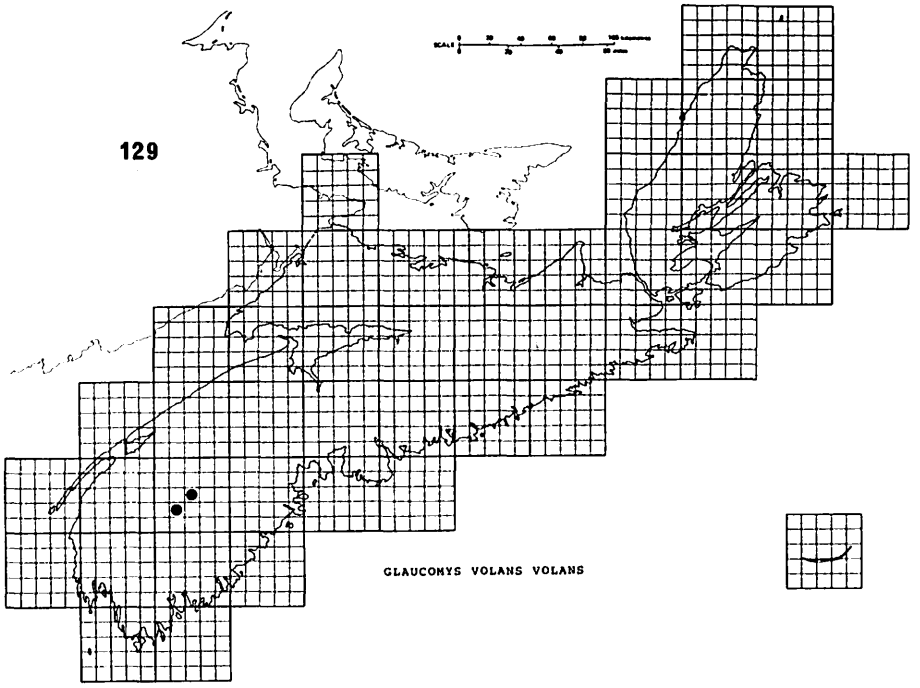
LASIURUS BOREALIS BOREALIS

128



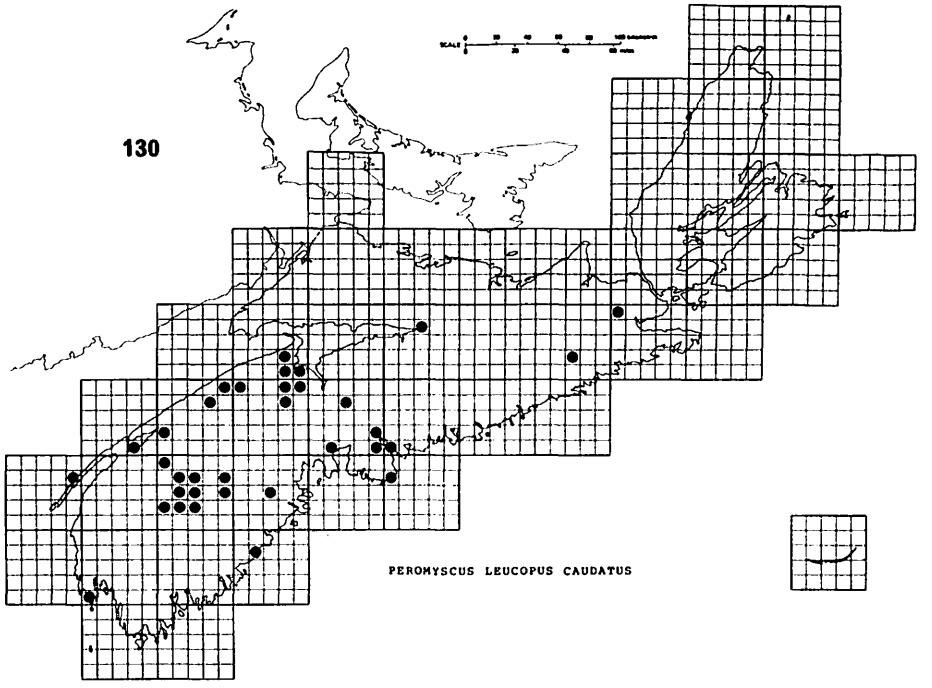
LASIURUS CINEREUS

129



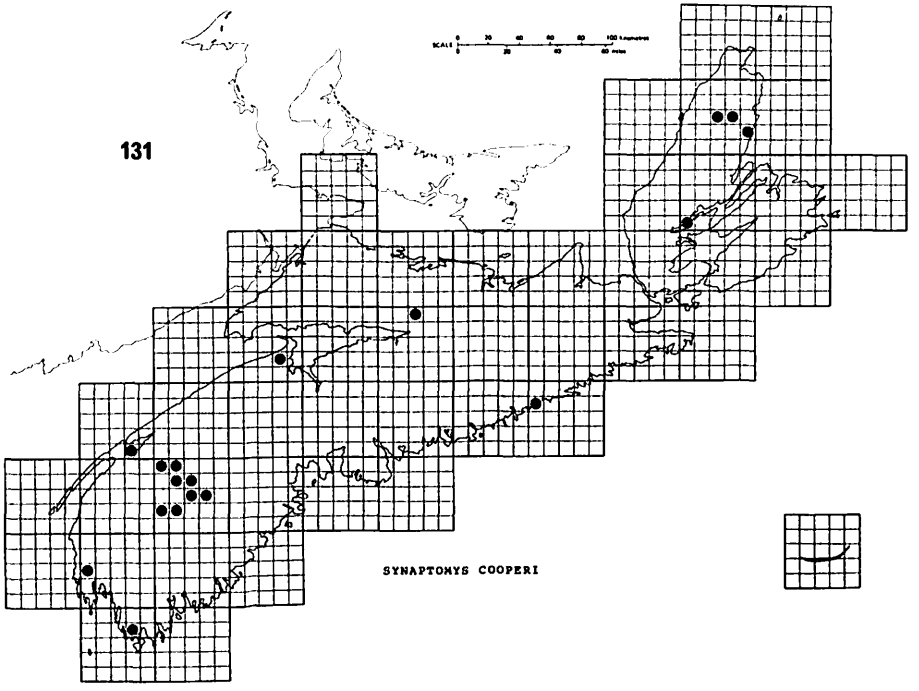
GLAUCOMYS VOLANS VOLANS

130



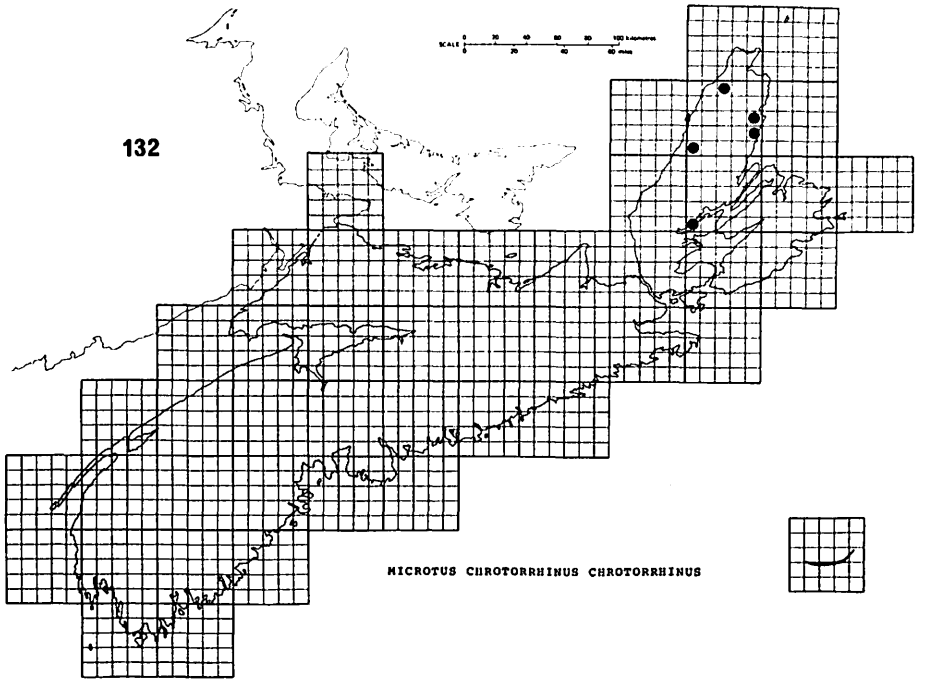
PEROMYSCUS LEUCOPUS CAUDATUS

131



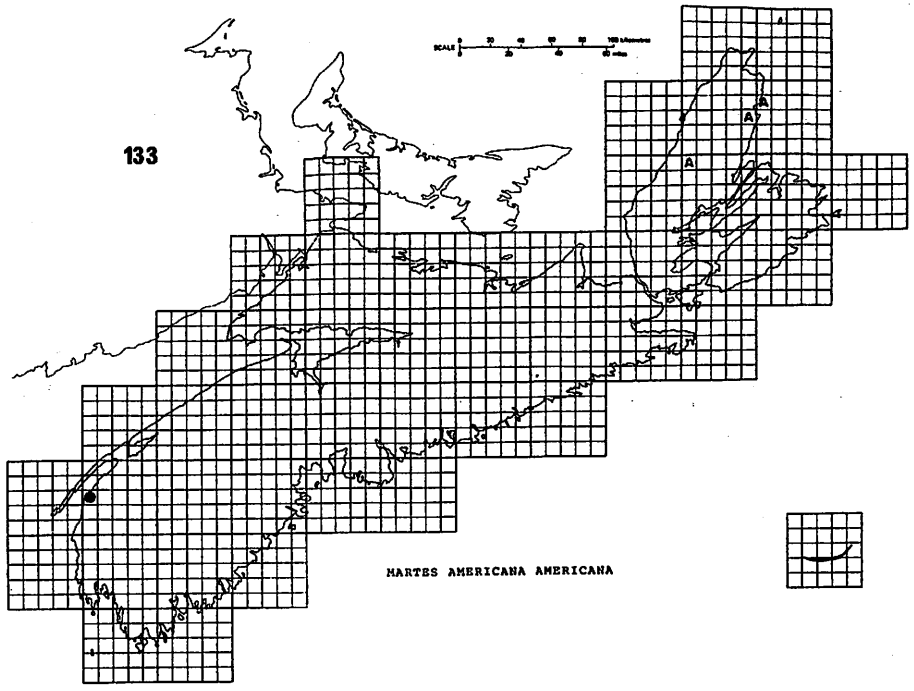
SYNAPTOMYS COOPERI

132



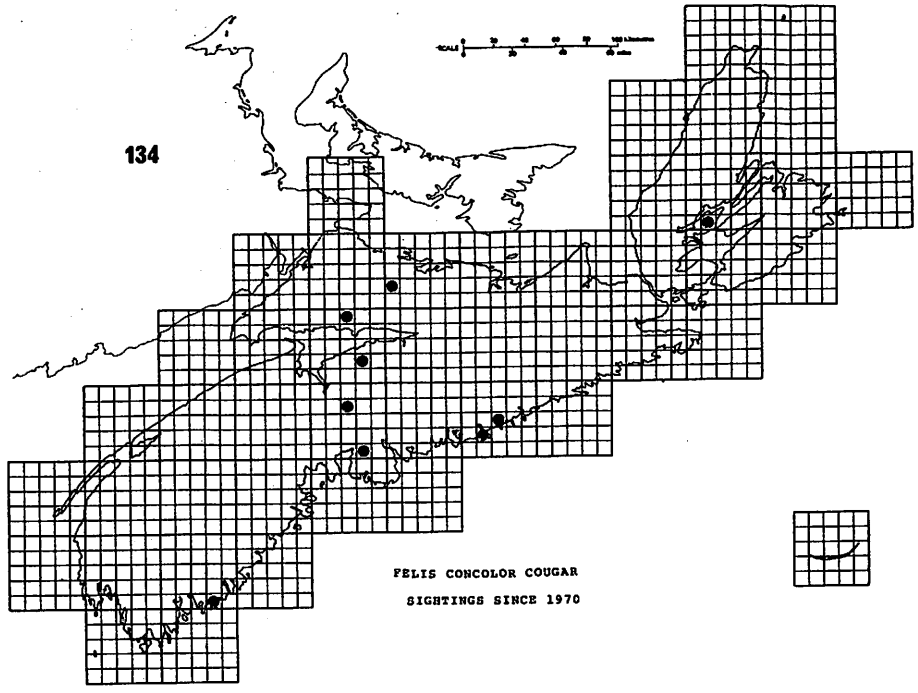
MICROTUS CHROTORRHINUS CHROTORRHINUS

133



MARTES AMERICANA AMERICANA

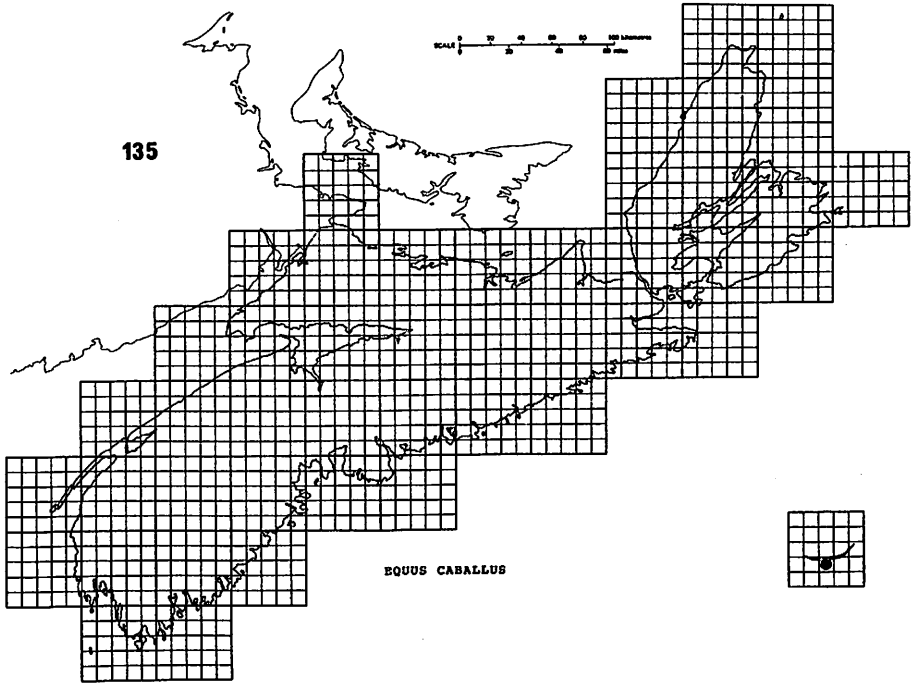
134



FELIS CONCOLOR COUGAR

SIGHTINGS SINCE 1970

135



EQUUS CABALLUS