

A LIST OF THE ANTS OF MANITOBA

George C. Wheeler and Jeanette Wheeler
3358 NE 58th Avenue, Silver Springs, FL 32688, U.S.A.

Terry D. Galloway
Department of Entomology, University of Manitoba, Winnipeg
Manitoba, Canada R3T 2N2

Gordon L. Ayre
4875 Maxine Lane, Victoria, British Columbia, Canada V8Y 2J3

ABSTRACT

This list of 52 species of ants collected in Manitoba is based on 505 records from 92 localities. The list consists of 10 species in 3 genera of Myrmicinae, 3 in 2 genera of Dolichoderinae and 39 in 5 genera of Formicinae. Of the Formicinae 23 species are in the genus Formica. A map is provided to aid in finding the localities. The biogeography of the Province is discussed briefly.

INTRODUCTION

The ant fauna of Manitoba has never been catalogued, despite treatments of nearby assemblages (e.g. North Dakota by Wheeler and Wheeler 1963; central and southern Alberta by Sharplin 1966). For the students of Manitoba ants Gregg's 1973 article is of limited application. In the first place it was based on "an ecological framework provided by Merriam's life zones," a system long since replaced by the Biome System. He collected at four localities in Manitoba but did not name them. The most important part of the article was the account of his trip to Churchill. He did name the four ant species collected there and gave good descriptions and excellent photographs of the tundra. Ayre (1977) published a short note on nine introduced ant species in Manitoba, collected in a Winnipeg apartment (1 species), and in the tropical house at Assiniboine Park Zoo in Winnipeg (8 species). He speculated that these species were unlikely to become a serious problem in Manitoba, and they are not included in our subsequent treatment. In 1978, Ayre published "Ants", in which he gave an account of ants in general and Manitoba ants in particular. It is illustrated by photographs of four named species, but only one species (Formica obscuripes Forel) was named in the text. The most extensive published account specifically on Manitoba ants is that of O'Neill and Robinson (1977) in which they listed 27 species of ants associated with aphids in the province. Bradley and Hinks (1968) also examined ant-aphid associations and recorded 19 species of ants present in Sandilands Provincial Forest.

Manitoba is a biogeographically diverse province, and has long been of special interest to us (GCW and JW). When we lived in North Dakota, we made two trips of myrmecological interest into Manitoba, 19-22 July 1957 and 26 July 1962. In our collection of Nearctic ants we have 75 records of 27 species for the province. Both Ayre and Galloway began collecting ants in Manitoba in the 1970's, and it was by chance that we had the opportunity to combine our efforts and produce the following checklist of Manitoba ants.

The Province of Manitoba

CLIMATE: Manitoba's southern and northern boundaries are on the 49° and 60° parallels respectively. This places it in the higher-middle latitudes, which are characterized by great seasonal changes in temperature. At 60°, the solar radiation reaching the earth's outer atmosphere in June is about 20 times that in December. "This is the main reason for Churchill's large annual range of 40 C° based on a July average of 12.6°C and a January average of -27.4°C" (Shaykewich and Weir 1977). Another reason is that the province's midcontinental longitude removes it from oceanic mitigation. To be sure, Hudson Bay is a large body of water, but because of its lee position it has a minimal effect. Furthermore it is frozen for nine months of the year and its water is very cold even in summer (Shaykewich and Weir 1977).

ELEVATION: The northeastern two-thirds of Manitoba is lowland, *i.e.*, below 450 m (1500'); the remainder is upland. The lowland is a land of many lakes and rivers and much of it is poorly drained and covered with marsh and bog (muskeg). Along the western and southwestern borders of the province there are five elevated areas: Porcupine Mountain, Duck Mountain (reaching the provincial maximum elevation of 831 m [2726'] at Mount Baldy), Riding Mountain, Turtle Mountain and Pembina Mountain (Shaykewich and Weir 1977).

BIOMES: According to Odum's map (1971) three biomes are represented in the province: grassland, coniferous forest and tundra. In "A Naturalist's Guide to the Americas" Connell (1926) separated the vegetation of the province into: (1) The Prairie; (2) The Transition Zone of grassland and deciduous forest (poplar-savanna); (3) The Northern Coniferous Forest; (4) Tundra. Danks and Footitt (1989) mapped four major vegetation zones: prairie, parkland, boreal forest and subarctic. The three systems are really the same, but they differ in nomenclature. The Grassland Biome (= prairie) occupies a very small area forming the southwestern corner of the province. The grasses are tall and deep-rooted mesophytes. "Typical flood plain forests of ash, Manitoba maple, poplar and willow occur along the stream courses. Alkali sloughs are frequent" (Connell 1926). Northeast of the Grassland Biome lies the Ecotone (= transition zone = poplar-savanna = parkland). This is a narrow zone 80 to 160

kilometers (51 to 100 miles) wide. The vegetation is principally mixed grasses with scattered areas of aspen and balsam poplar trees. "This area together with the prairies is the agricultural section of the Province and contains the bulk of the population" (Connell 1926). Next to the Ecotone is the Northern Coniferous Forest Biome, which occupies most of the provincial area. The climax trees are black spruce (*Picea mariana* (Mill.) BSP), white spruce (*Picea glauca* (Moench) Voss) and balsam fir (*Abies balsamea* (L.) Mill.). The tundra is limited to a zone about 280 kilometers (175 miles) wide lying along Hudson Bay and across the northern boundary of the Province. That portion (perhaps a third the width) bordering the Bay and the boundary is described by Danks and Footitt (1989) as continuous permafrost and the remainder as discontinuous permafrost. North of Latitude 55°, there are few towns or highways but many lakes. North of 57° there are no towns, except on the railroad going north to Churchill, and no highways; lakes are extremely numerous.

Gregg (1972: 1084) gave a good description of the tundra and told where ants could be collected near Churchill. "It appeared that rocks of small to moderate size were the most productive, and this can be attributed probably to the greater speed at which they are heated during the daylight hours. Larger stones and boulders lie deeper in the soil and remain permanently cold underneath. Below the ridge, where land levels off and the general topography is very flat, muskeg is present and large areas are covered with melt water. Such locations are probably the least attractive to ants. None were found there. Away from the muskeg and in the areas where ants were collected, the vegetation is in general described as tundra heath. The stature of the plants is, of course, very low, in keeping with the usual nature of tundra vegetation. Most species are only a few inches high, but others may grow a foot or more, and several of the dwarfed and shrubby species may reach 2 to 2½ ft [0.6-0.75 meters]. The floristic composition includes arctic dryad, arctic blueberry, crowberry, Labrador tea, arctic sunflower, arctic daisy, arctic laurel, arctic cotton, arctic birch, several arctic willows, bearberry, grasses, sedges, mosses and crustose, foliose, and fruticose lichens."

Sources of Records in Species List

A = G.L. Ayre coll., Agriculture Canada Research Station, 195 Dafoe Rd., Winnipeg, MB R3T 2M9. The assistance of Frank Matheson is gratefully acknowledged.

BH = Bradley and Hinks (1968)

F = A. Francoeur (1973).

G = T.D. Galloway coll., J. B. Wallis Museum of Entomology, Dept. of Entomology, University of Manitoba, Winnipeg, MB R3T 2N2.

H = C.G. Hewitt coll., Dominion Entomologist, 1885-1920.

N = Canadian National Collection, Biosystematics Research Centre Agriculture Canada, Ottawa, ON K1A 0C6. The assistance of J. Huber is gratefully acknowledged.

OR = M.C.A. O'Neill and A.G. Robinson (1977), J. B. Wallis Museum of Entomology, University of Manitoba, Winnipeg, MB R3T 2N2.

W = G.C. Wheeler and J. Wheeler coll., 3358 NE 58th Ave., Silver Springs, FL 32688.

Plan of the List

The sequence of the subfamilies and genera is that of the Wheelers (1986). The species of each genus are arranged alphabetically. Under each species all the Manitoba localities (=records) are also listed alphabetically. After each locality the name of a collector (or collectors), collection or published source is indicated by an abbreviation in parentheses. To aid in finding the localities we have provided a map of the Province (Fig. 1). A grid is superimposed on this outline. With the aid of the legend one may locate approximately any record in the list. The horizontal lines of the map are close to parallels of latitude. The vertical lines are entirely arbitrary. The only localities north of 57° are in or near Churchill, which is labeled.

Keys for the identification of Manitoba ants are provided by Wheeler and Wheeler (1963;1977).

SUBFAMILY MYRMICINAE

Myrmica americana Weber

Aweme (N), Glenlea (A), Rennie (N), Sandilands Provincial Forest (BH), Spruce Woods Provincial Park (A), Stockton (G).

Myrmica brevinodis Emery

(= incompleta Provancher)

Baldy Mountain (A), Brokenhead River (E. of Sandilands) (G), Churchill (G, Gregg 1972), Crandall (G), Dauphin (N), East Blue Lake (G), Grahamdale (G), Lake Katherine (A), near Portage la Prairie (G), Pine Falls (N), Riding Mountain National Park (W).

Myrmica brevispinosa Emery

Baldur (A), Beaconia (OR), Binscarth (A), Birds Hill Provincial Park (OR), Darwin (N), East Blue Lake (G), Garson (W), Glenlea (G), Lake Katherine (A), Lake Minnewasta (N), Laurie Lake (A), Morden (OR), Pine Falls (N), Portage la Prairie (G, OR), Riding Mountain National Park (W), Riverton (N), Sandilands Provincial Forest (G), Spruce Woods Provincial Park (A, G), Telford (N), Winnipeg (A, G).

Myrmica emeryana Forel

Birds Hill (OR), Birds Hill Provincial Park (OR), Cooks Creek (OR), East Blue Lake (G), Glenlea (A), Lake Katherine (A), Pinawa (A), Riding Mountain National Park (W), Rosa (A), St. Malo (A), Sandilands Provincial Forest (BH, OR), Spruce Woods Provincial Forest (OR, W), Spruce Woods Provincial Park (A, G), Telford (N), Whiteshell Provincial Park (OR).

Myrmica fracticornis Emery

Glenlea (A), Lake Katherine (A), La Salle (G), Morden (G), Pine Falls (N), Portage la Prairie (G), Rennie (N), Richer (A), Sandilands Provincial Forest (BH), Sanford (G), Telford (N).

Myrmica monticola Wheeler

Spruce Woods Provincial Forest (W).

Solenopsis molesta (Say)

Birds Hill Provincial Park (OR), Richer (A, G), Rosa (A), Spruce Woods Provincial Park (A).

Leptothorax ambiguus Emery

St. Malo (A).

Leptothorax hirticornis Emery

(=Formicoxenus hirticornis of Francoeur and Loiselle 1985)
Richer (A).

Leptothorax muscorum (Nylander)

Carberry (N), Churchill (Gregg 1972), Glenlea (A), Lake Katherine (A, G), Morden (G), Richer (A), Riding Mountain National Park (W), Rosa (A), Sandilands Provincial Forest, Spruce Woods Provincial Park (A), Whiteshell Provincial Park (OR).

SUBFAMILY DOLICHODERINAE

Dolichoderus plagiatus (Mayr)

Birds Hill Provincial Park (OR), Pinawa (OR), Rathwell (OR), Spruce Woods Provincial Forest (W).

Dolichoderus taschenbergi (Mayr)

Aweme (N, OR), Carberry (OR), 2 mi. N. of Forrest (N), Glenlea (A), Richer (A), St. Malo (A), Sandilands (A), Sandilands Provincial Forest (BH, OR), Spruce Woods Provincial Forest (G), Telford (N), Treesbank (H, N).

Tapinoma sessile (Say)

Agassiz Provincial Forest (OR), Aweme (N), Baldur (A),

Binscarth (A), Birds Hill Provincial Park (G), East Blue Lake (G), Pelican Lake (A), Pinawa (A), Portage la Prairie (G), Richer (A, G, OR), Rosa (A), St. Malo (A), Sandilands (G), Sandilands Provincial Forest (OR), Spruce Woods Provincial Forest (W), Spruce Woods Provincial Park (A), Whiteshell Provincial Park (OR), Winnipeg (N).

SUBFAMILY FORMICINAE

Acanthomyops coloradensis (Wheeler)

Richer (A), Rosa (A), Spruce Woods Provincial Forest (W).

Acanthomyops latipes (Walsh)

Sandilands Provincial Forest (BH), Spruce Woods Provincial Forest (G, W), Spruce Woods Provincial Park (A).

Acanthomyops occidentalis (Wheeler)

Spruce Woods Provincial Forest (W).

Acanthomyops subglaber (Emery)

Garson (W), Giroux (A), St. Malo (A), Spruce Woods Provincial Park (A).

Formica altipetens Wheeler

La Salle (G).

Formica argentea Wheeler

Garson (W), Glenlea (A), Grahamdale (G), Hecla Island (A), Lake Katherine (A), Northwest Angle Provincial Forest, Richer (A), Rosa (A), Sandilands (G), Spruce Woods Provincial Forest (W), Spruce Woods Provincial Park (A), Vita (F), Whirlpool Lake (A).

Formica bradleyi Wheeler

Aweme (Halverson et al. 1976, N), Carberry (G, N), Onah (G), Portage la Prairie (G), Spruce Woods Provincial Forest (G), Spruce Woods Provincial Park (A, G).

Formica dakotensis Emery

Hartney (A), Rosa (A), St. Malo (A).

Formica exsectoides Forel

Spruce Woods Provincial Forest (W), Spruce Woods Provincial Park (A).

Formica fossiceps Buren

Pinawa (A), Rennie (N), Sandilands Provincial Forest (BH).

Formica fusca Linnaeus

Agassiz Provincial Forest (OR), Aweme (OR), Birds Hill

Provincial Park (OR), Cedar Lake (F), Cormorant Lake (F), Holland (A), La Salle (G), Northwest Angle Provincial Forest (OR), Pelican Lake (A), Pinawa (OR), Pine Falls (N), Richer (OR), Riding Mountain National Park (W), Rosa (A), Sandilands (G), Sandilands Provincial Forest (BH, F, OR), Seven Sisters (G), Spruce Woods Provincial Forest (W), Twin Lakes near Churchill (G), Whiteshell Provincial Park (OR).

Formica hewitti Wheeler

Birds Hill Provincial Park (OR), Churchill (N), Hecla Island (OR), Northwest Angle Provincial Forest (OR), Sandilands Provincial Forest (F, OR).

Formica lasioides Emery

Birds Hill Provincial Park (N), Glenlea (A), Rathwell (OR), Rennie (OR), Riding Mountain National Park (W), Pinawa (OR), Sandilands Provincial Forest (BH, OR), Stony Mountain (OR), Whitemouth Lake (G, OR).

Formica limata Wheeler

Sandilands Provincial Forest (BH).

Formica montana Emery

(= canadensis Francoeur)

Aweme (F), Winnipeg (F, OR).

Formica neogagates Emery

Aweme (G), Birds Hill Provincial Park (N), Portage la Prairie (G), Spruce Woods Provincial Park (A).

Formica neorufibarbis Emery

Aweme (F), Cedar Lake (F), Churchill (F, OR, Gregg 1972, N, OR), Churchill (Rocket Range Road, Mile 3-4) (G), Cormorant Lake (F, N), Fort Churchill (F), Gillam (F), Pine Falls (F, N), Riding Mountain National Park (W), Rennie (F), Riverton (N), Seddons Corner (F), Telford (F, N), Twin Lakes, near Churchill (G).

Formica obscuripes Forel

Aweme (G), Birds Hill Provincial Park (OR), Carberry (OR), Clear Lake (A) Giroux (A), Lake Minnewasta (OR), Langruth (G), Lewis (OR), Miami (A), Morden (OR), Portage la Prairie (OR), Richer (A), Riding Mountain National Park (A), St. Malo (A), Sandilands Provincial Forest (BH, OR), Spruce Woods Provincial Park (A), Stony Mountain (OR), Treesbank (H, N).

Formica obscuriventris Mayr

Agassiz Provincial Forest (OR), Lake Minnewasta (OR), Morden (OR), Sandilands Provincial Forest (BH), Spruce Woods Provincial Park (A), Winnipeg (N).

Formica oreas Wheeler

Agassiz Provincial Forest (OR), Aweme (N, OR), Birds Hill (OR), Birds Hill Provincial Park (OR), Carberry (OR), Garson (W), Hartney (A), Lake Minnewasta (OR), Pelican Lake (A), Pleasant Valley (A), Riding Mountain National Park (W), Rosa (A), St. Malo (A), Sandilands (G), Sandilands Provincial Forest (BH, OR), Spruce Woods Provincial Forest (OR, W), Spruce Woods Provincial Park (A), Stockton (A), Treesbank (H, N), 5.7 km NW of Treesbank (G), Virden (G), Whitemouth Lake (OR).

Formica pergandei Emery

Sandilands Provincial Forest (BH).

Formica puberula Emery

Riding Mountain National Park (W), St. Malo (A), Sandilands Provincial Forest (BH), Spruce Woods Provincial Forest (W).

Formica spatulata Buren

Rathwell (OR), St. Malo (A), Spruce Woods Provincial Park (A).

Formica subintegra Emery

Gillam (N).

Formica subnuda Mayr

Baldur (A), Baldy Mountain (A), Binscarth (A), Birds Hill (OR), Birds Hill Provincial Park (OR), Carberry (OR), East Blue Lake (G), Fortier (OR), Grahamdale (G), Grand Rapids (G), Hartney (A), Hecla Island (OR), Lake Katherine (A), La Salle (G), Laurie Lake (A), Northwest Angle Provincial Forest (OR), Pelican Lake (A), Pinawa (A, OR), Rennie (OR), Richer (A, OR), Riding Mountain National Park (W), Rosa (A), Rosser (G), St. Malo (A, N), Sandilands Provincial Forest (BH, OR), slave raid, 6 km W of Portage la Prairie (G), Spruce Woods Provincial Forest (OR, W), Spruce Woods Provincial Park (A), Whirlpool Lake (A), Whiteshell Provincial Park (OR), Winnipeg (G).

Formica subsericea Say

(= glacialis Wheeler = podzolica Francoeur)

Aweme (F, OR), Baldur (A), Birds Hill (G, OR), Birds Hill Provincial Park (OR), Carberry (OR, W), Dauphin Lake (F), East Blue Lake (G), Glenlea (A), Goose Creek (G), Hartney (F), International Peace Garden (G), Lake Minnewasta (OR), Lewis (OR), Mafeking (F), Morden (OR), Northwest Angle Provincial Park (OR), Paint Lake Provincial Park (G), Pinawa (OR), Rennie (OR), Richer (A, OR), Riding Mountain National Park (A, W), St. Malo (A), Sandilands Provincial Forest (F, OR), slave raid, 6 km W of Portage la Prairie (G), Spruce Woods (F), Spruce Woods Provincial Forest (W), Spruce Woods Provincial Park (A), Stony Mountain (OR), Swan River (F), Telford (F), Thompson (A, OR), Whitemouth Lake (OR), Whiteshell

Provincial Park (OR), Winnipeg (G, OR).

Formica ulkei Emery

Cooks Creek (OR), Lake Katherine (A), La Salle (G), Portage la Prairie (G), Riding Mountain National Park (W), 5 km E. Seddons Corner (G), Telford (N), Winnipeg (M).

Lasius alienus (Foerster)

Agassiz Provincial Forest (OR), Birds Hill (OR), Carberry (OR), Morden (OR), Pinawa (OR), Portage la Prairie (OR), Rennie (OR), Sandilands (G), Sandilands Provincial Forest (BH, OR), Spruce Woods Provincial Forest (W), Spruce Woods Provincial Park (A), Whiteshell Provincial Park (OR).

Lasius crypticus Wilson

St. Malo (A).

Lasius flavus (Fabricius)

Garson (W), Spruce Woods Provincial Forest (W).

Lasius neoniger Emery

Hartney (A), Portage la Prairie (G), Richer (A), Sandilands Provincial Forest (BH, OR), Spruce Woods Provincial Park (A), Telford (N).

Lasius sitkaensis Pergande

(= pallitarsis (Provancher))

Aweme (N), Fortier (OR), Glenlea (A), near Portage la Prairie (G), Riding Mountain National Park (W), St. Agathe (A, G), St. Malo (A), St. Norbert (A, G), Sandilands Provincial Forest (OR), Spruce Woods Provincial Forest (OR), Spruce Woods Provincial Park (A), Stony Mountain (OR), Treesbank (H, N), Whiteshell Provincial Park (OR), Winnipeg (A, G, N, OR).

Lasius subumbratus Viereck

Aweme (N), Spruce Woods Provincial Forest (OR).

Lasius umbratus (Nylander)

Glenlea (A), Hartney (A), Spruce Woods Provincial Park (A).

Polyergus breviceps Emery

Riding Mountain National Park (W), Spruce Woods Provincial Forest (W).

Camponotus herculeanus (Linnaeus)

Churchill (Gregg 1972, N, OR), Darwin (N), Fort Churchill (HBR mile 445) (N), Gillam (N), Goose Creek (G), Hecla Island (A), Lake Katherine (A), Morden (OR), Northwest Angle Provincial Forest (OR), Pikwitonei (N), Pine Falls (N), Pinawa (A, G, OR), Rennie (N, OR),

Riding Mountain National Park (W), Riverton (N), Sandilands (G), Sandilands Provincial Forest (BH), Seddons Corner (N), Seven Sisters (G), Spruce Woods Provincial Forest (OR, W), Teulon (N), Winnipeg (A).

Camponotus nearcticus Emery

Darwin (N), Dauphin (N), Riverton (N), Sandilands Provincial Forest (OR), Seddons Corner (N), Winnipeg (M).

Camponotus noveboracensis (Fitch)

Agassiz Provincial Forest (OR), Aweme (N, OR), Birds Hill Provincial Park (OR), Camp Morton (OR), Dacotah (OR), Darwin (N), Garson (W), Glenlea (A), Hargrave (A), Hecla Island (OR), Hnausa (OR), LaBarrière Park, Winnipeg (OR), Lewis (OR), Morden (OR), Northwest Angle Provincial Forest (OR), Pinawa (A, OR), Portage la Prairie (OR), Rennie (N, OR), Riding Mountain National Park (W), Riverton (N), St. Malo (A), Sandilands Provincial Forest (BH, OR), Spruce Woods Provincial Forest (W), Spruce Woods Provincial Park (A), Stony Mountain (OR), Telford (N), Whitemouth Lake (A, G, OR), Whiteshell Provincial Park (OR), Winnipeg (A, OR).

Camponotus vicinus Mayr

Pinawa (A).

Biogeography of Manitoba ants

Latitudinal diversity is an interesting aspect of biogeography. This is manifest in most taxa by the decreasing gradient in number of species away from the equator. We have taken as an example the number of species of Formicidae in Costa Rica and the states and provinces touching the 100th Meridian. (See Table I.) Although the westernmost edge of Costa Rica is only 85°, we chose it because we could make a satisfactory list of species from Kempf's 1972 catalogue. Because Texas is so large we have eliminated the species from the extreme west, i.e. west of 103°.

Manitoba occupies a unique position: it is "at the end of the line". Even within the province there is a gradient: the 52 species are concentrated in the southern half; north of that there are only four species at Churchill, and after that, no records in Manitoba.

Table 1. Number of species recorded in subfamilies of Formicidae.

SUBFAMILY	Costa Rica	Texas	Okla.	N. Dak.	Man.
Ponerinae	66	14	7	1	-
Cerapachyinae	1	1	-	-	-
Dorylinae	29	16	8	-	-
Pseudomyrmecinae	24	-	-	-	-
Myrmicinae	124	94	38	22	10
Dolichoderinae	32	9	7	5	3
Formicinae	53	47	28	58	39
TOTAL	329	181	88	86	52

If the family is broken down into its subfamilies, there is a tendency for the Formicinae, which is second in number to switch with the Myrmicinae which ranks first in the Neotropical and Nearctic faunas. The gradient is reversed at the generic level, due largely to the increasing northern dominance of the genus Formica. In Costa Rica there is none; in Texas there are 8 species of Formica, which is 4% of the total; Oklahoma has 3 (3%); North Dakota has 34 (39%); Manitoba has 23 (44%).

Especially Interesting Manitoba ants

Farthest North: Leptothorax muscorum is a small and elusive ant about 3 mm long. Nevertheless it is quite a distinguished species, for it ranges farther north than any other ant species in the Western Hemisphere. It is recorded from Richard Island, Kiduit Bay, in the Arctic Ocean, at lat. 69° 32', long. 133° 47', in Mackenzie Territory (Brown 1955: 49). "Of all the ants occurring in North America, Leptothorax muscorum is the species best able to survive in extreme Arctic-alpine conditions. Throughout boreal and alpine North America within the limits of the timbered area, L. muscorum is found in company with Camponotus herculeanus (Linnaeus) and Formica rufibarbis Emery, the two dominant ants of the region." (Brown 1955: 47)

Churchill at lat. 58° 45' is at the northern limit for ants

recorded in Manitoba. It is far south of the continental limit, but its ant fauna comprises only four species: the three mentioned above plus Myrmica brevinodis.

The Sand-Hill Ant: Few ants are limited to a particular kind of soil. Formica bradleyi, however, is found only in very sandy soil, where it nests at the base of pioneer grasses. Galloway has found it in the sandy, beach-ridge habitat on the west side of glacial Lake Agassiz. The records for the Portage la Prairie area are from an old delta, including some of the black Olmassippi sands. He has always found the workers associated with aphids, which were aggressively defended by the ants. An extensive study of this interesting species was published by Halverson et al. (1976).

Thatching Ants: Most of the nest is underground but it is surmounted by a dome-shaped mound. A typical mound is about 63 cm (25 inches) in diameter and 30 cm (12 inches) high. It is constructed of twigs, grass blades, dried herbaceous stems or any other slender bits of material assembled by the workers from the neighbouring vegetation. The thatching ants reported from Manitoba are Formica obscuripes, F. obscuriventris and F. oreas.

Mound-Builders: The mound-builders in Manitoba are Formica exsectoides and F. ulkei. They are usually found in openings in forests. The conoidal mounds are composed of excavated soil and are covered by a thin crust of freshly mined soil particles mixed irregularly with plant debris brought in by the ants and that which has fallen onto the surface. The mounds of F. ulkei were extraordinarily abundant in Dunn County, North Dakota, where they measured from 25 cm (10 inches) in diameter and 8 cm (3 inches) high to 293 cm (117 inches) by 85 cm (34 inches) (Wheeler and Wheeler 1963).

Obligatory Slave-Makers: Obligatory slave-makers are incapable of performing any of the nest functions and are therefore wholly dependent upon their slaves. The story of how they raid the nests of some species of Formica to get their slaves is fascinating but too long for this essay (see Wheeler and Wheeler 1986). The only Manitoba slave-maker is Polyergus breviceps, which has been taken only twice in Manitoba: Spruce Woods Provincial Park with Formica argentea as slaves and Riding Mountain National Park with Formica neorufibarbis as slaves.

Facultative Slave-Makers: These are in the genus Formica and their slaves are other species of Formica. They are, however, capable of performing all necessary nest functions; hence they can, and often do, get along without slaves. The following species of this group have been taken in Manitoba: F. pergandei, F. puberula,

F. subintegra and F. subnuda.

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FIGURE 1. Map for localities of ants collected in Manitoba. The letter-number combination on the left of the name is the square in which the locality may be placed; more precise location can then be determined on a conventional map. Horizontal lines represent approximate parallels of latitude; the vertical lines are entirely arbitrary. The only localities north of 57° are in or near Churchill, which is labeled.

D2 Agassiz Provincial Forest	C3 Hnauasa
B1 Aweme	B1 Holland
B1 Baldur	A1 International Peace Garden
A3 Baldy Mountain	C1 Labarrière Park, Winnipeg
D2 Beaconia	B2 Lake Katherine
A2 Binscarth	C1 Lake Minnewasta
C1 Birds Hill	B2 Langruth
C1 Birds Hill Provincial Park	C1 La Salle
D1 Brokenhead River	A3 Laurie Lake
(Sandilands Provincial Forest)	C1 Lewis
C2 Camp Morton	A4 Mafeking
B1 Carberry	B1 Miami
B5 Cedar Lake	C1 Morden
58°45'N, 94°10'W Churchill	D1 Northwest Angle Provincial Forest
B2 Clear Lake	B1 Onah
C1 Cooks Creek	C7 Paint Lake Provincial Park
A5 Cormorant Lake	B1 Pelican Lake
A2 Crandall	D7 Pikwitonei
C1 Dacotah	D2 Pinawa
D1 Darwin	D2 Pine Falls
B3 Dauphin	A3 Pleasant Valley
B3 Dauphin Lake	C1 Portage la Prairie
A3 East Blue Lake	B1 Rathwell
(in Duck Mountain Provincial Park)	D1 Rennie
B2 Forrest	D1 Richer
C1 Fortier	A-B2 Riding Mountain National Park
58°45'N, 94°5'W Fort Churchill	C3 Riverton
D2 Garson	D1 Rosa
D8 Gillam	C1 Rosser
D1 Giroux	C1 St. Agathe
C1 Glenlea	C1 St. Malo
58°50'N, 94°6'W Goose Creek	C1 St. Norbert
(20 km S. of Churchill)	D1 Sandilands
B5 Grand Rapids	D1 Sandilands Provincial Forest
A1 Hargrave	C1 Sanford
A1 Hartney	D2 Seddons Corner
D3 Hecla Island	D2 Seven Sisters

B1 slave raid, 6 km
 W. of Portage la Prairie
B1 Spruce Woods
B1 Spruce Woods Provincial Forest
B1 Spruce Woods Provincial Park
B1 Stockton
C2 Stony Mountain
A4 Swan River
D1 Telford
C2 Teulon
C7 Thompson
B1 Treesbank
B1 5.7 km NW.of Treesbank
58°38'N, 93°49'W Twin Lakes
A1 Virden
B1 Vita
A2 Whirlpool Lake
D1 Whitemouth Lake
D1-2 Whiteshell Provincial Park
C1 Winnipeg

Churchill

