

wood. Because of their habits as carpenter ants requiring wood for nesting material, they do not easily colonize the treeless tundra, although their populations are usually abundant in the nearby coniferous forest. Gregg (1972) recorded one colony in the tundra heath of Churchill, but found it more abundant in an undisturbed, rather dense, black spruce and tamarack forest.

Formica neorufibarbis Emery

Though mainly concentrated in sandy habitats, this ant appears most prosperous in the vicinity of the tree-line, either in terms of colony populations, which amount to a few hundred individuals, or in the numbers of colonies, particularly in open spruce-lichen formations. In the same kind of habitat much farther south, it is replaced by *F. podzolica* Francoeur as a dominant ant (Francoeur, 1973). The nests are most often constructed under stones of small to moderate size, and cushions of lichen, sometimes under miscellaneous objects. Only three among the discussed samples were extracted from dead wood (log and stumps). Habitats: sandy terraces with dwarf birch thickets and stones or open spruce-lichen formations, *Elymus* strips along water banks, rocky outcrops with shrubs. Gregg (1972) reported this form under the name *Formica neorufibarbis gelida* Wheeler (specimens examined).

When I was in Fort-Chimo the director of the experimental musk ox farm, Mr. H. Durocher, told me that once he observed the curious behavior of a black bear turning stones up in a sandy coastal terrace with dwarf birch thickets. He kindly agreed to take me to that place, located about one km east of Old Chimo Village, on the south bank of the Koksoak River. I discovered there a polygynous colony under almost every stone. Obviously the bear was looking for these ants as food. At that very place samples of live queens, workers and brood were taken from some colonies. Workers exhibited aggressiveness when the nest was disturbed. About two weeks later in my laboratory they were fused into two populations without problem. This could mean that the colonies prospering in that isolated place have developed a polycalous population such as encountered in the *Formica rufa* group. If such an interpretation should be confirmed the *Formica fusca* group would also exhibit this biological feature. Polygynous colonies were also observed in most of the other sites.

In the Alpine Garden of Mt. Washington, New Hampshire, where an alpine tundra occurs, colonies with numerous small queens were collected by Brown and Wilson (Brown, personal communication), illustrating a similar situation and exhibiting a morphological trend associated with altitude (Francoeur, 1973). However the relations between colonies remain unknown in this case.

Formica subnuda Emery

Since Francoeur (1974) reported the presence of this species in Poste-de-la-Baleine based upon dealated

females, no additional data have been collected from the forest-tundra ecotone of northern Québec. Therefore, colony establishment has not yet been confirmed. However the species occurs in more southern zones of open spruce-lichen formations (unpublished data). The nearest known record comes from the northernmost jack pine stands (*Pinus banksiana* Lamb.) discovered by S. Payette on Little Whale River (55°2'N, 75°47'W). Creighton (1950) has stressed the transcontinental nature of the range of this species which extends into Yukon and Alaska.

Formica subnuda builds nests either with mineral or organic matter, in heavy or open deciduous and coniferous woods, or in fully exposed biotopes such as pastures. This active and aggressive ant frequently enslaves *Formica* species such as *subaenescens* and *neorufibarbis*. Despite the abundance of the latter, the absence of *F. subnuda* could mean that it cannot become permanently established near the tree-line in Québec. It was not recorded by Gregg (1972) from Churchill, Manitoba.

Discussion and conclusions

The northern ant fauna of North America was traditionally associated with only three species, under a number of different names (Brown, 1955; Weber, 1950 and 1953; Francoeur, 1973). Recently Gregg (1972) and Francoeur (1974) added a fourth species for both sides of Hudson Bay. The list is here again enriched with another element, so that now five ants are known to occur and reproduce at or near the tree-line:

Myrmica alaskensis
Leptothorax acervorum
Leptothorax muscorum
Camponotus herculeanus
Formica neorufibarbis

These species, belonging to four different genera, compose the basic myrmecofauna best able to survive in the eastern part of the forest-tundra ecotone from Churchill, Manitoba to Ungava Bay, in Québec. They represent only two subfamilies of ants: Myrmicinae with the first three species (60%) and Formicinae with the last two (40%). *Formica subnuda*, which is not included here for reasons explained previously, belongs to the latter. The taxonomic diversity and the density of colonies remain rather reduced as compared to much richer faunas farther south. For example, such an impoverished remnant makes up only about 20% of the typical ant complement in the boreal coniferous biome of Québec (unpublished data).

Only *Leptothorax acervorum* seems restricted to the transition belt. Known up to now as a palearctic form its occurrence in North America raises questions about the introduced or indigenous nature of its presence. Though limited, the actual data indicate a wide distribution not easily explained as an introduction. The discovery of this *Leptothorax* in the western part of the nearctic region would mean the ant is a true holarctic form.