Application of EPB by hand is not a pleasant job and requires diligence for effective coverage. A hand-cranked dust-blower, designed for the application of granular pesticides, proved useful, although it sometimes clogged at high speed. A venturi-type blower would definitely be more satisfactory.

In summary, the trial demonstrated that the EPB treatment gave effective and persistent control of mosquitoes in pit latrines. The material is cheap, inert, nontoxic, and unlikely to give rise to resistance problems. In all these features it offers clear advantages over conventional control methods, such as oils and chemical larvicides. It could probably be used to control breeding in other sheltered, still-water habitats, such as cesspools and water-storage cisterns, providing that it is protected from the wind and not removed by drainage or flooding.

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SPECIES COMPOSITION AND RELATIVE ABUNDANCE OF ANTHROPOPHILIC MOSQUITOES IN SUBARCTIC QUEBEC

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Much of the published information on mosquitoes of northern Canada has been generated as a result of the Canadian Northern Insect Survey initiated in 1947. Since then there have been rather general studies of mosquitoes, and ecological studies in specific subarctic or high arctic localities. Recently, the Groupe de Recherche sur les Insectes Piqueurs (Université du Québec à Trois-Rivières), demonstrated that mosquito species select their larval habitats, and as a result of habitat vegetation analyses, suggested that there is a typical mosquito community for a particular vegetal unit. Whereas many of the studies of arctic and subarctic mosquitoes have considered, at least peripherally, the pest species of humans, few studies have been conducted to examine the seasonality and abundance of anthropophilic species. The purpose of this investigation was to determine the species composition and relative abundance of anthropophilic mosquitoes in a subarctic Québec locality.

The study was conducted in the vicinity of Schefferville (54°47′N; 66°50′W), Québec, better known by earlier investigators as Knob Lake. Adult mosquitoes were collected weekly for 12 weeks commencing the second week of June during 1983 and 1984. Five sites were selected in which landing counts, biting counts and aerial net collections were made in succession. Three sites were outside the town of Schefferville (9 km east, 4 km north, 4 km south), one was adjacent to the town, and the fifth was actually in the town. Landing counts were obtained by counting the number of mosquitoes landing on a square blue cloth (0.09 m^2) placed on a subject's lap during a 2-min interval. Biting counts were the number of mosquitoes biting a subject's exposed, left forearm during a 2-min interval (most of these were

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collected with an aspirator held in the right hand). Aerial net collections were made with a standard entomological sweep net (30 cm diam). At each site a standard procedure of 40 figure-eight sweeps were made about the collector. Consecutive counts and collections were made by one person. Mosquitoes were killed in the field and subsequently pinned and identified in the laboratory. Identifications were made using the keys of Wood et al. (1979). Except when weather conditions dictated otherwise, collections were made sequentially at the 5 sites on one day of each week usually between 1700 and 2030 hr. Data from all 5 sites and for both years have been averaged in order to provide a relatively realistic view of the dynamics of adult mosquito populations in this region of subarctic Canada.

Species composition. Seven species of anthropophilic mosquitoes were collected in the Schefferville region during 1983–84 (Table 1). All 7 species were collected in both years; twice as many mosquitoes were collected in 1984 as in 1983, but the proportions of the various species were similar. *Aedes punctor* (Kirby) was the dominant species in biting counts and aerial net collections. Due to morphological similarities and variation in the black-legged *Aedes,* it is possible that 'rubbed' specimens collected late in the summer and identified as *Ae. punctor* may be other species. Similar numbers of mosquitoes were collected at 4 sites. However, the number collected in the town was approximately 50% less than those of the other sites.

Although only the anthropophilic mosquitoes were sampled during this investigation, we expected that the number of species collected would be intermediate between the 2 species recorded from the high arctic (Oliver et al. 1964) and the 26 species recorded from southern Québec localities (Leprince and Lewis 1982). All 7 species have been previously recorded from subarctic Québec by Maire and Aubin (1980) and Wood et al. (1979).

Landing counts. Landing counts (Fig. 1) were negligible early in the sampling period, but by late June mosquitoes became bothersome. Maximum landing counts (27/min) were obtained during late July, although counts at any one site were as high as 55/min. Based on the data obtained from the biting counts and aerial net collections (Table 1) many of these landings were probably *Ae. punctor.*

Landing counts obtained in the Schefferville area are higher than those obtained by Haufe (1952) at Goose Bay, Labrador (17/min). Counts made by Curtis (1953) at Whitehorse, Yukon Territory, and Hocking et al. (1950) at Churchill, Manitoba, are not directly comparable since landing counts and biting counts were totalled or the data were otherwise treated in a different manner. Maximum landing counts in Schefferville were obtained during late July. However in Whitehorse, they were maximum in mid to late June (Curtis 1953). Maximum counts were obtained during early July in Churchill (Hocking et al. 1950).

Biting counts. Biting count data (Fig. 1) follow a similar pattern to that of landing counts. Biting mosquitoes became bothersome during late July; maximum bites (16/min) were obtained in early August. Individual site counts were as high as 51/min. About 75% of the mos-

Table 1. Relative abundance of anthropophilic mosquitoes in the vicinity of Schefferville, Québec, 1983–84.

Species	Biting counts		Aerial net collections	
	No. specimens	%	No. specimens	%
Aedes communis	122	13.4	303	7.5
Aedes excrucians	5	0.6	37	0.9
Aedes hexodontus	44	4.8	40	1.0
Aedes nigripes	18	2.0	20	0.5
Aedes punctor	711	78.2	3,629	89.8
Culiseta alaskaensis	3	0.3	4	0.1
Culiseta impatiens	6	0.7	10	0.2
Totals	909		4.043	

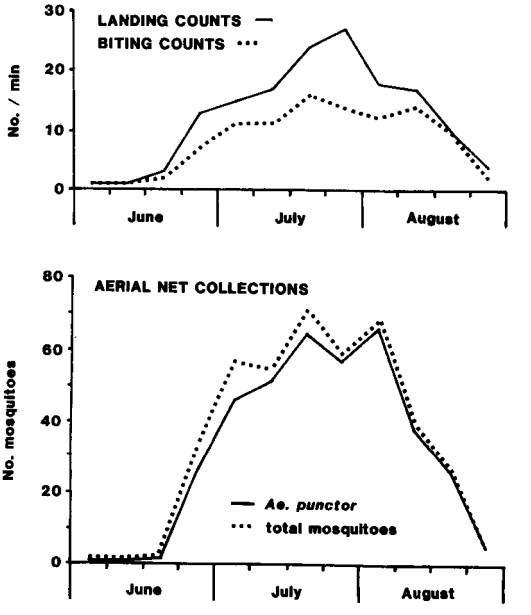

Fig. 1. Landing counts, biting counts, and aerial net collections of anthropophilic mosquitoes obtained near Schefferville, Quebec, 1983–84.

quitoes involved in the biting counts were actually collected, the relative abundance of each species is presented in Table 1. *Aedes punctor* comprised 78% of the total.

The biting counts obtained during this investigation are higher than those obtained by Haufe (1952) at Goose Bay (9/min), but lower than those recorded by Twinn et al. (1948) at Churchill (50/min). Again, the data presented by Curtis (1953) for Whitehorse and Hocking et al. (1950) for Churchill are not directly comparable. When biting rates by mosquitoes or blackflies exceed 3–5/min at Canadian Forces Bases, adulticiding of the entire site is performed (National Research Council Canada 1982). Maximum biting counts were obtained much later in Schefferville than in other areas; they were maximum during mid- to late June in Whitehorse (Curtis 1953) and early July in Churchill (Twinn et al. 1948, Hocking et al. 1953).

AERIAL NET COLLECTIONS. The numbers of mosquitoes obtained in aerial net collections (Fig. 1) followed a similar pattern to the numbers obtained for the landing and biting counts; negligible at the beginning of the season and a peak during late July. The relative abundance of each species obtained in the net collections is presented (Table 1); the curve exhibited in Fig. 1 is due primarily to the abundance of *Ae. punctor* (Table 1) which accounted for almost 90% of the mosquitoes. A maximum of 180 specimens were obtained in net collections at individual sites.

Although comparable aerial net collections of mosquitoes from subarctic Canada are lacking, *Ae. punctor* is a widely distributed species in Canada (Wood et al. 1979) and is uncommon in some areas, including Poste-de-la-Baleine (Jenkins and Knight 1950).

SEASONAL ABUNDANCE. The seasonal distribution of mosquito species is presented (Fig. 2) and is based on both biting counts and aerial net collections. *Culiseta alaskaensis* (Ludlow), *Cs. impatiens* (Walker), *Ae. nigripes* (Zetterstedt) and *Ae. punctor* were collected during the first week of sampling. All except *Ae. punctor* were collected in relatively low numbers. *Aedes nigripes* and *Cs. alaskaensis* were not collected after the end of June; *Ae. punctor* persisted until the end of August. *Aedes communis* (DeGeer) and *Ae. hexodontus* Dyar were collected during the last half of June; their flight periods were approximately 9 weeks. *Aedes excrucians* (Walker) was collected for about 6 weeks, commencing mid- to late July. Apart from *Ae. punctor,* in which the peak of abundance is quite obvious (Fig. 1), the peaks of abundance of the other 6 species were difficult to define due to the low numbers collected.

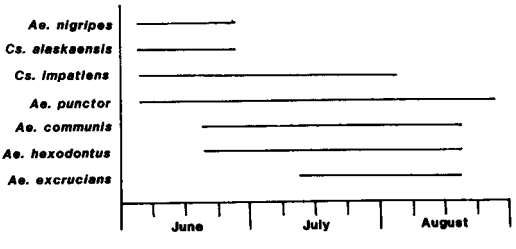

Fig. 2. Seasonal distribution of anthropophilic mosquitoes near Schefferville, Quebec, 1983–84.

The seasonal distribution of mosquitoes in Schefferville is very similar to those reported for the same species in Whitehorse (Curtis 1953), Churchill (Twinn et al. 1948, Hocking et al. 1950), Poste-de-la-Baleine (Jenkins and Knight 1950) and Goose Bay (Haufe 1952).

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