# NOTES ON THE TABANIDAE (DIPTERA) OF WESTERN LABRADOR

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ABSTRACT. The seasonal distribution and relative abundance of adult Tabanidae were studied in 2 mining communities of western Labrador during 1984. Four collecting methods were compared. Fifteen species belonging to 2 genera were collected (6 *Chrysops* and 9 *Hybomitra*). Results were compared with other studies conducted in adjacent northern areas. *Chrysops excitans* was the most abundant species collected. The horizontal distribution of adult host-seeking *C. excitans* was investigated. A list of species collected in previous years and in central Labrador is also given.

## INTRODUCTION

Since 1980 one of us (MHC) has conducted research on biting flies, including an experimental black fly control program, in the twin western Labrador mining communities of Labrador City and Wabush (52°55'N; 65°55'W). During their short flight period relatively large populations of tabanids were noted. As tabanids are a serious pest of man in Canada (Teskey 1979), and as data exist only for isolated locations in the whole northern Quebec-Labrador region (Philip 1962, Baribeau and Maire 1983a) an intensive adult survey was undertaken during the 1984 fly season in the Labrador City-Wabush vicinity. Data are presented here on relative abundance and seasonal distribution in 1984, as well as observations on the abundance of adult host-seeking *Chrysops excitans* Walker in a spruce forest, a burnt over spruce forest and a fen. Qualitative comparisons between the different trapping methods used are also made. Collections from previous years and at Churchill Falls, Labrador (53°30'N; 64°00'W) are included. These are the first published records from these Labrador communities.

## MATERIALS AND METHODS

STUDY SITE. Labrador City and Wabush (3 km apart), located near the western border of Labrador, fall within the Subarctic life zone (Maire and Aubin 1980). It is typified by spruce forests (Ducruc et al. 1976) and a mean annual temperature of −3°C (Richard 1978). Three general habitats were distinguished and collected from: 1) open wetlands, primarily fens, 2) spruce forests with pockets of birch and alder and 3) high rocky open hilltops. Churchill Falls, approximately 200 km NE of Labrador City-Wabush, is also Subarctic. Collections were made here only from habitats 1 and 2.

COLLECTION METHODS. During 1984 tabanids were collected in the Labrador City-Wabush area using sweep nets, Manitoba traps and Malaise traps. Flies attracted to human collectors or the red research truck were collected with sweep nets. Flies which occasionally entered the truck were removed from the windows with aspirators. Sweep net samples around humans were made at a distance (> 10 m) from the truck to decrease any possible influence of this visual target. Captured flies were placed in a killing jar containing dichlorvos-impregnated plastic.

Manitoba traps stood 1.5 m high. The roof was a flat top 3-sided pyramid constructed of light green cloth. The pyramid roof was 60 cm high and the base of each side 1 m in length. Suspended 20 cm below the entrance of the pyramid roof was a beach ball (diam = 45 cm) painted flat black. The Malaise traps consisted of 4 right angle baffles (1 m high × 1.75 m long) of light green cloth attached to a center pole. Baffles were flush to the ground, and placed above the center pole was a pyramid roof as described above. The base of the pyramid was flush with the top length of the baffles. Each baffle extended 1.1 m beyond the base of the pyramid. Traps were not baited with $CO_2$. One Malaise and one Manitoba trap (20 m apart) were placed at 3 sites around a 300 × 150 m pond. Each site, representing a different habitat, was 200–300 m from the other two. Sites were in a spruce forest, a burnt over spruce forest and an open fen. Collecting chambers, containing dichlorvos-impregnated plastic, were changed every 48 hr. A fourth Manitoba trap placed in an open wetland on a hilltop (850 m in elevation, 250 m above surrounding terrain) had the collecting chamber checked 5 times over a 22-day period. Preliminary collections in the Labrador City-Wabush area (1981–83) and at Churchill Falls (July 6–10, 1984), involved samples around humans and trucks only.

Tabanids were identified using Pechuman et al. (1961) and Pechuman (1981). A substantial proportion of the material collected was sent to Dr. H. J. Teskey, Biosystematics Research Institute, Ottawa, for verification. Voucher specimens were deposited in the Memorial University collection, St. John's, Newfoundland.

## RESULTS AND DISCUSSION

Twelve species of tabanids in 2 genera (5 *Chrysops;* 7 *Hybomitra*) were collected in the Labrador City-Wabush area from 1981 to 1983. These included *Chrysops ater* Macquart, *C. excitans, C. frigidus* Osten-Sacken, *C. furcatus* Walker, *C. sordidus* Osten-Sacken, *Hybomitra aequetincta* (Becker), *H. affinis* (Kirby), *H. arpadi* (Szilady), *H. astuta* (Osten-Sacken), *H. hearlei* (Philip), *H. lurida* (Fallen) and *H. zonalis* (Kirby). Seven of these 12 species were also collected in Churchill Falls (*C. ater, C. excitans, C. furcatus, H. aequetincta, H. affinis, H. arpadi* and *H. lurida*). All further results pertain to data collected around the Labrador City-Wabush area during 1984.

From July 7 to August 14, 1984, 15 locations within 20 km of Labrador City-Wabush were sampled. Pond sites were sampled on 12 occasions; other sites were sampled 1 to 5 times. A total of 770 females and 1 male (Table 1) representing 15 species and 2 genera were collected; *Chrysops* (6 species) and *Hybomitra* (9 species). *Chrysops nigripes* Zetterstedt, *H. frontalis* (Walker) and *H. pechumani* Teskey and Thomas were collected for the first time in 1984. The most frequently collected tabanids were *Chrysops excitans* (64.1%), *C. ater* (15.1%), *Hybomitra aequetincta* (5.8%), *H. zonalis* (4.1%) and *H. arpadi* (3.5%). The remaining 10 species each represented less than 2% of the specimens collected. Two specimens designated as *H. zonalis/aequetincta* (Table 1) were not clearly assignable to *H. zonalis* or *H. aequetincta.* Baribeau and Maire (1983a) have suggested that *H. zonalis/aequetincta* may represent a hybrid or a single polymorphic species.

Strict comparisons between sampling methods are not possible and comparisons should be considered qualitative in nature. However, some inferences can still be drawn. In all sampling methods other than sweep net collections around the truck, *Chrysops* was clearly the predominant genus, constituting 83% of those captured (Table 1). *Chrysops excitans* and *C. ater* were the two most commonly collected species using a sweep net. They are the most serious pests of man, comprising 57.6% and 28.3% of human sweep net collections respectively. This is supported by our field observations on the persistence of their attacks on man. *Hybomitra* was rarely collected around man (Table 1) and constituted less than 11% of the human sweep net samples. Other studies have shown *Chrysops* to be more troublesome to man than *Hybomitra* (Pechuman et al. 1961, Smith et al. 1970).

In open areas, unobstructed by trees and high shrubs, *H. aequetincta,* and possibly *H. zonalis*, were very strongly attracted to the truck. This attraction to the truck occurred even when humans were several meters from the vehicle and presumably had little influence on its attractiveness. Also when collectors were present by the truck most specimens hovered around

Table 1. The species and seasonal occurrence of adult female Tabanidae collected at Labrador City-Wabush from July 7 to August 14, 1984.

| Species | No. collected | | | | Total (%) | Seasonal occurrence |
|---|---|---|---|---|---|---|
| | Truck | Man | Manitoba trap | Malaise trap | | |
| *Chrysops ater* | 12 | 89 | 13 | 2 | 116 (15.1) | July 8–27 |
| *C. excitans* | 46 | 181 | 239 | 28 | 494 (64.1) | July 7–27 |
| *C. frigidus* | 2 | 1 | 1 | 0 | 4 (<1) | July 9–20 |
| *C. furcatus* | 3 | 5 | 1 | 0 | 9 (1.2) | July 11–20 |
| *C. nigripes* | 0 | 2 | 0 | 4 | 6 (<1) | July 15–20 |
| *C. sordidus* | 7 | 3 | 1 | 1 | 12 (1.5) | July 9–20 |
| Total *Chrysops* | 70 | 281 | 255 | 35 | 641 (83.2) | |
| *Hybomitra aequetincta* | 37 | 4 | 4 | 0 | 45 (5.8) | July 8–27 |
| *H. affinis* | 1 | 0 | 0 | 0 | 1 (<1) | July 19 |
| *H. arpadi* | 7 | 8 | 8 | 4 | 27 (3.5) | July 9–27 |
| *H. astuta* | 1 | 2 | 0 | 0 | 3 (<1) | Aug. 6–14 |
| *H. frontalis* | 1 | 0 | 0 | 0 | 1 (<1) | July 20 |
| *H. hearlei* | 0 | 2 | 1 | 0 | 3 (<1) | July 11–17 |
| *H. lurida* | 5 | 7 | 0 | 0 | 12 (1.5) | July 9–18 |
| *H. pechumani** | 0 | 0 | 3 | 0 | 3 (<1) | July 21 |
| *H. zonalis* | 15 | 10 | 6 | 1 | 32 (4.1) | July 10–27 |
| *H. zonalis/aequetincta* | 2 | 0 | 0 | 0 | 2 (<1) | July 18–20 |
| Total *Hybomitra* | 69 | 33 | 22 | 5 | 129 (16.8) | |
| Total Tabanidae | 139 | 314 | 277 | 40 | 770 | |

* One male specimen of *H. pechumani* was also collected in a Malaise trap on July 17.

points of the truck rather than the collector. Only 4 *H. aequetincta* were taken from human sweep net samples conducted in absence of the truck (Table 1), suggesting humans were not frequently attacked by this species. Miller (1951) reported that the closely related *H. zonalis* was not a pest of man in Churchill, Manitoba.

Previous studies have shown that the Manitoba trap may be less effective for collecting *Chrysops* than other genera of tabanids (Roberts 1978), whereas in the present study this method was highly successful for capturing *C. excitans* (Table 1). However, all tabanids were collected in very low numbers in the Malaise traps (Table 1), most likely due to the limited size of the pyramid roofs which were much smaller than the extended baffles and the absence of $CO_2$.

The main flight period for tabanids in 1984 lasted only 20 days (July 7–27), with only 3 specimens (all *H. astuta*) collected in August. This agrees well with a northern Quebec study (Baribeau and Maire 1983b). The 5 most commonly collected species, *C. excitans, C. ater, H. aequetincta, H. zonalis* and *H. arpadi,* all first appeared in the field over a 4 day period with no apparent difference in phenological succession as observed for these species in more southern locations (Smith et al. 1970). Baribeau and Maire (1983b) observed a similar phenomenon in northern Quebec.

Tabanids collected between July 15–21 from 3 Manitoba traps (pond sites) were used to determine the horizontal distribution of adult host-seeking flies by habitat. *Chrysops excitans* was the only tabanid taken in large enough numbers for comparison (Table 1). Of the 3 habitats examined *C. excitans* showed a distinct preference for the open fen (fen = 92.4%; burnt spruce forest = 6.3%; spruce forest = 1.3%). Tabanids use visual stimuli to locate a host and the attractant principle of the Manitoba trap is based on this premise (Thorsteinson et al. 1965). In forested areas the potential for using vision would be restricted. Therefore it is not surprising that *C. excitans* was most frequently captured in an open habitat, where the visual attractant (black-sphere) was plainly visible. This suggests that a host would be more frequently attacked by *C. excitans* in an open environment such as a fen or bog than a forested area. Using $CO_2$ box traps in Ontario, Smith et al. 1970 found that the distribution of adult *C. excitans* was roughly uniform in 4 habitats tested. The different results obtained in these 2 studies may be due to the different trapping methods used (visual vs $CO_2$ attractants), which suggests that an accurate assessment of the distribution of adult host-seeking *C. excitans* may require data from a variety of trap designs.

The most comprehensive study of the Tabanidae of the Subarctic life zone is that of Baribeau and Maire (1983a) in which many locations were sampled over a large area of northern Quebec. *Chrysops* was clearly the dominant genus over *Hybomitra* in the Labrador City-Wabush area (Table 1), whereas these genera were equally abundant in the study of Baribeau and Maire (1983a). They also found that *C. excitans* (2,717 specimens) and *H. arpadi* (1,861 specimens) were the two most common species of the Subarctic life zone. In the present study *C. excitans* and *C. ater* were the most abundant species collected, with *H. arpadi* constituting less than 4% of the total catch. Whether differences between the two studies are due to differences in trapping methods or actual differences in the tabanid faunas studied will require further investigation.

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