ALTITUDE DISTRIBUTION OF TABANIDAE AS DETERMINED BY MALAISE TRAP COLLECTIONS[1, 2]

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ABSTRACT. Two Malaise traps with 0.6-m high openings were placed on screen platforms and used to sample tabanid populations at various heights above ground level. Seventy percent or more of the tabanids were collected when the opening was less than 1.8 m above ground. In most cases, a higher percentage was collected at heights between 0.9 and 1.5 m (26.1–65.3%) than at heights between 0 and 0.6 m (14.3–45.8%).

This study, one of a series investigating the use of Malaise traps as a tool in ecological and biological research on Tabanidae, deals with an investigation of the altitude distribution of host-seeking tabanid females. In a previous study (Roberts 1972), a barrier of hardware cloth 8 ft high was sufficient to prevent tabanids from reaching a host animal. However, the effectiveness of this barrier may have been related to the position of the bait, which was at ground level. The response of tabanids to baited traps suspended at various elevations above ground level was therefore investigated.

MATERIALS AND METHODS. Malaise traps (Townes 1962) constructed of natural saran screen were modified by changing the 1.2 m high opening to one that was 0.6 m high. This trap was then placed on a 2.4x2.4-m screen platform that prevented tabanids from entering the trap from below. Presumably such an arrangement would be biased toward collection of those tabanids flying within 0.6-m-thick planes.

The traps were suspended from two trees approximately 137 m apart located on the west edge of a natural gas transmission pipeline right-of-way that passed through the southeast corner of the Delta Experimental Forest at Stoneville, Washington Co., Mississippi. The right-of-way was approximately 38 m wide and extended in a NE-SW direction. The traps were baited with CO_2 released at the rate of 100 ml/min from 50 lb (net) CO_2 tanks by means of a single-stage regulator and adjusted to the desired rate with a needle valve and a Gilmont® compact flowmeter. A hose, 15 m long, extended from the flowmeter through the platform so the CO_2 was released on the center support pole of the trap on a level with the top of the trap opening (Fig. 1).

Tabanids were trapped at five elevation zones: 0.0–0.6 m; 0.9–1.5 m; 1.8–2.4 m; 2.7–3.3 m; and 3.6–4.2 m. The experimental design used in this study was an incomplete block design (Cochran and Cox 1957, plan 11.2, where $t=5$, $k=2$, and $r=4$). This design required 20 trapping days, each of which started at 2 pm (CDT) and was ended the next day at 11 am. Two series of collections were made, the first from June 19 to August 4 and the second from August 8 to September 19, 1972.

RESULTS AND DISCUSSION. A total of 15 tabanid species was collected of which 7 were present in sufficient numbers for statistical analysis (Table 1). The 8 species not listed in Table 1 were *Tabanus americanus* Forster, *T. cymatophoras* Osten Sacken; *T. mularis* Stone; *T. venustus* Osten Sacken; *T. wilsoni* Pechuman; *Chrysops flavidus* Wiedemann; *Chlorotabanus crepuscularis* (Bequaert); and *Leucotabanus annulatus* (Say). Although

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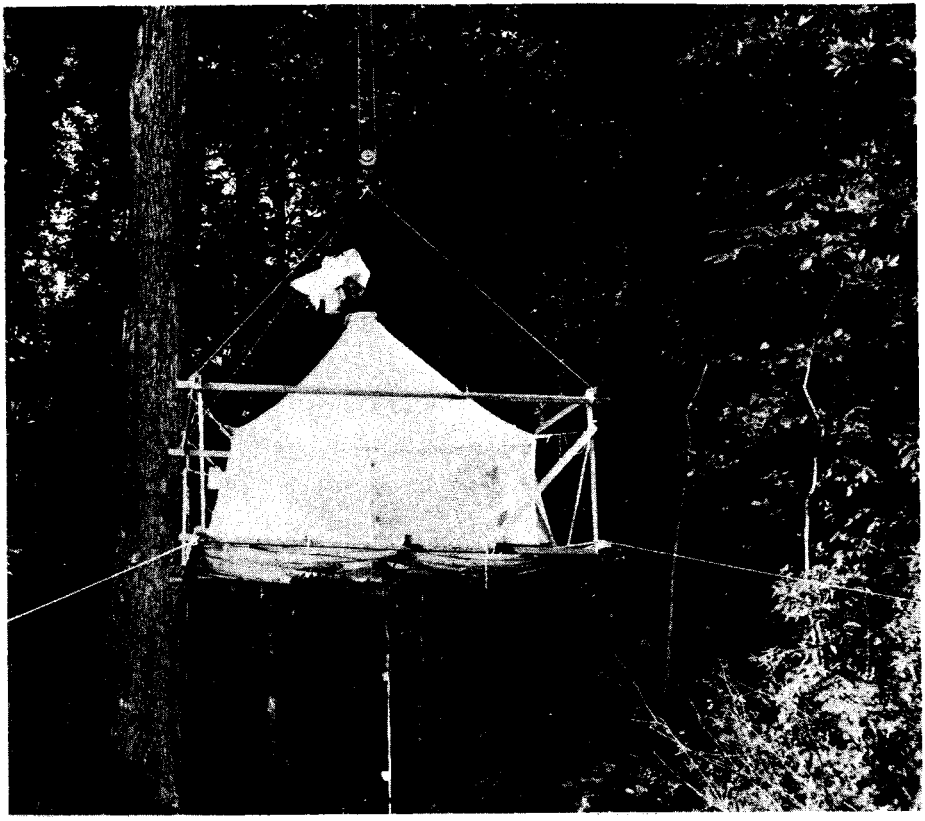

Fig. 1. Modified Malaise trap suspended in the 1.8–2.4 m zone.

Table 1. Percentage of total tabanids collected at 5 elevation zones.

Species	Series[a]	Elevation (m) zone 0.0–0.6	0.9–1.5	1.8–2.4	2.7–3.3	3.6–4.2	Total no. collected	F
Tabanus								
abdominalis F.	1	37.8	41.9	10.8	9.4	0	74	**
calens L.	2	45.8	26.1	12.3	6.4	9.4	203	*
fuscicostatus Hine	1	32.8	51.7	5.7	8.2	1.5	402	**
lineola F.	1	35.6	49.1	14.1	0.8	0	118	**
	2	26.4	55.9	11.8	5.9	0	34	**
proximus Walker	1	14.3	65.3	16.3	2.0	2.0	49	**
	2	19.1	56.2	9.0	13.5	2.2	89	N.S.
subsimilis Bellardi	1	40.4	38.4	5.0	7.1	9.1	99	**
sulcifrons Macquart	2	21.1	61.7	10.6	5.0	1.7	180	**
Total: all species	1	35.4	47.6	8.2	6.2	2.6	819	**
	2	31.5	44.6	12.4	6.9	4.5	619	**

[a] Series 1—June 19–August 4, 1972; series 2—August 8–September 19, 1972.
* $P < 0.05$.
** $P < 0.01$.

the numbers of these species collected are not reported separately, they were included in the analyses for total tabanids collected.

The data show a significant pattern in trap collections at the various elevations. Depending on the species, from 72 to 88% were trapped at the two lowest elevations. However, a higher percentage of all except *T. calens* was trapped at the 0.9–1.5 m elevation than at the 0.0–0.6 m elevation. Thus, in a flyway, the majority of tabanids are flying at heights below 1.8 m. These data are similar to those of Snoddy (1970) for deerflies attracted to colored balloons suspended at various elevations above ground level.

The low percentage of tabanids collected above 1.8 m indicates that these flies are attracted little if at all upwards towards the trap or bait (CO_2) located above the flyway. The concentration of the tabanids in a flyway suggests the possibility that a mechanical barrier could be used to trap or prevent tabanids from reaching a host.

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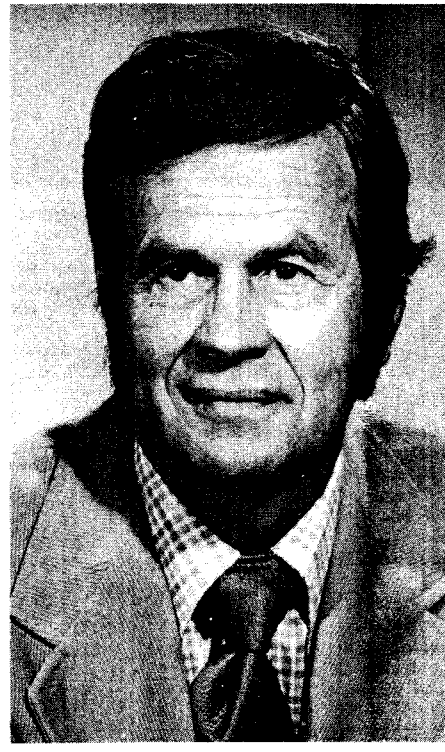

LEWIS T. NIELSEN

On the right is a photograph of Dr. Lewis T. Nielsen, President-Elect of the AMCA. Dr. Nielsen, Professor of Biology, University of Utah, Salt Lake City, will become president at the New Orleans Meeting, March 27–30, 1977.