

A BLOWER TRAP FOR CAPTURING MOSQUITOES¹

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Causey *et al.* (1961) have described the use of sentinel mice, exposed in cages suspended under light aluminum hoods, to attract hematophagous insects that transmit arboviruses. Since 1959 this technique has been routinely employed in the forest of the Instituto de Pesquisas e Experimentação Agropecuárias do Norte (IPEAN) near Belém, Brazil. The mosquito catch has been restricted, however, to hand captures made each morning when the bait is changed; mosquitoes coming to the bait at other hours of the day or night have not been captured regularly.

Accordingly, a blower trap has been designed which provides for continuing capture of the mosquitoes at spaced intervals throughout the 24-hour period. The present paper gives details of the design and reports some of the results obtained with the trap.

DESCRIPTION OF APPARATUS. As before, the sentinel mice are exposed in a cage sheltered by a hood. Situated under the bait is a fan which, at regulated intervals, directs a current of air upward past the bait to the apex of the hood where it forces open trap doors leading to a screened basket. Mosquitoes are thus blown, without damage, from the bait into the basket.

Figure 1 is a diagram of the trap. The basic components are: (1) an aluminum hood, 62 cm. square and 32 cm. from base to apex; (2) a cage for the sentinel animal bait, 10 x 10 x 12 cm., made of 4 x 4 mesh wire and suspended from the

hood; (3) a flue, 21 x 21 x 26 cm., the upper half of aluminum and the lower half of nylon netting; (4) a 19 cm. propeller, turned by a 6-volt D.C. motor (model DC-85A-6, Pittman Corp., Sellersville, Pa.); (5) a clock connected between the motor and the power source, with a conducting minute hand and contact points at 15-minute intervals which allow the motor to run for 90 seconds; (6) a 6-volt power source (automobile battery); (7) foam plastic trap doors, 11.5 x 11.5 cm., which open by force of air from the propeller and close by gravity; (8) a receiving basket, 23 x 23 x 30 cm., made of 32 x 32 mesh plastic screening.

The apparatus is suspended on wires under a protective roof of aluminum sheet metal, which in turn may be suspended on pulleys or (Figure 2) may be placed on portable metal supports at any desired level above the ground. Tin cans are soldered to the metal supports and filled with water to keep out ants. The clock is housed in a small box under the aluminum roof. Figure 3 shows the motor, protected by a plastic bag, suspended under the flue.

RESULTS. During December 1964 and February–April 1965, the blower trap was operated with sentinel mice (mother and babies) for 84 daily periods in the IPEAN forest. Captures totaled 41,825 mosquitoes, for an average of 498 insects per day.

Because of the overwhelming volume of mosquitoes, only representative captures were completely identified. Of 13,100 sorted, 12,600 were *Culex* and about two-thirds of these were *Culex (Melanoconion)*. An additional 14,690 *Culex* (comprised of *C. (M.) taeniopus*, two other species that are distinctive but not identifiable by the female characteristics, and a heterogeneous group of species) were utilized for attempts to obtain oviposition

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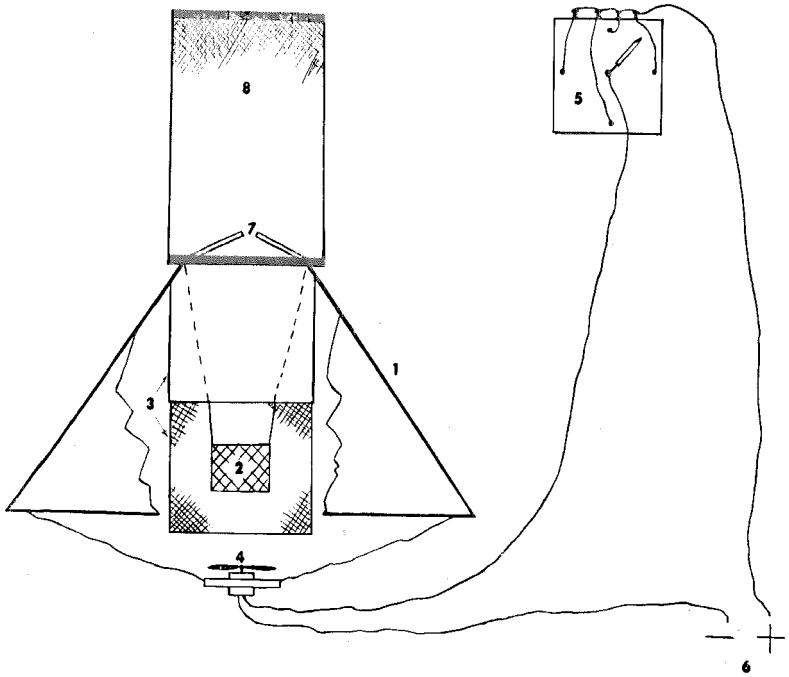


FIG. 1.—Blower trap. See text for description of numbered parts.

TABLE 1.—Comparison of effectiveness of blower trap and conventional hood trap for detection of viruses in mosquitoes.

Month	Type of trap	No. sentinel mouse groups exposed *	No. mosquitoes collected	No. sentinel groups infected with virus	No. mosquitoes/sentinel group infection
Dec. 1964	Blower	19	3,858	3	1,286
	Hood	31	....	4	....
Feb. 1965	Blower	15	8,388	4	2,097
	Hood	28	....	4	....
Mar. 1965	Blower	23	11,272	3	3,757
	Hood	31	....	6	....
Apr. 1965	Blower	27	18,307	6	3,051
	Hood	30	....	2	....

* Each for a 24-hour period.

in the laboratory. These mosquitoes were also allowed to feed on sentinel baby mice in the laboratory for attempted virus transmission, according to a technique described elsewhere (Toda and Shope, 1965).

During December the trap was operated at 30-minute intervals and approximately 20 percent of the insects captured were engorged. During February–April the interval was reduced to 15 minutes and approximately 7 percent of the insects captured had fed. Comparison of the results of operation at these two intervals

on alternate days showed that the number of mosquitoes captured with the 15-minute interval was not much greater than with the 30-minute interval.

Monthly data on the number of sentinel mouse groups exposed in the blower trap and the number infected with virus are listed in Table 1, together with corresponding data from a conventional hood trap operated during the same period in the same forest at a distance of 200 meters from the blower trap. It can be seen that, in terms of number of sentinel groups in-



FIG. 2.—Blower trap in use with 6-volt car battery.

fected, the two traps gave roughly comparable results.

Assuming that no mosquito escaped from the blower trap after probing, then at least one virus transmission occurred for every 1,286 to 3,757 mosquitoes captured. The actual transmission rate may be higher, however, since, as noted above, only about 7 to 20 percent of the mosquitoes were visibly engorged.

DISCUSSION. The blower trap has proved effective in collecting *Culex* coming to mouse bait in the IPEAN forest. It has

the virtues of offering hematophagous insects relatively open access to the bait and of collecting them undamaged since they do not pass through the fan blade. Furthermore, the frequency of operation can be regulated so that mosquitoes may either be allowed to feed on the bait before capture or be taken mostly unengorged.

With the conventional hood trap, mosquitoes that feed on the bait are still free to return to the forest environment. Consequently, if early in the exposure period

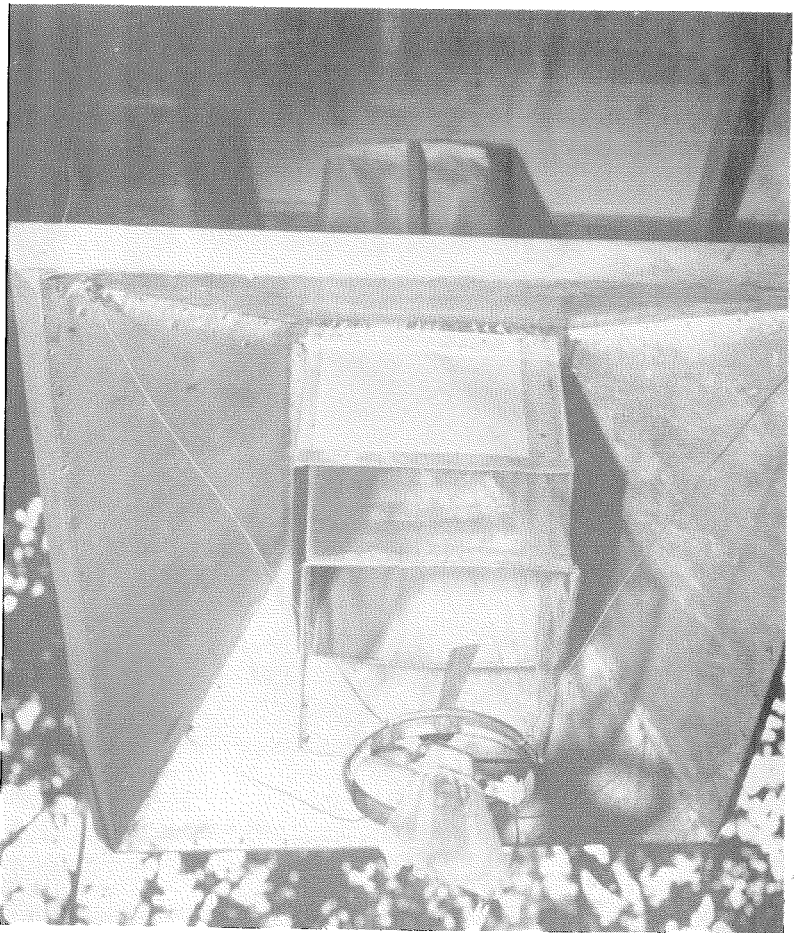


FIG. 3.—Close-up of hood; bait (not shown) is suspended over propeller.

the sentinel mice are infected by mosquitoes and develop viremia, other mosquitoes coming to the bait later on may pick up the virus and carry it back to the forest. In such circumstances, the sentinel mice may be serving as an artificial amplifying host. The blower trap would seem to be an effective means of avoiding this potential danger.

SUMMARY. A trap has been designed on the blower principle which effects continuing capture of mosquitoes attracted to sentinel mouse bait by forcing them at regulated intervals from the bait into a

collecting basket, where they arrive undamaged. The trap has been efficient in collecting *Culex* in a forest near Belém, Brazil.

References

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