

A PORTABLE MOSQUITO BAIT-TRAP<sup>1, 2</sup>R. E. BELLAMY<sup>3</sup> AND W. C. REEVES

The successful operation of a mosquito stable-trap using carbon dioxide gas (dry ice source) as a bait has been described by Reeves (1951). To facilitate further studies, a small, portable bait-trap was developed<sup>4</sup> to supplement the larger stable-trap. This small trap shows much promise in capturing certain species of mosquitoes. Description of the trap and the results of preliminary testing in Kern County, California, during the summer of 1951 form the basis of this report.

**DESCRIPTION OF THE TRAP AND TRAPPING METHODS.** The trap (Fig. 1) is made from a standard 50-pound lard can (12 inches diameter x 14½ inches high). In constructing, a round hole 8¾ inches in diameter is cut in the center of both lid and bottom of the can. A funnel of 13¼ x 18 mesh bronze hardware cloth 10 inches in diameter and 5½ inches deep is fitted and soldered to the rim of each opening so that the apex of each funnel will be directed into the can. A ¾ inch diameter hole at the apex of each funnel permits the entrance of mosquitoes.

A block of dry ice, approximately 3 pounds, wrapped in heavy paper was used as a standard bait. A hole less than an inch in diameter was torn in the paper to permit the ready escape of gas. When such a bait was placed in a trap in the late afternoon, some ice usually remained the following morning.

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<sup>3</sup> Scientist, Communicable Disease Center, Public Health Service, Federal Security Agency, Atlanta, Georgia.

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The trap was operated either in a vertical or in a horizontal position. In the former, the bait block was suspended near the middle of the trap by a string or wire attached to the lid; in the latter, the bait was laid at the midpoint of the lower side of the can.

To remove mosquitoes, the trap, with funnel openings plugged, was placed inside a larger can with a wad of cotton wool soaked in chloroform. About 5 minutes sufficed to anesthetize the mosquitoes for removal from the trap.

Initial tests with one trap in late July, 1951, were sufficiently encouraging so that four additional units were constructed. The traps were tested on the ground and at various elevations up to at least 25 feet, suspended by cord from the limbs of trees or from convenient structures (Fig. 2). Most of the testing was done at a locality on Poso Creek, Kern County, California, an area selected because of the presence of a large population of *Culex tarsalis* Coq. On a few occasions the traps were tested at other localities in Kern County. Some special testing was done at the Poso Creek locality. In one instance, a baited trap was removed and replaced by another at various intervals throughout a night to provide data on the time that mosquitoes enter the traps. On another occasion, 100 mosquitoes were transferred by aspirator from a baited trap to an unbaited one about two hours after sunset; the unbaited trap was then left in an operating position until the following morning to determine what proportion of the mosquitoes would escape.

**RESULTS.** On five nights in August, 1951, all five traps were operated at the Poso Creek locality, the total catch of mosquitoes from the five traps being, 481, 1,146, 458, 573, and 1,302 on these respective nights. Of the 3,960 mosquitoes, 3,929 were *Culex tarsalis*, 11 males and the rest females. The other specimens were: *Culex quinquefasciatus* Say, 30 females;

and *Culex stigmatosoma* Dyar, 1 female. No trap failed to catch mosquitoes on any of these nights, the smallest number taken by a trap in a night being 8, and the largest number 551. (In July, when only one trap was used, negative trapping nights were experienced twice.) On the night of September 20 at the same locality 922 female *Culex tarsalis* and 25 female *Culex quinquefasciatus* were taken in a trap baited with an unusually large (about 5 pounds) block of dry ice.

On the few nights in August and September that the traps were operated at other localities in Kern County, some mosquitoes were taken each night but the catches were small, the total catch of the five traps not exceeding 100 specimens on any night. At one locality, the composition of the catch was unlike that from Poso Creek, 15 females of *Aedes nigromaculis* (Ludlow), 5 of *Aedes dorsalis* (Meigen), and 11 of *Culex tarsalis*, con-

stituting the catch of a trap operated in a horizontal position on the ground.

On the one night that the time of entrance of mosquitoes was tested, *Culex tarsalis* entered the trap throughout the night, but there was a peak of activity at sundown and a lesser one at dawn.

Of the 100 mosquitoes left overnight in an unbaited trap, 95 were recovered the following morning.

In the quest of optimum operating conditions, the traps were shifted from one location to another, or were operated at different heights, or in different positions on successive trapping nights; therefore, the various trials are not comparable. However, the trapping experience supports the following pertinent points. With only rare exceptions, the specimens trapped were unengorged females which show little or no evidence of ovarian development.

The exact location of a trap greatly

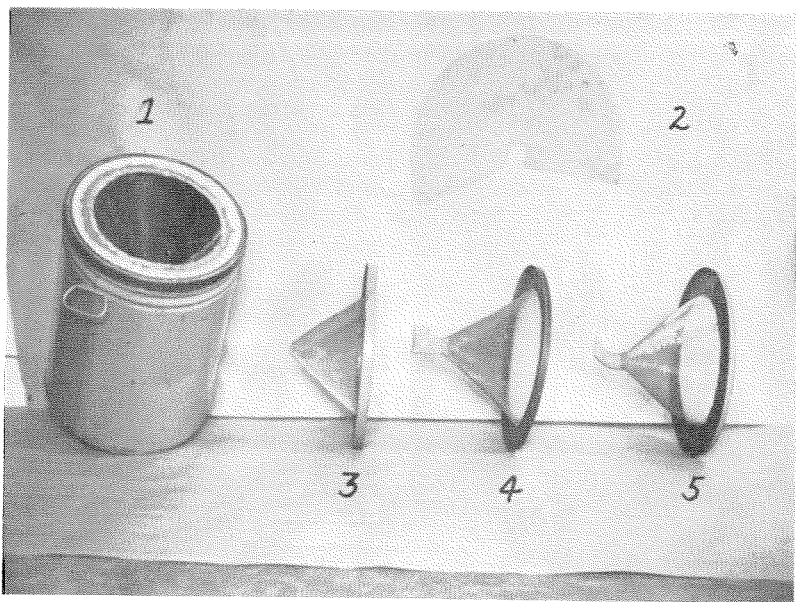


FIGURE 1. LARD CAN MOSQUITO TRAP

1. Assembled trap.
  2. Screen cone pattern.
  - 3, 4, and 5. Lids with screen cones or funnels soldered in place; 4 and 5, respectively, with angled and curved funnel opening extensions.
- Funnel in bottom of can (1) does not show.

influences the catch. Apparently, a difference of a few yards in locating a trap would determine whether the catch would consist of several hundred specimens or of less than a dozen.

*Culex tarsalis* will enter a baited trap at almost any height from ground level up to at least 25 feet (some of the larger catches were from traps operated at heights of 14 or more feet).



FIGURE 2. TRAPS IN OPERATING POSITIONS

Note traps suspended vertically in tree (upper left and lower right), and traps suspended horizontally from tree limb (lower left) and from stakes just a few inches off ground.

When a trap is operated in a vertical position, *Culex tarsalis* will enter from below or (apparently less readily) from above. Most of the trials were with traps operated in a vertical position, suspended five feet above the ground or higher. The entrance hole of the top funnel was usually plugged when a trap was used in this manner, and in these instances a flat piece of screen could just as well have been substituted for the top funnel. The traps appeared to be only slightly more effective when suspended in a horizontal position with both funnels open. Operation of the traps on the ground is often unsatisfactory because ants enter and destroy the captured specimens.

**SUMMARY AND CONCLUSION.** The construction of a portable mosquito bait-trap from hardware cloth and a standard 50 pound lard can is described. This trap, when used with dry ice (carbon dioxide) bait, has shown much promise as a device for capturing adult female mosquitoes. The catches of *Culex tarsalis*, in particular, were large when the trap was operated in an area in Kern County, California, where this species was abundant. The other species collected were *Culex quinquefasciatus*, *Culex stigmatosoma*, *Aedes nigromaculis*, and *Aedes dorsalis*.

The trap is economically and simply constructed, is light and easily transported, and therefore offers a wide variety of possibilities in the positions and places in which it may be operated. In preliminary trials it is desirable to utilize several traps simultaneously at a locality in order to discover favorable operating sites promptly.

It would be interesting to observe the response of other species of mosquitoes to the trap and its efficacy in other areas.

#### Literature Cited

- REEVES, W. C. 1951. Field Studies on Carbon Dioxide as a Possible Host Stimulant to Mosquitoes (18679). *Proc. Soc. Exp. Biol. and Med.* 77:64-66.