A COLLAPSIBLE, PORTABLE VEHICLE-MOUNTED INSECT TRAP[1]

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The application of aerially dispersed pesticides on many posts in the First Army area created a need for a simple method of sampling mosquito populations and evaluating its extent of control achieved. The large acreages involved indicated that some sort of vehicle-mounted trap would be in order. Various types of vehicle-mounted devices have been used for years in basic biological studies. The two traps recently described in literature by Sommerman (1965) and Bidlingmayer (1966) were considered and found unsuitable because neither filled the requirements for portability and lightness. A device was needed which weighed less than 25 pounds including containers, and qualified as personal baggage on passenger airlines (Fig. 1). A prototype was designed and constructed in this laboratory.

DESCRIPTION. The hoop or mouth of the trap is 7 feet wide by 2 feet high and collapses to 3½ feet by 2 feet. A fiber glass cone is inserted at the rear of the net and attached to two metal uprights mounted in a plywood platform which is secured to the top of the car with suction cups and straps. The hoop is secured to metal poles projecting in front of the windshield and attached to the car by suction cups and straps. The upper portion of the hoop is secured to the front of the car by guy ropes. One-quarter inch nylon ropes were sewn into each corner of the net and attached to the metal uprights on the rear platform with eye bolts and wing nuts. The fiber glass cone is spring-tensioned into the net. Overall length of this trap is 7 feet. A CDC trap collecting bag is used for collections. This trap was stable at speeds up to 40 miles per hour.

This design was turned over to the Medical Equipment Research and Development Laboratory, Fort Totten, New York, for further development. Several engineering changes have been made to

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FIG. 1.—Prototype constructed at 1USAML

the trap during the development period. The military prototype trap is described as follows (Fig. 2): The hoop is ¾ inch aluminum tubing, 5 feet wide by 2 feet high. The 5-foot axis has removable 2-foot center sections that are secured with sliding internal pins during assembly. Breaking the hoop in this manner sets the maximum dimension of the folded trap at 2 by 1½ feet. The net is constructed of nylon netting, fabric and an aluminum collecting tube. The large end, which is sewn to the hoop, is fabric for centerline distance of 12 inches. Nylon netting is used from this point to the end of the net. A fabric sleeve (4-inch diameter) is sewn to the small end of the net. This sleeve is glued to the inside of a 4-inch (inside diameter) collecting tube. A universal mount has been constructed which consists of telescoping square aluminum tubes attached to a cross bar at the rear of the mount. The cross bar has a yoke attached which cradles and secures the collecting tube. Suction cups and straps are attached to the telescoping tubes for securing the trap to the top of almost any vehicle. During assembly the hoop bolts to the ends of the telescoping tubes. The collecting tube is secured to the yoke. The entire unit is tensioned by extending the telescoping tubes and securing the top of the hoop to the front of the vehicle with guy ropes. Small adjustments in tensioning can be effected by sliding the collecting tube through the yoke.

OPERATION. This trap proved to be an excellent means of sampling populations and evaluating aerial spray operations so long as consideration is given to the flight activity of the mosquitoes. Bidlingmayer, 1966, states that maximum flight activity of *Aedes taeniorhynchus* occurs during the crepuscular period and falls off sharply as

FIG. 2.—Military model of Vehicle Trap.

twilight grades into night. According to his data, this decrease in activity ranges from 50 to 60 percent under full moon conditions and about 90 percent under new and last quarter moon conditions.

This pattern of flight activity is true of the mosquito species in this area, though the actual percentage of decrease in flight activity under night conditions may vary somewhat. The difference in nighttime flight activity caused by lunar light levels is not of great importance in using the vehicle trap for aerial spray evaluations since the period of sampling is rarely more than 4 days. If a complete evaluation of the time required for a buildup after an aerial spray is desired, then the factor of lunar light levels must be seriously considered.

The method of sampling used by this laboratory with the vehicle trap has been designed so that these flight activity variations are taken into account. Before surveying the entire route is laid out on a map and divided into increments, usually five miles. The most important areas are surveyed during the crepuscular period. Since flight activity varies markedly during the crepuscular period, sampling must be continuous and over a route short enough to allow two round trips. In practice, 5 miles works well for most situations. This method produces a sample representing 5 miles at the beginning of the crepuscular period, 5 miles at the end and 10 miles during the period of maximum activity. An average of these samples has been a dependable population estimate. After the crepuscular period flight activity is fairly constant. The remaining samples are taken by driving the predetermined route with sample bag changes at 5-mile intervals. The route is then retraced with inbound bag changes at the same points as

outbound. Outbound and inbound samples are averaged.

DISCUSSION. The vehicle trap shares the problems associated with other methods of trapping in that wind, rain, and temperature can play havoc with trapping results. As with any trap there is some selectivity as to species and relative numbers of each species trapped in relation to the total population of each species. This is not a problem when the trap is used to evaluate control operations unless control is directed toward specific mosquitoes. The vehicle trap is quite useful for ecological surveys, and when used for this purpose, selectivity must be considered. Various models of the collapsible, portable, vehicle trap have been used in this Army area, in Panama, and by the United States Public Health Service in South Carolina for aerial spray evaluation and general survey.

Bibliography

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