

KEH, B. 1955. A mosquito gynandromorph. *Calif. Vect. Views* 2:18.

KITZMILLER, J. B. 1953. Mosquito genetics and cytogenetics. *Rev. bras. de Malarior. e D. Trop.* 5(4):285-359.

LAURENCE, B. R. 1959. A gynandromorph of *Taeniorhynchus uniformis* (Theobald) (Diptera; Culicidae). *Proc. R. ent. Soc. Lond. (A)* 34: 34-36.

A FAN TRAP FOR COLLECTING BITING INSECTS ATTACKING AVIAN HOSTS

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Lumsden (1958) developed a fan-type trap to capture mosquitoes in the vicinity of small vertebrate baits. In preliminary trials, fans pulled a stream of air horizontally across the bait at regular intervals in such a way that the attacking insects would be carried into a screen sleeve provided with a killing jar. The fan was operated intermittently so that insects could approach the bait undisturbed during the periods when the fan was not running. Subsequent tests showed that a suction-type trap with the fan placed above the bait was more efficient.

In 1957-1958, TVA constructed a recirculating type of trap different from Lumsden's but using some of his principles. The TVA trap was designed for use in field studies to determine host-parasite relationships of biting Diptera frequenting bottomland forest canopy.

The drawing (Fig. 1) shows the assembled trap with the upper sliding panel removed. The frame of this trap is constructed of $\frac{3}{4}$ " \times 2" wood uprights and 16-gauge sheetmetal channels (2 " \times $\frac{1}{4}$ " and $\frac{3}{4}$ " \times $\frac{1}{4}$ ") with welded corners. The blower (A) is a twin centrifugal type zCO69 "Dayton" with two $4\frac{1}{2}$ " diameter-balanced blower wheels in direct drive on each end of the motor shaft. Each of the blowers has a 3" \times 3" discharge opening. These airstreams are brought together to form a common discharge having a diameter of approximately 10 inches. This opening allows the airstream to completely surround the bait (B). A sheetmetal cone 8" in diameter with the cup side uppermost was centered in this air discharge duct to augment the velocity. This cone also serves as a collector for droppings from the small chicken used as bait. Sheetmetal collars (C) are used to convey the airstream to the height required. The bait was restrained in a metal basket (D) constructed of large mesh wire with a reversible hinged cover. The chicken's head protrudes through a small opening in the cover. The position of the bait in respect to the airstream and distance below the trap hood can be controlled by adjusting the four metal rods

(D) running from the lower rim of the bait basket through holes in the wooden frame.

The air blast from below the bait is directed into the center of the sheetmetal hood (E) above the bait. When the airstream reaches the hood, it has lost most of its velocity due to friction with the bait and surrounding atmosphere, but the hood and the cross section of the throat area (F) leading to the suction intake duct were designed to produce a gradual increase in velocity which prevents the escape of insects caught in the airstream. The insects are separated from the airstream by means of a fine mesh (32) wire cone (G) and collected in a pint killing jar (alcohol) (H). The cone has a large surface area which minimizes the loss in velocity. Both the cone and killing jar are located in a reversed, tapered section of the intake duct. The screened cone and killing jar can be removed by sliding the cone out through this panel opening. While the trap is in operation the sliding panel and the spring-loaded door (I) are both kept closed. The killing jar alone can be attended by opening the lower door.

For ease of handling and transporting, the complete unit is constructed in two matching parts of about the same size. By removing four small bolts the upper section, consisting of lifting eye,

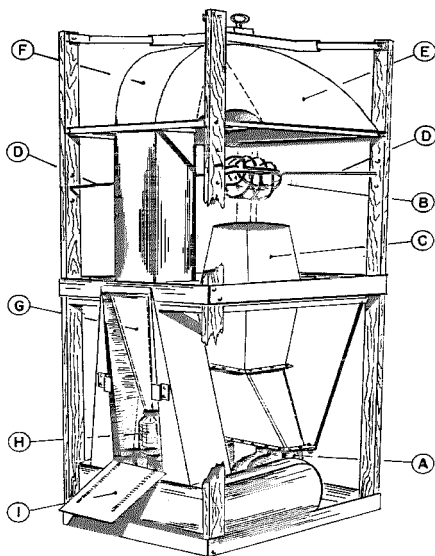


FIG. 1.—Assembled fan trap for collecting biting insects attacking avian hosts. See text p. 315 for explanation.

hood, upper section duct, and bait basket, may be removed as a unit. The upper section weighs 20 pounds and the lower section 36 pounds. The dimensions of the trap when assembled are 4.5 feet high by 2.0 feet wide.

An automatic control unit*, consisting of a recycling cam timer (Series CM-5) and B-15 gear and rack assembly, was used to activate and deactivate the blower. The timer has a five-minute periodicity that can be adjusted to provide 0 to 100 percent "on" or "off." The most suitable cycle of operation was two minutes "on" and three minutes "off." This unit and the portable gasoline generator used to furnish power for operation of fan were located approximately 150 feet from the base of the tree in which the fan trap was suspended.

The trap was operated during the summers of 1958-1959 in connection with a program to investigate the feeding habits of biting Diptera in natural and altered bottomland habitats at Beaverdam and Blackwell Swamps near Decatur, Alabama. The fan trap collections were made in hardwood forest canopy to supply information on Diptera attacking avian (chicken) bait. In order to obtain a wider scope of the insect biting population, collections from human bait at ground and different canopy levels were also made. These collections were made using another oak tree approximately 150 yards from the fan trap location. The results are given in Table 1.

TABLE 1.—Record of female mosquitoes and hecids taken at different locations and elevations by two sampling methods using human host and fan-type trap during the crepuscular period, Beaverdam Swamp, Greenbrier, Alabama, June 23, 1958

Method: Collection period:	Fan-type bait trap * 1825-2035	Aspirating on man ** 1845-2015
<i>Species</i>		
<i>Anopheles quadrimaculatus</i>	1	3
<i>Mansonia perturbans</i>	19	35
<i>Culicoides baueri</i>	26	5
<i>C. guttipennis</i>	5	9
<i>C. hinmani</i>	22	0
<i>C. paraensis</i>	0	2

* 35-foot level in forest canopy—avian bait.

** 75-foot level in forest canopy.

SUMMARY

A new trap for collecting biting insects has been made. The unit is virtually a closed system with

a twin centrifugal fan taking in air from the hood above the bait and passing it through the screen cone separator and discharging the blast of air beneath the bait where it is recirculated. Based on two summers' observations, it appears that this trap has sufficient airflow to capture small Diptera such as *Culicoides* and *Phlebotomus*, but an increase in velocity appears essential to sample mosquito populations adequately.

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Reference

LUMSDEN, W. H. R. 1958. A trap for insects biting small vertebrates. *Nature* 181:819-820.

A MOSQUITO-TIGHT CAGE

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The escape of mosquitoes from breeding and maintenance cages is a great nuisance, especially where genetics and resistance studies are carried out, since escaped mosquitoes may re-enter experimental cages and thus render such experiments futile. In most mosquito cages described (Young & Burgess (1946), Boyd (1949), Barnett (1955), Trembley (1955), Hartzell *et al.* (1958)), a sleeve is used which makes possible all required manipulations inside the cage; this arrangement, however, does not prevent the escape of mosquitoes on those occasions when materials (eggs, food, animals, etc.) are transferred. The construction of a mosquito cage in which all the required manipulations could be carried out without ever opening the cage (except when no adults are present, e.g. for cleaning and introducing the pupae) is described.

The cage (40 x 44 x 40 cm.) (Fig. 1) has a wooden frame and bottom and a 20-mesh metal screen on all sides except the front which is only partly screened and divided into two parts: one part (40 x 15 x 15 cm.) is fixed, the other (40 x 30 x 33.5 cm.) removable by means of screws and snaps (Detail A). This removable part is lined around the inner edge with a strip of rubber sponge and around its outer edge with a metal frame to insure tight sealing.

Larvae reared in any suitable container are filtered after pupation from the rearing medium, put into a plastic dish (31.5 x 23.5 x 8.0 cm.) (Detail D) containing fresh water, and placed on the floor of the cage slightly inclined towards the front. A metal tube (1 cm. in diameter) con-

* Industrial Timer Corporation.