BIOLOGICAL STUDIES ON TABANIDAE I. INDUCED OVIPOSITION[1]

R. H. ROBERTS
Entomology Research Division, Agr. Res. Serv., U.S.D.A., Stoneville, Mississippi

In Tabanidae species that have been reported, the adult female oviposits around or over the larval habitat on leaves, grass, or twigs, or on any object available. Unfortunately, the larval habitat of most species of Tabanidae is not known. Identification of eggs collected in the field is questionable unless the larvae from the eggs are reared to the adult stage as only a few species can be accurately identified in the larval stage.

A technique for obtaining eggs from known species would provide the basis for descriptive data needed for identification of eggs and larvae collected in the field and would also provide larvae of known species for biological study. The present paper describes a method that has been used satisfactorily for several years to obtain eggs of Tabanidae.

MATERIALS AND METHODS. The oviposition chamber is a wide-mouthed gallon jar with 2-3 inches of water-saturated sand in the bottom covered with a wire screen disk; resting on the disk is a 16 x 18-mesh wire screen cylinder that just fits the mouth of the jar and projects 4 to 6 inches above the jar top. The top of the wire cylinder is covered with cheesecloth (Figure 1).

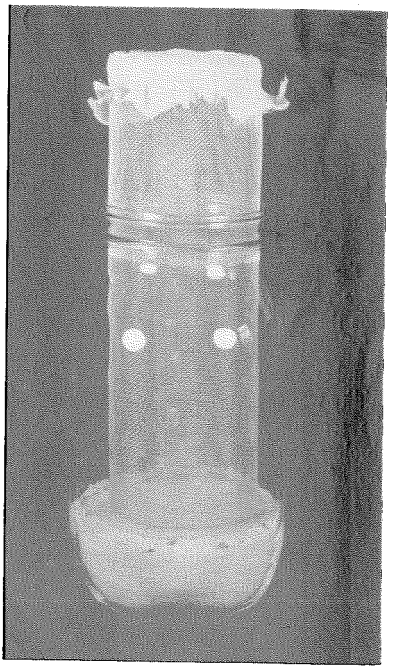

FIG. 1.—Oviposition chamber.

[1] In cooperation with Delta Branch of the Mississippi Agricultural Experiment Station.

Engorged adults were collected from a bait animal, brought into the laboratory, and identified. Each species was placed in a separate cage. The size of the cage was adequate for 25–30 adults of the smaller species and 10–15 adults of the larger species. The flies were fed 2–3 times a week by placing cotton pads saturated with a solution of 5 percent honey on the cloth top. At other times a cotton pad saturated with water was supplied.

RESULTS AND DISCUSSION. Eggs from 16 species representing 5 genera of Tabanidae were obtained. The species are listed below.

Tabanus
abdominalis F.
americanus Forster
atratus F.
calens L.
equalis Hine
fuscicostatus Hine
lineola F.
proximus Walker
pumilus Macquart
subsimilis Bellardi
sulcifrons Macquart
Hybomitra
lasiophthalma (Macquart)
Chrysops
flavidus Wiedemann
callidus Osten Sacken
Chlorotabanus
crepuscularis (Bequaert)
Whitneyomia
beatifica (Whitney)

A sprig of Johnson grass was initially planted in the sand in the bottom of each cage because previous workers using similar techniques (Webb and Wells, 1924; Schwardt, 1936; and Kershaw et al., 1954) reported that the flies oviposited on vegitation placed in egging cages. However, in the present study the flies oviposited more often on the screen or cloth top; thus the use of grass was discontinued.

The construction of the oviposition chamber was such that a gradient in humidity was obtained: the lower portions of the screen cylinder within the jar had absolute or near absolute humidity; at the top of the screen cylinder the humidity was that of the room in which the cages were held. Smaller species such as *T. lineola* tended to remain in the bottom of the cages; larger species such as *T. atratus* tended to remain at the top. This observation was interpreted to mean that the smaller species required higher humidity than the larger species.

Generally all species tended to oviposit more on the cloth covering than on the screen cylinder and in the bottom of the cage. Except for *W. beatifica*, all species studied grouped their eggs together in clumps of varying sizes and shapes. The eggs of *W. beatifica* were scattered over the cloth covering; however, these eggs were sterile, which may have influenced the manner in which they were oviposited.

The size and shape of the egg masses (Figure 2) appeared to be governed by (1) the number of eggs the female apparently had available for oviposition; (2) the size and shape of the surface chosen for oviposition; and (3) the size of the eggs. Species with small eggs had difficulty forming a compact egg mass when oviposition occurred on the wire screen because the female was unable to oviposit normally in the spaces between the wires (Figure 2 D). Oviposition occurred several times on a single wire projecting into the cage, which resulted in egg masses that were ovoid in shape.

Eggs of the genus *Tabanus* are generally laid in multiple-layered masses; eggs of the genus *Chrysops* are usually laid in a single-layered mass. However, the two genera cannot specifically be identified in this manner because there are too few other characters that can be used. However, with any generality, there are usually exceptions, and the present study showed several. The one egg mass of *Chrysops callidus* obtained was 2-layered. The eggs of *T. equalis* were deposited in a single layer with the eggs placed perpendicular to the surface and cemented tightly together (Figure 2 A). The egg mass of *T. abdominalis* was also unique in that the eggs were not cemented together, and only the leading end of the egg as it was deposited had cement; after the first layer was formed, the remaining eggs were inserted between the eggs of the first layer, and this insertion continued until a conical, loosely formed egg mass was constructed (Figure 2 B). *Chlorotabanus crepuscularis* formed single-layered egg masses in which the eggs were perpendicular to the surface (Figure 2 C).

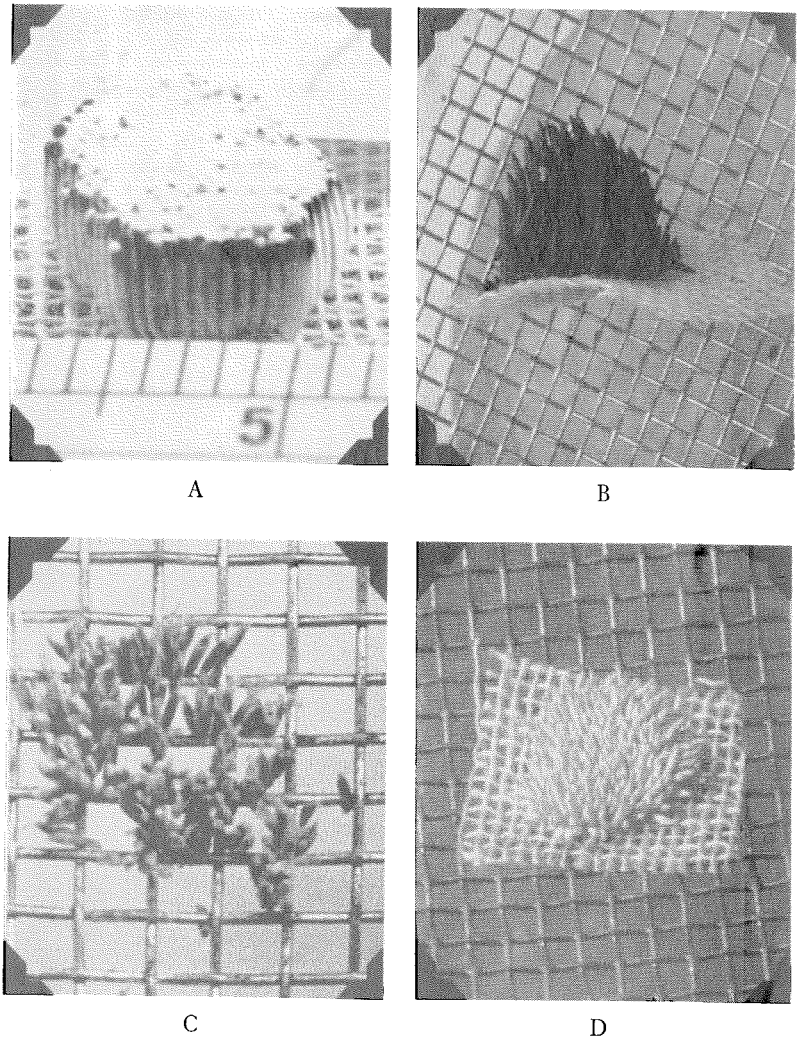

FIG. 2.—A. Eggs of *Tabanus equalis*. Scale is in mm. B. Eggs of *Tabanus abdominalis*. C. and D. Eggs of *Chlorotabanus crepuscularis*. Estimate of size can be made by using the 16 x 18-mesh screen as a measuring grid.

The color of the egg masses varied among the species—black, reddish brown, yellowish white, white, and in one case, light green. The colorations observed in this study were in agreement with those species previously reported, but the eggs of one species, *Chlorotabanus crepuscularis*, were light green, a color not previously reported for the eggs of the Tabanidae. However, the colors observed for the other species were not distinctive enough for specific use.

The egg masses of *T. abdominalis, T. equalis,* and *Chlorotabanus crepuscularis* appear to be sufficiently distinctive for specific identification; those of the other species need additional study to determine whether specific characteristics exist.

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