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LABORATORY OBSERVATIONS ON A MOSQUITO, *CULISETA MELANURA* (COQUILLETT)

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Recent isolations of virus from field-caught *Culiseta melanura* (Coquillett) have directed attention to this species as a possible vector of both eastern and western equine encephalitis (Chamberlain *et al.*, 1951, Kissling *et al.*, 1954, Holden, 1954). *C. melanura* is a rarely encountered but widely distributed mosquito which breeds throughout the southern and eastern states in swampy or low areas where small permanent waters occur (Carpenter *et al.*, 1946). As recently pointed out by Wallis (1954), the bionomics of the adult, including its feeding habits, are largely unknown. In view of its potential importance as a vector and the paucity of information regarding its life habits, an attempt was made to establish a colony in the laboratory.

On November 6, 1951, 2nd to 4th stage *C. melanura* larvae, associated with those of *Culex territans* Walker, were collected

n a swamp near Macon, Georgia, from eepage holes left by decay of sweetgum tumps. The weather was cold, with tem-eratures near freezing at night. The arvae were transported immediately by nheated automobile in jars of the origi-al breeding water to the Communicable Disease Center Virus and Rickettsia Lab-ratory, Montgomery, Alabama. About ne-fourth of the collection, consisting of nixed *C. melanura* and *C. territans,* was laced directly into an insectary main-ained at 80° F., and 75 per cent relative umidity. The remainder was held tem-orarily in an unheated room. Nearly all f the *C. melanura* larvae which were laced directly into the insectary died vithin 18 hours, although all the *C. ter-itans* larvae in the same pans with them urvived. Meanwhile, the weather gradu-lly warmed up. A week later, when the nidday temperature was near 80° F., the pecimens from the unheated room were ntroduced into the insectary with no ap-arent ill effects.

The larvae were reared in white enam-led pans containing a 2-inch depth of wamp water to which a little swamp nuck had been added. Water lost by vaporation was replaced with tap water. \ small piece of compressed alfalfa rabbit ellet was placed in each pan daily as ood. The surface of each pan was kimmed daily to keep down surface rowth.

Larval development was slow, compared vith such species as *Culex quinquefasci-atus* Say and *Aedes aegypti* (L.), with 2 to ; weeks required to reach the pupal stage. t was not known at the time whether his was characteristic of the species or a esult of prior conditioning to cold tem-erature in the field. However, it appears s though the latter is the case, in view f a recent report (Wallis, 1954) of rapid levelopment of larvae not exposed to low emperatures. The duration of the tage was 48 to 72 hours. Most of the dults were of normal size.

The adults were kept in 9" x 9" x 12" nosquito-netting cages. No mating was bserved, although the specimens were placed under artificial lights of different intensities and near a window exposed to natural afternoon and evening light. It is probable that the lack of mating was due to their being restricted to a small cage. They fed readily upon soaked raisins placed on top of the cages and were long-lived. Some remained alive for 6 weeks, at which time they were killed in the course of another experiment.

They were not avid blood feeders in the laboratory. After being deprived of soaked raisins for 36 to 48 hours, only 10 per cent of the specimens fed upon a 3-day-old chick immobilized on top of the cage overnight. Thirty per cent of similarly starved specimens engorged upon the shaved abdomen of a rabbit. These results do not necessarily indicate a natural preference for mammalian blood over avian, however, as the attracting surface was many times larger in the case of the rabbit than that of the chick. That they will feed upon birds in nature is shown by the results of a precipitin test on a single engorged *C. melanura* light-trapped in Louisiana in 1953, which revealed that avian blood had been ingested.

In virus transmission experiments unrelated to attempts to colonize *C. melanura,* both males and females fed readily in the light upon an infected chick embryo suspension to which a small amount of sugar had been added. Two weeks later the individual females of this group, starved for 48 hours, were induced to feed in the light upon chicks carefully held in contact with them.

In the act of feeding, deep probing rarely occurred. The mouth parts appeared barely to penetrate the skin surface, as labial buckling was seen in only one or two instances. The feedings on chicks carefully held against the mosquitoes required from 10–40 minutes for completion, with an average of 20 minutes in a series of 20 specimens.

Seventeen specimens which engorged upon a rabbit were provided with a 100 ml beaker of swamp water as a site for oviposition. Of these specimens, 11 produced egg rafts. One raft was laid on

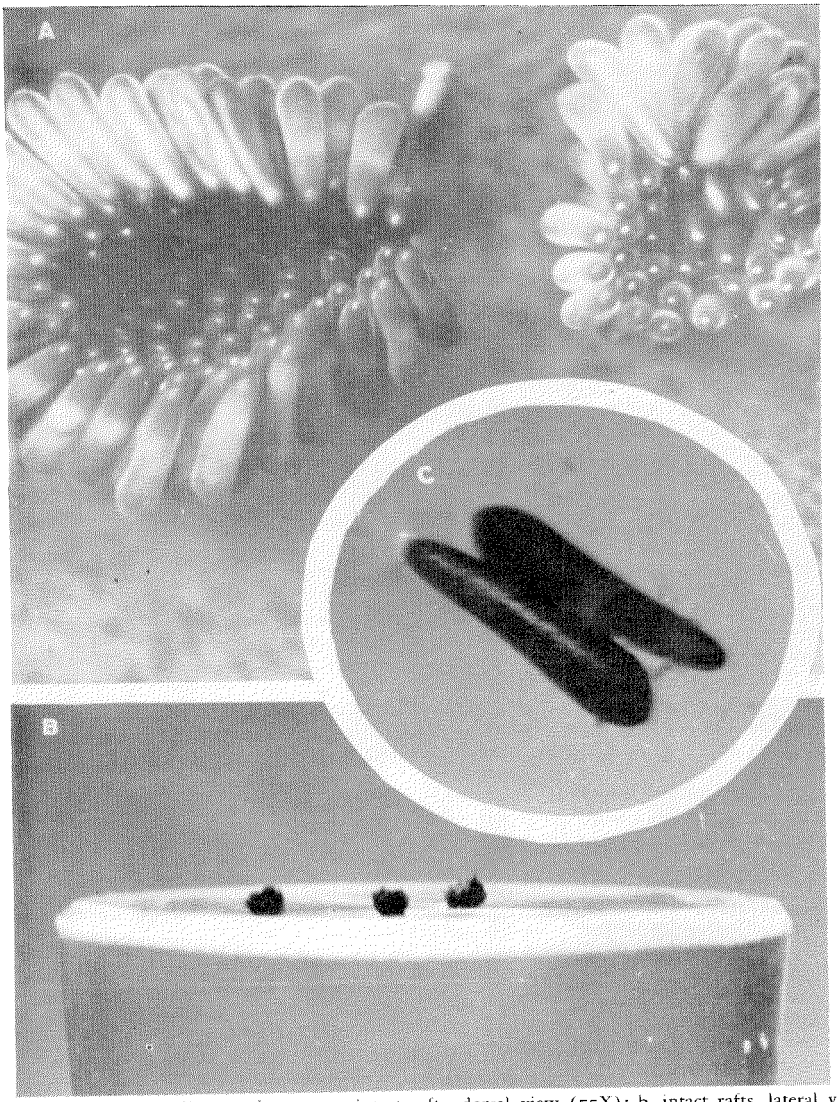

FIGURE 1.—Eggs of *Culiseta melanura*. a, intact rafts, dorsal view (55X); b, intact rafts, lateral view (4.7X); c, individual eggs (90X).

the 4th day, 5 on the 5th day, and 5 on the 6th day after the blood meal. None of the eggs from these rafts hatched, nor from 5 other rafts obtained from a different lot of mosquitoes after chicken feedings.

The egg rafts, examples of which are shown in figure 1-a were about 2.0–2.5 mm. in diameter and bowl-shaped. Some of the rafts were almost perfectly round; others were oval, with one side incomplete. The bottom contours of the rafts were strongly rounded so that only the centrally located eggs were in contact with the water surface, those on the margin and submargin being entirely out of the water (fig. 1-b). Each raft contained about 100 eggs (2 average-sized rafts consisted of 85 and 102 eggs respectively). Individual eggs (fig. 1-c) were about 0.84 mm. long and 0.22 mm. wide at the greatest point. Some had begun to collapse when the photographs were taken, probably because these eggs were infertile.

Successful colonization of this mosquito would be an important contribution to encephalitis workers, for then more critical and complete biological and disease transmission studies could be conducted than are possible when only occasional wild-caught specimens are available. It is hoped that this article will stimulate further investigation of *C. melanura* which may lead to its successful colonization. The authors would appreciate notification by field collectors when large numbers are encountered so that specimens may be obtained for additional laboratory work.

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THE NON-BLOOD FEEDING HABITS OF *AEDES TAENIORHYNDUS* (DIPTERA, CULICIDAE) ON SANIBEL ISLAND, FLORIDA

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The feeding of mosquitoes on nectar-producing plants was reviewed by Howard, Dyar and Knab (1912), and more recently by Hocking (1953) whose extensive observations in the Arctic are an exception to the more or less casual observations reported elsewhere in the literature. Such feeding of salt-marsh mosquitoes has not so far been reported beyond the observation of Smith (1904) on *Aedes sollicitans* in New Jersey: "I have seen both sexes of this species feeding in the blossoms of wild cherry and it is quite probable that vegetable juices form a considerable element in the food of this species" (p. 203).

FIELD OBSERVATIONS. Although *Aedes taeniorhynchus* has been closely studied in Florida since 1948, it was not until the spring of 1953 that feeding on nectar was

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