THE OVIPOSITION OF *HAEMAGOGUS EQUINUS* IN NATURE (DIPTERA, CULICIDAE)

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So far as the writer is aware, there are no recorded observations on the egg-laying of any species of *Haemagogus* mosquitoes in nature. In June 1945, the writer was fortunate enough to observe the process of oviposition of *Haemagogus equinus* Theobald. During a collecting trip to the Plant Introduction Gardens at Summit, Canal Zone, in search of *Haemagogus* larvae, many were collected from tree holes, bamboo stubs, and crevices between the buttressed roots of *Ficus* trees. Upon approaching a tree hole which, on previous visits, had contained *Haemagogus* larvae, a female *Haemagogus* was seen flying back and forth over it, in full sunlight. The hole was in the main trunk of a small mango tree, approximately five feet from ground-level; it was about 4 inches in diameter and about 3½ inches deep, and contained about three-quarters of an inch of dark brown water, over a substratum of dead leaves and other detritus. The rounded edge of the hole was covered with very short green moss, kept moist by capillarity from the water beneath.

The female mosquito flew back and forth over the hole for some minutes, then alighted and crawled about on the thin mossy cover. Within a few moments the first egg was laid. Normally, when in a resting position, the terminal segments of the abdomen are turned upward. The female turned the end of the abdomen downward before thrusting into the moss, prior to extruding an egg. No preliminary probing movements of the abdomen were noted. After six eggs were deposited, none very close to each other, and at intervals of approximately one minute each, the female was captured in a dry glass vial. The pieces of mossy bark on which the eggs had been laid were carefully removed with a knife, placed in a stoppered glass shell-vial, and taken to the laboratory.

Three of the eggs, attached to the mossy bark, were then placed in water from a bamboo section in which other *Haemagogus* larvae had been growing. The remaining three eggs, attached to the moss, were kept for a little more than 72 hours in a humid atmosphere in a shell-vial, and were then immersed in water from the bamboo section. The first three eggs did not hatch, indicating that a period of maturation may be required before hatching takes place. The second lot of three eggs hatched, and the larvae, fed on brewers' yeast, produced one male and two female adults. These were found to be *Haemagogus equinus* by examination of the terminalia of the single male.

The captured female was transferred to a shell-vial covered with bobbinet, and provided with a piece of moistened corrugated paper, in the hope that additional eggs might be deposited. The vial was kept at room temperature, 80° to 85° F. No more eggs were laid, and the mosquito died a few hours more than two days after it was captured. It was dissected, and two apparently mature ova and a number of immature ova were found in its ovaries. Possibly it had been injured during transportation from the field to the laboratory, or probably some tactile or other stimulus necessary for oviposition was absent in the artificial conditions of the laboratory. The female had toothed tarsal claws, and the characteristic white knee-spots of *H. equinus,* which are absent from the other species of *Haemagogus*

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known from the Canal Zone and Panama.

The foregoing account differs somewhat from that given by Bates (1949) of the experimental oviposition behavior of *Haemagogus spegazzinii falco* Kumm *et al.*, which he called *H. spegazzinii*. Bates states that the female was placed in a glass vial, with "a filter-paper disc in the bottom, moistened with distilled water. The mosquito was observed making exploratory movements over the disc with the tip of the abdomen, but no eggs were deposited. A slip of filter-paper was inserted into the vial until it touched the wet disc in the bottom, and then appressed to the side of the vial, making a moisture gradient. The mosquito crawled onto this, continuing the exploratory movements of the abdomen. Finally one egg was laid, at about the point on the filter paper where the moisture ceased to be visible. Then seven more eggs were laid in about five minutes. Between each egg the female explored the paper carefully with the tip of the abdomen, and usually laid another egg when she chanced to touch a previous egg—in other words, responding to irregularities in the surface . . . the tip of the abdomen was placed in close contact with the surface of the paper and drawn steadily forward (the mosquito remaining motionless except for the abdominal movement), leaving the egg adhering to the paper."

The female *H. equinus* seen ovipositing by the writer could not be observed as closely as Bates watched his *H. spegazzinii falco* female, for fear of distracting it and causing it to fly away. But apparently it made no preliminary probing movements with the tip of the abdomen, but placed its eggs at random on the moss surrounding the tree hole, at some distance from the water-line below.

Bates also quotes Wesenberg-Lund (1921, p. 75) as describing the oviposition of *Aedes communis* (de Geer), but from his account it is evident that Wesenberg-Lund did not actually observe the process, as did Bates and the writer, but only found the eggs where they had been deposited by the females.

References

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AN INVASION OF THE GULF COAST BY SALT-MARSH MOSQUITOES

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During September, 1954 the Gulf Coast area of Texas and Louisiana was subjected to a severe invasion of the salt-marsh mosquitoes, *Aedes sollicitans* and *Aedes taeniorhynchus*. The factors that contributed to the enormous swarms that invaded the Gulf Coast communities are of interest.

During the months of June, July and August, 1954, the rainfall in Jefferson County, Texas, totaled 8.41 inches, about three inches of which fell during the last four days of August. The average rainfall of the area for this period is 16.71 inches. As a result of the reduced precipitation the coastal marshes became completely dry. The brackish marshes that extend inland as much as 30 to 40 miles also became dry. Drought conditions also prevailed in the watersheds of the Sabine and Neches rivers, further contributing to the drying of the inland marshes.

During the summer there were no high tides that reached a point that would flood the marshes. By the end of August, even