A PRELIMINARY NOTE ON EGG PRODUCTION FROM MILK-FED MOSQUITOES[1]

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The usual procedure in rearing mosquitoes is to supply the adults with a blood meal from a living host in order to obtain viable eggs. It has been customary for several years to maintain cultures of *Anopheles quadrimaculatus* and *Aedes aegypti* in the research laboratories of the Department of Zoology and Entomology of The Ohio State University, by feeding the adult mosquitoes on rabbits. However, the expense and time required in raising and handling the rabbits was so great that investigations were initiated to find a substitute for living hosts.

Preliminary studies showed that citrated beef blood could be used satisfactorily for both species if offered under certain conditions.

As a food source for males and supplementary food for females, both the stock and test cages of the mosquitoes were always provided with a solution of 9 parts water and 1 part honey absorbed on a cotton pad. It seemed possible that the female mosquitoes might take blood from the pad if offered as a 9 part blood and 1 part honey mixture.

The *Aedes* females fed on the blood-honey mixture at room temperature and laid viable eggs. For 9 months the stock colony had no living host on which to feed; instead, a blood-honey pad was the only food source during this period. Best results were obtained if the blood-honey pad was placed on the top of the screened stock cage or suspended in the middle of the cage rather than placed on the bottom of the cage in a Petri dish. Egg production by this method appeared to be equal to that from a living host, and was certainly far more abundant than that needed for testing purposes.

McLintock (1952) had also used this technique to feed adults 1 part of 10 percent sucrose solution to 3 parts of difibrinated pig, beef, or sheep blood.

Results with *Anopheles* mosquitoes using the above method were poor, however, observations in this laboratory had indicated that temperatures higher than room temperature played a greater role in host attraction with *A. quadrimaculatus* than with *A. aegypti*. Subsequent experiments showed that the Anophelines would flock to and engorge on citrated beef blood absorbed on cotton (no honey), if the blood temperature was maintained between about 93°–95° F. Initial tests were run by wrapping blood-soaked cotton around a test tube and placing hot water into the tube to get the desired temperature for feeding. For use in the stock cage, a U-tube was fitted into one side of the cage while the two ends were exposed to the outside. The tube was wrapped with blood-soaked cotton, and water at 115°–120° F flowed through the tube to maintain the desired range of temperature. Under these conditions, the temperature recorded with a thermocouple at the surface of the cotton was maintained at 93°–95° F. Generally, most of the mosquitoes engorged within the first 30 minutes.

After establishing the fact that the cultures could be maintained using extracted beef blood rather than a live animal, studies were made to determine whether eggs could be obtained using a more readily available material than preserved blood. Fielding (1919), feeding *A. aegypti* a peptone-sugar water solution, succeeded in obtaining a few fertile eggs. However, Young (1922) and Gordon (1922), could not repeat these results.

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In the present study, it was found with both of these mosquitoes, skimmed milk could be substituted for blood as an egg producing agent. *A. quadrimaculatus* also laid viable eggs when fed a mixture of proteose-peptone, liver concentrate, and casein hydrolysate. Feeding methods for each species were the same as outlined above.

Mosquito larvae are useful insects in certain bioassay tests. If large numbers of eggs can be produced by maintaining a stock colony on a material as cheap and available as milk, this work will be greatly facilitated.

These results are certainly ample evidence that blood itself is not a prerequisite for egg production in mosquitoes. It has been suggested by various investigators that one or more proteinaceous materials are essential, and it may be possible that these substances can be fully determined.

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