PAIRING OF *ANOPHELES ALBIMANUS* IN RESPONSE TO HUMAN BREATH [1]

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Garcia and Laing (1970) reported that copulation occurred more frequently among caged *Aedes aegypti* exposed to CO_2 or human breath than in the absence of these stimuli. A sexual response to the observer's breath by *Anopheles albimanus* adults was recently noted at this laboratory. Because the response appeared considerably stronger on some occasions than on others, a series of scheduled observations was made to assess the influence of time of day and mosquito age on this behavior.

Mosquitoes whose behavior cycle had been modified by photoperiod entrainment were used to obtain nighttime activity levels during the day (Wilton and Fay, 1970). Pupae in half-pint containers stapled inside netting-covered gallon cartons were placed for emergence in photoperiod control boxes which provided 12 hours of constant light and 12 hours of darkness. Each carton held approximately 400 mosquitoes. Blood was not offered but 10 percent sucrose on cotton pads was continuously available.

Hourly observations were made of the response to human breath 5- to 6-day-old *A. albimanus* adults from 1 hour before "sunset" (light off) to 1 hour after "sunrise" (light on) and at 3, 6, and 9 hours after "sunrise." Tests were also conducted with adults younger than 5–6 days at 1 hour after "sunset" and 1 hour before "sunrise" only. In addition, limited observations on the response of *Anopheles stephensi* to human breath were recorded.

Cartons were taken from the photoperiod box in pairs and covered with glass plates. A count was made of the number of pairings in each carton during a 2-minute period; the glass was then removed and while the observer gently exhaled into the cartons, the number of pairings during the ensuing 2 minutes was noted. Four replicates were run at each observation time.

With *A. albimanus,* distinct activity peaks were evident; one occurred an hour after "sunset," and a second was associated with "sunrise." A third, less definite peak was midway between these two (Fig. 1). These peaks appear to represent an intensification of an existing natural activity pattern rather than behavior newly initiated by the stimulus of human breath. No daytime sexual activity at 3, 6, or 9 hours after "sunrise" was observed. The data are plotted per 100 pairs of mosquitoes to allow comparisons among counts based on differing totals. The term "copulation" is not used because female mosquitoes may accept a male partner but refuse copulation (Lea and Evans, 1972) and it was not possible to distinguish these two events while observing several hundred mosquitoes confined in a gallon carton. Attempted pairings in which the male was evaded were not tallied. The number of pairs in a carton was taken as equal to that of the sex with the smaller number since males and females were seldom equally represented.

As shown in Fig. 2, sexual behavior stimulated by human breath characterized adults as young as 0–1 day of age, with a maximum "post-sunset" response occurring at 2–3 days and a peak "pre-sunrise" response at 1–2 days. The stimulant effect of human breath was affected

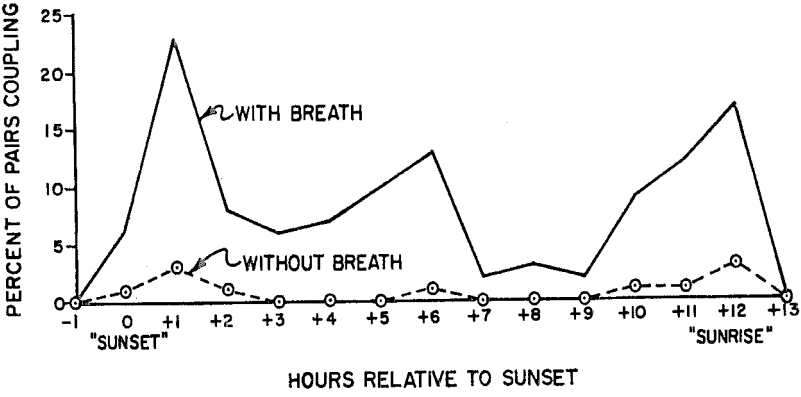

FIG. 1.—Pairings by 5- to 6-day-old *Anopheles albimanus* stimulated by human breath.

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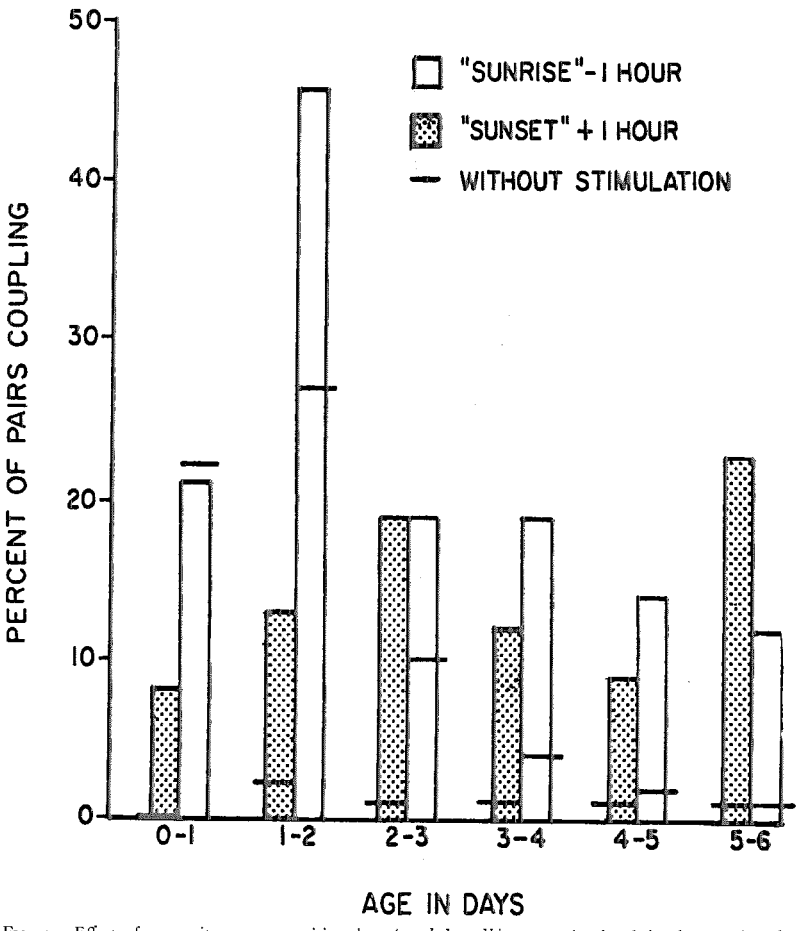

FIG. 2.—Effect of mosquito age on pairing by *Anopheles albimanus* stimulated by human breath.

by both time of day and mosquito age. At the "pre-sunrise" observation time, the ratio of spontaneous to stimulated pairings changed progressively from 1:1 at 0–1 day of age to 1:12 at 5–6 days, reflecting the much greater influence of the stimulus on older mosquitoes. At the "post-sunset" observation time, however, no consistent relation between mosquito age and stimulant effectiveness was evident.

Hourly observations of 5- to 6-day-old *A. stephensi* adults gave no indication of a sexual response to breath at any time from an hour before sunset to an hour after sunrise.

These observations indicate a convenient approach to the study of reproductive behavior in *A. albimanus* and possibly other malaria vectors.

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