TEMPERATURE; ITS INFLUENCE ON LIGHT TRAP CATCHES OF Aedes vexans (Meigen)  

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For a number of years the New Jersey light trap has been used as a practical and popular device to sample some mosquito populations. Huffacker and Back (1943) reviewed the literature and discussed means of improving light trap collections for certain species of mosquitoes. Southwood (1966) discusses the use of light traps in ecological studies.

The light trap is an effective tool to sample Aedes vexans (Meigen), a crepuscular mosquito that is a serious nuisance pest in many areas. Thompson and Dicke (1965) reported that this mosquito at Madison, Wisconsin is very active at dusk and vigorously seeks blood meals at this time. Its peak activity appears to be 30-40 minutes after sunset; yet very few A. vexans were attracted to light traps prior to 10 p.m. as compared to the period of time from 10 p.m. to dawn. Temperatures during this period were not given.

Williams (1939) reported the number of insects caught in light traps was doubled for every 5° F rise in temperature. Except for some Lepidoptera, he identifies the insects only to orders.

While it is obvious that mosquito behavior is influenced by environmental conditions prevailing during the period that the light traps are operating, the authors are not aware of any reports where temperatures were reported during such a sampling period.

MATERIALS AND METHODS. This study was carried out at Point Beach State Forest two miles north of Two Rivers, Wisconsin. Light traps employed are described by Thompson and Dicke (1965). The light was switched on at 8:00 p.m. DST and the trap was manually emptied at 2-hour intervals until 2 a.m., then again at 7 a.m. Temperatures were recorded at the beginning of each interval. Sunset time for 44° 15' N latitude and 87° 30' W longitude, the study area, was obtained from the U. S. Naval Observatory, Washington, D.C.

Since both temperatures and light intensity are known to influence insect activity, analysis of covariance was used to determine whether differences exist between time periods when temperature is constant. The fourth interval, unlike others, was 5 hours in length because a smaller light trap catch was expected after 2 a.m. (Williams, 1939). The numbers of A. vexans (males plus females) caught were converted to logarithms, base ten, to transform the data to a normal distribution (Williams, 1940). Traps were operated only on those nights when sunset temperature was above 62° F, as from past experience it was learned that poor catches were obtained when temperatures were 62° F or lower at sunset.

RESULTS. Data are summarized in Figure 1. The analysis of covariance reveals a nonsignificant F value of 0.51 for the variation between time intervals. This means that when the catches are adjusted for temperature, there is no essential difference between time periods in numbers of A. vexans attracted to light. Temperature does influence the size of the light trap catches. The F value for regression is 4.16, significant at the 5 percent level. The slope of the regression line was 0.079, which when transformed from logarithms to actual numbers indicated that there was an increase of 1.2 times more A. vexans for each degree rise in temperature independent of the time period.

1 Diptera: Culicidae.  
2 Research Assistant and Associate Professor of Entomology respectively. Published with the approval of the Director of the Research Division, College of Agricultural and Life Sciences. This work was supported in part by the Department of Natural Resources.
Fig. 1. The influence of temperature on the number of *Aedes vexans* caught in a light trap.
SUMMARY AND CONCLUSIONS. Temperature during the period that a light trap is operated is an important factor and should be considered if light traps are to be used in a quantitative manner in ecological studies. Above 62°F a rise of 1 degree F increased the trap catch by 1.2 times.

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References Cited

A NEW ULTRA-LOW VOLUME COLD AEROSOL NOZZLE FOR DISPERAL OF INSECTICIDES AGAINST ADULT MOSQUITOES

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Mount et al. (1968) reported that ultra-low volume (ULV) cold aerosols of malathion and naled were highly effective against adult mosquitoes. To further evaluate the potentialities of ULV aerosols a commercially manufactured nozzle that disperses liquid insecticide concentrates from ground equipment has been tested to: (1) determine the droplet size range produced by the ULV nozzle; (2) compare the effectiveness of aerosols produced by the ULV nozzle with aerosols produced by a high-volume thermal nozzle; (3) establish minimum doses for satisfactory adult mosquito kill with ULV cold aerosols of malathion, naled, and fenithion, and (4) determine the effect, if any, of dispersal speed on efficiency of adult mosquito kill with ULV cold aerosols.

METHOD AND MATERIALS. The Leco ULV cold aerosol nozzle was used on both a modified Leco 120 thermal aerosol generator and a modified Curtis 55,000 cold aerosol generator. Maximum air pressure with the Leco 120 at 3350 r.p.m. was 3.5 p.s.i. The Curtis 55,000 was also operated at 3.5 p.s.i. even though air pressures as high as 6 p.s.i. can be produced with this unit. Mount et al. (1968) showed greater atomization of technical malathion with increased air pressure using similar type venturi nozzles. A

1 Mention of a proprietary product in this paper does not constitute an endorsement of this product by the USDA.
2 Developed by Lowndes Engineering Co., Inc. (Leco), Valdosta, Georgia.