

SCIENTIFIC NOTES

THE EFFECTS OF TEMPERATURE ON SEXUAL DIMORPHISM IN *Culex pipiens* LINNAEUS

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Recently Horsfall and Anderson (1961) described the suppression of male characteristics in *Aedes stimulans*, both external (i.e. parameres, phallosomes, genitalic position, antennae, palpi, and mouthparts) and internal (i.e. accessory glands, seminal vesicles, vasa deferentia, testes, and spermatozoa), and their replacement with morphologically female structures by environmental control. By exposing the larvae to abnormally high temperatures for varying periods of time, Horsfall and Anderson were able to produce intersexes from genetically intended males. An attempt was made by the present writer to determine if similar exposures of *Culex pipiens* to high temperatures would result in intersexes.

Egg rafts were collected three times daily from an established colony of *C. pipiens*. Each raft was numbered and divided into two pieces, one approximately twice as large as the other. The smaller segments were reared at room temperatures as controls; the larger segments were reared at controlled temperatures. A third of the rafts were reared at 11° C. for 1 to 10 days before being placed at room temperature for the duration of the larval stage. None of the adults were found to have any signs of intersexuality when examined under a stereoscopic microscope. The remainder of the rafts were held at room temperature (24° ± 5° C.) for 1 to 10 days before being placed at 32° C., 38° C., or 46° C. Thirty-eight° and 46° were found to be fatal to both the eggs and larvae.

Of those larvae raised at 32° C. for part of their life cycle, six females from one raft and two from another were found to have abnormal palpi. These rafts were raised at room temperature (18° C. to 29° C.) for 9 and 10 days, respectively, before being placed at 32° C. The palpi of these eight mosquitoes were typical five-segmented palpi with an additional terminal segment. Several factors—structural, functional, and statistical—led to the conclusion that these eight individuals were zygotic females rather than intersexes. Mouthparts (except palpi), antennae, and terminalia were completely female-like; no intergrades could be found in these eight or in any of the other females from these two rafts. After having been allowed to feed on 4-day old chicks, two of the eight became fully engorged.

A statistical analysis of these two rafts adds strength to the conclusion that these mosquitoes were genetically intended females rather than

males. If it is assumed that they were females, chi-square tests (with Yates' correction) (Snedecor, 1962) run on both rafts give probabilities of essentially 1 ($\chi^2=0.00^*$) that sex was due to chance alone. If it is assumed that these individuals were genetically intended to be males, chi-square tests give probabilities of 0.132 ($\chi^2=2.36$) and 0.663 ($\chi^2=0.19$) that sex was due to chance.

The ratio of the controlled temperature to the species' normal environmental temperatures is believed to be the deciding factor in the production of intersexes. Temperatures high enough to produce intersexes in *C. pipiens* are thought to be lethal to the larvae.

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Literature Cited

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Psorophora confinnis BREEDING IN ARTIFICIAL CONTAINERS

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Twelve *Psorophora confinnis* larvae were collected from discarded, small-arms, metal ammunition boxes, approximately ten miles south of Crestview, Okaloosa County, Florida, 6 October 1965. The boxes were strewn about a grassy clearing in a typical Florida pine flatwoods. This finding appears to be a departure from the normal larval breeding habitat of this species. A review of available literature indicates that breeding of *P. confinnis* in artificial containers has not been previously recorded. The purpose of this note is to record the unusual breeding at a time when extraordinary interest has been generated in mosquitoes breeding in artificial containers.

References

- ANONYMOUS. 1953. Mosquito larvae from the Third Army area. Third Army Medical Laboratory, Fort McPherson, Georgia. 68 pages.