

## SCIENTIFIC NOTES

MALATHION RESISTANCE IN THE BLACK SALT-MARSH MOSQUITO, *Aedes taeniorhynchus* (WIEDEMANN), IN FLORIDA

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Malathion has been used for 8 consecutive years to control mosquitoes in Florida. Until recently no resistance has been reported (Rogers and Rathburn 1964). However, in August of 1965, aerial fogging with malathion did not give satisfactory control of the black salt-marsh mosquito, *Aedes taeniorhynchus* (Wiedemann), in Lee County, Florida. Larvae were therefore collected in the county near Ft. Myers and returned to the Gainesville laboratory for testing. Some tests were made with larvae and others with adults reared from the larvae. These mosquitoes are called the Iona strain.

**PROCEDURE.** Groups of 25 fourth instar larvae were placed in glass beakers containing 250 ml. of distilled water that had been treated with various concentrations of the insecticide in acetone solution. Mortality was recorded after 24 hours. Duplicate beakers were used in each test at each concentration, and all tests were replicated four times.

Adult females were tested in lots of 25 each by exposure in a wind tunnel to contact sprays containing various concentrations of the insecticide in deodorized kerosene. The procedures were those described by Davis and Gahan (1961). Mortality was recorded after 24 hours. Duplicate cages were used in each test at each concentration, and all tests were replicated four times.

Larvae and adult females of a susceptible strain of *Aedes taeniorhynchus*, the Shiloh strain, which has been reared at the laboratory since 1958, were tested at the same time.

In both types of tests, a succession of concentrations was employed so that log concentration-probit mortality regression lines could be obtained and the LC<sub>50</sub> and LC<sub>90</sub> levels established. The concentration-mortality data were subjected to probit analysis using the maximum likelihood

method of Finney (1952). The 95 percent fiducial limits served as a measure of statistical significance.

**RESULTS.** The results are shown in the table. The fiducial limits of the LC<sub>50</sub>'s or the LC<sub>90</sub>'s did not overlap in either test.

One characteristic of increased resistance is an appreciable change in the LC<sub>50</sub> value. However, the question of what constitutes an appreciable change is difficult to answer. In the literature, changes of anywhere from 2X to 10X have been considered indicative of resistance. For the present study we adopted the WHO (Brown 1958) definition of resistance: an increase of 2X-4X in the LC<sub>50</sub> indicates vigor tolerance; an increase of more than 4X over the normal indicates resistance. On this basis, the data clearly indicate that the Iona strain is resistant to malathion.

It has taken 8 years for resistance to malathion to develop in this species in Lee County. The credit for this long period of delay belongs to the Florida State Board of Health. That organization felt (Rogers and Rathburn 1964) that malathion resistance would eventually occur but its early appearance could be avoided by using malathion only as a space treatment for adults, and not as a larvicide.

## References

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Stage	Strain	LC <sub>50</sub>	LC <sub>90</sub>	Increase in	
				LC <sub>50</sub>	LC <sub>90</sub>
Larval	Iona	0.325 p.p.m.	1.144 p.p.m.	6X	14X
	Shiloh	.055 p.p.m.	.087 p.p.m.		
Adult	Iona	.093%	.329%	10X	13X
	Shiloh	.009%	.025%		