

through the waterlock. The towelling is inspected and the immobilized wetted adults are destroyed.

The egg papers may be left on the structure for conditioning or they can be removed and replaced with fresh paper towelling for additional oviposition.

With the harvester one can introduce paper towelling into a mosquito colony cage as an oviposition surface without the usual escape of adults or exposure to mosquito bites. The free water in the pan helps to humidify the cage. The oviposition surface is in constant contact with moisture.

#### ON THE DIFFERENT TYPES OF RESISTANCE

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At the Seventh Meeting of the World Health Organization Expert Committee on Insecticides the following definitions were made: "Resistance to insecticides is the development of an ability in a strain of insects to tolerate doses of toxicants which would prove lethal to the majority of individuals in a normal population of the same species. The term *behavioristic resistance* describes the development of the ability to avoid a dose which would prove lethal."

This means that through selection there appeared an increase in the power to avoid irritants.

According to Busvine and Pal (1958), *physio-*

*logical resistance*, which is specific to a particular type of poison, is inherited, apparently by normal Mendelian process, and in several cases through single genes.

The *vigor tolerance* of Hoskins and Gordon depends on non-specific defence mechanisms due to improved condition, greater weight. Many genes might be responsible for this condition. As improved vigor might be due solely to environmental effects, such as improved nutrition, it could be reversible.

Normal insects may show *protective behavior* and avoid certain stimulants. Through selection, they might show behavioristic resistance, and through selection in a suitable population might show physiological resistance. Referring to behavior a certain number of specimens, or a population, show either protective behavior or behavioristic resistance.

If we consider that under the heading of resistance there are four clearly defined entities, the theoretical combinations of them could lead to the finding, either in nature or in the laboratory, of seven types.

The literature mentions several instances of physiological resistance, vigor tolerance, protective behavior or behavioristic resistance as isolated entities but we are waiting for instances of their combinations.

#### Reference

BUSVINE, J. R. and PAL, R. 1958. Resistance of insects to insecticides. A note on terminology. Indian J. of Malariology 12(4):265-267.

#### Theoretical combinations of resistance entities

	a.—Physiological resistance	b.—Vigor tolerance	
	c.—Protective behavior	d.—Behavioristic resistance	
1.—	a b	Physiological Resistance	+ Vigor tolerance <sup>1</sup>
2.—	a c	Physiological Resistance	+ Protective Behavior <sup>2</sup>
3.—	a d	Physiological Resistance	+ Behavioristic Resistance <sup>1</sup>
4.—	b c	Vigor tolerance	+ Protective Behavior
5.—	b d	Vigor tolerance	+ Behavioristic Resistance
6.— <sup>3</sup>	c d	Protective Behavior	+ Behavioristic Resistance
7.—	a b c	Physiological Resistance	+ Vigor tolerance
			+ Protective Behavior
8.—	a b d	Physiological Resistance	+ Vigor tolerance
			+ Behavioristic Resistance
9.— <sup>3</sup>	a c d	Physiological Resistance	+ Protective Behavior
			+ Behavioristic Resistance
10.— <sup>3</sup>	b c d	Vigor tolerance	+ Protective Behavior
			+ Behavioristic Resistance
11.— <sup>3</sup>	a b c d	Physiological Resistance	+ Vigor tolerance
			+ Protective Behavior
			+ Behavioristic Resistance

<sup>1</sup> Suggested by Busvine and Pal (1938).

<sup>2</sup> Suggested by Busvine and Pal (1938) and considered of "considerable importance."

<sup>3</sup> By definition this combination does not exist.