

A NOTE ON THE USE OF WINDOW-TRAPS AS A TOOL FOR EVALUATING INSECTICIDES

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One of the methods used by the World Health Organization to evaluate insecticides on a village scale is to place window-traps in treated huts (and untreated for control) to catch outgoing mosquitos. These traps, of the usual "lobster pot" type, consist of terylene netting mounted on a 12-inch cubical wooden frame. The entrance side was drawn into a truncated cone with a one-inch diameter hole at its apex which was one inch from the opposite face of the trap. Since the traps were placed in windows which were the main source of light in the room, a number of mosquitos were trapped. The window-traps were placed in the evening at about 6 p.m., and removed next morning at about 6 a.m. After removal, the number of dead and live mosquitos was noted, and the live ones were transferred to paper cups, given food, and the 24-hour mortality was determined. It was assumed that dead mosquitos in the window-traps, and those dying within 24 hours, received a lethal dose by the time they left the treated hut.

A similar method was used in treated houses or huts by various investigators (Davidson 1954, Hocking *et al.*, 1960, van Tiel 1961, Smith & Hocking 1962). It has been pointed out by Smith & Webley (1963) that when using a residual fumigant (Dichlorvos), vapor released in the room accumulates also in the window-traps. Consequently, mosquitos may die from continuous exposure inside the traps, whereas under natural conditions, they may possibly escape without picking up a lethal dose. As a result they suggested a

modified window-trap by reducing the area of diffusion of Dichlorvos from 1 ft² to 1 in² by changing the truncated cones of netting for polythene sheets (which are transparent). Smith & Hocking (1962) found evidence of "vapour toxicity" inside huts treated with residual insecticides (malathion and Baytex). But this effect was not tested inside window-traps.

The purpose of the present communication is to show that not only a fumigant insecticide, but also some residual insecticides extend their effect into the window-traps, and to describe a method of testing this effect.

MATERIALS AND METHODS. In tests conducted by the WHO Insecticide Testing Unit (ITU) in 1964, a 25 percent wettable powder formulation of OMS 658, also known as "Bromophos" (o, o-dimethyl o-(2,5-dichloro-4 bromophenyl) phosphorothioate), and a 50 percent wettable powder formulation of OMS 33, also known as "Bayer 39007" (o-isopropoxyphenyl N-methyl carbamate) were each applied at intended dosages of 2g/m² inside six huts of two villages (Baiyeku and Ibeshe respectively). In addition, the walls and ceiling of one room in each of two other huts of the OMS 33 treated village were covered with cheesecloth that had previously been treated with OMS 33 at the same dosage (2g/m²). (The cloth was kindly supplied by Dr. C. N. Smith of the U.S.D.A., Gainesville, Fla. The purpose was to test also the effectiveness of the insecticide when mud walls were covered with treated cloth as compared with sprayed walls.)

To determine if the atmosphere in the window-traps was toxic to mosquitos, 20 three-day old, blood fed *A. aegypti* were released into small terylene cages (5 x 5 x 2.5 in) which were placed inside

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the window-traps, situated in treated and untreated huts, at 6 p.m. The mosquitoes were thus exposed to the atmosphere of the trap without coming in contact with its walls. The next morning (6 a.m.) the cages were removed, the dead mosquitoes were counted, and the live ones were transferred to clean cages, given food, and 24 hours later the mortalities were recorded.

An additional test was made to determine if the walls of the window-traps had become contaminated with the insecticide. A few window-traps, taken at random from the treated village, were brought to the laboratory. Twenty blood-fed *A. aegypti* were introduced into each trap and a control cage, and the mortality determined after 24 hours. The traps were washed and were then found to be decontaminated. Tests for contamination of window-traps in the treated village were carried out weekly until no more contamination occurred.

RESULTS AND DISCUSSION. Table I shows that the atmosphere inside the window-

TABLE I.—Average percent monthly mortality of caged *A. aegypti* exposed for 12 hours inside window-traps situated in treated and untreated huts^a

Treatment	Months after treatment	24 hour percent mortality	
		Treated	Untreated
OMS 658	2	100	1
	3	98	4
	4	79	2
	5	68	2
	6	4	2
OMS 33	1	100	16
	2	84	16
	3	56	2
	4	49	0
	5	33	3
	6	17	2
OMS 33 treated cloth	1	100	10
	2	98	2
	3	58	1
	4	48	3
	5	8	2

^a Total number of insects exposed each month for each treatment varied from 200 to 500 in the treated and 120 to 360 in control.

TABLE 2.—Average percent monthly mortality of mosquitoes released in used window-traps for 24 hours^a

Treatment	Months after treatment	Percent mortality	
		Treated	Untreated
OMS 658	2	18	7
	3	21	10
	4	23	3
OMS 33	1	67	9
	2	24	21
	3	14	5
OMS 33 treated cloth	1	68	15
	2	24	4

^a Total number of insects exposed each month for each treatment varied from 100 to 300 in the treated and 40 to 160 in control.

traps of huts treated with OMS 658 was toxic. This effect, which was gradually reduced with time, continued up to 5 months after treatment. The same was true with OMS 33, but to a somewhat lower extent. Similar results were obtained whether the walls of the hut were sprayed or covered with treated cloth.

Table II shows that contamination of the window-traps resulting from OMS 658 was slight or none as from the second month after treatment (tests during the first month after treatment were not carried out). There was a strong contamination of window-traps by OMS 33 in both sprayed huts, and those rooms covered with the treated cloth, only during the first month after treatment, but little or no contamination in the following months.

A similar effect of toxicity of the atmosphere inside the window-traps, which lasted for 4 months, was observed with huts treated in 1963 with OMS 43, also known as "Folthion" (o,o-dimethyl o-(4-nitro-m-tolyl) phosphorothioate) (Bar-Zeev & Bracha 1963). The same insecticide also contaminated the walls of the window-traps for 3 months after spraying (Bar-Zeev & Bracha 1965).

The assumption that dead mosquitoes obtained in the window-traps of treated huts resulted from mosquitoes picking up a lethal dose before leaving the hut, appears unreliable. It seems that some

other type of traps should be used to overcome contamination of the atmosphere and walls of the trap. The modification suggested by Smith & Webley (1963), to reduce the area of diffusion of a fumigant insecticide (Dichlorvos) inside the window-traps, may possibly be effective also with residual insecticides.

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