

EFFECTIVENESS OF SEVEN PROMISING
MOSQUITO ADULTICIDES¹

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The evaluation of candidate chemicals against adult *Aedes taeniorhynchus* (Wiedemann) in wind-tunnel tests is an essential part of our research program on mosquito control. The results of previous evaluations have been reported by Davis and Gahan (1958; 1961), Davis (1959), Gahan and Davis (1964), and Glancey *et al.* (1966; 1969). This paper reports the results obtained with seven new chemicals.

TESTING TECHNIQUE. Adult female mosquitoes from a colony of *A. taeniorhynchus* reared in the laboratory were exposed to sprays containing a range of concentrations of each insecticide in a wind tunnel. The wind tunnel is a cylindrical tube 4 inches in diameter through which a column of air is drawn at 4 m.p.h. by a suction fan. Twenty-five mosquitoes were confined in a tubular galvanized metal cage with screened ends which was placed in the center of the tube. One-fourth milliliter of a solution of the insecticide in kerosene was atomized at a pressure of 1 p.s.i. into the mouth of the tunnel, and the mosquitoes were exposed momentarily to the solution as it was drawn through the cage. Duplicate cages were used in each test, and three tests were made with each concentration of each insecticide. After treatment, the mosquitoes were anesthetized with carbon dioxide, transferred to cardboard holding cages, and furnished with a 10 percent sugar-water solution. Knockdown and mortality counts were taken 1 and 24 hours after exposure, respectively. Mosquitoes not exposed to the chemicals showed only 2 percent knockdown and 5 percent kill.

RESULTS AND DISCUSSION. Table 1 gives the concentrations estimated to give 90 percent knockdown and 90 percent kill (KC₉₀ and LC₉₀, respectively).

The most effective compound was Dowco 217 which was about six times as effective as the malathion standard at the LC₉₀ level. Bay 78537 was also highly effective being 2¾ times more effective than malathion at the LC₉₀. Dowco 214, CIBA C-10015, and Bay 79330 were from 1½ to 1¾ times more toxic, National Research Development Corporation NRDC 104 was slightly more effective, and Stauffer R-7240 was slightly less effective than malathion.

Relatively quick knockdown is a desirable characteristic of mosquito adulticides. The KC₉₀ values given in Table 1 indicate that Bay 78537, CIBA C-10015, and NRDC 104 produced 90 percent knockdown within the first hour after exposure to concentrations less than their respective LC₉₀'s. Dowco 217, Stauffer R-7240, and the malathion standard gave moderate knockdown with KC₉₀'s about 50 percent higher than their LC₉₀'s. Dowco 214 and Bay 79330 gave relatively poor knockdown.

A factor related to the potential use of chemicals as insecticides is their mammalian toxicity. Table 1 also lists the acute oral toxicity to rats as given by the manufacturer of these promising mosquito adulticides. The acute oral toxicities of Dowco 214 and NRDC 104 were about the same as the malathion standard and these compounds were more toxic to adult mosquitoes. The acute oral toxicity of Dowco 217 (820 mg/kg) was about one-half that of the three above compounds.

SUMMARY. Seven candidate chemicals were compared with a malathion standard

¹Mention of a pesticide in this paper does not constitute a recommendation of this product by the U. S. Department of Agriculture.

TABLE 1.—Effectiveness of seven adulticides (compared with malathion standard) in contact-spray tests against adult females of *Aedes taeniorhynchus* (Wiedemann).

Adulticides	1-hour Knockdown (KC ₅₀)	24-Hour Kill (LC ₅₀)	LC ₅₀ re- ciprocal Ratio to Malathion	Mammalian Toxicity ^a (Oral LD ₅₀ mg/kg)
Dowco 217 (dimethyl 3,5,6-trichloro-2-pyridyl phosphate)	0.01	0.0066	5.91	820
Bay 78537 (2,3-dihydro-2,2-dimethyl-7-benzofuranyl acetylmethylcarbamate)	.0087	.014	2.79	200
Dowco 214 (O,O-dimethyl O-3,5,6-trichloro-2-pyridyl phosphorothioate)	>.05	.022	1.77	1630
CIBA C-10015 (o-(4,5-dimethyl-1,3-dioxolan-2-yl)phenyl methylcarbamate)	.019	.023	1.70	67
Bay 79330 (O,O-diethyl phosphorothioate O-ester with (2,6-dichlorophenyl)glyoxylonitrile oxime, <i>alpha</i> -isomer)	.09	.026	1.50	250
National Research Development Corp. NRDC 104 ((5-benzyl-3-furyl) methyl 2,2-dimethyl-3-(2-methylpropenyl) cyclopropanecarboxylate)	0.01	0.032	1.22	1500
Malathion	.064	.039	1.0	1375
Stauffer R-7240 (O,O-dimethyl phosphorodithioate S-ester with (3-(mercaptomethyl)-2,4-thiazolidinedione)	.08	.054	.72	68

^a Data on female rats supplied by manufacturers.

against adult *Aedes taeniorhynchus* (Wiedemann) in wind-tunnel tests. Dowco 217 was the most effective adulticide, being about six times as effective as malathion. Bay 78537, Dowco 214, CIBA C-10015, Bay 79330, and National Research Development Corporation NRDC 104 were also more effective than malathion. Stauffer R-7240 was slightly less effective than malathion.

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