

ASSESSMENT OF THE RESIDUAL TOXICITY OF THE INSECTICIDE BAYER 37344 TOXICITY TO *ANOPHELES GAMBIAE*

A. SMITH AND K. S. HOCKING

Tropical Pesticides Research Institute, Arusha, Tanganika

INTRODUCTION. The insecticide 3,5-dimethyl-4-methylthiophenyl M-methyl-carbamate (Bayer 37344) received study in the form of bioassay and trials in experimental huts at Magugu Outstation as part of the World Health Organization's program of testing and developing new insecticidal compounds. The results presented in this paper are of trials made from November, 1962, to February, 1963.

EXPERIMENTAL METHODS. The formulation contained 50 percent w/w technical product and was made by Fabenfabriken Bayer A.G. Four experimental huts were treated throughout by an "Oxford Pre-

cision Sprayer" at a nominal dosage of 2 gms/m². The dosages applied to the huts were determined colorimetrically by means of a dye, Kiton red, which was dissolved in the water that was applied with the insecticide. The entomological techniques were the same as in previous studies (Smith and Hocking, 1962), including additional observations on mosquito behavior, that are described in a separate paper (Smith, 1963).

RESULTS. A. Bioassays. The results of bioassays in the experimental huts, are shown in Table 1. The toxicity of the insecticide persisted well on grass roofs as shown by mortalities of 100 percent after

TABLE 1.—Bioassays on the walls and roofs of experimental huts, treated with Bayer 37344 (applied 26th November 1962).

Substrate	gm/m ²		Age of Deposit in weeks			
			1	4	8	12
			Walls			
5 non-sorbtive	2.29	Exp. time in Mins.	5	5	5	5
		% Mortality	100	48	78	60
8 sorbtive	2.15	Exp. time in Mins.	5	5	5	10
		% Mortality	56	100	100	93
16 sorbtive	1.55	Exp. time in Mins.	..	10	20	40
		% Mortality	..	97	100	100
17 sorbtive	2.01	Exp. time in Mins.	20	40
		% Mortality	96	100
1 non-sorbtive	Control	Exp. time in Mins.	..	10	20	40
		% Mortality	..	0	0	6
			Roofs			
5 grass	1.8	Exp. time in Mins.	5	5	5	5
		% Mortality	100	100	100	100
8 grass	2.44	Exp. time in Mins.	5	5	5	5
		% Mortality	100	100	100	100
16 sorbtive mud	2.15	Exp. time in Mins.	5	10	20	40
		% Mortality	93	100	98	100
17 sorbtive mud	1.41	Exp. time in Mins.	5	10	20	40
		% Mortality	93	100	93	95
1 grass control	Control	Exp. time in Mins.	5	5	5	5
		% Mortality	0	7	5	3
19 sorbtive mud	Control	Exp. time in Mins.	5	10	20	40
		% Mortality	0	0	0	0

5 minutes exposure, three months after application. Persistence was not quite so long on non-sorbitive mud as shown by a mortality of 60 percent after 5 minutes exposure, three months after application; and shorter still on sorbitive mud, an exposure period of 40 minutes being required to maintain high mortality.

B. Mortality of naturally-entering mosquitoes. An overall mortality of 75 percent is empirically considered to represent an adequate degree of toxicity. The

surfaces, and would be ineffective where substantial resting occurred on mud surfaces.

The results have also followed another general rule that bioassay exposure times have no simple relationship with times that naturally-resting mosquitoes spend in a hut. With this particular insecticide, the discrepancy is even wider than with other insecticides previously studied in a comparable way (Smith and Hocking, 1962).

TABLE 2.—Overall mortalities in *A. gambiae* entering experimental huts treated with Bayer 37344 (applied 26.11.62).

Hut No.	Roof		Walls		Average hut dosage	Percent mortality in 24 hours. (No. of specimens in parentheses).		
	Substrate	Dosage gm/m ²	Substrate	Dosage gm/m ²		Months after treatment	0-1	1-2
5	grass	1.80	non-sorbitive mud	2.29	2.1	100(11)	83(23)	65(34)
8	grass	2.44	sorbitive mud	2.15	2.3	100(9)	68(85)	49(78)
16	sorbitive mud	2.15	sorbitive mud	1.55	1.8	50(14)	21(77)	15(170)
17	sorbitive mud	1.41	sorbitive mud	2.01	1.8	37(54)	10(275)	15(488)
1	grass	..	sorbitive mud	..	Control	36(22)	12(110)	15(242)
19	sorbitive mud	..	sorbitive mud	..	Control	14(75)	21(238)	9(351)

results, summarized in Table 2, show that the insecticide was adequately toxic to mosquitoes entering huts with grass roofs for two months after application, but inadequate within a month, in huts with roofs lined with mud.

DISCUSSION. The bioassay results have shown that the insecticide has followed the general rule of toxicity persisting longest on grass, less on non-sorbitive mud and least on sorbitive mud.

Overall mortalities among naturally entering *A. gambiae* indicate that the insecticide would be effective for about three months in areas where a high proportion of resting was on impermeable

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References

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