

FIELD TRIALS ON THE EFFECTIVENESS OF BIORESMETHRIN RESLIN 10/10 (R) ON *Aedes Aegypti*

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INTRODUCTION

The Ministry of Health has for the past six years been using Reslin 10/10 (R) for thermal fogging against *Aedes aegypti*. In view of the recent report of bioresmethrin resistance in *A. aegypti* in Thailand (WHO, 1976) it was decided to evaluate the effectiveness of this compound for *A. aegypti*. The trial was carried out in the Chinese New Village of Seri Kembangan, since there was an outbreak of Dengue Haemorrhagic Fever in that area in 1978 and also the *A. aegypti* index was high.

MATERIALS AND METHOD

Tests were carried out with Reslin 10/10 (R) applied as a thermal fog on caged adult *A. aegypti* from the Serdang Colony. Larvae were collected from the field and hatched into adults. These adults when 5 - 6 days old were blood fed using guinea pigs. These adults were then transported to the test site in paper cups, 20 - 25 per cup. The cups were covered with muslin cloth and provided with cotton wool moistened with sugar solution.

At the test site the mosquitoes were transferred to 1'x1'x1' cages of fine mesh cloth, 40 - 50 per cage.

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Two cages were placed inside and two outside each house prior to fogging. Control cages were placed well away from the houses.

Reslin 10/10 (R) was diluted at a rate of 56 ml/gal. of diesel, which is the rate recommended by the manufacturers.

Fogging was carried out in the morning between 8.30 am and 9.30 am when it was still fairly cool. It was done by means of a hand operated SN 11 swing fog, from the distance of about 6 feet from the houses. The Reslin fog was applied at walking pace all around each house and directed into the houses through the windows and doors which had all been left open. The doors and windows were then shut immediately after fogging.

The test cages were removed after half an hour and brought back to the laboratory. Mortality was recorded after a holding period of 24 hours. The number of mosquitoes knocked out ½ hour post-exposure was also recorded to assess the immediate knock down potential of Reslin 10/10 (R).

Survivors were kept to establish a new generation of adults for the next fogging trial. Tests were carried out in this way on five different occasions. After the second trial, due to high post treatment mortality and reduced oviposition the colony had to be replenished with a larval collection from the field.

RESULTS

The mortality rates obtained in the fogging trials with Reslin 10/10 (R) on the caged adults are

TABLE I
MORTALITY RATES IN FOGGING TRIALS WITH RESLIN 10/10 (R)
APPLIED AT 56 ML/GAL. ON CAGED ADULTS

	Trials No		No Exposed	No. Knocked out 1½ hr.	No. Killed 24 hr	% Mortality	Overall % Mortality	Corrected Overall % Mortality
Adults from 1st Larval Collection From field.	1	Inside	155	81	86	55.48	40.00	-
		Outside	160	27	40	25.00		
		Control	80	0	0	0		
1st Generation Adults	2	Inside	194	171	193	89.18	69.81	67.35
		Outside	177	96	86	48.59		
		Control	85	0	5	5.88		
Adults from 2nd Larval Collection From Field	3	Inside	97	56	56	57.73	48.15	-
		Outside	92	25	35	38.04		
		Control	45	0	0	0		
1st Generation Adults	4	Inside	87	48	36	41.38	52.10	-
		Outside	103	52	63	61.16		
		Control	50	0	0	0		
2nd Generation Adults	5	Inside	256	241	247	96.48	76.14	74.89
		Outside	247	194	136	55.06		
		Control	100	0	5	5.00		

presented in Table I and Fig. 1.

The overall percentage mortality in the fogging trials ranged from 40 - 76 percent.

Although the lowest mortality was obtained in the 1st trial and the highest in the fifth trial, there was no definite trend of increase in mortality. The average percentage mortality for all five trials worked out to 57.2 percent. The percentage mortality was higher in caged mosquitoes placed indoors than outdoors.

DISCUSSION

In the fogging trials with Reslin 10/10 (R) with the adult *A. aegypti* confined in cages, the average percentage mortality was only about 57 percent. Under field conditions, when there is a greater chance of the mosquitoes moving away from the fogged area, the mortality rate is likely to be lower. During outbreaks of dengue this mortality rate may not reduce adult vector densities sufficiently to prevent disease transmission.

Results obtained by other investigators in field trials with Reslin 10/10 (R) have not been very encouraging. In a fogging trial in Thailand, 90 percent reduction of the *Aedes* population in the

test areas was achieved only at a costly high dosage of 30 g/ha. At a lower dosage of 7.0 g/ha the percentage reduction was 14.3. ² ULV applications of Reslin 10/10 (R) was reported to have even less effect. In another ULV trial a slightly different formulation Reslin 15 (R) applied at 0.5 ml/house caused only a 22 percent reduction in the female *A. aegypti* population and was markedly inferior to three other compounds tested. ³

Lo *et al* ⁴ conducted trials with Reslin 10/10 (R) and found the mortality rates to be 89.5 percent outdoors and 61.1 percent indoors. While in this study it was found that the indoor mortality was greater than the outdoor mortality. This may be due to the fact that the fog remains inside the house for a longer time since the doors and windows were shut immediately after the fogging.

The poor control achieved with thermal fogging of Reslin 10/10 (R) was attributed by Panthumachinda *et al* ² to the volatile and unstable nature of the compound in hot humid climates. Moreover, spray deposits exposed to light exhibit a rapid loss of activity. ⁵

As has noted, the conditions prevailing during fogging are likely to affect the results obtained. In this study the atmospheric conditions prevailing

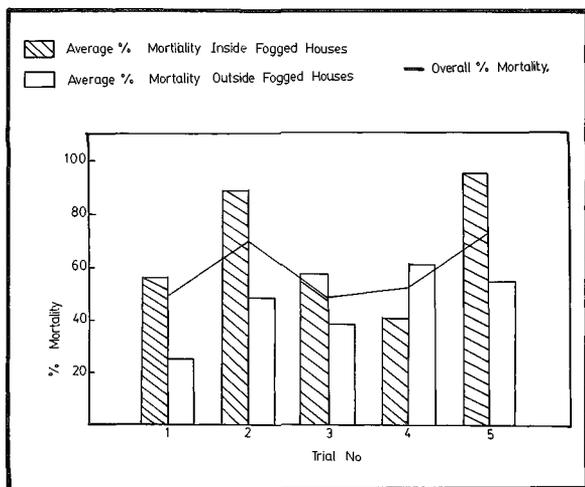


Fig. 1 Mortality rates in fogging trial with Reslin 10/10 on caged adult *A. aegypti*.

during fogging were not monitored but noted generally (Table II). In the fifth trial under conditions of good cloud cover, no detectable turbulence and fairly cool temperatures the fog stayed longest on the ground, giving the highest mortality rate of all the trials.

In laboratory trials to investigate bioresmethrin resistance in *A. aegypti* adults, Chadwick *et al*⁶ reported resistance in four South East Asian strains, at levels ranging from 4.4 to 10.8 times that of the susceptible strain. In view of this it may be prudent to assess the effectiveness of thermal fogging of this compound on local *A. aegypti* populations more thoroughly and review its use for dengue control from time to time.

ACKNOWLEDGEMENT

We wish to thank Dato (Dr.) Haji Abdul Talib bin Latiff, Director General of Health, Malaysia for allowing the publication of this paper. Thanks are also extended to Dr. Chong Chee Tsun Deputy Director of Health Selangor for his constructive

TABLE II
ATMOSPHERIC CONDITIONS PREVAILING DURING FOGGING TRIALS

Trial No.	1	2	3	4	5
Rain	-	-	-	-	-
Wind	++	+	++	+	-
Cloud Cover	+	++	+	-	++
Temperature	Warm	Cool	Warm	Warm	Cool

criticism and the staff of Gombak & Petaling district for the fogging operations.

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