AN EVALUATION REPORT ON OMS 786 [1] IN RICEFIELDS IN THE AHWAZ AREA, 1971[2]

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ABSTRACT

Regarding the importance of ricefields, as the main mosquito breeding places, use of chemical larvicides has been under consideration in Malaria Eradication Programmes.

In this trial, OMS 786 was used, to study the method and cost of application of this larvicide in the ricefields.

Two form of larvicides (1% sand granule, and 50% E.C.) were used in four formulations. (10 and 15 kg. of 1% S.G./hectar, 100 and 150 ml. of 50% E.C./hectar).

The density of Anopheline and Culex larvae were checked before application, and also in specific intervals after application, in different plots, and were compaired with control.

The results of the trial shows, that OMS 786 (specially in E.C. form) can successfully be used in the ricefields to eliminate the mosquito activities in the problem areas.

The trial also shows that the cost of operation (specially for 50% E.C.) is less than other methods.

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1 OMS 786 = Abate = (o, o, ó, ó — tetramethyl o, ó — thiodi-p-phenylene phosphorothioate)

2 This study was carried out by the joint collaboration of M.E.O., Khuzestan Office, and the Abadan Research Station of the Institute of Public Health Research, University of Teheran, P.O. Box 1310, Teheran, Iran.

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4. *Type of irrigation* :

Usually in the ricefields, each plot (the smallest part of the ricefield) is irrigated from the previous plot, and only the first plot is irrigated from the main canal. The surfaces of the plots are different and vary from 100 to 200 M^2.

5. *Selection of plots under study*:

The following factors were considered in selection of the plots :

5-1 In general, in each line, in which the plots are irrigated one from the other, the 3rd plot was chosen for spraying because the water level of the first and second plots varies from time to time.

5-2 It was decided to let one row go unsprayed between two sprayed rows, to avoid mixing of the various formulations of larvicides (4 formulations were used in this study). For this purpose, 4 rows (A, C, D and F) were sprayed and row G was left for control. In each sprayed row, spraying of the emulsion was performed at the opening of Plot No. 3. The larval densimetry was checked in Plots 3, 4 and 5 of each sprayed row.

MATERIALS AND DOSAGES

OMS 786 was available in two formulations (1% granule and 50% emulsifiable concentrate) in sufficient amounts for the trial and was used as follows :

1. *1% Granules*:
   1-1 10 kg/hectare
   1-2 15 kg/hectare
2. *50% E.C.*:
   2-1 100 ml/hectare
   2-2 150 ml/hectare

It should be mentioned that these amounts are less than the dosages recommended by the producer, in order to study the possibility of use on a large scale.

METHODS

The folowing factors were observed in the trial :

It was not possible to enter the plots, as this would cause damage to the plants. For this reason it was decided to use the natural irrigation way for dispersing the larvicide (50% E.C.). The larvicide (undiluted) was added to the irrigation water just before it entered the plot. It was observed that the material which was added to the water spread to all surfaces of the plot in 30 minutes.

INTRODUCTION

The extension and increase of ricefields in different areas of Khuzestan, which has great importance in increasing the Anopheline Vector Capacity of the area, and the difficulty in using oils on these breeding places, were the reasons for this study of the possibility of using new chemical larvicides.

The objective of this limited study, in addition to an economical evaluation, was based on the determination of a suitable method for operating an extended larviciding program.

Different formulations of OMS 786 (1% granule and 50% concentrate) were tested in permanent breeding places (Fahlian area, Kazeroon) for the first time in Iran in 1965 (Motabar *et al.*, 1967). The results regarding the dosages (3 kgs. of granules per hectare) were reported to be satisfactory.

According to the experience of other countries which have used OMS 786 for various purposes, this larvicide has been proven to be highly effective on mosquito larvae and it can even be used safely in drinking water (WHO, 1967).

SITUATION AND CONDITIONS OF THE STUDY AREA

1. *Location* :

   The ricefields selected for this study are located in the Bavy area, 40 km. from Ahwaz on the Ahwaz-Andimeshk Road.

2. *Anopheline fauna* :

   Anopheles stephensi, d'thali, superpictus and *pulcherrimus* are the species usually captured during the regular entomological checking of the area. (Under normal conditions *A. pulcherrimus* is the dominant species.)

3. *Operation* :

   The operations which are being implemented in the area, according to the large plan of the Malaria Eradication Program, are : Malathion residual spraying (2 rounds of 2 g/sq. m. - May and August), monthly case detection and radical treatment of positive cases.

   Note : It should be mentioned that only one village (Maravaneh), which is closed to the ricefields (study areas), was not sprayed during the second round (August) in order to have a higher density of anopheline in the area. (It is important to note that in order to prevent the occurrence of any positive cases, this village was under careful surveillance and entomological checking, and no positive cases were found in or around the village.)

The granules were dispersed by hand (similar to seeding) around the plot, as special instruments were not available. It was clear, of course, that the granule particles were not spread evenly over the entire plot surface.

METHOD OF CHECKING

1. The larval density of the plots to be sprayed and the adjoining plots, which could possibly be polluted by the larvicide, were checked carefully before spraying. It was decided to have at least 7-10 larvae in each dip (on the average) before starting the trial. For this reason, the first round of larviciding in 2 plots (No. 3 from the first and third lines) was started on Sept. 15th, 1971.
2. Therefore, the last larval checking (before spraying) was done on Sept. 16th (see tables).
3. The method of checking of the larval density in all plots was similar during the period of trial (30 dips in each plot).
4. The sprayed plots were checked :
   4-1 24 hours after spraying;
   4-2 a second time with a 48-hour interval before the next spraying.

DISCUSSION AND CONCLUSION

1. Table No. 1 shows that the granule formulation at a rate of 10 kg/hec. is effective, but this dosage is not able to kill the entire larvae population. However, 5 days after spraying the number of larvae (15 in 30 dips) was much lower than before treatment (135 in 30 dips).

   A considerable result was obtained on Culex larvae, even in plots Nos. 4 and 5 which were indirectly affected by the material. The table shows that the density of Culex in these plots decreased to 0 and 1 (after 24 hours), 20 and 12 (after 72 hours) and 24 and 11 (on 5th day of treatment) against 120 and 178 (before treatment).
2. Table 2 shows the result of treatment with 15 kg of granules/hectare. This treatment gave better results. The anopheline larval density in 30 dips was 1, 0 and 3 on the first, second and fifth day of treatment, respectively. This result was also obtained in the second round of treatment. This compound showed a similar effectiveness against Culex larvae in the first plot.

   It should be noted that the decrease of larvae in adjoining unsprayed plots (indirectly affected by Abate) was also considerable.
3. The result of treatment with 100 ml of 50% E.C./hectare is shown in Table 3. It can be observed that the density of anopheline larvae

decreased rapidly during the first 3 days of treatment and was almost 0 on the 7th day of larviciding. Better results were obtained during the second round of treatment.

The effectiveness of the larvicide against Culex larvae in treated plots and in adjoining untreated plots (Nos. 4 and 5) was also considerable.

4. Table 4 shows the result of treatment with 150 ml of 50% E.C./ hectare. The effectiveness of the larvicide against both anopheline and culex larvae is shown clearly.

In general, the results of this trial show that, by the use of OMS 786, it is possible to obtain better results in the elimination of larvae populations. Although this trial, due to weather conditions, was very short, this method was found to be much more suitable than other methods.

It should be noted that granules are not applicable to large-scale use in ricefields and, if used, should be applied by a special instrument, as, especially in heavily planted fields, parts of the granule particles will remain on the leaves.

The use of E.C., considering the simplicity of the operation, has more advantages and is the best solution for the ricefield problems.

As the tables show , this compound gave satisfactory results in most cases within the first 5 days of treatment. Thus, considering the mosquito generation period (5-7 day minimum), it seems likely that larviciding can be performed at 8-12 day intervals.

It should also be mentioned that, in a large-scale program in ricefields, the indirect influence of the material should be considered.

Costs

1. Application of 10-15 kg granules/hectare, including labor and transportation, is estimated at about 6.8 to 9.3 U.S. dollar per hectare/ round.
2. Application of 100-150 ml 50% E.C./hectare, including labor and transportation, would be almost $1.8 to $ u.s.2.1 per hectare/round.

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TABLE 1

Density of Anopheline and Culicine larvae per 10 dips in treated (1% granules) and untreated breeding places

Date of Study	Untreated		Plots Treated					
			Direct Treatment		Indirect due to percolation			
			Plot No. 3		Plot No. 4		Plot No. 5	
	An. larva	Cu. larva	An. larva	Cu. larva	An. larva	Cu. larva	An. larva	Cu. larva
15/9/71 before treatment	91	205	134	318	89	178	51	120
16/9/71 after treatment	17	22	32	31	29	0	20	9
18/9/71	17	9	23	28	15	20	12	12
20/9/71	15	9	15	36	16	24	15	11
22/9/71	23	14	20	42	12	30	18	45
24/9/71 second round	25	46	36	106	40	40	15	65
25/9/71	23	42	5	7	30	18	28	51
27/9/71	59	18	16	15	17	4	11	45
29/9/71	57	9	10	30	28	25	10	65
1/10/71	22	9	38	68	77	22	50	42

TABLE 2

Density of Anopheline and Culicine larvae per 10 dips in treated (1% granules) and untreated breeding places

Date of Study	Untreated		Plots Treated					
			Direct Treatment		Indirect due to percolation			
			Plot No. 3		Plot No. 4		Plot No. 5	
	An. larva	Cu. larva	An. larva	Cu. larva	An. larva	Cu. larva	An. larva	Cu. larva
16/9/71 before treatment	48	112	18	29	56	15	34	74
17/9/71 after treatment	9	18	1	0	13	3	40	42
19/9/71	9	5	0	3	18	9	25	28
21/9/71	8	5	3	11	15	15	17	34
23/9/71	12	8	16	14	46	65	39	57
25/9/71 second round	13	26	16	55	50	64	60	75
26/9/71	18	23	1	10	17	0	40	21
28/9/71	39	10	0	5	19	5	55	22
30/9/71	30	5	5	1	35	27	55	30

TABLE 3

Density of Anopheline and Culicine larvae per 10 dips in treated (100 ml. E.C./hec.) and untreated breeding places

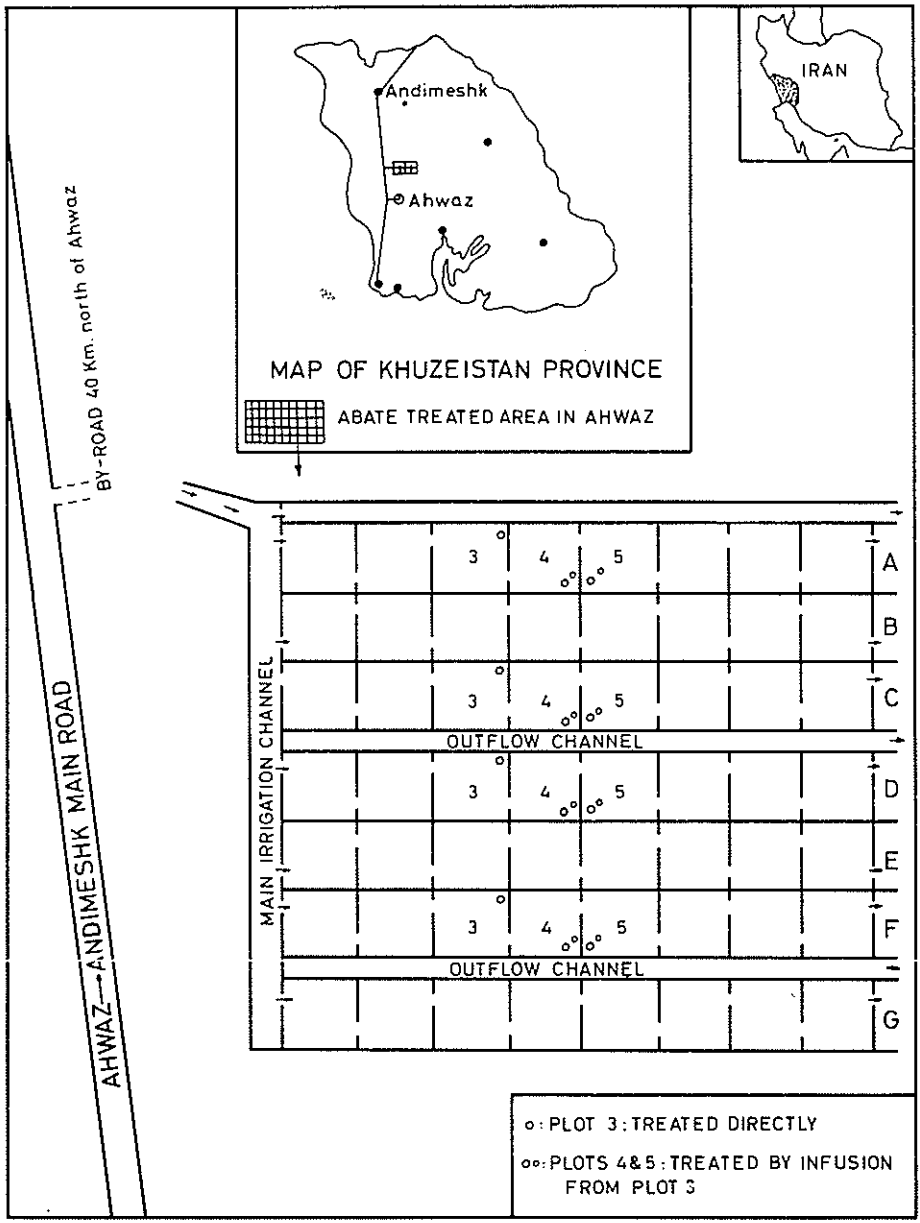
Date of Study	Untreated		Plots Treated					
			Direct Treatment		Indirect due to percolation			
			Plot No. 3		Plot No. 4		Plot No. 5	
	An. larva	Cu. larva	An. larva	Cu. larva	An. larva	Cu. larva	An. larva	Cu. larva
15/9/71 before treatment	86	321	43	223	139	480	78	262
16/9/71 after treatment	16	51	9	1	10	1	30	2
18/9/71	16	14	6	0	13	0	16	8
20/9/71	14	14	0	11	12	20	13	28
22/9/71	21	23	0	18	12	20	13	65
24/9/71 second round	23	64	7	25	9	110	15	95
25/9/71	50	65	0	1	8	1	27	0
27/9/71	55	28	1	6	7	14	16	5
29/9/71	54	14	0	3	10	66	16	42
1/10/71	16	14	0	3	7	3	10	5

TABAE 4

Density of Anopheline and Culicine larvae per 10 dips in treated (150 ml. E.C./hec.) and untreated breeding places

Date of Study	Untreated		Plots Treated					
			Direct Treatment		Indirect due to percolation			
			Plot No. 3		Plot No. 4		Plot No. 5	
	An. larva	Cu. larva	An. larva	Cu. larva	An. larva	Cu. larva	An. larva	Cu. larva
16/9/71 before treatment	55	180	53	178	68	190	45	172
17/9/71 after treatment	11	29	2	6	12	5	10	0
19/9/71	10	0	0	1	7	0	10	3
21/9/71	9	8	4	1	8	23	13	12
23/9/71	13	13	1	8	10	55	18	26
25/9/71 second round	14	41	6	31	4	37	18	37
26/9/71	27	37	0	0	10	0	15	0
28/9/71	36	16	1	0	2	2	8	2
30/9/71	33	8	7	4	12	5	12	8

STUDY ON FIELD APPLICATION OF ABATE INSECTICIDE



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