

INSECTICIDAL EFFECTS OF INDIGENOUS VEGETABLE OILS (TARAMIRA AND ARTEMISIA) ON SOME RICE DELPHACIDS IN PAKISTAN

M.A. Jabbar Khan and Raana Jabbar Khan

Department of Zoology University of Karachi-Pakistan

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Toxic potentiality of indigenous vegetable oils, i.e., Taramira and Artemisia, were assessed separately as well as in combination with organic synthetic insecticides, i.e. DDT (40%, product of Itehad Pesticides Ltd., Pakistan, and Lindane Gamma BHC, introduced by ICI Ltd. under the trade Mark Gammaxane) against some rice pests namely, *Perkinsiella insignis* Distant, *Sogatella striatus* Qadri & Mirza, *Sogatella longifurcifera* Esaki and Ishihara, *Toya attenuata* Distant, *Perigrinus maidis* Kirkaldy.

For laboratory experiments direct and indirect sprays were used. These vegetable oils separately and in combination with DDT and Lindane have proved effective insecticides against the above rice pests.

INTRODUCTION

Synthetic insecticides are commonly used as effective toxicants against various household, agricultural pests and insects of medical and veterinary importance, but they are generally hazardous to man and other non-target organisms. Also insects rapidly develop resistance to synthetic insecticides.

Considering the above disadvantages of synthetic insecticides, the School of Toxicology in Karachi University has selected studies and research on the utilization of indigenous vegetable oils as insecticides.

The vegetable oils Taramira (seed oil of *Eruca sativa* Mill) and Artemisia oil (oil from the distillation of leaves and shoots of *Artemisia kurramensis* Qazilbash) were used in the laboratory tests against five species of rice delphacids. They were *Perkinsiella insignis* Distant, *Sogatella striatus* Qadri and Mirza, *Sogatella longifurcifera* Esaki and Ishihara, *Toya attenuata* Distant, *Perigrinus maidis* Kirkaldy.

The possibility of the use of vegetable oils as insecticides has been demonstrated in the past. Hartman [3] used *Artemisia* oil against mosquito larvae. The oil of *A. vulgaris* L. was found to be a good larvicide, comparable to kerosine, although it is only a feeble insecticide [2], Hartzel [4] and Rogers, *et al.* (1950) conducted tests on various species of *Artemisia* for insecticidal characteristics. Qadri and Jabbar [8] used *Artemisia* oil against several insect pests of vegetables and fruit plants. Jabbar and Qadri [6] determined the doses of *Artemisia* and Taramira oils lethal to full-grown larvae of *Anophles stephensi* Liston and compared them with DDT and Lindane. Later, Jabbar [5] determined the aquatic vertebrate toxicity of indigenous vegetable oils,

used as mosquito larvicide. Recently Jabbar [7] used these oils against delphacid rice pests and obtained promising results.

Taramira and Artemisia oils were tested in the laboratory against adult rice pests, *P. insignis* Distant, *S. striatus* Qadri and Mirza, *S. longifurcifera* Esaki and Ishihara, *T. attenuata* Distant, *P. maidis* Kirkaldy.

Teepol-610 from Burmah Shell Co. was used for preparing an emulsion of taramira and *Artemisia* oils.

The following are the formulations of insecticidal materials (A-H) which were added to water and used in the experiments for spraying.

- A. *Artemisia* 1% plus *Teepol* 0.5%.
 - B. Taramira 1% plus *Teepol* 0.5%.
 - C. DDT 0.5% plus *Teepol* 0.5%.
 - D. Lindane 0.5% plus *Teepol* 0.5%.
 - E. *Artemisia* 1% plus DDT 0.5% plus *Teepol* 0.5%.
 - F. *Artemisia* 1% plus Lindane 0.5% plus *Teepol* 0.5%.
 - G. Taramira 1% plus DDT 0.5% plus *Teepol* 0.5%.
 - H. Taramira 1% plus Lindane 0.5% plus *Teepol* 0.5%.
 - I. *Teepol* 0.5%.
 - J. Water
 - K. Untreated
- } Controls.

Direct spray technique: The above formulations of the same composition of the different insecticides were employed as sprays. For each test 20 adult insects of each species were placed in a tube (10" high, 1½ diam). 0.5 cc of each formulation was sprayed on insects by Divilbis Atomizer No. 15. After 10 min. they were transferred to clean recovery petridishes 1" high, 6" diam. with fresh food. After 15 min. the knockdown effect was noted. Sub-

Table 1. Showing the percentage of mortality of insects in 24 hours

Insect		Percentage of mortality in 24 hr								Control		
		A	B	C	D	E	F	G	H	I	J	K
<i>Perkinsiella insignis</i> Distant	a	65	50	75	75	85	90	80	85	0	0	0
	b	75	65	85	90	100	100	95	90	"	"	"
<i>Sogatia striatus</i> Qadri & Mirza	a	75	65	80	90	100	100	95	100	"	"	"
	b	100	80	90	95	100	100	100	100	"	"	"
<i>Sogatella longifurcifera</i> Esaki and Ishihara	a	95	80	95	100	100	100	100	95	"	"	"
	b	100	95	100	100	100	100	100	100	5	"	"
<i>Toya attenuata</i> Distant	a	50	45	55	70	70	90	80	80	0	"	"
	b	70	60	70	95	100	100	100	100	"	"	"
<i>Perigrinus maidis</i> Kirkaldy	a	80	65	80	95	100	100	95	100	"	"	"
	b	100	100	100	100	100	100	100	100	5	"	"

N.B: Readings (a) relate to indirect spray method and readings (b) to direct method. A-H are the formulations, I-K control.

sequent mortality was recorded after half an hr, 1 hr, 3 hr, 6 hr, and finally after 24 hr. The mortality was corrected by the Abbot's formula [1] as follows:

$$\frac{(x - y)}{x} \times 100$$

When x = insects remaining alive amongst untreated
 y = insects remaining alive amongst treated
 $x - y$ = Total insects killed.

Every treatment was replicated 10 times. All experiments were checked by control.

Indirect spray technique: The inner surface of a glass tube was sprayed and after 10 min. 20 insects were released over the sprayed surface. After 10 min. the insects were transferred to new untreated receptacles and the mortality was recorded as in the case of the direct spray method.

The mortality records (Table 1) show that Taramira and Artemisia oils have insecticidal effects themselves slightly weaker than DDT and Lindane, and that these effects are considerably improved by mixture with DDT and Lindane. The oils are also good solvents for DDT and lindane and are effective even with small quantities of these insecticides.

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