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Compatibility of Pretilachlor with Insecticides and Fungicides in rice ecosystem

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Abstract : Simultaneous or sequential application of herbicides with insecticides and fungicides in a single cropping season can minimize the cost of application of herbicides economically. To avoid physical, chemical and biological incompatibility, compatibility studies are to be carried out to find out the suitability of a spray combination. With this view, compatibility of pretilachlor was studied by estimating the yield obtained in the treatments consisting of pretilachlor in combination with an insecticide (Monocrotophos) and a fungicide (Carbendazim). The results of the study revealed that there was no difference in grain and straw yield of rice in treatments which received application of pretilachlor alone and with monocrotophos and carbendazim indicating the compatibility of pretilachlor with pesticides.

Key words: Rice, Pretilachlor, Compatibility, Insecticides, Fungicides.

Introduction

Preemergence application of herbicide was found to be effective in controlling weeds in transplanted rice (Narayanan *et al.*, 2000). Pretilachlor is a new selective herbicide introduced for the control of broad leaved weeds and sedges in transplanted rice. Weed infestation along with disease and insect pests which occurs simultaneously cause damage to rice crop under farmer's conditions. Therefore it is essential to apply herbicide, fungicide and insecticide at the same time. Simultaneous or sequential application of herbicides, pesticides and fungicides is made in a single cropping season to achieve saving of time, ware and tare of spraying equipments and cost of application. But there are problems of physical, chemical and biological incompatibility. Hence, before deciding a combined plant protection schedule, compatibility studies are to be carried out to find out the suitability of a particular spray combination. Literatures pertaining to pretilachlor in combination with insecticides and fungicides are scanty.

Materials and Methods

Laboratory experiment

As a lab study, Emulsion stability test was conducted. Recommended spray concentration of herbicide combinations were taken in a beaker and 30 ml of hard water was added and stirred with a glass rod at the rate of 4 revolutions per second. Then transferred to a 100 ml graduated cylinder and volume was made up to the mark using standard hard water. The cylinder was kept in a thermostat at 30 ±1°C for 30 min. After the expiry of specified time the volume of sediment at the bottom and creamy material at the top were noted.

Table 1. Compatibility of Pretilachlor with Pesticides (Emulsion stability test)

No.	Treatments	Sedimentations (ml)	Creaming (ml)
1.	Pretilachlor + Endosulfan	-	-
2.	Pretilachlor + Monocrotophos	-	-
3.	Pretilachlor + Carbendazim	1.0	-
4.	Pretilachlor + Endosulfan + Carbendazim	1.0	-
5.	Pretilachlor + Monocrotophos + Carbendazim	1.2	-

Table 2. Compatibility of Pretilachlor with Pesticides on crop toxicity, mean rice grain and straw yield (kg ha^{-1})

Trt No.	Treatments	Crop toxicity*		Grain yield	Straw yield
		7 DAT	15 DAT		
T_1	Pretilachlor 0.75kg + HW	1.3	1.0	5588	8142
T_2	Pretilachlor 1.0kg HW	1.3	1.0	5822	8256
T_3	Pretilachlor 0.75kg + HW	1.7	1.0	5515	8160
T_4	Anilofos 0.4kg + HW	1.3	1.0	5491	8136
T_5	Butachlor 1.25kg+ HW	1.3	1.0	5566	8155
T_6	Hand weeding twice	1.0	1.0	5800	8214
T_7	Pretilachlor 0.75kg + Monocrotophos (1000ml) + HW	1.4	1.0	5512	8148
T_8	Pretilachlor 0.75kg + Carbendazim (250kg) + HW	1.3	1.0	5728	8124
	SEd			142	106
	CD (P=0.05)			NS	NS

*Not statistically analysed

Scale 1-10 : 1 = No crop injury and 10 = complete crop destruction

T_1 and T_2 : Pretilachlor (New formulation)

T_3 : Pretilachlor (Rifit 50 EC)

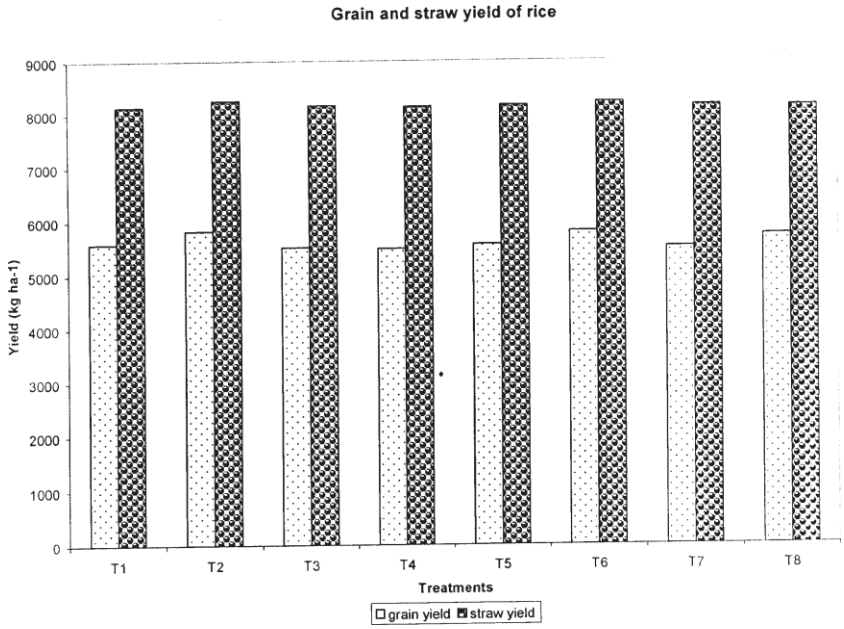

Fig.1 Grain and Straw yield of rice

Field experiment

Field experiment was conducted during summer, 2002 at wetlands of Tamil Nadu Agricultural University, Coimbatore. The soil of the experimental site was clay loam in texture, tending towards alkaline in reaction with pH of 8.5 and EC 0.14 dSm^{-1} and possesses relatively low N status and high P and K status. The treatments included pretilachlor at 0.75 and 1.0 kg ha^{-1}, pretilachlor (Rifit) at 0.75 kg ha^{-1}, anilofos (Aniloguard) at 0.4 kg ha^{-1} and butachlor (Machate) at 1.25 kg ha^{-1} along with hand weeding twice, were compared with pretilachlor at 0.75 kg ha^{-1} in combination with recommended dose of monocrotophos (1000 ml ha^{-1}) and pretilachlor at 0.75 kg ha^{-1} in combination with recommended dose of carbendazim (250 g ha^{-1}) to study the compatibility of pretilachlor along with pesticides. The experiment was conducted in a randomized block design with three replications. The herbicides alone and in combination with pesticides were applied on 3rd day after transplanting and one hand weeding was given for all the herbicide treated plots at 45 DAT. The hand weeding treatment received two hand weeding at 20 and 45 DAT. The plots were observed after herbicide application to find out the crop toxicity effects on rice. The observation were taken at 7 DAT and 15 DAT taking into the considerations of epinasty, hyponasty, chlorosis, necrosis, stunting, mortality adopting the rating scale of 0-10, where 0 is no crop toxicity and 10 is complete mortality of plants. Grain and straw yield were recorded at harvest.

Results and Discussion

Lab study carried out revealed that, the creamy material was not found in all the combinations. However 1.0 ml, 1.0 ml and 1.2 ml of sedimentation was occurred in combination of pretilachlor + carbendazim, pretilachlor + endosulfan + carbendazim and pretilachlor + monocrotophos + carbendazim respectively, however, not exceeding the 1S1 limit of 2 ml (Table 1). Hence the pretilachlor in combination with pesticides indicated the compatibility and suggests that the insecticide (monocrotophos) and fungicide (carbendazim) tested, could be used in combination with pretilachlor.

In the case of field study, the visual toxicity ratings are often used to quantify the crop tolerance to the herbicide. These rating are good indicators of grain yield reduction (Pantone and Baker, 1992). In qualitative assessment, the plants in control and hand weeding twice were used as reference. In this context, pretilachlor alone and in combination with pesticides did not show any crop toxicity symptoms. This is in accordance with findings of Janardhan *et al.* (1999) (Table 2). This proves that pretilachlor combinations has not imparted the reduction in growth and negative influence on the yield attributes resulting in the poor yielding potential of rice.

There was no significant difference in grain and straw yield among different treatments. This might be due to reason that both the chemicals were compatible with pretilachlor without causing deleterious effect on crop growth and yields of rice (Table 2 & Fig. 1). The combinations indicated the compatibility and suggested that pretilachlor in combination with monocrotophos at 1000 ml ha^{-1} (insecticide) and carbendazim at 250 g ha^{-1} (fungicide) were significantly effective in increasing yield when compare to untreated check and on par with pretilachlor alone, can be used in combination.

Reference

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