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EFFECT OF PACLOBUTRAZOL IN CONJUNCTION WITH HERBICIDE ANILOFOS ON AGED SEEDLINGS OF RICE

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ABSTRACT

Field experiments were conducted during *rabi* 1993-94 and *Kharif* 1994 to find out the effect of growth retardant paclobutrazol in conjunction with herbicide anilofos on aged seelings of rice. The highest grain yield was obtained with the application of paclobutrazol 200 g/ha at 8 days after sowing in the nursery and anilofos 0.4 kg/ha at 5 days after transplanting followed by paclobutrazol 200 g/ha at 8 days after transplanting in the main field. Paclobutrazol applied at 8 days after transplanting was preferred to 15 days before heading.

KEY WORDS : Seedling age, paclobutrazol, anilofos, growth retardant

Normally 25-35 days old seedlings are recommended for transplanted rice. However, under delayed water supply, farmers are forced to extend the age of the nursery. Age of seedling at the time of transplanting is an important factor for uniform stand and establishment of rice (Padalia, 1981). As the planting was delayed, the yield components and grain yield decreased significantly. Therefore, a study was undertaken to find out the efficiency of paclobutrazol in conditioning the rice seedlings for delayed transplanting. The beneficial response of paclobutrazol in conjunction with herbicide anilofos was also studied.

MATERIALS AND METHODS

Field experiments were conducted in the wet lands of Tamil Nadu Agricultural University, Coimbatore during 1993-94 to evaluate the efficiency of paclobutrazol and anilofos on aged seedlings of transplanted rice.

The experiment was started in *rabi* 1993-94 in factorial design using 45 day old seelings. The nursery had 3 treatments *viz.*, 200 g/ha of growth regulator (paclobutrazol) at 8 days after sowing (DAS), anilofos 0.2 kg/ha followed by paclobutrazol 200 g/ha at 8 DAS besides the untreated check (control). In the main field, besides

Table 1. .Effect of herbicide and growth regulator on yield and yield parameters of rice - *rabi* 1993-94

Treatments	Productive tillers (No./m^2)	Panicle length (cm)	Filled grains/panicle (No.)	1000 grain weight (g)	Grain Yield (t/ha)
NURSERY					
Control	304.81	17.67	59.12	20.34	2.59
PCB 200 at 8 DAS	318.03	18.07	58.9	20.29	2.78
ANL 0.2 fb PCB 200 at 8 DAS	315.72	18.08	58.71	20.19	2.65
SEd	6.14	0.20	0.95	0.18	0.053
CD (P=0.05)	12.50	NS	NS	NS	0.108
MAIN FIELD					
Control	200.78	19.76	4.24	20.00	2.28
ANL 0.4 at 5 DAT	294.06	20.10	53.23	20.23	2.35
GR at 15 DBH					
PCB 200	310.02	19.82	63.48	20.14	2.58
PCB 300	312.11	16.49	62.15	19.85	2.62
ANL 0.4 fb PCB 200	320.53	19.56	65.76	20.73	3.11
ANL 0.4 fb PCB 300	333.03	15.90	63.57	20.49	3.22
SEd	8.69	0.20	1.34	0.26	0.073
CD (P=0.05)	17.68	0.42	2.73	0.54	0.153

PCB - Paclobutrazol DAT - Days after transplanting
DAS - Days after sowing DBH - Days before heading
ANL - Anilofos

the control, anilofos at 0.4 kg/ha 5 days after transplanting (DAT), paclobutrazol at 200 g/ha and 300 g/ha at 15 days before heading (DBH) were tested each one separately. The two doses of paclobutrazol at 15 DBH were tested in conjunction with anilofos at 0.4 kg/ha also applied earlier at 5 DAT. Thus, there were 18 treatments combining nursery and main field which were replicated thrice.

In the next experiment in *kharif* 1994, 30 and 45 day old seedlings were planted. The treatments tested in the nursery were control, paclobutrazol 200 g/ha at 8 DAS and anilofos 0.2 kg/ha followed by paclobutrazol 200 g/ha at 8 DAS. They were superimposed in the main field with a set of treatment *viz.*, (1) Control, (2) anilofos 0.4 kg/ha at 5 DAT, (3) paclobutrazol 200 g/ha at 8 DAT, (4) paclobutrazol 300 g/ha at 8 DAT. (5) anilofos 0.4 kg/ha at 5 DAT followed by paclobutrazol 200 g/ha at 8 DAT, (6) anilofos 0.4 kg/ha at 5 DAT followed by paclobutrazol 300 g/ha at 8 DAT, (7) paclobutrazol 200 g/ha at 15 DBH, (8) paclobutrazol 300 g/ha at 15 DBH, (9) anilofos 0.4 kg/ha at 5 DAT followed by paclobutrazol 200 g/ha at 15 DBH and (10) anilofos 0.4 kg/ha at 5 DAT followed by Paclobutrazol 300 g/ha at 15 DBH. Thus there were 3 nursery treatments and 10 main field treatments under 2 seedling are constituting 60 treatments in all.

RESULTS AND DISCUSSION

The results obtained from *rabi* and *kharif* crops are presented in Tables 1 and 2 respectively. The interaction effect of the age of seedlings, growth retardant and herbicide of *kharif* season are also presented in Table 3. An overall perusal of results of the two experiments indicate the set back in all the yield attributes studied and yield as well as with

Table 2. Effect of herbicide and growth regulator on yield and yield parameters of rice - *kharif* 1994

Treatments	Productive tillers (No./m^2)	Panicle length (cm)	Filled grains/panicle (No.)	1000 grain weight (g)	Grain Yield (t/ha)
SEEDLING AGE (DAYS)					
30	431.72	21.10	83.38	20.87	4.34
45	259.00	21.08	61.94	20.83	2.30
SEd	3.29	0.14	0.28	0.05	0.064
CD (P=0.05)	7.24	NS	0.61	NS	0.140
NURSERY					
Control	348.09	21.14	71.92	20.89	3.29
PCB 200 at 8 DAS	344.78	21.16	74.37	20.85	3.49
ANL 0.2 fb PCB 200 at 8 DAS	344.47	20.97	74.28	20.80	3.42
SEd	4.03	0.17	0.33	0.77	0.079
CD (P=0.05)	NS	NS	0.75	NS	0.170
MAIN FIELL					
Control	315.97	22.18	60.94	20.91	2.54
ANL 0.4 at 5 DAT	333.44	22.04	68.53	21.01	3.00
GR at 8 DAT					
PCB 200	348.88	21.65	74.59	21.06	3.32
PCB 300	346.14	21.67	74.02	20.97	3.29
ANL 0.4 fb PCB 200	368.75	21.83	77.20	21.14	3.78
ANL 0.4 fb PCB 300	362.10	21.99	75.99	21.07	3.73
GR at 15 DBH					
PCB 200	337.32	19.88	73.41	20.56	3.18
PCB 300	337.14	19.55	71.78	20.52	3.14
ANL 0.4 fb PCB 200	355.17	20.14	75.13	20.53	3.65
ANL 0.4 fb PCB 300	353.71	19.96	75.04	20.73	3.62
SEd 3.96		0.27	0.55	0.21	0.022
CD (P=0.05) 7.86		0.53	1.07	0.43	0.043

aged seedlings (45 day old) as compared to 30 day old seedlings. The difference in the values of yield attributes and grain yield between normal and aged seedlings is conspicuously higher than the effect due to anilofos and paclobutrazol tested at different doses. Such significant reduction due to delayed planting was earlier reported by many authors (Trivedi and Kwatra, 1983 ; Gill and Shahi, 1985 ; Reddy and Reddy, 1992). In both the experiments , the herbicide anilofos 0.4 kg/ha at 5 DAT did not improve the yield attributes *viz.*, productive tillers, panicles/unit area, filled grains/panicle etc., and the grain yield over control (unweeded plot) with 45 day old seedlings. Generally herbicide application would favour growth and development and promote the yield attributes. But in the present study, the unfavourable effect of aged seedlings (45 day old) was to such an extent that the effect of herbicide was not pronounced. This is further confirmed from the results presented in Table 3

Table 3. Interaction between age of seedlings (X) main field treatments (M) grain yield

Treatments	30 DAT	45 DAT	Mean
Control	3.22	1.87	2.54
ANL 0.4 at 5 DAT	4.00	2.00	3.00
GR at 8 DAT			
PCB 200	4.32	2.33	3.32
PCB 300	4.30	2.28	3.29
ANL 0.4 fb PCB 200	4.88	2.68	3.78
ANL 0.4 fb PCB 300	4.86	2.60	3.73
GR at 15 DBH			
PCB 200	4.20	2.17	3.18
PCB 300	4.18	2.10	3.14
ANL 0.4 fb PCB 200	4.77	2.53	3.65
ANL 0.4 fb PCB 300	4.72	2.52	3.62
Mean	4.34	2.30	

	SEd	CD
X at M	0.031	0.061
M at X	0.015	0.061

between 30 and 45 day old seedlings while the effect for herbicide was distinct for 30 day old seedlings (3.22 tonnes/ha for unweeded control and 4.0 tonnes/ha for anilofos) it was not so with aged seedlings (1.87 tonnes/ha for 45 day old seedlings and 2.0 tonnes/ha for 30 day old seedlings).

The growth retardant paclobutrazol both at 200 g/ha and 300 g/ha applied at later stages of crop growth *viz.*, 15 days prior to heading did not have perceptible effect on all the yield parameters and grain yield; possibly the timing of application might be too late to have desired effect on the yield. Application of paclobutrazol 200 g/ha at 8 DAS increased the yield by 200 kg/ha in both the seasons indicating the scope for its use in the paddy nursery. Nevertheless, its effect at the early stage of application in the main field (8 DAT) even at higher dose of 300 g/ha did not have favourable effect but its effect in combination with the herbicide anilofos improved the yield attributes and the grain yield regardless of the age of seedlings as could be seen from the results in Table 2 and 3. This might be due to complimentary effect between the herbicide and growth retardant tested which needs further indepth studies for finding out the cost and effect relationship clearly.

Thus it is preferred to avoid delayed planting of seedlings. If it is unavoidable, the application of paclobutrazol 200 g/ha at 8 DAS in the nursery and anilofos 0.4 kg/ha at 5 DAT followed by Paclobutrazol 200 g/ha at 8 DAT is found to be useful. It should be followed by Paclobutrazol 200 g/ha at 8 DAT in the main field in conjunction with anilofos. Since there is complimentary effect between anilofos and Paclobutrazol, studies on the lines of application of various herbicides with different time of growth retardant application would aid to get maximum out of the newer growth retardant.

It may be concluded that the planting of rice seedlings of normal age is more useful. The newer growth retardant Paclobutrazol is having scope for its application in rice. It needs to be tested at various stages of crop growth with different herbicides and even with specific recommendations made for aged seedlings *viz.*, closer spacing, higher doses of nitrogen etc.

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