

**Effect of Pretilachlor Alone and in Combination with 2, 4-D on Weeds and Grain Yield of Rice (*Oryza sativa* L.)**

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Weeds, being a serious negative factor in crop production, are responsible for marked losses in crop yields. In the absence of suitable and effective weed control measures, weeds compete with crop plants and remove nutrients faster and in relatively larger amount than crop, resulting in significant yield loss. Pretilachlor in rice has been found effective mostly against grasses and some of broad-leaved weeds. There is increase in the density of broad-leaved weeds and sedges by continuous use of such herbicides. Pretilachlor in combination of 2, 4-D was evaluated to see if its weed control efficiency and spectrum can be enhanced.

Field experiment was conducted during *Navarai* season (Dec.-April) of 1999 and 2000 at Annamalai University Experimental Farm, Annamalainagar. The soil of the experimental field was clayey in texture, medium in organic carbon 0.70% and neutral in soil reaction (pH 7.5). The available N, P and K in the soil were 232, 18.1 and 226 kg ha<sup>-1</sup>, respectively. The treatments consisted of ready mix formulation of pretilachlor+2, 4-D and pretilachlor alone at various doses, anilofos, butachlor, hand weeding twice (20 and 40 DAT) and weedy (Table 1). The experiment was laid out in randomized block design and replicated thrice. Twenty-five day old seedlings of rice variety ADT 36 were transplanted at 12.5 x 10 cm spacing keeping 2-3 seedlings hill<sup>-1</sup>. The herbicides were sprayed by mixing them in 500 l of water ha<sup>-1</sup> on third day after transplanting. Recommended package of practices was adopted to grow the crop. Weed species and their dry weight at 60 days of crop

growth were recorded from the randomly selected quadrates (0.25 m<sup>2</sup>) in each plot and data were analysed after subjecting to square root transformation  $\sqrt{x+0.5}$ .

The major weeds observed in the experimental plots were *Cyperus rotundus*, *Echinochloa colona*, *Leptochloa chinensis*, *Marsilea quadrifolia*, *Eclipta alba* and *Sphenoclea zeylanica*. Grassy, non-grassy and sedges contributed 30.8, 22.0 and 46.7% of total weed population. Minimum weed population (2.8 m<sup>-2</sup>) and weed dry biomass (155.7 kg ha<sup>-1</sup>) were recorded in hand weeding twice (20 and 40 DAT). This was followed by pretilachlor + 2, 4-D (ready mix) at 300+300 g ha<sup>-1</sup> being at par with pretilachlor+2, 4-D (ready mix) 240+240 g ha<sup>-1</sup> produced significantly lower weed population (3.4 and 3.6 m<sup>-2</sup>), weed dry biomass (235.7 and 248.1 kg ha<sup>-1</sup>) and higher WCE (74.9 and 73.5%), respectively than other treatments (Table 1).

Grain yield losses amounted to 69.9% due to uncontrolled weed growth as compared to hand weeding (20 and 40 DAT). Hand weeding (20 and 40 DAT) recorded higher grain and straw yield (5.81 and 7.26 t ha<sup>-1</sup>). Among the herbicide treatments pretilachlor+2,4-D (ready mix) at 300+300 and 240+240 g ha<sup>-1</sup> produced significantly higher number of panicles hill<sup>-1</sup>, number of filled grains panicle<sup>-1</sup>, grain and straw yield (Table 1). The possible reason for higher yield and yield attributing characters in these treatments was reduced crop-weed competition. None of the herbicide treatments could produce grain yield comparable to hand weeding 20 and 40 DAT.

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Table 1. Effect of weed control treatments on weeds and rice crop (Mean of two seasons)

| Treatment                     | Dose<br>(g ha <sup>-1</sup> ) | Weed density (No. m <sup>-2</sup> ) at<br>60 DAS |            | Weed dry<br>weight<br>(kg ha <sup>-1</sup> ) | No. of<br>panicles<br>hill <sup>-1</sup> | No. of filled<br>grains<br>panicle <sup>-1</sup> | Grain yield<br>(t ha <sup>-1</sup> ) | Straw<br>yield<br>(t ha <sup>-1</sup> ) |
|-------------------------------|-------------------------------|--|------------|--|--|--|--------------------------------------|---|
|                               |                               | Grassy   | Non-grassy |  |  |  |                                      |   |
| Weedy                         | -                             | 6.47 (41)  | 6.59 (42)  | 937  | 4.1                                      | 58.4   | 3.42                                 | 4.38                                    |
| Weeding twice (20 and 40 DAT) | -                             | 2.12 (3)   | 1.87 (2)   | 155  | 6.6                                      | 68.8   | 5.81                                 | 7.26                                    |
| Pretilachlor+2, 4-D*          | 180+180                       | 4.22 (17)  | 3.08 (8)   | 420  | 5.4                                      | 64.3   | 4.85                                 | 5.90                                    |
| Pretilachlor+2, 4-D*          | 240+240                       | 2.73 (6)   | 2.27 (4)   | 248  | 6.1                                      | 67.3   | 5.47                                 | 6.78                                    |
| Pretilachlor+2, 4-D*          | 300+300                       | 2.67 (6)   | 2.19 (4)   | 235  | 6.3                                      | 67.5   | 5.55                                 | 6.89                                    |
| Anilofos+2, 4-D               | 250+400                       | 3.58 (12)  | 2.67 (6)   | 339  | 5.7                                      | 65.7   | 5.13                                 | 6.35                                    |
| Pretilachlor                  | 187                           | 5.18 (26)  | 5.24 (26)  | 660  | 4.4                                      | 60.0   | 4.00                                 | 4.73                                    |
| Pretilachlor                  | 250                           | 4.67 (21)  | 4.60 (20)  | 578  | 4.7                                      | 61.5   | 4.31                                 | 5.13                                    |
| Pretilachlor                  | 375                           | 3.89 (14)  | 4.41 (18)  | 501  | 5.0                                      | 62.9   | 4.57                                 | 5.49                                    |
| Butachlor                     | 1250                          | 3.08 (9)   | 3.08 (8)   | 325  | 5.8                                      | 65.9   | 5.19                                 | 6.40                                    |
| LSD (P=0.05)                  | -                             | 0.20   | 0.25       | 36   | 0.15                                     | 1.2  | 0.23                                 | 0.29                                    |

Figures in parentheses are original values.

\*Ready mix formulation.