

## EFFECT OF APPLICATION OF 2,4-D MIXED WITH UREA IN LOW-LAND DIRECT SOWN RICE

The intensity of weed menace in rice depends to a large extent on the system of cultivation practised. Direct sown rice in general have more competition from weeds right from the time of emergence. Pillai and Rao (1974) estimated the yield reduction in rice due to weeds alone as 15-20% in transplanted rice, 30-35% in direct seeded rice under puddled condition and 50-60% in upland rice. The important grass weeds identified are *Echinochloa colonum* and *E. crusgalli* and the sedges are *Cyperus iria*, *C. difformis* and *Fimbristylis miliaca*. The prominent broad leaved weeds are *Monochoria vaginalis*, *Ludwigia parviflora*, *Sphenoclea zeylanica*, *Marsilia quadrifolia* and *Lindernia* sp. The weedicide 2,4-D has been proved to give effective control of grasses and other annual weeds in rice (De Datta and Laesiana, 1973). The time of application of 2,4-D adopted by farmers is three weeks after sowing which almost coincides with the first top dressing of nitrogen. The high cost of sprayers and labour charges necessitated the present investigation to know the weed control efficiency of 2,4-D(WP) mixed with urea at the time of first top dressing.

The trial was laid out in a randomized block design with three replications on 25th May, 1980 at the Rice Research Station, Moncompu. Sprouted seeds of a photo-insensitive variety of rice (Jyoti) of 110 days duration was uniformly broadcast in puddled plots. Fertilizers  $70 \text{ kg N} + 35 \text{ kg P}_2\text{O}_5$  and  $35 \text{ kg K}_2\text{O/ha}$  were applied. Nitrogen was given in three splits, half as basal, one-fourth on 20th day and the rest on 50th day after sowing. The various weed control treatments were given as

per Table 1. Fernoxone, a 2,4-D Na salt (a.i. 80% w/w) and Weedone, 2, 4-D EE (a.i. 18% w/w) were the two herbicides used. In combined treatments, wettable powders of both these formulations were physically mixed with urea to be topdressed at 20 days after sowing. Observations on weed population, dry matter content, nitrogen loss through weeds, weed control efficiency at 80 days after sowing, yield and yield attributing characters were studied.

The application of Fernoxone @ 1.25 kg/ha either sprayed separately or mixed with urea and Weedone @ 5.6 kg/ha mixed with urea 20 days after sowing were equally effective in reducing the population as well as the dry weight of weeds and consequent nitrogen loss as compared to unweeded control (Table 1). However, hand weeding twice, at an interval of 20 days proved superior to all the other treatments. It was also seen that Fernoxone mixed with urea @ 1.0 kg/ha was as effective as 1.25 kg either sprayed separately or mixed with urea. Dickinson and Carpenter (1977) prepared home made granules of 2,4-D by sprinkling 2,4-D liquid on urea and broadcast it three weeks after sowing of rice and found that it was agronomically sound and acceptable to the farmers.

Data on yield and yield attributing characters (Table 2) showed that number of productive tillers/hill was on par in hand weeded and Fernoxone (@ 1.25 kg/ha) treated plots either sprayed separately or mixed with urea. Fernoxone treatment @ 1 kg/ha was on par with its higher dose of 1.25 kg/ha. The 1000 grain weight also followed the same pattern. The highest grain and

Table 1. Dry weight of weeds, nitrogen uptake of weeds and weed control efficiency as affected by different treatments

Treatment	Weed population per m <sup>2</sup>	Dry weight of weeds (kg/ha)	N loss through weeds (kg/ha)	Weed control efficiency (%)	Cost of weed control (Rs/ha)
1. Femoxone 9 1.25 kg/ha sprayed and urea top dressed	52.0(5.1)*	0.6	5.9	63.8	5
2. Femoxone 6 0.75 kg/ha mixed with urea and top dressed	59.3(7.8)	1.0	8.3	44.4	51
3. Femoxone @ 1 kg/ha mixed with urea and top dressed	24.7(5.1)	0.6	5.7	67.5	68
4. Femoxone @ 1.25 kg/ha mixed with urea and top dressed	22.0(4.8)	0.5	5.4	71.0	85
5. Weedone @ 2.8 g/ha mixed with urea and top dressed	45.7(6.8)	1.0	9.2	44.0	126
6. Weedone @ 4.2 g/ha mixed with urea and top dressed	44.3(6.7)	1.0	9.3	44.0	18
7. Weedone @ 5.6 g/ha mixed with urea and top dressed	26.3(5.2)	0.6	5.7	65.1	10
8. Hand weeding twice (uniformly)	13.7(3.8)	0.2	2.2	77.0	150
9. Weeded control (uniformly dressed)	95.7(9.5) 0.6	2.0 0.1	16.2 1.2	3.0 -	- -

\* Figures in parentheses are values transformed as  $\sqrt{x+1}$

Table 2. Yield and yield attributing characters and protein content of grain influenced by different treatments

Treatment number	Productive tillers/hill	1000 grain weight (g)	Yield (t/ha)		Weed index (%)	Protein content (%)
			Grain	Straw		
1	6.2	30.0	4.0	5.2	5.6	8.8
2	4.4	29.5	3.4	4.8	20.2	8.3
3	5.8	29.5	4.0	5.2	5.6	8.4
4	6.0	29.7	4.1	5.3	5.1	8.9
5	4.3	28.7	3.4	4.4	20.0	8.3
6	4.4	29.3	3.6	3.7	13.8	8.3
7	4.5	29.7	3.8	3.9	11.1	8.4
8	6.4	30.0	4.2	5.3	0.0	8.3
9	3.8	28.2	2.4	3.3	42.3	7.6
Cd (0.05)	0.5	0.7	0.3	0.3		0.4

The treatment details are given in Table 1.

straw yields were recorded in hand weeded plots which was similar with Fernoxone @ 1.00 and 1.25 kg/ha. Weedone 5.6 kg/ha was effective in controlling weeds but could not reach the same level of Fernoxone in terms of straw and grain yield possibly due to the **phytotoxicity** observed at higher doses of Weedone in comparison with the **Farnoxone** treatment. The weed indices were also lower in Fernoxone treated plots than Weedone treated plots.

Greater weed control efficiency was observed with the handweeding treatment. **However**, similar weed control efficiencies were observed with Fernoxone @ 1 and 1.25 kg/ha, **irrespective** of the method of application.

Fernoxone @ 1.25 kg/ha either sprayed or applied after mixing with urea recorded slightly higher protein content in rice grain than the other treatments. This may be due to significantly lower N loss through the weeds (Table 1) and consequent greater uptake and utilization of N by rice in those treatments. The cost of weed control has been reduced to about one-third when Fernoxone @ 1 kg/ha mixed with urea and applied, instead of spraying Fernoxone @ 1.25 kg/ha.

Thus we can conclude that Fernoxone mixed with urea @ 1.0 kg/ha can be recommended for controlling weeds in lowland direct sown rice which will reduce the cost of production to a considerable extent.

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## REFERENCES

- De Datta, S.K. and Laesiana, R.Q. 1973. New herbicides, plant growth regulators and techniques for weed control. Paper presented at the Eleventh British Weed Control Conference 1972. *PANS* 19(2):248-249
- Dickinson, L. and Carpenter, A.J. 1977. Home made granular formulations for applying chemicals to irrigated rice. *PANS* 23(2): 234-235
- Pillai, K.G. and Rao, M.V. 1974. Current status of herbicides research in rice in India. Paper presented at the Annual International Rice Research Conference held at IRRI, Manila from 22nd to 25th April, 1974