

Integrated weed management in *Kharif* sorghum [*Sorghum bicolor* (L.) Moench]

S.S. RATHOD, K.K. ZADE AND S.A. JAWALE

ABSTRACT

An experiment was conducted during the *Kharif* season 2002-2003 at Parbhani. Pre-emergence application of Atrazine @ 0.50 kg/ha + hand weeding and hoeing at 6 weeks after sowing boosted the growth and yield of sorghum. Weed free and pre-emergence Atrazine @ 0.50 kg a.i./ha at HW and H at 6 WAS and recommended cultural practices significantly over UWC.

KEY WORDS : Atrazine, 2,4-D (Na), Intercultivation, Sorghum, Yield

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INTRODUCTION

An integrated weed control involves the utilization of combination of physical, chemical and cropping methods of weed control in a well planned sequence so designed not to affect the ecosystem and consist of using pre-emergence application of herbicides supplemented with interculture operation at later stage of crop growth. Hence, considering the need for development of effective and economic weed management practices an experimental trial was conducted to compare the chemical method with manual and integrated method and to work out the economic *Kharif* sorghum.

MATERIALS AND METHODS

An experiment was conducted during the *Kharif* season of 2002-2003 at Department of Agronomy, Marathwada Agricultural University, Parbhani. The treatment combinations were T₁ – Weed free (weeding at 15 days interval), T₂ – Recommended cultural practices *i.e.* two hand weeding and hoeing at 3 and 6 weeks after sowing, T₃ – Hand weeding and hoeing at 3 weeks after sowing (WAS), T₄ – Pre-emergence Atrazine @ 0.50 kg/ha + hand weeding and hoeing at 6 WAS, T₅ – Atrazine @ 0.50 kg a.i./ha + 2,4-D (Na) @ 0.80 kg a.i./ha (post

emergence) at 6 WAS, T₆ – 2,4-D (Na) @ 0.80 kg a.i./ha at 30 days after sowing (one spray at 30 DAS), T₇ – Two post emergence sequential spray of 2,4-D (Na) 0.80 @ kg a.i./ha (30 and 50 DAS) (2 sprays at 30 and 50 DAS), T₈ – Control (without weeding and hoeing). The experiment was laid out in Randomized Block Design with 3 replications. The soil of the experimental plot was deep black having fairly uniform topography. All managerial practices were followed as per the standard package of practices recommended for the *Kharif* sorghum in the region, except weed management. A uniform dose of 40 kg P₂O₅/ha through single super phosphate (16 % P₂O₅) and 40 kg K₂O/ha through murate of potash (60 per cent K₂O) prior to sowing and nitrogen was applied through urea (46 per cent N) as per treatments in two equal splits *i.e.* 50 per cent as basal dose prior to sowing and 50 per cent nitrogen after three weeks of sowing (top dressing). Weed control efficiency was worked out by standard method given by Gautam *et al.* (1975).

RESULTS AND DISCUSSION

The plant height, total dry matter were significantly influenced due to weed free (T₁) weeding at 15 days interval treatment. The next best treatment was PE Atrazine @ 0.50 kg a.i./ha followed by one hand weeding and hoeing at 6 WAS (T₄), which was at par with the RCP (T₂) and beneficial over PoE application of 2,4-D (Na) at 3 WAS (T₆) treatment, PE atrazine @ 0.50 kg a.i./ha followed by 2,4-D (Na) @ 0.80 kg a.i./ha at 6 WAS (T₅) could gave only marginal inferiors results than RCP (T₂). Increase in plant height due to weeding and/or hoeing

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Table 1 : Number of weeds as influenced by different weed control treatments

| Treatments | 3 WAS | 6 WAS | At harvest |
|---|----------|----------|---------------|
| T ₁ – Weed free (weeding at 15 days interval), | 3.00 | 2.50 | 2.00 |
| T ₂ – Recommended cultural practices i.e. two hand weeding and hoeing at 3 and 6 weeks after sowing | 65.00 | 31.00 | 8.00 |
| T ₃ – Hand weeding and hoeing at 3 weeks after sowing (WAS), | 60.00 | 30.00 | 33.00 |
| T ₄ – Pre-emergence Atrazine @ 0.50 kg/ha + hand weeding and hoeing at 6 WAS, | 5.00 | 17.00 | 6.00 |
| T ₅ – Atrazine @ 0.50 kg a.i./ha + 2,4-D (Na) @ 0.80 kg a.i./ha (post emergence) at 6 WAS, | 4.66 | 20.00 | 18.00 |
| T ₆ – 2,4-D (Na) @ 0.80 kg a.i./ha at 30 days after sowing (one spray at 30 DAS), | 60.00 | 53.00 | 40.00 |
| T ₇ – Two post emergence sequential spray of 2,4-D (Na) 0.80 @ kg a.i./ha (30 and 50 DAS) (2 sprays at 30 and 50 DAS), | 55.60 | 50.00 | 35.60 |
| T ₈ – Control (without weeding and hoeing) | 78.00 | 85.00 | 95.00 |
| S.E. ± | 2.56 | 1.61 | 1.81 |
| C.D. (P=0.05) | 7.75 | 4.89 | 5.50 |

WAS – Weeks after sowing.

Table 2 : Growth, yield components and yield of Kharif sorghum as influenced by integrated weed management

| Treatments | Weed control efficiency (%) | Plant height (cm) | Total weight / plant at harvest | Grain yield (kg/ha) | Stalk of fodder yield (kg/ha) | Test weight (g) |
|--|--------------------------------------|-------------------------|--|---------------------------|--|-----------------------|
| T ₁ – weed free (weeding at 15 days interval), | 95.58 | 168.37 | 139.33 | 2604 | 15496 | 34.98 |
| T ₂ – Recommended cultural practices i.e. two hand weeding and hoeing at 3 and 6 weeks after sowing | 61.00 | 164.77 | 129.27 | 2103 | 14400 | 34.13 |
| T ₃ – hand weeding and hoeing at 3 weeks after sowing (WAS) | 47.00 | 162.67 | 126.00 | 1855 | 14292 | 33.36 |
| T ₄ – Pre-emergence Atrazine @ 0.50 kg/ha + hand weeding and hoeing at 6 WAS | 81.00 | 167.40 | 130.93 | 2334 | 15264 | 34.30 |
| T ₅ – Atrazine @ 0.50 kg a.i./ha + 2,4-D (Na) @ 0.80 kg a.i./ha (post emergence) at 6 WAS | 52.00 | 163.57 | 128.00 | 1969 | 15322 | 34.10 |
| T ₆ – 2,4-D (Na) @ 0.80 kg a.i./ha at 30 days after sowing (one spray at 30 DAS) | 41.00 | 156.10 | 123.67 | 1630 | 13792 | 33.04 |
| T ₇ – Two post emergence sequential spray of 2,4-D (Na) 0.80 @ kg a.i./ha (30 and 50 DAS) (2 sprays at 30 and 50 DAS) | 51.00 | 160.00 | 125.00 | 1799 | 13649 | 33.12 |
| T ₈ – Control (without weeding and hoeing) | -- | 152.27 | 96.26 | 1599 | 11892 | 32.05 |
| S.E. ± | -- | 1.15 | 3.00 | 132 | 450 | 1.07 |
| C.D. (P=0.05) | -- | 3.48 | 9.10 | 398 | 1366 | NS |

was also recorded earlier by many research workers (Patwari, 1982; Kanade, 1983; Rathore *et al.*, 1985; Balyan and Singh, 1986, Chauhan *et al.*, 1987).

Significantly increase in grain and fodder yield of sorghum recorded by weed free treatment (T₁ weeding at 15 days) to the extent of 26.04 and 154.96 q/ha, respectively and it was at par with the PE application of atrazine @ 0.50 kg a.i./ha followed by one hand weeding and hoeing at 6 WAS (T₄) treatment which was beneficial over RCP (T₂) treatment.

The population of weed upto 3 WAS next maximum

in RCP which was effectively controlled by weeding and hoeing followed after 3 and 6 WAS (8/sq.m. at harvest) while weeds were effectively controlled by PE atrazine @ 0.50 kg a.i./ha for early 42 days and supplemented weeding and hoeing at 6 WAS (T₄) resulted in reducing weed population 6/sq.m. at harvest during successive stage of crop growth. Lowest population of weeds were observed in weed free treatment (T₁) (2/sq.m. at harvest). Highest weed control efficiency was noted in weed free followed by T₄, T₂, T₅, T₇, T₃ and T₆. Earlier Dwivedi *et al.* (1991) also recorded minimum weed population in

cultural treatments.

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