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Short Note

Effect of Manually Operated Weeders on Growth and Yield of Irrigated Maize

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Maize is a crop of both irrigated and rainfed agriculture. The magnitude of maize yield loss due to competition of weeds varies from 30 to 50 per cent, depending upon the growth and persistence of weed density in the standing maize crop (Rout and Satapathy, 1996). The traditional weeding operation is arduous, time consuming, back breaking and may not be undertaken at appropriate time due to non-availability of labourers during peak period. So, it is not possible to control the weeds timely with the traditional methods like hand weeding wherein mechanical weeding comes handy. In view of the importance of mechanical weed control, a field experiment was conducted at TNAU, Coimbatore during *Kharif* 2006 to study the effect of weed management treatment with manually operated weeders on growth, yield attributes and yield in irrigated maize.

The experiment was laid out in randomized block design with three replications. Maize variety Co 1 was sown. The treatments consisted of four manually operated weeders *viz.,* crescent hoe (T_1), multi tyne weeder (T_2), wheel hoe (T_3) and rotary peg weeder (T_4) weeding twice on 25 and 45 days after sowing. The above treatments were compared with hand weeding twice on 25 and 45 DAS (T_5), pre-emergence application of atrazine 0.5 kg ha^{-1} on 3 DAS with one hand weeding on 45 DAS (T_6) and unweeded control (T_7). Atrazine 50 per cent WP 0.5 kg ha^{-1} was sprayed using knapsack sprayer fitted with fan type WFN 40 nozzel at 3 DAS as pre-emergence spray. The weeders were used at 25 and 45 DAS.

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Pre-emergence application of atrazine 0.5 kg ha^{-1} on 3 DAS with one hand weeding on 45 DAS (T_6) recorded distinctly higher leaf area index(LAI) at 90 DAS. The next best treatment was hand weeding on 25 & 45 DAS (T_5) and it was comparable with all the manually operated weeders weeding. At 90 DAS, dry matter production (DMP) was conspicuously higher in pre-emergence application of atrazine 0.5 kg ha^{-1} on 3 DAS with one hand weeding on 45 DAS (T_6) and it was at par with either hand weeding or weeding with wheel hoe weeder or multi tyne weeder on 25 and 45 DAS (Table 1). Efficacy of mechanical or manual weeding in controlling the weeds at critical crop-weed competition at 45 DAS in maize might be the reason for better growth of maize in mechanical or manual weeding as reported by Perron *et al*. (2001). Lesser weed competition resulting in higher availability of plant nutrients and moisture favouring higher leaf area index and vigorous crop growth of maize.

The effect of treatments on yield parameters was non significant except on cob length where in pre-emergence application of atrazine 0.5 kg ha^{-1} on 3 DAS with one hand weeding on 45 DAS(T_6) recorded lucidly longer cob(19.3cm) which was comparable with either hand weeding or weeding with wheel hoe or multi tyne weeder weeding on 25 & 45 DAS(Table 1). Pre-emergence application of atrazine 0.5 kg ha^{-1} on 3 DAS with one hand weeding on 45 DAS (T_6) recorded remarkably higher grain yield of 5429 kg ha^{-1} and comparable yield of 5227 kg ha^{-1} was recorded with hand weeding twice (T_5). Among the mechanical weeders, wheel hoe

Table 1. Effect of weed management treatments on LAI, DMP and yield attributes in irrigated maize

Treatments	Growth parameters		Yield attributes			
	LAI at 90 DAS	DMP (kg ha^{-1}) at 90 DAS	Cob length (cm)	No. of grains per cob	100 grain weight(g)	Grain yield (kg ha^{-1})
Crescent hoe	4.81	8242	16.2	430	26.9	4059
Multi tyne weeder	5.27	8606	17.7	438	27.1	4615
Wheel hoe	5.27	8869	18.5	484	26.3	4814
Rotary peg weeder	5.26	8421	17.0	449	26.4	4345
HW twice	5.45	9022	18.6	513	25.7	5227
PE Atrazine + HW	6.45	9186	19.3	457	26.7	5429
Unweeded control	3.56	5445	14.6	380	25.8	3125
SE_d	**0.34**	**322**	**0.1**	**37**	**0.6**	**188**
CD(P=0.05)	**0.74**	**701**	**2.1**	**NS**	**NS**	**411**

weeding twice (T_3) recorded significantly higher grain yield of 4814 kg ha^{-1} and was comparable with multi tyne weeder weeding (T_2). The weed growth resulted in reduced vegetative growth and nutrient availability to the plants. This shows the importance of weed management for increasing dry matter production of maize plants, thereby increasing the crop yield of irrigated maize. (Kandasamy and Chandrasekhar, 1998)

The study revealed that pre-emergence application of atrazine 0.5 kg ha^{-1} on 3 DAS with hand weeding on 45 DAS (T_6) and hand weeding on 25 and 45 DAS(T_5) for higher grain yield. Among the manual weeders, higher grain yield could be obtained by weeding with either wheel hoe(T_3) or multi tyne weeder(T_2) on 25 and 45 DAS.

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