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Short Communication

ECONOMICS OF TOMATO AS INFLUENCED BY INTEGRATED WEED MANAGEMENT

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Tomato (*Lycopersicon esculentum* Mill.), belonging to the family Solanaceae, is one of the most economically important vegetables in the world, ranking second in importance to potato in many countries (Fageria *et al*., 2003). India is the second largest producer of tomato in the world after China, accounting for about 11% of the world tomato production (Anonymous, 2011). Tomato is a rich source of vitamin A, vitamin C and lycopene. Because of its high nutritive value, it has great demand as raw, cooked and processed vegetable. A number of processed products like paste, puree, soup, juice, ketchup, drinks, whole peeled tomatoes etc. are prepared on large scale and used as food ingredients (Kalloo, 1991). Thus, today it is one of the important raw materials for multimillion food industry. Besides nutritional importance, tomato also has great medicinal value. Consumption of tomato fruits helps in the prevention of cancer and heart diseases because of antioxidant properties of lycopene (Kaur *et al*., 2013). There are several constraints in tomato production, of which weeds often pose a serious problem and adversely affect the vegetative growth, flowering and fruiting resulting in greater loss of yield. Though manual weeding is the effective method of weed control, it is becoming cumbersome and uneconomical due to hike in wages and labour scarcity in these days (Warade *et al*., 2007). Hence, Keeping in view of the above situation, the present experiment was undertaken to find out the best weed management practice that is economically feasible to the farmers.

Table 1: Effect of integrated weed management on economics of tomato

Treatment	Fruit yield (t ha^{-1})	Gross returns (Rs. ha^{-1})	Net returns (Rs. ha^{-1})	B :C ratio
Pendimethalin (PE) @ 1.0 kg a.i. ha^{-1}	20.95	104750	56400	1.16
Pendimethalin (PE) @ 1.0 kg a.i. ha^{-1} + hand weeding at 30 DAT.	26.98	134900	83050	1.60
Pendimethalin (PE) @ 1.0 kg a.i. ha^{-1} + Quizalofop ethyl (POE) @ 50 g a.i. ha^{-1}	22.52	112600	62210	1.23
Metribuzin (PE) @ 0.5 kg a.i. ha^{-1}	23.21	116050	68635	1.44
Metribuzin (PE) @ 0.5 kg a.i. ha^{-1} + hand weeding at 30 DAT.	30.33	151650	100735	1.98
Metribuzin (PE) @ 0.5 kg a.i. ha^{-1} + Quizalofop ethyl (POE) @ 50 g a.i. ha^{-1}	25.00	125000	75754	1.52
Oxadiargyl (PE) @ 100 g a.i. ha^{-1}	21.63	108150	60536	1.27
Oxadiargyl (PE) @ 100 g a.i. ha^{-1} + hand weeding at 30 DAT	27.35	136750	85636	1.67
Oxadiargyl (PE) @ 100 g a.i. ha^{-1} + Quizalofop ethyl (POE) @ 50 g a.i. ha^{-1}	23.29	116450	66796	1.34
Quizalofop ethyl (POE) @ 50g a.i. ha^{-1}	15.85	79250	31260	0.65
Quizalofop ethyl (POE) @ 50g a.i. ha^{-1} + hand weeding at 30 DAT.	21.62	108250	56760	1.10
Farmers practice of hand weeding at 20 and 40 DAT.	28.72	143600	90650	1.71
Unweeded control	12.01	60050	14100	0.30
SEm±	0.63			
CD (P=0.05)	1.78			

PE - Pre emergence, POE - Post emergence, DAT - Days after transplanting, B: C ratio – Benefit: Cost ratio

A field experiment was carried out at College of Horticulture, Andhra Pradesh Horticultural University, Hyderabad during rabi 2010-11 to study the effect of integrated weed management on economics of tomato (*Lycopersicon esculentum* Mill.). The experiment was laid out in randomized block design with three replications and thirteen treatments viz., Pendimethalin (PE) @1.0 kg a.i. ha^{-1}, Pendimethalin (PE) @ 1.0 kg a.i. ha^{-1} + hand weeding at 30 DAT, Pendimethalin (PE) @ 1.0 kg a.i. ha^{-1} + Quizalofop ethyl (POE) @50 g a.i. ha^{-1}, Metribuzin (PE) @ 0.5 kg a.i. ha^{-1}, Metribuzin (PE) @ 0.5 kg a.i. ha^{-1} + hand weeding at 30 DAT, Metribuzin (PE) @ 0.5 kg a.i. ha^{-1} + Quizalofop ethyl (POE) @50 g a.i. ha^{-1}, Oxadiargyl (PE) @ 100 g a.i. ha^{-1}, Oxadiargyl (PE) @ 100 g a.i. ha^{-1} + hand weeding at 30 DAT, Oxadiargyl (PE) @ 100 g a.i. ha^{-1} + Quizalofop ethyl (POE) 50 g a.i. ha^{-1}, Quizalofop ethyl (POE) @ 50 g

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a.i. ha^{-1}, Quizalofop ethyl (POE) @ 50 g a.i. ha^{-1} + hand weeding at 30 DAT, Farmers practice of hand weeding at 20 and 40 DAT and Unweeded control. Healthy seeds of tomato variety Arka Vikas were sown on raised nursery bed of 1 m width and 4 m length and 15 cm height at 10 cm apart. Twenty five days old seedlings were transplanted at a spacing of 60 × 45 cm in flat beds on 13th October 2010. Fertilizers were applied at the recommended dose of 120:60:50 (N:P:K) kg ha^{-1}. For economic analysis, the prevailing prices of the inputs and produce during the period of experimentation were considered.

The data pertaining to effect of integrated weed management on economics of tomato are presented in Table 1. Study on economics in relation to integrated weed management, certainly helps in formulating, an effective and economical method for weed control in tomato. Cost of cultivation was found to be maximum (52950 $Rs.ha^{-1}$) with farmers practice of hand weeding at 20 and 40 days after transplanting. Hike in labour wages might be resulted in maximum cost of cultivation. These results are in line with the findings of Warade *et al*. (2007). However, maximum gross returns (151650 $Rs.ha^{-1}$), maximum net returns (100735 $Rs.ha^{-1}$) and highest benefit: cost ratio (1.98) were recorded by the treatment metribuzin as pre-emergence herbicide @ 0.5 kg a.i. ha^{-1} + hand weeding at 30 days after transplanting. This might be due to high efficacy of metribuzin in controlling the weeds and also removal of weeds during critical period of crop-weed competition by hand weeding. These results are in confirmity with the findings of Sinha *et al*. (2000) and Channappagoudar *et al*. (2007). Whereas, minimum cost of cultivation (45950 $Rs.ha^{-1}$), minimum gross returns (60050 Rs ha^{-1}), minimum net returns (14100 Rs ha^{-1}) and lowest benefit: cost ratio (0.30) were observed in unweeded control. This might be due to heavy competition from weeds for nutrients, light, space and moisture with the tomato crop throughout the crop life cycle. These results are supported by the findings of Channappagoudar *et al*. (2007). Among the other treatments, cost of cultivation ranged from 47415 - 51850 $Rs.ha^{-1}$, gross returns ranged from 79250 – 143600 $Rs.ha^{-1}$, net returns ranged from 31260 – 90650 $Rs.ha^{-1}$ and benefit: cost ratio ratio ranged from 0.65 – 1.71.

From the above results, it can be concluded that the application of metribuzin as pre-emergence herbicide @ 0.5 kg a.i. ha^{-1} + hand weeding at 30 days after transplanting is found to be economically feasible to the tomato farmers.

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