

## Studies on Methods of Weed Control in Tomato\*

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The herbicide metribuzin 0.5 kg/ha gave season long weed control with higher yield of fruits. Combination of hand-hoeings or earthing up was useful only to eliminate the weeds. Alachlor at 2.0 kg/ha resulted in significantly lower yield of fruits. Combination of hand hoeings or earthing up increased the yield through effective weed control in the case of alachlor 2.0 kg/ha. There was no appreciable difference in yield of fruits between the two cultural methods, namely farmers method and hand hoeing thrice. In chemical weed control earthing up could be dispensed with unless specially warranted. Earthing up following the herbicide neither conferred any additional advantage nor harmful effect to the early weed control accomplished with herbicides.

Tomato, an important vegetable crop in Tamil Nadu is being intensively cultivated. In this state, transplanting of seedlings on ridges is preferred for tomato as compared to planting on beds. Normally weed control in tomato includes two hand hoeings in the first and third fortnights after transplanting. In the second fortnight, soil is earthed up as an important inter culture to the crop. The use of herbicides for weed control has necessitated a reassessment of this tillage practice in terms of weed control and soil physical condition. Studies were conducted with two herbicides individually and in combination with earthing up and hoeing in comparison with cultural methods.

### MATERIAL AND METHODS

Field experiments were conducted at the Department of Agronomy, Tamil Nadu Agricultural University, Coimbatore-during monsoon 1975 and 1976. The Soil texture was ranging from loam to clay. There were nine treatments as given below:

(1) Metribuzin 0.5 kg. (2) Alachlor 2.0 kg (3) Metribuzin 0.5 kg followed by hand hoeing on 30th and 45th day, 4) Alachlor 2.0 kg. followed by hand hoeing on 30th and 45th day (5) Metribuzin 0.5 kg followed by earthing up on 30th day and hand hoeing on 45th day (6) Alachlor 2.0kg followed by earthing up on 30th day and hand hoeing on 45th day (7) Farmers' method (hand hoeing on 20th and 45th day and earthing up on 30th day) (8) Hand hoeing thrice on 20th, 30th and 45th day and (9) unweeded control. The design of the experiment adopted was Randomized Block design with three replications. The gross and net plot size was 4.5 X 3.6 m and 4.5 x 1.8 m respectively. The tomato cultivar included was Co.1

### RESULTS AND DISCUSSION

The weed flora of the experimental field is seen from unweeded plot consists of the dominant weed species namely *Trianthema portulacastrum* followed by *Dactyloctenium aegyptium* and *Cyperus rotundus*.

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*Weed population* : The results on the weed population showed that it was low at 45 days under Metribuzin 0.5 kg and its combination with hand hoeing and earthing up. Alachlor 2.0 kg/ha registered higher weed population next only to unweeded control but comparable with Metribuzin 0.5 kg/ha. The treatments receiving herbicides and hand hoeing gave weed free conditions.

*Weed dry matter* : Weed dry matter production on 45th day was higher under unweeded control followed by Alachlor 2 kg/ha. Other treatments registered low weed dry matter except Metribuzin 0.5 kg/ha during monsoon 1976.

It was seen from the weed population and weed dry matter production at 45th and 60th day that combination of cultural methods and Metribuzin 0.5 kg were fairly free from weed infestation. Alachlor was not able to provide season long weed control. There was not much difference between farmers' method and hand hoeing indicating that both are accomplishing weed control.

*Yield attributes* : The data on the yield attributes namely, number of fruits per plant single plant, yield and nonmarketable fruits yield are presented in table 2. Number of fruits per plant were lower under unweeded control and not significantly differing between different treatments.

Single plant yield was significantly lower under unweeded control and Alachlor 2 kg/ha and rest of the treatments were not varying much in

the year 1975. There was no marked difference between farmers' method and hand hoeing thrice. There was a trend of decreased yield for unweeded control and Alachlor 2.0 kg/ha for the year 1976. Non-marketable yield of fruits was higher for unweeded control and Alachlor 2 kg/ha. Other treatments were almost comparable with reference to non-marketable yield.

It has been found that combination of hand hoeing and earthing up have not influenced the yield attributes in the case of Metribuzin. With reference to Alachlor combining cultural methods was useful to increase the yield attributes favourably. There was no difference between hand hoeing and earthing up the crop.

*Yield of marketable fruits* :

The results on the marketable fruit yield of tomato revealed that there was no significant difference among the treatments Metribuzin 0.5 kg Metribuzin plus hand hoeing and Metribuzin plus earthing up. Marketable fruits yield was significantly improved under Alachlor plus hand hoeing and Alachlor plus earthing up as compared to Alachlor alone.

The yield of marketable fruits were not differing much between Metribuzin, its combination with hand hoeing and with earthing up indicating that Metribuzin 0.5 kg. alone was found to be optimum for tomato. The results are in conformity with the findings of Michel and Pourcharesec. (1972) that at the end of the harvest season there was slight weed infestation without reduction in yield of

tomato with Metribuzin 0.5 Kg/ha. Alachlor at 2.0 Kg/ha gave short term weed control to which a late hand weeding or earthing up improved the yield of tomato significantly. The low persistence of the chemical, regeneration of weeds and smothering of crop by weeds were the causes of failure of the treatment Alachlor 2.0 Kg to accomplish weed control upto the critical weed free period. The present findings are in line with the earlier reports by Bhan and Singh (1975) that one weeding given 45 days after transplanting over and above Alachlor 2.0 to 3.0 kg/ha was necessary to get increased yield. Short term weed control was reported with Alachlor by Rajagopal and Sankaran (1976) in tomato, and by Rangiah *et al* (1976) in cotton. The results of the present experiment brought out the fact that combining hand weeding is complementing the weed control accomplished with chemical in the case of alachlor.

With reference to two cultural methods namely hand hoeing and earthing up were comparable in terms of fruit yield. Farmers' method involving earthing up of the crop at the early flowering stage which conferred no additional benefit over and above hand weeding. In the context of chemical weed control, this operation could be

dispensed with unless specially required. This has been supported by the results of soil physical characters which were not improved due to earthing up as compared with hand hoeing or chemical alone (Rajagopal and Sankaran, 1983). In cotton, earthing up was found to give weed control effect only (Anon' 1954). The present findings also fall in line with the results of the above reports.

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TABLE—1 Effect of herbicides and cultural methods on the weed control on tomato

	Weed population (Number/m <sup>2</sup> )				Dry weight of weeds (g/m <sup>2</sup> )			
	45 days				45 days			
	M '75		M <sup>a</sup> '76		M '75		M '76	
	T	O	T	O	T	O	T	O
Metribuzin 0.5 kg	3.0	17.0	8.2	74.0	1.0	0	7.9	64.0
Alachlor 2.0 kg	9.5	103.9	7.5	56.0	12.8	165.0	11.4	130.5
Metribuzin 0.5 kg plus hand hoeing	1.0	0	7.9	63.0	1.0	0	3.3	9.7
Alachlor 2.0 kg plus hand hoeing	1.0	0	7.4	55.0	1.0	0	4.6	20.3
Metribuzin 0.5 kg plus earthing up	1.0	0	5.6	33.0	1.3	0.6	4.3	18.4
Alachlor 2.0 kg plus earthing up	1.0	0	9.0	93.0	2.0	4.9	4.0	15.3
Farmers method	1.0	0	12.0	149.0	3.7	12.8	6.3	39.8
Hand hoeing	1.0	0	11.4	133.0	2.5	6.2	5.9	36.1
Unweeded control	12.4	155.0	16.1	259.0	18.6	34.66	15.6	243.3
S. E.	0.53		1.18		0.46		0.66	
C. D.	1.5		2.4		1.1		1.9	

M: Monsoon, T: Transformed values, O: Original values

TABLE—II Effect of herbicides and cultural methods on the Weed control in tomato

	(Single plant) yield (kg)		Marketeble Fruits t/ha	
	M <sup>a</sup> '75	M, '76	M, '75	M' '76
Metribuzin 0.5 kg	2.2	1.5	38.1	27.3
Alachlor 2.0 Kg	1.2	0.9	16.1	20.6
Metribuzin 0.5 kg/plus hand hoeing	2.3	1.3	38.8	29.7
Alachlor 2.0 kg plus hand hoeing	2.1	1.5	35.2	26.4
Metribuzin 0.5 kg plus earthing up	2.3	1.4	34.7	29.1
Alachlor 2.0 kg plus earthing up	2.1	1.3	37.9	25.2
Farmers method	2.2	1.5	37.1	30.1
Hand hoeing thrice	2.4	1.3	36.7	30.0
Unweeded control	1.2	0.8	11.00	15.6
S. E.	0.15	0.23	1.83	2.71
C, D, (P=0.05)	0.4	NS	5.6	7.8

\* Transformed values are given in the table \*\* Original values are given in paranthesis.