

Tomato Response to Preplant Incorporated Herbicides

Henry G. Taber, Diane Shogren, and Gordon Rolph
Department of Horticulture

Early tomato production involves transplanting near the spring frost-free date. For central Iowa this is usually May 6-10. Because early spring conditions can be harsh and the soils are cold, a plasticulture system consisting of plastic ground mulch and row covers of some type are used. Black plastic is the common mulch but it does not warm the soil as well as clear plastic. However, the clear plastic allows unacceptable weed growth. Wavelength selective plastics, such as IRT100 or SRM- green, are available that prevent most weed growth and warm the soil more than black, but less than clear. However, these products cost 2.5 to 5 times as much as clear.

Our objective was to evaluate preplant incorporated herbicides with early tomato production. It has been known since the '70's that trifluralin (treflan) will reduce tomato transplant growth under cool soil conditions.

General Methods: The various herbicide treatments were applied to the soil surface on May 15 with a backpack C0 sprayer delivering 19 gpa at 30 psi. Treatments were incorporated with a rototiller, and the plastic mulch laid the same day. Tomato transplants, cv. Mtn. Spring, were set May 17. The napropamide (Devrinol) herbicide was applied in the transplanting water. No fertilizer was used in transplanting water. Row spacing was on 6-foot centers with plants 18 inches in-row. Irrigation was by trickle.

The herbicide type and rate were: trifluralin (treflan 4E at 3/4 qt/ acre); metribuzin (sencor 75DF at either 1X rate of 1/3 lbs/ acre or 2X rate of 2/3 lbs/ acre); and napropamide (Devrinol 50DF applied in transplanting water at a rate of 1X = 8 grams/ gal or 2X = 16 g/ gal. Applied at 1 cup or 8 oz. per transplant).

Results: The best performing treatments for growth and flower cluster development were the devrinol rates (Table 1). The treflan or treflan + sencor, with either the black plastic or clear plastic mulch, had similar plant dry weights of 28.7 grams compared with the devrinol treatments of 48.7 grams. This was a 41% reduction. Similar results were found for flower cluster number. The devrinol treatments were superior to any plastic or treflan combination by 2.63 clusters/plant or 55%. However, there was very little weed control with the devrinol rates. We are not able to determine from this study if treflan reduced growth or devrinol enhanced growth. Extensive deer damage prevented carrying the study to harvest.

A similar study was repeated in the fall when the soil temperature was considerably warmer. Only black plastic mulch and treflan and sencor combinations were used. There was no effect on plant growth rate from any of the herbicide treatments (Table 2). Flower cluster development by August 30 was significantly higher with herbicides compared with no herbicide. But this effect disappeared by September 6 when there was no effect of treatment on flower cluster development.

Table 1. Effect of plastic and herbicide treatment on early season growth and flower cluster number of Mtn. Spring tomato. Data collected June 23.

<u>Treatment</u>	Plant Dry	No. Flwr	Weed
	<u>Wt., g</u>	<u>Clusters</u>	<u>Control</u> ¹
Black plastic + tref.	24.8 C ²	4.25 B	0.5 AB
Clear plastic + tref.	33.4 BC	4.75 B	0.75 AB
Clear plastic + treflan+sencor	27.8 C	5.25 AB	0.0 B
Black plastic + devrinol 1X	43.5 AB	7.00 AB	1.5 A
Black plastic + devrinol 2X	53.8 A	7.75 A	1.25 AB

¹ Weed control rating was visual. A score of 0= no weeds, 3= heavy pressure.

² Values in a column followed by the same letter are not significantly different by DMRT, 5% level.

Table 2. The effect of preplant incorporated herbicide treatments on early growth of Mtn. Spring tomatoes set August 7, 2000. No significant difference among treatments for any date.

<u>Herbicide Treatment</u>	<u>Plant Dry Weight, grams</u>		
	<u>Aug. 21</u>	<u>Aug. 30</u>	<u>Sept. 6</u>
Control - none	2.8	14.8	33.8
Treflan	3.0	11.7	37.2
Sencor 1X	2.9	15.9	36.4
Treflan + Sencor 1X	2.9	13.0	32.2
Treflan + Sencor 2X	2.6	12.0	30.4

Table 3. The effect of preplant incorporated herbicide treatments on flower cluster number of Mtn. Spring tomatoes set August 7, 2000

<u>Herbicide Treatment</u>	<u>Flower Cluster Number/plant</u>	
	<u>Aug. 30</u>	<u>Sept. 6</u>
Control - none	1.7 C ¹	9.6
Treflan	2.0 BC	11.4
Sencor 1X	2.2 BC	11.8
Treflan + Sencor 1X	2.5 AB	9.9
Treflan + Sencor 2X	2.5 A	10.6

¹ Values within a column followed by the same letter are not significantly different by DMRT, 5% level.