RESPONSE OF GRAFTED TOMATO TO METRIBUZIN, FOMESAFEN *S*-METOLACHLOR, TRIFLURALIN, NAPROPAMIDE, AND HALOSULFURON

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Vegetable grafting is gaining popularity in the United States as an alternative to methyl bromide to control soil-borne pests and diseases. Tomato grafting has been successfully used to manage fusarium wilt, verticillium wilt, root-knot nematodes, and certain abiotic stresses. In tomato production, weed management is critical to produce good quality fruit and yield. Fumigants, herbicides and hand weeding are the primary methods of weed control in plasticulture tomato production. Several herbicides are registered for use in tomato including *S*-metolachlor, metribuzin, napropamide, halosulfuron, and trifluralin. However, the effect of these herbicides on grafted tomato plants with different rootstocks has not been well documented. Crop cultivars can exhibit differential tolerance and susceptibility to particular herbicides. Therefore the objective of this study was to determine the response of grafted tomato to these herbicides.

Grafted plants were produced at NC State University's phytotron using the tube grafting technique (Rivard and Louws, 2006). Treatments consisted of Amelia tomato scions grafted on to three rootstocks including Maxifort , AnchorT , or Beaufort, and nongrafted Amelia. Amelia is a commercially acceptable hybrid planted by NC growers. Herbicide treatments included *S*-metolachlor (0.8 and 1.06 kg ai/ha), fomesafen (0.28 and 0.42 kg ai/ha), metribuzin (0.28 and 0.55 kg ai/ha), napropamide (1.12 and 2.24 kg ai/ha), halosulfuron (0.039 and 0.052 kg ai/ha), and trifluralin (0.56 and 0.84 kg ai/ha) applied one day prior to tomato transplanting. The experimental design was a strip-plot with four replications. The whole-plot treatment was the rootstock and the subplots were the herbicide treatments. Response variables were tomato injury(chlorosis, necrosis and deformation of leaves) 7 and 14 days after transplanting (DAT), and tomato height 14, 21, and 42 DAT. Harvest data were collected once 60 DAT at which time all tomatoes at least 3.8 cm in diameter were picked from the plant.

At 7 and 14 DAT injury was greater in grafted plants regardless of rootstock type (AnchorT, Beaufort, Maxifort) as compared to non-grafted for halosulfuron, metribuzin, and fomesafen. The maximum injury was observed from halosulfuron on AnchorT (19%). However, by 28 DAT no injury was observed in grafted or non-grafted plants. The effect of grafting on plant height was significant 14 DAT. Height averaged over herbicides was greatest with AnchorT rootstock (37 cm). At 21 DAT, there was an interaction between herbicides and grafting treatments for height; under both halosulfuron rates non-grafted plants were taller than grafted plants. Eventually, at 42 DAT, grafted and non-grafted plants had no significant effect on height due to herbicide treatments. Herbicide and grafting had no effect on total fruit yield (20,553 to 35,082 kg/ha).

These results demonstrated that grafted plants recover fairly well from halosulfuron, metribuzin, and fomesafen injury in terms of height and total marketable yield. This type of research will assist in developing weed management programs consisting of herbicides that are safe for use in grafted tomato production.

References:
Rivard, C.L. and F.J. Louws. 2006. Grafting for disease resistance in heirloom tomatoes. North Carolina Coop. Ext. Serv. Bul. Ag-675.