

Tomato Grafting with Inter-specific Rootstock to Manage Soilborne Diseases

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Tomato grafting is a new technology in the US and is primarily used for greenhouse or high tunnel production. Many rootstocks are available that effectively manage soilborne diseases such as fusarium wilt (*F. oxysporum* f.sp. *lycopersici*), root-knot nematodes (*Meloidogyne* spp.) and bacterial wilt (*Ralstonia solanacearum*), and may be an alternative to soil fumigation. However, little research has been done in the US to verify the efficacy and relevance of grafting for open-field tomato production. At the Mountain Horticultural Crops Research Station, we are conducting two field trials that investigate grafting to manage soilborne diseases important to local growers. Bacterial wilt is a new disease on the research station and is particularly difficult to control. This soilborne bacterium causes a sudden and permanent wilt leading to plant death. Bacterial wilt has been managed in Asia and India through grafting as resistance is available in wild tomato lines, but is tightly coupled to fruit quality. In the first study (upper field), four rootstocks are being tested for resistance to bacterial wilt. Bacterial wilt incidence, AUDPC, and fruit yield will be compared with non-grafted plants and those receiving fumigation.

Rootstock	Seed Company	Origin
'Dai Honmei'	Asahi Seed Co	Japan
'Unreleased variety'	De Ruyter Seed Co	Holland
'RST-04-105-T'	D. Palmer Seed Co.	USA
'TMZQ702'	Sakata Seed Co.	Japan

Verticillium wilt is a common disease in western NC, and is difficult to manage as resistance is not known to *Verticillium dahliae* (race 2). This pathogen colonizes the vascular tissue and reduces the plants ability to translocate water and nutrients to the shoot, leading to poor vigor and decreased fruit yield. In the second trial (lower field), we are looking at vigorous rootstock, 'Maxifort', to manage crop losses caused by damage from verticillium wilt. In 2007, the results from a similar trial showed that grafting onto 'Maxifort' led to similar yields as fumigation with methyl bromide. In this study, we are also utilizing grafted plants at reduced planting density to determine the optimum spacing for grafted plants. Increased plant spacing may help to reduce the economic constraints of using grafted plants as they are typically more expensive than non-grafted ones. The treatments in this study are shown below.

Rootstock	Fumigation	Spacing
Non-grafted	None	18"
'Maxifort'	None	18"
'Maxifort'	None	24"
'Maxifort'	None	36"
Non-grafted	Methyl Bromide	18"
'Maxifort'	Methyl Bromide	18"
'Maxifort'	Methyl Bromide	24"
'Maxifort'	Methyl Bromide	36"

Tomato grafting may be a viable alternative to soil fumigants for soilborne disease management. This research will provide rootstock recommendations and cultural management strategies to better utilize grafting technology in US production systems.