

PERFORMANCE OF GRAFTED TOMATO SEEDLINGS IN OPEN FIELD PRODUCTION

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Over the last five to ten years the incidence of bacterial wilt (*Ralstonia solanacearum*) in tomato has been increasing on the Eastern Shore of Virginia. This may be due to a reduction in fumigant use rates or that the pathogen is becoming more widely established. It is not uncommon for growers to lose as much as 30% stand or greater before first harvest. In many cases decades of monoculture have aggravated the problem. Growers have such capital investment into farm infrastructure and land rent, it is difficult to rotate the land out of production and not suffer substantial economic losses. Although grafted plants add significantly to input costs at current prices, the net economic result is often positive when infestations are high.

Materials and Methods

This trial was established in a commercial tomato with traditionally high incidences of bacterial wilt. Rootstock and scion seed were established in a greenhouse eight weeks prior to the desired transplant date. Two commercially available bacterial wilt resistant rootstocks from D. Palmer Seed Co. were used, 'RST-04-105' and 'RST-04-106'. One rootstock 'RST-04-105' requires planting ten to fourteen days ahead of scion seed due to a slower growth rate. 'BHN 602' was used as a scion. Other treatments included non-grafted 'BHN 602' and 'BHN 602' grafted onto its own rootstock. Plants were grafted at the two leaf stage using the tube grafting technique. Plants were healed in a growth chamber for seven days and moved back to a greenhouse to harden before transplanting. Black plastic mulch was laid on 30 March, 2009 with no pre-plant fumigation. Two weeks prior to transplanting halosulfuron was applied to emerged nutsedge. Experimental plots were hand weeded once during the season. Experimental plots consisted of a single row 30 feet long. Plots were replicated four times. Standard commercial pest management practices were used to maintain plant health. An observational trial with grafted plants was also transplanted into a portion of a commercial grower's field. Only 'BHN 602' / 'RST-04-105' and 'BHN 602' / 'RST-04-106' entries were included. These seedlings were transplanted into mulched beds that received soil fumigation with methyl iodide at a rate of 67 lb/a broadcast. The grower maintained and harvested the plants while staff from the Virginia Tech Eastern Shore AREC took disease ratings. The grower's field variety was 'BHN 602'. Fruit from the replicated trial were harvested, weighed and graded by USDA grades.

Results and Discussion

Although bacterial wilt was present in the field, little was located in the trial area. Bacterial wilt and root system analysis is ongoing and complete findings will be presented in November. Yield data has been analyzed and is presented in Table 1. The

highest yielding entry was 'BHN 602' grafted onto 'RST-04-106' which yielded significantly greater than all other entries. There were no significant differences in total yield between the other three entries. These differences would likely be greater if there was moderate to severe incidence of bacterial wilt present within the trial.

The incidence of bacterial wilt in the observational trial was much greater than the replicated trial. The results of these observations indicate that 'RST-04-105' is not completely resistant to bacterial wilt. Disease incidence in this entry was nearly as high as the ungrafted field variety. The 'RST-04-105' plot had 36% mortality while the susceptible field variety had 56% mortality. The 'RST-04-106' plot did not have any plants exhibiting bacterial wilt symptoms. The grower was questioned after the season and indicated that he was pleased with the plant habit, fruit set, and disease resistance and would be interested continuing work with grafted plants.

If results such as these are consistent, there is great promise in the use of grafted plants, even in open field production. The yield increase seen in this trial would nearly offset the increase in production costs due to grafted plants if these results are consistent. In situations where rotational land is limited and producers are faced with persistent soil-borne diseases, grafting appears to offer an opportunity to maintain productivity.

Table 1. Yield of grafted tomato entries in open field production – Spring 2009

Entry	Yield (lb/acre)			
	Medium	Large	Extra large	Total Yield
'BHN 602' / 'RST-04-106	4961 ^z	19674	42882 a	67517 a
'BHN 602'	3902	18688	35925 ab	55902 b
'BHN 602' / 'BHN 602'	3667	16075	35508 ab	54075 b
'BHN 602' / 'RST-04-105'	7030	14901	23668 b	49386 b

^z Means not followed by the same letter are significantly different at $P \leq 0.05$ by Duncan's multiple range test