Evaluation of grafting to control race 2 of Fusarium wilt on watermelon

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Fusarium wilt of watermelon is a serious, widespread disease caused by four races of the soilborne fungal pathogen *Fusarium oxysporum* f. sp. *niveum*. Race 2 is widely distributed and has been found in most major watermelon-growing regions of the United States. No diploid or triploid cultivars have resistance to race 2. Fascination (Syngenta Seeds, Boise, ID), a high yielding, seedless watermelon cultivar that is resistant to race 1, is grown in South Carolina and other southeastern states. It is used by growers whose fields have a mixture of races, because there is a benefit to using cultivars with race 1 resistance in such fields (Keinath et al., 2010). However, Fascination is susceptible to Fusarium wilt caused by race 2 isolates.

Four rootstock cultivars, two bottle gourd (*Lagenaria siceraria* 'Macis' and 'Emphasis') and two interspecific hybrid squash (*Cucurbita maxima* × *C. moschata* 'Strong Tosa' and 'Carnivor'), were tested in 2012 and 2013 to control race 2 of Fusarium wilt. In each year, Fascination was grafted onto the four rootstocks, and non-grafted and self-grafted Fascination were included as susceptible control treatments. The 2012 experiment was done on a large watermelon farm in South Carolina in a field infested primarily with race 2 isolates (Keinath and DuBose, 2009). The 2013 experiment was done at the Coastal REC in Charleston, SC, in a field infested with a mixture of race 1 and race 2 isolates. Progress of Fusarium wilt was assessed by counting the number of symptomatic plants three times in 2012 and six times in 2013. When fruit were mature, numbers of fruit were counted, and fruit size was estimated as marketable or non-marketable.

In both experiments, all four rootstock treatments reduced the percentage of plants with symptoms of Fusarium wilt compared to the susceptible control treatments. Maximum incidence ranged from 48% to 69% in the control treatments and from 0.3 to 11% in the grafted rootstock treatments. Disease incidence did not differ between rootstock species or cultivars. In both years, watermelon grafted onto Strong Tosa and Macis produced more marketable-sized fruit than the control treatments. In addition, watermelon grafted onto Emphasis and Carnivor also produced more marketable-sized fruit than the controls in 2012. The cucurbit rootstocks suppressed Fusarium wilt caused by race 2 isolates and increased marketable yield of seedless watermelon grown in infested soil.

Literature Cited

Keinath, A. P., and DuBose, V. B. 2009. First report of *Fusarium oxysporum* f. sp. *niveum* race 2 in South Carolina watermelon fields. Phytopathology 99:S63.

Keinath, A. P., Hassell, R. L., Everts, K. L., and Zhou, X.-G. 2010. Cover crops of hybrid common vetch reduce Fusarium wilt of seedless watermelon in the eastern United States. Online. Plant Health Progress doi:10.1094/PHP-2010-0914-01-RS.