

Evaluation of Watermelon Rootstocks for Resistance to Verticillium Wilt in Northwestern Washington, USA[©]

J.A. Wimer, C.A. Miles and D.A. Inglis
Washington State University, NWREC, 16650 State Route 536, Mount Vernon,
Washington 98273, USA
Email: jesse.wimer@wsu.edu

Watermelon (*Citrullus lanatus*) grafting is common in areas of the world where production is affected by soil-borne diseases. One serious disease is verticillium wilt. The pathogen, *Verticillium dahliae*, has a wide host range and produces microsclerotia (long-lived resting structures). Verticillium wilt has the potential to become increasingly problematic for watermelon growers because watermelon does not have known resistance and chemical control options are limited. This study investigated the reactions of 11 non-grafted, commercially available watermelon rootstocks and 14 non-grafted, potential watermelon rootstocks to *V. dahliae* in a field naturally infested with the pathogen. Entries were obtained from various seed companies as well as the U.S. National Plant Germplasm System (NPGS). One grafted entry was also included, as well as two non-grafted watermelon cultivars that served as controls. The experiment was arranged as a Randomized Complete Block design with three replications. Plants were rated visually for verticillium wilt severity using classic symptomology including chlorosis, necrosis (in the form of V-shaped lesions) and wilting. Ratings began in August and continued through September of 2013. Severity was reported as the percentage of each plot displaying verticillium wilt symptoms and was plotted over time so that the area under disease progress curve (AUDPC) value could be calculated. Due to staggered planting dates among entries, the AUDPC values were converted to relative area under disease progress curve (RAUDPC) values. All entries displayed at least some verticillium wilt severity. The mean of all RAUDPC values was 6.56 and there was a significant difference among entries ($P=0.0001$). The non-grafted watermelon controls 'Sugar Baby' and 'Crimson Sweet' had the highest RAUDPC values (26.80 and 15.62, respectively), but did not differ significantly from 'Marvel', PI 642045 'Speckled Swan' or PI 368638 'Mesna'. 'Crimson Sweet' grafted onto 'Shintoza' and PI 419060 had the lowest RAUDPC values (1.46 and 2.03, respectively), but did not differ significantly from eight other entries. There was no significant difference between the RAUDPC values of germplasm accessions and commercial rootstock cultivars. At season's end, entries were assayed for the presence or absence of *Verticillium* spp. *Verticillium* spp. were observed on all but two entries (PI 181913 and 'Crimson Sweet' grafted onto 'Shintoza') and isolated from 18 entries. Eight isolates were sent to a lab for species identification. Three of the isolates were identified as *V. dahliae*, while the other five were identified as *V. isaacii*. Results from this study show that the rootstocks have greater tolerance to Verticillium wilt than watermelon, suggesting that grafting may be used as a successful management strategy for controlling verticillium wilt in Washington State.

