

ABSTRACT

Thirteen race 1 and race 2 isolates of Verticillium dahliae from diseased tomato plants and one from eggplant were obtained from North America, Europe and Australia. Using ultra-violet irradiation and N-methyl-N'-nitro-N-nitrosoguanidine, a range of auxotrophic mutants was produced. Pairings of complementary auxotrophs on minimal medium revealed that the North American and Australian isolates were in different heterokaryon compatibility groups. The European isolates were compatible with some members of both the Australian and North American groups. Heterozygous diploids were recovered from pairings of North American isolates but not from pairings of Australian isolates. The European isolates also yielded heterozygous diploids when paired with some North American and some Australian isolates. Haploid prototrophic and auxotrophic sectors were recorded from each segregating diploid colony.

The wild type isolates were tested on tomato cultivars of the near-isogenic pairs Roma/Roma VF and Improved Pearson/Improved Pearson VF. The foliar symptoms, extent of stunting and vascular colonization were assessed. Race 1 isolates were significantly more pathogenic on the susceptible than the resistant (VF) cultivars. North American isolates were more pathogenic than those from Australia. All isolates colonized each

cultivar to some extent but the level of colonization by race 1 isolates was significantly higher in Roma than Roma VF. Most isolates stunted the non-VF cultivars. Wilt symptoms were correlated linearly with the extent of vascular colonization but not with stunting.

The prototrophic recombinants were tested on Roma and Roma VF. All recombinants from each cross were of similar or significantly lower pathogenicity than the more pathogenic wild type parental isolate. Recombinants from a selfed cross were as pathogenic as the wild type parent. Generally, recombinants from the race 2/race 2 and race 2/race 1 crosses varied significantly in pathogenicity on Roma and Roma VF. The recombinants from the race 1/race 1 crosses also varied significantly in pathogenicity on Roma but not on Roma VF. The genetic control of pathogenicity in tomato wilt isolates of V. dahliae is discussed.