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STUDIES TOWARDS THE IDENTIFICATION OF A CAUSAL AGENT OF COTTON BRONZE WILT

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Abstract

Field, greenhouse and laboratory studies were conducted to determine the causal agent of bronze wilt of cotton. Cotton plants exhibiting bronze wilt symptoms along with healthy plants were collected from two fields in South Carolina in 2001. Plant height, number of nodes, and number of bolls were recorded. The number of bolls and plant height in diseased cotton plants were significantly reduced as compared to healthy plants. The number of nodes in healthy plants was not significantly different from diseased plants, indicating that bronze wilt caused significant reductions in internode length. Though present on both bronze wilt symptomatic and asymptomatic plants, populations of *Agrobacterium tumefaciens (radiobacter)* were higher on/in the roots of bronze wilt symptomatic cotton plants. The incidence of *A. tumefaciens* (*radiobacter*) in 11 cotton varieties was determined by direct seeding in soil-less growth media and incubating seeds in liquid broth. *A. tumefaciens* (*radiobacter*) was only detected on two varieties with less than 10% isolation frequency. The most commonly isolated bacteria were *Enterobacter* spp., *Cedecea* spp., *Pantoea* spp., *Pseudononas* spp., *Erwinia* spp., and *Bacillus* spp. Growth chamber tests showed that *E. carotovora* and *A. tumefaciens (radiobacter)* caused necrosis on cotton roots and reduced root fresh weight when introduced onto cotton seeds grown in a autoclaved sand/soil-less mix. The relationship between root necrosis caused by agrobacterial bacterial isolates and bronze wilt disease is unknown at this time. Sixty *Agrobacterium* spp. isolates were collected from South Carolina and Texas and tested for their ability to induce tumors on tobacco, tomato, potato, cotton and sunflower. None of the isolates induced tumor formation on any of the hosts except cotton where small tumor-like deformation was observed on cotton stem bases. Using 3 sets of primers designed to detect the presence of *VirC* and *VirD* (i.e. the Ti plasmid), the predicted DNA fragment size was never detected with selected *Agrobacterium* isolates from South Carolina and Texas. Population dynamics of two *Agrobacterium* isolates, *A. tumefaciens* (*radiobacter*) 25A and D11 were monitored on cotton varieties PM1218 BR in the greenhouse and microplots by using their rifampicin-resistant mutants. Cotton rhizosphere colonization pattern of two *Agrobacterium* isolates will be discussed.