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COTTON SEEDLING DISEASE CONTROL WITH BIOLOGICAL/CHEMICAL SEED TREATMENTS

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The pre-emergence phase of cotton seedling disease, incited by *Pythium* spp. and *Rhizopus oryzae*, is very effectively controlled with biocontrol strains of *Trichoderma virens*. However, they are much less efficient in the control of the post-emergence phase of the disease that is incited by *Rhizoctonia solani*. The post-emergence phase of the disease can be successfully controlled with systemic fungicides. Control of both pre-and post-emergence phases of cotton seedling disease will therefore most likely require combination seed treatments of biologicals and chemicals. A disease control study of various biological/chemical combination seed treatments, in soil infested with pre-and post-emergence damping-off pathogens, was initiated in an effort to discover the most effective means of controlling both phases of cotton seedling disease. Black seeds of the cotton cultivar DP 451 B/RR were treated with the recommended concentrations of the seed treatment fungicides Baytan, Chloroneb, Deltacoat AD, Dividend, Flint, Maxim, Nuflow M, Vitavax, or Vitavax-PCNB. Non treated or fungicide treated seeds were then coated with latex and dry Wheat bran + Peat moss granules of *Trichoderma virens* strain G-6. Non treated, fungicide treated, or fungicide + G-6 treated seeds were planted in test tubes containing 10 grams of moist field soil naturally infested with pre-emergence damping-off pathogens, or infested field soil amended with air dry millet culture granules of *Rhizoctonia solani*. The tubes were incubated in a growth chamber at 25°C and with a 14 hr photoperiod. After 7 days incubation, the tubes were examined for the presence of emerged and surviving seedlings. The resulting data were analyzed using SAS Planting black cotton seed of the cultivar DP 451 B/RR in naturally infested field soil resulted in 0-10% seedling survival. Seed treatment with the fungicides tested in this trial resulted in very little improvement in seedling stand, with % survival ranging from 7-13%. However, seed treatment of DP 451 B/RR with WB+PM preparations of the biocontrol strain G-6 of *Trichoderma virens* significantly improved seedling stands over the fungicide treatments and the non treated control, and seedling survival was increased to 93%. Stands of non treated cotton seedlings planted in naturally infested field soil amended with *R. solani* were also devastated, with 0% survival in the soil. Again, seed treatment with the fungicides tested did little to alleviate the disease syndrome, with % survivals ranging from 0-20%. Seed treatment with the biocontrol agent alone resulted in significant improvement over the non-treated control and the fungicide treatments. However, seedling survival was still only 40% of the seed originally planted. The numbers of emerged and surviving cotton seedlings from field soil naturally infested with *Pythium* spp. and *Rhizopus oryzae*, and amended with *Rhizoctonia solani,* was vastly improved by chemical/biological combination seed treatments. Some of the combination treatments were far superior to either the fungicide or the biocontrol agent alone, while other combinations were no better than the individual treatments. The most effective combinations were Chloroneb + G-6 and Deltacoat AD + G-6, followed in descending order by Vitavax + G-6, Vitavax-PCNB + G-6, Flint + G-6, Baytan + G-6, Nuflow M + G-6, Maxim + G-6 and Dividend + G-6. Some combination treatments can therefore control both phases of cotton seedling disease and result in healthy, vigorous, plant stands.