**AN ASSESSMENT OF SEED TREATMENT EFFICACY AND COTTON SEEDLING DISEASE PRESENCE USING INNOVATIVE TECHNIQUES**

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## Abstract

The National Cottonseed Treatment Program has used the same protocol for detection of *Rhizoctonia solani*, *Pythium* spp., *Fusarium* spp., and *Thielaviopsis basicola* for over 23 years. Seedlings from 12 locations across the United States Cotton Belt were rated, and assessed for disease using selective media, microscopy, and ELISA. Isolations were made for each isolate with the use of selective media: *Pythium* spp. (P$_5$ARP), *Fusarium* spp. (MGA), *Thielaviopsis basicola* (TB-CEN), *Rhizoctonia solani* (Terry Spurlock media). ELISAs were only performed to access presence of *Pythium* spp. and *Rhizoctonia solani* form seedling tissue. Among isolation frequencies collected from seedlings (selective media and microscopy), *Fusarium* spp. had the greatest isolation across all locations with an average of 92%, followed by *T. basicola* (48%) and *Pythium* (26%). *R. solani* was isolated using soil baiting techniques, and was able to be recovered from each field location with an average of 26.8 propagules/ 100cm3 across all locations. Selective media isolation frequencies where compared to ELISA isolation frequencies for both *R. solani* and *Pythium* spp. Results from this comparison suggested that selective media consistently gave a higher isolation frequency than ELISA. *Pythium* isolates originally collected from selected media were rated for aggressiveness which determined that Texas was the state that contained the most aggressive isolates of *Pythium* spp. Finally, seed treatment efficacy was evaluated using stand count data for each treatment across all reps at each location. Among 11 nominated seed treatments, all significantly increased stand over the non-treated check across

all locations. Among the 4 control treatments, the base fungicide treatment (Spera 240FS, Proline 480 SC, Evergol Prime, Alleginace FL) increased stand over the non-treated check the most consistent.  Ultimately, by updating the protocol to include pathogen specific medias, enzyme-linked immunosorbent assays, and pathogenicity screening, these data are more reliable. With more accurate pathogen detection methods, we were able to collect multi-dimensional data to interpret seed treatment efficacy in relation to pathogens present in each field site location.