RESULTS OF A BELTWIDE SCREENING EXPERIMENT TO IDENTIFY ABNORMALITIES IN SEED DEVELOPMENT

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Abstract

Plots were established in 4 states at a total of 11 locations to monitor the incidence of seed rot on identical genotypes across a range of environments. Plots were established in Maricopa, AZ, Unadella, GA, Scott, MS, and Hartsville, SC with assistance from personnel of Delta and Pine Land Company. Clemson University personnel established irrigated and non-irrigated early-planted plots and a late-planted dryland plot at the Pee Dee R.E.C. near Florence, SC, and an early-planted irrigated plot plus late-planted irrigated and dryland plots at the Edisto R.E.C. near Blackville, SC. They also established a late-planted, dryland plot in Hampton County, SC. Cultivars tested at each location included 'NuCOTN 35B', Deltapine '5690', Deltapine '655', Stoneville '474', Fibermax '989', Paymaster '1218 BR', and Suregrow '501'. At the Clemson University locations 'Sphinx' and 'Maxxa' were added to the trials and at the Delta and Pine Land locations Deltapine '458' was included in the trials. Plots consisted of 4-row plots 40- to 50-feet long on conventional row widths with 4 replications of each cultivar. Each location was managed according to local extension recommendations for fertility, nematode control, planting dates, plant population, weed control, PGRs, irrigation, etc. Weekly applications of pyrethroids beginning at first flower and continuing until defoliation were used to minimize insect feeding and damage. Observations for abnormalities in flowering or boll set were begun at early bloom and continued at approximately 2-week intervals. Bolls were rated for seed rot when they were at least 21-days old. At each sample date the oldest unopened boll which was 21-days old or older was harvested from 10 to 15 plants per plot. Two transverse cuts were made in each boll resulting in 3 approximately equal width sections. The number locules containing one or more seeds exhibiting seed rot symptoms was recorded. The lint and seeds were removed from each affected locule and the presence or absence of insect feeding (punctures or warts on the locule wall) recorded. Seed rot was not reported for any locule rated positive for insect feeding. When possible, observations were also made on bronze wilt, cavitation, elongation of peduncles, phloem discoloration, root abnormalities, supernumerary carpel, necrotic bracts, and any other plant abnormality found.

Severity of seed rot ranged from none detected at Maricopa to a mean severity (% of bolls affected) across sample dates and cultivars of 34% at Unadella, 18% in the Edisto R.E.C. early-planted irrigated, 17% in the Pee Dee R.E.C. early-planted irrigated, and less than 12% in the remaining 7 trials. Mean severity in the Hampton Co. field was 4%. Severity in this field in 1999 had been greater than 60% when planted to a single cultivar (Deltapine 655). Yields in most of the locations were high, between 800 and 1100 lbs of lint per acre, indicating that seed rot can occur in fields with high yield potentials. It was difficult to detect differences in seed rot severity among cultivars across locations, or at a single location. The only cultivar which exhibited a consistently high level of susceptibility was Maxxa when it was planted in the South Carolina locations. Maxxa was not developed and is not adapted to this environment. There were no consistent differences detected among the cultivars commonly grown in the Southeast. High levels of variability among replications prevented detection of differences among cultivars. Severity of seed rot varied from sample date to sample date within locations. It was more severe at certain nodal locations than others. In general it was more severe at the base of the plant than at the top.

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