

SEED ROT IN SOUTH CAROLINA
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Abstract

Seed rot was detected in cotton growing in 22 South Carolina counties. It was observed on 26 cultivars including both conventional and transgenic cultivars. The cause of seed rot has not been determined. It appears to occur independently of either stink bug feeding or supernumerary carpels. No fungal or bacterial species has been identified as the causal agent. It does not appear to be caused by problems in pollination or fertilization.

Introduction

A malady not previously reported on cotton was detected in the first week of August 1999 by cotton scouts cutting open bolls to detect stink bug damage in Hampton County. Fields where seed rot was present appeared to have high yield potential in July. Plants with seed rot exhibited no stunting, chlorosis or other abnormalities. Bolls with seed rot also appeared normal until cut open. Symptoms included seed that were hollow, had thickened seed coats or seed coats that were uneven in thickness, seed that exhibited a pinkish color, and naked seed. Sometimes lint adjacent to the affected seed was discolored. The entire seed did not decay and no soft rot was observed. Seed rot could be detected in any or all of the locules of a boll. Any or all of the seed within a locule could be affected.

Seed rot appeared to be more severe on lower fruiting branches than those higher up the plant. Seed rot also appeared to be more severe in first and second position bolls than bolls farther out on branches.

Methods

During the last week of August a survey was conducted with the assistance of county agricultural agents in each of the cotton-producing counties of South Carolina. Agents were asked to sample fields of Deltapine 458 and Deltapine 655 when possible. Each agent submitted 25 bolls from each of 10 fields randomly chosen in their county. Bolls chosen were the oldest unopened first or second position bolls on a plant. Bolls were submitted from 22 counties. Observations were only made on 148 of the 220 submitted fields due to time constraints. At least 5 fields from each county were assayed. Data taken included the percentage of bolls and locules with

seed rot, stinkbug damage, and supernumerary carpels. All lint was removed from each locule to observe insect punctures on the interior boll wall. A correlation index for each locule was estimated based on the proximity of damaged seed to stinkbug punctures.

Results

Samples assayed included 41 fields of 458 and 51 fields of 655. Only 4 of the 148 fields assayed did not exhibit any level of seed rot. Seed rot was detected in all 22 counties. Counties in which seed rot was detected included: Aiken, Allendale, Bamberg, Barnwell, Calhoun, Chesterfield, Colleton, Darlington, Dillon, Dorchester, Edgefield, Florence, Hampton, Kershaw, Lee, Marion, Marlboro, Newberry, Orangeburg, Saluda, Sumter, and Williamsburg. Seed rot seemed to be especially severe near Holly Hill in Orangeburg County and Furman in Hampton County.

Seed rot was observed in 13% of the locules of Deltapine 458 and 15% of the locules of Deltapine 655. The mean correlation index over all fields for both cultivars was 50%, indicating half of all seed rot was not in immediate proximity to stink bug damage and therefore could not be caused by stink bugs.

Seed rot was observed during the county survey or informal surveys in the following 26 cultivars: Deltapine (DP) 90 RR, DP 458, DP 655, DP 675, DP 5111, DP 5415, DP 5415 RR, DP 5690, DP 5690 RR, DP NuCotn 33b, DP NuCotn 35b, Fibermax 989, Paymaster (PM)1220, PM 1220 RR, PM 1220 BR, PM 1560, PM 1560BR, Stoneville (ST) 373, ST 474, ST KC 311, Suregrow (SG) 125, SG 125BR, SG 501, SG 585, and SG 747.

Dr. James McD. Stewart was brought in by Clemson University as a consultant to assess any abnormalities in pollination or fertilization in the affected plants. He indicated that he could observe no problems in pollination or fertilization in the affected plants and that seed rot did not appear to affect seed in bolls less than 21 days old.

Summary

Preliminary conclusions include: 1). Seed rot was observed in all South Carolina counties surveyed; 2). Seed rot was observed on bolls 21 days old or older occurring on apparently healthy plants in fields with relatively high yield potentials in July; 3). Seed rot was observed on 26 cultivars from a total of 6 different companies; 4). Seed rot was observed on both conventional and transgenic cultivars; 5). Seed rot was not highly correlated to either stink bug damage or supernumerary carpel; 6). No specific bacterial or fungal pathogen has been determined to be the causal agent of seed rot; no species of *Agrobacterium* has been recovered at more

than trace levels; 7). No specific weather pattern or event has been highly correlated to the incidence of seed rot; and 8). Poor pollination and/or fertilization do not appear to be a contributing factor to seed rot.