Bacterial Blight Eliminated From California Cotton Gins

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THE BACTERIAL BLIGHT PATHOGEN, *Xanthomonas malvacearum* on cotton, *Gossypium hirsutum*, has not been found in San Joaquin Valley fields since 1961. Its ability to survive for up to seven years in dried cotton refuse might lead to long-term contamination of cotton gins, however. This would in turn provide an opportunity for the pathogen to again contaminate planting seed, with consequent recurrence of the disease in the field. Field eradication, dilution of contaminated refuse, and decreasing viability of the pathogen with age were expected to result in the disappearance of the pathogen from cotton gins in California. This report deals with attempts to determine whether contamination was still present, particularly in gins from which *X. malvacearum* had previously been isolated—as well as a large number of other gins in the area where bacterial blight was once prevalent.

Gin refuse

Refuse was collected from augers of the inclined cleaner and gin stand, placed in paper bags, and stored at room temperature. The average weight per sample was 186 grams. Some samples consisted of lint, petioles, seed, stem parts and leaves, and were coarse in texture; others were powdery, containing a fair amount of soil. The entire sample was placed in a clean, brown, gallon jar and a minimum of a pint of distilled water added. Four hundred disease-free acid-delinted seeds of Acala 4–42 (which is highly susceptible to the disease) were soaked with the refuse for 18 hours with periodic agitation to aid in wetting the sample. The contents were spread over sterile soil in metal flats and covered with a layer of sterile soil. Tests were repeated with samples from cotton gins from which the pathogen had been isolated in 1959–1961.

Undelinted seed

Undelinted seeds were taken from large seed sources that had been processed in gins handling sprinkler-irrigated cotton. They were stored at room temperature in cloth bags. One hundred seeds were taken at random from each sample and four samples were composited in each gallon jar. The seed was soaked in a pint of distilled water for 18 hours with agitation, and contents were distributed over sterile soil as in the tests with gin refuse. When disease was found in any flat, the samples were narrowed to four and individual tests conducted.

Incubation and readings

Plants were allowed to develop in a greenhouse that was isolated from other greenhouses in which the disease was being studied. No plants with angular leaf spot had previously been allowed in the greenhouse. Average temperature in these tests was 85°F.

Readings for disease began two weeks after emergence of seedlings and continued for two additional weeks. In preliminary readings, plants with lesions on cotyledons were tagged. After four weeks, each plant was removed from the soil and critically examined for disease. Cotyledons with lesions similar to angular leaf spot were placed on paper towels and dried for a minimum of four days before isolations were made.

Lesion areas were crushed in sterile water and isolations for bacteria were made on carrot agar. Bacterial colonies resembling *X. malvacearum* were taken from plates and serially diluted on carrot agar for purification. Cultures resembling *X. malvacearum* were inoculated in Acala 4–42 cotton to verify pathogenicity. When a culture was nonpathogenic but similar in appearance to *X. malvacearum*, it was compared serologically in agglutination tests with antisera of Race 1.

No contamination

Two hundred and sixty-five refuse samples from 255 cotton gins were tested for contamination. Approximately 53,000 plants were examined for the presence of disease. Isolations made from 54 plants resulted in nine cultures resembling *X. malvacearum*—all of which proved nonpathogenic and serologically unrelated to the pathogen.

One hundred and sixty-seven undelinted seed samples were tested for contamination. Approximately 12,600 plants were examined for disease. Isolations were made from eight plants, and six cultures that were similar to *X. malvacearum* were obtained. All proved to be nonpathogenic.

Conclusions

Failure to detect *X. malvacearum* in cotton gins five years after field eradication indicates that the pathogen has either been eliminated or is present in amounts too small to be detected by the method used. Failure to demonstrate its presence in cotton gins from which it was readily isolated by similar techniques several years ago, supports the suggestion that it has been eliminated by dilution, decreased viability with age and lack of recontamination from cotton processed in the last several years. This period (five years) could undoubtedly be greatly reduced if contaminated gins were cleaned and sterilized by steam and/or chemical treatment.

It appears that total eradication of the pathogen from cotton-growing areas in the San Joaquin Valley has been accomplished and that new occurrences would have to arise from introduction of infested and/or infected seed into the "one-variety" district from other cotton-growing regions.

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