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BIOLOGICAL CONTROL OF VERTICILLIUM WILT AND SEEDLING DISEASES OF COTTON

1992 - 1995

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SUMMARY

Virtually all of the cotton seed planted in Australia is treated with chemical fungicides to control seedling diseases. The control of Verticillium wilt was dependent on cultural practices until the recent introduction of resistant cultivars . The stability of this resistance is still being tested. Black root rot, Fusarium wilt and bacterial stunt have been recognised as important soil-borne diseases of cotton in the last few years. All of the pathogens that cause these soil-borne diseases are difficult to control because of their ability to survive and be dispersed in soil. Biocontrol methods are recognised as being more environmentally acceptable than chemical control measures.

A large collection of microorganisms with over 2000 isolates has been established at the Australian Cotton Research Institute for the purpose of identifying potential bio-control agents and developing biological control methods for seedling diseases and Verticillium wilt. These isolates have been collected from within, on and around the roots of cotton plants collected from commercial crops in different cotton growing areas of New South Wales. The collection is constantly being expanded.

About 29% of the isolates in this culture collection suppressed the growth of one or more major cotton pathogens when tested in the laboratory. About 300 of these isolates were further tested for disease control in pot experiments. Some microorganisms were highly effective in controlling seedling diseases and Verticillium wilt.

Biological control of seedling diseases was also evident under field conditions. Treatment of cotton seed with bacteria at planting resulted in increased plant stand. The biological control activity of the microorganisms need to be enhanced through further reasearch in order to make biocontrol methods agronomically feasible. There is also evidence of cotton growth-promoting effects produced by some isolates.