

Soil-borne diseases of cotton in Australia: Meeting the challenge

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ABSTRACT

The most important pathogens of cotton in Australia are soil-borne. Black root rot, caused by *Thielaviopsis basicola*, is widespread and *Fusarium wilt*, caused by *Fusarium oxysporum* f.sp. *vasinfectum*, is becoming widespread. Effective host-resistance is not yet available for these pathogens and control strategies have relied upon exclusion and cultural methods. Fungicides are generally ineffective against either pathogen. Seed treatment with acibenzolar-S-methyl is proving to be an effective method for inducing a degree of systemic acquired resistance to both black root rot and *Fusarium wilt*. However, devising integrated strategies for the control of multiple pathogens is problematic. Biofumigation, using plants such as hairy vetch (*Vicia villosa*) and *Brassica* spp. as green-manure crops, reduced the severity of black

root rot by up to 50% but increased the severity of *Fusarium wilt*. Rotation with cereals for more than a single year can reduce the severity of black root rot. In contrast, a single rotation with cereals can increase the severity of *Fusarium wilt*, even though cereals are not susceptible. A plethora of 'biological' treatments are currently being marketed to farmers for disease control, on the assumption that they have ruined the health of their soil in some way. Yet cereals, grain legumes and canola grow very well in cotton fields infested with *T. basicola* or *F. oxysporum* f.sp. *vasinfectum*, or other pathogens of cotton. It is, therefore, important to distinguish issues of plant health from soil health. In reality, the build-up of soil-borne pathogens can be viewed as a sign that a 'healthy' soil ecosystem is responding to the unnatural imposition of repetitive monocultures of cotton.