

Seedling Diseases

Seedling diseases are caused by various soil borne fungi which include Pythium, Rhizoctonia and Fusarium. Cool and/or wet conditions promote disease development with seedlings most susceptible in early growth stages. Factors that slow down the rate of germination, emergence and development will ultimately increase the chance of seedling mortality. Some of these factors include poor seed beds, incorrect planting depth, herbicide damage, poor fertiliser placement and poor drainage.

A slow developing seedling is more susceptible to seedling diseases because plant roots produce sugary substances called exudates as they develop. Soil pathogens are stimulated by these exudates.

- In a slow developing crop, the exudates will be very concentrated around the root, increasing the chance for the pathogens to colonise the root system.
- In a fast developing crop, the roots move too quickly for pathogen colonisation.

Symptoms

Seedling diseases include; pre-emergent seed rots, lesions on roots and post-emergent damping-off which shows up as wilted or collapsed seedlings. Other symptoms may include seedlings with slow early season growth, small cotyledons and reddened hypocotyls. The black root rot fungus, which causes blackening of the roots, weakening seedlings are more susceptible to other diseases.

Plants affected are commonly found in poorly drained areas. When seedling disease is evident in rows, management practices such as fertiliser placement, planting depth or herbicide damage may have contributed to disease levels.

Assessment

Seedling diseases can be done by counting the number of established plants per metre at several locations across the field. The level of seedling mortality is determined by the difference between estimated stand at 6-8 weeks and the number of seed/metre sown. Losses of seedlings can also be due to seedling pests such as wireworms and seed viability.

Economic impacts

Additional costs of replanting and standard seed treatments contribute to extra outlay. Replanting may also delay maturity and incur associated yield impacts as a result. Further costs may eventuate due to necessary, late season insect control in conventional cotton crops.

Management practices to minimise disease development include:

1. Select varieties with good seedling vigour
2. Use effective fungal seed treatment.
3. Delay planting until temperatures and moisture conditions are at an optimum.
4. Plant into moist firm beds and avoid fertiliser and herbicide damage.

For more information about diseases of cotton refer to the Integrated Disease Management guidelines produced by the Cotton CRC and CRDC.

Fusarium Wilt (Fov). Linda Smith, QLD DPI&F New Fusarium strain of Fov in Macintyre

Until recently, no new strains of fusarium had been confirmed amongst the specimens received for Fov diagnosis. However, one isolate recovered from the stem of diseased cotton from the Macintyre valley, which gave negative results for VCG analysis in 2005, was shown to be pathogenic to cotton in a glasshouse pathogenicity test. Testing confirmed that the isolate was clearly different to all of the overseas strains of Fov and was not identical to Australian VCGs 01111 or 01112. Therefore, a new strain of Fov had emerged in Australia.

Origin of Fusarium Wilt of Cotton in Australia

Fusarium oxysporum f. sp. vasinfectum (Fov) causes fusarium wilt in cotton. In Australia, this pathogen was first diagnosed in the Brookstead/Cecil Plains regions of the Darling Downs in Queensland in 1993 and the Boggabilla region of New South Wales in 1994. Isolates of the pathogen were recovered from diseased cotton stems and analysis determined that the Australian strains were different from strains found overseas. The simultaneous appearance of two Fov strains of different geographic origin (200 km apart) suggested that these strains may have evolved locally. Results of analyses showed that the two strains of Fov were unique to Australia and each belonged to a distinct **vegetative compatibility group – VCG 01111** (main strain) and 01112 (commonly known as the Boggabilla strain).

Further sampling from the area which has not yielded well suggests that this strain arose from a spontaneous mutation and that it has not spread. A new VCG will not be designated to this new strain until a larger number of representative isolates have been identified.

Distribution of VCG's 01111 & 01112

Stringent containment measures have been adopted since fusarium wilt was initially identified in 1993, but the incidence of this disease continues to increase.

Geographically VCG 01111 is widespread, but VCG 01112 remains restricted to the Boggabilla area where this strain was initially found 13 years ago. Both strains are equally pathogenic on cotton.

It is important to continue to practice good farm hygiene.

What should growers do if they suspect fusarium wilt?

Early detection and containment of new outbreaks are the key strategies for managing fusarium wilt of cotton. It is essential that specimens from new outbreaks be analysed to detect any new strains of Fov and to monitor the stability of current strains.

Growers are encouraged to send stem segments from suspect plants for examination at the DPI&F's Plant Pathology Laboratories in either Indooroopilly or Toowoomba.

Please contact your Regional Extension Officer and they can package and send samples to pathology for testing.