

## *Alternaria alternata* (Fr.) Keissl. (1912)



**Photos:** *Alternaria* leaf spot (ALS) was observed early on cotyledons (a) and later on mature cotton leaves and bolls, heavily infected crops appeared purple from a distance (b); defoliated leaves caused by severe ALS infection (c); a corresponding pathogen *A. alternata* was recovered and produced typical small conidia in chains or singly (d). Bar = 20  $\mu$ m.

**Disease:** *Alternaria* leaf spot (ALS) of cotton

**Name:** *Alternaria alternata*

**Classification:** **K:** Fungi **P:** Ascomycota **C:** Dothideomycetes **O:** Pleosporales **F:** Pleosporaceae

*Alternaria* leaf spot (ALS) has been long considered a minor disease on cotton crops in Australia, especially on upland cotton, which is the only species grown commercially in Australia. However, crops in southern NSW were severely affected by this disease in the 2017/18 season. The disease was prevalent early on cotton seedlings and remained problematic throughout the season. Premature crop senescence was also observed in some severely ALS infested fields.

**Biology and Ecology:** *Alternaria alternata* belongs to section *Alternata*, which produces small spores frequently in chains. Conidia are ovate to obclavate in shape, divided by transverse and vertical walls. Conidia with conical or cylindrical beaks range from 10 to 25  $\mu$ m in length and 4 to 10  $\mu$ m in width.

*A. alternata* is a cosmopolitan saprophyte and pathogen, which is also rarely reported as a hyperparasitic fungus. Currently, seven pathotypes have been identified which differ in their production of host-selective toxins during conidia germination prior to penetration of the host plant.

**Impact:** Yield loss from ALS in cotton has not been established in Australia. Average yield losses of 25-33% have been reported on ALS infected cotton in India, Israel and Zimbabwe. Early and severe infection of ALS on cotton cotyledons cause desiccation and may lead to delayed crop maturity. In mature cotton crops, severe ALS infection frequently results in premature senescence and defoliation.

**Host Range:** *A. alternata* has been frequently reported causing pre- and post-harvest rot(s)/blight(s) of more than 100 host species.

However, strains with host specificity have also been recorded.

**Distribution:** ALS is observed widely across cotton growing regions in both NSW and QLD. However, the disease is considered of minor importance in QLD and northern NSW. Conversely, central and southern cotton production valleys in NSW have been hot spots for ALS in recent seasons.

**Management options:** Fungicide application is commonly used to manage ALS. There are a number of fungicides registered against *A. alternata* on horticultural crops. Historically, ALS was only considered a minor disease of cotton in Australia; hence, there are no registered fungicides for use in cotton. An emergency permit was granted for use for mancozeb and tebuconazole in response to the outbreak of ALS in southern NSW in 2017/18. *A. alternata* can survive saprophytically on crop residues. Burying ALS infected residue could accelerate decomposition and subsequently reduce inoculum loads. Planting ALS resistant varieties would be the most desirable management option. However, there is sparse data on the susceptibility of current commercial upland Australian cotton germplasm to ALS caused by *A. alternata*.

**Further Reading:** Le and Gregson (2019) Australas. Plant Pathol. doi.org/10.1007/s13313-019-0617-9; Bhuiyan et al. (2007) Australas. Plant Pathol. 36, 488-497; Zhu et al. (2019) Plant Dis. doi.org/10.1094/PDIS-08-18-1350-RE

**Key Contact:** Dr Duy Le, NSW Department of Primary Industries, email: duy.le@dpi.nsw.gov.au