



Fig. 1. The classic symptom of citrus black spot is the (a) hard spot, which typically contain (b) pycnidia within the centre. The pycnidia ooze splash dispersed (c) conidia when wet. Airborne dispersal occurs from leaf litter via (d) pseudothecia which produce (e) ascospores within individual asci.

Disease: Citrus black spot (CBS)

Classification: Kingdom: *Fungi*, Phylum: *Ascomycota*, Class: *Dothideomycetes*, Order: *Botryosphaeraiales*
Family: *Phyllostictaceae*, Genus: *Phyllosticta* (syn. *Guignardia*), Species: *citricarpa*

Phyllosticta citricarpa (McAlpine) Van der Aa was first reported from Australia in 1895. The disease is problematic in citrus production areas subject to summer rainfall. The disease can cause significant losses through cosmetic downgrading of fruit, premature fruit abscission, and lost market access.

Biology and Ecology:

CBS encompasses several symptom types in addition to those shown in Figure 1. These include freckle spot, speckled blotch, false melanose and cracked spot. Symptoms arise from latent infections of the pathogen. Infection occurs during the first 20-24 weeks of fruit development, via airborne ascospores from pseudothecia in leaf litter and/or water dispersed conidia from pycnidia on fruit and twigs. The relative importance of the two spore types depends on the particular circumstances. Conidia are likely to be more important in cultivars such as lemons, where diseased mature fruit can coincide with young susceptible fruit. In cultivars with no crop overlap, ascospores are likely to be more important.

Impact:

CBS is most often a cosmetic disease of citrus, with latent symptoms often not appearing until after harvest. However, under the right conditions the disease can be severe enough to induce premature fruit drop. Perhaps the most significant financial impact of CBS is exclusion of fruit from certain export markets due to quarantine concerns.

Host Range:

All commonly cultivated *Citrus* are susceptible to CBS with a small number of exceptions.

Distribution:

The distribution of CBS is mainly limited by climate, with the disease only establishing in summer rainfall areas. CBS has never established under Mediterranean, winter rainfall conditions. As such CBS is present in certain parts of Australia, Africa, Asia, North and South America. The most recent detection of CBS was from certain counties in Florida, USA. In Australia, the disease is present in coastal New South Wales, Queensland, and the Northern Territory. Area freedom has been granted to the inland, winter rainfall regions of the Riverland

(South Australia), Sunraysia (NSW and Victoria border) and Riverina (southern NSW).

Management options:

Management of CBS relies heavily on the application of protectant fungicides (mancozeb, copper, azoxystrobin). Fungicides are typically applied monthly for the first 20-24 weeks of fruit development. Recommended cultural control measures include regular pruning, mulching over leaf litter, and postharvest cold storage to reduce symptom expression.

Further Reading: Kiely TB (1948) Preliminary studies on *Guignardia citricarpa*, n.sp.: the ascigerous stage of *Phoma citricarpa* McAlp. and its relation to black spot of citrus. *Proceeding of the Linnean Society of New South Wales* 73(5-6): 249-292.

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