Kenya Avocado Industry Support Program (KAISP)

Technical Note 4: Anthracnose *(Colletotrichum gloeosporioides)*

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All photos courtesy of RA Fullerton, Plant & Food Research

The disease ‘anthracnose’ is caused by various species of the fungal genus *Colletotrichum*. In tropical areas the most common species is *Colletotrichum gloeosporioides*. It is a major problem in avocado, mango and many other fruit types, and is one of the most common causes of postharvest rots of avocado and mango during storage and in the marketplace.

Distribution and host range

Colletotrichum gloeosporioides is found in all countries and has an extremely wide host range covering many commercial fruit and vegetable crops, as well as weeds, shrubs and forest trees. Some strains are specialised for different hosts, but the same strain tends to infect fruits such as avocado, mango and other tropical fruits.

Symptoms

Wet conditions during flowering can lead to extensive infections on inflorescences causing death of the many inflorescences, black spotting and drop of very young fruit. Wet weather over flowering and fruit set can significantly affect yield.

As fruit develop, the fungus can infect the fruit but it does not progress to form a rot. It remains latent in the skin without causing symptoms and at harvest the fruit appears to be healthy. As the fruit ripen, the latent infections become active and cause internal rotting, spreading dark spots on the fruit, often covered with patches of pink- or salmon-coloured spores.

The fungus can also infect very young leaves and young stems causing dieback of growing tips.

Life cycle

The fungus sporulates profusely on dead leaves, twigs and mummified fruit in the canopy, and on the ground. Most infection comes from spore sources in the canopy. The disease is normally worse in large, old trees because of the amount of dead, spore-bearing plant material in the canopy.

The spores are released and dispersed by rain splashing and washing. This often leads to tear-drop patterns of infection on young, smooth skinned fruit such as mango. The spores germinate on the surface to produce a short germ tubes. The germ tube swells at the end to produce a dark, thick-walled structure, an appressorium which adheres firmly onto the outer layer (cuticle) of the skin. The fungus then dissolves a small hole through the cuticle and outer wall of the epidermis and enters the plant.

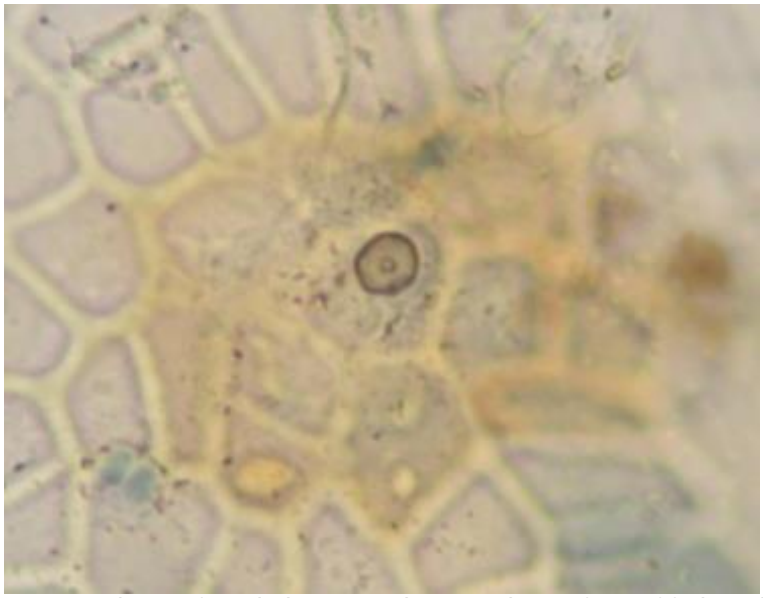

Figure 1. Appressorium on surface of fruit showing browning reaction of surrounding cells. Spot in centre is the point of penetration of the epidermal cell below.

Appressoria can form in large numbers on the surface of fruit and leaves. They are very tolerant of adverse conditions such as drying and exposure to sunlight. The host cell immediately around the infection point often reacts to form a dark speck. On leaves and twigs there are often no symptoms, but the fungus can colonise and sporulate on dead tissue after normal senescence and tissue death.

The fungus will only sporulate on dead plant tissue. It forms mats of hyphae and masses of conidiophores below the epidermis (an acervulus) which eventually ruptures to expose spores masses. These continue to exude spores resulting in the characteristic salmon-pink spore masses These spores, which are held together by mucilage, separate in water and are dispersed by rain splash and washing.

Figure 2 Pink spore masses of Colletotrichum sp. oozing from acervuli on surface of infected fruit.

Control

Anthracnose can be controlled by a wide range of fungicides. Applications need to commence at flowering to protect inflorescences and young fruit, particularly if there are wet conditions over flowering, and at regular intervals thereafter to protect from latent infections during the season.

Copper fungicides are often allowable for organic production systems but there are sometimes limits on the number of treatments that can be applied in any one season. Since it is not possible to apply fungicides to large avocado trees from the ground without specialised spray equipment, fungicidal control is not a viable option for Kenyan smallholder farmers.

The only options available to small farmers are management activities that can reduce the amount of inoculum in the orchard and create conditions less conducive to infection. Pruning of old, overgrown trees will rejuvenate the canopy with less dead wood and hence inoculum. All prunings should be removed from the orchard. Opening up dense canopies by selective pruning will promote better air movement and faster drying after rain, thus reducing the potential for spore germination and infection.

Anthracnose rots progress quickly in stored and ripening fruit. Losses from rots can be reduced by minimising the time in storage, ripening the fruit quickly, and processing it without delay.

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