SPECIES

Pseudocercospora angolensis (Car. & Men.) P.M. Kirk. Formerly known as *Cercospora angolensis* (Car. & Men.) and *Phaeomularia angolensis*

1 PATHOLOGICAL PROFILE

1.1 Distribution and status

P. angolensis fruit and leaf spot was first reported from Angola and Mozambique in 1952. It is known to occur in other African countries such as Cameroon, Gabon, Nigeria, Uganda, Zambia, Zimbabwe, Kenya and Zanzibar but not in South Africa and Swaziland. The disease has been observed on all citrus cultivars including grapefruit, lemon, lime, orange, pummelo and mandarin. Grapefruit, orange and Mandarins are very susceptible and lime is the least susceptible.

1.2 Description

Fungal spores, called conidia, are the primary source of infection. The microscopic, diagnostic features of *P. angolensis* are as follow:

Leaf spots are amphigenous, mainly hypophyllous, 4-10 µm or more in diameter, pale brown, blackish-brown when sporulation is dense, surrounded by a dark brown margin and a yellow halo, the centre often becoming detached resulting in a shot-hole spot. Conidiophores are macronematous and fascilate or forming loose synnemata 12-45 µm wide, arising from a usually large stroma 30-60 µm diameter, simple, septate, smooth, pale brown to brown, 120-240 µm high, 4.5-7 µm wide. Conidiogenous cells are integrated, terminal, sympodial, slightly geniculate, cicated. Conidia are acrogenous, becoming acropleurogenous, solitary or catenate, borne in simple or branched chains of 2-4 conidia, cylindrical to narrowly obclavate, rounded at the apex, trucate at the base, straight or slightly flexuous to more or less curved, smooth, hyaline to pale brown, 3-4 septate, 24-79 µm long, 4-5 µm wide, 2-3 µm wide at the base, the basal and, where present, the apical scar is slightly thickened and pigmented (CMZ Descriptions of Pathogenic Fungi and Bacteria, No. 843).

1.3 Symptoms

1.3.1 Leaves

On leaves, the fungus produces circular, mostly solitary spots that are up to 10 mm in diameter with light brown or greyish centres. Each spot is usually surrounded by a yellow halo. Occasionally, the papery thin necrotic tissue in the centres of old spots falls out, creating a shot-hole effect. During rain, leaf spots on young leaves often coalesce and culminate in generalized chlorosis. Premature defoliation takes place when leaf petioles are infected.

1.3.2 Fruit

On fruit, the spots are circular to irregular, discrete or coalescent, and surrounded by yellow halos. Most measure up to 8 mm in diameter. On young fruit, symptoms often commence with nipple like swellings without halos. Spots on mature fruit are normally flat, and often a dark brown to black sunken margin of anthracnose around the spots is observed (Fig. 6.5). In Zimbabwe, fruit lesions occurred only on out-of- season fruit in neglected orchards. In-season fruit is not affected because of the unfavourable conditions during the most susceptible time for infection which is during blossom and when the fruit is very small.

1.4 Transmision

Spread of the disease from one orchard to another is by airborne spores produced on fruit and leaves.

1.5 Seasonal occurrences

Although the pathogen is present throughout the year, symptoms only occur after summer rain in mid-summer on leaves and out of season fruit where fruit was not protected by fungicides that were sprayed for CBS control.

2 MANAGEMENT ASPECTS

2.1 Disease assessment

In areas where the disease occurs annually, a preventive approach should be adopted.

Treatments should commence as soon as the first spring flush emerges.

In areas where the disease occurs infrequently, or has not yet occurred, young vegetative flush and fruit should be inspected after rainy periods for the presence of lesions.

2.2.1 Plant Protection Products

All sprays must be applied at medium cover spray intensity, ensuring that all fruit surfaces and leaves are thoroughly wetted. For more details on spraying requirements consult the part on the application of plant protection products in Chapter 2 of this volume.

Although not registered, the following spray programme has been shown to be effective in trials conducted by M.C. Pretorius.

Spray programme for *Pseudocercospora*

	Month	Treatments
1.	Mid-Nov	Ortiva (20 ml) or Cabrio (20 ml) or Flint (20 g) + Dithane 150 g + oil (0.5%)
2.	End Dec	Benlate (25 g) + Dithane (150 g) + oil (0.5%)
3.	Mid-Feb	Score (40 ml) + Dithane (150 g). No oil
4.	End Mch	Copper oxychloride (200 g)

Figure 6.4 Circular *Pseudocercospora angolensis* spots on abaxial and adaxial sides of leaves surrounded by a yellow halo.

Figure 6.5 *Pseudocercospora angolensis* lesions on young fruit with nipple-like swellings without halos.