Storage and Market Diseases of Fruit. XVI

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MARKET AND STORAGE DISEASES OF CITRUS FRUITS

Black Centre Rot

This is a slow-growing rot usually confined to fruit weakened by over-maturity, adverse climatic conditions, and/or long storage. Infection is via the button or the stylar end of the fruit, and it proceeds slowly down the 'core' where a black centre rot develops, often without any external indication of its presence (Fig. 65). It is caused by the fungus *Alternaria citri*.

Mandarins are more often affected, particularly if cool stored at higher temperatures (7–10°C) for several weeks.

Alternaria rot is not controlled by benzimidazole compounds such as TBZ and benomyl, and fruit treated with these and thus protected from green and blue moulds may eventually develop considerable black centre rot after long storage. The problem can be overcome by avoiding long storage at higher temperatures, and storage of over-mature fruit.

Sour Rot

This is a pale soft decay (Fig. 66), which later develops a creamy slimy surface growth. It usually has a putrid sour odour and is especially attractive to ferment flies, which lay their eggs in the rotten fruit. Sour rot is caused by the fungus *Gleotrichum candidum* var. *citri-aurantii*. It occurs in fruit weakened by over-maturity and long storage, more commonly in lemons and grapefruit after long storage at higher temperatures. Initial infection is mainly through injuries, and it spreads by contact to produce a putrid, sour, leaking, maggot-filled mass. As with black centre rot, the remedy lies in choosing sound young fruit for storage, and in not storing for too long or at too high a temperature.



Black centre rot (Alternaria) on (left) Valencia orange and

(right) Ellendale mandarin.



Sour rot on Washington Navel orange.

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Black Spot

Black spot is a serious disease of the rind affecting all commercial varieties of mature citrus fruits in the orchard and during storage. It is confined to the coastal areas of high rainfall and principally affects the Valencia variety since this matures during warm weather, when conditions favour the disease. It is caused by the fungus *Guignardia citricarpa* which infects the fruit during the first 20 weeks after petal fall; the disease itself does not appear until the fruit matures 12 months later.

In one form, which develops early and grows slowly, the spots are small, sunken, and blackedged, with pale centres in which pinpoint black dots can be seen (Fig. 67). A later, more virulent form develops very rapidly, especially when hot dry winds occur in late spring and early summer; many small reddish brown spots rapidly enlarge to form brown sunken areas up to 15 mm in diameter and these may coalesce to affect most of the rind.

Because of latent infections, the disease can also develop on apparently sound fruit in cool storage, especially at higher temperatures, or it can develop when the fruit is held at high temperatures after cool storage. It may show as irregular sunken light brown areas, or as larger irregular dark brown to black areas that may coalesce (Figs. 68 and 69). Black spot is not to be confused with septoria spot, which is similar in appearance but has a persistent reddish purple tinge to the lesions and occurs only on inland fruit.

Control is by spray applications of Bordeaux mixture at petal fall, with follow-up sprays of mezineb and oil 9 and 16 weeks after the initial spray.

Further reading

Kiely, T. (1970).—Black spot of citrus. 5th Ed. N.S.W. Dep. Agric. Pl. Dis. Bull. No. 11.





Typical field symptoms of black spot on Valencia orange.



Black spot developed in cool storage on Valencia orange.

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