# Storage and Market Diseases of Fruit. XV

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## MARKET AND STORAGE DISEASES OF CITRUS FRUITS

### Green and Blue Mould Rots

Green mould (Fig. 59), caused by the fungus *Penicillium digitatum*, is the most important cause of wastage of citrus fruits after harvest; blue mould (*Penicillium italicum*) (Fig. 60) is similar but much less common. All species of citrus fruits are susceptible to these rots, particularly when more mature.

The first sign is a soft water-soaked area on the surface of the fruit. Under favourable conditions of warmth and high humidity the soft rot develops rapidly, the fruit becoming covered with a dense whitish growth of mycelium, from the centre of which masses of fungal spores form and spread



Green mould on Washington Navel orange.

out, producing a dense, coloured growth of spores which rise in clouds at the slightest touch.

Generally, sound undamaged fruits are not affected unless by contact-spread from rotted specimens. However, even slight damage to the rind opens the way to infection, and therefore careful handling is a basic safeguard. Mould development is rapid at temperatures of  $20-25^{\circ}C$ and very slow at temperatures below  $5^{\circ}C$  and above  $30^{\circ}C$ .

Control requires careful handling at all times, and treatment promptly after picking with a recommended fungicide such as Tecto 90 or benomyl (Benlate). The fruit should be treated within 36 hours of picking in summer and 72 hours in winter, otherwise the infection may be too deep-seated to be eradicated.

#### Further reading

Long, J. K., Leggo, D., and Seberry, J. A. (1965).--Washing, sterilizing, and waxing citrus fruits. N.S.W. Dep. Agric. Bull. No. H168.

Citrus Wastage Research Laboratory (1970, 1972).--Citrus Wastage Research News Nos. 4 and 5.

#### Melanose

Melanose, an orchard disease that disfigures the skin of fruit grown in coastal areas, is caused by the fungus *Diaporthe citri*, which also causes stem-



Blue mould on Valencia orange.



Melanose—'fly-speck' form—on Washington Navel orange.

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end rot (q.v.). The characteristic appearance of melanose is due to the many pinpoint infections scattered over the rind; by the time the fruit matures, each of these becomes a raised spot up to 1 mm in diameter and reddish brown to black in colour, giving the common 'fly-speck' appearance (Fig. 61). More severe infections, in which large numbers of the water-borne spores wash down over the fruit, produce the 'tear-stain' or 'mud-cake' forms of the disease (Fig. 62). Oranges and grapefruit are most affected. Control is by spray application of a recommended coppercontaining fungicide at the petal-fall stage.

#### Stem-end Rot

This is a firm, pliable, light brown rot which commences at the stem end and grows slowly with very little surface development of the fungus (Fig. 63). Most stem-end rots in fruit grown in coastal areas are caused by the fungus *Diaporthe citri*, and all commercial varieties of citrus are affected. Stem-end rots are much less common in fruit grown in inland areas but other fungi, such as *Alternaria*, may produce stem-end rots in weak fruit (Fig. 64).

Diaporthe citri infects the green button while the fruit is on the tree, but remains dormant until after harvest, when aging of the fruit allows the rot to develop. Old and weak trees in high-rainfall areas are most likely to be heavily infected by the fungus, especially if orchard sanitation has been neglected; fruit from them should not be stored. Susceptibility increases with increasing maturity of the fruit at harvest and with higher storage temperatures.

Control can be achieved by orchard sanitation and field sprays, and by treating the fruit after harvest with an effective fungicide such as benomyl, and with 2,4-D to delay aging of the buttons.

#### Further reading

Anon. (1972).—Melanose of citrus. 2nd Ed. N.S.W. Dep. Agric. Pl. Dis. Bull. No. 22.



Stem-end rot on coastal fruit.



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Melanose—'tear-stain' and 'mud-cake' forms—on Washington Navel orange.



Stem-end rot on inland fruit.

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