Storage and Market Diseases of Fruit. IV

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Supplement to *CSIRO Food Preservation Quarterly*
Volume 30, Number 1, March 1970

BITTER PIT OF APPLES

This appears as small brown spots in the flesh, mostly near the surface and towards the calyx end of the fruit. Many pits show through the skin as small, circular, green to brown depressions (Fig. 13). Susceptible varieties are often severely affected and the disorder is often responsible for considerable losses in exported fruit. Bitter pit may occur on the tree (tree pit) or in cool storage on fruit apparently sound at picking (storage pit). Lenticel blotch pit (Fig. 14) is a severe form of shallow pitting occurring on fruit from light crops.

Bitter pit is more common in fruit experiencing warm temperatures and periods of water stress when approaching maturity. Early picking, large fruit size, light crops, excess nitrogen fertilizer, low calcium concentration in the fruit, delay before cooling, slow cooling, and high storage temperatures increase the incidence of the disorder. It can be considerably reduced by the use of calcium-containing sprays while the fruit is growing. Dipping the fruit after harvest in a solution of calcium chloride is sometimes effective. Control of pit is improved by the addition of diphenylamine* to the dip. Pre-shipment cool storage of susceptible varieties for 2–3 weeks allows some of the surface pit to develop and affected fruits may then be removed, thus reducing the risk of pit developing during export. The incidence of pit is less in apples in controlled-atmosphere storage and in fruit waxed before storage.

The most susceptible varieties are Cox's Orange Pippin, Ribston Pippin, and Cleopatra, while Granny Smith, Sturmer, and Dunns are moderately susceptible. However, under favourable growing conditions Granny Smith, Delicious, Golden Delicious, and other varieties may also be affected, at times severely.

Bitter pit on Delicious apple.

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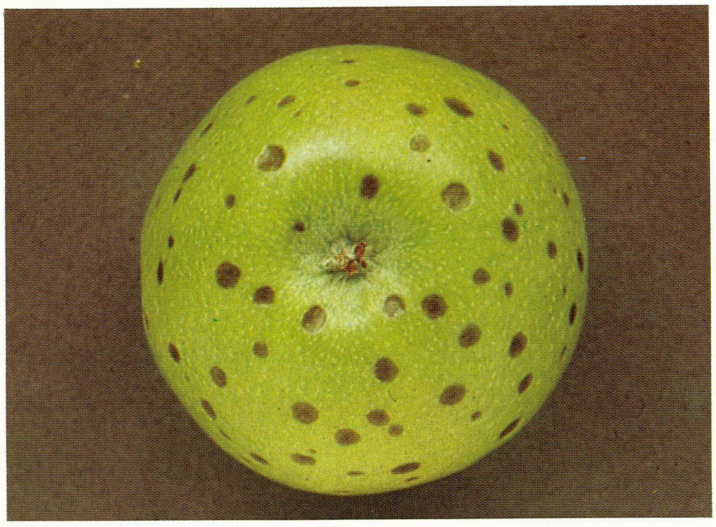
Lenticel blotch pit on Granny Smith apple.



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Further reading

Martin, D., Lewis, T. L., and Cerny, J. (1960).—Bitter pit in the apple variety Cleopatra in Tasmania in relation to calcium and magnesium. *Aust. J. agric. Res.* **11**, 742-9.

* While the use of this compound on apples is permitted in Australia, it is not permitted in Britain and a number of other countries.

CORE FLUSH OF APPLES

Core flush, or brown core, may show first as a faint pinkish or yellowish discoloration of the core tissue which later turns brown but remains firm and dry. When the disorder is severe it may spread out into the flesh as a rather dry breakdown. Core flush may also start as small brown areas next to the carpels, or as a light brown discoloration along or within the core line. It frequently develops between the horny carpels of the core as separate, dry, brown to dark brown areas shaped like arrowheads.

Overseas and in Queensland core flush (brown core) has commonly been worse at low storage temperatures, at which its appearance is generally of the first-mentioned type. On the other hand, it may be a senescent disorder developing after over-long storage (Fig. 15). There is also another form induced by carbon dioxide (Fig. 16), which is commonly more severe and darker in colour and occurs as arrowhead-shaped separate areas between the carpels. Although the disorder may not show in cool storage it commonly develops rapidly after the apples are transferred to warm conditions.

Large fruits from light crops, especially if heavily fertilized with nitrogen, are very susceptible to core flush. Varieties most commonly affected are Granny Smith, Statesman, and Cleopatra. To avoid the occurrence of the disorder, susceptible fruit should be stored in an atmosphere containing less than 3% carbon dioxide, and they should be removed from storage early.

Core flush (senescent type) on Granny Smith apple.

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Further reading

Padfield, C. A. S. (1969).—The storage of apples and pears. Bull. N.Z. Dep. scient. ind. Res. No. 111 (rev.), 43.

Core flush (CO_2-induced type) on Granny Smith apple.

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