

Storage and Market Diseases of Fruit. X

By

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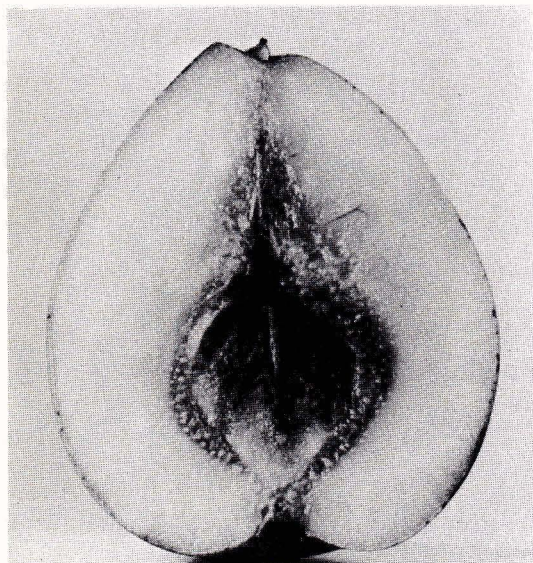
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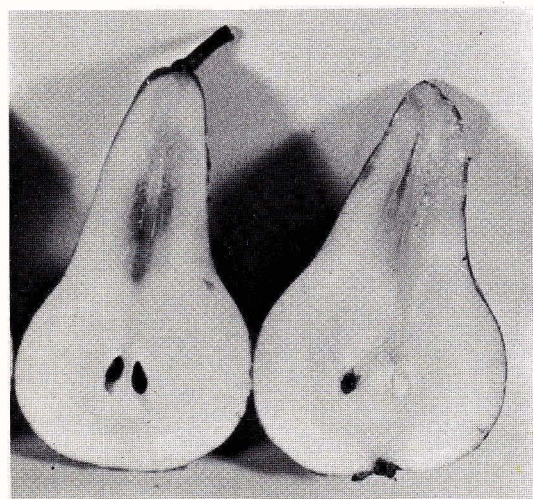
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CORE BREAKDOWN IN PEARS

Pears kept too long in storage fail to ripen normally after removal to ripening temperatures. As pears approach the end of their storage life there is a progressive decline in the quality of the fruit when ripe and a progressive development of scalding of the skin and/or breakdown of the core and flesh. Finally, badly over-stored fruit, while it will colour, will not soften or develop characteristic flavour after removal, but develops scald and breakdown and a fermented flavour.



Core breakdown in pears, var. Howell, due to over-storage.



Neck breakdown in pears, var. Beurre Bosc, due to over-maturity and over-storage.

Core breakdown is a brown mushy breakdown of the core and surrounding tissue (Fig. 37). It is often part of the normal sequence of over-ripeness changes, in which case it is preceded by normal ripening. When due to over-storage this will not be so and the disorder develops soon after removal from low temperature. In less severe over-storage the fruit may soften satisfactorily but the flavour will be poor and core breakdown develops early so that at no stage is the pear fit to eat. Especially in over-stored fruit, core breakdown may merge into a more general discoloration and breakdown of the flesh.

Anything which reduces storage life, such as over-mature fruit or higher storage temperatures, will cause earlier development of the disorder.

Further reading

Hall, E. G., and Scott, K. J. (1964).—Cool storage of pears. *Agric. Gaz. N.S.W.* 75, 1216–21. (Also issued as N.S.W. Dep. Agric. Div. Hort. Bull. No. H148.)

NECK BREAKDOWN IN PEARS

When over-stored, pears, particularly elongated varieties like Beurre Bosc, often develop a brown to black discoloration of the vascular tissue connecting the stem to the core and often an associated discoloured breakdown of the flesh of the neck of the fruit around these vasculars (Fig. 38). There may be a neck breakdown in over-ripe fruit but in this type there is no marked discoloration of the vascular strands and the breakdown is not associated with poor flavour and lack of juiciness in the ripe fruit.

As with core breakdown, factors that reduce storage life induce earlier development of neck breakdown and those, such as C.A. storage, which lengthen life delay the disorder.

ALCOHOLIC POISONING OF APPLES

Alcoholic poisoning, or alcoholic breakdown, is an oxygen deficiency disorder caused by very low levels of oxygen around the fruit. The actual damaging level depends on the temperature and the condition of the fruit; at cool storage temperatures it is usually 1% or less. Therefore the disorder is often associated with brown heart.

Externally affected fruit shows extensive dark brown areas, usually smooth and shiny, which may be somewhat water-soaked (Fig. 39). The flesh under the skin may be affected with a brown breakdown to a depth of usually only about $\frac{1}{10}$ – $\frac{1}{8}$ in. Characteristically the normal red colour of the skin of affected coloured varieties becomes bluish. After removal to air the affected flesh dries out and the skin above may become crinkled and depressed. A slight browning of the core may be an associated

symptom. The deficiency of oxygen also results in fermentation of the fruit and the development of an alcoholic flavour.

The disorder has occurred commercially in apples stored in sealed plastic bags under conditions causing a rapid consumption of oxygen which cannot be replaced fast enough. Similarly, it may also occur in fruit heavily waxed or coated with some other preservative film, when the coating is too thick or the temperature too high.

Further reading

Carne, W. M. (1948).—The non-parasitic disorders of apple fruits in Australia. Bull. Coun. scient. ind. Res., Melb. No. 238.

DIPHENYLAMINE INJURY TO APPLES

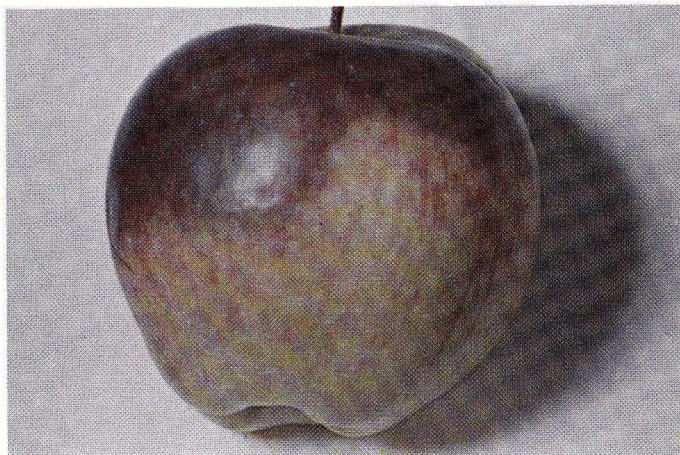
Before storage, apples are generally treated with a chemical inhibitor of superficial scald, usually with diphenylamine. If the concentration of the chemical is too high or the fruit is in the liquid too long, or if the temperature of the fruit is too high, or if previously treated fruit is stored in wraps impregnated with diphenylamine, the fruit may absorb injurious amounts of the chemical.

Diphenylamine injury takes several forms (Fig. 40) and visible damage is confined to the skin. It may be grey to brown to black, as small black spots or larger, lighter-coloured depressed spots, or light grey to brownish or black patches. Slight injury from pre-storage treatment by dipping or spraying is often only a light discoloration in the calyx or stem cavity. Slight injury from storage in treated wraps is usually a light, diffuse, greyish discoloration of the skin. Severe injury as a result of absorption of high levels of diphenylamine is dense and almost black and the flavour of the fruit is affected by the presence of the chemical in the flesh.

With most varieties injury can be prevented by avoiding over-exposure of the fruit to the chemical but the Sturmer and Golden Delicious varieties are so sensitive to diphenylamine that all contact with it must be avoided.

Further reading

Hall, E. G. (1971).—Cool storage of apples and pears, directions for practical scald control. (CSIRO Div. Fd Res.)



Alcoholic poisoning of apples, var. Delicious.



Chemical injury by diphenylamine scald inhibitor, var. Granny Smith.