Storage and Market Diseases of Fruit. XXIV

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Supplement to CSIRO Food Research Quarterly Volume 35, Number 3, September 1975

MARKET AND STORAGE DISEASES OF FRUIT

Chilling Damage to Bananas

Although all fruits are damaged by freezing, some fruits, expecially bananas and other tropical fruits, may be damaged by exposure to temperatures considerably above their freezing point.

The lowest temperature at which green bananas can be safely held to delay ripening is about $12^{\circ}C$, below this they become chilled and injury to the peel results. Certain cells of the peel are killed and the dead cells darken to give the peel a smoky or dull yellow appearance after ripening, although the pulp is unaffected. When chilling is more severe, the peel of the green fruit develops a grey



to black discoloration with a steaky appearance which darkens as the fruit ripens (Fig. 98). A characteristic symptom of even slight chilling is darkening of the vascular bundles of the peel, as seen in section (Fig. 99). Exposure of green fruit to a temperature of 10° C for 12 h or so is usually enough to cause slight dulling of the colour of the peel when ripe.

Chilling lowers the resistance of the fruit to infection, and anthracnose and other fruit rots may develop on chilled fruit before it starts to ripen. The degree of chilling depends not only on the

> temperature and duration of exposure, but also on the nature of the fruit. Bananas grown under more tropical conditions are more susceptible and in New South Wales winter fruit is more resistant to chilling than summer fruit. The peel of ripe fruit darkens rapidly and severely when exposed to cold.

98 Chilling.



99

Chilling (section).

Bruising of Bananas

Bruising and other mechanical damage to the green fruit which cause disfiguring blemishes, increased fruit rots, more rapid ripening, and more rapid weight loss from the fruit are a serious marketing problem for the industry. Few growers and packers realize the need for careful handling of green fruit because damage by rough handling usually does not become obvious until the fruit ripens, when it shows as brown to black blemishes (Fig. 100). Bruising of green fruit may extend to the pulp which breaks down locally during ripening.

Considerable damage, particularly bruising, is caused by overtight packing. In transport and handling, injury is caused by abrasive movement of the fruit against the box or carton or another fruit. This injury can be greatly reduced by the use of polyethylene film bag or sheet box liners which reduce friction. Water loss is much more rapid from damaged peel; much of the consequent unsightly darkening of mechanical injuries can be prevented by reducing water loss by packing in polyethylene film.

EDB Injury in Bananas

Ethylene dibromide (EDB) is used for the quarantine fumigation of various fruits against fruit flies, but treatment may damage the skin and/or have adverse effects on the ripening of bananas. This injury may be confused with chilling injury.

Slight injury to green fruit causes a slight grey discoloration of the peel and more severe injury is darker, often brown to black and shiny, and more extensive (Fig. 101). Injury is caused by the darkening by oxidation of leucoanthocyanidins in killed cells of the peel. Injury and killing of cells by other chemicals may produce similar symptoms.

Doses of EDB of 15 g per m³ at 2-hourly intervals or more have been found to cause injury to the peel, while lower doses have hastened ripening.

Further reading

Farooqi, W. A., and Hall, E. G. (1972). Effects of ethylene dibromide on the respiration and ripening of bananas (*Musa cavendishii* L.). *Nucleus* (*Karachi*) **9**(3–4), 22–8.



Bruising.



EDB injury

100