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Introduction

Fruits evolved as vehicles for production and dispersal of seed. Humans then imposed further selection pressures to develop products for our use. Such development has occurred during the past century and our concept of a fruit as a sweet and fleshy object for eating is really quite recent in evolutionary terms.

Despite modi?cations and exaggerations of fruit structures due to human selection, and with a few seedless exceptions such as banana and sultana grapes, fruit growth is largely dictated by seed development. Processes underlying those influences are considered here, followed by an account of postharvest changes.

Postharvest technology is also a human device to serve human needs, and includes everything that happens to crops between harvest and human utilisation. However, preharvest events do impact on subsequent postharvest behaviour. Genetic background is particularly important, in part determining crop response to growth and storage environments. Postharvest techniques can be slight, as in grain stores, or highly developed, as in controlled atmosphere storage of fresh produce.

In every instance, some key concepts apply. In particular, *potential quality* of fresh commodities is irretrievably ?xed by harvest time, with no further opportunities to manipulate their basic properties. After harvest, storage time may be as short as the few minutes taken for immediate consumption, or extremely prolonged as with years of seed bank storage. Most research discussed here is concerned with storage periods of 2–25 weeks. Handling over this period has a profound effect on ?nal usefulness because a crop is still *alive* throughout this process and vulnerable to adverse conditions. Postharvest physiology is therefore of particular importance to countries such as Australia and New Zealand which ship a large portion of their crops to distant markets. Accordingly, kiwifruit (*Actinidia deliciosa*) is used here as an example where principles of postharvest research have been applied successfully in establishing a new international crop on a stable and permanent basis.

Wild fruits often contain components which make them unattractive to potential consumers until they are ready to be dispersed. These commonly include calcium oxalate crystals (raphides), bitter flavours and astringent tastes. However, humankind adapted fruit for personal use by applying intense selection pressure to remove unpleasant components and enhance desired features. These include appealing flavour with well-developed aroma volatiles and sweetness, bright colour, pleasant texture and high food value. As early as the seventeenth century, Gerard recorded that ‘some peares are sweet, divers fat and unctuous, others soure, and most are harsh, especially the wilde peares’. Nowadays, all European and Asian cultivars are sweet with greatly reduced acidity and tannin content compared to their various wild parents. Persimmons provide another example where an originally astringent fruit has given rise to a non-astringent form.

During the twentieth century, additional selection pressures have been applied to temperate fruits in a drive for cultivars that are well suited to postharvest handling and storage. This has not been true for

most tropical fruits, which have had little selection for such characteristics and which still present challenging problems for postharvest researchers and breeders.

The history of kiwifruit shows some of the steps that will be needed. It was a wild species until 1900, when domestication began. A major commercially valuable cultivar, Hayward, was selected around 1930. This event was followed by progressive development of techniques for cultivation, handling and marketing — all required to make a new fruit commercially successful. Several features of kiwifruit physiology make it amenable to commercialisation, namely (1) an unusual flavour combined with good nutritional value, (2) retention of chlorophyll so that inside tissues remain bright green when ripe, (3) a long and manageable ripening period resulting in a long harvest season where fruit can be picked in a mature but ?rm condition, and (4), especially important, kiwifruit tolerate lengthy low-temperature storage without subsequent shelf life being compromised.

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