Chapter 28

HARVESTING

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It is not possible to identify the point at which a whole pineapple is “ripe” because the pineapple fruit is a *sorosis* (composed of multiple fruitlets/eyes) and each fruitlet ripens individually. The pineapple flowers from the bottom up, and matures the same way so the pineapple fruit is mature earlier at the bottom than the top.

It is the grower’s responsibility to supply fruit that are “eating mature” to both the processing and fresh markets. Because fruit size and shell colour alone are not reliable indicators of internal maturity, fruit must be cut, tasted and tested by refractometer readings to ensure standards are met. The grower must also depend on his experience to judge when each harvest round should be conducted. The importance of a high level of uniformity across the field needs to be stressed.

Another important fact to be aware of is that pineapple fruit do not ripen after they are picked since there are no starch reserves in the fruit for conversion to sugar after picking. Thus whatever the sugar level is at picking, it will remain at this level when consumed even two weeks later.

To attain the best quality fruit and payment, it is essential that fruit be allowed to reach the maximum possible level of total soluble solids (TSS/brix) at harvest. This must be balanced against the practicalities of harvest, and (for fresh market fruit) the need to have sufficient shelf life.

Fruit maturity indicators

Because the individual pineapple fruit ranges in maturity from bottom to top, a number of factors go to make a "mature" fruit. The standards are slightly different for processing and fresh market.

Shell colour

While shell colour has some relationship to internal maturity, it is not a good indicator by itself. In very broad terms, fruit for processing should show more shell colour than fruit for fresh market fruit at picking. Fruit in the cannery is processed within 24 hours whereas fresh market fruit needs a shelf life of up to 2 weeks. Shell colour is important to growers who must decide (a) how "green" they can pick to be certain that there will be no "over mature" fruit at the next harvest, and (b) how late they can leave it to attain maximum sugar levels.

Depending on the time of year, fruit must be at ¼ to ½ shell colour to ensure that an acceptable flesh colour for the cannery is attained. Immature fruit should not be harvested. If the fruit are intended for fresh market, harvest fruits at first break to ¼ colour.

Shape of eye

As fruit mature the eye changes from "pointed" towards "flat". Late spring/early summer fruit tend to have "pointed" eyes when mature so shape of the eye is not a good indicator of maturity by itself. Of course, fruit with very "pointy" eyes ("prickly eye") is not acceptable.

Internal colour

Pineapple should have a yellow internal colour. Internal colour develops with maturity and immature fruit tend to be white-fleshed. The level of "yellowness" varies considerably with season and variety. Summer fruit have better internal colour than winter fruit. Smooth Cayenne tends to be yellow to pale yellow, while some of the newer selections and hybrids, like 73-50, are much more yellow. Clonal differences become most obvious in winter.

Internal translucence

As individual eyes mature they tend to show some clear area within their cells. This is called translucence and a small degree of translucency is a normal part of ripening. However excessive translucency is a disorder. Translucency varies with environmental conditions, cultural practices and variety.

Refractometer reading

As fruit mature, sugar and acid levels change. Summer fruit tend to have high sugar/low acid levels, while fruit maturing in winter have low sugar/high acid levels.

For the fresh fruit market there is no longer any legal minimum %TSS (brix) but fruit with a refractometer reading of at least 13% is recommended although higher is preferred depending on the time of year and your market agent's requirements.

Processing fruit with high TSS readings attract significantly higher payments under Golden Circle Ltd's Quality Based Payment System (an average of $6.54 per tonne for every 1% TSS increase above 8.1% and up to 15%) so harvesting too soon will mean lower value per tonne. The refractometer reading should be taken from juice expressed from the middle of the fruit, not the top or the bottom.

Field uniformity and number of harvest rounds

Harvest is the time when all the effort directed towards attaining maximum crop uniformity should pay off. The importance of uniformity across the field is very important in order to minimise the cost of this operation which is one of the most expensive of growing pineapples. The fewer the number of harvesting rounds required the lower the cost. Many factors contribute to uniformity, starting at site selection and ground preparation right through to induction and ethephon ripening (if used). These topics are covered in other chapters.

In spite of the best efforts to obtain crop uniformity at harvest, an early or "edge" pick is often necessary for fruit that have matured before the bulk of the rest of the field. Generally these early fruit are the result of natural initiation and are for the most part found along the edges where there is greater exposure to sunlight.

Typically the number of harvest rounds required to pick a uniform field of pineapples for processing is two or three.

For fruit destined for the fresh market, the number of rounds required to pick a field (assuming that all plants in the field have been initiated together) can be several.

If the field is uniform and some other important pre-requisites are met, ethephon ripening can sometimes be used to reduce the number of harvest rounds. *Refer to the chapter on ethephon ripening for details.*

Harvesting methods and practices

Picking and trimming fruit

Mature Smooth Cayenne fruit are manually snapped from the plants and placed on the conveyor of the harvesting boom which takes it to the harvesting bin.

Any basal leaves remaining on the fruit must be removed. Basal knobs or sprouts must also be removed from processing fruit; these fruit are not suitable for the fresh market because of the increased risk of rots.

Plant-crop rough leaf varieties are harvested by cutting the fruit stalk below the collar of slips with a knife and then separating the stalk and slips from the base of the fruit with a second knife stroke before placing it on the conveyor. These slips are usually too small for planting but if they are left to grow larger they delay sucker growth. After the ratoon crop is harvested the slips are left on the plant to grow to a more suitable size for use as planting material.

Top (crown) removal

Smooth Cayenne fruit destined for the fresh market are normally sent "tops-on". Fruit for processing and the newer hybrid clones are normally sent "topless". Tops are removed by snapping rather than by twisting. Twisting tends to leave a wound which is easily invaded by the "water blister" fungus *(Thielaviopsis paradoxa)*. Tops may be cut off, and this is common where multiple or malformed tops are present. In recent times some growers have developed mechanical de-toppers on the harvest boom that mechanically remove the crown quite satisfactorily and significantly improve harvest rates. Make sure that top leaves are not left on the fruit with these devices.

Case study: Whilst some growers (e.g. the French family at Elimbah and Bethonga) have developed de-toppers on their harvesting boom, others (e.g. Piñata) have developed de-toppers for use in the packing shed.

Gentle handling
Mature fruit are very easily damaged. A drop of as little as 10 cm will cause bruising and even leakage of juice. Fruit should be placed on the conveyor slowly to avoid bruising, never throw the fruit onto the belt. Fruit falling into the bin at the end of the conveyor should be provided with cushioning to minimise bruising, this is particularly important when starting to load a bin.

Not overloading the harvester belt
Overfilling the harvester boom will result in fruit bruising through "fruit-to-fruit" contact.

Running the harvester belt as slowly as possible
If the harvester belt is going too fast the fruit are "chucked" into the bin, and severe bruising will result. Run the belt only as fast as necessary to carry the fruit away easily.

Maintaining your harvester
Make sure there are no sharp places where fruit can be damaged on the boom, or while filling the bin.

Postharvest treatments
Water blister is a serious postharvest rot. Most fruit are infected at harvest, but the rot takes about four days to develop. Cannery fruit are processed soon after picking, so postharvest rots are normally avoided, but fresh fruit can be in the market chain several days before consumption so it is recommended that they be treated with the registered fungicide prochloraz (e.g. Sportak®) before packing. *Refer to the chapter on postharvest management for more information.*

Fruit traceability

Remember at harvest time to record harvest information including name of the field, date, quantity of fruit harvested, variety and bin numbers. This information forms part of the record required for fruit traceability and food safety. For fruit destined for Golden Circle Ltd the harvest information is recorded on the Consignment note, fresh fruit growers need a similar record. The harvest records can then be linked to the farm map and farm operation documentation which details the chemicals and fertilisers that have been applied to that crop. *Refer to the chapter on the Golden Circle Ltd approved supplier program for more information.*

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