Chapter 6

SMOOTH CAYENNE PROCESSING CLONES

Version 1, 1 Feb 2006

Modern pineapple production is based on selections of Smooth Cayenne, universally denoted as clones. The benefits of clones include higher yield, fewer picks due to more uniform ripening within a field, and quicker harvesting due to fewer defects such as basal knobs. While there are often only small differences between the different clones, the uniformity of growth and ripening across a field improves efficiency.

List of Clones

Clones 8, 10, 13 & 30 were released by DPI&F in 1968. In terms of yield Clone 8 was considered to be a good overall performer. C30 was similar but slightly inferior to C8 and became a popular clone. C10 was ranked third and it also became a popular clone, it tends to bear "square" blocky fruit but is known to produce fruit knobs in certain seasons. A mixture of clones 8, 10, 13 & 30 is usually referred to, in the industry, as **QC** (Queensland Cayenne). In the absence of roguing, these clones have generally deteriorated with a rise in the number of knobs and slips and a reduction in fruit weight. Recent studies have shown that C10 and C30 tend to produce small fruit with too many slips and not enough suckers.

F180 was imported by Golden Circle Ltd in 1973 from Hawaii (where it is known "Champaka F180"). Although this clone sometimes produces a light plant crop (based on fruit weight) it usually produces a better ratoon yield than the Queensland clones and often out-yields them over the course of a two crop cycle. Its good ratoon yield appears to be related to its higher sucker number. It usually matures its fruit about 2 weeks later than Queensland clones thereby giving a harvest separation from a similar initiation. The fruit is usually held slightly lower in the plant in comparison with C10 or C13. Anecdotal evidence suggests F180 has a higher incidence of translucency, double crowns and mealybug wilt. Anecdotal information also suggests that it crops best in cool districts with better rainfall and that it does not perform as well in drier districts and more northerly areas of Queensland. F180 is a popular clone within the Australian industry.

Queensland clones 33, 34, 35, 36, 37, 38, 39, 40 were released by DPI&F in 1994. C40 is a re-selection of C30. The others are re-selections of C8. These new clones generally perform better than C13 and C30, producing a better plant crop yield with better suckering. Defects such as basal knobs and slips are also reduced. C34 has performed the best in the few trials that have been completed. Limited planting material is available within the industry.

"Farm run", a collective name for material in existence in Australia before the selection of clones, continues to be used by a small number of growers. However the introduction of the DPI&F selected clones were credited with a 20% increase in yields relative to the old "farm runs" and elimination of "collar of slips"

Recommended clones

Clones currently recommended for new plantings include C34, C40 and F180. C40 does not sucker as well as other clones and this may be why the plant crop yields well, thus suiting it to a single cropping situation. This does not imply that other clones are not suitable. Where good performance has been obtained with other clones, there is no reason to change.

Implications of Quality Based Payment System

It is very important to bear in mind that since Golden Circle Ltd started introducing their Quality Based Payment System (QBPS) in 2004, the basis of what constitutes a good variety have changed slightly. Previously growers were paid almost entirely on fruit size and yield. The new scheme now also takes into account the size and sugar levels (Total Soluble Solids or TSS) of the fruit, harvesting fruit from particular districts for certain times of the year, forecasting crop more accurately on a short and long term basis, and ensuring fruit nitrate levels fall below the threshold. An

incentive is paid for fruit with a TSS greater than 8.2% with incremental incentives up to 15% that are equivalent to about $6.54/tonne for every 1% increase in TSS. (Note: TSS is roughly equivalent to Brix; refer to the chapter on TSS management for more detail). Growers will also be encouraged to produce medium sized fruit rather than very large fruit which give poor cannery recovery. Refer to the chapter on Golden Circle Ltd fruit specifications for more detail.

Main desirable characteristics of a clone

- Good yield - e.g. potential for more than 100 t/ha for a plant crop and more than 80 t/ha for a ratoon crop.
- Fruit size - Golden Circle Ltd is aiming for a reduction in the optimum fruit size and this will be introduced gradually over two or three seasons. Optimum fruit size guidelines are issued as fruit dimensions rather than weight.
- High TSS (brix)
- Cylindrical fruit shape
- No basal knobs
- Good suckering – optimum 1.3 suckers per plant in summer
- Few slips – less than 1 slip per plant in summer

Difficulties in evaluating Smooth Cayenne clones

It is important to bear three things in mind when comparing Smooth Cayenne clones in order choose which one(s) to plant:

1. Differences hard to pick

Differences between recommended Smooth Cayenne selections are subtle and often very hard to pick visually in the field (compared with say F180 vs. 73-50), however relatively small differences in performance can translate to quite significant differences in profitability across the farm.

2. Clones change

Different populations of what started off as the same clone will take on different characteristics after a few years depending on how choosey the grower has been in selecting planting material. It is an established fact that the overall performance of a clone will deteriorate over a few years unless some effort is made to discard planting material from plants with bad characteristics such as basal knobs, excessive slips and poor fruit shape. For example, after a few years a population of say C30 on one farm is not necessarily the same as C30 on another farm.

3. Clones perform differently under different situations

Clones will perform differently under different conditions e.g. cycle, district, soil type, aspect, management practices, season etc. For example, the results from a summer plant crop clonal trial in Wamuran will not necessarily reflect how the clone will perform in an autumn plant crop at Yeppoon. So the farmer's own observations and experiences on his farm are an important guide to choosing which clone(s) to plant.

Roguing of planting material on-farm

It is important for growers to be selective with the planting material they use.

There are about 30 characteristics that a plant breeder would use when selecting for a new clone however to maintain the potential of an existing clone, growers should rogue out plants with obvious defects such as:

- Spiny leaves
- Collar-of-slips
- Excessive number of slips
- Basal knobs
- Multiple crowns
- Uncharacteristic ripening, either very early or very late.

These defects are more commonly expressed in summer fruit so this is the best time to identify defective plants.

Train your harvesting crew to recognise the defects listed above and have them discard tops and slips from such plants onto the ground rather than place on tops of plants or send up the conveyor.

Another suggested procedure is to go through the field just prior to the summer harvest with a can of spray paint or a knife and mark or cut tops on plants that you don't want to propagate. Instruct workers not to keep or plant any painted or trimmed tops. This procedure is necessary when using an automatic detopper.

Selecting superior clones

Some growers wish to go further than just maintaining the performance of a clone; they actively go about improving the clone by identifying superior plants and propagating them (refer to the chapter on planting material for information on propagation). They will select plants for various market and agronomic characteristics such as fruit size and shape, brix/acid ratio, absence of diseases such as blackheart, internal/external colour, crown size, pest tolerance and absence of natural initiation. This is a slow and steady process but over time should gradually improve the characteristics of the selections.

References and further reading

Anonymous. (1925). Mass selection of pineapple planting material. *Experiment Station of the Association of Hawaiian Pineapple Canners*. Bulletin No. 1. University of Hawaii. 10 p.

Anonymous. (1940). Improvement of the pineapple by breeding and selection. *Queensland Agricultural Journal*. **53,**14-44.

Groszmann, H.M. (1939). Pineapple plant selection - with special reference to the elimination of inferior types. *Queensland Agricultural Journal.* **52**(1), 27-42.

Groszmann, H. M. (1940). Improvement of the pineapple by breeding and selection. *Queensland Agricultural Journal*. **53**, 14-44.

Groszmann, H. M. (1945). Pineapple plant selection with special reference to the elimination of inferior types. *Queensland Agricultural Journal*. **6**(19),

Newett, S., and Sanewski, G. (1994). Release of new pineapple clones. *Queensland Fruit and Vegetable News*. March 10. Pp 10 & 15.

Sanewski, G. M., Simpson, D.R., Winks, C.W., and Sinclair, E.R. (1992). Selection of Smooth Cayenne clones. *Annual Pineapple Field Day Notes*. Queensland Fruit and Vegetable Growers. 5 p.

Sanewski, G. M. (2000). New cayenne clone comparisons. *Pineapple Field Day Book*. 21 July. Pp 51-53.

Wassman, R. C. (1982). The importance of selected clones in pineapple production. *Annual Pineapple Field day Notes*. Queensland Fruit and Vegetable Growers.

Notes

Notes