

Guidelines for cultivars with improved production in mind

C J Partridge

PO Box 866, Tzaneen 0850

Earlier during this symposium, Professor Wolstenholme stressed that increased productivity at lowest cost is a vital key to remaining competitive. Unfortunately this is a fact that many growers have to recognise, as many are getting very poor yields per hectare at present.

There is no such thing as the perfect cultivar and growers should always bear this in mind. Improved management can improve profitability.

The cultivars which will be taken into account are those which are already being grown commercially in South Africa, namely **Fuerte, Hass, Ryan, Pinkerton and Edranol**. Many of the statements made are the result of observations in the field:

Climatic requirements

The prevailing climate has an overriding influence on productivity for all cultivars and because there may be many microclimates in an area, a prospective grower should gather as much historical climatic data as possible. All cultivars are frost-sensitive, especially when young or when flowering.

Successful pollination of flowers from cultivars with A type flowering patterns (Hass and Pinkerton) is less influenced by cool temperatures than those with B type patterns (Fuerte, Edranol and Ryan).

Extreme heat especially coupled with low humidity, has a marked influence on the fruit size of Hass. Tony Whaley recently found that Hass fruitlets respire much faster than Fuerte fruitlets at any given temperature. They require far more energy to grow and as a consequence bear small fruit. The small fruit problem is especially aggravated when irrigation is sub-optimal. Some growers have found that up to 60% of their Hass fruit was too small for export during the 1989 season.

Attention to irrigation management can reduce the problem. Hass, however, is obviously more suited to cooler climates.

Storage ability or shipability

Of all the cultivars, Hass and Ryan damage have been found to travel with the least amount of physiological damage on arrival overseas. Fuerte has been the subject of much research and increasing success has been obtained, but temperature management is still of cardinal importance. Pinkerton shows potential with some

problems and Edranol does not relate as highly as any of the others.

Pest and disease susceptibility Diseases

Hass and Ryan are the least problematic of all the cultivars with Hass fairly resistant to Cercospora spot (but still susceptible to Anthracnose and Dothiorella).

Fuerte is the most problematic cultivar for pre- and post-harvest disease problems and well-timed control measures are essential.

Pinkerton appears to be susceptible to Anthracnose in some areas, but its Cercospora susceptibility is unknown at this stage. Edranol rates much the same as Pinkerton.

Pests

Hass and Ryan are the most susceptible to Heart-shaped scale and orchards should be monitored regularly.

Thrips is assuming some importance with Hass and to a lesser extent with Fuerte.

Grasshoppers and Buck are very fond of young avocado shoots. Damaged growing points can set a young tree back severely and growers must take precautions with new plantings.

At present, the majority of trees are planted on seedling rootstocks. Increasing use is being made of Duke 7, Martin Grande and G6 (in order of magnitude of propagation) as clonal stocks.

The risk associated with clonal stocks is always high but so is the potential reward. The most pertinent observations and comments to be made to date are as follows:

Irrigation requirements

Irrigation is essential for maximum yield in virtually all the microclimatic areas in South Africa. Correct irrigation scheduling is important to get the best yields.

Hass requires more water (volume and frequency) than the other cultivars. It is suspected that Pinkerton will require about as much water as Hass. Note must be taken of this and Hass should therefore be planted in solid blocks with irrigation independent of other varieties.

Fertiliser requirements

Hass has a higher nitrogen requirement than the other cultivars and norms are consequently higher. Regular leaf and soil analysis must be done to monitor the situation.

Hass is susceptible to rapid physiological decline, which is difficult to reverse if not reacted to quickly. This decline is always associated with stress (root rot, water, low nitrogen), especially when the tree is bearing a heavy crop. This cultivar therefore

requires more intensive management to realise its potential.

Fruit shape

Ease of packing affects the productivity of packhouse staff.

Fruit shape affects this aspect. In order of eased packing are Ryan, Fuerte, Edranol, Hass and Pinkerton. Fuerte can become extremely "necky" in hot, dry areas which is a factor to consider.

Suitability for intensive cultivation

This is determined by the cultivars' precocity or its early bearing ability, so that costs of establishment can be recovered early and before orchard thinning has to take place. In this respect Hass and Pinkerton are performing well and a close initial spacing of 5 m x 5 m has been tried successfully.

Maturity

Fortunately not all cultivars mature at the same time. This is further influenced by climate and altitude. Accepting that there is some overlap amongst cultivars, in order of maturity are Fuerte, Edranol, Pinkerton, Hass and Ryan. This, coupled with knowledge of prevailing climatic conditions and the target market, will influence grower decision as to which cultivars and in what proportion to plant.

Seedling stocks — less risk because of genetic variability but variability in vigour, bearing capacity, resistance to root rot, etc.

Duke 7 clonal — moderately resistant to root rot but control measures essential. This stock has also been found to be particularly susceptible to stem canker caused by *Phytophthora cinnamomi* and growers must monitor the situation regularly, even in young orchards. Tree uniformity is good and yield potential, especially with Hass, is very good if managed correctly (root rot control, fertilisation and irrigation). This stock, however, is very intolerant of waterlogged conditions.

Martin Grande — more root rot resistant than Duke 7 and vigorous but a warning light is flashing at this stage from a productivity point of view: Hass on Martin Grande (or G6) yielded three times **less** fruit than Hass on Duke 7 at two years old (Botha and Kotzé, 1989). This trend has also been confirmed from California (Brokaw, personal communication). The yield on Martin Grande may improve considerably as trees become older, but such information is not available yet.

This stock appears to be more tolerant to waterlogging than Duke 7 but appears to be intolerant of calcareous soils (Toerien, personal communication).

G6 — moderately tolerant to root rot but indications are that the productivity at this stage is not as promising as for Duke 7.

CONCLUSION

Growers have a relatively good choice of cultivars and stocks. Ideally a few more should be available and the search is still on for the ideal combination.

A number of imports of the promising California cultivars has been made and those are currently under test. Californian results indicate that Gwen is still relatively promising, but far from ideal, while Whit-sell and Esther have all but been discarded.

On the rootstock front, a more promising scene unfolds with Barr Duke, Thomas and Duke 9 showing good potential, but these are not yet available commercially.

The potential for local selection is untapped and some effort is currently underway. Hopefully promising stocks at least, will surface in the next two years.

As can be realised now, the ideal scion and stock do not yet exist. However, forearmed with the knowledge of each cultivar's weak spots, growers will hopefully compensate timeously with appropriate management techniques to maximise productivity.

REFERENCES

BOTHA, T & KOTZÉ, J M 1989. Susceptibility of avocado rootstocks to *Phytophthora cinnamomi*. *S A Avocado Growers' Assoc Yrb.* 12, 66 - 67.