The strategic role of new cultivars: a case study of ‘Maluma’

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ABSTRACT

Cultivar choices are more difficult with new orchard development. Many new cultivars have been introduced during the last decade, each claiming its own unique benefits. ‘Hass’ continues to claim the premium avocado cultivar position in large parts of world, especially in the marketing paradigm. Furthermore farmers also need to adapt to the modern farming environment to remain relevant and efficient. After studying multiple commercial ‘Maluma’ orchards in Limpopo, South Africa, ‘Maluma’ was identified as a cultivar that is well suited for the modern farming environment. ‘Maluma’, is a less vigorous, precocious and productive ‘Hass’-like cultivar. The fruit turns to an attractive dark purple-black once ripened. Furthermore, over the past years it has proven itself to be one of the best suited cultivars for ripening programmes. In the South African context ‘Maluma’ has filled an important gap in the farmers’ production and marketing basket. Although it is similar enough to be acknowledged as ‘Hass’, it distinguishes itself sufficiently to expand the range with which the farmer competes in the market. It does not merely compete with ‘Hass’ to the detriment of the farmers’ current value proposition. This study proves the key production advantages of ‘Maluma’ in the farming environment such as high yields, precocity and suitability for high-density, susceptibility to diseases and orchard cold damage and other influences on quality. Also key marketing parameters of avocado such as appearance, count size, timing, cold tolerance, shelf life and ripening is differentiated. Ultimately this study proves to the farmer that establishing new generation cultivars are worthwhile.

Key words: New generation cultivars, Maluma, Marketing basket, High density, precocity, Value proposition, Production advantages.

INTRODUCTION

Critical to any successful product is the ability to successfully and cost efficiently produce that specific product. Consumer needs and demands are not sufficient pre-requisites for product success. Many products worldwide have sufficient consumer pull, but due to production cost implication or relative sophistication of processes these products have not yet seen daylight. The world has huge demand for non-fossil-fuel-powered cars, yet either the production thereof, or the associated complexity the usage of the product has prevented huge market share gains. Sometimes the relative cost of technology or sophistication also prevents the consumer from buying such expensive products.

In farming, the development and improvement of current methods and plant material is crucial to the sustainability of farmers as well as the industry in which they operate. Brokaw (1989:121) agrees and suggests that in annual plants farmers eagerly plant new varieties as they develop. However in subtropical fruit, many are considered but very few are ever planted or even adopted commercially. One of the issues involved with this adoption process is the risk entailed with planting unproven perennial cultivars, which require formidable capital investments. Even once that is done, the marketing challenge arises, and even more so once a satisfactory cultivar is available in larger quantity.

In the modern farming environment many different global IP-companies control the release of new cultivars. The speed at which this is done as well as the management of these cultivars in terms of patent collection on behalf of the patent holder, appointment of market agents and agencies, growers and nurseries largely depend on the IP-company or holder. These companies rarely have any production capabilities and therefore subjectivity with which they release these cultivars are very questionable, often to the detriment of the farmer. They present themselves as knowledgeable to the farmer and specialists in their field. The effect of this will possibly be realised increasingly in years to come and might have a detrimental effect on the rate at which new varieties and cultivars will be adopted.

In the avocado industry many high-potential cultivars have never made it beyond the semi-commercial phase or even the early commercial years. One of the main reasons in many instances have been the lack of technical support and responsible backing to the farmer and intermediaries throughout the production and marketing chains. Some fail based on rumours of non-acceptance in the marketplace, production issues or even cold-chain / supply chain technicalities.

This article will largely focus on the risks involved to the farmer with regards to new cultivar acceptance, production and marketing and the key success factors that need to addressed and accepted to ensure that a new variety will benefit the farmer. New cultivars also have very important strategic advantages to farmers. It is crucial for the farmer to identify his critical strategic shortcomings and to address these through the adoption of a new variety.

Maluma production and marketing will be analysed from a South African perspective for the purpose of this article. The specific way that Maluma as a commercial cultivar fits into the business strategy of Allesbeste Boerdery will be analysed.
MATERIALS AND METHODS
Maluma orchards around Tzaneen, Limpopo, South Africa were used for the purpose of this article. Cultivation methodology, production ability and the marketing of the product were evaluated from the perspective of Allesbeste Boerdery. Results and findings do not necessarily differ from the views of other Maluma farmers. Orchards differ in their cultivation methods, such as plant density, location, height above sea level, harvesting period, pruning methodology, irrigation, micro climatic conditions and age.

Table 1: Allesbeste Maluma orchard information

<table>
<thead>
<tr>
<th>Orchard</th>
<th>Farm</th>
<th>Date planted</th>
<th>Rootstock</th>
<th>Size</th>
<th>Trees</th>
<th>Density trees/ha</th>
<th>Spacing</th>
<th>Irrigation litres/hour</th>
<th>Height above sea level</th>
<th>Pruning</th>
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<tbody>
<tr>
<td>D1</td>
<td>Allesbeste</td>
<td>1999</td>
<td>Duke 7</td>
<td>2.3</td>
<td>821</td>
<td>356</td>
<td>7x4m</td>
<td>40</td>
<td>790m</td>
<td>Hedge</td>
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<td>C3</td>
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<td>2001</td>
<td>Duke 7</td>
<td>1.7</td>
<td>686</td>
<td>408</td>
<td>7x3.5m</td>
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*CLP = Central Leader Pruning

RESULTS AND DISCUSSION
Avocado production key success factors
In modern farming, methods and strategies need to be adopted to achieve success and sustainability in a modern business environment. Avocado farming has many new challenges associated with it. Ample research is done annually on these factors of production to improve production or the cost efficiency thereof. There is also a growing importance of selling an improved product to the end consumer. The proceedings of the previous World Avocado Congresses illustrates the following as key issues in avocado cultivation and possible key success factors for the future of avocado farming:
- Orchard Frost Damage (prevention or handling)
- Alternate bearing
- Growth Hormones (such as Uniconazole, Paclobutrazole & Cultar)
- Fruit set / Crop enhancement (through Uniconazole & Paclobutrazole)
- Fruit size improvement (through Uniconazole, Paclobutrazole Florone)
- Dry Matter alteration / Crop planning
• Shade netting / possible improvements on fruit quality
• Sustainable benefits for smallholder farmers
• Spraying Techniques
• High Density & Ultra/very high density
• Dwarfing genetics

Furthermore through the management of commercial avocado orchards of Fuerte, Hass, Ryan, Pinkerton, Lamb Hass and Maluma at Allesbeste Boerdery, the following has also been identified as additional key success factors for the future of avocado farming.

• Harvesting rate improvements
• Amount of chemicals used
• Accuracy of chemical sprays
• Improvement of pruning techniques
• Optimal spatial utilisation
• Cultivars that adopt different management techniques to adapt to needs of the particular farmer
• Sunburn reduction
• Wind damage prevention

In terms of marketing, specifically the management of risk, the following can also be added as key success factors that the farmer needs to take into account:

• Harvesting spread
• Cultivar specific timing
• Count spread

Maluma and its performance on the key success factors as identified

**Orchard frost damage**

Globally frost damage is currently causing tremendous damage and loss of income in the avocado industry due to temperatures falling below 0°C. It has been proven that Maluma is less susceptible to orchard frost damage. Maluma and Hass orchards at Allesbeste Boerdery have been exposed to temperatures below 0°C. Where Hass fruit had destructive cold damage symptoms, Maluma fruit still cut clean.

![Figure 1: Cold damage symptoms on Hass fruit.](image)

**Quality and packout improvement**

Progressive farmers worldwide are investing in expensive infrastructure to improve packouts on avocados and many other fruit varieties. Some of the symptoms that can be prevented by closing orchards with shade cloth are hail damage, wind damage and sunburn. Farmers that don't invest in infrastructure often spray expensive chemicals to attempt to prevent poor packouts, for example preventing sunburn. Maluma, through its bearing pattern (fig 2), achieves better packouts in general than other varieties often by a margin of 10 – 20% (Ernst, 2015).

![Figure 2: Maluma's bearing pattern compared to that of Hass and Fuerte](image)
Growth control and fruit set
Maluma is characteristically less vigorous and more precocious than Hass (Ernst, 2007). This semi-dwarfing tree with lower growth vigour and higher precocity therefore does not require growth retardants such as Uniconazole or Paclobutrazole to decrease flush growth to improve fruit set.

From the pictures above it is evident that, although both orchards are exactly the same age, Maluma on the left has a significant slower growth-rate than that of Hass. The tree is also less dense.

Fruit size & count spread
Maluma boasts significantly better fruit size than that of Hass. Fruit size is in many industries of the world an acceptance factor for the consumer (Hofshi, 1996, Storey, Bergh & Whitsell, 1973). Large amounts are spent on Uniconazole and similar products to inhibit tree growth to the benefit of fruit size. Without the usage of growth retardants Maluma produces larger fruit than Hass trees that were in fact treated with growth manipulating products.

Spraying and chemical usage improvements
Compared to cultivars such as Fuerte, one of the dominant cultivars in the South African industry which is very susceptible to Cercospora Cinamommi (black spot), Maluma uses significantly less chemicals. Fuerte is subject to three copper oxychloride sprays annually, whereas Maluma and Hass are only sprayed once. Maluma is also furthermore sprayed less than Hass due to the fact that it does not require growth retardant sprays as mentioned above (Ernst, 2007).
Maluma through its dwarfing characteristics and pruning simplicity have proven itself to be a high density cultivar. This also benefits the spraying applications as the target is visibly clear. Trees are rarely higher than 3m. Accuracy and penetration is critical in spraying. It is therefore acceptable to conclude that Maluma saves significantly on chemical expenses and is also a more environmentally friendly avocado variety.

**High density production and dwarfing characteristics**

As mentioned under section 3.2.3 above, Maluma is less vigorous than Hass and its dwarfing characteristics are evident. In table 1 above it is also illustrated that Allesbeite Boerdery is currently cultivating 25.27 ha of Maluma in high density conditions and 0.9 ha in ultra high density conditions commercially.

**Harvest rate improvements**

Due to its higher yields and smaller, less complex trees, Maluma tends to harvest at faster rates than most other cultivars. Where Hass harvesters generally harvest on average 4.81 units per hour, Maluma is harvested at 7.52 units per hour.

This has a direct effect on expenses and accordingly on the bottom-line of the business.

**Pruning improvements**

With reference to figure 4 above, Maluma is less vigorous than most avocado varieties. The tree also has a natural central-leader tendency with a triangular shape. The tree is therefore less complex with less vertical branches which compete within the tree. The simple structure combined with its tendency to shoot lateral branches with more than a 45° provides for an already open tree which allows ample sunlight to enter the tree (Ernst, 2007). Very little significant pruning is necessary, which allows for less alternate bearing and less potential flower being removed from the tree during pruning. This simpler tree therefore now also possibly allows for the adoption of micro-management in terms of pruning as specific branches can now be selectively removed.

Maluma is well suited for central leader pruning. As identified by Hofshi (2004), central leader pruning is to a large extent a prerequisite for ultra high density plantings.

![Figure 6: A central leader managed Maluma tree](image)

**Cultivars that adapt to different management techniques**

In Table 1 above, it is shown that Allesbeite Boerdery does not only follow one production technique in its commercial orchards. Plant densities differ and tree spacing within similar plant densities also differ to allow different management practices. Some trees for example are managed through hedge row pruning, whereas some orchards are managed to central leaders.

Due to Maluma’s ability to be managed in a hedge row, and be pruned by a machine with less sophisticated pruning methodology, it can be used by large commercial agriculture businesses. However it is not limited to that. Maluma also, as mentioned above in section 3.2.8, allows for micro management.

**Harvesting spread & cultivar timing**

Unlike as was initially expected and announced about Maluma, it is not limited to being an early Hass-like cultivar (Ernst, 2007). During the 2015/16 season Maluma was harvested from week 17 until week 29. With reference to figure 7 below it is evident that Allesbeite is over committing itself in the early stages of the season. The main reason for this is the dominance of Hass in the business, of which roughly 66% of the crop needs to be removed before end of May. The main reason being orchard cold damage due to the upcoming winter cold fronts in June.
It is evident that too much risk is created by Allesbeste with the amount of its crop being marketed in one section of the market. One of the only options to overcome this effect, that Hass and its orchard cold susceptibility have caused, is to replant low lying orchards with Maluma. These orchards can then be harvested in the later section of the market to create a better spread, thereby reducing risk.

Another reason it is critical to create a good spread with market supply is the size distribution that is supplied into the market. It is a tremendous high risk for a company to sell, for example, just Hass in a particular section of the market. Hass counts which peak from count 18 – 26 (based on 4kg cartons) exposes the farmer to risk of small fruit being in over supply. A better strategy would most likely be to supplement the supply of Hass with that of Maluma which peaks from count 12 – 18, thus creating an even supply of the full range of sizes into the market. This will create less risk exposure.

CONCLUSION
This article supports the fact that consumer acceptance is not the only prerequisite. Farmers need assurance that within their business strategy certain success factors are addressed. It needs to make farming sense in terms of the present and the future.

The article also proves that often it is not the only solution to invest in infrastructure or to go about making large expenses on chemicals or technology to improve. Much of this can be accomplished through the proper genetics.

Although many farmers are hesitant to produce new cultivars due to uncertainty, Maluma illustrates sufficient strategic advantages to the farmer. It has been trialled and tested in many different circumstances both for research as well as for commercial purposes. It has proven to address issues as identified by the avocado community. Maluma proves that it makes business sense, farming sense and, even more, consumers have accepted it, as the cultivar has already been commercially produced for 15 years.

REFERENCES


ACTAS · PROCEEDINGS

VIII CONGRESO MUNDIAL DE LA PALTA 2015

del 13 al 18 de Septiembre. Lima, Perú 2015

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