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 world wide 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 therefor 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

Orchard	Farm	Date planted	Rootstock	Size	Trees	Density trees/ha	Spacing	Irrigation litre/hour	Height above sea level	Pruning
D1	Allesbeste	1999	Duke 7	2,3	821	356	7x4m	40	790m	Hedge
C3	Humor	2001	Duke 7	1,7	686	408	7x3,5m	40	800	Hedge
E4A	Allesbeste	2006	Duke 7	2,25	1800	800	7x3,5 Tramline	20	760	CLP
E4B	Allesbeste	2006	Duke 7	2,25	918	408	7x3,5	20	780	Hedge
A4	Humor	2008	Duke 7	0,5	170	408	7x3,5	40	817	Hedge
D5	Allesbeste	2009	Duke 7 Bounty Dusa	12,9	10709	800	7x3,5 Tramline	20	760 - 810	CLP
HM 01	Hansfontein	2010	Duke 7	1,8	1448	800	7x3,5 Tramline	20	1170	CLP
B5A	Avondshoek	2012	Duke 7 Bounty Dusa	3,32	2707	800	7x3,5 Tramline	20	750	CLP
B5D	Avondshoek	2012	Duke 7 Bounty Dusa	0,89	1359	1600	2,5x2,5m	20	770	CLP
C1	Humor	2014	Duke 7 Bounty Dusa	2,5	1980	800	5x2,5	42	800	CLP
D1	Humor	2014	Duke 7 Bounty Dusa	2,3	1840	800	5x2,5	42	790	CLP

*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 the 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.

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).

Maluma Hass Fuerte

Figure 2: Maluma's bearing pattern compared to that of Hass and Fuerte

Figure 3: Maluma's bearing pattern – a side view

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.

Figure 4: Maluma's growth vigour compared to Hass

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.

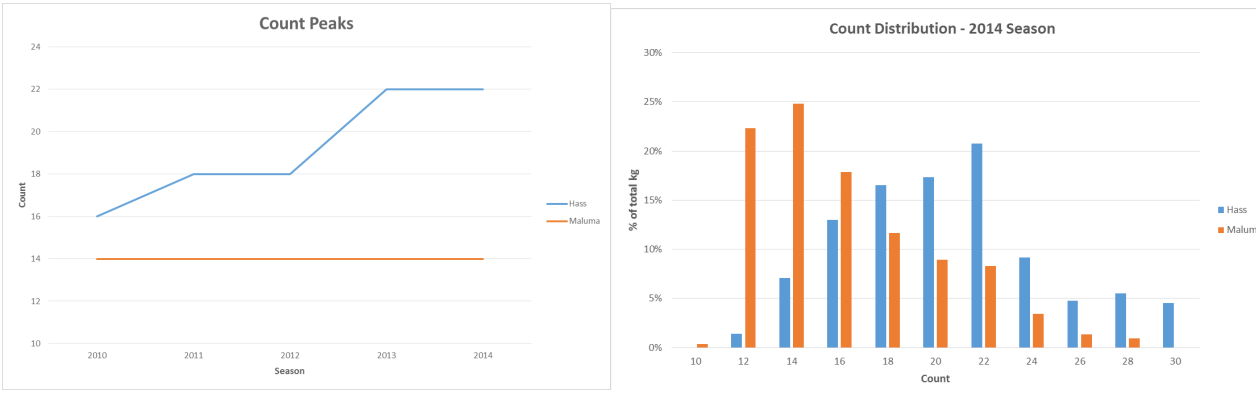

Figure 5: Illustration of a comparison of Maluma fruit size compared to Hass (based on 4kg cartons) Source: Ernst (2015)

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 *Cercospera Cinnamomi* (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 Allesbeste 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

Cultivars that adapt to different management techniques
In Table 1 above, it is shown that Allesbeste 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 Allesbeste 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.

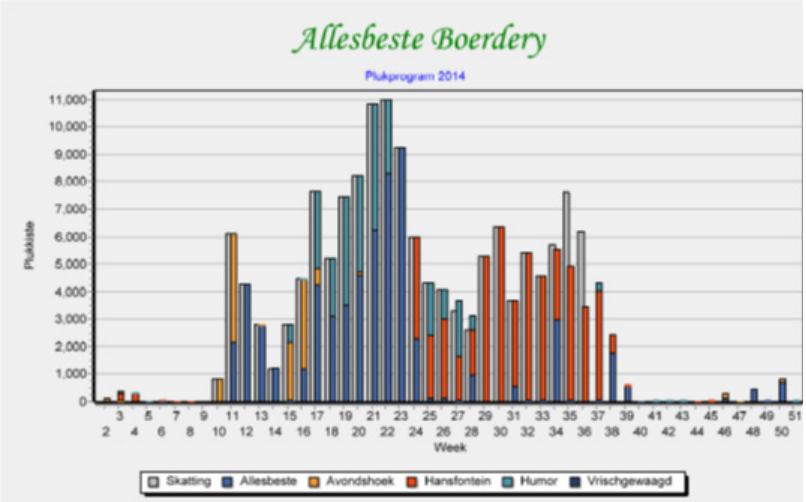

Figure 7: Allesbeste harvesting program 2014/15

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 its makes business sense, farming sense and, even more, consumers have accepted it, as the cultivar has already been commercially produced for 15 years.

REFERENCES

Brokaw, W.H. 1989. Introducing New Cultivars: Needs vs. Risks. *California Avocado Society 1989 yearbook*. Volume 73(121-126).

Ernst, A.A. 2007. Maluma Hass a newly released cultivar in comparison with Hass. *World Avocado Congress Chile.*

Ernst, E.D. 2015. Economic value of Maluma. *Maluma day 2015, South Africa.*

Hofshi, R. 2004. Beyond Yield: Re-engineering the avocado. *2nd Seminario Internatcional de Paltos.*

Hofshi, R. 1996. We can shape our future. *California Avocado Society Yearbook* 80:159–166.

Hofshi, R. Not Dated. High Density Avocado planting – An Argument for Replanting Trees.

Proceedings of the VI World Avocado Congress 2007 Chile. Retrieved July, 2015, of http://www.avocadosource.com

Proceedings of the VII World Avocado Congress 2011 Australia. Retrieved July, 2015, of http://www.avocadosource.com

Storey, W.B. Bergh, B.O and Whitsell, R.H. 1973. Factors affecting the marketability of avocado fruit. *California Avocado Society Yearbook* 57:33-39.

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