

Apple Variety Introduction— A New Paradigm



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It is quite clear that maintaining the status quo on how we currently deal with varieties will not enable the industry, as we know it, to survive in the medium to long term. The World Apple Review 2000 Edition (Belrose Inc., Pullman, WA, USA) details the increase in world apple production over the past decade from 40 million tonnes (metric tons, MT) to the current 60 million MT. The projection of production at the end of this decade is 80 million MT. This increase is far outstripping increases in world population. The apple industry is a mature industry with consumption falling to competition from other products. If we think the industry is not profitable at the moment, what will it be like in the future? Collectively we need to think outside the square we currently operate in to survive. There is no guarantee that what we have done up until now will give us a ticket to continue into the future. The writing is on the wall. Are we standing close enough to see it?

From my observations we are basically involved in growing and selling commodities. We need to be involved with products, not commodities. The dictionary defines commodities as “products produced by agriculture for exchange in commerce.” I would define Delicious as a commodity. Products are defined as “something produced: the amount, quantity, or total produced.” I would define a product as any variety that is managed to the extent that specifications are set and production and supply are controlled. Pink Lady™ is an example of this.

I have been told that most consumers cannot tell the difference between apples that have been stored for 12 months and new season's fruit. Do we really believe

this? If we do, is that good for us? Our whole approach to marketing has generally taken away the seasonality of the varieties we grow and, through poor eating experiences, we have lost consumers along the way. This has resulted in a decline in consumption in many markets.

Tasmania gained access to the Japanese market in 1999 with a very small volume of Fuji apples. Achievable fruit specifications were set and only one pack house was used. There was only one importer and distributor but fruit was sold through a number of chain stores. Follow-up research was conducted (Tasmanian Apple and Pear Growers Assoc. Trial Shipment to Japan, June 1999) to assess the market acceptance of the product. The Japanese consumers are quite legendary in their approach to buying fruit and vegetable products. The results were very interesting in that the overwhelming response was the better taste and freshness of the Tasmanian product compared to the local fruit out of long-term CA storage. The other major factor was that watercore or, as the Japanese call it, honey core is not present in CA-stored fruit, as it disappears in storage. This gave the market a product that it normally would not have had and it was well received. It is not that complicated. We just need to give consumers what they want.

I would expect that many growers have been involved in direct sales to consumers whether it is at the farm gate or selling apples from the industry stand at the fair. How many times have we heard “where can I get apples like these? They are so good.” We need a system that delivers what the consumers want.

The way growers access and present apple products to consumers is going to

change. It is quite unrealistic for growers to believe that they will get ready access to new varieties as they have in the past. The breeding programs that are operating in the world, and there are plenty of them, until recent times have been largely government funded as a legitimate avenue for local industry competitiveness through new varieties. Now there is an expectation that there will be some return on the investment. This

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means that more than just local outcomes for the varieties needs to be considered as part of a complete strategy. For the program to return as much money as possible, it means that the owner needs to have more control or input into the success of its products. Johan Nicolai put forward some figures 2 years ago (*Compact Fruit Tree* 31(3):66-68, July 1998) that showed at that time in Europe apple sales were worth \$7 billion (US) at the consumer end (retailers) with only \$3.5 million (US) being returned to breeding programs. It is obvious that owners (mostly government agencies) are going to be keen to get higher returns from the products they develop or they will simply stop investing dollars in this area, and any reduction in the number of programs immediately impacts on the potential for new varieties to be developed. Taxpayers' money is used to fund many programs in many countries; growers therefore believe they have a natural right to the varieties developed. This faith is ill founded, as we all pay taxes and we do not get right of access to all the government products produced. The commercial approach required and the restricted access will combine to see governments pulling back from breeding programs in the medium to long term. It is highly likely that private entities will become more involved in the breeding of varieties, particularly if controlling mechanisms become the norm and returns can be better predicted.

Biotechnology will also have an impact on variety development, particularly in altering existing selections to produce a unique or more manageable product. The cost of this is enormous and at the moment the science is still quite imprecise, but this will improve with time. There will be an expectation for the investment to be recouped from the final sale of the product.

The need for developers of varieties to recoup their investment is one of the reasons why per-tree royalties are disappearing in favor of production royalties. Variety owners have until now had to sit back and watch as the first thing we do as an industry is try (with sports) to make the variety redder or greener or whatever the case may be depending on the variety, with little or no return to the original breeders for their initial efforts.

Gala is a classic example of this. Someone decided that it should be a dark red apple. Consequently the selections now recommended to growers for planting are very dark (almost black), lack any stripe and do not look the least bit like the wonderful world class bi-colored apple we started out with some years ago. Granny

Smith is another example of this urge to change a variety. We all generally grow Grannies with a nice red blush on the side facing the sun, but we are now locked into the supply of a bright green apple that needs to be picked before it is mature so the color standard can be met. This constant chase to change the characteristics of varieties for what is perceived as a benefit leaves large areas of orchards rendered useless as only the "latest" selection is in vogue with the market. Ultimately this leaves growers where they are now with less money in their pockets because of this chase, and consequently they have less money to reinvest into their future in the industry. A large section of our industry is concerned that new varieties will take market share away from established varieties. Until now we have largely retained the same varieties but changed their appearance, to our own detriment, which is having the same impact as new varieties.

Tight control on the ownership and use of varieties will alleviate the need to chase color or whatever, because plantings will be limited and take place over a set period. Any sports or mutations found would not have any place in the program for the variety if they do not fit the trademark specifications and the marketing strategy. Trademarks in conjunction with agreements are being used to describe the specifications of the fruit and will dictate the requirements for the fruit to all those involved, including supermarkets. Brand names are being used separately from the variety name. The brands are being registered as trademarks as is the case with Pink Lady™ (the product brand name) and Cripps Pink (the variety). The specifications required to meet the requirements of the Pink Lady™ are described in Table 1. I believe this will become the norm in the years to come.

In the future there will be many more varieties grown for specific purposes. Until now we generally have looked for the qualities in the apples that best suit growers and everyone else in the supply chain other than the consumers. Although the growing and shipping qualities are very important, they should be considered as only one part of the product and considered on their merits.

I believe we will start to work from the market back on varieties, that is, the marketing package will be developed for the variety focusing on its unique feature(s) and include the volume of product required to complete the marketing strategy. Where the product will come from will also be considered, as timing for fresh

supply will be important and may well be part of the marketing strategy. This will mean production in the northern and southern hemispheres to supply a particular market year-round.

Technology will be used to redefine current and future apple products and thereby change the way they are presented to consumers. If the apple parameters can be measured, they can be promoted. To date we have generally focused on color and size. Near Infrared Spectroscopy (NIS) can be used to assess the internal qualities of every apple that goes over the grader, and it is used widely in Japan (Table 2).

Japanese consumers look for watercore in Fuji apples. This technology allows the pack house to deliver what they want with a high degree of accuracy. The Japanese have developed a good understanding of NIS technology. It is only a matter of time before it is more widely adapted in other countries. This kind of technology will allow the development of marketing packages focusing on very specific characteristics of apples and guarantee delivery.

Supermarket and Internet-based suppliers, just to name a couple, will contract the supply of specific varieties in an effort to distinguish themselves in the market. Thirty-five years ago when I was growing up in the Huon Valley of Tasmania, all our groceries were ordered over the phone and delivered by the shopkeeper. He also had a basket of goodies for us kids to buy at delivery time, an olden day version of "would you like fries with that." We now have this phenomenon again with the Internet with shoppers needing only to click on "add to my shopping cart" and the items are on their way. The use of technology will allow our industry to guarantee that what the consumer buys is of high quality. Control of the variety will ensure supply to consumers only when it is of the required quality.

It will be possible to have 50 or so varieties running in the world with 2% of world production being the maximum any will reach. It is highly unlikely that a variety ever again will be planted to the same extent as Delicious is now. Cripps Pink is an example that is currently considered successful; it is self-limiting in that it cannot be grown in all areas because of its long growing season requirements. It is estimated (World Apple Report, January 2000) that Pink Lady™ production from Cripps Pink trees will increase eightfold by 2008 but it will still make up only 0.57% of world production. There are already rumblings about overproduction of Pink Lady™ and competition between producers in the same market.

The resultant increase in varieties and the control mechanisms will lead to the formation of what I call “a closed loop” where all facets of the product are managed. These closed loops will include growers, packers, marketers and distributors. The first of these are still finding their feet in our industry. With the passage of time growers will become involved in a number of these closed loops for different varieties, which will offset some of the risks. For controlled production to be successful, I believe it will be necessary for everyone in the deal to take some risk.

Until now new varieties or selections of varieties have come along and have been promoted in the main by nurseries. This means that growers plant them and hope that they can sell them to someone when they come online in the future. I know this gives entrepreneurs the opportunity to make money on new varieties, but it is also very risky. The current system perpetuates the gap between producers and consumers.

It also means that varieties are grown in areas that do not suit them and this diminishes their value. In Australia we are now growing Gala, a high chill variety, in very low chill areas. The fruit looks good

but does go soft very quickly. Consumers are therefore turned off what is an excellent apple from the high chill areas, and sales and prices are affected. New variety owners are going to be very careful about where they grow their varieties. They can ill afford any poor quality fruit in the program as it will damage the life expectancy of a variety and returns to those involved. Caudle (Cameo in the US) will be the first variety in the Australian apple industry that will be controlled to the extent of where and how much will be planted with a particular marketing strategy in mind. Specialization is something that growers

TABLE 1

Pink Lady™ minimum international quality specifications at destination (courtesy of the Australian Apple & Pear Growers Association Inc.).

Major defects	Required standard	Tolerance
Bitter pit	Nil	No more than 3% of fruit in box with minor damage permitted.
Bruising	No individual bruise greater than 10 mm diameter. Maximum total area per apple 100 mm ² .	No more than 3% of fruit in box to exceed allowable level.
Core rot	Nil	No more than 1% of fruit in box with core rot permitted.
Cracks	Nil	No more than 3% of fruit in box with cracks permitted.
Decay	Nil	No more than 1% of fruit in box with decay permitted.
Greasiness	Nil	No more than 3% of fruit in box with an excessive oily feel permitted.
Hail marks	Nil	No more than 3% of fruit in box with minor hail damage permitted.
Mixed cultivars	Nil	Nil
Scald	Nil	No more than 3% of fruit in box with minor scald permitted.
Sunburn	Where sunburn adversely affects the blush color, the fruit does not qualify.	No more than 3% of fruit in box with minor color bleaching permitted.
Minor defects	Required standard	Tolerance
Acid levels	Between 0.4 and 0.8.	Nil
Blemishes	No more than 8% of fruit may have a single mark up to 20 mm long and a total area no greater than 100 mm ² .	Nil
Brix	Average 15% or greater. Minimum 13%.	Nil
Chemical burn	Nil	No more than 1% of fruit in box with minor damage permitted.
Color	No less than 40% of the surface area of a fruit must be covered by a bright pink (CYMK) code over a cream-pale green but not yellow background.	Nil
Dirty fruit	Fruit must be clean but dust allowed in lower halves of stem and calyx ends.	No more than 8% of fruit in a box may have excessive dust in stem and calyx.
Firmness (pressure)	Average 7.0 kg (15.4 lbs) or greater. Minimum 6.8 kg (15.0 lbs). <i>Measured with an 11 mm penetrometer.</i>	No more than 10% of fruit in a box may be down to 6.5 kg (14.3 lbs).
Fusicladium or black spot	No more than 8% of fruit may have a single spot of 5 mm diameter.	Nil
Hammering and ridging	Permitted as long as uneven surface is not discolored.	No more than 8% of fruit in a box may have slight hammering and ridging.
Insects	Record if harmful insects found.	No more than 3% of fruit in box may have live insects present.
Insect damage	Nil	No more than 1% of fruit in box may exhibit insect damage.
Lenticel pit	Five stains of light intensity allowed on a single fruit.	No more than 4% of fruit in a box may have slight lenticel pit above this level.
Lenticel spot	One spot allowed on a single fruit.	No more than 4% of fruit in a box may have slight lenticel spot above this level.
Malformations	Fruit must not be more than 10 mm off-shape at eye of the fruit.	Up to 8% of fruit in a box may be between 10 and 20 mm off-shape.
Mechanical injury	Nil	No more than 3% of fruit in box may have slight mechanical injury.
Russet	Russetting not to extend outside the calyx basins.	No more than 8% of fruit in a box may have slight russetting outside the calyx basin.

Total major defects must not exceed 3%, with no more than 1% in any major defect category. Total defects (major + minor) must not exceed 8%, e.g., 3% major and 5% minor OR 0% major and 8% minor.

already do now; some areas, for example, achieve color more readily than other areas, and this will come to the fore even more in the future.

Variety owners are going to be very mindful of which industries, areas or countries will respect their ownership rights. Access to new varieties will be limited unless it can be demonstrated that the owners' rights will be observed. An apple variety is no different from any other invention and can be protected by a range of measures. DNA fingerprinting processes will improve over the next few years to allow for very accurate and ready identification of varieties. In the future I believe the law will be used more extensively to uphold owners' rights.

Knowing whether or not a variety will perform to the required specification in their growing area will be of major importance to growers. As a company owned by the Australian Apple & Pear Growers Association, one of our main functions is to produce efficient independent information about the performance of new varieties in local areas in a secure environment (*Compact Fruit Tree* 33(1):9-11, January 2000). For this to be successful, early access to varieties is essential so that information gathered is used in the commercialization process. This gives value to the information

free of any vested interest. This information is vital for both the variety owner and the grower. Growers need to be able to consider carefully the opportunities in a new variety. If they are in an area where it performs well and they have independent information to support this, it will take a major slice out of the decision-making equation, and the other financial considerations can be made with some confidence.

The variety owner will want to grow the variety only in an area where it performs to its specifications and it fits into the marketing strategy. Reliable cropping areas will also come to the fore. It is unlikely that regions that suffer regular crop failures from climatic or other occurrences will be considered in some instances. Always meeting the marketing volume requirements for the product will be of major importance. I envision that marketing programs will be established

to avoid competition on specific products between growers in different regions, states, countries or continents.

For new varieties to be successful in making their way onto the already crowded supermarket shelves, it is obvious the entire package including growing, packaging, marketing and distribution will need to be set up from the outset. It will also need to be profitable so the shared risk will be worth it.

In an ideal world it would be great to think that the level of risk would dictate the level of return, lower the risk, lower the return, etc. Until now the growers have shouldered more than their fair share of the risk. At times the return has been high, but nothing in the future shows that they are going to get anything other than a low return if the status quo on variety management remains.

TABLE 2

Parameters measured for internal apple quality in Japan.

Parameters	Measured
Brix level	As a percentage
Maturity	Based on index developed for each variety
Acidity	As a percentage
Watercore	Based on index developed for each variety
Internal browning	Based on index developed for each variety