

COLLABORATING TO INCREASE THE VALUE OF ONTARIO PEACHES

Research Findings

May 2011



In conjunction with two peach producers, Vineland Growers Co-operative Ltd., and Loblaw Companies Limited, the **Value Chain Management Centre** undertook research to identify whether innovative growing practices could assist Ontario's stone fruit industry to capture greater value from the market.

In particular, the research sought to identify the following:

- Can growing practices, namely the laying of reflective foil, summer pruning, and leaf plucking - common in competing growing regions such as California - increase the value that consumers apportion to Ontario-grown fruit?
- Would adopting these practices provide Ontario suppliers and retailers with opportunities to capture greater value from the market?



The results suggest that all three practices can assist Ontario producers, and increase the value of their peach crop, particularly reflective foil and summer pruning. Leaf plucking may have a positive incremental benefit on fruit quality, though is the most costly of the three options.

RESEARCH METHODOLOGY

The research took two forms. The first was a 'Production' experiment, to establish which of the factors derived from a visit to California have the greatest effect on yields and peach qualities: foil, summer pruning and/or leaf thinning. The second was in-store interviews with peach consumers to establish the relative importance of factors that drive their purchasing behaviours.

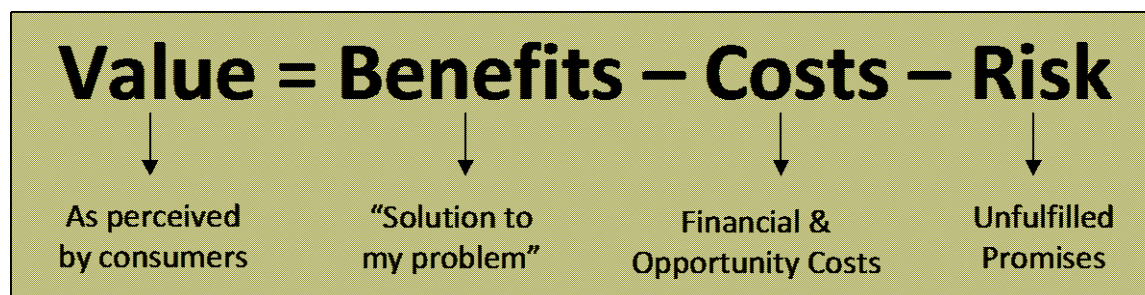


While the production research was directional and will be expanded in the 2011 season to provide more rigorous insights, the consumer research is statistically significant and provides findings on which the industry can base informed decisions.

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CONSUMER RESEARCH

Fearne¹ (2009) states that the value proposition consumers equate to a specific product is shaped by three overriding factors: benefits, costs and risk.



In relation to peaches, the perceived benefits, costs and risk include:

- Benefits/Solution: pleasurable eating experience compared to alternative fruit, a convenient food item, or a healthy food choice;
- Financial and opportunity costs: price per piece, value associated with overall food occasion, chance of giving up a tastier or more functional piece of fruit; and
- Risk: expectations are not met, leading to disappointment and the potential that the consumer(s) will decide not to purchase again or only at a reduced price.

To get a sense of the perceived value that Ontario consumers place on peach attributes, 1,000+ peach consumers were interviewed in Loblaw stores over two weeks in August 2010. The findings are statistically significant and illustrate that the peach market is segmented. Findings blended from the two weeks show the following:

- As can be seen below in Figure 1, the market comprises four general groups of consumers who are distinct regarding income, education and household unit size;
- Visual cues unequivocally have the greatest influence on consumers’ purchasing decisions;
- Attributes associated with eating experience are of slightly lesser though still of critical importance to motivating consumers to purchase Ontario peaches;
- Price was found to be of moderate importance in motivating consumers to purchase Ontario peaches. The importance of price fluctuated according to consumers’ propensity to purchase peaches as individual fruit or packaged; and
- Underlining the fact that quality is the key determinant of value, the following should be noted:
 - Most consumers place less importance on whether peaches are marketed as “grown in Ontario” or “tree ripened”; and
 - Those consumers who say they strongly support local are less likely to be in the top 25% of purchasers of Ontario peaches, by volume.

¹ Fearne, Andrew (2009). *Building competitiveness through value chain management: The role of consumer insight*; Dunhumby Academy of Consumer Research, Kent Business School, University of Kent

Figure 1: Consumer Cluster Analysis, Demographics

	Cluster #1: (19%) Discriminators	Cluster #2: (24%) Discerners	Cluster #3: (49%) Affluent, Engaged	Cluster #4: (8%) Disengaged	Sample average
Female %	65.2%	70.6%	57.8%	58.7%	62.4%
Age	Older, highest % of seniors (19%)	Youngest, 80% are under 50	Middle aged	Upper middle aged	29% under 35, 11% are 65+
Household size	Strongest presence of larger family size	Strongest presence of singles	More likely to be an average-sized family	Similar to sample average	18% singles, 65% are 2-4
Household income	Highest concentration of low income earners	Widest variety across income groups	Most affluent cluster	Weakest presence of middle income	13% earn less than 30K and 31% earn 101K+
Education	- Weakest presence of postgraduate degrees - Higher than average high school level	Higher than average high school, university & post-graduate categories	- Weakest presence of high school graduates - Highest presence of university graduates	Weakest presence of university graduates	19% have high school diploma and 18% have postgraduate degrees

Based on blended results from weeks 1 and 2

1. **Discriminators** (19%)

- Have strong feelings so are more likely to buy (or not), depending on what they value
- Similar to the average regarding gender distribution
- Tend to be more mature, with a lower income than other clusters
- More than double the average percentage of large households
- Greater agreement than the average across all attitudinal factors
- The group most likely to buy on price
- 94% indicate that colour is an important factor to them when choosing peaches

2. **Discerners** (24%)

- More open to influence. Aware of personal preferences, but more likely to buy even if their needs are not specifically met
 - Don't hold onto personal values as strongly as those in Cluster 1
- Dominated by females (71%)
- Tend to be single person households, and younger
- Has the highest percentage of low income earners, though overall also features a good representation from across all income levels
- Although fewer than average agreed that they buy peaches based on colour, no one in this cluster disagreed with this statement
- This cluster appears to be less price sensitive than the average

3. **Affluent & Engaged** (49%)

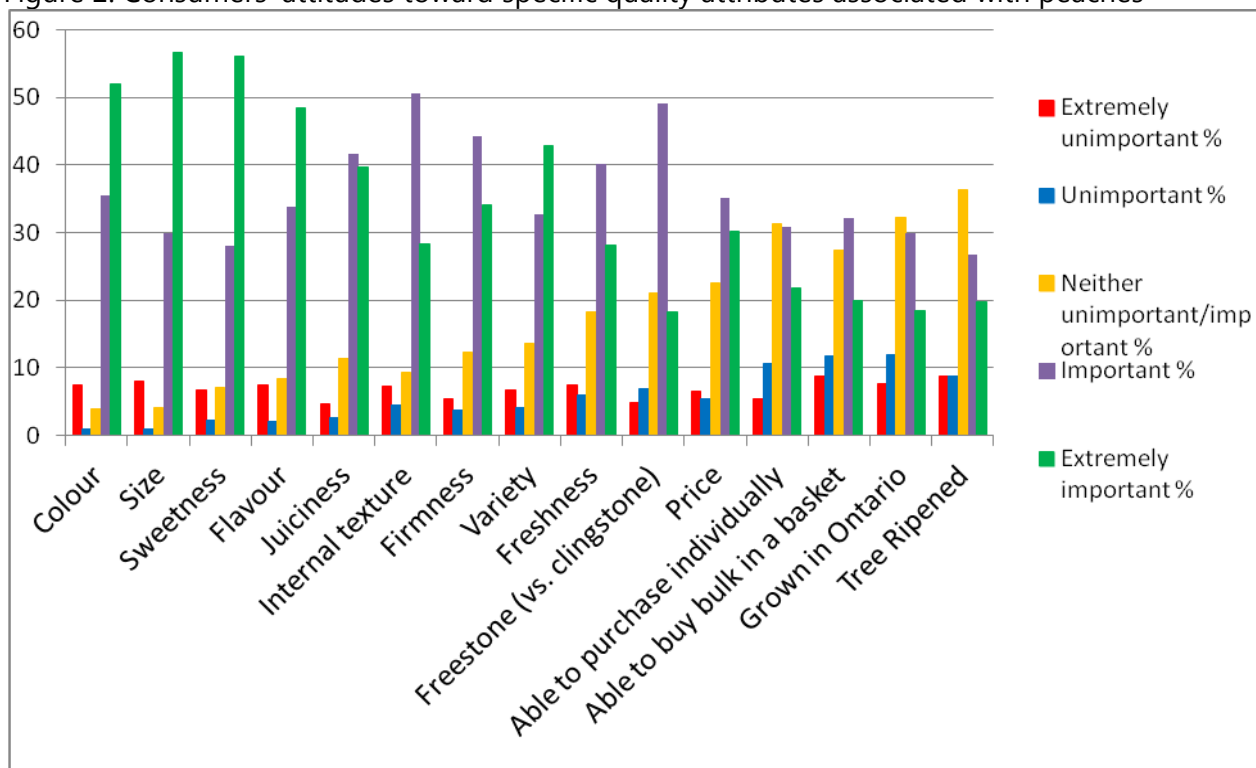
- Most affluent and well-educated cluster
- Favour specific attributes
- Although the majority is female, this cluster has the highest representation of men (42%)
- Tend to be middle aged (35-64 years) with an average household size (2-4)
- More likely than the average to agree that they buy peaches based on their colour
- More price sensitive than the average, and more interested in local point of origin

4. **Disengaged** (8%)

- Smallest cluster
- Similar to Cluster 3, with a higher than average representation of men
- Younger than the average (78% under 50)
- Huge difference to the average, regarding the level of agreement across all attitudinal factors
- The majority in this cluster disagree with every attitudinal statement in the analysis

Consumers were asked to rank the impact that specific attributes have on their purchasing decisions. As can be seen in figure 2, the top nine of 15 factors relate to quality, particularly those associated with visual appeal and eating experience. While price is important, it is not in the top tier of importance. Neither is “grown in Ontario” or “tree ripened”. The chart shows that consumers have specific preferences for how fruit is packaged, with approximately 50% indicating that it is either “important” or “extremely important” that they are able to buy individual fruit vs. fruit packaged in a basket/container. This suggests that packaging formats could be used to strategically target specific segments of the consumer market.

Figure 2: Consumers’ attitudes toward specific quality attributes associated with peaches



ORCHARD EXPERIMENT

To determine whether practices common to the California stone fruit industry could provide Ontario producers with a competitive advantage, an experiment was undertaken to assess the use of reflective foil, leaf plucking and summer pruning in assisting growers to increase their competitiveness by producing fruit that better matched consumers' perceptions of value. Given the size of the experiment, the findings are directional only.

Experimental design

The experiment reflected a Design of Experiment (DOE) philosophy and involved two growers/packers: Lepp Family Farms/Niagara Shoreline Growers and Andrewes Farms Ltd. Each grower selected a block of trees in which to conduct the experiment. As part of the project, existing fruit-sizing equipment was upgraded to include a colour sorter. In comparison to experiments conducted in California (e.g. Layne, Jiang and Rushing²), the number of trees/volume of fruit in this experiment was significantly higher, and the fruit was evaluated using objective mechanized colour sorters vs. researchers subjectively evaluating them by eye. Therefore, while VCMC researchers consider the experiments to be directional and not statistically significant, the results are sufficient to use as the basis for careful management decisions.

Two growers each set aside an area of trees similar in variety and age. Each of the chosen areas (experiments) was divided into eight clearly defined blocks of trees. The performance of each block was evaluated using measurements that reflected Loblaw's specifications for 'regular' and 'platinum' peaches. Records were maintained until all eight blocks had been harvested.

As can be seen below in Figure 3, the eight experimental blocks were distinguished as follows:

1. Thinned leaves, no summer pruning, foil
2. Thinned leaves, summer pruning, foil
3. Thinned leaves, summer pruning, no foil
4. Thinned leaves, no summer pruning, no foil
5. No thinned leaves, no summer pruning, foil
6. No thinned leaves, summer pruning, foil
7. No thinned leaves, summer pruning, no foil
8. No thinned leaves, no summer pruning, no foil (control)

Figure 3: Eight Blocks used in DOE

	Reflective Foil		No Reflective Foil	
<i>Thinned Leaves</i>	1. No Prune	2. Prune	3. Prune	4. No Prune
<i>No Thinned Leaves</i>	5. No Prune	6. Prune	7. Prune	8. No Prune

² Layne, D.R., Jiang, Z., Rushing, J.W.. (1999). *Tree Fruit Reflective Film Improves Red Skin Coloration and Advances Coloration in Peach* - South Carolina Agricultural Experimental Station Contribution 4650 <http://www.clemson.edu/hort/peach/pdfs/peachrf.pdf>

Shown below, Figure 4 illustrates how the reflective foil was arranged in one of the experimental blocks.

Figure 4: Photo of the reflective foil laid at Lepp Family Farms



Weather and environmental conditions

Daily temperature and rainfall data were downloaded from Environment Canada, though were not used in the DOE analysis. Anecdotally, growers advised us that for 2010, the spring was earlier and hotter than usual; and that the summer was hotter and more humid, and lacked the cooler nights required to allow the orchard to recover from the heat of the day. The fact that Ontario experienced higher than average heat units and sunlight hours may have influenced the final results. For example, the above average heat units may have lessened the impact the experimental practices had on fruit quality compared to experimental crops. If correct, this assumption may mean that the benefits would be greater in years where the weather was closer to average.

Picking and packing

Andrewes and Lepp both picked their experimental lots in three picks. Andrewes put all the fruit into cold storage so that it could be graded and packed in one go. This meant that the first fruit picked was in storage approximately 10 days. Lepp graded and packed one pick 'hot' and the others about three days after picking. Both packers have different fruit sizers, however both were retrofitted with a Bartlett colour sorter. Thus, all fruit being graded could be placed on a packing table as follows:

- Bulk fruit – 2 3/4 to 2 7/8" diameter, but low colour
- 3 litre baskets (Lepp only) 2 3/8 to 2 1/2" diameter
- Plastic pack 2 1/2 to 2 3/4" diameter and colour xx to yy
- Platinum grade > 2 7/8" diameter and coloured more than 55%

At the time of packing, three pieces of fruit were sampled from each of the experimental lots, with readings taken of pressure and brix.

DOE analysis

Vineland Growers Co-operative (VGC) set up data collection sheets in Excel and coordinated the recording of the data from the two growers/packers. Minitab was used to conduct a statistical (ANOVA and regression) and graphical analysis of both DOEs. A high level analysis of the findings is presented below.

The following charts indicate that reflective film, summer pruning and leaf plucking did increase the volume of Platinum grade peaches. That no one factor emerged as being statistically significant is likely due to a number of reasons. Despite this, both producers are sufficiently encouraged by the outcome of the DOE to undertake a more thorough and extensive experiment next year.

The results shown below in Figure 5 suggest that reflective foil used in conjunction with pruning or plucking had a noticeable impact on brix, which can enhance eating quality. Results shown in Figure 6 suggest that the same factors lead to an increase in the volume of peaches making 'Platinum' grade, and are, therefore, of higher commercial value to producers. Figure 7 is a summary chart of the main effects.

Figure 5: Interaction Plot for Average Brix

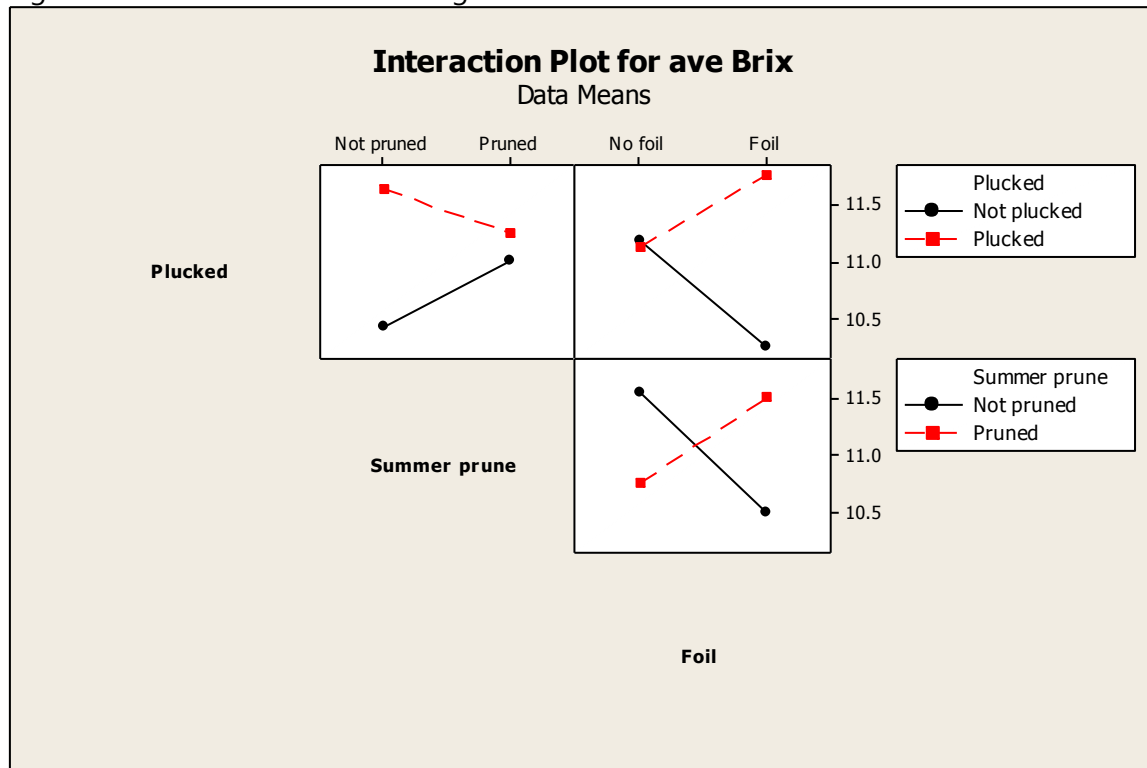


Figure 6: Interaction Plot for Platinum Peaches

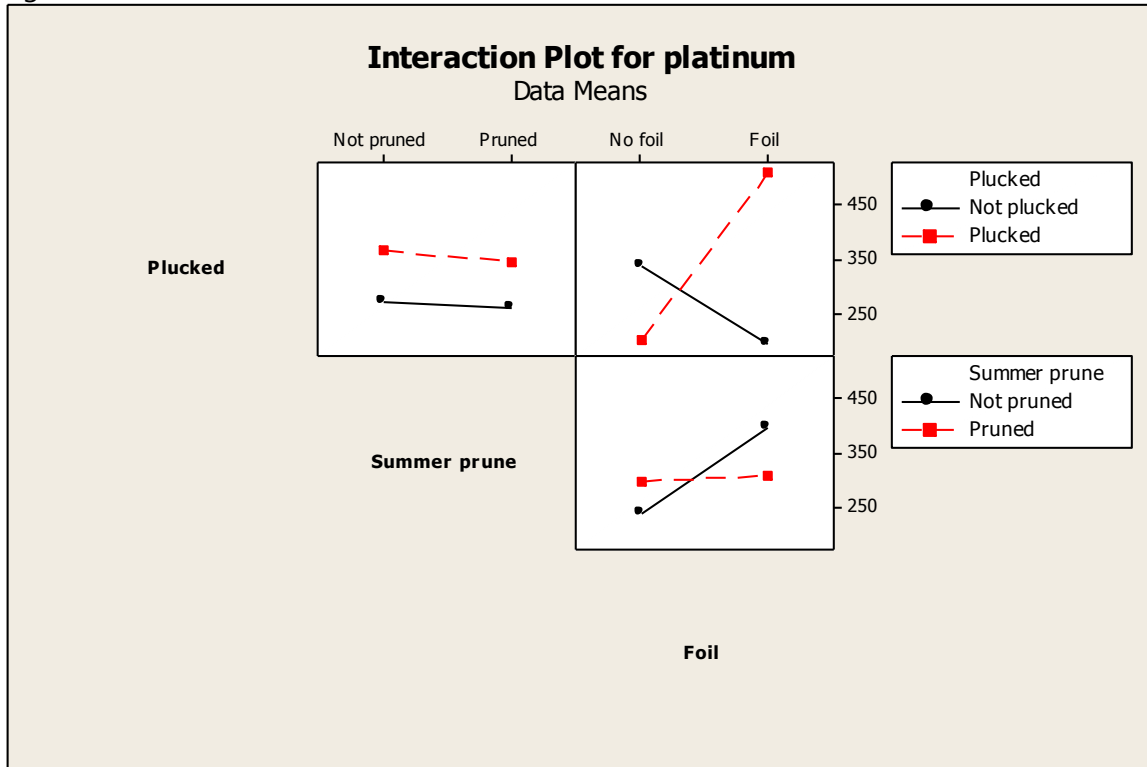
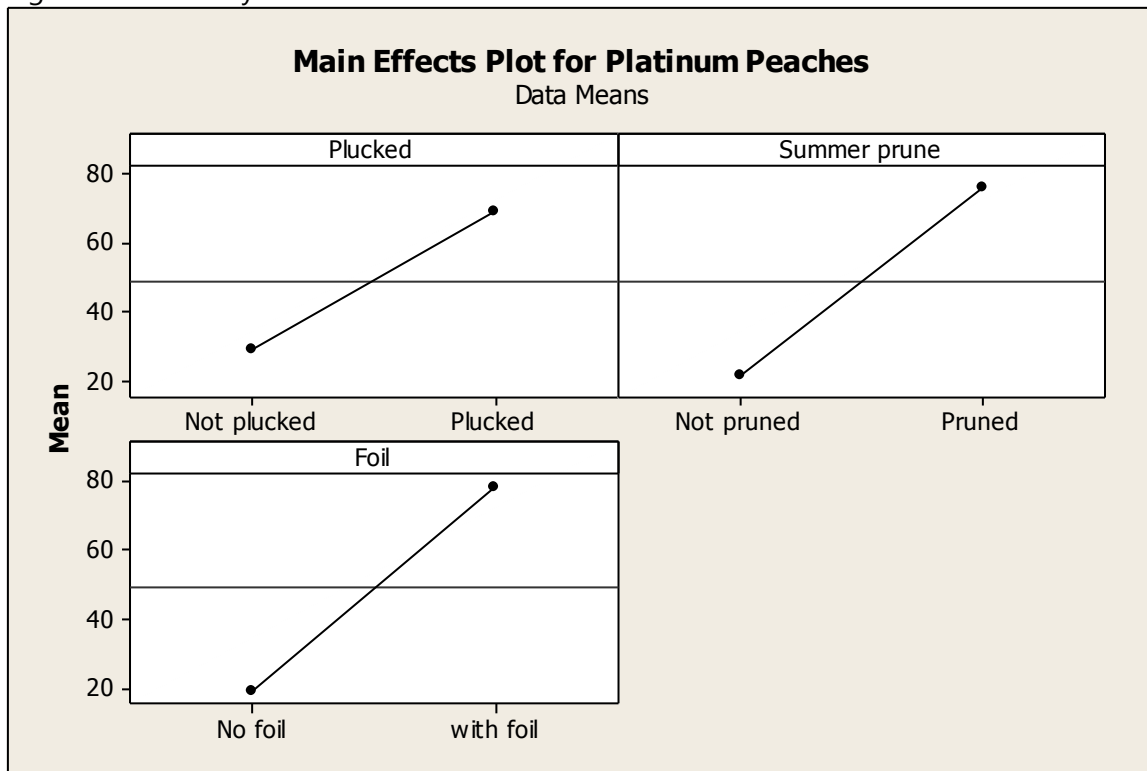


Figure 7: Summary of Main Effects



BUSINESS CASE

To estimate the business case for the methods described above, the researchers based their calculations on the following elements:

- Labour costing \$12 per hour
- Every case of Platinum (~35) peaches earns the producer a \$3 premium
- Summer Pruning costs \$1.13/tree (6 minutes per tree)
- Leaf plucking costs \$2.40 per tree (12 minutes per tree)
- Foil costs \$0.50/tree – single row

Given that the analysis suggested that summer pruning has a greater positive impact on fruit quality (using Platinum peach specifications as the benchmark), we must conclude that whatever effect leaf plucking has on the production of Platinum peaches, it is likely not financially viable.

Initial indications are that using reflective foil in conjunction with summer pruning is financially feasible and can increase producers' returns, even if they lead to the production of just one additional case of Platinum peaches. This appears to be an extraordinarily low estimate considering the first year's limited trial.

CONCLUSION

The study shows that opportunities exist for Ontario's fruit industry to capture greater value through producing fruit that possesses attributes for which consumers are prepared to pay. The study also shows that the majority of consumers' purchasing decisions are not based predominantly on price, or that the fruit is from Ontario. Appearance and eating quality are of greater importance, so too is the format in which fruit is merchandized. Knowing which consumers to target with a specific combination of product attributes and packaging formats, and possessing the ability to consistently achieve the desired outcomes, offers opportunities that Ontario's tender fruit industry has not previously been able to exploit.