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Hawai'i Avocado Industry Analysis Part 2: Buyer Preferences Focus

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In the late 1980s, Hawai'i's avocado industry was able to supply about half of the total local market demand, with the remaining half being provided by imports, most of which arrived from California. As reported in the Avocado Industry Analysis No. 3 (Bittenbender et al. 1989), in 1987 the industry supplied 900,000 pounds, or 45 percent, of the local market, and this trend has been stable until recent years. In 2005, avocado production in Hawai'i was 800,000 pounds, which satisfied almost 30 percent of total demand, and 2,000,000 pounds were imported (National Agricultural Statistical Service 2005). From surveys of the Hawai'i avocado industry it was estimated that about half of local production is wasted (Chan-Halbrendt et al. 2007). Considering also the higher prices received for imported avocados, which are almost three to four times the price of local avocados (Chan-Halbrendt et al. 2007), there is a great potential for import substitution by Hawai'i's avocado industry.

Our avocado industry is quite versatile, in that it can supply many different cultivars and thus cater to unique customer tastes as well as different uses of the product, such as for guacamole, oil, and lotions. Despite the diverse local supply and lower retail prices for Hawai'i-grown avocados, increasing amounts of a single cultivar ('Hass') from Central and South America (Mexico, Chile) and California are being imported. Import trends from 1989 to 2007 showed that even as demand for avocados in Hawai'i increased, local growers lost market share against imports.

The Hawai'i Avocado Association (HAA) has asserted that lack of information on the preferences of buyers and consumers and lack of coordinated supply decisions are major reasons for the industry's inability to respond to market demand opportunities. Similarly, Bittenbender et al. (1989) concluded that lack of production and marketing information was severely hindering the avocado industry's expansion to meet growing demand. Furthermore, Hawai'i's avocado growers are mostly small-scale farmers with low production volume, and they often sell directly to buyers, while their competitors from out of state operate at a much larger scale.

Avocado cultivar 'Kahaluu' *Photo: The Honolulu Advertiser*

During the 1980s, as a strategy to enhance the local

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'Sharwil' *Avocado photos by Ken Love; not sized to scale.*

'Linda'

avocado farmers' income, there was a push to focus on the production of a specific avocado cultivar, 'Sharwil', for export, due to its similarity (and some would say superiority) to 'Hass' in product characteristics. Unfortunately, this effort was not as successful as the industry has hoped, due to the costly regulations for exporting to the U.S. mainland (i.e., the requirement for fruit fly–free certification) coupled with high transportation costs. The main markets for 'Sharwil' exports are now Canada and Alaska.

Currently, Hawai'i avocado farmers are not able to meet the year-round local demand or maintain a consistent market supply, despite the increasing demand. What is needed is a coordinated marketing strategy to promote locally grown avocados, including branding and the use of other consumer-awareness efforts such as "Buy Fresh, Buy Local," to develop the presence of Hawai'i avocados in the state market (Chan-Halbrendt et al. 2007). Lack of information on the local demand for avocados and absence of orchestrated marketing mechanisms have allowed imports to capitalize on the increasing market demand.

Objectives

In this, the second, part of the current avocado industry analysis effort, we obtained information on buyer preferences for avocados through test panels. The objective was to evaluate consumers' and chefs' preferences to see if there is a match between what is preferred and what is being grown. Information was collected both from high-end buyers such as chefs and from consumers. Learning about chefs' preferences for avocado attributes is important, because hotels and restaurants in Hawai'i annually cater to about seven million visitors who spend, on average, eight days per stay. In most hotels and high-end restaurants, chefs make decisions on food purchases; hence it is important to evaluate their preferences. This study explores the importance of farmer-buyer coordination by using test panel results to address some critical questions:

'Kahaluu'

The chefs' tasting panel in Honolulu
Photo: The Honolulu Advertiser

- Is it true that there is a lack of coordination between what the farmers are growing and what buyers prefer?
- Would buyers and consumers prefer the local cultivars if these were available and well publicized?
- Do buyers and consumers actually prefer out-of-state avocados?

Strengthening coordination of supply and demand requires better information on buyer and customer preferences. In view of Hawai'i's numerous avocado cultivars, which can be targeted to niche markets, such as chefs, to enhance local sales, it is essential to identify the cultivars consumers most prefer and thus determine which avocado product characteristics they find desirable. Since imported 'Hass' represents about 2,000,000 pounds per year, we can hypothesize that consumers prefer 'Hass' to local avocados. A different hypothesis is that local cultivars are not able to penetrate the market as easily as the imports, and consumers are simply used to what is available in the stores, i.e., 'Hass'.

Methods

In 2007, test panel surveys were developed and administered to collect data from two groups of respondents to identify their preferences among avocado cultivars. One survey was developed for chefs from Kailua Kona and O'ahu, and the other was developed for consumers in Honolulu. For the chefs' preferences, test panels were organized for each location. The first tasting event was held in conjunction with the monthly meeting of the Kona-Kohala chapter of the American Culinary Federation (ACF) in October 2007. Another tasting event was organized in December 2007 for chefs from some of the high-end restaurants on O'ahu. A total of 36 chefs participated in the two surveys. The reason why chefs from Kona (on the west side of Hawai'i island) were surveyed is because it is a popular tourist destination with many high-end restaurants and hotels. Kona is also the largest avocado production area in Hawai'i (about 80 percent of total Hawai'i avocado production). O'ahu was included because it represents the principal tourist destination in

the state, with many high-end restaurants. For consumers' preferences, data were collected in November and December 2007 at a farmers' market at the Kapi'olani Community College campus in Honolulu, where participants completed surveys recording 292 evaluations.

The survey questionnaires were designed to test the palatability and appearance of the major avocado cultivars grown in Hawai'i, along with the imported 'Hass'. The questionnaire asked people to score characteristics of the avocados based on a rating scale of 0 to 10, with 0 being undesirable and 10 being most desirable. The taste characteristics were flavor and texture. The visual characteristics for chefs were peeling characteristics and color. Consumers didn't rate peeling characteristics, because the avocados evaluated were already peeled and sliced. Instead, they rated seed-to-flesh proportion and color.

Both chefs and consumers rated the top locally grown avocados cultivars, which are 'Sharwil', 'Kahaluu', 'Malama' and 'Linda', plus the imported 'Hass'. One additional cultivar, 'Yamagata', was included for the consumer tasting on O'ahu because it was seasonally available at the time. The chefs were asked to peel, taste, and provide scores for each characteristic (peeling, flavor, texture, color) for the five cultivars. Those scores were analyzed using general linear modeling (GLM), and the score means were separated with Duncan's multiple-range test using SAS version 9. GLM was employed to see if the mean scores of each characteristic significantly differ among the cultivars.

Results

The results of the first test panel, in Kona, are presented in Table 1. A total of 23 chefs participated. Means followed by the same letter are not statistically different from each other, even if the actual mean score is higher or lower. The last column shows the overall average score per cultivar.

The overall mean scores for each of the characteristics indicate a preference for local cultivars 'Kahaluu,' 'Malama', and 'Linda' over 'Sharwil' and the imported 'Hass'.

The rating of taste characteristics (flavor and texture) had similar results, with 'Linda', 'Kahaluu', and 'Malama' most preferred, 'Hass' least preferred, and 'Sharwil' intermediate. For the peeling characteristic, 'Kahaluu' was clearly preferred over 'Hass' and 'Sharwil'. For color, 'Hass' again was rated less desirable than the three most preferred cultivars.

In Honolulu, 13 chefs participated in the survey. Generally, as did the Kona chefs, the O'ahu chefs indicated a preference for 'Linda', 'Kahaluu', and 'Malama' over imported 'Hass' (Table 2), with 'Sharwil' ranked with 'Hass'. In terms of peeling characteristics, however, 'Sharwil' scored high with these chefs.

The results of the consumer test are reported in Table 3. The additional cultivar 'Yamagata' gathered wide approval among consumers, gaining the highest scores for most of the characteristics surveyed. 'Sharwil' and 'Kahaluu' were generally ranked low. 'Linda', 'Malama', and 'Hass' were generally graded equivalently.

The seed-to-meat ratio is considered an important characteristic for consumers, because they pay by the pound and tend to prefer avocados that have more pulp than seed. The results show that consumers found 'Sharwil' to have a poor seed-to-meat ratio compared to 'Linda' and 'Malama'. For color, 'Linda' and 'Yamagata' were preferred to 'Kahaluu' and 'Sharwil'. For taste, 'Yamagata' was preferred to all other cultivars except 'Linda'. For texture, 'Yamagata' and 'Linda' were preferred to the other cultivars, but 'Kahaluu' was not significantly different.

In each of the tables, the overall score for each cultivar is the average of the scores of characteristics assessed, and while it cannot be considered an absolute ranking of the cultivars, it can be used as a general indication of overall preference. For example, imported 'Hass' was least preferred by chefs in Kona, and both chefs and consumers found 'Sharwil' to be generally less desirable than other local cultivars. 'Hass' was rated low by chefs, but consumers rated it a little higher. Both chefs and consumers preferred locally produced avocados, with the exception of 'Sharwil'.

Implications

To evaluate whether there is a correlation between what buyers prefer and what is currently being grown in Hawai'i, we can compare consumers' and chefs' preferences through the surveys with the production of each cultivar. Based on production data collected in 2006 and 2007, 'Sharwil' is the most cultivated (45% of total local production), followed by 'Malama' (21%), 'Yamagata' (11%), 'Murashige' (3%), and local 'Hass' (0.9%) (Chan-Halbrendt et al. 2007).

The results of the tests suggest that there is a lack of coordination between what the farmers grow and what the buyers prefer, confirming our initial hypothesis. It

Table 1. Results of a test panel of Kona chefs on avocado characteristics.

Cultivar	Peeling	Flavor	Texture	Color	Overall
	Mean score[a]				
Linda	8.095 ab	7.478 a	8.087 a	8.333 a	8.087 a
Kahalu'u	8.500 a	7.435 a	7.870 ab	8.609 a	8.174 a
Malama	8.227 ab	7.435 a	8.130 a	8.391 a	8.130 a
Hass (imported)	6.714 c	6.130 b	6.739 c	7.348 b	6.870 b
Sharwil	7.409 bc	6.435 ab	7.044 bc	7.818 ab	7.348 b
P value[b]	$P < 0.01$	$P < 0.05$	$P < 0.01$	$P < 0.05$	$P < 0.001$

Table 2. Results of a test panel of O'ahu chefs on avocado characteristics.

Cultivar	Peeling	Flavor	Texture	Color	Overall
	Mean score[a]				
Linda	7.583 abc	6.923 a	7.833 a	7.154 ab	7.365 ab
Kahaluu	7.154 bc	7.385 a	8.250 a	8.000 a	7.654 a
Malama	8.083 ab	6.692 a	7.462 a	8.462 a	7.699 a
Hass (imported)	6.833 c	4.417 b	5.417 b	5.917 b	5.731 c
Sharwil	8.462 a	5.000 b	5.923 b	6.462 b	6.462 bc
P value[b]	$P < 0.05$	$P < 0.001$	$P < 0.001$	$P < 0.01$	$P < 0.001$

Table 3. Results of a survey of O'ahu consumers' perceptions of avocado characteristics.

Cultivar	n[c]	Flavor	Texture	Color	Seed-to-flesh ratio	Overall
		Mean score[a]				
Linda	54	7.389 ab	8.130 a	8.259 a	8.517 a	7.407 ab
Kahaluu	41	6.659 b	7.293 ab	6.854 c	7.300 b	6.663 b
Malama	37	6.378 b	7.189 b	7.865 ab	8.232 a	7.065 ab
Hass (imported)	65	6.785 b	6.877 b	7.931 ab	7.297 b	6.988 ab
Sharwil	31	6.355 b	6.839 b	6.903 c	6.258 c	6.719 b
Yamagata	64	7.844 a	8.156 a	8.133 a	7.797 ab	7.658 a
P value[b]		$P < 0.01$	$P < 0.001$	$P < 0.001$	$P < 0.001$	$P < 0.001$

Notes to the tables

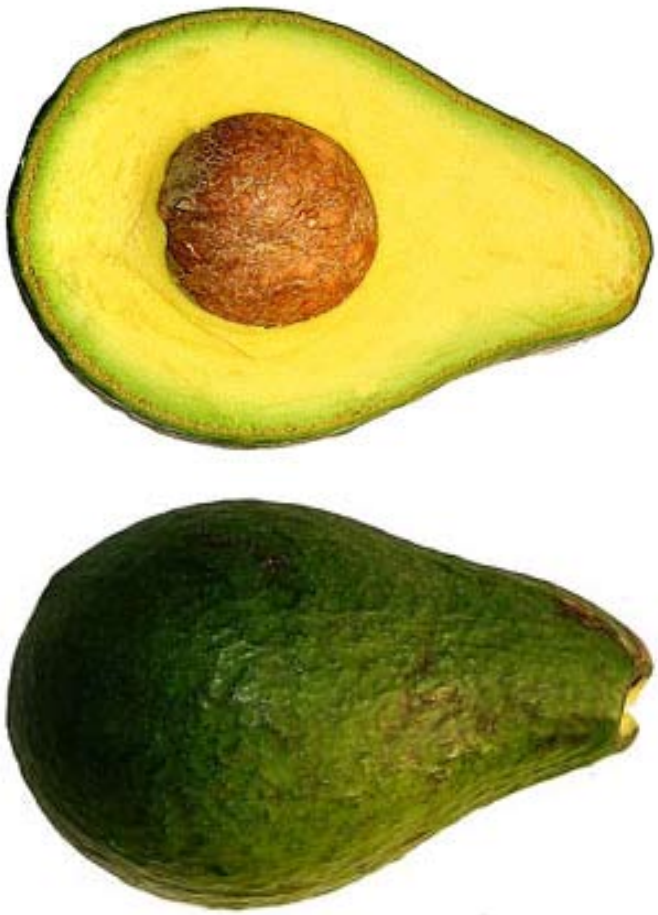
[a] Within data columns, cultivar means that are not followed by the same letter are significantly different from each other, with a 95% level of confidence that the results for the cultivars actually differ, and with only a 5% chance of error ($\alpha = 0.05$).

[b] The *P* (probability) value associated with each column is a measure of the level of statistical confidence that the results are not due to chance. A low *P* value, such as $P < 0.001$, means that there is very little chance, less than 0.1%, that the results are due to chance. This value has to be smaller than the 5% chance of error, described in note "a," associated with the separation of means.

[c] n = the number of participants who evaluated the cultivar (not all participants evaluated all six cultivars).

Evaluating avocados at the KCC Farmer's Market
Photos, page 6–7: Ken Love

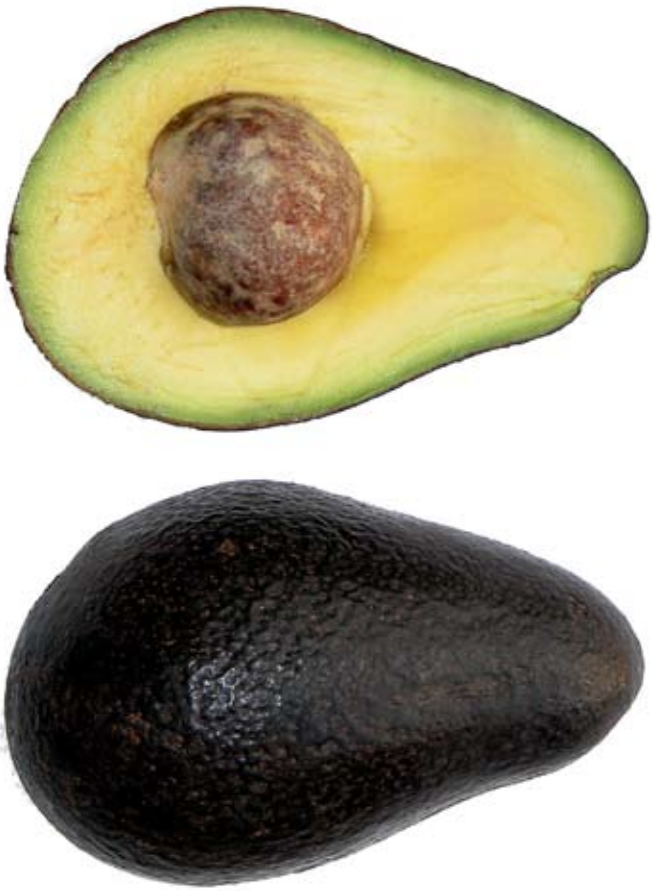
is noteworthy that among the locally grown cultivars, 'Sharwil' appears to be at the bottom of rankings by chefs and consumers. This result confirms the conclusion provided by an earlier study, where 'Sharwil' appeared to be not well received in the highly competitive Honolulu market (CTAHR Farmer's Bookshelf: Avocado). This represents inefficiency in the industry, which is now employing larger amount of resources (in terms of land and labor) in growing a cultivar that is not highly demanded in the Hawai'i market. Currently, 'Sharwil' represents the main alternative to imported 'Hass' in our stores. Perhaps the fact that 'Sharwil' does not stand out compared to imported 'Hass' helps explain why consumers do not mind buying 'Hass', with its (possibly) more consistent quality and year-round availability. However, local 'Sharwil' is mainly marketed in Canada, where it seems to be better appreciated. So 'Sharwil' can be still a profitable cultivar, considering the returns in the Canadian market. To capitalize on the Canadian preference, 'Sharwil' should continue to be promoted in that market, while the preferred cultivars should be further developed for the local market. The characteristics that an avocado has for export may differ from the characteristics desired for the local market. Shelf life and condition after shipping are critical in exporting. The avocados need to survive shipping in salable condition, and some of the local cultivars may not be suited for that.



'Yamagata' *Avocado photos are not sized to scale.*

Seasonality

If we now look at the seasonal availability of local avocados, we can assess whether the local industry can rely on its own production or if it needs imports to satisfy the demand throughout the year. As presented in Chan-Halbrendt et al. (2007), the harvest period in Hawai'i varies with different cultivars. Some of the preferred cultivars are available in the fall–winter months, while other preferred cultivars are available in the spring–summer period. Therefore, the local industry has the potential to supply desirable avocados the year around. This represents a real opportunity for our farmers to substitute imports, at least in part. Knowing what buyers and consumers want could have a direct impact on the local industry. This requires coordination among the smaller-scale farmers.



'Malama'

A challenging situation for the local industry is the inconsistent supply of quality avocados during the summer (CTAHR Farmer's Bookshelf: Avocado). This has been noted since the 1980s and still seems to be the case, as the most appreciated and widely grown cultivars have a peak season lasting from October to March. Not all farmers are able to supply avocados throughout the year. Some form of coordination among farmers (a cooperative, for instance) is necessary to guarantee a consistent supply of avocados, so that retailers and wholesalers will not have to rely on imports during the summer months when local supply is limited.

Conclusions

Our study showed that consumers and chefs prefer local cultivars to the imported 'Hass', and that not all local cultivars are the same. 'Linda', 'Malama', 'Kahaluu', and 'Yamagata' received higher ratings than 'Sharwil'. This suggests that while 'Sharwil' should continue to be grown for export, the other cultivars should be promoted for the Hawai'i market. The high ratings of local cultivars suggest that consumers and chefs are open to substituting "new" cultivars for 'Hass'. The positive feedback on all the local cultivars tested represents valuable information for the avocado industry in Hawai'i.

It is important that farmers be provided with adequate market information such as customer preferences so that they can cater effectively to the increasing demand and earn higher and more consistent revenues. Avocado cultivars that are most preferred by customers should be promoted for year-round supply. State support should be provided to better assist cooperation among farmers that will help increase their revenues, making the industry more self-sufficient and substituting local products for imports.

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