

NICARAGUA

ARAP

**Agriculture Reconstruction Assistance
Program**

The US Market for Organic Pineapple

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Executive Summary

A goal of the Chemonics – USAID ARAP Project in Nicaragua is the improvement of income of some 900 growers cultivating approximately 1,400 ha of pineapple in Ticuantepe, Nicaragua. The edaphological, hydrological and climatic conditions of the zone are such that pineapple production is one of the few options for agriculture in Ticuantepe. However, competition of these small landholders with transnational pineapple producers for market share in supplying fresh conventionally produced pineapple to the US is not a viable option because of production, financial and infrastructure restraints.

In the past, adopting a niche strategy has proven a successful option for smaller competitors in a highly competitive market. One such niche for small landholders of pineapple might be targeting the US market for organic pineapple products.

This paper examines the size and growth trends for pineapple products in the US market, the current status and trends in the organic market in the US and, specifically, the status of the US market for organic pineapple products. The products studied include: fresh and IQF frozen fruit, pineapple crush, juice, concentrates and canned, dehydrated and dried pineapple.

The US is the largest single consumer nation of pineapple, importing over 29% of the world's production. Sales for fresh conventional pineapple have been given a boost since the introduction of the new Gold cultivars by Dole and Del Monte. Consumption of pineapple has increased from 2.0 to 3.0 lb per capital since 1998. Retail sales have increased by 9% and sales by volume by 3%.

Most of the fresh fruit consumed in the US is imported from Mexico, Costa Rica, Panama, the Dominican Republic and Honduras, with Costa Rica being the largest exporter to the US. There is some domestic production of pineapple in Hawaii.

Canned pineapple consumption has also increased dramatically since 1985, although growth in the sales of this product slowed in 1995 and has been volatile since. Thailand, the Philippines and Indonesia are the most important suppliers of canned pineapple both worldwide and to the US. Imports of juice and concentrates have fluctuated since 1993. However, between 1998 and 1999, the value of imported pineapple juice rose by 20%.

Like the rest of the food industry in the US, the market for organic foods has shown dramatic, sustained growth over the last ten years. That growth has resulted in the development of the different links in the distribution channel, particularly for the retailers, through expansion, mergers and acquisitions. This growth has also attracted the interest of mass market food industry businesses, retailers, distributors and manufacturers who are acquiring organic businesses to gain entrance into the organic food market. Transnational grower/shippers are also exploring organic production of their conventionally cultivated crop. Among those is Dole, a global pineapple grower/shipper.

Trends in the supply and demand of organic pineapple are difficult to assess due to the lack of official statistics and the resulting reliance on anecdotal information. However, it appears that consumer demand for fresh organic pineapple is low due to the interest in the Gold pineapples, which are better quality, more gold in colour and sweeter than the Monte Lirio and available all year around. Monte Lirio, while a hardy cultivar that is tolerant of poor growing conditions and

diseases, has a white flesh and is not sweet enough for the palate of most American consumers and will not compete well against the more yellow, sweeter Gold and Cayenne cultivars. Therefore, Nicaraguan growers will have to switch cultivars to a Cayenne, shipped as a “Golden Ripe” or to Gold cultivars. Use of a Gold cultivar would require consent of the company to which it belongs as the Golds are registered cultivars.

Development of value-added products has been slow due to the scarcity of reliable supplies of good quality raw material. However, there is a general consensus among all of the individuals in the market who are working with organic pineapple that it has great unrealized potential. Venturing into value-added products for the Nicaraguan pineapple growers would only be profitable if the appropriate processing facilities were available within close proximity. At the present time, there are no organically certified processing facilities close to the Ticuantepe pineapple production area. Therefore, in the short term, production of organic pineapple for processing or manufacturing value-added products is not an option.

The acceptance of the National Organics Standard Board of ethylene and prohibition of calcium carbide for use for flower induction in the organic production of pineapples has great implications to small growers of pineapple. On the one hand, ethylene use will allow year around production of organic pineapples, which should result in increased demand and allow the development of more value-added products. However, large growers with the capital to acquire ethylene application equipment and for the certification fees will have a competitive advantage over the small grower. Growers trying to work small plots of pineapple will be increasingly marginalized as the larger competitors, with their greater resources, are better able to meet market demands at lower prices.

Strategies for small landholders to compete in the market for organic pineapple will involve a combination of tactics such as increasing effective production area (cooperative production), switching pineapple cultivars from the Monte Lirio to a Cayenne or Gold and seeking out a sponsor to assist small growers in learning efficient organic production practices and financing certification fees and production costs and providing a captured market for their product. Were the Ticuantepe growers, organized through UPROTIC, to secure the sponsorship of one of the large distributors of fresh organic fruits and processed products or an independent grower relationship similar to the one that independent banana growers enjoy with the large transnationals, they would be able to acquire technical and financial assistance as well as marketing and distribution of their products.

There are several opportunities for such relationships. Dole, for example, already has several years of experience in organic pineapple production in Honduras and could provide guidance in production activities, as well as equipment sharing and a ready market for Ticuantepe organic pineapple. Dole has the transportation, distribution and marketing infrastructure to move larger volumes of product to and through the market than the Ticuantepe producers would be able to move on their own. Also, Dole has experience with IQF fruit and juicing through its operations in La Ceiba, Honduras. Dole, although the legality of ownership and exploitation is in dispute, has a Gold cultivar and organically certified propagative material in Honduras that might be available for establishing plantations in Nicaragua.

Alternatively, sponsorship by or joint ventures with companies such as Jacob’s Farm or CF Fresh would bring production, distribution, marketing and processing experience and knowledge to Ticuantepe organic pineapple growers, as well as assistance with certification and in depth knowledge of the organic market in the US.

Introduction

Understanding the prospects of the organic pineapple in the US market requires a broad base of knowledge. First, it is important to understand that in the larger fruit and vegetables market, the conventional pineapple is the closest competitor to the organic pineapple. Organic pineapple represents little more than yet another version of pineapple products to most consumers. Currently, the price and quality differentials between products of the conventional pineapples and those of the organic pineapple force most consumers to decide between the purchase of one over the other, with consumers and, therefore, retailers often choosing the conventional pineapple over the organic at the current time.

Second, organic pineapple is just one commodity of many within the US market for organic fruits and vegetables. In order to understand the market for organic pineapple, one must have a general understanding of how the organic market functions, its players and its current behavior and trends.

Therefore, basic knowledge of the production of pineapples, the US market for organic products and, within that market, the market for organic pineapples, is necessary to assess the prospects for organic pineapple producers. This information is organized in four sections. The first section focuses on the US market for conventional pineapple products, both fresh and processed. The second section describes the organic market and the distribution channels for fresh and processed organic products. The third section focuses on the current situation in the US market with respect to organic pineapple products and the fourth analyzes the cost-benefits of the various organic pineapple products.

Section 1. The Pineapple

Pineapple, *Ananas comosus* (L.) Merr, is a member of the bromeliad family. It is a xerophytic plant and uses water very efficiently. Therefore, it is the crop of choice in tropical climates where annual rainfall is low (50-200 cm) and irrigation is expensive or unavailable. Drip irrigation is generally used during dry periods in commercial operations but irrigation can be detrimental if over-applied because wet soil conditions favor the growth of root rot pathogens (<http://agrss.sherman.hawaii.edu/pineapple/pinehaw.htm>).

Pineapple is grown in all of the tropical zones throughout the world.

Cultivars

The cultivars being planted in commercial operations in Central America include Smooth Cayenne, Champaka and the new “Gold” cultivars of Del Monte and Dole. Local cultivars that are widely grown in Central America include the Sugarloaf, Azucarón, Montufar and Monte Lirio.

There are basically five groups of pineapple, depending on morphological characteristics and plant habits. These are the Cayenne, Spanish, Queen, Pernambuco and Perolera (Py, Lacoeyilhe and Teisson, 1987, *The Pineapple, Cultivation and Uses. Techniques Agricoles et Productions Tropicales*. Editions G.-P. Maisonneuve & Larose, 15, Rue Victor-Cousin, Paris, pp.568). Within these five morphological types fall the various cultivars of pineapple (See Annex 1).

The Smooth Cayenne, a cultivar of the Cayenne Group, probably originated from botanical samples taken from French Guiana during a French botanical expedition in 1819. The material was first sent to a botanical greenhouse in Versailles from which it was then shipped to a botanical greenhouse in Great Britain where it was propagated and sent out to Australia, Jamaica and Hawaii in the late 1880s. It has since become the most commercially successful pineapple cultivar in the US market.

Smooth Cayenne is typical of the Cayennes. It has leaves that are mostly smooth except for the spiny tips. The fruit is both sweet and acid, non-fibrous, and has pale yellow flesh (Py et al, 1987). The Smooth Cayenne, until recently, was considered to be the best type available for commercial purposes as it has fruit characteristics that allow it to be sold fresh or sliced and processed as canned fruit.

The Smooth Cayenne is a “modern” cultivar. Although it is very productive, it is also very susceptible to pests and diseases and is very sensitive to stressful growing conditions. It requires efficient cultural practices. Another drawback of Smooth Cayenne is its low rates of sucker and slip production without the use of plant regulators. Under natural conditions, it may produce as few as two slips and no suckers (Py et al, 1987). Therefore, a limiting factor in replanting or expansion of production area in Smooth Cayenne is the paucity of propagative material from existing plantations.

Champaka is another cultivar of the Cayenne group and is thought to be a selection from the Smooth Cayenne. It was first collected in India by the Philippine Packing Corporation (PPC). Slips were sent by the PPC to the Pineapple Research Center in Hawaii in 1934 from whence it was disseminated. It is a commercially acceptable cultivar in Central America, although not to the extent of the Smooth Cayenne.

Azucarón and Montufar were identified as Central American cultivars of the Pernambuco group by Grazia, Antoni and Leal in 1980 (Grazia, María, Antoni S. and Freddy Leal. 1980. Clave Para La Identificación de Las Variedades Comerciales de Piña (*Ananas comosus*). Proc. Amer. Soc. Trop. Reg., v. 24:107-112). This group is characterized by having spiny leaves, whitish-yellowish flesh and sweeter flavor than Smooth Cayenne. Azucarón and Montufar are very similar, the main distinguishing feature being that the Montufar has flesh that is slightly more yellow in colour than that of the Azucarón. Both are reported as susceptible to a post harvest physiological disorder called endogenous browning or internal brown spot (IBS) that generally appears late in the post harvest cycle, i.e., after packing and shipping but before it arrives on the consumer’s table. This has been a drawback in its use as a fresh fruit for export. Therefore, Azucarón and Montufar are mainly consumed locally, although they are known to export markets.

Many brokers and produce managers contacted in the organic supermarkets in the US report the Sugarloaf as the white-fleshed fresh organic pineapple that they have handled in the past. Sugarloaf is reported as a cultivar in the Pernambuco Group by Py et al. Pernambucoes are reported by Collins as being pale-yellow to white-fleshed, tender and juicy as well as possessing a mild, good flavor and less acid than the Cayennes. However, he goes on to report that the Pernambuco Group fruit is “not a good shipper unless harvested about half ripe” (Collins, J. L., 1960, *The Pineapple: Botany, Cultivation and Utilization*. London Leonard Hill (Books) Limited. Interscience Publishers Inc. New York, pp. 294). These comments are supported by those of the retailers who report problems of uneven ripening and the endogenous browning, but who describe Sugarloaf as having a good flavor and sweet. At least one broker reported that his organic customers sought out this type of pineapple for its exceptional sweetness as compared to the “Hawaiian-type” (most likely Smooth Cayenne).

Monte Lirio is a cultivar of the Perolera group of pineapples and has smooth leaves up to the distal portion of the leaf. Monte Lirio is less acid and less sweet than Cayenne and has a higher ascorbic acid content. Monte Lirio is less susceptible to Pineapple wilt than the Smooth Cayenne types.

Monte Lirio is a minor cultivar in comparison to the Cayenne, Champaka, Red Spanish and Queen cultivars. It was described by Collins as having white flesh, very little fibre and “a fine flavour and aroma.” It was then, as now, only sold locally in Mexico and Central America. None of the buyers contacted in either the fresh or processed industries were familiar with the Monte Lirio.

Often seen in supermarkets these days are the new Dole and Del Monte Gold pineapples and another fresh pineapple product called “Golden Ripe.” Gold and Golden Ripe pineapples are distinctly different products. The Gold pineapples are newly released cultivars whereas the “Golden Ripe” pineapples are the standard Cayenne cultivars sold at a more advanced maturity stage. The “Gold” cultivars of Del Monte and Dole are newly released cultivars selected and developed by these companies. The Del Monte Gold Extra Sweet was developed by Del Monte in cooperation with the Pineapple Research Institute more than ten years ago and was marketed as the MDII in the United Kingdom for about three years (Fresh Produce Journal, May 17, 1996 and October 31, 1997). It is different from the standard commercial varieties in that it has a yellow shell rather than the typical green shell of the Smooth Cayenne and Champaka at the mature green maturity stage (Color Stage 1) for sea shipment and, so, has the appearance of being more mature than the green-shelled cultivars. The Dole Gold Premium is substantially similar to the Del Monte product. Many companies are selling a “Golden Ripe” product, which is a standard commercial variety that has been allowed to ripen further than usual, to a half or three-quarter ripe stage (Color Stage 2-3), before sale to the consumer (personal communication, Winston Walker, November 2000).

Conventional Pineapple Cultivation

Good fruit quality is usually associated with growing sites with relatively cool nights, a high percentage of sunny days and daytime temperatures ranging between 21° C to 29.5° C and not exceeding 32° C. Drought is tolerated but yields are affected by prolonged droughts. Pineapples grow best in slightly acid soils (pH 4.5-5.5) as this reduces disease problems. Soil pH > 7.0 should be avoided. Good soil drainage is essential. Pineapple tolerates low soil fertility but productivity is reduced. This crop tolerates high levels of aluminum and magnesium in the soil but needs high levels of potassium and organic matter (Evans, Dale O., Wallace G. Sanford, and Duane P. Bartholomew, *Pineapple*, Hawaii Cooperative Extension Service Commodity Fact Sheet PIN-3(A)).

Generally, after the first harvest, one or more suckers will continue to grow and produce a ratoon crop. Ratoon fruit is usually smaller, sweeter, less acidic and more aromatic than fruit from the primary harvest. A second ratoon may be taken in good fields with high fertility and low nematode populations.

Two important management issues arise that will affect the marketing success of organic pineapple to the fresh fruit market. One is the use of growth regulators to schedule production volumes and extend the participation of organic fresh pineapple in the market from seasonal to year around supply and the other is the management of the shipping disorder, internal brown spot.

The Use of Growth Regulators to Stimulate Flower Induction

Pineapple grown under natural conditions has an 18-20+ month crop cycle. Flower initiation occurs naturally on short, cool days. Therefore, harvest, under natural conditions, is limited to certain times of the year, usually six-eight months after flower initiation. In Central America, this results in two harvest seasons, the first season being the heavier harvest, late April, May-July, and a smaller crop of first ratoon that runs January-February, to early March.

Flower initiation may be induced by the use of chemicals, usually ethylene, acetylene or ethaphon, an ethylene-releasing compound, mixed with urea; which enables the grower to have year around production. Also, calcium carbide, which releases acetylene when in contact with water, is reported as effective in inducing flowering when applied at night (Aldrich and Nakasone, 1975, J. Amer. Soc. Hort. Sci. 100(4):410-413). Without the use of a growth regulator to induce flowering, plants could grow vegetatively 12-14 months before flowering. With the use of flower inducers, this time may be reduced to 9-12 months.

As of June 2000 the National Organic Standards Board (NOSB) approved the gas form of ethylene for use in flower induction of pineapple (personal communication, Emily Brown Rosen, Project Director, OMRI). This is the only product approved for flower induction of pineapple, other forms of ethylene are not allowed. The commonly used and convenient product, calcium carbide, is specifically prohibited from use. The final form of this report is under review and the report is due for release in early 2001. However, once the report is released by the NOSB, all certifying bodies must accept this product as “organic” for the US market.

However, although ethylene is now permitted for use by the NOSB for products sold as organic in the US, ethylene use will **not** be allowed for “organic” products entering the European Union after 15 January 2001 (FruiTrop, February 2000). This is very important for the grower because, as of the cut-off date, the use or non-use of ethylene for flower induction will determine the geographical market to which his pineapple or pineapple products may be shipped as “organic”.

Use of ethylene gas for flower induction allows the producer to control the timing of harvest so that he may increase or decrease production volumes as needed and produce organic pineapples all year around. The ability to control timing of harvest and provide product to the market year around are important tools for meeting market requirements for fresh organic pineapple, as will be seen later in this report.

Internal Brown Spot

Internal brown spot (IBS) is a physiological disorder associated with shipped pineapples, particularly those cultivars that have high brix and low titratable acidity (high pH). It manifests itself as a browning of the internal flesh, usually centered in and around the core, radiating outwardly from the core into the flesh in sections. The disorder generally does not make its appearance until after the arrival of a shipment to the importer. The disorder may result in high losses of fruit after it has reached the marketplace, after the grower/shipper has incurred all the costs of production, harvest and packing, transportation and customs clearance. In addition to the economic losses incurred by the grower/shipper, there is the additional loss of loss of confidence in the grower’s product in the marketplace. The problem of IBS surfaces repeatedly throughout the rest of this paper and warrants a brief explanation at this point.

Internal brown spot is a complex physiological disorder and pineapple cultivars with high brix and low titratable acidity seem to be more prone to develop the disorder. The browning is the result of an oxidation reaction that results in the development of brown pigment. The mechanism of IBS formation is an enzymatic reaction with substrates that results in the development of initial products that develop into the brown pigment. One of the required substrates is oxygen. The enzyme involved in the reaction is polyphenol oxidase and the initial product is orthoquinone. Low titratable acidity and higher pH contribute to the reaction. A well-known inhibitor of the reaction is ascorbic acid, vitamin C.

There are a number of climatic, production, and post harvest conditions that contribute to the development of the disorder. Fruit grown in cool weather under low sunlight conditions is more susceptible to the disorder. Stressful conditions, such as extremes in water availability that occur when the dry season ends and heavy rains begin, also predispose fruit to IBS. Therefore, it may be expected that more incidences of the development of the disorder will occur in fruit harvested during the rainy season due to the low sunlight, cool temperatures and high water availability. Use of flower induction may run producers into production during wet periods that would increase the incidence of IBS in their arrivals.

Shipping conditions also contribute to the development of the disorder. It is well known that chilling fruit that is low in shell colour (colour 0 – 2), high in brix and low in titratable acid will induce IBS.

To avoid or lower the incidence of IBS, choices that could be made before production is begun would include choice of field site (sunnier locations, more uniformly warm temperatures) and cultivar (lower brix, more acid). Once in production, the producer might employ cultural practices to increase fruit acidity, such as the application of potassium near forcing time. Reduction of water stress by application of irrigation during particularly droughty periods might prove helpful. Harvesting fruit with higher shell colour and application of fruit coatings to reduce respiration during shipment might also reduce the severity of the disorder (Anderson, David J., 1990, “Consultancy Report on Technical Assistance to FEPROEXAH for Development of Pineapple and Mango Exports from Honduras”, Chemonics International Consulting Division).

Section 2. US Market for Conventional Pineapple Products

The two most important tropical fruits are bananas and pineapples, with pineapple trailing bananas at a far distance.

In 1999, the worldwide production of pineapple was 13,444,203 metric tons. Most of this production took place in Thailand and the Philippines, followed at a distance by Brazil. These nations have historically been the major producers of pineapple (FAOStat, 1999). Most of this production is consumed locally or canned.

Per capita consumption of pineapples rose from 2.0 lb in 1990 to 2.81 lb in 1998, an increase of over 40%. (The Packer, 1999). Del Monte reports that the consumption of pineapple rose to over 3.0 lb in 2000, in part because of their new Gold Extra Sweet pineapple (AmericaFruit, Aug-Sept,

2000). In comparison, the per capita consumption in the US of banana, the most important tropical fruit, is 28 lb. At 3 lb per capita, total reported pineapple consumption is 10.7% of that of banana.

Between 1997 and 1998, supermarket sales of pineapple rose by 9% to nearly \$171 million. This represents an increase in physical volume sales of pineapples of 3% to 128 million pounds in 1998 (The 1998 Food Institute Report). The average retail price for fresh pineapple in 1998 was \$1.33/lb.

In 1998, the US, by far the world's largest consumer of pineapple, imported 252,848 tons of the 859,949 tons of pineapple imported worldwide. This represents over 29% of the world imports of pineapple. The next largest consumer nation of pineapple is France, with only 15% of the world's imports. The value of the 1998 imports to the US was \$103,259,000, an average value of \$480/ton. The average value of the imports into France during the same period was \$680/ton (FAOstat). In comparison, over \$12 billion of bananas were imported into the US in 1999 (US Dept. Commerce, Bureau of Census).

Between October 1998 and September 1999, Central America supplied the United States with 272,601 tons worth \$121,679 or an average of \$446/ton. Most of this was supplied by Costa Rica, Honduras and Mexico. Costa Rica supplied 217,918 tons, or 80% of the pineapples imported into the US, followed by Honduras, with 31,452 tons, and Mexico, with 14,405 tons. Costa Rican fruit received an average price of \$475/ton, Honduras, \$238/ton, and Mexico, \$358/ton (USDA). Costa Rican fruit is higher valued on the average than Honduran or Mexican because much of the production is in the new Gold Extra Sweet, which is fetching a premium price over the Champaka and Smooth Cayenne which are the predominant cultivars grown in Honduras.

Fresh Fruit

The leading producing areas of fresh pineapple, both conventional and organic, for the US market are Hawaii, Costa Rica, Honduras and Mexico. Producers in these nations can offer fresh conventional pineapple to the US market year-around. The predominant variety is the Smooth Cayenne, although the new Gold varieties are quickly becoming popular. Del Monte reported that as of 1997 the Gold Extra Sweet had captured 30% of the market share for fresh pineapple (Fresh Produce Journal, October 31, 1997). Dole also has a Gold pineapple product on the market and this has generated a legal battle between Dole and Del Monte over ownership of the cultivar, with Del Monte accusing Dole of having acquired their product and renamed it. Dole disputes this allegation.

The Smooth Cayenne and Champaka have a dry, crisp shell and dark green crown leaves. The shell color of a ripe pineapple ranges from greenish-brown to golden brown. The shell color is not a reliable indicator of either ripeness or sugar content. The interior flesh is firm and light yellow and has a sweet to sweet-tart flavor. They are usually sold in three grades, U.S. Fancy, U.S. Grades No. 1 and No. 2 (See Annex 2). Some pineapples are not graded and these are sold as "unclassified."

Pineapples are commonly packaged in either 20-lb single layer or 40-lb 2-layer cartons. Commercial sizes vary from 6, 7, 8, 9, 12 and 14 count per 40-lb carton. Counts 8 to 14 are most common for retail, 12s and 14s are usually sent off to the foodservice industry. Brix for fresh pineapple should be 12% or higher (PMA Fresh Produce Manual).

The recommended temperatures and relative humidity for short-term storage of 7 days or less are 45-50° F (7-10° C) and 85-95% relative humidity. Care must be taken when handling pineapples as, despite their tough-looking exterior, they bruise easily.

Market prices for fresh pineapple vary with the location of the market due to transportation and other logistical reasons. An examination of the Miami terminal market wholesale prices for fresh conventional pineapple sales from June 1999 to September 2000 shows that the predominant sources of fruit were Costa Rica and Honduras. In June 1999 some Gold pineapple was reported as imported by Ecuador but reports of Ecuadorian pineapple sales ended before July. The reason for this is unknown. Pineapple was imported from Costa Rica and Honduras in two layer 40-lb cartons, 7s-14s. "Golden" (Gold) pineapple from both Costa Rica and Ecuador were sold in single layer 20-lb ctns, 4s-12s.

Most of the reports for the "non-Golden" pineapple imported were 7s, 8s and 14s, 40-lb ctns from Costa Rica and 14s, 40-lb ctn from Honduras, although fewer reports of other counts (10s and 12s for Costa Rica and 7s, 8s and 12s for Honduras) were recorded. Few to no reports were recorded for 9s for either country. Prices varied according to source, season and box counts. In 1999, prices were above the six-month average for between June and October. In 2000, prices remained above the 9-month average in late February and March and from June to September.

The same pattern is true for Gold pineapple. Prices in 1999 were above the six month average from June through August for most sizes for Costa Rican fruit and the prices in 2000 above the nine-month average for February through July for sizes 6s-9s and continuing on high for 5s and 6s into September.

The average price for the entire period for non-Golden Costa Rican 6s, 7s and 8s were \$19.94-20.55, \$11.40-12.32 and \$12.16-13.03, respectively, and for the most often reported Honduran count, 14s, \$13.24-13.90/ctn. For Gold, 8s and 9s, the average prices were \$18.07-18.45 and \$17.28-17.59 respectively. In general, the market paid more for the 5s and 6s Gold, between \$17.25 and \$21.30 on an average. Note that these high prices are the terminal market prices being paid for half the weight of a box of non-Golden pineapples. Brokers report wholesale prices of \$30.00 and more for 40-lb cartons of Gold pineapples.

The average price per box count for the 17-month period for non-Golden and Gold pineapple for each country of origin may be found in Tables 1 and 2.

Table 1. Summary of Miami Terminal Market Prices for 2-Layer, 40-lb ctns of “Non-Golden” Pineapple.¹

Origin	Count	7s		8s		10s		12s		14s	
	Statistic	Low	High								
HN	Average	\$11.00	\$11.83	\$11.66	\$12.18			\$13.55	\$14.00	\$13.24	\$13.90
	# Reports	9		19				10		48	
	Maximum	11.00	12.00	13.25	13.50			14.00	14.00	14.00	14.50
	Minimum	11.00	11.50	10.00	11.00			13.50	14.00	12.00	13.00
Costa Rica	Average	\$11.40	\$12.32	\$12.16	\$13.03	\$13.03	\$13.40	\$12.98	\$13.65	\$13.08	\$13.78
	# Reports	55		56		8		44		53	
	Maximum	13.85	14.85	14.00	14.75	13.50	14.00	14.00	14.25	16.50	16.50
	Minimum	8.75	8.85	9.00	10.75	12.35	12.35	12.00	12.50	12.00	12.50

¹ Non-Golden refers to Champaka and Smooth Cayenne.

Table 2. Summary of Miami Terminal Market Prices for Single Layer, 20-lb ctns of Gold Pineapple from Costa Rica.

Box ct	# Reports	Low Prices			High Prices		
		Average	Minimum	Maximum	Average	Minimum	Maximum
4s	37	\$17.25	\$13.75	\$22.00	\$17.71	\$13.00	\$24.00
5s	38	20.63	13.00	24.00	21.30	13.00	25.00
6s	60	19.94	14.00	25.00	20.55	14.00	25.00
7s	26	18.73	14.00	25.50	19.44	14.00	25.50
8s	52	18.07	14.00	25.00	18.45	14.50	25.00
9s	51	17.28	12.75	25.00	17.59	12.75	25.00

Preserved Pineapple Fruit

Canned Pineapple

The main producers of canned pineapples are Thailand, the Philippines and Indonesia. Thailand has been the leading producer and exporter of processed pineapple since 1980 and Thai market share has fluctuated greatly with the fortunes of the market. The Philippines, the next largest supplier after Thailand, has maintained the same position in the market during the last twenty years.

After 1985, exports of canned pineapple worldwide broke records year after year until reaching a peak of 1.1 million tons in 1994 (around 80 million cartons of 24, #2 cans). Rising supplies did not exceed demand until around 1991, when prices did significantly decrease as a result of over-production. Prices thereafter were unstable, rising and falling cyclically, but gradually falling until after 1995. By 1995, production adjustments began to correct supply. As production costs (canning pineapple requires high labour input) rose and market prices fell, production began to fall. Following 1995 were a series of meteorological, political and economic crises in Asia and other producing nations that combined to continue to push production volumes downwards. The

Asian crisis and El Niño drought in 1997 exacerbated the problems of increasing production and transportation costs and that year the worldwide export volumes dropped from the 67.7 million cartons of 1996 to 57.4 million cartons, a 15% decline that resulted in an export volume equal that of 1987 (FruiTrop, January 1999).

To illustrate the volatility of the market after 1994, Thai exports decreased from 35.6 million cartons (24, #2s) in 1994 to 28.2 million in 1995, a 21% drop in exports. In 1998, Thai exports hit a 12-year low at 16.63 million cartons, roughly half of the 1994 peak in exports. However, by 1999, export volumes recovered to 34.94 million cartons.

The world's single largest importer of processed pineapple is the United States. The 15-member European Union vies with the United States as a major importer of processed pineapple, followed by Japan, Canada and Taiwan (FruiTrop, January 1999).

US consumption of canned pineapple is covered by Hawaiian production and imports. US production in Hawaii exceeded 700,000 tons of fresh pineapple until 1997, but has been in decline since. Of the 20 pineapple farms in the islands in operations in the 1970s, only 15 were in operation by 1999. Two-thirds of the Hawaiian production is processed. Of this, canned pineapple production is 2.5-3 million cartons, valued at \$90 million (FruiTrop, January 1999).

Some 90% of the canned pineapple supplies is provided by Thailand, the Philippines and Indonesia. The volume of imports into the US in the years 1995 to 1999 rose from 301 million to 331 million metric tons, an average annual increase in volumes imported of 10%. Although imports into the US had been expected to increase in 1998-1999, import volumes dropped from 296 million metric tons in 1997 to 255 million metric tons in 1998, probably due to the combined effects of El Niño and Hurricane Mitch on the production areas in Central America. The value of preserved pineapple fruit imported into the US between 1995 and 1999 rose from \$160 million to \$245 million in value, an average annual increase of 53% (U.S. Department of Commerce, Bureau of Census, 2000).

Juice

Imports of frozen pineapple juice to the United States fluctuated between 266 and 326 million liters between 1993 and 1997. The value of the imports fluctuated with volumes, ranging between \$56 and \$88 million annually (FINTRAC GAIN report, 1998). Prices on a unit basis have fluctuated between \$0.23/liter in 1993, dropping to around \$0.21-0.22/liter in 1994-1995 and rising to \$0.29/liter in 1996 and 1997. Prices dropped again in 1999.

The U.S. Department of Commerce/Bureau of Census reports that in 1998, the value of imported pineapple juice reached \$71 million and by 1999 this had risen to over \$85 million.

Dehydrated and Dried Pineapple

No statistical information on either the import volumes or values of dehydrated or dried pineapple fruit is available for the US market. Total value of imported dried fruit rose between 1998 and 1999 from \$86.7 million to \$123.7 million, a 42.7% increase in import value (US Department of Commerce/Bureau of Census, 2000).

Section 3. The US Market for Organic Foods

The Organic Market

The organic food market in the United States has grown tremendously in the last ten years. According to the Organic Trade Association (OTA), in the last five years, the annual sales revenue of natural/organic foods at the retail level grew from an estimated \$1 billion dollars to an estimated \$5.75 billion in 1999. This represents an average annual growth of around 20-25% in the sales of organic and natural foods as compared to an annual growth of the grocery industry overall of around 2%.

The organic/natural food segment comprises only an estimated 1.5% of the food industry, The food industry will experience annual sales of an estimated \$400 billion in the year 2000. The OTA estimates that, given the value of the food industry and the current rate of growth of the natural/organic segment of the food industry, the natural/organic foods segment could eventually achieve a potential market share of the food industry of around 30%, which represents an estimated \$120 billion in annual sales.

An Overview of The Food Chain

An excellent overview of the current status of the organic foods market is *Organic Food Markets in Transition* by Carolyn Dimitri and Nessa J. Richman (Dimitri and Richman, April 2000, Henry A. Wallace Center for Agricultural & Environmental Policy, Winrock International, Policy Studies Report No. 14). For more information on the overall trend for consolidation in the food industry, the symposium reports for seminars on industry consolidation of the PMA 2000 are useful (Produce Marketing Association, 2000).

The most important issue for organic food products, as for their conventional counterparts, is that the products have the qualities that the final consumer looks for; i.e., freshness and wholesomeness. For conventional food products, this implies a fresh, clean, healthy and safe product. The same holds true for the organic food products but with the additional requirement that the product also have those qualities of wholesomeness attached to the organic production of the food, i.e., that it be free of pesticides and other “unhealthy” chemicals.

Reports show that nearly half of all US shoppers equate “organic” with freshness and a product that is more nutritious than a conventional product. Of the organic shoppers, nearly 60% believe that organic foods are fresher, more nutritious and of **better quality** than conventional foods (Natural Food Merchandiser, 1998).

The marketing chain of organic fruits and vegetables essentially parallels that of the conventional fruit and vegetable, the main difference being the links in the chain (although, increasingly, many companies are in both markets for conventional as well as organic products, as will be seen later in this report). After leaving the field, a food product will pass through a number of hands before it arrives to the consumer’s table, whether as a fresh or processed product. Regardless of whether

the product arrives as a fresh or processed product, the better the quality of the final product, the higher the price that will be paid. Obviously, it is in the producer's (and all the middlemen between the producer and consumer) best interest to deliver a product to the consumer of the highest possible quality so that he can capture the quality price premium. However, as the product moves along the distribution chain from the producer to the consumer, at each stage in the journey it is subject to a loss of quality. Therefore, maintaining high quality becomes a challenge for every middleman in the chain from the field to the table. The more perishable the product, the more urgent becomes the need to move the product quickly to the consumer. Retailers want the freshest, best quality product that they can possibly acquire for the least possible trouble and lowest cost to themselves.

All fresh fruit or vegetable (fresh f&v) foods must arrive to the market quickly because they are highly perishable. Processed foods have a **longer** shelf life, **but not an indefinite** shelf life. The raw materials from which the final product is made, the fresh fruits and/or vegetables, must be harvested and delivered to the processor in a timely manner and the product must be of the quality specified by the processor.

As alluded to above, an additional concern for the market for organic products is that all along the marketing chain the product does not lose its "organic-ness". At all the points along the marketing chain, handlers of the product must be certified by an organic certifying body to manage and process the product as an organic product; that includes the producer and packer, broker, distributor and processor.

Marketing Imported Fresh Fruit

The first stage in the fresh imported fruit marketing chain is the production and post harvest management of the fruit. The producer may pack and ship his product to the export market or may sell to a packer who ships and exports for him. The product may then be imported by a specialty broker who will either sell the product for the shipper to a terminal wholesale market, where it would be resold to a retailer, or to a distributor or directly to a retailer. If the shipper can provide a particular commodity at the quality and quantity desired, he may sell directly to a retailer. Distributors may be able to sell the product directly to the consumer via electronic sales (Foodtrade, GreenTrade, etc.). The product must be grown on land certified as organic and, if packed at a facility other than that of the producer, the packer must be certified as well.

In the case of farms that are in the process of certification but which have not yet received their certification, there is the possibility of selling the product as "transitional". Some brokers, such as CF Fresh, do try to market transitional products to help growers.

Marketing Processed or Intermediate Products

Organic processed foods made from organic pineapple might include: single strength juice, juice concentrates, canned, bottled or IQF frozen chunks, rings, or quarters and dehydrated products. Also, tropical juice or concentrate blends, fruit salads and trail mix snacks could be manufactured with pineapple as an ingredient. Processors, like producers, must be certified by organic certifiers and their products may not include processes or other ingredients or additives that are not approved by the Organic Materials Review Institute (OMRI) or by the certifier's standards or state or national standards where they are ultimately sold.

As mentioned above, the processor must have product of a uniform specified size and quality. This lowers processing costs and assures a uniform product that will meet the processor's market requirements.

The marketing chain for processed products is basically: farmer-processor/manufacturer-distributor/wholesaler-retailer. However, there may be several variations on this theme. For example, the producer may sell his product outright to a processor. Alternatively, he may choose to have his product partially processed, retain title to the product, and sell the semi-processed product to a manufacturer who will incorporate the intermediate product in a finished product, such as a sorbet or smoothie. Also, there are distributors of organic frozen products, for example, who will assist the producer in developing a final product that the distributor can then sell directly to retailers.

The closer the producer attempts to move to the consumer with added value processing to capture higher price premiums, the more capital and time are required to develop and market the end product. Obviously, the novice organic producer should "stick to his knitting" at the beginning of his venture into exporting organic fruit products. He should concentrate on learning how to produce consistent and sufficient volumes of fruit of sufficient and consistent quality to be able to meet the processor's needs.

The following is a review of the different types of middlemen in the marketing chain for both fresh and processed organic pineapple, as well as their roles, and companies that fill these roles.

Distribution Channels for Fresh Organic Produce

In general, fresh organic pineapple is sold by producers to an importer/receiver, who could be a broker, wholesaler, distributor or shipper, who, in turn, sells it to another handler down the chain, who could be a wholesaler, distributor, or retailer. Traditionally, the chain would be as below:

Broker - wholesaler - retailer
Broker - distributor - retailer
Importer (broker/distributor) - retailer

Usually, the broker handles the importation of the product and finds buyers for the producer. Their buyers could be wholesalers in other markets around the country or a distributor, who would sell the product to retail clients, such as supermarkets. Some brokers also act as distributors and sell directly to retailers, such as supermarkets and organic/natural foods stores with whom they have relations as well as to wholesalers in remote markets.

The advantage of working with brokers is that they will generally work with the producer to sell the product to a variety of customers who will have different quality requirements and volume requirements. As the producer attempts to more directly approach the end user, he will find that quality and volume requirements will become more rigorous.

Distributors

There are a number of distributors of natural and organic foods in the United States, but the two largest distributors that sell uniquely organic products are United Natural Foods and CF Fresh/Rootabaga.

United Natural Foods also includes Stow Mills, Hershey Imports, Albert's Organics and Tree of Life. The two most important customers of United Natural Foods are Whole Food Markets and Wild Oats, the two most important retailers of organic and natural foods.

Smaller broker/distributors that handle fresh pineapple on the West Coast are Earl's Organics, Farmers Fruit Express, and Organic Ingredients, Inc. and on the East Coast: Lincoln Produce, Four Seasons, Global Ingredients and InterNatural Marketing.

Large National Distributors

CF Fresh

CF Fresh was started in 1993 in the state of Washington by Roger Wechsler. Wechsler began Roger's Brokerage in 1984 and sold product for Cascadian Farms and other Washington producers. In 1989, Wechsler merged Roger's brokerage with Cascadian Farms to form Cascadian Farm Fresh. In 1993, Wechsler left Cascadian Farm Fresh to form CF Fresh.

CF Fresh is the leading supplier of certified organic and transition apples, pears and other fruits, vegetables, apple juices and other organic products and commodities. CF Fresh sells to wholesalers, retailers, manufacturers and food service operators in North America. CF Fresh also exports organic and transition products to both Europe and Asia. The company serves West Coast, Chilean, Argentine and some Latin American growers. Their major products are apples, pears and garlic. Product is consolidated in Los Angeles, Washington, Miami and Philadelphia.

The company is certified by Oregon Tilth as an organic processor, marketer and handler. Their growers are certified through a variety of organic certifying bodies: Washington State Department of Agriculture, Oregon Tilth, California Certified Organic Farmers, Organic Crop Improvement Association, Demeter and others. CF Fresh does show commitment to its growers through the use of grower representatives who travel to growers to disseminate information on results of organic research results.

CF Fresh sells products under one of its own brand names or under the brand name of its growers and packers. CF Fresh has four brand names: Viva Tierra Organic, Rootabaga Country Organic, Stéller Organic and Nature Conserve. The first three labels are used on certified organic fruits, fruit juices and vegetables. Produce and juice in transition are sold under the Nature Conserve label and are grown as permitted under the California Organic Foods Act of 1990.

Tree of Life

Tree of Life, Inc. is a direct subsidiary of Wessanen U.S.A., Inc. The company advertises itself as the world's largest marketer and distributor of natural and specialty food products. Tree of Life started out in the 1970s as a natural foods retailer and expanded, first, into a regional wholesale distributor, and more recently, to a national distributor. The company handles over 30,000 products and has more than 15,000 customers nationwide.

In addition to offering imported and national food brands, the company also develops and markets its own proprietary brands ("Gourmet Award" being one), among these are smoothie ingredients and frozen fruits.

Albert' Organics

Albert's Organics was founded in 1981 by Albert Lusk. It is now one of the largest organic produce companies in the United States. It is a fully owned subsidiary of United Natural Foods, Inc. Albert's is the source, distributor and consolidator for 1,000 retailers nationally. Albert's sources through both brokers and direct imports from producers. The company has four distribution centers: Los Angeles, Denver, Winter Haven, NY and Bridgeport, NJ. Albert's offers over 450 fresh produce and perishable items. At one time, Made In Nature Fresh was a subsidiary of Albert's Organics.

Melissa's/ World Variety Produce

Melissa's is based in Vernon, California and is a buyer/distributor of specialty and organic produce. The company was established by Joe Hernandez, a Texas native, in 1984 and has since become the largest distributor of specialty produce in the United States. The company now has a 120,000 sq. ft office/warehouse facility. In addition to the warehouse facility, Melissa's has a "state-of-the-art" packinghouse that has been certified organic by California Certified Organic Farmers and Quality Assurance International.

Melissa's has a line of over 600 items. In addition to its lines of fresh specialty and organic fruits and vegetables, the company offers an extensive line of dried f&v products. The company sells under various brand names: Melissa's, Don Enrique, Rookies and Jo-San.

Melissa's may source fresh product directly from the grower or through another broker. Melissa's primary clients are the supermarket chains.

Organic pineapple is not currently among the organic items offered by Melissa's, either fresh or dried. Melissa's does offer dried organic mango and papaya so there may be an opportunity here to provide Melissa's with fresh or dried organic pineapple.

Small Brokers/Receivers/Distributors

East Coast

Global Organic, Ltd. /Specialty Source

Global Organic of Sarasota, Florida is a relatively small distributor with annual sales of around \$5 million. They have mostly regional sales although they do distribute some products nationally.

Lincoln Produce Co.

Lincoln Produce of Miami, Florida is an importer/distributor, mainly of Haitian organic mangos. Lincoln Produce sells both organic and conventional products on both the East and West Coast of the US. Lincoln Produce sells organic products to Albert's Organics and directly to some supermarkets.

Four Seasons Produce

Four Seasons Produce, based in Denver Pennsylvania, offers an extensive line of organic and specialty produce.

InterNatural Marketing

This company is located in Lake Worth, Florida. Owner Chris Bell has 16 years in the business, of which 11 have been in the role of independent importer market for organic growers.

InterNatural mostly sells to the mass market by providing supermarkets with price lists. Occasionally InterNatural sells to Wild Oats or Whole Foods.

West Coast

Earl's Organic Produce

Earl's Organic Produce, located in San Francisco, moves some organic pineapple out of Mexico into the San Francisco market mainly. At least one Whole Foods Market sources organic pineapples through Earl's Organic Produce.

Farmer's Fruit Express

Farmer's Fruit Express works with more conventional products than organic, however, they do occasionally sell organic pineapple.

Made In Nature Fresh

Made In Nature Fresh certified organic products are sold in supermarkets and natural food stores and include dried fruits and vegetables in 3-oz and 8-oz resealable bags, among which is organic pineapple. At various times in the last several years it has been owned by Dole and Sonoma. Recently, Premier Valley Foods, an exclusive producer and marketer of Del Monte dried fruits and nuts in the US, Caribbean and Central American markets acquired rights to pack and market certified organic products under the Made In Nature brand name.

Distribution Channels for Processed Organic Products

The product types with the most potential for growth for fruits are puree, concentrate, IQF frozen fruit, dehydrated fruit and for pineapple alone, crush ("crush" is a product unique to pineapple). Sales for single strength juice are important but more so in Europe than for the United States. In the following discourse, each of these types of processed products will be touched upon individually, along with the ingredients for baby foods, after a discussion of the marketing chain for each product type.

Manufacturers convert raw agricultural products into prepared and processed foods such as canned and frozen foods, ice cream, sorbets, smoothies, fruit flavored yogurts, deserts, convenience foods, etc. They must manufacture a uniformly consistent product and market their product to retailers successfully and profitably. To do so, they must find a source of verifiably organic ingredients in sufficient volumes, when needed, and at a sufficiently low price; process the organic ingredients in a manner that will maintain the organic integrity of the ingredients and then retail the final product at a profit. In addition to concerns with organic certification (processors themselves must be certified by organic certifying bodies), processors must be concerned with food safety issues.

To assure supply, manufacturers in the US may purchase the fruit or a semi-processed ingredient made from the fruit directly from the producer or a processor or may purchase the product from an organic ingredients supplier who acts like a broker or trader for the producer/processor. Because of the prohibitively high cost of transportation of whole pineapples to the US manufacturer, most manufacturers will purchase some form of semi-processed pineapple. For example, a manufacturer of tropical blend frozen concentrate juices will purchase, not the whole fruit, but a frozen pineapple concentrate processed in the country of origin whose specifications and whose processor meets the requirements of the frozen tropical fruit juice concentrate

manufacturer. As has been emphasized previously, each of these parties must be certified as organic by a recognized organic certification body.

Organic Ingredient Distributors/Retailers

Examples of organic food distributors that have or who might handle organic pineapple ingredients for their own use or to distribute to other manufacturers are Beta Pure, Inc., Pure Sales, Global Organic, Ltd., Fine Dried Foods and Organic Ingredients, Inc.

Distributors, in general, tend to specialize in certain types of processed foods (powders, purees, frozen IQF fruit and concentrates and juices, dehydrated, etc.) because different products have different storage, handling and distribution needs (cold rooms, refrigerated trucks, etc) and different materials management and sales training. Some distributors have become sufficiently large to be able to handle almost any processed form of the commodity possible.

In addition to supplying ingredients to other manufacturers, some distributors also produce their own name brands of certain products. Others prefer to act strictly as distributors and provide ingredients and service to manufacturers, and do not develop their own product lines. Beta Pure and Ojai International advertise this as their strategy on their webpages. Both of these companies offer consulting services to processors and manufacturers to help them develop and market a processed product.

Non-Specialized Manufacturer/Distributors of Processed Organic Foods/Food Ingredients

Organic Ingredients

Organic Ingredients is located in Aptos, California. The company provides a diverse range of organic food ingredients, including vinegars, frozen fruits and vegetables, juices, concentrates, puree, puree concentrates, essences and oils. In addition to the ingredients line, Organic Ingredients offers a line of retail products that includes a 3+1 frozen juice, single strength juices, polybag IQF fruits and various condiments. In all, the company has around 65 ingredient products that are sold to organic food manufacturers in the United states, Canada, Asia and Europe to make baby food, baked goods and confections, beverages, fruit snacks and toppings, ice cream and sorbet, jams and jellies, yogurts, and many other products.

Organic Ingredients sources raw materials through both growers and brokers

Tree of Life

The Tree of Life has a line of IQF frozen organic fruit products, all of which are berries. It also has a line of frozen organic smoothie makers made of fresh frozen organic fruit mixes, one of which is a tropical fruit mix. The tropical fruits are mango and banana.

Small Planet Foods

In 1997 Gene Kahn merged several organic and natural food companies, including Cascadian Farm and Fantastic Foods to form Small Planet Foods. In 1998, Muir Glen, a tomato processing company, joined the group. In 1999, Muir Glen, Cascadian Farm and Small Planet Foods were bought by General Mills.

The company is based in Sedro-Woolley, Washington. Cascadian Farms is an organic food manufacturer and produces more than 150 organic foods in seven major food categories. These

include: frozen fruits, vegetables and vegetable blends, ready meals, desserts, juice concentrates and condiments and pickles. The estimate that their market share for their organic juice concentrates is 45% of that category and for the IQF frozen f&v, 83% of that category.

Muir Glen is primarily a manufacturer of organic tomato products, producing more than 50 products in five food categories. Altogether, Small Planet Foods has over 250 organic retail products under their brands.

To provide products to SPF, the producer and processor must be organically certified by a certifying body compatible with SPF certifying bodies. Additionally, the processor must provide copies of both the processor's HACCP program and the producer's production records and undergo an inspection by SPF inspectors. SPF may require changes in the facilities, processes and/or supplier's HACCP program to insure that the supplier provides a product that meets SPF standards for organic integrity, wholesomeness and product quality.

Ojai Organics

Ojai Organics, located in Ojai, California, supplies bulk certified organic ingredients to food manufacturers and food service companies. The company acts as a sourcing agent, or trader, for their clients. The company does not have a retail line, thus avoiding direct competition with clients. Among the products that the company offers are: IQF frozen fruits and vegetables, juices and purees, dehydrated and dried products.

Mr. George Kalogridis provides consulting services to clients, mainly grower/processors. He offers assistance with developing products, labeling and artwork and packaging of products.

Global Organics, Ltd.

Global Organics is located in Arlington, Massachusetts. It is an importer and exporter of organic and natural ingredients.

Beta Pure Foods/Morr Pure Foods, Inc.

Beta Pure Foods, like Organic Ingredients, is located in Aptos, California, is a division of Morr Pure Foods, Inc. The company was formed in 1984 to assist manufacturers of natural foods in sourcing and packaging ingredients, moving product and assisting with formulation and manufacturing processes. Beta Pure Foods also provides marketing services for both producers and manufacturers. The company supplies bulk volumes of product to food manufacturers.

Organic food ingredients offered by Beta Pure Foods include: fruit concentrates and purees and fresh frozen fruit.

Dehydrated Pineapple

Among the distributor/manufacturers of dehydrated organic fruits are Melissa's, Fine Dried Foods International, Made In Nature Fresh, Ojai International and Global Organics, Ltd. Of these, only Fine Dried Foods International specializes in dried fruit products.

Fine Dried Foods International offers dried organic fruit products, among which are 4-5 lb cases of pineapple pieces and rings. Under the True Fruit label, the company offers 1.8-2.5 oz packages of pineapple by the case.

Organic Baby Foods

Most of the large transnational baby food manufacturers already have had some organic baby foods products, cereals, juices or food, in their product lines for some time. Most of them have had these for some time and already have well-established relationships with raw materials suppliers (personal communications, Conrad Timms).

Earth's Best Baby Foods was founded in 1987 and a subsidiary of Heinz, sells a complete line of organic baby foods, cereals, juices and a variety of fresh and processed fruits and vegetables to manufacturers. They operate both in the US and internationally.

Earth's Best at one time attempted a project to develop a product with organic pineapple as an ingredient but lack of sufficient supplies to carry out the R&D caused them to abandon the project and they now have no interest in attempting to develop an organic pineapple product.

Organic Food Retailers

Until recently, retailers of organic products were local or regional natural food stores and health food stores. However, as consumer demand for organic products increased, large mainline mass marketer supermarkets have begun to carry lines of organic products. Also, as the organic market grew, some of the local natural food stores grew with the market and became regional, then national natural/organic food supermarkets. Some of this growth has been through expansion of stores into new regions, some has been through the acquisition of other established local/regional natural/organic/health food stores and/or through mergers. Consolidation, as for the rest of the food industry, is occurring very rapidly in the natural/organic segment of the food industry.

The share of food sales to supermarkets and grocery stores is an estimated 56% as compared to 9% for natural food supermarkets, 11% for health food stores, 14% for farmer's markets and 1% for direct mail catalog sales (Hartman Report, 2000).

In the past, to insure consistent supplies of food that was truly organic, retailers established long-term relationships with wholesalers who purchased a variety of products for them and who provided custom service. More recently, many mass market retailers have started purchasing organic products directly from the producer or processor. Many of these have vertically-integrated their sales and distribution centers. An example of this is Whole Food Markets, which has eight regional distribution centers across the US.

However, it should be pointed out that attempts by the producer to sell fresh fruit directly to a supermarket, especially large supermarket chains, are only successful if the producer can consistently provide a product of the quality required by the retailer. This is also true in the case of processed products, of course. In the case of fresh fruit, retailers expect a quality equal to the conventional product counterpart and year-around supply of volumes that they want, at the price that they offer. If the producer is not capable of meeting these basic requirements, he will not be successful in establishing a long-term relationship with a supermarket chain. Because of the considerable supply of most products and the large variety of items in supply (substitutes), supermarkets have developed considerable clout with their suppliers and will demand price discounts if the quality does not meet their standards and often reject and return product that is below standard. In the last case, the producer-supplier would have to absorb not only the loss of unsold product, but the transportation costs and disposal costs unless he has alternative buyers.

Three fully integrated wholesaler-retailers of natural and organic food products in the United States are: Whole Foods Market, Trader Joes and Wild Oats. These companies retail both fresh and processed products of organic pineapples. In order to understand and appreciate the growth of the retail portion of the organic market, some details on these businesses are provided.

Whole Foods Market

Whole Foods Market was founded in 1980 in Austin, Texas as a single store by three investors, John Mackey, owner of Safer Way Foods and Craig Weller and Mark Stiles, owners of Clarksville Natural Grocery. Since opening twenty years ago, Whole Foods Market has grown to become the largest retailer of natural and organic foods in the world. Whole Foods Market, through growth, mergers and acquisitions currently has 117 stores in 22 states and the District of Columbia with such names as: Wellspring Grocery, Bread of Life, Bread & Circus, Gaiam (formerly Amrion), Fresh Fields, Allegro Coffee, Merchant of Vino and Whole Foods Market. Whole Foods Market is now a Fortune 1000 company, with stock listed on the NASDAQ (WFMI). For three years in a row (1998, 1999 and 2000), it has had the distinction of having been chosen by Fortune Magazine's as one of the "100 Best Companies to Work For In America".

Whole Foods Market's gross sales have grown from \$ 748.7 million in 1995 to \$ 1.6 billion by 1999, an increase in sales revenues of 114% over the five-year period. Third quarter sales performance in 2000 was reported to be \$ 442.6 million, a 23% increase over sales performance for the same quarter in 1999.

Whole Foods Market promotes itself as obtaining its products both locally and worldwide from "small, uniquely dedicated food artisans". Whole Foods Market supplies itself through its own distribution centers. One of which is Texas Health Distributors, which also supplies its on-line marketplace, WholePeoples.com. Prospective suppliers of fresh products must submit product information and samples to the Produce Buyer at one of their seven regional offices. Quality standards are high for their products.

Wild Oats

Wild Oats Markets, Inc. is a natural foods retail family with 110+ stores across the United States and British Columbia. The Wild Oats family of brands includes: Wild Oats Markets, Alfalfa's Markets, Ideal Markets, Capers Markets, Henry's Marketplace, Nature's Northwest/Nature's Fresh, Oasis Fine Foods, Sun Harvest Farms, Sunshine Grocery, Uptown Whole Foods, and Vitamin Expo.

Wild Oats started up in Boulder, Colorado in 1987 by Mike Gilliland and Libby Cook. In 1996, Wild Oats Markets, Inc. issued stock on the NASDAQ (OATS). Sales for the second quarter of 2000 were \$212.8 million, an increase of 23% over sales of \$173.2 million for the same period in 1999.

Wild Oats is very active in community support and charitable activities. It founded the "5 % Day Charitable Giving" program and donated more than \$1.5 million in 1999.

Wild Oats has strict product standards. Products must be organically grown, whenever possible, and in a presentation that is the least processed or unadulterated version of the product available.

Trader Joes

Trader Joes is a regional Southwestern grocery store that is in the process of expanding into the Eastern United States. They carry over 800 gourmet items, among which is a line of organic products.

Section 4. Results of Market Surveys

The US Market for Fresh Organic Pineapples

Instead of beginning with the importer/receiver of fresh pineapple, we will start with the supermarket retailers, the penultimate receiver of the fruit before the consumer. Everyone up the chain back to the producer has to do his job to meet the expectations of the retailers, who are merely trying to sell as much of the fresh product to the consumer as possible and whose expectations, therefore, reflect those of the consumers and the needs of the retailer to meet those expectations profitably.

Retailers of Organic Pineapple

Grades, packaging, sizes and product requirements

In general, organic supermarket retailers of organic products have the same preferences or standards for their organic products as for most supermarkets for the conventional product. Conventional pineapple standards allow for three grades: U.S. Fancy, U.S. Grade No. 1 and U.S. Grade No. 2. The best grade is the U.S. Fancy, followed by the U.S. Grade No. 1 and U.S. Grade No. 2. Supermarkets handling conventional product generally require U.S. Fancy or U.S. Grade No. 1. U.S. Fancy pineapple has the characteristics of being a well-formed pineapple that is clean, ripe without being either over- or under-ripe, free of injury, blemishes and disease; with a single-stemmed, reasonably straight crown that is not more than 1-1/2 times the length of the fruit. U.S. Grade No. 1 allows for some curving of the crown, which may be up to twice the length of the fruit. U.S. Grade No. 2 permits a crown that is “not completely curved over” and “not more than two fairly well-developed stems” (See Annex 2).

Survey of the Offering of Fresh Organic Pineapple in the Produce Departments of Organic Retailers

A telephone survey was made of individual store locations of the three major organic/natural foods retailers: Whole Foods Market, Wild Oats and Trader Joes; to determine whether the product was currently in stock, experiences with organic pineapple and the retail market price. For both Wild Oats and Whole Foods Market, stores located in Florida and Southern and North California were included in the survey. In all, ten stores participated in the survey. The respondent was the Produce Department Manager or an assistant.

Of the ten stores contacted, none of the produce department employees reported currently having organic pineapple in stock.

Trader Joes does not carry organic pineapple in the one store located in Los Angeles that was contacted, nor does Trader Joes offer organic pineapple in any of its other stores, according to the employee interviewed.

Of the three Wild Oats stores contacted (two in Florida and one in Southern California), none currently have organic pineapple in stock, moreover, nor was any available from their distribution centers and none of the store locations in Florida carried organic pineapple at the time of the survey. However, one store in Florida reported having previously carried organic pineapple but that it was too expensive, did not arrive in good condition, had been of poor quality and did not hold for a full week in the store.

In all, six Whole Foods Market stores were contacted. All stores contacted reported having had experience with organic pineapple, although none had the product available at the time of the survey. This is not surprising as the season for natural-flowering organic pineapple ended in August-September. Comments made by produce employees for these stores about organic pineapple generally ran along the same themes: too expensive, poor quality, easier to sell the Hawaii conventional pineapple, not always available, etc. One store reported that they had just thrown out a load of organic pineapple that had arrived and, despite a fair outward appearance, had internal browning. Customers had returned the product and they had taken the product off the shelves. Although at the time of the survey the product was not in stock, the produce managers of four stores offered to acquire the product. One stated that he could have the product in stock within a week, as it was available through Earl's Organics.

Retail prices varied between store locations from around \$1.29/lb to \$1.69/lb for 10s and \$5.99 for whole 12s, for a range of \$1.29-1.80/lb. The average retail price nationwide for conventional fresh pineapple is reported to be about \$1.33/lb (AmericaFruit, Aug-Sep, 2000). From this information the premium for the fresh organic product would appear to be 12%-33%. Conventional wisdom holds organic products to have a 10-25% premium over conventional counterparts, so this appears to be within the expected range. However, although not reported by the retailers surveyed, it is known that in seasons when very good quality conventional fruit is in over-supply, the market price for organic products will drop to that of the conventional product. This has been reported for other fresh organic products and should be expected for organic pineapple, especially as supplies of organic pineapple increase.

In summary, produce department employees report that organic pineapple is not always available. They receive the occasional shipment throughout the year. It often arrives in poor condition. This may be due to the management of the fruit in the field and in packing as there are no complaints about transportation-related post harvest problems, other than IBS. One observation was that the fruit often was bruised, probably at the time of harvest or during packing, and that often IBS and poor crown quality were problems. A respondent noted that his customers, who "could afford whatever they wanted", preferred the Hawaiian conventional pineapple, which was not only cheaper than the organic pineapple that he occasionally has in stock, but was also the far superior quality product of the two.

When asked about the cultivar of organic pineapple that they had sold, most respondents could not identify the cultivar, with the exception of one individual who reported that he had handled Sugarloaf. All respondents felt that the conventionally produced "Hawaii" pineapple (probably Smooth Cayenne) sold better than the organically produced pineapple that they had handled. Whether this is due to the better overall quality of the conventional product or an actual taste and flesh color preference would be difficult to judge. When asked about customer's flavor preferences, most respondents observed that the most important factor seemed to be sweetness, not flesh colour.

Concerning demand by customers, no one was able to provide estimates of volumes that moved through their stores. One respondent, to illustrate the relative importance of organic pineapple in

comparison to his sales of “Hawaiian” pineapple stated that if he sold “500 cases of the Hawaiian”, he might “move two of the organic.” In one case, the most recent shipment of pineapples had all been thrown out because of customer complaints about a quality problem, presumably due to IBS. Two respondents noted that of the organic tropical fruits, the banana and pineapple were the most important but that the banana far out-distanced the pineapple in volume sold.

One of the regional buyers surveyed had the following observations to make concerning his experiences with organic pineapples:

Probably less than 10% of the fruit he received was a U.S. Grade 1 or better and that probably more than 90% was only U.S. Grade 2 or better. Besides the problem of quality with respect to grade, organic pineapple tends to have quality problems with: (1) disease development (IBS, in particular, was mentioned); (2) harvest or post harvest handling (with bruising being specifically complained of); (3) the tops are often in poor condition upon arrival and are of poor quality (double-stemmed, curved - with respect to the curving, it was speculated that the curving was probably due to growing the pineapple on hillsides and poor management of fruit development during production); (4) the “invariable” development of mold on the surface of the cut peduncle and occasionally on the fruit itself and, lastly, (5) supply is erratic, so it is difficult to keep the stores in stock.

Survey of the Offering of Fresh Organic Pineapple in the Produce Departments of Mass Market Food Retailers

Because it is widely reported that mass market supermarket chains are offering organic products alongside conventional food counterparts in their produce departments, a survey of ten large and two regional supermarket chains was made to determine whether the organic pineapple was being incorporated in the product lines of these large food retailers.

Twelve supermarket chains were contacted by email and asked whether any of their store locations offered organic pineapple. Of the twelve companies surveyed, 8 companies responded (66% of supermarket chains surveyed). Of the respondents, seven (58% of supermarket chains surveyed) responded that they did not carry organic pineapples in their stores and one respondent was unsure of whether their stores carried this product as their stores source independently. One respondent added that “there isn’t any demand for them. In fact, we weren’t sure even where to find a source for them”. Four supermarket chains did not respond to the survey.

The eight supermarket chains that responded represent over 7,451 stores across the United States and parts of Canada and none of these carry organic pineapple. As of 1998, the total number of chain supermarkets in the US was reported to be approximately 18,955 and the number of supermarkets retailing over \$2 million annually was 30,300 (Food Review 1998, The Food Institute). Therefore, according to our survey, an estimated 39% of chain supermarkets in the US report that their stores do not offer organic pineapple, or approximately 25% of all supermarkets retailing over \$2 million in annual sales do not offer this product.

Table 3. Twelve mass market supermarkets surveyed

Publix
Bristol Farms
Krogers
Albertsons
Winn-Dixie
A&P Tea Company
FoodLion
Giant Foods
Loblaw Cos. Ltd.
Fleming Cos.
Harris Teeter
Piggly Wiggly

Large National Distributors

An interview with a buyer for CF Fresh indicated that organic pineapple has potential for the growers who are able to consistently maintain product quality and volumes over time. CF Fresh purchases pineapples mostly from Mexico, Honduras and Costa Rica, although they had moved product from other countries from time to time. In his experience, growers might achieve good quality and seasonal volume for the first couple of years of production and then gradually lose control of these, eventually exiting the market. To avoid this pattern, he suggested that growers who wished to succeed must possess or quickly acquire the skills and resources necessary to provide these products year-around, through seasons of high market prices and low market prices (June-July). Newcomers should try to aim for higher volumes during the seasons when Mexico is not in the market (early Fall months).

Marketing problems that he had most often encountered with organic pineapple were mold, poor size and weight, poor grading and internal brown spot.

According to a recent survey by Fintrac International, Albert's organic pineapple is flown in fresh. They report that experiences with the Gold cultivar have been disappointing as the pineapple deteriorates very quickly because organic pineapples are very sensitive. They are very temperature sensitive during shipping and storage and bruise easily. Organic pineapples have problems in shipping and if they arrive with pests (usually an insect), they must be fumigated which increases the customs costs and will result in the product losing its "organic-ness". Once fumigated, the pineapple must then be sold as a conventional pineapple in a market of cheaper, better quality Hawaiian pineapples

Small Brokers/Receivers/Distributors

East Coast

Global Organics moves organic pineapples on occasion and usually in volumes less than a container at a time. When they do get organic pineapples, they usually are sourced out of Mexico or the Dominican Republic and are Smooth Cayenne. They prefer to work directly with producers to source their products, although they will occasionally source through a broker if the market situation necessitates. Supplies for organic pineapple are usually limited and Global Organics moves them when they are available, which is not year around. This “is not a huge seller” for them.

In general, their customers want a sweet pineapple with a brix of around 18% or more. They do know the Sugarloaf but do not handle it. The Monte Lirio was described to the contact and the reaction was they believed that the customer would prefer a yellower, sweeter pineapple for the fresh market.

Lincoln Produce has handled Costa Rican organic pineapples in the past. Those were good quality waxed organic pineapples, Smooth Cayenne, with high brix. Lincoln reports that sales of one 40-ft. container weekly are possible at prices of around \$12.00-22.00/25-box for much of the year. Sales between July and September slow for most tropical fruits because so much other, seasonal fruit comes into the market at that time. He has found that prices for organic pineapple are generally best around May, June and early July. Prices drop after the first of July and don't start to rise again until winter months. Prices tend to be good between Christmas and February if the product is available.

Four Seasons currently imports organic pineapple from the Dominican Republic and have shipped out of Mexico and Costa Rica in the past. Volumes vary depending on the supply and price. Prices vary with supplier. The buyer for Four Seasons Produce believes that there is still more room for organic pineapple and suggests that the Gold cultivar be developed as it is superior to the other types and that new entrants to the market avoid the season that the Costa Ricans and Mexicans are in the market.

InterNatural Marketing has imported pineapple from the Dominican Republic in the past but currently does not handle this item. He is of the opinion that none of the cultivars currently offered to the organic market are good, Cayennes and Sugarloaf being, in his opinion, too large and too expensive. He does believe that there is room in the market for a small “Golden” cultivar.

West Coast

Earls Organics reports that organic pineapple in their area usually comes from Mexico, Honduras and, occasionally, Hawaii. The Mexican organic pineapple that they had handled was generally not as good in quality as the Hawaiian conventional pineapple. Customers for pineapples are generally looking for a clean pineapple with good eating quality, organic quality is secondary. The pineapple must be ripe but not overripe, and consistently ripe. Sometimes, there is a problem with organic pineapples in both the degree of ripeness of the fruit and the uniformity of the ripening throughout the fruit, with some parts being riper than other parts (usually between top and bottom of the fruit, with the bottom ripening in advance of the top). Organic pineapple with high colour, a full shape with nice shoulders sells well. The grade should be similar to that of the conventional pineapples, U.S. Grade No. 1 or better.

Earl's Organics is familiar with the Sugarloaf and believe that it has a good following. They described their product as being white, sweet, low acid with an edible core.

Earl's prefers to work directly with producers. They find that tropicals like the pineapple are sensitive to changes in the shipping conditions and can have problems at arrival. Quality is always an issue. The belief was expressed that the market for organic pineapple is under-developed and that there is room for development, particularly for good quality pineapple. The choice of organic certifier is very important and Oregon Tilth Certified Organically Grown (OTCO or "Oregon Tilth"), Organic Crop Improvement Association (OCIA) and Quality Assurance International (QAI) were recommended for their market. Also, there are transitional programs for growers getting into organic production.

Farmer's Fruit Express does buy organic pineapples from Panama and is currently importing.

Melissa's sources organic pineapples from Mexico. The volumes imported are very variable and depend on the price, but may be around 5-500 boxes weekly. Their wholesale price is \$15.00-17.00/box. The buyer believes that there is room for more organic pineapple but recommends the Gold cultivar.

Pavich Farms has its own production farms in California and Arizona. Pavich brand produce is certified by California Certified Organic Farmers. The market their products to retail supermarkets and health and natural food stores throughout the United States and export to Europe and Japan. Pavich Farm was sourcing pineapple from Costa Rica but does not currently have any in stock and will not carry this item this year.

Jacobs Farm/Del Cabo combines production from its own farms, located in California, with that of small growers in Baja California and in Mexico. Last year they sold small lots, approximately 400 boxes a week, of air-shipped organic Smooth Cayenne grown by a small grower in Mexico into southern California. Beginning in December, they will move to truck transportation, shipping in about one container a week. Air transportation proved to provide only marginal returns.

This is a pilot project to determine whether to continue trying to market the pineapple next based on the results of this year's sales. The opinion was offered that perhaps this was a crop that benefited from economies of scale that small growers do not possess.

Discussion of the US Market for Fresh Organic Pineapple

Market Requirements

Product

The product required by the market is U.S. Fancy, U.S. Grade No. 1 and U.S. Grade No. 2, with U.S. Fancy and U.S. Grade No. 1 being the preferred products. Essentially, the successful organic product must have a quality equal or nearly equal to that of the conventional commercial pineapples. Buyers are looking for healthy, fresh, good-sized fruit that is well-shaped, undamaged and unblemished, and which is certified as organic by a recognized, respected certifying body, preferably one with which they have worked previously. Currently, the cif price must be around \$14-20/40-lb ctn, if the producer can offer his product for a slightly lower price and with a better quality than that reported, he will be more competitive.

FHIA's Post harvest Department ran a time series study on a sample of fresh Monte Lirio pineapple provided by ARAP-Nicaragua. A copy of the results of these tests may be found in Annex 4. The Monte Lirio is a white-fleshed, smallish cultivar with pH of 3-4, which is comparable to other commercial pineapple cultivars and a brix of 9.5-13%, with an average of 11.4% at the butt end and 12.4% at the crown end. The brix is a little low for a commercial cultivar, most of which have a brix of 12-14% (Smooth Cayenne), with some having brix as high as 18-19% (Azucarón). As for the quality of the pineapple tested after 20 days in cold storage, the crowns stayed in relatively good condition. Mold developed on the fruit at levels that would require a fungicide for control for commercial shipments and the cut on the butt end developed mold. This is a problem that has been reported for other pineapple cultivars such as Smooth Cayenne and Azucarón, and is difficult to control, even with fungicides. Approximately half of the 12-unit experiment showed signs of IBS after 20 days of storage. This would indicate that it is susceptible to IBS.

It would appear from this small-scale experiment that Monte Lirio might arrive in fair condition to the US market, although the susceptibility to IBS is worrisome. However, to verify how this pineapple would behave in a commercial shipment would require larger scale shipments. Part of the sample was treated with Piñaseel, an organic coating which has been shown to reduce chilling injury for Smooth Cayenne by nearly half and to a lesser extent for Azucarón and enhance shell shininess. However, it showed no efficacy in either reducing chilling injury or in enhancing shell shininess for Monte Lirio in this test.

The Monte Lirio was unknown to all of the contacts made in the market, not surprising considering that it is not a widely cultivated commercial cultivar. Also, it is my understanding that neither Costa Rica nor Nicaragua (where it is widely grown) has tried any large-scale commercial shipments of this fruit to the US fresh fruits and vegetable market. Most of the contacts, with the particular exception of one, indicated that their experience was that consumers preferred a yellow-gold fleshed fruit above a white-fleshed fruit, as the consumer equated deep flesh colour with sweetness. The exception to that common observation was one natural food supermarket produce manager who stated that he had knowledgeable organic-minded customers who specifically looked for the white cultivar that he occasionally carried (probably Sugarloaf or Azucarón) because they believed that it was sweeter than the yellow commercial variety (Smooth Cayenne or Champaka).

Until recently, most of the organic pineapple in the market has been Sugarloaf, "Mexican white" (probably Sugarloaf or Azucarón) or Smooth Cayenne and Champaka (which looks very much like a "Smooth Cayenne" to the untrained eye). If the Monte Lirio were to have sufficiently good storage life and quality for shipments to the US, it is unlikely that it would compete well against the Smooth Cayenne, because of the flesh colour, nor against the Sugarloaf/Montufar/Azucarón because of its much tarter flavor (lower brix).

Moreover, the advent and success of the very sweet, golden-fleshed Golden Ripe products and the Gold pineapples in the conventional market have put pressure on providers of organic pineapple to offer these new products instead of the traditional products of white-fleshed and Smooth Cayenne pineapples. The "Golden Ripe" pineapples are jet fresh Smooth Cayenne or Champaka that has been picked at a more advance stage of ripeness and so has a deeper shell colour and greater sweetness at the point of sale than for those shipped by sea. The Gold cultivars, newly released cultivars developed by Del Monte and Dole, reportedly have a more golden shell colour and higher brix than other commercial cultivars. These are being sold as a super sweet (brix >14%) premium "variety", at double the price of the Champaka and Smooth Cayenne. As a result

of this the producers will probably have to at least include a “Golden Ripe” or “Gold” pineapple in their product line, if not switch over completely to these.

The problem inherent in switching to the much sweeter, modern pineapple cultivars is their high requirements for agronomic inputs in order to realize high yields and good quality fruit. The “rustic” cultivars Monte Lirio and Montufar require fewer inputs and are hardier than the “modern” cultivars such as Smooth Cayenne, Champaka and the Gold cultivars. Rustic pineapple cultivars tolerate drought, adverse soil conditions and disease much better than modern cultivars as well. Therefore, successfully switching small growers with a history of working with a hardier crop to one that has higher input (cost) requirements and with potentially greater negative consequences for failure to meet the crop’s requirements will be a challenge.

Price

Prices reported by brokers on the East Coast tended to be higher than for those in California. Three brokers on the East Coast reported FOB US port prices ranging from \$10.00-30.00/40-lb two layer carton, with an average low-high price of \$12.00 - 26.00/ctn. California buyers reported FOB California port prices ranging from \$12.80 - 20.00/40-lb two layer cartons, with averages of \$14.00-20.00/carton. The difference in price may reflect a difference in transportation costs as many report receiving Mexican pineapples, which may be trucked into California. East Coast buyers are sourcing from the Dominican Republic and Costa Rica. This fruit would either be shipped maritime or air shipped, both forms of transportation are more expensive than trucking from Mexico to California, hence a difference in price between the East and West Coast price reports.

Customer Service

Clearly, comments by brokers, importers and distributors of organic pineapple all agree in that all report the need to receive consistent volumes of supplies throughout the year and better quality fruit from their suppliers, year after year, in order to build retail demand for fresh organic pineapple.

Apparently, in the past, producers have entered into the market, often initially with good quality fruit. Over time, however, the quality of the fruit deteriorated and with it, prices and returns and the producer would then fade out of the market.

Also, flower induction products were not previously not approved and so not practiced with organic pineapples. Because flower induction was not practiced, supply was restricted to two seasons annually; producers were not able to provide product year around. According to Emily Brown Rosen, Project Director of the Organics Materials Review Institute, the National Organic Standards Board decided in June 2000 to allow the use of ethylene gas to induce flowering (personal communication, November 2000). So, it is now possible to schedule production year around. In order to acquire and retain market share, any producer of organic pineapple must immediately take advantage of this opportunity to supply product to the market year around despite the seasonality of demand. However, the permitted formulation of ethylene is the gas form, which means that small growers will be using compressed gas bubbled through water and applied in the field from the mixing tank by a boom sprayer.

In addition to control of supply, the producer must control communications. One of the most often mentioned frustrations of working with Mexican and Central American suppliers was the lack of quick access to information from the producer. This is not a problem unique to organic producers. Producers must have sufficient communications infrastructure to allow for the quick

transfer of information as needed. This may mean possession of: more than one telephone and fax line, answering machine, cellular telephones and access to email facilities. Good work habits are essential. Provide need-to-know information as soon as it is available and ALWAYS return telephone calls from brokers. Obviously, if the broker cannot speak Spanish, then the producer must have an employee available who both understands the business and speaks the broker's language. This is becoming less of a problem as more and more companies in the US are hiring Spanish-speaking employees.

Demand and Supply

As previously stated, official statistics on the production and/or import volumes of any of the organic products is not available (personal communications, USDA-ERS and FAS, FAOstat, Eurostat). This information might be available from cooperative certifying bodies as they are required to maintain records of their clients' production and sales volumes. However, in the short time allowed for this study, this information could not be acquired. Twenty-seven certification bodies accredited by IFOAM or members of the Organic Trade Association, were contacted and requested information. Only three replied that they certified organic pineapple in the region. Two of three of the major certifying bodies of organic pineapple in Central American demonstrated willingness to cooperate but either do not have the information readily at hand and are too busy to collate the information (BCS OKO Garantie) or require receipt of payment by wire transfer in advance of providing the information (SKAL). One company does not release this information as they feel that it is a conflict of interest (Oregon Tilth). Contacts for these companies will be provided in Annex 3 in the event that ARAP-Nicaragua might wish to pursue this line of research.

Demand by retailers

Nevertheless, we can examine the information gathered from the retailers and major brokers/distributors. Contacts with the major mass market food retailers in the United States (and Canada) indicate that they are not currently offering this product to their customers. Apparently, there is no demand coming from the mass market, large supermarket chain segment of the food industry as yet.

Melissa's, which distributes its products to mass market supermarkets, grocers and regional and local organic/natural foods stores, does report retail sales, probably to the grocers and organic/natural foods stores. Therefore, it may be deduced that currently, most of the demand for fresh organic pineapples in the US is coming from organic restaurants, specialty grocers, regional/local organic/natural food stores, Whole Foods Market and, occasionally, Wild Oats.

Of the three well-known and largest chains of organic/natural foods supermarkets in the US, only Whole Foods Market attempts to keep the product in stock when possible. Wild Oats has tried in the past to stock organic pineapple in their stores but is not currently attempting to do so. Trader Joes does not carry that item in its product line. Targeting sales to these retailers, through their intermediaries, seems to be a viable strategy, if their product requirements can be met.

Geographically, the organic market is, in general, better (i.e., higher demand and prices) in the Northeastern and Pacific Coasts of the United States. However, with the highly developed transportation and distribution infrastructure in the US, brokers receiving fruit in Florida and California may send product all over the United States, Canada and Europe.

Supply

Reviewing the sales volume reported by the importer/brokers/distributors interviewed can give us an estimate of the minimum volumes of organic pineapple imported annually, which will have to serve proxy for estimates for supply volumes. According to the eight respondents who shared this information, the minimum is 237,640 40-lb ctns annually, which is about 198 refrigerated container loads (40-ft) annually or, roughly, four container loads weekly. Obviously, the actual levels of imports are higher than this figure as the number of respondents represents a minority of the whole industry of fresh organic pineapple, although they are all important suppliers to retailers.

Future levels of demand and supply

All of the brokers contacted were of the opinion that the lack of consistent supply of good quality fruit was holding down demand and that there is a great potential for increased sales for organic products of good quality. All expressed great interest in handling additional volumes, especially if the product were of good quality, the right cultivar and available all year around. Few of the brokers asked would venture a guess at what the potential volumes might be, although two suggested that they could handle a container a week at the beginning and perhaps more within a year as demand picked up.

Competitors

Conventional pineapple and other fruit

At the current time, the stiffest competitor for organic pineapple is its conventional counterpart. As the produce managers and buyers in the organic/natural foods supermarkets all attested to, the poor quality and higher price of the organic pineapple when compared to the conventional pineapple, particularly the Golden Ripe and Gold cultivars, resulted in far more sales of conventional pineapples relative to organic pineapples. As one produce manager said, for every “500 cases of the Hawaiian sold,” he might “move two of the organic.”

Domestic production

Brokers report importing Hawaiian-grown organic pineapple. Information on sources and volumes was not forthcoming. However, the variety being shipped is reported to be Smooth Cayenne. Three Hawaiian certifying bodies were contacted to try to ascertain the provenance of the Hawaiian organic pineapple. Only one responded, Hawaii Bio-Organic Growers Association, to respond that there was no export-level production of organic pineapple on Hawaii, although the respondent reported that “white pine” pineapple was grown organically for local (island-chain) consumption. The observation was made that growing organic pineapples in Hawaii was difficult for small growers because disease (lethal yellows), insect (mealybugs) and nematode pests reduced yields. Also, economies of scale due to the cost of infrastructure for the irrigation, harvesting and spray booms, ripening and cold rooms and transportation to the mainland was beyond the means of most small organic producers.

Non-domestic production

Non-domestic sources of organic pineapple are Mexico, the Dominican Republic, Costa Rica, Panama and Honduras.

The most often mentioned source of organic pineapple is **Mexico**. Jacob’s Farm reports working with a small grower on mainland Mexico, who is certified by Oregon Tilth. Oregon Tilth confirms having a grower in San Jose del Cabo, Mexico, which is where this grower is located. Another Mexican producer, Mexican-American (MexAm) Fruit Company, produces Smooth

Cayenne, which it offers in 40-lb two layer cartons, with tags, in counts of 10s, 12s and 14s. MexAm is certified by QAI and OCIA.

Honduras has a number of small organic pineapple producers. Yojoa Fruit Company markets frozen fruit, purees, crushed pulp, juice concentrate and juice, mostly to European markets. Yojoa Fruit Co. markets organic pineapple grown on 70 ha by over 65 independent producers certified by BCS OKO-Garantie, a German certifying body. Production volume is reported to be around 1,480 tons of fresh fruit annually or approximately 1 million fruits. There are two seasons annually for these producers. The peak occurs between May and September, followed by a second harvest from November to February. There are no reports of fresh fruit sales to the United States. The variety grown is Montufar/Sugarloaf.

Other producers in the Lake Yojoa area are certified by SKAL and market their product through CONNATURAS, which formerly was linked to Tradin, a Dutch receiver of organic products. However, CONNATURAS is now owned and operated by RINAGRO, a local processing operation located in San Pedro Sula. Most of the production from these growers was processed and sold to Europe (formerly to Tradin Netherlands).

Dole has a small 2 ha research plot of organic pineapple in La Ceiba. Mssrs. Franz Wielemaker and Martijn Van Es of Dole have been active in the campaign to get ethylene permitted for use to force flower induction.

RIVAGRO has a small production area of organic pineapple that is also certified by BCS Oko-Garantie. Organic Fruit International (OFISA) has a small plot of organic pineapple in the first year of growth.

Little information is available on the number of organic pineapple growers and their production areas in the Dominican Republic or **Costa Rica**. One Costa Rican grower is TropOrganics. The owner/operator is Mr. Dale Johnson, who was also very active in lobbying for the use of ethylene for organic pineapple flower induction. TropOrganics has approximately 40 ha of organic pineapples, certified by Oregon Tilth. TropOrganics produces both fresh and processed organic pineapple for sales in markets in the US and Europe.

Opportunities

Market windows

If gas ethylene has indeed been accepted by the National Organic Standards Board, the resulting year around production will erase the seasonality of organic pineapple production and market “windows” will cease to offer an opportunity. Production will probably be manipulated to allow for year around production with some adjustments in volumes depending on market price and seasonal demand for pineapple. However, this opportunity is available only to those growers who can acquire the equipment and master the technique, which will shut out small growers without the resources to do so. Perhaps, as not everyone is agreement with this development in organic standards, there might develop a market for natural-flowering pineapple for the purist organic aficionados to which these small growers might sell their seasonal pineapple.

Product quality

The failure of others represents an opportunity to oneself. Without one single exception, all of the importers, distributors and retailers of organic pineapples contacted in the course of this study complained of poor product quality and short shelf-life. Therefore, at the present time, to successfully compete in organic pineapple would require delivering a good quality product to the

market ALL of the time. That would require the immediate institution of a really strong-willed, well-trained field and post harvest team to provide growers and packers with the production and post harvest training necessary for them to understand and accept the high production and packing standards required for success and to supervise the selection, grading and packing activities to assure for uniformity and consistency in packing.

Customer service

This issue has been addressed above. Reduction of friction is always a successful strategy in any relationship. This is the result of good communications, i.e. timely, truthful information and responses to inquiries.

Threats

Choice of certifying body

The choice of certifying body for production and processors is very important for sales. All buyers want a product that has been certified by a certifying body whose standards and procedures in record keeping are compatible with those of their own certifiers and who are known and recognized by the consumer. By preference, they would prefer to work with the same certifier(s) as their own. Therefore, it would be advisable to check with prospective clients BEFORE certification to insure that the certifying body chosen to certify the farms is acceptable to the client's certifying bodies. Failure to choose the "right" certifying body could, at best, result in continual problems with conflicts between the certifiers of the buyer and seller and, at worst, another multiple year delay while the producer goes through a re-certification process by a certifying body that is acceptable to the buyer's certifying body.

Volatility of demand

Currently, demand for fresh organic pineapple is not large. It also appears to be very volatile. Reportedly, there are farms in the transitional phase of certification that will come online within the next year or two. Depending on the relative rates of growth of demand and supply, there could be periods in which demand will be low and sales will fall off or prices will fall and others with windfall prices as demand increases faster than supply. To successfully ride these markets, the producer will have to have alternative markets (preferably, domestic) to soak up excess production during periods of low export volumes, particularly if the grower is trying to stay in the market year around. Being in the market year around would allow the producer to form stable relationships with buyers both domestic and abroad. Alternatively, the grower will have to have the capital resources to withstand the periods of low prices and/or low sales volumes.

Market consolidation

As the market continues to consolidate through mergers and acquisitions, the number of buyers and buyers' needs will change. More consolidation will result in fewer buyers. It also means that buyers, as their client base increases as the merged/acquired companies' client lists are pooled, will need larger volumes of products from the smaller pool of providers. Purchasers for importers/distributors will seek out suppliers who can provide their volume needs and with the least management possible; i.e., consistent volumes year around. Therefore, to avoid being marginalized as their clients merge or acquired, producers will be increasingly forced to provide more product year around to avoid losing these fewer customers.

Networking to broaden customer base and strong customer relations will buffer consolidations as well.

Transnational pineapple producers

Apparently, there seems to be increasing interest on the part of large commercial producers of conventional fruits and vegetables to get into organic production of the conventional commodity that they know so well. Dole, Chiquita and Del Monte grow or have grown pineapple in the past. Dole has already shown interest in production of organic pineapples in Honduras. This development could pose a considerable threat to smaller, less cost efficient producers. Large producers such as Dole have the economies of scale to allow them to produce at lower costs and therefore, allow them to sell their product at prices considerably lower than those that smaller producers could sustain. They also have extensive transportation and distribution infrastructure and experience. Two contacts made in the course of this investigation expressed concern about this development.

Market, financial and production forces may discourage the large growers, particularly the transnationals, from over-investing in organic production. First, large companies such as the transnationals must show that each business of the company is realizing sufficiently high returns to justify risk of the venture relative to all other business ventures of the company. Organic production is perceived as riskier than conventional production because of the restricted number of tools at one's disposal to fight diseases and pests, the higher management costs and higher market risks. Also, transnationals generally require a higher internal rate of return than individuals as each business within the company is competing for operating funds and some of those will inevitably have higher returns than will the organic operations, simply by virtue of the much greater sales volumes of conventional products than can be realized currently with fresh organic sales.

On the other hand, if a company such as Dole were to decide to invest heavily in organic pineapple production, they could capture the entire market share almost immediately because of the limited size of the market and their great capital and human resources, as well as their own well-developed transportation and distribution systems. A benefit to the market of such an event would be that the availability of product would allow for more rapid development of manufactured products.

Strategies for small growers to compete in such a market would include consolidation of growers under the umbrella of a marketing cooperative or seeking out niche organic markets in which the transnational would find it difficult to compete, such as biodynamic production which requires a holistic farming approach, such as animal husbandry along with crop production on the same property. The market demand for such products is even more restricted than for merely organic products, but pay much better.

Late introduction phase market entry

If, as is rumored, there is a lot of production area in the transition phase of certification about to become fully certified and should a large grower decide to extend greatly his production area, newcomers will find it difficult to acquire market share without engaging in such competitive strategies as specializing in quality, developing special relationship (joint venture) with a buyer or supplying the larger competitor; i.e., consolidating with either the competition or "integrating" vertically with a buyer.

Dole has expressed an interest in exploring an opportunity to work with the Nicaraguan growers if they should decide to try organic production of pineapple as have importers of fresh and processed organic pineapple.

To compete with other producers as a late entrant in an introductory-growth phase of new product development, producers will have to climb the learning curve quickly to catch up and pass competitors. This requires hiring field technicians/supervisors for production and experienced processor or product development consultants to develop and coordinate field, processing and exporting activities.

Transportation and product quality

High transportation costs relative to competitors will require careful control of other costs to improve margins so that Nicaraguan growers can compete with producers in other countries with lower transportation costs (Honduras). The additional transportation time required for maritime transport of pineapples to Miami via Puerto Cortés in Honduras will also be a disadvantage with Honduran growers in product quality. Careful product quality control would be required.

Table 4. Volumes, Country of Origin and Varieties of Organic Pineapple Handled by Brokers and Distributors in US Market

Company name	Annual volumes (40-lb ctn)		Country of Origin	Variety
	Low	High		
Albert's Organics	15,600	15,600	DomRep, MX	Golden
Better Life	2,080	2,600	MX	
Earl's Organics			MX, HN, Hawaii	Sugarloaf, others
Farmers Fruit Express	62,400	62,400	Panama	
Four Seasons	520	6,240	DomRep, MX, CR	MX "white" CR "Golden"
Global Organics			MX, DomRep	Smooth Cayenne
Jacob's Farm	20,800	62,400	MX	Smooth Cayenne
Lincoln Produce	62,400	62,400	CR, DomRep	White Smooth Cayenne
Melissa's	260	26,000	MX	Golden
MexAm			MX	Golden
New World			MX, DomRep	Mexican "white" DomRep "Golden"
Totals annual sales	164,060	237,640		

Sources: personal communication with company buyers and CDA Market Information Series #2: The US Market for Selected Organic Fresh Fruits, October, 2000.

The US Market for Processed Organic Pineapple

The Fruit and Vegetable Division of the United States Department of Agriculture has developed grades and standards specifically for pineapple juice and concentrates, canned pineapple and

fresh pineapple. Those may be found on the USDA's website at <http://www.ams.usda.gov/standards.htm>. Copies are also included in this report in Annex 2.

In addition to the grades and standards set by the USDA, the Food and Drug Administration has a separate set of regulations controlling food safety standards whose requirements must be met. These may be found at <http://www.fda.gov> or at <http://www.access.gpo.gov/nara/cfr/index.html>.

At a minimum, processors will be required to manufacture organic products that meet the standards and regulations of these two government entities, in addition to maintaining the organic integrity of the product, to be able to import their product into the US as organic. In addition to these requirements, the client may impose additional or more stringent requirements on the processor's Good Manufacturing Practices, HACCP programs or product specifications.

IQF Fruit

Although several companies with online ordering for organic products list frozen pineapple as products, upon inquiry it turns out that, currently, they do not have the product in inventory. Only one company contacted responded positively as currently handling IQF frozen pineapple from Central America. However, he only handles frozen chunks. The importer/distributor would not share production volume as this is a project in early stages. Nevertheless, he was willing to discuss some problems that were being experienced with the product. It appeared that the product was thawing at some point after freezing and then re-freezing. He based that observation on crystallization, clumping and frozen juice forming in the bottom of the bag. He is of the opinion that adequate cold storage and good electricity supply are essential for good quality product.

Other comments made by the buyer were that to build a new product, the manufacturer needs enough material to develop the product into a branded retail product and build up the customer base and so far volumes of organic pineapple had not been consistent enough year around nor had the volumes been large enough for him to purchase enough when the product was in season to hold over inventory with which to work in the off-season. Also, holding product over for off-seasons hurt his cash flows. He was aware of the seasonality of the product.

Another important complaint made was that communications were a "serious problem" and that the only other supplier with such serious difficulties with communications was his supplier in Turkey. He was referring to the difficulty in communicating because of busy trunk lines, lines being out of service, failures with faxes and inability to locate key contacts when he did succeed in getting a call through as well as the failure of the person to return calls or answer faxes. He compared the ability to communicate with his Central American supplier with that of his Chilean suppliers, saying that he NEVER had these kinds of problems with the Chilean suppliers. This underscores the importance to the supplier of insuring that alternative forms of communication are always available to the US buyer and of developing good communication skills; i.e., making promised calls, returning calls promptly, etc.

Another ingredients supplier who does not handle frozen fruit did offer the information that, to his knowledge, only one "true" IQF plant in Central America was capable of freezing IQF organic pineapple of the quality acceptable to his company and that plant was located in Guatemala. This operation is Bon Appetit and it mostly freezes organic broccoli for Finca Cauque (Maria Samayoa).

However, there are other freezing operations in Honduras of which this gentleman probably has no knowledge. One such freezing operation in San Pedro Sula, IMEXA, has, or will soon have, IQF freezing capabilities. Another IQF operation in Honduras is the Dole plant in La Ceiba, which was set up recently to freeze Dole's grapefruit and pineapple sections.

Frozen Juices, Concentrates and Crushes

As for the IQF frozen organic pineapple, several distributors with online ordering of their products list pineapple juice, concentrates and/or crush as products but, in fact, few had the product in inventory at the time of the study. No one could suggest a possible demand or supply volume for these products because of the erratic nature of supply and demand, although all agreed that if such products were regularly in supply that the demand could be developed. Apparently, because of the hiccups in supply, demand is not consistent and vice versa. Most of these suppliers know of different possible sources of the product and when they receive a request for the product, they search out a supplier.

One distributor of fruit juices, purees and concentrates that answered negatively as to having organic pineapple in stock indicated that the reason for not having the product in inventory was that there was almost no demand for the product. This he attributed to there having been very inconsistent supplies of organic pineapple products up until recently. He noted that very few manufactured products use organic pineapple as there had been insufficient supplies available to develop a product. Echoing the words of the buyer of IQF frozen organic pineapple chunks, the buyer noted that until there were solid supplies of these ingredients, progress would be slow in developing the market for any manufactured products from organic pineapple. The "R&D to develop the product's ingredient lists with specifications and flavor profiles and to develop a market base through promotion and taste tests requires a long period of time and a lot of product."

Nevertheless, this contact was certain that there was "a lot of organic pineapple in the pipeline" that would soon be available for just this purpose. He was aware that there are currently a number of farms in the transition phase of certification that would soon be able to sell their product as organic. He observed that if Nicaragua were to start planting organic pineapple in the next year or so, by the time their product was through the certification process, three years later in 2003, they would be entering the market "in the late introductory phase of product development but that with good pricing and good product they might be alright".

Small Planet Foods' Director of Purchasing, Peter LeCompte, purchases ingredients directly from the producer or processor for his company's products. Small Planet Foods (SPF) produces frozen juices and concentrates, among other products.

Mr. LeCompte would not be interested in receiving a single strength juice from Central American producers as he feels that it would be wasteful expense as most of the transportation costs would be in "moving water". He suggested that if the end product were to be juice, that it would probably sell at a better price in Europe and where demand for organic juices is higher. One trader in Honduras of single strength juice to European markets reported having exported some 693 barrels of 490 lb net weight, or 339,570 lbs total weight with an average invoice value of \$0.56/lb in the first three quarters of 20003. There are other such operations in Honduras that are reported to sell their product to Europe or to intermediaries who sell to European buyers.

Mr. LeCompte stated that concentrates would be more interesting from his point of view, although he acknowledged that producing concentrates would involve higher processing costs

because of the need to add an evaporator in the processing line to concentrate the product. SPF sells most of its processed fruit as a fruit juice concentrate in 3+1 “Sonoco” cans (probably a reference to Sonoco Products Co. of Hartsville, SC, a can and paper products company). This product is a juice that has gone through a two-stage evaporation to get a brix of 68 +.

No one lists puree as an organic pineapple product. The closest product might be pulp or pineapple crush but those products are also not offered by any of the buyers of any of the companies interviewed.

Dehydrated and Dried Fruit

Global Organics, Ltd. has dehydrated pineapple on its Go!Organic website product list but does not, in fact, have any in inventory. Nevertheless, their buyer expressed interest in testing and representing new growers, in either or both the US and Europe.

An example of the product specifications for dried pineapple quarter rings that the Global Organics, Ltd buyer provided described the product as follows: Sugarloaf pineapple quarter rings with clean, uniform off-white colour, sweet, consistent pineapple taste, easily chewable and not overly tough, hard or fibrous; and blended with pineapple stem powder (optional). The rings are packed in heat-sealed poly bags in tape-sealed 40-lb cartons. Boxes fit 30 per pallet. Brix is 14.5-16.0 with a moisture content of 5-7%. Where pineapple stem powder is used it comprises 2% by weight of the product. The product must be stored at temperatures below 45 F. Microbiological specifications are: <10,000 aerobic plate count, <3.6/g coliform and *E. coli*, <1,000 yeasts and molds and Salmonella absent in amounts up to 25 g. The product should be certified by an IFOAM accredited certifying body.

The cif US price for dried pineapple rings would be \$2.80-3.00/lb depending on quality and the port to which it is delivered.

Another trader of dried organic pineapple stated that there is demand for dried pineapple but only for product of consistent high quality and that has been lacking in suppliers from certain Central American countries. The same trader was of the opinion that it would be very difficult to find a foreign company willing to invest in the development of a dehydrated pineapple project. Not a surprising statement considering the failure of two such investments in Honduras in recent years.

The experiences of organic processors in Honduras attempting to produce and market dried organic pineapples are instructive. In the last five years, one company, FrutaSol, that produced dried pineapple rings was experiencing cash flow problems and after infusion of cash and a name change, gave up dried pineapple rings. Another company, PROTROSA, started up during this period and was testing several products, among which were dried organic pineapple rings and whole bananas. That company also is no longer in operation. The reasons for the failures of the dried pineapple operations are various and it is difficult to determine how much the market conditions for this product contributed to their failure.

Discussion of the Results of the Market Study for Processed Organic Pineapple Products

In general, ingredients distributors and processors interviewed seem to agree that there are possibilities for the use of organic pineapple for smoothies, yogurts, desserts, snacks, trail mixes, beverages and juice concentrates.

Demand and Supply

There are very few organic processed products currently on the market made of pineapple. There are very few manufacturers who make products from organic pineapple. None of the ingredients distributors contacted carry organic pineapple products in stock. The reason for not carrying these in stock, they say, is because of the low demand for them. The reason for the low demand, according to the distributors and manufacturers contacted, is because few end products made from organic pineapple have been developed due to the lack of raw materials with which to do the research and promotion required for product development. The drawback to increasing the demand for processed products is the lack of raw materials that meets the specifications for quality and hygiene that US manufacturers require.

Opportunities

There does seem to be considerable interest in developing new products made from organic pineapple. What is lacking is the raw material with which to do the research and development.

Although this is primarily a study of the US market for organic pineapple products, one would be remiss in not pointing out that there is a large European market for processed organic pineapple products. Although good quality fresh organic pineapple would be difficult to provide the European market at a reasonable and competitive price, processed products are possible and much of the organic pineapple produced in Honduras is sold to the EU. Mr. LeCompte of Small Planet Foods commented that, while juices had little market in the US (concentrates being the preferred product for the US market), he believed that there was a much larger demand for organic tropical fruit juice in Europe. Some investigation of this seems to bear this opinion out as true. A German consultant, Mr. Conrad Timms, concurred with this comment and provided the name of Voelkel Frucht und Gemusesafte as a long time organic juice manufacturer who might be interested in purchasing organic pineapple juice. Indeed, this company has a request for bid for organic pineapple juice on the internet (www.voekeljuice.de).

Threats

Margins on intermediate processed juices and concentrates are minimal. It is the sale of large volumes of the end product where highly profitable margins are realized. Usually sales of fruit for processing are made to supplement income earned from fresh sales to help pay overhead costs for the production of the fresh product and as a means of profitably disposing of fruit that is not perfect enough for fresh fruit sales. One manufacturer warned of attempting fruit production for sales solely to processors because of the low margins of return.

Should the producer decide to process some portion of his fruit for the purpose of selling the processed product as an ingredient for manufacturers, he must be aware that the specifications for processed products are stringent. In addition to the USDA grades and standards and FDA regulations for certain processed products, manufacturers have their own particular requirements. They require a consistently uniform ingredient within and among batches. The product specifications describe parameters such as product colour, texture, size (chunks, rings, tidbits), pH, brix, soluble solids, moisture (dried products), acceptable levels of foreign matter and packaging. It is absolutely imperative to the success of a processed product project to be able to supply the product with **all** of the specifications as agreed upon. Once the manufacturer and the

producer/processor agree on specifications, any product offered with characteristics outside those agreed upon will usually be rejected by the manufacturer.

Processors must be organically certified by an accredited certifying body that the manufacturer's certifying body recognizes.

Another very important consideration for processing for manufacturers is that many manufacturers in the US now require that the processor provide them with detailed information on their HACCP and Good Manufacturing Practices programs and provide proof of an auditing program. Additionally, they will inspect the facilities to assure that they meet with their own requirements as to hygiene and safety. If conditions in the facilities do not meet their requirements, the manufacturer may require that changes be made before accepting shipments. Small Planet Foods, for example, has such requirements for its ingredients suppliers.

In a visit to a processor near the production area in Ticuantepe, APRONOT, a walk-through of the facilities was sufficient to determine that the physical layout, management and personnel training and the facilities would not meet any US manufacturer's requirements. A copy of the results of the tests made by Levers International of a sample of conventional crushed pineapple from pineapple grown by pineapple grower-members of the cooperative, UPROTIC, was not available for examination of the specifications of the sample, specifically of interest were the microbiological and foreign matter counts.

In the case of the manufactured end product, supermarket shelf space is parceled out to their suppliers, who must pay slotting fees to the supermarket; i.e., they must pay for the shelf space. Competition for slotting space can be fierce and costly. This has previously not a customary business practice for health food/organic/natural food stores. However, as health food/organic/natural food stores change business practices to compete with mass market supermarkets and large manufacturers of conventional products enter into marketing organic products and organic manufacturers begin marketing to mass supermarkets, slotting fees may become the norm for organic products as well. Failure to acquire shelf space and high slotting fees has been the demise of many new manufactured products of marginal start-ups.

Also, new regulations being enforced by the USDA as of 2000 require pasteurization of juices.

Section 5. Results of Production Cost-Benefit Study for Fresh Organic Pineapple

Results of Cost-Benefit Study for Fresh Organic Pineapple

Much of the format and data in the cost-benefit study is based on information provided by Honduran growers and UPROTIC. Where Nicaraguan costs for an item or activity are not known, the Honduran cost for that item, in dollars, is substituted. Other assumptions with respect to costs are that Nicaraguan and Honduran laborers achieve the same daily output. The yields in fruit per area and numbers of the four different grades are based on experiences with Honduran growers in Lake Yojoa. Different soil and weather conditions may cause these to differ from those of the Ticuantepe pineapple production.

The cost of the ethylene application equipment and ethylene gas are estimates provided by an organic pineapple grower in Costa Rica. Actual costs for these to Nicaraguan growers may vary. The cart and application equipment costs are depreciated over three years, the approximate useful life of the planting, assuming that a ratoon harvest will be taken. Also, ethylene gas is not available in Honduras and must be imported. This may also be the case in Nicaragua. If so, the cost of the cylinder, if the small grower is able to import it, may be much higher than the estimated \$50/cylinder used here because of import taxes, freight, etc.

There is no cost for a packinghouse included. Size and cost for a packinghouse would vary considerably depending on the actual output of the packinghouse. Therefore, fixed costs are underestimated. No opportunity cost (land rental) is used as the alternative use and its value for the land in Ticuantepe is unknown. No supervision costs are included as it is assumed that the landowner will supervise himself and has no alternative form of employment. Interest is simple interest on a loan for the total production cost for the period.

Certification cost derives from two activities. The certifying body charges for their oversight over the certification and the goodwill of the use of their name as the certifier. They arrange for an independent inspector to manage the actual process of inspecting and overseeing the record keeping for the certification. The certifying body sets the fees for both their own involvement and that of the inspector. The fee for the initial certification costs and recurring inspection fees are based on the cost for a certification paid for by FHIA in 2000, with some adjustments for transportation costs. The cost of certification as charged by the certifying body is based on those of Oregon Tilth. Actual costs of the initial certification fee and the recurring inspection fees, as well as the fees charged by the certifying body, will vary with certifying body, inspector, area of land that is to be certified, type of organization being certified, time needed to complete the certification and other factors.

Results indicate that if the price for US Grade No. 1 and 2 pineapples packed as 10s and 12s, respectively, in 40-lb two-layer cartons are \$14.00 and \$12.00, respectively, that the grower will realize approximately \$3,100 from one manzana (~1.42 mz = 1 ha) for his two-year investment, approximately 29% on his investment. *Ceteris paribus*, for \$16.00 and \$14.00 for US Grade No. 1 and 2, the net income for the grower for his two-year investment would be \$7,660/mz, a return of 69% and for \$20.00 and \$16.00, a net income of \$14,460, or 123% return on investment. These estimated returns are overestimations of the actual return as packinghouse cost is not included. Actual returns would depend on the cost of a packinghouse, the terms of financing and cost to maintain and operate the packinghouse. Alternatively, if an organically certified packinghouse were available for custom service, the grower could rent or pay a service fee for its use instead of constructing and operating his own.

Conclusions

Fresh Fruit

Generally, the market for organic pineapples appears to be small and volatile. Retailers report having a difficult time promoting fresh organic pineapple because the producer and intermediaries cannot get it to them in sufficiently good quality, consistently enough throughout the year and at a low enough price (considering quality) to promote the product, especially with the premium quality, sweeter, more attractive Gold cultivars in the market year around. Apparently, if a producer were able to provide a good quality, sweet, Gold or Golden Ripe organic pineapple year around, year after year, and at lower cost, he would do quite well. So far, it appears that no one has achieved this.

Despite the apparent positive returns from the cost-benefit study, a grower with only one manzana of organic pineapple would probably not realize positive returns because he would not be able to schedule all of his production to come into harvest simultaneously so that he could fill a container in a few days of harvest and packing. The daily cost of holding a container beyond the minimum allowed time (about four days) is \$100 in Honduras. Also, fruit quality suffers as some fruit is older and more mature on arrival than other parts of the shipment, which may result in poorer than expected returns.

Also, one shipment of organic pineapple annually does not fulfill the goal of year around shipments to the buyer. This means that every year, the grower has to shop around for a buyer willing to handle his fruit and that 51 weeks out of the year, the buyer has to source organic pineapple from someone else. If another producer is able to meet the buyer's desire for year around shipments, the small grower of one manzana will lose his buyer to the grower with higher production volume.

Without a production curve for the cultivar of choice from a typical farm in Ticuantepe, it is difficult to predict how much production area is required to meet a goal of weekly shipments of a minimum of one refrigerated container, but if the expected yield is one container/mz and the goal is a weekly shipment, one would need a production area of around 55-70 mz, minimum. For such a large operation, one would need a larger more sophisticated packinghouse, supervision, security, electrical service, etc. This would increase fixed costs, which would increase the amount of production area needed to cover these costs.

Area could be consolidated through a grower's organization, cooperative or some other cooperative arrangement binding smaller growers into a single operational unit, sharing infrastructure.

However, the single most limiting factor for both production and marketing is the growing conditions of Ticuantepe. Much of the growing area is located in a zone with a distinct, prolonged dry period, no surface water for irrigation and an aquifer that is very deep and, if good water of sufficient output were accessible, the cost to access and use it would be very high (personal communication, Eduardo Lopez Davila, President of UPROTIC, 2000).

While pineapple is xerophytic, it will not produce large fruit quickly in droughty conditions and is usually irrigated in commercial operations when needed. A comment was made by the Mr. Davila (UPROTIC) during the field visit was that after the rains of Hurricane Mitch that the growers in

the region had experienced a record bumper crop and that the 2000 crop had failed to materialize because the region was 50% behind in normal rainfall. This is a clear signal that even the rustic and sturdy Monte Lirio cannot produce under rain-fed production conditions in the region. Irrigation would be a primary requisite for growing a modern variety and the practicality and cost of that would have to be studied carefully before venturing into a large commercial operation with the purpose of exporting weekly to the US. If irrigation cannot be used to supplement rainfall, the size and quality of the fruit will be variable and the ability to meet the production volume goals will be jeopardized in dry years, which will affect sales and marketing. Consistent quality and consistent volumes all year around, year in, year out – those are the goals for the buyer and the producer to gain and maintain market share.

Processed Products

The usual progression of a grower/shipper's evolution is to develop an ability to produce low-cost, high quality fruit for fresh sales. Production that is in excess of that needed for fresh sales, does not meet all of the cosmetic requirements of fresh sales or does not meet all of the requisites of the buyer, is sold to processors or sent to a processor that offers custom services for processing a product that can be sold as a bulk ingredient to manufacturers. The additional income from the sales to the processor or sales of processed bulk ingredient is used to offset overhead costs. This is customary, for example, for citrus cooperatives in Florida. As commented previously, APRONOT, as is, does not appear to be an appropriate facility as a processor for an organic pineapple processed product destined for sale outside of Nicaragua.

Development of a manufactured end product, such as a brand name 3 + 1 organic pineapple concentrate in Sonoco cans, requires considerable investment in research and development of the product, the market and the legal requirements, processing facilities and personnel and management training and promotion and marketing of the product. This is beyond the scope of a single pineapple smallholder, UPROTIC or APRONOT at this point without substantial donations of investment capital and technical assistance.

RECOMMENDATION

The recommendation for both fresh and processed products would be to seek out a sponsor that has capabilities and experience for both processed and fresh products to develop products that would increase demand for both the pineapple of fresh fruit sales and processing quality. An alliance with a sponsor who is knowledgeable about organic production of pineapple and who has the investment capital and production, processing, distribution and marketing infrastructure to relieve the small grower of the financial burden and need for a wide range of business and language skills to be successful in the US organic market, would be a practical option for the beginner producer. There are many examples of these types of arrangements in the organic market. One such arrangement mentioned earlier in this report is that of the relationship between Jacob's Farm and the Del Cabo organic pineapple grower. During the course of this study, several distributors and Dole have expressed interest in exploring a relationship with the growers in Ticuantepe should they decide to try the organic pineapple production, so these opportunities are available.

With respect to processed products, particularly the juices, the option of shipping these to Europe should not be ignored. While delivery of organic pineapple as fresh fruit might be impractical because of the transit time, delivery of processed products is possible. Juices, in particular, are reportedly in higher demand in Europe than in the United States.

Annex 1

Taxonomical treatment of pineapples

Annex 2

Grades and standards for fresh pineapple

Annex 3

List of certifying bodies and contacts for production volumes

Annex 4

Results of Post Harvest Study of a Sample of Monte Lirio Pineapple from Nicaragua

Storage and shelf life of Monte Lirio pineapples from Nicaragua (Sept. 2000)

G. Self, Postharvest Department

Summary

This is the report of a small-scale storage and shelf life trial with Monte Lirio pineapple fruits from Nicaragua. Fruits were treated with Piñaseel, an organic coating that reduces chilling injury in pineapples, and compared with untreated fruits after storage at 9 °C for 18 days and then at 20 °C for 11 days.

The average soluble solids content of the whole fruits was 11.4 °Brix, that of the butt end 12.4 °Brix and that of the crown end 10.3 °Brix. A minimum of 12 – 14 °Brix is generally needed for the export market, but some pineapple varieties can have soluble solids contents of 18 – 19 °Brix. The pH of the juice was similar to values reported for other pineapples and was lower at the butt end of the fruit (3.39) than at the crown end (3.47). The differences in total soluble solids and pH of the juice could be tasted as differences in sweetness and acidity.

The crowns of the fruits stayed in good condition during cold storage and did not deteriorate significantly for up to 4 days at 20 °C. The shells developed an attractive yellow to orange colour during storage at 20 °C. Fungal development on the crown and the shell was light throughout the trial, but still above commercially acceptable levels, meaning that a fungicide would have to be used for control. Fungal development on the butt end of the fruits is very difficult to control even with fungicides, and was similar in this trial to other trials with Smooth Cayenne and Azucarón pineapples.

It is not possible to say from the results of a single, small trial such as this whether or not these pineapples are particularly susceptible to chilling injury (internal or edogenous brown spot, IBS). However, it can be said that the fruit is not immune to chilling injury, because half of the fruits showed some symptoms of IBS during the trial.

Introduction

At the request of Marsha Krigsvold (CIMA) a small-scale storage and shelf life trial was done on Monte Lirio pineapple fruits (Maipure group) sent from Nicaragua. Half of the fruits were treated with Piñaseel, an organic coating for pineapples that reduces the incidence and severity of chilling injury. Chilling injury in pineapples, also called endogenous brown spot, physiological breakdown, blackheart, internal browning (*mancha café* in Spanish) and internal brown spot, occurs when fruits are stored at temperatures of less than 7 °C to 12 °C (although in some cases temperatures less than 20 °C have been reported to cause symptoms). The symptoms of the injury do not become apparent until after the fruit have been returned to ambient temperatures greater than 20 °C to 25 °C. Chilling injury can be present at harvest if preharvest temperatures have been low (this is particularly a problem in subtropical growing areas such as parts of Australia). Shady conditions prior to harvest can also predispose fruit to chilling injury, while fruits low in ascorbic acid may be more susceptible to chilling injury. There is some evidence that pineapple fruits can adapt during low temperature storage, so that symptom development decreases after longer storage times. Chilling injury can be ameliorated by the use of coatings, bags, heat treatments, controlled atmospheres and treatment with ascorbic acid.

Materials and methods

Two lots of pineapples were received, one on August 30 and one on August 31. Each Lot was of two boxes each containing 6 fruits (12 fruits per lot, 24 in total). On September 1 the shells of the fruit of one box from each lot were treated with Piñaseel (Norex International, S.A.), by dipping in a 10 % v:v solution. The fruits were then left to drain before repacking in the boxes. The fruits were not treated with a fungicide. The boxes were put in a 10 m³ cold room set a 9 °C until September 18 when the first assessment was done. The temperature of the room was then increased to 20 °C and further assessments made on September 22 and September 29. Two fruits from each treatment and each Lot were assessed at each time.

Results and discussion

Soluble solids content

The soluble solids content of the juice measured with a refractometer was greater at the butt end of the fruit (12.4 °Brix) than at the crown end (10.3 °Brix) by an average of 2 °Brix, or 2 g 100 mL⁻¹ of juice (Table 1). This is generally so in pineapples and the difference can be up to 4 g of sugar 100 mL⁻¹. The difference between the two ends of the fruit can be tasted. There was an increase in the content of soluble solids after the first assessment (Table 1), but pineapples do not generally sweeten after harvest. There was no change in the content of soluble solids during the second period at 20 °C (Table 1) and the treatment with Piñaseel did not affect the soluble solids content (data not shown).

The average soluble solids content of the whole fruits was 11.4 °Brix, that of the butt end 12.4 °Brix and that of the crown end 10.3 °Brix (Table 1). A minimum of 12 - 14 °Brix is generally needed for the export market, but some pineapple varieties can have soluble solids contents of 18 – 19 °Brix.

Acidity of the juice

The pH of the juice was lower at the butt end of the fruit (3.39) than at the crown end (3.47) (Table 2). As with the difference in sweetness due to the soluble solids content, the difference in pH could be tasted as a difference in acidity. The lower pH at the butt end suggests a greater acid content compared to the crown end, because in other studies on pineapples pH and titratable acidity (acid content) have been inversely correlated. In other studies it has been found that there is more acid and therefore a lower pH at the crown end of the fruit than at the butt end.

The pH of the juice increased during the first 4 days at 20 °C and then did not change during 7 more days at 20 °C (Table 2). There were no differences in juice pH due to treatment with Piñaseel (data not shown). In other studies it has been found that the pH of the juice increases and then decreases (with inverse changes in titratable acidity) during storage at 8 °C. Juice pH has also been reported to decrease as fruits reach full ripeness and then increase as the fruits senesce. Furthermore, juice acidity increases radially from the core outwards. Changes in acidity in pineapples are therefore complex, and it is not surprising that the findings here do not match exactly other reported studies. The range of juice pH values found (3.2 to 3.6) is similar to others reported in the literature.

Condition of the crown

The crowns were in good condition after storage at 9 °C, but began to deteriorate when the temperature was increased to 20 °C (Table 3). After 4 days at 20 °C the leaves had developed yellow borders and after 7 more days were yellowing and turning brown at the edges (Table 3).

Colour and shininess of the shell

The fruits were at the mature green stage when harvested. A few had sunburn and one or two had begun to lighten in colour at the base, but were not yellow. After 4 days at 20 °C the shells had begun to yellow, and after 7 more days were almost completely yellow to orange (Table 4). Treatment of the shells with Piñaseel did not retard shell colour development in this trial as it has done in previous trials. The shells gradually lost shininess with time at 20 °C, and again in contrast to other trials, Piñaseel did not make the shells more shiny (Table 4).

Fungal development on the fruits

Fungal mycelium developed on the fruits during storage at 20 °C, but was light (Table 5). Fungal development on the shells started during storage at 9 °C and remained light for up to 4 days at 20 °C (Table 5). There was further fungal development during the following 7 days at 20 °C, the fruit of Lot 2 being more badly affected than the fruit of Lot 1 (Table 5). Fungal development on the butt scar followed a similar pattern (Table 5). Treatment with Piñaseel had no effect on fungal development on the shell or the butt scar.

The incidence and severity of internal brown spot (IBS)

The incidence of IBS depends on many factors (see Introduction) and a single small trial such as this cannot answer the question of whether a variety of pineapple grown in a particular location is susceptible to IBS and if so to what extent. In addition, there is usually a lot of variation in the severity of IBS within a susceptible batch of fruit, which means that many more fruits than were available for this trial are needed to get reliable estimates.

Incidence is scored as the proportion of fruits in a lot that are affected by IBS. Severity is assessed by cutting slices one floret thick from the base of the fruit and scoring the surface of the fruit thus exposed for IBS using the scale in the Appendix. Slices are successively cut until there is no further sign of IBS. A severity score is then calculated by multiplying the number of affected slices by the highest score for any slice¹.

There was no difference in the incidence of IBS between treated and untreated fruit which was between 0 % and 25 % for up to 4 days at 20 °C (Table 6). After a further week at 20 °C, all of the fruits showed some signs of IBS. The severity of IBS in this trial was light. It tended to increase during storage at 20 °C and tended to be lower in treated fruits (Table 6), but these trends were not statistically significant.

¹ This is the method described to me by Mr. Norbert Bart who got it from the Standard Fruit Company pineapples operation, La Ceiba.

Appendix: Scales used for fruit assessments

COLOUR OF THE CROWN

- 1 green
- 2 green with yellow borders
- 3 more yellow than green
- 4 more yellow than green with brown borders
- 5 no green, yellow with brown

COLOUR OF THE SHELL

- 1 green, no yellow
- 2 10% yellow at the base
- 3 11% to 30% yellow at the base
- 4 31% to 50% yellow
- 5 51% to 80% yellow
- 6 81% to 100% yellow
- 7 yellow with brown spots

INCIDENCE OF FUNGAL INFECTION ON THE CROWN, SHELL AND STEM SCAR

- 1 no fungal development
- 2 <5% of area affected
- 3 5% to 20% of area affected
- 4 20% to 50% infection
- 5 > 50% infection

INTERNAL BROWN SPOT (IBS) (per slice)

- 1 no IBS
- 2 1% to 5% IBS
- 3 6% to 10% IBS
- 4 11% to 25% IBS
- 5 26% to 50% IBS
- 6 > 50% IBS

SHININESS OF THE SHELL

- 1 shiny
- 2 more shiny than dull
- 3 more dull than shiny
- 4 dull

Table 1 The total soluble solids content as °Brix of the base and the top of Monte Lirio pineapples from Nicaragua stored for 18 days at 9 °C and then at 20 °C for a further 11 days. The data are the mean values for four fruits per position assessed at each time.

Treatment	Time in storage at 9 °C + time ripening at 20 °C			Average
	18 d	+ 4 d	+ 11 d	
Base of the fruit (Control and Piñaseel)	11.8	13.1	12.3	12.4
Top of the fruit (Control and Piñaseel)	9.5	10.8	10.6	10.3
Average	10.7	11.9	11.5	

Table 2 The pH of juice from the base and the top of Monte Lirio pineapples from Nicaragua stored for 18 days at 9 °C and then at 20 °C for a further 11 days. The data are the mean values for four fruits per position assessed at each time.

Treatment	Time in storage at 9° C + time ripening at 20 °C			Average
	18 d	+ 4 d	+ 11 d	
Base of the fruit (Control and Piñaseel)	3.26	3.50	3.40	3.39
Top of the fruit (Control and Piñaseel)	3.30	3.59	3.54	3.47
Average	3.28	3.54	3.47	

Table 3 The condition of the crown of Monte Lirio pineapples from Nicaragua stored for 18 days at 9 °C and then at 20 °C for a further 11 days. The data are the mean values for eight fruits assessed at each time.

Treatment	Time in storage at 9 °C + time ripening at 20 °C			Average
	18 d	+ 4 d	+ 11 d	
Control and Piñaseel	1.0	2.0	3.5	2.2

Table 4a The colour of the shell of Monte Lirio pineapples from Nicaragua stored for 18 days at 9 °C and then at 20 °C for a further 11 days. The data are the mean values for eight fruits assessed at each time.

Treatment	Time in storage at 9 °C + time ripening at 20 °C			Average
	18 d	+ 4 d	+ 11 d	
Control and Piñaseel	1.0	3.0	6.7	3.6

Table 4b The shininess of the shell of Monte Lirio pineapples from Nicaragua stored for 18 days at 9 °C and then at 20 °C for a further 11 days. The data are the mean values for eight fruits assessed at each time.

Treatment	Time in storage at 9 °C + time ripening at 20 °C			Average
	18 d	+ 4 d	+ 11 d	
Control and Piñaseel	2.0	2.9	3.5	2.8

Table 5a Fungal development on the crown of Monte Lirio pineapples from Nicaragua stored for 18 days at 9 °C and then at 20 °C for a further 11 days. The data are the mean values for eight fruits assessed at each time.

Treatment	Time in storage at 9 °C + time ripening at 20 °C			Average
	18 d	+ 4 d	+ 11 d	
Control and Piñaseel	1.0	2.0	2.0	1.7

Table 5b Fungal development on the shell of Lot 1 and Lot 2 Monte Lirio pineapples from Nicaragua stored for 18 days at 9 °C and then at 20 °C for a further 11 days. The data are the mean values for four fruits per Lot assessed at each time.

Treatment	Time in storage at 9 °C + time ripening at 20 °C			Average
	18 d	+ 4 d	+ 11 d	
Lot 1 (Control and Piñaseel)	2.0	2.0	2.5	2.2
Lot 2 (Control and Piñaseel)	2.0	2.7	4.0	2.9
Average	2.0	2.4	3.2	

Table 5c Fungal development on the peduncular scar of Lot 1 and Lot 2 Monte Lirio pineapples from Nicaragua stored for 18 days at 9 °C and then at 20 °C for a further 11 days. The data are the mean values for four fruits per Lot assessed at each time.

Treatment	Time in storage at 9 °C + time ripening at 20 °C			Average
	18 d	+ 4 d	+ 11 d	
Lot 1 (Control and Piñaseel)	2.7	3.2	4.7	3.6
Lot 2 (Control and Piñaseel)	2.7	4.7	5.0	4.2
Average	2.7	4.0	4.9	

Table 6a The incidence of internal brown spot (IBS) in Monte Lirio pineapple from Nicaragua untreated or treated with Piñaseel and stored for 18 days at 9 °C and then at 20 °C for a further 11 days. The data are the numbers of fruit out of 4 affected by IBS.

Treatment	Time in storage at 9° C + time ripening at 20 °C			Average
	18 d	+ 4 d	+ 11 d	
Control	1	1	4	2.0
Piñaseel	0	2	4	2.0
Average	0.5	1.5	4.0	

Table 6b The severity of internal brown spot (IBS) in Monte Lirio pineapple from Nicaragua untreated or treated with Piñaseel and stored for 18 days at 9 °C and then at 20 °C for a further 11 days. The data are the mean values for the fruit affected by IBS.

Treatment	Time in storage at 9° C + time ripening at 20 °C			Average
	18 d	+ 4 d	+ 11 d	
Control	1.0	0.7	6.5	2.7
Piñaseel	0.0	1.0	4.5	1.8
Average	0.5	0.9	5.5	

Annex 5

Contact Information for Organic Industry Businesses

INTERNATIONAL ACCREDITATION, AFFILIATIONS AND INSTITUTES

International Federation for Organic Agricultural Movements (IFOAM)

Location: Tholey-Theley, Germany
Contact name: Robert Simmons(USA)
Telephone:
Fax:
Email: fvointl@aol.com
Webpage: www.ifoam.org

International accreditor of organic certification bodies.

Organic Materials Review Institute (OMRI)

Location: Eugene, OR
Contact name: Emily Brown Rosen, Project Director (NJ)
Telephone: 609-737-8630 (NJ)
Fax: 541-343-8971 (OR)
Email: ebr@omri.org
Webpage: www.omri.org

Organization that does research and review of permitted/prohibited materials for use in organic crop production.

Organic Trade Alliance (OTA)

Location: Greenfield, MA
Contact name:
Telephone: 413-774-7511
Fax: 413-774-6432
Email:
Webpage: www.ota.org

Organization of certifying bodies and other groups in the United States.

ORGANIC CERTIFYING BODIES

There are many organic certification bodies in many countries worldwide, some of which only certify in their country, others of which are international in scope. Lists of these may be found on the OTA, NOSB and IFOAM websites, although much of the contact information is no longer correct. The following are organic certifying bodies known to certify organic pineapple in Central America and Mexico.

BCS – OKO GARANTIE

Location: Nurnberg, Germany
Contact name: Peter Grosch, General Mgr.
Telephone: 49-911-49176
Fax: 49-911-492-239
Email: bcsgermany@aol.com

SKAL

Location: Netherlands
Contact name: Jan-Willem Heezen
Telephone: 31-38-426-8181
Fax: 31-38-421-3063
Email: www.skal.com
Research and statistics

Location: Peru
Contact: Jaime Cartero
Telephone: 51-1-445-7558
Fax: 51-1-444-4542
Email: SKAL@peru.to
regional certifier for SKAL

Oregon Tilth

Location: Oregon
Contact name: Connie
Telephone: 503-378-0690
Fax: 503-378-0809
Email: organic@tilth.org

BROKERS, IMPORTERS, RECEIVERS, TRADERS, DISTRIBUTORS OF FRESH ORGANIC PINEAPPLE

Albert's Organics

Location: Bridgeport, NJ
Contact name: Donald Lusk, Head buyer
Telephone: 1-800-899-5944
Email: Donald@albertsorganics.com

Blue Book credit rating of (150) XXX148(40)C. (148) indicates some reports of performance of less than XXX. C rating for payments of 29-35 days. Affiliated with Tree of Life.

CF Fresh

Location: Sedro-Woolley, Washington
Contact name: Luis Acuña
Telephone: 360-855-0566
Fax: 360-855-2430
Email: luis@rootabaga.com
Webpage: www.rootabaga.com

Blue Book rating of 200M XXX and a Red Book rating of B *** II (100M, good trading ability and payment practices within acceptable limits). Would be interested in talking to growers about marketing fresh organic and transitional pineapple. Also provide technical assistance and assistance in finding certification bodies. Very active with Honduran growers.

Tree of Life, Inc., Corporate HQ

Location: St. Augustine, FL
Telephone: 904-824-4699
mail: www.treeoflife.com

Blue Book rating of XXX B (payment within 22-28 days).

Melissa's

Location: Los Angeles, CA
Contact name: John Sanders, Category Merchdsg.
Telephone: 513-831-9883

Location: Los Angeles, CA
Contact name: Jeff Phillips
Telephone: 323-588-0151

CHEMONICS INTERNATIONAL, INC.

Fax: 513-831-9886
Email: johns@melissas.com
Webpage: www.melissas.com

Blue Book rating of 400M XXX C.

Global Organics, Ltd.

Location: Sarasota, FL
Contact name: Mitch Blumenthal
Telephone: 941-952-1198
Fax: 941-952-9739
Email: blumen@kudos.net

Not given a rating in Blue Book although listed.

Lincoln Produce

Location: Miami, FL
Contact name: Chuck Fiorenzi
Telephone: 305-635-1114
Fax: 305-635-0338
Email: ldschuck@aol.com

Would be interested in talking to growers about marketing fresh organic pineapple. Rated XXX (83) by October 2000 Blue Book. Payment usually within 29-35 days although some reports of up to 60+ days. Red Book gives a 65* (request a Red report) flag.

Four Seasons Produce

Location: Denver, PA
Contact name: Jason, Hollinger, Buyer
Telephone: 1-800-422-8384
Fax: 717-336-5791

Blue Book gives this company a rating of 1000M XXXX B.

InterNatural Marketing

Location: Lake Worth, FL
Contact name: Chris Bell
Telephone: 561-0048
Fax: 561-586-2863
Email: cbell@internaturalmarketing.com
Webpage: www.internationalmarketing.com

Not listed in Blue Book. Red Book gives a rating of 147 (limited credit information). Would be interested in talking to growers about marketing fresh organic pineapple.

Earl's Organics

Location: San Francisco, CA
Contact name: Earl Herrick
Telephone: 415-824-7419
Fax: 415-824-7819
Email: earlorg@pacbell.net

Would be interested in talking to growers about marketing fresh organic pineapple. Rated XXX (81) in Blue Book. Red Book gives a *** (good trading practices) and II (satisfactory pay practices).

Farmer's Fruit Express

Location: Leggett, CA
Contact name: Phil Corlay
Telephone: 707-925-6453
Fax: 707-925-6454

Red Book rating is *** C (250M) and Blue Book gives a rating of 100M XXX AB (15-21 days).

Jacob's Farm

Location: Pescadero, California
Contact name: Skye Ogden
Telephone: 650-879-0580
Fax: 650-879-0930
Email: info@jacobsfarm.com
Webpage: www.jacobsfarm.com

Blue Book rating is 400M XXX. Would be interested in talking to growers about marketing fresh organic pineapple.

Made In Nature Fresh

Location: Sebastopol, CA
Contact name: Ren Lawrence
Telephone: 707-824-2099
Fax: 707-824-2005
Webpage: www.madeinnature.com

Blue Book report is (150) XXX 148(83). No financial reports are available for credit rating. Trading ability good (some reports less than good). Further information about company is available upon request. Company has been sold and re-sold during past three years.

Mexican American Fruit, Inc.

Location: San Diego, CA
Contact name: Lilian
Telephone: 619-671-9311
Fax: 619-671-9833
Webpage: www.mexam.com

Rating by Blue Book: XX 147 (conflicting reports, some say better than XX).

Pavich Farm

Location: Terra Bella, CA
Contact name: Helen Pavich
Telephone: 661-391-1000
Fax: 661-391-1019
Email: pavich@pavich.com

CHEMONICS INTERNATIONAL, INC.

Webpage: www.pavich.com

Listed in the Blue Book but not given a rating. Red Book gives company a *** 124 rating for good trading practices and "officers and/or owners connected with other firms.

PROCESSORS, DISTRIBUTORS OF PROCESSED PRODUCTS, INGREDIENT SUPPLIERS AND MANUFACTURERS

Dole

Location: San Jose, Costa Rica
Contact: Martin Van Es or Franz Wielemaker
Telephone: 506-287-2170

Would be interested in visiting area and exploring possible relationship with growers.

Small Planet Foods

Location: Sedro-Woolley, CA
Contact name: Peter LeCompte
Telephone: 360-855-2720
Fax: 360-855-0444
Email: peter.lecompte@smallplanetfoods.com
Webpage: www.smallplanetfoods.com

No Blue Book or Red Book rating, which is not unusual as these are designed for handlers of fresh f&v, not processors or manufacturers.

Beta Pure /Morr Pure Foods, Ltd

Location: Aptos, CA
Contact name: Nathan Morr
Telephone: 831-685-6565
Fax: 831-685-6559
Email: nate@betapure.com
Webpage: www.betapure.com

While listed in the Blue Book, Beta Pure has no rating. Not listed with the Red Book. Interested in providing consulting and marketing services.

Pure Sales

Location:
Contact name: Jimmy Silver
Telephone: 714-540-5455
Fax:

Not listed in either the Blue or Red Book.

Produce Unlimited

Location:
Contact name: Myra
Telephone: 619-710-0658
Fax:

CHEMONICS INTERNATIONAL, INC.

Not listed in either the Blue or Red Book.

Fine Dried Foods International

Location: Capitola, CA
Contact name: Rusty Brown
Telephone: 831-426-1413
Fax: 831-426-0870

Not listed in either the Blue or Red Books.

Earth's Best Baby Foods

Location:
Contact name: Jordon Smith
Telephone: 702-829-4930
Fax:

Do not currently use pineapple. Not listed in either the Blue or Red Book.

PurePak Foods

Location: Oxnard, CA
Telephone: 805-485-1127
Fax: 805-983-6020

Do not currently use pineapple. Blue Book rated as XXX 148.

Annex 6
Cost-Benefit Worksheets