

# **Potential Impacts of Cuban Citrus on Florida's Citrus Industry**

Economic and Market Research Department  
**Florida Department of Citrus**

**September 20, 2000**

Working Paper Series 2000-2

EMRD Working Papers are generally speeches and research reports to the Florida Citrus Commission and other industry organizations. The content focuses on research results and industry implications. Technical details of the analytical models are presented in other professional and EMRD publication outlets.

**ECONOMIC AND MARKET RESEARCH DEPARTMENT  
FLORIDA DEPARTMENT OF CITRUS**

**DIRECTOR: Philip F. Lesser, Ph.D.**

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**WEB SITES:** [www.fred.ifas.ufl.edu/citrus](http://www.fred.ifas.ufl.edu/citrus)  
[www.floridajuice.com](http://www.floridajuice.com)

**LAKELAND OFFICE:** 1115 East Memorial Boulevard  
Post Office Box 148  
Lakeland, Florida 33802-0148 USA

Telephone: 863-499-2542  
FAX: 863-499-2436  
E-Mail: [plesser@citrus.state.fl.us](mailto:plesser@citrus.state.fl.us)

**GAINESVILLE OFFICE:** c/o Food and Resource Economics Department  
Institute of Food and Agricultural Sciences  
University of Florida  
2125 McCarty Hall  
Post Office Box 110249  
Gainesville, Florida 32611-0249 USA

Telephone: 352-392-1874  
FAX: 352-392-8634  
E-Mail: [mbrown@fred.ifas.ufl.edu](mailto:mbrown@fred.ifas.ufl.edu)

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# **Potential Impacts of Cuban Citrus on Florida's Citrus Industry\***

## **Introduction**

The Cuban citrus industry has experienced dramatic changes following the fall of Communism in the former Soviet Union and Eastern Europe (Muraro and Spreen; Muraro and Spreen and Gonzalez; Spreen, Gonzalez and Muraro; Gonzalez and Spreen; Gonzalez). Cuba's citrus industry has gone from operating in a socially planned economy with barter-arranged prices to a free market economy where prices are competitively determined. With recent developments on easing restrictions on U.S. exports to Cuba, the likelihood of trade between the U.S. and Cuba appears to have increased, raising questions about how trade normalization might impact Florida citrus. The purpose of this paper is to provide background information on the Cuban citrus industry and consider possible impacts on the Florida citrus industry that may result from opening citrus trade with Cuba. Given present low consumer income levels in Cuba, potential sales opportunities for Florida citrus in Cuba in the near future are thought to be small and are not considered here. The focus is on how potential Cuban citrus exports to the U.S. might impact the Florida citrus industry.

## **Overview of Cuban Citrus Acreage and Production**

Cuban citrus acreage is estimated to be about 20% as large as Florida's citrus acreage. However, due to lower yields, Cuban citrus production, as measured as a percentage of Florida's production, is much smaller. For the 1998-99 season, Cuban citrus production is estimated to be about 8% as large as

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\*Presented by Mark G. Brown, Senior Research Economist, Florida Department of Citrus, to the Market and Economic Research Committee, Florida Citrus Commission, September 20, 2000, Lakeland, Florida [Working Paper Series 2000-2].

Florida's production (Table 1). Cuba's citrus production in 1998-99 was larger than the combined production of Texas and Arizona, but about 36% as large as California's production.

Cuban production of oranges and tangerines is relatively small. Cuba produces about 1% of the oranges in the world <sup>1</sup> and accounts for 1% to 1.5% of the world's oranges utilized for processing (Table 2). About 75% of Cuba's oranges are utilized for processing; most of Cuba's oranges utilized fresh are consumed domestically. Cuba produces less than 1% of the world's tangerines (Table 3).

In contrast to oranges and tangerines, Cuba is a relatively large producer of grapefruit. Following the U.S. and Israel, Cuba was the world's third largest producer of grapefruit from 1997-98 through 1999-00 (Table 4). Cuba and Israel have been producing about 8% and 9% of the world's grapefruit, respectively. In contrast, the U.S. share has been about 63% to 64%. Cuban fresh grapefruit exports have accounted for about 5% of the world's total, while Cuban processed grapefruit has accounted for 12% to 13% of the world's total.

### **Cuban Orange Juice Production and Fresh Oranges**

Cuban orange juice (OJ) production is a small fraction of OJ production in the U.S. and Brazil. Average Cuban OJ production in the last three seasons is estimated at 39 million single-strength-equivalent (SSE) gallons per year, versus average U.S. and Brazilian production at 1,352 and 1,787 million SSE gallons, respectively (Table 5). Cuban OJ production is about 1.2% of aggregate Cuba, U.S. and Brazil production. Most Cuban OJ is made from Valencia oranges (Gonzalez and Spreen). Potential Cuban OJ exports to the U.S. would be expected to help satisfy blending needs, with probably little impact on

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<sup>1</sup> World production (USDA, Foreign Agricultural Service, "World Horticultural Trade and U.S. Export Opportunities," August 2000) excludes some production by minor producers.

price. Given that Cuban OJ production and exports are relatively small, Cuba is considered generally to be a OJ price taker (trades at the world price, without affecting it), with the price largely determined by the availability of Brazilian and U.S. OJ.

Opportunities for Cuban fresh oranges in the U.S. appear to be limited, with the U.S. market for fresh oranges dominated by supplies from California, Arizona, Florida and Texas (Gonzalez and Spreen). In the last three seasons, Cuba has consumed about 2.4 million boxes of fresh oranges annually, and has exported about .3 million boxes. U.S. consumption of fresh oranges in 1997-98 was slightly over 4 billion pounds (14.9 pounds per capita) or 44.8 million 90-pound boxes, with imports under a million boxes (USDA).

### **Grapefruit Production and Utilization in Cuba and Florida**

Cuba has been producing about 8 million 85-pound boxes of grapefruit, versus about 50 million boxes for Florida (Table 6). Roughly 6 million boxes or about 75% of Cuba's grapefruit is processed, with grapefruit juice (GJ) production estimated at about 21 million SSE gallons. Cuban GJ production is equivalent to about 14% of Florida's GJ production. In the last three seasons, Florida fresh and processed grapefruit utilization has averaged roughly 40% and 60%, respectively.

Fresh grapefruit consumption in Cuba is about a million boxes, with another million boxes being exported.

The relatively large size of the Cuban grapefruit industry suggests that opening up the U.S. market to Cuban fresh grapefruit and GJ may result in significant impacts on Florida.

## **Potential Impact of Cuban Fresh Grapefruit Exports to the U.S.**

In recent years, U.S. fresh grapefruit consumption has been about 1.5 to 1.6 billion pounds (5 to 6 pounds per capita), with Florida supplying about 45% to 55% of the market (Table 7). U.S. fresh grapefruit consumption increased from 1989-90 to 1992-93, leveled off over the next several seasons, and then reached a high point in 1996-97, after which consumption has been declining. Recent Cuban fresh grapefruit exports of slightly over a million boxes per season equal about 92 million pounds or roughly 5% the size of the U.S. market and 10% of Florida's domestic fresh grapefruit market share.

Various scenarios for Cuban fresh grapefruit exports to the U.S. might be considered, depending on crop sizes and fresh versus processed utilization<sup>2</sup>. However, present Cuban exports are used here as a starting point in considering potential impacts on the Florida citrus industry. The question is asked, what would be the impact on Florida's fresh grapefruit FOB price if Cuba's average fresh grapefruit exports of slightly more than a million boxes or 92 million pounds were put in the U.S. market? This scenario assumes that processed utilization would decrease, freeing up fresh grapefruit to export to other world markets; or Cuban grapefruit production increases to supply these markets. The analysis is partial in that it does not take into account the interrelationships between the various world markets for fresh grapefruit,

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<sup>2</sup> The displacement of Florida product by Texas product in the U.S. fresh grapefruit market in the last decade provides a parallel that may be useful in assessing the potential impact of opening up the U.S. market to Cuban grapefruit. Recent Texas grapefruit production has been at about 6 million boxes which is comparable to Cuba's production of about 8 million boxes. Over the last decade, strong growth in Texas fresh grapefruit shipments to the domestic market has been a notable factor underlying the decrease in Florida's share of the U.S. fresh grapefruit market from over 70% in 1990-91 to 45.5% in 1999-00; another factor has been the increasing supplies of other fresh fruit in the U.S. market. Texas shipments were virtually zero in 1989-90 and 1990-91 due to the 1989-90 freeze. Since then Texas' grapefruit production and fresh shipments have been increasing, with their fresh grapefruit shipments to the U.S. and Canadian markets standing at an estimated 245 million pounds in 1999-00 or about 37% the size of Florida's certified shipments of 657 million pounds to these two markets.

as well as interrelationships between fresh and processed grapefruit markets. Cuba would be expected to reallocate fresh grapefruit from other world markets like Europe to the U.S. only if the U.S. (net) price were higher than in the alternative markets. Reallocation of Cuban fresh grapefruit to the U.S. would tend to decrease the U.S. price and increase the prices in the other markets, until all prices, net of transportation costs and tariffs, were equal across countries.

To answer the above question, an equation relating the Florida fresh grapefruit FOB price to Florida domestic fresh grapefruit shipments, other domestic fresh grapefruit consumption and time<sup>3</sup> was estimated. This equation was then used to calculate the impact on price of putting an additional 92 million pounds of Cuban fresh grapefruit in the U.S. market. The results indicate that the additional Cuban fruit might decrease price by \$.34 per 42.5-pound carton (Table 8).

As alluded to above, the foregoing estimated price decline does not take into account possible reallocation of fresh grapefruit by either Cuba or Florida among world markets due to the estimated price change. Opportunities in world fresh grapefruit markets may limit the amount of product Florida and Cuba might put in the U.S., resulting in a smaller FOB price decline (alternatively, weak demand in world markets may result in more Florida and Cuban grapefruit being allocated to the U.S., which may further decrease prices). Alternative Cuban fresh grapefruit shipment scenarios (23, 46 and 92 million pounds) are shown in Table 9, with Florida domestic and export fresh grapefruit opportunities assumed to be fixed. The results in the table indicate that the decline in Florida fresh grapefruit FOB revenue might range from \$1.6 to \$10 million, depending on Cuban shipment level and the model used to make the estimate.

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<sup>3</sup> U.S. income was also considered as an explanatory variable but was dropped due to the high correlation between this variable and time.

It should be noted that most fresh grapefruit consumed in the U.S. market is red seedless grapefruit, and Cuba may be limited in supplying this variety. White versus red seedless grapefruit production levels in Cuba are not known, but Gonzalez and Spreen indicate that most Cuban grapefruit is white seedless grapefruit, although more red seedless grapefruit has been planted in recent years.

Another point to note is that Cuba's fresh grapefruit season begins earlier than the Florida season. Cuba starts harvesting grapefruit in mid August and could be supplying the U.S. market during the August-September season, when little Florida fresh grapefruit is available and prices tend to be high.

### **Potential Impact of Cuban Grapefruit Juice Exports to the U.S.**

The above approach for analyzing potential Cuban fresh grapefruit exports to the U.S. was also used to analyze potential Cuban grapefruit juice exports to the U.S. An equation relating the Florida FOB delivered-in price for GJ to the availability of Florida GJ (beginning inventory plus production)<sup>4</sup> was estimated. Then, average Cuban GJ exports of 21 million SSE gallons were assumed to be shipped to the U.S. market (Florida), increasing Florida availability. Based on the estimated equation, this additional volume of GJ would decrease the Florida delivered-in price by \$.20 per pound solids (Table 10). Applying the \$.20 per pound solids price decline to average Florida GJ production of 149 million SSE gallons for the last three seasons indicates that Florida's delivered-in revenue, as well as its on-tree value assuming constant pick and haul costs, could decline by nearly \$30 million.

Again, it should be noted that the analysis is partial and does not take into account the interrelationships of the different world markets for GJ. Reallocation of Cuban GJ from other world

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<sup>4</sup> In preliminary analysis, price responses related to only supplies in the domestic market were estimated. For this analysis, (total) availability was replaced by domestic availability, estimated by subtracting exports from total availability. The price response results for these two measures of availability were essentially the same.

markets like Europe to the U.S. would be expected only if the U.S. price were higher than in the alternative markets. Reallocation of GJ to the U.S. would tend to decrease the U.S. price and increase the prices of GJ in the other markets, until all prices, net of transportation costs and tariffs, were equal across countries. If Cuba were to ship 5.3 or 10.6 million SSE gallons of GJ to the U.S., as opposed to the 21 million gallons assumed for the above price/revenue estimate, the Florida delivered-in value is estimated to decrease by \$7.5 and \$15 million, respectively. As noted in Table 10, the foregoing price and revenue decline estimates are based on a linear model; results based on a double log model suggest the price and revenue declines may be roughly half those for the linear model.

### **Concluding Comments**

Cuba's orange industry is relatively small, with their orange production accounting for about 1% of the world's production and their OJ production accounting for about 1.2% of aggregate Cuban, U.S. and Brazil OJ production. Cuban OJ is made largely from Valencia oranges, and may be demanded in the U.S. for blending purposes. Cuba would be expected to be a price taker for OJ, with OJ prices for different quality product being largely determined by the availability of OJ from Brazil and Florida. Cuban fresh orange exports to the U.S. would appear to be limited due to the large availability of fresh oranges and specialty citrus from California and Florida.

On the other hand, Cuba's grapefruit production accounts for about 8% of world production, and potential Cuban fresh grapefruit and GJ exports to the U.S. could significantly impact the Florida citrus industry. It was estimated that for each million cartons of fresh grapefruit that Cuba might put in the U.S. market, the FOB price for Florida fresh grapefruit would decrease by about \$.17 per carton. In recent years, Cuba has been exporting about 2 million cartons to all destinations. Similarly, it was estimated that

for each million SSE gallons of Cuban GJ exports to the U.S. market, the Florida delivered-in price for GJ would decrease by about \$.01 per pound solids. Average Cuban GJ exports to all destinations have been about 21 million SSE gallons in recent years. The price analysis in this study has been based on a partial analysis, focusing only on putting additional supplies in the U.S. market. Full impacts would depend on supplies and demands in the interrelated world markets for fresh and processed grapefruit products.

# **TABLES**



Table 1. U.S. versus Cuban citrus acreage.

Area	Year	Total Acres	Bearing Acres	1998-99 Production <sup>a,f</sup>		
		----- acres -----	- % Florida -	- 1,000 MT -	- % Florida -	
Florida <sup>a</sup>	1998	833,701	777,100	100.0	9,810	100.0
California <sup>a</sup>	1998	na	275,200	35.4	2,130	21.7
Arizona <sup>a</sup>	1998	na	30,100	3.9	213	2.2
Texas <sup>a,b</sup>	1995	32,800	29,100	3.7	277	2.8
Cuba <sup>c,d,e</sup>	1997	199,324	151,486	19.5	769	7.8

<sup>a</sup>Florida Agricultural Statistics Service, "Citrus Summary 1998-99."

<sup>b</sup>Florida Agricultural Statistics Service, "Citrus Summary 1997-98."

<sup>c</sup>Muraro, R. and T. Spreen, Univ. of Florida, IFAS, FRE 268, 1996, "Recent Developments in the Cuba Citrus Industry."

<sup>d</sup>Muraro, R., T. Spreen, and A.N. Gonzalez, Proc. Fla. State Hort. Soc., 1998, "Cuba Citrus Industry's Transition into the International Free Market Arena."

<sup>e</sup>Cuba total acres included roads, windbreaks, etc.; bearing acres estimated as tree acres.

<sup>f</sup>Cuba production: United States Department of Agriculture, "World Horticultural Trade and U.S. Export Opportunities," August 2000.

Table 2. Fresh oranges: supply & utilization, selected countries.<sup>a</sup>

Country/Year <sup>b</sup>	Production	Imports	Exports	Consumption <sup>c</sup>	Processed	Production	Imports	Exports	Consumption <sup>c</sup>	Processed	
	----- 1,000 metric tons -----					----- % of world -----					
Cuba											
1997-98	460	0	20	95	345	1.0	0.0	0.5	0.6	1.3	
1998-99	450	0	10	100	340	1.0	0.0	0.3	0.6	1.5	
1999-00e	440	0	10	100	330	0.9	0.0	0.2	0.5	1.4	
Brazil											
1997-98	15,912	0	82	4,080	11,750	34.4	0.0	2.0	24.4	45.6	
1998-99	17,952	0	102	5,039	12,811	41.3	0.0	2.8	29.8	54.7	
1999-00e	16,524	0	102	5,243	11,179	35.2	0.0	2.5	27.7	45.8	
United States <sup>d</sup>											
1997-98	12,493	40	645	1,675	10,213	27.0	11.3	15.5	10.0	39.6	
1998-99	8,986	102	245	1,313	7,530	20.7	21.5	6.8	7.8	32.2	
1999-00e	11,894	25	500	1,676	9,743	25.3	6.3	12.4	8.9	39.9	
Mediterranean Basin											
1997-98	9,650	101	2,736	4,970	2,045	20.8	28.6	65.8	29.7	7.9	
1998-99	8,434	199	2,516	4,470	1,647	19.4	42.0	69.5	26.4	7.0	
1999-00e	9,806	156	2,680	5,272	2,010	20.9	39.2	66.3	27.8	8.2	
Mexico											
1997-98	3,331	20	9	2,642	700	7.2	5.7	0.2	15.8	2.7	
1998-99	2,903	20	50	2,513	360	6.7	4.2	1.4	14.8	1.5	
1999-00e	3,100	22	9	2,753	360	6.6	5.5	0.2	14.5	1.5	
Other Countries <sup>a</sup>											
1997-98	4,454	192	663	3,267	716	9.6	54.4	16.0	19.5	2.8	
1998-99	4,762	153	698	3,501	716	11.0	32.3	19.3	20.7	3.1	
1999-00e	5,211	195	743	3,887	776	11.1	49.0	18.4	20.5	3.2	
Total World <sup>a</sup>											
1997-98	46,300	353	4,155	16,729	25,769	100.0	100.0	100.0	100.0	100.0	
1998-99	43,487	474	3,621	16,936	23,404	100.0	100.0	100.0	100.0	100.0	
1999-00e	46,975	398	4,044	18,931	24,398	100.0	100.0	100.0	100.0	100.0	

<sup>a</sup>Excludes data for some minor producers.

<sup>b</sup>Crop year refers to harvest and marketing period, which usually begins in the fall and extends to the spring. This corresponds roughly to October-June in the Northern Hemisphere and April-December in the Southern Hemisphere. For the Southern Hemisphere, harvest occurs almost entirely during the second year shown.

<sup>c</sup>In Greece, Italy, and Spain "consumption" includes fruit withdrawn from the market under the European Union price support program.

<sup>d</sup>Includes Temples.

SOURCE: United States Department of Agriculture, "World Horticultural Trade and U.S. Export Opportunities," August 2000.

Table 3. Fresh tangerines: supply & utilization, selected countries.<sup>a</sup>

Country/Year <sup>b</sup>	Production	Imports	Exports	Consumption <sup>c</sup>	Processed	Production	Imports	Exports	Consumption <sup>c</sup>	Processed
	----- 1,000 metric tons -----					----- % of world -----				
Cuba										
1997-98	5	0	0	5	0	0.03	0.00	0.00	0.04	0.00
1998-99	5	0	0	5	0	0.04	0.00	0.00	0.06	0.00
1999-00e	5	0	0	5	0	0.04	0.00	0.00	0.05	0.00
China										
1997-98	6,910	0	193	6,442	275	47.9	0.0	9.2	57.7	22.2
1998-99	5,068	0	190	4,523	355	43.2	0.0	10.3	50.9	31.0
1999-00e	5,732	2	148	5,195	391	na	na	na	na	na
Mediterranean Basin										
1997-98	3,925	46	1,832	1,725	414	27.2	50.0	87.2	15.4	33.5
1998-99	3,667	71	1,595	1,719	424	31.3	51.4	86.6	19.3	37.0
1999-00e	4,198	72	1,894	1,893	483	31.6	39.1	89.5	18.8	37.0
Japan										
1997-98	1,773	5	6	1,497	275	12.3	5.4	0.3	13.4	22.2
1998-99	1,471	8	3	1,339	137	12.5	5.8	0.2	15.1	12.0
1999-00e	1,622	7	5	1,467	157	12.2	3.8	0.2	14.6	12.0
United States <sup>d</sup>										
1997-98	443	39	25	287	170	3.1	42.4	1.2	2.6	13.7
1998-99	401	57	14	284	160	3.4	41.3	0.8	3.2	14.0
1999-00e	493	100	30	383	180	3.7	54.3	1.4	3.8	13.8
Mexico										
1997-98	295	0	3	263	29	2.0	0.0	0.1	2.4	2.3
1998-99	260	0	1	233	26	2.2	0.0	0.1	2.6	2.3
1999-00e	250	0	1	225	24	1.9	0.0	0.0	2.2	1.8
Other Countries <sup>a</sup>										
1997-98	1,064	2	42	950	74	7.4	2.2	2.0	8.5	6.0
1998-99	862	2	38	782	44	7.3	1.4	2.1	8.8	3.8
1999-00e	990	3	39	885	69	7.4	1.6	1.8	8.8	5.3
Total World <sup>a</sup>										
1997-98	14,415	92	2,101	11,169	1,237	100.0	100.0	100.0	100.0	100.0
1998-99	11,734	138	1,841	8,885	1,146	100.0	100.0	100.0	100.0	100.0
1999-00e	13,290	184	2,117	10,053	1,304	100.0	100.0	100.0	100.0	100.0

<sup>a</sup>Excludes data for some minor producers.

<sup>b</sup>Crop year refers to harvest and marketing period, which usually begins in the fall and extends to the spring. This corresponds roughly to October-June in the Northern Hemisphere and April-December in the Southern Hemisphere. For the Southern Hemisphere, harvest occurs almost entirely during the second year shown.

<sup>c</sup>In Greece, Italy, and Spain "consumption" includes fruit withdrawn from the market under the European Union price support program.

<sup>d</sup>Includes tangelos which account for about half of combined tangerine and tangelo production.

SOURCE: United States Department of Agriculture, "World Horticultural Trade and U.S. Export Opportunities," August 2000.

Table 4. Fresh grapefruit: supply & utilization, selected countries.<sup>a</sup>

Country/Year <sup>b</sup>	Production	Imports	Exports	Consumption <sup>c</sup>	Processed	Production	Imports	Exports	Consumption <sup>c</sup>	Processed	
	----- 1,000 metric tons -----					----- % of world -----					
Cuba											
1997-98	300	0	40	35	225	8.1	0.0	4.9	2.6	12.3	
1998-99	300	0	40	35	225	8.3	0.0	4.7	2.7	12.7	
1999-00e	310	0	45	35	230	7.9	0.0	5.3	2.3	12.2	
United States											
1997-98	2,352	5	392	689	1,276	63.2	1.8	47.9	51.1	69.6	
1998-99	2,286	16	426	646	1,230	63.3	4.9	50.1	49.4	69.2	
1999-00e	2,530	7	400	835	1,302	64.4	2.0	46.8	54.8	68.8	
Israel											
1997-98	349	0	134	13	202	9.4	0.0	16.4	1.0	11.0	
1998-99	325	0	121	21	183	9.0	0.0	14.2	1.6	10.3	
1999-00e	365	0	115	28	222	9.3	0.0	13.5	1.8	11.7	
Turkey											
1997-98	55	1	34	17	5	1.5	0.4	4.2	1.3	0.3	
1998-99	100	0	65	25	10	2.8	0.0	7.6	1.9	0.6	
1999-00e	120	0	80	28	12	3.1	0.0	9.4	1.8	0.6	
Cyprus											
1997-98	70	0	35	10	25	1.9	0.0	4.3	0.7	1.4	
1998-99	50	0	20	10	20	1.4	0.0	2.4	0.8	1.1	
1999-00e	65	0	35	10	20	1.7	0.0	4.1	0.7	1.1	
Mexico											
1997-98	168	1	3	141	25	4.5	0.4	0.4	10.5	1.4	
1998-99	165	1	3	139	24	4.6	0.3	0.4	10.6	1.4	
1999-00e	160	1	3	134	24	4.1	0.3	0.4	8.8	1.3	
Argentina											
1997-98	229	6	30	167	38	6.2	2.1	3.7	12.4	2.1	
1998-99	178	6	21	119	44	4.9	1.8	2.5	9.1	2.5	
1999-00e	165	6	18	113	40	4.2	1.7	2.1	7.4	2.1	
South Africa											
1997-98	186	1	140	9	38	5.0	0.4	17.1	0.7	2.1	
1998-99	194	1	145	11	39	5.4	0.3	17.0	0.8	2.2	
1999-00e	200	1	150	11	40	5.1	0.3	17.5	0.7	2.1	
Other Countries <sup>a</sup>											
1997-98	12	266	10	268	0	0.3	95.0	1.2	19.9	0.0	
1998-99	11	302	10	301	2	0.3	92.6	1.2	23.0	0.1	
1999-00e	11	330	9	330	2	0.3	95.7	1.1	21.7	0.1	
Total World <sup>a</sup>											
1997-98	3,721	280	818	1,349	1,834	100.0	100.0	100.0	100.0	100.0	
1998-99	3,609	326	851	1,307	1,777	100.0	100.0	100.0	100.0	100.0	
1999-00e	3,926	345	855	1,524	1,892	100.0	100.0	100.0	100.0	100.0	

<sup>a</sup>Excludes data for some minor producers.

<sup>b</sup>Crop year refers to harvest and marketing period, which usually begins in the fall and extends to the spring. This corresponds roughly to October-June in the Northern Hemisphere and April-December in the Southern Hemisphere. For the Southern Hemisphere, harvest occurs almost entirely during the second year shown.

<sup>c</sup>In Greece, Italy, and Spain "consumption" includes fruit withdrawn from the market under the European Union price support program.

SOURCE: United States Department of Agriculture, "World Horticultural Trade and U.S. Export Opportunities," August 2000.

Table 5. Florida and Brazil versus Cuba orange production and utilization.

Area/Season	Production	Fresh Exports	Fresh Domestic Consumption	Processed	Orange Juice Production		Share of Cuba, Florida & Brazil OJ Production
	----- 1,000 90-pound boxes -----				SSE gallons per box <sup>a</sup>	million SSE gallons	percent
<b><u>Cuba</u></b>							
1997-98	11,268	490	2,327	8,451	4.74	40.0	1.2
1998-99	11,023	245	2,450	8,328	4.74	39.5	1.4
1999-00e	10,778	245	2,450	8,084	4.74	38.3	1.2
Average	11,023	327	2,409	8,288	4.74	39.3	1.2
<b><u>Florida</u></b>							
1997-98	244,000	721	10,289	232,990	6.27 <sup>b</sup>	1,486.8 <sup>b</sup>	42.9
1998-99	185,700	1,033	9,784	174,883	6.47 <sup>b</sup>	1,154.6 <sup>b</sup>	40.6
1999-00e	231,000	600	8,401	222,000	6.23 <sup>b</sup>	1,413.5 <sup>b</sup>	43.8
Average	220,233	784	9,491	209,958	6.32 <sup>b</sup>	1,351.6 <sup>b</sup>	42.5
<b><u>Brazil</u></b>							
1997-98	465,000	2,400	132,600	330,000	5.87	1,935.7	55.9
1998-99	390,000	2,000	100,000	288,000	5.73	1,648.9	58.0
1999-00e	440,000	2,500	123,500	314,000	5.65	1,775.6	55.0
Average	431,667	2,300	118,700	310,667	5.75	1,786.7	56.2

<sup>a</sup>Assumes a yield of one 65E Brix metric ton of juice per 12 metric tons of fruit (Spreen, Gonzalez and Muraro, "Citrus Industries in Cuba and Florida," University of Florida, IFAS, FRED, International Working Paper Series, IW96-2r).

<sup>b</sup>Includes specialty citrus used in orange juice.

SOURCES: Cuba: United States Department of Agriculture, "World Horticultural Trade and U.S. Export Opportunities," August 2000. Florida: Florida Agricultural Statistics Service, "Citrus Summary 1998-99" and FDOC estimates. Brazil: Foreign Agricultural Service, USDA, various Attache reports.

Table 6. Florida versus Cuba grapefruit production and utilization.

Area/Season	Production	Fresh Exports	Fresh Domestic Consumption	Processed	Grapefruit Juice Production		Share of Cuba & Florida GJ Production
					SSE gallons per box <sup>a</sup>	million SSE gallons	
----- 1,000 85-pound boxes -----							
							percent
<b><u>Cuba</u></b>							
1997-98	7,781	1,037	908	5,836	3.59	20.9	13.4
1998-99	7,781	1,037	908	5,836	3.59	20.9	13.0
1999-00e	8,040	1,167	908	5,965	3.59	21.4	11.2
Average	7,867	1,081	908	5,879	3.59	21.1	12.4
<b><u>Florida</u></b>							
1997-98	49,550	10,915	10,245	28,390	4.78	135.8	86.6
1998-99	47,050	11,107	8,840	27,104	5.17	140.2	87.0
1999-00e	53,300	10,302	7,799	35,200	4.83	169.9	88.8
Average	49,967	10,774	8,961	30,231	4.93	148.6	87.6

<sup>a</sup>Assumes a yield of one 58E Brix metric ton of juice per 14 metric tons of fruit (Spreen, Gonzalez and Muraro, "Citrus Industries in Cuba and Florida," University of Florida, IFAS, FRED, International Working Paper Series, IW96-2r; estimated at below 15 tons of fruit per ton of 58E Brix product by Spreen et al.).

SOURCES: Cuba: United States Department of Agriculture, "World Horticultural Trade and U.S. Export Opportunities," August 2000. Florida: Florida Agricultural Statistics Service, "Citrus Summary 1998-99" and FDOC estimates.

Table 7. U.S. fresh grapefruit market.

Season	Supplier				U.S. Consumption <sup>c</sup> mil. lbs.	U.S. Per Capita Consumption <sup>c</sup> pounds
	Florida <sup>a</sup>		Other <sup>b</sup>			
	mil. lbs.	% of total	mil. lbs.	% of total		
1989-90	648.4	58.9	452.1	41.1	1,100.5	4.43
1990-91	1,057.5	71.7	418.0	28.3	1,475.5	5.87
1991-92	1,024.3	67.8	486.5	32.2	1,510.8	5.95
1992-93	1,063.4	66.4	538.3	33.6	1,601.7	6.24
1993-94	913.3	57.5	675.9	42.5	1,589.2	6.13
1994-95	921.3	58.0	667.4	42.0	1,588.7	6.07
1995-96	867.9	55.4	698.6	44.6	1,566.5	5.93
1996-97	890.0	53.1	785.7	46.9	1,675.7	6.28
1997-98	870.8	53.5	757.9	46.5	1,628.7	6.05
1998-99	751.4	48.1	811.2	51.9	1,562.6	5.75
1999-00 <sup>d</sup>	662.9	45.5	794.1	54.5	1,457.0	5.28

<sup>a</sup>Certified shipments (Florida Department of Citrus, "Florida Fresh Fruit Citrus Shipments, 1998-99 Annual Report") plus non-certified utilization.

<sup>b</sup>Total U.S. market minus Florida suppliers.

<sup>c</sup>USDA, "Fruit and Tree Nuts Situation and Outlook Yearbook," 1999.

<sup>d</sup>Estimated at 7/24/00.

Table 8. Domestic fresh grapefruit price analysis.

Season	Florida FOB <sup>a</sup>	U.S. Consumption <sup>b</sup>	
		From Florida	From Other
	- \$/carton -	- - - - million pounds - - - -	
1989-90	7.52	648.4	452.1
1990-91	7.91	1,057.5	418.0
1991-92	7.35	1,024.3	486.5
1992-93	5.70	1,063.4	538.3
1993-94	5.87	913.3	675.9
1994-95	5.27	921.3	667.4
1995-96	5.78	867.9	698.6
1996-97	6.16	890.0	785.7
1997-98	6.08	870.8	757.9
1998-99	7.44	751.4	811.2
1999-00 <sup>c</sup>	7.58	662.9	794.1
<hr style="border-top: 1px dashed black;"/>			
	Estimated Florida FOB <sup>d</sup>	Average 1997-98 thru 1999-00	
		From Florida	From Other
	- \$/carton -	- - - - million pounds - - - -	
Without Cuba	6.62	761.7	787.7
With Cuba	6.28	761.7	879.6
Difference <sup>e</sup>	-0.34	0.0	91.9

<sup>a</sup>Citrus Administrative Committee, "Annual Statistical Report," various issues.

<sup>b</sup>USDA, "Fruit and Tree Nuts Situation and Outlook Yearbook," 1999.

<sup>c</sup>Estimated.

<sup>d</sup>Based on a regression of the log of the CPI-deflated Florida FOB price on the log of per capita Florida domestic fresh grapefruit shipments, the log of per capita other domestic consumption of fresh grapefruit, and time; R-square of .65.

<sup>e</sup>The price difference was \$.56, based on a linear model; R-square of .63.

Table 9. Florida FOB revenue loss scenarios for fresh grapefruit.

Scenario	Model	Assumed U.S. Market Supplies				Estimated Florida FOB Price	Assumed Florida Shipments <sup>a</sup>	Estimated Florida FOB Value	Difference
		From Cuba	From Florida <sup>a</sup>	From Other	Total				
		----- million pounds -----				\$/carton	mil. cartons	--- million \$ ---	
1	Double Log	0.0	761.7	787.7	1,549.4	6.62	17.9	118.6	0.0
2	Double Log	23.0	761.7	787.7	1,572.4	6.53	17.9	117.0	1.6
3	Double Log	45.9	761.7	787.7	1,595.4	6.44	17.9	115.4	3.2
4	Double Log	91.9	761.7	787.7	1,641.3	6.28	17.9	112.6	6.1
1	Linear	0.0	761.7	787.7	1,549.4	6.57	17.9	117.7	0.0
2	Linear	23.0	761.7	787.7	1,572.4	6.43	17.9	115.2	2.5
3	Linear	45.9	761.7	787.7	1,595.4	6.29	17.9	112.7	5.0
4	Linear	91.9	761.7	787.7	1,641.3	6.01	17.9	107.7	10.0

<sup>a</sup>Certified domestic shipments plus non-certified.

Table 10. Grapefruit juice price analysis.

Season	October Beginning Inventory <sup>a</sup>	Production <sup>b</sup>	Availability	Delivered-In Price <sup>c</sup>	CPI	Delivered-In/ CPI
	- - - million SSE gallons - - -			\$/PS	98-99=1	\$/PS
1989-90	84.8	100.8	185.7	1.07	.76	1.41
1990-91	71.8	104.6	176.5	.77	.79	.97
1991-92 <sup>d</sup>	55.6	97.6	153.2	1.23	.82	1.50
1992-93 <sup>d</sup>	34.6	158.7	193.3	.58	.84	.69
1993-94	61.9	138.2	200.1	.79	.86	.92
1994-95	67.3	156.8	224.1	.68	.89	.76
1995-96	83.3	142.2	225.5	.62	.91	.68
1996-97	81.8	162.5	244.3	.50	.94	.53
1997-98	101.9	135.8	237.7	.48	.95	.51
1998-99 <sup>p</sup>	84.9	140.5	225.4	.53	.97	.55
1999-00 <sup>e</sup>	52.8	169.9	222.7	1.14	1.00	1.14
	Average 1997-98 through 1999-00			Estimated Delivered-In <sup>e</sup>	CPI	Estimated Delivered-In/ CPI <sup>e</sup>
Without Cuba	79.9	148.7	228.6	.68	1.00	.68
With Cuba	79.9	169.8	249.7	.48	1.00	.48
Difference <sup>f</sup>	0.0	21.1	21.1	-.20	.00	-.20

<sup>a</sup>The sum of frozen concentrated grapefruit juice, chilled grapefruit juice and canned grapefruit juice inventories, as reported by FCPA.

<sup>b</sup>FCPA.

<sup>c</sup>FASS.

<sup>d</sup>Chilled grapefruit juice inventory (not reported) was estimated.

<sup>e</sup>Based on a regression of the CPI-deflated delivered-in price on availability; R-square of .616.

<sup>f</sup>The price difference was \$.11, based on a double log model; R-square of .615.

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