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Florida Citrus Production Trends 1999-00 Through 2008-09

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Executive Summary

- The 1998 commercial citrus tree inventory indicates that Florida's orange tree population increased to a record 85.4 million. The grapefruit tree population decreased by 7% to 14.1 million. Both tree populations are still relatively young, although the tree population for grapefruit is somewhat older than that for oranges. Florida citrus tree densities are also continuing to trend upward, increasing from 92 trees per acre in 1986 to 127 tree per acre in 1998.

- The production estimates in this report are for potential production, as opposed to utilized production. The potential production estimates assume no fruit abandonment.

- Two basic methods were used to estimate potential production in the upcoming years: (1) a tree-based method which applies average historical yields per tree to projected trees, by age, and (2) an acre-based method which applies average historical yields per acre to projected acres, by age.

- The tree-based (acre-based) method may overestimate (underestimate) future production as future yields per tree (acre) may be less (more) than the average historical yields per tree (acre), due to increasing tree densities. At present, there is insufficient information on how tree and acre yields may trend in the upcoming years with higher tree densities.

- Future yields may also differ from past yields underlying the tree-based and acre-based production estimates due to changes in the distribution of citrus acreage across the State. In some areas, drainage problems may limit yields.

- Potential production estimates for oranges, grapefruit and specialty are summarized below.

Item/ Season	Tree-Based Method				Acre-Based Method			
	Bearing Trees	**Yield**	**Average Bearing Tree Age**	**Potential Production**	**Bearing Acres**	**Yield**	**Average Bearing Acre Age**	**Potential Production**
	millions	boxes/ tree	years	million boxes	thousands	boxes/ acre	years	million boxes
Oranges								
1999-00	79.8	3.3	12.6	**262**	607.5	399.7	13.4	**243**
2003-04	80.4	3.6	14.8	**290**	608.1	415.1	15.2	**252**
2008-09	80.0	3.9	17.3	**311**	605.8	430.6	17.0	**261**
Grapefruit								
1999-00	12.7	4.7	14.5	**59**	118.7	462.0	15.5	**55**
2003-04	12.2	5.0	16.5	**61**	108.2	478.2	17.3	**52**
2008-09	12.2	5.2	18.5	**64**	108.2	471.2	18.0	**51**
Specialty								
1999-00	–	–	–	**–**	44.3	284.4	12.3	**12.6**
2003-04	–	–	–	**–**	43.2	314.8	13.9	**13.6**
2008-09	–	–	–	**–**	43.2	314.8	15.5	**13.6**

- The tree-based (acre-based) potential production estimates for oranges increase from 262 million boxes (243 million boxes) in 1999-00 to 311 million boxes (261 million boxes) in 2008-09.

- The tree-based (acre-based) potential production estimates for grapefruit range from 59 million boxes (55 million boxes) in 1999-00 to 64 million boxes (51 million boxes) in 2008-09.

- For oranges, total bearing trees and acres underlying the above estimates are relatively stable over the projection period. The increases in the production estimates are due to aging of the trees and acres. The projected average bearing age for trees and acres differ as a result of (1) differences in the tree versus acre age distributions and (2) differences in assumed loss and planting rates (the rates for acres exceeded those for trees).

- Potential specialty citrus production is projected to increase from 12.6 million boxes in 1999-00 to 13.6 million boxes in 2008-09.

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Florida Citrus Production Trends 1999-00 Through 2008-09*

Introduction

This report presents production estimates for Florida round oranges, grapefruit and specialty citrus for the 1999-00 through 2008-09 seasons. The estimates are based on the Florida Agricultural Statistics Service (FASS) biennial commercial tree inventory for 1998. The biennial inventory reports numbers of trees and acres by age for different varieties of citrus. These data are combined with FASS yield data on boxes of fruit per tree by age category to project future production. The methodology used to project production in this report is the same as used in our last report made in 1996. Two basic methods are used to project production—(1) a tree-based method which directly applies average boxes of fruit per tree to projected trees, by age, and (2) an acre-based method which applies boxes per acre (calculated indirectly using the tree, acreage and tree yield data) to projected acreage, by age.

The production estimates in this report are estimates of potential production, as opposed to utilized production reported by FASS. Potential production is the fruit that could be utilized assuming favorable citrus prices, while utilized production is the amount of fruit actually entering certified fresh and processing channels, as well as noncertified channels. Some fruit may be abandoned rather than utilized when grower prices are below harvest and post-harvest costs.[1]

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[1] FASS reported abandonment of 3 million, 6 million and 6 million boxes of grapefruit in 1995-96, 1996-97 and 1998-99, respectively.

Overview of the 1998 Commercial Tree Inventory

The 1998 commercial tree inventory shows Florida's total citrus acreage decreased from 857.7 thousand acres in 1996 to 845.3 thousand acres in 1998, a 1.4% decrease (Table 1). The number of citrus trees in 1998 was 107.1 million, unchanged from the 1996 level. The trend toward denser plantings continued with the average trees per acre at 126.7 in 1998. Acreage and tree inventory data for round oranges, grapefruit and specialty citrus are shown in Tables 2, 3 and 4, respectively.

The 1998 FASS commercial tree inventory indicates that the population of bearing and nonbearing round-orange trees increased to a record 85.4 million in 1998, up 1.5% over the previous inventory. Approximately 20 million round-orange trees or 23.5% of the total are five years old or less; an additional 22.8 million trees or 26.7% of the 1998 round-orange tree population are between six and eight years old (Table 5). In total, 50.2% of the round-orange trees are less than nine years old, reflecting the planting activity that has occurred since the freezes of the last decade. Maturation of the large population of young trees is expected to increase Florida's orange production potential in the upcoming years.

According to the 1998 FASS commercial tree inventory, the total number of bearing and nonbearing grapefruit trees decreased 6.9% from 15.1 million in 1996 to 14.1 million in 1998, reflecting the low returns grapefruit growers have been experiencing (grapefruit on-tree prices have decreased from about the $5.60 to $6.60 per box range in the early 1990's to $.72 per box in 1997-98). The grapefruit tree population in 1998 is still relatively young but with a larger percentage of older trees compared to the orange tree population (Table 6). The age distribution for grapefruit trees by variety and by Indian River and Interior regions is shown in Table 7.

The 1998 inventory indicates that the number of specialty-citrus (Temples, tangelos and tangerines) acres and trees decreased by 4.7% and 3.1%, respectively, over the last two years. The 1998 specialty tree population continues to be relatively young with 35.4% of the trees being less than 6 years old (Table 8). Tangerines account for about 81% of these younger trees.

Methodology

The production estimates provided in this report are based on projecting the number of trees and acres, or just acres in the case of Temples, tangelos and tangerines, in 25 age categories in the upcoming seasons. Separate projections were made for early and midseason oranges, and late oranges; white seedless, red and pink seedless, and seedy grapefruit; and Temples, tangelos and tangerines.

The relatively young citrus production base as discussed in the previous section, underlies our production projections. Production potential tends to increase with maturation of trees. Over the period from 1997-98 to 2008-09, the estimated average age for bearing orange trees increases from 11.4 to 17.3 years; for grapefruit, the average bearing tree age increases from 13.4 to 18.6 years; for specialty, the average age for bearing acreage increases from 11.2 to 15.5.

Planting Assumptions

The projections are dependent on assumed future tree-planting rates or acreage-planting rates. Planting levels for the period from 1995 through 1997 (Table 9) are down from earlier post-freeze levels. The decreasing trend in the last several censuses in the percentage of trees less than 2 years old, shown in Tables 5 and 6 for oranges and grapefruit, provides an indication of the slowdown in planting activity. Over the projection period, planting levels are assumed to stabilize at relatively low

levels compared to earlier post-freeze levels. Prices and grower returns are major factors that have stimulated past plantings. The future planting assumptions are based on anticipation that these factors will be at levels that do not stimulate additions to the population of trees or acres as in the earlier post-freeze period. Low returns that some grapefruit growers have been experiencing may result in very little grapefruit planting activity.

In this report, orange tree and specialty citrus acreage planting levels in the upcoming years are assumed to equal corresponding losses. Thus, this assumption maintains the orange and specialty citrus production bases but does not allow growth in these bases as occurred since the freezes of the last decade. Grapefruit planting levels over the projection period from 1998-99 through 2000-01 are set at the average planting level for the period from 1995 through 1997, the last three years covered by the 1998 tree census; over the projection period from 2001-02 through 2008-09, grapefruit plantings are set equal to losses. Sensitivity of the orange and grapefruit production estimates to assumed plantings is examined by considering zero plantings over the projection period.

Tree/Acre Loss Assumptions

The tree-loss and/or acreage-loss rates used in making the projections are based on recent loss rates implied by the tree census (Table 10). From 1994 to 1998, average annual orange tree loss rates have been about 1% to 2%; orange acre loss rates have been slightly higher at about 2.3%. Tree and acre loss rates for oranges have tended to increase with age of tree or acre, and assuming this pattern continues into the future, the orange projections are based on tree- and acre-loss rates which increase with age.

With low grower returns for grapefruit, Interior grapefruit loss rates from 1996 to 1998 were more than double the loss rates that occurred between 1994 to 1996; Indian river grapefruit loss rates

were smaller than Interior grapefruit loss rates but also increased. Seedless grapefruit tree (acre) loss rates from 1996 to 1998 for the Interior and Indian River were 7.4% (7.9%) and 3% (3.5%), respectively. Given the relatively large grapefruit tree and acreage changes that have been occurring, relationships between grapefruit loss rates and tree or acre age were considered uncertain, and flat loss rates across tree or acre ages were assumed in projecting grapefruit production. Recent high grapefruit loss rates were assumed to continue for the next three seasons; thereafter, loss rates were assumed to decrease to levels that occurred before the recent loss-rate increases. Specialty citrus loss rates were assumed to be flat at recent levels. To determine the sensitivity of the production projections to loss rate assumptions, projections based on higher loss rates were also made. The various loss rate assumptions are indicated in the tables showing the production projections.

Yield Assumptions: Projection Methodologies Based on Trees Versus Acres

The tree-based (acre-based) production estimates are obtained by multiplying the projected number of trees (acres) in each specific age category by the yield or average number of boxes per tree (acre) for that age category and summing the results. Yields per tree by age are based on data reported by FASS for 1993-94 through 1997-98 (Table 11). The FASS data indicate that yields per tree tend to increase with age. FASS data also indicate that yields vary considerably over time.

Yield variability for early and midseason, and Valencia oranges by season since the last major freeze in 1989-90 is indicated in Table 12 . Weighted average yields (yields by age category weighted by category tree population shares) by variety for each season were calculated using 1998 tree census data to construct the weights (1998 weights, as opposed to season specific weights, were applied to each season's yields so that changes over time in yields and tree population shares would not be confounded). Standard deviations in the weighted average yields over this period were .25 boxes for

early and midseason oranges, and .19 boxes for Valencia oranges; standard deviations divided by mean weighted average yields indicate yields for early and midseason oranges, and Valencia oranges varied on average from their means by 6.8% and 7%, respectively. Patterns over time in yield variation are shown in Exhibits 1 and 2. Exhibit 2 shows a strong up and down pattern over time for Valencia yields; this pattern is unbroken except for 1997-98 when yields were up instead down as one might have expected. Exhibit 1 shows a less distinct up and down pattern for early and midseason oranges with a noticeable decrease in yield variation in the last five years. These historic yield patterns suggest that future yield variation could be significant. However, prediction of future yield patterns would be problematic, as a major determinant of yield variability is weather, which is largely unpredictable. Thus, in this report, the production projections are based on average yields for the past five seasons. These projections indicate the trend in production but, based on the preceding analysis, actual future production in any given season could deviate substantially from the trend estimate based on yield variation alone. For example, the 95% confidence interval for the 1999-2000 orange projection (tree-based method estimate) subsequently discussed, is roughly ±10% of the reported estimate, based on yield variation alone.

Another yield issue concerns tree density. Yields may be dependent, in part, on the number of trees per acre or tree density which has been increasing over time, as shown in Tables 1 through 4. Since the mid 1980's, tree densities have noticeably increased. For example, on average, 139 orange trees were planted per acre in the last three years, 1995 through 1997; on the other hand, tree density of the oldest acreage (pre-1954), reported in the 1998 commercial inventory, averages 90 trees per acre.

The 1997-98 orange and grapefruit tree densities for the 25 age categories considered are shown in Table 13. In the future, older-age-category densities are expected to increase. For

example, in 1997-98, the round-orange tree density for the three-year-old category was 145 trees per acre, compared to 120 trees per acre in the fourteen-year-old category. Three-year-old trees in 1997-98 will become fourteen-year-old trees by the end of the projection period in 2008-09. Hence, assuming the average density in this cohort is maintained over time, the density in the fourteen-year-old age category would increase from 120 trees per acre in 1997-98 to 145 trees per acre in 2008-09.

For young acreage, increasing tree densities are expected to increase yields per acre. However, since older acreage presently has relatively low tree densities, we do not know how older-age-category yields per acre might be affected as young-high-density acreage matures into old acreage. In terms of tree yields, we do not know how boxes per tree may be affected by dense plantings, as trees mature and compete for space. As highly dense acres age, some trees may be removed to allow the remaining trees more space to grow, or yields per tree may simply be less than historically observed. The likelihood of yields per tree decreasing with increasing tree density is supported by data in Table 12 and Exhibits 1 and 2. The data show that the correlation between yields and tree densities for early and midseason and valencia oranges are negative, although not highly statistically significant. As the data series on yields and densities are extended over time, the relationship between yields and densities will become more clear.

This uncertainty about yields motivated our projections based on yields per acre. For each age category, yields per acre were calculated as the product of yields per tree times trees per acre, based on historic data. These calculated historic yields per acre were then applied to projected acres to estimate production.

We also note that the production estimates in this report are based on historical yields which may not fully reflect the impact on yields of the new distribution of acreage across the different regions of the State, resulting from the post-freeze recovery. For example, with the major replanting

following the freezes, there has been an increase in the proportion of citrus acreage in southern areas of the State, where soil types and drainage may limit yields. The full impact of such changes on yields may not manifest itself until the present tree populations in these regions of the State mature further. However, anecdotal information from growers suggests that in some areas drainage problems may be severely reducing tree yields. The post-freeze movement of the Florida tree population to the south has apparently reduced the risk of production losses due to freezes, but may have increased the risk of losses due to drainage problems resulting from weather cycles like El Nino. Given this possibility, production projections based on alternative yield assumptions were also made.

Data on regional yields, boxes of fruit per tree for four regions (Indian River, North & Central, Western, and Southern) are reported by FASS in *Citrus 1997-98 Summary*, September 23, 1998. The State average yields, used in this report to project citrus production, are weighted averages of the regional yields. To the extent the underlying region weights (region shares of State trees) do not change significantly over the projection period, the projections based on weighted average yields for the State would be expected to be similar to projections explicitly based on regional yields through the application of yields by region to projected trees by region. An analysis of this issue supports this expectation (production projections based on regional yields were similar to subsequently reported projections based on State average yields).

It should also be noted that abandonment of grapefruit in 1995-96, 1996-97 and 1997-98 negatively impacted grapefruit boxes of fruit per tree reported by FASS for those seasons. For each age category, FASS boxes of fruit per tree were calculated as that age category's utilized production divided by the number of trees in that age category, including trees that yielded abandoned fruit. Hence, use of mean yields, based on the last five years of FASS data, to project grapefruit production may result in an under estimation of potential production. To correct for this problem, reported

grapefruit yields for the last three seasons when abandonment occurred were adjusted upward by multiplying the reported yields times the ratio of potential production (utilized production plus reported abandonment by FASS) to utilized production. Separate adjustments were made for white and colored seedless grapefruit yields.

Round-Orange, Grapefruit and Specialty-Citrus Production Estimates

For oranges and grapefruit, two sets of potential production estimates based on average yields are presented—(1) estimates based on projected trees times yields per tree, by age; and (2) estimates based on projected acres times yields per acre, by age. For oranges, the tree-based estimates show potential production increasing from 262 million boxes in 1999-00 to 311 million boxes in 2008-09 (Table 14). This set of estimates is generally a continuation of our tree-based estimates made two years ago, except for adjustments resulting from changes in the tree census numbers, as well as planting, loss and yield assumptions. Likewise, the acre-based orange estimates are generally a continuation of our acre-based estimates made two years ago. The acre-based estimates are substantially less than the tree-based estimates, increasing from 243 to 261 million boxes over the ten-year projection period.

Estimated average yields and tree-age distributions over the projection period are shown in Tables 15, 16 and 17.

Sensitivity of the orange production projections to planting, loss and yield assumptions is shown in Table 18. Tree and acre yields were assumed to fall below the state average yields underlying the projections in Table 14. Beginning at age six, the assumed yields are slightly less than the state averages; as age increases, the assumed yields fall farther below the state averages, alternatively reaching 10% and 25% below the state averages by age category 24 and over. Based

on a decrease in yields to 10% (25%), the orange crop projections for 2008-09 would decrease by 18 to 22 (46 to 57) million boxes, depending on the projection method. Likewise, if zero orange plantings were assumed over the projection, the orange projections for 2008-09 would decline by 25 to 35 million boxes, depending on the projection method. If the assumed acre and tree loss rates increased by 1%, the orange crop projections for 2008-09 would decline by roughly 15 to 20 million boxes, depending on the projection method.

The two sets of estimates for grapefruit in Table 14 suggest potential production in the upcoming years may range from 51 million boxes to 64 million box, assuming continuation of recent tree and acre loss rates and planting levels for several more years. As indicated earlier, these projections are not meant to be estimates of utilized production---utilized production in upcoming years can be expected to be dependent on future grapefruit price levels. The tree-based estimates indicate that potential grapefruit production could range from 59 to 64 million boxes, despite recent tree and acre losses and continuation of such losses for several more years. In contrast, the acre-based estimates indicate grapefruit production may be in the 55 to 51 million box range in the next ten years. Sensitivity of the grapefruit projections to planting, loss and yield assumptions is shown in Table 19. For example, if tree loss rates for the next several years were doubled, potential grapefruit production based on the tree method would decrease to 53 to 55 million boxes, as opposed to the 59 to 64 million box range mentioned above.

Specialty-citrus production was projected using estimated equations which relate historic production to acres, by age (data on specialty tree yields were not available to make the same two sets of estimates as were made for oranges and grapefruit). Potential specialty citrus production is

estimated to increase from 12.6 million boxes in 1999-00 to 13.6 million boxes in 2008-09. These estimates are generally a continuation of our specialty citrus estimates made two years ago.[2]

Production Estimates by Variety

Oranges

Based on the tree (acre) method, potential early-and-midseason-orange production is projected to increase from 153 (142) million boxes in 1999-00 to 176 (149) million boxes in 2008-09, while potential late-orange production is projected to increase from 109 (100) million boxes to 135 (112) million boxes over the same period (Table 20).[3] Based on the tree method, percentages of total round-orange production accounted for by early and midseason oranges versus late oranges in 1999-00 are estimated at 58.5% and 41.5%, respectively; by 2008-09, these percentages are estimated to change slightly to 56.6% for early and midseason oranges and 43.4% for late oranges. Percentages based on the acre method are roughly the same as those based on the tree method.

[2]Recent specialty planting levels have been below the replacement levels assumed in making the above estimates. Alternative specialty production projections were made based on the assumption that future planting levels will be at the average for the 1995 through 1997 period. These projections were the same as those reported in Table 14 for 1999-00 through 2000-03; thereafter these projections fall below those reported, to 12.4 million boxes in 2008-09.

[3]Recent late orange planting levels have been somewhat greater than the assumed replacement level underlying the late orange production projection shown in Table 20. If the average late orange annual planting level from 1995 to 1997 is assumed over the projection period, late orange production would increase from 109 million boxes in 1999-00 to 143 million boxes in 2008-09, based on the tree method, or from 100 million boxes in 1999-00 to 116 million boxes in 2008-09, based on the acre method.

Grapefruit

Based on the tree (acre) method, potential white-seedless-grapefruit production is projected to range over the projection period from 23 to 26 (22 to 21) million boxes; while potential red-and-pink-seedless grapefruit production is projected to range from 35 to 36 (32 to 28) million boxes (Table 21). Potential seedy-grapefruit production is estimated to be at around 1 million boxes or below over the next ten year (reported utilized production for seedy grapefruit may be less than actual utilized and potential production, as some seedy grapefruit utilization may be reported as seedless grapefruit utilization). These estimates are based on loss and planting rates as indicated in Table 14; however, as implied by the results in Table 19, grapefruit projections by variety are sensitive to estimation method, and assumed loss and planting rates.

Specialty Citrus

Potential tangerine production is estimated to increase from 7.4 million boxes in 1999-00 to 8.6 million boxes in 2008-09, a 16% increase (Table 22). The upward projection trend in tangerine production is related to the relatively high percentage of young tangerine trees at present (Table 8), with relatively low yielding young trees expected to mature into higher yielding older trees. On the other hand, maturation of Temple and tangelo trees over the projection period is not expected to result in upward production trends for these varieties as presently they have smaller percentages of trees in the younger age categories than tangerines. Potential Temple and tangelo production levels are estimated to be relatively flat at around 2 and 3 million boxes, respectively, over the projection period.[4]

[4]Recent specialty planting levels have been below the replacement levels underlying the estimates reported in Table 22. If future planting levels are set at the average for the 1995 through 1997 period, specialty production

Summary

In the upcoming ten years, potential orange production based on average yields could range from roughly 240 to over 300 million boxes, depending on trends in yields. If increasing orange tree densities limit yields per acre, orange production may be in the 240 to 260 million box range. Potential grapefruit production based on average yields could range from the low 40 to low 60 million box range, depending on tree and acre loss rates, as well as planting levels and yield trends. To the extent downward adjustments in Florida's grapefruit tree and acre populations continue and increasing tree densities limit yields per acre, potential grapefruit production may be in the high 40 million to mid 50 million box range. Potential specialty production is expected to range between 12 and 14 million boxes.

projections by variety would be the same as those reported in Table 22 for 1999-00 through 2000-03; thereafter the projections fall slightly below those reported; in 2007-08,Temple, tangelo and tangerine estimates based on average planting levels are 11%, 13% and 6%, respectively, below those based on replacement planting levels.

TABLES

Table 1. Florida citrus acreage and tree numbers by commercial inventory, 1966 to 1998.

Year of Inventory	Number of Acres	Percent Change from Previous Acre Inventory	Number of Trees	Percent Change from Previous Tree Inventory	Tree Density
	- thousand -	- % -	- million -	- % -	- trees/acre -
1966	858.1	--	66.4	--	77.4
1968	931.2	8.5	74.4	12.0	79.9
1970	941.5	1.1	76.7	3.1	81.5
1972	878.0	-6.7	72.1	-6.0	82.1
1974	864.1	-1.6	71.3	-1.1	82.5
1976	852.4	-1.4	70.5	-1.1	82.7
1978	831.2	-2.5	69.1	-2.0	83.1
1980	845.3	1.7	70.7	2.3	83.6
1982	847.9	8.5	71.6	1.3	84.4
1984	761.4	-10.2	66.0	-7.8	86.7
1986	624.5	-18.0	57.5	-12.9	92.1
1988	697.9	11.8	69.3	20.5	99.3
1990	732.8	5.0	78.9	13.9	107.7
1992	791.3	8.0	92.0	16.6	116.3
1994	853.7	7.9	103.7	12.7	121.5
1996	857.7	.5	107.1	3.2	124.9
1998	845.3	-1.4	107.1	NC	126.7

SOURCE: Florida Agricultural Statistics Service, *Commercial Citrus Inventory*, various issues.

Table 2. Florida round-orange acreage and tree numbers by commercial inventory, 1966 to 1998.

Year of Inventory	Number of Acres	Percent Change from Previous Acre Inventory	Number of Trees	Percent Change from Previous Tree Inventory	Tree Density
	- thousand -	- % -	- million -	- % -	- trees/acre -
1966	695.8	--	53.8	--	77.3
1968	713.4	2.5	56.6	5.2	79.3
1970	715.8	.3	57.8	2.1	80.7
1972	659.4	-7.9	53.7	-7.0	81.4
1974	642.4	-2.6	52.5	-2.3	81.7
1976	628.6	-2.1	51.6	-1.8	82.1
1978	616.0	-2.0	50.8	-1.5	82.5
1980	627.2	1.8	52.0	2.2	82.9
1982	636.9	1.5	53.5	2.9	84.0
1984	574.0	-9.9	49.9	-6.8	86.9
1986	466.3	-18.8	43.5	-12.9	93.3
1988	536.7	15.1	54.5	25.5	101.5
1990	564.8	5.2	62.6	14.9	110.8
1992	608.6	7.8	72.8	16.3	119.6
1994	653.4	7.4	81.6	12.1	124.9
1996	656.6	.5	84.2	3.1	128.2
1998	658.4	.3	85.4	1.5	129.8

SOURCE: Florida Agricultural Statistics Service, *Commercial Citrus Inventory*, various issues.

Table 3. Florida grapefruit acreage and tree numbers by commercial inventory, 1966 to 1998.

Year of Inventory	Number of Acres	Percent Change from Previous Acre Inventory	Number of Trees	Percent Change from Previous Tree Inventory	Tree Density
	- thousand -	- % -	- million -	- % -	- trees/acre -
1966	103.2	--	7.10	--	68.8
1968	119.9	16.2	8.50	19.7	70.9
1970	124.1	3.5	8.92	4.9	71.9
1972	124.1	NC	9.01	.9	72.6
1974	130.3	5.0	9.65	7.0	74.1
1976	137.9	5.8	10.40	7.8	75.4
1978	136.3	-1.2	10.41	1.3	76.4
1980	139.9	2.6	10.77	3.4	77.0
1982	139.9	NC	10.83	.6	77.4
1984	134.7	-3.7	10.58	-2.3	78.5
1986	117.8	-12.5	9.62	-9.1	81.7
1988	119.6	1.5	10.08	4.7	84.3
1990	125.3	4.8	11.19	11.0	89.3
1992	135.2	7.9	13.12	17.2	97.0
1994	146.9	8.7	15.00	14.3	102.1
1996	144.4	-1.7	15.12	.8	104.7
1998	132.8	-8.0	14.08	-6.9	106.0

SOURCE: Florida Agricultural Statistics Service, *Commercial Citrus Inventory*, various issues.

Table 4. Florida specialty-citrus[a] acreage and tree numbers by commercial inventory, 1970 to 1998.

Year of Inventory	Number of Acres	Percent Change from Previous Acre Inventory	Number of Trees	Percent Change from Previous Tree Inventory	Tree Density
	- acres -	- % -	- million -	- % -	- trees/acre -
1970	82,767	--	7.6	--	91.48
1972	77,042	-6.9	7.1	-5.8	92.60
1974	74,446	-3.4	7.0	-2.1	93.84
1976	67,485	-9.4	6.2	-10.9	92.24
1978	62,723	-7.1	5.8	-7.1	92.23
1980	60,360	-3.8	5.6	-3.9	92.07
1982	55,163	-8.6	5.1	-8.8	91.88
1984	34,619	-37.2	3.2	-37.7	91.17
1986	30,155	-12.9	2.9	-7.7	96.60
1988	30,284	.4	3.0	4.1	100.09
1990	33,347	10.1	3.7	21.1	110.04
1992	37,507	12.5	4.6	24.0	121.36
1994	45,768	22.0	5.9	30.4	129.69
1996	50,950	11.3	7.0	17.1	136.40
1998	48,556	-4.7	6.7	-3.1	138.70

[a]Temples, tangelos and tangerines; fallglo tangerines not included prior to 1996.

SOURCE: Florida Agricultural Statistics Service, *Commercial Citrus Inventory*, various issues.

Table 5. Age distribution of Florida round-orange trees by year of inventory.

Year	Tree Age						Total Trees	Bearing Trees
	≤2	3-5	6-8	9-13	14-23	≥24		
	- % -						- - - - thousand - - - -	
1970	9.1	20.6	17.6	14.8	13.4	24.4	57,801.5	49,404.2
1972	5.5	11.1	20.2	22.0	14.1	27.0	53,731.1	49,786.5
1974	4.0	5.9	16.9	27.8	16.9	28.4	52,521.7	49,466.9
1976	4.0	4.8	7.5	29.7	24.1	29.8	51,595.3	48,373.8
1978	5.2	4.5	4.7	23.4	31.5	30.6	50,843.2	47,454.5
1980	7.2	4.7	3.8	13.0	39.1	32.2	51,977.8	47,366.3
1982	12.0	5.1	3.7	7.2	40.2	31.8	53,504.7	46,078.5
1984	17.5	7.1	4.5	5.8	35.2	29.9	49,884.7	39,777.7
1986	20.0	12.4	6.1	7.1	28.7	25.7	43,461.4	32,708.0
1988	30.7	13.9	7.8	5.7	17.7	24.1	54,536.6	35,537.3
1990	35.1	14.3	10.7	6.7	10.0	23.3	62,613.4	40,666.0
1992	31.9	23.4	9.9	8.4	6.7	19.7	72,826.3	49,577.1
1994	24.4	24.6	16.7	11.0	6.5	16.9	81,614.4	61,707.7
1996	10.5	26.9	24.0	14.7	8.2	15.7	84,155.4	72,286.6
1998	8.0	15.5	26.7	23.0	11.5	15.3	85,430.6	78,586.5

SOURCE: Florida Agricultural Statistics Service, *Commercial Citrus Inventory*, various issues.

Table 6. Age distribution of Florida grapefruit trees by year of inventory.

Year	Tree Age						Total Trees	Bearing Trees
	≤2	3-5	6-8	9-13	14-23	≥24		
	- % -						- - - - - thousand - - - - -	
1970	15.1	21.7	4.2	3.9	14.1	41.1	8,925.4	6,746.5
1972	6.9	21.9	14.0	5.5	10.6	41.1	9,012.7	8,032.1
1974	11.5	8.2	25.1	7.6	8.1	39.4	9,647.2	8,362.6
1976	13.9	7.9	13.3	20.8	6.8	37.2	10,398.1	8,598.9
1978	8.5	13.8	6.8	28.9	7.1	34.9	10,412.5	8,969.7
1980	8.9	10.5	10.7	21.6	15.8	32.5	10,768.7	9,586.2
1982	7.5	7.4	12.8	12.6	29.1	30.6	10,833.2	9,753.9
1984	11.4	6.7	7.5	15.7	32.1	26.7	10,582.9	9,192.8
1986	9.7	7.8	7.9	17.0	35.7	22.0	9,624.0	8,367.7
1988	11.0	9.7	6.5	13.8	38.3	20.7	10,081.2	8,654.7
1990	21.8	6.2	8.0	9.1	31.4	23.5	11,193.2	8,748.5
1992	27.2	14.0	5.5	8.6	19.1	25.6	13,119.2	9,556.9
1994	23.3	21.3	7.6	8.3	16.0	23.5	15,004.0	11,514.1
1996	9.8	25.3	17.8	8.2	15.3	23.6	15,116.9	13,632.8
1998	4.3	16.7	24.6	13.8	14.8	25.8	14,079.1	13,469.6

SOURCE: Florida Agricultural Statistics Service, *Commercial Citrus Inventory*, various issues.

Table 7. Age distribution of Florida grapefruit trees by marketing district and variety, 1998 inventory.

Item	Tree Age						Total Trees
	≤2	3-5	6-8	9-13	14-23	≥24	
	- - - - - - - - - - - - - - - - - - - %[a] - - - - - - - - - - - - - - - - -						- thousand -
Indian River							
White Seedless	7.4	11.8	23.8	4.2	8.7	44.1	3,696.1
Red and Pink Seedless	2.9	16.5	21.0	17.8	23.9	18.0	5,684.1
Seedy	1.4	.6	.0	.0	5.8	92.2	17.2
TOTAL	**4.7**	**14.6**	**22.0**	**12.4**	**17.9**	**28.4**	**9,397.5**
Interior							
White Seedless	5.5	17.3	22.0	11.0	7.3	37.0	1,550.2
Red and Pink Seedless	2.8	24.3	36.0	20.0	8.5	8.3	2,848.7
Seedy	1.4	6.3	10.2	10.4	16.9	54.9	282.7
TOTAL	**3.6**	**20.9**	**29.8**	**16.5**	**8.6**	**20.6**	**4,681.6**

[a]Percentages may not total 100 due to rounding.

SOURCE: Florida Agricultural Statistics Service, *1998 Commercial Citrus Inventory.*

Table 8. Age distribution of Florida specialty-citrus trees by variety, 1998 inventory.

Item	Tree Age						Total Trees
	≤2	3-5	6-8	9-13	14-23	≥24	
	- % -						- thousand -
Temples	6.8	9.5	10.0	9.6	5.2	58.9	723.8
Tangelos	4.5	16.9	26.6	21.8	3.7	26.5	1,556.7
Tangerines	7.3	36.1	31.6	15.7	3.3	6.1	4,452.8
TOTAL	**6.6**	**28.8**	**28.1**	**16.5**	**3.6**	**16.5**	**6,733.3**

SOURCE: Florida Agricultural Statistics Service, *1998 Commercial Citrus Inventory*.

Table 9. Average annual citrus plantings, by variety, 1995 through 1997.

Variety[a]	Plantings	
	Trees	Acres
	- thousand -	- acres -
Oranges		
Early and Midseason	876	6,524
Late	1,395	9,800
TOTAL	**2,271**	**16,324**
Grapefruit		
Indian River	91	769
White Seedless	56	423
Red and Pink Seedless	.1	2
Seedy		
Interior		
White Seedless	28	246
Red and Pink Seedless	27	205
Seedy	1.3	15
TOTAL	**203.4**	**1,660**
Specialty		
Temples	20	127
Tangelos	30	206
Tangerines	108	654
TOTAL	**158**	**987**

[a]Orange trees and acres listed as "unidentified" by the FASS were allocated between early and midseason oranges, late orange, Temples and tangelos in the same proportions as the identified proportions in calculating the averages. Grapefruit trees and acres listed as "unidentified" by the FASS were allocated between grapefruit varieties in the same proportions as the identified proportions in calculating the averages.

Table 10. Citrus tree- and acreage-loss rates, by variety.

Variety	Loss Rate[a]			
	1994-96		1996-98	
	Trees	Acres	Trees	Acres
	%			
Oranges[b]				
Early and Midseason	1.2	2.2	1.9	2.3
Late	1.2	2.2	1.9	2.3
Grapefruit[c]				
Indian River				
White Seedless	1.5	2.4	3.0	3.5
Red and Pink Seedless	1.5	2.4	3.0	3.5
Seedy	4.2	3.9	13.7	14.1
Interior				
White Seedless	2.3	2.8	7.4	7.9
Red and Pink Seedless	2.3	2.8	7.4	7.9
Seedy	3.7	5.2	11.8	12.7
Specialty[d]				
Temples	3.2	3.9	4.9	5.7
Tangelos	4.3	4.7	5.2	5.6
Tangerines	2.1	3.0	4.1	4.5

[a]Based on 1994, 1996 and 1998 commercial citrus inventories.

[b]One loss rate for round oranges (early and midseason and late oranges) was estimated due to the large number of unidentified (by variety) young round-orange trees.

[c]One loss rate for seedless grapefruit was estimated due to the large number of unidentified (by variety) young grapefruit trees.

[d]Loss rates based on bearing trees or acres due to the large number of unidentified nonbearing specialty citrus.

Table 11. Average yields by age of tree for 1993-94 through 1997-98.[a]

Item	Tree Age				
	3-5	6-8	9-13	14-23	24+
	- - - - - - - - - - 1-3/5 bushel boxes per tree - - - - - - - - - -				
Oranges					
Early and Midseason	1.30	2.93	3.82	4.65	5.19
Valencia	1.14	2.23	2.54	3.49	4.26
Grapefruit					
Indian River					
White Seedless	2.01	3.76	3.81	5.52	5.23
Red and Pink Seedless	2.12	3.15	4.21	4.62	4.80
Interior					
White Seedless	2.66	3.83	4.38	8.15	6.97
Red and Pink Seedless	2.09	3.69	5.65	5.79	6.19

[a]The average yields by age category shown in the table were used to obtain linear interpolation yield estimates for ages, 3, 4, ..., 23, 24+ which were used in estimating the orange and grapefruit crop sizes shown in Table 14.

SOURCE: Florida Agricultural Statistics Service.

Table 12. Historical yields by age of tree, by season.

Variety/ Season	Tree Age					Weighted Average[a]	Bearing Tree Density
	3-5	6-8	9-13	14-23	≥24		
	boxes/tree						trees/acre
Early and Midseason							
1990-91	1.40	3.00	4.50	5.00	5.60	3.89	107
1991-92	1.40	3.00	4.00	4.10	4.50	3.44	111
1992-93	1.80	3.40	4.60	5.00	6.00	4.15	116
1993-94	1.40	3.20	3.80	4.50	5.20	3.61	119
1994-95	1.20	3.10	4.10	4.60	5.20	3.65	122
1995-96	1.30	2.90	3.80	4.10	4.90	3.41	124
1996-97	1.30	2.80	3.70	5.10	5.30	3.57	125
1997-98	1.30	2.70	3.80	4.80	5.30	3.53	126
Mean	1.39	3.01	4.04	4.65	5.25	3.65	
Standard Deviation	.18	.22	.34	.40	.44	.25	-.44[c]
CV[b]	13.0%	7.4%	8.5%	8.5%	8.5%	6.8%	
Valencia							
1990-91	1.60	2.40	3.00	4.00	4.50	2.90	107
1991-92	1.20	2.10	3.00	3.70	3.50	2.54	112
1992-93	1.40	2.40	3.30	3.90	4.20	2.88	118
1993-94	1.00	2.00	2.70	3.50	4.00	2.46	123
1994-95	1.40	2.70	2.50	3.60	4.20	2.75	127
1995-96	1.20	2.00	2.50	3.20	4.00	2.42	130
1996-97	1.10	2.30	2.50	3.30	4.20	2.54	131
1997-98	1.10	2.20	2.60	3.80	4.90	2.70	133
Mean	1.25	2.26	2.76	3.63	4.19	2.65	
Standard Deviation	.20	.24	.30	.28	.41	.19	-.46[c]
CV[b]	16.0%	10.5%	10.9%	7.8%	9.7%	7.0%	

[a]Weights based on 1998 tree distribution, reported in the *Commercial Citrus Tree Inventory*, by FASS.

[b]Coefficient of Variation: Standard deviation divided by mean.

[c]Correlation coefficient between the weighted average yield and bearing tree density, adding seasons 1986-87 through 1988-89 (1989-90 is omitted as a freeze occurred then) decreases the early and midseason correlation to -.27 and increases the Valencia correlation to -.53.

Table 13. Estimated 1997-98 round-orange and grapefruit trees per acre, based on the 1998 commercial inventory.

Tree Age	Round Orange[a]	Grapefruit
	- - - - - - - - - - - - trees per acre - - - - - - - - - - - -	
0	133.6	121.2
1	145.8	121.9
2	140.3	123.5
3	145.4	130.9
4	143.5	130.3
5	141.2	122.7
6	143.7	120.5
7	147.2	118.1
8	148.2	117.5
9	138.1	112.4
10	132.7	112.1
11	132.6	110.9
12	129.0	112.1
13	121.3	110.7
14	120.2	101.9
15	117.7	96.1
16	119.0	100.1
17	119.5	103.2
18	119.1	95.0
19	112.9	98.2
20	111.2	100.3
21	115.6	93.5
22	116.6	96.4
23	120.0	101.0
24	101.3	87.3

[a]Orange trees and acres listed as unidentified by the FASS were allocated between round oranges, Temples and tangelos in the same proportion as the identified proportions in calculating the average trees per acre.

Table 14. Estimated production for round oranges, grapefruit and specialty citrus, based on alternative estimation methods.

Season	Oranges		Grapefruit		Specialty[e]
	Method				
	Tree[a]	Acre[b]	Tree[c]	Acre[d]	
	million boxes				
1999-00	262.0	242.8	59.0	54.8	12.6
2000-01	270.5	245.9	58.5	53.4	13.1
2001-02	277.7	248.2	59.7	53.0	13.3
2002-03	284.2	250.5	60.6	52.4	13.5
2003-04	289.9	252.4	61.3	51.7	13.6
2004-05	295.0	254.5	61.8	51.3	13.6
2005-06	299.5	256.3	62.3	51.1	13.6
2006-07	303.8	258.0	62.7	50.9	13.6
2007-08	307.7	259.1	63.1	50.9	13.6
2008-09	311.3	260.9	63.5	51.0	13.6

[a]Projected trees times average yield per tree, by age of tree, with tree plantings equal to tree losses, and the annual tree loss rate increasing with age, averaging 2.0% over tree ages, over the projection period.

[b]Projected acres times average yield per acre, by age of acre, with acre plantings equal to acre losses, and the annual acre loss rate increasing with age, averaging 2.6% over acre ages, over the projection period.

[c]Projected trees times average yield per tree, by age of tree; from 1998-99 through 2000-01, annual tree plantings are equal to the average from 1995 through 1997, and the annual tree loss rate averages 4.5%; from 2001-02 to 2008-09, annual tree plantings are equal to annual tree losses, with the annual tree loss rate averaging 1.7%.

[d]Projected acres times average yield per acre, by age of acre; from 1998-99 through 2000-01, annual tree plantings are equal to the average from 1995 through 1997, and the annual tree loss rate averages 5.0%; from 2001-02 to 2008-09, annual tree plantings are equal to annual tree losses, with the annual tree loss rate averaging 3.0%.

[e]Based on regression equations relating production to acres, by age of acre. Acre plantings equal acre losses for Temples, tangelos and tangerines. Acre loss rates for Temples, tangelos and tangerines were 4.0%, 5.0% and 3.5%, respectively.

Table 15. Estimated average yields for production estimates for round oranges and grapefruit.

Season	Oranges				Grapefruit			
	Tree Method		Acre Method		Tree Method		Acre Method	
	Bearing Trees	Boxes/ Tree	Bearing Acres	Boxes/ Acre	Bearing Trees	Boxes/ Tree	Bearing Acres	Boxes/ Acre
	million trees	boxes	thousand acres	boxes	million trees	boxes	thousand acres	boxes
1999-00	79.8	3.3	607.5	399.7	12.7	4.7	118.7	462.0
2000-01	80.7	3.4	610.5	402.9	12.3	4.8	113.9	469.0
2001-02	80.6	3.5	609.5	407.3	12.2	4.9	111.9	473.2
2002-03	80.5	3.5	608.8	411.4	12.2	5.0	110.0	476.0
2003-04	80.4	3.6	608.1	415.1	12.2	5.0	108.2	478.2
2004-05	80.3	3.7	607.5	419.0	12.2	5.1	108.2	474.4
2005-06	80.2	3.7	607.0	422.2	12.2	5.1	108.2	472.0
2006-07	80.1	3.8	606.5	425.4	12.2	5.2	108.2	470.2
2007-08	80.1	3.8	606.1	427.4	12.2	5.2	108.2	470.2
2008-09	80.0	3.9	605.8	430.6	12.2	5.2	108.2	471.2

Table 16. Estimated age distribution of Florida round-orange trees.

Season	Tree Age						Total Trees
	≤2	3-5	6-8	9-13	14-23	≥24	
	- % -						- million -
1999-00	6.6	7.2	22.2	34.3	14.2	15.5	85.4
2000-01	5.5	7.8	14.8	38.5	17.8	15.6	85.4
2001-02	5.7	6.8	9.6	38.1	24.1	15.8	85.4
2002-03	5.8	6.4	6.9	36.5	28.5	15.9	85.4
2003-04	5.9	5.4	7.5	29.9	35.0	16.4	85.4
2004-05	6.0	5.5	6.5	24.9	40.2	16.9	85.4
2005-06	6.1	5.6	6.2	17.9	46.3	17.9	85.4
2006-07	6.2	5.8	5.1	13.4	50.7	18.9	85.4
2007-08	6.2	5.9	5.3	10.5	51.2	20.9	85.4
2008-09	6.3	5.9	5.4	10.0	50.4	21.9	85.4

Table 17. Estimated age distribution of Florida grapefruit trees.

Season	Tree Age						Total Trees
	≤2	3-5	6-8	9-13	14-23	≥24	
	- % -						- million -
1999-00	4.0	5.8	21.9	26.0	13.3	29.0	13.22
2000-01	4.5	4.2	15.8	32.1	14.0	29.4	12.83
2001-02	4.7	3.7	9.3	35.5	16.4	30.3	12.83
2002-03	4.9	3.8	5.5	35.3	19.3	31.1	12.83
2003-04	5.0	4.3	4.0	29.8	25.1	31.9	12.83
2004-05	5.0	4.5	3.5	24.1	30.9	32.1	12.83
2005-06	5.0	4.6	3.7	17.4	36.6	32.8	12.83
2006-07	5.0	4.7	4.1	10.7	41.8	33.8	12.83
2007-08	5.0	4.7	4.3	7.3	43.9	34.9	12.83
2008-09	5.0	4.7	4.4	6.3	43.8	35.9	12.83

Table 18. Sensitivity analysis of orange production projections.

Season	Scenario				
	Base	Zero Plantings	1% Higher Loss Rate	10% Lower Yield by Age 24+[a]	25% Lower Yield by Age 24+[b]
	million boxes				
Tree Method					
1999-00	262	262	257	249	230
2003-04	290	285	275	273	247
2008-09	311	286	291	289	254
Acre Method					
1999-00	243	243	238	231	212
2003-04	252	245	240	237	215
2008-09	261	226	246	243	215

[a]Beginning at age six, tree and acre yields are assumed to fall below the state average yields underlying the projections in Table 14; at age six, the assumed yields are slightly less than the state averages; as age increases, the assumed yields fall farther below the state averages, reaching 10% below the state averages by age category 24 and over.

[b]Beginning at age six, tree and acre yields are assumed to fall below the state average yields underlying the projections in Table 14; at age six, the assumed yields are slightly less than the state averages; as age increases, the assumed yields fall farther below the state averages, reaching 25% below the state averages by age category 24 and over.

Table 19. Sensitivity analysis of grapefruit production projections.

Season	Scenario				
	Base	Zero Plantings	Double Loss Rate[a]	10% Lower Yield by Age 24+[b]	25% Lower Yield by Age 24+[c]
	million boxes				
Tree Method					
1999-00	59	59	53	56	50
2003-04	61	60	53	57	51
2008-09	64	59	55	59	52
Acre Method					
1999-00	55	55	46	52	47
2003-04	52	51	41	48	43
2008-09	51	45	40	47	42

[a]Double the loss rate assumption for 1998-99 through 2000-01 indicated in Table 14 footnotes d and e.

[b]Beginning at age six, tree and acre yields are assumed to fall below the state average yields underlying the projections in Table 14; at age six, the assumed yields are slightly less than the state averages; as age increases, the assumed yields fall farther below the state averages, reaching 10% below the state averages by age category 24 and over.

[c]Beginning at age six, tree and acre yields are assumed to fall below the state average yields underlying the projections in Table 14; at age six, the assumed yields are slightly less than the state averages; as age increases, the assumed yields fall farther below the state averages, reaching 25% below the state averages by age category 24 and over.

Table 20. Estimated round-orange production by variety.

Season	Early & Midseason		Late[a]		Total	
	Method					
	Tree	Acre	Tree	Acre	Tree	Acre
	million boxes					
1999-00	153.3	142.4	108.7	100.4	262.0	242.8
2000-01	157.9	143.9	112.6	102.0	270.5	245.9
2001-02	161.6	144.8	116.1	103.4	277.7	248.2
2002-03	164.8	145.7	119.4	104.8	284.2	250.5
2003-04	167.4	146.2	122.5	106.2	289.9	252.4
2004-05	169.6	146.9	125.4	107.6	295.0	254.5
2005-06	171.5	147.5	128.0	108.8	299.5	256.3
2006-07	173.2	148.0	130.6	110.0	303.8	258.0
2007-08	174.8	148.1	132.9	111.0	307.7	259.1
2008-09	176.1	148.7	135.2	112.2	311.3	260.9

[a]Recent late orange planting levels have been somewhat greater than the assumed replacement planting level underlying the late orange production projection shown in the table. If the average late orange annual planting level from 1995 to 1997 is assumed over the projection period, late orange production would increase from 108.7 million boxes in 1999-00 to 143.2 million boxes in 2008-09, based on the tree method; or, from 100.4 million boxes in 1999-00 to 115.7 million boxes in 2008-09, based on the acre method.

Table 21. Estimated grapefruit production by variety.

Season	White Seedless		Red and Pink Seedless		Seedy		Total	
	Method							
	Tree	Acre	Tree	Acre	Tree	Acre	Tree	Acre
	million boxes							
1999-00	23.2	21.8	34.6	31.8	1.2	1.2	59.0	54.8
2000-01	22.9	21.2	34.5	31.2	1.1	1.0	58.5	53.4
2001-02	23.2	21.0	35.4	31.0	1.1	1.0	59.7	53.0
2002-03	23.6	21.0	36.0	30.4	1.0	1.0	60.6	52.4
2003-04	24.1	21.0	36.2	29.8	1.0	.9	61.3	51.7
2004-05	24.5	21.1	36.3	29.3	1.0	.9	61.8	51.3
2005-06	25.0	21.3	36.3	28.9	1.0	.9	62.3	51.1
2006-07	25.4	21.4	36.3	28.6	1.0	.9	62.7	50.9
2007-08	25.8	21.6	36.4	28.5	.9	.8	63.1	50.9
2008-09	26.2	21.8	36.4	28.4	.9	.8	63.5	51.0

Table 22. Estimated specialty-citrus production by variety.

Season	Temples[a]	Tangelos[b]	Tangerines[c]	Total
	- million boxes -			
1999-00	2.0	3.2	7.4	12.6
2000-01	2.0	3.2	7.9	13.1
2001-02	1.9	3.1	8.3	13.3
2002-03	1.9	3.1	8.5	13.5
2003-04	1.9	3.1	8.6	13.6
2004-05	1.9	3.1	8.6	13.6
2005-06	1.9	3.1	8.6	13.6
2006-07	1.9	3.1	8.6	13.6
2007-08	1.9	3.1	8.6	13.6
2008-09	1.9	3.1	8.6	13.6

[a]Acre plantings are assumed to be equal to acre losses; the acre-loss rate is assumed to be 4.0% per year.

[b]Acre plantings are assumed to be equal to acre losses; the acre-loss rate is assumed to be 5.0% per year.

[c]Acre plantings are assumed to be equal to acre losses; the acre-loss rate is assumed to be 3.5% per year.

EXHIBITS

Exhibit 1

Early & Midseason Yields and Tree Density

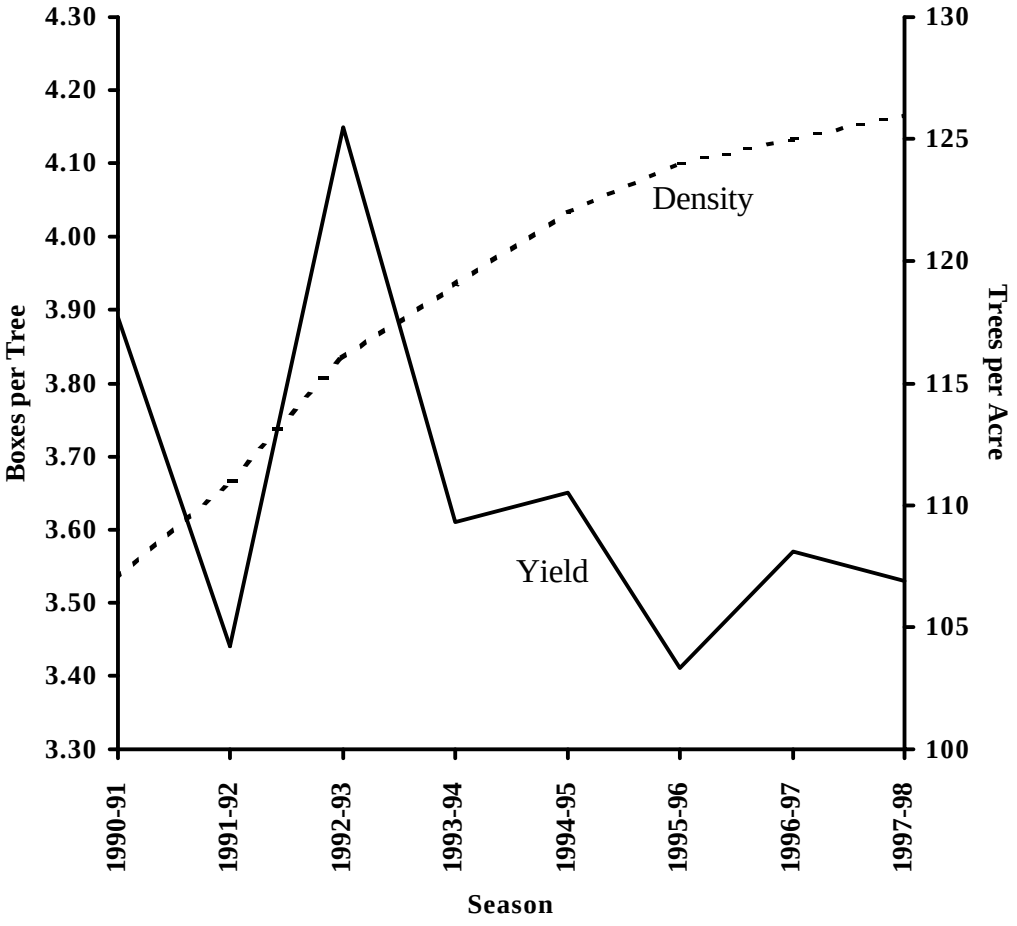

Exhibit 2

Valencia Yields and Tree Density