United States Department of Agriculture
National Agricultural Statistics Service

CITRUS

OCTOBER FORECAST
MATURITY TEST RESULTS AND FRUIT SIZE

Cooperating with the Florida Department of Agriculture and Consumer Services
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October 10, 2019

Florida All Orange Production Up 3 Percent From Last Season
Florida Non-Valencia Orange Production Up 5 Percent
Florida Valencia Orange Production Up 2 Percent
Florida All Grapefruit Production Up 2 Percent
Florida All Tangerine and Tangelo Production Up 6 Percent

FORECAST DATES – 2019-2020 SEASON
November 8, 2019
December 10, 2019

Citrus Production by Type – States and United States

Crop and State	Production [1]			Forecasted Production [1]
	2016-2017	2017-2018	2018-2019	2019-20120
	(1,000 boxes)	(1,000 boxes)	(1,000 boxes)	(1,000 boxes)
Non-Valencia Oranges [2]				
Florida	**33,000**	**18,950**	**30,400**	**32,000**
California	39,300	35,900	40,800	38,000
Texas	1,090	1,530	2,210	2,050
United States	73,390	56,380	73,410	72,050
Valencia Oranges				
Florida	**35,850**	**26,100**	**41,350**	**42,000**
California	9,000	8,300	9,000	9,000
Texas	280	350	290	650
United States	45,130	34,750	50,640	51,650
All Oranges				
Florida	**68,850**	**45,050**	**71,750**	**74,000**
California	48,300	44,200	49,800	47,000
Texas	1,370	1,880	2,500	2,700
United States	118,520	91,130	124,050	123,700
Grapefruit				
Florida-All	**7,760**	**3,880**	**4,510**	**4,600**
Red	**6,280**	**3,180**	**3,740**	**3,900**
White	**1,480**	**700**	**770**	**700**
California	4,400	3,800	3,200	4,200
Texas	4,800	4,800	6,100	5,700
United States	16,960	12,480	13,810	14,500
Lemons				
Arizona	1,550	1,000	1,350	1,400
California	20,500	21,200	22,800	20,000
United States	22,050	22,200	24,150	21,400
Tangerines and Tangelos				
Florida-All [3]	**1,620**	**750**	**990**	**1,050**
Early [4]	**600**	**(NA)**	**(NA)**	**(NA)**
Royal	**210**	**(NA)**	**(NA)**	**(NA)**
Honey	**530**	**(NA)**	**(NA)**	**(NA)**
Tangelo	**280**	**(NA)**	**(NA)**	**(NA)**
California [5]	23,800	19,200	26,000	23,000
United States	25,420	19,950	26,990	24,050

NA Not available.
[1] Net pounds per box: oranges in California-80, Florida-90, Texas-85; grapefruit in California and Texas-80, Florida-85; lemons-80; tangerines and mandarins in California-80, Florida-95.
[2] Navel and miscellaneous varieties in California; Early non-Valencia (including Navel) and midseason non-Valencia varieties in Florida; Early and mid-season varieties in Texas.
[3] In 2016-2017, includes Fallglo, Sunburst, Royal, and Honey tangerine varieties and tangelos. Beginning in 2017-2018, includes all certified varieties of tangerines and tangelos.
[4] Fallglo and Sunburst varieties.
[5] Includes tangelos and tangors in California.

All Oranges 74.0 Million Boxes

The 2019-2020 Florida all orange forecast released today by the USDA Agricultural Statistics Board is 74.0 million boxes, 3 percent more than last season's final production. The total includes 32.0 million boxes of non-Valencia oranges (early, midseason, and Navel varieties) and 42.0 million boxes of Valencia oranges. The Navel orange forecast, at 800 thousand boxes, accounts for 3 percent of the non-Valencia total.

The estimated number of bearing trees for all oranges is 50.1 million. Trees planted in 2016 and earlier are considered bearing this season. Field work for the latest Commercial Citrus Inventory was completed in June 2019. Attrition rates were applied to the results to determine the number of bearing trees which are used to weight and expand objective count data in the forecast model.

A 9 year regression has been used for comparison purposes. All references to "average", "minimum", and "maximum" refer to the previous 10 seasons, excluding the 2017-2018 season, which was affected by Hurricane Irma. Average fruit per tree includes both regular bloom and the first late bloom.

Non-Valencia Oranges 32.0 Million Boxes

The non-Valencia forecast of 32.0 million boxes is 5 percent higher than last season's production. The estimated number of bearing trees (without Navels) is 19.5 million, down 1 percent from the previous season. The estimated fruit per tree for early-midseason oranges is 775, a decrease of 5 percent from last season. Projected fruit size is below average, requiring an estimated 308 pieces of fruit to fill a 90-pound box. At 26 percent, droppage is above average.

The Navel forecast of 800 thousand boxes is 7 percent higher than last season's production. The estimated number of bearing trees is 932 thousand, down 1 percent from the previous season. The estimated fruit per tree is 236, an increase of 11 percent from last season. Projected fruit size is below average, requiring an estimated 142 pieces of fruit to fill a 90-pound box. Projected droppage is above average at 25 percent.

Valencia Oranges 42.0 Million Boxes

The Valencia forecast of 42.0 million boxes is 2 percent higher than last season's production. The estimated number of bearing trees is 29.6 million, up 2 percent from the previous season. The estimated fruit per tree is 536, a decrease of 12 percent from last season. Projected fruit size is below average, requiring an estimated 245 pieces of fruit to fill a 90-pound box. Projected droppage is above average at 28 percent.

Reliability

To assist users in evaluating the reliability of the October 1 Florida production forecasts, the "Root Mean Square Error," a statistical measure based on past performance, is computed. The deviation between the October 1 production forecast and the final estimate is expressed as a percentage of the final estimate. The average of squared percentage deviations for the latest 20-year period is computed. The square root of the average becomes statistically the "Root Mean Square Error." Probability statements can be made concerning expected differences in the current forecast relative to the final end-of-season estimate, assuming that factors affecting this year's forecast are not different from those influencing recent years.

The "Root Mean Square Error" for the October 1 Florida all orange production forecast is 10.8 percent. However, if you exclude the three abnormal production seasons (three hurricane seasons), the "Root Mean Square Error" is 6.6 percent. This means chances are 2 out of 3 that the current all orange production forecast will not be above or below the final estimates by more than 10.8 percent, or 6.6 percent excluding abnormal seasons. Chances are 9 out of 10 (90 percent confidence level) that the difference will not exceed 18.7 percent, or 11.5 percent excluding abnormal seasons.

Changes between the October 1 Florida all orange forecast and the final estimates during the past 20 years have averaged 10.2 million boxes (7.32 million, excluding abnormal seasons), ranging from 0.30 million boxes to 42.3 million boxes including abnormal seasons, (0.30 to 22.0 million boxes excluding abnormal seasons). The October 1 forecast for all oranges has been below the final estimate 4 times, above 15 times, (below 4 times, above 12 times, excluding abnormal seasons). The difference does not imply that the October 1 forecast this year is likely to understate or overstate final production.

Weather and Crop Progress

The citrus growing region had favorable weather leading up to the bloom period in early March. Only the Indian River District showed abnormally dry conditions; the remaining citrus growing region was drought free. By the end of March trees had formed an abundance of pea size fruit for the next season. Several growers had finished hedging and topping programs. Caretakers were pulling out non-productive and dying trees for disposal. By the end of April, oranges were observed in various measurements between marble and quarter size. May and June saw favorable conditions with mildly warm weather and above average rainfall. During the summer, conditions were normal with average rainfall and warm temperatures. The fruit sized much better than the previous season. The notable event of the summer was Hurricane Dorian, which stalled Sunday over the Bahamas as a Category 5 storm before weakening to Category 2 and traveling parallel to the state. Though it remained 70 to 100 miles offshore, rain bands from Dorian dropped 1 to 3 inches along Florida's eastern citrus growing area. Sustained winds were limited to 30 to 35 mph, with gusts up to 50 mph. Little to no damage was observed to the citrus crop. Growers were optimistic about a healthy crop and promising upcoming season.

Forecast Components, by Type – Florida: October 2019

[Survey data is considered final in December for Navels, January for non-Valencia oranges, February for grapefruit, and April for Valencia oranges]

Type	Bearing trees	Fruit per tree	Droppage	Fruit per box
	(1,000 trees)	(number)	(percent)	(number)
ORANGES				
Non-Valencia	19,529	775	26	308
Navel	932	236	25	142
Valencia	29,615	536	28	245
GRAPEFRUIT				
Red	2,150	415	31	121
White	356	453	25	110

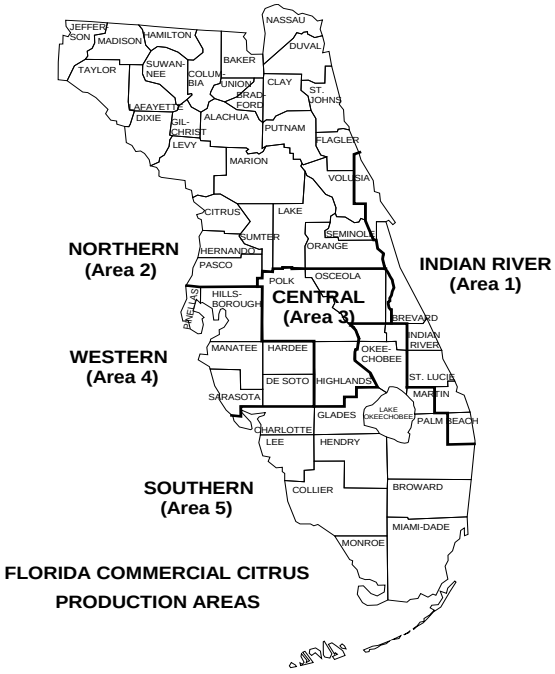
Citrus Production and Prorated Forecast, by Production Area – Florida: 2018-2019 and 2019-2020

[Forecasts based on fruit populations. The possible differences between growing areas, concerning average fruit size, loss from droppage, and harvest patterns, can alter the prorated estimates]

Production Area	Oranges			
	Non-Valencia		Valencia	
	2018-2019	2019-2020	2018-2019	2019-2020
	(1,000 boxes)	(1,000 boxes)	(1,000 boxes)	(1,000 boxes)
Western	11,409	11,800	12,400	11,500
Other [1]	18,991	20,200	28,950	30,500
Florida Total	30,400	32,000	41,350	42,000

Production Area	Grapefruit			
	White		Red	
	2018-2019	2019-2020	2018-2019	2019-2020
	(1,000 boxes)	(1,000 boxes)	(1,000 boxes)	(1,000 boxes)
Indian River	661	600	2,903	2,700
Other [2]	109	100	837	1,200
Florida Total	770	700	3,740	3,900

[1] Includes Central, Indian River, Northern, and Southern areas.
[2] Includes Central, Northern, Southern, and Western areas.



Distribution of Estimated Fruit Population, by Type, Area, and Age Groups – Florida: September

[Distribution of fruit population in September as determined by multiplying average fruit per tree from the Limb Count Survey by bearing age trees]

Areas and age groups	Oranges				Grapefruit			
	Non-Valencia		Valencia		Red		White	
	2018-2019	2019-2020	2018-2019	2019-2020	2018-2019	2019-2020	2018-2019	2019-2020
	(percent)	(percent)	(percent)	(percent)	(percent)	(percent)	(percent)	(percent)
Indian River	1	2	4	5	71	69	88	82
Northern	4	2	1	1	2	2	1	1
Central	30	30	35	35	5	6	5	8
Western	38	37	29	27	3	5	(Z)	(Z)
Southern	27	29	31	32	19	18	6	9
3 - 5 years	4	4	5	6	7	4	(Z)	(Z)
6 - 8 years	6	7	6	7	9	9	2	(Z)
9 - 13 years	12	14	9	10	5	8	(Z)	1
14 - 23 years	25	25	29	29	10	10	9	6
24 yrs & over	53	50	51	48	69	69	89	93

Z Less than half of the unit shown.

Maturity

Regular bloom fruit samples (325 orange and 99 grapefruit) were collected from groves on established routes in Florida's five major citrus producing areas and tested by the Florida Agricultural Statistics Service (FASS) on September 25-27, 2019.

Unadjusted Maturity Tests – Florida: 2018-2019 and 2019-2020

[Averages of regular bloom fruit from sample groves. Juice and solids per box are unadjusted and not comparable to juice processing plant test results. Samples were run through an FMC 091B machine using pneumatic pressure. This machine utilizes a 0.025 short strainer and a 1.00 inch orifice tube for the 3 inch cup and a 1.25 inch orifice tube for the 4 inch and 5 inch cups]

Fruit type (number of groves) test date	Acid		Solids (Brix)		Ratio		Unfinished juice per box		Solids per box	
	2018-2019	2019-2020	2018-2019	2019-2020	2018-2019	2019-2020	2018-2019	2019-2020	2018-2019	2019-2020
	(percent)	(percent)	(percent)	(percent)			(pounds)	(pounds)	(pounds)	(pounds)
ORANGES										
Early N-V (120-120)										
Sep 1	1.19	1.21	8.84	9.06	7.51	7.58	43.67	45.11	3.86	4.09
Oct 1	0.86	0.89	9.22	9.69	10.94	11.04	49.09	49.65	4.52	4.81
Midseason N-V (55-55)										
Sep 1	1.32	1.37	8.93	9.04	6.84	6.71	44.64	45.55	3.99	4.12
Oct 1	0.94	1.04	9.31	9.76	10.02	9.54	49.78	49.37	4.64	4.81
Valencia (150-150)										
Sep 1	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
Oct 1	1.90	1.97	8.56	9.08	4.54	4.68	46.30	47.73	3.96	4.33
GRAPEFRUIT										
Red Seedless (50-50)										
Sep 1	1.44	1.53	9.72	10.10	6.79	6.63	36.75	39.41	3.58	3.98
Oct 1	1.22	1.31	9.48	10.21	7.80	7.84	42.49	46.18	4.03	4.71
White Seedless (50-49)										
Sep 1	1.53	1.63	9.84	10.33	6.45	6.35	36.37	38.84	3.58	4.01
Oct 1	1.36	1.41	9.61	10.33	7.10	7.37	42.63	46.00	4.10	4.75

NA Not available.

Unadjusted Maturity Test Averages, by Areas – Florida: October 2018-2019 and 2019-2020

Fruit type (number of groves) test date	Acid		Solids (Brix)		Ratio		Unfinished juice per box		Solids per box	
	2018-2019	2019-2020	2018-2019	2019-2020	2018-2019	2019-2020	2018-2019	2019-2020	2018-2019	2019-2020
	(percent)	(percent)	(percent)	(percent)			(pounds)	(pounds)	(pounds)	(pounds)
ORANGES										
Early N-V										
Indian River (9-9)	0.98	0.95	9.33	10.01	9.71	10.59	43.81	47.97	4.09	4.81
Other Areas [1] (111-111)	0.85	0.89	9.21	9.66	11.03	11.08	49.52	49.79	4.56	4.81
Midseason N-V										
Indian River (2-2)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Other Areas [1] (53-53)	0.94	1.04	9.32	9.76	10.08	9.57	50.05	49.58	4.66	4.84
Valencia										
Indian River (29-29)	2.10	2.23	8.84	9.53	4.22	4.32	44.03	46.48	3.90	4.43
Other Areas [1] (121-121)	1.86	1.91	8.49	8.97	4.62	4.77	46.84	48.03	3.98	4.31
GRAPEFRUIT										
Red Seedless										
Indian River (42-42)	1.22	1.34	9.52	10.30	7.86	7.74	42.82	46.06	4.07	4.75
Other Areas [1] (8-8)	1.23	1.17	9.24	9.71	7.53	8.36	40.77	46.82	3.78	4.53
White Seedless										
Indian River (42-43)	1.35	1.40	9.65	10.38	7.18	7.42	42.74	45.52	4.13	4.72
Other Areas [1] (8-6)	1.41	1.42	9.37	9.98	6.67	7.05	42.06	49.38	3.94	4.93

D Withheld to avoid disclosing data for individual operations.
[1] Includes Central, Northern, Southern, and Western areas.

All Grapefruit 4.60 Million Boxes

The forecast of all grapefruit production is 4.60 million boxes, 2 percent more than last season's utilization of 4.51 million boxes, but up 19 percent up from the 2017-2018 season. The total is comprised of 3.90 million boxes of red grapefruit and 700 thousand boxes of white grapefruit.

The **red** grapefruit forecast at 3.90 million boxes is 4 percent more than last season's final production, and 23 percent more than the 2017-2018 season. Bearing trees are estimated to be 12 percent less than last season's revised bearing tree numbers. The average fruit per tree is 40 pieces more than last season and the highest since the 2015-2016 season. Fruit droppage is projected to be above average, while sizes are projected to be average.

The **white** grapefruit forecast of 700 thousand boxes is 9 percent less than last season's final production, however equal to the final production of the 2017-2018 season. White grapefruit bearing trees used in this forecast are estimated to have declined by 26 percent from last season's revised bearing tree numbers, and are 47 percent less than two seasons ago. Loss from droppage is expected to be higher than average. The average fruit per tree is 90 pieces more than last season, yet 10 pieces less than the average of the previous nine seasons used in the regression. At 453 pieces of fruit per tree, it is the most since the 2015-2016 season. Current fruit sizes are above average, and the rate of growth measured in last month's survey indicates that final size will be above average.

Tangerines and Tangelos Total 1.05 Million Boxes

The forecast for tangerine and tangelos is 1.05 million boxes, 6 percent more than last season's utilization of 990 thousand boxes. This forecast number includes all certified tangerine and tangelo varieties.

Forecast Procedures

All citrus forecasts are based on actual fruit counts and measurements. The objective count method uses four components:

(1) bearing age trees provided from the latest Commercial Citrus Inventory;
(2) average fruit per tree obtained from the Limb Count survey using randomly selected trees and limbs;
(3) fruit size from the fruit measurement survey;
(4) fruit loss from the drop survey.

These measurements are used in the forecast models; regression data are from the 2009-2010 through 2018-2019 seasons.

The latest Tree Inventory is used to determine estimated tree numbers. All trees planted in 2016 and earlier are included for the current season. An attrition factor was applied to these tree numbers (by age and area) to account for losses since the inventory period.

Statistically valid procedures are used to provide unbiased estimates of fruit count. Samples are drawn with known probabilities from the Commercial Citrus Inventory, taking into account the variability in fruit per tree. Limbs are randomly selected from sample trees. Fruit on these limbs are counted in the mid-July to mid-September period.

Expected Gift Fruit Shipments Under the 6-R Program and Non-Certified Usage, by Type – Florida: 2019-2020

Type	1,000 boxes
Navel Oranges	50
Non-Valencia Oranges (excluding navels)	100
Valencia Oranges	100
Red Grapefruit	75
White Grapefruit	15
All Tangerines and Tangelos	60

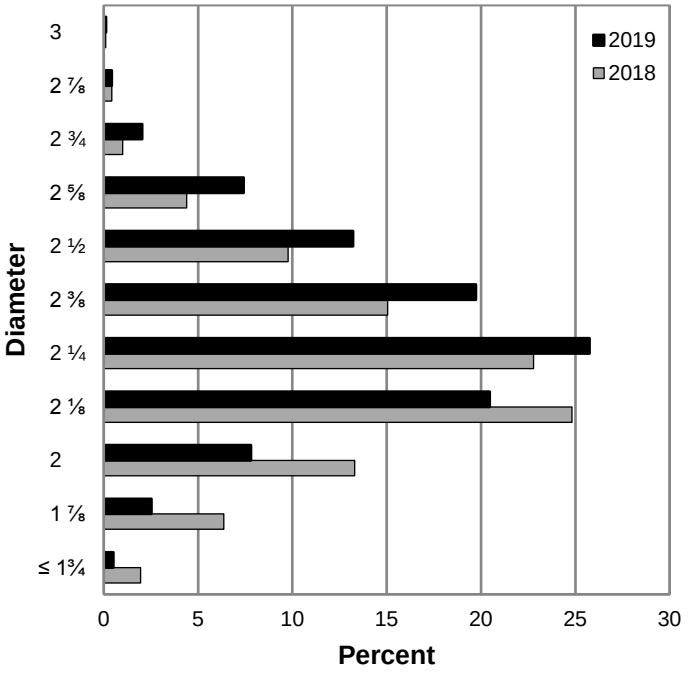
Citrus Size Frequency Measurement Distributions, by Type – Florida: September

Type and number of fruit per 4/5 – bushel containers	2017	2018	2019
	(percent)	(percent)	(percent)
NON-VALENCIA ORANGES [1]			
64 or less	0.1	0.0	0.0
80	0.7	0.3	0.3
100	6.4	2.5	4.6
125	22.4	12.9	18.3
163 or more	70.4	84.3	76.8
NAVEL ORANGES			
64 or less	26.6	29.4	27.7
80	30.8	27.8	32.6
100	25.0	25.6	24.2
125	12.9	11.7	11.9
163 or more	4.7	5.5	3.6
VALENCIA ORANGES			
64 or less	0.1	0.0	0.0
80	1.3	0.2	0.3
100	7.0	3.0	4.9
125	24.3	13.8	19.8
163 or more	67.3	83.0	75.0
TANGELOS			
80 or less	1.1	0.4	5.0
100	7.5	3.8	10.9
120	23.2	12.1	21.4
156 or more	68.2	83.7	62.7

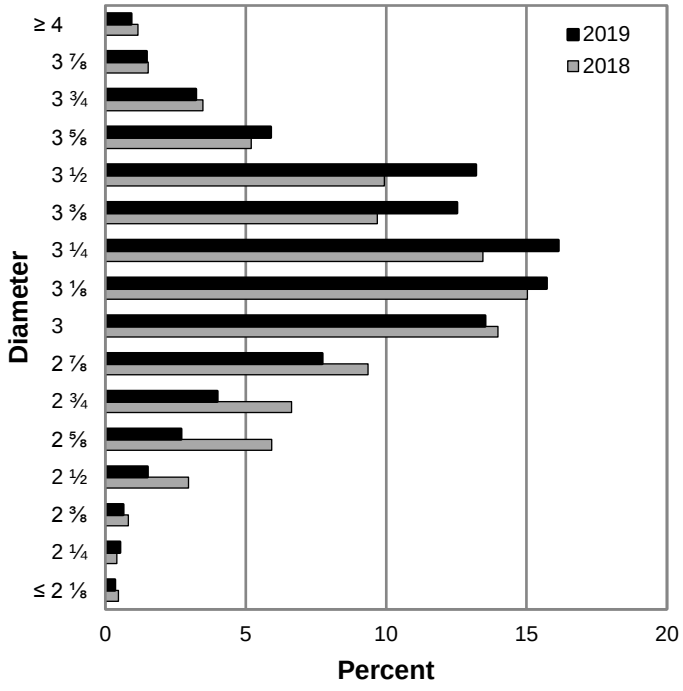
Type and number of fruit per 4/5 – bushel containers	2017	2018	2019
	(percent)	(percent)	(percent)
RED GRAPEFRUIT [2]			
32 or less	0.4	0.4	0.1
36	3.2	1.3	1.4
40	7.3	4.5	4.1
48	11.1	8.8	10.0
56	12.6	9.8	13.7
63 or more	65.4	75.2	70.7
WHITE GRAPEFRUIT [2]			
32 or less	0.4	1.0	0.3
36	2.8	2.8	2.6
40	7.2	6.6	6.5
48	13.2	10.1	14.9
56	14.1	13.9	14.4
63 or more	62.3	65.6	61.3
FALLGLO TANGERINES			
80 or less	13.2	6.9	3.5
100	18.2	7.7	17.3
120	21.5	22.3	29.2
176	9.7	16.9	17.0
210 or more	37.4	46.2	33.0
SUNBURST TANGERINES			
100 or less	0.9	0.0	1.7
120	9.4	1.9	5.0
176	10.9	6.9	6.2
210 or more	78.8	91.2	87.1

[1] Excludes Navels.
[2] Excludes seedy variety.

Fruit Size Frequency Measurements, Non-Valencia Oranges [1], by Diameter - Florida: September



Fruit Size Frequency Measurements, Red Grapefruit, by Diameter - Florida: September



[1] Excludes Navel variety.