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 11, 2018

Florida All Orange Production Up 76 Percent From Last Season
Florida Non-Valencia Orange Production Up 79 Percent
Florida Valencia Orange Production Up 73 Percent
Florida All Grapefruit Production Up 73 Percent
Florida All Tangerine and Tangelo Production Up 60 Percent

2018-2019 SEASON FORECAST DATES
November 8, 2018
December 11, 2018

Citrus Production by Type – States and United States

Crop and State	Production [1]			Forecasted Production [1]
	2015-2016	2016-2017	2017-2018	2018-2019
	(1,000 boxes)	(1,000 boxes)	(1,000 boxes)	(1,000 boxes)
Non-Valencia Oranges [2]				
Florida	**36,100**	**33,000**	**18,950**	**34,000**
California	47,200	39,300	35,900	40,000
Texas	1,351	1,090	1,530	1,800
United States	84,651	73,390	56,380	75,800
Valencia Oranges				
Florida	**45,600**	**35,850**	**26,000**	**45,000**
California	11,300	9,000	9,500	9,000
Texas	340	280	350	600
United States	57,240	45,130	35,850	54,600
All Oranges				
Florida	**81,700**	**68,850**	**44,950**	**79,000**
California	58,500	48,300	45,400	49,000
Texas	1,691	1,370	1,880	2,400
United States	141,891	118,520	92,230	130,400
Grapefruit				
Florida-All	**10,800**	**7,760**	**3,880**	**6,700**
Red	**8,310**	**6,280**	**3,180**	**5,500**
White	**2,490**	**1,480**	**700**	**1,200**
California	3,800	4,400	4,000	3,900
Texas	4,800	4,800	4,800	6,200
United States	19,400	16,960	12,680	16,800
Lemons				
California	21,000	20,500	21,200	20,000
Arizona	1,600	1,550	1,000	1,400
United States	22,600	22,050	22,200	21,400
Tangelos				
Florida	**390**	**(NA)**	**(NA)**	**(NA)**
Tangerines and Tangelos				
Florida-All [3]	**1,415**	**1,620**	**750**	**1,200**
Early [4]	**785**	**600**	**(NA)**	**(NA)**
Royal	**(NA)**	**210**	**(NA)**	**(NA)**
Honey	**630**	**530**	**(NA)**	**(NA)**
Tangelo	**(NA)**	**280**	**(NA)**	**(NA)**
California [5]	21,700	23,800	19,200	23,000
United States	23,115	25,420	19,950	24,200

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; tangelos-90 in 2015-2016 and tangerines and mandarins in Arizona and California-80, Florida-95.
[2] Navel and miscellaneous varieties in California; Early non-Valencia (including Navel) and midseason non-Valencia varieties in Florida and Texas. Includes small quantities of Temples in Florida in 2015-2016.
[3] Prior to 2016-2017 includes Fallglo, Sunburst, and Honey tangerine varieties only. 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 79.0 Million Boxes

The 2018-2019 Florida all orange forecast released today by the USDA Agricultural Statistics Board is 79.0 million boxes, 76 percent more than last season's final production. The total includes 34.0 million boxes of non-Valencia oranges (early, midseason, and Navel varieties) and 45.0 million boxes of Valencia oranges. The Navel orange forecast, at 800 thousand boxes, accounts for 2.4 percent of the non-Valencia total.

The estimated number of bearing trees for all oranges is 49.9 million. Trees planted in 2015 and earlier are considered bearing this season. Field work for the latest Commercial Citrus Inventory was completed in June 2018. 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 34.0 Million Boxes

The non-Valencia forecast of 34.0 million boxes is 79 percent higher than last season's production. The estimated number of bearing trees (without Navels) is 19.7 million. The estimated fruit per tree for early-midseason oranges is 813, an increase of 9 percent from last season. Projected fruit size is below minimum, requiring an estimated 317 pieces of fruit to fill a 90-pound box. At 23 percent, droppage is above average.

The Navel forecast of 800 thousand boxes is 60 percent higher than last season's production. The estimated number of bearing trees is 951 thousand, up 1 percent from the previous season. The estimated fruit per tree is 213, a decrease of 16 percent from last season. Projected fruit size is below the minimum average, requiring an estimated 140 pieces of fruit to fill a 90-pound box. Projected droppage is above the maximum at 30 percent.

Valencia Oranges 45.0 Million Boxes

The Valencia forecast of 45.0 million boxes is 73 percent higher than last season's production. The estimated number of bearing trees is 29.3 million, up 2 percent from the previous season. The estimated fruit per tree is 609, an increase of 19 percent from last season. Projected fruit size is below the minimum, requiring an estimated 255 pieces of fruit to fill a 90-pound box. Projected droppage is above average at 26 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 10.6 percent. However, if you exclude the three abnormal production seasons (three hurricane seasons), the "Root Mean Square Error" is 6.1 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 10.6 percent, or 6.1 percent excluding abnormal seasons. Chances are 9 out of 10 (90 percent confidence level) that the difference will not exceed 18.3 percent, or 10.7 percent-excluding abnormal seasons.

Changes between the October 1 Florida all orange forecast and the final estimates during the past 20 years have averaged 10.1 million boxes (7.11 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 forecasts this year are likely to understate or overstate final production.

Weather

The citrus growing region was very dry during February and March 2018. Monthly rainfall totals were below historical averages. By the end of March, abnormally dry conditions had expanded far into the Western area and moderate drought conditions were reported in portions of the Northern, Central and Southern areas. At that time, petal drop was over in most areas, with pea size and larger fruit having been formed on all varieties of trees. In spring, precipitation returned to average or above average volumes, which eliminated drought conditions in all areas. This positive trend continued as the fruit progressed on the trees. Growing conditions were ideal throughout the summer as owners and operators focused on the new season's crop.

Forecast Components, by Type – Florida: October 2018

[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	19,718	813	23	317
Navel	951	213	30	140
Valencia	29,262	609	26	255
GRAPEFRUIT				
Red	2,573	369	30	124
White	540	362	31	111

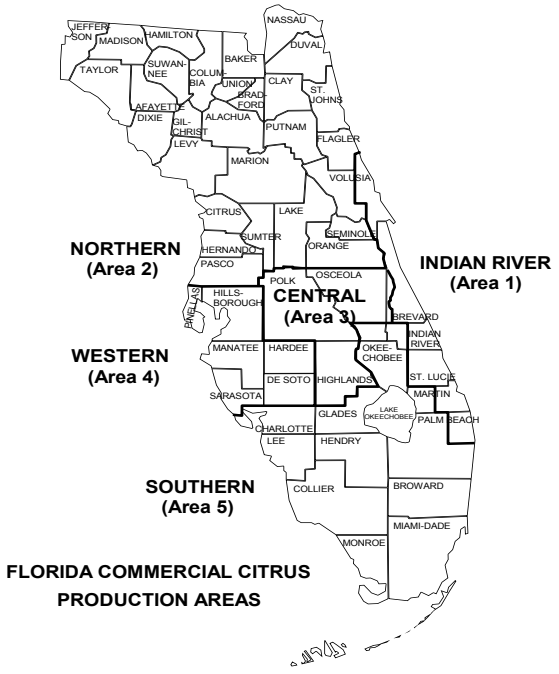
Citrus Production and Prorated Forecast, by Production Area – Florida: 2017-2018 and 2018-2019

[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	
	2017-2018	2018-2019	2017-2018	2018-2019
	(1,000 boxes)	(1,000 boxes)	(1,000 boxes)	(1,000 boxes)
Western	8,485	12,900	6,494	13,250
Other [1]	10,465	21,100	19,506	31,750
Florida Total	18,950	34,000	26,000	45,000

Production Area	Grapefruit			
	White		Red	
	2017-2018	2018-2019	2017-2018	2018-2019
	(1,000 boxes)	(1,000 boxes)	(1,000 boxes)	(1,000 boxes)
Indian River	592	1,100	2,815	3,900
Other [2]	108	100	365	1,600
Florida Total	700	1,200	3,180	5,500

[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	
	2017-2018	2018-2019	2017-2018	2018-2019	2017-2018	2018-2019	2017-2018	2018-2019
	(percent)	(percent)	(percent)	(percent)	(percent)	(percent)	(percent)	(percent)
Indian River	2	1	4	4	69	71	82	88
Northern	3	4	1	1	2	2	(Z)	1
Central	29	30	36	35	6	5	13	5
Western	36	38	23	29	3	3	(Z)	(Z)
Southern	30	27	36	31	20	19	4	6
3 - 5 years	5	4	6	5	10	7	(Z)	(Z)
6 - 8 years	8	6	6	6	8	9	1	2
9 - 13 years	13	12	9	9	7	5	2	(Z)
14 - 23 years	23	25	29	29	7	10	11	9
24 yrs & over	51	53	50	51	68	69	86	89

Z Less than half of the unit shown.

Maturity

Regular bloom fruit samples (325 orange and 100 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 26-28, 2018.

Unadjusted Maturity Tests – Florida: 2017-2018 and 2018-2019

[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	
	2017-2018	2018-2019	2017-2018	2018-2019	2017-2018	2018-2019	2017-2018	2018-2019	2017-2018	2018-2019
	(percent)	(percent)	(percent)	(percent)			(pounds)	(pounds)	(pounds)	(pounds)
ORANGES										
Early N-V (117-120)										
Sep 1	1.17	1.19	9.10	8.84	7.96	7.51	43.84	43.67	3.99	3.86
Oct 1	0.88	0.86	9.22	9.22	10.72	10.94	49.19	49.09	4.53	4.52
Midseason N-V (55-55)										
Sep 1	1.27	1.32	8.97	8.93	7.22	6.84	44.70	44.64	4.01	3.99
Oct 1	0.95	0.94	9.38	9.31	10.05	10.02	51.51	49.78	4.84	4.64
Valencia (150-150)										
Sep 1	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
Oct 1	1.84	1.90	8.74	8.56	4.83	4.54	48.52	46.30	4.24	3.96
GRAPEFRUIT										
Red Seedless (48-50)										
Sep 1	1.43	1.44	9.84	9.72	6.88	6.79	36.95	36.75	3.64	3.58
Oct 1	1.28	1.22	9.55	9.48	7.50	7.80	43.62	42.49	4.16	4.03
White Seedless (48-50)										
Sep 1	1.53	1.53	9.75	9.84	6.39	6.45	37.19	36.37	3.63	3.58
Oct 1	1.34	1.36	9.48	9.61	7.11	7.10	44.04	42.63	4.18	4.10

NA Not available.

Unadjusted Maturity Test Averages, by Areas – Florida: October 2017-2018 and 2018-2019

Fruit type (number of groves) test date	Acid		Solids (Brix)		Ratio		Unfinished juice per box		Solids per box	
	2017-2018	2018-2019	2017-2018	2018-2019	2017-2018	2018-2019	2017-2018	2018-2019	2017-2018	2018-2019
	(percent)	(percent)	(percent)	(percent)			(pounds)	(pounds)	(pounds)	(pounds)
ORANGES										
Early N-V										
Indian River (9-9)	0.93	0.98	9.31	9.33	10.18	9.71	45.96	43.81	4.28	4.09
Other Areas [1] (108-111)	0.87	0.85	9.21	9.21	10.77	11.03	49.46	49.52	4.55	4.56
Midseason N-V										
Indian River (2-2)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Other Areas [1] (53-53)	0.94	0.94	9.37	9.32	10.09	10.08	51.53	50.05	4.83	4.66
Valencia										
Indian River (29-29)	1.99	2.10	8.91	8.84	4.51	4.22	46.72	44.03	4.16	3.90
Other Areas [1] (121-121)	1.80	1.86	8.70	8.49	4.90	4.62	48.96	46.84	4.26	3.98
GRAPEFRUIT										
Red Seedless										
Indian River (40-42)	1.28	1.22	9.56	9.52	7.49	7.86	43.71	42.82	4.17	4.07
Other Areas [1] (8-8)	1.26	1.23	9.51	9.24	7.55	7.53	43.18	40.77	4.12	3.78
White Seedless										
Indian River (37-42)	1.34	1.35	9.56	9.65	7.14	7.18	44.46	42.74	4.25	4.13
Other Areas [1] (11-8)	1.32	1.41	9.20	9.37	7.02	6.67	42.62	42.06	3.93	3.94

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

All Grapefruit 6.70 Million Boxes

The forecast of all grapefruit production is 6.70 million boxes, 73 percent more than last season's hurricane affected utilization of 3.88 million boxes, but down 14 percent from the 2016-2017 season. With the exception of last season's hurricane reduced crop, this is the lowest since the 6.70 million boxes in the 1921-1922 season. The total is comprised of 5.50 million boxes of red grapefruit and 1.20 million boxes of white grapefruit.

The **red** grapefruit forecast at 5.50 million boxes is 73 percent more than last season's final production, but 12 percent less than the 2016-2017 season. Bearing trees are estimated to be 7 percent less than last season's revised bearing tree numbers. The average fruit per tree is less than the minimum of the previous nine seasons used in the regression. Fruit droppage is projected to be above average, while sizes are projected to be below average.

The **white** grapefruit forecast of 1.20 million boxes is 71 percent more than last season's final production, however 19 percent less than the 2016-2017 season. White grapefruit bearing trees used in this forecast are estimated to have declined by 19 percent from last season's revised bearing tree numbers and 35 percent from two seasons ago. The average fruit per tree is less than the minimum of the previous nine seasons used in the regression. Current fruit sizes are average, and the rate of growth measured in last month's survey indicates that final sizes will be average. Loss from droppage is expected to be above average.

Tangerines and Tangelos Total 1.20 Million Boxes

The forecast for tangerine and tangelos is 1.20 million boxes, 60 percent more than last season's hurricane affected utilization of 750 thousand boxes, yet 26 percent less than the 2016-2017 season. 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 2008-2009 through 2016-2017 seasons.

The latest Tree Inventory is used to determine estimated tree numbers. All trees planted in 2015 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: 2018-2019

Type	1,000 boxes
Navel Oranges	100
Non-Valencia Oranges (excluding navels)	200
Valencia Oranges	200
Red Grapefruit	150
White Grapefruit	30
All Tangerines and Tangelos	60

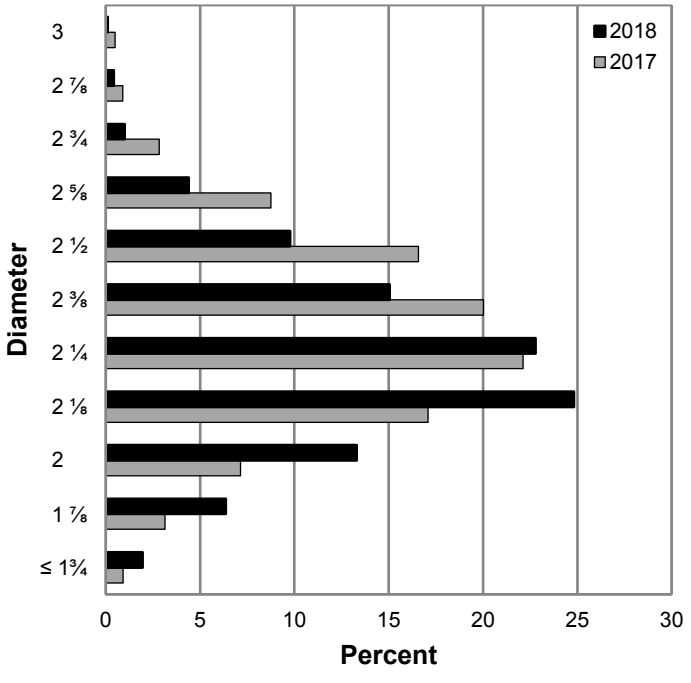
Citrus Size Frequency Measurement Distributions, by Type – Florida: September

Type and number of fruit per 4/5 – bushel containers	2016	2017	2018
	(percent)	(percent)	(percent)
NON-VALENCIA ORANGES [1]			
64 or less	0.1	0.1	0.0
80	0.9	0.7	0.3
100	5.7	6.4	2.5
125	16.1	22.4	12.9
163 or more	77.2	70.4	84.3
NAVEL ORANGES			
64 or less	24.7	26.6	29.4
80	28.5	30.8	27.8
100	25.6	25.0	25.6
125	11.8	12.9	11.7
163 or more	9.4	4.7	5.5
VALENCIA ORANGES			
64 or less	0.2	0.1	0.0
80	1.7	1.3	0.2
100	8.9	7.0	3.0
125	20.5	24.3	13.8
163 or more	68.7	67.3	83.0
TANGELOS			
80 or less	1.9	1.1	0.4
100	4.4	7.5	3.8
120	12.8	23.2	12.1
156 or more	80.9	68.2	83.7

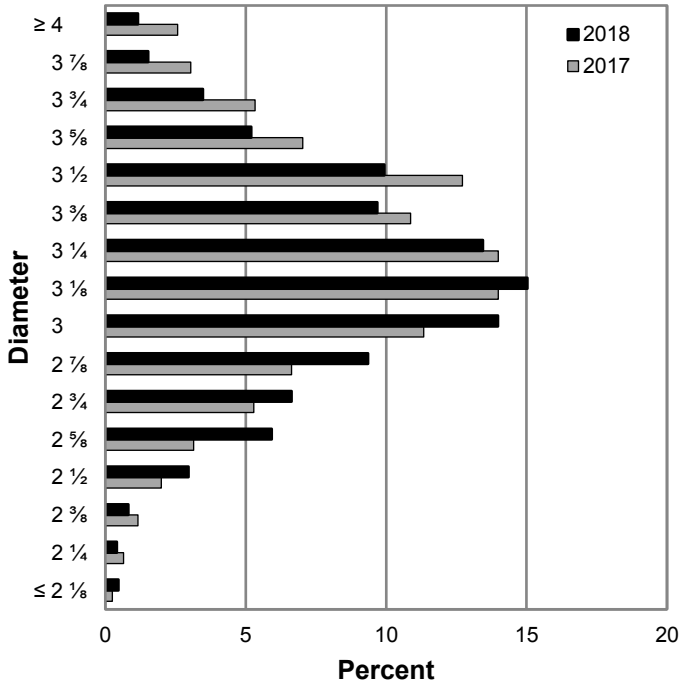
Type and number of fruit per 4/5 – bushel containers	2016	2017	2018
	(percent)	(percent)	(percent)
RED GRAPEFRUIT [2]			
32 or less	0.4	0.4	0.4
36	1.6	3.2	1.3
40	5.5	7.3	4.5
48	10.4	11.1	8.8
56	12.5	12.6	9.8
63 or more	69.6	65.4	75.2
WHITE GRAPEFRUIT [2]			
32 or less	0.7	0.4	1.0
36	2.6	2.8	2.8
40	4.1	7.2	6.6
48	9.4	13.2	10.1
56	13.0	14.1	13.9
63 or more	70.2	62.3	65.6
FALLGLO TANGERINES			
80 or less	0.3	13.2	6.9
100	6.9	18.2	7.7
120	21.5	21.5	22.3
176	14.7	9.7	16.9
210 or more	56.6	37.4	46.2
SUNBURST TANGERINES			
100 or less	0.2	0.9	0.0
120	4.4	9.4	1.9
176	4.2	10.9	6.9
210 or more	91.2	78.8	91.2

[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.