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 12, 2021

Florida All Orange Production Down 11 Percent from Last Season
Florida Non-Valencia Orange Production Down 16 Percent
Florida Valencia Orange Production Down 7 Percent
Florida All Grapefruit Production Down 7 Percent
Florida All Tangerine and Tangelo Production Up 1 Percent

FORECAST DATES - 2021-2022 SEASON

November 9, 2021 (No update)	March 9, 2022
December 9, 2021	April 8, 2022
January 12, 2022	May 12, 2022
February 9, 2022	June 10, 2022
July 12, 2022	

Citrus Production by Type – States and United States

Crop and State	Production [1]			Forecasted Production [1]
	2018-2019	2019-2020	2020-2021	2021-2022
	(1,000 boxes)	(1,000 boxes)	(1,000 boxes)	(1,000 boxes)
Non-Valencia Oranges [2]				
Florida	**30,400**	**29,650**	**22,700**	**19,000**
California	42,000	43,300	40,600	35,000
Texas	2,210	1,150	1,000	450
United States	74,610	74,100	64,300	54,450
Valencia Oranges				
Florida	**41,450**	**37,750**	**30,100**	**28,000**
California	10,200	10,800	9,500	8,500
Texas	290	190	50	100
United States	51,940	48,740	39,650	36,600
All Oranges				
Florida	**71,850**	**67,400**	**52,800**	**47,000**
California	52,200	54,100	50,100	43,500
Texas	2,500	1,340	1,050	550
United States	126,550	122,840	103,950	91,050
Grapefruit				
Florida-All	**4,510**	**4,850**	**4,100**	**3,800**
Red	**3,740**	**4,060**	**3,480**	**3,200**
White [3]	**770**	**790**	**620**	**600**
California [4]	4,200	4,700	3,900	3,900
Texas	6,100	4,400	2,400	3,100
United States	14,810	13,950	10,400	10,800
Lemons				
Arizona	1,350	1,800	800	1,300
California	23,700	25,300	21,300	21,000
United States	25,050	27,100	22,100	22,300
Tangerines and Tangelos				
Florida	**990**	**1,020**	**890**	**900**
California	26,500	22,400	28,100	21,000
United States	27,490	23,420	28,990	21,900

[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] Early non-Valencia (including Navel) and midseason non-Valencia varieties in Florida; Navel and miscellaneous varieties in California; Early and mid-season varieties in Texas.
[3] Includes seedy grapefruit.
[4] Includes pummelos in California.

All Oranges 47.0 Million Boxes

The 2021-2022 Florida all orange forecast released today by the USDA Agricultural Statistics Board is 47.0 million boxes, down 11 percent from last season's final production. The total includes 19.0 million boxes of non-Valencia oranges (early, mid-season, and Navel varieties) and 28.0 million boxes of Valencia oranges. The Navel orange forecast, at 450,000 boxes, accounts for 2 percent of the non-Valencia total.

The estimated number of bearing trees for all oranges is 49.4 million. Trees planted in 2018 and earlier are considered bearing for this season. Field work for the latest Commercial Citrus Inventory was completed in June 2021. Attrition rates were applied to the results to determine the number of bearing trees used to weigh and expand objective count data in the forecast model.

A 9-year regression was 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 19.0 Million Boxes

The non-Valencia forecast of 19.0 million boxes is 16 percent less than last season's production. The estimated number of bearing trees (without Navels) is 18.2 million, down 3 percent from the previous season. The estimated fruit per tree for early and mid-season (non-Valencia) oranges is 571, a decrease of 20 pieces from last season, and the lowest in a series dating back to the 1964-1965 season. Projected fruit size is below average, requiring an estimated 313 pieces of fruit to fill a 90-pound box. At 27 percent, projected droppage is above average.

The Navel forecast of 450,000 boxes is 22 percent less than last season's production. The estimated number of bearing trees is 864,000, down 4 percent from the previous season. The estimated fruit per tree is 150, a decrease of 35 pieces from last season. Projected fruit size is above average, requiring an estimated 138 pieces of fruit to fill a 90-pound box. Projected droppage is above average at 31 percent.

Valencia Oranges 28.0 Million Boxes

The Valencia forecast of 28.0 million boxes is 7 percent lower than last season's production. The estimated number of bearing trees is 30.3 million, up 1 percent from the previous season. The estimated fruit per tree is 394, a decrease of 47 pieces from last season, and the lowest in a series dating back to the 1964-1965 season. Projected fruit size is below average, requiring an estimated 254 pieces of fruit to fill a 90-pound box. Projected droppage is above average at 30 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 18.8 percent, or 11.6 percent excluding abnormal seasons.

Changes between the October 1 Florida all orange forecast and the final estimates during the past 20 years have averaged 8.76 million boxes (5.57 million, excluding abnormal seasons), ranging from 0.30 million boxes to 42.3 million boxes including abnormal seasons, (0.30 to 20.4 million boxes excluding abnormal seasons). The October 1 forecast for all oranges has been below the final estimate 3 times, above 16 times, (below 3 times, above 13 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 experienced average temperatures and dry weather leading to the bloom period at the end of February. Following a few weeks of minimal rainfall, the citrus region declined into abnormally dry conditions. Growers and caretakers irrigated regularly to keep the trees as healthy as possible. By the beginning of April, the bloom period was over, and trees had set fruit for the new season. Rain in late April seemed suboptimal nourishment for the new crop being set. Other than in a few isolated areas, dryness set in for several more weeks. June and July welcomed much needed precipitation, bringing the entire citrus region to a drought free state. Despite a hurricane season with above-average levels of activity, the citrus growing area was spared any negative tropical impacts. Fruit set on oranges appeared to be less than most seasons. Fruit sizes in the early stages were consistent, yet small, with some late bloom reported. Maturity tests showed ratios were slightly lower on oranges, indicating a later start to the crop. Only harvest of early tangerines (Fallglo) has been reported so far this season.

Forecast Components, by Type – Florida: October 2021

[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 (excluding Navels)	18,171	571	27	313
Navel	864	150	31	138
Valencia	30,349	394	30	254
GRAPEFRUIT				
Red	1,776	393	31	121
White	314	481	29	113

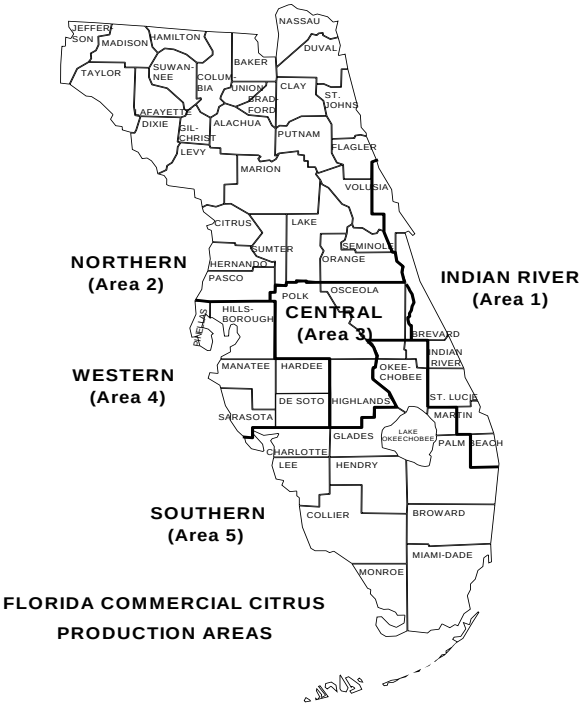
Citrus Production and Prorated Forecast, by Production Area – Florida: 2020-2021 and 2021-2022

[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	
	2020-2021	2021-2022	2020-2021	2021-2022
	(1,000 boxes)	(1,000 boxes)	(1,000 boxes)	(1,000 boxes)
Central	7,780	5,550	11,602	10,100
Southern	4,419	4,800	7,709	7,450
Western	8,858	7,700	8,956	8,850
Other [1]	1,643	950	1,833	1,600
Florida Total	22,700	19,000	30,100	28,000

Production Area	Grapefruit			
	White		Red	
	2020-2021	2021-2022	2020-2021	2021-2022
	(1,000 boxes)	(1,000 boxes)	(1,000 boxes)	(1,000 boxes)
Indian River	573	550	2,710	2,260
Other [2]	47	50	770	940
Florida Total	620	600	3,480	3,200

[1] Includes Indian River and Northern 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	
	2020-2021	2021-2022	2020-2021	2021-2022	2020-2021	2021-2022	2020-2021	2021-2022
	(percent)	(percent)	(percent)	(percent)	(percent)	(percent)	(percent)	(percent)
Indian River	3	3	4	5	75	71	90	92
Northern	2	2	1	1	1	2	(Z)	1
Central	31	29	39	36	5	5	4	3
Western	37	41	29	32	4	4	1	(Z)
Southern	27	25	27	26	15	18	5	4
3 - 5 years	4	3	9	8	2	3	(Z)	(Z)
6 - 8 years	7	7	7	9	10	7	1	(Z)
9 - 13 years	15	15	10	12	10	16	1	1
14 - 23 years	26	28	30	25	10	11	5	3
24 yrs & over	48	47	44	46	68	63	93	96

Z Less than half of the unit shown.

Maturity

Regular bloom fruit samples (323 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) from September 29 to October 1, 2021.

Unadjusted Maturity Tests – Florida: 2020-2021 and 2021-2022

[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 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	
	2020-2021	2021-2022	2020-2021	2021-2022	2020-2021	2021-2022	2020-2021	2021-2022	2020-2021	2021-2022
	(percent)	(percent)	(percent)	(percent)			(pounds)	(pounds)	(pounds)	(pounds)
ORANGES										
Early N-V (120-119)										
Sep 1	1.21	1.16	8.82	9.11	7.42	7.92	44.44	43.76	3.91	3.99
Oct 1	0.88	0.90	9.18	8.99	10.58	10.06	49.74	48.01	4.57	4.32
Midseason N-V (55-54)										
Sep 1	1.26	1.32	8.57	8.74	6.91	6.78	45.27	44.96	3.88	3.93
Oct 1	0.97	1.02	9.00	8.80	9.45	8.78	50.04	48.75	4.51	4.29
Valencia (150-150)										
Sep 1	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
Oct 1	1.79	2.00	8.75	8.66	4.95	4.37	48.55	46.41	4.25	4.02
GRAPEFRUIT										
Red Seedless (50-50)										
Sep 1	1.46	1.42	9.89	9.70	6.80	6.86	38.64	38.88	3.82	3.77
Oct 1	1.25	1.35	9.79	9.92	7.86	7.37	44.43	44.92	4.35	4.46
White Seedless (49-50)										
Sep 1	1.46	1.55	9.99	9.98	6.88	6.44	39.06	39.04	3.90	3.89
Oct 1	1.31	1.36	10.00	9.97	7.65	7.34	44.18	46.36	4.41	4.62

NA Not available.

Unadjusted Maturity Test Averages, by Areas – Florida: October 2020-2021 and 2021-2022

Fruit type (number of groves) test date	Acid		Solids (Brix)		Ratio		Unfinished juice per box		Solids per box	
	2020-2021	2021-2022	2020-2021	2021-2022	2020-2021	2021-2022	2020-2021	2021-2022	2020-2021	2021-2022
	(percent)	(percent)	(percent)	(percent)			(pounds)	(pounds)	(pounds)	(pounds)
ORANGES										
Early N-V										
Indian River (9-9)	0.98	0.95	9.48	8.97	9.90	9.53	47.54	47.70	4.50	4.28
Other Areas [1] (111-110)	0.87	0.90	9.15	8.99	10.64	10.11	49.92	48.03	4.57	4.32
Midseason N-V										
Indian River (2-2)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Other Areas [1] (53-52)	0.97	1.01	8.98	8.79	9.41	8.83	50.20	48.96	4.51	4.31
Valencia										
Indian River (29-29)	1.96	2.19	9.29	8.94	4.82	4.14	48.36	46.10	4.50	4.12
Other Areas [1] (121-121)	1.75	1.96	8.62	8.60	4.99	4.43	48.59	46.48	4.19	3.99
GRAPEFRUIT										
Red Seedless										
Indian River (42-43)	1.25	1.36	9.87	9.98	7.92	7.36	44.16	44.64	4.36	4.46
Other Areas [1] (8-7)	1.25	1.29	9.40	9.56	7.55	7.43	45.86	46.62	4.31	4.45
White Seedless										
Indian River (42-46)	1.32	1.36	10.04	9.99	7.61	7.36	44.47	46.15	4.46	4.61
Other Areas [1] (7-4)	1.24	(D)	9.76	(D)	7.87	(D)	42.44	(D)	4.14	(D)

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

All Grapefruit 3.80 Million Boxes

The forecast of all grapefruit production is 3.80 million boxes, 7 percent less than last season's utilization of 4.10 million boxes. The total is comprised of 3.20 million boxes of red grapefruit and 600,000 boxes of white grapefruit.

The **red** grapefruit forecast at 3.20 million boxes is 8 percent less than last season's final production. Bearing trees are 9 percent down from last season's revised bearing tree numbers. The average fruit per tree is 22 pieces more than last season. Fruit droppage at is projected to be above average. Fruit size at the final month is expected to be slightly above average.

The **white** grapefruit forecast of 600,000 boxes is 3 percent less than last season's final production. White grapefruit bearing trees declined by 5 percent from last season's revised bearing tree numbers. The average fruit per tree is 74 pieces more than last season, and 23 pieces more than the nine-year season average. Current fruit sizes are above average, and at the rate of growth measured in last month's survey, are expected to be above average at harvest. Final drop is expected to be slightly above average.

Tangerines and Tangelos Total 900,000 Boxes

The forecast for tangerine and tangelos is 900,000 boxes, 1 percent more than last season's utilization of 890,000 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 2011-2012 through 2020-2021 seasons.

The latest Tree Inventory is used to determine estimated tree numbers. All trees planted in 2018 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: 2021-2022

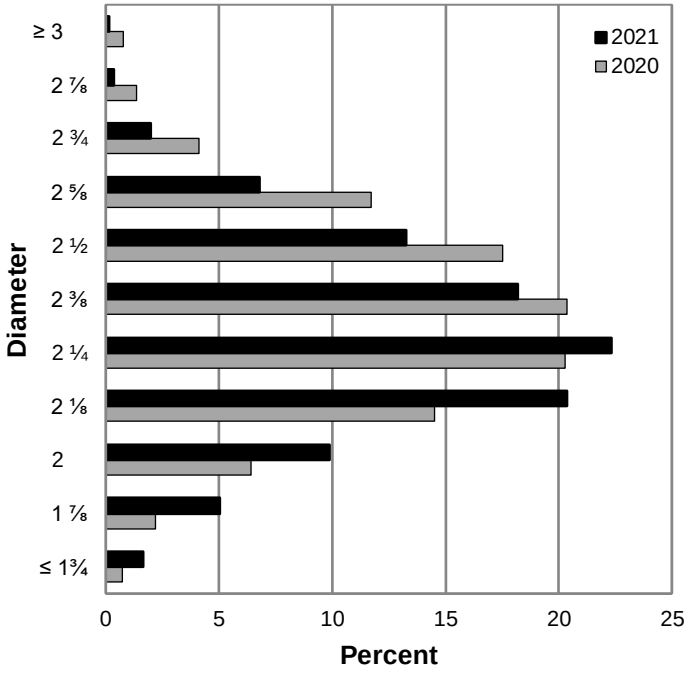
Type	1,000 boxes
Navel Oranges	30
Non-Valencia Oranges (excluding Navels)	70
Valencia Oranges	100
Red Grapefruit	70
White Grapefruit	10
Tangerines and Tangelos	50

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

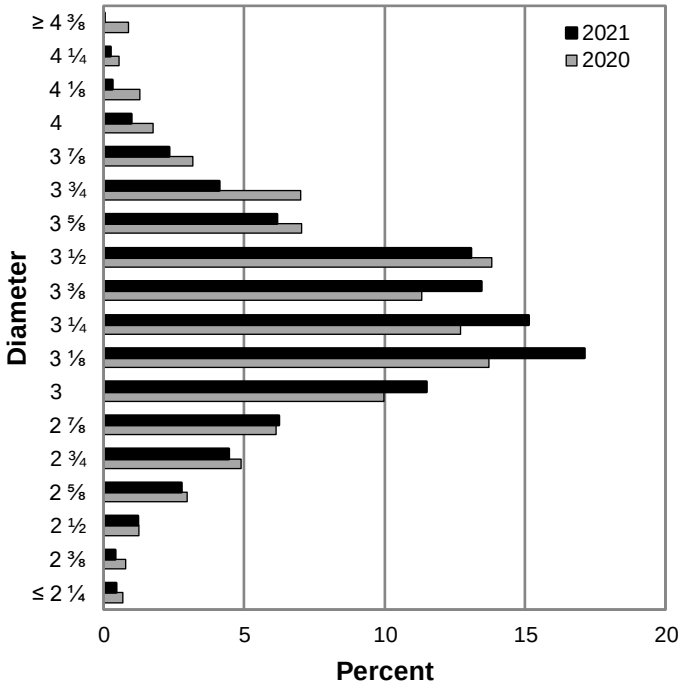
Type and number of fruit per 4/5 – bushel containers	2019	2020	2021
	(percent)	(percent)	(percent)
NON-VALENCIA ORANGES [1]			
64 or less	0.0	0.1	0.0
80	0.3	1.2	0.3
100	4.6	8.8	4.2
125	18.3	25.4	18.0
163 or more	76.8	64.5	77.5
NAVEL ORANGES			
64 or less	27.7	38.7	27.1
80	32.6	28.8	30.8
100	24.2	19.4	27.5
125	11.9	9.5	10.7
163 or more	3.6	3.6	3.9
VALENCIA ORANGES			
64 or less	0.0	0.1	0.0
80	0.3	1.0	0.4
100	4.9	7.4	4.7
125	19.8	20.2	17.9
163 or more	75.0	71.3	77.0
RED GRAPEFRUIT			
32 or less	0.1	1.8	0.4
36	1.4	4.0	2.1
40	4.1	8.9	5.5
48	10.0	11.4	9.7
56	13.7	13.7	14.9
63 or more	70.7	60.2	67.4
WHITE GRAPEFRUIT [2]			
32 or less	0.3	1.1	0.2
36	2.6	3.7	2.6
40	6.5	8.2	8.7
48	14.9	16.8	14.1
56	14.4	15.6	20.0
63 or more	61.3	54.6	54.4

[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.