Current forecast update (variation regarding the February forecast):   **April, 10 2024**

Total orange crop production forecast: 307.22 million boxes (unchanged)
Hamlin, Westin and Rubi: 58.09 million boxes (unchanged)
Other early season: 18.51 million boxes (unchanged)
Pera Rio: 97.62 million boxes (unchanged)
Valencia and Valencia Folha Murcha: 105.20 million boxes (unchanged)
Natal: 27.80 million boxes (unchanged)

> **The orange production forecast of the 2024-2025 season will be released at 10:00 a.m. (BRT, GMT -3:00) on May 10, 2024.**

Table 1 – Orange crop forecast update by sector and variety group – citrus belt

Month	Forecast components				Crop forecast update 2023-2024			Crop forecast update 2023-2024		
	February/2024 and April/2024 (strike-through values were presented in February/2024, to their left are their respective values updated in April/2024)				February/2024			April/2024		
Sector and variety group	Bearing trees	Fruit per tree at stripping	Fruit estimated per box	Estimated drop rate	Per tree	Per hectare	Total	Per tree	Per hectare	Total
	(1,000 trees)	(number)	(number)	(percentage)	(boxes/ tree)	(boxes/ hectare)	(1,000,000 boxes)	(boxes/ tree)	(boxes/ hectare)	(1,000,000 boxes)
CITRUS BELT										
Hamlin, Westin and Rubi....	25,716.04	828	293	10.8	2.26	1,047	58.09	2.26	1,047	58.09
Other early.........................	9,866.33	597	251	12.1	1.88	987	18.51	1.88	987	18.51
Pera Rio............................	61,508.67	563	258	19.0	1.59	837	97.62	1.59	837	97.62
Valencia and Folha Murcha	53,648.92	653	233	22.0	1.96	969	105.20	1.96	969	105.20
Natal..................................	18,551.19	573	244	28.9	1.50	738	27.80	1.50	738	27.80
Total..............................	**169,291.15**	**635**	**255**	**19.0**	**1.81**	**911**	**307.22**	**1.81**	**911**	**307.22**
NORTH SECTOR										
Hamlin, Westin and Rubi....	6,503.91	1,005	289	7.2	2.89	1,246	18.79	2.89	1,246	18.79
Other early.........................	2,191.81	779	246	8.4	2.60	1,405	5.70	2.60	1,405	5.70
Pera Rio............................	13,535.28	592	254	15.6	1.76	937	23.83	1.76	937	23.83
Valencia and Folha Murcha	12,926.93	798	218 ~~219~~	19.3	2.63	1,210	33.98	2.63	1,213	34.06
Natal..................................	3,774.50	655	226 ~~229~~	17.6	2.11	964	7.95	2.12	971	8.01
Subtotal...........................	**38,932.43**	**746**	**246 ~~247~~**	**14.8**	**2.32**	**1,116**	**90.25**	**2.32**	**1,117**	**90.39**
NORTHWEST SECTOR										
Hamlin, Westin and Rubi....	1,994.68	582	276	6.6	1.76	840	3.52	1.76	840	3.52
Other early.........................	1,718.19	414	245	14.9	1.29	680	2.21	1.29	680	2.21
Pera Rio............................	6,669.81	611	241	11.5	2.01	924	13.40	2.01	924	13.40
Valencia and Folha Murcha	3,058.93	725	222	13.9	2.51	1,248	7.69	2.51	1,245	7.67
Natal..................................	1,556.98	508	226 ~~227~~	22.2	1.55	747	2.42	1.55	747	2.42
Subtotal...........................	**14,998.59**	**597**	**240**	**12.7**	**1.95**	**933**	**29.24**	**1.95**	**932**	**29.22**
CENTRAL SECTOR										
Hamlin, Westin and Rubi....	6,606.99	747	290	9.6	2.09	1,036	13.78	2.09	1,036	13.78
Other early.........................	3,473.28	677	247	12.0	2.16	1,126	7.50	2.16	1,126	7.50
Pera Rio............................	17,927.80	570	257	24.3	1.50	820	26.97	1.50	820	26.97
Valencia and Folha Murcha	15,036.66	574	236	22.0	1.69	882	25.48	1.69	880	25.43
Natal..................................	4,631.97	567	247 ~~248~~	31.6	1.40	684	6.47	1.39	683	6.46
Subtotal...........................	**47,676.70**	**603**	**255**	**20.7**	**1.68**	**880**	**80.20**	**1.68**	**879**	**80.14**
SOUTH SECTOR										
Hamlin, Westin and Rubi....	4,966.73	855	303	17.5	2.09	979	10.36	2.09	979	10.36
Other early.........................	542.68	342	274	16.4	0.94	451	0.51	0.94	451	0.51
Pera Rio............................	11,764.73	530	261	21.9	1.42	750	16.71	1.42	750	16.71
Valencia and Folha Murcha	9,592.07	732	238 ~~239~~	27.1	2.00	922	19.14	2.00	924	19.17
Natal..................................	2,585.87	539	242	41.1	1.17	587	3.03	1.16	583	3.01
Subtotal...........................	**29,452.08**	**648**	**261**	**24.2**	**1.69**	**830**	**49.75**	**1.69**	**831**	**49.76**
SOUTHWEST SECTOR										
Hamlin, Westin and Rubi....	5,643.73	781	298	12.1	2.06	946	11.64	2.06	946	11.64
Other early.........................	1,940.37	481	272	16.0	1.33	706	2.59	1.33	706	2.59
Pera Rio............................	11,611.05	526	272	16.8	1.44	774	16.71	1.44	774	16.71
Valencia and Folha Murcha	13,034.33	524	247	23.5	1.45	768	18.91	1.45	766	18.87
Natal..................................	6,001.87	558	258	31.6	1.32	686	7.93	1.32	683	7.90
Subtotal...........................	**38,231.35**	**566**	**267**	**20.2**	**1.51**	**783**	**57.78**	**1.51**	**782**	**57.71**

Total orange production for the 2023-2024 crop season ended at 307.22 million boxes[1]

The 2023-2024 orange crop for the São Paulo and West-Southwest Minas Gerais citrus belt, published on April 10, 2024, by Fundecitrus – performed in cooperation with Markestrat and full professors from FEA-RP/USP and FCAV/Unesp[2] – concluded with 307.22 million boxes of 40.8 kg each (90 lbs), divided as follows:

- 58.09 million boxes of the Hamlin, Westin and Rubi early-season varieties;
- 18.51 million boxes of the Valencia Americana, Seleta, Pineapple and Alvorada early-season varieties;
- 97.62 million boxes of the Pera Rio mid-season variety;
- 105.20 million boxes of the Valencia and Valencia Folha Murcha late-season varieties;
- 27.80 million boxes of the Natal late-season variety.

Of the total, about 27.82 million boxes were produced in the Triângulo Mineiro region.

The season´s production was 2.22% lower in comparison to the previous crop, which reached 314.21 million boxes and was 0.69% below the initial forecast made in May 2023. The determining factor for the production decrease about to the initial expectation was the shift from a rainy first semester in 2023 to a precipitation deficit in the subsequent semester, extending until the end of the season in 2024. Beyond adverse weather conditions, the production decrease was also influenced by the worsening of citrus greening and a hastened harvest pace, which shortened the oranges' development period.

This confluence of factors resulted in fruits smaller than expected, particularly for mid-season and late varieties. Although the accelerated harvest pace posed challenges to fruit growth, it did yield a positive outcome by reducing losses attributed to premature fruit drop.

All these factors were considered in the December 2023 crop forecast update, when the production volume was revised to 307.22 million boxes. This update resulted in an increase of 2.27 million boxes of oranges from early varieties, which benefited from abundant rains in the first semester, but a decrease of 4.39 million boxes from other varieties, including Pera Rio, Valencia, Valencia Folha Murcha, and Natal, which were impacted by reduced rainfall and increased temperatures in the second semester of 2023. Adverse conditions, including irregular rainfall, extreme temperatures, heatwave episodes, and increased evapotranspiration, intensified from July 2023, shortly after the onset of the El Niño phenomenon in June of the same year. This phenomenon reached a strong intensity and remained active until the end of the harvests.

Average rainfall in the citrus belt accumulated from May 2023 to March 2024 decreased significantly, totaling 963 millimeters. This represents a 343-millimeter or 26% decrease compared to the historical average of 1,305 millimeters (1991-2020), according to data provided by Climatempo Meteorologia. Except for the Votuporanga region, all regions of the citrus belt had volumes below the historical average. Total volumes were 767 millimeters in Bebedouro (-40% compared to the historical average); 808 millimeters in Matão (-38%); 838 millimeters in São José do Rio Preto (-32%); 865 millimeters in Duartina (-34%); 926 millimeters in Avaré (-32%); 999 millimeters in Itapetininga (-24%); 1,042 millimeters in Brotas (-19%); 1,055 millimeters in the Triângulo Mineiro (-19%); 1,086 millimeters in Porto Ferreira (-12%); 1,166 millimeters in Altinópolis (-18%); 1,197 millimeters in Limeira (-15%); and 1,238 millimeters in Votuporanga (+0.5%). The rainfall data were obtained through Climatempo Meteorologia and are presented in Graph 1.
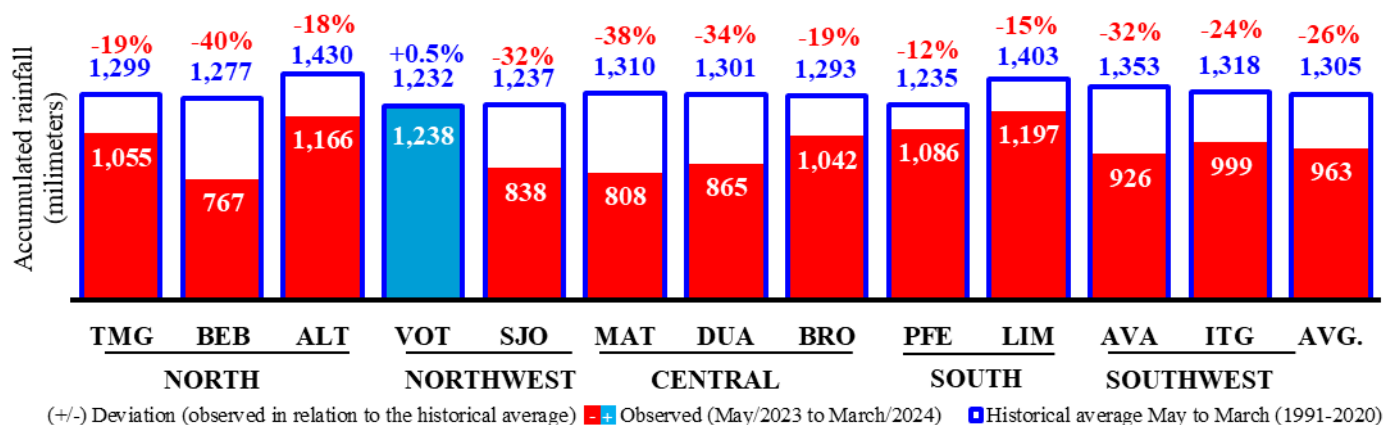
Graph 1 – Accumulated rainfall from May 2023 to March 2024
Source: Fundecitrus, according to data from Climatempo Meteorologia

Considering the average size of harvested fruits across all varieties, it required 255 fruits to fill a 40.8 kg box, reflecting an increase of eight fruits compared to the May projection. These fruits exhibited an average weight of 160 grams (5.64 oz), differing from the initially forecasted weight of 165 grams (5.83 oz). This observed weight falls below the average weight recorded over the past decade, which stands at 163 grams per fruit (5.75 oz).

The group comprising Hamlin, Westin, and Rubi was projected, in May 2023, with an average size of 304 fruits per box (134 grams/4.73 oz per fruit), but concluded the harvest with 293 fruits per box (139 grams/4.91 oz per fruit). Oranges from other early varieties went from 253 fruits per box (161 grams/5.69 oz per fruit) in May 2023 to 251 fruits per box (163 grams/5.73 oz per fruit). The Pera Rio variety went from the initial projection of 243 fruits per box (168 grams/5.92 oz per fruit) to 258 fruits per box (158 grams/5.58 oz per fruit). The average size of Valencia and Valencia Folha Murcha varieties, which was projected at 222 fruits per box (184 grams/6.48 oz per fruit) in May 2023, ended the harvest at 233 fruits per box (175 grams/6.18 oz per fruit). The Natal variety went from the initial projection of 227 fruits per box (180 grams/6.34 oz per fruit) to 244 fruits per box (167 grams/5.90 oz per fruit) in this closing. The sizes by sector and variety are presented in Table 2.

Table 2 – Average fruit sizes by sector and variety projected in May 2023 and observed in April 2024[3]

Group of varieties	Sector (hatched values were presented in May 2023 and their respective values updated in April 2024 are on the left)					
	North	Northwest	Central	South	Southwest	Total
	(Fruits per box)	(Fruits per box)	(Fruits per box)	(Fruits per box)	(Fruits per box)	(Fruits per box)
Hamlin, Westin and Rubi………..	289 306	276 301	290 301	303 309	298 302	**293** 304
Other earlies...............................	246 249	245 250	247 250	274 264	272 269	**251** 253
Pera Rio......................................	254 240	241 249	257 246	261 251	272 232	**258** 243
Valencia and V. Folha Murcha...	218 214	222 229	236 226	238 230	247 221	**233** 222
Natal..	226 219	226 246	247 235	242 237	258 219	**244** 227
Total...	**246** 244	**240** 251	**255** 249	**261** 255	**267** 242	**255** 247

[3] The precision of the overall average of the citrus belt is higher than that of the sectors, ages or variety groups, due to the larger sample size

This season, a faster harvesting pace was adopted to reduce the fruit drop rate and losses in production. However, it is relevant to note that the fruit drop rate remained above historical levels, mainly due to the impact of greening nowadays. Overall, the average fruit drop rate in the citrus belt was 19.0%, accumulated since the beginning of the harvest, representing a 2.0 percentage point decrease compared to the projection made in May 2023. The margin of error is 0.9 percentage point plus or minus, with 95% confidence.

The drop rate for Hamlin, Westin, and Rubi was 10.8%, with a margin of error of ± 1.2 percentage point. The other early varieties had a slightly higher drop rate of 12.1%, with a margin of error of ± 2.3 percentage points. Pera Rio had a drop rate of 19.0%, with a margin of error of ± 1.5 percentage point, while Valencia and Valencia Folha Murcha varieties had a higher drop rate of 22.0%, with a margin of error of ± 1.8 percentage point. Finally, the Natal variety had the highest drop rate, at 28.9%, with a margin of error of ± 3.0 percentage points.

Drop rates by sector and variety are presented in Table 3. The Northwest, comprising the Votuporanga and São José do Rio Preto regions, had the lowest drop rate in the citrus belt, at 12.7%. In the South sector, which includes Porto Ferreira and Limeira, regions with high greening incidence, the highest drop rate was recorded, reaching 24.2%.

Table 3 – Average drop rates by sector and variety projected in May 2023 and observed in April 2024[4]

Group of varieties	Sector (hatched values were presented in May 2023 and their respective values updated in April 2024 are on the left)					
	North	Northwest	Central	South	Southwest	Total
	(percentual)	(percentual)	(percentual)	(percentual)	(percentual)	(percentual)
Hamlin, Westin and Rubi….......	7.2 9.5	6.6 13.8	9.6 11.6	17.5 12.1	12.1 8.5	**10.8 10.5**
Other earlies................................	8.4 9.0	14.9 18.0	12.0 13.9	16.4 22.5	16.0 9.8	**12.1 12.6**
Pera Rio.......................................	15.6 19.5	11.5 17.5	24.3 25.2	21.9 23.6	16.8 23.9	**19.0 22.5**
Valencia and V. Folha Murcha....	19.3 22.9	13.9 29.5	22.0 26.6	27.1 26.4	23.5 26.0	**22.0 25.5**
Natal..	17.6 23.9	22.2 28.9	31.6 23.1	41.1 28.5	31.6 29.6	**28.9 26.5**
Total..	**14.8 18.2**	**12.7 21.0**	**20.7 22.2**	**24.2 22.4**	**20.2 21.7**	**19.0 21.0**

[4] The precision of the overall average of the citrus belt is higher than that of the sectors, ages or variety groups, due to the larger sample size

Production loss, resulting from premature fruit drop, was estimated at approximately 72 million boxes. This volume is eliminated from the production estimate through the premature fruit drop rate, which is considered in the calculations. The main reason for the production loss this season was greening, contributing 8.35% (of the total 19%), which represents 32 million boxes that dropped prematurely. Next, with 5.05%, came the fruit borer and the fruit fly, together resulting in an estimated loss of 19 million boxes. The category covering natural (2.00%) and physical (1.01%) drop ranked third, accounting for 3.01% of the total, equivalent to 11 million boxes lost. Black spot, in fourth place, accounted for 1.50% of losses, corresponding to 6 million boxes. The remaining reasons, totaling 4 million boxes lost, include leprosis in fifth place, with 0.53%, fruit peel cracking in sixth place, with 0.33%, and citrus canker in last position, with 0.19%, as shown in Graph 2.
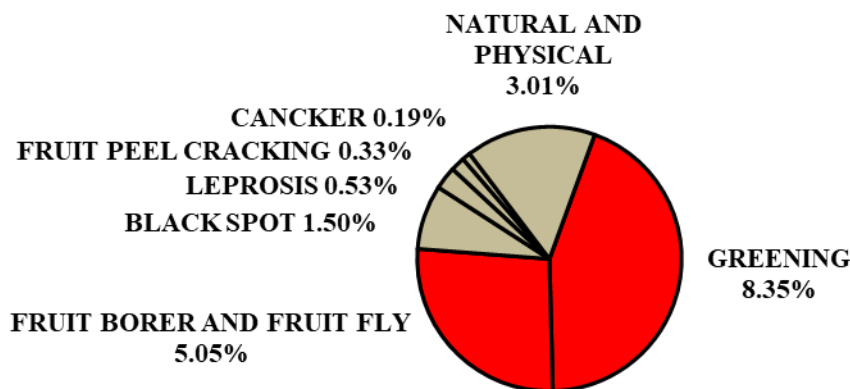
Graph 2 – Causes that made up the average rate of fruit drop in the 2023-2024 crop, highlighting the main pests and greening
Source: Fundecitrus

The data obtained in the field survey used in the re-estimations were obtained from a stratified sampling by region, variety, and age. The survey began in May 2023, in 1,200 plots. These plots visited and sampled monthly until their complete harvest. Another source included in this study was the size of the fruits received throughout the season by the orange juice companies associated with Fundecitrus – Citrosuco, Cutrale, and Louis Dreyfus – for industrial processing purposes. Each processor provided, under confidentiality, individual data to the independent consulting company for calculating the average size of processed fruits.

2024-2025 crop forecast

The orange crop forecast and tree inventory will be released on May 10, 2024, at 10 am (BRT, GMT -3:00), in a face-to-face event at Fundecitrus – with simultaneous broadcast and translation to English on the institution's YouTube channel.

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[1] Hamlin, Westin, Rubi, Valencia Americana, Seleta, Pineapple, Alvorada, Pera Rio, Valencia, Valencia Folha Murcha, and, Natal.
[2] Department of math and science, FCAV/Unesp Jaboticabal Campus.