



Current crop update (variation regarding the February forecast):

April 10, 2023

Total orange crop production update: 314.21 million boxes (decreased of 0.6%)

Hamlin, Westin and Rubi: 58.04 million boxes (unchanged)

Other early season: 16.69 million boxes (unchanged)

Pera Rio: 96.35 million boxes (unchanged)

Valencia and Valencia Folha Murcha: 105.01 million boxes (decreased of 1.1%)

Natal: 38.12 million boxes (decreased of 2.2%)

The orange production forecast of the
2023-2024 season will be released
at 10:00 a.m. (BRT, GMT -3:00)
on May 10, 2023.

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

Month	Forecast components				Crop forecast update 2022-2023			Final crop update 2022-2023		
	February/2023 and April/2023 (strike-through values were presented in February, to their left are their respective values updated in April)				February/2023			April/2023		
	Bearing trees	Fruit per tree at stripping	Fruit estimated per box	Estimated drop rate	Per tree	Per hectare	Total	Per tree	Per hectare	Total
Sector and variety group	(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....	26,151	859	310	10.40	2.22	1,021	58.04	2.22	1,021	58.04
Other early.....	9,044	638	266	14.20	1.85	925	16.69	1.85	925	16.69
Pera Rio.....	62,037	560	258	20.30	1.55	811	96.35	1.55	811	96.35
Valencia and Folha Murcha	53,741	686	229	27.50 26.50	1.98	950	106.17	1.95	940	105.01
Natal.....	18,999	722	233 232	28.00 26.50	2.05	1,000	38.98	2.01	978	38.12
Total.....	169,972	668	256	21.30 20.80	1.86	918	316.23	1.85	912	314.21
NORTH SECTOR										
Hamlin, Westin and Rubi....	6,891	744	304	9.80	1.97	857	13.58	1.97	857	13.58
Other early.....	1,887	726	253	7.60	2.31	1,039	4.35	2.31	1,039	4.35
Pera Rio.....	12,908	705	231	19.90	1.50	785	19.33	1.50	785	19.33
Valencia and Folha Murcha	13,428	481	212 208	25.90 25.00	1.97	914	26.44	1.91	887	25.65
Natal.....	4,069	609	231 238	22.60 21.40	2.15	959	8.76	2.19	974	8.90
Subtotal.....	39,183	607	242 241	19.40 19.00	1.85	876	72.46	1.83	868	71.81
NORTHWEST SECTOR										
Hamlin, Westin and Rubi....	2,060	680	329	15.20	1.57	696	3.23	1.57	696	3.23
Other early.....	1,733	725	319	11.90	1.34	730	2.32	1.34	730	2.32
Pera Rio.....	7,289	540	292	12.00	1.67	750	12.17	1.67	750	12.17
Valencia and Folha Murcha	3,142	617	248 240	25.30 24.40	1.78	859	5.60	1.71	822	5.36
Natal.....	1,497	631	255 248	39.80 37.70	1.64	746	2.45	1.54	700	2.30
Subtotal.....	15,721	630	287 284	18.10 17.70	1.64	761	25.77	1.61	750	25.38
CENTRAL SECTOR										
Hamlin, Westin and Rubi....	6,951	886	300	10.70	2.36	1,132	16.38	2.36	1,132	16.38
Other early.....	3,046	625	251	14.20	2.05	996	6.25	2.05	996	6.25
Pera Rio.....	18,673	670	241	23.50	1.50	817	28.03	1.50	817	28.03
Valencia and Folha Murcha	14,585	526	224 222	23.00 22.10	1.93	952	28.20	1.90	933	27.64
Natal.....	4,484	614	228 219	19.50 18.40	2.09	1,010	9.36	1.98	960	8.89
Subtotal.....	47,739	624	247 246	19.70 19.30	1.85	939	88.22	1.83	928	87.19
SOUTH SECTOR										
Hamlin, Westin and Rubi....	4,802	932	324	10.70	2.29	1,077	11.02	2.29	1,077	11.02
Other early.....	477	895	331	23.80	1.26	563	0.60	1.26	563	0.60
Pera Rio.....	12,219	611	296	21.70	1.52	785	18.61	1.52	785	18.61
Valencia and Folha Murcha	9,934	641	252 268	28.00 27.00	2.02	898	20.07	2.12	942	21.06
Natal.....	2,956	827	247 254	25.80 24.40	2.39	1,234	7.06	2.42	1,248	7.14
Subtotal.....	30,388	772	281 287	22.30 21.80	1.89	909	57.36	1.92	926	58.43
SOUTHWEST SECTOR										
Hamlin, Westin and Rubi....	5,447	975	312	9.10	2.54	1,188	13.83	2.54	1,188	13.83
Other early.....	1,901	705	259	21.30	1.67	953	3.17	1.67	953	3.17
Pera Rio.....	10,949	614	253	19.90	1.66	915	18.21	1.66	915	18.21
Valencia and Folha Murcha	12,652	585	226 225	33.10 31.90	2.04	1,062	25.86	2.00	1,039	25.30
Natal.....	5,992	753	224 221	35.70 33.80	1.89	979	11.35	1.82	939	10.89
Subtotal.....	36,941	721	251 250	25.00 24.30	1.96	1,023	72.42	1.93	1,008	71.40



Orange production for the 2022-2023 crop season totaled 314.21 million boxes¹

The 2022-2023 orange crop for the São Paulo and West-Southwest Minas Gerais citrus belt, published on April 10, 2023 by Fundecitrus – performed in cooperation with Markestrat, FEA-RP/USP and FCAV/Unesp² – is 314.21 million boxes of 40.8 kg each (90 lbs), divided as follows:

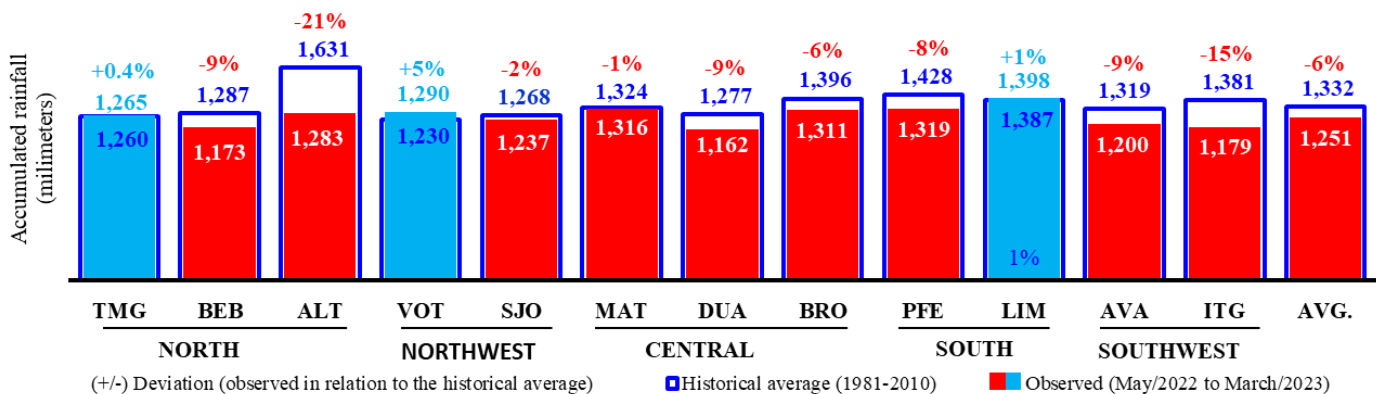
- 58.04 million boxes of the Hamlin, Westin and Ruby early-season varieties;
- 16.69 million boxes of the Valencia Americana, Seleta, Pineapple and Alvorada early-season varieties;
- 96.35 million boxes of the Pera Rio mid-season variety;
- 105.01 million boxes of the Valencia and Valencia Folha Murcha late-season varieties;
- 38.12 million boxes of the Natal late-season variety.

Of the total, about 23.22 million boxes were produced in Triângulo Mineiro region.

The production of this crop exceeded the previous season (2021-2022) by 19.49%, which was severely impacted by a combination of drought and frost, resulting in a drastic reduction in harvest. Due to the atypical climatic conditions of the past harvest, the most appropriate comparison is using the average volume produced over the past ten years. In this context, the production of the current crop is equal to the historical average, with an insignificant difference of +0.24%.

The volume obtained from this crop was 0.64% below the February update and 0.86% below the first estimate made in May 2022, which represented a decrease of 2.74 million boxes compared to the initial projection. With the exception of the Pera Rio variety, whose production exceeded expectations, the other cultivars showed a slightly lower than expected production. Such production falls are associated with anomalies in the rainfall regime, which presented quite distinct patterns throughout the season. At the beginning of the harvest, the lack of rainfall hampered the growth of the fruits of early-season varieties, while the heavy and frequent rainfall from November onward made it difficult to harvest the late-season varieties and accentuated the drop of premature fruit of these cultivars.

Despite the imbalance in the distribution of rainfall between the beginning and end of the season, the cumulative total was close to the historical average. Considering the full period, which extends from May 2022 to March 2023, the average accumulated precipitation in the Citrus Belt amounted to 1,251 millimeters. This represents a decrease of 81 millimeters or 6% compared to the historical average (1981-2010) of 1,332 millimeters, according to information provided by Somar/Climatempo Meteorologia. In Graph 1, it is possible to observe that, in only three regions, rainfall exceeded the average: Limeira, 1,398 millimeters (+1%); Votuporanga, 1,290 millimeters (+5%); and Triângulo Mineiro, 1,265 millimeters (+0.4%). However, in other regions, rainfall was below average. The greatest variations were observed in Altinópolis, with a reduction of 21% compared to the historical average, with 1,283 millimeters of rain, followed by Itapetininga, with a reduction of 15% and 1,179 millimeters of rain. The regions of Bebedouro, São José do Rio Preto, Matão, Duartina, Brotas, Porto Ferreira and Avaré also recorded below average rainfall, with accumulations ranging from 1,162 millimeters (-9%) in Duartina to 1,319 millimeters (-8%) in Porto Ferreira.



Graph 1 – Accumulated rainfall from May 2022 to March 2023 (observed and historical averages) in the citrus belt regions

Source: Fundecitrus, according to data from Somar/Climatempo Meteorologia



Due to the more favorable rainfall pattern from mid-season to the end of the harvest and the higher proportion of mid-season and late-season oranges in the crop compared to the early ones, there was an average increase of one gram in the weight of oranges compared to the projected weight in May. On average, considering all varieties, the weight was 159 grams per fruit, approximately 5.61 ounces, slightly above the historical average of the last five harvests, which is 156 grams, roughly 5.50 ounces. The oranges of the early-season cultivars showed a smaller size than expected, while the mid-season and late-season varieties showed a larger size than expected.

The group that includes Hamlin, Westin and Ruby was projected, as of May 2022, to average size of 300 fruits per box (136 grams/4.80 oz per fruit), but ended the harvest with 310 fruits per box (132 grams/4.66 oz per fruit). The oranges of the other early-season varieties went from 260 fruits per box (157 grams/5.54 oz per fruit), in May 2022, to 266 fruits per box (153 grams/5.40 oz per fruit). The Pera Rio variety went from the initial projection of 260 fruits per box (157 grams/5.54 oz per fruit) to 258 fruits per box (158 grams/5.57 oz per fruit). The average size of the Valencia and Valencia Folha Murcha varieties, which in May 2022 was projected at 237 fruits per box (172 grams/6.07 oz per fruit), ended the harvest at 229 fruits per box (178 grams/6.28 oz per fruit). The Natal variety went from the initial projection of 240 fruits per box (170 grams/6 oz per fruit) to 233 fruits per box (175 grams/6.17 oz per fruit) in this closure. The sizes by sector and variety are shown in Table 2.

Table 2 – Average fruit sizes by sector and variety in May 2022 and April 2023¹

Group of varieties	Sector (strike-through values were presented in May 2022, and on the left are the values re-estimated in April 2023)					
	North (Fruits per box)	Northwest (Fruits per box)	Central (Fruits per box)	South (Fruits per box)	Southwest (Fruits per box)	Total (Fruits per box)
Hamlin, Westin and Rubi.....	304	329 291	300 294	324 304	312 302	310 300
Other earlies.....	253	319 257	251 257	331 265	259 276	266 260
Pera Rio.....	231 249	292 244	241 274	296 265	253 255	258 260
Valencia and V. Folha Murcha...	212 224	248 236	224 249	252 247	226 232	229 237
Natal.....	231 229	255	228 239	247 253	224 239	233 240
Total.....	242 247	287 250	247 265	281 263	251 252	256 258

¹ 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

In addition to increasing the weight of oranges, rains also contributed to a significant increase in premature fruit drop. This was particularly noticeable in late-season varieties, whose harvests were delayed due to persistent rain. Consequently, the fruits of these cultivars remained longer on the plants, which triggered the increase in the drop rate, reaching the highest levels ever recorded for the Valencia, Valencia Folha Murcha and Natal varieties since the research began in 2015-2016.

Overall, the average fruit drop rate in the Citrus Belt increased to 21.30%, accumulated since the beginning of the harvest, which represents an increase of 1.3 percentage point compared to the projection made in May 2022. The margin of error is 0.88 percentage point plus or minus, with 95% confidence.

Hamlin, Westin and Ruby's drop rate was 10.4%, with a margin of error of ± 1.5 percentage points. The other early-season varieties showed a slightly higher drop rate of 14.2%, with a margin of error of ± 2.4 percentage points. The Pera Rio had a fruit drop rate of 20.3%, with a margin of error of ± 1.7 percentage points, while the Valencia and Valencia Folha Murcha varieties had a higher fruit drop rate, of 27.5%, with a margin of error of $\pm 1,7$ percentage points. Finally, the Natal variety had the highest fruit drop rate, with 28.0% and a margin of error of $\pm 2,5$ percentage points. The drop rates by sector and variety are presented in Table 3.

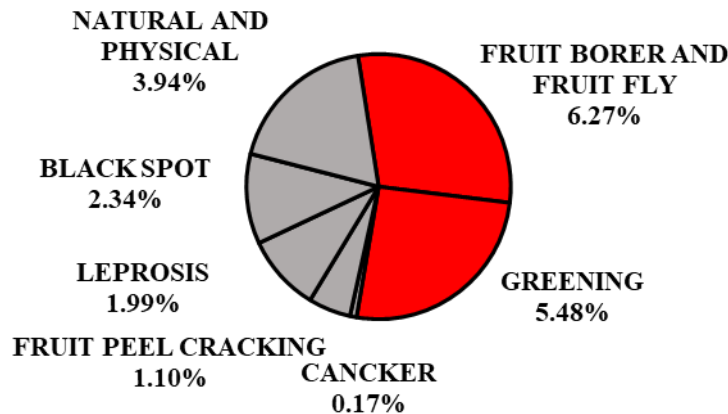


Table 3 – Average drop rates by sector and variety in May 2022 and in April 2023¹

Group of varieties	Sector (strike-through values were presented in May 2022, and on the left are the values re-estimated in April 2023)					
	North	Northwest	Central	South	Southwest	Total
	(percentage)	(percentage)	(percentage)	(percentage)	(percentage)	(percentage)
Hamlin, Westin and Rubi.....	9.80 10.70	15.20 13.00	10.70 12.50	10.70 13.60	9.10 8.90	10.40 11.50
Other earlies.....	7.60 9.40	11.90 17.00	14.20 13.80	23.80 20.00	21.30 6.00	14.20 12.00
Pera Rio.....	19.90 18.10	12.00 16.80	23.50 23.80	21.70 26.40	19.90 19.70	20.30 21.70
Valencia and V. Folha Murcha....	25.90 21.80	25.30 27.00	23.00 25.40	28.00 27.90	33.10 18.70	27.50 23.50
Natal.....	22.60 21.00	39.80 24.70	19.50 22.50	25.80 29.80	35.70 21.50	28.00 23.50
Total.....	19.40 17.70	18.10 19.20	19.70 21.10	22.30 24.80	25.00 16.90	21.30 20.00

¹ 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

In the last three years, the fruit drop rate has remained above 21%, which represents an increase compared to previous years, when this rate persisted around 17%. This increase can be explained, mainly, by the adverse climatic conditions during the last three harvests, as well as by the growth of losses caused by the action of the citrus fruit borer in conjunction with fruit flies (6.27%) and greening (5.48%). Graph 2 presents a visualization of the proportion in which each factor contributed to the fruit drop in this crop.



Graph 2 – Causes that made up the average rate of fruit drop in the 2022-2023 crop, highlighting the main pests and greening
Source: Fundecitrus

The data obtained in the field survey used in the re-estimates were obtained from a stratified sampling by region, variety and age. The survey began in May 2022, using 1,200 plots, which were visited and sampled monthly until their complete harvest. Another source contemplated in this study was the size of the fruits that were received throughout the harvest by the orange juice companies associated with Fundecitrus – Citrosuco, Cutrale and Louis Dreyfus – for industrial processing purposes. Each processor provided, under confidentiality, the individual data to the independent consulting company for calculation of the average size of the processed fruits.

2023-2024 crop forecast

The orange crop forecast and tree inventory update will be released on May 10, 2023, 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.

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.