

CONSIDERATIONS RELATING TO THE CULTIVATION OF PLUMS IN THE NORTH-WEST DEVELOPMENT REGION, ROMANIA

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Abstract

The paper analyzes the areas cultivated with plums worldwide, in the European Union and in Romania, in the period 2018-2019. Also, the number of cultivated plums and the production obtained at national level are presented, on Macroregions and Development Regions, as well as at the level of the counties that make up the North-West Development Region, for the year 2019. In this Region, plums were the second option for fruit growers, representing 36.56% of the total number of fruit trees, and the production obtained - 41.59%. The North-West region stood out, in fact, due to the average production of plums - 24 kg / tree, which in 2019 exceeded the national average (20 kg / tree). Of the 6 component counties, Sălaj county had the most plums - 31.18% and the highest plum production - 34.26% and an average production - 27 kg plums / tree. The forms of ownership in which the largest share of plums and plum production were found were individual holdings.

Key words: plum production, plums, North-West Development Region, Romania

INTRODUCTION

The tradition and preferences of Romanians regarding the growth of plums and the processing of plums have positioned our country among the major growers and producers worldwide. In Romania, this fruit species was the first choice for fruit tree growers in the period 2008-2017, so that the plums occupied the largest areas, followed by apple trees (*MADR*).

Romania was, in 2019, the 2nd largest plum producer in the world, with a production of 692,670 tons, which represented 47.38% of the total fruit production of the country. Out of the total of 73,866,869 fruit trees existing in 2019 in Romania, 46.65% were plums. Macroregion Four is the "homeland of plums", here being cultivated in 2019 - 40% of the total plums and harvesting 37% of the total production (*NIS*).

Plums are appreciated due to their content in vitamins (A, C, B1, B2, B3, B6, K, E and folic acid), minerals (K, P, Mg, Fe, Ca and Zn), fibers, carbohydrates and others, and low calories. They are used both fresh and dried, in the preparation of pies, desserts, jams and jellies (*Ghidnutritie.ro*). Last but not least, it is the raw material for the production of traditional alcoholic beverages.

In the current financial year, 2014-2020, PNDR supported the development of fruit growing by creating sub-measures dedicated to this sector, which aimed at setting up new plantations, filling gaps with saplings, reconversion, purchasing equipment, setting up / modernizing storage or processing systems (*AFIR, PNDR 2014-2020*).

MATERIALS AND METHODS

In this paper, a series of indicators were analyzed, such as: the area cultivated with plums (ha) and the production of plums (tons) worldwide, by Union (EU) and national, total by country and by Macroregions, Development regions and counties. The number of plums and the average plum production (kg/tree) for Romania, by Macroregions, Development Regions and counties were also studied. The information was processed, interpreted and presented in the form of graphs and tables.

The data presented in the paper were taken from the Internet, after extensive documentation carried out on specialized sites such as Eurostat, Faostat and NIS.

RESULTS AND DISCUSSIONS

According to data published by Faostat, in 2018 Romania was on the 4th place in the world ranking of plum growers, with an area of 65,910 ha (Table 1). The first place was occupied by China, where 1,925,399 ha of plums were cultivated. In terms of plum production, Romania ranked second, with 842,132 tons, after China - 6,801,187 tons.

Table 1

The world's leading growers and producers of plums, 2018

Specification	Area ha	Production tons
China	1,925,399	6,801,187
Bosnia and Herzegovina	97,739	190,386
Serbia	72,224	430,199
Romania	65,910	842,132
Iran	41,834	313,103

Source: Faostat, 2020

The area cultivated with plums in the European Union was 155.08 thousand ha, in 2019, increasing by 0.19% compared to 2015 (Table 2). In Romania, the largest plum grower, the area decreased by 0.14%, from 65.67 ha in 2015, to 65.58 ha in 2019. In 2017, our country registered the largest area occupied with these fruit trees, of 66.68 thousand ha.

Other large plum growers in the EU were in 2019 Spain - 14.85 thousand ha, France - 14.83 thousand ha and Poland - 13.63 thousand ha.

Table 2

The main plum growers in the EU -28, (1,000 ha)

Specification	2015	2016	2017	2018	2019	2019/2015 %
European Union - 28	154.79	153.49	154.48	154.05	155.08	100.19
Bulgaria	6.83	6.71	6.82	7.36	8.02	117.42
Czechia	1.87	1.88	1.76	1.82	1.88	100.53
Germany	4.34	4.35	4.83	4.82	4.83	111.29
Greece	2.05	2.60	2.06	2.20	2.18	106.34
Spain	16.06	15.28	15.20	14.64	14.85	92.47
France	14.97	14.81	15.06	14.97	14.83	99.06
Croatia	5.12	4.83	4.36	4.28	4.46	87.11
Italy	11.63	11.57	11.68	11.72	11.94	102.67
Cyprus	0.58	0.45	0.38	0.37	0.38	65.52
Lithuania	0.77	0.73	0.73	0.72	0.74	96.10
Hungary	7.22	7.98	7.94	7.92	7.96	110.25
Poland	13.90	13.39	13.31	13.48	13.63	98.06
Portugal	1.79	1.80	1.78	1.80	1.80	100.56
Romania	65.67	65.11	66.68	65.91	65.58	99.86
Slovakia	0.56	0.58	0.52	0.61	0.61	108.93
United Kingdom	0.70	0.70	0.60	0.62	0.60	85.72

Source: Own calculation based on Eurostat, 2020

Out of the total of 73,866,869 fruit trees that were cultivated in 2019 in Romania, 46.65% were plums, 34,459,654. The distribution by Macroregions and Development Regions is shown in Figure 1. As it can be seen, Macroregion One registered the highest percentage, here being found 40% of the total plum specimens in Romania. Macroregion One and Three recorded the same percentage, of 21% of the total plums, and Macroregion Two 18%.

The development regions where over 5,000,000 plums were grown in 2019 were South - West Oltenia Region - 8,645,560 plums (representing

62% of the total of Macroregion Four), South Muntenia Region - 7,199,087 plums (representing 98% of the total of Macroregion Three), North - West Region - 5,352,453 plums (representing 75% of the total of Macroregion One) and West Region - 5,253,880 plums (representing 38% of the total of Macroregion Four). The Bucharest-Ilfov region, where agriculture and fruit growing is not an important activity, has only 125,654 plums, 2% of the total of the Macroregion Three.

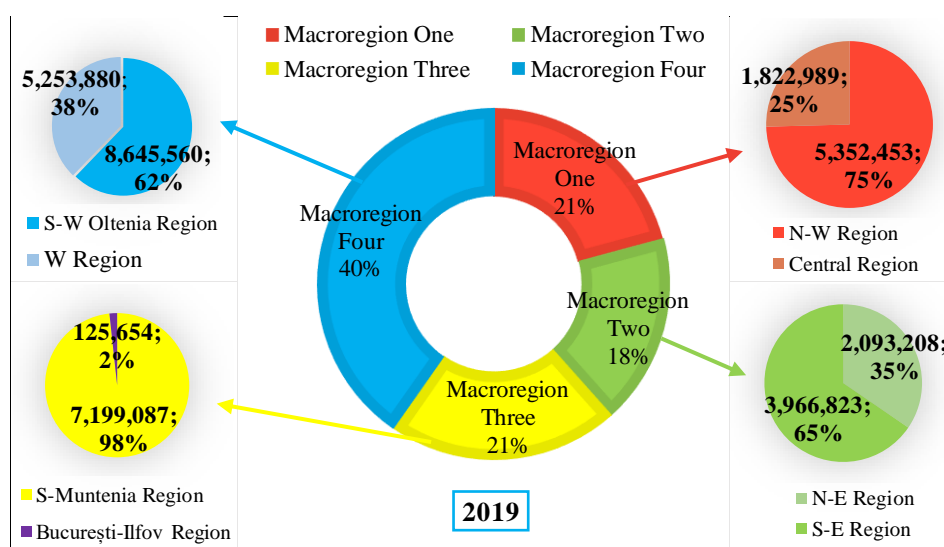


Figure 1. Number of plums by Macroregions and Development Regions, 2019
Source: Own graphics based on NIS, Tempo On-line Database, 2020

In the North-West Region, the plums cultivated in 2019 represented 36.56% of the total registered fruit trees - 14,639,327. This Region is known for the fact that most apples in the country were cultivated here (*Soare E., Chiurciu IA, 2018*).

The distribution of plums on the counties of the Development Region is shown in Figure 2.

From the presented data it is observed that Sălaj county owned the most specimens - 1,668,719, ie 31.18%, followed by Satu-Mare - 1,151,187, representing 21.51% and Bihor - 733,915, 13.71%. The lowest number of plums was found in Cluj County - 523,281, ie 9.78%. Taking into account the forms of ownership, in the North-West Region 99.63% (5,332,599) of the plum specimens were owned by the private sector, of which 5,099,782 specimens by individual holdings, ie 95.63%.

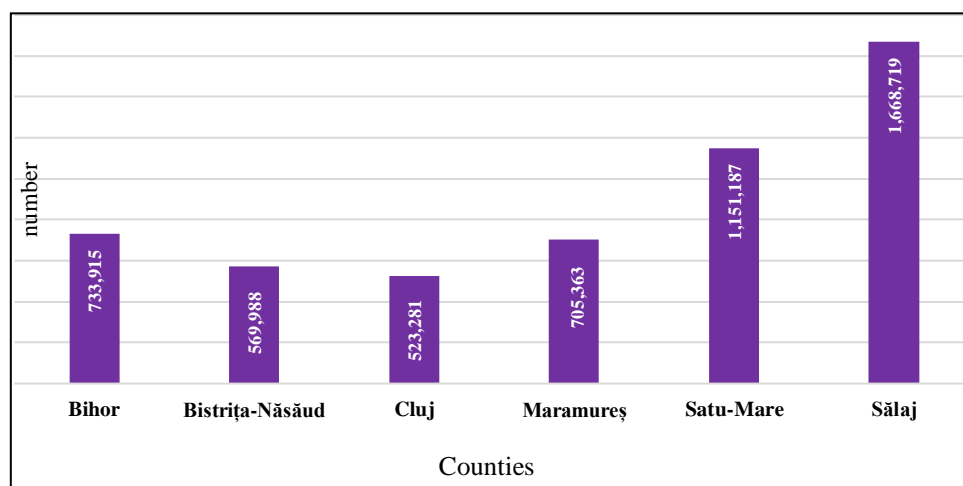


Figure 2. Number of plums in the counties of the North-West Region, 2019
Source: Own graphics based on NIS, Tempo On-line Database, 2020

Regarding the plum production obtained in the period 2015-2019, in the EU (Table 3), we find an increase of 16.39% in 2019 compared to 2015. Romania, the largest plum producer, recorded an increase of 42.60%, from 485.74 thousand tons in 2015 to 692.67 thousand tons in 2019. 2018 was the year in which the largest production of plums in the analyzed period was obtained, by 842.13 tons.

Other important plum producers were, in 2019, Italy - 215.02 thousand tons, France - 205.11 thousand tons and Spain - 179.84 tons.

Table 3
Plum production obtained by the main EU growers -28,
(1,000 tons)

Specification	2015	2016	2017	2018	2019	2019/2015 %
European Union - 28	1,399.56	1,472.01	1,297.25	1,772.37	1,628.98	116.39
Bulgaria	36.18	48.63	49.19	56.43	56.19	155.31
Czechia	9.12	6.00	4.07	12.92	8.76	96.05
Germany	51.43	42.06	26.59	70.12	52.14	101.38
Greece	22.24	23.78	25.46	28.79	20.54	92.36
Spain	217.29	193.60	172.33	152.98	179.84	82.76
France	163.01	216.43	211.03	175.44	205.11	125.83
Croatia	9.07	8.84	7.84	12.54	9.06	99.89
Italy	199.94	220.73	206.97	197.73	215.02	107.54
Cyprus	1.73	1.18	1.63	1.19	1.21	69.94
Hungary	46.02	47.56	43.30	46.69	45.25	98.33
Austria	16.74	7.78	9.72	29.56	12.78	76.34

Poland	94.90	109.50	58.40	121.08	94.95	100.05
Specification	2015	2016	2017	2018	2019	2019/2015 %
Portugal	24.54	26.07	29.52	17.48	17.48	71.23
Romania	485.74	502.20	434.39	842.13	692.67	142.60
Slovakia	2.20	0.49	0.99	2.19	1.79	81.36
United Kingdom	11.00	9.20	8.00	8.70	7.40	67.27

Source: Own calculation based on NIS, Tempo On-line Database, 2020

Of the total fruit production of Romania in 2019, of 1,487,450 tons, the plum production represented 47.38%. Figure 3 shows the distribution of the plum crop by Macroregions and Development Regions. Thus, it is found that in Macroregion Four the highest quantity was obtained, totaling 37% of the plum production, unlike Macroregion Three, which ranked last with 19%. Production in Macroregion One represented 24%, and that in Macroregion Two - 20%.

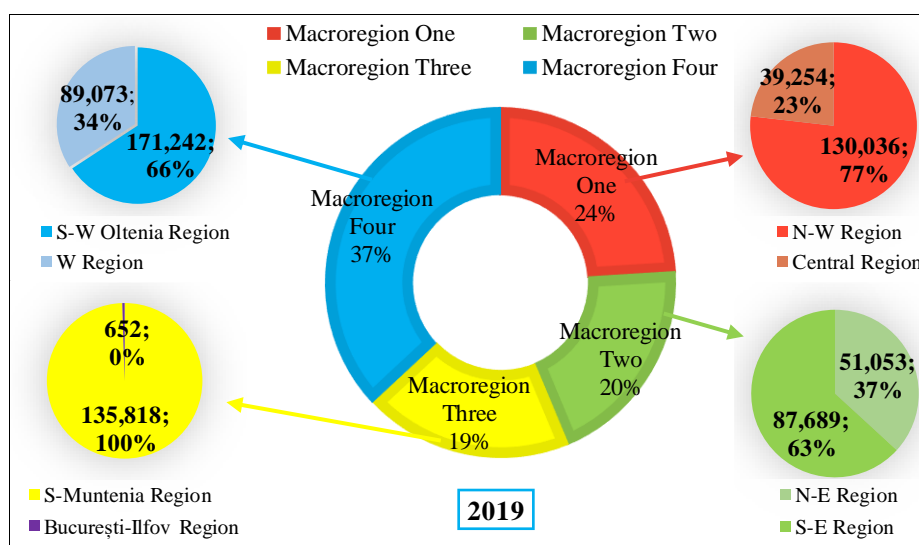


Figure 3. Plum production (tons) by Macroregions and Development Regions, 2019

Source: Own graphics based on NIS, Tempo On-line Database, 2020

The development regions where the largest plum crops were obtained in 2019 were South - West Oltenia Region - 171,242 tons (representing 66% of the total of the Four Macroregion), South Muntenia Region - 135,818 tons (representing 100% of the total of the Macroregion Three) and North - West Region - 130,036 tons (representing 77% of the total of Macroregion One). In the other Development Regions, the plum production obtained was below 100,000 tons.

For the North-West Development Region, plum production - 130,036 tons, represented 41.59% of the total fruit production obtained in 2019, of 312,631 tons.

Figure 4 shows the plum harvests that took place in the 6 counties of the North-West Development Region. The first three places were occupied by Sălaj counties - 44,547 tons (34.26%), Satu-Mare - 29,064 tons (22.35%) and Maramureș - 17,162 tons (13.20%). In Bistrița-Năsăud County, the lowest plum production was obtained - 11,397 tons (8.76%). Application of the Expert system in the plum plantation from SCDP Bistrița, Bistrița-Năsăud county, showed that the natural and anthropic resources include the plantation in the category “with natural and anthropic restrictions”. Analyzing the climatic conditions, it is found that in the Bistrita area there are average conditions for plum cultivation, with restrictions on average temperatures recorded in May, thermal amplitude recorded in November-February and rainfall recorded in May-July (*Dana D. et al., 2020*). All this negatively influenced the production of plums.

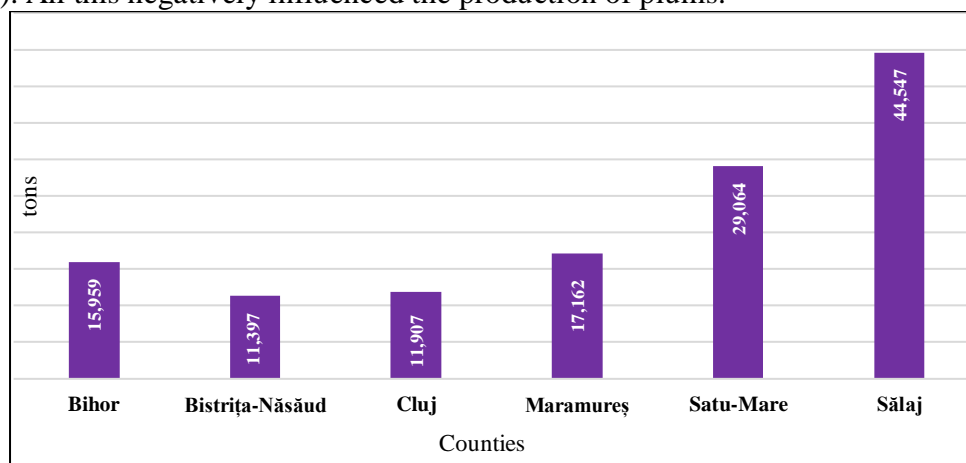


Figure 4. Plum production (tons) in the counties of the North-West Region, 2019
Source: Own graphics based on NIS, Tempo On-line Database, 2020

The private sector brought 129,938 tons of plums in 2019 for the North-West Development Region, ie 99.92%, of which 127,380 tons (98.03%) came from individual farms.

The average plum production for Romania in 2019 was 20 kg / tree (Figure 5). Macroregion One obtained the highest value of 24 kg / tree, above the national average. Also, the counties in the North-West Region had values of the average plum production above the national average: Sălaj county - 27 kg / tree, Satu-Mare - 25 kg / tree and Maramureș - 24 kg / tree, Cluj - 23 kg / tree and Bihor - 22 kg / tree. In Bistrița-Năsăud county, the lowest value was recorded - 20 kg / tree.

Although the Macroregion Four was in first place in terms of the number of plums and plum production, in terms of average production / tree, this Macroregion and Macroregion Tree recorded the lowest values, of 19 kg/tree.

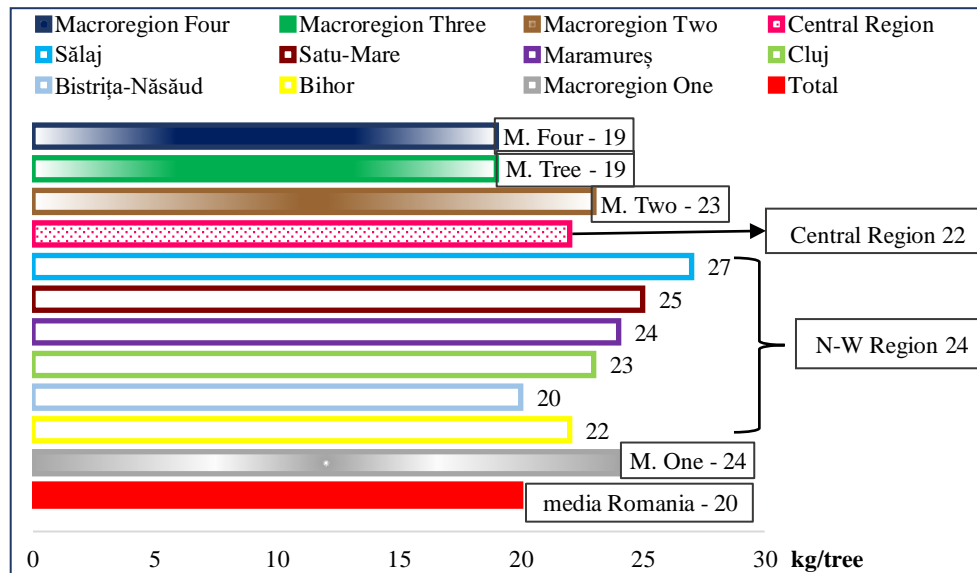


Figure 5. Average plum production (kg/tree) at national level, by Macroregions Development regions and counties, 2019

Source: Own graphics based on NIS, Tempo On-line Database, 2020

According to studies published in 2018 by *Dana D. et al.*, plum growth is favored by natural conditions, but the thermal amplitude higher than 20 °C in November-February has negative effects on the yield (*Dana D. et al., 2018*).

The plum production obtained by Romania ensures the necessary consumption on the domestic market and at the same time represents the raw material for the processing activity. Unfortunately, the income obtained by growers is not in line with their efforts and expectations (*Soare et al., 2019*). A solution must be found to make better use of fresh fruit, to intensify and at the same time to diversify the processing of plums, so that the products obtained can be better used.

CONCLUSIONS

The conclusions that emerge from the analysis regarding the cultivation of plums in the North-West Development Region are the following:

- In the ranking of Development Regions with the most plums, North - West Region was on the 3rd place, with 5,352,453 plums. This value represented 75% of the total of Macroregion One, at the level of 2019;
- The private sector owned 99.63%, respectively 5,332,599 specimens of plums. Of these, 95.63% belonged to individual holdings;
- In Sălaj county were found the most plums - 1,668,719, ie 31.18%, and in Cluj county, the smallest number - 523,281, which represented 9.78%;
- The plum production obtained by North - West Region in 2019 was 130,036 tons (77% of the total of Macroregion One) and represented the 3rd value for this indicator at NUTS 2 level;
- 99.92% of the plum production of the North-West Development Region came from the private sector, of which 127,380 tons (98.03%) from individual farms;
- The largest plum producers were Sălaj counties - 44,547 tons (34.26%), Satu-Mare - 29,064 tons (22.35%) and Maramureș - 17,162 tons (13.20%), and the lowest production was obtained in Bistrița-Năsăud county, - 11,397 tons (8.76%);
- The average plum production of the North-West Development Region, of 24 kg / tree, was higher than the average production at country level (20 kg / tree);
- At county level, the average production recorded the following results: Sălaj county - 27 kg / tree, Satu-Mare - 25 kg / tree and Maramureș - 24 kg / tree, Cluj - 23 kg / tree, Bihor - 22 kg / tree and Bistrița-Năsăud - 20 kg / tree.

REFERENCES

1. AFIR, <https://www.afir.info/>, accessed on 07.10.2020
2. Dana D., Chiurciu IA, Voicu V., Soare E. 2020, Managementul performant și durabil al terenurilor pomicole și plantațiilor de pomi în Sistem Expert/ Performance and sustainable management of orchards and tree plantations in Expert System, University Publishing House, Bucharest, 2020, ISBN 978-606-28-1138-9, pp 199-205
3. Dana D., Chiurciu IA, Voicu V., Soare E. 2018, The management of the plots and of the plum orchards using an Expert System-Crom. Scientific Papers. Series

"Management, Economic Engineering in Agriculture and rural development", Vol. 18 Issue 1, PRINT ISSN 2284-7995, 137-142.

4. Eurostat, [https://ec.europa.eu/eurostat/data / database](https://ec.europa.eu/eurostat/data/database), accessed on 10.10.2020
5. Faostat, Food and Agriculture Organization of the United Nations, <http://www.fao.org/faostat/en/#data>, accessed on 15.10.2020
6. Ghidnutritie.ro, <https://www.ghidnutritie.ro/articol/fructe/prunele>, accessed on 07.10.2020
7. MADR, Ministry of Agriculture and Rural Development, [https://www.madr.ro/horticultura / fructe-si-legume.html](https://www.madr.ro/horticultura/fructe-si-legume.html), accessed on 15.10.2020
8. NIS, National Institute of Statistics, Tempo On-line Database, 2020, www.insse.ro, Accessed on 14.10.2020
9. PNDR 2014-2020, National Rural Development Program Romania, <https://www.pndr.ro/>, accessed on 07.10.2020
10. Soare E., Chiurciu IA 2018, Trends in the production and marketing of apples in Romania. Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development", Vol. 18 Issue 1, PRINT ISSN 2284-7995, pp 465-472
11. Soare E., Chiurciu IA, Balan AV, David L., Constantin (Oprea) DM, Bogan E., Grigore E. 2019, Trends on the plums market in Romania in the period 2012-2017, The 33rd IBIMA Conference, 10- 11 April 2019, Granada, Spain