

TENDENCIES RELATED TO THE PRODUCTION OF RASPBERRIES IN THE REPUBLIC OF SERBIA

Nataša Kljajić¹, Predrag Vuković², Slavica Arsić³

Summary

Raspberry for its biological characteristics, economic importance, agro-ecological, technological, organizational and other requirements, the market value of the product, as well as very high interdependence and interdependence between the various phases of reproductive cycle, specific fruit species. He is one of the most important types of berries in the world, and is one of the most profitable crops in the overall crop production. By production volume, Serbia is among the leading producers of raspberries, and its economic significance is very high level of market sells and market competitiveness of the European Union.

Accordingly, the paper presents the production season in the Republic of Serbia for the period 2000-2010 its average, minimum and maximum of values in production, changes in rates and coefficients of variation.

Key words: *raspberry, production, economic importance.*

JEL: *Q13, Q11*

Introduction

The most significant production for the economy of our country within fruit production is the production of berrylike fruit (strawberries, raspberries, blackberries, blueberries, cranberries, gooseberries) since an annual turnover realized with the export of this fruit, and first of all the export of raspberries, is more than 120 million of euros (*Kljajic, 2012.*).

Raspberry (*Rubus idaeus L.*) is the most important kind of berry-like fruit. Growing raspberries has a very long tradition in our country, longer than a century. Growing raspberries in Serbia dates from 1880 but it was used just as an ornamental plant at the

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beginning. The production of goods dates from the period after WWI, more precisely in 1920 when raspberry was produced for the needs of the local market and mostly for preserves, treacle and pulp. After WWII demand for raspberries increased and the prices were high. Wide range of raspberry production in Serbia was realized at the end of the 20th century. Recently, raspberry has become the most important product in Serbian export. Serbia has become famous for its raspberries since they survived among competition on choosy western market (*Mišić, 2004*).

Raspberry is one of the most important exported products, the framework of rural development in some circles, Serbian brand, an important branch in the economy and lot more. Raspberry fruit is very attractive, very tasty, with special aroma, juicy, it has high nutritional, dietetic and technological value and therefore extremely demanded and very appreciated. It is the most profitable exported product in Serbian agriculture. During the recent years in Serbia average annual production of raspberry was about 80.000 t which is 5,5% of total production of fruit. Over 90% of raspberry produced is being frozen and exported and the rest is being sold fresh or made into other products. About 25% of world raspberry production is from Serbia. In that way about 100 million of euros is insured in the Balance of Payment. Serbia mostly exports frozen and rarely cooled raspberry (*Vlahović et al., 2003, Dimitrijević, 2009*).

The production of raspberry in the world

In the world, raspberries are grown in relatively small areas, although for growing raspberries there is lot more space. According to the data of FAO Statistics FAO Statistics (*FAO Statistical Yearbook, 2009*.) the surface area of that space during the period 2007-2009 is in average 94.727 ha (Table 1.).

Table 1. Surface area planted with raspberries (by continents) for the period 2007-2009.

Area	Surface (ha)			Average 2007-2009 (ha)	Structure (world=100%)
	Year				
	2007	2008	2009		
World	102.441	90.482	91.257	94.727	100,00
Africa	66	66	66	66	0,07
North and South America	10.001	9.379	9.539	9.640	10,18
Asia	2.800	3.100	3.200	3.033	3,20
Europe	88.806	77.380	77.958	81.381	85,91
Pacific	768	557	487	604	0,64

Source: www.fao.org (<http://faostat.fao.org/site/567/DesktopDefault.aspx?PageID=567#anchor>)

Observed by continents, the largest areas planted with raspberries are in Europe (81.381 ha or 85,91%), then in North and South America (9.640 ha or 10,18%), in Asia (3.033 ha or 3,20%), in Africa (66 ha or 0,07%) and in Oceania (604 ha or 0,64%).

Raspberry production in the Republic of Serbia

Serbian share in total European raspberry production is 20%, and its share in domestic structure of fruit production is 6,5%. The largest areas planted with raspberries in Serbia are in Central Serbia – 98%. If Central Serbia is observed, the highest concentration of raspberry producers is in Western Serbia, which is logical because raspberries are growing best in hilly and mountainous regions (*Nikolić et al., 2008*). Region of Vojvodina is insignificant regarding raspberry production. The raspberry production statistics regarding the Republic of Serbia and observed by regions and years is shown in Table 2.

The data sources were statistics publications (FAO, Statistics Division – FAOSTAT), as well as statistics publications taken from the official website of the Republic Bureau of Statistics and related to the observed period.

Table 2. Realized range of raspberry production in the Republic of Serbia for the period 2000–2010.

The observed period	The Republic of Serbia			Central Serbia			AP Vojvodina		
	Area planted with raspberries (ha)	Total return (t)	Return per unit (kg)	Area planted with raspberries (ha)	Total return (t)	Return per unit (kg)	Area planted with raspberries (ha)	Total return (t)	Return per unit (kg)
2000.	13.519	55.999	4,14	13.238	55.530	4,20	281	469	1,67
2001.	14.753	77.781	5,27	14.385	77.068	5,36	368	713	1,94
2002.	15.293	93.982	6,15	14.943	93.572	6,26	350	410	1,17
2003.	16.354	78.974	4,83	15.987	78.664	4,92	367	310	0,85
2004.	15.995	91.725	5,73	15.589	90.861	5,83	406	864	2,13
2005.	15.413	84.331	5,47	15.063	83.777	5,56	350	554	1,58
2006.	15.024	79.680	5,30	14.672	78.929	5,38	352	751	2,13
2007.	14.496	76.991	5,31	14.116	76.185	5,40	380	806	2,12
2008.	14.680	84.299	5,74	14.174	83.335	5,88	506	964	1,91
2009.	14.957	86.961	5,81	14.441	85.302	5,91	516	1.659	3,21
2010.	15.174	83.870	5,53	14.709	81.240	5,52	462	2.630	5,70
Aver.	15.060	81.327	5,39	14.665	80.406	5,47	394	921	2,22

Source: The Republic Bureau of Statistics

The area covered with raspberries in the Republic of Serbia during the period from 2000-2010 in average was 15.060 ha with variations from year to year from 13.519 ha in the first observed year to 16.354 ha in 2003 (Table 3, Graph 1). The share of Central Serbia, an average surface area of 14.655 ha, in the total area planted with raspberries in Serbia was about 97,4% and the share of AR of Vojvodina was only 2,6%.

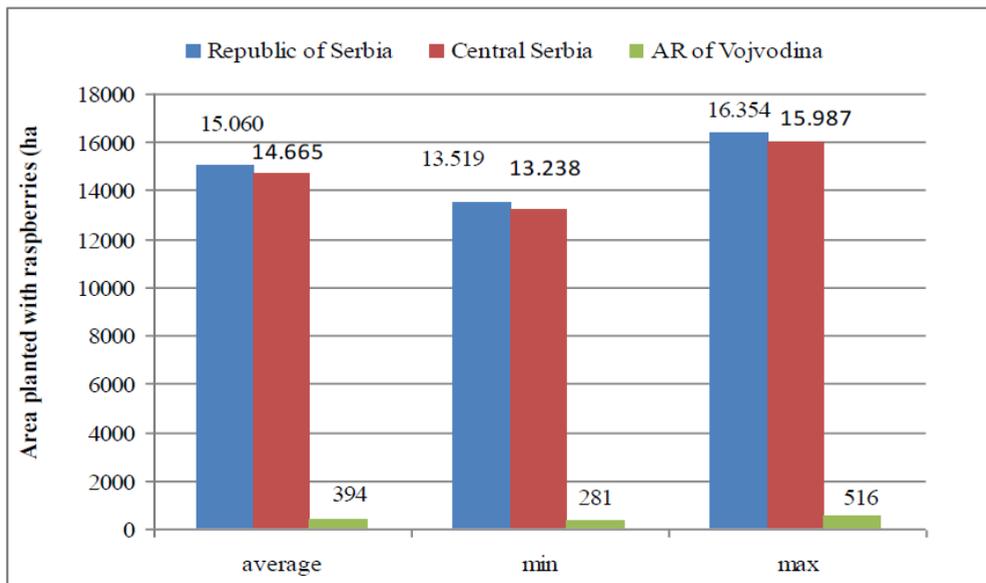
Table 3. Variations in surface area planted with raspberries in Serbia during the period 2000-2010.

IndeXES	Surface area (ha)		
	Republic of Serbia	Central Serbia	AP Vojvodina
Average for the period 2000-2010.	15.060	14.665	394
Minimum	13.519	13.238	281
Maximum	16.354	15.987	516
Rate variability (%)	0,19	0,07	4,53
Coefficient of variation (%)	5,01	5,08	18,32

Source: Calculation based on the data of the Republic Bureau of Statistics

Besides small exceptions in the observed period, the average surface areas covered with raspberries in Serbia had little tendency to grow (rate variability 0,19%) and in Central Serbia (rate variability 0,07%). However, the growth in the surface areas covered with raspberries in Vojvodina was a little bit more expressed (average annual rate variability 4,53%).

Graph 1. Variations in surface area planted with raspberries in the Republic of Serbia during the period 2000-2010.



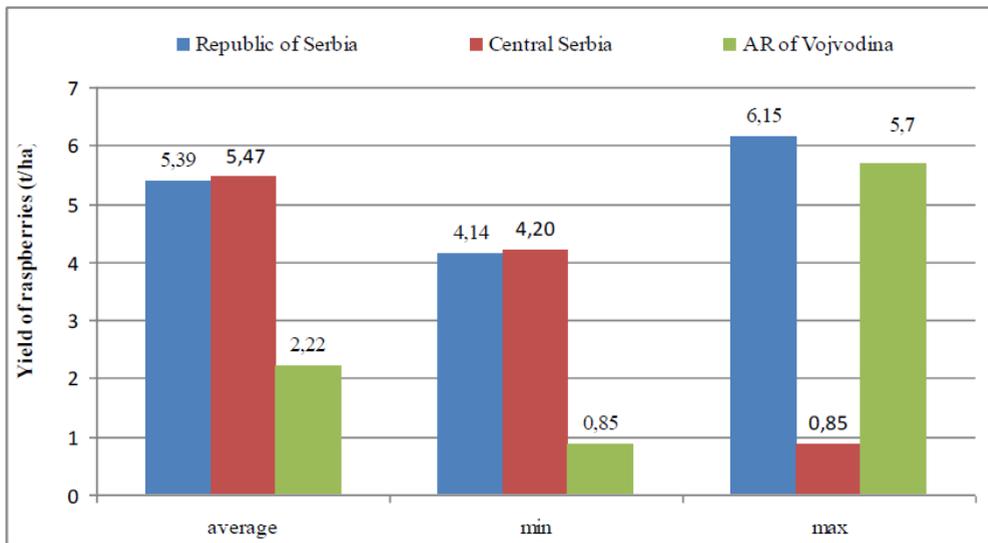
Observing raspberry return expressed in kg/ha, during the period from 2000-2010 average raspberry return in the Republic of Serbia was 5,38 kg/ha (Table 4, Graph 2). The return per surface area unit in Central Serbia was significantly bigger – 5,47 kg/ha, while in AP Vojvodina it was 2,22 kg/ha.

Table 4. Variations in raspberry return in Serbia during the period from 2000-2010

Indexes	Return (kg/ha)		
	Republic of Serbia	Central Serbia	AP Vojvodina
Average for the period 2000-2010.	5,39	5,47	2,22
Minimum	4,14	4,20	0,85
Maximum	6,15	6,26	5,70
Rate variability (%)	1,60	1,53	10,97
Coefficient of variation (%)	10,03	10,11	58,73

Source: Calculation based on the data of the Republic Bureau of Statistics

The average raspberry return shows tendencies of growth in Serbia in general (rate variability 1,60%), as well as in regions. Raspberry return in Vojvodina was increased according to the average annual rate variability which is 10,97% and there was a significant variability during the observed period (coefficient of variation 58,73%).

Graph 2. Average raspberry return (kg/ha) in the Republic of Serbia for the period from 2000-2010.

Average raspberry production during the observed period from 2000-2010 in the Republic of Serbia was 81.327 t and the lowest production was realized during the first year observed (55.999 t), and the highest in 2002 (93.982 t). The share of Central Serbia, whose average production was 80.406 t, in the total raspberry production in Serbia was 98,9% (Table 5, Graph. 3). The remaining 1,1% represent the share of AP Vojvodina in the total raspberry production in Serbia.

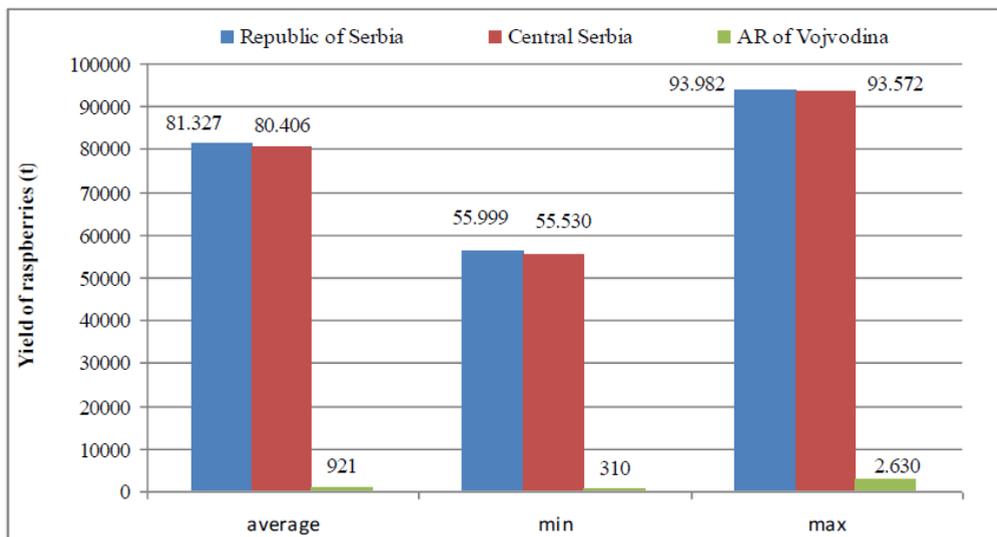
Table 5. Variations in raspberry production in the Republic of Serbia for the period 2000-2010.

Indexes	Production (t)		
	Republic of Serbia	Central Serbia	AP Vojvodina
Average for the period 2000-2010	81.327	80.406	921
Minimum	55.999	55.530	310
Maximum	93.982	93.572	2.630
Rate Variability (%)	1,79	1,61	16,01
Coefficient of Variation (%)	12,33	12,31	73,08

Source: Calculation based on the data of the Republic Bureau of Statistics

Total raspberry production in the Republic of Serbia was increased according to the average annual rate variability of 1,79%, with a remark that the intensity in production growth was significantly more expressed in Vojvodina (rate variability 16,01%) in relation to Central Serbia (rate variability 1,61%).

Graph 3. Total raspberry production (t) in the Republic of Serbia for the period 2000-2010



There are several regions in Serbia where raspberry production is widespread: 1) Region of the city of Valjevo (Podgorina and Pocerina), 2) Region of the city of Šabac (Krupanj, Loznica, Bajina Bašta), 3) Region of the city of Kosjerić (Povlen-Varda), 4) Region of the city of Arilje (Arilje), 5) Region of the city of Ivanjica (Ivanjica, Kaona, Kotraž, Guča), 6) Region of the city of Čačak (Čačak and Kablar), 7) Region of the mountain Kopaonik (Brus with the surroundings), 8) Region of the city of Kraljevo (Kraljevo, Dragačevo), 9) Region of the city of Leskovac (Leskovac). The biggest part of raspberry production is concentrated in the areas of the following municipalities: Kosjerić, Užice, Arilje, Požega, Ivanjica, Valjevo, Mionica, Osečina, Koceljeva, Krupanj, Ljubovija, Gornji Milanovac, Čačak, Lučani, Brus, Aleksandrovac (Table 6).

Table 6. Raspberry production in the Republic of Serbia (t) according to municipalities for the period 2001-2010

Municipality	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Kosjerić	4.752	5.611	4.624	6.416	5.230	3.700	2.950	3.321	3.483	3.853
Užice	3.403	3.987	3.499	3.997	3.426	2.590	2.435	2.539	3.074	2.863
Arilje	8.185	10.000	10.904	11.775	7.310	9.225	8.480	8.650	11.015	10.230
Požega	4.411	4.958	3.745	4.870	4.121	4.006	3.152	3.631	4.138	3.952
Valjevo	3.136	5.358	2.450	2.223	2.936	3.047	3.048	3.142	2.090	2.304
Ivanjica	7.421	7.398	7.009	11.075	9.120	8.513	8.495	9.720	9.236	9.637
Mionica	499	630	242	371	274	286	282	492	318	228
Osečina	3.640	5.862	3.479	4.232	3.894	3.524	3.210	3.992	3.468	3.710
Koceljeva	1.417	1.526	799	1.054	1.331	1.343	1.367	1.323	763	962
Krupanj	3.537	4.897	3.868	3.912	3.421	3.951	4.309	4.224	4.364	4.304
Ljubovija	3.542	4.138	3.937	1.751	3.452	3.578	3.537	4.575	4.516	3.889
Gornji Milanovac	1.400	1.374	1.518	1.885	1.888	1.470	1.726	1.912	2.168	2.217
Čačak	1.368	1.422	2.753	2.707	3.377	3.102	3.041	3.558	3.142	2.829
Lučani	6.046	7.967	5.638	5.815	7.223	5.704	4.402	5.181	5.712	4.671
Brus	5.178	6.322	5.232	5.207	6.349	5.469	5.384	6.538	6.434	5.834
Aleksandrovac	2.605	2.691	3.250	3.282	2.613	2.256	3.621	3.719	3.906	3.170

Source: The Republic Bureau of Statistics, Municipalities in Serbia, 2002-2011.

According to the data in Table 6 the biggest raspberry production during the observed period was realized in the following municipalities: Arilje (from 7.310 t to 11.775 t), Ivanjica (from 7.009 t to 11.075 t), Lučani (from 4.402 t to 7.967 t), Brus (from 5.178 t to 6.538 t) etc. Raspberry is being grown in other regions too, but on smaller areas. Other regions that have been started to develop significantly regarding raspberry production are: Region close to the river Drina, region of the mountain Kopaonik, region of the city of Šabac and region of the mountain Zlatar, but there are also regions where there are no optimal conditions for this kind of production, but because of profitability people started to grow raspberries there, as well (Kljajić, 2012.).

Raspberry production depends on weather conditions. There are irrigation systems just on small areas and therefore every drought year significantly reduces return (Cecić et al., 2006b). Droughts that are more often and last longer and which appear because of low rainfall, low water resource capacity and extended vegetative period, higher temperature and evapotranspiration, cause serious damages to raspberry production (Milivojević et al., 2005). Therefore, in some areas, considerable fall in raspberry return was recorded with the tendency of further falling. On the other side, improper fertilization resulted in too much acid in soil, so it is necessary to check low pH value for a while in order to grow raspberries on that soil again.

Some of the problems in raspberry production in our country are related to the foreign investment. In an effort to enable foreign investments the problem appeared – poor infrastructure since we are talking about undeveloped hilly and mountainous areas. On the other side, genetic resources related to fruit growing in Serbia are significant and represent the base for improvement. It should emphasize the most modern and quality fruit types breeding and not rely on old fruit types that don't have potential. There is a long tradition in raspberry production on farms in Serbia, but specialization in households is necessary, as well as to form associations and unions in order to inform producers about the latest trends in production and to help producers directly. In particular, it is necessary to organize seminars to educate producers especially in order to transfer knowledge in production planning and realize the highest quality possible at the lowest possible production costs.

The problem related to raspberry production which is also important to mention is certainly the emigration of manpower from villages and an increased number of older people and therefore it is necessary to create conditions that will attract young people to return to villages. On the other side, there are lots of uneducated and unqualified seasonal workers, especially in the prime fruit-picking season, but because our workers are not interested to work, workers from Romania and Bulgaria are imported. In order to improve the situation it is necessary to ensure compliance with the EU Regulations, especially related to hygiene and human rights related to fruit picking jobs, as well as related to education and advanced training. In the EU countries rural development is considered to be an integral part of economic development. Therefore, rural development represents required standard for the development of our country. Besides, the question of dying villages and environmental protection are becoming more and more interesting topics in transitional societies and therefore, one of the most important tasks for the Ministry is to create more suitable conditions that would motivate young people to start with various activities related to those fields (*Cecić et al., 2008*).

Conclusion

Raspberry production is an exceptional chance for the development of agriculture and Serbian Economy in general. It could be realized through increased economic efficiency in primary productivity, as well as in the improvement in product quality. Regarding competitors which have become more and more outstanding over the past several years, it is necessary to regain positions on the world market that our country used to have; it is important that state enables loans with favourable terms and that state protects raspberry as a product of national interest etc. (*Milić et al., 2011*)

Strategy of raspberry market development, since raspberry is an extremely important fruit type for our country, should be based on the following:

1. *To extend growing season* by introducing new fruit types suitable for long term storage, by modernization in pomotechnical measures and by introducing fruit growing in semi confined or confined space or sheltered space;

2. *Fruit picking and quality control* using new picking techniques, applying international quality standards and certification;
3. *Packaging and logistics* through the improvement in packaging plants and the improvements in transportation of products to foreign markets;
4. *Sales and marketing* through the improvement in regional and foreign fresh fruit market information, international promotion from Serbia using mass media and participation of fruit producers in international fairs;
5. *To coordinate standards with the EU requirements* and to create Serbian product according to European standards (Cecić et al., 2006a, 2007).

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TENDENCIJE PROIZVODNJE MALINE U REPUBLICI SRBIJI

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Rezime

Malina je po svojim biološkim osobinama, ekonomskom značaju, agro-ekološkim, tehnološko-organizacionim i drugim zahtevima, tržišnoj vrednosti proizvoda, kao i vrlo visokoj međuzavisnosti i uslovljenosti između pojedinih faza reproduktionog ciklusa, specifična voćna vrsta. Spada među najznačajnije vrste jagodastog voća u svetu, i jedna je od najrentabilnijih kultura u celokupnoj biljnoj proizvodnji. Po obimu proizvodnje, Srbija se svrstava u vodeće proizvođače maline, a njen ekonomski značaj je u izrazito visokom stepenu robnosti i konkurentnosti na tržištu Evropske Unije.

Shodno tome, u radu je prikazana proizvodnja maline u Republici Srbiji za period 2000-2010. godine, njene prosečne, minimalne i maksimalne vredosti u proizvodnji, stope promene i koeficijenti varijacije.

Ključne reči: *malina, proizvodnja, ekonomski značaj.*

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