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## RASPBERRY PRODUCTION, TRADE AND MARKET IN THE REPUBLIC OF SERBIA<sup>4</sup>

### Abstract

*Fruit production has great importance for the Serbian economy, especially the production of berries, where the production of raspberries can be highlighted. Investments in raising raspberry plantations are relatively high, but the invested funds return quickly, given that raspberry fruits have a high market value in both domestic and foreign markets, so the economic risk that accompanies production is much lower than for large fruits. Due to the high value of production on a small area and due to the high position that raspberries have in the total market value, the interest of producers to raise larger areas under raspberry plantations is increasingly pronounced, and therefore its production is constantly increasing. Accordingly, the paper presents the volume of raspberry production in our country for the last ten years (period 2011-2020), trade and foreign trade with other countries, sales and purchase, as well as problems in the market of raspberry purchase in our country.*

**Key words:** *raspberry, production, export, sale, purchase, market*

**JEL classification:** *Q10, Q11, Q17*

## ПРОИЗВОДЊА, ПРОМЕТ И ТРЖИШТЕ МАЛИНЕ У РЕПУБЛИЦИ СРБИЈИ

### Сажетак

*Воћарска производња има велики значај за привреду Србије а нарочито производња јагодастог воћа, где се посебно може издвојити производња малине. Инвестиције у подизање засада малине су релативно високе али се*

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*уложена средства брзо враћају обзиром да плодови малине имају високу тржишну вредност како на домаћем тако и на иностраном тржишту, па је економски ризик који прати производњу знатно мањи него код крупног воћа. Због велике вредности производње на малој површини и због високе позиције коју малина има у укупној тржишној вредности, интерес произвођача за подизање већих површина под засадама малине је све израженији, па је самим тим и њена производња у сталном порасту. Сходно томе, у раду је приказан обим производње малине у нашој земљи за последњих десет година (период 2011-2020. год.), промет и спољнотрговинска размена са другим земљама, продаја и откуп, као и проблеми на тржишту откупа малине у нашој земљи.*

**Кључне речи:** малина, производња, извоз, продаја, откуп, тржиште

## Introduction

Raspberries can be classified in the group of the most important and most profitable types of berries in our country and in the world in terms of quantity and value of production. It is very adaptable to different conditions in terms of climate and soil, so similarly, only hail and possible late snows can cause damage during its cultivation. The specifics of raspberry as a fruit species are manifold, and are reflected primarily in its favorable biological properties, agroecological growing conditions that it requires, the market value of the production itself, the economic effects of production, etc. Raspberries bear fruit in the first or in the second year after planting, and already in the third year they reach full fertility. Raspberry yields can be extremely high if a balance is established between favorable agroecological growing conditions, the application of modern agrotechnical measures and the use of certified seedlings. With high yields, production costs are reduced and producer profits are significantly increased (Sredojević Z., i sar., 2013).

Raspberries have certain advantages when grown in relation to other crops, and they are: - the possibility of growing on lands with poorer characteristics; - the possibility of using fragmented production plots; - the risk in production is small; - breeding technology is simple; - it is an intensive working plant species because it enables the engagement of physically weaker labor forces such as women, children, the elderly and people with disabilities, - it gives very high quality fruits of exceptional nutritional value, etc. (Kljajić N., 2012).

Raspberry fruits have a high nutritional and technological value. They are extremely healthy because they have protective, dietary therapeutic and dietary prophylactic properties. They contain sugars, acids, minerals, pectin, cellulose, proteins, fatty substances and vitamins. Raspberries are rich in vitamins C, B, E and K, as well as Mg, Mn and Cu. They also have a significant cytostatic effect. Anthocyanins and polyphenols as components of raspberry, of which ellagic acid is especially indicated, have proven to be very beneficial in protecting cells from damage, aging and various forms of cancer. It also contains plant fibers that promote digestion and cleansing of blood vessels. Raspberries also have a positive effect on the regulation of blood sugar. It is a low-calorie fruit that prevents the deposition of fat in the body. Dried raspberry leaves are used to make tea for colds, sore throats, coughs and diarrhea. Vinegar and raspberry juice are used to lower body temperature, etc. (Kljajić N., 2014).

The peculiarity of raspberries is that they are a very important export item. Exceptional biological-pomological properties and production-technological characteristics of raspberries ensure its easy placement on the domestic and foreign markets. Among all types of fruits and vegetables in our country, raspberries occupy a very high place in terms of total exports, because it belongs to the rank of the top 10 export products from Serbia. On the other hand, the production of raspberries in the world lags behind the demand, the needs of the foreign market for frozen raspberries as well as for raspberry products are constantly increasing. All this makes it one of the most profitable crops in the entire plant production, so its production is very attractive for agricultural producers.

## Raspberry production in Serbia

Raspberries originate from Asia and began to be grown in Serbia in 1880. Initially, it was grown only as an ornamental plant. Commodity production began after the First World War, ie in 1920, when raspberries were produced for the needs of the local market, mainly for sweets, syrup and pulp. After the Second World War, the demand for raspberries became higher and the prices of fruits were high. Nevertheless, the production of raspberries in Serbia reached a large volume at the end of the 20<sup>th</sup> century.

In terms of importance, the following regions are: northwestern Serbia (Valjevo, Sabac, Osecina, Ljubovija) and southeastern Serbia (Brus, Aleksandrovac and Kursumlija). Based on the data from the 2012 Census of Agriculture, the largest areas under raspberries are located in the municipalities of Ivanjica (1,249 ha) and Arilje (1,226 ha). Among the municipalities where raspberries are grown on an area of over 500 ha are Krupanj (759 ha), Brus (759 ha), Bajina Basta (694 ha), Osecina (686 ha), Lucani (662 ha), Aleksandrovac (596 ha), Uzice (548 ha), Ljubovija (539 ha) and Kosjeric (503 ha).

In these areas, autochthonous raspberries with various types are represented. This autochthonous material has an excellent adaptation to the soil and climatic conditions of the environment in which it is located. Various genotypes also have some significant characteristics by which they stand out, especially the pronounced aroma of fruits and a specific pleasant taste (Kljajić N., 2017a).

Raspberries are also grown on smaller areas in other areas of Serbia. In the last few years, the picture under raspberry areas has changed and plantations have been decentralized, given that new raspberry plantations with two-species raspberry varieties are being raised in areas where raspberries have not been traditionally grown, such as Bačka in Vojvodina, Raška District (Novi Pazar, Sjenica) and southern Serbia (Leskovac, Lebane, Vladicin Han), but these attempts to produce raspberries did not yield the expected results.

Raspberry production takes place mainly on family farms. All members of the farm are active and engaged in production, but seasonal labor is also engaged during the harvest. The harvest lasts about a month (3-4 weeks) because the fruits of raspberries do not ripen at the same time. The length of the harvest increases the price of the harvesting process itself, but the market is thus provided with fresh raspberry fruits for a longer period (Kljajić N. et al., 2017b).

The value of raspberry production for the last ten years (period 2011-2020) is shown in Table 1. The table shows data for the native area under raspberry plantations in ha, data for

total production in thous. tons, as well as the average yield in t/ha, including base indices, at the level of the entire Republic of Serbia.

**Table 1. Raspberry production in the Republic of Serbia in the period 2011-2020.**

Year	Republic of Serbia					
	Native area under raspberry plantations		Total production		Average yield	
	(ha)	Index (2011=100)	(thousand t)	Index (2011=100)	(t/ha)	Index (2011=100)
2011	15.354	100,00	89.602	100,00	5,8	100,00
2012	15.748	102,57	70.320	78,48	4,5	77,59
2013	15.433	100,51	68.458	76,40	4,4	75,86
2014	11.040	71,90	61.715	68,88	5,6	96,55
2015	16.211	105,58	97.165	108,44	6,0	103,44
2016	20.194	131,52	113.172	126,30	5,6	96,55
2017	21.861	142,38	109.742	122,48	5,0	86,20
2018	22.654	147,54	127.010	141,75	5,6	96,55
2019	23.249	151,42	120.058	133,99	5,2	89,66
2020	24.028	156,49	118.674	132,44	4,9	84,48

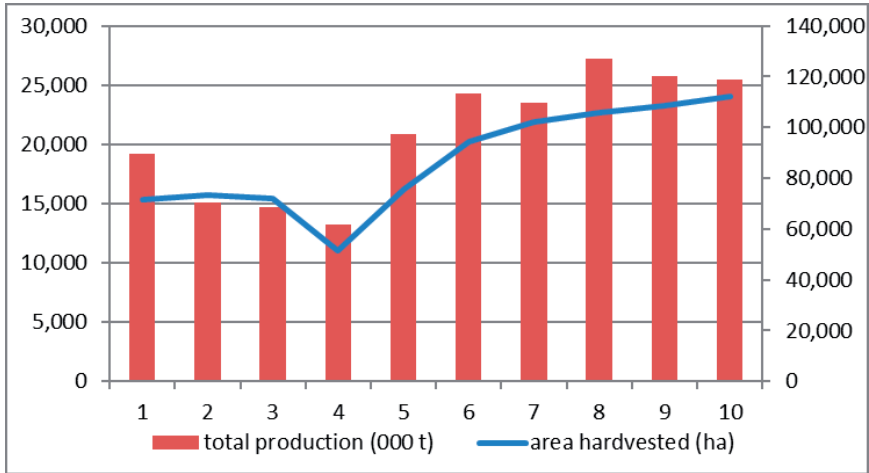
*Source:* Republic Statistical Office, Statistical Yearbooks of the Republic of Serbia, 2008-2020. (for 2020 [http://www.minpolj.gov.rs/dokumenti/izvestaji-sa-trzista/?cp\\_maline=1](http://www.minpolj.gov.rs/dokumenti/izvestaji-sa-trzista/?cp_maline=1))

Based on the presented data, it can be seen that the production of raspberries in our country has increased over the years (Graph 1) and that producers are showing increasing interest in this type of fruit. Compared to 2011, when raspberry plantations occupied 15,354 ha of agricultural land, in 2020 the area was increased to 24,028 ha. The average yield is 5.3 t/ha. However, in relation to the realized yield of 5.3 t/ha recorded by official statistics, in practice it has been shown that in Western Serbia there are regular yields of 15 to 20 t/h<sup>5</sup>, which corresponds to the genetic potential of raspberries.

In the last few years, in the regions where raspberries are mostly grown, the appearance of early frosts, stormy rains followed by the appearance of the city has been recorded, and in 2020, with all these phenomena, there were floods that hit western Serbia and caused great damage and losses.

<sup>5</sup> Source: [https://www.kzk.gov.rs/kzk/wp-content/uploads/2018/01/Analiza-trzista-malina\\_2017.godine.pdf](https://www.kzk.gov.rs/kzk/wp-content/uploads/2018/01/Analiza-trzista-malina_2017.godine.pdf)

**Graph. 1.** Overview of raspberry production trends in the Republic of Serbia for the period 2011-2020.



Source: Creation of graphs on the basis of the data from Table 1.

### Foreign trade

For the period 2011-2020., according to the value of exports, frozen raspberries were among the top 10 export products of Serbia. The quantity of exported raspberries from Serbia for the mentioned period is shown in Table 2. In this period, the export of raspberries had a changing trend. Compared to 2011, when exports amounted to 73,548 t, in 2012 and 2013, raspberry exports decreased to 64,268 t, and 61,417 t, respectively, in 2014. year again grows to the level of 73,253 t, or 236,518 (000 USD), and then constantly grows again, until 2019 when the amount of exports reached a value of 114,354 t, or in thousands of USD 234,344,000.

**Table 2.** Exports of frozen raspberries (without added sugar), quantity and value from Serbia in the period 2011-2020.

Year	Rank of frozen raspberries among the top 10 export products from Serbia	Exports, quantity (t)	Exports, value (000 USD)	Unit value of exports (USD / kg)
2011	7	73.548	176.472	2,4
2012	10	64.268	135.648	2,1
2013	10	61.417	187.358	3,1
2014	8	73.253	236.518	3,2
2015	6	93.732	267.566	2,9
2016	9	85.957	247.884	2,9
2017	10	94.000	233.233	2,5
2018	10	103.276	225.764	2,1

2019	10	114.354	234.344	2,0
2020	5	107.745	295.897	2,7

Source: Republic Statistical Office of Serbia <http://webrzs.stat.gov.rs/WebSite/public/ReportView.aspx>. <https://data.stat.gov.rs/Home/Result/170402?languageCode=sr-Cyrl&displayMode=table&guid=f02d0669-c305-452e-9c06-9fd3153345b8>

In 2020, 107,745 tons of raspberries were exported, with an export value of almost 296 million USD.

Raspberries participate in the total export of fruits with a large percentage. For example, in relation to the total export of fruit in 2020, which amounted to 644.6 million euros, raspberries participated with 40.6% (Table 3).

**Table 3.** Value share of raspberries in total fruit exports, in euros, for the period 2011-2020.

Years	The value of raspberry exports		
	Total fruit (mil EUR)	Raspberries (mil EUR)	Percentage of participation
2011	319,4	131,4	41,1
2012	288,0	105,7	36,7
2013	358,4	91,0	25,4
2014	415,8	186,8	44,9
2015	523,4	252,7	48,3
2016	546,6	229,7	42,0
2017	583,2	214,1	36,7
2018	492,9	194,1	39,4
2019	543,3	215,6	39,7
2020	644,6	261,6	40,6

Source: [http://www.minpolj.gov.rs/dokumenti/izvestaji-sa-trzista/?cp\\_maline=1](http://www.minpolj.gov.rs/dokumenti/izvestaji-sa-trzista/?cp_maline=1)

The largest quantities of raspberries are exported to the countries of the European Union (Germany, France, Belgium, Great Britain, Sweden, the Netherlands, Poland, Austria), then to the USA, Canada, the Russian Federation and other countries. The dominant export markets for frozen raspberries from Serbia are: Germany, France, Belgium and the United Kingdom, and the values of exports in tons for the period 2011-2020 are shown in Table 4.

**Table 4.** Dynamics of frozen raspberry exports from Serbia to the leading export markets in the period 2011-2020. (value of exports in Euro thousand)

States	Years									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Germany	53.849	49.375	60.353	68.159	88.540	83.421	68.496	63.711	70.393	102.589
France	29.46	27.459	35.393	42.715	55.325	53.131	45.661	37.558	40.316	46.876
Belgium	17.075	18.079	22.521	22.050	26.651	21.421	16.866	15.547	15.886	23.152
United Kingdom	7.396	7.059	6.896	7.831	13.873	15.481	13.706	16.680	16.101	22.838

<sup>1/</sup> Product code: 081120 - includes frozen raspberries, blackberries, mulberries, berries, currants and gooseberries. Source: International Trade Centre (ITC), Trade Map, <http://www.trademap.org/Index.aspx>. [https://www.trademap.org/Country\\_SelProductCountry\\_TS.aspx?nvpm=1%7c688%7c%7c%7c%7c081120%7c%7c%7c6%7c1%7c1%7c2%7c2%7c1%7c2%7c1%7c1%7c1](https://www.trademap.org/Country_SelProductCountry_TS.aspx?nvpm=1%7c688%7c%7c%7c%7c081120%7c%7c%7c6%7c1%7c1%7c2%7c2%7c1%7c2%7c1%7c1%7c1)

The high degree of presence and exchange of goods and the presence of the competitiveness on the European Union market are the reason for the great economic importance of our raspberries produced in special geomorphological, pedo-microclimatic and ecological conditions. This is certainly contributed by the long tradition of raspberry production in our country and the long experience of producers.

The orientation of exports to the European Union is conditioned primarily by the deficit of the European Union in raspberries, and on the other hand by the relatively high standard of living that allows a significant level of demand for raspberries as an exclusive fruit. The export perspective is very good, considering that raspberries have the epithet of safe food, so with proper marketing, exports can increase significantly.

According to the export orientation of frozen raspberries, the leading competitor to Serbia is Poland, considering that the export markets of this country largely coincide with the markets where Serbia sells frozen raspberries (Table 5).

**Table 5.** Export markets of Serbia's leading competitor (Poland) in the frozen raspberry market for the period 2011-2020. years (value of exports in Euro thousand)

States	Years									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Germany	34.501	38.931	47.928	46.003	54.743	51.872	46.551	39.592	37.734	56.406
France	6.534	7.361	9.174	11.694	10.740	11.457	10.925	12.574	10.881	16.220
Belgium	11.767	11.516	20346	19.355	19.830	15.115	15.966	14.306	11.480	15.883
United Kingdom	7.029	8.930	10.858	11.732	11.675	13.710	13.554	11.101	10.501	18.518

<sup>1/</sup> Product code: 081120 - includes frozen raspberries, blackberries, mulberries, berries, currants and gooseberries. Source: International Trade Centre (ITC), Trade Map, <http://www.trademap.org/Index.aspx>. [https://www.trademap.org/Country\\_SelProductCountry\\_TS.aspx?nvpm=1%7c688%7c%7c%7c%7c081120%7c%7c%7c6%7c1%7c1%7c2%7c2%7c1%7c2%7c1%7c1%7c1](https://www.trademap.org/Country_SelProductCountry_TS.aspx?nvpm=1%7c688%7c%7c%7c%7c081120%7c%7c%7c6%7c1%7c1%7c2%7c2%7c1%7c2%7c1%7c1%7c1)

## Domestic trade (Internal trade)

Factors that are crucial for the specific economic importance of raspberries are: high and diverse use value of the fruit; relatively high rate of profitability in favorable agroecological conditions; high product robustness; additional employment of labor force and indirect impact on the overall socio-economic development, etc. (Petrović et al., 2002).

It can be said that the production of raspberries is very safe, considering that its fruits, when fresh and frozen, are easily marketed both in our country and in the world.

The fruits of all varieties of raspberries can be used for different purposes: as a frozen raspberry (in the form of a roll, half-block, block, semolina); for the production of juices, concentrates, syrups and jams; for the production of compotes and sweets; as dried raspberries and others (Šoškić A., 1997). Of all the products, raspberries are mostly processed into products in frozen form, and of the frozen forms, raspberry roll is produced the most as the highest quality product.

Frozen raspberries can be used throughout the year, so about 80% of the raspberries produced are frozen, used for various forms of processing or to improve the quality of other products. A small part of production (about 20%) is used for domestic processing, fresh consumption. In more industrialized countries, raspberry fruit is dried and used in powder form.

According to the data of the Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia, all produced raspberries in our country are placed on the market through official market channels (purchase and sale to refrigerators).

Graph 2 and Table 6 show the values of raspberry sales and purchases, market sales and raspberry purchase prices for the period 2011-2020.

*Graph 2. Purchase of raspberries and sales at markets*



Source: [http://www.minpolj.gov.rs/dokumenti/izvestaji-sa-trzista/?cp\\_maline=1](http://www.minpolj.gov.rs/dokumenti/izvestaji-sa-trzista/?cp_maline=1)



During 2020, redemption was lower by 8% compared to the previous year. The sale of raspberries at the markets increased 4 times compared to the previous year and amounted to 493 tons.

*Table 6. Purchase prices of raspberries (din / kg), for the period 2011-2020.*

Years	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Redemption price (din./kg)	82,4	124,89	184,23	152,27	192,89	194,23	131,72	96,26	143,64	196,29

Source: [http://www.minpolj.gov.rs/dokumenti/izvestaji-sa-trzista/?cp\\_maline=1](http://www.minpolj.gov.rs/dokumenti/izvestaji-sa-trzista/?cp_maline=1)

The price of raspberries on the market is not guaranteed, but is defined on the principle of supply and demand. In the period 2011-2020, the purchase price of raspberries ranged from 82.40 dinars (2011) to 196.29 dinars (2020). In 2020, the purchase price of raspberries increased by about 37%, compared to the previous year. The reason for the increase in the price of raspberries is the reduced stocks at the world level of raspberries. Also, during the „COVID – 19“ pandemic, there was an increased demand for raspberries worldwide, as well as other berries due to its medicinal properties and as an antioxidant, as a preventative. On the other hand, the weather conditions affected the raspberry harvest.

Raspberry producers in Serbia are facing numerous problems in the purchase market. Some of them are:

- Absence of classification, quality control and health safety of raspberries, then absence of control of the purchase process in terms of purchase conditions and payment deadline, etc .;
- Problems with long-term, standard agreements on business cooperation in production and purchase, which producers conclude with purchasers at the beginning of the year. The contracts are drawn up mainly in such a way that on the basis of them, producers receive pesticides and fertilizers from the purchasers, which they do not pay in cash, but pay as a natural exchange (in raspberries) during the purchase period. At the time of signing the contract, the producers do not know what the price of raspberries will be for the next purchase season and they only know the current price of raw materials. If that contract does not oblige them, the producers generally will deliver all the raspberries during the purchase period to the purchasers (refrigerators) with whom they have already established cooperation and good experience with payment;
- Disorganization of fragmented producers from villages in hilly areas with small holdings, less than one hectare. They do not have a good negotiating position in relation to buyers, and they often need help in financing raspberry production, transferring new knowledge from cultivation technology, information on quality and safety standards required by export markets, etc.;
- Non-existence of redemption at a single redemption price.

Refrigerators as buyers, on the other hand, cannot accurately predict the future selling price of raspberries at the time of purchase. Purchase price decisions are based on estimates of export prices. Some purchasers are often forced to use unfavorable

redemption loans, which is why they buy fruit on deferred payment. Accordingly, producers prefer to pay for buyers who pay as soon as possible or guarantee payment (Republic of Serbia Commission for Protection of Competition. Report on the analysis of competition conditions in the market of purchase and export of raspberries in the Republic of Serbia in the period 2015-2017, December, 2017).

Raspberry production is an exceptional development opportunity for agriculture and the entire Serbian economy. This can be achieved by increasing the economic efficiency of its primary production as well as processing and improving product quality. In all this, the role of the state is extremely important through the provision of favorable loans and other incentives to improve fruit production (raising new perennial production plantations; raising new parent plantations, production of planting material; insurance of crops, fruits, etc.), as well as through protection raspberries as a product of our national interest and more.

The raspberry market development plan should be based, among other things, on the following:

*Extension of the growing season* through the introduction of new varieties that are suitable for longer storage, modernization of post-technical measures and the introduction of cultivation in semi-closed and closed, ie protected space;

*Harvesting and quality control* through new harvesting techniques, introduction of international quality standards and certification;

*Packaging and logistics* through the improvement of packaging facilities and the improvement of transport to the international market; and

*Sales and marketing* through the improvement of information on the regional and international market of fresh fruit, international promotion from Serbia through the media and direct participation of fruit producers in international fairs (Cecić et al., 2007).

Raspberry production, especially in the region of Šumadija and Western Serbia, indicates that there are realistic preconditions for successful and sustainable development of clusters that would have a positive impact on production. Factors that are suitable for the formation of clusters when it comes to raspberry production and the above area are numerous: favorable natural production conditions, long tradition of production, high production and export of raspberries, high quality raspberries and recognizability of producers in the world market, concentration of producers and cold storage, the existence of numerous scientific and advisory institutions, which could provide support to raspberry producers and more.

At the same time, there are a numrous of negative factors for cluster development such as: lack of advanced vertical integration in the product value chain, lack of innovation in production, lack of specialized knowledge and skills, lack of trust between market participants, short product market and more must be overcome (Parašić V. et al., 2016).

## Conclusion

The potential of fruit growing in Serbia is the excellent quality of fruits and fruit products. Within fruit production in Serbia, raspberry is extremely important because it is one of the most important export products of Serbia. Fresh and frozen raspberries are easily

placed not only on the foreign market where the demand for raspberries is very high, but also on the domestic market.

In 2020, the yield area under raspberry plantations was 24,028 ha, the total production was 118,674 (000) tons, and the average yield was 4.9 t / ha. However, the practice in relation to the official statistics shows that in Zapadna Serbia, an average yield of about 20 tons of raspberries per ha is achieved, which corresponds to the genetic potential of raspberries.

The dominant export markets for frozen raspberries from Serbia are Germany, France, Belgium and the United Kingdom. In 2020, 107,745 tons of raspberries worth almost 269 million USD were exported from Serbia to Germany alone. According to the value and quantity of frozen raspberry exports, the leading competitor of Serbia on the world market is Poland. The export markets of this country largely coincide with the markets where Serbia sells frozen raspberries. Of the total raspberries produced, 80% is frozen while the remaining 20% is used for domestic processing and fresh consumption. All raspberries produced in our country are placed on the market through official market channels. During 2020, redemption was lower by 8% compared to the previous year. The sale of raspberries at the markets increased 4 times compared to the previous year and amounted to 493 tons. The price of raspberries on the market is not guaranteed, but is defined on the principle of supply and demand. In the period 2011-2020, the purchase price of raspberries ranged from 82.40 dinars (2011) to 196.29 dinars (2020). In 2020, the purchase price of raspberries increased by about 37%, compared to the previous year.

Raspberry producers in Serbia face numerous problems. The state has a great role in overcoming these problems through various support measures that it implements in agriculture and within it in the fruit sector, such as: raising new perennial production plantations; raising new parent plantations, production of planting material; insurance of crops, fruits, etc., as well as through the protection of raspberries as products of our national interest, and others.

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