

FRUIT AND GRAPE PRODUCTION IN SERBIA

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Abstract

Economic and socio-economic importance of fruit and grape production in Serbia is very high due to favourable natural conditions of our country. Fruit and grapes and their derivatives can be very profitable, particularly regarding export. On the other hand, it directly or indirectly affect the development of other industries and their products such as the production of propulsion and auxiliary machinery, mineral fertilizers, plant protection and other inputs.

Accordingly, this paper presents the production of fruit and grapes for the period 1999-2010 in the Republic of Serbia (total), Central Serbia and Vojvodina, as the import-export trade and development prospects of fruit production in Serbia.

Key words: fruit, grapes, production, import-export, yield, development directions.

INTRODUCTION

Fruit growing, as a field crop production, is characterized by a number of comparative advantages over other branches of agriculture, but it is necessary to undertake substantial measures towards the intensification of production, as specialization and modernization of processing facilities.

Nowadays, the development of fruit output does not have production as the only goal because that product has to be placed on the market under favourable conditions. This means that in aim to maintain the successful fruit production (both intended for the market and for household purposes) planting beds with high quality and productive varieties of fruit trees, providing under the given agro-ecological conditions in the environment the optimal production and economic results, should be raised [3].

The importance of fruit is reflected in the fact that it is a good source of vitamins (especially A, B and C) and minerals as ingredients essential to human nutrition.

According to Vlahovic [6] one of the divisions of the fruits importance in the diet is:

- water-rich fruits like orange, lemons, grapes, raspberries, strawberries, blackberries, cherries, cherry, apricot, peach, apple, pear, plum, etc. (containing up to 95% water, small value of the energetic values, containing fats and proteins in very small quantities, but with significant amounts of minerals and vitamins (C, A, etc.).
- fruits rich in fat-walnut, almond, hazelnut, chestnut, peanut etc.. - are high in calories and contain significant amounts of fat, protein and carbohydrates, and little water.

A significant number of fruit species enables the use of a number of locations and areas with very different soil and climatic conditions for fruit production, and because of the wide range of distribution, fruit production is economically important activity in our country.

MATERIAL AND METHOD

The paper is part of the research project number 46006: "Sustainable agriculture and rural development accomplishing the strategic objectives of the Republic of Serbia within the Danube region, "an integral and Interdisciplinary Research (period 2011-2014); 46009 - Promotion and development of

hygienic and technological processes in the production of foods of animal origin in order to obtain high-quality and safe products competitive on the world market and the 179028 - Rural labour markets and rural economy of Serbia - the diversification of income and poverty reduction; funded by the Ministry of Education and Science of the Republic of Serbia.

RESULTS AND DISCUSSIONS

Among the official data, Statistical Office lists the following production results for the types of fruit: apples, pears, plums, cherries, cherry, apricot, peach, strawberry, and raspberry (Table 1).

Collected data were analyzed by mathematical standard and statistical methods and presented through tables and histograms.

Apple, as the most important fruit specie in the world and Europe, is very important in the diet as economically. It is spread in the wide open spaces because it successfully adapts to

different climatic conditions. Chemical composition and organoleptic qualities make apple fruit very delicious, healthy and hygienic food with strong and multiply effect of dietary-therapeutic values. It is rich in varieties (over 20,000 varieties) and it can be use as the fresh apple fruit, or in the form of different products. The world's largest apple producer is China. In our country, apples are more or less grown in all areas particularly frequently in the Western Morava river basin and Moravice, in the surroundings of Ivanjica, Pozega, Arilje, Guca, in Toplica, in the valley of the River Ibar and Lim, around Subotica, etc.

Total apple production in the Republic of Serbia for the period 1999-2010 amounts to 207,900 t with an average yield of 14 kg per tree. In Central Serbia, the production is 129,200 t yield respectively 13 kg per tree, while in Vojvodina is slightly lower representing 78,800 t with an average yield of 16.2 kg per tree.

Table 1. The average fruit production (000 t) for the period 1999-2010 in the Republic of Serbia

Years	Republic of Serbia					
	Total		Central Serbia		AP Vojvodina	
	Production thousands of tons	Average per tree, kg	Production thousands of tons	Average per tree, kg	Production thousands of tons	Average per tree, kg
apples	207.9	14.0	129.2	13.0	78.8	16.2
pears	57.0	11.3	45.1	11.9	11.8	10.2
plums	469.3	11.1	427.1	11.0	42.1	16.2
cherry	24.5	13.3	20.2	12.9	4.3	15.2
cherries	78.8	9.1	62.8	8.4	16.0	11.4
appricots	22.6	14.1	16.5	13.7	6.2	15.4
peaches	53.7	13.6	39.8	13.5	13.9	13.7
strawberries	33.7	4.1 t/ha	32.3	4.2 t/ha	1.3	2.2 t/ha
raspberries	79.9	5.3 t/ha	79.1	5.3 t/ha	0.9	2.2 t/ha

Data source: Statistical Yearbook of Serbia, 2004, 2009.

Pear is the oldest, highest quality and very profitable fruit specie. The best production results are obtained from the areas up to 600 m above sea level. The world, as well as in apple, pear production is largest in China, followed by Italy, USA, Spain, Argentina etc. The largest production centres in our country are located in Grocka- Smederevo area, West

Morava Valley, Pomoravlje, eastern Serbia, Fruška Gora, and area of Bela Crkva.

The average production of pears in the Republic of Serbia covering the period 1999-2010 amounts to 57,000 t with an average yield of 11.3 kg per tree. In Central Serbia, the production is 45,000 t, respectively 11.9 kg per tree, whereas in Vojvodina is slightly

lower represented by 11,000 t with an average yield of 10.2 kg per tree.

Plum is a fruit that has a great energy merit as fresh and distinct protective, therapeutic values and dietary value in the dry state. It contains all the substances necessary for the functioning of the human organism. This specie is widespread because the fruit can be successfully grown on all continents of the world. The largest producer is China. In Serbia, it is mostly grown in the hilly and mountainous areas.

The average production of plums in the Republic of Serbia for the period 1999-2010 amounts to 469,000 t with an average yield of 11.1 kg per tree. In Central Serbia, the production is 427,000 t in other words 11.0 kg per tree while in Vojvodina is slightly lower with 42,000 t with an average yield of 16.2 kg per tree.

The largest producers of cherries in the world are Turkey, Iran and America. In our country the cherry grows most frequently in the mountainous areas at high altitudes over 1,000 m. The most significant area of cherry production in Serbia is Belgrade and the surrounding area of Smederevo and Dragačeva. In Vojvodina, the characteristic areas of production are Fruska Gora, Sombor and Subotica. The observed period of 1999-2010 has shown that average production of cherries in the Republic of Serbia amounted to 24,500 t with an average yield from 13.3 kg per tree. Much higher production was in Central Serbia with 20,200 t or 12.9 kg per tree compared to Vojvodina, where production was 4,300 t with an average yield of 15.2 kg per tree.

Cherry is a high quality and delicious fruit shake and a regular companion to cherries. Their characteristics are largely consistent with the difference that the cherry ripens later. It features high technological value of the fruit. Cherry is rich in various nutrients, and is widely in use in fresh and in processed condition. The average production of cherries in the Republic of Serbia in the past 12 years amounted to 78,800 t in other words 9.1 kg per tree.

Apricot is a very popular fruit in the domestic and foreign markets, but the extent of its

production in our country does not meet market demands. The average production of apricots in the Republic of Serbia in the observed period amounted to 22,600 t or 14.1 kg per tree. Production in Central Serbia is 16,500 (13.7 kg per tree), and in Vojvodina 6,200 t (15.4 kg per tree).

Peach is a very honourable, good and profitable fruit. For a brief period it reaches full production capacity of 30 t/ha. The largest producer in the world is China, followed by North America and Asia. In Europe the largest producers of peaches are Italy, Greece, Spain and France. In our country the biggest peach production is realized in the vicinity of Belgrade, and in this area one third of domestic production of peaches is achieved. In addition, it has been successfully grown near Danube river, in Srem, Banat and South-North Backa. In the present research period, the average production of peaches in the Republic of Serbia amounted to 53,700 t with an average yield of 13.6 kg per tree. In Central Serbia two-thirds of domestic peach production is achieved with an average production of 39,800 t and average yield of 13.5 kg per tree.

Compared with other fruit species, strawberry is characterized by early entry into yield, fast return on investment in the strawberry fields, modest requirements in terms of natural conditions of production, a wide area of distribution, ease cultivation, a large and varied use-value, etc. [4].

The average production of strawberries in the Republic of Serbia amounted to 33,700 t (4.1 t/ha), except that regarding the production in central Serbia, 32,300 t (4.2 t/ha) Vojvodina produce 1,300 t (2.2 t/ha).

Raspberry is the most important type of berries. Raspberry is one of the most important export products, the backbone of rural development in certain areas, the real Serbian brand, its growth represents an important economic sector and many more. The fruit is attractive, delicious, with excellent flavour, juicy, high-nutrient, containing dietary and technological values for which the raspberry is highly appreciated and sought after fruit. It is the most profitable export product of Serbian agriculture.

The average production season in the Republic of Serbia for the period 1999-2010 amounts to 79,900 t with an average yield of 5.3 t/ha. In Central Serbia, the production is

79,000 t yield representing 5.3 t/ha whereas in Vojvodina yield is 900 t with an average of 2.2 t/ha. Values of fruit production in our country are shown in the Fig. 1.

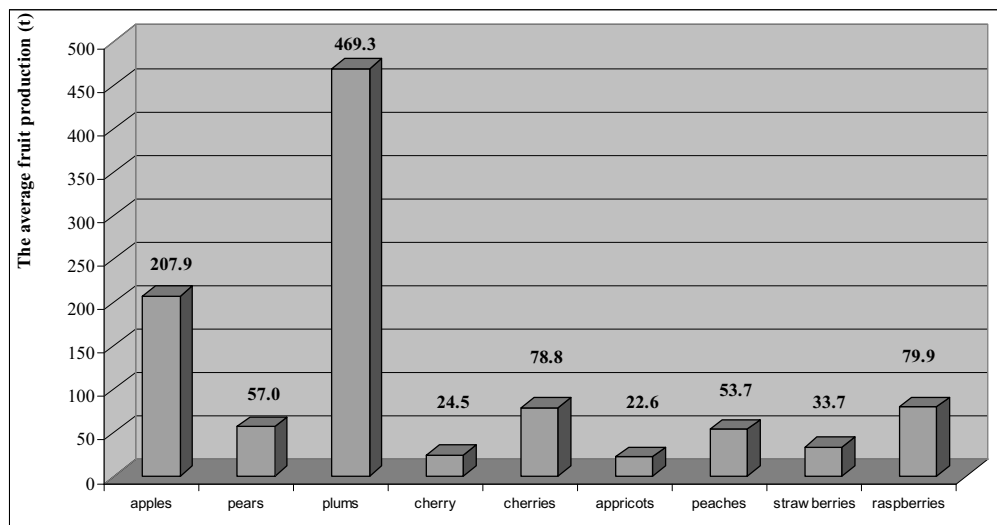


Fig. 1. The average fruit production in Serbia for the period 1999-2010

Grapevine has a wide world distribution as in the countries of Europe, and in our country and this is primarily due to the modest requirements in terms of natural conditions of production. For successful cultivation of grapes land with physical, chemical and other properties lower than average, and land with a greater slope and more complex terrain can be used. As the vines can thrive on poor soil quality, where with the same success rate arable crops cannot be cultivated, many vineyards change infertile land in productive. In this way we achieve significant intensification of agricultural production in general. Also, it is characteristic for the grape as a perennial plant that it does not make specific demands on the climate, it makes good use of solar energy, enough to rapidly proliferate and sporulates regularly. If the natural conditions are favourable, grapes can exist for a long time and give satisfactory yields and quality [3].

Areas under vineyards in the Republic of Serbia amounted to an average of 64,323 ha. These areas were in the previous ten years

ranged from 57,103 ha (2010) up to 71,749 ha (1999). In recent years, a slight decline was acknowledged. Significantly larger areas of vineyards are in Central Serbia in relation to the AP Vojvodina. However, the areas under this crop and yield were not correlated. The highest production was achieved in 2003 showing 450,000 t with yield of 1.2 kg per vine, and the lowest in 1999 with 183,000 t with yield of 0.4 kg per vine in the Republic of Serbia (total). A similar situation applies to the territory of Central Serbia and Vojvodina (Table 2).

The EU has specific measures for the products of regional importance, which is facing pressure from the international market, namely: export subsidies, funds for promotions and other financial assistance.

Table 2. Grape productions in the Republic of Serbia for the period 1999-2010

Years	Vineyard (ha)	Vines (mil.)	Productivity (000 t)	Yield per vine kg
Republic of Serbia				
Average	64,322.8	362.2	354.0	1.0
Central Serbia				
Average	53,450.8	311.0	282.9	1.0
AP Vojvodina				
Average	10,872.0	51.3	71.1	1.5

Source: Republican Bureau of Statistics, www.stat.gov.rs

According to data from the Statistical Office RS main foreign trade partner in imports of fruits was Greece, from where fruit was imported representing the value of 13,141 (2005) to 27,662 (2009) USD \$. Italy follows with a value of fruit exports to our country from 4,121 in 2005 up to \$ 8947 thousand USD in 2008. Spain is the third country by the value of fruit exports to Serbia, the lowest value is achieved in 2005 with 13,141, and the highest in 2008 with thousands of USD \$ 6.721. In the observed period there were no imports of fruit from Luxembourg, which is understandable, and from Ireland only in 2007, and from Slovakia during years 2007 and 2008 import was achieved. From the Czech Republic import was made in 2008. From Sweden in 2005 and 2008, and from England in 2008 and 2009. (<http://agroekonomija.wordpress.com/2011/03/08/uvoz-svezeg-i-suvog-voca-iz-zemalja-evropske-unije-u-republiku-srbiju/>). In 2010, fruits imported represent 206,476 t as fresh and dry in the amount of \$ 133,823,000 USD. The largest amount was imported from Greece, Turkey, Ecuador, the Republic of Macedonia and Croatia. In the structure of agricultural products export raspberry is the most important and most profitable product. The movement of imports and exports in the country for the past few years, (the period 2005-2009) is shown in Table 3. Raspberry is exported at a price approximately of 1.4 to 1.5 € / kg, mostly frozen [2].

The value of imports in the Republic of Serbia for this period is € 82,490 on average, or 62,312 kg, while the export value is € 6,748,037, and 5,851,792 kg naturally expressed, made with a positive trade balance in the amount of 6,665,547.00 € or 5,851,792 kg. In Central Serbia in the observed period, exports of 5,715,629 kg or € 6,590,912 were dominant over the import of 62,296 kg or € 82,168, where it achieved a positive balance of 5,653,332 kg, respectively € 5,653,332. The area of Vojvodina is characterized by substantially lower production of raspberries in relation to Central Serbia but also in this area a positive balance of 198,459 kg, with respect to the export of 198,475 kg (€ 157,125.00) was significantly higher than imports, which amounted to 16 kg or € 322.00 is noticed (Table 3).

Fresh raspberries in the various forms are mainly exported to the European Union because the EU countries, deficient in raspberry, have a relatively high standard of living, and place raspberries as food safe fruit. Therefore, it is promising that exports with the appropriate marketing measures, could significantly increase [5].

Major problems of fruit production

Extremely favorable climatic and soil conditions are rational for fruit production in Serbia. The quality of most of the land is excellent but the zoning and land fragmentation properties represent an obstacle to the production unification. Water resources are also, of good quality but, unfortunately, are not used sufficiently. In the process of irrigation problem is the risk of used water contamination.

Genetic resources of Serbian orchards have been significant. Opportunities for biodiversity conservation exist, but production programs should not rely on the old varieties that have potential for development of quality fruit. The world market should be reached with organic production.

Table 3. Import and export of raspberries to the Republic of Serbia in the period 2005-2009

Years	Import			Export		
	Amount, kg	Value/ dinars	Value/euros	Amount, kg	Value / dinars	Value/euros
Republic of Serbia (total)						
2005	94,081	4,389,119	56,059	7,611,881	312,554,872	3,774,897
2006	22,004	974,889	11,965	5,632,170	377,796,296	4,478,316
2007	10,678	1,399,326	17,381	6,793,866	668,019,847	8,255,177
2008	79,791	12,945,172	165,647	4,997,713	915,225,757	11,557,824
2009	1,05,006	15,016,045	161,399	4,534,890	530,953,607	5,673,973
Average	62,312	6,944,910	82,490	5,914,104	560,910,076	6,748,037
<i>Balance</i>				+5,851,792	+553,965,166	+6,665,547
Central Serbia						
2005	94,081	4,389,119	56,059	7,100,452	291,418,872	3,521,066
2006	22,004	974,889	11,965	5,389,004	360,673,505	4,275,062
2007	10,662	1,368,424	16,990	6,556,086	641,425,243	7,926,633
2008	79,741	12,862,896	164,662	4,997,713	915,225,757	11,557,824
2009	104,994	14,993,788	161,164	4,534,890	530,953,607	5,673,973
Average	62,296	6,917,823	82,168	5,715,629	547,939,397	6,590,912
<i>Balance</i>				+ 5,653,333	+541,021,574	+ 5,653,332
AP Vojvodina						
2005	0	0	0	511,429	21,136,000	253,831
2006	0	0	0	243,166	17,122,791	203,254
2007	16	30,902	391	237,780	26,594,604	328,544
2008	50	82,276	985	0	0	0
2009	12	22,257	235	0	0	0
Average	16	27,087	322	198,475	12.970.679	157.125
<i>Balance</i>				+198,459	+12,943,592	+ 198,459

Source: Republican Bureau of Statistics, www.stat.gov.rs

Holdings engaged in fruit production in Serbia have a long tradition in fruit, but only to the extent that they provide free survival wishes for the introduction of new technologies. Holdings are fragmented, although there are opportunities to complete their merging in order to increase production. Necessary specialization of farms and the formation of associations and organizations, whose main task will be to assist manufacturers, represent an imperative. We should maximize the experience of other countries. There is also a drain of manpower and increase of the number of elderly households and it is necessary to create conditions for the return of youth to the countryside. Unskilled and uneducated labour performing seasonal work is enough, but it is still imported from Bulgaria and Romania,

because domestic people have no interest in carrying out this work.

Generally, there is no vertical or horizontal linkages with producers and manufacturers have no real information. It is therefore necessary to perform association and organization of processing and marketing in all parameters with a proper division of labour and risk. A strategy that will have the task of connecting with the goal of a quality final product should be prepared.

High quality manufacturers association would solve any potential problems for further connectivity using the help of institutions and their advisors. It is necessary to establish a new vertical and horizontal organization.

The primary production covers only 14% of the population, due to inadequate product prices and subsidies that cannot specialize in

fruit growing. Primary production should stabilize while maintaining quality. It is necessary to clearly define what it is that we sell? What should be the quality of the product and what are the standards to be met in order to be successful. It is necessary to introduce the EU standards in all aspects of production, because there are real opportunities to increase exports of fresh fruit. Export prospects have a variety of wild fruits, which are a good opportunity for small producers.

Storage and production capacity is sufficient, but mostly useless. Refrigerators are positioned differently and there are large losses in transportation and most are privately owned. A small number of refrigerators have a „HACCP quality system“. The problem is the unresolved status of common cold stores most of whom are not active. It is necessary to list all the cold stores and make the existing registry. It is necessary to accelerate the privatization process and to encourage construction of new modern cold stores to be able to follow all the requirements of new markets, using modern technological principles. The biggest problem for the survival of the cold stores is not meeting production standards.

Our problem is a very weak organization and marketing of local companies. The state should assist marketing, organizing symposiums and other activities, as there are companies that have great potential for marketing local products abroad. It is necessary to create a brand and the ability to define products. Certainly is the possibility of penetrating the market as well as in Eastern countries and in the region. It is necessary to intensify the performances of export-oriented companies to organize fairs and better logistics. Compliance with EU directives is necessary, as applying other countries experience. It is necessary to stimulate the production of cherries and berries and enhance activities in the domestic and foreign markets.

A very serious problem is too extensive representation of foreign manufacturers in domestic market, but tastes of the manufacturer change (for example, medicinal

brandy and liqueurs, such as. Vermouth is more and more popular, at the expense of brandy), but our production is slow to react.

CONCLUSIONS

Looking at the production of fruit and grapes in the Republic of Serbia for the period 1999-2010, it was observed that our country is especially noted for the production of plums and apples. By far, the greater production of both fruits and grapes is concentrated in Central Serbia in relation to Vojvodina, which is understandable considering that Vojvodina is mainly producing industrial plants.

In the fruit production of Serbia, very important type of berries (in addition to strawberries) is raspberry, which is especially underlined in this paper in terms of exports. In our country, raspberry is the most profitable export item because there is a significant and stable export demand for it. Of the total production of raspberries more than 99% is targeted toward market. Approximately 95% of total production is exported, mainly in the frozen state, bringing foreign exchange earnings of 100 to \$ 200 million [1].

In general, regardless of the favourable natural conditions, fruit production in Serbia is in pretty bad shape. Fragmentation of land under fruit plantations unable use of more productive machinery and perform the necessary agro-technical measures. The high share of obsolete (outdated) variety and diversity of cultivars represents a significant difficulty in terms of standard quality fruit supply. And many other unresolved issues (production of quality planting materials, the necessary funding for the establishment and regular production of fruit, etc..) represents also a serious obstacle to halt years of stagnation in fruit production.

The development of fruit growing in our country is not at a high level (irregular and low yields and poor fruit quality), despite the favourable conditions that our country has for its.

Market-oriented, fruit could be highly profitable in terms of growing technology harmonized with market demand and therefore the future development of the fruit

should be directed towards increasing production to achieve high yields of quality fruits and specialization and modernization of processing facilities.

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