

STRAWBERRY PRODUCTION IN CROATIA WITH FOCUS ON VRGORAC AREA

Marin CAGALJ*, Frane STRIKIC, Tatjana KLEPO, Mira RADUNIC

Institute for Adriatic Crops and Karst Reclamation, Split, Croatia

*(Corresponding author: marin.cagalj@krs.hr)

Abstract

Last decade, we are witnessing increased production of strawberries in the world. In Croatia production is also constantly growing. The main Croatian areas of growing strawberries are the area of Vrgorac, Neretva river delta, surrounding of city of Zagreb, Podravina and county of Vukovar. In Vrgorac, growing strawberries for most of the producers is the semi-professional family business which presents additional family income. In Croatia are planted around 4 million seedlings on area of around 500 ha, of which 95% relates to frigo seedlings and only 5% of green seedlings. Total country production is around 3000t of strawberries yearly. Strawberries are produced on open fields and undercover in higher and smaller greenhouses. Concerning the low input costs and higher market prices it became an interesting fruit for farmers and chance to achieve higher incomes. Largest producers worldwide of strawberries are the United States of America and China. In the Europe, the largest producer is Spain. Biggest share of imported strawberries in Croatia are from Spain. Last five years strawberry production in Croatia has reached a level of self-sufficiency and achieved export potential. The main export of Croatian strawberries went the countries of European Union (EU) and Bosnia and Herzegovina. Agriculture plays an important role in country's total GDP and employment. European Union is the main trading partner, concerning that more than 60% of import and export are form the EU countries. Constraints for strawberry producers in Croatia are the level of production, uneven production techniques and land fragmentation.

Keywords: strawberry, Croatia, rural development, Vrgoracka jagoda

Introduction

Strawberry (*Fragaria × ananassa* Duch.) is the most common berry fruit species in cultivation. Strawberry is also fruit with high source of vitamin C and other antioxidant compounds, such as ellagic acid and flavonoids (Robards et al., 1999). Annual production of strawberries in the world is about 6.5 million tons of fruit. In the last decade, strawberry production is increasing in the world. In Croatia we are also witnessing increased strawberry production and consumption, due to the high nutritional and health value and very early ripening (first fresh fruit market). In 2011, total production of strawberries in Croatia was 2.800 t, of which 2.000 t was for the market (CBS, 2012). Total harvested area under strawberries in Croatia is around 500 ha (author's calculation).

The main areas of growing strawberry in Croatia are the area of Vrgorac, Neretva river delta, surrounding of city of Zagreb, Podravina and county of Vukovar.

Area of Vrgorac (about 200 m above sea level) has favorable climatic conditions for growing strawberries. In that area, there are three major agricultural fields (Picture 1.); 1. field Rastok (1.675 ha), 2. field Jezero (2.914 ha) and 3. Koteze-Kokorici field (150 ha). Through that three fields pass the open surface of the river Matica which is used for irrigation of strawberry.

Population of Vrgorac (6,501 inhabitants) is situated in the twenty-four settlements and is mainly engaged in farming. Fruit growing is one of the most important branches of agriculture in area of Vrgorac. In Vrgorac, growing strawberries for most of the producers is the semi-professional family business which presents additional family income.

In Croatia are planted around 4 million seedlings on area of around 500 ha, of which 95% relates to frigo seedlings and only 5% of green seedlings. Strawberries are produced on open fields and undercover in higher and smaller greenhouses. Concerning the low input costs and higher market prices it became an interesting fruit for farmers and chance to achieve higher incomes. Largest producers worldwide of strawberries are the United States of America and China. In the Europe, the largest producer is Spain. Biggest share of imported strawberries in Croatia are from Spain. Last five years strawberry production in Croatia has reached a level of self-sufficiency and achieved export potential. The main export of Croatian strawberries went the countries of European Union and Bosnia and Herzegovina.

Materials and methods

The data on the major technological and economic characteristics of production (yield, volume of production, expenses, production techniques, income and sales) of strawberries in Vrgorac were obtained by surveying 78 strawberry producers who are members of the Association of Vrgorac strawberry, for two growing seasons; 2012 and 2013. The association has 160 registered members (family farms) who are not registered for Value Added Tax (VAT).

In this study authors applied interviewing survey methods and costing (Karic, 2002). Surveys were used to collect data on production and economic characteristics of production. Applied is a form of written survey where the respondents (producers) responded to previously prepared questions about the productive resources of the farm, the quantity and value of production of strawberries and applied agro-technical operations in the production area.

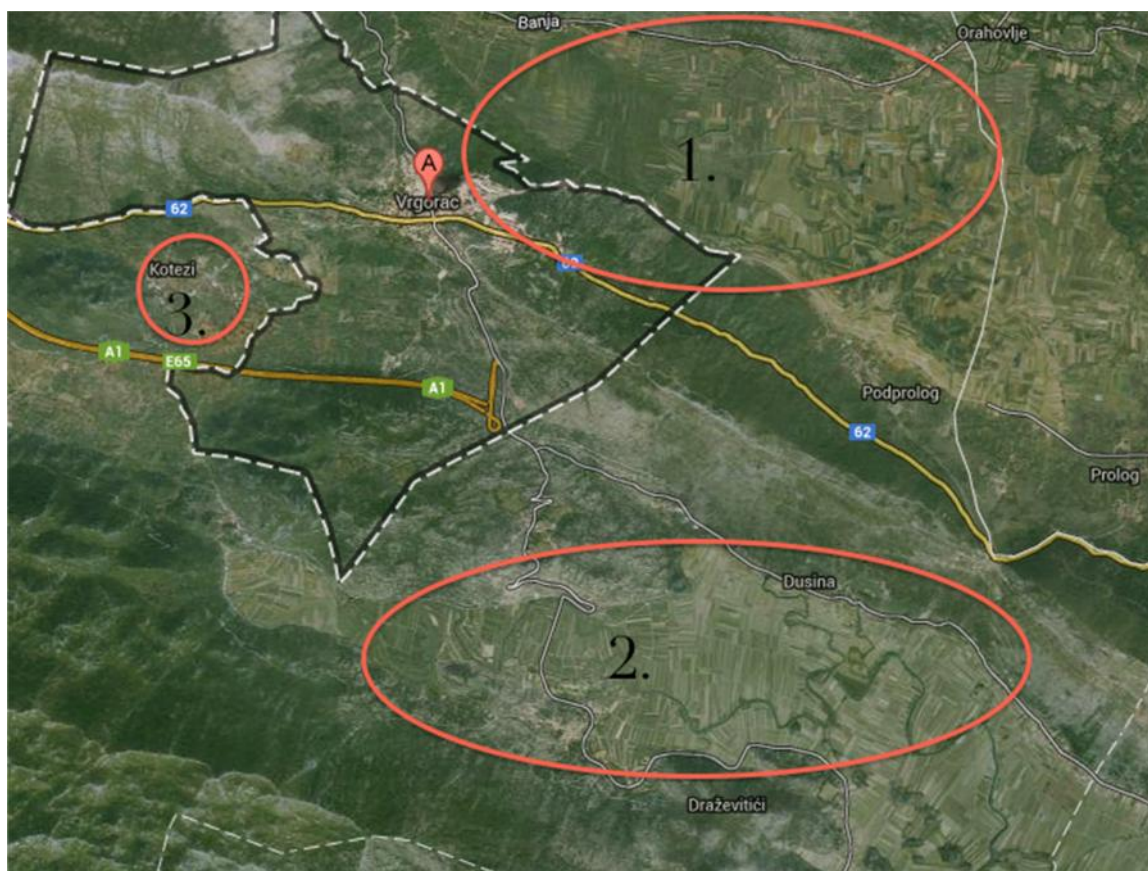
This study was done within the project “Vrgorac strawberry-local product for the global market” which is financed by the Croatian Ministry of Agriculture.

Results and discussion

Most of the surveyed producers (98%) have the land used for the strawberry production in their own possession, while the other (2%) are leasing the land. The total area on which analyzed farms cultivated strawberries is 24.5 ha. The average size of the family farm, which is engaged in the production of strawberries in area of Vrgorac is 3.600 m².

In Croatia, more than 50% of small family farm where production area less than 1 ha (CBS, 2003). All of the surveyed producers are not only the strawberry producers; they are also growing other fruit species, mainly vine grapes, apples, and peaches.

Picture 1. Area of Vrgorac and fields of growing strawberry



Source: Google maps

In the area of Vrgorac technology of growing strawberries is not fully standardized (growing outdoor cultivation in greenhouses and growing in small tunnels), which significantly affects the production during ripening and fruit quality. Specifics of Vrgorac areas affecting the very early maturing and fruits appear in markets in mid-April, as the first fresh fruit and achieves a higher price. Strawberry fields in Vrgorac are highly valued and sought after due to which traders and wholesalers often marketed strawberries from other breeding areas or even from abroad called "Vrgora ka strawberry."

Producers are planting strawberries from the beginning of August till the mid of September. Due to the microlocation and climate specificities of Vrgorac area, harvesting starts at the mid April. Start and end dates of planting varies between locations (three major fields) and cultivars of strawberry that are planted.

Strawberry cultivars that are grown in Vrgorac area are: Clery, Asia, Alba, Delly, Elsanta and Madeline.

Most of the surveyed producers (95%) had high school education, 3% had University degree and 2% finished elementary school.

In both analyzed growing seasons, the soil is cultivated before planting when it is done basic fertilization or manure. Weeds in strawberry are suppressed mechanically by hilling or chemically with herbicides.

Producers starts irrigate strawberry in Vrgorac area when vegetation starts (depends of climate conditions in growing season), usually on the beginning of March.

Most of producers (76%) are selling their strawberry to the redemption center in Vrgorac, 20% of producers are selling to the local markets, while other 4% are selling them directly on

their own land. Average age of respondents in the survey was 46 years, of which 83% of men and 17% of woman.

Table 1. Strawberry production in Croatia

Year	Area harvested (ha)	Production Quantity (t)	Yield (t/ha)
2011	228	2.771	12.1
2010	269	2.572	9.5
2009	257	2.548	9.9
2008	256	2.358	9.3
2007	305	3.118	10.2
2006	350	3.669	10.4
2005	500	3.221	6.4
2004	1000	4.400	4.4

Source: authors calculation and FAOSTAT

Conclusion

In this study authors conducted field survey to collect all relevant data on strawberry production in area of Vrgorac. Obtained results differ from the official data on strawberry production in Croatia, and have to be updated. Large variation between yields is the result of different growing techniques and cultivars of strawberry. Producers are not mainly agronomists and don't have efficient knowledge in growing strawberries. Other constraint for strawberry producers in Croatia is also land fragmentation. Our results provide baseline for further research on the market and data collection for strawberry production in Croatia.

References

- CBS-Croatian Bureau of Statistic-Agriculture census 2003.
 CBS-Croatian Bureau of Statistic- www.dzs.hr- accessed 11.07.2013.
 FAOSTAT- faostat.fao.org – accessed 09.07.2013.
 Google Maps- www.maps.google.com- accessed 09.07.2013.
 Karic, M. (2002). Calculation in agriculture. Faculty of agriculture, Osijek, Croatia.
 Robards, K., Prenzler, P.D., tucker, G., Swatsitang, P., Glover, W. (1999). Phenolic compounds and their role in oxidative processes in fruits. Food Chemistry, 66; p.p. 401-436.