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Organic viticulture in world, Serbia and region

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Abstract - Organic production is a process that develops a viable and legitimate agricultural ecosystems. The link between man, agriculture and local environmental conditions, provides quality food for people, plants and animals in a healthy environment. There are a few basic principles and ideas that explain the production of organic food in the ecosystem. The organic viticulture production in which there is a balance between environmental conditions, varieties and methods of cultivation. The two main factors that determine the choice of location concepts and establishing assortments. Organic viticulture is widespread mainly in the Mediterranean countries of Europe such as Italy, France and Spain. The Mediterranean climate with hot, dry summers and constant air currents limiting the development of pests and diseases on grapevines. The same concept can be seen in California, USA and South Africa. In the wine-growing countries with humid climates apply to another concept of organic viticulture, and that is the use of varieties resistant to pests and diseases. In Romania, Germany, Hungary, Switzerland and northern France are represented interspecific hybrids and new resistant varieties. In the north-east of America, on the border with Canada, grown varieties Vitis labrusca and Vitis species in the south rotundifolia. However, in these humid regions is crucial in the selection of sites with appropriate climatic and soil conditions. The choice of suitable climatic conditions is important for conventional viticulture in order to get the best quality of grapes and wine.

Key words: organic farming, viticulture.

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Introduction

High yields of conventional production ensure the survival of civilization, or in industrial countries, there is overproduction. This surplus food is a problem for profit drivers of capitalism. One way to reduce this overproduction in the European Union is to encourage farmers to change their conventional to organic production. The other side of the application of chemicals, their harmful impact on human health. The World Health Organization has registered an increased number of diseases in the European Union and the United States. On average, people are living longer, but with the help of medicine in which to invest huge funds. Industrial developed countries believe that the introduction of organic products in human nutrition improve the health and finance intended for medicine will be forwarded for industrial development.

Today's scientific knowledge in agriculture allows us to find and correct mistakes. Access to the new agriculture, organic called, consists in the production of food in an environment where there is a perfect balance, a balance between climate, land, flora, fauna and humans. The creation of this complex system is limited by environmental conditions, the genetic potential of varieties, and at the same time obtaining high quality products. In relation to these factors, there are two concepts.

The first concept is to find the location with the best conditions for a particular culture. These sites are oases in agricultural land, with high fertility and limited terms for the development of diseases, pests and weeds. According to the size of these locations, it is clear that organic production can dazameni conventional production, but the tendency is to find the locations and maximum use. As a result of this concept, there is globalization of agricultural production. In northern regions, the production of cereals, fruits in Mediterranean regions and in tropical conditions is the production of spices and tropical fruits.The second concept is the selection activities varieties with increased resistance to external influences. The limiting factor in the expansion of the quality of products that are still lagging behind in terms of varieties represented in conventional production. Organic farming is the pinnacle of scientific knowledge in agriculture, the creation of an ecosystem by a man who understands how to work each part of the system. Healthy food influences the development of future generations of avoiding negative effects on human health due to the use of antibiotics, heavy metals and pesticides.

Definition and basic objectives of organic production and organic viticulture

Organic production is a process that develops a sustainable and reasonable agro-ecosystems. The link between man, agriculture and local environmental conditions, provides quality food for people, plants and animals in a healthy

environment. There are a few basic principles and ideas that explain the production of organic food in the ecosystem:

1. Manufacture of food products of high quality and sufficient quantity.
2. Encouraging and improvement of biological systems in the agricultural system, which includes micro-organisms, flora and fauna of the land, plants and animals.
3. Maintain and increase long-term soil fertility.
4. Maintaining genetic diversity of the production system and its environment, including the protection of wild animals and plants.
5. Reduction of all forms of pollution.
6. The production of fully biodegradable organic products.
7. Allow all involved in organic production and processing with a quality of life to satisfy their basic needs and to allow them adequate satisfaction, including a safe working environment.
8. Developing the perfect chain of production, processing and distribution, which is socially correct and environmentally responsible.

International Federation of Organic Agricultural Movement - IFOAM

Organic production marked the beginning when Rudolf Steiner held a course on bio- dynamic agriculture in 1924. In other countries, important pioneers of organic agriculture as Hans Muller in Switzerland, Eve Balfour and Albert Howard in Britain and Masanobu Fukuoka, Japan. International Association of Organic Agriculture Movements IFOAM was founded in 1972 (International Federation of Organic Agriculture Movement).

This worldwide organization creates a network of associations of organic producers who work in their countries. On the basis of the established common positions on congresses and conferences, bringing the rules, guidelines and laws for the production of organic food. The IFOAM joined in more than 750 organizations iz104 country. So far održano15 Congress on Organic Farming and the 17 Congress on organic viticulture.

Markets for organic products

In industrialized countries, sales of organic products has been steadily increasing and now amounts to 1 - 2% of the total market for agricultural products. Organic food occurs in large supermarket chains, but važnaje and the emergence of small specialized shops for organic food. The favorable political climate in Europe creates unlimited possibilities for the development of this production. Therefore, it is intensively working on legislation that would remove ambiguities and refine each type of production. Developing countries should follow the legislation of developed countries and inplementiraju in its laws. The international market is extremely open to organic products from all over the

world, especially the developing countries of tropical and subtropical regions. Bananas, citrus fruits, spices, coffee and cocoa are produced in tropical agro-ecological conditions. Fruits and grapes are produced in the temperate continental, Mediterranean and subtropical areas. These products have no competition in the European market and an opportunity for agricultural development in poor countries and countries in transition.

Legislation on organic production in Serbia and the region

On the basis of the documents generated by IFOAM, were adopted laws on organic production. The purpose of these laws is to protect organic production, processing and marketing. The law requires that all activities in organic production taking place in accordance with the standards of IFOAM.

Both in Serbia and in the neighboring countries governments make annual program of encouragement and promotion of organic farming. Coordination is done through coordinating the Commission established at the Ministry of Agriculture, Forestry and Water Management. The Steering Committee consists of representatives from the Ministries of Agriculture, Health, Environment, Economy and Finance, the Bureau of Meteorology, the Institute for Standardization, Institute for accreditation of institutions, professional and research institutions, non-governmental organizations. Entities organic production are the Ministry of Agriculture, certification companies, laboratories for the analysis of food and organic food producers.

The Ministry of Agriculture is dominated by organic production through the:

1. Adoption of the rules and regulations;
2. Authorization certification company for production control;
3. Organize a competition for the certification of companies;
4. Authorizes accredited laboratories for analysis of organic food;
5. Follow the certification of companies and authorized laboratories;
6. Takes registered organic producers;
7. Publishes an annual list of companies certificated in Europe Union.

Also supervise and control the production, processing and trade in parallel through agricultural inspection and certification company. Certification company controlled organic production. You need to be accredited by IFOAM, then that registrovne and authorized by the Ministry of Agriculture and to have its representative office in Serbia, professional staff, facility and equipment. These are companies that have their own experts in all areas of organic agricultural production. From their assessment depends on the type, scope and method of production. They work on the basis of IFOAM standards, rules and regulations of the Ministry of Agriculture. Organic farmers sign a contract for production control with sertfikacionim companies. From the date of signing the contract with the certification companies are required to be registered in the register of organic producers in the Ministry of Agriculture. The nature, scope and method of

production is determined by the certification company, where records are kept of all proceedings in the technological process. Products from organic production are specially marked. Sales of these products are made in strictly defined areas, shops and markets where it must not be mixed, and the replacement of products from conventional production.

Conversion Period - change from conventional to organic production

The change from conventional to organic production takes place in a certain time. Changes are taking place under strictly specified plan, the plan can be upgraded if necessary to fully respond to the set standards for organic production. During the period converse determined standards. All standards are applied in all material respects, from the beginning of the conversion onwards. Before the product is labeled as organic, inspection has to take care during the entire conversion period. Conversion time is counted from the moment of the certification body or from the date of setting standards for a particular farm.

The organic viticulture in the world

Start the occurrence of organic production in 1950, and the initial development of organic viticulture. The rapid advance of it happens in the nineties of the last century and continues to this day. Countries with the largest areas under organic vineyards are Italy with 31,170 ha, ha sa16428 France and Spain sa14928 ha, which are also the biggest producers of grapes and wine in the world. As important manufacturers and other Mediterranean countries: Greece, with 3303 ha; Turkey, with 1,988 ha; Portugal with 912 ha, followed by Syria, Israel, Cyprus, indicating the suitability of the Mediterranean climate for organic viticulture Coulouma et al. (2006).U continental significant producers are Germany with 2500 ha, 1657 ha with Austria, Hungary, with 579 ha and Switzerland with 358 ha Chaignon et al. (2003). Countries in the region are still in the initial development of organic viticulture with very small surfaces: Macedonia 280 ha, 49 ha Slovenia, Croatia 32 ha and Serbia 6 ha.

The organic viticulture production in which there is a balance between environmental conditions, varieties and methods of cultivation. The two main factors that determine the choice of location concepts and establishing assortments. Organic viticulture is widespread mainly in the Mediterranean countries of Europe such as Italy, France and Spain Bispo et al. (2011). The Mediterranean climate with hot, dry summers and constant air currents limiting the development of pests and diseases on grapevines. The same concept can be seen in California, USA and South Africa. In the wine-growing countries with humid climates apply to another concept of organic viticulture, and that is the use of varieties resistant to pests and diseases. In Romania, Germany, Hungary, Switzerland and northern France are represented interspecific hybrids and new

resistant varieties Bongers and Ferris (1999). In the north-east of America, on the border with Canada, grown varieties Vitis labrusca and Vitis species in the south rotundifolia. However, in these humid regions is crucial in the selection of sites with appropriate climatic and soil conditions. The choice of suitable climatic conditions is important for conventional viticulture in order to get the best quality of grapes and wine. For this organic viticulture is crucial, because in addition to the quality of important yes to reduce excessive use of chemicals in fertilization and protection from diseases and pests. It is necessary to avoid the location at which the low winter and high summer temperatures, late spring and early autumn frosts Emmerling (2001). In terms of humidity is necessary to avoid humid areas, with large amounts of precipitation during the growing season Franzle (2006). Top locations correspond with long periods of drought. Permanent air currents remove moisture in the zone of grapes and leaves, prevent the development of disease and insect flight Hansen (1996). City as air disasters is one of the major factors in choosing a location. Grad cause long-term damage in the vineyard. Restricted use pesticides for effective protection reduces the success in restoring vines and obtaining quality grapes.

Determination assortment

The share of organic vineyards in most EU countries amounted to about 1%, except in Italy 5% Martinez-Casasnovas and Ramos (2009). Protection against diseases and pests is carried out mainly using sulfur and copper compounds which occur as contaminants of land Rahman,et al.(2009). Reducing the amount of pesticides as possible the introduction of varieties of other species or interspecific hybrids (interspecies varieties). In new areas under organic vineyards, it is estimated that the share of interspecific hybrids to be 20 to 50%.

The assortment is divided into four groups:

1. The cultural vine Vitis vinifera;
2. interspecific hybrids;
3. The varieties with increased resistance;
4. American variety.
5. Varieties of European cultural loze- Vitis vinifera

Europe's cultural variety vines belonging to the species *Vitis vinifera* are susceptible to three diseases: downy mildew, powdery mildew and gray mold of grapes. Growing varieties of *Vitis vinifera*, is possible by applying agricultural practice that provides a stable soil structure, high degree of root development, a balanced diet, the optimal ratio of insects and predators as the locations with favorable climatic and soil conditions. In this way, the risk of pests and diseases was reduced, but still requires the use of chemicals, particularly sulfur, and copper, which are polluting the environment.

Options to expand the assortment of varieties belonging to other species of the genus *Vitis*
The varieties of interspecies hybrids

In mid-nineteenth century from America to Europe have been transferred to diseases and pests that have caused serious damage in the vineyards. Fight against downy mildew and powdery mildew has been successfully carried out with the use of copper and sulfur soup. Phylloxera was a longtime problem, which completely destroyed European vineyards at the end of XIX century. The solution to this problem breeders were looking for in hibridaziciji varieties of European grapes with American wild species that possess genes for resistance. This hybridization between different species of the same genus in the case of Vitis, called interspecies hybridization Potthoff et al. (2006). The first intersection is derived pre100 years in France, and later in Italy and Germany. The fight against phylloxera, one of the most prolific breeder was Albert Sajbel (1844-1936) who created 1500 new varieties with which it is raised on 140000 hectares in France. By the end of the twentieth century was created around 5800 new varieties of interspecific hybridization. The main objective is to create hybridization varieties that will be a combination of the quality of grapes and wines from Vitis vinifera and disease resistance of wild American species Basak and Biswas (2009). Despite the high resistance to disease, first obtained hybrids had a poor quality wine, which is a serious problem for their expansion Morlat and Chaussod (2008). Meanwhile phylloxera problem was solved by grafting European vines onto rootstocks obtained by hybridization between species Berlandieri, Riparia i rupestris Neher (2001). For further slowing the creation of new varieties influenced the development of more effective fungicide and low quality wines. Breider (1964-73) in your research points to the possible negative impact of grapes and wine interspecific hybrids on human health. The latest medical research has not confirmed this thesis, but these discussions have destroyed the reputation of hybrids.

Characteristics of interspecific hybrids

The European law on wine, interspecific hybrids are not defined, or indirectly, are excluded from the production of quality wines, because wine can be produced only from varieties of *Vitis vinifera*. When first obtained hybrids observed a high resistance to disease, but the quality of the grapes is lagging behind compared to the varieties of *Vitis vinifera*. In interspecific hybrids showed the presence of 2,5 dimethyl - 4 hydroxy - 3 (2H) - furanone with the smell of burned and methyl - anthranilate, with unpleasant smell fox. The content of anthocyanins in interspecies hybrids significantly učešče3 - 5 - diglucoside and more characteristic malvidin 3-5 diclucoside, Arcand and Schneider (2006). The most recent studies have not confirmed the harmful effects of these components

on human health. The berry skin is a greater amount of pectin that can vinification decomposes to methanol in an amount greater than the amount at the varieties *Vitis vinifera* or insignificant that causes harm to human health Beni and Rossi (2009). The presence of these compounds can be avoided with proper vinification and obtaining wines with technology for white and rose wines where it separates from the seed shell and beyond.

Perspective interspecies varieties

In the context of interspecies hybrids were selected varieties which are at the beginning of XXI century, widespread in Europe, Canada and northern America: Vidal Blanc seyval, Villard noir and Baco noir Reinecke et al. (2008). These varieties are important for northern climates, due to its high resistance to low winter temperatures. In Hungary it is grown Bianca, Medina and the Pearl of Zala (Zalagyongye). In addition to high-quality grapes and wines, disease resistance, is important and their adaptability in extreme continental conditions, with warm and suvimletima and cold winters Le Bissonnais et.al.(2007).

The cultivars with increased resistance

Further selection in the interspecific hybridization, has enabled the return crossings with *Vitis vinifera* varieties, to transfer the genes for resistance to generation in stages where dominated genes from *Vitis vinifera*. New hybrids derived from backcrossing contain genes which genes dominated *Vitis vinifera*. This is reflected in the ampelographic characteristics, according to which this variety is fully can be classified into Vitis vinifera. As a result of this crossing, there is a new term "variety with increased resistance" Van Leeuwen and Seguin (2006). Promising varieties are Regent, Bronner, Rondo, Merzling, Johanniter and Prinzipal. Wines from these varieties, the most recent blind tasting, received high sensory evaluation, even surpassed the standard of wine favored varieties of *Vitis vinifera*.

American cultivars of *Vitis labrusca*

American varieties belong to the American species of the genus Vitis. American types have been developed in the specific conditions that are different from the conditions in which they developed varieties of *Vitis vinifera*. On the American continent, the survivors are only those species that are resistant to diseases and pests present in the area. So far, the isolated 70 species, divided into two subgenus *Muscadinia* and *Euvitis*. For the production of the more important species *Vitis rotundifolia* (Muscadinia) and *Vitis labrusca* (*Euvitis*) Van Leeuwen et al. (2004). Synonyms: Concord, American bunch, or Fox grape. Members of this species are widespread in the eastern and northeastern border between

Canada and the United States and across the Atlantic Ocean Komarek (2010). They are resistant to fungal diseases, low winter temperatures, poor resistance to phylloxera and carbonates in the soil. Morphological, according to the list and the grapes are very similar to *Vitis vinifera* but different in terms of the continuous occurrence of tendrils along the shoots. Meat berries at labrusca is slimy, with a characteristic odor Labrusk (Foxy = fox). Due to the high resistance to fungal diseases, type labrusca used for obtaining interspecific hybrids of which were obtained substrate directly hometown hybrids Ingels et al. (2005). In direct gender hybrids is transmitted and smell fox, peptic substances and disaccharides properties that are controversial for European legislation on wine, as apparently harmful to human health Steenwerth and Belina(2008). These qualities in labrusca varieties are strongly expressed, or medical tests in the United States indicate usefulness of the juice from labrusca for human health. Variety Concord is the most common variety, about 80% of total production, and therefore appears as a synonym for all types of labrusca varieties. Other important varieties are: Niagara, Izabella, Delaware and Catawba.

The cultivars the species *Vitis rotundifolia*

These cultivars belonging to the subgenus Muscadinia. They are distributed in the southeastern parts of America, ranging from Florida to Virginia to the north, and Texas and Oklahoma in the west Peres et al. (1998). They are tolerant to pests and diseases for which correspond to organic viticulture. They are sensitive to low winter temperatures and drought. Studies have shown a high content of antioxidants. Currently in America, the most widespread varieties: Cowart, Hunt, Noble, Jumbo Nesbitt, Southland, Carlos, Higgins, Fry, Dixieland and Summit Probst et al. (2008). University of Florida, based on previous research and experience, as well as promising varieties recommended: Black Beauty, Black Fry, Fry, Granny Val, Farrer, Pam, Pineaple, Polyanna, Southern Home, Supreme, Sweet Jenny and Tara as a table cultivars and Alachua, Carlos, Noble and welder for wine and juices.

Conclusion

The share of organic vineyards in most EU countries amounted to about 1%, except in Italy 5%. Protection against diseases and pests is carried out mainly using sulfur and copper compounds which occur as contaminants of land. Reducing the amount of pesticides as possible the introduction of varieties of other species or interspecific hybrids (interspecies varieties). In new areas under organic vineyards, it is estimated that the share of interspecies hybrids to be 20 to 50%.For this organic viticulture is crucial, because in addition to the quality of important yes to reduce excessive use of chemicals in fertilization and protection from diseases and pests. It is necessary to avoid the location at which the low

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ORGANSKO VINOGRADARSTVO U SVETU, SRBIJI I REGIONU

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Rezime

Organska proizvodnja je proces koji razvija održive i opravdane agroekosisteme. Povezanost čoveka, poljoprivrede i lokalnih ekoloških uslova, pruža kvalitetnu hranu za ljude, biljke i životinje u zdravoj životnoj sredini. Postoji nekoliko osnovnih principa i ideja koji objašnjavaju proizvodnju organske hrane u ekosistemu. Organsko vinogradarstvo je proizvodnja u kojoj postoji ravnoteža između ekoloških uslova, sorte i načina kultivacije. Dva osnovna faktora koji određuju koncepte su odabir lokacije i utvrđivanje sortimenata. Organsko vinogradarstvo je široko rasprostranjeno uglavnom u mediteranskim zemljama Evrope kao što su Italija, Francuska i Španija. Mediteranska klima sa toplim i suvim letima i stalnim vazdušnim strujama ograničava razvoj bolesti i štetočina na vinovoj lozi. Isti koncept se ogleda u Kaliforniji, SAD-u i Južnoj Africi. U vinogradarskim zemljama sa humidnom klimom primenjuje se drugi koncept organskog vinogradarstva, a to je primena otpornih sorata na bolesti i štetočine. U Rumuniji, Nemačkoj, Mađarskoj, Švajcarskoj i Severnoj Francuskoj zastupljeni su interspecies hibridi i nove otporne sorte. Na severo-istoku Amerike, na granici sa Kanadom, gaje se sorte vrste *Vitis labrusca*, a na jugu vrste *Vitis Rotundifolia*. Međutim, u ovim humidnim oblastima presudan je izbor lokacije sa odgovarajućim klimatskim i zemljišnim uslovima. Izbor pogodnih klimatskih uslova je važan i za konvencionalno vinogradarstvo kako bi se dobili najbolji kvalitet grožđa i vina.

Ključne reči: organska poljoprivreda, organsko vinogradarstvo.