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ACHIEVEMENTS AND PROSPECTS IN THE DEVELOPMENT OF BERRY CULTURES IN REPUBLIC OF MOLDOVA

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Abstract

This paper presents a detailed analysis of the berry crop growth in the Republic of Moldova in the period 2010-2013, the benefits of berry production, cultivated areas, fruit production, cultivated assortment, achievements and perspectives.

Key words: *berry crops, fruit production, achievements and prospects, Republic of Moldova.*

INTRODUCTION

Berry culture unlike other fruit cultures is distinguished by an early bearing; it achieves high and stable yields. Berry fruits are valued due to their phytotherapeutic and curative qualities, they have a wide use while fresh, processed and frozen (Chira L., 2000).
Secular traditions and favorable natural conditions allow cultivation of strawberries and fruit shrubs, the production of berries and products derived from them with special qualities, obtaining higher yields, although investment is considerable, revenues are substantial and are of major economic importance in the development of agriculture in the Republic of Moldova (Sava, 2000; 2003).
Maintenance of small fruit plantations and is simple and most of the work can be mechanized (planting, soil care, harvesting, fight against weeds, pests and diseases), these species are highly valued as a melliferous crop.
Basic characteristic features of a new type of berry plantations are: implementing the required performance varieties on the market, the use of high biological quality planting material, increased plant density to the unit area, early bearing, increased productivity and high quality fruit competitiveness on the internal and external market (Mladin, 2011).
Although in recent years, scientists have created highly productive varieties with big and qualitative fruits, we must not forget that they are created for a specific climate and soil, and no one can guarantee that they will manifest the same qualities to the conditions of our country. For this reason it is necessary to conduct research on small areas in order to establish their degree of adaptability to new conditions for cultivation.

MATERIALS AND METHODS

A study on the current state of berry cultures development in Moldova was conducted during the years 2010-2013 and it was based on scientific, practical and specialized literature data within the IP IŞPHTA - strawberry trees and shrubs laboratory, in collaboration with the Ministry of Agriculture and Food Industry, the direction of Services Horticultural Products, the Association of Berry Producers « Bacifera ». and relying on statistical data of the National Bureau of Statistics of the Republic of Moldova.

RESULTS AND DISCUSSIONS

Establishment of new strawberry and berry plantations, implementation of technologies and new varieties, installation of water tanks and irrigation systems, maintenance purchases, construction of refrigerators, storage rooms and packaging involves large investments which can be obtained through advantageous loans and require a concrete plan and reliable recovery of these costs.

Many public associations get involved to support agricultural producers, for example: "FNAM, AGRO, FNFM, UniAgroProtect (UAPA), ACSA, the Association of Producers and Exporters of fruits - Moldova Fruct, Grape Producers and Exporters Association of Moldova, the Association of Berry Producers « Bacifera »", etc.

The National Rural Development Agency is organizing trainings, theoretical and practical seminars for berry producers involving laboratory and strawberry fruit tree specialists and awards grants in projects including the establishment of berry plantations.

In February 2010, the Association of Berry Producers « Bacifera » (AO APP Bacifera) is created in order to promote the interests of producers of berries, to provide consultative support in economical activities, to represent its members in the network of public organizations, State bodies, public administration organizations, in order to promote the policy of berries production, to participate in the creation and promotion of laws, to create economic development programs, to solve problems related to the production, including the purchase of planting material, marketing, organize and attend seminars, exhibitions, fairs etc., « Bacifera » is successfully operating today.

In this chain that supports the berry producers the most important link is the Public Institution "Practical Scientific Institute of Horticulture and Food Technology" (IP ISPHTA) with its specialists, who create, update and implement cultivation technologies for berry cultures, introduce, study and recommend productive and qualitative varieties, support the producers in this field, provides advise both in the premises of the institute, as well as on the field, organizes theoretical and practical seminars, publishes articles, prepare technological recommendations to studied cultures, specialized literature, and, publishes them within financial possibilities etc.

Certainly an important role is played by the State Agrarian University of Moldova that trains specialists for agriculture and research institutions in the field.

To facilitate the initiation of strawberry and berry plantations State aid comes to the reimbursement of a part of the costs invested by the berry producers. Ministry of Agriculture through the AIPA (Payments and Intervention Agency for Agriculture) provides grants to berry producers since 2010. Subsidizing of berry producers is very welcomed, namely attributable to these measures taken by the State to actively reinvigorate and develop this sector, although the mechanism of grants still needs some improvement and simplification.

Only by working intensively together we can create better conditions for agricultural development, especially for the cultivation of strawberry segment and fruit shrubs, which are high-value crops, with high productivity and profitability and which are able to favor the increase of capital in our country.

The interest of producers is manifested through the establishment of new plantations, and the statistical data are presented in Table 1.

Table 1. The current state of berry cultures in Moldova

Specification	Unit of measure	Years					
		2010	2011	2012	2012 in % as against 2011	2013	2013 in % as against 2012
Total area, of which:	thousand ha	0.96	0.93	0.76	82	0.78	103
Fruit plantations growth	thousand ha	0.87	0.84	0.67	80	0.68	101
Global harvest	thousand tons	1.80	1.48	0.96	65	1.09	114
Average yield	tons/ha	20.20	17.20	14.00	81	1.57	112
Export and Re-export	tons	8.47	5.81	7.73	133	5.42	70
Export/re-export Value	mil USD	14.18	10.02	11.48	115	7.50	65
Import	tons	10.56	8.17	10.11	124	8.29	82
Import value	mil USD	14.98	12.07	11.89	99	9.77	82
The planting	ha	5.00	48.00	101.0	210	152.60	242
Deforestation	ha	3.00	0	600.0	0	50.00	556

According to statistics presented in Table 1 it is noticeable that since 2010 the surface of newly created berry culture plantings increased from 5 ha to 48 ha in 2011 and reaches 101 ha in 2012.

In Figures 1; 2 and 3 are presented the data relating to area, global harvest and productivity of the most widespread berry crops cultivated in the country.

The largest areas are planted with raspberries, they occupy 0.28 thousand ha, other areas: strawberry – 0. 27 thousand ha, blueberry – 0.19 thousand ha, and gooseberries which began to attract the attention of producers and it has reached 0.04 thousand /ha. The largest global harvest is obtained from strawberry– 0,6 thousand tons with the average yield of 2.23 t/ha, followed by raspberry with a production of 0.420 tones and average yield of 1.72 t/ha, blueberry with 0.070 thousand tons and average yield of 0.45 t/ha and gooseberry with a production of 0.003 thousand tons and average yield of 0.07 t/ha.

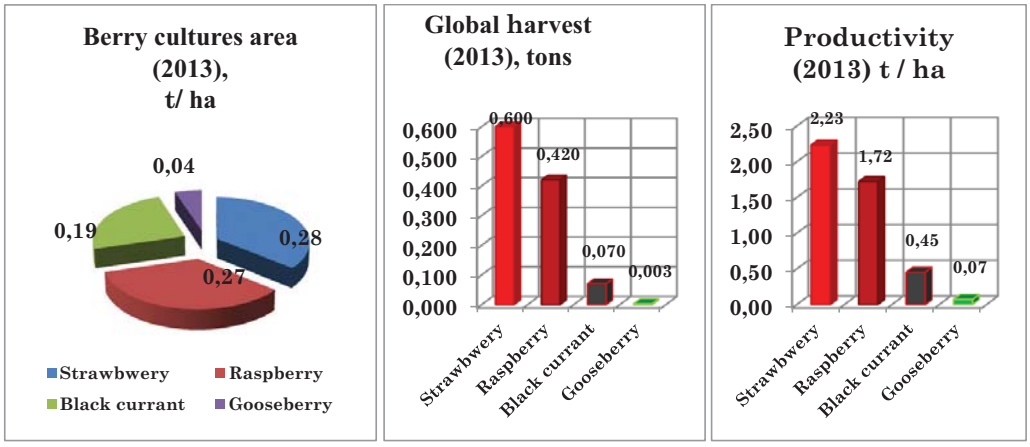

Figure 1. Statistic data of area cultures, global harvest and productivity of berries in Moldova

Due to lack of funding we do not have local varieties of strawberry and berry plantations created for pedoclimatic conditions of our country. Specialists of ISPHTA IP Institute, study, select and propose the most productive and qualitative from the introduced varieties to be tested at the State Commission for Variety Testing, with their further proposal for record them in the catalog of Plant Varieties of Moldova, that can be cultivated under the conditions of our country. The species of berry varieties registered in the catalog of Plant Varieties of Moldova and approved for cultivation in the agri-food sector are: raspberry (Rubus idaeus L.) - Barnaulskaia, Skromnitsa; black currant (Ribes nigrum L.) -Belarusskaia sladcaia, Minai Smiriov, Titania; red currant (Ribes rubrum L.) - Red Netherlands; gooseberries (Ribes L. grossularia) - Donetskii crupnoplodnai, Donetskii pervenets; strawberry (Fragaria ananassa Duch.) - Gorella, Red Gauntlet, Senga Sengana; blackberry (Rubus fruticosus L.) - Thornfree Cl.

Varieties temporarily admitted for testing under production conditions: strawberry - Betty, Cireine, Charlotte, Elsanta, Honeoye, Marmolada, Polka, Selva; Black rowan (Aronia melanocarpa L.) - Aronia divi.

The varieties cultivated on small areas in the Republic of Moldova to obtain strawberries fruits are Koroleva Elizaveta II, Elsinore, Elsanta, Honeoye, Marmolada, Polka, Victoria, Gigantella Symphony, Tristar, Elvira, Charlotte etc.;

Raspberry: Polana, Crepis, Automne Bliss, Pathfinder, The Latham, Delbard Magnificent, Gheracle, Pathfinder, Automne Bliss, Cuzimina Novosti, Liulin, Scromnița;

Black currant: Titania, Kentavr, Ben Alder, Dubrovskaia, Golubca, Zagadca, Ciornoglazaia, Minai Smiriov, Belorusskaia sladcaia.

Gooseberries: Coloboc, Smena, Donetskii krupnoplodnai, Donetskii pervenets, Rozovai, Ruskii, Captivator.

Some of the big farms with strawberry and berry plantations have rented the land as for small and medium-sized farms, they are privately owned. Plantations producing small berries structures are comprised mostly of two to three berry cultures of most widespread species like strawberry, raspberry, blueberry, gooseberry, blackberry while in the big farms monoculture prevails or other shrub species are cultivated on the small surfaces.

The size of areas cultivated with strawberry by the producers varies between 0.01ha - 8.0 ha, gooseberry between 0.01ha - 53.0 ha, raspberry between 0.01ha - 20.0 ha, gooseberries between 0.01ha - 10 ha, ha blackberry 0.4 - 7.0 ha. Optimal surfaces of strawberry and berry plantations set up to achieve cost-effective production are 1-5 ha, where can be applied to maximum mechanization of maintenance, which reduces the cost of obtained production, for small farms - 0.5 ha.

Strawberry and berry plantations are carried out mainly intensively for a more efficient use of land. The life of strawberry plantations is 4 years including 3 years of fructification, raspberry plantations 10-12 years, 12-15 years blackberry, currant and gooseberries up to 15 years, and its duration depends on several factors, particularly on the way of taking care of the plantations. The planting distances that is used to establish plantations of strawberries (0.7-0.9 x 0.25 m), raspberry (1.6 to 3.0 x 0.5 m), gooseberry (1.6 to 3.0 x 0.5-1.0) and blackberry (3.5-4.0 x 1.5-2.0 m). The life of strawberry plantations is 4 years including 3 years of fructification, raspberry plantations 10-12 years, 12-15 years blackberry, currant and gooseberries up to 15 years, and its duration depends on several factors, particularly on the way of taking care of the plantations. The planting distance that is average age of existing strawberry plantations is 2-3 years, 3-7 years of raspberry plantations, blueberry 3-10-15 years, of gooseberries - 3-7 years, 3-4 years blackberry. Aging berry plantations, exhausted, each parcel are gradually replaced with new ones that have a high productive potential and fruit quality.

Atmospheric precipitations in Republic of Moldova fall in the amount of 300-600 mm, which are unevenly distributed during the year and more often dry periods prevail. Available water reserves are limited; therefore

irrigation is a very important factor in cultivating of berries. In the climatic conditions of our country, without irrigation, strawberry is not likely to be cultivated. Strawberry is grown in open field and in protected field - greenhouses, tunnels, in which they apply extensively polyethylene film mulching, agrilia, straw and sawdust. Blueberry, raspberry and blackberry species are more resistant to drought than strawberries, but harvest and quality suffer more in case of severe water insufficiency, the irrigation is therefore a welcome thing.

The most drought-resistant crops among berries are gooseberries whose roots penetrate deep into the soil up to 2.0-2.5 m. Therefore when planting, gooseberries can be placed even on top of the slope, where a dry place, but can also be used as contraerozionala culture. For maintaining soil fertility (based on analyses) organic or mineral fertilizers (macro or trace elements) are applied in soil, irrigation water or foliage.

Labor force is an important factor in maintaining and developing berries producing farms. It is available in regions with more developed enterprises, where the arms are engaged on permanent and well-paid, and it is available in regions with more developed enterprises, where the workforce are employed on permanent and well-paid job. Certain persons employed permanently, being well trained, become qualified and for works that do not require qualification temporary workers are being hired. To solve the problem of insufficiency of the labor force it is required a mechanization of all possible processes of the maintenance of the culture; including harvesting. Large berries producing farms employ permanent workers in about 15-50 persons, seasonal and 35-120 persons. Small farms employ permanent workers about 3-8 people, and seasonal 5-30 people, or hire no one, only family members are working.

The productivity of strawberry and shrubs plantations depends on the compliance of all the technological elements, plantation age etc. Harvest per hectare on strawberries plantation varies between 5-15-20 t/ha in dependence of technology used, cultivated variety and quality of planting material. The selling price of the fruit is 25-35 lei/kg. The obtained harvest from blueberry plantation varies between 6-8 t/ha, from raspberry 8-10 t/ha, from blackberry 10-12 t/ha, from gooseberries 15 to 20 t/ha. The selling price of a kilogram of fruit is in average 15-25 lei/kg.

The local market of berries is not yet saturated. Berry production intended for export is an insignificant quantity; the import of fresh berry production takes place in the period when we do not have fresh fruit, in the months from November to April. Medium and large enterprises sell fruit production to legal entities at shops, schools, kindergartens, restaurants, bakeries, factories for processing or freezing and operate with payment by transfer, but small producers-individuals, with payment in cash.

Getting very high strawberry harvest of aproximatively 50 t/ha, blueberry, raspberry, gooseberry, blackberry 15-30 t/ha involves implementation of new super intensive technologies, fertilizer application in large quantities, performant varieties, but not always guarantees high harvests and high quality and organic fruits.

Harvesting requires cold room for temporary storage of berries directly on the field or nearby. For strawberry, raspberry and blackberry fruit storage facilities are not necessary for a long time, because production is easily perishable and is intended to be sold as soon as possible.

Blueberry and gooseberries harvested production can be sold directly from the field or it can be harvested in stages, selectively as the fruit reaches maturation period or may be kept in storage rooms only for 1-2 days, while in refrigerated rooms with controlled atmosphere the storage period can go up to 14-15 days for blackcurrants, gooseberries up to 20 days, and for some varieties this period may be extended up to 50 days. As for the white and red currants their preservation period can reach up to 40-45 days. Mechanically harvested berries, packed in polyethylene bags can be stored in the refrigerator for 50-60 days. To extend their period of use, berries can be frozen and can be used at the right time for another 6-8 months (Sava et all. 2012, Crivorot, 2004).

Currently there is a need for temporary storage refrigerator or for refrigerating berries, for the construction of which considerable investments are needed; in their absence we seek access to existing ones. Establishing partnership links, conclusion of mutually beneficial contracts between canning factories for processing fruits would promote the development berry production. Using a qualitative packaging in harvesting berry increases the trading success. Most commonly are being used containers, sometimes baskets made out from paper, plastic or wood with a capacity of 0.25; 0.5; 1.0 kg, which are placed in cardboard boxes.
The fruits for processing are harvested directly into wooden boxes or cardboard with 3-4 kg capacity. Harvesting period for strawberries, raspberry and blackberry is long (30-60 days). Harvesting is carried out as the fruit matures after 1-2 days. Sorting the strawberries, raspberries and blackberries is made directly during harvest because they are very sensitive and does not support being molded from one container to another.
Most of the strawberry production is used fresh. Part of it is processed for juice and used in the food industry. Raspberry and blackberry production is mostly intended for processing or freezing and is used partly for dessert. Black currant production goes to processing, gooseberry, red and white currant are mostly for dessert, although they are also good for processing and freezing. For the berry production destined for sale it is necessary to receive a certificate of quality, "hygiene certificate", attesting to the high quality of the fruit, which is confirmed by the results of laboratory analysis for toxic residues

CONCLUSIONS

The berry production sector is one of perspective that can cope with internal and external market and it is a strong point in agricultural development in Moldova.
The areas occupied by the berry cultures in Moldova are: raspberry – 0.28 thousand ha, on strawberries – 0.27 thousand ha, black currant – 0.19 thousand ha, gooseberries – 0.04 thousand ha. Global harvest obtained from strawberry is 0.6 thousand tons and average harvest - 2.23 t/ha, at raspberry corresponding – 0.42 thousand tons, 1.72 t/ha, at black currant – 0.07 thousand tons and 0.45 t/ha, to gooseberries – 0.003 thousand tons and 0.07 t/ha.
Attracting specialists in the field of berry cultures with the aim to establish modern plantations can be achieved with the use of quality planting material produced by a certified company and complying with all the technological elements of maintenance.
Cooperation of State institutions, associations in the field and producers, will create conditions for agricultural development and especially of the generation of berry cultures that have a high productivity and profitability.

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