

RESEARCH ON OBTAINING SEA BUCKTHORN ORGANIC BERRIES IN REPUBLIC OF MOLDOVA

Parascovia SAVA, Elena GHERASIMOVA

Practical Scientific Institute of Horticulture and Food Technology, 14 Costiujeni str.,
Kishinau, MD 2019 Republic of Moldova, Phone: + 373 69801776, + 373 67379552,
Email: psava2110@gmail.com

Corresponding author email: psava2110@gmail.com

Abstract

According to the results obtained from the study of sea buckthorn varieties, during the years 2010, 2013, 2014, the accumulation of dry substances in the variety 'Trofimovskaia' achieved the highest average values -9.35%, while the lowest were achieved in the variety 'Otradnaia' -8.4%. The accumulated amount of sugars reached average values in the variety 'Nivelina' -7.77% and lowest ones in the variety 'Otradnaia' -2.58%. The average values of the fruits acidity were reached by the variety 'Botaniceskaia' -3.88% , while the variety 'Otradnaia' reached 1.86%. The average accumulation of vitamin C in fruit is found in the variety 'Otradnaia' -117.96 mg% and in the variety 'Botaniceskaia' -79.97 mg%. The average value of sugar/acidity coefficient is expressed to the variety 'Otradnaia' through -4.51 and to the variety 'Botaniceskaia' -0.55.

Key words: varieties, sea buckthorn, phenological phases, harvest, nutrient substances, Republic of Moldova.

INTRODUCTION

Sea buckthorn is a shrub introduced into culture in our country, valuable in its many uses: like food, forestry, animal husbandry, pharmacology, as anti erosion and ornamental plant. It's fruits contain numerous bioactive substances, valuable, with an important role in the treatment of numerous diseases (high tension, avitaminoses, radiation disease etc.) (Gradinaru, Istrate, 2009).

The sea buckthorn fruits contain two times more vitamin C than the rose hip and ten times more than the citrus fruits. Other vitamins present in the fruit composition are A, B1, B2, B6, B9, E, K, P, F and we can find cellulose, beta-carotene (in a significantly much higher percentage than in carrot pulp), microelements as phosphor, calcium, potassium, magnesium, iron and sodium, complex oils. Sea buckthorn is a unisexual dioeciously shrub, 1.5-3.5 m high, forming a dense bush with many branches equipped with many strong thorns or without, adaptable to different climatic conditions and to any type of soil. The sea buckthorn yields starting its 3rd year after planting and it can produce 10-15 t/ha, with a lifespan of 18-20 years (Gatin, 1963).

This shrub has a great ecological plasticity, growing in dry plateau areas, as well as in foothill and mountain areas. Regarding the temperature it is less demanding, with a tolerance to low temperatures up to -35 °C, -40 °C. It manifests also a strong resistance to sun strokes on the ground over +45 °C. Sea buckthorn demands lots of light and produces very large fruit in areas exposed to direct sunlight. In shading conditions the young plants perish and lose their leaves.

Regarding the humidity sea buckthorn adapts easily, resisting from the worst drought in temperate area until the temporary water redundancy.

The sea buckthorn is totally indifferent to the nature of the soil. It grows on dry land lacking humus layer, on sandy soils or gravel, clay, salty, which other fruit species fail (Chira, 2000).

MATERIALS AND METHODS

Sea buckthorns experimental sector was established in 1999 on the experimental territory of the Technological - Experimental Station "Codru" on an area of 0.20 ha with a

planting scheme of 3.0 x 2.0 m, on medium loamy chernozem soil type, in irrigated. As study object served the following varieties: Nivelina, Botaniceskaia, Padaroc sadu, Trofimovskaia and Otradnaia. Researches regarding the studies of the sea buckthorn varieties were performed according to accepted methods for small fruits.

RESULTS AND DISCUSSIONS

Sea buckthorn is distinguished by growth form, fruits size, color, nutrients and yield.

Table 1. Phenological phases and biometric measurements to varieties of sea buckthorn, year 2014

Name of the Variety	Duration of flowering and % flowers	Leaf length, cm	Sprouts length, cm	Thorn presence	Crown shape	Harvest t/ha
Padaroc sadu 2013 2014	80% 70%	7-8	10-13	few	Middle Compact	14.5
Nivelina 2013 2014	80% 70%	5.6	10-15	few	Middle Compact Umbrella	16.0
Otradnaia 2013 2014	60% -	6-5	10-14	many	Pyramid Branched	15.0
Trofimovskaia 2013 2014	50% 30%	6-7	11-20	few	Compact Umbrella	9.0- 13.0
Botaniceskaia 2013 2014	50% -	5-6,5	11-14	few	Pyramid	20.0

Sea buckthorn every year confirms high productivity through good growth of shoots which are formed for next year's harvest. Each year, the floral buds differentiation, favoring increase the proportion of the large fruits formation depending on natural climatic requirements and the characteristics special for variety. Submission of the sea buckthorn fruit bud occurs in the period between 15.X-30.XII. Many annual cycle of growth and



Figure 1. Variety Botanicescaia

Fruit, in great number, are false drupe, small (0.26-0.50g), ovoid to globular shape and even flattened. Their predominant color is orange, passing in yellow and more rarely red fruits. Research has revealed that sea buckthorn berries contain a number of valuable biologically active substances with important role in regulating human metabolism. The fruit processing producing highly valued: juice, syrup, nectar, jam, jelly, liquor etc.

fruiting in ecological conditions of the sea buckthorn is influenced by the variety. Research conducted to study this fruits varieties allowed us to obtain results on the influence of environmental factors. The varieties Podaroc sadu, Nivelina and Trofimovskaia are more resistant to low temperatures during winters than the varieties Botaniceschia and Otradnaia.



Figure 2. Variety Nivelina



Figure 3. Female plants with small buds



Figure 4. Male plants with large buds

On which negatively influenced temperatures -20 °C, -18 °C in January and February of 2014. Conducted research to study the varieties of sea buckthorn allowed to obtain results on the accumulation of nutrients in fruits as solids, sugars, vitamin C, tannins and

dyestuffs, acidity, and the results are shown in Table 2. During the researches in various climatic conditions, with continued plant growth, fruit quality was influenced by variety.

Table 2. Biochemical analysis of some buckthorn varieties fruits

Varieties	Dry substances, %	Sugar, %	Acidity, %	Tanning, color substances, mg%	Vitamine C, mg %	Coefficient sugar/acid
Nivelina 2010	8.13	7.16	4.52	37.41	81.90	1,58
2013	8.27	2.99	3.06	83.14	99.40	0,97
2014	8.8	6.58	2.59	54.04	99.88	2,54
mean	8.4	5.58	3.39	58.20	93.73	1,70
Botaniceskaia 2010	7.87	4.60	3.92	37.40	69.52	1,17
2013	10.07	2.14	3.84	74.83	90.42	0,55
2014	-	-	-	-	-	-
mean	8.97	3.37	3.88	56.11	79.97	0,86
Podaroc sadu 2010	8.06	2.50	4.46	54.04	85.80	1,80
2013	9.00	3.18	2.46	83.14	110.00	3,65
2014	9.67	5.46	3.50	41.57	89.96	1,56
mean	8.91	3.71	3.47	59.58	95.25	2,34
Trofimovskaia 2010	8.06	3.48	2.97	29.10	124.96	2,71
2013	9.80	3.31	2.58	83.14	114.40	3,79
2014	10.20	6.30	3.20	54.04	80.16	1,96
mean	9.35	4.36	2.92	56.12	106.51	2,82
Otradnaia 2010	-	-	-	-	-	-
2013	8.4	2.58	1.86	62.36	117.96	4,51
2014	-	-	-	-	-	-
mean	8.4	2.58	1.86	62.36	117.96	4,51
Limite of variation	8.4-9.35	2.58-5.58	1.86-3.88	55.2-62.36	79.97-117.96	0,86-4, 51

In 2013 for all studied varieties were obtained higher values of dry substances accumulated, which ranged from 8.27 to 10.07%. The amount of sugars that has accumulated in smaller quantities was in the variety Botaniceskaya in 2013, and the highest accumulated in the variety Nivelina in 2010. Gained acidity in this fruit ranged between 1.86% in variety Otradnaia in 2013 and 4.52% in variety Nivelina in 2010, and

according to the literature, the given values ranges between 2.0 - 3.5 % (Bukštinov, Trofimov et al., 1978). Tanning and dyestuff substances accumulation ranged from 29.10 mg% in variety Trofimovskaia in 2010 and 83.14 mg% in 2013, compared to other geographical regions where ranged differently between 48-55 mg% (Bukštinov, Trofimov, et al., 1978).

The amount of vitamin C gained in studied

berry varieties in 2010 ranged between 69.52 mg% in variety *Botaniceskaia* and 124.96% mg in variety *Trofimovskaia* in 2010. Sea buckthorn fruit varieties grown in the European part of Russia, the quantity of vitamin C accumulated ranged between 30-

70% (Bukštínov, Trofimov et al., 1978). Coefficient sugar / acid, in 2013 compared to previous years research has achieved higher values in *Trofimovskaia* and *Otradnaia* varieties corresponding to 3.79 and 4.51, which certifies the highest quality fruit taste.

CONCLUSIONS

According to the results obtained in the varieties study of sea buckthorn during the years of research it was found that: accumulation of dry substances reached higher average values in the variety *Trofimovskaia* - 9.35% and lower average values in the variety *Otradnaia* - 8.4%.

Sugars accumulated amount has reached the maximum average values in *Nivelina* variety - 7.77% and minimum average values in the variety *Otradnaia* - 2.58%. Medium to high

fruit acidity values were set in *Botaniceskaia* variety at 3.88% and lower values in the variety *Otradnaia* - 1.86%.

Accumulation of average amount of vitamin C in fruit stands in the variety *Otradnaia* - 117.96 mg% and -79.97 mg% in variety *Botaniceskaia*.

Average value of the coefficient sugar / acidity is expressed by 4.51 in variety *Otradnaia* and in the variety *Botaniceskaia* - 0.55.

REFERENCES

- Gradinaru G, Istrate M., 2009. *Pomicultura generală și specială*, Iași, p. 492.
- Bukštínov B.S., Trofimov T.T., et al. 1978. *Oblepiha*, izdatelstvo Lesnaia promišlenosti, M., p. 72.
- Gatin G.I., 1963. *Oblepiha*. M., Izdatelstvo Selihozghiz, s.8-13.
- Chira, L. 2000. *Cultura arbuștilor fructiferi*, Editura M.A.S.T., București, p.72-79, 80-84, 91-98.