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DESCRIPTION OF SOME PATENTED AND CERTIFIED SEA BUCKTHORN CULTIVAR IN BACAU COUNTY

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INTRODUCTION

International trade with sea buckthorn has been developed over the past ten years with great success (Brad I., si colab, 2002). More and more, not only fruit, but also semi-products are marketed, and commercial channels become more complex. Due to the high demand in different segments of the international market, more and more Asian, European and North American farmers are turning to large scale of sea buckthorn crops. Along with the continuous growth of sea-buckthorn areas there has been a steady increase in the demand for quality seedlings (Rați I.V., et al.,. 2013; Simon-Gruta Alexandra et al.,2010).

Although there are several homologated cultivars of sea buckthorn in Romania, few have valuable features, not internationally competitive. Due to this reason and the high variability of the Carpatica subspecies, there is a need for an intensive selection process within the spontaneous flora directed on components conforming to the current market demand (Rati I.V., Rati Luminita, 2001; Rati I.V., Rati Luminita, 1993) .

The sea buckthorn (*Hippophae rhamnoides* L.) presents itself as a high shrub of 1.5 - 3.5 m, with numerous strong thorns. Depending on the climatic conditions and the soil, it grows differently, namely, as a low creeping bush in arid areas and on poor soils, or under the shape of a tree of 8-10 m in height on fertile soils.

Sea buckthorn (*Hippophae rhamnoides* L.) culture is already a profitable one in countries such as Germany, Italy, Sweden, Finland, Russia, Mongolia or China and it represents an ecological alternative to current, denatured and over chemical farming .

The eco-pedo-climatic conditions and the suitable landscape launch Romania onto the place of one of the most suitable countries for this new and valuable species of fruit growing. The physic-chemical content of the fruits obtained, their miraculous energy and therapeutical qualities, as well as the increasing demand for Romanian sea buckets on the European market, are the premises for the emergence of a new fruit growing sector in Romania, strong, cost-effective and sustainable, following certain steps, as a pomology sector of economic importance (Rati I. V. et al., 2010, Rati I.V., Rati Luminita, 2003).

In Romania, the sea buckthorn is now cultivated on an area of more than 300,000 hectares, most of it being realized by European funds. The culture technology used is high-density, super-intensive using the form of the "Cu trunchi" type of crown ("Trunk-shaped" - which presents similarities both to spreading crown and layered crown)- sea buckthorn in the agricultural exploitation (Rati I.V., Rati Luminita, 2003).

MATERIAL AND METHODS

Approved and patented cultivars: "Serpenta, Diana, Silvia, Victoria, Ovid, Tiberiu, Auras" by Fructex Bacau Company, are proliferated in the nursery for obtaining of seedlings. The company owns the main plantations with "BASE" and "CERTIFICATE" material. Seedling material is obtained from cuttings in dry (washed sand beds) and in green (in greenhouses) and it is ecologically certified.

RESULTS AND DISCUSSIONS

Description of Certified Sea Buckthorn Cultivars

SERPENTA (Serpeni 11) (Fig. 1)

The growth type of the plant is a tree with a semierect port. The vigour of the plants is medium to large; they have a globular-pyramidal crown, with branches moderately distributed. On the fruit branches starts medium shoots as thickness, although they measure 15-20 cm in lenght.The thorns are rigid, 3-4cm long and quite thickset.

The leaves are lanceolate, elliptic, narrow, alterante with serrulate margin and medium length (6-7 cm) and a breadth of over 6 mm, with medium-sized scaly and medium-sized trichomes, with a silver-white hue of the back part, upper part and primary vein. The color of the upper face of the leaf is light green. The small mixed buds are thickset from which bloom many flowers (6-8) along the entire length, resulting in a fairly dense distribution of the fruit that surrounds the branch all along its length.

The fruit is ovate-elongated, almost cylindrical (broadly elliptical) of medium weight (G = 0.38 g; h = 12.3mm; d = 7.6mm) with medium pubescence and over 3 mm, peduncle.

The biotype is suitable for harvesting by vibration. The epicarp is orange, with medium-sized trichomes, with some concentration towards the top of the fruit. The apex is poorly contoured. The age of bloom is early.

Fig. 1. Serpenta cultivar

Very good production capacity with alternating plumage. Medium black brown seed. Dry matter 18.75%, ascorbic acid 155.47 mg% s.u, lipids 21.94 g% s.u., carotenoids 41.28 mg% oil, crude protein 14.0 g% s.u. Serotonin ranges between 21.31 µg / g in fruit and 48.48 µg / g in leaves. The micro-element content was determined from both fruit and leaf, so zinc reached values of 12.8 ppm in fruit and 15.5 in leaf; copper found in approximately equal amounts in both fruit and leaf, respectively 4.5-5 ppm. Fruit manganese reaches 9.3 ppm and within leaves 3 times more, 31.8 ppm. The iron both in the leaf and in the fruit is about the same amount of 323-315 ppm. Bromine in fruit is found in the amount of 19.0 ppm and in leaf much more 66.5 ppm. Molybdenum is found in the proportion of 1.43 ppm in fruit and 2.6 ppm in leaf.

Seeds are elliptical-elongated, of medium size.

The production capacity is very high, with alternating periods of fructifying ranging from 7.0 kg to 30.5 kg / plant. The age of fruit ripening is extra-early.

DIANA (without thornes) (Fig. 2)

The tree-shaped plant, having a medium vigour, with long, flexible branches with downward growth resulting in a weeping tree crown. The shoots are thin and 15-20 cm long, of medium density. The thorns for this biotype are 4-5 cm long, very flexible and rare, the plant being slightly aggressive.

The leaves are light green, narrow (elliptic) of medium length of 4.5-5 cm.

The posterior side the leaf is silvery; the trichomes are poorly emphasized. Small buds are quite rare and cover almost the entire length of the shoots. From the buds start 3-6 flowers, resulting in an average fruit load on the length of the branches, due to the rather infrequent distribution of the bouquets.

The fruits are medium to small (0.27 g), oval (oblonga, d = 7.2mm, h = 9.2mm). The color of the epicarp is orange-yellowish and has medium-sized trichomes. The mucron is poorly highlighted and is given by a crowd of scaly epidermal hair cells (trichomes). The length of the peduncle is medium. The seed is big and blackish.

The dry matter content is 21.62%. , and ascorbic acid is 91.98 mg%. Serotonin content is greater in leaf than in fruit, ie 27.27 micrograms / g, compared to 16.72 in dry fruit. Fruit lipids reach values of 8.88 g% s.u., carotenoids 14.32 mg% oil, and crude protein 17.06 g% s.u.

Determinations were made on the microelement content of both fruit and leaf, zinc ranging from 11.8 ppm in fruit to 23.3 ppm in leaf. Copper ranges from 6.75 ppm in fruit to 5.0 ppm in leaf.

Manganese is more than 7 times higher in leaf than in fruit, namely 74.3 ppm versus 10.0 ppm. Iron achieves 340 ppm in leaf, compared with only 95 ppm in fruit. Bromine has values ranging from 66.5 ppm in leaf and 11.0 in fruit, and molybdenum has similar values in both fruit and leaf, respectively 2.62 ppm versus 2.28 ppm in leaf.

The seed is large and darkish brown. Average yield is good and relatively constant: 10-12.6 Kg per plant.

Fig. 2. Diana cultivar

SILVIA (Serbăneşti 4) (Fig. 3)

The vigor of the plants is weak, the globular crown, sturdily branched, with a dense crown.

The lateral shoots are 10-11 cm and the terminal ones somewhat longer with medium densities and thickness (14-16 cm). They have well-developed, high-density buds. Peaks evolve into rigid spines, 4-5 cm long.

The leaves are 5-6mm long and 4.5-5mm long with light brown trichomes highlighted on the back of the leaf and of the primary vein.

From the mixed small buds, 8-12 fruits are formed that cover the branches (sleeve type).

Fruits are oval-flatened, (circular) h = 8.2mm; d = 7.0 mm, yellowish epicarp, covered with scaly trichomes more concentrated in the mucron area, with short peduncle. Seed medium-sized, darkish brown.

Resistant to diseases and pests.

Fig. 3. Silvia cultivar

VICTORIA (Delta 60M) (Fig. 4.)

The plants are medium-to-large in size, medium-branching, resulting in airy, globular-shaped crowns. Lateral 10-15 cm short shoots and 1-2 sturdy end shoots (20-30 cm) emerge from the fruitful branches. The thorns are long (4-6 cm) rigid, quite though.

The leaves are narrow and 6-6.5 cm long with the scaly, light coloured trichomes on the back of the leaf, resulting in a pearly-white colour. Mixed buds have high density, being spread over almost the entire length of the shoots, forming 4-7 flowers that will often cover the entire length of the shoots, clutching it like a sleeve.

The fruits are very large (G = 0.70 g; h = 11.4mm; d = 9.1mm), orange, oval-elongated, with medium-sized, scaly, pretty highlighted trichomes distributed throughout the epicarp. The mucron is noticeable and slightly immersed. The peduncle is long (4 mm) and the fruits are easily detached from the branches.

Fig. 4. Victoria cultivar

The blooming age is late. The seed is large, chocolate brown. Suitable for vibratory harvesting. The dry matter content is 17.45%, in ascorbic acid 44.5 mg %, serotonin content is higher in leaves 33.05 µg / g, and in fruit 26.36 µg / g. The lipid content is 14.01 g % su in carotenoids 13.72 mg % oil, and crude protein 13.36% b.w.

Fruit and leaf determinations on micro-element content have highlighted that both the fruit and leaf content of zinc is approximately the same, namely 14.3-13.8 ppm, copper 6.75-5.25 ppm, manganesse 9.0 ppm and in the leaf 4 times as much as 41.8 ppm. Iron content is 183 ppm in fruit and 235 ppm in leaf. Brom 17.5 ppm in fruit and 77.5 ppm in leaf. Molybdenum is found in similar quantities in both leaf and fruit 3.9-3.1 ppm.

The average yield is high, with alternations from 4 to 12.6 kg / plant. The age of fruit ripening is late. It reaches late harvest maturity.

OVIDIU (Sf. Gheorghe 9) (Fig. 5.)

The type of plant growth is semi-erect position. The plants have great vigor, quite branched, with the shape of the pyramid crown.

The shoots start in large numbers, have a semi-erect growth and they are 20-25 cm long. The thorns are 8-10 cm long, rigid and quite though. The leaves are 5-6 mm long and 5-cm long, with light scaly trichomes on the back of the leaf.

Fig. 5. Ovidiu cultivar

Mixed buds are of medium density on the branch and cover less than half the length of the branches, where a cluster of fruit is formed, and the rest of the branch, without mixed buds, turns into a long, rigid thorn. Most mixed buds under the floral bouquet also form a mixed medium bud.

The fruit is large (0.44 g) with oval shape (h = 11.4 mm; d = 8.8 mm). The color of the epicarp is orange- yellow with scaly trichomes, which are rare but highlighted by their gray and agglomerated color in the mucron area. The seed is medium in size and brown. Dry matter 17.74 %, ascorbic acid 166.61 mg %, lipids 11.22 g % s.u., carotenoids 30.08 mg %, crude protein 13.34 g % s.u.

Serotonin content ranges from 26.39 µg / g in dried leaves up to 39.12 µg / g in the fruit.

The micro-element content was determined in leaves and fruits as follows: Zn was found in the fruit at 12.5 ppm and in leaf 10.5 ppm, 4.5 ppm in fruit and 13.7 ppm in leaf, Mn in fructose 10.8 ppm and in leaf 4 times more 42.5 ppm. Iron is found in a larger quantity than fruit in the leaf, or 228 ppm versus 135 ppm. Bromine in fruit reaches values of 19.0 ppm and in leaves the amount is double 43.5 ppm.

The average yield is very high, alternating from 7.2 up to 30.5 kg / plant. It reaches extra-early harvest maturity.

TIBERIU (Serbăneşti 1) (Fig. 6)

The plants have medium-to-large vigour and semi-erect port, with rather branched twigs and globular crown that tends to a pyramid shape. Shoots are 20-30 cm long and erect. The thorns are 7-8 cm long, rigid and quite though.

The leaves are narrow elliptical, 4-5 mm long and 6-7 cm long. The small buds are quite developed with a medium density on the shoot and occupy two-thirds of the length of the shoots, where the upper third of the shoot (of the top) turns into a long and rigid thorn. From the small buds we start 6-8 flowers, which yield a fruit load with large bouquets, with a uniform distribution on the branches.

The leaf is light green on the upper side, and puberty on the posterior side is medium with silvery-white epidermal hair cells (trichomes).

The fruit is oval-oblong (oblong, h = 9.6mm; d = 9.4mm), yellowish-orange, medium-sized (0.49g) with scaly epidermal hair cells (trichomes) and quite rare on the epicarp. The mucron is located in a small cavity and the short peduncle smaller than three millimeters. Small seed, blackish brown. The blooming age is medium.

The dry matter content is 12.74% and in ascorbic acid is 159.97 mg%. Fruit lipids reach values of 11.10 g % s.u., carotenoids 32.24 mg %, and crude protein 14.21 g% s.u. The serotonin content ranges from 17.9 µg / g in fruit to 45.27 µg / g in leaves. From the determinations made it follows that Serbanesti 1 biotype is the richest in microelements compared to the other analyzed biotypes. Zinc ranges from 16.0 ppm. in fruit at 14.5 ppm. in the leaves. Copper 7.0 ppm. in fruit, 5.0 in leaf. The manganese is found in the fruit in the amount of 11.3 ppm. And in the leaf four times as much as 56.8 ppm. The iron both in the leaf and in the fruit is found in approximately equal amounts, namely 395 ppm in the leaf and 428 in the fruit. Bromine is found in the amount of 3.5 ppm in the fruit and 75 times more in the leaf, respectively 80.5 ppm. Molybdenum is found in the amount of 3.15 ppm in the fruit and much less in the leaf, respectively 0.65 ppm.

Production capacity averages 6.6 - 10.4 Kg per plant. The fruit reaches early harvest maturity.

Fig .6. Tiberiu cultivar

AURAS (Sf. GHEORGHE 5) (Fig. 7)

The plant is medium-to-high vigour, semi-erect port., with a crown of globular shape, with lax branches, medium density and medium thickness,

high thorniness, medium-sized (3-5 cm long) stiff and sharp at the top, average weighing capacity, achieving increases in length of 15-20 cm.

The leaves are alternate, small lanceolate (narrow elliptical), with medium length and width, respectively, 5.5-6.5 cm, with a pronounced primary vein. The upper face of the leaf is light green and the posterior side presents medium-density silvery-white coloured stellar trichomes, causing a pearly - coppery colour.

The female flowers are very small, barely visible to the naked eye, which bloom at the same time with the detachment of the foliage and are grouped into small short stems (racemes), pedunculated with a number of 5-8 flowers.

The density of the small buds on the branch and the number of flowers in the buds determine a high density of fruit on the branches, with tassels quite close to the appearance of a sleeve that covers the branch.

Fig. 7 Auras cultivar

The fruits are of medium size (0.48-0.50 g) with spherical-oval shape (circular), with yellow-orange epidermis, middle peduncle length (3 mm) and relatively easy detachment from the branch. It shows on the entire surface of the epidermis rare tiny scales of brown color and an obvious mucron. The blooming age is late.

Medium seed is chocolate brown to blackish.

The content of micro-elements was determined in both fruit and leaves. Zinc is found in the fruit in the amount of 10.5 ppm and in the leaf 18.5 ppm. Copper is found in the same amounts of 5.25-6.75 ppm. Manganese in fruit reaches 9.5 ppm and leaves more than 5 times as much as 56.8 ppm. Iron in fruit reaches 280 ppm, and in fruit 300 ppm. Molybdenum is found in quantities of 3.10 in fruit and 2.76 in leaf. The seed is usually one in fruit. It is medium-sized, elongated, hard, and brown-brown to blackish.

The production capacity is medium to large, showing the species-specific alternation of production, ranging from 7.00 kg in the years of low production to 16.6 kg in years of high production. Fruit maturity is extra-early.

CONCLUSIONS

The analyzed varieties under the conditions of culture reach the harvesting maturity (physiological maturity) between 15 July and 30 September, which allows partitioning of fruit harvesting.

Biochemical composition is different from variety to cultivar to cultivar; each of them is distinguished by a specific biochemical constituent.

The raw material provided by the fruits differs from cultivar to cultivar, allowing more fields of use. This highlights the high content of ascorbic acid in Serpenta varieties, Ovidiu; carotenoids at Silvia and Serpenta; the high amount of lipids in the Auras and Silvia varieties; fruity serotonin in Victoria and Diana varieties; serotonin in leaf leaves for Serpenta and Tiberiu varieties; crude protein in leaves for Diana and Silvia varieties; dried fruits in Diana and Silvia varieties.

Each cultivar is certified by ISTIS and is published in the official national catalog ()

Varieties are protected for multiplication by invasive patents.

The seedlings are from the BIOLOGICAL category CERTIFICATED and licensed for ecological crops.

ABSTRACT

Within Fructex Bacau Company, following a rigorous selection process through a continuous improving process for more than 20 years, a number of 7 sea buckthorn cultivars have been certified and patented. This fact allows, in accordance with the fruit and vegetables legislation, the establishment of sea buckthorn agricultural/fruit holdings. The existence of patented varieties allows multiplying

them in nursery, thus obtaining "CERTIFICATE", a valuable biological material.

The cultivars obtained by the author are in fact the suggested collection for the process of reproduction and establishment of ecological plantations. The obtained cultivars allow to the spread over two months the process of harvesting of the fruit that reach the physiological maturity during the period July 15 - September 30. The biochemical composition is different, specific for each cultivar so that the raw material provided by the fruit ensures use in different fields.

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