

THE UTILIZATION OF THE SEA BUCKTHORN IN ROMANIA, PAST, PRESENT AND FUTURE

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Abstract

Sea buckthorn is called by the Romanian peasants “berries of the Holy Virgin”. They use from hundreds of years the fruits for health problems. From fruits they are obtained many products in feeding. Romania had great specialists in forestry, horticulture, medicine, bio-chemistry with many studies and applications of sea buckthorn. In Romania Hippophae rhamnoides L. was the object of many national research programs. Now there are not serious investitures and are not mobilized foreign institutions which may use modern instruments for the obtaining all advantages of this plant. Some institutions, industrial units, particulars continue the tradition with good results, that is not the level which is possible in the actual potential of Romania. It must be a solution of the rehabilitation of thousand of hectares of Romanian denuded grounds.

Key words: “berries of the Holy Virgin”, denuded grounds, Hippophae rhamnoides L., sea buckthorn, treatments

INTRODUCTION

Sea buckthorn, Euro-Asiatic specie, was classified in 1753 in “Speciae Plantarum” by Karl von Linné at the position 1023. The great botanist seems to be its godfather, Hippophae rhamnoides has two significations. Now, because it has a positive signification is accepted the etymology from Greek words: horse and shine. Romanian specialists demonstrate the influence of sea buckthorn which induces health for all animals, externalized in the aspect of their skin. The second signification is also from Greek, horse and poison, this is reflected in occidental Europe tradition. Romanian specialists’ conception at the beginning of the XX century was the same; it may be caudated by the plant’s negative effect. Other opinions are relative to the effect in elimination of intestinal worms. Romanian “catina” seems to become from Latin “catena”, the image from Romans invaders was a chain around rivers, the colour of leafs suggested them the silver. Its natural area was one of the largest of the world, from Atlantic Ocean to the Pacific, (fig. 1). Now it is also a subject of research programs in Northern and South America. If we consider Jawaharlal Nehru’s idea, that actual world situation is the result of the European domination in ancient social economical and military development; maybe

sea buckthorn could have had another position in the history of plant utilization.

MATERIALS AND METHODS

In this paper, is the result of more of 30 years of accumulations in sea buckthorn studying and publishing. Important results were obtained regarding the role of Hippophae rhamnoides L. in the environmental protection and human health economy (Berca, M, Proorocu Angel, 2005, 2010). Researchers are involved in the promotion of a new interdisciplinary science Seabuckthornology and with cooperation of more of 30 states involved in this plant studying and using, the terminology and data base necessary in a global activity have been made (Proorocu Angel, 2010). Also a handbook of Seabuckthornology was proposed by Proorocu Angel, 2010 because it is necessary to any person who is involved in sea buckthorn studies. A unilateral view is not benefice for their results. Also students need to have a point of view on the possibilities of using sea buckthorn actual human crises.

RESULTS AND DISCUSSIONS

In Romania, the modern scientific statute of agriculture started in the inter-war period. In 1938-1943, Constantin Filipescu coordinated a large staff and published “The Great

Agricultural Romanian Encyclopedia". "Any country with pretensions of civilization must have in the cultural treasure agricultural encyclopaedia and dictionaries needed by anyone who is concerned by this millenary activity"- said the author in the introduction.

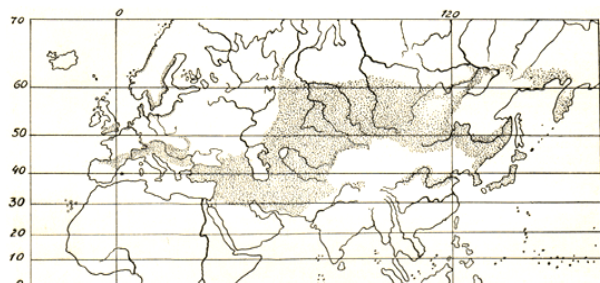


Fig. 2150. *Hippophaë rhamnoides* L. Verbreitungskarte unter Zugrundelegung der Darstellung von Servetatz.

Fig. 1. Sea buckthorn area from *Illustrierte Flora von Mittel - Europa* von Dr. Gustav Hegi Munchen J.F. Lehmanns Verlag 1926

In the first volume of this work sea buckthorn was ample described at page 710: "cătina albă bot. *Hippophae rhamnoides* L. Fr. Saule epineux, germ. Sanddorn, engl. Sea buckthorn (sea, buck, thorn) bush usually 2-5 m. it may become a little tree of 5-6 m. from slippery grounds of river's gravels. One year stems has silver scaly brush and ferruginous rust colored down, early they get thorns, old steams has a great number of short steams transformed in thorns. The ovoid buds are covered by a small number of golden yellow scales with silver brush. Leafs are linear lancelet or narrow oblongs 4-5 (6) cm. long and 5-6 (10) mm. breadth, short petiolated, petiole of 1-3 mm., entered edge; superior face at first has silver scales, at maturity dark green, glabrous and only the long of principal nervure with down, inferior face is silver with scaly silver thread to golden yellow which at friction are taken on the fingers. Dioeciously flowers are little, less apparent, greenish, situated on annual stems on which it appear simultaneous with leafs by 2-3 at the base of inferior leafs which are hiding integrally. Male flowers sessile with yellow-green perigonium on intern face have silver scaly thread in tubular form, evidently separate at the extremity in two lobes on square disk. Female flowers in raceme specula form, with a perigonium evidently separate at the extremity in two lobes, covered

in exterior with scaly thread; unilocular pistil, one only box, with one ovule. Blossoms from April to May. Fruit is an achene covered in exterior with an indurion, seems that in the inferior part persists the perigonium which became fleshy. Fruit is ovoid like a pea bean brown-orange to golden yellow, the fleshy part has acidulous taste, contains a poisonous principia, which don't hinder birds to devour them after the snow fall. The pip, achene with solid brown shining cover, usually has one seed. The trunk may be strong developed 4-6m. and at soil level it may be 10-15 cm. in diameter with many ramifications has lateral direction, sinuously, covered at the beginning with brown smooth bark, in time it has a rhytidome dark brown scaly profoundly cracked. The hardwood yellow-brown, became by drying weighty, solid, may be polish, don't resists in air, the ashes are rich in potassium. The striking root is profound, because the pivoted part penetrate depth the soil and superficial by lateral roots parallels with the surface, from lateral roots in sands there are starting many suckers. In roots there are tuberosities in which leaves in symbiosis an Actinomicete capable to assimilate atmospherically nitrogen. Is spread on marine dunes, alluvional sands along rivers and around lakes on stonily versants and crumbling bank, coasts and cliffs, detritus degraded pasture lands, etc. Its principal area is in Central Asia from Caucasian territory to North of Persia and Ural, to the East of Asia. In Europe it is along of Scandinavian coasts, in Baltic Countries to North Sea, South of England to the south of Europe vegetating on a narrow band on Mediterranean littoral in interior on vales in mountains or hills in North of Spain, South of France, North and Center of Italy, Yugoslavia, Down Austria, Hungary, South of Romania and Bulgaria. In our country *Hippophae* is in hills territories, Meridional and Eastern Carpathians valleys of versants from Moldavia and in Muntenia brings along valleys to field to the Danube. An insular center of sea buckthorn is in Danube Delta on Black Sea littoral in the place called Cardon at north of Sulina (5 km.). the optimum of its area is in under Carpathian zone of aflorismen of salifer, age

Mediterranean inferior aquitanian in Ialomita valley, Laculete, Prahova valley and its affluent Campina, Comarnic, Telega, Slanic, Teleajan valley, Homoraciu, Buzau valley, Cislau, Nehoiasi, Ramnicu Sarat valley, valleys from Vrancea Country etc. and it continues in all basins to Bucovina. Utility in forestry for the fixing of dunes or moving grounds supports more salts in soil Na Cl, it may be the national essence for the restoration of Vrancea Country and other regions deforested from salifer under Carpathians in which the installation of forest on salt soils is difficult. Its ample ramification and numerous thorns make it valorous for hedges. As bush it is very ornamental also with its silver leaves and its numerous orange fruits and persists on branches after the snow fall. It may be multiplied by seeds, slips, marcotage and suckers." Authors declared that the activity of elaboration of the encyclopedia was along the after first war period. I proudly may affirm the experience of Romanian specialists in the utilization of *Hippophae rhamnoides* in soil amelioration. In 2005 spring Romania has a great surface of flood. The economic phenomenon from the end of XIX Century when forests were destroyed and sailed for the construction of railways in Central Europe was the same in the legislative vide after 1990 and the situation in Romania is dramatic because the amplitude of destruction is incomparable. The mistake in the tackle of sea buckthorn is the attempt to define all varieties as one kind of assortment. It has a great variability and adaptability. Romanian researchers had demonstrated that the specie has the capacity to accumulate in its tissue a great level from some radioactive elements, characteristically for the soil and subsoil in its habitat zone. In soil and subsoil there are slowly transformations of radioactive elements, with variable times of halve which give to the crust a certain natural radioactivity. Alfa radioactivity results from the transformation of radium in radon, the beta radioactivity is given in special by the isotopic form of potassium being in soil near K40 ions. Romanian measurements of fruits in regions which are known with the particularity of radioactivity, established that

there were 34-37 less alfa global concentration like the maxim admitted limit in potable water and 2-3 more beta radiations. This illustrated the capacity of fruits to indicate the presence of natural radioactivity in soil, there are storing of beta radiation from absorbed radioactive elements on soil particles or dissolved in soil solution. There are other species like *Solanum nigrum*, Romanian zarna, *Veratrum album* stregoaie which has toxic components influenced by the soil composition. These explain many contradictions about the benefice or lethal effect of fruit utilisation. The authors of the Romanian Encyclopaedia considered it like not recommended in feeding, their occidental formation and sources are explaining this opinion. Conclusion is that the variability of this specie is the motive of many contradictions about the concentration of components and the large utilisation of it. I think that International Sea buckthorn Association must be the promoter of a scientific map-drawing of varieties on the global areas first step for research in the various domains of utilisation. The regional people's millenary experience in conditions of maintaining of environmental parameters must be an important yielding point in research activity. *Hippophae rhamnoides* L. has an opportunity to become the solution of the modern environment and feed global crises only in conditions of a global conception in research, integration of the production, processing, management and marketing. In my opinion the complete view of sea buckthorn resources must be as my schematic presentation in fig. 2. Important in all the world is to use it in soil degradation treatments. I had the privilege to see China works in Yellow River antierosional measures. Sea buckthorn is used in Bolivia in Amazonian region.

Romania has many natural resources in all domains of agriculture but we now are isolated, due to many causes, principals of them being corruption and the precarious management. This makes now sea buckthorn a solution like in China for the rehabilitation of soil, also a resource for the development of production of derivates. In Danube Delta a

research program on 1450 ha. and other surfaces demonstrate the capacity of the plant to be utilized in soil erosion protection. Actual situation needs thousand of environmental plantations, possibilities of rehabilitation are certified.

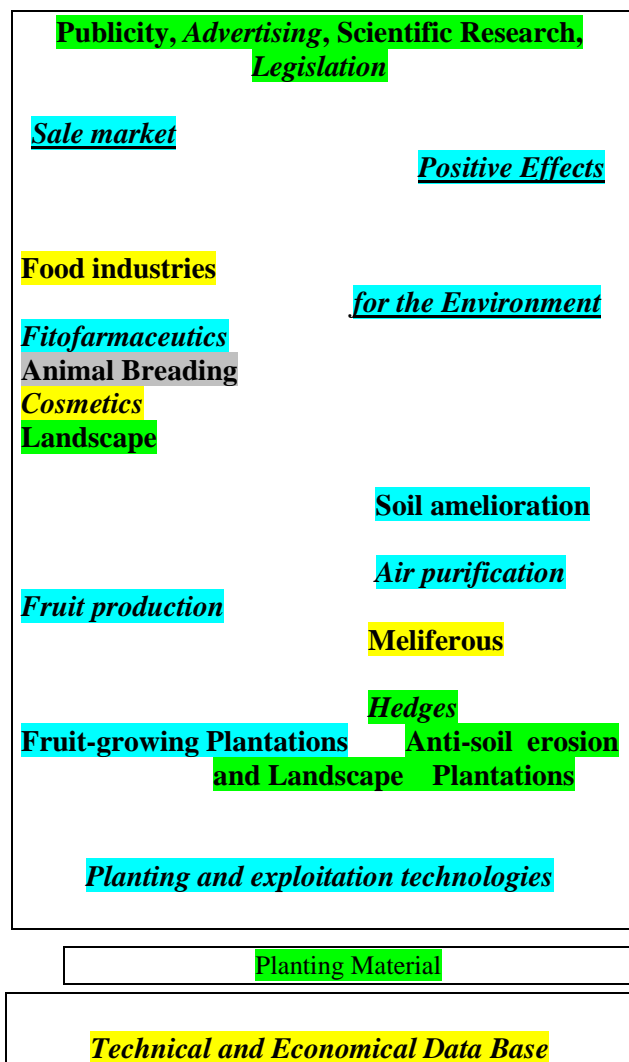


Fig. 2 Schematic presentation of principal aspects which are logically necessary for the scientifically implementation of sea buckthorn utilisation in Romania.

Sea buckthorn is called by the Romanian peasants in Buzau county “berries of the Holy Virgin”. Romanian people used from hundreds of years the fruits for the treatment of anaemia, diarrhoea, rheumatism and rash. From fruits they obtained many products in feeding: juice, vine, jam (with cherry, apples and plums), butter etc., they used it as textile colorant. In Romanian “Medicinal and Aromatic Plants from A to Z” guide book, the

two appreciate specialists Ovidiu Bojor and Mircea Alexan recommend sea buckthorn as vitamin complex (C, B1, B2, PP) carotenes, folic acid, oil, izoramnethol, fitosterol. Recommended in avitaminose Fructus Hippophae in combination with Fructus Cynosbati (hip rose), Folium Urticae (stinging nettle), gooseberry, Folium Menthae (mint), Folium Rubi idaei (raspberry) and Folium Primulae (cowslip), infusion, cooling drinks, syrups, gout as reach in vitamins and diuretic, pneumonia in combination with colt’s foot, linden tree, hyssop, cowslip, savory, elder tree, rickets Fructus Cynosbati (hip rose), Fructus Hippophae, Folium Primulae (cowslip), Folium Melissa (balm mint), adjuvant in pulmonary tuberculosis in winter and spring for vitamins with Fructus Cynosbati (hip rose), Folium Urticae (stinging nettle), Folium Primulae (cowslip), uremia in combination with diabetes Folium Betulae (birch tree), Folium Myrtilli (bilberry) and Herba galegae (goat’s rue), xerophthalmia in combination with Fructus Cynosbati (hip rose), Folium Urticae (stinging nettle), Flores Tagetes (marigold) and Fructus Myrtilli (bilberry).



Fig. 3 Variety of Sea buckthorn oil products of S. C. HOFIGAL S. A. from Romania

PRODUCTS PRESENTATION:
 Phials with 10 ml; 20 ml ; ±3%, 100ml; 500 ml; ±2% or capsule with 0,4 or 0,6 ml sea buckthorn fruit oil the active principia extracted through an original proceeding being a natural food concentrate. Liposolubil components of the sea buckthorn oil represent a polivitaminic complex with regenerating action for the cellular metabolism. Active principia contained are, in principal β-carotenes, vitamins D, E, F, K, therefore all liposolubil vitamins, also o series de polifenolic products strong anti-infectious.

Also contains lecithin in easy assimilability forms (calcium and magnesium salts), unsaturated fatty-acids like β -linolic acid as precursor of a lot of organic enzymes. ACTION: general tonifiant, antianemic, vitaminizant; imunomodulator; synergic action with interferon; contribution for the syntheses of proteins raw-material for interferon; coronaries protector; antiaterosclerotic; slowing down the process of ageing by consumption of undesirable free radicals; detoxifying the liver and assure the trofic function for the hepatic cell; anticancerigen by the great contain of β -carotene; in extern administration good for cicatrizing, dermoregenerator effect, anti-inflammatory, nutritive; excellent protector against solar radiations or de other nature. INDICATIONS: Intern use: Prophylactic: slowing down the process of ageing and anticancerigen, tonic general in stress situations, imunomodulator. Adjuvant: intern treatment of some dermatological affections (psoriasis, LED cutanate forms), ORL affections with component atrophic and inflammatory, cardio-vascular affections being a good coronaries protector affections ale digestive system. Active in chronic hepatitis, uro-genital affections, neurological psychical affections, antianemic, excellent role in slowing down of some ocular affections (hemeralopia, presbytism, keratomalacie, myopia, astigmatism, hipermetropy, glaucoma, cataracts) being rich in β -carotenes.

Extern use: local treatment of eczema, thermal and chemical burns, chilblains, alergodermatitis, psoriasis, lent recovery wound. It is the only natural product recognized for the activity of protection against solar radiations or other nature. Cosmetically use: ant-lifting and nutritive creams, gels and lotions of protection and maintenance for all kinds of skin.

S.C. CCPPM Plantavorel S.A. Piatra Neamt, continue the traditions of Vorel pharmacists family which in 1880's initiate Green Pharmacy, in 1942 produced 120 products. In 1948 it was nationalized. In 1983 Plantavorel Laboratory initiates new research and production in utilisation of Romanian "Green

Gold'. Now there are sea buckthorn homologated products "Cevisol", natural dietetic and food supplement extract of fruits. Tonic general, for children, convalescents, intellectual and physical effort. "Vorisol granule" natural dietetic and food supplement extract of fruit extracts of *Hippophae rhamnoides* and *Rosa* species. Granules may be used also like tea, 2 spoons at 100 ml. water. There is "Hebe radix" protection cream extracts of sea buckthorn, marigold and blackwort, volatile oil of mint, excipients, conservants. Recommend in solar and thermo burns, contact dermatitis, etc. Research programs recommend plants from "Curvature Carpathians" as optimal for pharmaceutical products.

Ioan Lupe, Romanian forestry specialist had modern initiative in sea bukthorn utilisation. In the work „Pomicultura generală și specială Editura Didactică și Pedagogică 1982, authors Popescu M. and other pomologists presented the first tehnology and presentation of sea buckthorn, now the research is focalised on conservation, evaluation and development of genetic resources, establishment of plantations with suitable varieties, identification of new valuable genotypes, analyses of biochemical fruit characteristics, studies of physical and chemical soil improvement, and studies of symbiotic association between the plant and fungi and bacteria. Unfortunately this plant was never approached in a global conception in Romania; this made it a permanent a theoretical resource.

The approach should be in two directions of implementation in Romanian agricultural system: horizontally: plantations on large surfaces on degraded soils, eroded, salty, etc.; vertically: creation of a data base, of some productive centers, biological material selected budgets, systems of plantation, technologies, a system of processing of the production, diversification, creating a large game of uses and obtaining economical superior results, competitive products for export creation of an informational system and publicity for sea buckthorn products, changing mentalities and wrong treatments with artificial products (Fig. 2.).

CONCLUSIONS

This plant is fixing lands which are most degraded (has many suckers), assimilate atmospherically nitrogen directly by roots (has an ameliorative effect to the soil), Frankia is the bacteria which is responsible of this quality estimative it is considered a volume of 2 – 179 kg. N / ha/year.

In modern pharmaceuticals it is also used in cosmetics, many treatments and for burned and irradiated tissues. In the feeding of domestic animals were used some products, for the aspect of the hair of dogs, cats, and horses, the quality of eggs and the immunity.

Plants are used like decorative plants and hedge; their green-white colour is in contrast with the orange of flowers and fruits.

Lupe Z. Ioan, Grigorescu Emanoil, Brad Ion, Cireasa Victor, Manea Stefan are some of Romanian specialists in forestry, horticulture, medicine, bio-chemistry with many studies and applications of sea buckthorn as we can see in the summary attached bibliography.

In Romania *Hippophae rhamnoides* L. was the object of many national research programs, now it was abandoned. Now there are not serious investitures and are not mobilized foreign institutions which may use modern instruments for the obtaining all advantages of this plant.

Some institutions and industrial units continue the tradition with good results, but I think that is not the level which is possible in the actual potential of Romania. It must be a solution of the rehabilitation of thousand of hectares of Romanian denuded grounds.

In the doctorate thesis: “Studies about the importance of sea buckthorn (*Hippophae rhamnoides* L.) in the environmental protection and human health economy”, there were presented solutions for the implementation of the plant but in Romania but it is difficult to be initiating a national programme in this domain at this moment when the national interest is inexistent. Romania is considered to be the place where many vegetables have some conditions which made them most good like in other regions, sea buckthorn is one of them and here it has a great variability. The Romanian biotypes fruits contain a lot of vitamins, 2 x

vitamin C like hip roses, carotene, citric acid etc. The oil contains E vitamin which is revitalizing the human organism, near vitamins P, B1, B2, A, K, F (F vitamin defend cells of cancer and irradiation, there are also 15 microelements Fe, Mn, B, Al, K, F, Ti etc. From fruits it is possible to obtain many products in feeding: juice, vine, jam (with cherry, apples and plums), butter etc. All products are very rich in vitamins.

Plants of *Hippophae rhamnoides* L. are valuable like decorative plants; their green-white color is in contrast with the orange of flowers and fruits, it is a melliferous plant, aspect important in its polenisation.

Interesting was the EU-Project G5ST-02-71999, SEABUCK Innovative products obtained from fruits of Sea buckthorn (*Hippophae rhamnoides*). Milestones of Seabuck project funded by the European Commission are:

- optimization of the extraction, purification and stabilization technology for carotenolipoprotein complex from Sea buckthorn fruits;
- detailed analysis of obtained carotenolipoprotein complex on chemical composition, stability and activity;
- large scale realization of the extraction and purification technology for the carotenolipoprotein complex at one of the participating technology companies and estimation of the production costs;
- development of three different cosmetic products containing the Sea buckthorn carotenolipoprotein complex ready for commercialization
- sensory and dermatological trials of the developed cosmetic products.

International Sea buckthorn Association has an important role in the future development of Romanian evolution, the natural potential of Romanian biotypes may be integrated in research and production programs, international collaboration, creating a world data base in research, commercial and technological domains. In Romania must be initiate an environmental and food and health program, the logical succession of problems was presented in Fig.4, there are many problems, one of them being the resistance and opposition

of artificial producers of food, juice, syrup, vitamins etc.

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