

SEA BUCKTHORN "*HIPPOPHAE RHAMNOIDES L.*" - BIOLOGICAL, ECONOMIC AND SOCIAL IMPORTANCE IN ROMANIA AND NOT ONLY

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Abstract

The paper aimed to present the importance and role of sea buckhorn from a biological, agronomical, economical and social point of view. To attain this goal, an important range of scientific publications offered their support regarding the results obtained by various researchers across the time. A critical review and a personal point of view was used to highlight the main aspects of interest and in addition the experience accumulated in setting up the PhD Thesis and participation with the scientific results to various international and national Symposia and Confereneces allowed to develop exchanges of main impressions and expeirience with other researchers. This approach intends to be an alarm bell for the recovery of the white sea buckhorn as an important plant which could be included among various solutions in this period of economic, food, health, and social crises. The conclusions highlighted that the scientists of the world must understand the actual Earth crises and find, among other solutions, that sea buckthorn could be extended in scientific conditions. The optimist vision considers that a new horticultural science will be able to implement sea buckthorn in all zones with problems covering social, feeding, health and environment aspects. In this way, sea buckthorn could open a new door and occupy a new position in the history of plant utilization.

Key words: sea buckthorn, biological characteristics, economic, social, health and environment importance

INTRODUCTION

"Man is meant to be accomplished. It is from this that the one who does not aim at perfection is destroyed and destruction is the beginning of misfortune ... No wretched man is happy. The evil man suffers even in the midst of riches, and his soul never has peace. Thus, happiness on earth lies in the fulfilment of the purpose for which we are made, that is, of our work on us and our peers to make us better" said, almost two centuries ago, Nicolae Bălcescu [1] a Romanian personality whose name was borne by the Agronomic Institute of Bucharest, founded in the year 1852, at present University of Agronomic Sciences and Veterinary Medicine of Bucharest.

About 50 years ago, a new current in agricultural theory has appearead in Romania, according to which some species from spontaneous flora were adopted in culture, one of them being sea buckthorn [7].

Sea buckthorn is called by the Romanian peasants "berries of the Holy Virgin".

It seems that when Roman imperial legions invaded "Dacia" (the name of Romania in the old times) and saw the Carpathian Mountains at the base of them was a line of plants coloured like a metal like steel. When they arrived near the mountains, they understood that it was a plant and called it "*catena*" (latin of chain). It may be the origin of the Romanian name of sea buckthorn: "*catina alba, catina cenusie, catina de rau etc*".

Lupe Z. Ioan [17], Grigorescu Emanoil [11], Brad Ion [5, 6], Manea Stefan [18] are some of the Romanian specialists in forestry, horticulture, medicine, bio-chemistry with many studies and applications of sea buckthorn.

In this context, the purpose of the paper is to present the biological, economical and social importance in Romania, at present and in the future.

MATERIALS AND METHODS

To set up this study, it was needed to consult a large range of books, textbooks, scientific journals, published articles for identifying the main ideas which could be selected and highlighted in the content of the paper.

The material is presented in a logical order covering the following aspects: the importance and role of the International Sea buckhorn association at the global level, the situation of seabuckhorn in Romania, the geographical zones where this magic plant grows, biological aspects of the plant, its utilization in forestry, agriculture, nutrition, medicine, cosmetics, economic, social, health and environment importance.

The results obtained by various researchers across the time were approached in a critical manner and also the personal point of view of the author intended to highlight the main aspects of interest.

In addition, the experience accumulated in setting up the PhD Thesis and participation with the scientific results to various international and national Symposia and Confereneces allowed to develop exchanges of main impressions and exeprience with other researchers.

This approach intends to be an alarm bell for the recovery of the white sea buckhorn as an important plant which could be included among various solutions in this period of economic, food, health, and social crises.

RESULTS AND DISCUSSIONS

The role of International Sea buckthorn Association

The International Sea buckthorn Association organized world reunions as seen in the Proceedings of the first and next Congresses [13, 14, 22] where are published the essays elaborated by specialists from Bolivia, Canada, China, Estonia, Finland, Germany, India, Italy, Latvia, Romania, Russia and Ukraine.

At the second Congress there were delegates from Azerbaijan, Bolivia, Canada, Korea, Finland, Germany, India, Italy, Japan, Latvia,

Mongolia, Nepal, Nigeria, Pakistan, Russia, Sweden, Turkey, Ukraine and U.S.A.

All these experts from many countries work under one flag, sea buckthorn a plant which means hundreds of years of plant arrangement architecture, research, experience, secrets, production, health of soil, health of animals and health of peoples in a self-destructive human society of the third millennium.

What displeased at those Conferences? The impossibility of put in order all important and multidisciplinary information.

There were involved specialists in: botanics, geology, marketing, medicine, biochemistry, agronomy, management etc. All of them need information.

The solution is to elaborate a statute of an interdisciplinary new science the subject being sea buckthorn and the most important, a multilingual data base, alphabetically ordered accessible for anyone interested.

Sea buckhorn in Romania

Romania has many natural and scientifically resources in all domains of agriculture. In year 2000 it had 3,500 species of plants (800 in forests, 300 weeds, 1,150 in the Danube Delta), there were 300 species of birds and 100 species of mammals.

The beginning in Romania was in the modern scientific statute of agriculture started in the inter-war period. There are important works [12, 21, 30, 34] which presented the past and actual situation.

Biological description of Sea buckthorn

In the period 1938-1943, Constantin Filipescu [10] published "The Great Agricultural Romanian Encyclopedia" where he mentioned in the introductory part: "Any country with *pretensions of civilization must have in the cultural treasure agricultural encyclopedia and dictionaries needed by anyone who is concerned by this millenary activity*".

In the first volume of this work, sea buckthorn was ample described from page 710: "cătina albă bot. *Hippophae rhamnoides* L. Fr. Saule epineux, germ. Sanddorn, engl. Sea buckthorn (sea, buck, thorn) bush usually having 2-5 m, looking like a little tree from slippery grounds of river's gravels.

One-year stems has silver scaly brush and ferruginous rust colored down, early they get

thorns, old stems have a great number of short stems 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 being 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".



Photo 1. Sea buckhorn in Brebu locality, Prahova County, Romania
Source: Original by Prorocu Angel.

Dioeciously flowers are little, less apparent, greenish, situated on annual stems on which it appears simultaneous with leaf by 2-3 at the base of inferior leaf 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; unicarpelar 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 principium, 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 resist 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.

The zones where Sea buckthorn is spread are the 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 the Scandinavian coasts, in the Baltic Countries to the North Sea, the South of England to the South of Europe vegetating on a narrow band on the Mediterranean coast in interior on valleys in the 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 Romania, Hippophae is in the hilly territories, the Meridional and Eastern Carpathians valleys of the versants from Moldavia and Muntenia along the valleys to the field to the Danube.

An insular center of Sea buckthorn is in the Danube Delta at the Black Sea littoral in the place called Cardon at North of Sulina (5 km). The optimum of its area is in under the Carpathian zone of aflorishment 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 County etc. and it continues in all the basins to Bucovina.

Agronomical importance of Sea buckthorn

The plant is of high utility in forestry for the fixing the dunes or moving grounds supports more salts in soil Na Cl. It is the national essence for the restoration of Vrancea County and other regions deforested from saline under the Carpathians in which the installation of forest on salt soils is difficult. Its ample ramification and numerous thorns make it valorous for hedges.



Photo 2. The capacity of roots to generate many suckers

Source: Original photo by Proorocu Angel.

As bush it is very ornamental also with its silver leaf and its numerous orange fruits and persists on branches after the snow fall. It may be multiplied by seeds, slips, marcottage and suckers.

In 2005 spring, Romania has a great surface of flood. Sea buckthorn could be able either like the single plant or in combinations with other plants to consolidate the places sensitive in this kind of situations.

The economic phenomenon from the end of XIX Century when forests were destroyed and

acaparated 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.



Photo 3. Nodules of symbiotic organisms on roots

Source: Original photo by Proorocu Angel.

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 maximum 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) and *Veratrum album* (stregoaie) which have toxic

components influenced by the soil composition. These explain many contradictions about the beneficial or lethal effect of fruit utilization.

The authors of the Romanian Encyclopedia considered it like not recommended in feeding, their occidental formation and sources are explaining this opinion.

The variability of this species is the cause of many contradictions about the concentration of components and the large utilization of sea buckhorn.

Utilizations

Romanian people used from hundreds of years the fruits for the treatment of anemia, diarrhea, rheumatism and rash [31].

From fruits they obtained many products such as: juice, vine, jam (with cherry, apples and plums), butter etc., they used it as textile colorant.

In modern pharmaceutics 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.

Sea buckhorn is also used like a decorative plant and hedge; its green-white color is in contrast with the orange of flowers and fruits.

Hippophae rhamnoides L. was used as a solution for the rehabilitation of denuded grounds and as a quality of it, the fact that the plant assimilates atmospherically nitrogen directly by roots.

National Programs concerning of Sea buckhorn in Romania

In Romania *Hippophae rhamnoides* L. was the object of many national research programs. Now, there are no investments and no mobilized scientific and financial forces able to use modern instruments for obtaining all the advantages of this plant at the great potential and necessity in the actual crises. Some institutions and industrial units continue the tradition with good results, but not at the potential level of Romania. It must be a solution of the rehabilitation of thousand of hectares of Romanian denuded grounds. One important step in sea buckhorn implementation as a resource in actual human

crises is a handbook of Seabuckthornology, in Romania, where it is discussed about silvosofia and silvocalia, which is not a bad idea, but sea buckthorn could be one of the solutions to solve vital problems.

In this direction, at the global level and in Romania as well, there are 6 reasons as Sea buckhorn to be considered a valuable plant:

(1) Romania has a great variety of the biological material which was not catalogued and capitalized in its all aspects and possibilities.

(2) Sea buckthorn is a crises solution in soil, considered as an organism, birds, animals and human health in poor and debased regions but not only there.

(3) Sea buckthorn (as material and scientific abroad) from Romania could be a source of biological material, [4] treasure of scientific experience in many domains of human crises for the rest of Europe, harmoniously implementing the national traditions with high technologies in production and presentation on a large market interested in ecological and natural products.

(4) Being at the last “door” of the Danube, the most important and most facile way of communication and transport in the old times, there were founded solutions and made hydrological works by the European Commission for the Danube area when experts from many countries used sea buckthorn for sophisticated hydrological and consolidation works [33].

Across the time, the Romanian peasants had abilities in using the sea buckhorn for treatments, feeding, and as colorant.

After the second World War it was an emulation and it was developed the experience of the Romanian forestry specialists, peisagists, and land health and many other domains specialists [3, 8, 9, 18, 19, 20, 23, 32, 35].

Important results were obtained by the specialists working in the research and the production of pharmaceutical, feeding, cosmetics industries.

A great part of this activity was abandoned after 1990.

At present, there are problems with forest fruits which are chaotically collected without

scientific reasons by “enterprisers” to be sold to foreign firms with a little profit.

Many animals have no possibilities to find their habitual food and are migrating in cities and villages, to look for food in garbage dumps, bears are notorious in this respect in Romania.

(5) In consequence, it is necessary a new approach of sea buckthorn with all its possibilities of utilization simultaneously applied;

(6) It is needed that in the future to be created and implemented an educational program in agricultural schools of all levels as the new generation to understand and apply sea buckthorn utilization in all domains.

It is a plant which grows in all Euro-Asia and now is also found in America.

Like in case of Viticulture, where the contribution of national schools was vital in *Vitis vinifera* crises caused by phylloxera and evolution of culture systems and diversified products, sea buckthorn has to be promoted.

Prof. dr. Ion Brad was the most famous researcher and promoter of sea buckthorn in Romania. Many great specialists were involved in sea buckthorn research and utilization in many domains but regrettably disappeared [16].

The absence of material and financial support does not sustain the creation of enterprises at the potential of the Romanian thesaurus in this domain.

The Danube Delta could be a good example of a place in permanent transformations, possibilities of research in many aspects and could be also an example of successful use of its potential even though there are still many things to do to entirely exploit it.

In 2006, in the thesis entitled: “Studies about the importance of sea buckthorn (*Hippophae rhamnoides* L.) in the environmental protection and human health economy” [29], it was mentioned that: “*In the entire world it is a wrong treatment in climate soil and health crises. A reason that Seabuckthorn has to be reconsidered!*” [24-28]

CONCLUSIONS

Sea buckthorn is a plant used by world peoples from thousands of years, Romanian people having a great natural biological resource, is one of them.

Many domains were preoccupied of this plant but many accumulations of generations are not used in actual period. The simple production of berries is not significant. There are solutions for classic plantations (ex. China) or mechanized kind when 7 people may with adequate machines may resolve all aspects for 50 ha. (ex. Germany).

First of all, important is to be considered work and intelligence in time of Romanian people, interference with “the greatest powers” of sea buckthorn in all aspects [15] and starting producing in Romania final products with logical intern benefit.

Now when the problem of Terra is a profound crisis in principal aspects of classical agriculture and environment it will be necessary a scientific, practical and coordinated strategy and results will be grandiose!

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