

SUSTAINABLE USE OF MEDICINAL AND AROMATIC PLANTS FROM THE FOREST ECOSYSTEMS LOCATED IN DOGROGEA (SOUTH-EASTERN ROMANIA)

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Abstract

*The tradition of using medicinal and aromatic plants in Romania dates back to the year 1862. The purpose of the present paper is to identify the main medicinal and aromatic plants, as well as estimating the quantities that can be harvested from Dobrogea in 2018 from the forest fund managed by RNP - Romsilva, the National Forest Management Institute. As such, 21 medicinal plants were identified in the two forest districts (DS) from Constanța and Tulcea Counties. A quantity of 22 t of medicinal plants from 10 species was estimated for harvesting in DS Constanța, while in DS Tulcea the number reached 588 tones from 21 species. The largest quantities that can be harvested in DS Constanța are represented by locust (*Robinia pseudoacacia*) – 5 tones and elderberry (*Sambucus nigra*) – 5 tones, while for DS Tulcea they are represented by silver linden (*Tilia tomentosa*) – 180 tones, elderberry (*Sambucus nigra*) – 60t and nettle (*Urtica dioica*) – 50 tones. All the other species can be gathered in quantities ranging from 1 ton to 40 tones. Taking into account the natural conditions, Dobrogea region is characterised by a high potential of medicinal plants. The possibility that these natural resources are maintained and even developing future abundant populations is conditioned by the appliance of appropriate management measures that abide to the present laws, the species sustainability principle as well as the protection of endangered species.*

Key words: aromatic plants, Dobrogea, medicinal plants, non-wood forest products

INTRODUCTION

Medicinal plants are among the most used non-wood forest products since ancient times. In most of the countries worldwide, regardless of their medicinal traditions, the plants provided the main ingredients for medicines. However, the term “medicinal plants” can generate some controversies. As such, there are plants that are mainly used as food source but they are also considered to have additional health benefits. Furthermore, some aromatic plants (condiments or “herbs” - aromatic plants) are also known for their medicinal properties. Based on their characteristics, an insignificant difference is made between the plants used as food and the ones used as medicine, especially in areas such as Africa or India, in comparison with the Occident. Thereby, medicinal plants are grouped in the largest “medicinal and aromatic plants” (MAP) category which covers not only the plants used from a medicinal point of view (as they are known generally), but also plants that

are used for similar or overlapping purposes such as nourishment, condiments or cosmetic products [25].

Worldwide, the total number of plants used in medicine is ranging between 35,000 and 70,000 [25]; [9], while the percentage of people who rely on medicinal plants for satisfying their primary medical needs is of approximately 70-80%. [21]; [9]. For example, China uses 11,000-11,250 plant species in medicine [10]; [34]; [22], while India uses 7,500 [26], Mexico 2,237 [31] and North America 2,572 [20], respectively.

In Occidental medicine plants were used as ingredients for remedies or they had an important role in discovering new ones. Some remedies are extracted directly from plants, while others are obtained by manufacturing chemical substances from plants and others are synthesized from inorganic materials, even though they were also based on the research of active compounds identified in plants [16]; [15].

The tradition of using medicinal plants in Romania, was observed in the first century A.D. So that in 1862, was published the first Medicinal Book, describing 217 medicinal plants [14].

Medicinal and aromatic plants represent an important income source for the poor population from villages, especially through the form of harvested plants.

However, harvesting and trading medicinal and aromatic plants on a large scale can lead to the extinction of certain species. As such, the possibility that some species can become extinct at a local, regional or national level must not be sub estimated. This can lead to severe consequences for the economy, livelihood, as well as causing genetic conservation problems [9].

The most collected herb from Prahova County is wild garlic (*Allium ursinum* L.) [7], while in the case of Timiș County is common St John's-worth (*Hypericum perforatum* L.) [8].

The purpose of this paper was to identify the medicinal and aromatic plants from Dobrogea as well as to estimate the quantities that can be collected in 2018 from the forest fund managed by the National Forest Administration-ROMSILVA.

MATERIALS AND METHODS

Dobrogea has the shape of an irregular quadrilateral encompassing two counties: Constanța and Tulcea (Fig. 1). Dobrogea is confined by important European geographical coordinates. As such, the lower inferior Danube course bounds the area in the West and North side, while the Black Sea does the same in the East part. Overall, Dobrogea is a vast erosion plateau with landscape differentiations from one unit to the other [11]. The area accounts 10,400 km², namely 4.3% from our country's territory. The climate is continental with tendencies of accentuated excessivity.

The largest part of Dobrogea is characterised by silvo-steppe and steppe vegetation, with grayish oak, pubescent oak and Tatarian maple. The forest encompasses Măcin Mountains, Tulcea Hills, Babadag and Casimcei Plateaus, as well as South-West

Dobrogea with its sub Mediterranean, Mediterranean-balcanic, oriental, tauric-caucasian and medium-European elements [24]. The North is predominantly composed of holm, linden and hornbeam [5], composing a mesophile balcanic level; in the center (Casimcea), linden and grayish oak (accompanied by hornbeam and ash) form dense forests in a second xerotherm (Mediterranean) level; the elements of the two levels mentioned above can be found in the south (in Oltinei Plateau), with a preponderance of the mesophile ones - ash and hornbeam.

The forest soils characteristic for this area are chernozem and phaeozem [29], soils rich in humus [3] and nutritive elements [27]. The most common animals are wild boar, buck, jackal, European hare, duck and wild goose [4].



Fig. 1. Research area (/www.google.com/)

Identifying and estimating the quantities of medicinal and aromatic plants that can be collected from Dobrogea in 2018 [32] was based on the data recorded in the last years by the specialists from "Marin Drăcea" National Institute for Research and Development in Forestry (INCDS). These records concerned medicinal plants (information from specialty works: research themes, scientific papers etc.) and took into account the actual surface of the forest fund managed by RNP - Romsilva National Forest Administration.

Were taken into account also some ecologic factors that influence the forest ecosystems productivity. They included altitude, annual average precipitations and soil type. Another

factor taken into consideration was the principle of the sustainable harvesting, so that the limit of 75% imposed by the fundamental Romanian environment protection law was respected.

Very important for estimating the productivity of resources is meteorological prognosis for the current year. The quantities of medicinal herbs can significantly vary from one year to another, according to the precipitation quantities present during the blooming season.

RESULTS AND DISCUSSIONS

Medicinal and aromatic plants, with their potential for satisfying living needs, offering health alternatives and a series of ecological products for household, pharmaceutical or cosmetic usages can be found in significant quantities in Dobrogea, under the form of shrubs, trees or grasses. Twenty one species of medicinal and aromatic plants that can be harvested were identified on the surface of the two forestry directorates (*ro.* Direcție Silvică) from Constanța and Tulcea Counties.

A quantity of 22 tones of medicinal and aromatic plants from 10 species was estimated as harvestable in Constanța Forestry Directorate, followed by a quantity of 588 tones from 21 species in Tulcea Forestry Directorate (Fig. 1 and Fig. 2).

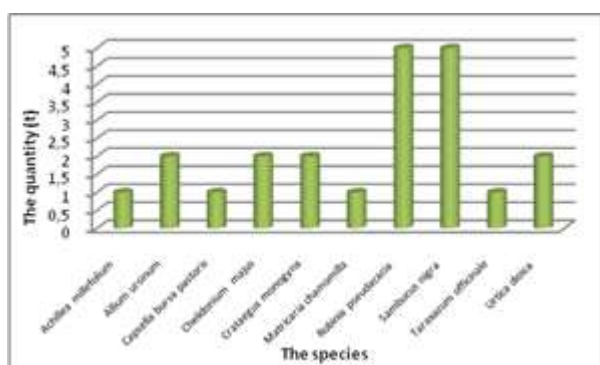


Fig.2. The quantity of medicinal and aromatic plants that can be harvested from DS Constanța
Source: Original

It was recently reported, the largest quantities of medicinal plants can be harvested from three of the 41 national forestry directorates, namely Bihor (16%), Tulcea (10%) and Vaslui (7%) [32]. As such, Tulcea Forestry

Directorate is an important center at a national level, from where important quantities of medicinal and aromatic plants can be harvested.

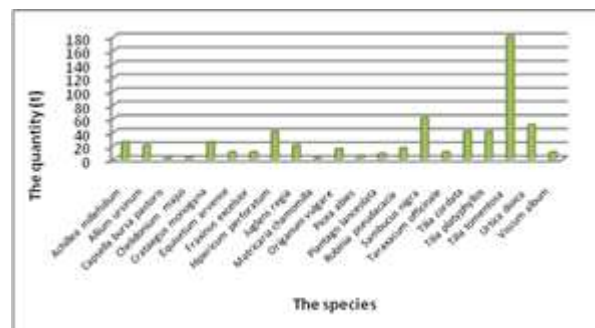


Fig.3. The quantity of medicinal and aromatic plants that can be harvested from DS Tulcea
Source: Original

In Constanța Forestry Directorate, the largest harvested quantities are those of black locust (*Robinia pseudoacacia*) – 5 t and elderberry (*Sambucus nigra*) – 5 t.

Black locust (*Robinia pseudoacacia* L., Family Fabaceae), is a rather pretentious species in regard with the climate and soil, but due to its peculiar vitality, it can grow in the most varied conditions, especially in plain areas, on light, sandy soils that are fixed by its strong root system [6]. It is commonly planted on roadsides from South Oltenia, Muntenia and South Moldova [28].

It usually blooms between May and June. The flowers (*Flores Acaciae*) are harvested, registering a drying yield of 6-8:1.

Due to the low content of robinia and acaciina - a flavonoidic glicozid and a volative oil, the flowers are recommended as gastric antacid and are indicated in some medicinal teas for calming cough [1].

Black elderberry (*Sambucus nigra* L., Family Caprifoliaceae) can be found in Europe, Asia and North Africa. In our country, the species is commonly found in fields, hills and inferior mountain areas [28].

The plant prefers warm areas with fertile soils, rich in humus, mellow and ravens [13] [29]. Black elderberry is one of the most recognized medicinal herb in Bihor County [30].

It develops in semi shadow and it can be found in the stands from hill and field forest.

The flowers are harvested during May-June and the fruits (*Fructus Sambuci*) during September-October.

The fruits are recommended as sudorific, in bronchitis, and urinary infections and fruits can be used in treating constipation. Elderberry has also an external usage for treating abscess, furuncle, eyesore, conjunctivitis etc [1].

The flower drying yield is 5- 6:1.

In Tulcea Forestry Directorate, the harvest estimate is high for quantities of silver linden (*Tilia tomentosa*) – 180t, elderberry (*Sambucus nigra*) – 60t and nettle (*Urtica dioica*) – 50t. All the other species can be harvested in quantities gathered between 1t-40t.

Silver linden (*Tilia tomentosa* Moench., Family Tiliaceae) is the most widespread species, being very resistant to frosts. It can be found in hill areas or pure linden stands, rarely in field or mountain forests[28].

The plant blooms between June-July, and only the flowers (*Flores Tiliae*) are harvested. Harvesting these flowers is a very hard process due to the tree's height and the harvesting height. The drying yield is of 3,5-4:1.

Due to mucilages, linden flowers decrease respiratory inflammations. The plant is also very good as a sedative in nervous conditions, insomnia and as expectorant in bronchitis [1].

Nettle (*Urtica dioica* L., Family Urticaceae) is spread out in the entire country, from the field area to the alpine one, preferring soils rich in nitrogen (forest clearings, near stables, on water shores, etc.) [29].

It blooms during June-October. Only the leaves (*Folium Urticae*) are harvested, or all the aerial part of the plant (*Herba Urticae*).

Nettle juice can be used as antidote for the sting caused by nettle leaves, while a fresh leaf infusion can cure burns. The root has a benefic effect for enlarged prostate. A homeopathic remedy from leaves is used in treating rheumatic gout, hives and chickenpox, while on the exterior it can be applied for treating bumps [2]. A rational harvesting can prevent its extinction from the spontaneous flora.

The sustainable use of medicinal and aromatic plants

In order to maintain the structure and stability of biocoenosis, the protected species will be controlled in order to prevent their harvesting and to ensure the species' perpetuity.

All the other species will be collected by respecting the following rules:

- it is forbidden: to collect plants that belong to small populations; to tear or destroy the subterranean parts (roots, rhizomes, etc.) of the plants used only for their superior parts; to break or cut stem or branches while collecting fruits, flowers or leaves or any other form of impairing plants and their habitat; to collect near roads with heavy traffic or waste deposits [13];

- the collected species must be very well identified so that confusions with similar species will be avoided, avoiding such species that can have a negative health effect or to avoid the harvest of rare or endangered species;

- one exemplar from the collected species must be kept in the Herbarium;

- species will be collected from the habitats where their populations are the most numerous;

- only mature exemplar will be collected, and only the parts with the highest content of active substances for which the plant is used [23]; [13].

The plant's parts will be collected during the year, when the content of active substances is the highest, as follows [33]:

- subterranean parts: autumn (September-October);

- bark: spring (March-April) and very rarely autumn;

- herbaceous plants: at the beginning of the plant's blooming;

- leaves: at the beginning of the plant's blooming;

- flowers: when the buds open;

- dried fruits: immediately before maturing;

- succulent fruits: when they are matured;

- seeds: when they are completely matured.

The management measures for medicinal and aromatic plants must take into account the future reserve, as well as methods for conserving species.

According to [12], a good method for maintaining future reserves and for conserving medicinal and aromatic plants is their cultivation, as it will satisfy the request for extending the market for these raw material. However, cultivating medicinal plants presents some inconveniency, such as [18]:

- most plants are hard to cultivate;
- cultivating a plant can often last many years;
- many plant species are required only in small quantities;
- the quality of plants harvested from wild areas is superior;
- the costs for the plants collected from the wild flora are lower than from the cultivated ones [17].

The socio-economic aspect implied by collecting of medicinal plants from the wild flora as an additional income or sometime the only means of subsistence for the poor population from certain countries, comes as a fact that sustains this type of harvesting against cultivation. However, in the case of medicinal and aromatic plants that are high in demand or for those threatened by supra-population or loss of habitat, cultivation remains the only method for stopping the diminishing of plant populations and for ensuring the survival on a long term of certain species [19].

CONCLUSIONS

Taking into account natural conditions, Dobrogea presents a high potential of harvesting medicinal plants. There is a possibility that these natural resources can be kept and even to develop abundant populations in the future if we consider the application of management measures that respect current legislation, the species and population sustainability principle and the protection of endangered species. As such, future generations can enjoy the benefits offered by medicinal and aromatic plants from this area, while people from poor cities can still be involved in their harvesting and can considerably improve their living conditions and income.

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