

Preservation of Sage Natural Resources and the Opportunity for Its Cultivation

Mato Arqilea^a, Mero Gjergji^b, Bardhi Nikoll^c

^aFaculty of Agriculture, University "Fan S.Noli", Korça, Albania

^bUniversity "Fan S.NOLI", Dean, Korça, Albania

^cFaculty of Agriculture and Environment, Agricultural University of Tirana, Albania

Abstract

In the group of medicinal plants with high environmental compatibility, in the Southeastern region of the country, the sage has an important place (Papadhopulli G.,1987). Its medicinal and agronomic values particularly for the dry regions are too high.

This was the reason why the authors of this study undertook experimentation on multiplication possibilities, either through the pieces from sage plants obtained from its natural habitat or through multiplication by seed, also obtained from the same place. Knowing the floral biology of this plant, is creating opportunities (Qosja Xh., 1980) not only to protect it from the biogenetic erosion that is operating sharply in all cross-pollination plants as well as sage, but also to improve, enhance and cultivate it for the benefit of farmers of these regions.

Seeing the tremendous risk involved in genetic erosion, its preservation is one of the greatest challenges for all those who believe that this plant is really a national asset, which should not only be preserved but also improved, through genetic improvement programs, without touching its natural habitats.

KEYWORDS: sage, medicinal plants, genetic erosion, natural habitat, preservation.

INTRODUCTION

In our country, sage is widespread in many hilly and mountainous regions in the form of natural massifs. In some regions, the income earned by its trade constitutes an important part of the income for the residents of the respective areas. (Group of Authors.,1989, 1992, 1996).This is an important source of economic growth.

Presently, genetic erosion is becoming more and more evident, consisting in the gradual loss or even total loss of genetic diversity (Group of Authors.,1998). This negative phenomenon, dramatically, appears across the globe, but at different intensity. In our days, the risk of this phenomenon is evident. From FAO studies it is estimated that in recent years the losses were 20,000 species per year, or in average 60 species per day(Heywood V.,1988). Even in our country, during the last 4-5 decades, strong genetic erosion has occurred in plant genetic resources.

But, while forms of cultivated plants are subject to genetic erosion (Ferrenti G., Massih L.,2003)by replacing them with intensive plant forms (hybrid cultivars, created by humans through genetic improvement programs), thus removing them from cultivation practice; while spontaneous forms are subject to this phenomenon by extinction from their natural site (in-situ). This phenomenon is more pronounced in aromatic and medicinal herbs that are gathered by the community for instant interests,

without thinking about their regeneration to be constantly irreplaceable property of that community(Sh. P. B. Tiranë.,1972).

Nowadays, the loss of variety of plants that carry genetic variability is a call to action: "***to preserve herbal genetic diversity, this wealth so precious to mankind and so vital to meet the needs that arise in the future of humanity***".

PURPOSE OF THE STUDY

Our main object of this study is: "***to maintain sufficient diversity within and between species, with the aim of providing a genetic potential that will be available in the future for generations to come, ensuring maximum income through cultivation of them***".

- to provide information on where to find the wide variation of species and to utilize all existing data for the collection missions made before.
- to evaluate some of biometric and physiological parameters of cultivated plants with those grown in the natural state in the Kolonje region.
- to estimate the yield of cultivated sage and its comparison with that collected from its natural habitat.
- to make comparative assessment of the active principles quality of plants cultivated with those harvested from the natural habitat.
- to increase the income per unit area.
- to determinate the planting material, selected from existing species.
- to meet the requirements of the plant through the technology of their cultivation.

Applying appropriate and contemporary cultivation techniques, our goal was to spread it out to the farmers of the area and make it to them as easy as possible. The cultivation we intend to introduce through this study is not entirely new and theoretically unknown, but we can say that it is "new" because this technology has never been implemented in the conditions of this area by farmers. As for the study of the current condition of the sage in this area, this work has not been done before. However, these results can be enriched in the future with the study of its extension in other areas of the district, in the extension and cultivation of those medical plants that are most demanded by the international market, which increase production and income per unit of the surface.

MATERIAL AND METOD

The methodology applied to this experiment was realized on the basis of accumulated experience and contemporary data. The study was conducted during the spring-autumn period 2006-2007, in the center Municipality Center, Lëngës Village, of Kolonja region.

From the exploration that took place in the Kolonja region, many natural vegetation areas of the plant of sage were evidenced. Analyzing the climatic and terrestrial factors as well as the current state of the sage vegetation in the natural habitat, it was estimated that this study would be carried out in the Lëngëz Village.

This area lies in the Gradec massif in front of the Gramoz Mountain, about 1000 m above sea level, facing south. In the entire Gradec massif, it was noted that there was a spontaneous sparse vegetation that had an uneven distribution and differentiated development (Piperi P., Kajno K.,1990). The best conditions were those parcels that were

facing south and south-east, which also had new vegetation of sage, from which they were defined and the places where seeds and seedlings that have been taken for planting in 2007

To accomplish the objectives of this study we focused on two sage cultivation technologies:

1. Cultivation of the sage through the preparation of seedlings in polyethylene cans.
2. Cultivation of the sage through new plants, taken in its natural habitat on Mount Gradec.

I. Providing seeds for the preparations of seedlings for transplanting.

The seeds for the production of seedlings were provided by spontaneous sage vegetation in the respective mountain massif. For this purpose, were selected the most developed plants in which was obtained a seed maturity of about 80%.

Seeds obtained in this way, were carried out to laboratory tests to determine their germinating ability. Selected seeds were disinfected and 3-4 seeds were planted in each can. The cans were placed in protected areas by performing all the necessary services such as irrigation, weeding, coverage with plastic sheets in the early days after planting etc. to ensure a faster and good germination.

The seedlings were ready to be planted in the field after 2 months from planting them to the respective polyethylene cans and during this period they had a height of 10-12 cm, with 4 leaves and a stalk thickness of about 0.3 cm.

II. Providing seedlings from natural habitat.

Work was organized to gather seedlings that would serve as planting material. Their gathering took place in the winter period, where new seedlings were generally taken. They were tied in bunches and kept in closed environments and with little moisture in the roots, rolling them with moss. Based on the intensity of distribution and sage development, we determined the parcel where its cultivation would be applied on an area of about 3 000 m². The land where the experiment was set up relates to the type of meadow brown sub-clay soil. They appear poor in humus, nitrogen, and moderately rich in phosphorus and potash at a pH of 7.1.

The experiment was set up in two parcels, one with seedlings produced in polyethylene cans and the other with seedlings taken from the natural habitat. In March, cleaning of the parcel was carried out, and land was plowing at depths of 40 cm accompanied by organic and chemical fertilization. Soil works were done like: tillage, levelling (2 times)ect., where attention was paid to the good preparation of the planting bed.

The planting was carried out in April (April 15-20) in rows of 60 cm and a distance between plants in lines of 25-30 cm from each other, providing a number of plants of 5500 plants / 1000 m². The planting process was realized with wooden pegs, paying attention to the good contact of the seedling root system through the compression of soil around the seedlings. Immediately after planting, plant irrigation was completed. After 7-10 days, in places where plant losses were noted in lines, their replacement was done with the seedlings that we had left for this purpose.

During the vegetation period, the following works were done:

a. Cultivation and hoeing three times. The first two weeks after the planting, the second 2 weeks after the first and the third two weeks later, where attention was paid to the good cleavage of the soil and the combating of weeds.

b. Additional fertilization with ammonium nitrate was carried out before the first hoeing with a dose of 8 kg / 1000 m².

c. Irrigation 3 times. Irrigation was accomplished by sliding, providing the required amount of water from a source near the site of cultivation. The water rose to the level of parcel with a pump. The first irrigation was performed 5 days before the second hoeing, the second before the third hoeing and the third about 2 weeks after the third hoeing.

d. The production harvest was partial, because a part of the plants that had left the flower buds were left for seed production. It was obtained 40 kg /1000 m² dry sage for the parcels planted with seedlings taken from their natural habitat, while the parcel planted with seedlings prepared in polyethylene cans was not harvested because the plants were weak with significant shortage of plant numbers and a large difference in growth compared to the first parcel.

III. Phenological phases observation.

Notes on these phenological phases were kept:

- Date of planting.
- Blossoming (beginning).
- The maturity of seeds.

IV. Biometric measurements and field counts.

There were these biometric measurements:

- The weight of dry material per unit of weight, production achieved (both ways of cultivation) and that obtained from the massif.
- Harvested production, for each parcel, in kg /1000 m², (both ways).
- Evaluation of active principles (drugs) in all three parcels (plants from natural habitat, seedlings taken from natural habitat to the cultivated parcels, seedlings from the seeds).

After sampling for the determination of dry matter indicators, the sage samples were weighed then dried and weighed again.

RESULTS AND DISCUSSION

The works done so far have only aimed at the recognition and dissemination of medicinal herbs, but very little has been experimented and studied on their cultivation in different climatic and terrestrial areas of our country.

Table 1. *The phenological stages transition*

No	Parcels	Phenological phases		
		Planting	The beginning of blossoming	Maturation of seeds
1	With seedlings prepared from seeds	15.3.07	--	--
2	With seedlings taken from the n. habitat	15.3.07	10.06.07	06.10.07
3	Plants from natural habitat	--	25.05.07	25.09.07

In the recent years, to increase the surface and the production of sage, amateurous efforts have been made by farmers and some agricultural specialists for the cultivation of the sage, but there is still no contemporary technology scientifically supported.

Table 2. *Biometric measurements*

No	Parcels	Indicators		
		Drymatter weight in %	Content of Essence in%	Yield [kg/decar]
1	With seedlings prepared from seeds	16,5	1,64	--
2	With seedlings taken from the n. habitat	18,7	2,23	40
3	Plants from natural habitat	21,4	2,73	--

The effects of this study, we think, will be positive not only in the scientific work but also for the farmers who are dealing with the cultivation of the sage. The active principles taken after the analysis of the samples show that their content in plants originating from the natural habitat in each case has higher content than those grown by seeds. This content is 2.23% to those grown by the pieces obtained from plants of its natural habitat and still higher, 2.73% from plants grown under natural conditions and only 16.5% from cultivated plants, enhanced by seeds.



Figure 1. Cultivated plant of sage with seedlings obtained from the natural habitat.



Figure 2. Plant of sage in its natural habitat.



Figure 3. The preparation of seedlings in polyethylene cans.



Figure 4. *Cultivated sage plants.*

CONCLUSIONS

Through this study was achieved:

Knowledge of the terrain and climatic conditions where this plant is found in this area and its current state.

1. Determination of the surface in which the vegetation can be preserved.
2. Multiplication of seeds and the possibility of its cultivation with seedlings taken from seeds.
3. Possibility of sage cultivation with seedlings collected from the massif where it is found in its natural habitat.
4. Determining the most convenient moment for harvesting and collecting it.
5. Increasing of the income of farmers per unit of surface, through cultivation.
6. Cultivating the sage, planting it mainly with seedlings taken from the natural habitats of this area, where cultivation with seeds is not as successful as in the first case.
7. To pay particular attention to the time and technique of gathering new seedlings that will be used as planting material.
8. Seeds need to be collected when about 60-70% of them have been matured and have ability and high gemination energy because, one of the reasons for not successful seed planting, was their ability and low germination energy due to harvesting them not in the right time.

REFERENCES

1. **Papadhopulli G.**, “*Bimët Mjekësore dhe Aromatike të Shqipërisë*”,1987.
2. **Sh. P. B. Tiranë.**, “*Kultivimi i Bimëve Aromatike dhe Mjekësore*”,1972.
3. **Qosja Xh.**,”*Flora e Shqipërisë*”, 1980
4. **Heywod V.**,”*Medicinal and Aromatic Plants of the Mediterranean*”, 1988.
5. **Group of Authors.**, “*Medicinal and Aromatic Plants of the Mediterranean*”, 1998.
6. **Ferrenti G., Massih L.**, “*La Coltivazione delle Piante Aromatic e Medicinali*”, 2003.
7. **Piperi P., Kajno K.**,”*Flora Mjekësore e Korçës*”, 1990.
8. **Grup Autorësh.**,”*Flora e Shqipërisë*”, Vol.1 1989,Vol 2 1992, Vol 3 1996.