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SAGE CULTIVATION POSSIBILITIES IN “MALESIA E MADHE”: ITS DEVELOPMENTS AND PERSPECTIVES

SUMMARY

Malesia e Madhe is extended in the north-west region of Albania. It has a surface of 555 km,² dominated mostly by high mountains, and only in the south, at close of Shkodra Lake, the relieve looks field of vision. All this low land has a name, “Pustopoje”, which is a Slavic denomination that means desert land. In its overall integrity, owing also to its formatting factors, it represents in the layer 0-60 cm, land structure with high percentage of conglomeration 70-95 % and middle sized stones (Ø 5-200 mm). In the practical evaluation, these lands are unproductive when referring to the field cultures, more over when the biggest part of it isn't under the irrigation system.

Field of Pustopoja is extended 20-550 m over the level sea, with Mediterranean climate and little rainfall during the period April- September. The land is skeletal and with low possibilities water keeping. All these elements give the name to this field “Pustopoje”. The biggest part of the surface has been bare of leafless. In particular “oasis” has been cultivated plants with short vegetative cycle. Several years ago many efforts have been done to put in efficiency by cultivating medicinal plants, as thymus, lavender, thyme, etc. The first results were encouraging, but with the passing of the years these surfaces are damaged by the lack of attentiveness, and today they are quite degraded.

During the last years there is a great interest by the rural community of the district and a special attention to the cultivation of sage. During the last five years the surface cultivated with sage has been grown very fast because the land climatic conditions are very favourable and the market is guaranteed. Actually there are about 700 ha sown with this plant that already we could nominate as agricultural culture.

In our country we say that the sage is in its own home. Albania has high diversity of this plant, but the ecotype of north region is more requested in the market. The region of Shkodra is the richest part with sage ecotype notable for their high active principles. On the other hand those ecotypes, as the one of Shiroka, Velipoja, Hoti etc. have a high adaptability and productivity in the cultivation conditions of Mbishkodra region (Malësia e Madhe, Pustopoja).

The incomes from one ha cultivated sage is about 4-5 000 USD. There exist the possibilities to cultivate more than 5000 ha, which means an annually income over 20 million USD.

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Having into consideration the numerous demands from the market (export), we are of the opinion that the perspective of this region, not only, but also in the similar district like Kukes, Gjirokaster etc, is to support strongly this activity (including subvention for the first year), because it brings not only the engagement of the precious surface "unproductive", but also the possibilities of vigorous developments of the rural community.

Keywords: Sage (*salvia officinalis*), autochtonous ecotypes, thujone, essential oil.

INTRODUCTION

Sage "*Salvia officinalis* L" is originated from Europe, with higher concentration in the Mediterranean. Sage is a plant of Labiate family. Its name comes from the Latin "Salvus i.e. "health care" due to its curative properties. It is considered a medicine to cure any disease. In general, its distribution in the Mediterranean, amounts to 1 200 m altitude. It is a plant that faces properly the lack of moisture. Sage is a very strong plant that grows well in sun exposed sites and prefers a good air circulation. The lower slopes with southern exposure are preferable. Found in all western and northwestern part of Albania. Some ecotypes are recognized in our country. From the standpoint of content active principles higher value, are ecotypes of northwestern Albania.

Malesia e Madhe lies in the northwestern area of Albania and has a 555 km² area. It is dominated by high mountain areas, while in the southern part of its proximity to Lake Shkoder, landscape appears flat. Pustopoje is the name of the dominant field, labeled a Slavic toponym, which means "the deserted field." Pustopojas field has an area of about 7 000 hectares, which lies at the foot of the Alps to the edge of Lake Shkoder. The area is populated by about 25 000 inhabitants, distributed in four communes and one municipality. Main economic activity and incomes for the community are provided from agriculture and livestock. During the transition period (1991-2011) about 1/3 of the area's population has migrated abroad or to urban areas of Albania, mainly in the surrounds of the city of Shkoder.

Climatic and soil indicators of Pustopoja (Malesia e Madhe)

Pustopoje field has a Mediterranean climate, mild winters and humid, hot dry summers. Average annual temperatures is ranging from 14.5 ° C to 16.8 ° C. The average of precipitation per year is 1200 -1800 mm and 80% of them in the months October-April. Summer is hot and dry. Pustopoje is crossed by three major streams with huge flows at the time of precipitation and dry during the period May-September. Coating herbaceous plants are characterized mainly by short-cycle, and low shrubs. General appearance in the dry summer months is almost "deserted". Land is flinty skeleton. Origin of land is based from forming streams from the Alps to Lake Shkoder. Content of gravel in the layer 0-60 cm soil depth, is 70-90%. During the '90 there have been made efforts for its

efficient use, cultivating medicinal plants as timus, livande, thyme, etc. Today these areas by the lack of care and abandonment are almost degraded.

During the last years from the rural community of the area found interest and attention to the cultivation of sage exactly in these lands. There are currently occupying about 700 ha, with the plants that can now call agricultural crop. Malesia e Madhe, Pustopoja, offers free and suitable land, about 5 000 ha, in terms of sage cultivation. There is a growing experience in the cultivation of sage (in the last 3 years is 10 folded surface of the plant). In this area operates a network of local entrepreneurs with the collection and processing capabilities to cope with domestic production.

MATERIAL AND METHODS

Until the year '90 the sage plant is collected in its natural habitat for the export destination. Albania during the years 1970-2000 has exported considerable quantities, 1800-2500 tons per year. After the year 2000 began its cultivation as perennial agricultural plants. This for two main reasons: first, reserves in natural habitats have been reduced and high collection costs; secondly, the market demand remains high. Today there are 700 hectares planted only in the upper zone, Pustopoje. Basic ecotypes cultivated are: "Tarabosh", "Hoti", "Velipoja" and a foreign variety called "Slovenia". The main way of obtaining planting material for country ecotypes, is with pieces of plants from natural habitats, and for variety, "Slovenia", which is dominant among foreign varieties, seedlings are produced with seeds. In terms of the impoverishment of natural habitats for native ecotypes, as sources of planting material, has already begun raising seedbeds and schemes for the production of seeds of better ecotypes at the Center of Agricultural Technology Transfer, ATTC-Shkoder.

Economic interest of sage cultivation

By far, the cultivation practices of sage results based on current price structure of accumulation (1.5-1.8 USD / kg of plant dry mass of the crude product of the farmer), which means an annual income per hectare, 5-year average 4 to 5 000 USD. Mass dry leafy production in one ha, is about 30 tons / ha. Cost of production (total costs to growers in a year, (5 year average) are 800-1200 USD / ha. Biggest expenses belong to the first year of cultivation, including costs for cleaning up the parcel, ploughmen's and prepare the ground for sowing as well as planting material values (saplings from seeds or pieces). The possibilities of extending the cultivation area of (Pustopoje) are for a 5 000 ha area. Annual incomes would be 20-25 million USD. This encouraging figure would be a safe support for the sustainable development of rural communities in the area.

Until now the sage export market has been based in dry mass leafy product and little export of processed sage (active principles, essential oil). This is because there haven't been problems in securing markets for the export of sage in dry leafy material form and second there have been not installed capacity of its

processing. In a near future there are all the possibilities of building the infrastructure of processing and export of active principles that will increase even more the economic interest of this work.

RESULTS AND DISCUSSION

In order to support this new farming practices with great economic interest, in recent years many studies have been carried out in order to design and implement more efficient technologies primarily for the benefit of the farmer who cultivates sage. There are also considering early estimates for medicinal plants in our country (Albania ranks among the richest in medicinal plants in the region), while, when it comes to cultivating sage, studies are scarce.

First, we focused on the evaluation of ecotypes used as plant material. It comes out that the content of thujone and essential oil in native ecotypes (northwestern Albania) is 10-12% higher, against foreign varieties in the same cultivation conditions. Export market prefers exactly these native ecotypes. To anticipate possible errors, the priority in our studies will have native ecotypes, achieving not only their collection, but also their agro morphologic characterization.

Table 1.: Data of some active principles in ecotypes of the country and foreign varieties in dry matter% (ATTC's Laboratory Shkoder)

Ecotype / variety	Etheric extract	Essential oil	Thujone
"Slovenian" cultivated	7.83	1.88	33.7
Native ecotypes "Tarabosh" cultivated	8.36	2.06	41.9
Native ecotypes "Hoti" cultivated	9.58	2.02	41.2
Native ecotype "Hoti" in the natural habitat	10.60	2.11	42.4

Table 2.: Data on the effect of fertilization expressed in dry matter % ("Slovenia" variety cultivated) (ATTC's Laboratory Shkoder)

Fertilization doses kg.a.m./ha	Essential oil	Thujone	Nitrite NO ₂
N 0 P ₂ O ₅ 0 K ₂ O 0 (control)	1.86	33.6	0.053
N 50 P ₂ O ₅ 80 K ₂ O 100	1.90	34.6	0.088
N 100 P ₂ O ₅ 80 K ₂ O 100	1.98	35.3	0.141
N 150 P ₂ O ₅ 80 K ₂ O 100	2.02	36.9	0.176
N 200 P ₂ O ₅ 80 K ₂ O 100	2.08	38.5	0.264

One of the most important elements in the technology of cultivation is manure system. Increased productivity requires a balanced fertilization system. Lately is made the studying of fertilizers effect on the quality of production and standards that the market demands. It is concluded that the unilateral use of nitrogen fertilizer increases production but seriously damaging

the quality and product issues out of standard (high content of nitrites). For Pustopojes conditions recommended NPK doses in a year are about, N 40-50 kg.a.m./ ha, P₂O₅ 40-60 kg.a.m. / ha, K₂O 80-100 kg.a.m. / ha.

One of the technological problems of special importance is the low % germination ability of native ecotypes seeds. The studies have shown that the germination ability of seeds in the first year does not exceed 12-15% value. With time, in good storage conditions (dry environments, low temperatures and in the absence of light), in the second year, seeds of native ecotypes express a 50-60% germination ability. This would be the best way to manage the seed material originated from native ecotypes. Taking into account the increased demand for plant material originating from native ecotypes, ATTC Shkoder has established a scheme of seeds certified production, for these ecotypes. Initially we set seedbeds based ecotypes collected in the region of northwestern Albania. From here we will proceed to establish the seedbeds for the production of pre base and base seeds, to continue with the production of certified seeds by strictly respecting the criteria of seed production schemes with qualitative indicators. In a near future, based on native ecotypes, we will be developing the genetic improvement programs, in order to increase productivity, adaptability and quality of cultivated sage.

CONCLUSIONS

This year, the Government of the Albanian Republic, has been supporting this activity by subvention the widening of cultivated surfaces with sage. The value of the subvention is 2 000 USD / ha. This support is only for the first year. It includes facing of highest costs of the first year, in particular the provision of planting material that continues to be with high cost. The effect of this measure taken by the Government is reflecting this year's application with over 300 projects for a new area planted with sage plants in about 400 ha, only in the area of Pustopoja, Malesia e Madhe.

Support of extending credit of the processing network for private entrepreneurs, continues to be prioritized to meet the increased of sage production. On the other hand are providing support for capacity building of distilleries in order to increase the export of the pure active principles.

In order to support the farmers cultivating the sage with the advisory service (cultivar selection, cultivation technology, etc.), ATTC Shkoder, as research and advisory institution, is focused on current issues and perspectives of sage cultivation. In this Center projects are being implemented not only for continual improvement of sage cultivation techniques and technologies, but also the genetic management of its resources to set up an efficient production of seeds and seedlings to directly support the growth of productive capacity and sustainability of this activity in the region of Malesia e Madhe. ATTC Shkoder is also supported by a laboratory infrastructure to contribute the realization of the analysis and expertise to specific sage products plant and other medicinal herbs.

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MOGUĆNOSTI KULTIVACIJE ŽALFIJE U "VELIKOJ MALESIJI": KRETANJA I PERSPEKTIVE

SAŽETAK

Velika Malesija se prostire u sjeverozapadnom regionu Albanije. Na površini od 555 km² uglavnom dominiraju visoke planine, a samo na jugu, pored Skadarskog jezera, reljef ima izgled polja. Ova nizija ima ime "Pustopoje" što je slovenski izraz za pustinju. U svom ukupnom sastavu, zahvaljujući faktorima koji su uticali na njeno formiranje, ova dolina ima 0-60cm sloja zemljišta, strukturu zemljišta sa viskim procentom konglomerata, 70-95%, i kamenja srednje veličine (Ø 5-200 mm). Ovo zemljište je paraktično neproduktivno, kada je riječ o kulturama, a posebno zbog toga što najveći dio nije pod sistemom kanala za navodnjavanje.

Polje Pustopoje se nalazi na 20-55 m iznad nivoa mora, sa mediteranskom klimom i malo padavina u periodu april-septembar. Zemljište je skeletno i sa slabim mogućnostima za zadržavanje vode. Svi ovi elementi daju ime ovom polju "Pustopoje". Najveći njegov dio je potpuno ogoljen. U pojedinim „oazama“ gajene su biljke sa kratkim vegetativnim ciklusom. Prije nekoliko godina, uloženo je mogo truda kao bi se ovo zemljište kultivisalo ljekovitim biljem, kao što su majčina dušica, lavanda, timijan itd. Prvi rezultati su bili ohrabrujući, ali nakon nekoliko godina ove površine su oštećene zbog nepažljivog tretmana, a danas su u velikoj mjeri zapuštene.

Poslednjih godina, postoji veliko interesovanje ruralne zajednice za ovu oblast, a za uzgoj žalfije. Tokom poslednjih pet godina, žalfija koja je posijana na ovoj površini je veoma brzo napredovala jer su klimatski uslovi veoma povoljni, a plasman na tržište je zagarantovan. Zapravo, kako je ova biljka zasijana na oko 700 hektara, već je možemo nazvati poljoprivrednom kulturom.

U našoj zemlji, kažemo da je žalfija u svojoj kući. U Albaniji postoje različite vrste ove biljke, ali ekotip sjevernog regiona je najtraženiji na tržištu. Region Skadra je najbogatiji ekotipom žalfije poznatim po svojim visokim aktivnim principima. S druge strane, ekotipovi u oblasti Shiroka, Velipoja, Hoti itd. karakteriše visoka prilagodljivost i produktivnost u uslovima Mbishkodra regiona (Velika Malesija, Pustopoja).

Prihodi od jednog hektara kultivisane žalfije su oko 4-5.000 američkih dolara. Kako postoji mogućnosti da se kultiviše više od 5000 ha, što bi značilo godišnji prihod preko 20 miliona dolara.

Imajući u vidu brojne zahtjeve tržišta (izvoz), smatramo da je perspektiva, ne samo ovog regiona, već i sličnih, poput Kukeša, Ćirokastra, itd. u snažnoj podršci ove aktivnosti (uključujući subvencije za prvu godinu), jer se njome aktivira površina koja je "neproduktivna", ali i otvaraju mogućnosti za brži razvoj ruralne zajednice.

Ključne riječi: žalfija (*Salvia officinalis*), autohtoni ekotipovi, tujon, eterično ulje.