Study of medical plant distribution in Lasem area of Northern Iran

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Abstract: In order to gather and identify the medicinal plants at the mountainous rangelands of Lasem in Larijan of northern Iran, the field survey method was done. The results showed that there were 42 medicinal species in the area belonging to 18 classes. The classes Rosaceae with 8, Compositae with 8, and Labiateae with 7 species had the biggest number of medicinal species; and the growth forms hemicryptophyte and trophyte were the most common. Furthermore, leaves and flowers were the main plant parts used, essence and tannin were the most common compounds, and the most common curative effect was as diuretic. The types, features, and the compounds found in the medicinal plants of this ecosystem suggest that this region has a high potential with regard to the production of medicinal plants; and if the exploiters of the rangelands get to know this potential, they will be able to maintain the ecosystem, to keep it sustainable, and to reap huge economic benefits as well.

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1. Introduction

Rangelands are considered a renewable natural resource which covers 43% of the land area of the planet earth; and they occupy 54.6 of the land area of our country as well. Rangelands, besides having a protective value (in protecting soil and water) and producing forage (animal products) and protecting the environment and serving as a genetic source, etc, enjoy a special status as regards the production of medicinal and industrial plants. Therefore, acquaintance with and study of the vegetative cover is necessary in this regard; and is an important step in making multiple use of rangelands (Hosseini 2001).

It can be easily seen that the main factor causing the destruction of rangelands and the expansion of deserts is the utilization of the basic products of rangelands in the framework of raising livestock. Many farmers and livestock producers see rangelands as a source of forage and continuously increase the number of stock kept on rangelands which, considering the lack of proper management of rangelands ,has intensified the process of the destruction of rangelands. Therefore, acquaintance with and utilization of the other pasture products can have a fundamental role in improving the economic situation of exploiters of rangelands and in preventing pressure on the vegetative cover.

Medicinal plants are among the most important by-products of rangelands which unfortunately, despite the fact that they have a high economic efficiency and that they are easily extractable and contrary to the situation in other countries, have received less attention in our country; and still many of our people do not know much about the types, the benefits, the composition, and the curative features of these plants (Nazir et al., 2010). Therefore, we studied the region of Larijan, especially the sub-region of Lasem, because of the important medical and economic values of medicinal plants as a tool for sustainable exploitation of the mountainous rangelands of Alborz, and due to the fact that this sub-region has not been studied with regard to medicinal plants because of its peculiar climatic and topographic features ,and also for the reason that the farmers and livestock owners who use these rangelands do not have sufficient knowledge about this green treasure trove .

Shahrokhi (2001) named local knowledge of medicinal plants an effective factor for sustainable development, and mentioned the protection of the environment, the production of raw materials, the

creation of jobs, and the access to the international market as some of the factors that, through the use of medicinal plants, have a role in sustainable development. Ahmadi (2001) gathered and identified 96 species of medicinal plants in the province of Lorestan and showed that most of them belonged to the classes of Liliaceae, Asteraceae, Laminaceae, and Rosaceae. Akbarzadeh (2003) and identified 36 species and 18 genera of the mint family and determined the distribution of each of the species as well.

Lebaschi et al. (2004) studied the growth status of the medicinal plants of salvia, milfoil, spogel seed plantain, marigold, and chamomile and stated that salvia and milfoil grew best in dry conditions; and can be established as medicinal plants resistant to dry conditions or to limited supply of water. Mazandarani et al. (2004) introduced 107 medicinal plants from the mountain of Ziarat in the city of Gorgan belonging to 103 genera and 42 families; and found out that the most important life forms in the region were the geophytes (36.4%), the trophytes (20.6%), the fanerophytes (19.6%), the camophytes (12.1%), and the hemicryptophytes (11.2%).

Zarezadeh et al. (2005) studied 37 species of drought resistant medicinal plants in the province of Yazd and found out that the families Apiaceae, Laminaceae, and Solanaceae had the most number of species. Fallah hosseini et al. (2005) investigated the effects of citrule in reducing blood sugar in type two diabetics and concluded that prescribing 100 milligrams of this plant three times a day reduces blood Hb1Ac and blood sugar without any side-effects on the digestive system, the liver, or the kidneys. They also carried out another study on the medicinal effects of onions, garlic, bitter cucumber, fenugreek, saltwort, whortleberry, blessed milk thistle, and green tea on diabetes. Mirza et al. (2005) conducted a research titled Identification and study of the chemical compounds in the essence of *Lepidium sativum* and stated that from among 25 identified compounds in this species, which constituted 94.7% of the essence, camphor was the main one with 19.8%.

Jalali et al. (2006) used different methods to compare the anti-listerial effects of thyme, eucalyptus, chamomile, rosemary, and salvia and concluded that that only the hydro-alcoholic extract of eucalyptus had anti-listerial effects on Listeria monocytogenes and can be considered as an anti-listerial compound. Jamshidi et al. (2006) introduced thyme as one of the valuable plants found in Alborz heights and showed that the essence of this plant had a high percentage of Thymol and Carvacrol and the best habitat for it to produce the highest yield and the best quality crop is at an altitude of 2400 meters above sea level. Akbarinia et al. (2006) studied the medicinal plants of the province of Ghazvin with regard to their biological and floristic features. They identified 85 medicinal species belonging to 33 classes and 76 genera, with the classes Laminaceae with 21 and Asteraceae with 6 species being the most important classes in the region.

Bah et al. (2004) showed that steroidal saponins, alkaloid glycosides and vitanoloidal steroids are the secondary metabolites found in the genus Solanum which have anti-cancer effects in people. Thabrew et al. (2005) investigated the anti-toxic effects of the species Hemidesmus indicus, Smilax glabar, and Nigella sativa, and showed that they have a very high anti-cancer potential because cancerous cells injected with the extract of these plants died after 24 hours.

Mathabe et al. (2006) investigated the medicinal plants in the region of Limpopo in South Africa and reported the anti-bacterial features of the species of *Schotia brachypetala* and *Punica granatum* in curing diarrhea. Lee et al. (2007) studied the antioxidant features of 45 medicinal species and showed that species such as *Scutellaria baicalensis* and *Fraxinus rhynchophylla* are a rich and natural source of these compounds.

Yun-long et al. (2007) investigated the insecticidal effects of the species *Matricaria chamomilla* and *Thymus vulgaris* and showed that the compound thiacloprid was the insecticide in these plants which decomposed rapidly. Yinger et al. (2007) studied the medicinal plants at Bale Mountains National Park in Ethiopia and referred to their effects in curing animal diseases. They identified 74 species belonging to 64 genera and 27 families of medicinal plants, and reported that forbs (47.3%) and bushes (37%) were the most common growth forms exploited, the roots and leaves of which were used most of all .

1. 2. Materials and Methods: The Region Studied

The area studied in the summer rangelands of Lasem, which is one of the sub-regions of the Talar River watershed, has a longitude of 52º 75’ 10” to 52º 84’ 15” and a latitude of 35º 92’ 34” to 35º 99’ 45”, an area of 3450 hectares, and its altitude varies from 1900 to 3400 meters above sea level. The average yearly temperature is 11 degrees centigrade and the average yearly rainfall is from 450 to 550 millimeters. The climate of the area varies from semi-humid at low parts

to semi-arid at high parts. The main formations are the geological formations of Lar and Shemshak.

2.1. Methodology

First, we used aerial pictures with a scale of 1: 20000 and topographical maps with a scale of 1: 50000 to locate Lasem, and then used the field survey method to study and sample the medicinal plant cover in the region. The samples were identified using the colored Flora and the herbarium at the Natural Resources College. Then we referred to valid scientific references, consulted with experts at research centers, and used local knowledge to determine features such as chemical composition, curative effects, the parts of plants used, and the distribution of various species. Finally, the Exel software was used to analyze the data; and the final adding-up was performed. It must be mentioned that important information about medicinal plants, their effects, and the way they are used was obtained from local people; and this information played a key role in the analysis of data.

2. 3. Results

3.1. Results Drawn from the study of the Flora of the Region

The medicinal species identified in the region studied belonged to 18 classes and 42 genera (Table 1). The classes Rosaceae with 8, Compositae with 8, and Labiateae with 7 species had the most medicinal species in the region; and 12 classes each with one species were the smallest. Figure 1 shows the abundance of plant species. We also determined the growth forms of the medicinal plants in the region and found that hemicryptophytes with 55% and Trophytes with 21% constituted the most common growth forms in the plants in the region. The results concerning the growth forms are shown in Figure 2.

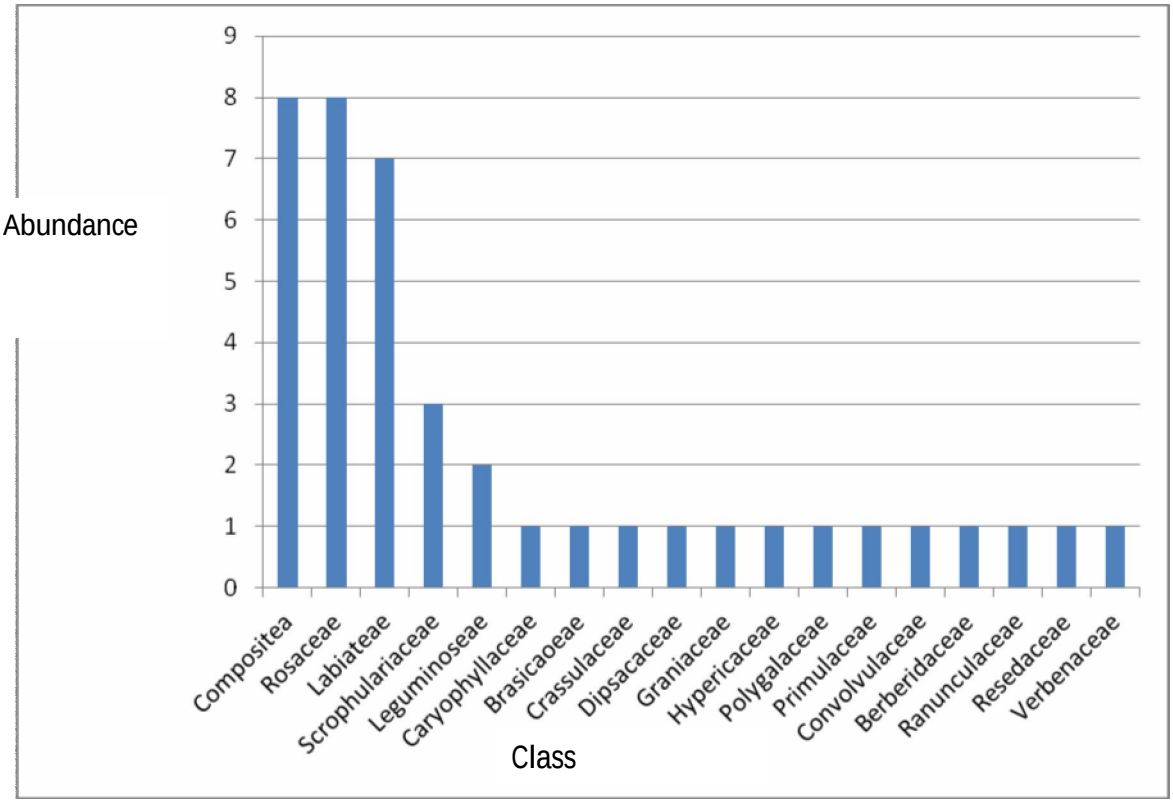

Figure 1- Abundance of Medicinal Plant Families in the Region

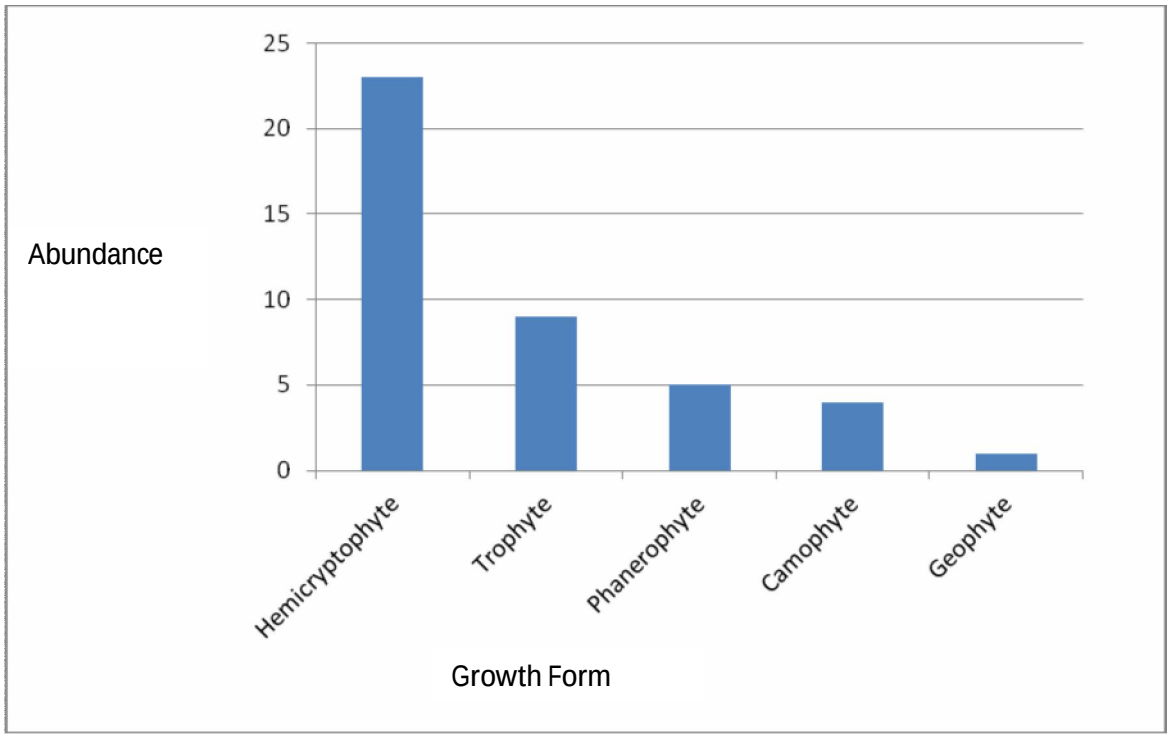

Figure 2 – The Growth Forms of the Medicinal Plants in the Region

Table 1. The list of scientific name, class, growth form and life form of the determined plants.

Ser. no	Scientific name	Class	Growth form	Life form
1	*Achillea spp*	Compositeae	hemicryptophyte	perennial
2	*Anthemis spp*	Compositeae	hemicryptophyte	perennial
3	*Artemisia absantinium*	Compositeae	hemicryptophyte	perennial
4	*Astragalus gossypinus*	Leguminoseae	hemicryptophyte	Perennial
5	*Berberis vulgaris*	Berberidaceae	Camophyte	Perennial
6	*Capsella bursa pastoris*	Brasicaceae	Trophyte	Annual
7	*Centaura virgata*	Compositeae	hemicryptophyte	Perennial
8	*Convolvulus arvensis*	Convolvulaceae	Trophyte	Annual
9	*Crataegus microphylla*	Rosaceae	fanerophyte	perennial
10	*Delphinium elbursense*	Ranunculaceae	hemicryptophyte	annual
11	*Digitalis nervosa*	Scrophulariaceae	hemicryptophyte	perennial
12	*Echinops cephalotes*	Compositeae	Hemicrtptophyte	Perennial
13	*Fragaria vesca*	Rosaceae	Hemicryptiphyte	Annual
14	*Granium tuerosum*	Graniaceae	Hemicryptophyte	Perennial
15	*Hypericum*	Hypericaceae	Hemicryptophyte	Perennial
16	*Hyssopus angustifolius*	Labiateae	hemicryptophyte	Annual
17	*Lamium album*	Labiateae	Hemicryptophyte	Perennial
18	*Malus commonis*	Rosaceae	Fanerophyte	Perennial
19	*Medicago sativa*	Leguminoseae	Hemicryptophyte	Perennial
20	*Mespilus germanica*	Rosaceae	Fanerophyte	perennial
21	*Nepeta crassifolia*	Labiateae	Hemicryptophyte	Perennial
22	*Nepeta racemosa*	Labiateae	Hemicryptophyte	Perennial
23	*Origanum vulgar*	Labiateae	Trophyte	perennial

24	*Polygala platyptera*	Polygalaceae	Hemicryptiphyte	Perennial
25	*Potentilla reptense*	Rosaceae	Hemicryptophyte	Perennial
26	*Primula acaulis*	Primulaceae	Hemicryptophyte	Perennial
27	*Pronus divaricata*	Rosaceae	Fanerophyte	Perennial
28	*Pyrus boisseriana*	Rosaceae	Fanerophyte	Perennial
29	*Reseda lutea*	Resedaceae	Hemicrtptophyte	Biennial
30	*Rosa persica*	Rosaceae	Camophyte	Prennial
31	*Scabiosae amaena*	Dipsacaceae	Hemicryptophyte	Perennial
32	*Sedum rubense*	Crassulaceae	Trophyte	Annual
33	*Sencio vernalis*	Compositeae	Geophyte	Annual
34	*Silene pruinosa*	Caryophyllaceae	Trophyte	Annual
35	*Stellaria media*	Caryophyllaceae	Trophyte	Annual
36	*Taraxacum monthanum*	Compositeae	Trophyte	Annual
37	*Teucrium polium*	Labiateae	Camophyte	Perennial
38	*Thymus pubscense*	Labiateae	Camophyte	Perennial
39	*Tragopogon marginatus*	Compositeae	Trophyte	Annual
40	*Verbascum specium*	Scrophulariaceae	Hemicryptophyte	Perennial
41	*Verbena officinalis*	Verbenaceae	Hemicryptophyte	Perennial
42	*Veronica persica*	Scrophulariaceae	Trophyte	Annual

3.2. Results Drawn from Information Supplied by Local People

Since the field survey method was used in our study, we also gathered information from some local people about the medicinal plants, such as their benefits and their effects. Some of the most important of this information is shown in table 2.

Table 2: Information about important local medicinal plants

Important Medicinal Species	**The Parts of the Plants Used**	**The Most Important Medicinal Effects**
Pyrus cordata	Bark, stem, leaves and fruit	Astringent ,sedative , reduces uric acid
Barberry	Bark, roots, stem	Purifies blood, cure for digestive problems and for sore throat
Crab apple	Bark, stem, leaves, and fruit	Astringent, sedative, reduces uric acid
Hawthorn	Flowers and fruit	Anti-spasm, heart tonic
Medlar	Leaves and fruit	Cure for sore throat and diarrhea
Polygala	Roots	Expectorant, cure for coughs
Camomile	Leaves and flower bearing browses	Anti-spasm, cure for worms
Milfoil	Leaves and flower bearing browses	Sedative for nerves, cure for diarrhea,general body tonic
Thyme	Leaves and flower bearing browses	Regulates the nervous system and blood circulation , tonic
Salsify	roots	Cure for skin diseases , appetizer

3.3. Chemical composition of Medicinal Plants

Studies carried out about the chemical compositional of medicinal plants showed that essence and tannin with 30% and 26% respectively, were the most frequent and ether, mucilage and pigments with 4 % , 4% , and 3% were the least frequently found compounds in the medicinal species in the region (Figure 3).

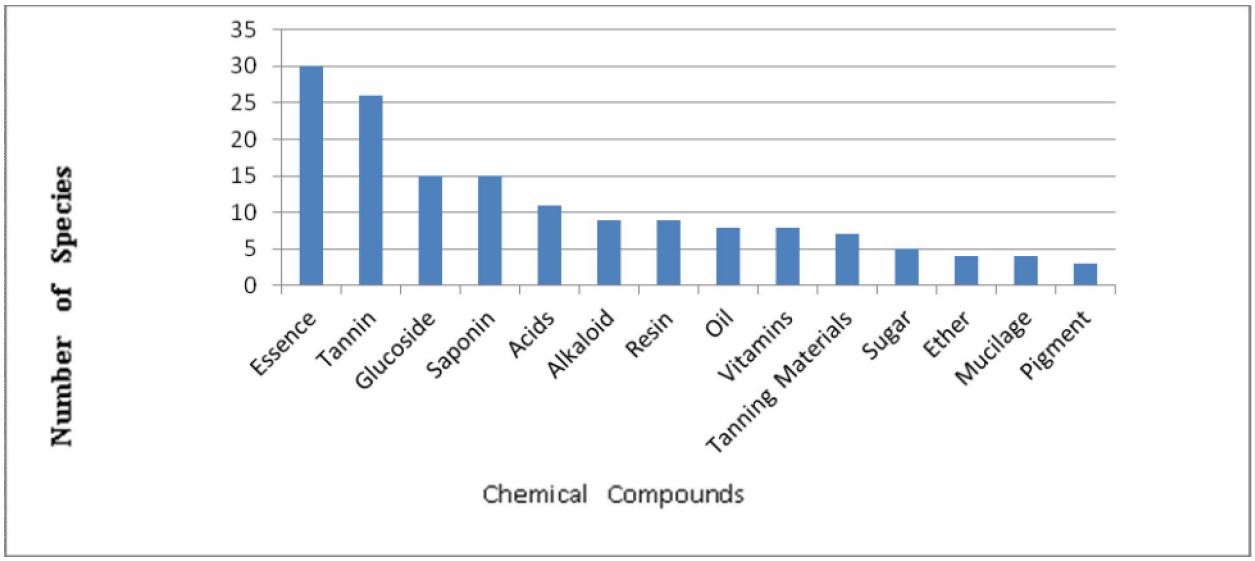

Figure 3: Chemical Compounds in the Plants of the Region of Lasem

3.4. The parts of the medicinal plants used

Different parts of leaves, flower bearing browses, roots, flowers, shoots, and fruits are the parts of medicinal plants in the sub-region of Lasem used for curing diseases and for conventional medicinal purposes, the flowers and the leaves being the parts most used (Figure 4).

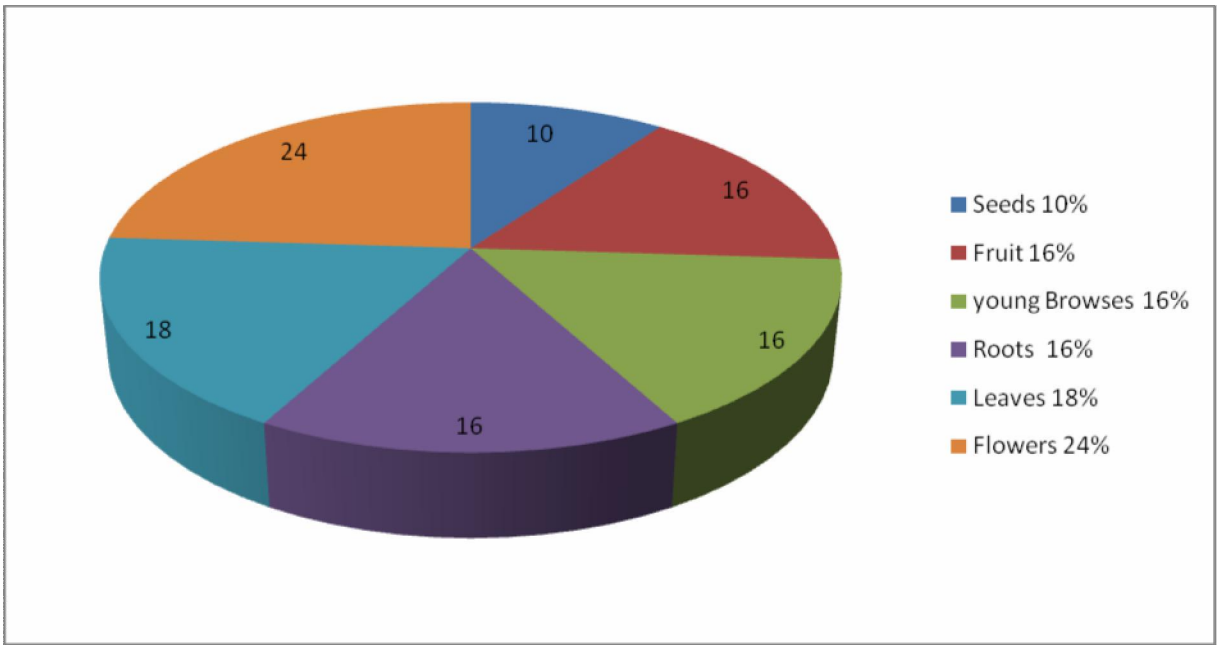

Figure 4: Abundance of the Parts of Medicinal Plants Used in the Region of Lasem

In investigations about the curative effects of the medicinal plants in the region of Lasem, it was found that most of these species had curative effects (Figure 5).

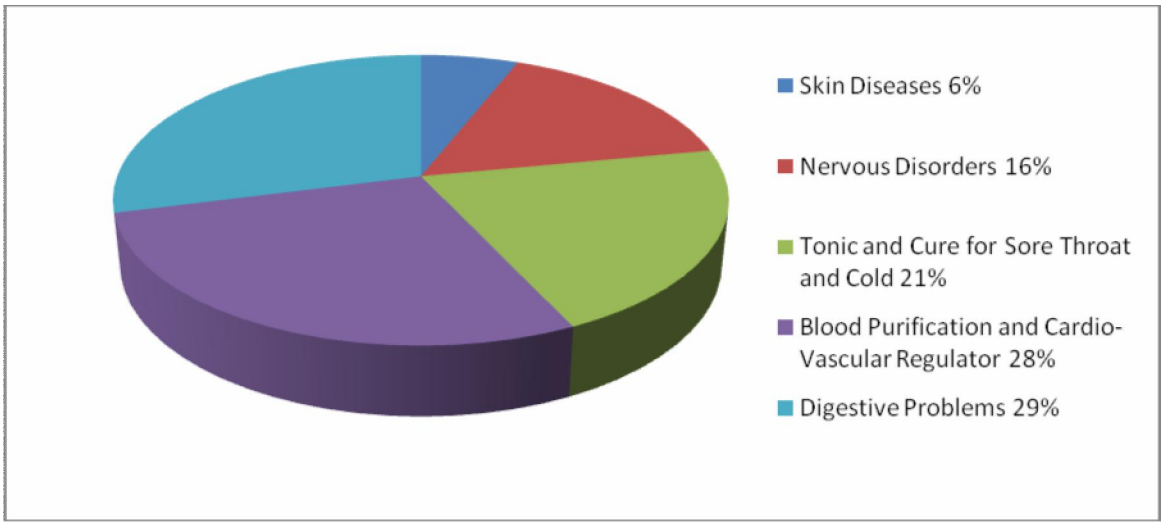

Figure 5: Curative Features of the Plants in the Region of Lasem

4. Discussion and conclusions

Given the results obtained, the abundance of the species of the family Labiateae and also the abundance of species containing essence and tannin in the sub-region can be ascribed to the fact that these species are not grazed because stock mainly do not graze plants containing these compounds; and hence plants containing them have become more abundant. On the other hand, the abundance of the growth forms Hemicryptophyte and Trophyte appears logical since these plants are more resistant to adverse environmental conditions, especially grazing, and also because trophytes are adapted to short growing seasons common in the cold, mountainous rangelands.

Since the grazing pressure on rangelands is mainly due to economic incentives which exist for those who exploit rangelands, and because the region of Cherat has a tremendous potential for the production and multiplication of medicinal plants, attention to these huge resources can, besides preserving the diversity of life forms which is the basis for the survival of natural ecosystems, will be useful in improving the economic situation of livestock producers; and by correctly training them in properly exploiting these plants, and also through cultivating and multiplying these species it is possible to reduce the pressure of excessive exploitation of the vegetative cover. Results obtained from the study of the curative features of these plants show that there is an abundance of plants with astringent and purgative effects which, considering the prevalence of diseases of the digestive system in the rural parts of the sub-region of Lasem, signifies the importance of identifying these species and the need for the pasture exploiters to become acquainted with these plants. Moreover, the abundance of plant species effective in purifying blood and in strengthening the heart, and the familiarity of the local residents with these plants, has resulted in fewer incidences of cardio-vascular diseases among these people. Furthermore, since flowers are the part most used in these species, and because flowers play the major role in apiculture, it is possible to prepare the grounds for the development of apiculture, which has been practiced in the region before, along with the cultivation and multiplication of medicinal plants, so that, while preserving the ecologic values of the sub-region, multiple use of these diverse rangelands and improving the economic situation of the local people and domestication of the existing plant species can be achieved. Therefore, familiarizing the pasture exploiters with the existing medicinal species and training them in the format of medicinal plants, as a practical strategy in raising the spirit of cooperation among them will create jobs and economic profits for pasture exploiters and will also greatly help in sustaining this natural ecosystem.

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