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Density of Selected Medicinal Plants at Disturbed and Undisturbed Sites on Seasonal Bases in Kokernag Forest area of Kashmir Valley

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ABSTRACT

Medicinal plants are of utmost importance. Kashmir is one of the treasure houses of these plants. Anthropogenic interference has very negative impact on the population of medicinal plants. Present study was carried out in order to see the population density of selected medicinal plants at disturbed and undisturbed sites. The results showed marked differences at two sites. The density values of selected medicinal plants showed marked increase from spring to summer season with sudden decrease in the autumn season. The study revealed that human interference has a profound impact on density of medicinal plants and there is need to conserve the same.

KEY WORDS: Medicinal plants, Density, Disturbed, Kashmir, Kokernag

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INTRODUCTION

Kashmir Himalaya hosts a remarkably rich wealth of medicinally important herbs. Ranging from cold desert of Ladakh through temperature Zone of Kashmir Valley to the sub-tropical areas of Jammu province, the area offers congenial habitats for luxuriance of the species with wide ranging ecological requirements. It is worthy to note that about 40% of medicinal herbs inhabiting the area are used in the local medical system and some are highly inhabiting the area are used in the local medical system and some are highly valued in the foreign market. Till about 20 years ago the country used to export 374,921Kgs Kutb (Saussurea Costus) to Hong Kong, Singapore, Thailand, Vietnam, Japan, Sri-Lanka and France[1].

Currently 11 of Indian medicinal plants are enlisted in the appendices of CITES which include the afore mentioned species, as well export of these herbs has been banned vide public notice number: 47 PN (92-97) dated March 30th 1994 and they have been enlisted in negative list of exports and imports policy 1997-2002 of the Government of India. It is apparent from this that the grim future of our medicinal plant wealth has been foreseen by various government and non-government organizations of the country hence the imposition of legislation including the Kuth Act of J&K government launched in the year 1974. Despite these protective measures at various levels from time to time to salvage this invaluable genetic resource and the country's national wealth nothing seems to happen at the grass root levels. Exploitation of these herbs continues unabated. In India, the Himalayas represent the richest store house of medicinal plants. Kashmir Himalaya, one of the biotic provinces of the Himalayas and a part of Biodiversity hotspot, supports a rich and unique floristic diversity including a fairly good representation of medicinal plants [2].

The present survey was, therefore, undertaken in one important forest area namely Kokernag, so as to have an insight into the floristic wealth of the region in general and the medicinal plant wealth in particular and to enlist and document the select medicinal flora of this unexplored region, four medicinal plants viz. *Artemisia absinthium, Achillea millefolium, Verbascumthapsus* and *Viola odorata* were selected for the purpose.

MATERIALS AND METHODS

The present study was carried out on Kokernag forest of District Anantnag in Jammu and Kashmir from July 2012 to May 2013. The study area was divided into two sub-sites viz. undisturbed site (site I) and Disturbed Site (Site II). Four medicinal plants viz. *A. absinthium, A. millefolium, V.*

Thapsus and *V. odorata* were selected. For every medicinal plant at least two sites viz. one in open /dry conditions and other in shade/moist conditions represented as population-I (Pop-I) and population II (Pop II) respectively were selected.

Density of selected medicinal plant was worked out by using simple quadrant method [3]. Vegetation survey of selected medicinal plant was conducted in the selected sites during three seasons viz. spring (March -May), summer (June-August), autumn (September-November) using permanent 1m *1m quadrants. Ten quadrants were laid out randomly using quadrats method at the two selected site. The vegetation data recorded was quantitatively analyzed for density following Curtis and McIntosh[3].

Density = Total number of individuals of species in all quadrants ÷ Total number of quadrants studied

RESULTS

The density values showed marked variation at both the sites (Site-I and Site –II) throughout the study period. Its values vary from the maximum of 1.8 ind/m^2 to a minimum of 0.2 ind/m^2 as depicted in Table 1 and Fig. 1.

In case of *A. absinthium* pop-I showed maximum value (1.6 ind/m^2) of density in summer season and minimum (0.7 ind/m^2) in spring and (0.4 ind/m^2) in autumn season at Stie-I. At site –II pop-I showed maximum value of density (1.5 ind/m^2) in summer season and minimum (0.6 ind/m^2) in spring. In case of pop-II maximum value of density (1.3 ind /m^2) was recorded in summer season as against the minimum values recorded in spring (0.8 ind/m^2) and autumn season (0.4 ind/m^2) and site-I At Site-II the maximum value of density (1.4 ind/m^2) was recorded in summer season as against the minimum values of 0.7 ind/m^2 and 0.5 ind/m^2 in spring and autumn season respectively.

In case of *A. millefolium* pop-I showed maximum value of density (1.8 ind/m^2) in summer season as against the minimum values recorded in spring (0.9 ind/m^2) and autumn season (0.7 ind/m^2) at Site-I. Again the maximum value of density was recorded at Site-II in the summer season (1.7ind/m^2) and minimum in spring (0.7 ind/m^2) and autumn (0.5 ind/m^2) season. In case of pop-II maximum value of density was recorded in summer season (1.4 ind/m^2) as against the minimum values of 0.6 ind/m^2 in spring season and 0.3 ind/m^2 in autumn season at Site-I. At site –II maximum value of density (1.5 ind/m^2) was recorded in summer season and minimum values of 0.7 ind/m^2 and 0.3 ind/m^2 were recorded in spring and autumn season respectively.

In case of *V. thapsus* the maximum value of density for pop-I was recorded in summer season (1.5 ind/m^2) as against the minimum values (0.7ind /m^2) recorded in the spring and summer (0.5ind/m^2) season at Site-I. At Site –II the maximum value of desity (1.6 ind/m^2) was recorded in summer season and minimum values of 0.6 ind/m^2 and 0.5 ind/m^2 in spring and autumn season respectively. In case of pop-II the maximum value of density (1.6 ind/m^2) was recorded in summer season as against the minimum values of 0.5 ind/m^2 and 0.4 ind/m^2 recorded in spring and autumn season respectively at Site-I. At Stie –II the maximum value of density (1.6 ind/m^2) was recorded in summer season and minimum values of 0.4 ind/m^2 and 0.3 ind/m^2 were recorded in spring and autumn season respectively.

In case of *V. odorata*, the preferable habitat for which is shady and moist conditions, the density value of pop-II was only assessed. The maximum value of density (1.4ind/m^2) was recorded in summer season and minimum value of 1.0 ind/m^2 and 0.2 ind/m^2 were recorded in spring and autumn season respectively. At Site-II the maximum value of density (1.3ind/m^2) was recorded in summer season as against the minimum values recorded in spring (0.3ind/m^2) and autumn (0.2 ind/m^2) seasons.

Table 1: Density (Ind/m^2) values of selected medicinal plants of Kokernag forest on seasonal bases at Site –I and Site-II for the year 2012-2013

Medicinal plant species	Site –I			Site-II		
	Spring	Summer	Autumn	Spring	Summer	Autumn
A. absinthium						
Population I	0.7	1.6	0.4	0.6	1.5	6.4
Population II	0.8	1.3	0.4	0.6	1.4	6.1
A. millefolium						
Population I	0.9	1.8	0.7	0.7	1.7	6.5
Population II	0.6	1.4	0.3	0.7	1.5	6.3
V. Thapsus						
Population I	0.7	1.5	0.5	0.6	1.6	6.5
Population II	0.5	1.6	0.4	0.4	1.6	6.3
V. odorata						
Population II	1.0	1.4	0.2	0.2	1.3	6.2

Site I: (Undisturbed site)

Site II: (Disturbed site)

Population-I: Plant species under partial forest cover

Population-II: Plant species under complete forest cover

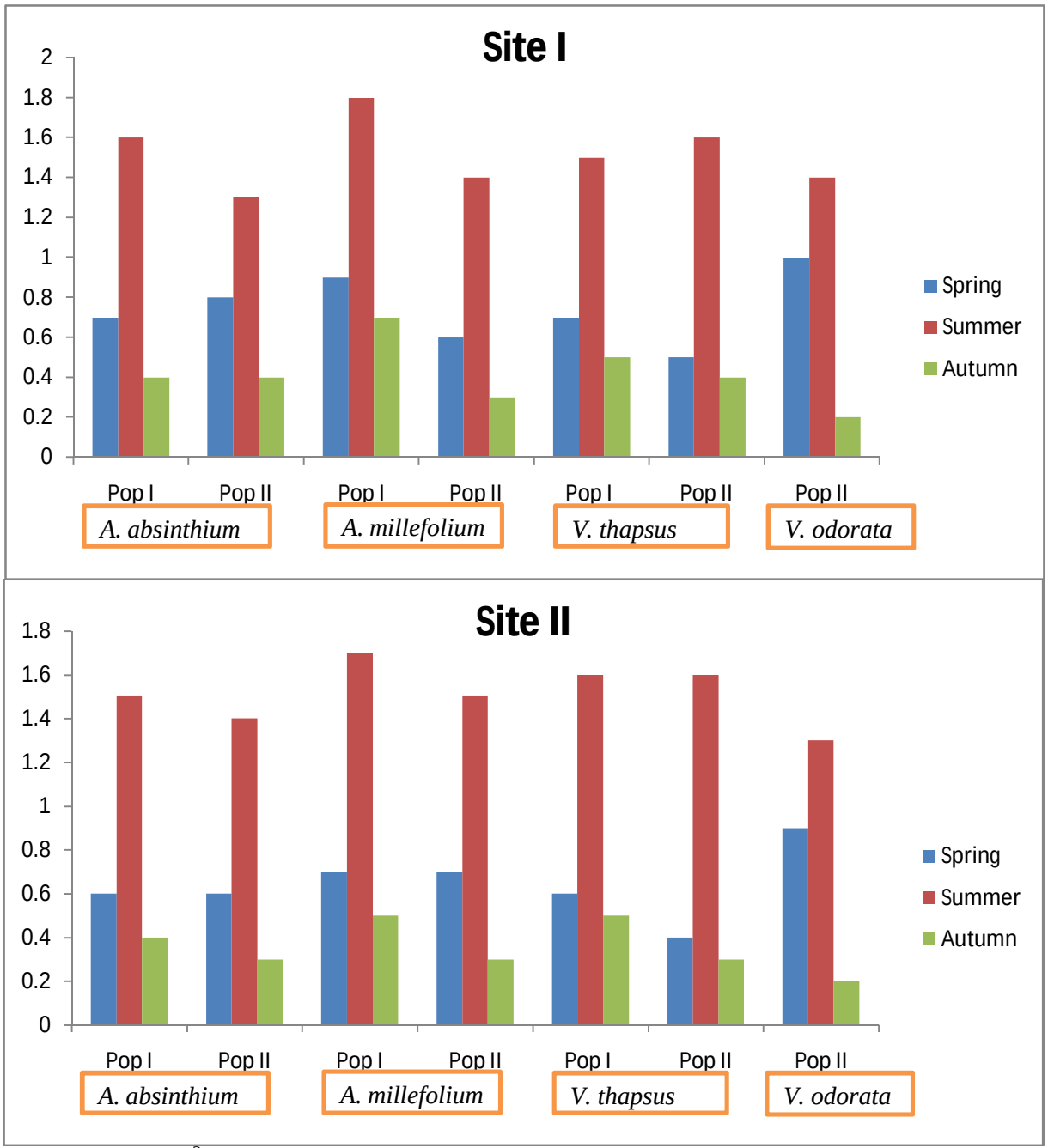

Fig 1: Density (ind/m^2) values of selected medicinal plants of Kokernag forest on seasonal bases at Site –I and Site-II for the year 2012-2013

DISCUSSION

The density values of selected medicinal plants showed marked increase from spring to summer season with sudden decrease in the autumn season. The reason for their maximum occurrence during the spring and summer season could be due to the availability of moisture provided most often by rains as about 589.7 mm of total rainfall reported in the month of July[5] and through other environmental factors. Similar pattern of observation mirrored to present study were also mentioned by[6]. Among all of the select medicinal plants highest density value of 1.8 ind/m^2 was recorded for pop-1 of *A. millefolium* in summer season at Site-1. This may be due to the maximum availability of macronutrients at soil pH value of 7.1 reported at this site. The lowest value of density of 0.2 ind./m^2 was observed for pop-II in autumn season at both sites. This could be due to lower rate of evolution and diversification of community. The overall mean density values of all the select medicinal plant showed maximum value at undisturbed site (site –I) 1± 0.64 ind./m^2 for *A. millefolium* A0.86 ± 0.47 ind./m^2 for *A. absinthium* 0.86 ±0.55 ind./m^2 for *V. thapsus* as against minimum value reported at disturbed site (Site-II) except in case of pop-II of *A. millefolium* and *V. thapsus* at disturbed site where highest mean density values of 0.83±0.56 ind./m^2 and 0.76±0.64 ind./m^2 were recorded as against the lowest values of 0.76±0.51 ind/m^2 and 0.72 ±0.51ind/m^2 scored at undisturbed site(Site-I). This may be due to their high regeneration potential in harsh environmental situations. Similar results were reported in case of *Anogeissus pendula* in highly disturbed area in northeastern part of Rajasthan[7].

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