

AN ASSESSMENT OF THE PRODUCTIVITY OF MEDICINAL PLANTS IN LEEPA VALLEY (JHELM VALLEY FOREST DIVISION) AZAD KASHMIR

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Abstract

Quantitative survey of ten important medicinal plants was conducted in Leepa Valley of Jhelum Valley Forest Division in Azad Kashmir, during the year 1978-79 to ascertain the productivity of medicinal plants available in the area. It was found that medicinal plants are available not only in considerable quantities for commercial exploitation but also it is imperative to initiate concerted efforts both by government and public to systematically establish cultivation of various medicinal plants.

Introduction

With the rapid advances in modern medicine although the medicinal plants have gradually been replaced by synthetic drugs particularly in the West but still the bulk of the rural population in Asia and Africa continue to rely mainly on drugs of plant origin for medical relief, and in the Indo-Pakistan Sub-continent over 70% of the population falls in this category. Pakistan is importing crude extract of drug plants from developed countries. During 1976-77 Pakistan imported medicinal plants worth Rs. 7.4 millions (REHMAN¹ 1979).

Although several medicinal plants are available in our country it is essential that we undertake a detailed inventory of this renewable resource before persuading the industrialists for the establishment of Pharmaceutical industries.

Jhelum Valley Forest Division lies on both sides of River Jhelum originating from occupied Kashmir and extending upto Kohala Bridge. This Division consists of four territorial forest ranges out of which Leepa Valley comprising an area of 14,200 hectares lies in Karnah Forest Range. The Valley is situated in the temperate zone with altitude varying from 1500 to 2900 meters, average annual rainfall 1000 mm. and snowfall 500 cms. Soil has a moderate amount of organic matter suitable for plant growth. *Pinus wallichiana*, *Abies pindrow*, *Cedrus deodara* and *Juglans regia* are the principle tree species with *Berberis* spp., *Rhododendron* spp., *Viburnum cotinifolium* and *Viburnum foetens* constituting the undergrowth. Plants like *Dioscorea deltoidea*, *Saussurea lappa*, *Podophyllum emodi* and *Valeriana jatamansi* grow abundantly as ground cover.

As an inventory of the resource quantitative survey of ten important medicinal plants was conducted in Leepa Valley during the year 1978-79 to ascertain the approximate quantities of medicinal plants which could be extracted from various forest areas.

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Materials and Methods

Quantitative survey of the following medicinal plants was conducted compartment-wise in Leepa Valley :—

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|-----------------------------------|--------------------------------------|
| (i) <i>Dioscorea deltoidea</i> | (ii) <i>Saussurea lappa</i> |
| (iii) <i>Viola serpens</i> | (iv) <i>Bergenia himalaica</i> |
| (v) <i>Podophyllum emodi</i> | (vi) <i>Valeriana jatamansi</i> |
| (vii) <i>Aconitum laeve</i> | (viii) <i>Polygonum amplexicaule</i> |
| (ix) <i>Geranium wallichianum</i> | (x) <i>Thalictrum vaginatum</i> |

Out of total area of 14,200 hectares of Leepa Valley 7845 hectares of Qazinag Block were surveyed and 15.57 hectares were covered with sampling intensity 0.1 percent. In each compartment an imaginary centre was located and plots of 10 x 10 metres were taken in all the four directions from this centre. For every 405 hectares, 40 plots of 10 x 10 metres were surveyed. First plot was taken after 330 steps from the imaginary centre in any direction and subsequent ones after covering 330 steps on either side. In all 775 plots were taken in eighteen compartments. Number of plants and weight of fresh roots, rhizomes and leaves was recorded in each plot. (KHAN & AHMAD, 1976).

For estimation of yield of different medicinal plants standard deviation and standard error were calculated and yield was estimated at 0.05 probability level with the following formula :—

$$Y = f(AV. \pm t_{0.05(d.f)} \times SE)$$

WHERE : Y — stands for estimated yield in kgs.

F — is the total area of compartments.

Av. — is the species-wise per hectare average.

$T_{0.05(d.f)}$ — is the probability level with degrees of freedom.

SE — is the standard error.

Results

Summarised results presented in table-1 show that *Polygonum amplexicaule*, *Podophyllum emodi* and *Saussurea lappa* are available in large quantities and can be exploited commercially. Local people collect *Viola serpens* and *Aconitum laeve* and sell them in open markets and these quantities are unrecorded. *Saussurea lappa* occupies ravines, nullahs and depressions and is abundantly found in compartments 17, 18, 19 and 20. *Saussurea lappa* and *Dioscorea deltoidea* although still available in adequate quantity but there is an urgent need to take effective steps by the Forest Department for regenerating the depleted areas where these plants have been threatened with extinction.

The above mentioned plants can be exploited commercially from Forest areas and the respective Forest Department should pay immediate attention not only for a sustained supply of these plants to the pharmaceutical companies but also for replenishing/regenerating the depleted areas where ruthless exploitation has ceased the process of natural regeneration of annuals in general and perennial plants in particular like, *Dioscorea*, *Saussurea* and *Bergenia* etc.

The Forestry Research Division of Forest Department should initiate experiments for determining the rotation of the medicinal plants that at which age the roots/rhizomes/leaves etc., contain the maximum alkaloids, steroids and other active constituents.

To motivate and to encourage farmers to grow medicinal plants the Forest Department should establish model units consisting of experimental farms on which medicinal plants are grown and optimum conditions of growth are worked out and if resources permit install isolation/separation sections/ in collaboration with some pharmaceutical industry in which the active principles are isolated and packed. Farmers should be provided information regarding active substances of the plants used in medicine, optimum conditions of growth, soil and environmental conditions required, and the prices that the plants grown would fetch in the market.

Efforts should be made to explore the markets of these medicinal plants and once export market of these manufactured drugs is established it would be easier to exploit our natural medicinal plant resources on large scale in future.

Acknowledgement

Thanks are due to Mr. Qallandar Malik, Deputy Forest Ranger of Azad Kashmir Forest Department for assisting in survey work.

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TABLE - I
LEEPA VALLEY AVERAGE WEIGHT OF DRIED ROOTS/LEAVES/FLOWERS IN KGS

Compartment nos.	Area (ha)	No. of plots taken	<i>Valeriana</i>	<i>Aconitum</i>	<i>Viola</i>	<i>Polygonum</i>	<i>Podophyllum</i>	<i>Bergenia</i>	<i>Geranium</i>	<i>Saussurea</i>	<i>Dioscorea</i>	<i>Thalictrum</i>
			<i>latamansi</i>	<i>laeve</i>	<i>serpens</i>	<i>umplexi- caule</i>	<i>hyllum emodi</i>	<i>himalatica</i>	<i>um walli- chianum</i>	<i>lappa</i>	<i>deltoides</i>	<i>trum vagina- tum</i>
5	318	40	9.75	2.5	23.25	18.60	15.40	36.30	24.00	0.00	0.75	0.70
6	186	30	2.77	0.00	5.2	2.40	10.13	0.00	1.86	3.00	0.00	11.86
8	348	40	18.17	0.00	23.00	30.00	57.40	25.00	6.50	0.00	31.65	11.60
9	243	36	11.67	0.00	25.58	27.55	17.11	45.66	23.00	5.33	29.55	0.00
10	191	36	10.39	0.00	32.00	0.00	32.88	4.00	18.88	4.00	22.88	1.36
11	147	19	38.68	29.84	50.80	37.05	90.52	0.00	3.15	3.15	70.31	1.26
12	560	49	4.43	48.18	14.95	0.00	12.24	13.18	18.28	17.38	25.34	2.12
13	733	71	4.34	2.66	11.60	15.77	9.80	24.08	14.08	0.00	10.70	2.45
14	190	26	4.69	0.00	27.53	17.84	8.30	51.23	30.46	5.07	3.30	0.00
15 a	515	53	1.26	0.00	13.69	15.84	9.05	4.98	11.69	0.00	21.88	0.00
15 b	265	24	40.29	8.50	13.75	31.00	9.00	28.25	37.83	11.00	3.37	0.00
16 a	313	34	0.18	10.85	25.94	10.35	22.82	0.35	12.35	0.00	15.11	0.00
16 b	548	48	34.31	11.62	4.14	26.00	23.50	25.08	1.58	59.75	10.45	0.00
17	596	56	8.59	1.33	20.41	22.07	3.14	3.42	13.92	0.53	13.92	0.00
18 a	778	74	22.68	5.83	14.85	25.24	32.75	15.16	4.00	37.78	1.28	0.77
18 b	1293	76	33.37	3.11	5.32	21.89	23.68	14.92	0.63	39.78	10.85	0.00
19	414	42	50.28	0.00	18.71	24.19	31.23	0.00	26.09	146.00	6.19	0.00
20	207	21	8.24	0.00	10.75	76.19	7.61	0.00	52.38	0.00	0.00	0.00
Total :-	7845	775	304.09	124.42	341.29	401.98	410.56	291.61	300.68	332.77	277.53	32.12
Average/hectare weight in Kgs.			18.56	7.07	15.28	20.98	21.53	14.90	12.85	24.34	16.20	1.34
Standard error.			0.17	0.14	0.12	0.23	0.16	0.15	0.13	0.39	0.19	0.033
Maximum estimated yield in Metric tonnes at 0.05% probability level.			148.22	57.62	121.81	168.14	171.48	119.26	102.84	196.98	130.10	10.99
Minimum estimated yield in Metric tonnes at 0.05% probability level.			143.01	53.30	117.92	161.03	166.31	114.51	98.76	184.90	124.07	9.98
Mean estimated yield in Metric tonnes at 0.05% probability level.			145.61	55.46	119.86	164.58	168.89	116.88	100.8	190.94	127.08	10.48