QUANTITATIVE SURVEY OF MEDICINAL PLANTS IN RAWALPINDI NORTH, RAWALPINDI SOUTH AND MURREE FOREST DIVISIONS.

by

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Importance of medicinal plants and their use as a remedy of certain diseases was known to human beings from times immemorail. Knowledge of medicinal plants lead to its logical conclusion, that is, gradual evolution of science of Taxonomy. In the present age because of synthetic products some of the medicinal plants have lost their old value but still a considerable number of drugs mentioned in the formularies are manufactured from plants. A casual look on the national formulary booklet confirms this statement.

Pakistan is importing crude extract of drug plants from developed countries, although these medicinal plants are available in our country. Plants like *Dioscorea deltoidea*, *Valeriana wallichii* and *Podophyllum hexandrum* can be quoted as an example. Before persuading the industrialists for the establishment of pharmaceutical industries, based on our plants resources, it is a must that the quantities of important medicinal plants available in Pakistan, be estimated.

Already survey of medicinal plants has been completed in Siran, Dir, Chitral, Gallies, Kaghan Forest Divisions and part of Baluchistan. Survey of medicinal plants in Rawalpindi North, Rawalpindi South and Murree Forest Divisions would give a complete picture of the availability of medicinal plants in hilly forests of Pakistan.

According to the revised working plan for Murree Kahuta Forests of Rawalpindi District for the year 1953-54 to 82-83, the said Forest Divisions are situated between 32° -06' and 34° -01' North latitude and 72° -04' and 73° -42' east longitude. The tract is bounded on the north by the provincial boundary of N.W.F.P. which is artificially demarcated. On the east Jhelum forms a natural boundary and separates it from Poonch Illaqa of Jummu and Kashmir, on the south and west the boundaries are also artificial and separate it from Jhelum and Cambellpur Forest Divisions.(1)

Murree Kahuta Forest Division which once consisted of eight ranges has now been splited into three independent Forest Divisions, i.e. Rawalpindi North, Rawalpindi South and Murree Forest Division. Total area of these three Forest Divisions are 47,176 hectares including cantonment Forest Range of Murree Forest Division. Rawalpindi North and

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Rawalpindi South forest divisions mainly consist of scrub and mixed Chir forests. Medicinal Plants like *Cannabis sativa, Adhatoda vasica* and *Viola serpens* are reported to be available in good percentage of the ground vegetation. Kail and Chir are the principal tree species in Murree Forest Division and plants like *Dioscorea deltoidea, Podophyllum hexandrum* and *Valeriana wallichii* grow in association with Kail and *Quercus incana*.

Quantitative survey of six important medicinal plants was conducted in the above mentioned three forest divisions during the year 1970-71 to ascertain the approximate quantities of medicinal plants available in the area. Survey work could not be conducted in Punjar range area of Rawalpindi South Forest Division, because of fire, which occured in May, 1970. Results of this survey are presented in this paper.

Method of Survey

1. Following medicinal plants were surveyed in the Forest Divisions already mentioned.

   (1) *Cannabis sativa*   (2) *Valeriana wallichii*

   (3) *Adhatoda vasica*   (4) *Dioscorea deltoidea*

   (5) *Viola serpens*   (6) *Podophyllum hexandrum*

2. Quantitative survey was conducted compartment-wise in Rawalpindi North, Rawalpindi South and Murree Forest Divisions:

3. In each compartment of a block an imaginary centre was located.

4. Plot of 20 × 20 metres i.e. 1/24th of an hectare were taken in all the four directions from this imaginary centre and number of plots to be studied was determined according to the area of the compartment.

5. First plot was taken after 330 steps (251 metres) from the imaginary centre in any direction and subsequent plots were taken after every 330 steps.

6. Distance covered by 330 steps was measured with the help of a Pedometer.

7. In all 1385 plots were taken in different compartments of the above mentioned forest divisions. Weight of fresh roots rhizomes and leaves was recorded in each plot.

8. Out of the total area of 47,176 hectares an area of 47 hectares was covered during the survey and sampling intensity was 0.1 percent.

9. For estimation of yield of different medicinal plants separately, standard deviation and standard errors were calculated and yield was estimated at .05

probability level with the following formula:—

$$Y = \overline{X} \pm t.05 \times SE_{\overline{x}}$$

Where Y stands for estimated yield in Kgs.

Presentation of Data. Data collected during the survey of Rawalpindi South, Rawalpindi North and Murree Forest Divisions are presented in summarised form in Table I, II and III.

Interpretation of Results. Summarised results presented in Table I, II and III clearly show that *Adhatoda vasica* is available in large quantities in all the three Forest Divisions. *Viola serpens* is found in good quantity in Rawalpindi North and Murree Forest Divisions, while in Rawalpindi South Forest Division the quantity of Viola plants is negligible. Similarly *Valeriana wallichii* roots are available in exploitable quantities in Rawalpindi North and Murree Forest Divisions. *Cannabis sativa* is present only in Rawalpindi South Forest Division and is mainly associated with lower altitude vegetation. Important medicinal plants like *Podophyllum hexandrum* and *Dioscorea deltoidea* are scarce in Murree Forest Division and are non existant in Rawalpindi North and Rawalpindi South Forest Divisions because of altitude factors. Standard error is generrll below 10% except in case of *Viola serpens* and *Podophyllum hexandrum*. This excess of standard error is because of very patchy occurrence of plants in the forest enclosures.

Discussion. Results of survey have shown that *Adhatoda vasica* and *Viola serpens* which are commonly used in Unani and Ayurvedic system of medicine are available in large quantities.(2) *Adhatoda vasica* known as Bansa or Bhaiker in local language is not in demand by the drug dealers, while *Viola serpens* can be sold in large quantities as it is in great demand in the market. Already firms like Hamdard Limited are manufacturing "Joshandi" which has *Viola serpens* as its main component. *Cannabis sativa* is mainly used by the addicts, and therefore it should be eradicated from the Forest enclosures. *Valeriana-wallichii* (Mushk bala) is available in sufficient quantities to meet the demand of drug dealers and can be exploited by the forest department.

Medicinal plants like *Podophyllum hexandrum, Dioscorea deltoidea* are in very limited quantity in Murree Forest Division because of higher density of population in Murree hills resort. Efforts should be made to regenerate these plants in secluded area of Murree Forest Division to preserve and protect this natural wealth.

Conclusion. Eastern system of medicine is prevalent in many countries of Asia and South East Asia, as it is difficult for the Government of these under developed countries to provide medical facilities on large scale under Alopathic system of medicine. Plants like Banafsha (*Viola serpens*) and Barg Bansa (*Adhatoda vasica*) can be exported to several countries which are following the eastern system of medicine if efforts are made to explore the markets of these countries. At present *Adhatoda vasica* plants are going waste and no systematic conversion from fresh plants to crude drug is being done.

TABLE I

MURREE FOREST DIVISION

Average weight of fresh roots/leaves in Kgs.

Name of Range	Name of Block	No. of comptts. Surveyed	No. of Plots Taken.	Area of Block in hectares.	Adhatoda vasica.	Viola species.	Valeriana wallichii.	Dioscorea deltoidea	Podephyllum hexandrum.
Ban	Ban	10	22	714.80	N.P.	3.85	8.98	N.P.	N.P.
Ban	Surba	11	24	713.20	N.P.	4.20	14.69	N.P.	N.P.
Sehr Bagla	Dewal	5	15	530.80	62.98	2.62	7.44	N.P.	N.P.
Sehr Bagla	Sehr Bagla	11	27	887.20	131.19	3.94	20.47	N.P.	N.P.
Sehr Bagla	Bhur Ban	12	21	586.80	N.P.	3.73	16.53	5.02	N.P.
Lower Topa	Charehan	26	51	480.00	N.P.	7.73	58.88	14.15	10.41
Lower Topa	Sunny Bank	9	11	400.00	N.P.	2.57	14.11	3.66	2.57
Lower Topa Municipal Committee	Patriata	16	44	1519.60	N.P.	9.39	37.46	13.85	10.62
"	Kashmir Point	17	31	876.40	N.P.	5.43	30.73	9.04	3.62
"	Pindi Point	12	24	684.40	N.P.	2.09	16.80	8.26	2.80
Cantonment	Cantt.	23	25	568.40	N.P.	3.40	24.05	9.48	5.83
Ghora Gali	Ghora Gali	23	54	1767.20	N.P.	14.17	23.08	14.48	7.87
Ghora Gali	Anguri	12	31	942.40	166.30	4.81	20.70	N.P.	N.P.
Ghora Gali	Sambli	12	31	1002.00	161.47	5.48	14.88	N.P.	N.P.
	Total:	199	411	11673.20	521.94	73.41	308.89	77.94	43.72
Average per Plot in Kgs..........					5.01	0.17	0.75	0.30	0.26
Standard error in Kgs...........					0.19	0.01	0.07	0.01	0.05
Percentage of error in Kgs.......					0.23	0.38	0.49	0.26	1.65
Estimated yield in Kgs...........					421865.28	56533.83	247012.87	59411.95	46586.56
Maximum estimated yield in Kgs. at .05% probability level........					473956.16	64515.08	292106.63	65675.74	67209.59
Minimum estimated yield in Kgs. at .05% probability level........					369831.12	44552.57	201919.11	53148.16	25739.60

N.P. Means non productive.

TABLE II

RAWALPINDI SOUTH FOREST DIVISION

Average weight of fresh roots/leaves in Kgs.

Name of Range	Name of Block	No. of comptts Surveyed.	No. of Plots taken.	Area of Bolck in hectares.	Cannabis sativa.	Adhatoda vasica.	Viola species.
Kahuta	Kahuta	13	70	1844.80	138.77	1571.43	N.P.
Kahuta	Keral	9	54	2002.40	157.44	1155.56	N.P.
Kahuta	Raj Garh	14	48	1620.00	119.20	1211.98	N.P.
Kaller	Kaller	5	33	1228.40	N.P.	905.24	N.P.
Kaller	Choa	6	66	2488.00	N.P.	1508.57	4.19
Kaller	Nara	8	49	1822.80	N.P.	1049.69	3.26
Gujar Khan	Baghan	19	48	1508.80	N.P.	1245.48	N.P.
Taxila	Taxila	13	45	1553.20	N.P.	1259.48	N.P.
Total:		87	413	14068.40	415.41	9907.43	7.45

	Cannabis sativa.	Adhatoda vasica.	Viola species.
Average per plot in Kgs.	2.42	23.98	0.06
Standard error in Kgs.	0.23	0.83	0.001
Percentage of standard error in Kgs.	0.55	0.20	0.10
Estimated yield in Kgs.	521778.01	8877148.30	7040.42
Maximum estimated yield in Kgs. at .05% probability level	734659.13	9605707.47	8653.02
Minimum estimated yield in Kgs. at .05% probability level	308896.89	8148578.67	5427.82

N.P.   Means non productive.

TABLE III

RAWALPINDI NORTH FOREST DIVISION

Average weight of fresh roots/leaves of Medicinal plants per Plot in different blocks in Kgs.

Name of Range	Name of Block	No. of Comptts Surveyed.	No. of Plots taken.	Area of Block in hectares.	Adhatoda vasica.	Viola species.	Valeriana wallichii.
Lehtrar	Lehtrar	14	39	1239.20	N.P.	8.51	N.P.
Lehtrar	Chirah	9	35	1200.00	342.16	11.22	N.P.
Lehtrar	Bangal	14	35	1136.00	N.P.	6.80	N.P.
Kotli	Kotli	7	18	643.20	159.53	4.20	14.69
Kotli	Dhir Kot	21	60	1998.80	587.76	11.90	35.48
Kotli	Kamra	16	58	1860.00	502.22	18.03	45.66
Karror	Karror	3	23	824.40	236.71	5.36	18.78
Karror	Asiari	6	28	955.60	235.10	5.44	17.96
Karror	Bagga	12	26	804.40	212.24	3.03	12.89
Banni	West Block	5	70	2675.20	740.53	N.P.	N.P.
Tret	Tret	7	39	1453.60	382.04	2.27	23.88
Tret	Chatar	14	76	2753.60	680.23	N.P.	N.P.
Tret	Tarlai	8	54	2168.80	620.29	0.63	25.19
Total:		136	561	19712.80	4698.81	77.39	194.53

			Adhatoda	Viola	Valeriana
Average yield per plot in Kgs.			9.65	0.19	0.64
Standard error in Kgs..................			0.29	0.30	0.04
Percentage of error in Kgs.................			0.18	0.93	0.34
Estimated yield in Kgs.			4177907.20	66550.89	95238.40
Maximum estimated yield in Kgs. at .05% probability level..............			4460865.57	90203.93	193148.17
Minimum estimated yield in Kgs. at .05 probability level..............			3894948.82	42897.85	146608.63

N.P.   Means non productive.

Kurram chemical company is facing hardships because of non-exploitation of drug plants from our natural resources. One such source is *Valeriana wallichii* (Mushk bala) which can be commercially exploited by the firm. For this purpose a systematic plan of extraction on three years rotation basis may be prepared by the Forest Department to provide some time for the regeneration of the plants. Some of the firms like Hamdard Dawa-Khana, Dawa Khana Hakim Ajmal and some Unani whole sale drug dealers can be approached to explore the feasibility of export of drugs manufactured by these companies from plants like *Adhatoda vasica* and *Viola serpens*. Once export market of these manufactured drugs is established it would be easier to exploit our natural medicinal plants resources on large scale in future.

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