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A Physiological Phytochemical and Cultivation Evaluation study of Herbal Plant

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Abstract - Despite the fact that many societies have historically utilised herbs, Indians have a long, prosperous, and diversified cultural past of employing medicinal plants. The purpose of the current study, which is described in this article, is to evaluate the potential of herbal plants' cultivation and their therapeutic value. The survey sought to determine both the total number of plants used in the preparations and the presence of Roylea cinerea in these drugs. It was clear that up to 100 species, 80% of which are native to the Morni Hills in Haryana, are employed in the creation of well-known herbal remedies.

Keywords - Herbal plant, Physiological, Phytochemical, Cultivation evaluation

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INTRODUCTION

Plants were an important part of ancient Indian, Chinese, and Egyptian societies as a source of medicine even during the Neanderthal period. Initially, these medications were offered for sale as unrefined herbal combinations, tinctures, teas, poultices, and powders (Samuelsson, 2004). The usage of plant-based treatments for different ailments and their manufacturing methods were formerly passed down orally. Herbals, which are providing many opportunities to examine and extract unfamiliar plant components, eventually became a repository for knowledge on therapeutic plants.

Given that the market for herbal products is now expanding dramatically on a worldwide scale, major pharmaceutical firms are continually researching a wide range of plant materials for potential medical benefits (Mukherjee & Houghton 2007).

Contrarily, the primary basis for prescribing crude medications has traditionally been anecdotal data from clinical investigations. It is impossible to stress the importance of thorough, systematic research into traditional remedies (Fabricant & Farnsworth, 2001).

India provides Ayurveda, Unani, Siddha, and homoeopathy as some of the legally recognised alternative health care systems for the extremely long-term, secure, continued use of several herbal treatments. These ideas have effectively coexisted with allopathy side by side and are not "in the region of obscurity." Herbal treatments are commonly used in seasonings, home remedies, health foods, over-the-counter (OTC) medicines for self-medication, and prescription drugs in non-allopathic systems (Jianga, et al., 2010).

Due to the advent of high-throughput screening in the post-genomic era, more than 80% of pharmaceutical components are derived from or inspired by naturally occurring compounds. Over 100 drugs developed from naturally occurring innovations are now undergoing clinical trials, and there are over 100 initiatives connected to this that are in the preclinical research stage (Thoppil et al., 2011).

Despite the fact that the middle Himalayas today produce 80% of the world's medicinal plants, little attention has been paid to their preservation and cultivation. However, the Uttrakhand government has delegated the duty of conducting research and producing medicinal plants to Pant Nagar's G.B. Pant University. The University is situated in the Tarai Region, where the climate has little to do with hills, thus the efforts would not be particularly beneficial. This restricts the suggestion. Institutions in diverse temperature zones must now coordinate their efforts, add to them, and integrate their infrastructural and human resource resources.

Recently, the government and a number of NGOs have been promoting the cultivation of medicinal plants among farmers in order to boost their livelihoods and protect the diversity of medicinal plants. As a consequence, the herb that was selected for the present project has the potential to be grown as a herb.

MATERIAL AND METHODS

Survey

After visiting several herbal drug stores in the town and surrounding areas for this study, an extensive

list of the herbal plants used in the production of various Ayurvedic and homoeopathic medicines was compiled. Every herb was identified as a component of a different drug that will be sold in a pharmacy.

An exhaustive survey was also conducted at each location. A list of notable herbal plants was compiled with the assistance of taxonomists and knowledgeable village elders from the various visitation sites. After that, the medicinal plants were gathered and brought into the lab.

Phytosociology

Three separate sites at various locations were chosen for the Roylea cinerea vegetation investigation. The point-centered quartet approach was used to analyse the vegetation. The investigation of the location's trees, shrubs, and plant components employed three different sizes of quadrates: 10x10 m, 5x5 m, and 50x50 cm. It was noted how many species there were, how many individuals there were, and how big each species' basal area was. To reduce experimental error, three samples of the vegetation analysis were collected at each site.

Busing et al. (1995) and Yadav et al. (1991) carried out the vegetation analysis according to their guidelines. Two techniques—the point-centered quarter approach and the quadrate method—were used to analyse the vegetation. For tree and shrub species, including saplings, the point-centered approach was employed. For herbaceous species, including seedlings and grasses, the quadrate method was utilised.

Soil analysis

The proportion of soil water, the ability of the soil to store water, and the contents of potassium, organic carbon, and phosphorus were all determined by soil analysis. About 1 kilogramme of dirt, taken from various depths (0, 10, 20, and 30 cm), was pushed into polythene bags with field information (site depth). The sample was sent to a lab for analysis of its chemical and physical characteristics.

Physical properties

The physical properties of soil are mainly the properties of its particles varying greatly in their size. The soil particles are divided into various components, termed as separates. Some of the important physical properties of soil are, soil texture, and Porosity.

Chemical analysis

To determine pH and the levels of organic carbon, phosphorus, and potassium, a chemical analysis was performed.

Propagation

By using the method developed by Heartrment and Kester in 1989, the propagation of plants by stem cutting and seed germination were examined in both laboratory and field conditions.

Chemical analysis

Searching the existing phytochemical literatures, such as Compendium of Indian Medicinal Plant, Journal of Organic Chemistry, Chem Abstract, Wealth of India, etc. for information on medicinally significant constituents

RESULT AND DISCUSSION

- **Phytosociology**

Phytosiciological studies of *Roylea cinerea* were carried out at three different sites, where this shrub plant strand occurs. The *Roylea cinerea* was associated with at least 19 other plant species. These included tree species, *Toona cileata*, *Grewia optiva, Mangifera indica, Melia azedarach , Psidium guajava, Ficus palmata, Mallotus philippensis, Celtis australis, shrubs- Adhatoda vasica, Lantana indica, Urtica dioica, Parthenium hysterophorus, Murraya koenigii, Canabis sativa, Carissa congesta* and herbacious plants- *Oxalis debilis , Oxalis corniculata, Stellaria media, Poa annua, Arabidopsis thaliana,.*

The ecological studies viz. density, frequency, mean basal area (MBA), total basal area (TBA), important value index (IVI), abundance/ frequence (A/F) etc, were calculated and presented in Table- 1-3.

Table 1: (SITE-A)

Shrub species	Den (Plant /100m^2)	Fre(%)	MBA (cm^2)	TBA (cm^2 /100 m^2)	IVI	A/F Ratio
Lantana indica	10.3	100	4.03	41.509	72.45174	0.103 C
Urtica dioica	9.4	100	4.5	42.3	71.19151	0.094 C
Roylea cinerea	9.4	70	2.73	25.662	52.65518	0.1917 C
Partheniium Hystenophaus	6.2	80	0.93	5.766	32.6716	0.096 C
Murraya Koenigii	6.4	70	1.18	7.552	32.53451	0.130 C
Canavis sativa	6.1	60	1.14	6.954	29.53013	0.169 C
Carissa congesta	0.4	40	1.14	0.576	8.9641623	0.25 Regular
Total	48.2	520		130.319	299.998	

Table 2: (SITE-B)

Shrub species	Den (Plant/ 100m^2)	Fre(%)	MBA (cm^2)	TBA (cm^2/100 m^2)	IVI	A/F Ratio
Lantanaindica	15	100	4.26	63.9	121.215	0.15 C
Urticadioica	8.4	100	3.8	31.92	75.847	0.084 C
Canavissativa	5.5	70	1.47	8.085	39.855	0.111 C
Royleacinerea	4.5	60	1.76	7.92	34.421	0.121 C
Murraya koenigii	1.9	40	1.15	2.185	17.3035	0.1187 C
Adthatodavasica	1.4	20	2	2.8	11.339	0.35 C
Total	36.7	390		116.81	299.980	

Table 3: (SITE-C)

Shrub species	Den (Plant/ 100m^2)	Fre(%)	MBA cm^2	TBA(cm^2 /100 m^2)	IVI	A/F Ratio
Muraya Koengii	15	100	1.287	19.305	81.68711	0.15 C
Royleacinerea	10	70	2.16	21.6	67.0721	0.202 C
Lantanaindica	6	100	2.5	15	53.3253	0.06 C
Urtica dioica	5	100	2.88	14.4	50.0803	0.05 Random
Parthenim hysterophrus	3	60	0.42	1.26	20.31113	0.083 C
Canavissativa	2	70	0.42	0.84	19.2023	0.04 C
Carissa congesta	0.3	30	1.47	0.441	6.9915	0.03 Random
Total	41.3	530		72.846	298.66	

- **Chemical and physical pheture of soil**

Table 4

	Soil Depth	Site A	Site B	Site C
pH	0-10	6.8	6.8	6.8
	10-20	6.7	6.6	6.7
	20-30	6.9	6.7	6.7
	Mean ± SD	6.8 ± 0.1	6.7 ± 0.1	6.7 ± 0.1
C	0-10	0.525	0.450	0.720
	10-20	0.570	0.460	0.765
	20-30	0.435	0.455	0.840
	Mean ± SD	0.51 % ± 0.068	0.45 % ± 0.005	0.77 % ± 0.06
P	0-10	12.728	14.208	17.76
	10-20	13.024	14.200	15.392
	20-30	13.616	14.610	14.504
	Mean ± SD	13.12 ha^{-1} ±0.45	14.33 ha^{-1} ±0.23	15.8 ha^{-1} ± 1.68
K	0-10	143.34	224.00	224.00
	10-20	224.00	215.00	203.00
	20-30	215.04	224.00	224.00
	Mean ± SD	194.1 ha^{-1} ± 44.1	221ha^{-1} ± 6.7	217 ha^{-1}± 12.12

- **Vegetative propagation**

The primary growing seasons, namely the spring and rainy season, were used to study Roylea cinerea's vegetative proliferation by stem cutting. Cuttings were planted in polybags containing various soil mixtures, including garden soil (T1), farm yard compost soil (T2), red soil (T3), forest soil (T4), primarily collected from oak forest at a height of 1800 metres above sea level, and sandy soil, between 15 February and 15 March for the spring season and from 15 July to 15 August for the rainy season (T5).

After being planted for nine days, the cutting showed evident signs of survival in the form of sprout initiation.

The total number of sprouted cuttings varied depending on the kind of soil. In comparison to the wet season, the proportion of sprouted cuttings was often greater in the spring. The springtime farm yard made of (T2 70% 10) showed the most sprouting, followed by forest soil (T4 63.3% 5.77) and garden soil (T1 60% 10) and sandy soil (T5 60% 17.32). The sprouting rate in red soil (T3 26.66 5.7) was the lowest. With the exception of red soil, which had approximately equal sprouting, the spring season was around 10–20% greater in the spring than the rainy season. However, compared to the spring, the sprout length was at its highest during the wet season. Forest soil (T4 30.66 cm 6.11) had the longest sprouts, followed by sandy soil (T5 26.66 cm 6.35) and garden soil (T1 22.00 cm 2.26).

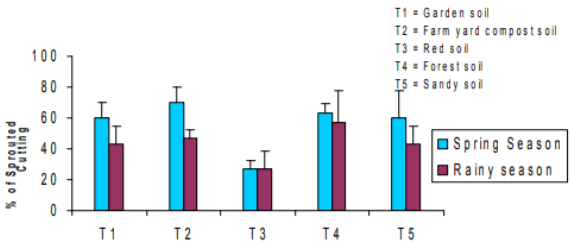

Figure 1:

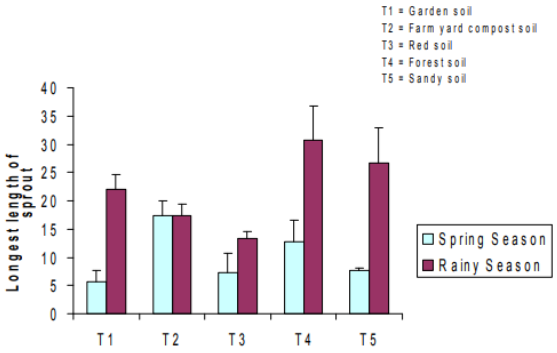

Figure 2:

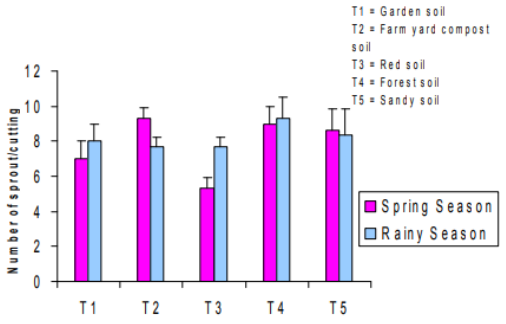

Figure: 3

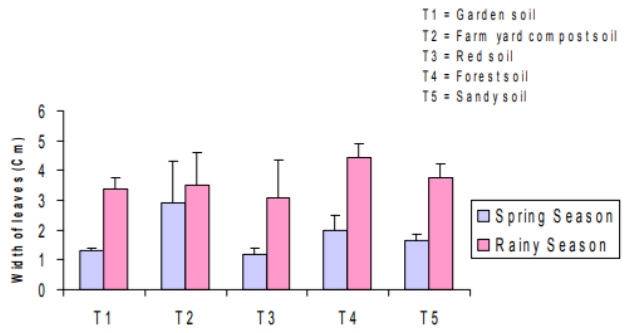

Figure 4:

- **Chemical analysis**

The data on phytochemical anlysis of the plant are summarized as thefollowing table.

Table 5

Part	Compounds isolated
Leaves	Betulin, beta-amyrin, beta-sitosterol, stigmasterol, cetylalcohol, glucose, fructose, arabinose, palmitic, stearic, olic, gallic, oxalic, tartaric, anthraquinone glycoside, 1,4-dihydroxy-6, 7-dimethoxy 2-methy 3-O-beta-D-glycopyranoside, flavonol glycoside, quercetin3 O-beta-L-rhamnoside, moronic acid, calyone, precalyone, andcalyenone.
Stem.	Pentacosane octacosanol, friedelin, beta-amyrin,beta sitosterol,betulonic acid ,beta-sitosterol- beta-D glucoside and 5,6,7,4 -tetramethoxyflavone.
Root	3beta-hydroxyolean-12-ed-28-oic acid.

It is evident that several phytochemicals are present in various part of the plant. The notable most valuable phytochemical are calyon and precalyone.

- **Discussion**

Only by taking cautious measures, like protecting and cultivating the few identified herbal species, is it possible to preserve biodiversity and manage herbal wealth sustainably (Bawa et al., 1993; Dhar et al., 2002; Farooquee et al., 1996; Joshi and Rawat, 1997; Khashoo, 1993; Nautiyal et al., 2002; Nautiyal, 1996; Nautiyal et al., 2001; Nautiyal et al., 1985; Purohit, 1997; Rana et al., 2004). Additionally, it would be necessary to concurrently document and make accessible the traditional local herbal knowledge for the benefit of a greater community. In addition to those already mentioned, this habitat can also be used to grow many more medicinal herbs in the future. Plants including: *Bergenea legulata, Centella asiatica, Emblica officinalis, Sida cordifolia, Coriandrum sativum, Spinaeia oleracea, Vitex negundo, Terminalia bellirica, Terminalia chebula, Vitis vinifera, Lawsonia alba, Andrographis paniculata, Sapindus mukorossi, Myrica esculenta, Punica granatum, Mucuna pruriens, Emblica officinalis* etc.,can be introduced in this region, though they are presently uncommon and rare.

CONCLUSION

The current work covers a wide range of topics, including a critique of physiological phytochemical research and an assessment of herbal plant production. One of the medicinal plants used in traditional medicine is Roylea cinerea, which is also used as a blood purifier, to treat different skin allergies, as a febrifuge, and to cure diabetes. It is clear that Morni Hills in Haryana might play a significant role in the sector based on herbs. In addition, it is evident that, with the exception of a few medications, *Roylea cinerea* is not currently in use. This requires introduction at the national level for the benefit of the populace.

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