

Medicinal Plant Strains Identification using Clustering & Visualization

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Abstract

Ethnobotany is a broad term that embraces all disciplines that have an impact on the interaction between plants and indigenous peoples. An ethnobotanical study was conducted to document indigenous medicinal plants and their usage from knowledgeable and elderly persons. According to World Health Organization more than 80 percent of the Population is directly dependent on natural diversity. During field excursions, indigenous knowledge about unique indigenous usage was gathered through personal interviews and questionnaires. Between Jan-April, 2022 survey was undertaken and authentication of 38 plant species have been done. The goal of this study is to gather information about ethnic usage of herbs so that they may be incorporated into current medication formulations [1][3].

Keywords :- Pesticidal chemicals, crops, yield, seeds, harvesting.

II INTRODUCTION

People in primitive societies from earliest times of human existence came to know the multifarious uses of plants and were the repository of vast knowledge of plants and their properties. The knowledge about plants has handed over through generation to generation. Ethnic people all over the world use an enormous range of wild plants for their daily needs, livelihood and healthcare. Since civilization an intricate relationship established between aboriginal people and plants Ethnobotany is the study of how people in human civilizations have used, handled, and perceived plants. This study takes into account the ways in which plants have been utilized for things such as food, medicine, dying, creating tools, currency, clothing, rituals, social life, and music. In the year (1895)

Hershberger coined the term "ethnobotany" to describe the study of plants that were utilized by ancient civilizations and native peoples. According to Schulte's (1962), the study of interpersonal ties of ancient civilization and their botanical genesis is referred to as ethnobotany. Additionally, according to Turner (1995) the science of human interactions with plants is referred to as ethnobotany. According to Cotton (1996) Ethnobotany is a broad term that embraces all disciplines that have an impact on the interaction between plants and indigenous peoples. This is because ethnobotany focuses on the relationship between plants and indigenous peoples 2][6].

According to Jain (2001) ethnobotany is the study of the entire range of natural and traditional relationships that exist between man and his plants and animals. Ethnobotany is regarded to be a branch of ethnobiology, which is a scientific discipline. It is in charge of the investigation and **evaluation of plant-human** relationships at all phases of development, as well as the impact of plant ecology on human societies. HM is a practice that has deep roots in the history and customs of indigenous communities, and it is still used in those communities today. Even in modern times, the vast majority of indigenous communities in the United States receive their primary medical treatment from an accessible, community-based traditional healing system. Formalization was defined by Singh (2010), the high rate of anthropogenic disturbance in the modern world, which can take the form of activities such as cattle grazing, the collection of fuelwood, and forest fires, is putting a number of medicinal plants in danger of going extinct and causing a loss in the genetic diversity of their species. In order to make the most of the herbal plant resources available, it is essential to be able to correctly identify the species of plants, as well

as have an understanding of the traditional medical uses of those plants (Kaur and Vashistha 2014)[1].

Medicinal plants, often known as medicinal herbs, are plants that have medicinal properties. The Latin word "herba" and the French word "herbe" are both derived from the word "herbe." Today, a medical plant can be defined as any structural element of a plant, such as a fruit, seed, stem, bark, flower, leaf, stem, or root, as well as a woodless plant that can be utilized for therapeutic purposes. A medicinal plant can also be defined as a plant that does not include any wood. Herbal medicines are also utilized as food, for the extraction of flavonoids, as herbs or spices, and for a variety of other spiritual activities[3]. Since far before the time of the ancient Greeks and Romans, people have been extracting medicinal compounds from plants in order to treat a variety of conditions. The Bible is just one example of the many old holy books and sacred scriptures that make reference to the usage of healing plants (Bhattacharjee *et al.*, 2019).

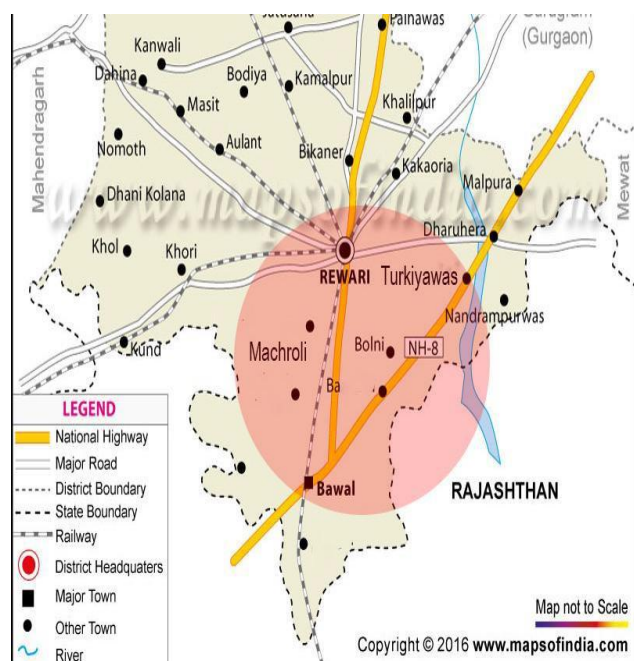


Figure.1 Geographical distribution of villages covered under Rewari District, Haryana

III METHODOLOGY

Data Collection

1. Selection of Informants: During the present study 36 key informants were selected on recommendation of knowledgeable elders and local authorities. The informants were selected from 8 villages of the study area[5].

The graph shows the total distribution of male and female informants in the following age classes which is shown below;

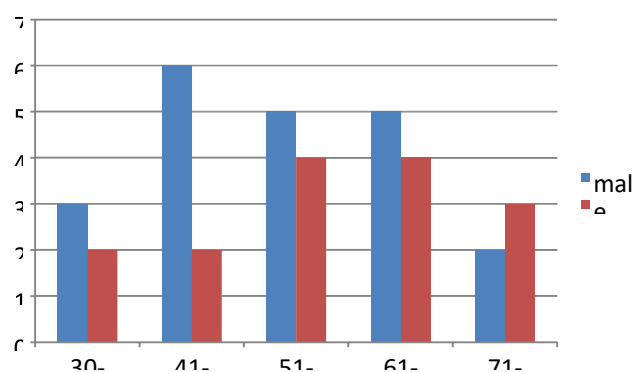


Figure .2 Distribution of Male and Female informants in age classes.

Collection of Plant Specimens and Their Preservation: A database of ethnobotanical information might be constructed with the help of the images, videos, and audio recording. During the course of the research conducted in the field, a significant number of digital images of flowering plants were taken. At the time of the interviews, it was possible to get photographs of myself with a number of the informants. When people were contributing knowledge about the medical applications of plants, many movies of the informants giving that information were made. Many different field note books were utilized in order to record all of the information that pertained to the research activity[1]. Every possible attempt was taken to produce voucher specimens of high quality for each plantspecies that was discussed with the informants. The

voucher specimens were gathered with the assistance of informants and people from the surrounding area. The specimens of the plants were gathered, dried, and then mounted on herbarium sheets after being conserved. Field requirements and other requirements for making voucher specimens. For collection of plant specimens, their processing and mounting articles were used.

RELATED WORK

Medicinal Plants Reported: -

During the course of present research work a total of 38 species of medicinal plants were reported. The result is presented in tabular form. The table is prepared on the basis of diseases. The diseases are arranged in order and the scientific names of plant species are given with their local name, family name, plant part used and mode of use [2].

: List of some ethnobotanical important plants species to cure Bites.

Sr. No.	Name of Plant Species	Local Name	Family	Plant Part Used	Mode Of Utilization
1.	<i>Syngonium podophyllum</i>	Arrowhead plant	Araceae	Rhizome	Remedy for the bite of Paraponera ants (F 2018)
2.	<i>Nyctanthes arbor-tristis</i>	harsingar	Oleaceae	Bark	The bark is used for the treatment of snakebites (Santosh <i>et al.</i> , 2011)
3.	<i>Celosia cristata</i>	cockscomb	Amaranthaceae	Whole plant	The whole plant is used as an antidote for snakebites (Rahm and Gulshana 2011)
4.	<i>Clinacanthus nutans</i>	Shabh snake grass	Acanthaceae	Leaves	Fresh leaves used as an antidote for snakebites and insect bites. (Chia <i>et al.</i> , 2011)
5.	<i>Crassula ovata</i>	Jade plant	Crassulaceae	leaves	The jade solution is used to cure mosquito bites (Bagnasco <i>et al.</i> 2019)
6.	<i>Piper samentosum</i>	Kaduk	Piperaceae	Leaf	Leaves are used in treating snake-bites (Chia <i>et al.</i> , 2020)
7.	<i>Tredecantia Zebrina</i>	silver inch plant	Commelinaceae	Leaf and Roots	Used as a treatment for poisonous snake bites (Moehring, 2011)
8.	<i>Portulaca grandiflora</i>	Rose Moss	Portulacaceae	Leaf and Stem	The fresh juice of leaves and stems is used externally as a treatment for snake and insect bites (Bartók 2011)

DIABETES

Sr. No.	Name of Plant Species	Local Name	Family	Plant Part Used	Mode Of Utilization
1.	<i>Tecoma stans</i>	Yellow elder	Bignoniaceae	Leaves	A leaf infusion can be taken orally for treating diabetes (Singh <i>et al.</i> , 2013)

2.	<i>Senecio kleiniiifor mis</i>	Spear Head	Asteraceae	leaves	Leaves are used to cure Diabetes.
3.	<i>Crassula ovata</i>	Jade plant	Crassulaceae	Jade flower juice	Jade juice is used as a diabetes remedy(Billah, 2012).
4.	<i>Clinacanthus nutans</i>	Shabh snake grass	Acanthaceae	leaves	Leaves are used to cure diabetes(Alam <i>et al.</i> , 2016)

List of some ethnobotanical important plants species to cure Blood Pressure.

Sr. No.	Name of Plant Species	Local Name	Family	Plant Part Used	Mode Of Utilization
1.	<i>Tradescantia pallida</i>	Purple Heart	Commelinaceae	Leaves	beneficial for hypertension and high blood pressure. (Huq 2015)
2.	<i>Nyctanthes arbor-tristis</i>	harsingar	Oleaceae	leaves	Paste of leaves is given with honey for the treatment of high blood pressure. (Santosh <i>et al.</i> , 2016)
3.	<i>Clinacanthus nutans</i>	Shabh snake grass	Acanthaceae	leaves	Fresh leaves used to improve blood circulation and High Blood pressure. (Alam <i>et al.</i> , 2016)

3D Projection Of Data In The Reduced Dimension

A 3D Projection Of Data In The Reduced Dimension

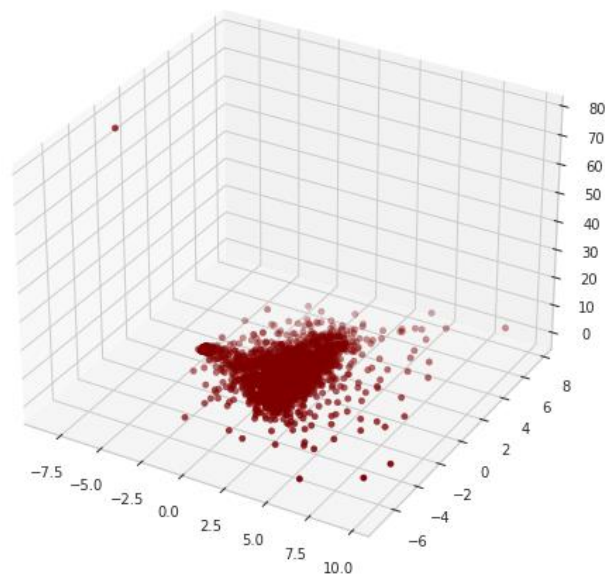


Figure 4 3D Projection Of Data In The Reduced Dimension

ARTHRITIS

List of some ethnobotanical important plants species to cure Arthritis.

Sr. No.	Name of Plant Species	Local Name	Family	Plant Part Used	Mode Of Utilization
1.	<i>Kalanchoe pinnatifida</i>	miracle leaf	Crassulaceae	Leaves	These compounds may reduce pain caused by fibromyalgia and arthritis. (Quazi 2011)
2.	<i>Crassula ovata</i>	Jade plant	Crassulaceae	Jade flower juice	The jade juice solution is used to cure inflammatory arthritis. (Billah 2012).

BLOOD PRESSURE

Elbow Method to determine the number of clusters to be formed:

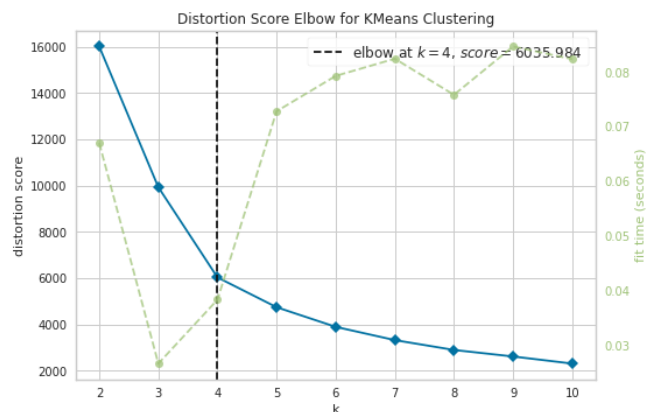


Figure 5 Number of Cluster Determination

Distribution Of The Clusters



Figure 6 Cluster Distribution

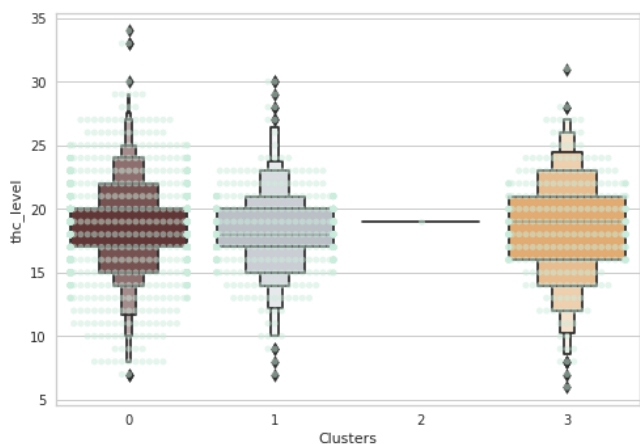


Figure 7 Cluster Distribution II

Results and Discussion

It has been observed in our research work various plant parts have been used in the treatment of the various diseases.

The recorded 38 plant species are used to treat different types of diseases. The types of diseases are grouped into major categories. shown by Fig.43 It has been observed that 8 plant species are used against Bites, 6 plants are used for Asthma, 4 plants are used for Dental problems, 4 plants are used for Diabetes, 3 plants are used for Hair problems , 2 plants are used for Arthritis , 6 plants are used for Wounds , 5 plants are used for Stomache , 3 plants are used for Blood pressure , 2 plants are used for Gynecological disorder , 2 plants are used for Digestive Disorder , 3 Plants are used for Dermatological disorder[3][4].

Conclusion

Most of the selected information was medicine man, some midwives were also selected. The plant specimens were collected, dried, preserved and mounted on herbarium sheets. The voucher specimens were identified with the help of floras and Govt. University, Indira Gandhi University. Study work is dedicated to result of my research work and discussion about the findings during the course of present research work. A total of 38 plants species were reported which are used for the treatment of different diseases/ disorders of study area. All the recorded plant species are present in tabulated form. Rewari district has a rich diversity of medicinal plants. the percentage distribution of these medicinal plants is shown by fig. The number of 38 plant species that are used to treat their different disease categories is shown by fig. the use frequency of different plant parts used for medicine is shown by fig. the percentage of difference plant parts used for medicine is shown fig the percentage of methods of remedy preparation for treat of diseases is shown by fig. it has been observed that the leaves are used very frequently than other plant parts. Among the methods of remedy preparation decoction is used most frequently The percentage of plant parts used and percentage of methods of

remedy preparation is analyzed separately under all sub headings.

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