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An Inventory of Medicinal Wealth of Jhil-Mil Jheel Conservation Reserve

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In India, the use of different parts of several medicinal plants to cure specific ailments has been in vogue from ancient time. India is a vast country where wide variations in climate, soil, altitude and latitude are available. Nature has bestowed on us a very rich botanical wealth and a large number of diverse types of plant grow wild in different parts of the country. Jhil-mil Jheel is a saucer shaped wetland situated on the left bank of river Ganga in Chiriyapur forest range of Haridwar district. The present study communicates information on medicinally important plant species. Several of the plant species are likely to go under the category of threatened due to over exploitation and habitat destruction.

Keyword: Conservation, Medicinal plants, Threatened, Wetland.

1. Introduction

Medicinal and aromatic plants constitute a major segment of the flora, which provides raw materials for use in the pharmaceuticals, cosmetics, and drug industries. The indigenous systems of medicines, developed in India for centuries, make use of many medicinal herbs. These systems include Ayurveda, Siddha, Unani, and many other indigenous practices. India is one of the world's 12th mega diversity centres with 47,000 plant species and is divided into 20 agro-eco zones^[1]. There are many medicinally valued plant resources, which provide various kinds of drugs and medicines for various ailments in our country.

In one of the studies by the World Health Organization, it is estimated that 80 per cent of the population of developing countries relies on traditional plant based medicines for their health requirements. Even in many

of the modern medicines, the basic composition is derived from medicinal plants and these have become acceptable medicines for many reasons that include easy availability, least side effects, low prices, environmental friendliness and lasting curative property. India and China are the two major producing countries, having 40 per cent of the global biodiversity and availability of rare species^[2].

The Ministry of Environment and Forest, Government of India has identified and documented over 9,500 species of medicinal plants that are significant for the pharmaceutical industry. of these, 2,000 to 2,300 species are used in traditional medicines while at least 150 species are used commercially on a large scale^[3]. The importance of medicinal and aromatic crops is increasing in the recent past, due to various changes that have taken place in the field. The first and foremost change that has

been observed is the preferred shift from Western medicines towards indigenous medicines.

This was also encouraged by the natural/organic contents of these medicines, and their affordability⁴. The increased popularity of Ayurvedic medicines in the Western world has spurred increased demand for trade⁵. The increased demand of the medicinal plants in the industry and for trade created direct incentives to the farmers to undertake cultivation of these crops⁶. Earlier, the medicinal plants, as raw material for the industry as well as trade was largely collected from natural habitats and forests. That led to high level of exploitation of these crops in the natural habitat and loss of biodiversity.

In one exemplary program, the U.S. National Cancer Institute (NCI) is collaborating with tropical countries to inventory plant species and assess their potential for anticancer and anti-AIDS treatments. Examples include the antileukemic agent vincristine, derived from a tropical periwinkle (*Catharanthus roseus*), and the ovarian cancer therapeutic, taxol, derived from the yew plant of the Pacific Northwest (*Taxus brevifolia*)

Although modern medicine has yet to identify cures for AIDS, many cancers, and a host of other human maladies—arthritis, obesity, schizophrenia, Parkinsonism, depression, to name just a few—potential pharmaceutical treatments for many of these conditions undoubtedly reside in the rich chemical diversity of the plant kingdom⁷. Modern tools of pharmacology have greatly improved on the methods of the forest shaman, the Egyptian seer, and the Aztec herbalist, but we have yet to discover or invent a richer selection of chemical possibilities than that which nature has already provided. So long as the natural diversity of the earth's vegetation remains accessible to scientific inquiry, the tradition

of medicinal plant exploration is likely to continue for centuries to come.

1.1 Study Area

Jhilmil Jheel is a saucer shaped wetland situated on the left bank of River Ganges in Chiriyapur forest range of Haridwar district. By virtue of it being the only wetland in the area of large size it remains productive throughout the year, and attracts the grazers from neighboring areas. The area is intensively grazed by livestock from March to June. Tantpur village, known earlier as Dudhiya Grant, is the only village adjacent to Jhilmil Jheel. This village came into existence only after 1950's and the community consists mostly of farmers from Punjab, Himachal Pradesh and Garhwal. The presence of five endangered deer species makes this area unique for conservation. However, little or no attention appears to have been paid to wildlife conservation and the forestry practices were confined to large scale Eucalyptus plantation. Fortunately local inhabitants around Jhilmil Jheel are conservation conscious and aware of the behavior and general habitat use by the Swamp deer.

The climate of this region is relatively sub-temperate; rainfall is chiefly confined to monsoon months. May and June are the hottest months of the region (37°C-40°C), and December – January is the coldest, sometimes the temperature reaches near freezing point. The South-West monsoon strikes the area in the end of the June and from July onward until the middle of the September. The North-East monsoon occasionally sweeps the area. The period from March to mid June constitutes the hot season characterized by the absence of rain or by scanty rainfall this is approximately less than 2000 mm. The relative humidity is generally the highest during monsoon and the lowest during the hot weather. The maximum is in July-August and minimum in

April to May. All these climatic conditions are favourable for plant growth and the vegetation is at its best during the period of monsoon.

1.2 Methodology

The vast natural pharmacy of plant medicines once accounted for 80 percent of the substances used to cure diseases. Now about 40 percent of all medicinal prescription in the United State contains at least one plant derived ingredient, and European physician routinely recommend to their patient herb such as Chamomile and Cone flower. In India, the use of different parts of several medicinal plants to cure specific ailments has been in vogue from ancient time. Ours is a vast country where wide variations in climate, soil, altitude and latitude are available. Nature has bestowed on us a very rich botanical wealth and a large number of diverse types of plants grow wild in different parts of the country.

❖ To prepare a complete list of plant biodiversity contribution of the area based on extensive field survey and studies following methods are applied by us:

- Extensive Field trips were undertaken to various localities of the area for vegetation studies.
- Based on the total area, all blocks were surveyed for recording the species occurring in each block.
- Spot identification has been generally carried out for common species growing with in the area.
- The species which could not be identified in the field, were collected as voucher specimen, identified and confirmed with the help of available standard flora and monographs and also by matching with authentic

specimens housed in the herbaria of Forest Research Institute, Dehradun.

- The inventory also include the species which are deposited (are lodged in) the herbarium of Forest Research Institute, Dehradun.
- Observation have been made on the frequency, distribution, density etc, habitat, size and colours of flowers and fruits, distribution pattern of each taxa and recorded.

The present data of Jhil-Mil Jheel, which is shown here in the form of tables, define the complete medicinal plant biodiversity of that region.

1.3 Procedure:

Following steps are involved-

- A simple checklist of plant names constitutes the first step in information gathering.
- Add ecological information ie. Type of plant: e.g. canopy tree, small tree, shrub, climber, herb and grass.
- Distribution in terms of community and abundance ie. How abundant is the plant within the community: e.g. dominant, frequent, occasional, or rare, local or widespread.
- Later the data can be brought together in report form as an annotated checklist. Make a list of the major communities in the area. With the help of the checklist prepared during the floristic inventory, make a list of plant species found in each community.

1.4 Sampling Procedure:

- First of all the total area was divided into small blocks and then each block was separately surveyed.
- Devise suitable categories of cover, e.g. lantana, grass, herbs, woody vegetation, leaf litter, dead wood.

- After this first of all we select an area of 10x10 m² in a random manner^[8] and count number of different tree species and measure the GBH.
- After counting the tree species we draw an area of 5x5 m² in previously selected area and count the shrub species and measure the GBH.
- After counting the shrub species we take 5 plots of 1 m² in this region and count the number of grass and herb species.

Table1: Based on the field exercise undertaken the following table indicates the complete inventory of the area:

| Sl. No. | Botanical name | Vernacular name | Family | Habit | Part used |
|---------|--|-----------------|----------------------------|-------|--------------------------------|
| 1. | <i>Acacia catechu</i> | Khair | Legumeinosae-Mimoseae | Tree | Bark & heartwood |
| 2. | <i>Adina cordifolia</i> | Haldu | Rubiaceae | Tree | Bark Juice |
| 3. | <i>Aegle marmelos</i> | Bel | Rutaceae | Tree | Pulp of ripe fruit & Root bark |
| 4. | <i>Bauhina racemosa</i> | Kachnar | Legumeinosae-Caesalpinieae | Tree | Leaves and bark |
| 5. | <i>Cassia fistula</i> | Amaltas | Legumeinosae-Caesalpinieae | Tree | Whole plant |
| 6. | <i>Cordia dichotoma</i> | Lessora | Boraginaceae | Tree | Fruit |
| 7. | <i>Crateva adansonii</i> spp. <i>odora</i> | Barna | Bixaceae | Tree | |
| 8. | <i>Diospyros montana</i> | Pinna | Ebenaceae | Tree | Fruit & leaves |
| 9. | <i>Ehretia aspera</i> | Chamror | Boraginaceae | Tree | Fresh Root |
| 10. | <i>Eucalyptus</i> ssp. | Eucalyptus | Myrtaceae | Tree | Leaves |
| 11. | <i>Ficus rumphii</i> | Pilkhan | Urticaceae | Tree | Bark |
| 12. | <i>Grewia optiva</i> | Bhimal | Tiliaceae | Tree | Root |
| 13. | <i>Mallotus philippensis</i> | Rohni | Euphorbiaceae | Tree | Fruit |
| 14. | <i>Oroxylum indicum</i> | Tarlu | Bignoniaceae | Tree | Root bark, bark, seeds, & stem |
| 15. | <i>Catunaregam spinosa</i> (<i>Randia dumetorum</i>) | Mainphal | Rubiaceae | Tree | Fruit & brk |
| 16. | <i>Rhamnus virgatus</i> | Thanthar | Rhamnaceae | Tree | Fruit |
| 17. | <i>Tectona grandis</i> | Teak | Verbenaceae | Tree | Wood and bark |
| 18. | <i>Terminalia chebula</i> | Hararh | Combretaceae | Tree | Fruit & bark |
| 19. | <i>Terminalia arjuna</i> | arjun | Combretaceae | Tree | Bark, fruit & leaves juice |
| 20. | <i>Ziziphus mauritiana</i> | Ber | Rhamnaceae | Tree | Leaves, fruit, root & bark |
| 21. | <i>Adhatoda zeylanica</i> | Bansa | Verbenaceae | Shrub | Flowers, leaves & root |
| 22. | <i>Clerodendrum</i> | Chingari | Verbenaceae | Shrub | Leaves ad root |

| | | | | | |
|-----|---------------------------------|----------------|----------------------------|-------|---|
| | <i>viscosum</i> | | | | |
| 23. | <i>Helicteres isora</i> | Kapasi | Tiliaceae | Shrub | <i>Fruit, bark & root</i> |
| 24. | <i>Lantana camara</i> | Lantana | Verbenaceae | Shrub | <i>Whole plant</i> |
| 25. | <i>Murraya koenigii</i> | Kath - Neem | Rutaceae | Shrub | <i>Bark, root & leaves</i> |
| 26. | <i>Sida cordifolia</i> | Kharenti | Malvaceae | Shrub | <i>Root bark & seeds</i> |
| 27. | <i>Ziziphus oxyphylla</i> | Ber | Rhamnaceae | Shrub | <i>Leaves, fruit, bark & seed</i> |
| 28. | <i>Abutilon indicum</i> | Kanghi | Malvaceae | Herb | <i>Whole plant</i> |
| 29. | <i>Achyranthes aspera</i> | Chirchita | Amaranthaceae | Herb | <i>Whole plant</i> |
| 30. | <i>Acorus calamus</i> | Sweet flag | Acoraceae | Herb | <i>Whole plant</i> |
| 31. | <i>Adiantum edgeworthii</i> | | Pteridaceae | Fern | |
| 32. | <i>Aerva lanata</i> | Chaya | Amaranthaceae | Herb | <i>Root</i> |
| 33. | <i>Argemone maxicana</i> | Pili kateli | Papaveraceae | Herb | <i>Root, seeds & juice of plant</i> |
| 34. | <i>Apluda mutica</i> | | Poaceae | Herb | |
| 35. | <i>Bacopa monnieri</i> | Bramhi | | Herb | <i>Whole plant</i> |
| 36. | <i>Boerhavia diffusa</i> | Punarnava | Nyctaginiaceae | Herb | <i>Root</i> |
| 37. | <i>Cannabis sativa</i> | Bhang | Utricaceae | Herb | <i>Whole plant</i> |
| 38. | <i>Cassia tora</i> | Panwar | Legumeinosae-Caesalpinieae | Herb | <i>Root, leaves & seeds</i> |
| 39. | <i>Centella asiatica</i> | Tulsi | Labiataeae | Herb | <i>Whole plant</i> |
| 40. | <i>Cissampelos pareira</i> | Harjori | Menispermaceae | Herb | <i>Root & leaves</i> |
| 41. | <i>Commelina benghalensis</i> | Kankaua | Commelinaceae | Herb | <i>Whole plant</i> |
| 42. | <i>Cynodon dactylon</i> | Doob | Poaceae | Herb | <i>Roots & juice of plant</i> |
| 43. | <i>Cyperus iria</i> | Motha | Cyperaceae | Herb | <i>Tubers</i> |
| 44. | <i>Cyperus rotundus</i> | Motha | Cyperaceae | Herb | <i>Tubers</i> |
| 45. | <i>Euphorbia hirta</i> | Dudhi | Euphorbiaceae | Herb | <i>Whole plant</i> |
| 46. | <i>Imperata cylindrica</i> | Cogon grass | Poaceae | Grass | <i>Whole plant</i> |
| 47. | <i>Mimosa pudica</i> | Lajwanti | Leguminoceae | Herb | <i>Leaves & Root</i> |
| 48. | <i>Oxalis corniculata</i> | Ambuti | Oxalidaceae | Herb | <i>Whole plant</i> |
| 49. | <i>Parthenium hysterophorus</i> | Congress grass | Aesteraceae | Herb | <i>Root</i> |
| 50. | <i>Paspalum scrobiculatum</i> | Chota moth | poaceae | Grass | <i>Fruit</i> |
| 51. | <i>Solanum viarum</i> | Kantkheri | Solanaceae | Herb | <i>Fruit</i> |
| 52. | <i>Sonchus asper</i> | | Compositae | Herb | <i>Whole Plant</i> |
| 53. | <i>Saccharum bengalense</i> | Sarkanda | Poaceae | Grass | <i>Stem & Root</i> |

2. Result and Discussion

The study area Jhil-Mil Jheel conserve reserve was extensively surveyed during May 10, 2007 to June 12, 2007. All the compartments were physically screened and surveyed for the occurrence of various tree, shrub, herb, climbers, lichens, algae etc of medicinal importance. The samples were collected and identified with the help of Herbarium collections of FRI

Herbaria and other relevant floras. The following table presents the results of the above inventory exercise.

In all 52 species of medicinal importance have been recorded in the study area. Some of these species are of high tradable nature such as *Bacopa*, *Adhatoda*, *Centella*, *Terminalia arjuna*, *Oroxylum indicum* etc.

Table 2: Different life forms of Medicinal Plants in Jhil-Mil Jheel

| <i>Life form</i> | <i>No. of Species</i> |
|------------------|-----------------------|
| <i>Tree</i> | 20 |
| <i>Shrub</i> | 07 |
| <i>Herb</i> | 22 |
| <i>Grass</i> | 03 |
| <i>Fern</i> | 01 |
| Total | 53 |

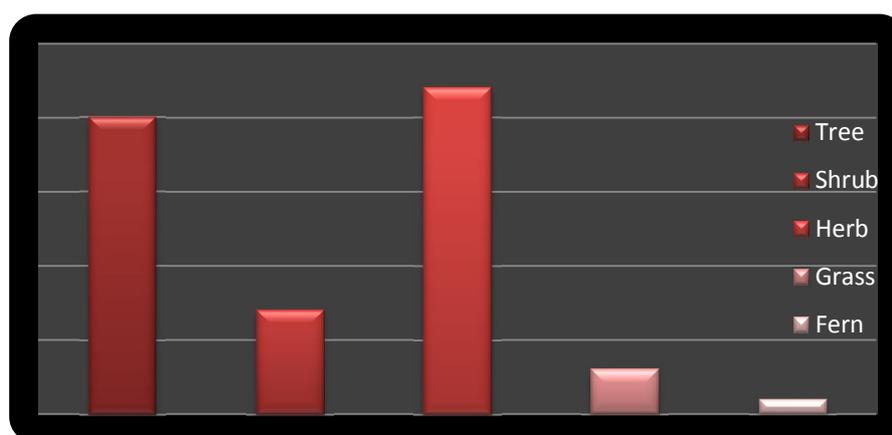


Fig 1: Percentage of different Life forms of Medicinal plants in Jhil-Mil Jheel

Above Table and figure indicate that herbs are the most common medicinal plants cover of the area followed by tree and shrub species respectively.

3. Conclusions

The area is harbouring a diverse floristic species, out of which atleast 52 species are of medicinal importance.

- The most dominant habit, which is found in this forest, is herbs.
- After analyzing the data we observe that the relative dominance percentage of herbs is higher than trees and shrubs.
- Out of 53 species, 20 species belongs to tree habit, 07 species belongs to shrub habit and rest 26 species belongs to herb habit (22 herbs, 3 grasses and 1 fern).
- Some of the species are in high market demand and are therefore liable to be exploited by local people and hence needs to be conserved as well as protected from any exploitation.
- On the basis of present data we can say that this reserve conserve has a vast biodiversity of medicinal plant.

Based on the field surveys and other studies on the medicinal plant diversity of Jhil-Mil Jheel Conserve Reserve described in the proceeding parts, it is concluded that:

1. The Blocks of conserve reserve which are named as 8(a), 9(a), 8 (b) etc. are the plantation forest of *Eucalyptus sps.* While another blocks like 8(b), 9(b) etc. are mixed forest type.
2. This ecosystem is quite rich floristically and harbors some of the important medicinal flora in its lap.
3. During the summer period (the time of this survey for the present study) the diversity of medicinal plants ranges from **9 – 15 species** in various

compartments. Almost all the compartments have same vegetation.

4. There is wide herbaceous vegetation because this reserve is moisty and swampy region.
5. There are **53** medicinal plants growing currently under the canopy of mixed and Eucalyptus plantation out of which 20 are trees, 07 shrubs and 26 herbs (22 herbs, 3 grasses and 1 fern).
6. *Centella asiatica* is one of the most important species which is a brain tonic and memory enhancer found very frequently in main jheel area.
7. In the swampy area i.e. main jheel located in the centre of conserve reserve is main habitat of swamp deer and the main flora of this jheel is *Typha angustifolia*, *Typha elephantiana* and *Acorus calamus*.

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