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Medicinal plants in an Urban environment; herbaceous medicinal flora from the campus of Regional Institute of Education, Bhubaneswar, Odisha

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Abstract

Bhubaneswar popularly known as the Temple City is one of the oldest continuously inhabited regions of the world, and one the most important Lord Shiva, Lord Bhubaneswari, Lord Mahavir and Lord Buddha pilgrimage sites of the country. Despite its importance, very little information is available on the city's herbaceous flora in general, and the medicinal species found within its limit in particular. As traditional medicine plays an important role in Indian society and in Oriya culture, the present study attempts to investigate the availability and their traditional uses. The paper presents information on the traditional uses of seventy-two plant species collected from the campus of Regional Institute of Education (NCERT), Bhubaneswar, Odisha, and highlights the uses of these plants by the local inhabitants for healthcare and the students of the institute for the study of Ethnobotany , Medicinal importance and conservation.

Key-Words: Medicinal Plants, Ethnobotany, Bhubaneswar, Regional Institute of Education

Introduction

The medicinal uses of plants are very old and plant parts are an age old practice. The ancient literature indicates that therapeutic use of plants is being practiced since as old as 5000-4000 B.C. and the Chinese were the first to use natural herbal preparations as medicines[1]. In India, however, the earliest reference of use of plants as medicine appears in Rig-Veda which is said to be written between 3500-1600 B.C., Later the properties and therapeutic uses of medicinal plants were studied in detail and recorded empirically by the ancient physician in Ayurveda which happens to be the basic foundation of ancient medical science in India. In India the native people used to exploit a variety of herbals for effective curing of various ailments. The medicinal value of these plants lies in some chemical active substances that produce a definite physiological effect in the human body. The most important of these bioactive constituents of plants are alkaloids, tannin, flavnoid, phenolic compounds etc. Interestingly it is estimated that more than 25 % of the modern medicines are directly or indirectly derived from plants.

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Therefore over the last few years, researchers have aimed at identifying and validating plant-derived substances for the treatment of various diseases commonly observed among rural and tribal community. It is worth mentioning that Indian medicinal plants are considered as a vast source of several pharmacological principles and compounds that are commonly used as home remedies against multiple ailments. The plant parts used, preparation, and administration of drugs vary from one place to another. However, the knowledge of herbal medicines is gradually perishing, although some of the traditional herbal men are still practising the art of herbal healing effectively. These plants are frequently used by the local inhabitants of the area for treatment of various diseases.

Ethno-medicinal studies have offered immense scope and opportunities for the development of new drugs. Some modern drugs have been deducted from folkfore and traditional medicines. Living close to nature, traditional societies have acquired unique knowledge about the use of wild flora and fauna, most of which are unknown to the people who live away from such natural ecosystem such as forests. The value and importance of traditional knowledge are now being increasingly acknowledged all over the world. The pharmaceutical industry tries to investigate and

confirm the efficacy of many medicines and toxins used by traditional communities[1]. The forests have been the source of invaluable medicinal plants since the time man realized the importance of preventive and curative properties of plants and started using them for human health care. The old traditional Indian systems of medicine, is one of the most ancient medicine practices known to the world, and derives maximum formulations from plants and plant extracts that exist in the forests. About 400 plants are used in regular production of Ayurvedic, Unani, Siddha and tribal medicines. About 75 % of those are from tropical and 25 from temperate forests. 30 % of preparations, 5 % flowers, 10 % fruits, 6 % leaves, 7 % seeds, 3 % wood, 4 % rhizomes, 6 % stems and only less than 20 % of the species used are cultivated[2]. It is estimated that10 % of all plant species are currently endangered in India[3]. The present study attempts to find out the medicinal value of the herbaceous plants of an urban area such as Bhubaneswar which was covered under forests couple of years before.

Methodology

The natural herbaceous flora of Bhubaneswar, the capital city of the state of Odisha has been considerably affected during the last 50 years due to the Capital construction. Bhubaneswar is located between 20 ° 14' 0" N and 20 ° 15' 40" N latitudes and 85 15' 30" E and 85 45' 30" E Longitudes. It lies on the western, margine of the costal plain of Odisha. The average height of the place is about 46 meters above the sea level. The topography of the place is low lateratic plateau with a valley-and-ridge composition possibly due to erosion. Geologically this region belonging to Gandwana land mass, one of the oldest and the most stable land masses of the world. So the rock range from the Archaean to the recent period but the major part of the area is covered with the quaternary alluvium and lateritic soil. According to changes in weather four seasons are distinguished as: Cool-dry, Hot-dry, Hot-wet and Cool-wet[4].Regional Institute of Education (RIE), Bhubaneswar is a constituent unit of National Council of Educational Research & Training (NCERT) is located in the heart of the Bhubaneswar city in an area of about 100 acres used by the students and staffs of the institute. A plant inventory was conducted in and around the campus of Regional Institute of Education. All plants were located, identified by authors. The field survey covered different seasons. The survey was started in summer session and collection was repeated every month till end of winter season. Seasonal variations and frequency of plant occurrence were noted.Ethnobotanical uses of the plants were first searched from the literature[6-8]. The etnobotanical uses mentioned in literature were then cross checked through interviews with local inhabitants in and around campus. The interviews were conducted randomly after obtaining prior informed consent of the participants. During the field visit, survey collection was made in different places i.e. waste lands, bare lands, play ground, road side, forest lands and grasslands. The collected samples of plants were brought to the department for identification.

Results and Conclusion

India has a tradition of codified healthcare systems: Ayurveda. Unani and Siddha. The present study recorded 72 plant species, many of which are herbs & shrubs, with few climbers, mostly belonging to class Diocotyledons (Table 1). The leaves, seeds and roots from 20, 4 and 8 plant species are used for treatments. Further the plants were observed to be highly valuable for medicinal uses including diarrhea, dysentery, gonorrhea, leprosy, paralysis, piles, purgative skin diseases, etc. The study provides sufficient ground to believe that the traditional medicinal practice using native medicinal plants is alive well functioning in the study area which happens to be a tropical urban location. Many communities use wild plant parts for the primary healthcare, due to belief in its effectiveness, lack of modern medicines and medication and poor economic status of people. The treatment of diseases with plants and plant products also causes little site effect and is cost effective too. Some plants such as *Amaranthus viridis*, *Commelina benghalensis* and *Murraya paniculata* are used as leafy vegetables. Few plants such as *Ipomea carnea, Ricinues communis, Parthenium hysterophorus* are toxic to animals. Plant like *Calotropis prostrate* has both medicinal & toxic effect against animals depending on the parts used. Among the plants recorded, family Euphorbiaceae had the large number of species (Fig-1). Keeping the importance of plants in consideration, large numbers of commercially important medicinal plant species are being over-exploited by persons involved in the trade. Lack of sustainable harvesting methods, inadequate knowledge about forest management and lack of financial resources are the main reasons behind over-exploitation of some commercially important species, and the populations of valuable species, are on decline. Intensive and unrestricted grazing, year after year by multitudes of cattles and goats of local villagers, accompanied with spread pilferage from the wild has led to serious decline of medicinal plants in particular and the entire natural environment as whole. More than 95 % of the medicinal plant materials used by the medicinal plant industry is acquired from the wild,

more often than not by illegal means[5].Bhubaneswar is a growing city and represents a large urban environment. Despite dense urbanization, medicinal plants still play a key role in the health care of the local population. Plants commonly used as traditional medicines in rural areas could still be found in Bhubaneswar, and were collected and used by the local people. Local herbal health practioners might be collecting the medicinal plants from the area of Regional Institute of Education. The current over-exploitation, unlimited grazing and soil compaction due to trampling seems to limit the ability of some species to propagate. Therefore, there is immediate need to conserve these important species for their sustainable uses for the future.

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Table No 1. Flora of RIE Campus along with by Family and uses

Botanical Name 1	Family 2	Habit 3	Ethnomedicinal Uses 4
1. ***Abrus precatorius* (L.)**	Fabaceae	Wild , climber	Seeds are used for avoiding conception during menstruation
2. ***Acalypha indica* (Linn.)**	Euphorbiaceae	Wild, annual shrub	Fresh leaves are used to cure ulcer
3. ***Achyranthes aspera* (L.)**	Amaranthaceae	Wild , herb	Whole plant is used in liver problems
4. ***Aerva lanata* (L.)**	Amaranthaceae	Wild, herb	Whole plant is used in cholera.
5. ***Ageratum conyzoides* (Linn.)**	Asteraceae	Wild, weedy herb	Leaves are used to treat fever and gastrointestinal ailments
6. ***Aloe vera* (L.)**	Liliaceae	Cultivated	Leaf juice is used to treat irritable bowel syndrome & Headche.

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7. *Amaranthus viridis* (L.)	Amaranthaceae	Wild, herb	Leaf is used as leafy vegetables.
8. *Asparagus racemosus* (Willd.)	Asparagaceae	Wild, climber	Whole plant is used in night blindness.
9. *Bacopa monnieri* (L.) Pennell.	Scrophulariaceae	Wild , prostrate	Whole plant are used as memory enhancer [6]
10. *Biophytum sensitivum* (L.) DC.	Oxalidaceae	Wild, herb	Whole plant used as anti-tumor activity and it inhibit metastasis
11. *Boerhavia diffusa* (L.)	Nyctaginaceae	Wild, prostrate	Roots are diuretic and expectorant
12. *Caesalpinia pulcherrima* (L.)Sw.	Caesalpiniaceae	Wild , shrub	Flowers are used as skin moisturizer
13. *Caesalpinia pulcherrima*(L.) var flava	Caesalpiniaceae	Wild , shrub	Flowers are used as skin moisturizer
14. *Calotropis prostrate* (L.) R. Br.	Asclepiadaceae	Wild, shrub	The root powder is used to cure eczema, and leaf is toxic for grazing animals, also Root is used as fish poison[7]
15. *Cassia occidentalis* (L.)	Caesalpiniaceae	Wild,. Herb	Paste of leaves is externally applied on healing wounds
16. *Catharanthus roseus* (L.) G.Don.	Apocynaceae	Wild , under shrub	Fresh twig with hot water is used to cure diabetes
17. *Centella asiatica* (L.) Urb.	Apiaceae	Wild, shrub	Whole plant is used as memory enhancer
18. *Christella dentate* Forssk.	Thelypteridaceae	Wild,	Leaves are used in skin disease among Dongaria Kodho of Niyamgiri.
19. *Cissampelos pareira* (Linn.)	Menispermaceae	Wild, climbers	Leaves are used in asthma
20. *Cleome monophylla* (L.)	Cleomaceae	Wild, herb	Seeds were used as a condiment.
21. *Coccinia grandis* (L.) Voigt.	Cucurbitaceae	Wild, climber	Common climber weed used in skin diseases
22. *Commelina benghalensis* (L.)	Commelineae	Wild, herb	Leaf used as leafy vegetables
23. *Croton bonplandianum* Baill.	Euphorbiaceae	Wild, under shrub	Repellent property against the insects
24. *Cyperus rotundus* (L.)	Cyperaceae	Wild, grasses	Whole plant powder boiled in ghee and applied as ointment in ulcers
25. *Datura stramonium* (L.)	Solanaceae	Wild, herb	The juice of leaves are used as anti-dandruff
26. *Desmodium pulchellum*	Fabaceae	Wild, herb	Stem is used in hemorrhages

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(Linn.)			
27. ***Desmodium triflorum***	Fabaceae	Wild, prostrate	Found in Wet areas as a weed
28. ***Dioscorea alata*** **(L.)**	Dioscoreaceae	Cultivated, climber	Tubers are edible
29. ***Dioscorea puber*** **Bl. Enum.**	Dioscoreaceae	Wild, climber	Bulbils and tubers are edible
30. ***Dipteracanthus prostrates*** **(Poir.) Nees.**	Acanthaceae	Wild	Roots are used in syphilis and renal affections.
31. ***Eclipta prostrate*** **(L.)**	Asteraceae	Wild, herb	Juice of leaves are used as hair growth enhancer
32. ***Emilia sonchifolia*** **(L.) DC.**	Asteraceae	Wild , erect herb	Leaves are used in eye inflammation
33. ***Euphorbia hirta*** **(Linn.)**	Euphorbiaceae	Wild, herb	Roots are used as nourishment for feeding mother when production of milk is deficient
34. ***Evolvulus alsinoids*** **(L.)**	Convolvulaceae	Wild, prostrate	Whole plant with mustard oil is used as hair growth enhancer
35. ***Evolvulus nummularius*** **(L.)**	Convolvulaceae	Wild , Prostrate	Whole plant paste is used externally to reduce tonsillitis pain
36. ***Gymnema sylvestre*** **R.Br.**	Asclepidaceae	Cultivated	Leaves are used in diabetes
37. ***Hedyotis corymbosa*** **(Linn.)Lam.**	Rubiaceae	Wild, herb	Whole plant is used as Liver tonic
38. ***Helianthus annuus*** **(L.)**	Asteraceae	Cultivated	Seed oil is edible
39. ***Heliotropium indicum*** **(L.)**	Boraginaceae	Wild , herb	Decoction of root with honey is taken as vitamin for iron deficiency by woman against anemia during pregnancy period.
40. ***Hemidesmus indicus*** **(L.) R.Br.**	Asclepiadaceae	Wild, shrub	Roots are used in kidney problems
41. ***Hibiscus rosa-sinensis*** **(Linn.)**	Malvaceae	Cultivated	Flowers are used in colouring and hair growth
42. ***Hyptis suaveolens*** **(L.)Poit.**	Lamiaceae	Wild, shrub	Leaves are sued to cure diarrhea
43. ***Ichnocarpus frutescens*** **(L.) W.T.Aiton.**	Apocynaceae	Wild, Shrub	Root is used to cure diabetes
44. ***Ipomoea carnea*** **Jacq.**	Convolvulaceae	Wild, shrub	Toxic for animals
45. ***Jatropha gossypifolia*** **(L.)**	Euphorbiaceaec	Wild, shrub	Stem and bark is used to cure blood dysentery
46. ***Kalanchoe pinnata*** **Lam.**	Crassulaceae	Cultivated	Whole plant is used to cure diarrhea

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47. ***Lantana camara*** **(L.)**	Verbeneaceae	Wild, shrub	Toxic for animals, whole plant is used as antidote to snake bite[7]
48. ***Leonotis nepetiifolia*** **(L.) R.Br.**	Lamiaceae	Wild , herb	Leaves are used in Malaria
49. ***Lawsonia inermis*** **(L.)**	Lythraceae	Cultivated	Strong fungitoxicity
50. ***Mikania micrantha*** **Kunth.**	Asteraceae	Wild, climber	Leaves are used in septic ulcers
51. ***Mimosa pudica*** **(L.)**	Mimosaceae	Wild , herb	Whole plant decoction with milk is taken to treat bleeding in piles
52. ***Mollugo pentaphylla*** **(L.)**	Aizoaceae	Wild ,herb	Whole plant is used as diuretic agent
53. ***Mucuna pruriens*** **(L.) DC.**	Fabaceae	Wild, prostrate	Seed powder is used to cure Parkinson diseases
54. ***Murraya paniculata*** **L. Jack.**	Rutaceae	Wild	Used as curry leaf
55. ***Ocimum basilicum*** **(Linn.)**	Lamiaceae	Wild , herb	Whole plant is used in fever
56. ***Ocimum sanctum*** **Linn.**	Lamiaceae	Wild, herb	Whole plant is used in gastric and hepatic disorders
57. ***Paederia foetida*** **(L.) Mant.**	Rubiaceae	Wild	Leaves juice used in diarrhea
58. ***Parthenium hysterophorus*** **(L.)**	Asteraceae	Wild , herb	Toxic weed for other plant
59. ***Peperomia pellucida*** **(L.)HBK.**	Piperaceae	Wild,	Whole plant is used to cure abdominal pain
60. ***Pergularia daemia*** **Forssk.**	Asclepiadaceae	Wild	Leaves are useful in Liver disorder
61. ***Phyllanthus reticulates*** **Poir.**	Euphorbiaceae	Wild, shrub	Fruits are edible
62. ***Piper nigrum*** **(L.)**	Piperaceae	Cultivated	Whole plant is used to cure sore throat
63. ***Rauwolfia serpentine*** **(L.) Benth.**	Apocynaceae	Wild , herb	Whole plant act as an active tranquilizer, Pregnant women avoid this herb
64. ***Ricinus communis*** **(L.)**	Euphorbiaceae	Wild, shrub	Toxic for grazing animals
65. ***Sida acuta*** **Burm.f.**	Malvaceae	Wild, under shrub	Whole plant is used in Elephantiasis and dandruff
66. ***Stachytarpheta jamaicensis*** **(L.)**	Verbenaceae	Wild, shrub	Leaves are used as emetic
67. ***Synedrella nodiflora*** **(L.)**	Asteraceae	Wild , shrub	Leaves are used in rheumatism
68. ***Tabernaemontana divaricata*** **(Linn.) R.Br.**	Apocynaceae	Cultivated	Flowers are used in worship of god in Odisha
69. ***Tridax procumbens*** **(L.)**	Asteraceae	Wild , herb	Leaf juice is used as insecticidal and piscidal and healing wounds.

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70. ***Vernonia cinerea* (L.) Less.**	Asteraceae	Wild , shrub	Whole plant is used in asthma
71. ***Withania somnifera* (L.) Dunal.**	Solanaceae	Cultivated, shrub	Leaves are used in spermatorrhoea and nocturnal emission
72. ***Ziziphus mauritiana* Lamk.**	Rhamnaceae	Wild	Fruit pulp with curd and Punica granatum, with sesame oil is taken to cure blood dysentery

Table 2: Five major herbaceous families at RIE Campus

Name of family	Number of Plant species
Asteraceae	08
Euphorbiaceae	10
Verbenaceae	5
Amaranthaceae	5
Apocynaceae	5

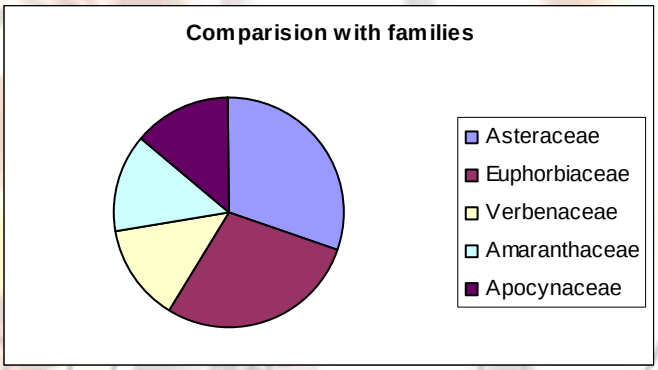

Fig. 1: Frequency of five major families recorded in RIE Campus, Bhubaneswar