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**DOCUMENTATION OF ECOLOGICAL STATUS AND MEDICINAL
VALUES OF SOME ROADSIDE HERBACEOUS PLANTS OF
ALIPURDUAR TOWN, WEST BENGAL, INDIA**

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ABSTRACT

Phytosociological survey of naturally occurring herbal plants has been carried out in Alipurduar town, West Bengal. About 50 plants were documented from the survey which are belongs to 26 families. It is found from the study that majority of the plants are belong to the family Asteraceae, Amaranthaceae, Lamiaceae, Solanaceae, Verbenaceae, Polygonaceae. Herbal medicine is always having minimal side effect with low cost remedy. So the focus of the study is to aware the medicinal value and ecological status of the common herbs around us. Different types of diseases like diabetes, uric acid, thyroid, abdominal problem, fever, cough, allergy etc. are possible to reduce using herbal medicine along with healthy habits. Alipurduar district is covered with a large floodplain in Eastern Himalayan foothill region, nestle of variety of flora and fauna and many tribal communities of West Bengal. So the unwritten herbal remedy practiced by tribal people will be the extended part of this study. Besides the medicinal value of herbs, frequency density and abundance values were calculated for each potential medicinal plant species found in this area during February and March. Out of the 50 plants studied *Xanthium*, *Spilanthes acmella*, *Amaranthus spinosus* are most dominant species than other plants.

Keywords: Dooars, Herbs, Medicinal plants, Species abundance, Tribal people

INTRODUCTION

Dooars region is covered with natural forest which is mixed deciduous type and other prominent vegetation like herbal lands, shrubby scrub, tall grass land [1]. It is a land of diverse flora and fauna along with diverse tribal inhabitants. Rabha, Hajang, Ho, Kheria, Mech Rajbanghsi, Polia Santal, Munda, Oraon, Lepcha, etc are the tribal communities of Dooars area of North Bengal [2] including one endemic tribe Toto inhabitant of Totopra. These tribal groups of people are still living in remote forest villages where the advantages of modern health service are yet to arrive. It was noted that the common day-to-day problems like fever, stomach-related disorders cuts, wounds and burns were treated with many species of forest herbs. It was documented that the communities were treating severe diseases like cancer, pox, ulcer, tuberculosis, typhoid, malaria, pneumonia and bronchitis [3]. So, people treat their ailments using their own indigenous knowledge, though this traditional knowledge is masked by modern allopathic medicine. However, recently the importance of traditional medicine, especially the plant based ones, is being realized by the masses for avoiding drug resistance, toxicity, incompatibility, expensiveness of allopath [4] and for new drug formulation. Phytosociological survey carried out in Chalsa Forest Range reveal

that excessive harvest of medicinal plants from forest may results the extinction of the species from the forest, which may led to the change in entire forest vegetation [5]. Same studies have been carried out in Buxa Tiger Reserve, Gorumara National Park [6, 7], Kedarnath Wildlife Sanctuary of Garhwal Himalaya [8], around Teesta Barrage Area [9] and many works by others. Many voices have already been raised for collection to cultivation of medicinal plants. Therefore the present study will attempt to explore the ecological status and medicinal importance of roadside herbal plants which may be the alternate place to cultivate medicinally important herbs.

MATERIAL AND METHODS

Study area: The selected study site situated in the Alipurduar area of West Bengal which falls under the Eastern Himalaya lies within 25°58' to 27° 45' N and 89° 08' to 89° 59' E. The altitudinal range of the region is 305ft. For the availability of time different areas have been selected for such study in Alipurduar town. Areas are selected as per the vegetation diversity and richness during February –March, 2021 when average temperature : ~20° C and rainfall : ~0.4mm, five different regions in Alipurduar town. For such studies, total 5 plots in each sites (1 m X 1 m plots for herbs) were selected

for regular monitoring of status of different wild medicinal plants along with some weed flora in the said populations. The size of the Quadrat was fixed by method of "Species area curve" [10] which was 1m X 1 m area for the herbaceous vegetation. The numbers of Quadrats required were determined by plotting the number of species against the number of Quadrats. Analysis of Quadrats was made following the reference [11] listed below. Five Quadrats at each site were selected in the

micro habitats were taken for such study. Plant species encountered in each Quadrat was listed and identified on the basis of floristic studies of regional vegetation made by [12] and [13], the names were cross-checked with the help of [14].

Frequency, relative density and abundance: The mean value, relative frequency, relative density, relative abundance of each species was calculated following the reference of [15] (Table 1). The formulae are given below:

$$\text{FREQUENCY} = \frac{\text{Total no.of Quadrates in which the species occur}}{\text{Total no.of species studied}} \times 100$$

$$\text{RELATIVE DENSITY} = \frac{\text{Total no.of individuals in a species}}{\text{Total no.of individuals in all species}} \times 100$$

$$\text{ABUNDANCE} = \frac{\text{Total no.of individuals in a species in all the quadrats}}{\text{Total no.of sample plots studied in which all species occurred}}$$

Medicinal value of herbs:

Primary data of ethno-medicinal importance of plants have been collected through survey from local sources, interacting tribal communities of Majher Dabri tea Garden and following the cotemporary researches like [2, 3, 16, 17].

RESULT AND DISCUSSION

The present study revealed that study site having medicinal plants with potential importance (mentioned in Table 2). Plants of 26 families have been observed like

Amaranthaceae, Asteraceae, Papaveraceae, Acanthaceae, Fabaceae, Apiaceae, Chenopodiaceae, Verbenaceae, Lamiaceae, Commelinaceae, Euphorbiaceae, Polygonaceae, Malvaceae, Brassicaceae, Utricaceae, Apiaceae, Scrophulariaceae, Oxalidaceae, Rubiaceae etc. Among these families Asteraceae is dominant, eight species were identified from this family out of fifty plants studied. Asteraceae is followed by Amaranthaceae, Verbenaceae, 4 plant species from each family and then 3

plant species from each of the family like Acanthaceae, Fabaceae, Lamiaceae, Solanaceae, Polygonaceae were found out. Two species of Euphorbiaceae are identified and one plant species from rest of the families including Chenopodiaceae, Poaceae, Cucurbitaceae, Clomaceae, Caryophyllaceae, Boraginaceae, Menispermaceae have been seen. Ecologically *Spilanthes acmella* (Asteraceae) having highest abundance value i.e., 37.5, followed by *Potentilla indica* (Rosaceae) i.e., 31.5 and the lowest abundance value has been observed in case of *Barleria cristata*. Similar study was carried out to investigate the population density, collection pattern and documentation of ethno-botanical knowledge of threatened medicinal plants used by the inhabitants of Buffer zone villages in Nanda Devi Biosphere Reserve [18]. Composition of forest vegetation are studied and the same investigation in particular time interval which will indicate the population density, extinction and other parameters has been recommended by [6] and [8], proper management of forest to preserve the flora has also been suggested [7]. Excessive harvest of medicinal plants or their propagule, expansion of human population invaded in forest area, alien and invasive plant species are main worst threats to native biodiversity after habitat destruction may results the

extinction of the species from the forest, which may led to the change in entire forest vegetation [5] and [9]. The present study shows that road side area is also a good habitat of medicinal plants where we can renew our valuable natural herbs with our little care and planned harvesting without disturbing the core forest. All the plants grow there as weeds as obnoxious one as per general view. But intensive query about each and every plants documented reveals that each contains immense medicinal values. Among all plants documented in this study 11 are used in the treatment in diabetes and acts as hypoglycemic. Decoction of 17 plant species treats skin problems like itching, eczema and allergy. 3 plant species having insect repellent properties and antifungal, antiviral activity. Above 20 plants species can use in indigestion problem and stomach problems. 9 plants species cure fever and in which 6 species plays major role to cure cough and cold. All other uses are listed in the **Table 2**.

CONCLUSION

This study is primarily based on survey and ecological data of ethno-medicinal plants were documented using random Quadrats in a random sampling technique. Thus there is a scope for further study of medicinal plants and their uses along with isolation of their phytochemicals which may be a clue of new drug formulation. Herbal plants

around us nurtured naturally are not only healing human pains moreover they mitigate the environmental pollution absorbing dust and smoke silently. Development and extension of township

leads to the abolition of many valuable herbal plants with medicinal values need to conserve if the species abundance has become low in a particular time interval.

Table 1: Ecological status of Medicinal plants in Alipurduar Town

S. No.	Name of the Medicinal plants	MEAN	RELATIVE FREQUENCY	RELATIVE DENSITY	ABUNDANCE
1.	<i>Achyranthes aspera</i>	4.6	4	2.51	23
2.	<i>Ageratum conyzoides</i>	5.9	10	3.22	11.8
3.	<i>Alternanthera sessilis</i>	8	8	4.36	20
4.	<i>Amaranthus spinosus</i>	13.8	16	7.53	17.25
5.	<i>Amaranthus viridis</i>	0.8	4	0.43	4
6.	<i>Argemone mexicana</i>	3.3	8	1.80	8.25
7.	<i>Balrera cristata</i>	0.4	2	0.21	1
8.	<i>Blumea lacera</i>	2.7	6	1.47	9
9.	<i>Cassia sopera</i>	0.8	4	0.43	4
10.	<i>Centella asiatica</i>	1.4	4	0.76	7
11.	<i>Chenopodium album</i>	0.5	4	0.27	2.5
12.	<i>Cleome rutidosperma</i>	1.5	6	0.82	5
13.	<i>Clerodendrum indicum</i>	6.1	6	3.27	20.1
14.	<i>Clerodendrum viscosum</i>	0.3	2	0.21	4
15.	<i>Coccinia grandis</i>	0.8	4	0.43	4
16.	<i>Coleus sp.</i>	1.7	2	0.93	17
17.	<i>Commelina diffusa</i>	3.2	8	1.75	8
18.	<i>Crotalaria pallida</i>	2.2	6	1.2	7.1
19.	<i>Croton bonplandianum</i>	0.6	4	0.32	3
20.	<i>Cynodon dactylon</i>	21.2	14	11.57	30.28
21.	<i>Drymaria diandra</i>	7.2	6	3.93	24
22.	<i>Eclipta alba</i>	1.1	4	0.6	5.5
23.	<i>Eupatorium odoratum</i>	2	4	1.09	10
24.	<i>Heliotropium indicum</i>	1.5	4	0.82	7.5
25.	<i>Lantana camara</i>	2.5	4	1.36	12.5
26.	<i>Leonurus sibiricus</i>	1.6	6	0.87	8
27.	<i>Leucus aspera</i>	3.5	8	1.91	17.5
28.	<i>Lippia alba</i>	1.5	2	0.82	7.5
29.	<i>Mimosa pudica</i>	6.2	10	3.38	15.5
30.	<i>Nicotiana plumbaginifolia</i>	3	4	1.63	15
31.	<i>Ocimum sanctum</i>	0.3	4	0.16	1.5
32.	<i>Oldenlandia paniculata</i>	1.9	4	1.03	9.5
33.	<i>Oxalis corymbosa</i>	1.2	4	0.65	6
34.	<i>Persicaria orientalis</i>	2.3	4	1.25	11.5
35.	<i>Phyllanthus maderaspatensis</i>	0.8	4	0.43	4
36.	<i>Potentilla indica</i>	6.3	4	3.44	31.5
37.	<i>Powzolzia</i>	1	6	0.54	3.3
38.	<i>Rorippa indica</i>	1.8	8	0.98	4.5
39.	<i>Rumex crispus</i>	3	2	1.64	30
40.	<i>Rumex dentatus</i>	5.5	8	3	13.75
41.	<i>Rungia pectinata</i>	1.8	4	0.98	9
42.	<i>Scoparia dulcis</i>	1.6	4	0.87	8
43.	<i>Sida rhombifolia</i>	1.7	4	0.93	8.5
44.	<i>Solanum nigrum</i>	1.9	6	1.03	2.7
45.	<i>Solanum xanthocarpum</i>	1.1	4	0.6	5.5
46.	<i>Spilanthes acmella</i>	15	8	8.18	37.5
47.	<i>Tinospora cordifolia</i>	0.2	2	0.11	2
48.	<i>Tridax procumbens</i>	3.2	8	1.74	8
49.	<i>Vernonia cinerea</i>	1.6	6	0.87	5.1
50.	<i>Xanthium strumarium</i>	21.1	14	11.52	30.14

Table 2: Medicinal importance of the following plants in Alipurduar Town

S. No.	Scientific Name, Bengali vernacular name and family	Parts use	Uses
1.	<i>Achyranthes aspera</i> L. (Apang) Amaranthaceae	Shoot, seeds and roots	Helps in wound healing due to its astringent property. Useful in indigestion, cough, asthma, anemia, jaundice and snake bite. It used in treatment of hypertension and diabetes in Indian folklore.
2.	<i>Ageratum conyzoides</i> L. Asteraceae	Whole plant	Cuts and wounds. Plant paste is applied to cure muddy wounds between toes during rainy season
3.	<i>Alternanthera sessilis</i> (L.) R.Br. ex DC. (Mati kanduri) Amaranthaceae	Whole plant	Treat hepatitis, bronchitis, asthma and other lung troubles.
4.	<i>Amaranthus spinosus</i> L. (Kata note) Amaranthaceae	Leaves and twigs	Burns, boils, as laxative Eaten as curry at night. Used as fodder after boiling specially for milch cow
5.	<i>Amaranthus viridis</i> L. (Note shak) Amaranthaceae	Leaves and twigs	Leaf Stomach, colic, as laxative Two tablespoons of filtered juice with sugar are taken in empty stomach.
6.	<i>Argemone mexicana</i> L. (sheyal kata) Papaveraceae	Leaves and stem	Used in Ayurveda to treat non healing wounds, constipation, malaria, chronic fever. It is considered as painkiller, diuretic, cures kidney stone.
7.	<i>Balreria cristata</i> L. (Jhinti) Acanthaceae	Wole plants	Potential medicinal plant for the treatment of toothache, anaemia, snake bite, diabetes, lungs disorder, blood disease and inflammatory conditions.
8.	<i>Blumea lacera</i> (Burm.f.) DC (Kukur sunga) Asteraceae	Leaves	It is hot, pungent bitter. Used extensively in ayurveda. Anti pyretic. Cure fever, thirst and burning sensations. Blood purifier
9.	<i>Cassia sophera</i> L. (Kal Kasunde) Fabaceae	Leaves	It is remedy for the treatment of multiple health complications including skin conditions such as ringworm and respiratory disorder such as asthma and bronchitis. Helpful in reducing pain in joints.
10.	<i>Centella asiatica</i> L. (Thankuni) Apiaceae	Whole plant	Tonic, antibacterial, anti-inflammatory, diuretic, digestive; diabetes, pneumonia, diarrhoea, dysentery, jaundice, constipation, good for reduction of uric acid, leucorrhoea
11.	<i>Chenopodium album</i> L. (Bathuya shak) Chenopodiaceae	Leaves and shoot	Medicinal properties like anthelmintic, antirheumatic, contraceptive, laxative etc. used in the treatment of bug bites, sunstroke, urinary problems, skin problems.
12.	<i>Cleome rutidosperma</i> DC. (Nil hurhure) Cleomaceae	Leaves	Used as appetizer, laxative. Plant decoction cures malaria. Leaf sap treats earache.
13.	<i>Clerodendrum indicum</i> (L.) Kuntze (bamunhati) Verbenaceae	Leaves and roots	Roots decoction increases appetite and lowers fever according to Unani medicine. Leaves used externally to treat tumors and certain skin diseases. Useful for cough, asthma.
14.	<i>Clerodendrum Viscosum</i> L. (Ghetu) Verbenaceae	Leaves and roots	Extracts enriches with anti-inflammatory, antioxidant, anti-hypersensitive, anticancer, antimicrobial, anti-diarrheal, hepato-protective, hypoglycemic, hypolipidemic, memory enhancing properties.
15.	<i>Coccinia grandis</i> (L.) Voigt (telakucha) Cucurbitaceae	Whole plants	Potent anti inflammatory, antioxidant, treats diabetes and reduce the cholesterol level. Controls high blood pressure.
16.	<i>Coleus</i> (Patharchur) Lour. Lamiaceae		Used to treat allergies, dry eye, obesity, blood clots. Reduce the trouble sleeping or insomnia
17.	<i>Commelina diffusa</i> Burm.f.(Dholpata) Commelinaceae	Roots	Heal swelling, treatment of urinary tract infection and respiratory tract infection, hepatic damage.

18.	<i>Crotalaria pallida</i> Aiton (jhunjunia) Fabaceae	Leaves and seeds	Treat urinary problems, reduce fever, prevent skin infections and eczema.
19.	<i>Croton bonplandianum</i> L. (ban tulusi) Euphorbiaceae	Leaves	Juice or paste used as antiseptic and coagulant.
20.	<i>Cynodon dactylon</i> L. (Durba ghas) Poaceae	Whole herbs	Plant has been long used in the traditional medicine to treat various ailments such as cancer, convulsions, cough, cramps, dropsy, epilepsy, headache, hypertension, warts and wounds.
21.	<i>Drymaria diandra</i> (L.) Willd. ex Schult (Avijal) Caryophyllaceae	Whole plant	Used in sinus, headache, cold, snake bite, fever, asthma, diphtheria, pneumonia, throat pain
22.	<i>Eclipta alba</i> L. (Bhrigaraj) Asteraceae	Whole plant	Use for treatment of gastrointestinal disorders, respiratory tract disorders, asthma, fever, hair loss and graying of hair, liver disorder, skin problems, spleen enlargement
23.	<i>Eupatorium odoratum</i> L. (Banmatmotia) Asteraceae	Leaves and roots	It has wound healing property, used to treat wound, burn and skin infections. Emetic, purgative, antiseptic in cuts and burns
24.	<i>Heliotropium indicum</i> L. (Hatisura) Boraginaceae	Leaves	Leaves juice is used on wounds, skin ulcers. Used as eye drop for conjunctivitis.
25.	<i>Lantana camara</i> L.(Putus) Verbenaceae	Leaves	Extracts used in the treatment of Cancer, Chicken pox, Asthma, Ulcers, Swellings, Eczema, Tumor, High Blood Pressure, Tetanus, Rheumatism.
26.	<i>Leonurus sibiricus</i> L. (Rakta dron) Lamiaceae	Leaves and young twigs	Whole plant has antibacterial, antispasmodic, astringent, diaphoretic, diuretic, antioxidant property
27.	<i>Leucus aspera</i> (Willd.) (Sweta dron) Lamiaceae	Leaves and young twigs	Reported to have antifungal, prostaglandin inhibitory, antioxidant, antimicrobial, help to reduce fever.
28.	<i>Lippia alba</i> (Mill) N.E. Brown (mamatia) Verbenaceae	Leaves	Cure heart problems, Fever, stomachache, cleanse the bladder, Blotches, pimples, diarrhea, sore throats.
29.	<i>Mimosa pudica</i> L. (Laggaboti) Mimosoidae	Leaves, roots and seeds	It majorly possesses antibacterial, anti-venom, anti-fertility, anticonvulsant, antidepressant and various other pharmacological activities. Helps in the treatment of many disorders like piles, dysentery, sinus, insomnia, diarrhea and is also applied to cure wounds since ages.
30.	<i>Nicotiana plumbaginifolia</i> Viv. (ban tamak) Solanaceae	Leaves	Used in the treatment of cuts, wounds, toothache, rheumatic swelling in the traditional system of medicine.
31.	<i>Ocimum sanctum</i> (Tulsi) L. Lamiaceae	Leaves seeds and roots	Tonic; gastritis, throat trouble, digestive problems, ring worm, skin disease, malaria fever; leaves insect repellent
32.	<i>Oldenlandia diffusa</i> Roxb (OD) (parpatah) Rubiaceae	Whole plant	Traditional Chinese medicine to treat liver, breast cancer, heat and to eliminate toxins. Herbal medicine for the treatment of hepatitis, tonsillitis, urethral infection.
33.	<i>Oxalis corymbosa</i> DC. (Golapi Amrul phul) Oxalidaceae	Plants	Dysentery, diarrhoea, piles, asthma, skin disease; refrigerant, appetizer
34.	<i>Persicaria lapathifolia</i> (L.) Delarbre (Bishkatali) Polygonaceae	Aerial parts	Antiseptic and astringent
35.	<i>Phyllanthus maderaspatensis</i> L. (Hajar moni) Euphorbiaceae	Whole plant	Used traditionally to treat headache, bronchitis, earache and ophthalmia.
36.	<i>Potentilla indica</i> (Nakal strawberry) Rosaceae	Leaves	Treat eczema and other skin condition, tonsillitis, insect bite.
37.	<i>Pouzolzia</i> sp. Gaudich. (Bala Pata) Utriacaceae	Roots	Roots eaten to cure dysentery, cough and asthma

38.	<i>Rorippa indica</i> L. (Ban sarisha) Brassicaceae	Leaves	Cough suppressing, promote blood circulation, detoxifying, removing jaundice.
39.	<i>Rumex crispus</i> L. (Yellow dock) Polygonacea		Treat inflamed nasal passages, digestive tract, liver
40.	<i>Rumex dentatus</i> L. (Jangli Palang) Polygonacea	Roots and seeds	Traditionally used as bactericidal, anti-inflammatory, antitumor, Anthelmintic, astringent. Root's decoction used in folk medicine for treating ascariasis, eczema, diarrhea, constipation.
41.	<i>Rungia pectinata</i> L. (Tangareswar) Acanthaceae	Whole plants	Juice of plants is applied as febrifuge.
42.	<i>Scoparia dulcis</i> L. (Chinimishri) Scrophulariaceae	Plants	Piles, diuretic, hyperthermia, cough, sore throat, boils, menorrhigia Cure hypertension, diabetes, anemia, dysentery.
43.	<i>Sida rhomboidifolia</i> L. (Ban Methi) Malvalaceae	Roots and leaves	Used in rheumatism and colic.
44.	<i>Solanum nigrum</i> L. (Kakmachhi) Solanaceae	Aerial parts	Sedative Juice is consumed
45.	<i>Solanum xanthocarpum</i> Schrad. and Wendl (Kontikari) Solanaceae	Fruits	Medicinal efficacy of fruit as antioxidant, anticancer and anti HIV agents
46.	<i>Spilanthes acmella</i> Murr. (Surya kanya) Asteraceae	Flowers	Flowers of the plants reduces the pain associated with throat and gum infections and reduce saliva secretion, cooling sensation for throat, named as toothache plant
47.	<i>Tinospora cordifolia</i> (Thunb.) Miers (gulancha) Menispermaceae	Root	Commonly known as Giloy or gulancha, Used for diabetes, high cholesterol, hay fever, gout, upset stomach, hepatitis and mostly important that it is used for boost the immune system.
48.	<i>Tridax procumbens</i> L. (Tridhara) Asteraceae	Whole plants	Leaf juice is insecticidal, also used to check hemorrhage of wounds.
49.	<i>Vernonia cinerea</i> (L.) Less. (Kalajira) Asteraceae	Roots and leaves	Used to cure fever, localized swelling, wounds, hiccups, kidney disease, stomach discomfort, potent analgesic,
50.	<i>Xanthium strumarium</i> L. (banokra) Asteraceae	Roots, leaves and seeds	the fruits of <i>X. strumarium</i> have become an important traditional Chinese medicine commonly used in clinic for the treatment of nasal diseases (including acute and chronic rhinitis, allergic rhinitis (AR), nasosinusitis, and nasal obstruction), itching.

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