

ECOLOGICAL AND FLORISTIC STUDIES OF SONBHADRA DISTRICT IN U.P., INDIA**RAVINDRA KUMAR SAHANI^a, CHANDRA SHEKHAR SINGH^{b1} AND
SANTOSH KUMAR UPADHYAY^c**^aDepartment of Botany, Kooba P. G. College, Azamgarh, U.P., India^bP.G. Department of Botany, A. B. R. P. G. College, Anpara, Sonbhadra, U.P., India**ABSTRACT**

The present paper gives an account of Floristic survey of Sonbhadra district including the reserve forest areas. The survey was conducted during different seasons of the year 2015-2016 after rainy seasons, in winter & in Basant seasons. Flora of trees, herbs, shrubs and grasses were collected in flowering and fruiting stage & herbarium sheets were prepared. Soil samples from forest, agricultural and barren lands were collected and analyzed for different parameters. In a floristic survey 135 plants species belonging to different families were recorded from this District. The plants were identified according to Bentham and Hooker's system of Classification. A categorical list of plant species with their habit & uses was recorded from this District.

KEYWORDS : Hermit crab, Gastropod shells, Intertidal area, Gulf of Kachchh

Uttar Pradesh is situated in the northern part of India. Sharing international border with Nepal. The Himalayas are located in the north part of the state and the plains cover most of the state. UP can be separated into three different hypsographical regions. The first one is the Himalayas region in the north. It has an extremely rugged and varied terrain. The topography varies to elevation ranging from 300 m to 500 m. the second is the gangetic plain in the center. It has highly fertile alluvial soils and a flat landscape which is dotted by numerous lakes rivers etc. the third are the Vindhya hills and plateau in the south. It has a hard rock strata and a diverse topography of plains, hills, valleys and plateau, water is limited in this region.

The weather of the state has primarily subtropical features. It experience four seasons and has a humid temperate climate. The Himalayan region is cold while the weather in the plains varies in different seasons. The state has three distinct seasons. The winter season is from October to February, the summer season is from March to mid June the rainy season is from June to September average temperature of 45°C accompanied by dust laden winds. Annuals rainfall of 990 mm.

Sonebhadra is the second largest district in Uttar Pradesh in terms of area. The district is elevated at a height of 319 to 194 meters above sea level and the district has its coordinates at 24.6 degree north latitude and 83 degree east longitude. The district lies close to the ranges of Vindhya Mountain.

The western part of Sonebhadra district is floristically richest part. The forest of *Madhuca indica* (Mahua), *Zizyphus nummularia* (char beri), *Albizia lebbek*, *Butea mososperma* are found in abundance. The forests are situated along the Uttar Pradesh Jharkhand border. The central part having forest of Billi Bari with dominating species *Melia azadirachta* L., *Butea monosperma*, *Tectona grandis* L. etc.

The soil in the valley is rich alluvial of the medium to heavy clay loam type on the top of the hills it tends to become gravel and shallow and of poor nutritive value. The soil is well drained on the hill slopes but along the foot of the hills sometimes it is water logged. Average annual rainfall is 750.7mm in the month of July, August and September; temperature ranges from 28 degree to 45 degree Celsius in summer and 4 degree and 18 degree in winter.

As there is no published flora of Sonebhadra district. In view of these present studies on the natural flora of this district has been taken. No doubt some work has been done on the study of vegetation of south east U.P. but still there is a pressing need for the survey of some more areas.

Methods of Plant Collection

Fields trips were adjusted in such a way so as to cover the various localities of Sonbhadra districts e.g. forest near Ghorawal, Khairahi, Shahganj, Madhupur, Markundi, Chopan, Channani, Kon, Pipri, Anpara, Mirchadhuri, Nemma, Sundri etc. in different season in winter, Basant and after rainy season in the year 2015-16, specimens of

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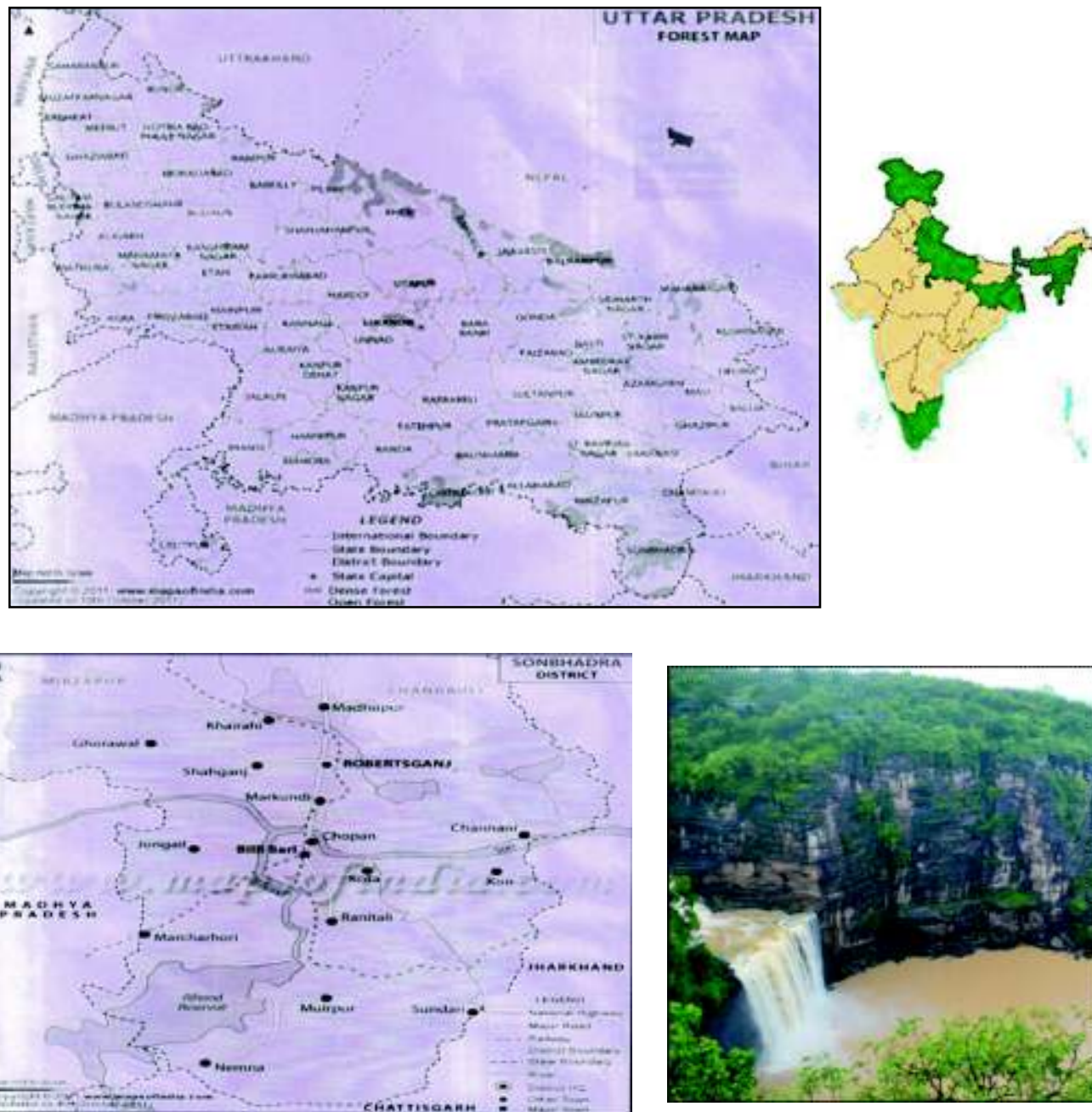


Figure 1 : Maps- India, Uttar Pradesh and Sonbhadra District

different flora were collected, herbarium sheets were prepared and identified according to Bentham & Hookers System) of Classification using local floristic work (Talbot 1976), Anand et al., 2010; Chaudhari, 2010)

Soil samples from forest and agricultural lands were collected and brought to laboratory in sealed polythene bags and were tested for different parameters e.g.

pH electrical conductivity (E.C.) organic Carbon by Walkley & Black, rapid method. Available nitrogen by alkaline per magnate method, available phosphorus by Olsens method. Exchangeable potassium by ammonium acetate solution method, (Flame Photometer) exchangeable sodium by ammonium acetate solution method, (Flame Photometer), Exchangeable calcium & magnesium by

Table 1 : An Enumeration of the Plants Inhabiting in the Sonbhadra District Including (Herb, Shrubs, Trees)

Sr. No	Scientific Name	Common/ Local Name	Family	Habit	Uses
1	<i>Abrus precatorius</i> L.	Chirmi	Papilionaceae	Climber	Medicine seeds used for weighing gold
2	<i>Abutilon indicum</i> (L.) Sweet	Talakuchi	Malvaceae	Herb	Fuel, fodder fibre, medicine
3	<i>Acacia catechu</i> (L.f) Willd	Khair	Mimosaceae	Tree	Bark for tanning, katha, fuel, extracts
4	<i>A. leucopholea</i> (Roxb.) Willd	Safed Khair	Mimosaceae	Tree	Timber, fuel, fodder, food
5	<i>A. nilotica</i> (L.) Willd ex. Del.	Babul	Mimosaceae	Tree	Timber, fuel, fiber medicine soil conservation
6	<i>Achyranthes aspera</i> L.	Lat Jira	Amaranthaceae	Herb	Famine food medicine
7	<i>Adhatoda vasica</i> Nees.	Adusa	Acanthaceae	Herb	Medicine extracts
8	<i>Adina cordifolia</i> (Willd. Ex. Roxb.)	Haldu, Adru	Rubiaceae	Tree	Timber, fodder food, tannin
9	<i>Aegle marmelos</i> (L.) Corr.	Bael Bilipattia	Rutaceae	Tree	Timber, fodder food, medicine
10	<i>Ageratum conyzoides</i>	Bhakumber	Asteraceae	Herb	Medicine, extracts
11	<i>Albizia lebbek</i> (L.) Benth.	Kalasiris	Mimosaceae	Tree	Timber, fuel, fodder, extract
12	<i>A. procera</i> (Roxb.) benth	Safed siris	Mimosaceae	Tree	Timber, fuel, medicine
13	<i>Aloe barbadens</i> Mill.	Gaur Pata	Liliaceae	Succulent plant	Medicine used for healing wounds, cosmetics
14	<i>Amaranthus spinosus</i> L.	Kantewali Chaulai	Amaranthaceae	Herb	Fodder, food leaves as vegetable
15	<i>A. viridis</i> L.	Jangli Chaulai	Amaranthaceae	Herb	Fodder
16	<i>Anagallis arvensis</i> L.	Jonkmri, Neel	Primulaceae	Herb	Medicine
17	<i>Annona squamosa</i> L.	Sitaphal	Annonaceae	Shrub	Food, fuel
18	<i>Anogeissus latifolia</i> (Roxb. Ex. DC)	Safed Dhawra	Combretaceae	Tree	Fuel, timber fodder, extract
19	<i>A pendula</i>	Dhao, Kaldhai	Combretaceae	Tree	Fuel, timber, extract
20	<i>Argemone mexicana</i> L.	Satyanshi	Papaveraceae	Herb	Fuel, extract medicine oil, used in medi.
21	<i>Argyrea nervosa</i> (Burm. f.) Boj.	Tamar Beal	Convolvulaceae	Climber	Medicine
22	<i>Asparagus racemosus</i> (L.) willd	Shatavari	Liliaceae	Climber	Food, veterinary & human medicine
23	<i>Azadirachta indica</i> A. Juss.	Neem	Meliaceae	Tree	Timber, fuel, medicine fruit, famine food.
24	<i>Bacopa Mannieri</i> (L.) wettest	'Jul Buti'	Scrophulariaceae	Herb	Medicine
25	<i>Balanites aegyptiaca</i> (L.) Delile	Hingota	Balanitaceae	Tree	Fruit as soap, fodder, fuel
26	<i>Barleria prionitis</i> L.	Brijdanti	Acanthaceae	Herb	Fuel medicine
27	<i>Bauhinia variegata</i> L.	Kachanr	Caesalpinaceae	Tree	Timber, fuel, food, medicine "Bidi" Making
28	<i>Boerhaavia diffusa</i> (L.) hook. f.	Lal Sata	Nyctaginaceae	Herb	Food, root as laxative, in asthma, jaundice
29	<i>Bombax ceiba</i> L.	Semal	Bombacaceae	Tree	Pod fibers used as cotton, roots famine food timber, fuel
30	<i>Boswellia serrata</i> (Roxb.ex.colebr)	Salar	Burseraceae	Tree	Medicine, extract, timber, fuel
31	<i>Butea monosperma</i>	Dhak, Khakhra	Papilionaceae	Tree	Dye Root, Famine food, fuel, timber
32	<i>Caesalpinia bonduc</i> L. Roxb.	Kant – Karanj	Caesalpinaceae	Tree	Soil conservation
33	<i>Calotropis gigantea</i> R. Br.	Aakra	Asclepidaceae	Large shrub	Fuel, fuel
34	<i>C. procera</i> (Ait.) R. Br.	Arkha, Madar	Asclepidaceae	Shrub	Fibre, medicine fuel
35	<i>Cannabibus sativa</i> L.	Bhang	Cannabaceae	Herb	Medicine intoxicant

36	<i>Capparis decidua</i> (Forsk.) Edgew.	Ker	Capparidaceae	Shrub	Panch Kuita component medicine timber, fuel
37	<i>Carissa spinarum</i> L.	Karaunda	Apocynaceae	Shrub	Food, fuel
38	<i>Cassia auriculata</i> L.	Tarwar	Carsalpiniaceae	Tree	Fuel, medicine, bark for tanning
39	<i>C. fistula</i> L.	Amaltas	Caesalpiniaceae	Tree	Tanning, timber, extract, medicine
40	<i>C. siamea</i> Lem.		Caesalpiniaceae	Tree	Soil conservation, timber, fuel
41	<i>Celastrus paniculatus</i>	Malkangani	Celastraceae	Climber	Food
42	<i>Celosia cristata</i> L.	Morsikha	Amaranthaceae	Herb	Food, fuel, medicine
43	<i>Chenopodium album</i> L.	Bathua	Chenopodiaceae	Herb	Food
44	<i>Chlorophytum borivilianum</i> Sant.	Safed Musali	Liliaceae	Herb	Medicine
45	<i>Coleus aromaticus</i> Benth.	Patherchur	Lamiaceae	Herb	Medicine
46	<i>Commiphora wightii</i> (Arnott.)	Gugal	Burseraceae	Tree	Fibre, medicine, timber, fuel
47	<i>Cordia dichotma</i> (Forst.f.prod.)	Goonda Lisora	Ehretiaceae	Tree	Edible fruit, timber, fuel
48	<i>C. gharaf</i> (Forsk.) Ehrenb.	Chotti Goondi	Ehretiaceae	Small Tree	Medicine food, fuel, timber
49	<i>Cryptostegia grandiflora</i> (Roxb.)	Chamchari	Asclepidaceae	Climber	Extract yields rubber
50	<i>Cuscuta reflexa</i> Roxb.	Amarbel	Cuscutaceae	Climber Steam parasite	Medicine
51	<i>Dalbergia sissoo</i> roxb.	Shisham	Papilionaceae	Tree	Timber, fuel, fodder
52	<i>Datura stramonium</i>	Dhatra	Solanaceae	Under shrub	Medicine
53	<i>Delonix regia</i> (Boj.ex.hook.) Ref.	Gul Mohar	Caesalpiniaceae	Tree	Timber, fuel
54	<i>Dendrocalamus strictus</i> (Roxb)nees	Bans	Gramineae	Tall Tree Grass	Timber, food, medicine veterinary medicine
55	<i>Digera muricata</i> L.	Lehsua	Amaranthaceae	Herb	Fodder
56	<i>Diospyros melanoxylon</i> Roxb.	Timmru	Ebenaceae	Tree	Timber, fuel, food, leaves for
57	<i>Echinops echinatus</i> Roxb.	Oonti kateli	Asteraceae	Under Shrub	Medicine
58	<i>Emblca officinalis</i> Gartn.	Aamla	Euphorbiaceae	Tree	Medicine food
59	<i>Euphorbia hirta</i> L.	Dudhi	Euphorbiaceae	Herb	Fuel, medicine
60	<i>E. nerifolia</i> L.	Sehund	Euphorbiaceae	Shrub	Fuel, medicine
61	<i>E. royleana</i> Boiss		Euphorbiaceae	Herb	Fuel
62	<i>Ficus Bengalensis</i> L.	Vad	Moraceae	Tree	Fruit famine food, timber, medicine
63	<i>F. carica</i> L.	Anjir	Moraceae	Small tree	Medicine
64	<i>F. glomerata</i> Roxb.	Gular, Umri	Moraceae	Tree	Fruit famine food, timber fuel, fodder medicine.
65	<i>F. religiosa</i> L.	Pipal	Moraceae	Tree	Lac collected, fruit famine, medicine, religious
66	<i>Fumaria indica</i> (Hausk) Pugsley	Pit Papra	Fumariaceae	Herb	Medicine, weed plant
67	<i>Gomphrena celosoides</i> Mart.		Amaranthaceae	Herb	Weed
68	<i>Grewia tilifolia</i> Vahl.	Dhaman	Tiliaceae	Small tree	Fuel, fibre medicine, food, fodder
69	<i>Holoptelea interifolia</i> (Roxb.) Planch.	Churel	Ulmaceae	Tree	Timber, fuel, food, seeds, contain fatty oil,

70	<i>Hydrilla verticillata</i>			Hydrocharitaceae	Water Plant	Food for aquatic animals
71	<i>Indigofera linifolia</i> (L.f.) Retz.	Sankh Buti		Papilionaceae	Herb	Medicine
72	<i>Ipomoea aquatica</i> (Forsk. Fl.)	Nali		Convolvulaceae	Amphibious Plant	Food
73	<i>I. fistulosa</i> (Mart. Ex.choisy) Austin	Nagar Pan		Convolvulaceae	Shrub	Hedge, fuel fodder
74	<i>I. palmata</i> Forsk.			Convolvulaceae	Climber	Fodder decorative bael
75	<i>Jasminum officinale</i> L.	Chameli		Oleaceae	Shrub	Jasmine oil
76	<i>Jatropha curcas</i> L.	Ratanjot		Euphorbiaceae	Small tree	Fuel, medicine bio- diesel extract
77	<i>J. gossypifolia</i> L.	Mavla or Ratanjoti		Euphorbiaceae	Shrub	Fuel
78	<i>Lantana camara</i> L.	Latina		Verbenaceae	Shrub	fuel
79	<i>L. indica</i> Roxb.	Safed galphusia		Verbenaceae	Shrub	Fuel
80	<i>Launea asplenifolia</i> (roxb)Hook. f.			Asteraceae	Herb	Fodder, weed
81	<i>Lawsonia inermis</i> L	Mehndi		Lytharaceae	Shrub	Fuel,medicine,for colouring hand , hair ,feet fodder
82	<i>Leucus aspera</i> (Willd.) Link	Chitia		Lamiaceae	Herb	Fodder
83	<i>Madhuca indica</i> Gmel.	Mahua		Sapotaceae	Tree	Flower & fruit used for liquor ,timber, fuel
84	<i>Mabastrum coromandelianum</i> L.	"buryara"		Malvaceae	Herb	Weed
85	<i>Mangifera indica</i> L.	Aam		Anacardiaceae	Tree	Timber ,fuel ,medicine extract
86	<i>Medicago sativa</i> L.	Rizka		Papilionaceae	Herb	Fodder
87	<i>Melia azadirachta</i> L.	Bakain		Meliaceae	Tree	Timber ,fuel ,medicine extract
88	<i>Melilotus indica</i> L. All	Methi		Papilionaceae	Herb	Food, medicine, soil conservation
89	<i>Mitragyna parviflora</i> L.	Kadam		Rubiaceae	Tree	Timber ,fuel fodder
90	<i>Moringa oleifera</i> Lamk.	Sohajan		Mori ngaceae	Tree	Food ,medicine ,soil conservation
91	<i>Morus alba</i> L	Mulberry shahtoot		Urticaceae	Tree	Silkwolm ,cultivation ,food ,timber for sport goods
92	<i>Mucuna pruriens</i> L. dc.	Kaunch		Papilionaceae	Climber	Medicine
93	<i>Nelumbo nucifera</i> Geatm.	Kamal		Nymphaeaceae	Aquatic herb	Food ,medicine
94	<i>Nerium oleander</i> Blanco.	Kaner		Apocyanaceae	shrub	Soil conservation ,decorative plant
95	<i>Nyctanthus arboritrisis</i> L.	Har-shingav		Oleaceae	Shrub	Fuel ,medicine
96	<i>Nymphaea nouchali</i> Burm F.	Bambher		Nymphaeaceae	Aquatic herb	Scarcity food medicine
97	<i>Ocimum americanum</i> L.	Bapchi or jungali tuls		Lamiaceae	Woody herb	Medicine
98	<i>Opuntia dillenii</i> (Ker-Gawler) Haw.	Nagphani		Cactaceae	Succulent cactus plant	Food ,planted as hedge
99	<i>Oxalis corniculata</i> L.	Khatto		Oxalidaceae	Herb	Fodder
100	<i>Peristrophe bicalyculata</i> (Retz)Nees.	Atrilal		Acanthaceae	Under shrub	Fibre ,soil conservation
101	<i>Phoenix sylvestis</i> L. Roxb	Khajur		Palmae	Tree	Fruits eaten ,fuel
102	<i>Pithecollobium dulce</i> (Roxb.)	Jangli jalebi		Mimosaceae	Tree	Fuel ,fodder ,food
103	<i>Ployalthia longifolia</i> (Sonnerat) Thw.	Ashok		Annonaceae	Tree	Timber

104	<i>Pongamia pinnata</i> L. Pierre	Karanj	Papilionaceae	Tree	Timber ,fuel ,fodder ,soil conservation
105	<i>Prosopis cineraria</i> L. Druce	Khrjri	Mimosaceae	Tree	Famine food ,sacred tree for bishnois
106	<i>Rauwolfia serpentina</i> L.benth.ex.Kurz	Serpandha	Apocynaceae	Herb	Medicine plant
107	<i>Ricinus communis</i> L.	Arandi	Euphorbiaceae	Shrub	Medicine ,fodder
108	<i>Rumex dentatus</i> L.	Jangli palak	Polygonaceae	Herb	Yields dye ,fodder ,food
109	<i>Santalum album</i> L.	Chandan	Santalaceae	Tree	Timber ,fuel ,medicine extract
110	<i>Sapindus detergens</i> L.	Areetha	Sapindaceae	Tree	In making soap
111	<i>Sida cordifolia</i> L.	Bhumli	Malvaceae	Herb	Fodder
112	<i>Solanum nigrum</i> L.	Mako	Solanaceae	Herb	Fodder
113	<i>S. surratense</i> burm. F.	Kateri	Solanaceae	Herb	Medicine
114	<i>Sonchus arvensis</i> L.		Asteraceae	Herb	Fodder
115	<i>Sphaeranthus indicus</i> L.	Gorukh-mundi	Asteraceae	Herb	Medicine
116	<i>Streculia uren s</i> Roxb.	Kadaya	Streculiaceae	Tree	Fibre from bark extract timber ,fuel
117	<i>Syzygium cumini</i> (L.) skeels	Jamun	Myrtaceae	Tree	Medicine ,food ,timber ,fuel
118	<i>Tamarindus indicus</i> L.	Imli	Caesalpiniaceae	tree	Food
119	<i>Tecoma stans</i> (L.) H.B.K.	bignoniaceae	Bignoniaceae	shrub	Fodder ,hedge plant
120	<i>Tectona grandis</i> L.	Sagwan	Verbenaceae	Tree	Dye from leaves ,timber ,fuel ,medicine extract
121	<i>Terminalia arjuna</i> (Roxb. Ex. Dc.)	Arjun	Combretaceae	Tree	Timber ,fuel
122	<i>T. bellirica</i> (Roxb)	Bahera	Combretaceae	Tree	Medicine extract
123	<i>Thevetia peruviana</i> (Pers.) Merr.	Pili kaner	Apocyanaceae	Shrub	Soil conservation ,hedge
124	<i>Tinospora cordifolia</i> (Willd.) Miers.	Neem giloi	Menispermaceae	Climber	Fuel ,medicine
125	<i>Trapa natans</i> L.	Singhara	Trapaceae	Floating herb	Seed edible ,food
126	<i>Fridax procumbens</i> L.	Kumru	Asteraceae	Herb	Veterinary medicine
127	<i>Trigonella foenum-graceum</i> (L.)	Methi	Papilionaceae	Herb	Medicine ,food
128	<i>Tylophora asthmatica</i> Wt.& Am.	Asthma bael	Asclepiadaceae	Twining herb	Medicine
129	<i>Typha angustata</i> boryet chaub.	Era patar	typhaceae	Aquatic herb	Food fibre ,green leave for mat weaving
130	<i>Vernonia cinerea</i> (L.) Less.	Sandri	Asteraceae	Herb	Fodder ,medicine
131	<i>Vitex negundo</i> L.	Nirgundi	Verbenaceae	Shrub	Medicine ,fuel ,insect repellent
132	<i>Withania somnifera</i> (L.) Dunal.	Aswagandha	Solanaceae	Herb	Medicine
133	<i>Xanthinum strumarium</i> (L.)	Adhasisi or chirchita	Asteraceae	Herb	Medicine
134	<i>Zizyphus jujuba</i> Lamk.	Bada,ber	Rhamnaceae	Small tree	Food ,soil-conservation fodder ,extract
135	<i>Zizyphus mummularia</i> (Burm.f.) W.& A.	Jharberi	Rhamnaceae	Shrub	Fuel fodder ,food medicine soil-conservation

EDTA titration method. Photographs of study site and flora were taken during field work observation of the habit of flora were studied. (Azaizeh et al. 2003)

RESULTS AND DISCUSSION

A concise list of wild plants (including herbs shrub & trees) of Sonbhadra districts & their uses will provide basic data for further studies e.g. for soils conservation, timber & fuel, medicines, resources for economics welfare of tribal people (table 1). Besides this the nude hills of the district & barren area can be enriched with floristic diversity for the benefit of tribal people because tribal people of rural areas subsist on the resources of natural world.

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