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Ethnomedicinal plants of Kawal wildlife sanctuary, Telangana, India.

Adepu Chandra Mohan[1], Sateesh Suthari[2]* and Ajmeera Ragan[3]

[1]Department of Botany, Government Degree College, Mancherial, Telangana-504208, India.
[2]Department of Plant Sciences, School of Life Sciences, University of Hyderabad, Central University P.O. Hyderabad, Telangana-500046, India.
[3]Department of Botany, Kakatiya University, Warangal, Telangana-506009, India.

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Abstract: The ethnomedicinal plants used by the ethnic tribes living in and around the Kawal wildlife sanctuary are documented based on interviewing 128 key informants from 43 villages. The study identified 198 medicinal plant taxa representing 165 genera of 72 families. Fabaceae are the predominant family with 33 species followed by Apocynaceae (11 spp.), Convolvulaceae, Euphorbiaceae, Malvaceae and Rubiaceae (7 spp. each), Anacardiaceae, Combretaceae and Verbenaceae (6 spp. each) and Rutaceae (5 spp.). Majority of these species are indigenous (83.33%). The indigenous people largely use trees (81; 40.91%) and herbs (48; 24.24%) which are wild and abundant followed by climbers (40; 20.21%) and shrubs (29; 14.64%).

Key words: Ethnomedicine; indigenous; Kawal wildlife sanctuary; Telangana

Introduction

Forests are the living resource base for its inhabitants besides serving as a storehouse of biodiversity. India is endowed with a vast forest resource. The traditional land-use practices like ethno-agriculture, animal husbandry and health are supported by forests. It is due to the cognitive ability of the ethnic people. Ethnobotanical research was conducted all over the country covering almost all the major tribes of India. Such research was carried out in Telangana more so from the Department of Botany, Kakatiya University, Warangal. The erstwhile Adilabad district ranks second among the districts in Telangana State with its 43.815% of forest cover of its geographical area (Anonymous, 2014). It harbours three wildlife sanctuaries namely, Kawal, Sivaram and Pranahita. With their immense biodiversity and importance, the district attracted the researchers for the exploration of its natural resources. Ravishankar (1990) and Swamy (2009) worked for their doctoral degree on the ethnobotany of the district. Murthy *et al.,* (2010) enlisted the stupifying plants used by Gonds from the Kawal wildlife sanctuary. Omkar *et al.,* (2011) published a paper on the diversity of NTFPs and their utilization in the district. Against this background, a study was undertaken to document the traditional medicinal plants knowledge of the indigenous people from Kawal wildlife sanctuary.

Study area

Kawal wildlife sanctuary was established in 1965 as Game Reserve and later declared as a sanctuary in 1999. It is one of the oldest and largest wildlife sanctuaries in the State, covering an area of 892.23 sq km. It is located between 19°05'-19°20'N latitudes and 78°32'-79°12'E longitudes. It is one of the finest teak forests of Central India. Kawal Tiger Reserve (KTR) is the only such reserve in Telangana State. It is spread in five forest divisions of Adilabad district namely, Adilabad, Asifabad, Bellampalli, Jannaram and Nirmal divisions. The Kadem river, Kadem reservoir, Peddavagu and the associated canal network form the life-line of the sanctuary (Murthy, 2010). The average rainfall is 1040 mm. The mean daily maximum temperature rises to 45°C in summer. After November, both day and night temperatures fall rapidly (Suthari, 2013).

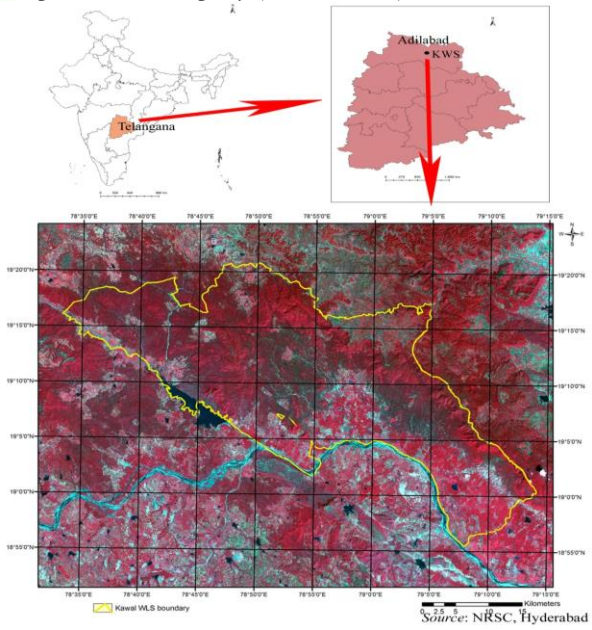

Figure: Kawal wildlife sanctuary: The Study Area.

***Corresponding Author:**
Dr. Sateesh Suthari,
YOUNG SCIENTIST- SERB (DST),
Department of Plant Sciences,
F-44, New Life Science Building (South Campus
University of Hyderabad)
Hyderabad, Telangana-500 046, India.
E-mail: suthari.botany@gmail.com

Materials and Methods

Data Collection and Documentation

The present study is entirely based on the appraisal of ethnic villages in and around the wildlife sanctuary. The data recorded were from the indigenous people, housewives, mid-wives, shepherds, forest-dependent communities, local healers, etc. The information on ethnomedicinal plants was obtained through the participatory rural appraisal (PRA) techniques. The list of ethnomedicinal plants was collected association with the community members for various purposes were recorded. Special attention was paid to collect the field data relating to the habit, habitat, economic/useful parts, features of flower and fruit, bark features, etc. of the medicinal plants used by the tribes. The plant species were identified with the help of Floras, e-floras and systematically collected. The voucher specimens were deposited at Department of Botany, Government Degree College, Mancherial, Telangana. The mutual understanding was that any benefit derived out from the present study pursued after their medicinal plant knowledge shall belong to the local ethnic people as mentioned by Suthari *et al*., 2014.

Major ethnic groups of Kawal wildlife sanctuary

More than ten ethnic tribal groups of central India are found in and around Kawal wildlife sanctuary region. They are Gonds, Kolams, Pardhans (Pradhans), Thotis, Mannewars, Dadve, Koyas, Gowari, Naikpods. The Yerukulas and Lambadis are largely found in the plain areas.

Results

Ethnomedicinal data were collected from the ethnic tribes in and around the Kawal wildlife sanctuary during 2014-2016. The dominant local inhabitants are Gonds, Koyas, Naikpods and the exotic Lambadis from whom the ethno-medico-botanical plants, the utility, drug preparation and mode of administration were noted. A total of 43 villages in the core and fringe areas of the sanctuary were covered for the present study. The interviews held for each village included a minimum of two informants (male and/or female). The study was not found any ethnic group in Kishtapur village. A total of 128 informants actively participated in the interaction and they belong to 21-85 years of age. The age group of informants was further categorized into seven age-groups and male: female ratio such as 20-30 (18[16:02]; 14.06%), 31-40 (13[13:00]; 10.16%), 41-50 (31[26:05]; 24.22%), 51-60 (30[24:06]; 23.44%), 61-70 (21[19:02]; 16.41%), 71-80 (10[10:00]; 7.81%) and 81-90 (05[05:00]; 3.91%) (Table 1).

Table 1: Age group and gender ratio of informants

	Age Group	No. of Informants	Male: Female (ratio)
1	21-30	18	16:02
2	31-40	13	13:00
3	41-50	31	26:05
4	51-60	30	24:06
5	61-70	22	20:02
6	71-80	10	10:00
7	81-90	03	03:00

Table 2: The vernacular, scientific and family names, growth-form, plant part used and ethnomedicinal use of plant species from Kawal wildlife sanctuary

	Local Name	Scientific Name	Family	Growth Form	Plant parts used	Ethnic use
	Dicotyledonae (Magnoliopsida)					
1	Gurije	*Abrus precatorius*	Fabaceae	Climber	Leaf/Whole	Insect bite, Retained placenta
2	Tutturu benda	*Abutilon indicum*	Malvaceae	Herb	Leaf	Dysentery, Helminthiasis, Insect bite
3	Sandra	*Acacia chundra*	Fabaceae	Tree	Stem bark	Asthma, Fever, Wounds
4	Muriki tumma	*Acacia farnesiana*	Fabaceae	Shrub	Fruit	Dog bite
5	Tella tumma	*Acacia leucophloea*	Fabaceae	Tree	Stem bark	Boils, Wounds, Ephemeral fever
6	Nalla tumma	*Acacia nilotica*	Fabaceae	Tree	Stem bark	Burns
7	Muripinda	*Acalypha indica*	Euphorbiaceae	Herb	Leaf	Skin disease
8	Uttareni	*Achyranthes aspera*	Amaranthaceae	Herb	Leaf/Root/Whole	Insect bite, Wounds, Boils
9	Maredu	*Aegle marmelos*	Rutaceae	Tree	Fruit/Leaf	Dysentery, Corneal opacity, Impaction
10	Pindi kura	*Aerva lanata*	Amaranthaceae	Herb	Leaf	Ear ache, Kidney stone
11	Peddamanu	*Ailanthus excelsa*	Simaroubaceae	Tree	Stem bark	Astringent, Febrifuge, Anthelmintic
12	Ooduga	*Alangium salviifolium*	Cornaceae	Tree	Stem bark/Root	Snake bite, Oedema, Bone fracture
13	Narlinga	*Albizia amara*	Fabaceae	Tree	Flower	Skin treatment
14	Tella chinduga	*Albizia procera*	Fabaceae	Tree	Stem bark	Rheumatism, Haemorrhage, Stupifying
15	Jeedi mamidi	*Anacardium occidentale*	Anacardiaceae	Tree	Fruit/Seed	Edible
16	Nela vemu	*Andrographis paniculata*	Acanthaceae	Herb	Leaf/Root	Ephemeral fever, Snake bite
17	Dayyam marri	*Anisomeles indica*	Lamiaceae	Herb	Leaf	Ephemeral fever
18	Seethalphal	*Annona squamosa*	Annonaceae	Tree	Root	Purgative
19	Thiruman	*Anogeissus latifolia*	Combretaceae	Tree	Stem bark	Insect bite, Asthma
20	Brahma dandi	*Argemone mexicana*	Papaveraceae	Herb	Latex	Skin disease
21	Chandra podi	*Argyreia nervosa*	Convolvulaceae	Climber	Leaf	Tympanitis, Ear-ache
22	Nalleswari	*Aristolochia indica*	Aristolochiaceae	Climber	Root/Leaf	Ear ache, Hemiplegia (Partial paralysis), Snake bite, Stomach-ache, Cough
23	Vepa	*Azadirachta indica*	Meliaceae	Tree	Stem bark/Shoots	Ephemeral fever
24	Tella uppi	*Azima tetracantha*	Salvadoraceae	Shrub	Stem bark	Infant diseases, Rheumatism
25	Brahmi	*Bacopa monnieri*	Plantaginaceae	Herb	Whole plant	Brain tonic
26	Gare	*Balanites roxburghii*	Zygophyllaceae	Shrub	Flower/Fruit	Pertussis, Corneal opacity, Ephemeral fever, Stupifying
27	Neeroddi	*Barringtonia acutangula*	Lecythidaceae	Tree	Stem bark	Stupifying
28	Aare	*Bauhinia racemosa*	Fabaceae	Tree	Stem bark/Flower	Dysentery
29	Addaaku	*Bauhinia vahlii*	Fabaceae	Climber	Seed	Indigestion
30	Aare	*Bauhinia variegata*	Fabaceae	Tree	Stem bark	Dysentery
31	Lajjavati	*Biophytum sensitivum*	Oxalidaceae	Herb	Leaf	Boils, Blisters, Cuts
32	Buruga	*Bombax ceiba*	Malvaceae	Tree	Stem bark/Seed	Fertility, Dysentery, Retained placenta
33	Anduga	*Boswellia serrata*	Burseraceae	Tree	Stem bark	Rheumatism, Dog bite, Scorpion sting
34	Panchotkam	*Bridelia montana*	Euphorbiaceae	Tree	Leaf/Stem bark	Boils, Blisters, Cuts

35	Pedda morli	*Buchanania axillaris*	Anacardiaceae	Tree	Flower	Wounds
36	Chinna morli	*Buchanania cochinchinensis*	Anacardiaceae	Tree	Flower/Fruit	Chest pain
37	Teega moduga	*Butea superba*	Fabaceae	Climber	Flower	Labour pains
38	Erra teega	*Byttneria herbacea*	Malvaceae	Herb	Leaf	Dysentery, Impaction
39	Gatchakaya	*Caesalpinia bonduc*	Fabaceae	Climber	Seed/Leaf	Ephemeral fever, Rheumatism, Hydrocele
40	Tella jilledu	*Calotropis gigantea*	Apocynaceae	Shrub	Flower/Latex/Root	Ear ache, Fever, Rheumatism, Constipation, Stupifying
41	Balusu	*Canthium parviflorum*	Rubiaceae	Shrub	Stem bark/Fruit	Insect bite
42	Aadonda	*Capparis aphylla*	Capparaceae	Shrub	Stem bark	Anthelmintic, aphrodisiac
43	Nalla uppi	*Capparis sepiaria*	Capparaceae	Climber	Stem bark/Fruit	Contraceptive, Rheumatism
44	Adonda	*Capparis zeylanica*	Capparaceae	Shrub	Stem bark/Fruit	Impaction, Diabetes
45	Budda kakara	*Cardiospermum halicacabum* var. *microcarpum*	Sapindaceae	Climber	Leaf/Root	Hydrocele, Ephemeral fever
46	Budda darmi	*Careya arborea*	Lecythidaceae	Tree	Flower/Stem bark	Labour pains, Stupifying
47	Kalimi	*Carissa spinarum*	Apocynaceae	Shrub	Fruit	Sores
48	Rela	*Cassia fistula*	Fabaceae	Tree	Leaf/Stem bark	Tympanitis, Stupifying
49	Bhutankus	*Cassine glauca*	Celastraceae	Tree	Leaf	Head ache
50	Paashi teega	*Cassytha filiformis*	Lauraceae	Climber	Whole	Bone fracture
51	Manga	*Catunaregam spinosa*	Rubiaceae	Shrub	Stem bark	Stupifying
52	Gunugu	*Celosia argentea*	Amaranthaceae	Herb	Leaf	Galactogogue, Insect bite
53	Saraswathi aku	*Centella asiatica*	Apiaceae	Herb	Leaf	Memory booster
54	Rajugari nanubalu	*Chamaesyce hirta*	Euphorbiaceae	Herb	Whole	Boils, Blisters, Cuts, Skin diseases
55	Billudu	*Chloroxylon swietenia*	Rutaceae	Tree	Stem bark	Shivering, Neck pain
56	Boddi	*Cissampelos pareira*	Menispermaceae	Climber	Root	Digestive
57	Nalleda	*Cissus quadrangularis*	Vitaceae	Climber	Stem/Leaf	Bone fracture, Anorexia, Helminthiasis
58	Adavi draksha	*Cissus vitiginea*	Vitaceae	Climber	Fruit	Stomach ache
59	Kodishe	*Cleistanthus collinus*	Euphorbiaceae	Tree	Stem bark/Leaf	Boils, Blisters, Wounds, Stupifying
60	Kukka vaminta	*Cleome viscosa*	Cleomaceae	Herb	Leaf	Boils, Blisters, Wounds
61	Takkali	*Clerodendrum phlomides*	Verbenaceae	Shrub	Leaf	Rheumatism
62	Gantena	*Clitoria ternatea*	Fabaceae	Climber	Leaf	Dysentery, Aphrodisiac
63	Kaki donda	*Coccinia grandis*	Cucurbitaceae	Climber	Leaf/Fruit	Dysentery, Tympanitis, Boils, Blisters, Cuts
64	Dusara teega	*Cocculus hirsutus*	Menispermaceae	Climber	Root	Urinary problems, Epistaxis
65	Konda gogu	*Cochlospermum religiosum*	Cochlospermaceae	Tree	Leaf	Piles
66	Yada teega	*Combretum albidum*	Combretaceae	Climber	Leaf	Diarrhoea
67	Pamu donda	*Corallocarpus epigaeus*	Cucurbitaceae	Climber	Tuber	Antidote for snake bite
68	Banka nakkiri	*Cordia dichotoma*	Boraginaceae	Tree	Stem bark	Astringent
69	Vulimiri chettu	*Crateva religiosa*	Capparaceae	Tree	Leaf	Tooth-ache
70	Pinjari gadda	*Crinum asiaticum*	Amaryllidaceae	Herb	Stem bark/Tuber	Wounds, Snake bite
71	Giligicha kaya	*Crotalaria verrucosa*	Fabaceae	Herb	Leaf/Root	Ephemeral fever, Insect bite, Fits
72	Jitregi	*Dalbergia latifolia*	Fabaceae	Tree	Stem bark	Stomach ache
73	Vadanika	*Dendrophthoe falcata*	Loranthaceae	Herb	Leaf/Stem bark	Tuberculosis
74	Nalla teega	*Derris scandens*	Fabaceae	Climber	Leaf/Stem bark	Impaction
75	Velturu	*Dichrostachys cinerea*	Fabaceae	Shrub	Leaf	Boils, Blisters, Cuts, Rheumatism
76	Illintha	*Diospyros chloroxylon*	Ebenaceae	Tree	Flower/Root	Snake bite
77	Tuniki	*Diospyros melanoxylon*	Ebenaceae	Tree	Leaf	Diuretic, Carminative, Laxative
78	Puli vaili	*Dodonaea viscosa*	Sapindaceae	Shrub	Flower/Stem bark	Bone fracture
79	Oddi	*Dolichandrone falcata*	Bignoniaceae	Tree	Stem bark/Fruit	Corneal opacity
80	Bandi gurija	*Dregea volubilis*	Apocynaceae	Climber	Root/Whole	Paralysis, Rheumatism, Tonsils, Neck pain
81	Eddu adugu padam	*Elytraria acaulis*	Acanthaceae	Herb	Root	Tonic
82	Resca	*Eniocostema axillare*	Gentianaceae	Herb	Whole	Boils, Blisters, Wounds
83	Tella moduga	*Erythrina suberosa*	Fabaceae	Tree	Seed	Leucorrhoea
84	Tella vajram	*Erythrina variegata*	Fabaceae	Tree	Leaf	Impaction
85	Devadaru	*Erythroxylum monogynum*	Erythroxylaceae	Tree	Stem bark/Fruit	Bone fracture
86	Vishnukrantham	*Evolvulus alsinoides*	Convolvulaceae	Herb	Whole	Boils, Blisters, Wounds, Ephemeral fever
87	Marri	*Ficus benghalensis*	Moraceae	Tree	Latex	Rheumatism
88	Medi	*Ficus racemosa*	Moraceae	Tree	Fruit	Infant diseases
89	Tabsi	*Firmiana simplex*	Malvaceae	Tree	Leaf/Stem bark	Menstruation pain, Stupifying
90	Kanregu	*Flacourtia indica*	Salicaceae	Shrub	Leaf	Boils, Blisters, Cuts
91	Pedda karinga	*Gardenia latifolia*	Rubiaceae	Tree	Leaf/Stem bark	Piles, Boils, Blisters, Wounds, Stupifying
92	Garugu	*Garuga pinnata*	Burseraceae	Tree	Stem bark/Fruit	Leucorrhoea, Stupifying
93	Gummer teku	*Gmelina arborea*	Verbenaceae	Tree	Stem bark	Antidote for snake bite
94	Kavva gummudu	*Gmelina asiatica*	Verbenaceae	Shrub	Leaf	Epistaxis
95	Podapatri	*Gymnema sylvestre*	Apocynaceae	Climber	Leaf/Whole	Diabetes, Ephemeral fever, Galactogogue
96	Bandaru	*Haldina cordifolia*	Rubiaceae	Tree	Leaf/Stem bark	Stomach ache, Stupifying
97	Nulthada	*Helicteres isora*	Malvaceae	Shrub	Leaf/Stem bark	Insect bite, Tympanitis, Stupifying
98	Sugandi pala	*Hemidesmus indicus*	Apocynaceae	Climber	Whole/Leaf	Galactogogue, Impaction, Blood purifier, Rheumatism
99	Sugandhi	*Hemidesmus indicus* var. *pubescens*	Apocynaceae	Climber	Whole	Diabetes
100	Palakodisa	*Holarrhena pubescens*	Apocynaceae	Tree	Root/Stem bark	Cough, Dysentery, Head ache, Stupifying
101	Nauli nara	*Holoptelea integrifolia*	Ulmaceae	Tree	Root/Leaf	Skin diseases, Stupifying
102	Nela kobbari	*Hybanthus ennaeaspermus*	Violaceae	Herb	Whole	Urinary problems
103	Neeli gorimidi	*Hygrophila auriculata*	Acanthaceae	Herb	Leaf	Oedema
104	Jidi vempali	*Indigofera trita*	Fabaceae	Herb	Leaf	Impaction
105	Tuti kada	*Ipomoea carnea*	Convolvulaceae	Climber	Whole plant	Tonsils, Neck pain
106	Eluka chevi	*Ipomoea eriocarpa*	Convolvulaceae	Climber	Leaf	Skin diseases
107	Kashi ratnam	*Ipomoea hederifolia*	Convolvulaceae	Climber	Leaf	Tonic
108	Korivi	*Ixora arborea*	Rubiaceae	Shrub	Root	Wounds
109	Adavi nepalam	*Jatropha curcas*	Euphorbiaceae	Shrub	Seed, Leaf	Anthelmintic, Inflammation
110	Addasaram	*Justicia adhatoda*	Acanthaceae	Shrub	Leaf	Cough, Epistaxis
111	Chennangi	*Lagerstroemia parviflora*	Lythraceae	Tree	Leaf	Boils, Blisters, Cuts

112	Dumpidi	*Lannea coromandelica*	Anacardiaceae	Tree	Leaf/Stem bark	Rheumatism, Bone fracture, Cracked heels, Wounds healing
113	Gorinta	*Lawsonia inermis*	Lythraceae	Shrub	Leaf	Jaundice
114	Velaga	*Limonia acidissima*	Rutaceae	Tree	Stem bark	Indigestion
115	Narra mamidi	*Litsea glutinosa*	Lauraceae	Tree	Fruit/Flower	Labour pains, Bone fracture
116	Ippa	*Madhuca longifolia* var. *latifolia*	Sapotaceae	Tree	Stem bark/Flower/ Seed	Galactogogue, Stupifying
117	Kunkuma	*Mallotus philippensis*	Erythroxylaceae	Tree	Fruit	Anthelmintic
118	Konda mamidi	*Mangifera indica*	Anacardiaceae	Tree	Whole	Boils, Blisters, Wounds
119	Telukondikaya chettu	*Martynia annua*	Martyniaceae	Herb	Flower	Boils, Blisters, Wounds
120	Danthi	*Maytenus emarginata*	Celastraceae	Shrub	Leaf	Ulcers, Sores
121	Alli	*Memecylon umbellatum*	Melanostomaceae	Shrub	Leaf	Leucorrhoea
122	Thalantu teega	*Merremia hederacea*	Convolvulaceae	Climber	Whole	Hair tonic/shampoo
123	Leenaku	*Merremia turpethum*	Convolvulaceae	Climber	Root	Ear ache
124	Atti patti	*Mimosa pudica*	Fabaceae	Herb	Leaf	Dysentery, Diarrhoea
125	Batta ganapa	*Mitragyna parviflora*	Rubiaceae	Tree	Stem bark	Fever
126	Yerri munaga	*Moringa concanensis*	Moringaceae	Tree	Leaf/Stem bark	Cough, Abortifacient
127	Dulagondi	*Mucuna pruriens*	Fabaceae	Climber	Root	Boils, Blisters, Wounds
128	Torri velaga	*Naringi crenulata*	Rutaceae	Tree	Root	Piles
129	Parijatam	*Nyctanthes arbor-tristis*	Oleaceae	Tree	Leaf	Fits
130	Bhutulsi	*Ocimum basilicum*	Lamiaceae	Herb	Leaf	Corneal opacity, Tympanitis, Summer stroke
131	Turaka thoppe	*Olax scandens*	Olacaceae	Climber	Root/Flower	Stomach ache, Diarrhoea
132	Dundilam	*Oroxylum indicum*	Bignoniaceae	Tree	Stem bark	Rheumatism
133	Vandanamu	*Ougeinia oojeinensis*	Fabaceae	Tree	Leaf	Stupifying
134	Dogorolisi	*Pentanema indicum*	Asteraceae	Herb	Leaf	Scorpion sting
135	Dushtapu teega	*Pergularia daemia*	Apocynaceae	Climber	Leaf	Boils, Blisters, Wounds, Corneal opacity, Gout
136	Bokkena	*Phyla nodiflora*	Verbenaceae	Herb	Whole	Stomach ache
137	Nela usiri	*Phyllanthus amarus*	Phyllanthaceae	Herb	Stem bark	Ephemeral fever, Jaundice
138	Usiri	*Phyllanthus emblica*	Phyllanthaceae	Tree	Leaf	Anorexia, Impaction
139	Nalla pulicheru	*Phyllanthus reticulatus*	Phyllanthaceae	Shrub	Leaf	Bone fracture, Dysentery, Insect bite
140	Chitra mulam	*Plumbago zeylanica*	Plumbaginaceae	Shrub	Leaf/Root	Fits, Skin diseases, Rheumatism, Tympanitis, Stupifying
141	Kanuga	*Pongamia pinnata*	Fabaceae	Tree	Shoot/Leaf/Seed	Skin disease, Stupifying
142	Naguru	*Radermachera xylocarpa*	Bignoniaceae	Tree	Stem bark	Antiseptic
143	Sarpagandhi	*Rauvolfia serpentina*	Apocynaceae	Herb	Root	Antidote for snake bite
144	Amudam	*Ricinus communis*	Euphorbiaceae	Shrub	Shoot/Seed	Gout, Purgative
145	Kunkudu	*Sapindus emarginatus*	Sapindaceae	Tree	Fruit	Juice used in asthma treatment
146	Pusugu	*Schleichera oleosa*	Sapindaceae	Tree	Root/Seed	Chest pain, Stupifying
147	Nalla jeedi	*Semecarpus anacardium*	Anacardiaceae	Tree	Stem bark	Dog bite, Fits
148	Tamara chettu	*Senna alata*	Fabaceae	Shrub	Leaf	Skin disease
149	Nela tangedu	*Senna angustifolia*	Fabaceae	Herb	Leaf/Fruit	Constipation
150	Tagarisa	*Senna obtusifolia*	Fabaceae	Herb	Leaf	Insect bite
151	Advi chennangi	*Senna occidentalis*	Fabaceae	Herb	Leaf	Rheumatism
152	Tagirisa	*Senna tora*	Fabaceae	Herb	Stem bark	Insect bite
153	Adavi nuvvulu	*Sesamum alatum*	Pedaliaceae	Herb	Whole	Boils, Blisters, Cuts
154	Tella mulaka	*Solanum virginianum*	Solanaceae	Climber	Seed	Fertility
155	Somi	*Soymida febrifuga*	Meliaceae	Tree	Seed/Leaf	Gout, Shivering, Tonic, Corneal opacity
156	Mushti	*Strychnos nux-vomica*	Loganiaceae	Tree	Seed	Insect bite, Dysentery, Stupifying
157	Chilla	*Strychnos potatorum*	Loganiaceae	Tree	Seed	Stupifying
158	Neredu	*Syzygium cumini*	Myrtaceae	Tree	Root/Stem bark	Epistaxis, Diabetes
159	Chinta	*Tamarindus indica*	Fabaceae	Tree	Stem bark/Fruit	Piles, Scorpion sting
160	Kommi	*Tarenna asiatica*	Rubiaceae	Shrub	Fruit	Vermicide
161	Teku	*Tectona grandis*	Verbenaceae	Tree	Stem bark/Fruit	Filariasis, Pregnancy
162	Vempalli	*Tephrosia purpurea*	Fabaceae	Herb	Seed	Scorpion sting, Cough
163	Nalla maddi	*Terminalia alata*	Combretaceae	Tree	Stem bark	Wounds
164	Tella maddi	*Terminalia arjuna*	Combretaceae	Tree	Stem bark/Shoots	Ephemeral fever, Boils, Blisters, Wounds
165	Tani	*Terminalia bellirica*	Combretaceae	Tree	Leaf	Gout
166	Karakkaya	*Terminalia chebula*	Combretaceae	Tree	Leaf/Fruit	Cough, Constipation
167	Tippa teega	*Tinospora cordifolia*	Menispermaceae	Climber	Stem	Rheumatism, Aphrodisiac
168	Palleru	*Tribulus lanuginosus*	Zygophyllaceae	Climber	Leaf	Venereal diseases
169	Adavi potla	*Trichosanthes cucumerina*	Cucurbitaceae	Climber	Leaf	Skin disease
170	Nallaalam	*Tridax procumbens*	Asteraceae	Herb	Leaf	Boils, Blisters, Cuts
171	Meka meyani aaku	*Tylophora indica*	Apocynaceae	Climber	Stem	Urinary problems
172	Danti	*Ventilago denticulata*	Rhamnaceae	Climber	Stem	Stupifying
173	Vavili	*Vitex negundo*	Verbenaceae	Shrub	Whole/Leaf	Ephemeral fever, Retained placenta
174	Dommadolu gadda	*Withania somnifera*	Solanaceae	Herb	Root	Boils, Blisters, Wounds, Fertility
175	Jaaji	*Woodfordia fruticosa*	Lythraceae	Shrub	Leaf	Blood purifier
176	Kodisha pala	*Wrightia tinctoria*	Apocynaceae	Tree	Leaf/Stem bark	Boils, Blisters, Wounds, Ephermeral fever, Stupifying
177	Marula matangi	*Xanthium strumarium*	Asteraceae	Herb	Leaf	Galactogogue
178	Bojja	*Xylia xylocarpa*	Fabaceae	Tree	Stem bark	Diarrhoea
179	Pariki	*Ziziphus oenopolia*	Rhamnaceae	Climber	Leaf	Dysentery
180	Gotte	*Ziziphus xylopyrus*	Rhamnaceae	Tree	Seed/Stem bark	Snake bite, Ephemeral fever, Wounds
	(Monocotyledonae) Liliopsida					
181	Vasa nabhi	*Acorus calamus*	Acoraceae	Herb	Rhizome	Stupifying
182	Saga nara	*Agave americana*	Asparagaceae	Herb	Leaf	Ephemeral fever
183	Kalabanda	*Aloe vera*	Xanthorrhoeaceae	Herb	Leaf	Piles, Insect bite
184	Guddelugu bochu	*Asparagus gonoclados*	Asparagaceae	Climber	Tuber	Skin disease
185	Ellamma gaddalu	*Asparagus racemosus*	Asparagaceae	Climber	Tuber/Shoots	Snake bite, Dysentery, Galactogogue, Insect bite, Tympanitis
186	Kepu kanda	*Cheilocostus speciosus*	Costaceae	Herb	Rhizome	Abortion, Stupifying
187	Yennadri	*Commelina benghalensis*	Commelinaceae	Herb	Stem bark	Helminthiasis
188	Nela thati	*Curculigo orchioides*	Hypoxidaceae	Herb	Tuber	Aphrodisiac, Ephemeral fever, Galactogogue
189	Pasupu	*Curcuma longa*	Zingiberaceae	Herb	Tuber	Boils, Blisters, Cuts, Bone fracture, Anti-septic
190	Adavi pasupu	*Curcuma pseudomontana*	Zingiberaceae	Herb	Tuber	Wounds
191	Tunga	*Cyperus rotundus*	Cyperaceae	Herb	Tuber	Ephemeral fever
192	Veduru	*Dendrocalamus strictus*	Poaceae	Tree	Tuber	Oedema

193	Bellam gadda	*Dioscorea alata*	Dioscoreaceae	Climber	Tuber	Aphrodisiac
194	Chenna gadda	*Dioscorea bulbifera*	Dioscoreaceae	Climber	Tuber	Indigestion, Bone fracture, Dysentery
195	Govinda gadda	*Dioscorea pentaphylla*	Dioscoreaceae	Climber	Tuber	Rheumatism, Cough
196	Potti dumpa	*Gloriosa superba*	Colchicaceae	Climber	Leaf/Tubers	Insect bite, Abortion, Stupifying
197	Firangi mokka	*Smilax zeylanica*	Smilaceae	Climber	Root	Venereal disorder
198	Kodikalla chettu	*Vanda tessellata*	Orchidaceae	Herb	Whole	Scorpion sting, Ephemeral fever, Snake bite

Table 3: Family-wise utility of ethnomedicinal plant taxa from Kawal wildlife sanctuary

Rank	No. of Plant Taxa	No. of Families	Family/Families
1	33	01	Fabaceae
2	11	01	Apocynaceae
3	07	04	Convolvulaceae, Euphorbiaceae, Malvaceae, Rubiaceae
4	06	03	Anacardiaceae, Combretaceae, Verbenaceae
5	05	01	Rutaceae
6	04	02	Acanthaceae, Capparaceae, Amaranthaceae, Asparagaceae, Asteraceae, Bignoniaceae,
7	03	12	Cucurbitaceae, Dioscoreaceae, Lecythidaceae, Lythraceae, Menispermaceae, Phylanthaceae Rhamnaceae, Zygophyllaceae Burseraceae, Celastraceae,
8	02	10	Ebenaceae, Lamiaceae, Lauraceae, Loganiaceae, Meliaceae, Moraceae, Solanaceae, Vitaceae

Note: The rest of the 38 families (Table 2) are represented by one species each.

The species enumerated 198 species belong to 165 genera of 72 families (Table 2). Of these, Fabaceae are the predominant family with 33 species followed by Apocynaceae (11 taxa), Convolvulaceae, Euphorbiaceae, Malvaceae and Rubiaceae (7 species each), Anacardiaceae, Combretaceae and Verbenaceae (6 species each) and Rutaceae (5). The rest of the 38 families offer a single species of utility (Table 3).

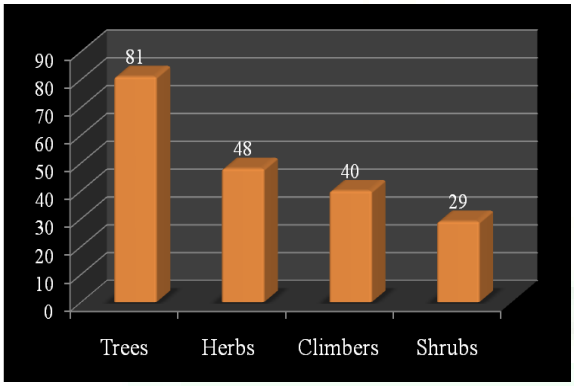

Figure 1: Growth-form pattern of ethnomedicinal plants of Kawal wildlife sanctuary

As per the growth-forms, the local tribes largely use trees (81; 40.91%) and herbs (48; 24.24%). These are followed by climbers (40; 20.21%) and shrubs (29; 14.64%). Since the tree species are found throughout the year, the tribes use them the most. Moreover, in the sanctuary, the ground vegetation constituted of herbs and shrubs is disappearing due to biotic disturbance and fire mainly during summer. Besides, the herbs are seasonal. Therefore, their use is low in the region i.e. 24.24% (herbs), 20.21% (climbers) and 14.64% (shrubs), respectively (Fig. 1).

Nativity of plant species

The ethno-botanic-medicnal knowledge of aboriginal people within and around the Kawal wildlife sanctuary is highly appreciated due to their vast traditional knowledge is being passed through their generations. The documented data was further classified as per the nativity (wild and exotic). Majority of the plants are from the wild (indigenous; 165; 83.33%), native forest species and arboreal while the rest are naturalized (10; 5.05%), wild/cultivated and planted (7; 3.54% of each), cultivated/planted (3; 1.52%), cultivated/running wild, planted/running wild and wild/planted (02; 1.01% of each) and cultivated (1; 0.5%) (Fig. 2).

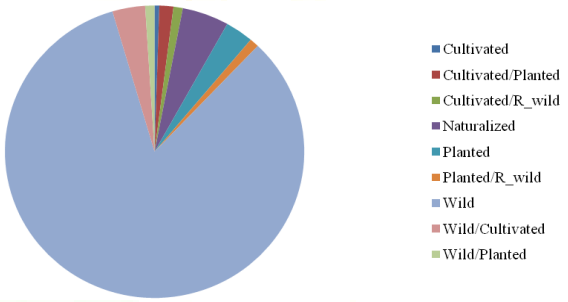

Figure 2: Nativity of recorded plant taxa from Kawal wildlife sanctuary

Discussion and Conclusions

The present study provides the ethnomedicine used by the inhabitants (ethnic tribes) of Kawal wildlife sanctuary, for which it will be useful to the pharmaceutical industries to discover new drugs for the treatment of various diseases and/or disorders. Some of these plants have to be experimented for the new drug discovery for the welfare of human beings as well veterinary as suggested by the WHO. The degradation of NTFPs (non-timber forest products) occurred due to over exploitation, unscientific tapping, cattle grazing, illegal felling of huge trees, and conversion of forest land to agricultural land through *podu/shifting* cultivation. There is an immediate need to take necessary steps to conserve NTFP species for the sustainability and empowerment of ethnic and non-ethnic of Kawal wildlife sanctuary. Awareness should be developed among the ethnic and non-ethnic groups about the importance of nature and natural resources.

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