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DIVERSITY OF MEDICINAL PLANTS AND ECOSYSTEM FUNCTIONING AT SRI KOMMACERVU ANJANEYA SWAMI TEMPLE, NEAR KALVABUGGA (Vi.), KURNOOL DISTRICT, A.P., INDIA.

Forestry Science

KEYWORDS: Medicinal plants, Biodiversity, Conservation, Ecosystem functioning.

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ABSTRACT

The study is aimed to reveal the diversity of medicinal plants up to 1 km. around Sri Kommachervu Anjaneya Swamy temple located near Kalvabugga village, Kurnool district, Andhra Pradesh, India and to analyze ecosystem functioning of the region. This area is represented with 79 medicinally useful plants that are distributed in 37 families and 66 genera among which Fabaceae, a well known family for nitrogen fixation is predominant with 9 species. Seventeen (17) families are represented by a single species including the rare families Leaceae and Hernandaceae indicating more diversity of the community that leads to functional diversity of the area.

Introduction:

The ecosystem processes such as plant productivity, soil fertility, water quality and many other conditions are controlled by both, the diversity and identity of the plant, animal and microbial species living within a community. They may become more variable as diversity declines. The two ecosystem processes – flows of energy and materials are mediated by the organisms that live, grow, reproduce and interact within ecosystems and contribute to many ecological and life support services. Recent studies of Loreau et al. (2001) have shown that ecosystems are highly sensitive to changes in numbers and kinds of species found in their communities. The local species identities, community composition and diversity are very significant to demonstrate the ecosystem processes and functioning. The precise information regarding the occurrence of plant species in a region is highly essential for their use and for assessment and conservation. The nature, particularly plants in search of new drugs is highly exploring in India, since India has traditionally well practiced knowledge of herbal medicine. Thus there is a need to prepare the lists of ethno medicinally useful plants.

This kind of observational studies could provide information about the impacts of species richness on ecosystem processes. Naeem et al. (1999) supposed that research into the link between biodiversity and ecosystem functioning is a new discipline and much work remains to be done. Studies of Hooper et al. (2005) have been shown that diversity mediated effects on biomass accumulation; nutrient retention and primary productivity are more significant. In view of this the present study is carried up to 1 km. around Sri Kommachervu Anjaneya Swamy temple located near Kalvabugga village, Kurnool district, Andhra Pradesh, India to prepare the list of ethno medicinally useful plants and analyzed the ecosystem functioning of the region.

Study area:

The name " Kommachervu" was given to this place due to a water body flowing there with a number of canals like branches of a tree. It supplies water to nearly 7-8 surrounding villages. The area is flourishing well with crops and with diversified flora and fauna. This area is feeding to the flocks of sheep, cows and buffaloes. Thus this area is selected for the study. This place is very near to Gudumbai thanda.

Methodology:

Several trips are conducted to explore plant species of the study area. Twigs are collected and labeled with field numbers. Herbaria are prepared by using standard methods. Critical observation is made on the habit and habitat of the collected plants and the details are recorded along with their local names and relevant information (Jain & Rao, 1977). The collected plants are identified with the help of floras (Raju & Pullaiah, 1995; Gamble & Fischer, 1915-35) and herbaria.

Results & Discussion:

The study revealed the presence of 79 plant species that are distributed in 37 families and 66 genera. Highest numbers of species are included in the family Fabaceae – 9 species followed with Euphorbiaceae – 8 species; Asclepiadaceae, Asteraceae, Mimosaceae – 4 species in each family; Amaranthaceae, Ceasalpinaceae, Capparidaceae, Combritaceae, Cucurbitaceae and Rubiaceae are with 3 species in each. The families Leaceae, Molluginaceae, Myrtaceae and Menispermaceae are included with 2 species in each. The remaining 17 families are included with one species in each. Leaceae and Hernandiaceae are the rare families. List of the species is tabulated.

Study of this region indicated more species diversity with different functional traits that lead to increasing functional diversity. In natural systems, the functional diversity depends on patterns of community assembly in which the functional trait is an important component (Bazzaz et al. 1987; Weiher, Clarke & Keddy, 1998). The study area is dominated with the family Fabaceae, a well known family for nitrogen fixation because of their root nodules comprising Rhizobium bacteria. They greatly increase the amount of plant nutrients in soils and encourage invasions of weedy grasses (Naeem et al. 1999).

Diversity of plants with different floral traits facilitating food resource to various kinds of insects and forms a complicated food web. Presence of rare families – Leaceae and Hernandiaceae indicates the specificity of the community.

Species richness has been the most common measure of diversity and requires a functional approach to classifying organism for understanding of biodiversity – ecosystem functioning relationships. The specific composition or identity of species in a community is important because species can vary dramatically in their contributions to ecosystem functioning (Naeem et al. 1999). The models of Naeem et al. (1999) predicts that diversity and composition of a community have equal importance as determinants of ecosystem functioning. They proposed two mechanisms – sampling effect and complimentarity effect to explain that the increase in ecosystem functioning due to increase in diversity. They invented that at least one species per functional group is essential to ecosystem functioning. In study area among 37 families identified, 17 families are represented by a single species. It indicates that this community is highly productive due to its well functioning. Hooper et al. (2005) proved that the nutrient retention and nutrient use efficiency are maximized in an ecosystem comprising higher herbaceous species richness than that of longer – lived perennials. Since the study area comprises 40 species of herbaceous flora among 79 species that are identified, the area may be highly significant in nutrient use efficiency and retention. These species rich ecosystems have a higher probability of containing species with high levels of functioning. More diverse communities may be older, more stable with a developed climax community and are less vulnerable to environmental vagaries. They may have longer food chains. Thus it is important to preserve this kind of biodiversity in order to safeguard ecosystem processes vital to society.

Table shows the list of collected plants, their vernacular names, families & Medicinal Uses.

S.No	Botanical Name of the plant	Vernacular Name	Family	Medicinal uses
1.	Andrographis paniculata (Burm.f.) Nees	Nelavemu	Acanthaceae	Root – Snake bite; Whole plant – Tonic, malaria; Leaf – Skin diseases
2.	Aerva lanata (L.) Juss	Konda pindi	Amaranthaceae	Root – Diabetes; Whole plant – kidney stone problems.
3.	Alternanthera sessilis (L.) R.Br.ex DC	Ponnaganti aku	Amaranthaceae	Whole plant – Night blindness, snake bite: Seeds – Sores in mouth: Plantlet – Eye diseases.
4.	Celosia argentea L.	Gurugu	Amaranthaceae	Seeds – Sores in mouth; Plantlet – Eye diseases.
5.	Mangifera indica L.	Mamidi	Anacardiaceae	Root & Stem bark – diarrhea, ulcers, fevers, urinary diseases; Seeds – ear diseases; Gum – skin diseases, diabetes.
6.	Annona squamosa L.	Seethapalam	Annonaceae	Leaf – Tonsils Seed - Abortifacient
7.	Wrightia tinctoria (Roxb.) R.Br.	Pala kordsha	Apocynaceae	Stem bark – diabetes, skin diseases, psoriasis; Latex – mouth ulcers, cold, cough, fever; Seeds – anthelmintic; Root – diuretic, uterine diseases.
8.	Cocos nucifera L.	Kobbari	Arecaceae	Leaf, flower spadix, fruit oil – Skin diseases, dysentery, eye diseases, head diseases, fever. Flower – Diabetes.
9.	Phoenix sylvestes L. (Roxb.)	Eatha chettu	Arecaceae	Root – Toothache; Fruit, Stem bark, Seeds – Dysentery, eye diseases; Palm candy, Joggery – digestive disorders, urinary disorders, eye diseases, fever.
10.	Calotropis procera (Ait.) R.Br.	Erra jilledu	Asclipiadaceae	Root – leprosy; diabetes, poisonous bites, worm infestations; Leaf – swollen legs, wounds; Flower – cholera; Latex – antiseptic.
11.	Calotropis zygantia (L.) R.Br.	Tella jilledu	Asclipiadaceae	Root – poisionus bites, Swollen joints, skin diseases: Milky latex – antiseptic, syphilis, leprosy, skin diseases; Flower – stmachic, diabetes, asthma.
12.	Caralluma adscendens (Roxb._Haw.	Sanna kundeti kommulu	Asclipiadaceae	Stem extract – antihypoglycemic, antiinflammatery, stomach disorders, rheumatism, reduce obesity.
13.	Gymnema sylvestre (Retz.) R.Br.ex.Sm.	Podapatri	Asclipiadaceae	Whole plant – Bronchites; Leaf – arrest the sence of taste temporarily, hyperglycemia, obesity, anemia.
14.	Acanthospermum hipidum DC.	Sanna palleru	Asteraceae	Whole plant – skin diseases.
15.	Eclipta prostrate (L.) L.	Guntagalagaraku	Asteraceae	Whole plant – hair tonic, dandruff, skin diseases; Root – lice eradication, emetic; Leaf – jaundice, cancer; Seed – anthelmintic.
16.	Echinops echinatus Roxb.	Mulla banthi	Asteraceae	Root – lice eradication, diuretic, wounds, stomachic.
17.	Tridax procumbence L.	Gaddi chamanthi	Asteraceae	Whole plant – hepato protective, Leaf – dysentery, wounds.
18.	Opuntia dillenii (Ker-Gaul.)Haw	Nagajamudu	Coctaceae	Stem – boils, guinea worm; Fruit – whooping cough, opthalmia, constipation, poisoning.
19.	Cassia auriculata (L.) Roxb.	Tangedu	Caesalpiniaceae	Root – skin diseases, leprosy. Polyuria; Bark – astringent; Whole plant – diabetes; Leaf – anthelmintic; Seed – eye diseases, diarrhea, urinary troubles.
20.	Cassia fistula L.	Rela chettu	Caesalpiniaceae	Whole plant – cardiotonic, jaundice, leprosy, worm infestation, anemia; Bark – skin diseases; Flower buds – diabetes.
21.	C.siamea L.	Chettu yhangedu	Caesalpiniaceae	Leaf – toxic to grazing animals.
22.	Cadaba fruiticosa L.	Chikondi/ Uttarasi chettu	Cappari daceae	Leaf – eczema, swelling, constipation.
23.	Cleome felina, L.	Kukka avalu	Cappari daceae	Whole plant – astringent, vermifuge
24.	Cleome viscosa, L.	Kukka vaminta	Cappari daceae	Leaf – rubefacient; Seed – Joint pains, anthelmintic.
25.	Maytenus emarginata (Willd,)Ding.	Danthi	Celasteraceae	Stem – dysentery; Root –diabetes; Whole plant – cancer.
26.	Terminalia catappa L.	Badham chettu	Combritaceae	Leaf – Scabies, rheumatism; Stem bark – diuretic, gonorrhea.
27.	Terminalia elliptica Willd. (Or) T.alata Roth.	Maddhi	Combritaceae	Stem bark – fever, boils; Fruit – piles, dysentery, diarrhea, diabetes, rheumatic pains.
28.	Commelina benghalensis L.	Venna veduru	Combritaceae	Whole plant – leprosy, laxative, fever, haemorrhage, disuria.
29.	Coccinia grandis (L.) Voigh	Donda	Cucurbitaceae	Root, Leaf, Fruit – diabetes, skin & eye diseases.
30.	Corallocarpus epigaeus (Rottl. & Wild.) Clarke	Naga donda	Cucurbitaceae	Root tuber – snake bite, anaemia, leprosy, dysentery; Stem – filariasis, wounds, goiter, diabetes.
31.	Cucumis melo L.	Budama teega	Cucurbitaceae	Seed – diuretic; Seed pulp – chronic eczema.
32.	Acalypha indica L.	Murupinda	Euphorbiaceae	Whole plant – laxative,worm infestation; Leaf – ear ache, emetic, migraine, scabies, diabetes.
33.	Euphorbia hirta L.	Nanubalu	Euphorbiaceae	Whole plant – urinary disorders, asthma, cough, dysentery, constipation.

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34.	E.indica Lam.	----------	Euphorbiaceae	Whole plant – urinary disorders, asthma, cough, dysentery, constipation; Leaf – Menorrhagia, narcotic, astringent.
35.	Jatropha gossypifolia L.	Yerra nepalamu	Euphorbiaceae	Root – leprosy; Leaf – fever, stomachic; Latex – ulcers.
36.	J.glandulifera Roxb.	Nela amudam	Euphorbiaceae	Root – abdominal complication, glandular swellings; Seed oil – worm infestation, rheumatism.
37.	Phyllanthus reticulatus poir	Purugudu/Incuchettu	Euphorbiaceae	Bark – dysentery, rheumatism; Leaf – snake bite; Fruit – diabetes, syphilis.
38.	P. virgatus Forst	Thoka usiri	Euphorbiaceae	Whole plant – eye diseases, diabetes, thrust, jaundice, urinary disorders.
39.	P.leucopyrus (Willd.) J. Koenig ex Roxb.	Tella pulugudu	Euphorbiaceae	Leaf – dysentery, digestive disorders.
40.	Butea monosperma (Lam.) Taub	Modhuga	Fabaceae	Leaf – diabetes; Gum – jaundice, diarrhea; Stem bark – piles, menorrhagia.
41.	Dalberzia sissoo Roxb.	Sissoo	Fabaceae	Leaf & stem bark – gonerrhoea; Root bark - polyurea, sciatica.
42.	Indigofera trifoliata L.	Baragadhamu	Fabaceae	Root & leaf – jaundice; Seed – astringent, rheumatism.
43.	I. linnaei, Ali.	Yerra palleru	Fabaceae	Whole plant – fever, diuretic, epilepsy.
44.	Derris indica (Lam.) Bennet	Kanuga	Fabaceae	Root – paralysis, ulcers; Bark – night blindness, piles; Flowers – diabetes; Seeds – ear diseases, snake bite, skin diseases.
45.	Psoralea corylifolia L.	Bavanchanalu	Fabaceae	Seed – laxative, tonic, diuretic, psoriasis, leprosy, rheumatism.
46.	Vigna aconitifolia (Jacq.) Marech.	Pilli pesara	Fabaceae	Seed – fever, tonic, dyspepsia, rheumatism.
47.	Tephrosia purpuria (L.)Pers.	Vempali	Fabaceae	Root – diabetes, urinary complications, cough.
48.	T.villosa (L.) Pers.	Nugu vempali	Fabaceae	Whole plant – memory in children; Root – cough, asthma, snake bite, teeth problems.
49.	Gyrocarpus asiaticus Willd.	Kumara poliki/tella poliki	Hernandieaceae	Stem bark – cancer.
50.	Cardiosper mum helicacabum L.	Budda theega	Leeaceae	Root – diabetes, nervous disorders, laxative, diuretic; Leaf – rheumatism, ear diseases, heart pain.
51.	Dodonaea viscosa (L.) Jacq.	Banderu	Leeaceae	Leaf – bone fractures, burns & wounds.
52.	Leucas aspera (willd)Link	Tella thummi	Lamiaceae	Whole plant – hepato protelitic; Leaf – swellings, poisonous bites;Flower – cough, cold, nasal disorders.
53.	Abutilon indicum (L.) Sweet	Thutturu benda	Malvaceae	Leaf – piles, cough, ulcers, rheumatism, diuretic, jaundice.
54.	Martynia annua L.	Telikondikaya	Martyniaceae	Leaf – epilepsy, throat infection; Fruit – alexeteric, scorpion sting.
55.	Azadiracta indica A.Juss.	Vepa	Meliaceae	Bark – skin troubles, antiseptic, ulcers, worm infestation, fever, jaundice; Whole plant – is used in medicine.
56.	Cocculus hirsutus (L.) Diers	Dussara theega	Menispermaceae	Leaf – abdominal disorders, diabetes; Root – laxative; Leaf – refrigerant, polyuria.
57.	Tinospora cardifolia (Willd.) Miers.ex.Hook	Tippa theega	Menispermaceae	Root – emetic; Stem – anaemia, leprosy, jaundice, diabetes, fever; Leaf – health tonic.
58.	Acacia nilotica (L.) Willd subsp. indica	Thumma	Mimosacea e	Stem bark – mouth refresher, dental diseases, gum resin, dysentery, ulcers, cough, piles.
59.	A. leucophloea (Roxb.) Willd.	Thella thumma	Mimosacea e	Stem bark- bronchitis, fever, diabetes; Fruit- giddiness.
60.	Albigia amara (Roxb.) Boiv.	Nirilingachettu	Mimosacea e	Root bark – cough; Leaf – dandruff, skin diseases; Flower – boils, ulcers; Seed – piles, diarrhea, gonorrhea.
61.	Prosopis cineraria (L.) Druce	Jammi	Mimosacea e	Fruit – giddiness, piles, diarrhea, worm infestations.
62.	Mollugo cerviana (L.) Ser	Verri chatraku	Molluginaceae	Root – rheumatism, gout; Whole plant – stomachic, fever, antiseptic, gonorrhea.
63.	M.nudicaulis, Lam.	Pedda parapatakamu	Molluginaceae	Whole plant – boils & whooping cough.
64.	Ficus religiosa L.	Raavi	Moraceae	Stem bark – skin diseases, ulcers, scabies, gonorrhea & diabetes;Fig – asthma, laxative, indigestion, sterility.
65.	Eucalyptus citriodora Hook	Neelagiri	Myrtaceae	Leaf oil – antiseptic, rheumatism, eczema, wounds, pain in joints, dysentery, diarrhea.
66.	Ziziphus mauritiana Lam.	Regichettu	Myrtaceae	Stem bark – Astringent; Leaf – hair tonic, scorpion sting, tonic: Fruit – sedative; Seed – diarrhoea.
67.	Boerhavia erecta L.	Atikamamidi	Nyctaginaceae	Whole plant – spleenic disorder, anemia;Root – asthama, diuretic, laxative.
68.	Jasminum auriculatum Vahl.	Adavi theega malli	Oleaceae	Flower – dropsy, indigestion & veneral diseases.
69.	Argemone mexicana L.	Brahmadandi	Papaveraceae	Yellow latex – scabies, opthalmia;Seed oil – cutaneous troubles; whole plant – leprosy, poisoning, cough, eye diseases,scorpion sting; Leaf – diabetes.
70.	Passiflora foetida L.	Tella jumiki	Passiflorac eae	Root,Leaf – hysteria; Fruit – asthama, emitic
71.	Chloris barbata Sw.	Uppu gaddi	Poaceae	Whole plant – rheumatism.
72.	Portulaca oleracea L.var.oleracea	Pappukoora	Portulacaceae	Seed – diabetes; Whole plant – mouth ulcers, cardiac diseases.

73.	Canthium parviflorum Lam.	Balusu	Rubiaceae	Seed – throat disorders.
74.	Catunaregam spinosa (Thunb). Tirven	Manga/ Manda	Rubiaceae	Stem bark – diarrhea, dysentery, emetic; Seed – induce appetite; Root – emetic.
75.	Spermacoca pusilla, Wall.	Pachanuri	Rubiaceae	Root – diarrhea.
76.	Salvadora persica L.	Chekkara chettu	Salvadoraceae	Root bark – joint pains, piles; Fruit – stomachic, diabetes; Leaf – asthama, cough.
77.	Holopetalea integrifolia (Roxb.) Planch.	Tapase	Ulmaceae	Bark – cancer, vomiting, piles, leprosy, polyurea.
78. 78. 78.	Cissus quadrangularis, L.	Nalleru	Vitaceae	Root & stem – bone fraction, diarrhea, dysentery; Stem – gout, piles, worm infestation, veneral diseases.
79.	Tribulus terrestris L.	Palleru	Zygophyllaceae	Root & Fruit – diabetes, dysuria, polyuria, piles etc. Whole plant – thirst, aphrodisiac.

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