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RESEARCH ARTICLE

DIVERSITY STATUS AND MEDICINAL PLANT SPECIES PRESENT IN THE NATURAL VEGETATION OF KONGUNADU ARTS AND SCIENCE COLLEGE CAMPUS, COIMBATORE

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ABSTRACT

The present study is aimed to identify the diversity status and medicinal plant species present in natural vegetation of Kongunadu Arts and Science College Campus, Coimbatore. The study was conducted during the period between October, 2015 and February, 2016 through exploration was made periodically at weekly intervals in all vegetation areas of Kongunadu Arts and Science College, Coimbatore to enlist the species. A total of 50 plant species belongs to 47 genera which are included in 29 families are present in the campus. The total number of species in herbs is higher (27) followed by the trees and climbers with 8 species, shrubs with 4 species in the college campus. The documentation of this floristic list along with the economic uses of plants may be considered as a baseline data for future management and perspective of plant species diversity.

Keywords: Diversity status, Medicinal plants, Kongunadu Arts and Science College.

1. INTRODUCTION

Institutional premises in the past few decades are becoming most conductive habitats for rich variety of wiled plant species as the management authorities are giving considerable attention to plant conservation. Despite the severe exploitation on wild bioresources in natural ecosystem, the premises of educational institutions generally have considerable green cover contributed by many number of plant species of different life-forms due to the habitat protection offered by the authorities. The communities being maintained in the educational institutions are economically efficient, ecologically sound and biologically sustainable systems. Campus plant communities have attained characteristics which can be useful for making interesting models for research and design of sustainable ecosystems. Some of the characteristics include efficient nutrient cycling, high biodiversity, low use of external inputs and soil conservation potential (1). The nature and organization of plant communities and ecological features of constituent species are generally vary from place to place according to the local physical environment (2). In biodiversity point of view, the first step for effective conservation of species is the documentation of all available species followed by preparing databases for every possible local areas, which can enable to prepare regional and national biodiversity map. Categorization of documented species into various groups according to their economic uses is another important requisite to offer species specific conservation strategy.

Kongunadu Arts and Science College, Coimbatore is a most popular educational institution in Tamil Nadu, India that attained top rank in NACC reaccreditation. College management authorities and staff and students forums give more attention for establishing indoor gardens and also maintaining the natural plant communities in a well manner inside the campus. Around seven hectares of habitat with natural plant communities encompassed by different plant species are available in Kongunadu Arts and Science College, Coimbatore. However, documentation of flora for that habitat with economic uses is not completed so far. Therefore, the present study was aimed at to prepare a floristic list along with the medicinal and other economical uses of plants in Kongunadu Arts and Science College with particular reference to wild species. The data obtained can be useful to know the changes in species composition, community dynamics and level of conservation as influenced by the habitat protection in future.

2. MATERIAL AND METHODS

During the period between October, 2015 and February, 2016 through exploration was made periodically at weekly intervals in all vegetation areas of Kongunadu Arts and Science College, Coimbatore to enlist the species. Identification of plant species was made on the basis of guidelines and keys provided by Gamble (3). Herbarium specimens were collected and deposited in the Department of Botany, Kongunadu Arts and Science College, Coimbatore. Medicinal and other economic uses of the plant species were known through

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literature survey and information from local traditional healers by adequate interagations. The level of anthropologenic disturbances caused to the communities of the college campus was mentioned regularly.

3. RESULTS AND DISCUSSION

The vegetation of college campus is heterogenous composed by various types of life-forms such as trees, shrubs, herbs, climbers, creepers, parasites, etc. As the climatic condition is semi-arid, the plants are mostly mesophytic in the college campus. Generally, the herbs are distributed in patches and also all along the length of the hedges. The tree species such as *Delonix regia, Albizia amara, Azadirachta indica, Morinda tinctoria, Peltophorum ferrugineum, Pongamia pinnata, Samanea saman* and *Spathodea campanulata* are raised by college management and they are nearly 35 years old in age.

A total of 50 plant species belongs to 47 genera which are included in 29 families are present in the campus (Table 1). Euphorbiaceae is the dominant family in terms of species richness consists six species followed by Asteraceae with four species and Asclepiadaceae, Mimosaceae, Poaceae and Solanaceae with three species each in the community of college campus. Twenty three families such as Acanthaceae, Aizoaceae, Amaranthaceae, Apocynaceae, Bignoniaceae, Combretaceae, Commelinaceae, Convolvulaceae, Cucurbitaceae, Cyperaceae, Fabaceae, Malvaceae, Meliaceae, Menispermaceae, Myrtaceae, Nyctaginaceae, Passifloraceae, Rubiaceae, Sapindaceae, Sterculiaceae, Tiliaceae, Verbenaceae and Zygophyllaceae contributed one species each to the community is also varying widely (Fig. 1). The total number of species in herbs is higher (27) followed by the trees and climbers with 8 species, shrubs with four species in the college campus.

In the floristic list of college campus, interestingly all the 50 species (100%) recognized as medicinally important (Table 1). This may be explained due to the existence of semi-arid climatic condition inside the campus, a favourable environment for many constituent plant species (4,5). It has been observed further that the medicinal uses of the plants in the campus are diverse and multifaceted (Table 1). A higher number of 18 plants which include the species like *Calotropis gigantea, Calotropis procera, Chloris barbata, Clitoria ternatea, Cynodon dactylon, Cyperus rotundus, Datura metel, Hibiscus micranthus, Justicia tranquebariensis, Lantana camara, Oldenlandia umbellata, Pergularia daemia, Physalis minima, Quisqualis indica, Sida acuta, Tinospora cordifolia, Vernonia cinerea* and *Waltheria indica* are known to have curing the fever. This may be attributed to high variety of flavonoids, the active principle compounds naturally present in high amount in the species of semi-arid climatic condition (6,7). Next to curing fever, a sizable number of 13 species such as *Albizia amara, Brachiaria ramose, Chloris barbata, Euphorbia hirta, E. microphylla, Eucalyptus tereticornis, Justicia tranquebariensis, Phyllanthus maderaspatensis, Pergularia daemia, Quisqualis indica, Samanea saman, Vernonia cinerea* and *Waltheria indica* are used for the treatment of diarrhea. Twelve species such as *Acalypha indica, Azadirachta indica, Corchorus tridens, Datura metel, Euphorbia heterophylla, Lantana camara, Peristrophe bicalyculata, Prosopis cineraria, Tabernaemontana divaricata, Tinospora cordifolia, Vernonia cinerea* and *Waltheria indica* are reported to have property of curing skin diseases. Seven species such as *Alternanthera pungens, Corchorus tridens, Hibiscus micranthus, Justicia tranquebariensis, Spathodea campanulata, Tabernaemontana divaricata* and *Tridax procumbens* are reported to have anti-inflammatory property. Seven species such as *Acalypha indica, Brachiaria ramose, Euphorbia hirta, E. microphylla, Pongamia pinnata, Solanum nigrum* and *Tridax procumbens* are used for treating ulcer. Seven species such as *Calotropis gigantea, Calotropis procera, Datura metel, Millingtonia hortensis, Oldenlandia umbellata, Passiflora foetida* and *Solanum nigrum* are generally used for curing asthma. The 7 species such as *Cardiospermum halicacabum, Cyperus rotundus, Euphorbia hirta, Euphorbia heterophylla, Mukia maderaspatana, Phyllanthus amarus* and *Vernonia cinerea* are prescribed abdominal/stomach disorders treatment.

A 5 species such as *Acalypha indica, Chloris barbata, Phyllanthus maderaspatensis, Spathodea campanulata* and *Quisqualis indica* are used for their anti-rheumatism. Five species such as *Alternanthera pungens, Phyllanthus amarus, Physalis minima, Tinospora cordifolia* and *Tribulus terrestris* are used for the treatment of kidney disorders. Five species such as *Calotropis gigantea, Lantana camara, Mollugo nudicaulis, Mukia maderaspatana* and *Waltheria indica* are used to reduce cough. Five species such as *Chloris barbata, Gomphrena decumbens, Hibiscus micranthus, Justicia tranquebariensis* and *Tinospora cordifolia* are reported to have anti-diabetic property. Five species such as *Justicia tranquebariensis, Millingtonia hortensis, Mollugo nudicaulis, Phyllanthus amarus* and *Solanum nigrum* are used to treat liver and spleen disorders. Four species such as *Euphorbia microphylla, Eucalyptus tereticornis, Lantana camara* and *Parthenium hysterophorus* are used for the control of dysentery.

Table 1. List of plant species in Kongunadu Arts and Science College campus, Coimbatore with their medicinal uses.

S. No.	Bionomial Name	Common Name	Family	Habit	Part Used	Medicinal Uses
1	*Acalypha indica* L.	Kuppaimeni	Euphorbiaceae	Herb	Leaf, root and flowers	Ulcers, snake bite, skin diseases and rheumatism.
2	*Albizia amara* (Roxb.) B.Boivin.	Arapu	Mimosaceae	Tree	Flower and seeds	Piles, diarrhea, gonorrhea, leprosy, leucoderma, erysipelas and abscesses.
3	*Alternanthera pungens* Kunth.	Ponnaganni	Amaranthaceae	Herb	Leaf	Blood Purification, anti-inflammatory and kidney disorders.
4	*Azadirachta indica* A. Juss.	Veppai	Meliaceae	Tree	Whole plant	Leprosy, intestinal helminthiasis and skin infections.
5	*Blumea obliqua* (Linn) Druce.	Kakronda	Asteraceae	Herb	Leaf	Insect repellent.
6	*Boerhavia diffusa* L.	Mukaratte kirai	Nyctaginaceae	Herb	Leaf, root and seed	Cooling, bowels complaint and blood purification.
7	*Brachiaria ramosa* (L.) Stapf.	Chamapothaval	Poaceae	Herb	Leaf	Ulcers and diarrhea.
8	*Calotropis gigantea* L.	Eruku	Asclepiadaceae	Shrub	Leaf, root, bark, seed and flower	Fever, rheumatism, cough, cold and asthma.
9	*Calotropis procera* (Aiton) W.T.Aiton.	Eruku	Asclepiadaceae	Shrub	Leaf, root, bark, seed and flower	Fevers, asthma, vomiting, nausea and indigestion.
10	*Cardiospermum halicacabum* L.	Mudakattan kirai	sapindaceae	Climber	Whole plant	Arthritis, constipation and abdominal problems.
11	*Chloris barbata* SW.	Mayil kondai pul	Poaceae	Herb	Leaf	Skin disease, fever, diarrhea and diabetes.
12	*Clitoria ternatea* L.	Thuthi	Fabaceae	Climber	Whole plant	Antimicrobial, antipyretic, analgesic and diuretic.
13	*Commelina benghalensis* L.	Kanangkozai	Commelinaceae	Herb	Whole plant	Mouth ulcer, psychosis, epilepsy, nose blockage in child.
14	*Corchorus tridens* L.	Yennai chedi	Tiliaceae	Herb	Leaf	Anti-inflammatory, gonorrhea and headache.
15	*Cynodon dactylon* Dress.	Arugampull	Poaceae	Herb	leaf and stem	Eye disorder and antipyretic.
16	*Cyperus rotundus* L.	Korai	Cyperaceae	Herb	Leaf and tuber	Fever, digestive system disorders and dysmenorrheal.
17	*Datura metel* L.	Umathai	Solanaceae	Herb	Leaf, seeds and flowers	Asthma, skin diseases and fever.
18	*Eucalyptus tereticornis* SM.	Thaila maram	Myrtaceae	Tree	Leaf	Diarrhea and dysentery.
19	*Euphorbia heterophylla* L.	Pall peruki	Euphorbiaceae	Herb	Leaf	Stomachache.
20	*E. hirta* L.	Amman pacharisi	Euphorbiaceae	Herb	Leaf	Diarrhea, peptic ulcers and stomach disorders.
21	*E. microphylla* B.Heyne ex Roth.	Pall peruki	Euphorbiaceae	Herb	Leaf	Jaundice, diarrhea, dysentery and ulcer.
22	*Evolvulus alsinoides* L.	Visnu kanthi	Convolvulaceae	Herb	Whole plant	Nerves tonic and memory loss.
23	*Gomphrena decumbens* Jacq.	Chengkruk	Amaranthaceae	Herb	Whole plant	Diabetes.

24	*Hibiscus micranthus* L.	Sitramutti	Malvaceae	Herb	Leaf, fruit and flowers	Hypoglycemia agent, anti pyretic, anti inflammatory and tumor.
25	*Justicia tranquebariensis* L.	Thavasi murungai	Acanthaceae	Herb	Leaf	Fever, inflammation, diabetes, diarrhea and liver disease.
26	*Lantana camara* L.	Unni chedi	Verbenaceae	Shrub	Leaf, bark, root and flower.	Itching, cold, cough, fever, dysentery and jaundice.
27	*Millingtonia hortensis* L.	Maramalli	Bignoniaceae	Tree	Whole plant	Asthma, sinusitis, cholagogue and tonic.
28	*Mollugo nudicaulis* Lam.	Parpadakapullu	Aizoaceae	Herb	Leaf	Whooping cough, wound healing and liver disorders.
29	*Mukia maderaspatana* (Linn.) M. Roemer.	Mosumouskai	Cucurbitaceae	Climber	Stem, bark and root	Cough, gas trouble and tooth ache.
30	*Oldenlandia umbellata* L.	Chaaya chedi	Rubiaceae	Herb	Whole plant	Asthma and febrifuge.
31	*Parthenium hysterophorus* L.	Parthenium	Asteraceae	Herb	Root	Dysentery and anti tumor.
32	*Passiflora foetida* L.	Mossukkattan	Passifloraceae	Climber	Whole plant	Asthma.
33	*Pergularia daemia* (Forssk.) Chiov.	Veliparuthi	Asclepiadaceae	Climber	Leaf and root	Laxative, antipyretic, diarrhea and malaria.
34	*Peristrophe bicalyculata* (Retz.)	Chebisa	Acanthaceae	Herb	Whole plant	Skin diseases.
35	*Phyllanthus amarus* Schum. & Thonn.	Sirunelli	Euphorbiaceae	Herb	Whole plant	Stomachache, liver, kidney and spleen disorders.
36	*P. maderaspatensis* L.	Arunelli	Euphorbiaceae	Herb	Whole plant	Diarrhea, menstrual problems and rheumatism.
37	*Physalis minima* L.	Kupanti	Solanaceae	Herb	Leaf, stem, root, fruit	Diuretic, laxative, head ache, fever and abscesses.
38	*Pongamia pinnata* (L). Pierre.	Pungai	Fabaceae	Tree	Whole plant	Bleeding hemorrhoids and ulcer.
39	*Prosopis cineraria* L.	Vanni	Mimosaceae	Tree	Leaf , bark, pad and flower	Scorpion bites and eye troubles.
40	*Quisqualis indica* L.	Irangun Malli	Combretaceae	Climber	Leaf, root and fruit	Fever, rheumatism and diarrhea.
41	*Samanea saman* (Jacq) Merr.	Thungumonji maram	Mimosaceae	Tree	Whole plant	Stomach cancer, colds, diarrhea, head ache and intestinal ailments.
42	*Sida acuta* Burm.	Palambasi	Malvaceae	Herb	Leaf and root	Fever.
43	*Solanum nigrum* L	Manathakkali	Solanaceae	Herb	Whole plant	Liver diseases, mouth ulcer and asthma.
44	*Spathodea campanulata* P. Beauv.	Neerkaai	Bignoniaceae	Tree	Leaf, root, bark, stem and fruit	Antiinflammatory, malaria and HIV.
45	*Tabernaemontana divaricata* (L.)	Nandia vattai	Apocynaceae	Shrub	Leaf, fruit, flower	Anti inflammatory, eye disease and skin disease.
46	*Tinospora cordifolia* (Thunb.) Miers.	Senthil kodi	Menispermaceae	Climber	Stem, bark and root	Fevers, diabetes, dyspepsia, jaundice, urinary problems and skin disease.
47	*Tribulus terrestris* L.	Nerunji	Zygophyllaceae	Herb	Leaf and root	Gonorrhea and urinary disorders.
48	*Tridax procumbens* L.	Vetukaya poondu	Asteraceae	Herb	Whole plant	Inflammation, wound, ulcers and hemorrhoids.
49	*Vernonia cinerea* Less.	Sahadevi	Asteraceae	Herb	Whole plant	Stomach pain, diarrhea, fever, eczema, ring worm and elephantiasis diseases.
50	*Waltheria indica* L.	Shengalipoondu	Sterculiaceae	Shrub	Leaf and root	Diarrhea, infertility, fever and cough.

Four species such as *Calotropis gigantea, Lantana camara, Commelina benghalensis* and *Samanea saman* are prescribed for the treatment of cold. Three species such as *Albizia amara, Pongamia pinnata* and *Tridax procumbens* are recommended to treat the problems of piles/bleeding hemorrhoids. Three species such as *Albizia amara, Corchorus tridens* and *Tribulus terrestris* are reported to have anti-gonorrhea property. Three species such as *Corchorus tridens, Physalis minima* and *Samanea saman* are prescribed for treating headache. Three species such as *Cynodon dactylon, Prosopis cineraria* and *Tabernaemontana divaricata* are used for curing eye disorders. Three species such as *Cyperus rotundus, Phyllanthus maderaspatensis* and *Tribulus terrestris* are used to ameliorate menstrual problem/dysmenorrhea. Three species such as *Euphorbia microphylla*, *Lantana camara* and *Tinospora cordifolia* are reported to cure jaundice. Three species such as *Hibiscus micranthus, Parthenium hysterophorus* and *Samanea saman* are reported to have anti-tumor/anti-cancer property. Two species such as *Albizia amara* and *Azadirachta indica* are prescribed for curing leprosy. Two species such as *Albizia amara* and *Physalis minima* are used for reduce obesity and abscesses. Two species such as *Alternanthera pungens* and *Boerhavia diffusa* are good blood purifiers. Two species such as *Azadirachta indica* and *Samanea saman* are used to treat intestinal helminthiasis/ailments. Two species such as *Pergularia daemia* and *Spathodea campanulata* are having anti-malarial property. Two species such as *Calotropis procera* and *Tinospora cordifolia* are used to control vomiting, indigestion and nausea. Two species such as *Commelina benghalensis* and *Solanum nigrum* possesses the property of control mouth ulcer. Two species such as *Commelina benghalensis* and *Evolvulus alsinoides* are used for improving memory disorders. Two species such as *Mollugo nudicaulis* and *Tridax procumbens* are reported to have wound healing property and the other two species such as *Pergularia daemia* and *Physalis minima* are reported to have laxative property.

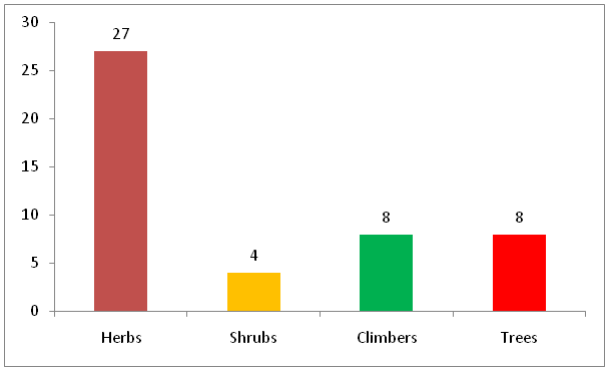

Fig. 1. The different life-form of KASC campus.

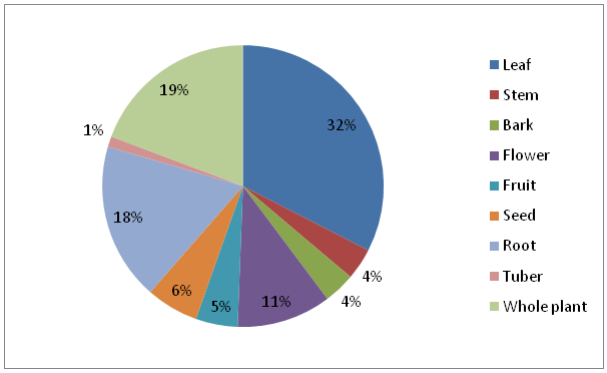

Fig. 2. The different plant parts used to cure various diseases.

The following species such as *Acalypha indica* used to treat snake bite, *Albizia amara* used to treat leucoderma and erysipelas, *Blumea oblique* used as insect repellent, *Boerhavia diffusa* used for body cooling and to treat bowels complaint, *Cardiospermum halicacabum* is used to treat arthritis and constipation, *Clitoria ternatea* used for antimicrobial and anti-analgesic, *Commelina benghalensis* used to treat psychosis and epilepsy, *Evolvulus alsinoides* used to treat nervous problem, *Millingtonia hortensis* used to cure sinusitis and as tonic, *Mukia maderaspatana* used to treat toothache, Prosopis cineraria is used to treat scorpion bite, *Vernonia cinerea* used to cure eczema, ring worm and elephantiasis diseases and *Waltheria indica* used to treat infertility.

The plant parts used for treating the ailments also varying according to the types of ailments (Fig. 2). Among them leaf part for the higher number of (32%) plant species followed by whole plants (19%), root (18%), flower (11%), seed (6%), fruit (5%), stem and bark (4% each) and tuber (1%). It is explained that leaf is the primary site of photosynthesis and produce many secondary metabolites, in addition to reserves like carbohydrates which attributes the higher number of species for leaf as medicinal part (8-10).

Many species present in the community of college campus are multifaceted in medicinal and other economic uses. Such species are *Acalypha indica, Albizia amara, Alternanthera pungens, Azadirachta indica, Boerhavia diffusa, Brachiaria ramose, Calotropis gigantea, C. procera, Cardiospermum halicacabum, Chloris barbata, Clitoria ternatea, Commelina benghalensis, Corchorus tridens, Cynodon dactylon, Cyperus rotundus, Datura metel, Euphorbia hirta, E. microphylla, Eucalyptus tereticornis, Evolvulus alsinoides, Hibiscus micranthus, Justicia tranquebariensis, Lantana camara, Millingtonia hortensis, Mollugo nudicaulis, Mukia maderaspatana, Oldenlandia umbellata, Phyllanthus*

amarus, P. maderaspatensis, Parthenium hysterophorus, Pergularia daemia, Physalis minima, Pongamia pinnata, Prosopis cineraria, Quisqualis indica, Samanea saman, Solanum nigrum, Spathodea campanulata, Tabernaemontana divaricata, Tinospora cordifolia, Tribulus terrestris, Tridax procumbens, Vernonia cinerea and *Waltheria indica* which are used in the treatment of various ailments. This may be explained due to the various phytochemicals and nutraceuticals in these species (11-14). The rich diversity of plant species in the college campus may be due to the presence of different microclimatic sites like open habitats, shaded habitats by broad tree canopy coverage, slightly ever wet places, hedges with the habitat of more soil organic matter etc in the common macroclimate of semi-arid condition. In addition, very little or no disturbance by biotic factor including man is being caused to the vegetation may also be a possible factor for this high species richness in the college campus.

4. CONCLUSION

It is concluded from the observation that the campus of Kongunadu Arts and Science College, Coimbatore is a habitat for various plant species of different taxonomic categories. Furthermore, it is a place of vegetation that contains many species with different medicinal uses. Hence, the campus may be considered as a potential site for many medicinal species sue to its divers microclimatic conditions. In addition to the establishment of many indoor plants, the perpetuation of natural vegetation with high species richness adds still more significance to the biodiversity conservation. Documentation of this floristic list along with the economic uses of plants may be considered as a baseline data for future management and perspective of plant species diversity.

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