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STUDY OF VEGETATION AND THEIR MEDICINAL PROPERTIES INSIDE THE HOLY CROSS COLLEGE CAMPUS, TIRUCHIRAPPALLI DISTRICT, TAMILNADU, INDIA

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ABSTRACT

The present study was aimed at determining the vegetation of an urban green-space- the Holy Cross College campus, Trichy and identify the medicinal properties of the plants. For this, the field survey was made from December 2016 – February 2017. The data from the survey resulted in the documentation of 56 species belonging to 55 genera under 36 families. Arecaceae and Lamiaceae were the dominant families. The represented plant is dominated by tree 55.4%, Shrubs 23.2%, herbs 17.8%, and climber 3.6%, respectively. Totally, the recorded vegetation comprises of 56 species (includes 31 trees, 13 shrubs, 10 herbs and 2 climbers). Shannon-Weiner index was observed as 3.286. Other than these plants, several ornamental plants and a grass land is maintained inside the campus. Considering the rapidly changing urban land use in the city, much attention should be paid towards the conservation of these green spaces, for which the present study provide baseline data.

KEYWORDS: vegetation, college campus, medicinal properties, ornamental plants, conservation.

INTRODUCTION

The vegetation of India is one of the richest of the world due to the wide variation of climatic condition and environment. A large part of our country is covered with different varieties of trees, shrubs and herbs. Plants are significant and perennial sources of food and medicines that are used for the treatment of various human diseases (Revathi *et al.*, 2017). The plants

are easily available, can be easily transported and do not spoil quickly and the system of treatment by plants is better and without any side effect. Various parts of the medicinal plants are used for different purposes and are also a source of economic growth to local people (Samant *et al*., 1997). Plants are important for conservation of biological resources as well as their sustainable utilization (Tiwari and Soni, 2015). With the increase in urbanizaton, studies focusing on urban ecology have developed rapidly in recent years (Celesti-Grapow 2006). Within urban ecosystems, themes like the flora in and around human settlements have been in the lime light in recent decades (Aronson *et al*., 2014). In cities, urban green spaces are of great importance because of the multiple ecosystem services may exist in the form of domestic, public or botanical gardens, unused fields, woodlands (Kitha and Lyth, 2011), campuses of educational institutes (Suresh and Bhat, 2000) or urban forests / wildscapes (Nerlekar and Kulkarni, 2015). The studies of biodiversity have now assumed greater significance to document global biodiversity in the face of unprecedented perturbations, habitat loss and extinction rates. With advances in science and technology, we are on the verge of understanding the natural world while at the same time in real danger of destroying it. Biodiversity is intrinsically valuable as a means of improving our understanding of the structure and functioning of ecological communities.

Holy Cross College is a college for women in Tiruchirappalli, Tamilnadu, India. It is affiliated to the Bharathidasan University and it is one of among the oldest colleges for women in South India. The Latitude and Longitude of Holy Cross College is 10.8256 and 78.6913 respectively. 10.8256 Latitude and 78.6913 Longitude can be mapped to closest address of Holy Cross College, Tiruchirappalli, Tamil Nadu, India. Holy cross college is located in sub-locality, Tiruchirappalli locality, Tiruchirappalli District, Tamil Nadu State of India Country. College is Nationally Reaccredited with “A” grade by NAAC and “College with potential for Excellence”. It has been in the forefront of women’s education for nearly nine decades. It was started for the benefit of the young girls of Tiruchirappalli as early as 1923.

Unlike the surrounding area where deforestation is high and the land is near to becoming bare, the campus of Holy Cross College is relatively vegetated by indigenous and exotic vegetation. It is a need to study them and take necessary measures in maintaining the ecological balance of the region. A healthy ecosystem is built when it is maintained in a suitable manner. Thus, the aim of the present study is to understand the flora and

documentation of medicinal plants distributed inside the college campus. The specific objectives of the study were therefore to enumerate the plant species that compose the campus vegetation, to identify the species richness, to know the plant species to their family level and to know the medicinal activities of the plant parts.

MATERIAL AND METHODS

Study Area

The recent work was carried out in the Holy Cross College campus, Trichy. The field study was carried out during December, 2016 to February, 2017.

Vegetational Survey

Regular field visits were made during the study period to explore the floristic strata of the college campus. Survey was made for identification of vegetation and also its medicinal use. The identification of the plants and their medicinal values were also done based on literature study. Each of the plant material was assigned and documented as to family, genus, species, common name, vernacular name, parts used and medicinal uses of plant parts and their habit were identified with the help of literature review. Further the plants are given in alphabetical order, under their respective families. The herbarium specimens were identified with the help of Rapinat Herbarium Centre, St. Joseph College, Tiruchirappalli, Tamilnadu, India.

Shannon-Weiner Index: Shannon- Weiner Index assumes that individuals are randomly sampled from an independent large population and all the species are represented in the sample. Shannon diversity is very widely used index for comparing diversity between various habitats (Clarke and Warwick, 2001). It was calculated in order to know the species diversity in different habitat (Hutchison, 1970) based on the abundance of the species by the following formula: $H' = - [\sum Pi \ln Pi]$

Where, H' = Diversity Index; Pi = is the proportion of each species in the sample; lnPi = natural logarithm of this proportion

The presence of one individual of a species is not necessarily indicative of the species being present in a large number. The value of Shannon Weiner Diversity Index usually falls between 1.5 and 3.5, only rarely it surpasses 4.5. A value near 4.6 would indicate that the numbers of individuals are evenly distributed between all the species (Bibi and Ali, 2013).

RESULTS AND DISCUSSION

In the present study, the campus have good vegetation status and the availability of medicinal plants and the uses are documented. The field survey on vegetation in the college campus were reported representing with dominant families Arecaceae, Lamiaceae, Apocyanaceae, Fabaceae, Annonaceae, Myrtaceae, Oleaceae, Poaceae, Rutaceae, Sapotaceae and Mimoscaeae. The represented vegetation of the campus is dominated by trees 55.4%, shrubs 23.2%, herbs 17.8% and climber 3.6%. Totally, the recorded vegetation comprises of 56 species (includes 31 trees, 13 shrubs, 10 herbs and 2 climber). Other than these medicinal plants, several ornamental plants and a grass land is maintained inside the campus such as *Allamanda neriifolia, Breynia nivosa, Chrysalidocarpus lutescens, Codiaeum aureum, Delonix vergia, Ficus mysorensis, Hibiscuc syriacus, Polyscias lalfourniana, Polyscias guifoylei, Polyscias fruticosa, Turnera ulmifolia and Turnera ulmifolia eleans.* The reported medicinal plant parts used are root, seed, fruit, bark and leaf. The plant are arranged in following their family, genus, species, common name, vernacular name, Parts used, its medicinal uses and habit (Table 1 and Figure 1). The vegetation in the campus is helpful to maintain the biodiversity and also it possess medicinal activities. There are many trees, shrubs and herbs, which are predominantly used to treat various diseases. Herbal remedies play a fundamental role in traditional medicine in some rural regions of Tamil Nadu, India where the plants often used as therapeutic agents as antiseptic, anti-inflammatory and in treatment of infectious diseases including candidiasis and dermatophytes (Shahidi, 2004).

CONCLUSION

Thus the present study revealed that the vegetation of Holy Cross College campus comprises 56 species of the plants with the Shannon Weiner index of 3.286 and their potent medicinal values. This baseline data gives an idea to conserve the flora of the campus and to protect the medicinal plants.

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Table 1: List of plants in the Holy Cross College campus.

S. No.	FAMILY	GENUS	SPECIES	COMMON NAME	VERNACULAR NAME	PARTS USED	MEDICINAL USE	HABIT
	Aloaceae	*Aloe*	*Vera*	Indian aloe	Katralai	Gel	Wound healing, treating burns, minimizing frost bite damage, lung cancer, intestinal problems, Increasing HDL, reducing LDL, reducing blood sugar in diabetics, fighting AIDS, allergies and improving immune system (Amit Pandey and Shweta Singh, 2016).	Herb
	Acanthaceae	*Andrographis*	*paniculata*	King of bitters	Nilavembu	Aerial part	Reduce blood glucose (Elavarasi and Sarvanan, 2012), Antibacterial, hepatoprotective activity, anti-cancer, immunomodulatory and hypotensive activities (Joselin, 2014).	Herb
	Amaranthaceae	*Celosia*	*argenta*	Silver cocks	Kozhli kontai	Stem, leaf, flower and seed	Immune-stimulating, anticancer, antioxidant, antinociceptive effect and antibacterial activities (Vanitha and Jayalakshmi, 2017)	Shrub
	Anacardiaceae	*Mangifera*	*indica*	Mango	Maa	Leaf, flower, bark and seed	Anti-diabetic, anti-oxidant, antiinflammatory, anthelmintic, antiparasitic, anticancer, anti HIV, antispasmodic, antipyretic, immunomodulation, antibone resorption, Hepatoprotective and gastro protective (Masud Parvez, 2016).	Tree

	Annonaceae	*Annona*	*squamosa*	Sugar apple	Seetha	Fruit, leaves and seeds	Antiinflammatory, antimicrobial, cytotoxic, anti-oxidant, antilipidimic, antiulcer, vasorelaxant, anti-tumour, anthelmintic activities and molluscicidal properties (Gajalakshmi *et al.*, 2011).	Tree
		Polyalthia	*longifolia*	Mast tree	Nettilingam	Bark and leaves	Antimicrobial, cytotoxic, antiulcer, hypoglycemic and hypotensive activities (Katkar *et al*., 2010)	Tree
	Apocynaceae	*Cathranthus*	*roseus*	Periwinkle	Nithya kalyani	Stem	Diabetes mellitus and high blood pressure (Loh, 2008).	Shrub
		Nerium	*oleander*	Oleander	Arali	Leaves and flowers	Anti-inflammatory, antibacterial, anticancer, antinociceptive and CNS depressant activities (Garima and Amla, 2010)	Shrub
		Tabernaemontana	*divaricata*	Crape jasmine	Nandiar vattai	Leaves	Antidiabetic, cytotoxic and antimicrobial activities (Masudur Rahman *et al*., 2012).	Shrub
	Arecaceae	*Areca*	*catechu*	Betel palm	Ataikkai	Nuts	Anti-nematode/helmintic, antioxidant, anti-venom, modulation of phagocytosis and immunosuppression (Preetee *et al*., 2011)	Tree
		Borassus	*flabelifer*	Wine palm	Panai	Flower	Analgesic, antipyretic, anti-inflammatory activity, and immunosuppressant property (Priya *et al*., 2016)	Tree
		Caryota	*urens*	Fish tail palm	Kontal panai	Palm sap	Antioxidant (Ranasinghe *et al*., 2012)	Tree

		Cocus	*nucifera*	Coconut palm	Thennai	Husk fibre, endocarp, mesocarp, coconut shell and oil	Antihelminthic, antiinflammatory, antinociceptive, antioxidant, antifungal, antimicrobial, and antitumor activities (Lima *et al*., 2015)	Tree
		Hyophorbe	*indica*	Champagne palm	-	-	-	Tree
		Phoenix	*dactylifera*	Date palm	Pericham pazham	Fruits	Antioxidant, antitumour, antiinflammatory and antidiabetic effect (Arshad *et al.*, 2014)	Tree
	Asclepidaceae	*Calotropis*	*gigantea*	Crown flower	Erruku	Stem bark, root, seed, leaves, latex and flower	Anthelmintic, appetizer, antiflatulence, astringent, expectorant, emetic, antidote, diaphoretic, sedative and anti-inflammatory activities (Jahan *et al.*, 2016)	Shrub
	Asteraceae	*Tridax*	*procumbens*	Coat button	Vettukaaya poondu	Flower and leaves	Wound healing, antifungal, anticoagulant, diarrhea and dysentery (Mir *et al*., 2017)	Herb
	Bignoniaceae	*Tabebuia*	*rosea*	Trumpet tree	Vasanta rani	Flowers	Antimicrobial activity (Solomon *et al.*, 2016)	Tree
	Clusiaceae	*Calophyllum*	*inophyllum*	Alexandrian laurel	Punnai	Leaves, stem bark, and seed oil	Bacterial infections and inflammation (Sundur *et al*., 2014)	Tree
	Combretaceae	*Termanalia*	*cattapa*	Indian Almond	Vadumai	Bark	Antifungal activity (Tercas *et al*., 2017)	Tree
	Costaceae	*Costus*	*igneus*	Spiral flag	Kostum	Leaves	Antidiabetic activity (Bhat *et al*., 2010)	Herb
	Cycadaceae	*Cycas*	*revoluta*	Sago palm	Madanagame swari	Leaves	Antioxidant activity (Manoj *et al*., 2011)	Tree

	Euphorbiaceae	*Emblica*	*officinalis*	Indian gooseberry	Nelli	Fruit	Diuretic, laxative, ulcer preventive, refrigerant, stomachic, anti-pyretic, liver and hair tonic, cold and fever (Dasarajou and Gottumukkala, 2014)	Tree
	Fabaceae	*Albizia*	*lebbeck*	Sirish tree	Siridam	Bark., leaves and seeds	Bronchial asthma, cold, anti-inflammatory, anti-histaminic, anti-asthmatic, antianaphylactic and antimicrobial properties (Gajendra and Nishtha, 2015)	Tree
		Pongamia	*pinnata*	Indian beech	Pungai	Leaves, root, bark and seeds	Bronchitis, whooping cough, rheumatism, diarrhoea, gonorrhoea and leprosy (Pramila *et al*., 2014)	Tree
		Peltophorum	*pterocarpum*	Yellow flame tree	Perungkonyai	Leaves, fruits, flowers, bark and seeds	Insomnia, constipation, ringworm, dysentery, muscular pains, sores and skin disorders (Shyamal *et al*., 2013)	Tree
	Lamiaceae	*Gmelina*	*arborea*	Gamhar	Kumalaa maram	Roots, fruits, flowers, leaves and bark	Anemia, anxiety, asthma, diarrhea, fever, headaches, antioxidants, antidiabetic, cardioprotective, diuretic, antipyretic, analgesic and antimicrobial activity (Munira banu *et al.*, 2013)	Tree
		Ocimum	*basilicum*	Sweet basil	Thiruneetru pachai	Leaves, flowers, aerial parts and whole plant	alleviation of mental fatigue, colds, spasm, rhinitis, first aid treatment for wasp stings and snake bites, antibacterial, antistress, anticancer, anticonvulsant, antidiabetic, antioxidant, antihyperlipidemic, antiinflammatory,	Herb

							hepatoprotective and immunomodulatory properties (Mueen Ahmad Ch *et al.*, 2015)	
		Ocimum	*tenuiflorum*	Holy basil	Karunthulasi	Leaves, stem, flower, root, seeds and whole plant	Anti-fertility, anticancer, antidiabetic, antimicrobial, analgesic, antispasmodic, cardioprotective and adaptogenic actions (Priyabrata *et al.*, 2010)	Herb
		Plectranthus	*amboinicus*	Indian mint	Karpooravalli	Leaves	Cold, asthma, fever, skin diseases, constipation, wound healing, headache, antimicrobial, antitumor, antiinflammatory, antiepileptic, antioxidant and analgesic activities (Greetha *et al.*, 2016)	Herb
		Vitex	*negundo*	Chaste tree	Nochi	Leaves	Antimicrobial, anti-inflammatory, astringent, bronchodilator, CNS-depressant, detoxicant, diuretic, emmenagogue, anticancer and hepatoprotective (Fauziya *et al.*, 2014)	Shrub or small tree
	Lecythidaceae	*Couroupita*	*guianensis*	Cannon ball	Nagalingam	Leaves and flowers	Antibiotic, antiseptic, analgesic and antimicrobial activities (Gousia *et al.*, 2013)	Tree
	Malvaceae	*Hibiscus*	*rosa sinensis*	Shoe black plant	Sembaruthi	Flower, leaves, root, stem and bark.	Reduce blood glucose (Elavarasi and Sarvanan, 2012), regulation of menstrual cycle, digestion, antidiarrheal, gonorrhoea, cough, abortifacient, dysentery, to induce labor, amenorrhea and dysmenorrhea (Jadhav *et al.*, 2009).	Shrub

	Meliaceae	*Azadirachta*	*Indica*	Margosa	Vembu	Leaves	Anti-inflammatory, antimicrobial and antioxidant activities (Galeane *et al*., 2017)	Tree
	Menispermeaceae	*Tinospora*	*cordifolia*	Guduchi	Seenthil kodi	Root, stem and leaves	Antidiabetic, anticancer, immunomodulatory, antioxidant, antimicrobial and antitoxic activities (Reddy and Rajasekhar reddy, 2015)	Climbing shrub
	Mimosaceae	*Leucanea*	*leucocephala*	Horse tamarind	Periyatakarai	Leaves	Antioxidant, antimicrobial, anti-inflammatory and antioxidant activities (Mohammed *et al*., 2015)	Tree
		Samanea	*Saman*	Rain tree	Amaivagai	Leaves, bark, root, seeds and pods	Antioxidant, antibacterial, analgesic, antifungal, insecticidal, antiulcer and cytotoxic activities (Juluri Sowjanya *et al*., 2014)	Tree
	Moraceae	*Ficus*	*Religiosa*	Scared Fig	Arasa maram	Bark, roots, vegetative buds, leaves, fruit, latex	Antidiabetic, vomiting, burns, gynaecological problems, dysentery, diarrhea, nervous disorders and astringent (Inder Kumar *et al.*, 2010)	Tree
	Musaceae	*Musa*	*paradisiaca*	Banana	Vaazhai	Unripe fruit, flower, stalk, peel, roots, stem and leaves	Antilithiatic, antioxidant, antibacterial, antidiabetic, antiulcer, antidiarrhoeal, hypocholesterolaemic, hepatoprotective, antisnake venom, wound healing, hair growth promoting, antifungal and antimenorrhagic activity (Lavanya *et al*., 2016)	Tree

	Myrtaceae	*Psidium*	*guajava*	Guava	Koyya	Leaves, pulp, skin, seeds and bark	Hepatoprotection, analgesic, antioxidant, antispasmodic, anticancer, antimicrobial, endothelial progenitor cells, antihyperglycemic, anti-stomachache and diarrhea (Barbalho *et al.*, 2012)	Shrub / small tree
		Syzygium	*cumini*	Black plum	Naval	Fruit , stem, bark , leaves and seed	Antidiabetic (Revathi *et al.*, 2015), diuretics, anti-inflammatory, antiplaque, antimicrobial, astringent antidiarrhoel, antioxidant and gastro-protective (Jadhav *et al.*, 2009)	Tree
	Oleaceae	*Jasminum*	*auriculatum*	Juhi	Uccimalligai	Leaves	Antioxidant activity (Sushant and Prasad, 2015)	Climber
		Nyctanthes	*arbor tristis*	Coral jasmine	Pavizhamalli	Seeds, leaves, flowers, bark and fruits	Hair tonic, hepatoprotective, anti-leishmaniasis, anti-viral, antifungal, anti-pyretic, anti-histaminic, anti-bacterial, antiinflammatory and anti-oxidant activities (Jain and Arti Pandey, 2016)	Shrub
	Phyllanthaceae	*Phyllanthus*	*niruri*	Gale of the wind	Keezha nelli	Young shoots and leaves	Antimicrobial, antiviral, hepatoprotective, antioxidant, anticancer, antiplasmodial and diuretic (Hakim and Obydul Hoq, 2016)	Herb
	Pinaceae	*Apies*	*balsamia*	Balsam fir	Christmas tree	-	-	Tree

	Poaceae	*Bambusa*	*vulgaris*	Common bamboo	Moongil	Bamboo shoots	Cancer prevention, weight loss to improving appetite and digestion (Maroma, 2015)	Shrub
		Vetiveria	*zizanioides*	Vetiver	Vetiver	Root	Cooling agent, blood purifier, skin disorders, calming effect on the nervous system, indigestion and loss of appetite (Archana and Ashwani, 2013)	Herb
	Portulacaceae	*Portulaca*	*grandiflora*	Rose moss	Table rose	Aerial parts	Sore throat and skin rashes (Jain and Bashir, 2010)	Shrub
	Rhamnaceae	*Ziziphus*	*jujuba*	Wild jujube	Ilantai	Leaves, bark, fruit, root and seed.	Hypnotic-sedative, anxiolytic, anticancer, antifungal, antibacterial, antiulcer, antioxidant, cardiotonic, cognitive, antispastic, antifertility/ contraception, wound healing, antinephritic, hypotensive and immunostimulant (Mahajan and Chopda, 2009)	Shrub
	Rubiaceae	*Ixora*	*Coccinea*	Jungle flame	Idly poo	Root, leaves, flowers and stem	Antioxidative, anti bacterial, gastroprotective, hepatoprotective, anti antinociceptive, anti mutagenic, antineoplastic and chemopreventive effects (Baliga and Kurian, 2012)	Shrub
	Rutaceae	*Citrus*	*Limon*	Lemon	Elumichai	Fruit	Anticancer activity, immunomodulatory effect, circulatory problems, antiemetic, analgesic, diuretic properties and ease the symptoms of hangovers	Tree

							(Beatriz Alvarez Arias and Ramon-Laca, 2004)	
		Murraya	*Koenigii*	Curry leaves	Karuveppilai	Root, leaves, seed, fruit and bark	Stomachic, carminative, dysentery, vomiting, antihelminthic, analgesic, cures piles, allays heat of the body, inflammation, itching, antidiabetic, cholesterol reducing property, antimicrobial, antiulcer, antioxidative, cytotoxic, antidiarrheal and phagocytic activity (Harish *et al*., 2012)	Tree
	Sapotaceae	*Mimusops*	*elengi*	Spanish Cherry	Magilampoo	Bark , fruit , flowers and seeds.	Analgesic, antibiotic, antiinflammatory, gastric ulcer, antimicrobial, antioxidant, antipyretic, cytotoxic, congestive enhancing, gingival bleeding and hypotensive activity (Prasad *et al*., 2012)	Tree
		Manilkara	*zapota*	Chiku	Sapota	Leaves	Antihyperglycemic, hypocholesterolemic and antioxidant activities (Nesrin *et al*., 2012)	Tree
	Tamaricaceae	*Tamarix*	*aphylla*	Athel pine	Sivapattusha vukku	Leaves	Antimicrobial activities (Sulaiman, 2016)	Tree
	Zingiberaceae	*Alpinia*	*galanga*	Galanga	Chittaratha	Rhizome	Antifungal, antitumor, antidiuretic, disease of heart, rheumatic pains, dyspepsia, fever and diabetes (Raviraja Shetty and Monisha, 2015)	Herb


Aloe vera


Andrographis paniculata


Celosia argenta


Mangifera indica


Annona squamosa


Polyalthia longifalia


Catharanthus roseus


Nerium oleander


Tabermaemontana divaricata


Cocus nucifera


Acacia catechu


Borrasus flabelifer


Caryota urens


Phoenix dactylifera


Hyophorbe indica


Calotropis gigantea


Tridax procumbens


Tabebuia rosea


Calophyllum inophyllum


Terminalia catappa


Costus igneus


Cycas revoluta


Emblica officinalis


Pongamia pinnata


Albizia lebbeck


Peltophorum pterocarpum


Ocimum tenuiflorum


Gmelina arborea


Plectranthus amboinicus


Ocimum basilicum


Vitex negundo


Couroupita guianensis


Hibiscus rosa sinensis


Azadirachta indica


Tinospora cordifolia


Leucanea leucocephala


Samanea saman


Ficus religiosa


Musa paradisiaca


Psidium guajava


Syzygium cumini


Jasminum auriculatum


Nyctanthes arbor tristis


Phyllanthus niruri


Apies balsamia


Bambusa vulgaris


Vetiveria zizanioides


Portulaca grandiflora


Ziziphus jujuba


Ixora coccinea


Citrus limon


Murraya koeinigii


Mimusops elengi


Manilkara zapota


Tamarix aphylla


Alpinia galanga

Figure 1: Pictures of flora in the Holy Cross College campus.

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