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International Journal of Current Research
Vol. 8, Issue, 02, pp.26008-26013, February, 2016

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

RESEARCH ARTICLE

FLORISTIC DIVERSITY OF ANGIOSPERMS IN THE PROPOSED SITE OF ARANMULA INTERNATIONAL AIRPORT

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ARTICLE INFO

Article History:
Received 16th November, 2015
Received in revised form
22nd December, 2015
Accepted 20th January, 2016
Published online 14th February, 2016

Key words:

Aranmula,
International Airport,
Floristic study,
RET plants.

ABSTRACT

The study was carried out in order to explore the Angiosperm flora in the proposed site of Aranmula International Airport Pathanamthitta, Kerala. The airport project, which is at the center of a raging political storm in Kerala has run into fresh trouble with the Kerala State Biodiversity Board (KSBB) expressing serious reservations over the land use changes and eco physiological imbalance. At present, the biodiversity of Aranmula is reduced to a great extent due to unsustainable anthropogenic activities, which was well evidenced from soil filled paddy fields around 60 acres and collapsed natural water reservoir, Kozhithode during 2003- 2006 period. With this scenario, the present study aims to document the floristic angiosperm diversity at proposed site as an effort for conservation. A detailed study on angiosperm plant diversity, conservation aspects and RET assessment was conducted during the work. Over 250 plant species belonging to more than 67 families were documented, among them members of Poaceae and Cyperaceae families are most dominant.

Citation: **Anto, M. and Jasy, T., 2016.** "Floristic diversity of angiosperms in the proposed site of aranmula international airport", *International Journal of Current Research,* 8, (02), 26008-26013.

INTRODUCTION

Biodiversity is the degree of variation of life forms within a given species, ecosystem, biome, or planet. It represents the variety and abundance of life expressed at the genetic, population, species and ecosystem levels, terrestrial and marine, cultivated and natural. India is known for its rich biological diversity. The country is also recognized as one of the eight Vavilovian Centers of Origin and Diversity of Crop Plants. The Western Ghats is one of the biodiversity hotspot in India and exists as major component contributing the biodiversity for Kerala state. The proposed Aranmula International Airport is located in Pathanamthitta district of Kerala. The Aranmula airport project is at the serious issue in Kerala regarding the anthropogenic activity related to the construction of airport and changes the ecological balance. The runway for the airport is being constructed over the Kozhithode, a tributary of the River Pampa. Many hills in the neighborhood will have to be razed for soil to reclaim the fields, a process that could lead to biodiversity loss and water shortage.

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The proposed Aranmula airport is 122 km from Thiruvananthapuram and closer to Cochin (104 km). Moreover, competition is bound to drive down prices and make all three airports economically unviable (SAF, 2012). In 2013, Kerala State Biodiversity Board reported that about 80 % of 500 acres in the proposed airport area comprises wetland and paddy fields. Conversion of these areas to plain lands for the construction of airport leads to many eco physiological impacts which in turn disturbs the food chain, water bodies and accelerate the depletion of fish resources as well as other flora and fauna in the Pampa river basin. A survey of the floristic analysis of Angiosperms in the proposed site of airport and its immediate environs was carried out to assess the present status.

MATERIALS AND METHODS

Study Area

Aranmula is a small village located in Pathanamthitta district of Kerala at 9.33^0N 76.68^0 E, an average elevation of 7 m (23 ft.) encompass 3500 acres of wetlands and paddy fields in the flood plains of the river Pamba. These areas are the major source of water for the villages of Aranmula, Kidangannur, and Mallappuzhassery. Annual temperature range between

24 °C to 36 °C in the plains and 15°C to 32°C in the Hills (SAF. 2012). The district experiences three distinct weather conditions; winter, summer and the monsoon. The winter season is experienced from December to January and summer season from March to May (Anilkumar *et al*., 2005). There are two rainy seasons: The South-West monsoon (June to September) and the North-East monsoon (October to November). The South-West monsoon is usually very heavy. About 75 % of the annual rain is received during this season. The proposed international airport site is the middle portion of this village. The most significant loss, due to the proposed airport will be the loss of aquatic diversity of many plants as well as animals and the distraction of paddy fields also cause the reduction 11 % of the total requirement of rice. One of the most significant values of these paddy fields and wetlands is the contribution that they make in maintaining the water level in the wells, streams and ponds in the villages around (SAF. 2012)

Floristic Analysis

The study was conducted during the post and pre-Monsoon period of June 2012 to July 2013 to obtain plants in different phenotypic phases. Field data were noted in the field diary. Collected plants were identified by referring different standard Floras and handbooks (Flora of the Presidency of Madras, Flora of Pathanamthitta, and Flowering Plants of Kerala) and matching with authentic specimens. Photographs were taken and prepared herbarium.

RESULT AND DISCUSSION

The survey of Angiosperm plants in the proposed area of International airport Aranmula shows that out of the 247 plant species observed, 59 were trees, 54 were shrubs, and 134 were herbs. It includes 109 medicinal plants, 14 endemic and 8 RET plant species. Among the families, *Poaceae* and *Cyperaceae* have 26 and 18 genera respectively. These are the dominant families in the proposed area. In Pathanamthitta, family Poaceae is the second dominant one with 49 genera and 81 species including the new species are also recently described, and 16 endemic species of Peninsular India (Anilkumar et al. 2005). A herbarium of 180 plant species/ specimens were prepared and kept in the herbarium of Botany Department of St. Thomas College Kozhencherry.

Trees

The site is rich tree-species diversity. A total of 59 tree species were identified in this area (Table 1). This includes economically and medicinally important species such as *Aegle marmelos*, *Saraca asoca*., *Alstonia scholaris* and *Santalum album.* The number of the tree species is getting reduced because trees are cut for a variety of purposes such as fuel and construction material

Table 1. List of Angiosperm plant species in the proposed site of International Airport, Aranmula (H- Herb., S- Shrub., T- Tree., M- Medicinal., E - Endemic)

SI. No.	Botanical Name	Habit	Family	Medicinal & Endemic
1.	*Andrographis paniculata* Nees.	H	Acanthaceae	M
2.	*Asystasia gangetica* L.	H	Acanthaceae	
3.	*Barleria cristata* L.	S	Acanthaceae	
4.	*Hygrophila ringens* R. Br.ex Steudd	H	Acanthaceae	M
5.	*Justicia adhathoda* L.	S	Acanthaceae	M
6.	*Strobilanthes heynianus* Nees	S	Acanthaceae	
7.	*Thunbergia sp.*	H	Acanthaceae	
8.	*Achyranthes aspera* L.	H	Amaranthaceae	M
9.	*Alternanthera sessilis* (L.) R. Br.ex Dc.	H	Amaranthaceae	
10.	*Aerva lanata* (L.) Juss. ex. Schultes	H	Amaranthaceae	M
11.	*Anacardium occidentale* L.	T	Anacardiaceae	M
12.	*Lannea coromandelica* Merr.	T	Anacardiaceae	
13.	*Mangifera indica* L.	T	Anacardiaceae	
14.	*Odina wodier* Roxb.	T	Anacardiaceae	
15.	*Spondias pinnata* Kurz.	T	Anacardiaceae	
16.	*Anona reticulata* L.	T	Annonaceae	M
17.	*Annona squamosa* L.	T	Annonaceae	
18.	*Polyalthia longifolia (Sonn.) Thwaites*	T	Annonaceae	
19.	*Uvaria narum* Wall.	S	Annonaceae	
20.	*Centella asiatica* Urb.	H	Apiaceae	M
21.	*Allamanda cathartica* L.	S	Apocynaceae	
22.	*Alstonia scholaris* R.Br.	T	Apocynaceae	M
23.	*Cathharanthus roseus* (L.) G. Don.	H	Apocynaceae	
24.	*Cerbera odollam* Gaertn.	T	Apocynaceae	
25.	*Holarrhena pubescens* Wall. ex. G.	T	Apocynaceae	M
26.	*Nerium oleander* L.	S	Apocynaceae	
27.	*Rauvolfia serpentina* Benth & Kurz.	S	Apocynaceae	M
28.	*Tabernaemontana alternifolia* L.	S	Apocynaceae	E
29.	*Amorphophallus sylvaticus* Kunth. E.	H	Araceae	M
30.	*Pothos scandens* L.	H	Araceae	
31.	*Areca catechu* L.	T	Arecaceae	M
32.	*Calamus rotang* L.	S	Arecaceae	
33.	*Aristolochia indica* L.	H	Aristolochiaceae	
34.	*Calotropis gigantea* R.Br.	S	Asclepiadaceae	M
35.	*Hemidesmus indicus* R.Br.	H	Asclepiadaceae	M
36.	*Tylophora indica* (Burm.f.) Merr.	H	Asclepiadaceae	
37.	*Acmella calva* (DC.) R.K. Jansen	H	Asteraceae	
38.	*Blumia patens* DC.	H	Asteraceae	
39.	*Chromolaena odorata* King & Robins.	S	Asteraceae	
40.	*Crassocephalum crepidioides* (Benth) M.	H	Asteraceae	

Continue……..

41.	*Eclipta prostrata* L.	H	Asteraceae	M
42.	*Elephantopus scaber* L.	H	Asteraceae	M
43.	*Emilia sonchifolia* DC.	H	Asteraceae	M
44.	*Mikania micrantha* Kunth.	S	Asteraceae	
45.	*Spilanthes agmata* L.	H	Asteraceae	
46.	*Struchium spargnophorum*. Kuntze.	H	Asteraceae	
47.	*Vernonia cinerea* Less.	H	Asteraceae	M
48.	*Wedelia trilobata* A.S. Hitchc.	H	Asteraceae	
49.	*Impatiens diversifolia* Wall.	H	Balsaminaceae	E
50.	*Ananas comosus* Merril.	H	Bromeliaceae	M
51.	*Periskia bloe* (Kunth) DC. Prodr.	S	Cactaceae	
52.	*Bauhinia variegata* L.	S	Caesalpiniaceae	M
53.	*Cassia fistula* L.	T	Caesalpiniaceae	M
54.	*Caesalpinia decapetala* Roth.	S	Caesalpiniaceae	
55.	*Croton tiglium* L.	S	Caesalpiniaceae	
56.	*Saraca asoca* (Roxb.) W. J. de Wilde.	T	Caesalpiniaceae	M
57.	*Senna tora* (L.) Roxb.	H	Caesalpiniaceae	
58.	*Tamarindus indica* L.	T	Caesalpiniaceae	M
59.	*Crataeva adansonii* Jacobs.	T	Capparidaceae	M
60.	*Carica papaya* L.	S	Caricaceae	M
61.	*Calophyllum inophyllum* L. Roxb.	T	Clusiaceae	M
62.	*Garcinia gummi-gutta* (L.) Robs.	T	Clusiaceae	M
63.	*Calycopteris floribunda* Poiret.	S	Combretaceae	
64.	*Quisqualis indica* L.	S	Combretaceae	
65.	*Terminalia catappa* L.	T	Combretaceae	M
66.	*Merremia umbellata* Hall. f.	H	Convolvulaceae	
67.	*Convolvulus* sp.	H	Convolvulaceae	
68.	*Ericibe paniculata* Roxb.	H	Convolvulaceae	
69.	*Ipomoea paniculata* R.Br.	H	Convolvulaceae	M
70.	*Xenostegia tridentata* Austin & Staples.	H	Convolvulaceae	
71.	*Costus speciosus* Sm.	H	Costaceae	M
72.	*Melothria indica* Lour.	H	Cucurbitaceae	M
73.	*Mukia maderaspatana* M.	H	Cucurbitaceae	M
74.	*Bulbostylis barbata* (Rottb) Clarke	H	Cyperaceae	
75.	*Cyperus cephalotes* Vahl, Enum.	H	Cyperaceae	
76.	*Cyperus compressus* L., Sp.	H	Cyperaceae	
77.	*Cyperus difformis* L., Cent.	H	Cyperaceae	
78.	*Cyperus diffusus* Vahl, Enum.	H	Cyperaceae	
79.	*Cyperus distans* L.f.	H	Cyperaceae	
80.	*Cyperus haspan* L., Sp.	H	Cyperaceae	
81.	*Cyperus iria* L.	H	Cyperaceae	
82.	*Cyperus rotundus* L.	H	Cyperaceae	M
83.	*Eleocharis retroflexa* (Poiret) Urban, Symb	H	Cyperaceae	M
84.	*Eleocharis spiralis* (Rottb) Roem & Schult	H	Cyperaceae	
85.	*Fimbristylis dichotoma* (L.) Vahl, Enum	H	Cyperaceae	
86.	*Fuirena ciliaris* (l.) Roxb., Fl.	H	Cyperaceae	
87.	*Fuirena umbellata* Rottb., Descr. Ic. Rar.	H	Cyperaceae	
88.	*Kyllinga nemoralis* (Forster & Forster f.) Dandy ex Hutch	H	Cyperaceae	
89.	*Pycreus pumilus* (L.) Nees, Hook. F.	H	Cyperaceae	
90.	*Schoenoplectus juncoides* (Roxb.) Palla.	H	Cyperaceae	
91.	*Scleria levis* Retz. Obs.	H	Cyperaceae	
92.	*Dioscorea sp.* Linn.	H	Dioscoreaceae	
93.	*Antidesma montanum* Blume	T	Euphorbiaceae	
94.	*Briedelia* sp.	T	Euphorbiaceae	
95.	*Breynia patens* Rolfe.	H	Euphorbiaceae	
96.	*Euphorbia hirta* L.	H	Euphorbiaceae	M
97.	*Hevea brasiliensis* (Willd.) Muell.	T	Euphorbiaceae	
98.	*Macaranga peltata* (Rox.) Muell Arg.	T	Euphorbiaceae	
99.	*Mallotus artrovirense* Muell.- Arg.	T	Euphorbiaceae	E
100.	*Manihot esculenta* Cranz.	S	Euphorbiaceae	
101.	*Microstachys chamaelea* Muell, Arg.	H	Euphorbiaceae	
102.	*Phyllanthus amarus* Schum.	H	Euphorbiaceae	M
103.	*Phyllanthus emblica* L.	T	Euphorbiaceae	M
104.	*Ricinus communis* L.	S	Euphorbiaceae	M
105.	*Tragia involucrata* L.	H	Euphorbiaceae	M
106.	*Centrosema molle* Benth.	H	Fabaceae	
107.	*Crotalaria pallida* Dryand.	S	Fabaceae	
108.	*Desmodium* sp.	H	Fabaceae	
109.	*Erythrina variegata* L.	T	Fabaceae	
110.	*Flemingia strobilifera* R Br. ex. Ait. f.	S	Fabaceae	
111.	*Indigofera tinctoria* L.	S	Fabaceae	M
112.	*Mucuna pruriens* (L.) DC.	S	Fabaceae	M
113.	*Pseudarthria viscida* (L.) Wight & Arn.	T	Fabaceae	M
114.	*Pterocarpus marsupium* Roxb.	S	Fabaceae	
115.	*Tephrosia purpurea* (L.) Pers.	H	Fabaceae	
116.	*Clitoria ternatea* L.	H	Fabaceae	M
117.	*Flacourtia jangomas* (Lour.Raeuasch.	T	Flacourtiaceae	
118.	*Flacourtia montana* Grah.	T	Flacourtiaceae	M & E
119.	*Biophytum sensitivum* (L.) DC.	H	Geraniaceae	M
120.	*Salacia fruticosa* Heyne ex Lawson.	T	Hippocrateaceae	M & E

Continue……..

121.	*Adenosoma indiana* (Lour.) Merr.	H	Lamiaceae	
122.	*Anisomeles indica* (L.) O. Ktze.	H	Lamiaceae	M
123.	*Hyptis capitatas* Jacq.	H	Lamiaceae	
124.	*Hyptis suaveolens* (L.) Poit.	H	Lamiaceae	M
125.	*Leucas diffusa* Benth.	H	Lamiaceae	M & E
126.	*Ocimum tenuiiflorum* L.	H	Lamiaceae	M
127.	*Cinnamomum malabatrum* (Burm.f.) Blume, Rumphia	T	Lauraceae	M & E
128.	*Cinnamomum verum* Presl, Prir.	T	Lauraceae	
129.	*Barringtonia acutangula* (L.) Gaertn.	T	Lecythidaceae	M
130.	*Aloe vera* L.	H	Liliaceae	M
131.	*Asparagus racemosus* Willd.	H	Liliaceae	M
132.	*Gloriosa superba* L.	H	Liliaceae	M
133.	*Smilax zeylanica* L.	H	Liliaceae	M
134.	*Strychnos nux- vomica* L.	T	Loganiaceae	M
135.	*Lagerstroemia speciosa* Pers.	T	Lythraceae	
136.	*Lawsonia inermis* L.	S	Lythraceae	M
137.	*Michelia chempaca* L.	T	Magnoliaceae	M
138.	*Hibiscus furcatus* Roxb.	S	Malvaceae	
139.	*Hibiscus rosa-sinensis* L.	S	Malvaceae	M
140.	*Sida acuta* Burn.	H	Malvaceae	M
141.	*Sida cordifolia* L.	H	Malvaceae	M
142.	*Taliparitiliaceum* (L.) Fryxell, contr.	T	Malvaceae	
143.	*Thespesia populnea* Sol. ex Corr.	T	Malvaceae	M
144.	*Osbeckia muralis.* Naud., Ann.	H	Melastomaceae	E
145.	*Memecylon randerianum* S. M. A. & M. R.	S	Melastomaceae	E
146.	*Melastoma malabathricum* L.	H	Melastomaceae	
147.	*Azadirachta indica* A. Juss.	T	Meliaceae	M
148.	*Naregamia alata* W&A.	H	Meliaceae	M & E
149.	*Swietenia mahagoni* Jacq.	T	Meliaceae	
150.	*Cyclea peltata* Hk. f &T.	H	Menispermaceae	
151.	*Tiliacora acuminate* Miers ex Hoof.	H	Menispermaceae	
152.	*Acacia caesia* (L.) Willd.	S	Mimosaceae	M
153.	*Adenanthera pavonina* L.	T	Mimosaceae	M
154.	*Mimosa pudica* L.	H	Mimosaceae	M
155.	*Mollugo pentaphylla* L.	H	Molluginaceae	M
156.	*Artocarpus heterophyllus* Lam.	T	Moraceae	M
157.	*Artocarpus hirsutus* Lam.	T	Moraceae	E
158.	*Ficus benghalensis* L.	T	Moraceae	
159.	*Ficus religiosa* L.	T	Moraceae	M
160.	*Artocarpus hirsutus* Lam.	T	Moraceae	
161.	*Moringa oleifera* Cam.	T	Moringaceae	M
162.	*Musa paradisiaca* L.	H	Musaceae	
163.	*Myristica fragrans* Houtt	T	Myristicaceae	M
164.	*Eucalyptus grandis* Hill ex Maid.	T	Myrtaceae	M
165.	*Psidium guajava* L.	T	Myrtaceae	M
166.	*Syzigium zeylanicum* DC.	S	Myrtaceae	
167.	*Syzygium cumini* Skeels.	T	Myrtaceae	M
168.	*Boerhavia diffusa* L.	H	Nyctaginaceae	M
169.	*Bougainvillea spectabilis* Willd.	S	Nyctaginaceae	
170.	*Mirabilis jalapa* L.	H	Nyctaginaceae	M
171.	*Ochna integerrima* (Lour) Merr.	S	Ochnaceae	
172.	*Jasminum angustifolium* (L.) Willd.	H	Oleaceae	
173.	*Ludwigia hyssopifolia* (G. Don) Exell.	H	Onagraceae	
174.	*Averrhoa bilimbi* L.	T	Oxalidaceae	M
175.	*Oxalis corniculata* L.	H	Oxalidaceae	M
176.	*Cocos nucifera* L.	T	Palmaceae	M
177.	*Passiflora foetida* L.	H	Passifloraceae	M
178.	*Piper betel* L.	H	Piperaceae	M
179.	*Piper longum.*L.	H	Piperaceae	M
180.	*Piper nigrum* L.	H	Piperaceae	M
181.	*Bambusa bambos* (L.) Voss.	H	Poaceae	
182.	*Brachiaria eruciformis* (Smith) Griseb.	H	Poaceae	
183.	*Centotheca lappacea* (L.) Desv., Nouv.	H	Poaceae	M
184.	*Chloris barbata* Sw., Fl.	H	Poaceae	
185.	*Coix lacryma-jobi* L., Sp.	H	Poaceae	
186.	*Cymbopogon citratus* (DC) Stapf.	H	Poaceae	M
187.	*Cynodon dactylon* Pers.	H	Poaceae	M
188.	*Dactyloctenium aegyptium* (L.) P. Beauv.	H	Poaceae	
189.	*Digitaria ciliaris* (Retz.) Koeler, Descr. Garm.	H	Poaceae	
190.	*Dimeria* sp.	H	Poaceae	
191.	*Echinochloa stagnina* (Retz.) P. Beauv.	H	Poaceae	
192.	*Eleusine indica* (L.) Gaertn., Fruct.	H	Poaceae	
193.	*Eragrostis tenella* (L.) P. Beauv. Ex Roem.	H	Poaceae	
194.	*Eragrostis uniloides* (Retz.) Nees ex Steud.	H	Poaceae	
195.	*Eragrotis cilianensis* (All) Vign.	H	Poaceae	
196.	*Eulalia trispicata* (Schult & Schult. f.) Henr.	H	Poaceae	
197.	*Heteropogon contortus* (L.) P. Beauv. ex Roem.	H	Poaceae	
198.	*Imperata cylindrica* (L.) Raeusch	H	Poaceae	
199.	*Ischaemum indica* L.	H	Poaceae	
200.	*Ochlandra travancorica* (Bedd.) ex Gamble, Ann. Roy.	H	Poaceae	

Continue……..

201.	*Oryza rusipogon* L.	H	Poaceae	
202.	*Panicum repens* L.	H	Poaceae	
203.	*Paspalum distichum* L.	H	Poaceae	
204.	*Perotis indica* (L.) Kuntze. Rev. Gen.	H	Poaceae	
205.	*Saccharum officinarum* L.	H	Poaceae	M
206.	*Polygonam* sp.	S	Polygonaceae	
207.	*Naravelia zeylanica* DC.	H	Ranunculaceae	M
208.	*Ziziphus oenoplia* Mill.	S	Rhamnaceae	M
209.	*Canthium angustifolium* Roxb.	S	Rubiaceae	
210.	*Chassalia curviflora* (Wall. Kurz) Thw.	S	Rubiaceae	
211.	*Coffea arabica* L.	S	Rubiaceae	M
212.	*Coffea roubasta* L.	S	Rubiaceae	
213.	*Hedyotis eualata* Henry & Subram.	S	Rubiaceae	E
214.	*Oldenlandia corymbosa* L.	H	Rubiaceae	
215.	*Oldenlandia umbellata* L.	H	Rubiaceae	M
216.	*Pavetta minor* (Hook. f.) Deb &Rout.	S	Rubiaceae	E
217.	*Spermacoce latifolia* Aubl.	H	Rubiaceae	E
218.	*Aegle marmelos* Corr.	T	Rutaceae	M
219.	*Glycosmis pentaphylla* (Retz) DC.	S	Rutaceae	M
220.	*Murraya koenigii* Spr.	S	Rutaceae	M
221.	*Ruta graveolens* L.	H	Rutaceae	M
222.	*Santalam album* L.	T	Santalaceae	M
223.	*Schleichera oleosa* (Lour.) Oken.	T	Sapindaceae	M
224.	*Chrysophyllum cainito* L.	T	Sapotaceae	
225.	*Mimusops elengi* L.	T	Sapotaceae	M
226.	*Bacopa monnieri* (L.) Pennel.	H	Scrophulariaceae	M
227.	*Lindernia rotundifolia* (L.) Alston.	H	Scrophulariaceae	
228.	*Lindernia* sp.	H	Scrophulariaceae	
229.	*Scoparia dulcis* L.	H	Scrophulariaceae	M
230.	*Datura stramonium* L.	S	Solanaceae	M
231.	*Solanum* sp.	S	Solanaceae	
232.	*Melochia corchorifolia* L.	S	Sterculiaceae	
233.	*Waltheria indica* L.	T	Sterculiaceae	
234.	*Grewia nervosa (*Lour) Panigrahi.L.	S	Tiliaceae	
235.	*Triumfetta rhomboidea* Jacq.	H	Tiliaceae	
236.	*Clerodendrum infortunatum* L.	S	Verbenaceae	
237.	*Clerodendron paniculatum* L.	S	Verbenaceae	
238.	*Lantana camara* L.	S	Verbenaceae	M
239.	*Premna mollissima* Roth.	H	Verbenaceae	
240.	*Tectona grandis* L.	T	Verbenaceae	
241.	*Vitex* negundo L.	S	Verbenaceae	M
242.	*Cissus quadrangularis* L.	H	Vitaceae	
243.	*Leea guineensis* G. Don.	S	Vitaceae	M
244.	*Leea indica* Merr.	S	Vitaceae	
245.	*Curcuma longa* L.	H	Zingiberaceae	M
246.	*Kaempferia galanga* L.	H	Zingiberaceae	M
247.	*Zingiber officinale* Rosc.	H	Zingiberaceae	M

Table 2. Endemic plant species of Western Ghats in the proposed site of International Airport, Aranmula

10	Botanical name	Family	Vernacular name
1.	*Tabernaemontana alternifolia* L.	Apocynaceae	Kunninpala, Kudalappala
2.	*Impatiens diversifolia* Wall.	Balsaminaceae	Balsm
3.	*Mallotus artrovirense* Muell. Arg.	Euphorbiaceae	
4.	*Flacourtia montana* Grah.	Flacourtiaceae	Mountain Sweet Thorn
5.	*Salacia fruticosa* Heyne ex M. Lawson.	Hippocrateaceae	Akanayakam
6.	*Leucas diffusa* Benth.	Lamiaceae	Thumba
7.	*Cinnamomum malabatrum* (Burm.f.) Blume, Rumphia	Lauraceae	Kumble
8.	*Memecylon randerianum* S. M. A. & M. R. A.	Melastomaceae	Kaasavu
9.	*Osbeckia muralis*. Naud., Ann.	Melastomaceae	Cherkulathi
10.	*Naregamia alata* W&A.	Meliaceae	
11.	*Artocarpus hirsutus* Lam.	Moraceae	Angili
12.	*Hedyotis eualata* Henry &Subram.	Rubiaceae	
13.	*Pavetta minor* (Hook. f.) Deb & Rout.	Rubiaceae	Pavettamkole
14.	*Spermacoce latifolia* Aubl.	Rubiaceae	Kauttutharavu

Table 3. RET plant species in the proposed site of International Airport, Aranmula

Sl. No.	*Botanical Name*	Family	Vernacular name	Threat status
*1.*1.	*Rauvolfia serpentina* Benth & Kurz.	Apocynaceae	Sarpa gandhi	Endangered
2.2.	*Saraca asoca* (Roxb.) W. J. de Wilde.	Caesalpiniaceae	Asokam	Vulnerable
3.3.	*Mallotus artrovirense* Muell. Arg.	Euphorbiaceae	Mallichera	Vulnerable
4.4.	*Salacia fruticosa* Heyne ex M. Lawson.	Hippocrateaceae	Akanayakam	Endangered
5.5.	*Gloriosa superba* L.	Liliaceae	Menthonni	Threatened
6.6.	*Artocarpus hirsutus* Lam.	Moraceae	Angili	Vulnerable
7.7.	*Hedyotis eualata* Henry & Subram.	Rubiaceae		Endangered
8.8.	*Aegle marmelos* Corr.	Rutaceae	Koovalam	Endangered

(Ravikumar K., D. K. Ved. 2000, IUCN 2015).

Shrubs

Shrubs are bushy plants that do not grow tall. These plants branch from the very bottom of their stem, which is mostly woody, but in some cases fleshy too. 54 species of shrubs have been identified from Aranmula (Table 1).

Medicinal Plants

Many medicinal plants are endemic to this area. Out of these, *Naregamia alata* (Vathacody), *Cissus quadrangularis* (Changalamparanda), *Cardiospermum halicacabum* (Uzhinja), and *Acorus calamus* (Vayamb) are very rich in this area. From the site, 109 species of medicinal plants were identified (Table 1).

Endemic Plants

In the present study, 14 endemic species of plants have been identified. The details of which are given in Table 2. The Flora of Pathanamthitta shows that, 260 species which form 22% of the total 1214 species (excluding alien species) are endemic (Anil Kumar et al. 2005).

RET Plants

From this area, 8 RET plant species have been identified. Out of eight species, four are endangered, three are vulnerable and one is threatened. The details of which are given in Table 3. The rarity and vulnerability of species of Pathanamthitta district showed that about 175 species are severely threatened and rare. (Anil Kumar *et al.* 2005). A similar observation was noted that, the floristic study of Shenduruny Wildlife Sanctuary, by Sasidharan (1999) reported that the sanctuary possesses several rare and threatened species.

Conclusion

Present study revealed that, over 247 plants belonging to 67 families are growing in this area. Among the 248 plants, 108 are medicinal plants, 14 are endemic species, and 8 are RET species. Quantitative studies are also essential to have a real status of plants on their distribution. The value of maintaining biodiversity is being increasingly realized by scientists all over the world and steps are being taken to conserve species and ecosystems. Global biodiversity monitoring is providing information on the number and distribution of species, enabling governments to protect areas with high levels of biodiversity and containing rare and threatened species. The present study gives an idea of existing plants in the proposed site. The habitat changes resulted in changes in the locality. This may have considerable influence in the floral and faunal composition.

Scientific investigations were carried out to find out the existing Angiosperm plants which include endangered, vulnerable and endemic plants. The new project of formation of International Airport may cause the loss of the existing flora. So steps have to be taken to conserve the threatened species existed in the area. This study gives only a small part of biodiversity study, further work is needed to find out the other existing flora and fauna.

Acknowledgement

Authors would like to thank The Principal, Department of Botany, St. Thomas College, Kozhencherry, Pathanamthitta, Kerala for providing facilities .Thanks to Prof. C.G Varghese (Rtd. Prof. St. Thomas College, Kozhencherry) for his timely advices and suggestions during plant identification. Thanks are also due to Kerala State Council for Science, Technology and Environment, for the financial support of this project.

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