RESEARCH ARTICLE JPAR 2020

Journal of Pharmaceutical Advanced Research

(An International Multidisciplinary Peer Review Open Access monthly Journal)

Available online at: www.jparonline.com

# Wetland inventory and useful plants of Coonoor, Nilgiris of the Western Ghats, Tamilnadu, India

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Received: 22.01.2020 Revised: 23.01.2020 Accepted: 28.01.2020 Published: 30.01.2020

**ABSTRACT: Background:** Floristic documentation in any particular area could reveal their importance in biodiversity conservation. **Aim:** The present study was undertaken to assess the wetland flora of Coonoor in Nilgiris, Tamil Nadu. **Methods:** The collected plant specimens were identified with the help of available floras and literature. The voucher specimens are deposited in the 'Bharati' Herbaria, Department of Botany, Bharathiar University, Coimbatore, for future references. **Results:** A total of 130 species were collected and identified during the field investigation, which belongs to 107 genera with 49 families of the present study, out of which 129 species were angiosperms and only one species represented by Pteridophyte. The study has recorded 42 plant species, which are used as herbal remedy for treatment of various diseases by the local people to face their daily health care needs. **Conclusion:** Many wetland plants were found to be endemic and endangered having many economical uses due to their medicinal properties, edibility. These are in severe threat of extinction with plants and animals. It is therefore, an urgent and almost need to record and to assess the wetland diversity and potentiality of their wetland flora of the district before they will vanish forever.

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**Keywords:** Floristic survey, Ethno-botanical uses, Wetland plants, Nilgiris, Western Ghats.

## INTRODUCTION:

Wetlands are defined as 'lands transitional between terrestrial and aquatic eco-systems [1] and they occupy 4 to 6 % of the earth's land area [2,3]. They maintain the water table relatively high and stable by retaining water during dry periods. Hence, they are referred as "Kidney of the landscape" [4]. They are one of the most productive ecosystem of world and essential life supporting systems providing a wide array of benefits.

Indian wetlands are grouped as Himalayan wetlands, Indo-Gangetic wetlands, Coastal wetlands and Deccan

wetlands. They occur in the hot arid regions of Gujarat and Rajasthan, the deltaic regions of the east and west coasts, highlands of central India, wet humid zones of south peninsular India and the Andaman and Nicobar and Lakshadweep islands. India being a leading agricultural country depends on major rivers like Ganga, Brahmaputra, Narmada, Godavari, Krishna, Kaveri and Tapti which are supported by the water supply by the wetlands [5].

The Nilgiris is home to exclusive wetlands and they are among the most important reservoirs of biodiversity that nature has meticulously crafted over millions of years, which are considered as wastelands and are neglected worldwide. So the wetland ecosystems are extensively threatened. Some studies on the Wetland plants are now available from the different phytogeographical regions of India. Earlier researches on wetland plants were done by various workers [6-15]. The present study in taxonomic survey of wetlands vegetation documents wetland species distribution and analysis, the distribution for four categories *viz* Haptophytes, Helophyte, Hyperhydate, Tenagophyte [16,17], have already documented the geographical distribution of species of South Indian hill station. Mohandass [18], also recorded the floristic distribution in Montana swamps of Nilgiris Mountains, Southern India. A review of literature clearly indicates that there is no comprehensive data on the local distribution and habit diversity of wetland species in Coonoor, Nilgiri District, Tamil Nadu and Southern India.

## MATERIALS AND METHODS:

### Study area:

Nilgiri district or Blue Mountains are some of the most picturesque mountain ranges situated in Southern India, it is located in North Western corner of Tamil Nadu, South India and the district has a geographical area of 2,543 sq. km, constituting about 1.95 % of area of Tamil Nadu state. Coonoor is situated in the state of Tamil Nadu in Southern India. It ranges between 11˚21’ Northern latitude and 76˚49’ Eastern longitude. The average annual temperature is 17.0 ˚C. The rainfall here averages 1335 mm. Rainfall is low in the month of December to February and the weather is chill and very cold. During March to May the weather is warm and hot. During June to October there is continuous heavy rain. The warmest month of the year is May with an average temperature of 19.6 ˚C. The lowest average temperature in the year occurs in January, when it is around 13.9 ˚C. The difference in precipitation between the driest month and the wettest month is 204 mm. The variation in temperatures throughout the year is 5.7 ˚C.

The major rivers flowing in Coonoor are Coonoor River, Lambs Rock River and Singara River. Coonoor River is a tributary of Bhavani River that empties into Kaveri River (Fig 3). Some of the water falls in the study area includes Catherine Falls and Malanur falls. Catherine falls is one of the beautiful tourist locations in the region that features a stream of water falling from an altitude of 250 ft.

### Methodology:

The present study was undertaken to study the wetland flora of Coonoor, Nilgiris District Southern Western Ghats of Tamil Nadu, India. Several intensive and extensive field trips were conducted, each ranging from 3 to 4 days were undertaken from 2015 to 2018 to different parts of the study area in all seasons, so as to collect the entire flowering and fruiting materials for almost all the species followed by Ariyan Sarvalingam and Arumugam Rajendran [19]. The collected plant specimens were identified with the help of available floras and literature [20-25]. The correct identity of the herbarium specimens were then confirmed by further critical study with the help of authentic specimens deposited in the Madras Herbarium (MH), of Botanical Survey of India (BSI), Southern Circle, Coimbatore. Vegetation types and many interesting plants were photographed, important observations and any other relevant field data were noted in the field itself. Suitable maps, tables, figures and Plates are given in appropriate places. The voucher specimens are deposited in the Bharati Herbaria, Department of Botany, Bharathiar University, Coimbatore, for future references.

## RESULTS AND DISCUSSION:

### Species inventory:

The present study was undertaken to assess the wetland flora of Coonoor in Nilgiris Tamil Nadu. A total of 130 species were collected and identified during the field investigation, which belongs to 107 genera with 49 families of the present study of which 129 species were angiosperms and only one species represented by pteridophyte. Dicots are dominating with 40 families and monocot with 8 families (Table 1).

Out of 49 families of which, *Asteraceae* is the most dominant family in the present study with 21 species under 19 genera followed by *Solanaceae* the second dominant family having 8 species, followed by

*Fabaceae* 7 species, *Rubiaceae*, *Lamiaceae*, *Urticaceae* and *Cyperaceae* with 4 species each, *Caryophyllaceae*, *Malvaceae*, *Rosaceae*, *Myrtaceae*, *Apiaceae*, *Scrophulariaceae*, *Verbenaceae* and *Araceae* with 3 species. Rest of the other families are represented by one or two species each (Fig 1).

Out of 12 genera represented in monocotyledons, *Arisaema* and *Cyperus* is the first dominant genera with 2 species, followed by other genera with 1 species. In pteridophyte Adiantum is single genus with single species. The life form analysis of the present study of wetland flora reveals that herbs are dominant with 71 % (9 species), followed by 12 % (16 shrubs), 10 % (14 climbers) and 7 % (9 trees). Based on the observation, herbaceous plant species are dominant vegetation in adverse condition such as climate and salinity.

The collection of plant taxa is very high at the end of October, and very less during summer [26]. In the present work wetland taxa are classified in to 4 groups on the basis of their growth forms following the concept. Out of the total species observed 36 % (46 species) were recorded as Helophyate (Hel.), 43 % (56 species) as Hyperhydate (Hyp.), 11 % (14 species) as Haptophyte (Hap.) and 10 % (13 species) as Tegnophyte (Teg.). Many of these species are not restricted only to wetlands and also to moist habitat (Fig 2).

The occurrence of the wetland species in the study area were analyzed Based on the extent distribution and frequency of occurrence, the species are categorized as common (74 %), Occasional (8 %), Scattered (6 %) and Rare (12 %). The rare taxa such are *Rosa leschenaultiana,* Wight and Arn., *Ganaphalium coarctatum,* Willd, *Exacum wightianum,* Arn., *Piper mullesua*, Buch. Ham. *ex* D.Don, *Arisaema leschenaultia,* Blume., *Cheirostylis flabellate,* (A. Rich.) Wight, *Anaphalis leptophylla* DC*, Anaphalis subdecurrens* (DC) Gamble, *Impatiens minae* Rathe, *Ophiopogon intermedius,* D.Don, and *Hydrocotyle conferta* Wt.

Total number of 130 species, the fruit types were grossly categorized into 9 types of which Achene (31) turned to be dominant, second dominant was Capsule (27), followed by others Berry (18), Pod (15), Drupe (7), Schizocarp (3), Caryopsis, Nut with (2 species) Samara and Follicle (1) each.

The present study also critically identified *Impatiens minae* Rathe species is a new record to Tamil Nadu. Out of 130 species, of which 9 species are in threatened categories were documented in the present study. Among that *Hydrocotyle cofertai*s an endangered species collected from the study area. 8 Endemic taxa are collected from the study area such are *Rosa leschenaultiana* Wight (Arn.), *Ganaphalium coarctatum* Willd, *Exacum wightianum* Arn, *Piper mullesua* Buch. (Ham. *ex* D.Don.), *Arisaema leschenaultia* Blume, *Cheirostylis flabellate* (A. Rich.) Wight, *Anaphalis leptophylla* DC, *Rubus ellipticus* Smith, *Ophiopogon intermedius* D.Don, and *Hydrocotyle coferta* Wt. Many of these plant species have immediate attention for their conservation. It is an alarming situation where endangered species require more and more attention.

**Ethno botanical Study:**

In India, rural people traditionally use about 9500 wild plants for various purposes like medicine, food, fodder, fuel, fiber and other miscellaneous purposes. The wetlands are ecologically and economically important; they provide bioresources and play important role in the decontamination of polluted water [27,28] has analyzed the river vegetation in Kerala and has enumerated the different uses of plant species of aquatic, semi-aquatic and bank species. The ethno-medicinal uses of 48 wetland plants and their conservation in South Orissa was reported [29].

Wetland plants gathering and exploitation is a common activity of indigenous people in Coonoor, Nilgiris. A total of 130 plants, among which 42 plant species are used as medicine, 15 species as edible and 8 species for miscellaneous uses (fodder, fuel, manure, fiber, ornamental and sacred purpose) (Table 2). It is clear that wetland plants are important bio-resources for local communities, particularly for medicinal purposes.

Out of 130 species, 42 plant species are used as herbal remedy for treatment of more than 20 diseases viz, Ulcer, laxative, piles, dysentery, abdominal disorder, rheumatism, inflammations, antihelminthic, poisonous bites, blood pressure, neuro disorders, bronchitis etc., 12 are used as fruit edible; 3 species *viz Oxalis latifolia* Calder, *Oxalis corniculata* L and *Solanum nigrum* non L. are used as leafy vegetables, 2 species *viz Polygonum chinensis* L., *Colocasia esculenta* (L.) Schottand *Spergula arvensis* L., shoots used for food preparation.

A total of 8 species are used for miscellaneous purpose *viz. Ipomea purpurea* Roth, *Desmodium repandum* (Vahl.) DC, *Butea monos rperma* (Lam.) Taub, *etc.,* 5 species are used for ornamental purpose *Bahunia purpurea* L., *Butea monosperma* (Lam.)Taub, *Verbena rigida*, *Cestrum elegans* Schlecht, *Duranta repens* L., *Jasminium brevilobium* A. DC., *Jasminium mesnyi*

Hance and *Salvia leucantha* Cav,2 species *Ipomea purpurea* Roth and *Desmodium repandum* (Vahl) DC, are used as cattle feed. *Pouzolzia bennetiana* Wight leaves are used as shampoo (Fig 4 to 11).

Most of the urban wetlands are seriously threatened by conversion to non-wetland purposes, encroachment of drainage, through landfill, pollution (discharge of domestic and industrial effluents, disposal of solid wastes), hydrological alteration (water withdrawal and inflow changes) and over exploitation of their natural resources resulting in loss of biodiversity and disruption in goods and services provided by wetlands. The rate of wetland loss has accelerated in recent years. Thus the wetlands are now the most threatened ecosystem of our planet. Wetlands are being discussed all round the world in matters of environment protection, pollution control, eco-restoration; biodiversity conservation *etc*. Maltby [29] also stated that wetlands support very large number and rich in diversity of plant species.

## CONCLUSION:

Though the wetland areas of India are rich repositories of various wealth, much work has not been undertaken to identify the potentiality of them. Most of the areas have been converted as agricultural fields and Industrial areas. They are in severe threat of extinction. The present work emphasize the usefulness of the aquatic plant wealth which in turn may form another criteria to conserve the delicate ecosystem considering the service they provide to the mankind. Hence there is an urge to assess, the wetland diversity and potentiality of the wetland species and community interest in the conservation of biodiversity before they will vanish forever.

## ACKNOWLEDGEMENTS:

We are grateful to the local peoples of Coonoor, for the cooperation and sharing valuable information during the field trips and also to the Professor and Head, Department of Botany, Bharathiar University, Coimbatore for giving necessary facilities for our research work.

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**Table 1: List of wetland plants of Coonoor regions.**

| Binomial Name | Family | Habit | Habitat | Occurrence |
|---|---|---|---|---|
| *Abutilon indicum* (L.) Sweet | *Malvaceae* | Shrub | Hel. | Common |
| *Acacia mearnsii* De Wild. | *Mimosaceae* | Tree | Hel. | Common |
| *Achyranthes bidentata* Blume | *Amaranthaceae* | Herb | Hyp. | Common |
| *Acmella clava* (DC.) Hook | *Asteraceae* | Herb | Hyp. | Occasional |
| *Adenostemma lavenia* (L.)Kuntze | *Asteraceae* | Herb | Hyp. | Common |
| *Adiantum raddianum* C. | *Adiantaceae* | Herb | Hel. | Common |
| *Ageratina adenophora* (Spreng.) R. King & H. Robinson | *Asteraceae* | Herb | Hyp. | Common |
| *Ageratum conyzoides* L. | *Asteraceae* | Herb | Hel. | Common |
| *Anaphalis leptophylla* DC. | *Asteraceae* | Herb | Hel. | Rare |
| *Anaphalis subdecurrens* (DC.) Gamble | *Asteraceae* | Herb | Hel. | Rare |
| *Annona squamosa* L. | *Annonacea* | Tree | Hel | Common |
| *Argyreia hirsute* Wight &Arn. | *Convolvulaceae* | Climber | Hel. | Common |
| *Arisaema leschenaultii* Blume | *Araceae* | Herb | Hap. | Rare |
| *Arisaema tortuosum* (Wall) Schot. | *Araceae* | Herb | Hyp. | Common |
| *Artemisia nilagirica* (Clarke) Pamp. | *Asteraceae* | Herb | Hyp. | Common |
| *Asclepias curassavica* L. | *Asclepidaceae* | Herb | Hel. | Common |
| *Bauhinia purpurea* L. | *Caesalpinaceae* | Tree | Hel. | Common |
| *Biophytum intermedium* Wight. | *Oxalidaceae* | Herb | Teg. | Occasional |
| *Brassica juncea* (L.) Coss. | *Brassicaceae* | Herb | Hel. | Common |
| *Butea monosperma* (Lam.) Taub. | *Fabaceae* | Tree | Hyp. | Common |
| *Cajanus rugosus* (W. &A.) Maesen | *Fabaceae* | Herb | Hel. | Common |
| *Cajanus trinervius* (DC). Maesen | *Fabaceae* | Herb | Hel. | Common |
| *Calceolaria gracilis* Kunth. | *Scrophulariaceae* | Herb | Hel. | Common |
| *Capsella bursa-pastoris* Moench. | *Brassicaceae* | Herb | Teg. | Common |
| *Cardamine africana* L. | *Brassicaceae* | Herb | Hyp. | Common |
| *Cardiospermum halicacabum* L. | *Sapindaceae* | Climber | Hyp. | Common |
| *Centella asiatica* (L.) Urban. | *Apiaceae* | Herb | Hyp. | Common |
| *Cerastium indicum* Wight & Arn. | *Caryophyllaceae* | Herb | Hel. | Common |
| *Cestrum aurantiacum* Lind | *Solanaceae* | Shrub | Teg. | Common |
| *Cestrum elegans* Schlecht | *Solanaceae* | Shrub | Hyp. | Common |
| *Chassalia curviflora* Wall. *ex* Kurz. | *Rubiaceae* | H erb | Teg. | Scattered |
| *Cheirostylis flabellate* (A. Rich) Wight | *Orchidaceae* | Herb | Hap. | Rare |
| *Chloris barbata* Sw. | *Poaceae* | Herb | Hyp. | Common |
| *Cirsium wallichii* DC. | *Asteraceae* | Herb | Hel. | Common |
| *Colocasia esculenta* (L.) Schott | *Araceae* | Herb | Hyp. | Common |
| *Conyza bonariensis* (L.)Cronq. | *Asteraceae* | Herb | Hel. | Common |
| *Coronopus didymus* (L.)Smith | *Brassicaceae* | Herb | Hel. | Common |
| *Cotula australis* (Sieb. *ex*Spreng.) Hook. | *Asteraceae* | Herb | Hel. | Common |
| *Crassocephalum crepidioides* (Benth.) S. Moore | *Asteraceae* | Herb | Hel. | Common |
| *Crotalaria scabrella* Wight & Arn. | *Fabaceae* | Shrub | Teg. | Common |
| *Crotalaria semperflorens*Vent. | *Fabaceae* | Shrub | Hap. | Scattered |
| *Cyanotis arachnoidea* Clarke. | *Commelinaceae* | Herb | Hyp. | Common |
| *Cynoglossum zeylanicum* (Vahl. *ex* Hornem.) Clarke. | *Boraginaceae* | Herb | Hel. | Common |
| *Cyperus brevifolius* (Rottb.) Haask | *Cyperaceae* | Herb | Hyp. | Common |
| *Cyperus rotundus* L. | *Cyperaceae* | Shrub | Hyp. | Common |
| *Dahlia imperialis* Roezl. | *Asteraceae* | Shrub | Hyp. | Common |
| *Desmodium repandum* (Vahl) DC. | *Fabaceae* | Herb | Hyp. | Occasional |
| *Dichrocephala integrifolia* (L.f.) O. Ktze. | *Asteraceae* | Shrub | Hyp. | Common |
| *Dodonaea angustifolia* L. | *Sapindaceae* | Herb | Hel. | Common |

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|---|---|---|---|---|
| *Droguetia iners* (Forssk.) Schweinf. | *Urticaceae* | Herb | Hel. | Common |
| *Drymaria cordata* (L.) Willd *ex* Roem. &Schult | *Caryophyllaceae* | Shrub | Hyp. | Common |
| *Duranta repens* L. | *Verbenaceae* | Tree | Hel. | Common |
| *Elaeocarpus munronii* (Wight) Mast. | *Elaeocarpaceae* | Tree | Hyp. | Common |
| *Elaeocarpus oblongus* Gaertn. | *Elaeocarpaceae* | Herb | Hel. | Rare |
| *Emilia ramulosa* Gamble | *Asteracea* | Herb | Hel. | Common |
| *Emilia sonchifolia* (L.) | *Asteracea* | Herb | Hyp. | Common |
| *Erigeron karvinskianus* DC. | *Asteracea* | Tree | Hap. | Common |
| *Eucalyptus globules* Labill. | *Myrtaceae* | Herb | Teg. | Common |
| *Euphorbia heterophylla* L. | *Euphorbiaceae* | Herb | Hap. | Scattered |
| *Exacum wightianum* Arn. | *Gentianaceae* | Tree | Hap. | Rare |
| *Ficus laevis* Blume | *Moraceae* | Climber | Hyp. | Rare |
| *Galinsoga parviflora* Cav. | *Asteraceae* | Herb | Hyp. | Common |
| *Gnaphalium coarctatum* Willd. | *Asteraceae* | Herb | Hel. | Common |
| *Hedychiums picatum* Var. Khasianum Clarke *ex* Baker. | *Zingiberaceae* | Shrub | Hyp. | Common |
| *Hydnocarpus alpine* Wt. | *Flacourtiaceae* | Herb | Hel. | Common |
| *Hydrocotyle conferta* Wt. | *Apiaceae* | Herb | Hyp. | Rare |
| *Hydrocotyle javanica* Thumb. | *Apiaceae* | Herb | Hyp. | Common |
| *Impatiens latifolia* L. | *Balsaminaceae* | Herb | Hyp. | Occasional |
| *Impatiens minea* Ratheesh**.** | *Balsaminaceae* | Climber | Hap. | Occasional |
| *Ipomoea purpurea* (L.) Roth. | *Convolvulaceae* | Shrub | Hel. | Common |
| *Jasminum brevilobum* A.DC. | *Oleaceae* | Shrub | Hap. | Rare |
| *Jasminum mesnyi* Hance, | *Oleaceae* | Herb | Hel. | Common |
| *Justicia japonica* Thunb. | *Acanthaceae* | Herb | Hyp. | Common |
| *Knoxia sumatrensis* (Retz.)DC. | *Rubiaceae* | Herb | Hyp. | Common |
| *Kyllinga melanosperma* Nees. | *Cyperaceae* | Herb | Hyp. | Occasional |
| *Lantana camera* L. | *Verbenaceae* | Herb | Teg. | Common |
| *Leucas aspera* (Willd.) Spreng. | *Lamiaceae* | Herb | Hyp. | Common |
| *Leucas biflora* (Vahl.) R. Br. | *Lamiaceae* | Herb | Hel. | Common |
| *Mimosa pudica* L. | *Mimosaceae* | Herb | Hel. | Scattered |
| *Oenothera rosea* L. | *Onagraceae* | Herb | Hap. | Common |
| *Ophiopogon intermedius* D.Don | *Haemodoraceae* | Herb | Hel. | Rare |
| *Ophiorrhiza mungos* L. | *Rubiaceae* | Herb | Hyp. | Scattered |
| *Oplismenus composites* (L) P. Beauv | *Poaceae* | Herb | Hel. | Common |
| *Opuntia striata* Haw. | *Cactaceae* | Shrub | Hel. | Common |
| *Osbeckia aspera* Blume | *Melastomataceae* | Shrub | Teg. | Common |
| *Oxalis corniculata* L. | *Oxalidaceae* | Herb | Hyp. | Common |
| *Oxalis latifolia* Calder | *Oxalidaceae* | Herb | Hap. | Common |
| *Oxalis triangularis* A.St. Hil | *Oxalidaceae* | Herb | Teg. | Rare |
| *Peperomia tetraphylla* (G.Forst) Hook. and Arn. | *Piperaceae* | Herb | Hap. | Common |
| *Persicaria nepalensis* Meisner | *Polygonaceae* | Herb | Hyp. | Common |
| *Physalis peruviana* L. | *Solanaceae* | Herb | Hyp. | Common |
| *Phytolacca octandra* L. | *Phytolacaceae* | Herb | Teg. | Common |
| *Pilea melastomoides* (Pior.) Blume | *Urticaceae* | Herb | Hel. | Common |
| *Piper mullesua* Buch.-Ham ex D.Don | *Piperaceae* | Climber | Hyp. | Rare |
| *Plantago asiatica* L. | *Plantaginaceae* | Herb | Hyp. | Common |
| *Pogostemon benghalensis* (Burm.f.) O.Ktze. | *Lamiaceae* | Herb | Hyp. | Rare |
| *Polygonum chinensis* L. | *Polygonaceae* | Shrub | Hyp. | Common |
| *Polygonum glabrum* Willd | *Polygonaceae* | Herb | Hap. | Occasional |

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|---|---|---|---|---|
| *Polygonum hydropiper* L. | *Polygonaceae* | Herb | Hyp. | Occasional |
| *Portulaca oleracea* L. var. *oleracea* | *Portulacaceae* | Herb | Hap. | Common |
| *Pouzolzia bennettiana* Wight | *Urticaceae* | Herb | Hyp. | Common |
| *Pouzolzia wightii* Bennett | *Urticaceae* | Herb | Hyp. | Common |
| *Rhodomyrtus tomentosa* (Ait.) Hassk. | *Myrtaceae* | Shrub | Teg. | Common |
| *Rosa leschenaultiana* Red. & Thory *ex* Wight & Arn. | *Rosaceae* | Climber | Hyp. | Rare |
| *Rubia cordifolia* L. | *Rubiaceae* | Herb | Hyp. | Rare |
| *Rubus ellipticus* Smith. | *Rosaceae* | Climber | Hyp. | Common |
| *Rubus niveus* Thumb. | *Rosaceae* | Climber | Hyp. | Common |
| *Rumex nepalense* Spreng. | *Polygonaceae* | Herb | Hyp. | Common |
| *Salvia leucantha* Cav. | *Lamiaceae* | Herb | Hyp. | Common |
| *Bidens pilosa* L. | *Asteraceae* | Herb | Hel. | Common |
| *Schoenoplectus articulatus* (L.) Palla | *Cyperaceae* | Herb | Hyp. | Occasional |
| *Siegesbeckia orientalis* L. | *Asteraceae* | Herb | Hyp. | Common |
| *Sida rhomboidea* Roxb *ex* Fleming | *Malvaceae* | Herb | Hel. | Common |
| *Smilax aspera* L. | *Liliaceae* | Herb | Hel. | Common |
| *Solanum erianthum* D.Don | *Solanaceae* | Shrub | Hap. | Common |
| *Solanum mauritianum* Scop. | *Solanaceae* | Shrub | Hyp. | Common |
| *Solanum nigrum* L. | *Solanaceae* | Herb | Hyp. | Common |
| *Solanum sisymbrifolium* Roxb. | *Solanaceae* | Shrub | Hel. | Common |
| *Solanum virginianum* L. | *Solanaceae* | Shrub | Teg. | Common |
| *Spergula arvensis* L. | *Caryophyllaceae* | Herb | Hyp. | Occasional |
| *Syzygium cumini* (L.) Skeels | *Myrtaceae* | Tree | Teg. | Common |
| *Thumbergia alata* Boj. *ex* Sims | *Acanthaceae* | Climber | Hel. | Common |
| *Thunbergia tomentosa,*Wall *ex* Nees | *Acanthaceae* | Climber | Hel. | Rare |
| *Tithonia diversifolia* (Hemsl.) A. Gray | *Asteraceae* | Shrub | Hel. | Common |
| *Trifolium repens* L. | *Fabaceae* | Herb | Hyp. | Common |
| *Urena lobata* L. | *Malvaceae* | Shrub | Hel. | Scattered |
| *Verbascum thapsus* L. | *Scrophulariaceae* | Herb | Hel. | Scattered |
| *Verbena rigida* Sprengel | *Verbenaceae* | Herb | Hel. | Common |
| *Veronica polita* L. | *Scrophulariaceae* | Herb | Hyp. | Common |
| *Viola serpens* Wall. *ex*Ging | *Violaceae* | Herb | Hyp. | Rare |

**Table 2. Ethnobotanical uses of wetland plants.**

| Binomial Name | Family | Uses | Useful part (s) | Methods of uses |
|---|---|---|---|---|
| *Abutilon indicum* (L.) Sweet (Thutti) | *Malvaceae* | Medicinal | Leaves, Bark and Seed | Intake of leaf decoction cures ulcer. Bark astringents and diuretics. Seed used as laxative |
| *Achyranthes bidentata* Blume (Segapunaiuruvi) | *Amaranth-aceae* | Medicinal | Whole plant | Whole plant is used leaf decoction reduce fever. Decoction of whole plant is used as laxative; it cures piles, dysentery, and abdomen itching and abdomen pain. |
| *Acmella clava* (DC.) R.K. Jansen (Pal vali poo) | *Asteraceae* | Medicinal | Flower | Chewing flower cures tooth ache. |
| *Ageratum conyzoides* L. | *Asteraceae* | Medicinal | Leaves | Leaf tonic is used to treat rheumatism. |
| *Annona squamosa* L. (Seetha) | *Annonaceae* | Edible and medicinal | Fruits and Seed | Fruit used as raw edible. Seed powder is applied on hair to remove lies. |
| *Arisaema leschenaultia* Blume (Pambuchedi) | *Araceae* | Medicinal | Whole plant | Whole plant is used as antiseptic in buffaloes; Decoction used to treat urinary disease, piles and hemorrhoids, round worm. |

| | | | | |
|---|---|---|---|---|
| *Arisaema tortuosum* (Wall) Schott. (Kai viri) | *Araceae* | Medicinal | Rhizome | Used as vermifuge in cattle's applied on wounds to kill parasites. Dried powdered tubers applied to snake bite. |
| *Artemisia nilagirica* (C.B.Clarke) Pamp | *Asteraceae* | Medicinal | Leaves | Used as hair tonic, Leaf juice is given orally to cure asthmatic eruption. |
| *Asclepias curassavica* L. (Pal chedi) | *Asclepid-aceae* | Medicinal | Latex | The latex is applied on inflammations caused by insect bite. |
| *Bauhinia purpurea* L. (Poo maram) | *Caesalpin-aceae* | Medicinal | Bark, Flower and Roots | Bark, roots and flowers mixed decoctions are used to treat ulcer, wounds, swollen glands and stomach tumors. |
| *Biden sepilosa* L. (ThathaThalavetti) | *Asteraceae* | Medicinal | Leaves | Crushed leaves are applied on wounds. |
| *Biophytum intermedium* Wight. (Marunthuchedi) | *Oxalid-aceae* | Medicinal | Stem | Stem extract are taken it cures Stomach disorders, inflammations, wounds, tumors, burns and urinary calculi. |
| *Brassica juncea* (L.) Cosson (Kadugu) | *Brassic-aceae* | Medicinal | Leaves | Leaves decoction is consumed for 21 days to cure liver problems Hepatoprotective activity. |
| *Butea monosperma* (Lam.) Taub. (Nerupu poo maram) | *Fabaceae* | Medicinal | Flowers | Flowers are used as drug in eye disease and chronic fever. |
| *Cardamine africana* L. (Kattukadugu) | *Brassic-aceae* | Medicinal | Leaves Flowers | Leaves and flower extracts are used to cure Psoriasis. |
| *Cardiospermum halicacabum* L. (Mudakayhan) | *Sapind-aceae* | Medicinal | Whole plant | The plant is dried powered and used in pepper water regularly to reduce joint pains and strengthen the bones. |
| *Centella asiatica* (L.) Urban (Vallaria) | *Apiaceae* | Misce-llaneous | Leaf | Leaves used as neuro stimulant, leaf is boiled in water, consumed to promote bowel movement. |
| *Cestrum elegans* Schlecht. (Velli poo) | *Solanaceae* | Ornamental | Whole plant | Used as ornamental purpose |
| *Colocasia esculenta* (L.) Schott. (Chemai) | *Araceae* | Edible | Leaves | Cooked leaves are and consumed as greens. |
| *Cynoglossum zeylanicum* (Vahl) Thunb *ex* Lehm | *Boragin-aceae* | Medicinal | Leaves | Leaf paste applied on inflammation for 3 days. |
| *Desmodium repandum* (Vahl) DC. (Pal vidai) | *Fabaceae* | Misce-llaneous | Whole plant | Whole plant is used as feed for cattle |
| *Dodonea angustifolia* L. (Vellari) | *Sapindaceae* | Medicinal | Leaves Bark | Fresh leaves used as bone fractures. |
| *Drymaria cordata* (L) Willd. (Thara poo) | *Caryophyll-aceae* | Medicinal | Whole plant | Whole plant juice is given as laxative, appetizer and stimulant. |
| *Duranta repens* L. ( Ela veli) | *Verben-aceae* | Misce-llaneous | Whole plant | Used as hedge plant. |
| *Elaeocarpus munroii* Mast. (Narebikki) | *Elaeocarp-aceae* | Edible | Fruit | Fruit used as edible and sour taste avoids giddiness. |
| *Elaeocarpus oblongus* Gaertn | *Elaeocarp-aceae* | Edible | Fruit Seed | Nut used as eaten. |
| *Emilia ramulosa* Gamble (Tha poo) | *Asteracea* | Medicinal | Root | Root decoction cure worm infection. |
| *Emilia sonchifolia* (L.) DC *ex* Wight | *Asteracea* | Medicinal | Whole plant | Decoction of the whole plants used remedy to eye, ear complaints, and Treat |

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|---|---|---|---|---|
| (Kala chedi) | | | | bronchitis. |
| *Erigeron canadensis* DC. (Kalpidari) | *Asteracea* | Medicinal | Stem Leaves | Stem and Leaves powdered and used as insect repellent. |
| *Eucalyptus globules* Labill. (Thailamaram) | *Myrtaceae* | Medicinal | Leaves | Leaves are boiled in water and taken bath, it reduce body ache, and the vapor are inhaled to get rid of cold. |
| *Euphorbia heterophylla* L. (Pal chedi) | *Euphorbi-aceae* | Medicinal | Leaf | Dried leaf powder is taken as a purgative and laxative to treat stomach-ache and constipation. |
| *Gnaphalium coarctatum* Willd. | *Asteracea* | Medicinal | Whole plant | Whole plant these help to cure worm infection in buffalos. |
| *Hedychium spicatum* Car. (Kattuenju) | *Zingiber-aceae* | Medicinal | Leaves | Leaf ash is applied on fore head to cure head ache and removes water in head. |
| *Hydrocotyle javanica* Thumb. (Peru vallari) | *Apiaceae* | Medicinal | Leaves | Leaves decoction acts as blood purifier, indigestion, cures dysentery. |
| *Ipomoea purpurea* Roth. (Pal kodi) | *Convolvul-aceae* | Misce-llaneous | Whole plant | The whole plant is taken to feed cattle, which yield more milk |
| *Jasminum brevilobum* A.DC. (Kattumulla) | *Oleaceae* | Ornam-ental | Flower | Used as ornamental purpose |
| *Jasminum mesnyi* Hance. (Manjalmalli) | *Oleaceae* | Misce-llaneous | Whole plant | Used as hedges and these avoid water run of in slopes. |
| *Lantana camera* L. (Unnichedi) | *Verbena-ceae* | Medicinal | Stem | Stems are cut boiled in water and massaged to cure body pain. |
| *Leucas biflora* (Vahl.) Sm. (Mala thumba) | *Lamiaceae* | Medicinal | Whole plant | Used as anti-venom for snake bite and the plant is boiled in water which is used for cleaning cattle. |
| *Leucas aspera* Willd. (Thumba) | *Lamiaceae* | Medicinal | Leaves | The leaf juice 1-2 drops are dropped in nose to cure one side head ache. |
| *Opuntia stricta* (Haw.) Haw (Kallichedi) | *Cactaceae* | Misce-llaneous | Fruits and Latex | Fruits edible, Latex is applied on the skin to remove thorns |
| *Oxalis corniculata* L. (Puliyankeerai) | *Oxalidaceae* | Edible | Leaves | Leaves are edible sour taste. |
| *Oxalis latifolia* Kunth. (Puliyankeerai) | *Oxalidaceae* | Misce-llaneous | Leaves | Leaves used as edible, Tubers are consumed. |
| *Peperomia tetraphylla* (G.Forst) Hook (Mara ottu) | *Piperaceae* | Medicinal | Whole plant | Used as tonic to cure kidney disorder. |
| *Persicaria chinensis* (L.)Nakal (Kaka karumbu) | *Polygona-ceae* | Medicinal | Stem Leaves | Stem juice cures stomach ache, Flower juice is used to treat eye disease |
| *Persicaria nepalensis* (Meisner) Gross (Neervadicu) | *Polygona-ceae* | Medicinal | Leaves | Leaves are applied on head to cure head ache. |
| *Physalis peruviana* L. (Tholthakali) | *Solanaceae* | Edible | Fruit | Fruits used as raw edible |
| *Pilea melastomoides* (Poir) Wedd | *Urticaceae* | Edible | Leaves | Young leaves are used as curry preparation. |
| *Plantago asiatica* L. (Neerurungi) | *Plantagi-naceae* | Medicinal | Leaves | The Leaves are taken tied on swollen wounds overnight it removes the water in the inflammation. |
| *Pogostemon benghalensis* (Burm.f.) (Kttuthulasi) | *Lamiaceae* | Medicinal | Leaves | The oil is extracted used for joint pains. |
| *Pouzolzia bennettiana* | *Urticaceae* | Misce- | Leaves | Leaves used as shampoo. |

| Wight | | llaneous | | |
|---|---|---|---|---|
| *Rhodomyrtus tomentosa* Wt. | *Myrtaceae* | Edible | Fruit | Fruits used as edible |
| *Rubia cordifolia* L. (Nanjuvirati) | *Rubiaceae* | Medicinal | Leaves | Leaves are made into paste and applied on wounds for scorpion bite. |
| *Rubus ellipticus* Smith (Mullupalam) | *Rosaceae* | Edible | Fruit | Fruits are edible rich in vitamins given to pregnant women. |
| *Rubus niveus* Thumb (Vellimulluchedi) | *Rosaceae* | Edible | Fruits Shoot | Fruits and Tender shoots are used as edible. |
| *Rumex nepalense* Spreng | *Polygon-aceae* | Medicinal | Root | Root is used as purgative, tender leaves are cooked and consumed. |
| *Salvia leucantha* Cav. | *Lamiaceae* | Orna-mental | Whole plant | Used as ornamental purpose |
| *Solanum mauritianum* Scop. (Kattupoyala) | *Solanaceae* | Edible | Fruits | Fruits are eaten by birds when properly ripened. |
| *Solanum nigrum* L. (Manathakali) | *Solanaceae* | Medicinal | Whole plant | Whole plant is consumed-Leaves cure stomach and mouth ulcers, reduce fever. |
| *Solanum sisymbriifolium* Lam (Mulluthakali) | *Solanaceae* | Edible | Fruit | Fruits used as edible |
| *Solanum virginianum* L. (Sunda) | *Solanaceae* | Edible | Fruit | Fruit edible used in cooking curries. |
| *Spergula arvensis* L. (Dadikeerai) | *Caryop-hyllaceae* | Edible | Shoot | Plant is edible cooked and consumed. |
| *Syzygium cumini* (L.) Skeels (Naval) | *Myrtaceae* | Edible and Medicinal | Fruits Seeds | Fruits edible, Seed dried powered taken regularly to control diabetics. |
| *Thumbergia alata* Bojer (Katu poo kodi) | *Acanthaceae* | Medicinal | Leaf | Leaves paste is used to treat Skin disorder. |
| *Thunbergia tomentosa* Wall. (Vellikodi) | *Acanthaceae* | Medicinal | Leaf | Leaf paste used to cure boils. |
| *Urena lobata* L. (Kayuruchedi) | *Malvaceae* | Medicinal | Stem | Fibers are obtained from the stem. |
| *Verbena rigida* Spreng | *Verbena-ceae* | Orna-mental | Flowers | Used as ornamental. |
| *Veronica polita* L. | *Scrophu-lariaceae* | Medicinal | Leaf | Leaf is grinded and the paste is applied on leech bite to avoid itching. |

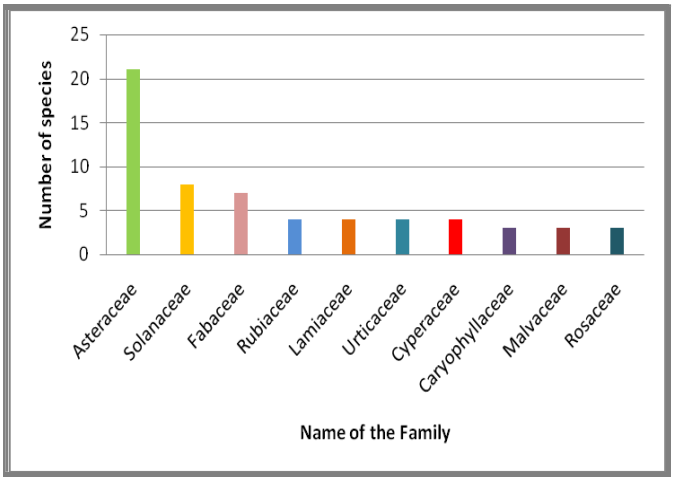


**Fig 1. Analysis of the dominant families from the present study.**

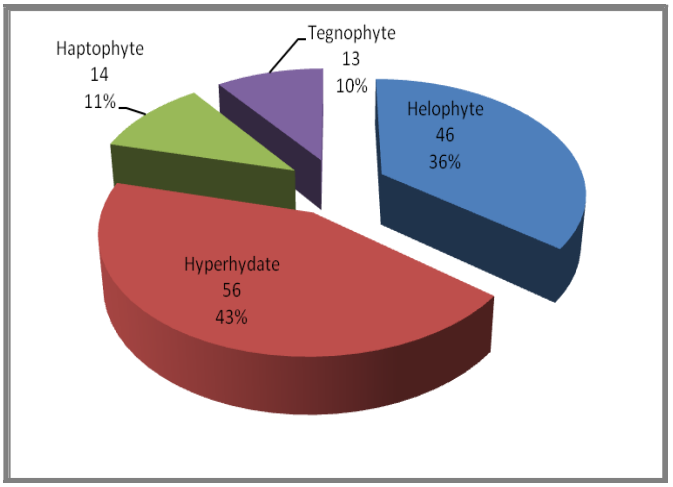


**Fig 2. Analysis of wetland categories of the present study area.**

Darlington bridge swamp

Karanci Water

Lambs rock river

Malanur falls

Sims park river

Singara river

**Fig 3. Vegetation types of Study area (Plate 1).**

## Plate 2

A. *Cardamine africana* L.

B. *Drymaria cordata*, Willd

C. *Viola serpens* Wall

D. *Spergula arvensis* L.

E. *Portulaca oleracea* L.

F. *Abutilon indicum* (L.) Sweet

**Fig 4. Vegetation types of Study area (Plate 2).**

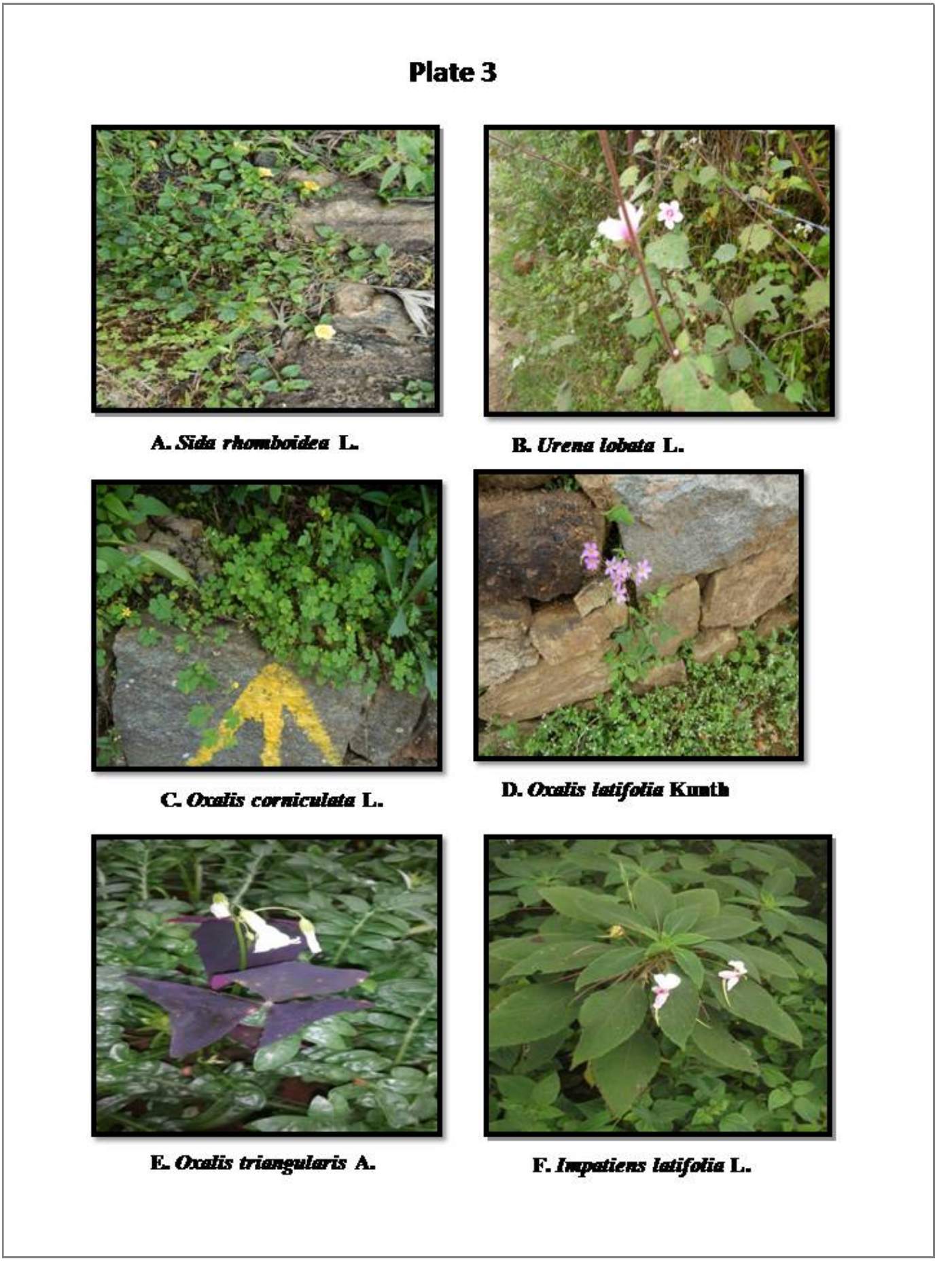


**Fig 5. Vegetation types of Study area (Plate 3).**

**Plate 4**

A. *Impatiens minae* Rathe.

B. *Dodonaea viscosa* L.

C. *Bauhinia purpurea* L.

D. *Crotalaria scabrella* W. & A.

E .*Crotalaria semperflorens* Vent.

F .Desmodium repandum (Vahl.) DC

**Fig 6. Vegetation types of Study area (Plate 4).**

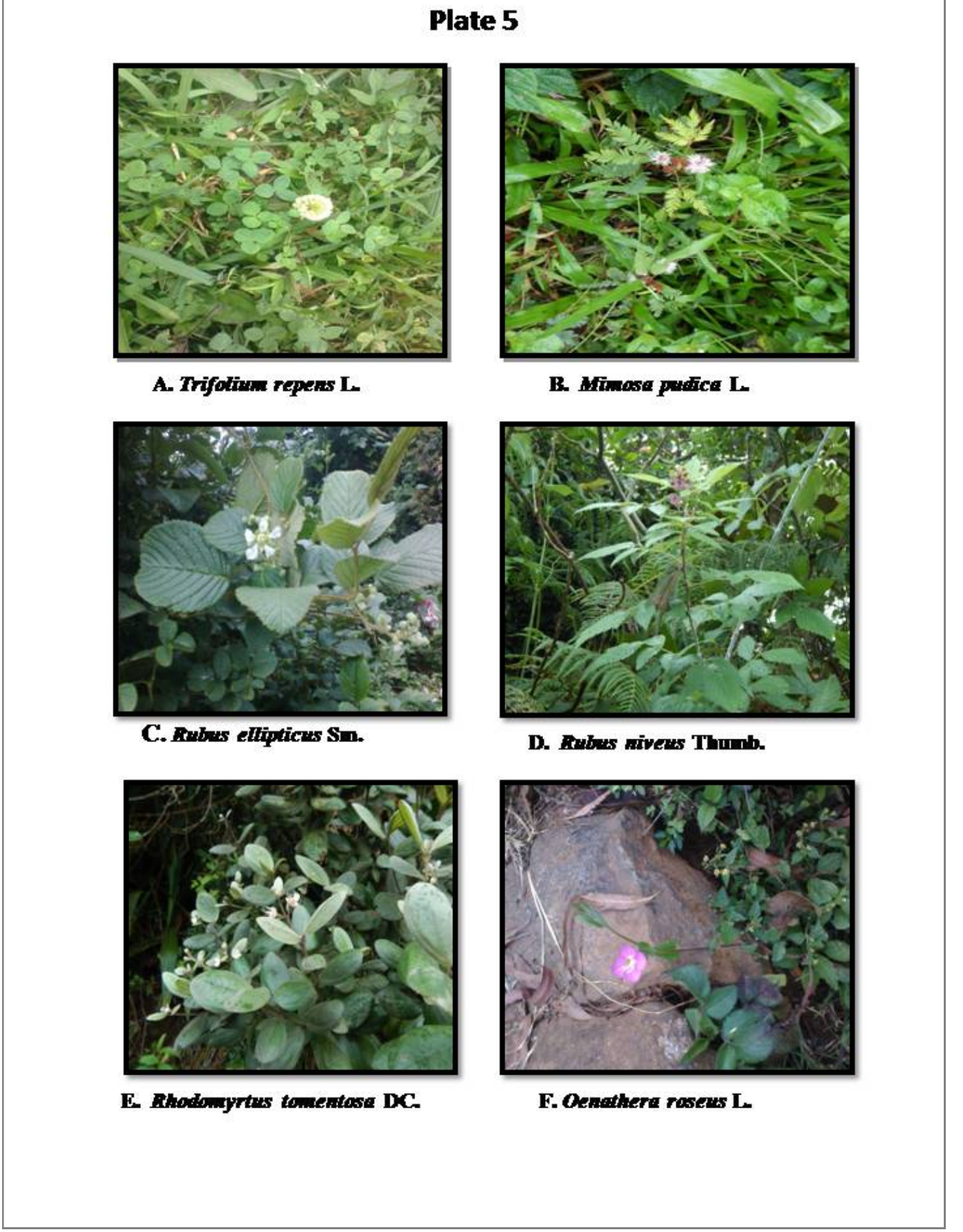


**Fig 7. Vegetation types of Study area (Plate 5).**

**Plate 6**

A. *Hydrocotyle conferta* W.

B. *Hydrocotyle javanica* Thumb.

C. *Chasalia curviflora* Thw.

D. *Knoxia sumarentensis*

E. *Ophiorrhiza mungos* L.

F. *Rubia cordifolia* L.

**Fig 8. Vegetation types of Study area (Plate 6).**

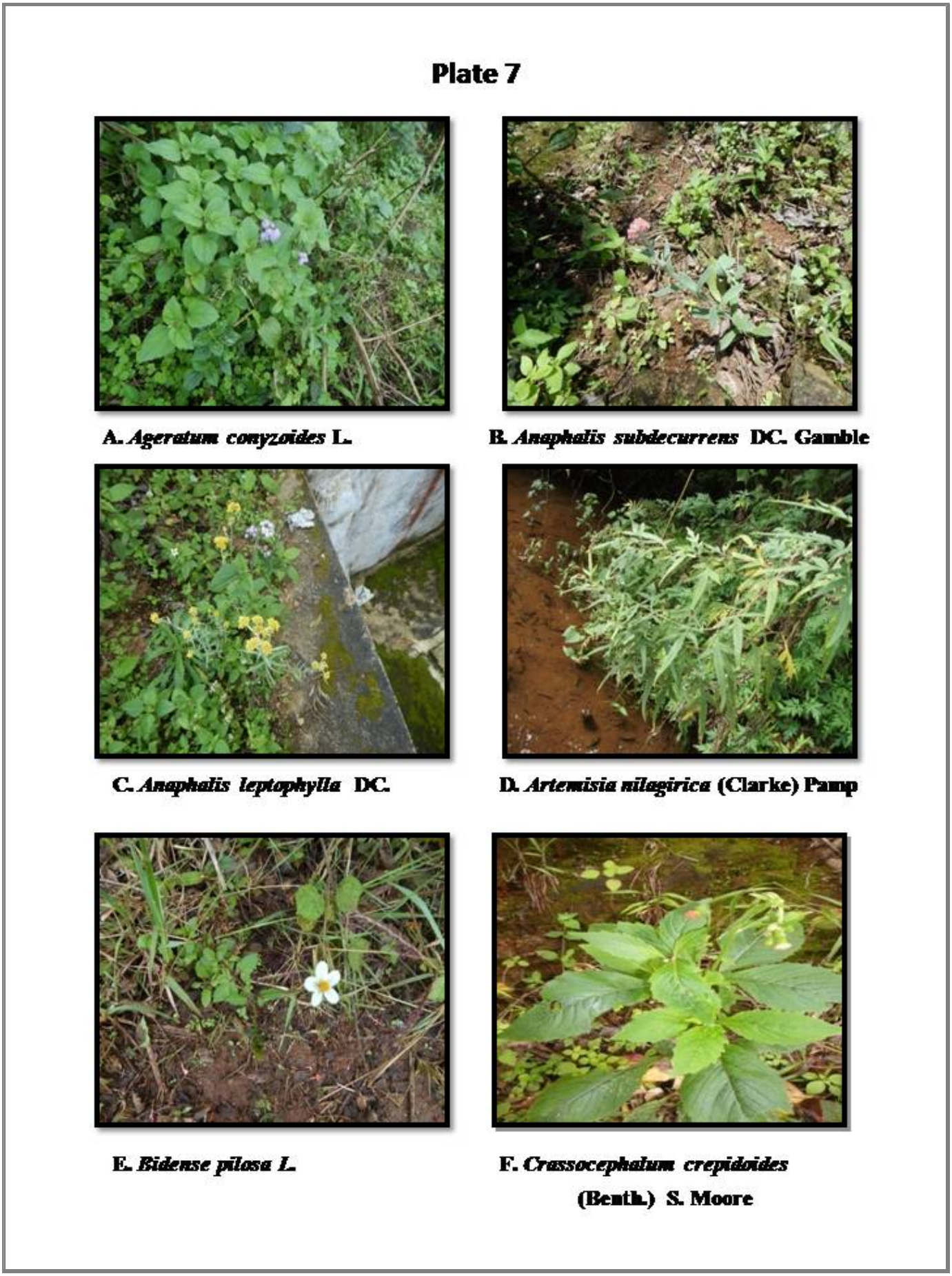


**Fig 9. Vegetation types of Study area (Plate 7).**

## Plate 8

A. *Dichrocephala intergrifolia* (L.F.) O. Ktze

B. *Emilia sonchifolia* L.

C. *Erigeron karvinskianus* DC.

D. *Ganaphalium coarctatum* Willd

E. *Siegesbeckia orientalis* L.

F. *Spilanthes clava* (DC.) Hook

Fig 10. Vegetation types of Study area (Plate 8).

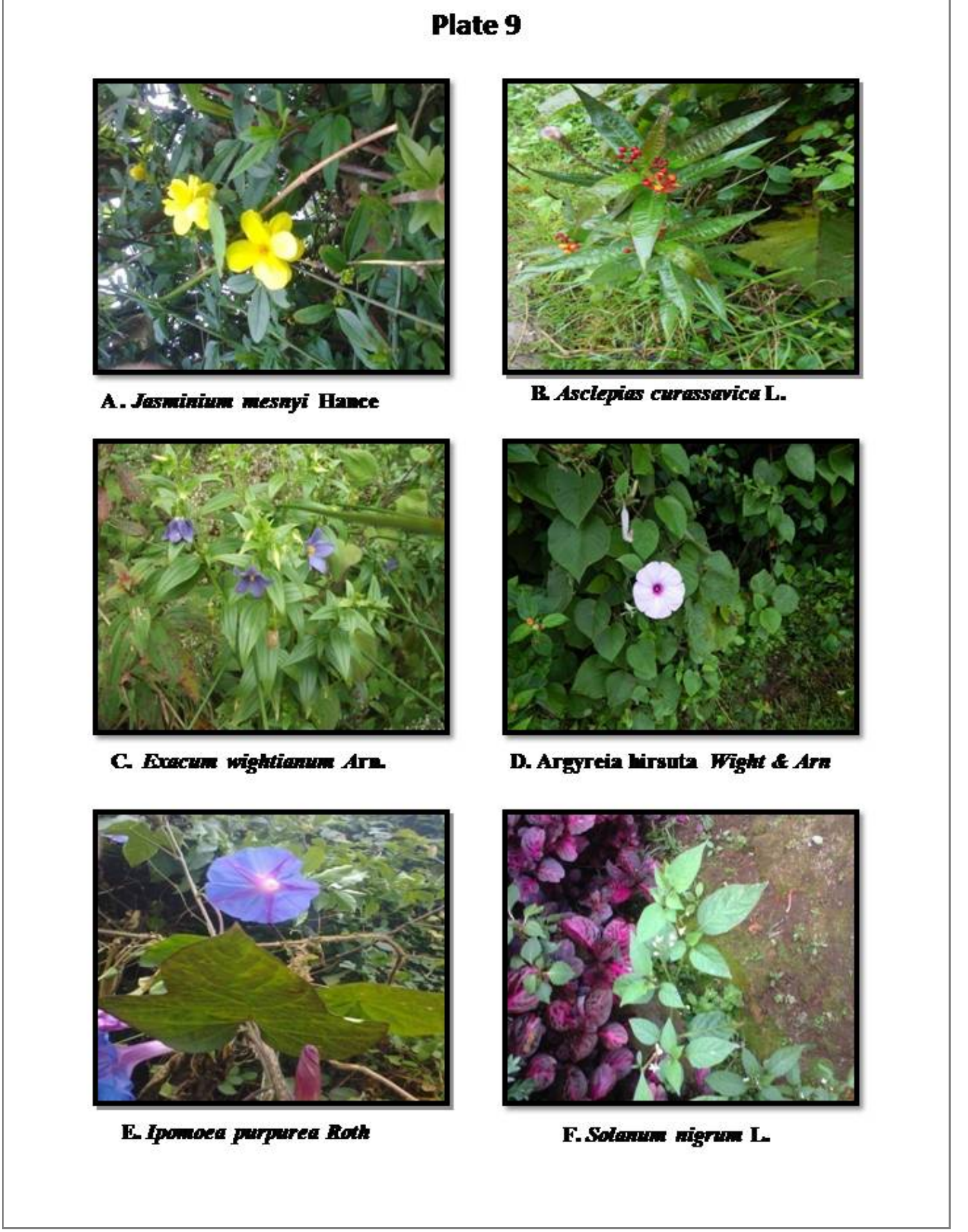


**Fig 11. Vegetation types of Study area (Plate 9).**

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**Conflict of Interest:** None
**Source of Funding:** Nil
**Paper Citation:** Bharathi GD, Rajendran A, Sarvalingam A*, Thomas B. Wetland inventory and useful plants of Coonoor, Nilgiris of the Western ghats, Tamil nadu, India. J Pharm Adv Res, 2020; 3(1): 767-786.