

A STUDY ON THE TREE AND SHRUB DIVERSITY IN THE CAMPUS OF THE
FERTILIZERS AND CHEMICALS TRAVANCORE LIMITED (FACT), COCHIN
DIVISION

A dissertation Submitted to

MAHATMA GANDHI UNIVERSITY
KOTTAYAM-682562

For the award of the degree of
MASTER OF PHILOSOPHY

IN

SCIENCE (BOTANY)

By

MINU JOSE

Reg. No: SMP21BOT001



DEPARTMENT OF BOTANY AND CENTRE FOR RESEARCH

ST. TERESA'S COLLEGE (AUTONOMOUS)

ERNAKULAM

DECEMBER 2022

DECLARATION

I hereby declare that the dissertation entitled “A STUDY ON THE TREE AND SHRUB DIVERSITY IN THE CAMPUS OF THE FERTILIZERS AND CHEMICALS TRAVANCORE LIMITED (FACT), COCHIN DIVISION” is an authentic record of the research work carried out by myself under the guidance of Dr. Liza Jacob, Associate Professor, Department of Botany, St. Teresa’s College (Autonomous), Ernakulam.

Place: Ernakulam

December 2022

Minu Jose

Reg. No: SMP21BOT001

CERTIFICATE

This is to certify that the dissertation entitled “A STUDY ON THE TREE AND SHRUB DIVERSITY IN THE CAMPUS OF THE FERTILIZERS AND CHEMICALS TRAVANCORE LIMITED (FACT), COCHIN DIVISION” submitted by Minu Jose (SMP21BOT001) for the degree of Master of Philosophy in Botany, is an authentic record of the research work carried out by under the supervision and guidance of Dr. Liza Jacob, Associate Professor, Department of Botany, St. Teresa’s College (Autonomous), Ernakulam. I further certify that no part of the work embodied in the project has been submitted for the award of any other degree or diploma.

Place: Ernakulam
December 2022

Dr. Liza Jacob
Project supervisor &
Head of the Department
Associate Professor
Department of Botany
St. Teresa’s College (Autonomous)
Ernakulam

ACKNOWLEDGEMENT

This work would not have become a reality without the timely guidance and support.

I am greatly indebted to my guide Dr. Liza Jacob, Associate Professor and the Head of the Department of Botany, St. Teresa's College (Autonomous) Ernakulam, for her constant motivation, immense knowledge and patience which have been instrumental in helping me at every step throughout my work.

I owe my heartfelt gratitude to the Director of the college Rev. Sr. Dr. Celine. E., former and current Principals of the college Dr. Lizzy Mathew and Dr. Alphonsa Vijaya Joseph, for granting me the golden opportunity to pursue my studies and permitting me to make use of the resources of the college.

I owe my special thanks to my dear teachers of the department for their constant support and encouragement in completing my project. A special thanks to our teacher in charge Dr. Arya P Mohan for her constant love and support.

A word of thanks goes to Abhiram sir and Shyam sir and other staff in support at FACT.

My friends and other research scholars also deserve a word of appreciation for their great help and support in my journey. And very warm appreciation to the non-teaching staff of the department who have rendered much help and support during the course of my work.

Very special gratitude from the bottom of my heart goes to my family who have been the pillars of strength and support in helping me complete my project. Above all, I thank God almighty for the showers of blessings poured down on me in successfully completing my task and help to set another milestone in my life.

Minu Jose

ABSTRACT

Several anthropological activities, such as industrialization, has led to a rapid decline in biodiversity. Pollution arising from the industries and the encroachment of land, both legal and illegal, creates a demand for understanding the level of impact of industrial activities and also looking into the status of biodiversity in such areas associated with and affected by the industries, and hence the present study was executed. Different types of diversity can be observed in diverse vegetation due to many factors, both biotic and abiotic. In spite of the rising demand for the conversion of land into industrial plants, the vision of the pioneers of FACT allowed the preservation of the land and industrial plant and its expansion to go hand in hand with minimal or no pollution from the industrial area affecting the public outside the campus area. Various strategies allowed the utilisation of by-products from the industry. Floral diversity was studied in selected areas of the campus of the FACT. The plants were identified, categorized, and described taxonomically. The study also focused on listing out invasive plants and exotic plants present among the vegetation in the study area. Endemic species like *Salacia fruticosa* Wall. ex M.A.Lawson was observed in the area. Some of the pollution tolerant plants that which suggested for Green-belt were observed in the area of study. Most number of species were from the family Fabaceae. There were several invasive plants of which the greatest number of invasive plants were from the family Araceae. As many as 36 exotic plants were observed and identified from the area of study.

Keywords: Biodiversity, Invasive species, Green-belt

TABLE OF CONTENTS

SL NO:	CHAPTER	PAGE NO:
1	CHAPTER 1 1.1 INTRODUCTION 1.2 REVIEW OF LITERATURE 1.3 OBJECTIVES	1 3 6
2	CHAPTER 2 2.1 MATERIALS AND METHODS	7
3	CHAPTER 3 3.1 OBSERVATION AND RESULTS	9
4	CHAPTER 4 4.1 DISCUSSION	54
5	SUMMARY AND CONCLUSION	55
6	REFERENCES	56

ABBREVIATIONS

L.	Carolus Linnaeus
Benth.	G. Bentham
Hook.	J. D. Hooker
Hook.f.	William Hooker
R.Br.	Robert Brown
Lam.	J. P. Lamarck
DC.	A. P. de Candolle
Wall.	Wallich
Scop.	G. A. Scopoli
Raeusch.	Raeuschel, Ernst Adolf
OKEN.	Oken, Lorenz
Pers.	C. H. Persoon
Lour.	de Loureiro, João
Thunb	Thunberg, Carl Peter
Dunal	Michel Félix Dunal
Thoms	Hermann Thoms
Anders.	Joseph Anders
Panigrahi	Gopinath Panigrahi
Retz.	Anders Jahan Retzius
Spreng.	Kurt Polycarp Joachim Sprengel
Jack.	William Jack
Gaertn.	Joseph Gaertner
Nooteb.	Hans Peter Nooteboom
A.Juss.	Adrien Henri Laurent de Jussieu
Jacq.	Joseph von Nicolaus Jacquin
M.A.Lawson	Marmaduke Alexander Lawson
Willd.	Carl Ludwig Willdenow
Regel	Eduard August von Regel
A.Cunn.	Cunningham, Allan

LIST OF TABLES

Table 1 showing the list of trees and shrubs observed at the site of study

Table 2 showing the list of invasive species found in the area of study

Table 3 showing the list of exotic species found in the area of study

LIST OF FIGURES

Figure 1 showing a graphical representation of the number of species in each family at the area of study

Figure 2 showing a graphical representation of the number of invasive species occurring at the area of study

Figure 3 showing a graphical representation of the number of exotic species occurring at the area of study

LIST OF PLATES

Plate 1 showing the area selected for the study- FACT road in the campus of FACT, Cochin Division

Plate 2 showing a view of FACT Guest house

Plate 3 showing plants observed in the study area 1-8

1. *Uvaria narum* (Dunal) Wall. ex Hook.f. & Thoms,
2. *Polyalthia longifolia* (Sonner.) Thw.,
3. *Hydnocarpus pentandra* (BUCH.-HAM.) OKEN.,
4. *Flacourtia jangomas* (Lour.) Raeusch.
5. *Garcinia xanthochymus* Hook.f. ex Anders. in Hook.f.,
6. *Urena lobata* L.
7. *Grewia nervosa* (Lour.) Panigrahi,
8. *Glycosmis pentaphylla* (Retz.) DC.

Plate 4 showing plants observed in the study area 9-16

9. *Murraya koenigii* (L.) Spreng.,
10. *Murraya paniculata* (L.) Jack.
11. *Quassia indica* (Gaertn.) Nooteb.,
12. *Azadirachta indica* A.Juss.
13. *Sweitenia mahagony* (L.) Jacq.,
14. *Aglaia elaeagnoidea* (A. Juss.) Benth.

15. *Cansjera rheedei* Gmel.,
16. *Anacardium occidentale* L.

Plate 5 showing plants observed in the study area 17-24

17. *Mangifera indica* L.,
18. *Lannea coromandelica* (Houtt.) Merr.
19. *Adenantha pavonina* L.,
20. *Albizia saman* (Jacq.) F.Muell.
21. *Acacia auriculiformis* A.Cunn. ex Benth.,
22. *Caesalpinia decapetala* (Roth) Alston,
23. *Cassia fistula* L.,
24. *Delonix regia* (Boj. ex Hook.) Rafin.

Plate 6 showing plants observed in the study area 25-32

25. *Mimosa pudica* L.,
26. *Peltophorum pterocarpum* (DC.) Backer ex Heyne
27. *Pongamia pinnata* (L.) Pierre,
28. *Saraca asoca* (Roxb.) de Wilde
29. *Tamarindus indica* L.,
30. *Terminalia catappa* L.
31. *Couroupita guianensis* Aublet,
32. *Melastoma malabathricum* L.

Plate 7 showing plants observed in the study area 33-40

33. *Lagerstroemia speciosa* (L.) Pers.,
34. *Ixora coccinea* L.

35. *Chassalia curviflora* (Wall. ex Kurz) Thw. var. *longifolia* (Dalz.) Hook.f.
36. *Canthium angustifolium* Roxb.,
37. *Mussaenda frondosa* L.
38. *Synedrella nodiflora* (L.) Gaertn.,
39. *Chrysophyllum cainito* L.
40. *Manilkara hexandra* (Roxb.) Dubard

Plate 8 showing plants observed in the study area 41-48

41. *Manilkara zapota* (L.) P.Royen
42. *Madhuca longifolia* (Koenig) Macbr. var. *latifolia* (Roxb.) A. Chev.
43. *Mimusops elangi* L.,
44. *Diospyros discolor* Willd.
45. *Alstonia scholaris*, (L.) R.Br.,
46. *Tabernaemontana alternifolia*, L.
47. *Merremia vitifolia* (Burm. f.) Hall.
48. *Ipomoea cairica* (L.) Sweet

Plate 9 showing plants observed in the study area 49-56

49. *Spathodea campanulata* P. Beauv.,
50. *Premna serratifolia* L.
51. *Rothea serrata* (L.) Steane,
52. *Clerodendrum infortunatum* L.
53. *Tectona grandis* L. f.,
54. *Dioscorea bulbifera* L.
55. *Cinnamomum verum* Presl,
56. *Phyllanthus emblica* L.

Plate 10 showing plants observed in the study area 57-64

57. *Macaranga indica* Wight,
58. *Macaranga peltata* (Roxb.) Muell.Arg.
59. *Sauropus androgynus* (L.) Merr.,
60. *Codiaeum variegatum* (L.) A.Juss.
61. *Hevea braziliensis* (Willd. ex A. Juss.) Muell.-Arg.,
62. *Artocarpus incisus* (Thunb.) L.f.
63. *Artocarpus hirsutus* Lam.,
64. *Artocarpus heterophyllus* Lam.

Plate 11 showing plants observed in the study area 65-72

65. *Ficus religiosa* L.,
66. *Ficus racemosa* L.
67. *Ficus benjamina* L.,
68. *Ficus benghalensis* L.
69. *Casuarina equisetifolia* L.,
70. *Salacia fruticosa* Wall. ex M.A.Lawson
71. *Asparagus racemosus* Willd.,
72. *Similax zeylanica* L.

Plate 12 showing plants observed in the study area 73-80

73. *Monstera deliciosa* Liebm.,
74. *Colocasia esculenta* (L.) Schott
75. *Caladium bicolor* (Ait. ex Dryand.) Vent.,

76. *Syngonium podophyllum* Schott
77. *Alocasia macrorrhiza* (L.) G. Don,
78. *Dieffenbachia seguine* (Jacq.) Schott
79. *Pothos scandens* L.,
80. *Spathiphyllum wallisii* Regel

Plate 13 showing plants observed in the study area 81-83

81. *Caryota urens* L.,
82. *Carica papaya* L.
83. *Bambusa vulgaris* Schrad.

Plate 14 showing invasive plants observed in the study area 1-6

1. *Monstera deliciosa* Liebm.,
2. *Colocasia esculenta* (L.) Schott
3. *Caladium bicolor* (Ait. ex Dryand.) Vent.,
4. *Alocasia macrorrhiza* (L.) G.,
5. *Dieffenbachia seguine* (Jacq.) Schott,
6. *Pothos scandens* L.

Plate 15 showing invasive plants observed in the study area 7-13

7. *Ipomoea cairica* (L.) Sweet,
8. *Syngonium podophyllum* Schott
9. *Mimosa pudica* L.,
10. *Merremia vitifolia* (Burm. f.) Hall.
11. *Spathiphyllum wallisii* Regel,
12. *Urena lobata* L.
13. *Synedrella nodiflora* (L.) Gaertn.

Plate 16 showing exotic plants observed in the study area 1-10

1. *Polyalthia longifolia* (Sonner.) Thw.,
2. *Sweitenia mahagony* (L.) Jacq.,
3. *Anacardium occidentale* L.,
4. *Adenantha pavonina* L.
5. *Albizia saman* (Jacq.) F.Muell.,
6. *Acacia auriculiformis* A.Cunn ex Benth.
7. *Caesalpinia decapetala* (Roth) Alston,
8. *Delonix regia* (Boj. ex Hook.) Rafin.
9. *Mimosa pudica* L.,
10. *Peltophorum pterocarpum* (DC.) Backer ex Heyne

Plate 17 showing exotic plants observed in the study area 11-20

11. *Tamarindus indica* L.,
12. *Terminalia catappa* L.
13. *Couroupita guianensis* Aublet,
14. *Synedrella nodiflora* (L.) Gaertn.
15. *Chrysophyllum cainito* L.,
16. *Manilkara zapota* (L.) P.Royen
17. *Diospyros discolor* Willd.,
18. *Merremia vitifolia* (Burm. f.) Hall.
19. *Ipomoea cairica* (L.) Sweet,
20. *Spathodea campanulata* P. Beauv.

Plate 18 showing exotic plants observed in the study area 21-30

21. *Sauropus androgynus* (L.) Merr.,
22. *Codiaeum variegatum* (L.) A.Juss.
23. *Hevea brasiliensis* (Willd. ex A. Juss.) Muell.-Arg., 24. *Artocarpus incisus* (Thunb.) L.f.
25. *Ficus religiosa* L.,
26. *Ficus benamina* L.

27. *Ficus benghalensis* L.,
28. *Casuarina equisetifolia* L.
29. *Caladium bicolor* (Ait. ex Dryand.) Vent.,
30. *Dieffenbachia seguine* (Jacq.) Schott

Plate 19 showing exotic plants observed in the study area 31-36

31. *Spathiphyllum wallisii* Regel,
32. *Monstera deliciosa* Liebm.
33. *Colocasia esculenta* (L.) Schott.,
34. *Alocasia macrorrhiza* (L.) G. Don,
35. *Carica papaya* L.,
36. *Bambusa vulgaris* Schrad.

INTRODUCTION

The interrelationship among species is unbreakable, and anthropological influence on nature has an immense and indisputable impact on this relationship. Rapid urbanisation and expanding industrialization have led to deforestation and the loss of biodiversity. Anthropological interventions have caused the decline of nature. The addition of xenobiotics to the environment at every stratum, as well as the elimination of the natural setup, has resulted in chaos in every natural system. As the author of "The Sixth Extinction," Elizabeth Kolbert quotes, "No other creature has ever managed this, and it will, unfortunately, be our most enduring legacy."

This seemingly unsurmountable problem is in fact attributable to a most recent yet old act of man: turning a blind eye. Nature has the capacity to nurture its beings to any extent and to revive itself from disasters, yet the act of man has made its mark on nature. Industrialization has led to a better economy and an outburst in human population, which has caused man to convert forests into concrete jungles, causing the decline of natural habitats (Patnaik, 2018).

The urbanisation of certain areas has resulted in rapid and mostly unscientific measures to clear land, causing widespread loss in such areas. This led to a huge loss in the genetic pool.

The current investigation was carried out at the FACT Cochin Division in Ambalamugal, an industrial area in Kochi, Kerala. Ambalamugal is one of the most well-known study locations for pollution because of its terrible neglect and heavy industrialization. Here are some well-known businesses, like Kochi Refineries and Hindustan Organic Chemicals. 2010 saw the Ministry of Environment and Forests deem it "critically polluted."

Social forestry is an important factor that mitigates the intensity of the impacts of industrialization and urbanization, along with the rules of forestry that it initiates and ensures that the industries adhere to, such as the maintenance of greenbelts.

Fertilizers and Chemicals Travancore Limited (FACT), the country's first significant fertiliser plant, was founded in Udyogamandal, Kochi, Kerala, in 1943. In 1947, work on FACT officially began. M/s. Seshasayee Brothers used to manage FACT as a private business. It converted to a public-sector organisation in 1960, and the Indian government bought the bulk of the company's shares in 1962. FACT is administratively under the direction of the Department of Fertilizers within the Government of India's Ministry of Chemicals and Fertilizers.

FACT was once a tiny organisation, but it has since expanded and diversified into a multi-divisional company with a broad range of operations. The main division at Udyogamandal underwent four stages of expansion up until 1972, improving technology and increasing capacity. After realising the need to develop indigenous capabilities for the design and construction of chemical and fertiliser plants, FACT established an engineering and consultancy arm called FEDO in the 1960s. In 1966, the fabrication division of FEW (FACT Engineering Works) was also created. In Ambalamedu, next to the BPCL-Kochi Refineries, another fertiliser factory, Cochin Division, was constructed in two phases.

Phase I started in 1973 when the ammonia-urea complex was put into service, while Phase II saw the complex fertiliser plant, the sulfuric acid plant, and the phosphoric acid plant put into service between 1976 and 1978. With the construction of the Petrochemical Division at Udyogamandal for the production of caprolactam in 1990–1991 and its subsequent expansion into the then-exploding Petrochemical industry, FACT proceeded to expand and diversify.

A new ammonia factory was built in Udyogamandal in March 1998.

REVIEW OF LITERATURE

Pollution has been a major threat to biodiversity, anthropological contribution had played a significant part in the increase of pollution. Particulate matter has been implicated in various respiratory, cardiopulmonary diseases, and even cancer. Many Indian cities find place among the world's worst polluted cities. Rapidly growing Indian cities have high concentration of particulates which is attributed to automobiles, industries, biomass burning, and resuspension of road dust. In most cases, this concentration even exceeds the permissible limits set up by the regulatory agencies. High particulate concentration would make particularly the urban population vulnerable to various forms of respiratory diseases. The problem of particulate pollution is more complicated by location meteorology and seasonal variation making some locations like Delhi a pollution chamber. Therefore, cleaner air should be India's focus for economic growth with regard to benefits of longer lives and fewer incidences of PM-related sickness. Better pollutant monitoring systems, public awareness regarding the adverse effects of PM, efficient vehicle engines, use of cleaner fuels, etc. would go a long way in mitigating the harmful effects of particulates. Pollution has an implication not just at the physiological level but even at psychological level causing many diseases and disorders like depression and schizophrenia. (Kaushik et. al., 2019, Paital et. al., 2020, Luigi et. al., 2017, Mandal et. al., 2019)

Invasive alien species (IAS) are one of the major threats to global and local biodiversity. In forest ecosystems, the threats caused by IAS include hybridization, transmission of diseases and species competition. Waage et. al., 2005 found a strong statistical correlation between economic variables and country's vulnerability to IAS. Invasive alien or non-native plant species (IAS) are one of the major threats to global and local biodiversity. A key component of biological invasions are human activities that modulate the introduction and spread of alien species. Clearing, for example, may change light conditions and resource availability in ways that favour alien plant species. Review aims to provide an overview of 48 research studies reporting on the impact and/or management of invasive plant species (IAS) in European temperate forests. We identified 53 vascular plant species having a negative influence on forest regeneration in Central European forests. 21 tree species are reported to be impacted by IAS in 24 studies. Invasive alien or non-native plant species (IAAS) are one of the major threats to global and local biodiversity. Biological invasions have negative socio-economic and human health impacts. Several policies, risk assessments and legislations are now in place to regulate the spread of IAS in forests. A key component of biological invasions are human activities that

modulate the introduction and spread of alien species. Clearing, for example, may change light conditions and resource availability in ways that favour alien plant species. Construction of forest roads can promote the spread of seeds and specimens through the movement of contaminated soil and construction material. (Cororaton et. al., 2009)

Eighty-four species of terrestrial plants were included. All of which call for urgent attention in terms of control and management. Invasive alien species are those which spread outside their normal distribution range and become invasive in their new locations. The book is structured into individual leaflets which contain information such as name of each invasive plant, its country of origin, most used synonym, common name, ecology and distribution. Total control of these invasives might just remain a dream - management of the populations through integrated control measures may be the only option left.

Invasive alien plants species (IAPS) are considered to be one of the major drivers of biodiversity loss. There is a dearth of studies regarding their economic quantification, livelihood considerations and biotechnological prospects. Panoramic review aimed to investigate the environmental, socio-ecological and health risks posed by IAPS.

Invasion induced biodiversity loss, drastically alters the meteorology/temperature and other climatic variables, which, indirectly exert the negative public health impacts. The ornamental and multi-purpose IAPS, which were deliberately or accidentally introduced subsequently spread to impose adverse effects on human and the ecosystem health.

Native plants can act as sink for air pollutants and contribute significantly to carbon sequestration. Loss of native plant diversity through invasive plant pathogens may indirectly affect human health. Invasion ecology is increasingly being considered as trans-disciplinary subject, intimately linked with the global change biology, land-use change, biodiversity and human health science. (Langmaier et. al.,2020)

Salacia fruticosa Wall. ex M.A.Lawson is endemic to Western Ghats.(Kunnath et. al.,2018)

A study conducted in Spain by Bemonte et. al,2004 mentions *Acacia*, *Acacia*, *Acer*, *Eucalyptus*, *Helianthus*, *Platanus* and *Xanthium* to be harmful to human health

Pollen invaders (studied in Spain) spread in atmospheric environment impose threats to human health in form of rhinitis, conjunctivitis, and asthma; Concomitantly, pollen allergens can exacerbate old respiratory problems and skin allergies (Belmonte et. al.,2004)

According to MoEF, a total thirty three percentage of an industrial area must be Green-belt and following list of trees are suggested by the ministry *Acacia auriculiformis* A.cunn, *Acacia nilotica* (Linn) Wild, *Albizia lebbek* Benth, *Anthocephalus chinensis* (Lamk.), *Azadirachta indica*, *Bambusa arundinacia* (Retz)Roxb, *Bambusa vulgaris* Schrad, *Bauhinia purpurea* Linn, *Bauhinia varigata* Linn, *Cassia fistula* Linn, *Citrus aurantium* Linn, *Cocos nucifera* Linn, *Delonix regia* (Boijer) Rafin., *Emblica officinalis* Gaertn., *Eucalyptus citriodora* Hook, *Ficus benghalensis* Linn, *Ixora undulate*, *Madhuca longifolia* (Koen), *Mangifera indica* Linn, *Nerium indicum*, *Peltophorum pterocarpum*, *Polythia longifolia*, *Terminalia catappa*

Profusely branching trees with canopy, such as Peepal, Banyan, Kadamb, Neem, Conocarpus lancefolius are suggested to be grown as avenue trees.

Although it originated in lowland tropical parts of Central and South America, *Carica papaya* L. is now cultivated commercially and in backyard gardens all over the world in tropical and subtropical climates. *Alstonia scholaris*, *Artocarpus heterophyllus*, *Azadirachta indica*, *Delonix regia*, *Ficus benghalensis*, *Ficus religiosa*, *Mangifera indica*, *Mimusops elengi*, *Spathodea campanulate*, *Tamarindus indica* are the plants as tolerant and or resisted to combined gaseous pollutants (emissions of oxides of sulphur, nitrogen and carbon) from petro-chemical and thermal power plants. (Bhattacharya,1994, Chacko et. al., 2001)

OBJECTIVES

1. To survey tree and shrub diversity of the campus of the FACT, Cochin Division.
2. To taxonomically identify and characterize plants of the campus of the FACT, Cochin Division.
3. To evaluate the diversity of invasive species of the campus of the FACT, Cochin Division.
4. To analyse the diversity of exotic species of the campus of the FACT, Cochin Division.

MATERIALS AND METHODS

The current work deals with floral diversity of FACT Campus at Cochin Division situated in one of prominent industrial areas of Ernakulam district, the Ambalamugal region.

STUDY AREA

FACT Road of FACT, Cochin Division was selected for the present study. The fertilizers and chemicals Travancore limited (FACT) is one among the eminent industries in this area. FACT owns over 481 Acres of land, of which include township, many industrial units, vast grounds, meeting halls, many areas covered in thickets of plants. Such thickets are the greenbelt areas of the industry. Ambalamedu guest house is one such area where there is a forest behind the guest house. The coordinates of the study area is 9.9817° N, 76.3694° E



Plate 1 Showing the area selected for the study- FACT road in the campus of FACT, Cochin Division

DATA COLLECTION AND ANALYSIS

Extensive surveys were conducted on FACT Campus. Information on plants were collected by direct field observation. Plants were identified taxonomically by referring to the “Flora of Presidency of Madras” (Gamble,) and Biodiversity Documentation for Kerala Part 6: Flowering Plants. (Sasidharan,2004) Extensive literature reviewing was also conducted to verify the name of plants.

OBSERVATION AND RESULTS

Table 1 List of trees and shrubs observed at the site of study

FAMILY	BINOMIAL
1. Annonaceae	<i>Uvaria narum</i> (Dunal) Wall. ex Hook.f. & Thoms
	<i>Polyalthia longifolia</i> (Sonner.) Thw.
2. Flacourtiaceae	<i>Hydnocarpus pentandra</i> (BUCH.-HAM.) OKEN.
	<i>Flacourtia jangomas</i> (Lour.) Raeusch.
3. Clusiaceae	<i>Garcinia xanthochymus</i> Hook.f. ex Anders. in Hook.f.
4. Malvaceae	<i>Urena lobata</i> L.
5. Tiliaceae	<i>Grewia nervosa</i> (Lour.) Panigrahi
6. Rutaceae	<i>Glycosmis pentaphylla</i> (Retz.) DC.
	<i>Murraya koenigii</i> (L.) Spreng.
	<i>Murraya paniculata</i> (L.) Jack.
7. Simaroubaceae	<i>Quassia indica</i> (Gaertn.) Nooteb.
8. Meliaceae	<i>Azadirachta indica</i> A.Juss.
	<i>Sweitenia mahagony</i> (L.) Jacq.
	<i>Aglaia elaeagnoidea</i> (A. Juss.) Benth.
9. Opiliaceae	<i>Cansjera rheedei</i> Gmel.
10. Anacardiaceae	<i>Anacardium occidentale</i> L.
	<i>Mangifera indica</i> L.
	<i>Lannea coromandelica</i> (Houtt.) Merr.
11. Fabaceae	<i>Adenanthera pavonina</i> L.
	<i>Albizia saman</i> (Jacq.) F.Muell.
	<i>Acacia auriculiformis</i> A.Cunn. ex Benth.
	<i>Caesalpinia decapetala</i> (Roth) Alston
	<i>Cassia fistula</i> L.
	<i>Delonix regia</i> (Boj. ex Hook.) Rafin.
	<i>Mimosa pudica</i> L.
	<i>Peltophorum pterocarpum</i> (DC.) Backer ex Heyne
	<i>Pongamia pinnata</i> (L.) Pierre
<i>Saraca asoca</i> (Roxb.) de Wilde	

	<i>Tamarindus indica</i> L.
12. Combretaceae	<i>Terminalia catappa</i> L.
13. Lecythydaceae	<i>Couroupita guianensis</i> Aublet
14. Melastomataceae	<i>Melastoma malabathricum</i> L.
15. Lythraceae	<i>Lagerstroemia speciosa</i> (L.) Pers.
16. Rubiaceae	<i>Ixora coccinea</i> L.
	<i>Chassalia curviflora</i> (Wall. ex Kurz) Thw. var. <i>longifolia</i> (Dalz.) Hook.f.
	<i>Canthium angustifolium</i> Roxb.
	<i>Mussaenda frondosa</i> L.
17. Compositae	<i>Synedrella nodiflora</i> (L.) Gaertn.
18. Sapotaceae	<i>Chrysophyllum cainito</i> L.
	<i>Manilkara hexandra</i> (Roxb.) Dubard
	<i>Manilkara zapota</i> (L.) P.Royen
	<i>Madhuca longifolia</i> (Koenig) Macbr. var. <i>latifolia</i> (Roxb.) A. Chev.
	<i>Mimusops elangi</i> L.
19. Ebenaceae	<i>Diospyros discolor</i> Willd.
20. Apocynaceae	<i>Alstonia scholaris</i> , (L.) R.Br.
	<i>Tabernaemontana alternifolia</i> , L.
21. Convolvulaceae	<i>Merremia vitifolia</i> (Burm. f.) Hall.
	<i>Ipomoea cairica</i> (L.) Sweet
22. Bignoniaceae	<i>Spathodea campanulata</i> P. Beauv.
23. Verbenaceae	<i>Premna serratifolia</i> L.
	<i>Rothea serrata</i> (L.) Steane
	<i>Clerodendrum infortunatum</i> L.
	<i>Tectona grandis</i> L. f.
24. Dioscoreaceae	<i>Dioscorea bulbifera</i> L.
25. Lauraceae	<i>Cinnamomum verum</i> Presl
26. Euphorbiaceae	<i>Phyllanthus emblica</i> L.
	<i>Macaranga indica</i> Wight
	<i>Macaranga peltata</i> (Roxb.) Muell.Arg.

	<i>Sauropus androgynus</i> (L.) Merr.
	<i>Codiaeum variegatum</i> (L.) A.Juss.
	<i>Hevea braziliensis</i> (Willd. ex A. Juss.) Muell.-Arg.
27. Moraceae	<i>Artocarpus incisus</i> (Thunb.) L.f.
	<i>Artocarpus hirsuts</i> Lam.
	<i>Artocarpus heterophyllus</i> Lam.
	<i>Ficus religiosa</i> L.
	<i>Ficus racemosa</i> L.
	<i>Ficus benjamina</i> L.
	<i>Ficus benghalensis</i> L.
28. Casuarinaceae	<i>Casuarina equisetifolia</i> L.
29. Hippocrateaceae	<i>Salacia fruticosa</i> Wall. ex M.A.Lawson
30. Liliaceae	<i>Asparagus racemosus</i> Willd.
31. Smilacaceae	<i>Similax zeylanica</i> L.
32. Arecaceae	<i>Caryota urens</i> L.
33. Araceae	<i>Syngonium podophyllum</i> Schott
	<i>Pothos scandens</i> L.
	<i>Caladium bicolor</i> (Ait. ex Dryand.) Vent.
	<i>Dieffenbachia seguine</i> (Jacq.) Schott
	<i>Colocasia esculenta</i> (L.) Schott
	<i>Spathiphyllum wallisii</i> Regel
	<i>Monstera deliciosa</i> Liebm.
	<i>Alocasia macrorrhiza</i> (L.) G. Don
34. Caricaceae	<i>Carica papaya</i> L.
35. Gramineae	<i>Bambusa vulgaris</i> Schrad.

Plants from the study area described with binomial and characteristics are as follows

ANNONACEAE

Uvaria narum (Dunal) Wall. ex Hook.f. & Thoms

They are shrubs with branchlets that are sparsely hairy. Leaves are elliptic or lanceolate and apex is acuminate. The flowers are solitary, sepals are tomentose and broadly ovate. The petals are fleshy with incurved apex. The anthers are concealed by connectives. The carpels are numerous, oblong and tomentose.

Polyalthia longifolia (Sonner.) Thw.

These trees are with tall straight trunk and conical crown. The bark of the tree is grayish-brown and smooth. Leaves are simple and alternate. Leaf lamina is ovate-lanceolate or lanceolate with acuminate apex and margin entire. The petiole is pubescent when young.

The bisexual green flowers are numerous and are born in umbels or fascicles. Fruit is an aggregate of berries.

FLACOURTIACEAE

Hydnocarpus pentandra (BUCH. -HAM.) OKEN.

The tree has branchlets that are minutely velvet-hairy and a brownish, fissured bark. Simple, alternating leaves have long-pointed, oblong to elliptic-oblong shapes with serrated margins. Short cymes or solitary flowers are found on the leaf axils. They are white. Berry is a spherical, hairy, typically brown, woody plant.

Flacourtia jangomas (Lour.) Raeusch.

Small dioecious trees, they have bark that ranges from light brown to coppery red. The leaves are alternating, oblong-ovate to lanceolate, subserrate or crenate, and acuminate at the apex. Racemes bearing axillary flowers that are subcorymbose. White or orange-yellow disc that is somewhat lobed and juicy. Male flowers have many free stamens, and the anthers are ellipsoid-shaped. Female flowers have four to six stigmas, styles that are as many as the locules, and are connate at the base. Fruit is berry

CLUSIACEAE

Garcinia xanthochymus Hook.f. ex Anders. in Hook.f.

Evergreens having thick, dark-gray or blackish-gray bark. Simple, opposite leaves oblong, linear, or oblong-lanceolate lamina with an entire border, glabrous, shiny, and coriaceous. flowers that are polygynous. axillary or emerging from the axils of the dead leaves are male blooms. Orbicular-concave, unequal sepals. Petals are orbicular, incurved, spreading, and greenish. There are 5 fleshy glands with bilocular anthers in between separate large bundles of stamens. Solitary female flowers with few staminodes. Smooth berries that become yellow when mature. The pulp tastes sour and is yellow in colour.

MALVACEAE

Urena lobata L.

Plant perennial herbs. The leaves are alternating, deeply lobed, palmate, velvety tomentose on both sides, and up to seven ribbed at the base. Axillary, typically single flowers. The base of the involucre bracts are connate and covered in stiff hairs. A campanulate calyx. Pink corolla with a black centre; obovate petals with rounded apexes that lack stellate hairs. Pinkish staminal column; pale pink anthers. Subglobose, stiff-hirsute ovary; capitate stigmas. mericarps are trigonous, thickly stellate-pubescent, and also have many glochidate spines. Schizocarps are globose. Seeds are up to 4 mm long, reniform, and angular.

TILIACEAE

Grewia nervosa (Lour.) Panigrahi

Erect, bushy shrubs with densely pubescent petioles, peduncles, and calyx on young stems. Leaves are simple, alternating, 6-18 x 3-5.5 cm, elliptic-oblong or ovate-lanceolate, with an acute to acuminate apex and a rounded or cordate base. When young, they are thickly stellately hairy; as they age, they become glabrous except for the nerve on both sides. Petioles can be up to 1 cm long. Flowers grow in axillary and terminal panicles; pedicels are about 1 mm long; linear-lanceolate bracts are 5–6 mm long. Sepals 5, free, oblong-obovate, 4-6 mm long, tomentose-free. Yellow, oblong, 5-petaled flower. Numerous stamens; filaments are 3–4 mm

long. A roughly one millimetre wide, globose, 2-4 cell, two ovule per cell, ovary. Drupe 6-10 mm in diameter, globose, and purple when ripe; one or two seeds.

RUTACEAE

Glycosmis pentaphylla (Retz.) DC.

Slender upright bushes. The subopposite, elliptic-lanceolate, attenuate at base, entire to minutely crenulate-serrate on the margins, acute to round at the apex, glandular on both sides, and glabrous leaflets have three to seven folioles. Spiciform panicles with flowers that are terminal or axillary. White, surface-dotted surface, five petals and four sepals. Stamens 8–10, 25–celled ovary, stigma that is flat or vaguely lobed. Ovoid berry with a pinkish tinge when white. 1-2-seeded.

Murraya koenigii (L.) Spreng.

Delicate tree with exceptionally fragrant leaves. Grayish-white wood. Numerous terminal corymbose flowers with petals that are 0.2 in length and 10 -20 leaflets. Black berry.

Murraya paniculata (L.) Jack.

Small trees or shrubs with light grey to white bark. Foliolate leaves with ovate to elliptic-ovate or rhomboid leaflets that are glabrous and briefly acuminate at the apex and attenuate at the base. Panicles are few-flowered and grow from the upper leaf axils; the calyx lobes are oval. White, ovate-elliptic to elliptic-shaped petals. An annular disc. Oblong, two-celled ovary with one ovule in each cell and capitate stigma. Ellipsoid and crimson berry.

SIMAROUBACEAE

Quassia indica (Gaertn.) Nootb.

A 10 m tall evergreen tree or shrub. Glabrous, elliptic-oblong leaves. 20 or more flowers are arranged in umbel-like clusters with fine velvet hairs or hairless petals. The petals might be white, light yellow, or purple. There are 8 velvet-haired stamens. Anthers with oblong-lance

shapes and delicately velvet-haired filaments Ovary styles are up to 2 cm long and have soft, velvety hairs. 1-4 together, flat, smooth, glandular, and net veined describe the fruits.

MELIACEAE

Azadirachta indica A.Juss.

Evergreen tree with a 15–20 m height potential. Alternating leaves. imparipinnate An axillary panicle of hermaphrodite flowers. 5. Calyx; petals 5. The fruit is a smooth, drupe-like olive that can be almost spherical or elongate oval in shape.

Sweitenia mahagoni (L.) Jacq.

A 30-35 m tall medium-sized semi-evergreen tree. The pinnate leaves are 12–25 cm long, have four to eight leaflets that are each 5–6 cm long and 1-2 cm wide, and do not have a terminal leaflet. The blooms, which are tiny and grow in panicles, The fruit is a woody capsule with many winged seeds within that is 5–10 cm long and 3-6 cm wide.

Aglaia elaeagnoides (A. Juss.) Benth.

Trees up to 15 m tall with smooth, reddish-brown bark, pink blazes, and branchlets that are 3–4 mm thick and scaled in a brownish colour. Leaflets 5-7, opposite, 6-10 x 3-4.5 cm, elliptic, elliptic-obovate, lanceolate or oblanceolate, apex acute, acuminate or caudate-acuminate, base oblique, acute or attenuate, margin entire, chartaceous, foveolate above, lepidote above and beneath; petiolule 10-18 mm long, lepidote scale Yellow flowers in polygamous, branching axillary panicles. Five-lobed, campanulate, scaly, ciliate-margined calyx. 5, free, imbricate petals. The apex of the staminal tube is complete, with five anthers. Small, superior, somewhat depressed, 1-2-celled, and with 1-2 ovules in each cell, the ovary is. Fruit is a globose, 1–15 cm across, buff-colored berry with one or two seeds.

OPILIACEAE

Cansjera rheedei Gmel.

Branches that climb shrubs and are glabrous. Alternate, ovate, 8-11 x 4-7 cm leaves with a rounded, rugose base and a short petiole. Flowers in axillary spikes; bisexual; calyx minute; petals combined form an urceolate tube; 4 mm long; lobes valvate; stamens free; disc 4-lobed; lobes erect; tridentate; ovary rectangular; 1-celled; ovule 1; style cylindrical; stigma capitate, 4-lobed. A drupe; one seed.

ANACARDACEAE

Anacardium occidentale L.

Bushes or trees Simple alternating, exstipulate, strong petiole, wollen at base leaves. Flowers in a terminal, conspicuously bracteate panicle are polygamous and yellow with pink striations.

Mangifera indica L.

It is a huge evergreen fruit-tree, capable of a growing to a height and width breadth of around 100 feet and trunk circumference of more than twelve feet. Simple, leathery, oblong-lanceolate, alternating leaves measure 16–30 x 3–7 cm and have somewhat wavy margins. A branched terminal panicle with numerous tiny greenish-white or pinkish flowers is an inflorescence. Fruit: a single compressed seed inside an irregularly shaped, slightly compressed, fleshy drupe.

Lannea coromandelica (Houtt.) Merr.

Deciduous trees that can reach a height of 25 m with bark that is rough, exfoliates in small, irregular flakes, and is fibrous. The immature parts of the trees have stellate-rusty tomentose growth. imparipinnate, alternating, grouped leaves with estipulation, near the terminal of branchlets; leaflets 7–11, opposite; rachis 21–27 cm, thick, swelling at base, stellate-hairy pubescent when young; Lamina 5-12 x 3-8 cm, oblong, oblong-lanceolate, or ovate, base oblique, acute or round, apex acuminate, margin entire; lower surface and part of the upper with scattered stellate pubescence; lateral nerves 10-16 pairs, parallel, prominent; puberulent beneath; intercostae reticulate, prominent. Petiolule 3-5 mm, slender, pub Flowers unisexual,

yellowish-green; male flowers: in compound racemes, 8 mm across; calyx 4-lobed; lobes ovate, imbricate, persistent; petals 4, lanceolate, reflexed, imbricate; disc annular, 8-lobed; stamens 8, inserted below the disc, filaments unequal, subulate, ovary abortive; female flowers: in simple racemes; petals and sepals as in male flowers; stamens very short and small; anthers sterile; ovary superior, ovule pendulous from near the top of the cell.; styles Fruit is an ovoid, crimson, stone-hard, compressed drupe with a length of 12 mm.

FABACEAE

Adenanthera pavonina L.

They are evergreen trees that reach a height of about 20 metres. Their bark has a slick surface. Larger than average leguminous tree with bipinnately complex leaves and 2 to 6 pairs of secondary stalks. This species has a narrow, curving seed pod and a raceme-shaped flower.

Albizia saman (Jacq.) F.Muell.

A canopy of evergreen, feathery foliage with pink flower puffs that resembles an umbrella. It frequently grows to a height of 27 metres, and its robust, spreading branches may extend almost as far. The trunk often forks relatively low down, and the bark has a dark grey colour. The blooms resemble rounded, silky tufts, but each flower stalk is actually covered in a circlet of up to twenty florets, one of which is centre. Each pinna, of which there are four to eight pairs, carries between three and seven pairs of leaflets. The long, heavy leaves are twice pinnate. The fruit is a fleshy pod that tastes sweet and is highly prized by cattle, horses, and squirrels.

Acacia auriculiformis A.Cunn. ex Benth.

An evergreen with hanging branches. Aerial, upright, cylindrical, branched, sturdy stem; smooth at first, becoming fissured with age; grey-brown bark. Only in seedlings are the leaves bipinnate; these flattened winged petioles (Phyllodes) have coriaceous, obliquely elliptic, pointy tips, and parallel, slightly curved, or sickle-shaped nerves. thick, stiff inflorescence spikes. Yellow blooms are fragrant, complete, actinomorphic, hermaphrodite. Campanulate

calyx. Yellow, tubular, and tiny corolla. Numerous, elongated stamens make up the androecium. When ripe, the tightly coiled, initially green pods that have a wavy border turn practically woody. The pods split open on the tree. Black and glossy seeds.

Caesalpinia decapetala (Roth) Alston

Shrubs with tomentose branchlets. Bipinnate leaves with oblong, acute, and thickly hispid leaflets. terminal racemes Flowers are numerous, with lance-shaped bracts; oblong, acute sepals; yellow, equiangular petals; and densely bearded filaments. Pods are two or three seeded, elliptic-oblong, flat, and glabrous.

Cassia fistula L.

Tropical ornamental tree with a trunk made of strong, reddish wood. The 15 cm long, pinnate deciduous leaves include 3–8 pairs of leaflets. Bright, eye-catching yellow flowers are produced in 20–40 cm pendulous racemes. Fruits is a 30-60 cm long dark brown cylindrical legume with a strong aroma.

Delonix regia (Boj. ex Hook.) Rafin.

About 15 m tall trees with warty, pubescent branchlets. Stipules are tiny and lateral on the bipinnate, alternating leaves. Pinnae 8-20 pairs, opposite or subopposite, 2.7-10 cm, slender, pulvinate, puberulent, with a sessile gland visible between each pinna on the upper side; leaflets 18-50, sessile, opposite; lamina 0.4-0.8 x 0.2-0.35 mm, oblong or linear-oblong, base oblique, apex obtuse, margin entire, puberulent above and Flowers are bisexual, crimson, in terminal or lateral corymbose panicles; calyx tube is very short; lobes are five, valvate, subequal; petals are five, orbicular, imbricate; margins are fimbriate; claws are yellow; upper petals are different and white with red and yellow streaks; stamens are ten, free, declinate, long exerted; filaments are villous below; an Fruit is a 40 x 6 cm flat, elongate, woody pod with many, oblong, transverse seeds.

Mimosa pudica L.

Herbs that droop; stems that are 4-sided and devoid of spines. Alternate leaves with rectangular, overlapping, acute-mucronate, and oblique-truncate leaflets and tomentose rachis. Pink flowers with recurved prickles on the margin.

Peltophorum pterocarpum (DC.) Backer ex Heyne

Trees with brown tomentulose on their young sections. Lamina sessile, rectangular, base obliquely truncate, apex obtuse or retuse, margin entire, glabrous above, puberulent underneath, membranous; lateral nerves 4–8 pairs, pinnate, thin, conspicuous, intercostae reticulate, faint. Leaves bipinnate, alternate, stipulate; stipules tiny, lateral, cauducous. Pedicels 7–10 mm long; calyx lobes 5, oblong, 7–10 mm long minutely rufous tomentulose; petals 5, subequal, crinkled; stamens 10, filaments free, pilose at base; anthers uniform; ovary half inferior; stigma peltate. Flowers are bisexual, golden yellow, in terminal or lateral racemose panicles. Fruit is a pod that is 5–11.5 x 1.7–2.8 cm, is samaroid-shaped, oblong-elliptic, minutely tomentulose, and longitudinally striated, and contains one to four compressed, lenticular, light brown seeds.

Pongamia pinnata (L.) Pierre

It is a deciduous tree with a broad, evenly-spaced canopy that reaches heights of 15 to 25 metres. The leaves begin the season as a soft, lustrous burgundy and develop into a glossy, deep green. On their branches, tiny clusters of white, purple, and pink flowers bloom all through the year, developing into brown seed pods.

Saraca asoca (Roxb.) de Wilde

Medium-sized tree that is evergreen and has lovely, fragrant blossoms. Old stems have dark green bark that is frequently accented with bluish and ash-white lichen patches. The leaves are 30–60 cm long, alternating, paripinnate, copper red when young, and green when mature.

Tamarindus indica L.

The common huge tree known as the tamarind has a short, robust trunk, ferny pinnate leaves, tiny yellow blooms, and plump, reddish-brown pods. The pulp that envelops the 8–10 seeds is quite acidic and delicious at the same time.

COMBRETACEAE

Terminalia catappa L.

Trees up to 25 m tall, frequently buttressed; bark brownish to grey, smooth; juvenile shoots rusty or brown tomentose; branchlets brown to reddish-brown, terete with noticeable leaf scars, becoming glabrous with age. Simple, alternate, densely clustered leaves with stipulation; petiole 8-15 mm long, stout, pubescent; lamina 13-34 6-20 cm, obovate, orbicular-obovate, base cuneate, acute or attenuate, apex round, obtuse, retuse or apiculate; margin entire, glabrous above, puberulent beneath; Flowers are polygamous, sessile, 4 mm across, white or yellowish-green, in axillary simple, rusty pubescent racemes to 8-21 cm long; calyx tube is 3-5 x 1-1.3 mm, pubescent, expanded portion cupular, 3.5-5 x 1.5-2 mm; teeth are 5 and are triangular or ovate, 1-2 x 1.5-2 mm, acute, glabrous; petals are absent; stamens are 10 The fruits are drupes that measure 3-7 2.5-4.5 cm, are broadly ellipsoid to ovoid in shape, are laterally compressed and inflated, and are brown to reddish-brown in colour.

LECYTHIDACEAE

Couroupita guianensis Aublet

75-foot-tall tropical tree with deciduous leaves. Simple, up to 6" long leaves with a serrated edge; racemes of yellow and reddish-pink flowers that emit fragrant fragrance grow right on the trunk's bark. The tree produces massive, globular woody fruits right on the trunk and major branches, as well as clusters of large, rusted cannonballs that resemble balls on a string. The fruits are basic, indehiscent dry fruit with tiny seeds that are covered in a foul-smelling white substance.

MELASTOMATACEAE

Melastoma malabathricum L.

Around 1.3 m tall shrubs with paleaceous pectinate hairs densely covering the stem. Petiole to 1.5 cm long; leaves simple, opposite, 4-11 x 1.5-4 cm, elliptic-oblong, with a sharp tip and an attenuate base. The upper surface is notably lineolate, while the lower surface is tomentose and 5-ribbed, drying dull-greenish. Flowers are solitary or few and rather densely clustered, measuring about 5 cm across; boat-shaped, thickly paleaceous hairy bracts measure 1.2-2 x 1-1.4 cm. Long and campanulate, the calyx tube has lobes that are ovate-lanceolate, 5-7 x 4-5 mm, and are thickly paleaceous hairy. Petals 5, obovate, reddish purple, 1.5-2 x 0.7-1 cm. Anthers are dimorphic and split by apical holes in the ten stamens, which alternate between large and small ones. Ovary ovoid, 5-locular, with many ovules; simple style. 1-1.5 x 0.8-1 cm, ovoid, irregularly dehiscent capsules with many, tiny seeds.

LYTHRACEAE

Lagerstroemia speciosa (L.) Pers.

Deciduous trees up to 25 m tall with 4-6 mm thick, smooth, yellowish-brown, fibrous bark. Stipules intrapetiolar, deciduous; petiole 6-12 mm long, strong, glabrous; lateral nerves 11-19 pairs, parallel, prominent beneath; intercostae reticulate, prominent; leaves simple, opposite or subopposite, 7.5-25 x 3-10 cm, oblong, ovate-lanceolate, elliptic-lanceolate or elliptic-oblong; apex Bisexual panicles with 5-7 cm wide mauve or pink flowers have pubescent inflorescence stems and 1-cm long pedicels. Calyx tube 1 x 1.3 cm, pubescent, without ribs, hemispherical; lobes 6, triangular; acute. 6, 4 x 2.5 cm, obovate, clawed, crispate edges. Numerous stamens that have emerged filaments are inserted close to the calyx tube's base. Ovary has several ovules, is sessile, glabrous, and partly inferior; style is 2 cm long and curved; stigma is capitate. Fruit is a capsule that is 10-12 mm long, winged, and pale brown; seeds are 10-12 mm long, ovoid, brown, woody, and dehiscent.

RUBIACEAE

Ixora coccinea L.

It is a branching shrub. In contrast to decussate, leaves typically lack stalks. Triangular, cordate, blunt, or having a short, sharp point are all possible stipule configurations. Flowers are produced in thick corymb-like cymes at the ends of the branches; flower clusters are either nonexistent or extremely small, and bracts are roughly 8 mm long. Flowers are vibrant scarlet and stalkless. When mature, fruit is spherical and crimson.

Chassalia curviflora (Wall. ex Kurz) Thw. var. *longifolia* (Dalz.) Hook.f.

Shrubs. Leaves are opposite, up to 18 x 7 cm long, linear-lanceolate, with an acute or acute-obtuse base with chartaceous veins that are more numerous and spreading. A terminal paniced-cyme inflorescence. 5-merous, pinkish-white flowers Five-toothed calyx. Corolla is a curving, cylindrical, white to pink tube. 5th stamen is typically present. Ovules are found in an ovary with two locules, and the style has two stigmatic lobes. Drupe that matures to a purple colour.

Canthium angustifolium Roxb.

Erect bushes with thin branches and straight, slender spines. Domatia glandular; petiole 3-6 mm long; lanceolate, long acuminate leaves up to 11 x 5 cm; stipule acuminate, villous within. Short and sessile cymes. Flowers with a short pedicellum; globose corolla tube; lobes that are lanceolate and spreading; and strongly cuspidate, hispid at the tip, anthers. Style 3 mm long with dense middle beard. 10 mm wide, globose.

Mussaenda frondosa L.

Shrubs having branchlets that are pubescent. Simple leaves with terminal cymes that are opposite roughly oval in shape, caudate acuminate at the apex, and rounded at the base. Flowering in fives. Linear and hairy bracteoles are present. One of the calyx lobes changed into a showy, white, pubescent, leaf-like structure. Calyx lobes are lanceolate and hairy. Corolla has ovate-lanceolate lobes that are dialated above the centre and have an orange-red or yellow colour, tomentose exterior, and villous mouth. Fruit globular.

COMPOSITAE

Synedrella nodiflora (L.) Gaertn.

Herbal plants with upright branches and hairy stems. Simple, opposite, elliptic-ovate leaves with a sharp tip, a narrowly winged base on the petiole, serrated margins, and scabrous surfaces. Solitary, terminal, axillary, and few-flowered heads. yellow, heterogamous flowers. Female style-arms with ray flowers. Bisexual disc flowers with five stamens. Achenes are dimorphic, with trigonous disc florets that are not winged and ray florets that are compressed dorsally and have lacerate wings.

SAPOTACEAE

Chrysophyllum cainito L.

Tress with subcoriaceous leaves and milky sap. Hermaphrodite, tiny flower in millary fascicles. Imbricate calyx and campanulate corolla. villous ovary. Berry that is fleshy or coriaceous.

Manilkara hexandra (Roxb.) Dubard

It is a tree or a shrub with smooth branchlets and grey bark. Near the ends of branchlets, alternately arranged leaves are frequently tightly crowded and have obvious scars. Leaf stalks are present but small. Obovate to obovate-elliptic in shape, with smooth surfaces on both sides and a widely wedge-shaped to obtuse base. Flowers grow in fascicles in the axils of leaves. Oval-triangular, velvety, golden to grey sepals. White or pale-yellow flowers are in bloom. Oval petals are present. Berry is ellipsoid to obovoid-oblong in shape.

Manilkara zapota (L.) P.Royen

Trees. Brown hairs cover the young portions, which exude milky white latex. simple, alternating, spiral leaves that are grouped near the tip of branchlets; Lamina are elliptic, elliptic-obovate, or elliptic-oblancheolate, with bases that are acute or attenuate, apexes that are slightly

acuminate with retuse tips, and margins that are entire, glabrous, coriaceous. Lateral nerves are numerous, parallel, slender, and faint, and intercostae are reticulate and obscure. Bisexual, white, solitary or pair flowers that emerge from the upper leaf axils; corolla campanulate, greenish-white or cream; lobes irregularly serrated; scurfy pedicels; staminodes alternate with the stamens, are bifid, laciniate, and irregularly divided; stamens are inserted at the top of the corolla tube; filaments are free or partially united with the staminodes; and anthers are extended. ovary superior, hairy, many celled, many ovules; disc annular; tomentose; style terminal. Fruit berries.

Madhuca longifolia (Koenig) Macbr. var. *latifolia* (Roxb.) A. Chev.

A big, deciduous tree with a thick layer of grey bark. wrinkled and cracked vertically. Minky-scented flowers are hung at the ends of the twisted, grey branchlets or in compact bunches of dozens. Large fruits with one to four lustrous, brown seeds are present.

Mimusops elengi L.

An evergreen tree. The leaves are shiny. oval, dark green in colour. Flowers are fragrant, hairy, and cream in colour. With striations and a few surface fissures, the bark is thick and appears dark brownish black or greyish black in colour.

EBENCEAE

Diospyros discolor Willd.

Tree up to 15 metres tall; rough, peeled-off, blackish or dark brown bark; pinkish inner bark; branchlets and end buds. The leaves are alternate, rigidly coriaceous, oblong or elliptic-oblong, rarely oblanceolate, 2.5 x 8 – 12 x 30 cm, acuminate or acute, base obtuse or subcordate, above glabrous, glossy, midrib impressed, beneath initially silver or golden sericeous, glabrescent, glaucous, lateral nerves obscure; petiole thick, 0.5–1.5 cm long White, fragrant flowers: Female inflorescences typically have one flower, while male inflorescences are short, pedunculate, and 3–7-flowered. Males are smaller than females, with short pedicels, fleshy, deeply 4-lobed,

turbinate-campanulate calyxes, and are glabrous on the interior. The 5–10 mm-long lobes are coriaceous, upright, ovate, obtuse, and ciliate in shape. Corolla twice as long as calyx, up to 1.5 cm diam. at apex; tube subcylindrical; lobes pale yellow, fleshy, subequal to the tube, ovate or oblong, revolute to patent upto 1 cm long. The filaments of the 24–30 hypogynous, pairwise connate, glabrous stamens can reach a length of 2 mm. Pilose rudimentary pistil. Subsessile female flowers. Four calyx lobes that are 1-1.5 cm long, ovate-rotund or oblong, green, and glabrous inside. Corolla is white, trumpet-shaped, and measures 1.5 to 2 cm long. Tube is cylindrical and 1 cm long. 4-5 or 8–10 glabrous staminodes. 8–10 cell, thickly sericeous ovary; 4-5 simple, erect, or more patent styles. Fruit is globose or depressed globose, fleshy, densely rusty or yellowish velutinous, edible, 5-12 cm long, and contains 4–10 seeds. The pulp is white or cream, and the mesocarp is fleshy and pinkish. Fruiting calyx 2.5–3.5 cm in diameter, flattened, adpressed to the base of the fruit, with lobes 1–1.5 cm long and 1-2 cm wide. Up to 4 cm long, ellipsoid, flat-convex seeds with rough testa and equidistant endosperm.

APOCYNACEAE

Alstonia scholaris (L.) R. Br.

Evergreen tree that reaches a height of 40 metres (130 feet). Its immature branches are heavily lenticulated, while its mature bark is greyish. The leaves have a shiny upper side and a greyish underside. There are three to ten whorls of leaves, and the petioles are 1-3 cm long. Cymes are abundant. Typically, pedicels are equal to or shorter than calyx. The corolla is white, widely oval, and tube-like. There are separate, pubescent ovaries. The follicles are straight and distinct.

Tabernaemontana alternifolia L.

Leaves are elliptic-oblong, 23 cm long, 6.5 cm wide, and have conspicuous nerves. They are placed oppositely. White blooms grow in cymes that resemble corymbs. Five thick sepals with a base fuse are present. Flowers have a tube that is narrow and extends out to form a flat flower. The five stamens are not exposed. Fruit consists of two up to 4 cm long orange pods with recurved beaks that are boat-shaped.

CONVOLVULACEAE

Ipomoea cairica (L.) Sweet

sizable climbers. Petiole up to 4.5 cm long; leaves pedately 5-7-foliolate, 3-7 x 4-8 cm; orbicular in shape; lobes elliptic-ovate; apex obtuse to emarginate. Pedicels that are 1-2 cm long and have solitary or brief racemes of flowers. Subequal, 4-6 mm long, obovate, apiculate outer calyx lobes. Pink, funnel-shaped, 4.5–6 cm long corolla. Five stamens; lower filaments are pilose. Long style; globular stigma. Subglobose, 1-1.2 cm long capsule. Blackish, subglobose to ovoid, 4-6 mm long seeds.

Merremia vitifolia (Burm. f.) Hall.

Twining shrubs with a brownish-black stem and clearly hairy juvenile shoots. Petiole length is 3 to 8 cm. Leaves are alternating, lobed, 6 to 12 cm long, equally wide, base cordate, border dentate-serrate, acute to acuminate at apex of lobation, sparsely fulvous hairy on both sides. Axillary, 1-3-flowered cymes with 4-5 cm long peduncles make up the inflorescence. Oval-lanceolate, mucronate, outer hirsute, inner glabrescent, sepals 10-15 x 6-8 mm. Yellow campanulate corolla, 3.5–5 cm long, 4-6 cm wide. A two-celled ovary with two ovules per cell. Capsules are globose and 1–1.2 cm in diameter; fruiting sepals are significantly bigger; seeds are 4–8 mm long and ovoid.

BIGNONIACEAE

Spathodea campanulata P. Beauv.

Around 80-foot-tall upright tree with a broad trunk. has a thick, tapering mottled warty light grey bark. A leaf consists approximately 5–19 oval, strongly veined leaflets. homomorphic buds. Flowers consist of large, crinkled red-orange tulip-like bells and 5–10 pre-brown fingerlike pods with tissue paper-like seeds.

VERBENACEAE

Premna serratifolia L.

1–8 m tall evergreen bush. The length of the leaves ranges from 3 to 15 cm. 2.5 to 9.5 cm broad. Flowers are flat-topped clusters that are 10–20 cm across and 1.5–3 mm across. Fruits are black and 3–4 mm long.

Rothea serrata (L.) Steane & Mabb.

A shrub with branchlets that, when young, are heavily covered in golden, velvety hair, especially in the nodal region. As it ages, the hair on the branchlets turns from yellow to dark brown to grey. The stalkless bracts have opposite leaves with obovate-oblong leaf blades and minutely dentate, tomentose margins. flowers that are white, blue, or purple. Stamens that are visible.

Clerodendrum infortunatum L.

Shrubs. Simple, opposite, 8–17 x 6–12 cm, oblong or orbicular leaves with an entire or denticulate border that are villous on the underside and tomentose on the top. Terminal panicle; foliaceous bracts. Cupular and tomentose calyx. White, tubular corolla. Long, thin, purplish stamen filaments that are 2–2.5 cm long; oblong anthers. When ripe, the globular, bluish-black drupe has a pink, expanded fruiting calyx.

Tectona grandis L. f.

Deciduous trees that can reach a height of 30 m, with branchlets that are 5–10 mm thick, 4-angled, puberulous, and with bark that is 10–20 mm thick, rough, shallowly vertically fissured, and fibrous. Petiole 10–50 mm long, stout, tomentose; lateral nerves 8–10 pairs, pinnate, prominent, raised beneath, puberulent beneath; intercostae scalariform, prominent; leaves simple, opposite, 30–60 x 15–30 cm, ovate, obovate, apex acute or obtuse, base attenuate; margin entire, wavy; glabrous above and pubescent. Bisexual, white, 7 mm in diameter, puberulous terminal cymose panicles measure 10 to 30 cm in diameter. Five millimetre long, campanulate, ovate, subequal calyx with tomentose lobes. 6 mm long, spreading, oblong-lobed corolla. Stamens: 5–6; filaments: 3 mm; anthers: oblong; equal; upright; inserted at throat; exerted. superior, 4-celled, globose, densely hairy ovary with one ovule in each cell; style thin,

4 mm; stigma linearly bifid. A drupe with a diameter of 1.5–2 cm, a densely floccose calyx covering it, a brown, globose fruit with 1-4 oblong seeds, and a spongy epicarp.

DIOSCOREACEAE

Dioscorea bulbifera L.

Vine with tuberous rootstocks; left-twining, terete stem. Oval-suborbicular leaves with a deeply cordate base and an acuminate to short caudate apex, membranous, glabrous, and basally ribbed leaves. Bulbils are common in the inflorescence and in the leaf axils. Male flowers grow in pendulous, axillary panicles with oval, sharp bracteoles. Perianth is linear-oblong, biseriate, and pale green. no stamens. Staminodes are present, the ovary is triquetrous and trilocular, there are ovules, styles are present, and the stigma is bifid and reflexed in the female spikes. Winged, oblong capsules.

LAURACEAE

Cinnamomum verum Presl

The cinnamon tree grows to a height of 10 to 15 metres. The 7–18 cm long ovate–oblong leaves are in form. The flowers, which grow in panicles and are greenish in colour, have a strong odour. The fruit is a purple, 1-cm-long berry with a solitary seed.

EUPHORBIACEAE

Phyllanthus emblica L.

A small to medium-sized deciduous tree that can grow as tall as 30 metres on occasion. Smooth bark is a light greyish-brown colour and flakes off in thin sheets like guava bark. The tiny, oblong leaves, which are just 3 mm wide and 1.25-2 cm long and are distichously arranged on very slender branchlets, give the false appearance that the foliage is finely pinnate. Yellowish-green flowers are in bloom. The fruit has six vertical stripes or furrows and is roughly spherical, pale greenish-yellow, smooth, and firm in appearance.

Macaranga indica Wight

It is a tall, 16 metres (52 feet), resinous tree. The texture of the greyish bark is smooth. The leaves are simple, alternately arranged, peltate, orbicular-ovate, acuminate at the apex, and 8–9 nerved palmately. Flowers are unisexual and dioecious, with zigzag-branched panicles and linear bracts with wide flat glandular appendages; male flowers are clustered on each bract, whereas female flowers are few on each. The fruit of one seed is a globular capsule.

Macaranga peltata (Roxb.) Muell.Arg. in DC.

Dioecious trees that can reach heights of 18 metres; thin, terete, glaucous branchlets; smooth, lenticellate, pale, greyish-brown bark surface. Stipules are large, lateral, ovate-acuminate, reflexed, and caudicous; petiole is 12-35 mm long, stout, glabrous; lamina is 8-10 ribs from the base, palmate, and prominent beneath; lateral nerves are parallel, regular, and prominent; intercostae are scalariform, and there are many promi; leaves are simple, alternate, 11-25 x 9-20 cm Unisexual, greenish-yellow flowers. Tepals 3, minute, obovate, and cuneate; stamens 2-8, free; slightly connate below; exserted; axillary, highly branching, dense, tomentose, panicles; bracteoles concave. Female flowers have simpler panicles than male flowers, branches racemes with larger bracts, four tepals that are basally connate at the base, an ovary that is superior and has two to six cells that are densely glandular and contain one ovule each, a style that is lateral, and a stigma that is sessile and frequently encircles one side of the ovary. A 5–6 mm wide, globular, hairy, glandular, and black fruit capsule; one black seed.

Hevea brasiliensis (Willd. ex A. Juss.) Muell.-Arg.

Up to 25 m tall trees with milky latex and grey bark. Digitately trifoliate, alternating, estipulate leaves; rachis 3–10.5 cm long; thin, glabrous; swelling at base; gland at top; petiolule 5-7 mm long; whorled; slender; glabrous; lamina 5.5–14 x 3-6 cm; elliptic, elliptic-ovate or obovate; base acute; ap blooms that are monosexual, yellowish-white, and in paniced racemes at the terminals, with the central flowers being both male and female; yellowish-white tepals, a disc of five free or connected glands, stamens 5–10 in two whorls, and filaments joined into a

column that extends past the anthers; 3-celled, superior ovary with three ovules; sessile stigma. Fruit is a capsule that is 3-4 x 3-3.5 cm, 3-lobed, woody, and dehiscent; seeds are three and mottled yellow-brown.

Sauropus androgynus (L.) Merr.

1-1.5 cm tall monoecious shrubs that are upright; leafy branches that appear to be grouped at the branch tips. Simple, alternating, triangular-lanceolate, acuminate at apex, wide and truncate at base, glaucous beneath, 2.5–10 x 1.5–13.5 cm leaves. Axillary, solitary to clustered flowers. 6-lobed, 1-seriate perianth. The third stamen's connate filaments form a column. Ovary globose, 0.15–0.2 cm in diameter, three cells, with two ovules in each; styles three; stigma curved. Globular capsules, 1 to 1.5 cm in diameter, have a persistent styler part at the apex.

Codiaeum variegatum (L.) A.Juss.

Well-branched monoecious shrub with grey, subglabrous branchlets that have round leaf scars. Alternate, linear, subcoriaceous leaves measure 25–35 x 1-1.5 cm, with an obtuse to acute apex and a petiole of up to 4 cm. Bases are cuneate to attenuate. Bracts 1-6 of the inflorescence's staminate, lax, spicate to racemose 25 cm in length. Perianth 5 + 5, and 10-15 disc glands. 15–100 stamens; 0 pistillodes. outer perianth smaller than staminate; inner perianth zero; pistillate to 15 cm. 3-celled, ovoid, glabrous ovary with one ovule per cell and three styles that are basally connate. Subglobose, smooth, marbling, carunculate, and about 6 cm wide, the drupe dehisces into three bivalved cocci.

MORACEAE

Artocarpus incisus (Thunb.) L.f.

Up to 10 m tall evergreen trees. Lamina 10-60 x 8-30 cm, broadly ovate, pinnatifid, base decurrent, apex acuminate, lobes oblong, margin of each lobe entire or dentate-serrate, chartaceous, sericeous-pubescent along the nerves above, densely below; lateral nerves 8-12

pairs, pinnate, intercostae scalariform, prominent; stipule 10-25 cm long, lateral Flowers are unisexual; spikes are located on the main branches; male catkins are 8-20 x 1-2 cm, pendent, oblong-cylindric; flowers are perianth 2 mm, glabrous, bilobed; stamens are one; filaments are 2 mm; anthers are oblong; and female spikes are 4-8 x 3-6 cm, perianth 2 mm, ovary superior, 0.2 mm, Oblong or spherical, conical-shaped fruit with a sorosis of 15-20 x 10-15 cm, a peduncle measuring 4-12 cm, and 1.5–2.5 cm oblong–cylindric seeds (seed formation is very rare).

Artocarpus hirsutus Lam.

An evergreen tree Simple, alternating leaves with up to 4 cm long stipules are present. kaf-stalk thick, hairy, wavy, and leathery. Male flowers are in leaf axils, drooping, narrowly cylindrical spikes up to 15 cm long, and female flowers are in leaf axils, ovoid spikes. Flowers are monoecious, tiny, yellowish- grey. Fruit is a variety of fleshy fruits that are echinate, spherical or ovoid, and turn yellow when ripe. Seeds 16-18 mm long, ovoid, white.

Artocarpus heterophyllus Lam.

Evergreen trees with thick, blackish-grey, mottled, orange-red exfoliating bark that sheds in huge, thick flakes, milky white latex, warty tubercles on the trunk, and glabrous branchlets. Simple, alternate, obovate, obovate-oblong, or elliptic-ovate leaves with an entire margin that is glabrous and shining above and scabrous beneath have lateral nerves that are 6-8 pairs, pinnate, prominent, arched, and intercostae that are scalariform. They also have lateral stipules that are ovate-lanceolate, sheathing, glab Male catkins are narrow-cylindric, perianth 2-lobed, puberulent; stamen 1; filament somewhat flattened, stout; anthers ovate-oblong; female catkins are more massive, perianth with strongly projecting conical apex, ovary 0.3 mm, superior, globose-obovoid; style exerted; stigma spatulate. Flowers are unisexual, minute, yellow Oblong, tuberculate, yellowish-green tubercles on a juicy, yellow to light orange fruit sorosis.

Ficus benjamina L.

Evergreen trees, fewer aerial roots.grey, silky bark; milky latex. Leaves simple, alternate, distichous; stipules 10-12 mm long, paired, lateral, lanceolate; petiole 4-25 mm long, stout, glabrous, glandular at apex below; lamina 3-12 x 1.5-6 cm, elliptic or elliptic-ovate, base round,

acute or subcordate, apex acute or acuminate, margin entire, glabrous, coriaceous; lateral nerves 6-18 pairs, parallel, prominent, secondary laterals prominent, intercostae reticulate, faint. The inflorescence is a syconia, 8-12 x 7-10 mm, sessile, paired, globose or subobovoid; the basal bracts are 2-3, minute, ovate; the orifice is circular, slightly raised, and closed by 3 apical bracts; internal bristles are absent; the flowers are unisexual, and there are 4 types: male and female. The female flowers are sessile, with Achenes smooth; syconium orange, pink or dark purple seldom.

Ficus religiosa L.

Large deciduous tree with many roots that have fused with the stem, giving it a pale stem that frequently seems fluted. Leathery, 4-8 inches long by 3-5 inches wide, somewhat egg-shaped or rounded, with a heart-shaped base and a tail at the tip, or occasionally without a base at all. Often pink while young, the leaves eventually turn copper and then green. Within the container, there were little flowers. A fig is the fruit.

Ficus racemosa L.

Oval to oblong-elliptic, whole, glabrous, imbricate, pubescent, linear-deltoid, deciduous leaves are found on evergreen plants. Hypanthodium inflorescences are androgynous solitary, globose to pyriform, hairy, and peduncled. borne from the trunk on the short, scaly branchlets. Flowers have numerous, subsessile, staminate florets that are sessile and pistillate florets that are smaller than the staminate florets.

Ficus benghalensis L.

Spreading trees up to 30 metres tall with aerial roots proliferating from the branches, thick, smooth, greyish-white bark that exfoliates in irregular flakes, dull red blazes, milky latex exudations, gently pubescent young portions, and light brownish branchlets. Stipules are lateral sheathing, white-puberulous, deciduous, leaving an annular scar, glandular at the apex below; lamina are ovate, with bases that are round or subcordate, obtuse apices, and margins that are entire, coriaceous, glabrescent above, and minutely pubescent beneath; leaves are simple,

alternate, spiral. flower single-sex; syconia, sessile, axillary pairs, globose, and without pubescence; 3 large, round, glabrous, persistent, aperture-closing basal bracts; no internal bristles; coriaceous; permanent; orifice plane; four types of flowers; male and female flowers coexisting in profusion close to the receptacle mouths; pedicel 0.5-2.8 mm long; tepals 2-3, rather broad, shortly connate, brownish, glabrous; stamens 1; filament 0.8-1 mm; anther oblong, parallel, unequal, shortly mucronate, connective brown; female flowers sessile; tepals 3-4, shortly connate, brownish, glabrous; superior ovary obovoid-globose, dark brown on Syconium 1.5–2 cm broad, achenes globose–ellipsoid, and maturing orange to crimson.

HIPPOCRATEACEAE

Salacia fruticosa Heyne ex Lawson in Hook. f.

A woody climbing shrub with looping branchlets is called a woody salacia. The elliptic-oblong leaves have a rounded or wedge-shaped base, a sharply tapering tip, and are leathery. Flowers are produced in leaf axils as cymes. The sepal cup has five tiny lobes. There are five brownish-yellow, meaty disc petals. Three stamens with broad, curved filaments are inserted on the disc's inner margin. The ovary is three cells in size, spherical, and partially embedded in the disc. Red, round berry with 1–3 seeds.

CASUARINACEAE

Casuarina equisetifolia L.

Dioecious trees with brown, rough, and vertically peeled-off bark. branchlets with ribs emerging from the axils of tiny, recurved scales. Sharp, scaly leaves at a node that alternate with the above node's ribs. Flowers are arranged in spikes; male flowers are pendulous, terminal spikes with brown tepals that are lanceolate, rough, faintly ciliate, and sharp. The first

stamen is inflexed in the bud. another oval. Female flowers: Solitary or in pairs, in axillary spikes, compressed into an ovoid "cone," with a short stalk; bracts and bracteoles persistent and woody; tepals missing; superior, ovoid; style filiform, persistent, and reddish-purple. Fruit is a carpophore, with winged seeds and ovoid or oblong-cylindric fruit.

LILIACEAE

Asparagus racemosus Willd.

Upright underbrush scandent and woody stem. leaves that have been reduced to tiny, frequently spinescent scales that carry tufts of more or less acicular or flattened cladodes in their axils. very minor compression of Cladodes. Strong, long, and decurved spines. Flowers are little. minute Solitary or fascicled racemes can be simple or branching.

SMILACACEAE

Smilax zeylanica L.

Shrubs that climbers; thorny stems. Petiole to 2 cm long, tendril from either side of petiole; leaves 6-12 x 3-6.5 cm, ovate-oblong or ovate-lanceolate, base rounded, acute to slightly cuspidate at apex; coriaceous, glabrous and glossy, 3-5-ribbed from base. 1-3 axillary, 2-3 cm long peduncles, umbels. Flowers are unisexual; bracts are oval; pedicels are 5–6 mm long. Perianth is free, six-partite, rectangular, and about 7 mm long. In male flowers, there are six free stamens, flat filaments, and a pistillode of zero. Female flowers have 3-lobed, 3-celled ovaries with 1-2 ovules per cell, 3-fid styles, and 3-6 staminodes. Subglobose berry, 0.8-1 x 0.6-0.8 cm. 1-3 globose, 3–4 mm wide seeds.

ARACEAE

Syngonium podophyllum Schott

When climbing larger trees, the arrowhead plant, a rampant creeper or climber, can frequently reach heights of 5 to 10 metres or more. Depending on where they are on the plant, the leaves of this plant differ in size, shape, and colour.

Lower leaves typically have an arrowhead form. An extended white spike surrounded by a creamy-white to greenish spathe makes up the flower. The fleshy fruits are typically buried and are coloured crimson to reddish-orange. Native to Latin America, arrowhead plant has been extensively cultivated as an indoor and attractive garden plant.

Caladium bicolor (Ait. ex Dryand.) Vent.

Pruinose, quickly sheathing petiole. Typically beautifully variegated with hues of green, white, and red, the underside of the leaf blade is glaucous and clearly peltate. Petioles and the peduncle are equal. Blade of the glaucous spathe is twice as long as the tube. The staminate portion of the spadix is twice as long as the pistillate, but the sterile portion is the same length.

Dieffenbachia seguine (Jacq.) Schott

Dieffenbachias are simple houseplants that may survive in a variety of environments. The fact that the caustic sap will burn your lips and numb your throat to the point of perhaps paralysing your voice chords is reflected in the term "Dumb Cane." The sap of the plant may cause a skin irritation in certain persons. If consumed, this plant may be poisonous. Dark green leaves with irregular zones of milky white along the principal lateral veins are carried by up to 6 foot tall plants. The size of the leaves will be around half that, or 47 cm long. The 30 cm long petioles have wings that extend along about half of their length. They produce a hardy, resilient houseplant that can survive low light levels. Any time of the year, if the conditions are right, a plant can flower. Their "flowers," which are actually spadices, are erect, frequently white, and enclosed within boat-shaped green spathes. The actual many flowers are carried on the spadix.

Pothos scandens L.

Climbers. stem with an angled root system. The petiole is 3-6 cm long, broadly winged, and the wing broadens above the leaf, which has leaves that are 5-9 x 2-3 cm, lanceolate, with an acuminate apex, numerous nerves, and 2-3 slender ribs. Spathe 5 mm across, orbicular, obtuse, concave, brown; spadix 3-5 mm across, globose; inflorescence axillary; peduncle to 0.5 cm long. Flowers closely clustered; bracts 3-5, orbicular; 6 free stamens; oblong ovary; stigma 3-toothed. Long, 1-1.8 cm, oblong berry.

Colocasia esculenta (L.) Schott

Stoloniferous rhizomed herb. Petiole 30-45 cm long, cylindrical, smooth; leaves few to numerous, peltate, 20-28 x 10-18 cm, ovate, cordate to sagittate at base, glabrous; nerves 6 pairs, linked to create an intramarginal vein; lowest pair with lateral nerves of the basal lobes, intercostae curved; The spathe, which can reach a length of 20 cm, is yellow, lanceolate, and constricted above the base. The limbs are acuminate. Spadix is 10 cm long, cylindrical, and has obtuse, terete appendages. Female flowers are lower, 2 cm of the spadix, with 1 cell ovary and numerous ovules on 2-4 parietal placentas. Male flowers are above, to 5-6 cm of the spadix, with 6 stamens. Between the male and female flowers, there are many, peltate neutral flowers. Fruit is a globular collection of berries.

Spathiphyllum wallisii Regel

Leaf-blade lanceolate- to oblong-elliptic (14-)24-36 cm long and (3-)5-10 cm wide, marginally undulate, the apex long-acuminate, recurved at the tip, the base acute, the midrib nude in the lowermost 2 cm above the geniculum, the primary lateral veins ca. 8-10 pairs arising at an angle of 45-50°; petiole subequaling the blade or Peduncle around 20-64 cm long, longer than the petiole; spathe cucullate, oval to oblong-elliptic. 7-17 cm long and 2.5-7.5 cm wide, the apex long-acuminate [to 2.5 cm], the base frequently obtuse or subrotund, occasionally acute, decurrent on the peduncle 1.5-4 cm or more, white, turning green with age; fragrant spadix, 1.5-8 cm long, on a stipe 0.5-1.2 cm long; white, of separate segments; pistil elliptic in outline; the style conic, white.

Monstera deliciosa Liebm.

A huge, coarse, epiphytic vine that frequently climbs high on trees, with internodes that are frequently 7 cm long or longer and nodes that frequently produce long aerial roots that hang far below the caudex; Blades of the primary leaves are small, cordate, and entire; those of the succeeding leaves are ovate-cordate and sparsely perforated; those of the adult leaves are 40-60 cm wide or larger, thick-coriaceous when dried, bright green and lustrous above, somewhat paler beneath, cordate-ovate in outline, almost regularly pinnatifid, and with few or numerous

perforations. Petioles are 1 m long or less, 2-2.5 Spathe coriaceous, broadly oval, apiculate, 20–25 cm long, 15–17 cm wide when spread out, pale yellowish; spadix 17–20 cm long, becoming rich and juicy in fruit; pistils turbinate; berries pale yellow, slightly tinted with violet, 1 cm long. Peduncles are 10–15 cm long and 1–1.5 cm thick.

Alocasia macrorrhiza (L.) G. Don

Thick stemmed sturdy perennial plants with a horizontal or upright stem. There are numerous leaves that can measure up to 48 x 33 cm. The leaves are oval, acute, and have rounded proximal lobes. There are up to 8 pairs of nerves, with the lowest pair carrying the lateral nerves for the lobes. Spathe to 28 cm long, constricted at the middle, and yellowish green; peduncle to 30 cm long, stout; spadix to 20 cm long, cylindrical, and 1-1.5 cm thick; continuous. Stamens 6 are linked form a hexagonal synandrium in the male flowers, which are located in the upper 12 cm of the spadix. A female flower with a 1-celled ovary and three basal ovules grows in the bottom 3 cm of the spadix. Hexagonal, flat blooms are neutral.

ARECACEAE

Caryota urens L.

Upto 60-foot-tall, annular, bare or encased stem. Few, very big leaves with broadly cuneate bipinnate leaflets. Spathes are 1.5 feet long, and the spadix is 10 to 12 feet long. a monoecious flower. Flowers ternate. fruit round.

CARICACEAE

Carica papaya L.

A little herbaceous tree with milky-white juice. trunk covered in leaf-scars. Petiole 40-100 cm long and 1-3 cm in diameter. Leaf blade 30-60 cm long, deeply divided into multiple lobes, each of which is further divided into smaller lobes with an acute apex. plants with fragrant,

nocturnal flowers that are typically dioecious but rarely monoecious. 30- to 100-cm long pendulous raceme of male inflorescence. Sessile, clustered flowers. A tiny, 2-mm-long, sharp, 5-lobed calyx measures 1.5–2 cm broad and 3-6 cm long. Rolling tube 1-3 cm long, 5-lobed, twisted in the bud, with lobes that are roughly 1 x 0.5 cm long and creamy yellow. Stamens are 10 and in two whorls, with the inner whorl being sessile and the outer whorl of the stamens having a short stalk. 1.5–2 mm long, basifixed, 2-celled, longitudinally dehiscent. In the leaf axil of the female plant, 2-4 floral buds appear, one of which develops into a full bloom. The other floral buds fall off, and occasionally one or two of them expand somewhat but never fully, giving the appearance of a single axillary flower. Peduncle hardly measures 1-2 cm. Fleshy, caducous, 1-2 cm long bracts. Ulyx Calyx Longer than 8 mm, acute, green, and fleshy 5-lobed. Some plants have female flowers at the tips of the branches of male inflorescences, which result in elongated and smaller fruit. The female flowers are 5–6.5 cm long, lanceolate, and obtuse; the stigma lobes are fimbriate and around 6 mm long; and the ovary is 3.5–4 cm long. Large spherical or pyriform fruit, approximately 20-30 x 8-15 cm, with flesh that turns yellow or orange. Black, wrinkled, oval-shaped seeds that are about 2 mm in diameter and each wrapped in a gelatinous membrane.

GRAMINEAE

Bambusa vulgaris Schrad.

Perennial and caespitose. Rhizomes are short and pachymorphic. The culms are woody, nodal-rootless, and measure between 1500 and 2000 cm in length and 40 and 100 mm in breadth. Internodes of the culm are hollow and cylindrical. One dominating branch that is thinner than the stem, one bud complement, three branch complements, or numerous, all grouped together. The culm sheaths are deciduous, hispid, ciliate on the shoulders, and auriculate. They also have dark brown hairs. The ligule on the culm sheath is 5-8 mm tall. The culm-sheath blade is oval, hairy, pointy, and 5–15 cm long. Per branch, there are 8 to 9 leaves. Hairy sheaths cover the leaves. The auricles of the leaf sheath are falcate, and the oral hairs are ciliate (resembling cilia). An enciliate membrane is the ligule. The base of the leafblade is broadly rounded and has a short, petiole-like attachment to the sheath. A brief petiole-like attachment connects the sheath to the blade. The lanceolate leaf blades measure 15–30 cm in length and 18–45 mm in width. Leaf blade margins are scabrous. The leaf blade apex is stiffened and pointed. Inflorescence: The synflorescence is leafy between clusters, bractiferous, clustered at the

nodes, and has dense, 1-3 cm-long spathaceous bracts that prophyllate below the lateral spikelets. The spikelets have axillary buds at the base. Fertile spikelets are spikelets that have 4–12 fertile florets but have fewer florets at the apex. It is disarticulating below each fertile floret, breaking up into oblong spikelets that are 10–20 mm long and compressed laterally. With distinct internodes, rachilla. Glumes: permanent, comparable, and shorter than spikelets. Lower glume is coriaceous, 0.7–0.8 length of upper glume, and lacks keels. The upper glume is oblong, coriaceous, without keels, and half as long as the fertile lemma next to it. Florets: The fertile lemma is oblong, 9–11 mm long, free of a keel, and has 11–15 veins. The edges of the lemma are ciliate and hairy above. The palea is oblong, has six veins, and was formerly the length of the lemma. The lemma's apex is acute. Palea keels lack wings and are ciliate. The apical florets look like florets but are undeveloped and sterile. Flower: There are six anthers, each about 5 mm in length. There are two to three stigmas. There are three membranous lodicules. It has an umbonate ovary. Fruit: Caryopsis and pericarp are attached.



Plate 3 showing plants observed in the study area 1-8

1. *Uvaria narum* (Dunal) Wall. ex Hook.f. & Thoms,
2. *Polyalthia longifolia* (Sonner.) Thw.
3. *Hydnocarpus pentandra* (BUCH.-HAM.) OKEN.,
4. *Flacourtia jangomas* (Lour.) Raeusch.
5. *Garcinia xanthochymus* Hook.f. ex Anders. in Hook.f.,
6. *Urena lobata* L.
7. *Grewia nervosa* (Lour.) Panigrahi,
8. *Glycosmis pentaphylla* (Retz.) DC.



Plate 4 showing plants observed in the study area 9-16

9. *Murraya koenigii* (L.) Spreng.,
10. *Murraya paniculata* (L.) Jack.
11. *Quassia indica* (Gaertn.) Nooteb.,
12. *Azadirachta indica* A.Juss.
13. *Sweitenia mahagony* (L.) Jacq.,
14. *Aglaia elaeagnoidea* (A. Juss.) Benth.
15. *Cansjera rheedei* Gmel.,
16. *Anacardium occidentale* L.

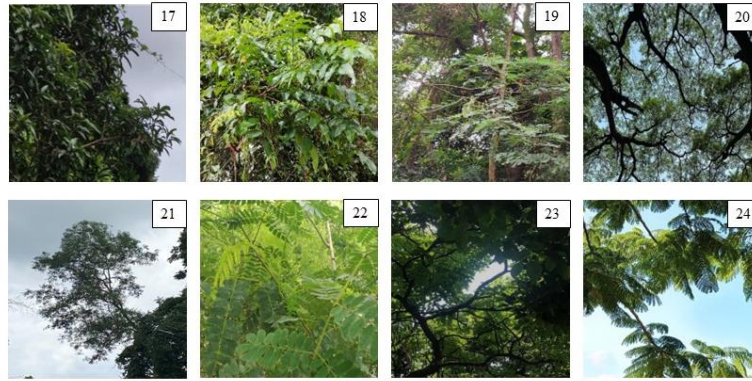


Plate 5 showing plants observed in the study area 17-24

17. *Mangifera indica* L., 18. *Lannea coromandelica* (Houtt.) Merr.
 19. *Adenantha pavonina* L., 20. *Albizia saman* (Jacq.) F.Muell.
 21. *Acacia auriculiformis* A.Cunn. ex Benth., 22. *Caesalpinia decapetala* (Roth) Alston
 23. *Cassia fistula* L., 24. *Delonix regia* (Boj. ex Hook.) Rafin.



Plate 6 showing plants observed in the study area 25-32

25. *Mimosa pudica* L., 26. *Peltophorum pterocarpum* (DC.) Backer ex Heyne
 27. *Pongamia pinnata* (L.) Pierre, 28. *Saraca asoca* (Roxb.) de Wilde
 29. *Tamarindus indica* L., 30. *Terminalia catappa* L.
 31. *Couroupita guianensis* Aublet, 32. *Melastoma malabathricum* L.



Plate 7 showing plants observed in the study area 33-40

33. *Lagerstroemia speciosa* (L.) Pers., 34. *Ixora coccinea* L.
 35. *Chassalia curviflora* (Wall. ex Kurz) Thw. var. *longifolia* (Dalz.) Hook.f.
 36. *Canthium angustifolium* Roxb., 37. *Mussaenda frondosa* L.
 38. *Synedrella nodiflora* (L.) Gaertn., 39. *Chrysophyllum cainito* L.
 40. *Manilkara hexandra* (Roxb.) Dubard



Plate 8 showing plants observed in the study area 41-48

41. *Manilkara zapota* (L.) P.Royen
 42. *Madhuca longifolia* (Koenig) Macbr. var. *latifolia* (Roxb.) A. Chev.
 43. *Mimusops elangi* L., 44. *Diospyros discolor* Willd.
 45. *Alstonia scholaris*, (L.) R.Br., 46. *Tabernaemontana alternifolia*, L.
 47. *Merremia vitifolia* (Burm. f.) Hall.
 48. *Ipomoea cairica* (L.) Sweet

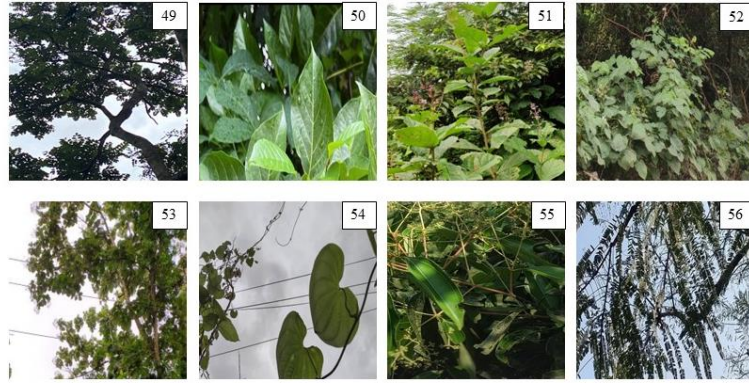


Plate 9 showing plants observed in the study area 49-56

49. *Spathodea campanulata* P. Beauv., 50. *Premna serratifolia* L.
 51. *Rotheca serrata* (L.) Steane, 52. *Clerodendrum infortunatum* L.
 53. *Tectona grandis* L. f., 54. *Dioscorea bulbifera* L.
 55. *Cinnamomum verum* Presl, 56. *Phyllanthus emblica* L.

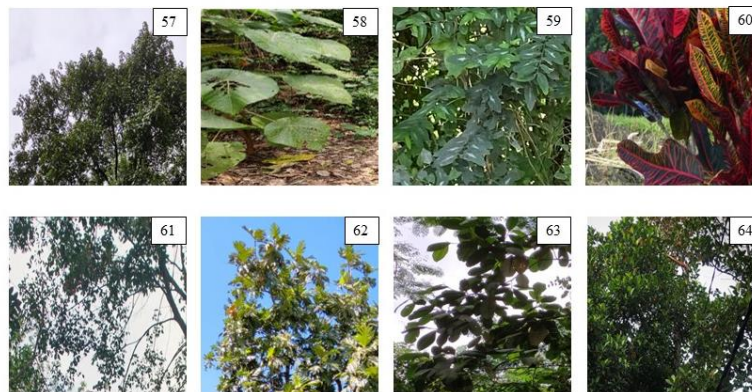


Plate 10 showing plants observed in the study area 57-64

57. *Macaranga indica* Wight, 58. *Macaranga peltata* (Roxb.) Muell.Arg.
 59. *Sauropus androgynus* (L.) Merr., 60. *Codiaeum variegatum* (L.) A.Juss.
 61. *Hevea brasiliensis* (Willd. ex A. Juss.) Muell.-Arg., 62. *Artocarpus incisus* (Thunb.) L.f.
 63. *Artocarpus hirsutus* Lam., 64. *Artocarpus heterophyllus* Lam.

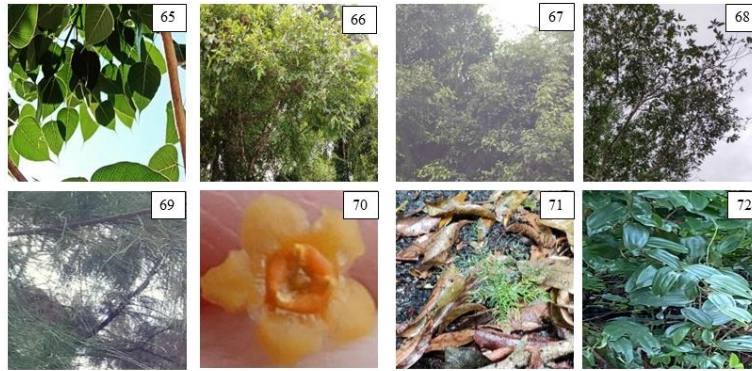


Plate 11 showing plants observed in the study area 65-72

65. *Ficus religiosa* L., 66. *Ficus racemosa* L.
 67. *Ficus benjamina* L., 68. *Ficus benghalensis* L.
 69. *Casuarina equisetifolia* L., 70. *Salacia fruticosa* Wall. ex M.A.Lawson
 71. *Asparagus racemosus* Willd., 72. *Similax zeylanica* L.



Plate 12 showing plants observed in the study area 73-80

73. *Monstera deliciosa* Liebm., 74. *Colocasia esculenta* (L.) Schott
 75. *Caladium bicolor* (Ait. ex Dryand.) Vent., 76. *Syngonium podophyllum* Schott
 77. *Alocasia macrorrhiza* (L.) G. Don, 78. *Dieffenbachia seguine* (Jacq.) Schott
 79. *Pothos scandens* L., 80. *Spathiphyllum wallisii* Regel



Plate 13 showing plants observed in the study area 81-83

81. *Caryota urens* L., 82. *Carica papaya* L.

83. *Bambusa vulgaris* Schrad.

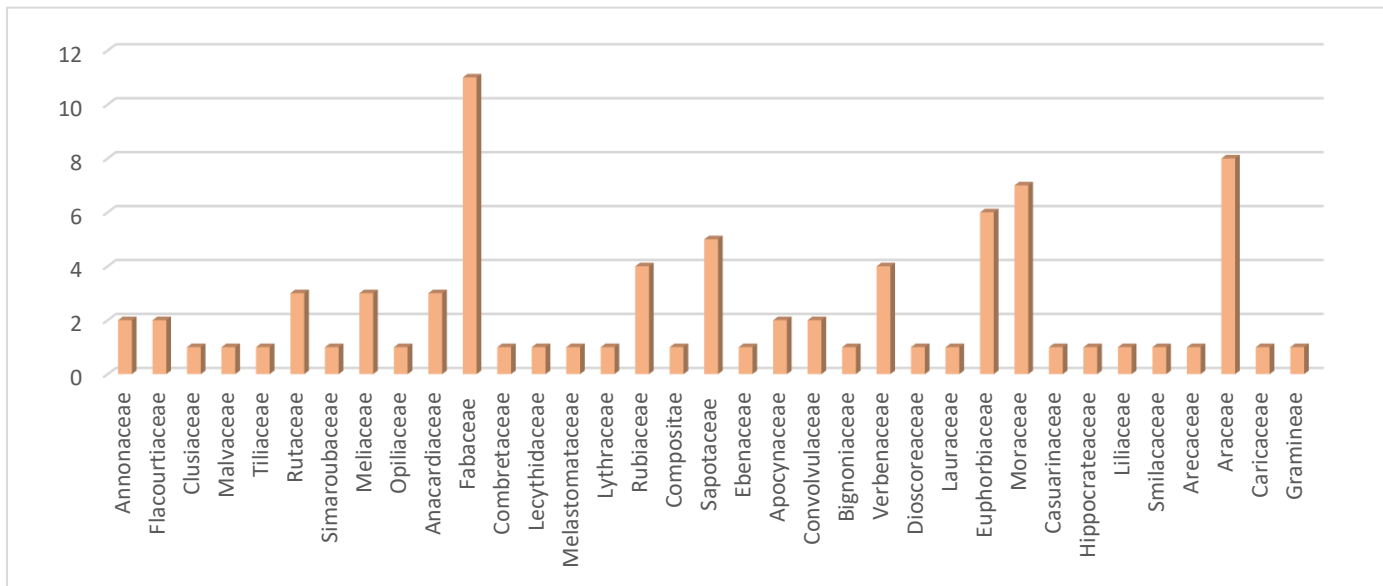


Figure 1 showing a graphical representation of the frequency of species in each family at the area of study



Plate 14 showing invasive plants observed in the study area 1-6

1. *Monstera deliciosa* Liebm., 2. *Colocasia esculenta* (L.) Schott
3. *Caladium bicolor* (Ait. ex Dryand.) Vent., 4. *Alocasia macrorrhiza* (L.) G.,
5. *Dieffenbachia seguine* (Jacq.) Schott, 6. *Pothos scandens* L.



Plate 15 showing invasive plants observed in the study area 7-13

7. *Ipomoea cairica* (L.) Sweet, 8. *Syngonium podophyllum* Schott
9. *Mimosa pudica* L., 10. *Merremia vitifolia* (Burm. f.) Hall.
11. *Spathiphyllum wallisii* Regel, 12. *Urena lobata* L.
13. *Synedrella nodiflora* (L.) Gaertn.

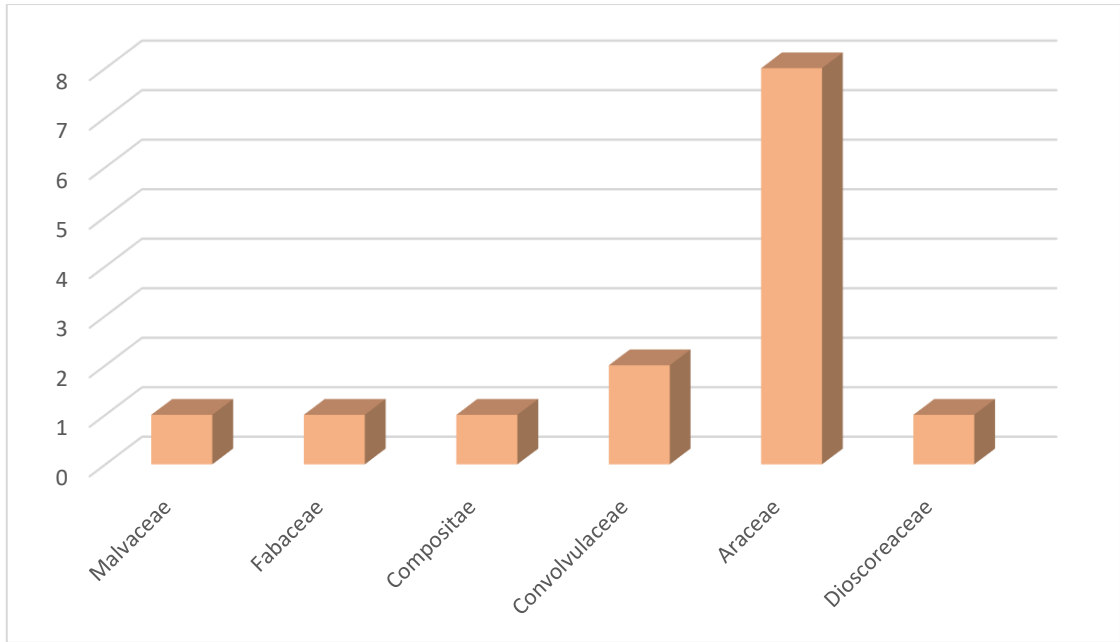


Figure 2 showing a graphical representation of the frequency of invasive species occurring at the area of study

Table 2 The following are the list of invasive species found in the area of study

List of Invasive species found at the site of study	
FAMILY	BINOMIAL
Malvaceae	<i>Urena lobata</i> L.
Fabaceae	<i>Mimosa pudica</i> L.
Dioscoreaceae	<i>Dioscorea bulbifera</i> L.
Compositae	<i>Synedrella nodiflora</i> (L.) Gaertn.
Convolvulaceae	<i>Merremia vitifolia</i> (Burm. f.) Hall.
	<i>Ipomoea cairica</i> (L.) Sweet
Araceae	<i>Syngonium podophyllum</i> Schott
	<i>Pothos scandens</i> L.
	<i>Caladium bicolor</i> (Ait. ex Dryand.) Vent.
	<i>Colocasia esculenta</i> (L.) Schott
	<i>Spathiphyllum wallisii</i> Regel
	<i>Monstera deliciosa</i> Liebm.
	<i>Alocasia macrorrhiza</i> (L.) G.

Table 3 The following are the list of exotic species found in the area of study

FAMILY	BINOMIAL
Annonaceae	<i>Polyalthia longifolia</i> (Sonner.) Thw.
Meliaceae	<i>Sweitenia mahagony</i> (L.) Jacq.
Anacardiaceae	<i>Anacardium occidentale</i> L.
Fabaceae	<i>Adenanthera pavonina</i> L.
	<i>Albizia saman</i> (Jacq.) F.Muell.
	<i>Acacia auriculiformis</i> A.Cunn. ex Benth.
	<i>Caesalpinia decapetala</i> (Roth) Alston
	<i>Delonix regia</i> (Boj. ex Hook.) Rafin.
	<i>Mimosa pudica</i> L.
	<i>Peltophorum pterocarpum</i> (DC.) Backer ex Heyne
	<i>Tamarindus indica</i> L.
Combretaceae	<i>Terminalia catappa</i> L.
Lecythidaceae	<i>Couropita guianensis</i> Aublet
Compositae	<i>Synedrella nodiflora</i> (L.) Gaertn.
Sapotaceae	<i>Chrysophyllum cainito</i> L.
	<i>Manilkara zapota</i> (L.) P.Royen
Ebenaceae	<i>Diospyros discolor</i> Willd.
Convolvulaceae	<i>Merremia vitifolia</i> (Burm. f.) Hall.
	<i>Ipomoea cairica</i> (L.) Sweet
Bignoniaceae	<i>Spathodea campanulata</i> P. Beauv.
Euphorbiaceae	<i>Sauropus androgynus</i> (L.) Merr.
	<i>Codiaeum variegatum</i> (L.) A.Juss.
	<i>Hevea brasiliensis</i> (Willd. ex A. Juss.) Muell.-Arg.
Moraceae	<i>Artocarpus incisus</i> (Thunb.) L.f.
	<i>Ficus religiosa</i> L.
	<i>Ficus benjamina</i> L.
	<i>Ficus benghalensis</i> L.
Casuarinaceae	<i>Casuarina equisetifolia</i> L.
Araceae	<i>Caladium bicolor</i> (Ait. ex Dryand.) Vent.
	<i>Dieffenbachia seguine</i> (Jacq.) Schott
	<i>Spathiphyllum wallisii</i> Regel
	<i>Monstera deliciosa</i> Liebm.
	<i>Alocasia macrorrhiza</i> (L.) G. Don
Caricaceae	<i>Carica papaya</i> L.
Gramineae	<i>Bambusa vulgaris</i> Schrad.



Plate 16 showing exotic plants observed in the study area 1-10

1. *Polyalthia longifolia* (Sonner.) Thw., 2. *Sweitenia mahagony* (L.) Jacq.,
3. *Anacardium occidentale* L., 4. *Adenantha pavonina* L.
5. *Albizia saman* (Jacq.) F.Muell., 6. *Acacia auriculiformis* A.Cunn ex Benth.
7. *Caesalpinia decapetala* (Roth) Alston, 8. *Delonix regia* (Boj. ex Hook.) Rafin.
9. *Mimosa pudica* L., 10. *Peltophorum pterocarpum* (DC.) Backer ex Heyne



Plate 17 showing exotic plants observed in the study area 11-20

11. *Tamarindus indica* L., 12. *Terminalia catappa* L.
13. *Couroupita guianensis* Aublet, 14. *Synedrella nodiflora* (L.) Gaertn.
15. *Chrysophyllum cainito* L., 16. *Manilkara zapota* (L.) P.Royen
17. *Diospyros discolor* Willd., 18. *Merremia vitifolia* (Burm. f.) Hall.
19. *Ipomoea cairica* (L.) Sweet, 20. *Spathodea campanulata* P. Beauv.

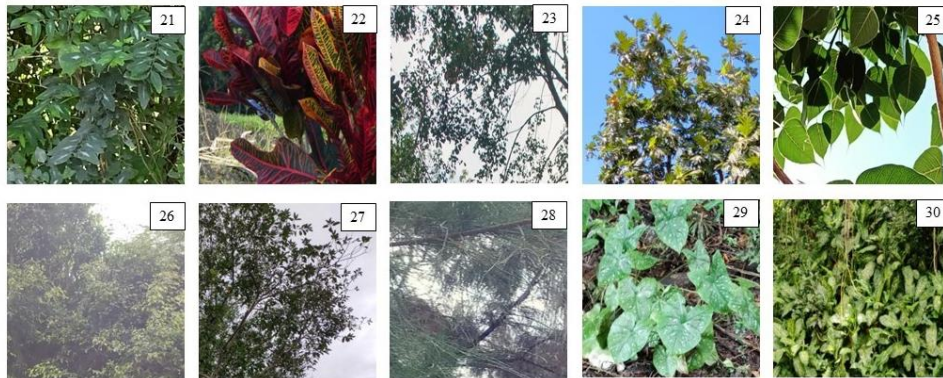


Plate 18 showing exotic plants observed in the study area 21-30

21. *Sauropus androgynus* (L.) Merr., 22. *Codiaeum variegatum* (L.) A.Juss.
 23. *Hevea braziliensis* (Willd. ex A. Juss.) Muell.-Arg., 24. *Artocarpus incisus* (Thunb.) L.f.
 25. *Ficus religiosa* L., 26. *Ficus benjamina* L.
 27. *Ficus benghalensis* L., 28. *Casuarina equisetifolia* L.
 29. *Caladium bicolor* (Ait. ex Dryand.) Vent., 30. *Dieffenbachia seguine* (Jacq.) Schott



Plate 19 showing exotic plants observed in the study area 31-36

31. *Spathiphyllum wallisii* Regel, 32. *Monstera deliciosa* Liebm.
 33. *Colocasia esculenta* (L.) Schott., 34. *Alocasia macrorrhiza* (L.) G. Don,
 35. *Carica papaya* L., 36. *Bambusa vulgaris* Schrad.

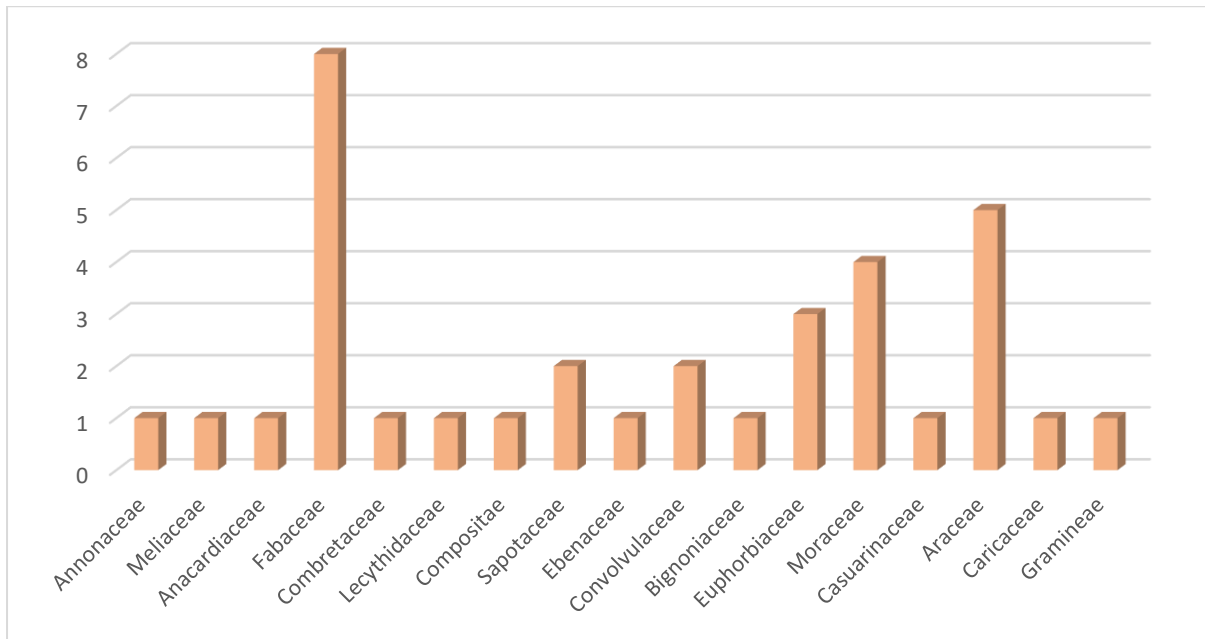


Figure 3 showing a graphical representation of the frequency of exotic species occurring at the area of study

DISCUSSION

The present study carried out at the campus of FACT, Cochin Division shows that the green belt areas are still sustaining and also maintained well. This ensures there aren't much pest infestation around the area and also put a tab reptilian attack on the township area. The township area has a pristine atmosphere, they have open spaces with trees like *Mangifera indica* L. and shady avenue trees like *Albizia saman* (Jacq.) F. Muell. The major findings from this study were that more than 80 plants could be observed and identified from 36 families, more than 30 exotic species were observed, these could have been accidentally introduced by transportation systems or intentionally as a part of Green-belt planning. *Manilkara zapota* (L.) P. Royen and *Carica papaya* L. are some of the commonly consumed exotic fruits found in the area of study. Some of the species *Casuarina equisetifolia* L. and *Polyalthia longifolia* (Sonner.) Thw. were among some of the exotics suggested for Green-belt. Though they are efficient controllers of air pollution, more native species could have been suggested while planning and planting Green-belt areas. It is noteworthy that there were native plants like *Garcinia xanthochymus* Hook.f. ex Anders. in Hook.f. in the campus. There were other plants like *Salacia fruticosa* Wall. ex M.A. Lawson which is endemic to Western Ghats. Major number of species were in the members of Fabaceae (**Table 1**) and all the members found in the study area belonging to Araceae were invasive. (**Table 2**) Among the invasive species there were exotic aroids like *Dieffenbachia seguine* (Jacq.) Schott and natives like *Colocasia esculenta* (L.) Schott. Majority of the exotic species were from Fabaceae family. The Fabaceae family comprises eight exotic species in the study area: *Adenanthera pavonina* L., *Albizia saman* (Jacq.) F. Muell., *Acacia auriculiformis* A. Cunn. ex Benth., *Caesalpinia decapetala* (Roth) Alston, *Delonix regia* (Boj. ex Hook.) Rafin., *Mimosa pudica* L., *Peltophorum pterocarpum* (DC.) Backer ex Heyne and *Tamarindus indica* L. (**Table 3**) Five exotic species in the area from Araceae family were *Caladium bicolor* (Ait. ex Dryand.) Vent., *Dieffenbachia seguine* (Jacq.) Schott, *Spathiphyllum wallisii* Regel, *Monstera deliciosa* Liebm., *Alocasia macrorrhiza* (L.) G. Don (**Table 3**) From the Moraceae family the species representatives were *Artocarpus incisus* (Thunb.) L.f., *Ficus religiosa* L., *Ficus benjamina* L., *Ficus benghalensis* L. (**Table 3**) Family Annonaceae, Meliaceae, Anacardiaceae, Combretaceae, Lecythidaceae Compositae, Ebenaceae, Bignoniaceae, Casuarinaceae, Caricaceae, Gramineae were represented by only one exotic species. (**Table 3**)

SUMMARY AND CONCLUSION

The major types of taxa were from Fabaceae. From this study a conclusion was drawn that the trees in FACT were planted based on pollution tolerance and pollution control. The species selected were fast-growing tree varieties. Invasive species like *Caladium bicolor* (Ait. ex Dryand.) Vent., *Dieffenbachia seguine* (Jacq.) Schott, *Spathiphyllum wallisii* Regel, *Monstera deliciosa* Liebm. are garden plants that can thrive under favourable conditions. The newly emerging saplings could have been spread by mammals or birds. There were rare and endemic species. FACT steers clear of plastic. One of the main waste products dumped at the industrial site is gypsum; with the continuous dumping of this product, no trees or plants grow on it; however, older trees survive and thrive despite being next to the dumping area. Occasional clearing of bushes is necessary, but regular maintenance ensures there aren't any reptile infestations immediately around the plant area and helps to keep the compound safe. Trees help in controlling pollution as they act as a green belt. The area can be further explored for phytopharmacological specimens that may be sourced for novel medicines. It is a treasure trove of gene pools that could vanish at any time, but they have survived due to visionaries like M K Nair, one of FACT's pioneers, who played a key role in planting these surviving trees, which restore pristine nature by ensuring micro-niches for other species to thrive.

The FACT gives priority to the health and safety of people in and around industrial areas. Despite being a growing industry, care is taken to maintain and protect the environment around it.

The campus of FACT, Cochin Division is indeed a treasure trove of plants. Despite the exposure to direct and indirect threats like pollution from nearby industries and expansion and encroachment these areas are still standing. It is important that more similar studies are conducted so as to understand the species diversity which is a good source of the dwindling genetic pool.

REFERNCE

Bhattacharya, A.K. 1994. Efficacy of tree species towards gaseous pollutants and its significance in air pollution control by plantations of pollution resistant trees. *Indian Forester* 120: 658- 669.

Belmonte, J.& Vilà, M. (2004). Atmospheric invasion of non-native pollen in the Mediterranean region. *American journal of botany*. 91. 1243-50. 10.3732/ajb.91.8.1243.

Chacko,K. C.,Pandalai,R. C. ,Sankar,S.,Pillai P. K. C (2001) Establishment of Greenbelt Around Kochi (Cochin) Refineries Limited, Ambalamugal,KFRI Research Report No. 217

Cororaton, C., Orden, D., & Peterson, E., (2009). A Review of Literature on the Economics of Invasive Species.

Gamble, J. S., & Fischer, C. E. C. (1847-1925). *Flora of the Presidency of Madras*. Vol 1,2,3, Adlard and sons limited, London

IPNI (2022). International Plant Names Index. Published on the Internet <http://www.ipni.org>, The Royal Botanic Gardens, Kew, Harvard University Herbaria & Libraries and Australian National Botanic Gardens. [Retrieved 06 December 2022].

ITIS (2022). Integrated Taxonomic Information System. Published on the Internet <https://www.itis.gov>, [Retrieved 06 December 2022].

Kapitza, K., Zimmermann, H., Martín-López, B., & von Wehrden, H. (2019). Research on the social perception of invasive species: A systematic literature review. *NeoBiota*. 43. 47-68. 10.3897/neobiota.43.31619.

Kaushik G., Chel A., Patil S., & Chaturvedi S. (2019). Status of Particulate Matter Pollution in India: A Review, *Handbook of Environmental Materials Management*

Kunnath, S & Jose, P. (2018). On the reproductive biology of *Salacia fruticosa* Wall. ex M.A. Lawson - An endemic medicinal plant of the Western Ghats, India. *Journal of Threatened Taxa*. 10. 13002-13005. 10.11609/jott.3069.10.15.13002-13005.

Langmaier M, Lapin K. A Systematic Review of the Impact of Invasive Alien Plants on Forest Regeneration in European Temperate Forests. *Front Plant Sci*. 2020 Sep 3;11:524969. doi: 10.3389/fpls.2020.524969. PMID: 33013958; PMCID: PMC7509433.

Luigi A., Francesco B., Raffaele G., Compton M.T. (2017). Environmental pollution and risk of psychotic disorders: A review of the science to date, *Schizophrenia Research*.181.55-59

Mandal, B., Ganguly, A., Mukherjee, A., Shome, D. (2019). Assessment and Analysis of Avenue Trees In Urban Kolkata : A Case Study. 14. 7-15.

Patnaik R. (2018) *IOP Conf. Ser.: Earth Environ. Sci.* **120** 012016

Paital B, Agrawal PK. Air pollution by NO₂ and PM_{2.5} explains COVID-19 infection severity by overexpression of angiotensin-converting enzyme 2 in respiratory cells: a review. *Environ Chem Lett*. 2021;19(1):25-42. doi: 10.1007/s10311-020-01091-w. Epub 2020 Sep 18. PMID: 32982622; PMCID: PMC7499935.

Sasidharan, N. (2004) Biodiversity Documentation for Kerala Part 6: Flowering Plants.
Kerala Forest Research Institute, Peechi.

Waage, J. K., R. W. Fraser, J. D. Mumford, D.C. Cook & A. Wilby. 2005. A New
Agenda for Biosecurity. London: Faculty of Life Sciences, Imperial College.