EASTERN

BEAUTIFUL FLOWERS OF ASSAM

Namita Nath
S. K. Borthakur

BEAUTIFUL FLOWERS OF ASSAM

Namita Nath

Sachin Kumar Borthakur

EASTERN

EBH Publishers (India)
Guwahati-1

Namita Nath, Sachin Kumar Borthakur

Beautiful Flowers of Assam

The views expressed in this book are those of the Author, and not necessarily that of the publisher. The publisher is not responsible for the views of the Author and authenticity of the data, in any way whatsoever.

© Author, 2014
First Published in 2014 by
EBH Publishers (India)
an imprint of Eastern Book House
136, M.L. Nehru Road, Panbazar
Guwahati-781 001 (India)

Phone : +91 361 2513876, 2519231, 92070 45352
Fax : +91 361 2519231
Email : info@easternbookhouse.in/easternbookhouse@gmail.com.
www.easternbookhouse.in

Digitalized by Mage Orange Publication and Technologies, Guwahati, India
www.mageorange.com

Preface

Very often we come across some type of attractive flower bearing plants that we get so much excited and impressed upon us. It is the fact that the beautiful flower bearing plants are the centre of attraction for all the nature lover. Such decorative showy flower bearing plants have the capacity to attract people by their graceful foliages along with very attractive showy, brilliantly colored blossoms either solitarily or displaying on various types of clusters. Some times the main attraction of some flower bearing plants may be the exquisite aroma that is highly perfumed blossoms also be a common cause of demand for those plants.

It is also a fact that some flowers are closely attached with our customs, tradition, and religion. Flowers have deep sense of belonging in our unconscious mind and associated with us that are often used in various religious traditional rites or finds mention in our songs, legends, culture and all. As Henry David rightly said "Earth laugh in flower" and Jim Brown opined "Flowers are our silent friends".

It is very interesting to note here that some flowers are often used as vegetable and eaten in curries or as herbal recipe to cure or control or to prevent one or other diseases. Mention may be made of flower of Night Jasmine (*Nyctanthes arbortristis* L.), Drumstick (*Moringa oleifera* Lamk.), Phlogacanthus (*Phlogacanthus thyrsiflorus* Nees.), and Agathi flower i. e.*Sesbania grandiflora* (L.) Poir., *Oroxylum indicum* (L.) Vent.,etc.

In Assam (India), we have lots of beautiful flower bearing plants.Some of which are not native to our country but such plants are being planted in the state from a very long time thus it is very difficult to differentiate or to distinguish them from rest of the native plants. Here in this book such exotic beautiful flower bearing plants are also included with their detailed descriptions and photographs. Besides all such beautiful flowering exotic or native plants that are planted as ornamental plants there are some wild plants which are often neglected but produce very attractive blossoms find mention in this book.

It is the fact that being attracted by the beautiful blossoms people become very much eager to know the name of the particular plant

displaying extravagantly beautiful or highly aromatic flowers. Thus in this book entitled **The Beautiful flowers of Assam** attempts have been made to make common people able to identify such plants with the detailed description in a very lucid way as far as possible by avoiding the technical taxonomic terminologies and providing photographs. Here the medicinal uses or properties of the plants are also mentioned so that one can get the information in this regard.

The book is having mainly three chapters , of which Chapter-I deals with introduction on plant species of Assam. Here importance is given to provide a brief account on Orchid diversity, Bamboo-cane diversity, Medicinal plant diversity, Rare and Endangered plants of Assam, Endemic plants as well as detailed about the study area including- location, physiography, geology, climate, rivers, soils and vegetation type.

The second chapter deals with all morphological aspects of flowers so that it becomes very easy for common people to get clear concept on structural detailed or terminologies regarding flower morphology. This includes detailed description of different parts of flowers like- calyx(sepal), corolla(petal), androecium(stamen) and gynoecium(carpel), as well as arrangement of flowers or inflorescence types.

Chapter-III is the main chapter of the book named Spectrum of flowers of Assam. In this chapter detailed description of all the included species are given providing some vivid photographs. Importance was given to provide the English name, Local name, updated Botanical name, family and then brief identifying description of each item. The medicinal uses of some species are mentioned if they bear so. In case of local name weightage was given to provide Assamese name of the state along with names that are used in Western part of Assam mostly in the old Goalpara region.

Hope this book **Beautiful Flowers of Assam** will be helpful to the naturalists, flower lovers, students of Botany, Researchers and common people as well. We sincerely invite constructive criticisms for improvement of the book in subsequent edition.

Namita Nath
Sachin Kumar Borthakur

Acknowledgement

In writing the book various persons helped in the different ways without whom the work would not get the present shape and for which authors are thankful to all of them. We are particularly thankful to Dr. Ananda Das (Department of Geography, Sonapur College) for his help and co-operation at every step of the work.

We are especially thankful to Mr. Bikramjit Barman and Mr. Kishore Deka (Project fellow, Dept. of Botany, Goalpara College) for helping us in taking the photographs of some of the plants. We offer our heartfelt thanks to Free lance Photographer Mr. Himdipta Kakati for taking the pain to take the lively snapes of a good number of flowers. We must express our gratefulness to Mr. Benjamin Kaman of k.v.k., Dudhnoi for providing the vivid photograph of *Rhynchostylis retusa* (L.) Bl.

We are thankful to Mr. Bhaben Nath (ICST Computer Centre, Goalpara, Assam) for guiding us at every step of the computerisation of the work.

Thanks are due to our colleagues both in the Department of Botany, Goalpara College and the Department of Botany, Gauhati University for encouraging us in this task.

We are also grateful to Prof. A.K. Bhagabati, Department of Geography, Gauhati University; Dr. Asraf Ali , Department of Geography, Sonapur College, Sonapur ; Dr Sidhinath Sarma, Department of Geography , Goalpara College, Goalpara for their help and cooperation in writing the Geographical profile of the Book.

We are thankful to Dr. Ananta Bora, Department of Botany, Birjhora Mahabidyalay, Birjhora and Prof. Karuna Kanta Das, Department of Botany, D. K. College, Mirza, for their help and cooperation during the work.

We extend our heart felt thanks to all our friends, family members for their constant encouragement and support.

We are indebted to Ms. Puspanjalee Das Dutta and Pranjal Kalita, EBH Publishers (India), who took the pain in editing the book, and to given it into publishable form.

We are thankful to Mr.J. P. Sarma of EBH Publishers (India), Guwahati -1 for accepting to bring out this book.

Namita Nath

Sachin Kumar Borthakur

Contents

Figure No.		Title
2.1	:	Gamosepalous Calyx
2.2	:	Palysepalous Calyx
2.3	:	Sepal modified in Mussaenda
2.4	:	Pappus
2.5	:	Sepal modified to spines
2.6	:	Sepal modified to fruit
2.7	:	Cruciform corolla
2.8	:	Tubular corolla
2.9	:	Bell shaped corolla
2.10	:	Funnel shaped corolla
2.11	:	Legulate corolla
2.12	:	Rotate corolla
2.13	:	Bilabiate corolla
2.14	:	Personate corolla
2.15	:	Valvate aestivation
2.16	:	Twisted aestivation
2.17	:	Imbricate aestivation
2.18	:	Vexillary aestivation
2.19	:	Monadelphous stamen
2.20	:	Diadelphous stamen
2.21	:	Polydelphous stamen
2.22	:	Syngenecious stamen
2.23	:	Synandrous stamen
2.24	:	Marginal placentation
2.25	:	Axile placentation
2.26	:	Parietal placentation
2.27	:	Central placentation
2.28	:	Free central placentation
2.29	:	Basasl placentation

2.30 : Superficial placentation
2.31 : A typical ovule
2.32 : Orthotropous ovule
2.33 : Anatropous ovule
2.34 : Amphitropous ovule
2.35 : Campylotrpous ovule
2.36 : Raceme
2.37 : Spike
2.38 : Spadix
2.39 : Catkin or Ament
2.40 : Spikelet
2.41 : Corymb
2.42 : Umbel
2.43 : Head or capitulum
2.44 : Monochasial scorpoid cyme
2.45 : Monichasial helicoid cyme
2.46 : Dichasial cyme
2.47 : Polychasial cyme
2.48 : Cyathium
2.49 : Hypenthodium
2.50 : Verticellester
3.1 : *Acacia farnesiana* (L) Willd.
3.2 : *Anthocephalus chinensis* (Lamk.) A. Rich. ex Walp.
3.3 : *Allamanda cathertica* L.
3.4 : *Allamanda nerfolia* Hook.
3.5 : *Allamanda violacea*
3.6 : *Bauhinia variegata* L.
3.7 : *Bauhinia variegata* var. *candida*
3.8 : *Bauhinia purpurea* L.
3.9 : *Belamcanda chinensis* (L.) DC.
3.10 : *Bombax ceiba* L.
3.11 : *Bougainvillea spectabilis* (pink)
3.12 : *Bougainvillia spectabilis* (white)

3.13 : *Brugmansia suaveolens* (Willd.) Bercht. & Presl.
3.14 : *Betea monosperma* (Lamk.) Taub.
3.15 : *Caesalpinea pulcherrima* (L.) Sw. (red)
3.16 : *Caesalpinea pulcherrima* (L.) Sw. (yellow)
3.17 : *Canna indica* L. (red)
3.18 : *Canna indica* L. (yellow)
3.19 : *Callistemon lanceolatus* (Sm.) Sweet
3.20 : *Cascabala thevet*ia (L.) Lippold (yellow)
3.21 : *Cascabala thevetia* (L.) Lippold (saffron)
3.22 : *Cascabala thevelia* (L.) Lippold (white)
3.23 : *Cassia alata* L.
3.24 : *Cassia fistula* L.
3.25 : *Cassia nudosa* Warm. *ex* Roxb.
3.26 : *Catharanthus roseus* (L.) G. Don var. *roseus*
3.27 : *Catharanthus roseus* (L.) G. Don var. *alba*
3.28 : *Celosia argentea* L.
3.29 : *Celosia argentea* L. var. *cristata* L.
3.30 : *Cestrum nocturnum* L.
3.31 : *Chrysanthemum coronarium* L. (yellow)
3.32 : *Chrysanthemum coronarium* L. (purple)
3.33 : *Cleome gynandra* L.
3.34 : *Clerodendrum japonicum* (Thunberg) Sweet
3.35 : *Clerodendrum philippinum* Schauer.
3.36 : *Clerodendrum thomsoniae* Balf.
3.37 : *Clerodendrum thomsoniae* Balf. (close up)
3.38 : *Clitoria ternatea* L. (white)
3.39 : *Clitoria ternatea* L. (blue double)
3.40 : *Cosmos sulphureus* Cav. (orange)
3.41 : *Cosmos sulphureus* Cav. (yellow)
3.42 : *Crataeva religiosa* Forst. f.
3.43 : *Crotalaria pallida* Ait.
3.44 : *Crinum pratens* Herb
3.45 : *Dahlia pinnata* Cav. (orange)

3.46 : *Dahlia pinnata* Cav. (maroon)
3.47 : *Datura metel* L.
3.48 : *Datura stramonium* L.
3.49 : *Delonix regia* (Bojer.) Raf.
3.50 : *Eichhornia crassipes* (Mart.) Solms
3.51 : *Erythrina indica* Roxb.
3.52 : *Euphorbia milii* (subspecies *splendens*)
3.53 : *Euphorbia pulcherrima* Willd. ex Klotzsch
3.54 : *Firmiana colorata* (Roxb.) R. Br.
3.55 : *Gardenia angusta* (L.) Merr.
3.56 : *Gloriosa superba* L.
3.57 : *Hedychium cononarium* Keoning var. *cononarium*
3.58 : *Helianthus annus* L.
3.59 : *Heliconia* species
3.60 : *Hibiscus mutabilis* L. (in morning)
3.61 : *Hibiscus mutabilis* L. (in afternoon)
3.62 : *Hibiscus rosa-sinensis* L.
3.63 : *Hibiscus schizopetalus* (Mast.) Hook. f.
3.64 : *Hibiscus rosa-sinensis* L. (white)
3.65 : *Hibiscus cannabinus* L.
3.66 : *Hibiscus subdarifa* (red variety)
3.67 : *Holmskioldia sanguinea* Retz.
3.68 : *Impatiens balsamina* L.
3.69 : *Impatiens balsamina* L.
3.70 : *Ipomoea quamoclit* L.
3.71 : *Ixora coccinea* L.
3.72 : *Jacaranda mimosifolia* D. Don
3.73 : *Jasminum laurifolium* Roxb. var. *laurifolium*
3.74 : *Jasminum multiflorum* (Burm f.) Andrews
3.75 : *Jasminum sambac* (L.) Ait.
3.76 : *Kalanchoe blossfeldiana*
3.77 : *Kalanchoe blossfeldiana* (close up)
3.78 : *Kalanchoe pinnata* (Roxb.) Pers.

3.79 : *Lagerstroemia regionae* Roxb.
3.80 : *Malvaviscus arboreus* Cav. (pale pink)
3.81 : *Malvaviscus arboreus* Cav. (red)
3.82 : *Melastoma malabathricum* L.
3.83 : *Mesua ferrea* L.
3.84 : *Michelia champaca* L.
3.85 : *Mimusops elengi* Roxb.
3.86 : *Mirabilis jalapa* L.
3.87 : *Mirabilis jalapa* L.(yellow)
3.88 : *Monochoria hastata* (L.) Solms.
3.89 : *Murraya paniculata* (L.) Jacq. (=*Murraya exotica* L.)
3.90 : *Mussaenda erythrophylla* (pink)
3.91 : *Mussaenda erythrophylla* (white)
3.92 : *Nelumbo nucifera* Gaertn.
3.93 : *Nerium oleander* L.
3.94 : *Nyctanthes arbortristis* L.
3.95 : *Nymphaea rubra* Roxb. ex Andrews
3.96 : *Dendrobium aphyllum* (Roxb.) C.E.C. Fisch.
3.97 : *Dendrobium fimbriatum* Hook.
3.98 : *Dendrobium moschatum* (Buch.-Ham.) Sw.
3.99 : *Dendrobium nobile* Lindl.
3.100 : *Vanda tessallata* (Roxb.) Hook. f.
3.101 : *Rhynchostylis retusa* (L.)
3.102 : *Oxalis debilis* H.B. K. var. *corymbosa* (DC.) Lour.
3.103 : *Oxalis triangularis*
3.104 : *Pandanus fascicularis* Lamarck
3.105 : *Pentapetes phoenicea* L.
3.106 : *Passiflora adenophylla* Mast.
3.107 : *Plumeria alba* L.
3.108 : *Plumeria rubra* L. var. *acutifolia* (Poir.) Bailey
3.109 : *Polianthes tuberosa* L.
3.110 : *Portulaca pilosa* L.
3.111 : *Quisqualis indica* L.

3.112 : *Rosa* sp (red)
3.113 : *Rosa* sp (white)
3.114 : *Rosa* sp (pale pink)
3.115 : *Saraca asoca* (Roxb.) de Willde
3.116 : *Saraca asoca* (Roxb.) de Willde (close up)
3.117 : *Selenicereus grandiflorus* Britton & Rose
3.118 : *Sesbania grandiflora* (L.) Poir.
3.119 : *Spathodia campanulata* Beauv.
3.120 : *Tabernaemontana divaricata* (L.) R.Br. ('Pin Wheel')
3.121 : *Tabernaemontana divaricata* (L.) R. Br. ('Flore Pleno')
3.122 : *Tagetes* species
3.123 : *Tagetes* species
3.124 : *Tecoma stans* (L.) Juss. ex Kunths
3.125 : *Thespesia populnea* (L.) Soland ex Corr.
3.126 : *Thunbergia coccinea* Wall.
3.127 : *Thunbergia coccinea* Wall. (close up)
3.128 : *Thunbergia erecta* (Benth.) T. And.
3.129 : *Tithonia diversifolia* (Hemsl.). A Gray
3.130 : *Zephyranthes candida* (Lindl.) Herb.
3.131 : *Zephyranthes rosea* (Lindl.) Streng.
3.132 : *Zinnia elegans* Jacq. (Profusion orange)

Introduction

The North-East of India, which includes the states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura, is one of the richest regions of biodiversity in India as well as in the world. About 73 percent of the region is covered with forests as against national average of 19.5 percent. With floral and faunal elements of different bio-geographical zones this region is particularly rich in biological species and genetic diversity with high endemism. This region is also one of the 12 mega hotspots identified in the world with reference to threats to biodiversity.

The region represents the transitional zone between Indian, Indo-Malayan and Indo-Chinese bio-geographic region as well as the meeting place of the Himalayan Mountains with that of Peninsular India, and thus acts as a bio-geographic gateway. About 8,000 species of flowering plants grow here. This region is considered to be a sanctuary of a number of primitive flowering plants. Several groups of plants such as orchids, rhododendrons, ferns, bamboos, zingibers and lichens demonstrate the diversity in this region. Of the 7,000 endemic species found in India, 3,000 alone are available here. North-East India is considered to be one of the centres of origin of rice and citrus and secondary origin of maize. About 17 species and 52 varieties with seven natural hybrids of citrus are available and over 8,000 germplasms of rice have been collected from this region. The genetic diversity of 132 species of wild relatives of cultivated crops like citrus, Prunus, Pyrus, Musa, cucurbit, legume and Thea are found in this region.

Assam with remarkable physiographic diversity having surrounded by hills all along its boundary, varied climate, old and

young geological strata, wild range of soil types, and wedged in between other interesting floristic areas like Tibet, China and Myanmar, has been the focal point of attraction for botanists and horticulturists from very early times. Apart from establishing the wild occurrence of the tea plants in the early part of the 19th century, the Assam Tea delegation consisting of Nathaniel William Griffith and John Mc Cleland, pioneered in bringing to light many interesting plants of the State. The distinguished botanists Joseph Dalton Hooker and Thomas Thomson spent some time during the 1850s exploring the floristic wealth of the State and did much to publicize to the rest of the botanical and horticultural world the multitude of interesting plants of this region. Even during the early period, the well-known horticultural firm of Veitch and Sons of Exeter had sent one of their plant collectors Thomas Lobb, all the way from England, to collect plants for the gardens of England. All these are now matters of history, and it explains why many European gardens are adorned with several attractive and well flowering plants that were collected from Assam.

The north bank landscape comprising of the area between foothills of the eastern Himalayas and the northern bank of the river Brahmaputra is considered as the second richest centre of plant diversity in the world next to Sumatra forests in Indonesia.

Botanical Profile of Assam

In Assam, there are about 4273 plant species including infraspecific taxa that are distributed in 1448 Genera and 272 families. This number of plants occupies 25.12 per cent of the flora of Indian Subcontinent. Such a large proportion of plant species are distributed in various plant groups which include- Fern Allies 40; Ferns 315 species; Gymnosperms 23 species; Dicotyledons 2823 species and Monocotyledons 1072 species. Thus it can be said that in the present work of Beautiful flowers as almost all species are from Angiosperm group that include both Monocotyledons and Dicotyledons comprise of a total of 3895 species.

It is very interesting that the state of Assam serves as a centre of origin of many economically important plants. Mention may be made of plants like- *Camellia sinensis* var. *assamica* (Masters, 1844), Musa(Chakraborty, 1951) , Citrus (Tanaka, 1958), *Mangifera indica*

(Mukherjee, 1949, 1972) and according to Tatktajan(1969) it is the centre of origin of most of the Primitive Angiosperms. It is remarkable that Takhtajan considered Assam as "The Cradle of Flowering Plants" and he commented that "between Assam and Fiji grew not just isolated primitive types but whole group of closely interrelated genera and even families."

Table 1.1: Ten Dominant Families of the Flora of Assam

Sl. No.	Family	Assam		India	
		Genera	Species	Genera	Species
1	**Poaceae**	83	212	264	1291
2	**Orchidaceae**	81	191	184	1229
3	**Fabaceae**	68	171	167	1141
4	**Asteraceae**	66	127	166	808
5	**Rubiaceae**	55	127	113	616
6	**Euphorbiaceae**	45	102	84	523
7	**Cyperaceae**	15	81	38	545
8	**Araceae**	18	47	29	126
9	**Cucurbitaceae**	23	46	39	99
10	**Lauraceae**	10	45	17	212

Source : Mao and Hynniewta, 2000, Floristic Diversity of North –East India, Jour. of Assam Sc. Soc.41, No. 4.

Orchid Diversity

As far as Orchid diversity is considered the state comprises of 293 Orchid species that occupies 44.39 per cent of the Orchid flora of Northeast India. Some of the important species being- *Aerides multiflora* Roxb.; *Arundina graminifolia* (D. Don) Hochr.; *Bulbophyllum* spp.; *Dendrobium aphyllum* (Roxb.) Fischer; D. *assamicum* Chowdhury; *D. densiflorum* Wall.; *D. formosum* Roxb. Ex Lindl.; *D. mannii* Ridl. ; *D. nobile* Lindl.; *Eria* spp.; *Eulophia kamarupa* Chowdhury; *Rhynchostylis retusa* (L.) Bl.; *Spathoglotis plicata* Bl.; *Vanda bicolor* Griff. V. *tessallata* (Roxb.) Hook. f. ; *Zeuxine strateumaticum* (L.) Schl.etc.

Bamboo-Cane Diversity

The topography, physiography, climatic conditions all these

favour the growth of good number of Bamboo- Cane species. Assam has about 42 Bamboo species under 10 genera and 14 Cane species under 4 genera. Some of the Bamboos are- *Bambusa balcooa* Roxb. ; *B. bambos* (L.)Voss ; *B. cacharensis* Majumder; *B. mastersii* Munro ; *B. nutans* Wall.; *B. pallida* Munro; *B. polymorpha* Munro; *B. tulda* Roxb.; *Dendrocalamus hamiltonii* Nees &Arn. Ex Munro; *D. baccifera* Kurz., etc.

Some of the Cane species are- *Calamus erectus* Roxb.; *C. flagellum* Griff.; *C. floribundus* Griff.; *C. gracilis* Roxb.; *C. latifolius* Roxb.; *C. tenuis* Roxb., etc.

Medicinal Plant Diversity

The medicinal plant diversity is very remarkable as the floristic diversity of the state of Assam is concerned with as many as 951 species of plants that are used as herbal medicine by one means or other. Some commonly used medicinal plants are- *Acorus calamus* L.; *Aegle marmelos* (L.) Corr.; *Ageratum conyzoides* L.; *Aloe barbadensis* Mill.; *Asperagus racemosus* Wild.; *Azadirachta indica* A.Juss. ; *Bacopa monnieri* (L.)Penn.; *Boerhavia diffusa* L.; *Cardiospermum helicacabum* L.; *Cassia alata* L.; *C. fistula* L.; *Catharanthus roseus* (L.) G. Don; *Centella asiatica* (L.) Urban ; *Cissus quadrangula* L. ; *Clerodendrum glandulosum* Coleb. Ex Wall.; *C. viscosum* Wall.; *Curcuma aromatica* Salisb.; *C. domestica* Valet.; *C. zedoaria* (Berg.)Rosc.; *Datura metal* L. ; *D. stramonium* L. ; *Deeringia amaranthoides* (Lam.)Merr.; *Drymaria diandra* Bl.; *Eclipta prostata* (L.)L.; *Enhydra fluctuans* Lour. ; *Euphorbia hirta* L.; *E. thymifolia* L.; *Euryale ferox* Salisb.; *Garcinia cowa* Roxb. ex DC. ; *G. Kydia* Roxb.; *Glycosmis pentaphylla* (Retz.) Corr.; *Grangea maderaspatana* (L.) Poir.; *Heliotropium indicum* L.; *Holarrhena antidysenterica* (L.) Wall.; *Homalomena aromatica* Schott; *Houttuynia cordata* Thunb.; *Hydrocotyle javanica* Thunb.; *H. sibthorpioides* Lam.; *Hyptis suaveolens* Poit.; *Impatiens balsamina* L.; *I. tripetala* L.; *Ipomoea aquatica* Forssk.; *I. quamoclit* L.; *Kaempferia galanga* L.; *Kolanchoe pinnata* (Roxb.) Pers.; *Lawsonia inermis* L.; *Leucas plukenetii* (Roth) Spreng. ; *Melia azedarach* L.; *Mentha arvensis* L.; *Mesua ferrea* L.; *Mimusops elengi* L. Baker ; *Mirabilis jalapa* L.; *Murraya koenigii* (L.) Spreng.; *M. paniculata* (L.) Jack.; *Nyctanthes arbortristis* L.; *Ocimum*

americanum L.; *O. basilicum* L.; *O. gratissimum* L.; *O. sanctum* L.; *Paederia foetida* L.; *Passiflora foetida* L.; *Phyllanthus acidus* (L.) Skeels ; *p. emblica* L.; *P. fraternus* Webster; *Piper longum* L.; *Plantago erosa* Wall.; *Plumbago indica* L.; *P. zeylenica* L.; *Plumeria alba* L.; *Polygonum barbatum* L.; *P. chinense* L.; *Rauvolfia serpentina* (L.) Benth.ex Kurz; *R. tetraphylla* L.; *Ricinus communis* L.; *Sapindus mukorossii* Gaertn.; *Saraca asoca* (Roxb.) de Willd.; *Scoparia dulsis* L.; *Sida acuta* Burm. f.; *S. cordifolia* L.; *S. rhombifolia* L.; *Solanum anguivi* Lam.; *S. ferox* L.; *S. nigrum* L.; *S. torvum* Sw.; *Spondias pinnata* (L.f.) Kurz; *Tabernaemontana divaricata* (L.) R. Br.; *Urena lobata* L.; *Vitex negundo* L.; *Xanthium strumarium* L. and many more.

Rare Endangered Plants

According to the International Union of Conservation of Nature and Natural Resources (IUCN 1994) Red Data Book, there are 8 extinct species, 1 extinct in wild, 284 critically endangered, 149 endangered, 58 vulnerable and 13 near threatened species are observed in Assam. Some such plants are mentioned in the following table.

Table 1.2: Some Rare, Endangered Plants of Assam

Sl. No.	Botanical name	Family	Status
1.	*Acalypha australis*	Euphorbiaceae	Rare
2.	*Begonia tessaricarpa*	Begoniaceae	Extinct
3.	*Bulbophyllum mishmeense*	Orchidaceae	Rare, endangered
4.	*B. virens*	Orchidaceae	Rare
5.	*Cassia wallichiana*	Caesalpiniaceae	Rare
6.	*Clematis fulvicoma*	Ranunculaceae	Rare
7.	*Dendrobium aruanticum*	Orchidaceae	Endangered
8.	*Eulophia manii*	Orchidaceae	Rare, endangered
9.	*Flacourtia helferi*	Flacourtiaceae	Rare
10.	*Goodyera prainii*	Orchidaceae	Rare
11.	*Hedyotis scabra*	Rubiaceae	Rare
12.	*Lagerstroemia minuticarpa*	Lythraceae	Extinct
13.	*Maba cacharensis*	Ebenaceae	Rare
14.	*Michelia mannii*	Magnoliaceae	Rare, endangered
15.	*Phlogacanthus asperula*	Acanthaceae	Rare

Endemic Plants

The list of endemic plants of the state of Assam is not exhaustive. Altogether 165 species are declared endemic to Assam; however, some of them have extended into other parts of Northeast India. Keeping this fact in mind, a total of 100 species are strictly endemic to the state. (Source: Department of Environment and Forest, Govt. of Assam).

Table 1.3: Some Endemic Plants of Assam

Sl. No.	Botanical name	Family
1.	*Adhatoda cymosa*	Acanthaceae
2.	*Bambusa cacharensis*	Poaceae
3.	*B. mastersii*	Poaceae
4.	*Camellia sinensis* var. *assamica*	Theaceae
5.	*Cinnamomum cacharensis*	Lauraceae
6.	*Citrus assamensis*	Rutaceae
7.	*Dendrobium assamicum*	Orchidaceae
8.	*Drypetes assamica*	Euphorbiaceae
9.	*Glochidion assamicum*	Euphorbiaceae
10.	*Litsea assamica*	Lauraceae
11.	*Mesua assamica*	Clusiaceae
12.	*Persea dubia*	Lauraceae
13.	*Phoebe goalparensis* var. *boriana*	Lauraceae
14.	*Phoebe goalparensis* var. *marliniana*	Lauraceae
15.	*Syzygium assamicum*	Myrtaceae

The rich flora of Assam has an astonishing array of plants which have beautiful flowers of diverse size, colour, odour and elegance. The indigenous plants with beautiful flowers are often difficult to distinguish from the exotic flowers introduce long back, either for their beauty or for their utility. Several of the introduced plants mingled with the natural vegetation of the State. The floral diversity which is the chief matter of concern of this work that is The Beautiful Flowers of Assam is also deeply ingrained in culture and traditions of the people of the State.

Study Area

Location

Assam is a state of India which is located at the north east part with an area of 78,523 sq. km. and lies between $24^0 09'$ N and $27^0 58'$ N latitude and a longitude of $89^0 42'$ and $96^0 01'$ E. It is bounded by Bhutan and Arunachal Pradesh in the north; in the western side by West Bengal, Tripura and Bangladesh; whereas Nagaland and Manipur form its eastern boundary; in the south it is bounded by Meghalaya and Mizoram.

Physiography

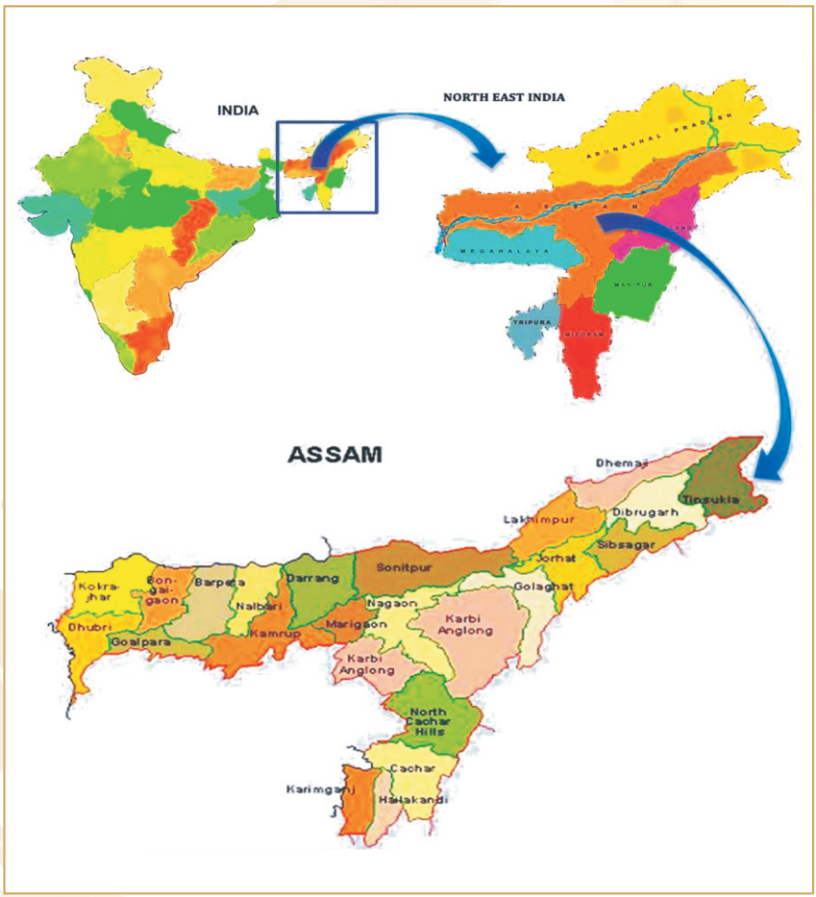
Assam consists of four physiographic divisions, namely the Brahmaputra valley, the Barak Valley, the Karbi Plateau and the Barail and the Southern Hills.

The Brahmaputa valley extends about 720 km with an average breadth of 96 km and this valley occupies a major area of the state i.e. 72 percent. The mighty river Brahmaputra divides the valley into the north bank plain and south bank plain. The flood plain of the Brahmaputra is irregular with occasional occurance of hillocks and river levees on both the north and south banks of it. Some important south bank hillocks are – Bura Mayong Pahar , Hatisila Pahar, Kharghuli Pahar, Nilachal , Hulukanda, Pancharatna Hill, Paglatek etc. Some remarkable north bank hillocks are- Chakrasila, Bhairab Pahar, Chandardinga, Tokrabandha etc. The Karbi Plateau which is the continuation of the Meghalaya Plateau covers the district of Karbi Anglong.The north Cachar Hills cover the whole North Cachar Hill distinct of Assam. The Barak Plain is surrounded by hills on three sides and only the western side is open that joins with Bangladesh.

Geology

The geologic formation of the state ofAssam is of Archaean, Precambrian, Tertiary and Quarternary periods. The Archaean rocks are found in the northen and central parts of the Karbi Plateau and the northen foot hills of the Meghalaya Plateau along Assam- Meghalaya border. The isolated monadnock like remains found scattered along the north and south banks of the river Brahmaputra in the distinct of Kamrup , Sonitpur , Nagaon, Darang, Goalpara are of Archaean group

of rocks. Precambrian rocks are found in small areas over the western flank of the Karbi plateau and the northern part of North Cachar Hills. The lower tertiary sediments occur in the Kopili valley, the south-eastern slopes of the Karbi Plateau and some parts of North Cachar Hills. The upper tertiary sediments are found in the southern flanks of the Karbi Plateau, the North Cachar Hills, the hills of Barak valley, the foot hills of the Naga Patkai ranges and the narrow belt of the Himalayan foot hills along the northern border of Assam. The quarternary sediments of older and newer alluviums, comprised the recent alluvial deposits of the Brahmaputra and Barak valleys.



Climate

Assam enjoys monsoon climate with some modifications. It receives heavy rainfall during summer, drought winter, and high humidity. Here the summer is very hot but humid with rainfall from the month of June to September of which June is the rainiest month of a year. About 60 percent of rainfall occur during the south west monsoon and some amount of rainfall also received in retreating monsoon season usually in the month of September to October. Again January is the coldest month of a year and December to February the state enjoys cold weather season with foggy morning, sunny noon and clear night.

The state experiences four climatic season, namely – Premonsoon, Monsoon, Retreating monsoon and Dry winter. From the month of March up to the end of May it is Pre- monsoon season with pleasant morning, hot afternoon, occasional thunder showers. From the last of May or early June monsoon season begins that lasts up to the month of September or the first part of October. Between the last part of September and first part of October, the rainfall intensity as well as rainfall duration decreases. In the middle of November the winter season begins in the state and continues up to the end of February with low temperature and morning fog.

Rivers

Due to unique geographical location Assam happens to be a land of rivers. In the state the Brahmaputra and the Barak are the two main rivers with numerous tributaries. The river Brahmaputra is one of the largest rivers of the world with large number of both north bank and south bank tributaries. The main north bank tributaries of the river are- Sonkosh, Manas, Beki, Pagladiya, Puthimari, Sowansiri, Dhonsiri, Ronganoi, Dihang, Dibong etc. While some important south bank tributaries of the river Brahmaputra are- Krishnai, Kolong, Kapili, Burhi Dihing , Dihing , Disang etc.

Another river Barak which forms second largest river system in the North east India as well as in Assam is having several tributaries. Some of the north bank tributaries of the Barak are – Jiri , Siri, Jatinga, Larang, Modhura etc, while some important south bank tributaries are- Sonai, Singla, Longai, Ghagra, Katakhal- Dhaleswari etc.

Soils

The soils of Assam can be divided into four main types , viz. – alluvial soil, piedmont soils ,hill soils and lateritic soils. The alluvial soils are distributed extensively over the Brahmaputa and Barak plains, which may be of two types – new alluvial soil and old alluvial soil. New alluvial soil are found in the extensive belt of the north bank and south bank plains including active flood plains of the Brahmaputra and Barak rivers. Old alluvial soil found in some patches in the districts of Kokrajhar, Barpeta , Nalbari, Kamrup, Darang, Sonitpur, Lakhimpur and Dhemaji between the north piedmont soil belt and the southern new alluvial soils. Piedmont soils are found in the northern narrow zone along the piedmont zone of the Himalayan foot hills which usually comprise the Bhabar soil and the Tarai soil covering Bhabar and Tarai belt of the Brahmaputra respectively. Hill soils are usually found in the Southern hilly terrains of the state of Assam which may be divided into red sandy soils and red loamy soils. The lateritic soil occur extensively over the North Cachar Hill district including some parts of southern Karbi Plateau with few patches here and there.

Vegetation Type

The geographical location with two main rivers i.e. the Brahmaputra and the Barak having a network of river systems along with their numerous tributaries, geology, fertile-living soil, tropical monsoon climate all these favour a very rich diversified floristic composition of the state of Assam of North-east India which itself belong to one of the 12 Mega biodiversity hotspots of the world. Though a truly comprehensive assessment of the Floristic diversity of the state of Assam is yet to be completed but a recent compendium brought out by the Government of Assam has enumerated 4273 plant species. The vegetational pattern, floristic composition were studied by various authors from time to time. Mention may be made of works of- Hooker (1854,1904), Griffith(1847), Gammie (1895),Clarke (1898), Kanjital *et al* (1934), Champion (1936), Chatterjee (1939,1956,1962), Bor (1938,1940,1942), Rajkhowa (1961), Baruah and Chowdhury (1978) and others. Based on the floristic composition of the state of Assam the vegetation of it are found to be of several types like -

Tropical Moist Evergreen forests, Tropical Semi evergreen, Tropical Moist Deciduous, Dry Deciduous, (Biodiversity of Assam ed. by AK Bhagabati, MC Kalita & S Baruah, 2006; S.C Choudhury in Assam's Flora, 2005; A.U. Choudhury in Geography of Assam, 1997). Beside these the Degraded and Scrubland, Grassland and Savannahs, Wetlands, Bamboo Forests and Waste Lands are also rich in their vegetation. (S.C. Choudhury, 2005)

Tropical Moist Evergreen Forests can be found in areas of upper Assam mainly in the districts of Sibsagar, Golaghat, Tinsukia etc. Here in Tropical Moist evergreen forests there is stratification or storey formation in three distinct storeys. In the top storey the dominant plant species being Hollong (*Dipterocarpus retusus*) which attain a height of 45 m along with species like- Chaama or Cham-goch (*Artocarpus chama*), Dewa (*Artocarpus lacucha*), Mekai (*Shorea assamica*), Nahor (*Mesua ferrea*) etc. In the middle storey the dominant plants are- Leteku (*Baccaurea ramiflora*), Bonmola (*Callicarpa arborea*) , Bogipoma (*Chukrasia tabularis*), Outenga (*Dillenia indica*) , Lali (*Dysoxylum procerum*), Kujithekera (*Garcinia kydia*), Sochopa-tenga (*Garcinia paniculata*) , Dighloti (*Litsea salicifolia*), Jaglo or Jagru (*Macaranga denticulata*), Bor-gahorisopa (*Magnolia griffithii*), Bon-aam (*Mangifera sylvetica*), Som (*Persea bombycina*), Bonsom (*Phoebe goalparenesis*), Hirik (*Sterculia guttata*)etc. Some common plants that form the lower storey of Tropical Moist Evergreen forests are – Larubandha (*Alangium chinense*), Outenga (*Dillenia indica*), Mezankori (*Litsea cubeba*), Dighloti (*Litsea salicifolia*), Jarat or Sinduri (*Mallotus philippinensis*) . Intermingled with these large trees that form three storeys there are gregarious growth of many herbs, undershrubs, shrubs, climbers, lianas, epiphytes etc, along the edges of the forests there is gregarious growth of many Bamboo - cane species.

Tropical Semievergreen forests are widely distributed along the north and south bank of the river Brahmaputra, Bura Pahar, Borail range of North Cachar Hills etc. It is a fact that some forest areas like – Garbhanga, Rani, Hollongapur, Mayong, Mahamaya, Kochugaon, Holtugaon, Guma are transformed into secondary semi- evergreen forests. Moderate sized trees, shrubs, intermingled with climbers lianas, epiphytes, parasites are commonly found in Tropical Semi Evergreen

forests. Some of the species found in such types of forests are- (*Artocarpus chama*), Lateku (*Baccaurea ramiflora*) Kanchan (*Bauhinia purpurea*) , Kunhi (*Bredelia retusa*) , Jolphai (*Eleocarpus floribunda*), Gomari (*Gmelina arborea*), Sidha or Jarul (*Lagerstroemia parviflora*), Dighloti (*Litsea salicifolia*), Borhomthuri (*Magnolia hodgsonii*), Jarat or Sinduri (*Mallotus philippinensis*), Bon-aam (*Mangifera sylvetica*), Makorisal (*Schima wallichii*), Teteli (*Tamarindus indica*) , Hilikha (*Terminalia chebula*), Bhelkor (*Trewia nudiflora*) etc. Besides some herbs, undershrubs, shrub climbers, Fern Allies, Ferns, are also found along with the tree species.

Tropical Moist Deciduous Forests are also found in some areas of Assam. The Moist Deciduous forests again can be divided into 2 sub-types i.e. Sal forests and Moist Deciduous Mixed forests. The Sal forests are usually found in areas like – Sonitpur, Darang, Nagaon, Morigaon, parts of Nalbari, Barpeta districts, Dhubri, Kokrajhar, Goalpara districts mainly. These Sal forests may be Wet Hill Sal forests or Moist Sal forests. The Wet Hill Sal forest type found along the foot hills and undulating hills of old mountain valley regions of Dhubri, Kokrajhar, Goalpara, parts of Kamrup. But Moist Sal forests are seen in heavy alluvial deposits of Nalbari, Barpeta, Guma Reserve forest of Kokrajhar district, Bhabar and Tarai region in Kokrajhar and Goalpara districts. Under the Sal forest often there are some climbers, lianas, herbs, Shrubs , epiphytes of which mention may be made of some beautiful flower bearing Orchids on Sal tress like – *Dendrobium aphyllum*, *Rhynchostylis retusa* etc.

The second type of Moist Deciduous forest is the Moist Deciduous mixed forests which occupies a large area in both the Brahmaputra and Barak valley usually at foot hill areas of Lakhimpur, Dhemaji, Karbi –Anglong and North Cachar Hills where the trees are most deciduous with few ever green and semi evergreen plants that are found scattered where Sal (*Shorea robusta*) is rarely found. Some dominant tree species of Moist Deciduous forest are- Chama or Chamgoch (*Artocarpus chama*) , Polash (*Butea monosperma*), Bonmola (*Callicarpa arborea*), Sishu (*Dalbergia sissoo*), Outenga (*Dillenia indica*), Oxi (*Dillenia pentagyna*), Rohimola or Thotmola (*Guruga*

pinnata),Gomari (*Gmelina arborea*), Jarat or Sinduri (*Mallotus philippinensis)*, Titasopa (*Michelia champaca*) , Bhatghila (*Oroxylum indicum*), Makorisal (*Schima wallichii*) , Amora (*Spondias pinnata*), Bhomora (*Terminalia bellirica*) etc.

Dry Deciduous Forests are found along the bordering of Moist Deciduous forests of the state of Assam. Mention may be made of the forest areas around Lumding, Morigaon, Daranga reserve forest of Nalbari district, isolated hills in both north and south banks of the Brahmaputra and islands of Brahmaputra. The dominant species of this type of forests being – Bel(*Aegle marmelos*), Simolu (*Bombax ceiba*), Chotiyona (*Alstonia scholaris*), Sishu (*Dalbergia sissoo*), Outenga (*Dillenia indica*), Bor (*Ficus benghalensis*),Aahot (*Ficus religiosa*), Gomari (*Gmelina arborea*),Ghora neem (*Melia azedarach*), Sojina (*Moringa oleifera*), Bhatghila (*Oroxylum indicum*), Amlokhi (*Phyllanthus emblica*), Sal (*Shorea robusta*), Teteli (*Tamarindus indica*), Segun (*Tectona grandis*) etc.Besides some herbs , shrubs are also found in such forests like – Bonkopahi (*Abroma augusta*), Akon (*Calotropes gigantea*), Khorpat (*Cassia alata*), Medelua (*Cassia occidentalis*), Chauldhuwa (*Glycosmis arborea*), Phutuki (*Melastoma malabathricum*), Borial (*Sida rhombifolia*), Bhekuri (*Solanum anguivi*), Kathonda (*Tabernaemontana divaricata*) etc.

Very uncommon Subtropical Moist Evergreen forests are found only in some limited high elevated areas and confined only in Hamren subdivision of Karbi Anglong district that too around Singhashan (1359m) and Dambukso (1365m) as well as around Kaukaina (1736m) and Tunja Klang (1866m)in the district of North Cachar Hills. Some broad leaved species are common in such vegetation like- *Antidesma bunias*, *Betula alnoides*, *Cinnamomum tamala*, *Drypetes elliptica*, *Ficus abelii*, *Glochidion velutinum*, *Litsea nitida*, *Phoebe lanceolata*, *Schima wallichii* etc. These are associated with some herbs, ferns. Of course beyond 1700m height the vegetation is mainly of *Pinus kesiya* a Gymnospermic species. Other species which are found along with the dominant species are- *Schima wallichii*, *Quercus serrata*, *Quercus semiserrata* etc.

Due to anthropogenic activities dense primary forests are often transformed into secondary vegetation forming Degraded and

scrublands. Some common species that are found in this type of degraded areas are- Sonaru (*Cassia fistula*), Ghora neem (*Melia azedarach*), Amora (*Spondias pinnata*), Teteli (*Tamarindus indica*), Bogori (*Zizyphus mauritiana*) along with many herb, shrub, climber species like- Gendhelibon (*Ageratum conyzoides*) , Kalmegh (*Andographis paniculata*), Sialkata (*Argemone maxicana*), Manimuni (*Centella asiatica*), Konasimola (*Commelina benghalensis*), Kehraj (*Eclipta prostrata*), Gakhirotibon (*Euphorbia hirta*) , Drun (*Leucas plukenetii*), Lajukilata (*Mimosa pudica*), Sarpagondha (*Rauvolfia serpentina*), Pokmow (*Solanum nigrum*), Samkochu (*Typhonium trilobatum*) and many more

The Grassland and Savannahs are also the most important components of the natural vegetation of the state of Assam, some of which of course found in recent alluvial deposits that occur in some places of riverine flats of the state like at the eastern side of the world famous Kaziranga National park, parts of Manas Tiger Reserve, parts of Dibru Saikhowa, Orang Sanctuary and others. Some grass species of these grasslands are- Gabnol (*Arundo donax*), Nal-khagri (*Phragmatis karka*), Tonga-bon (*Themeda arundinacea*), Kaumoni (*Coix lacryma-jobi*), Borkeyan-bon (*Eleusine indica*), along with other species like – Duwori (*Cynodon dactylon*), Arali or Aralibon (*Lersia hexanadra*), *Cyperus brivifolius* etc, along with other small herb species . There are grasslands and Savannahs in old alluvial high lands also which are often found in almost all protected species of these grasslands are- Ulu-kher (*Imperata cylindrica*), Khagra or Kanhi-bon (*Saccharum spontaneum*), Meghla (*Saccharum arundanaceum*), Bojal or Nal (*Schizostachyum polymorpha*), Ekora (*Sclerostachya fusca*) Jhau-bon (*Thysanolaena maxima*), Dol-ghah (*Hygroryza pseudointerrupta*), Banh-potia-bon (*Oplismenus burmannii*), Sial-nejia-bon (*Setaria pumila*), Tonga-bon (*Themeda arundinacea*) etc. Mixed with these grasses there are other species like Tora (*Alpinia galanga*), Bogitora (*A. nigra*), Some tree species are also found growing scatteredly along with these grasslands and savannas. Mention may be made of species like – Chotiyona (*Alstonia scholaris*), Simolu (*Bombax ceiba*), Bhatghila (*Oroxylum indicum*), Bogori (*Zizyphus mauritiana*), along with some herb species like Bhui

amlokhi or Mati amlokhi (*Phyllanthus fraternus*), Dum-dhakua or Bijol-goch (*Impatiens tripetala*), Makhiyoti (*Flemingia macrophylla*), Borial (*Sida rhombifolia*), Lajukilota (*Mimosa pudica*) and others.

Along the banks of larger rivers and streams the riparian fringing forests occur. The mighty river Brahmaputra with its 40 tributaries and the Barak with 9 tributaries form a network of water system in the state. In the extensive flood plain of the river there are some marshy lands, swamps, oxbow lakes, beels, ponds, lakes etc. All these water bodies are rich with various hydrophytic plant species, which can be placed into 7 categories –

- **Free floating hydrophytes :** They remain in free floting condition like Meteka (*Eichhornia crassipes*), Borpuni (*Pistia stratiotes*), Sorupuni (*Azolla pinnata*) etc.
- **Submerged suspended Hydrophytes:** like Kaurithengia (*Ceratophyllum demersum*),Bladderwort (*Utricularia aurea*) etc.
- **Submerged Anchored hydrophytes:** Examples being *Hydrilla*, *Vallisneria* etc that remain in submerged condition.
- **Anchored hydrophytes with floating shoots :** Kolmow (*Ipomoea aquatica*), Dolghah (*Hygroryza asiatica*) are some aquatic plants which remain connected at mud but their whole body remain on water surface in floating condition.
- **Anchored hydrophytes with floating leaves :** Plants like –Podum (*Nelumbo nucifera*) , Bhet (*Nymphaea* spp.), Singori (*Trapa bispinosa*), Nikori or mokhona (*Euryale ferox*) remain contact with soil , water and air.
- **Emergent Amphibian hydrophytes :**

  They usually grow along the edges of the water bodies. e.g. Kuhila (*Aeschynomene aspera*), Dangor Mati kaduri (*Alternanthera philoxeroides*), Kehraj (*Eclipta prostrata*), Helosi (*Enhydra fluctuens*), Jonaki phul (*Monochoria hastata*), Biholongoni (*Polygonum hydropiper*) etc.
- **Wetland hydrophytes:** These plants grow in wetland, e.g. Boch (*Acorus calamus*), Tora (*Alpinia galanga*), Bhat khutura (*Amaranthus viridis*), Phutuki (*Melastoma malabathricum*) and many more.

The state is also rich by its Bamboo- cane diversity. The state is having ten genera with 42 species of Bamboo and with 14 Cane species. Some of the Bamboo species are - Bhaluka bah (*Bambusa balcooa*), Kota bah (*B. bambos*), Betua bah (*B. cacharensis*), Beti bah (*B. mastersii*), Jati bah (*B. nutans*), Mokal bah (*B. pallida*), Bhaluka Mokal (*B. teres*), Bijuli bah (*B. tulda*) etc. Some important species of Cane are- Raidung (*Calamus erectus*), Lejai bet (*C. floribundus*), Suli bet (*C. gracilis*), Chandi bet(*C. guruba*), Takit (*C. latifolius*), Jati bet (*C. tenuis*) and others.

Places like outskirts of city, towns, residential areas, roadsides, railway line sides all these occupied by wasteland vegetation. Some plants are also seen to grow abundantly on walls of old monuments, buildings, temples etc. some important species in wastelands are as follows:

Gendheli bon (*Ageratum conyzoides*), Khutura (*Amaranthus spinosus*), Bhat khutura (*Amaranthus viridis*), Sial kata (*Argemone maxicana*), Bhang (*Cannabis sativa*), Duwori (*Cynodon dactylon*), Laijabori (*Drymaria diandra*), Punarnova sak (*Boerhavia diffusa*), Gakhiroti bon (*Euphorbia hirta*), Lajukilata (*Mimosa pudica*), Tengesi (*Oxalis corniculata*), Bortengesi (*Oxalis corymbosa*), Mulbhog sak (*Portulaca oleracea*), Bon dhonia (*Scoparia dulcis*), Somakochu (*Typhonium trilobatum*), Dhotura (*Datura metel & D. stramonium*), Bhetaitita (*Clerodendrum viscosum*), Phutuki (*Melastoma malabathricum*), Khorpat (*Cassia alata*), Parthenium (*Parthenium hysterophorus*), Dudh khori (*Holarrhena antidysenterica*), Pochotia (*Vitex negundo*) and many more.

Morphology of Flowers

The present work deals completely on such plants that bear very attractive flowers that are included under the group Phanerogams or Flower bearing plants . Flower is very well organized reproductive part of Angiospermic plants. The word flower gives a very in depth impression in our mind. The various parts of flowers vary according to the type of flower. They may be of different in colors like – scarlet, blue, white, purple, pink, mauve, yellow variegated and many more. The attractive color of flowers is due to presence of different types of pigments in them. The flowers show variations in respect of their size also. Some flowers are so minute that they are not distinctly visible with naked eye or from distance. The flower of a parasitic plant *Arceuthobium minutissimum* is a total stem parasite and is considered to be the smallest of all. Some flowers are large showy e.g. Rose, lily, Lotus, Hibiscus and many more. The flower of *Rafflesia arnoldii* is the largest flower bearing plant which is a total root parasite found in Java Sumatra of Indonesia.

A typical flower has four different parts viz.,-calyx, corolla, androecium and gynoecium. Out of these four whorls calyx and corolla are called accessory whorls while androecium and gynoecium are known as Reproductive whorls. When calyx and corolla of a flower cannot be differentiated then it is known as perianth that is in this case there is no distinction between green calyx and colored corolla. The perianth members are known as tepals e. g. flower of Coconut (*Cocos nucifera L.*)

When all the four whorls are present in a flower then the flower is said to be a complete flower while if any one of them is absent it said to be an incomplete flower. In a flower if there is no calyx or corolla then the flower is known to be a naked flower. A flower bearing only one

accessory whorl, either calyx or corolla or in the form of perianth, the flower is said to be haplochlamydous or monochlamydous. A flower with both male and female parts is known as a bisexual flower. On the other hand a flower may bear either male part androecium or female part gynoecium then the flower is known as unisexual flower. In this case if only androecium is present it is a male flower while if gynoecium is present the flower is considered as a female one.

On the basis of symmetry a flower may be actinomorphic or regular, zygomorphic or monosymmetrical and irregular or asymmetrical.

If the floral members are arranged very proportionately on the stalk or thalamus so that it can be cut into two equal symmetrical halves through any vertical plane. This type of flowers is known as regular or actinomorphic e.g. flower of Datura i. e.*Datura stramonium L*. While if the flower can be cut into two symmetrical halves at only one vertical plane then the flower is said to be zygomorphic or monosymmetrical e.g. Agathi flower i. e.*Sesbania grandiflora* (L.)Poir.

If the flower cannot be cut into two symmetrical halves in any plane it is said be irregular or asymmetrical. e.g. Canna flower (*Canna chinensis* Willd.)

Different Parts of Flowers

Calyx: The lower most green whorl of a typical flower is called the calyx. The members of calyx are known as sepals. They are usually green in color. The sepals may be united when it is called gamosepalous e.g. the sepals of *Hibiscus* spp.

Fig. 2.1 Gamosepalous Calyx

The sepals may be free from each other when they are known as polysepalous, e.g. sepals of Goldmohur i. e. *Delonix regia* (Bojer)Raf.

Fig. 2.2 Palysepalous Calyx

In many flowers members of calyx or the sepals are modified to different forms and structures, e.g. in *Mussaenda* where the sepals are modified to petal like structure being large, showy and colored.

Fig. 2.3 Sepal modified in Mussaenda

Sometimes they may be modified to hair like structurs known as pappus, e.g. flower of *Mikania micrantha* Kunth *ex* H. B.K.

Fig. 2.4 Pappus

Even the sepals may take the form of spines as in *Trapa natans L.* var. *bispinosa* (Roxb.) Makino (= *T. bispinosa* Roxb.) which remain intact with the fruit as spiny outgrowths.

Fig. 2.5 Sepal modified to spines

In Elephent Apple fruit (*Dillenia indica* L.) the whole fruit is made up of five large, sour green sepal members, which is a pseudo fruit or false fruit.

Fig. 2.6 Sepal modified to fruit

Corolla: Corolla is the second whorl of a typical flower which may be red, blue, yellow, pink, brown, orange and so on being the main attraction of majority of flowers. The members of corolla are known as petals which may be of free or united type. When the petals of a flower are free it is called polypetalous and if united it is known as gamopetalous.

Corolla may be of different forms-

a) **Cruciform :** In cruciform type the petals are placed forming a cross e.g. Flower of Mustard i. e. *Brassica nigra* (L.) Koch

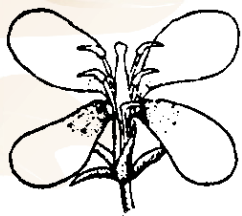


Fig. 2.7 Cruciform corolla

b) **Tubular:** Here the petals are united in such a way that they form a tube like structure. e.g. the central flowers of sunflower (*Helianthus annus* L.)

Fig. 2.8 Tubular

c) **Bell shaped or campanulate:** The petals are united here to form a bell like structure. e.g. the flower of Pumpkin (*Cucurbita maxima* Duch.)

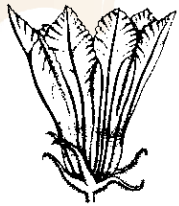


Fig. 2.9 Bell shaped

d) **Funnel shaped:** When the petals are united taking the form a beautiful funnel the corolla is called funnel shaped e.g. flower of Sweet potato i. e *Ipomoea batatus* (L.) Lamk.

Fig. 2.10 Funnel shaped

e) **Legulate:** Here the corolla is more or less tongue shaped, e.g. the peripheral flower of sunflower (*Helianthus annus* L.)

Fig. 2.11 Legulate

f) **Rotate:** In rotate type of corolla the petals are united in such a way that they take the form of a wheel and united on a tube below, e.g. flower of Night Jasmine (*Nyctanthes arbortristis* L.)

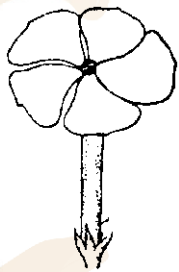


Fig. 2.12 Rotate

g) **Bilabiate:** In bilabiate form there are 5 petals which are united in two distinct lobes of which lower one is 3 lobed and the upper one is hooded being 2 lobed. All the 5 petals united to form a bilabiate corolla, e.g. flower of *Leucas aspera* (Roth) Spreng.

Fig. 2.13 Bilabiate

h) **Personate:** Here also the petals are united to some extend like bilabiate form but the two lobes are not so distinctly placed. e.g. flower of Snapdragon (*Antirrhinum* spp.)

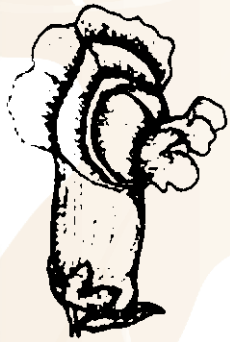


Fig. 2.14 Personate

Aestivation

In bud stage the sepals and petals of each and every flower remain arranged in a very organized manner. This arrangement is known as aestivation. It may be of the following main types-

i) **Valvate :** In valvate type of aestivation the floral members just touch one another but do not over lap each other. e.g. sepals in Periwinkle i. e. *Catharanthus roseus* (L.)G. Don

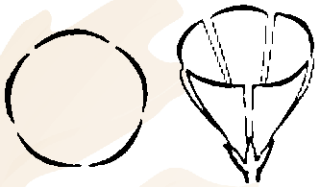


Fig. 2.15 Valvate

ii) **Twisted:** Here the floral members are overlapped in one direction that is one margin of a member overlaps the next member on one side which itself is overlapped by another member on another side attaining a very disciplined arrangement, e.g. petals in *Datura stramonium* L.

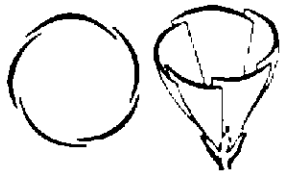


Fig. 2.16 Twisted

iii) **Imbricate:** Here some members are arranged in twisted manner and in other members both margins are either inside or outside. e. g. sepals of *Goldmohur* i. e.*Delonix regia* (Bojer) Raf.

Fig. 2.17 Imbricate

iv) **Vexillary:** This is a unique aestivation of butterfly like flowers found in the Pea family i. e. Papilionaceae. Here one petal is the largest known as standard or vexillum. This vexillum over-laps two lateral ones called wings and which in turn overlap two innermost smallest ones called keels e. g. flower of *Clitoria ternatea* L.

Fig. 2.18 Vexillary

Androecium

Androecium is the male reproductive part of a flower the members of which are called stamens. A typical stamen has a stalk called filament at the tip of which it bears two anthers with a connective between. Rarely anther may be single lobed the example being the anthers of *Hibiscus rosa- sinensis* L.

The stamens of a flower are of different types. Sometimes in some flowers like in *Justicia adhatoda* L.where there are four stamens , out of which 2 are longer than the other 2. This type of stamens are called didynamous stamens. Sometimes the stamens are six in number and out of which two are shorter than other 4 stamens. This type is called tetradynamous stamens, e.g. stamens of *Brassica nigra* L. (Mustard)

Union of Stamens

The stamens of a flower may be free from each other or they may be united in different forms or numbers or may be united with other

parts of flower. When the stamens are united in different bundles among themselves then it is called cohesion but if they are united with other parts of the flower viz. petals, tepals, gynoecium then it is called adhesion. Following are the different types of cohesion of stamens:

a) **Monadelphous:** In case of monadelphous stamens all the stamens are united forming one bundle,e.g. stamens of *Hibiscus* spp.

Fig. 2.19 Monadelphous

b) **Diadelphous:** Here the stamens united in two bundles, e.g. in *Clitoria ternatea* L. or Butter pea where there are 10 stamens of which nine are united in a bundle and the tenth one is free.

Fig. 2.20 Diadelphous

c) **Polydelphous:** When the stamens are united forming many bundles or groups the condition is called polydelphous, e.g. stamens of *Bambax ceiba* L. or Silk Cotton tree.

Fig. 2.21 Polydelphous

d) **Syngenecious stamens:** In some flowers the anthers of the stamens are united but all the filaments remain free which type of union is called syngenecious, e.g flower of Sunflower (*Helianthus annus* L.)

Fig. 2.22 Syngenecious stamens

e) **Synandrous stamens:** Here both the anthers as well as the filaments are united throughout the whole length of the stamens being known as synandrous stamens, e.g. stamens of Cucurbitaceae or Pumpkin family.

Fig. 2.23 Synandrous stamens

Adhension of Stamens

- Epipetalous: Sometimes in some flowers the stamens are united with the petals or the corolla then they are called epipetalous stamens,e.g. stamens of *Datura* spp.
- Epiphyllous: Here the stamens are united with the tepals or the perianth members and the condition is known as epiphyllous, e.g. flower of *Polianthes tuberosa* L. (Tuberose flower)
- Gynandrous: If the stamens get united with gynoecium then they are called gynandrous stamens, e.g. stamen of Orchids.

Gynoecium

Gynoecium is the female reproductive part of a flower which is the fourth whorl of a typical flower. The members of the gynoecium are

known as carpels. Sometimes in some flowers the carpels remain united when it is called syncarpous gynoecium,e.g. *Hibiscus esculentus* L. (Lady's finger) In some flowers the carpels may remain free,e.g. in *Michelia champaca* L.

A typical gynoecium or carpel has three distinct parts stigma, style and ovary. Inside the ovary the ovules are arranged in different forms. The tissue on which the ovules are arranged is called the placenta. The different types of arrangement of ovules on the placenta is called placentation which may be of various types :

- **Marginal:** In Pea (*Pisum sativum* L.) the ovules develop on the ventral suture where the ovary is one chambered and superior.

Fig. 2.24 Marginal placentation

- **Axile:** Here ovary is many chambered and ovules develop on the central axis, e.g. *Hibiscus* spp.

Fig. 2.25 Axile placentation

- **Parietal:** Here ovary is usually one chambered and ovules develop at the periphery of the inner wall of the ovary chamber, e.g. in Papaya (*Carica papaya* L.)

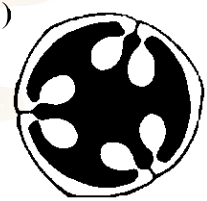


Fig. 2.26 Parietal placentation

- **Central:** In central type of placentation the ovules develop from the central axis without any partition wall, e. g. *Dianthus* spp.

Fig. 2.27 Central placentation

- **Free central:** In free central type of placentation ovules are found to develop on an axial column that is not connected with the ovary wall, e. g. Primrose (*Primula* spp.)

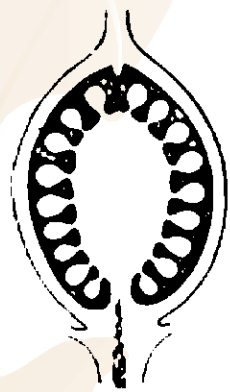


Fig. 2.28 Free central placentation

- **Basal:** In basal placentation single ovule is developed at the base of the one chambered simple ovary, e. g.in Sunflower(*Helianthus annus* L.)

Fig. 2.29 Basal placentation

- **Superficial :** In many carpelled flower like Water Lily (*Nymphea* spp.) ovary is many chambered. Here all the inner walls of the chambers lined with placental tissue and develop ovules as in Lotus(*Nelumbo nucifera* Gaertn.)

Fig. 2.30 Superficial placentation

Parts of a typical Ovule

A typical ovule has many parts like funicle, hilum, raphe, nucellus, embryo sac, integument, micropyle, etc. The ovule is attached to the placenta by the funicle that meets the ovule at the hilum. Raphe is an extension of the funicle and may extend upto the chalaza. The general tissue of the ovule is called the nucellus inside which the embryo sac is present. The ovule is enveloped by a covering called the integument that leaves an opening called micropyle.

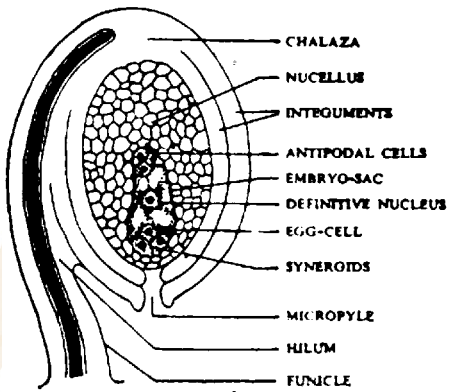


Fig. 2.31 A typical ovule

Different types of Ovules

Ovule is a very important part of an Angiospermic plant because it ultimately develops into seeds that help in reproduction. In case of a

single seeded fruit there is only one ovule in the ovary but in case of multi seeded fruits there are many ovules inside one ovary of a flower. The ovules may be of different types:

(a) Orthotropous: When the ovule remains straight it is called orthotropous, e. g. black piper (*Piper nigrum* L.)

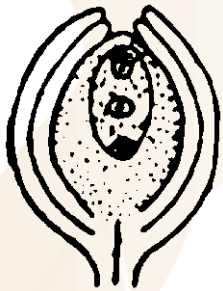


Fig. 2.32 Orthotropous ovule

(b) Anatropous : When the ovule is reversed type it is called anatropous, e. g. Butter pea (*Clitoria ternatea* L.)

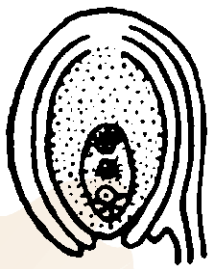


Fig. 2.33 Anatropous ovule

(c) Amphitropous: Here the ovule is placed transversely at right angle to the funicle, e. g. Poppy (*Papaver somniferum* L.)

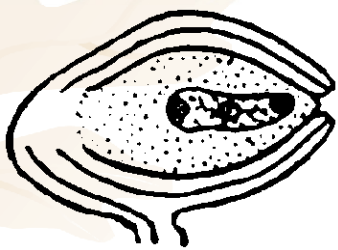


Fig. 2.34 Amphitropous ovule

(d) **Campylotropous:** When a transverse ovule bent in such a way that it takes the form of a horse shoe shape so that the micropyle is brought close to chalaza. This type of ovule is called campylotropous ovule, e.g. Four O' clock plant (*Mirabilis jalapa*

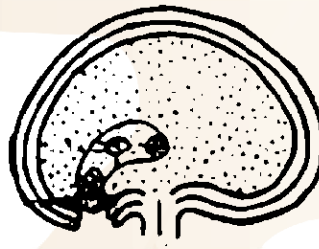


Fig. 2.35 Campylotrpous ovule

Inflorescences

Flowers are arranged differently on the rachis or on the axis. The different types of arrangement of flowers on the rachis are called inflorescences. The flowers become more and more attractive due to the fact that they are united in clusters in different manners. All the inflorescences can be broadly divided into three main types - Racemose, Cymose and Special types.

Racemose or Indefinite

In racemose type of inflorescence the rachis grows indefinitely and it does not terminate in a flower. The younger flowers develop towards the tip.

There are many types of racemose inflorescences that can be discussed under the following heads-

(A) **With the main axis elongated:** Here the rachis or the main axis is long and develop flowers in acropetal order. This may be of five types:

(1) **Raceme:** In a raceme type of inflorescence the flowers are displayed in a very attractive manner where the most matured flowers are at the base of the rachis and gradually the immatured flowers are arranged towards the apex, e.g. Mustard (*Brassica nigra* L.). In most of the cases of ornamental flowers the racemes are not simple rather the rachis is branched and flowers develop acropetally on each branch. So the inflorescence becomes large,

branched showy which is called panicle of raceme or compound raceme, e. g. flower of Goldmohur i. e. *Delonix regia* (Bojer) Raf., Dwarf Goldmohur i.e. *Caesalpinea pulcherrima*(L) Sw.etc.

Fig. 2.36 Raceme

) **Spike**: Spike is mostly like that of raceme but the difference is that here the flowers are sessile that is without stalk or pedicel, e. g. Tuberose (*Polianthes tuberosa* L.), here very beautiful stalk less white showy highly aromatic flowers are arranged on a long axis. A Spike may also be a compound one.

Fig. 2.37 Spike

(3) **Spadix:** In spadix the rachis is long thick and fleshy where the sessile flowers are attached and they are covered by a spathy bract, e. g. the inflorescence of Aroids (*Colocasia* spp.)

Fig. 2.38 Spadix

(4) **Catkin or Ament:** Here the main axis or the rachis is thin and very weak at the tip of which the unisexual flowers are clustered which usually droops down becoming pendulous, e. g. Mulberry (*Morus alba* L.)

Fig. 2.39 Catkin or Ament

(5) **Spikelet:** In spikelet type of inflorescence it is subtended by two bracts or glumes at the base. Above the glumes flowers develop where each flower is born at the axil of a bract which is known as lemma and a bracteole that is known as palea. Spikelets are usually compound or complex and found only in grasses or Grass family i.e. Poaceae.

Fig. 2.40 Spikelet

(B) With the main axis shortened: Here the main axis on which the flowers develop is short .Which may usually be of two different types:

i) Corymb: Here the main axis is short and flowers open from base to apex. The uniqueness of this type of inflorescence is that the flowers from the base towards apex bear gradually shorter stalks or pedicels so that the blossoms are arranged almost in the same plane, e. g. One species of *Cassia* i. e. *Cassia sophera* L.

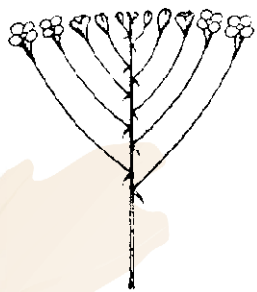


Fig. 2.41 Corymb

ii) Umbel: In umbel type of inflorescence the flowers develop radially from one point of the rachis. This may be simple or compound, of course mostly compound. In compound umbel the main rachis is branched and flowers develop radially on the tips of the branches, e.g. in Coriander (*Coriandrum sativum* L.).

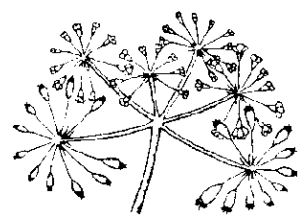


Fig. 2.42 Umbel

(c) With the main axis flattened

Head or capitulum: Here the rachis becomes flattened, convex which bears the florets in acropetal order. At the base of the head or capitulum it is surrounded by a uniseriate or multiseriate involucres of bracts where the matured florets are arranged at the periphery of the capitulum and gradually immatured flowers are arranged towards the centre. The florets at the periphery are larger and attractive, tongue shaped are known as ray florets. While the florets at the centre are called disc florets which are bisexual and tubular. This type of head with differentiation of ray florets and disc florets are known as heterogamous heads. While a head with same type of florets that is without differentiation of ray florets and disc florets are known as homogamous heads. Head or capitulum is the characterstic inflorescence of Marigold family (i.e. Asteraceae)

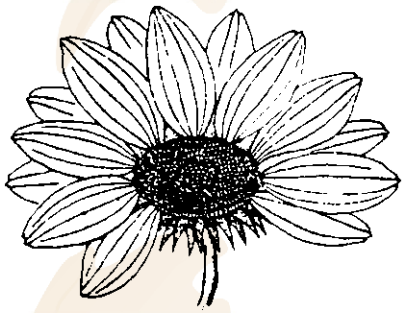


Fig. 2.43 Head or capitulum

Cymose or Definite Inflorescence

It is not like racemose where the main axis is terminated by a flower and the growth of inflorescence is checked vertically. The terminal flower limits the growth of the rachis and it is also known as definite inflorescence. Cymose may be of the following types-

1. Monochasial cyme : Here the main axis terminates in a flower and only one flower develops from each point of the rachis. It may be of two types-

(a) Monochasial scorpoid cyme: Here at the apex there is a flower and other flowers develop alternately to right and left side of it, e.g. *Heliotropium indicum* L.

Fig. 2.44 Monochasial scorpoid cyme

(b) Monochasial helicoid cyme: In helicoid cyme the flowers develop on the same side forming a helix, e. g. *Commelina benghalensis* L.

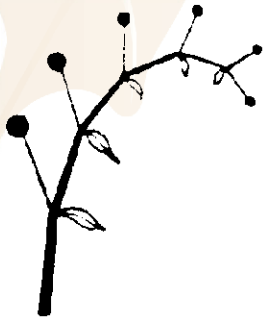


Fig. 2.45 Monochasial helicoid cyme

2. Dichasial cyme: Here also a flower terminates the apex which is the most matured one. The lateral branches branched again thus forming a dichasial cyme. This is found in Night Jasmine (*Nyctanthes arbortristis* L.)

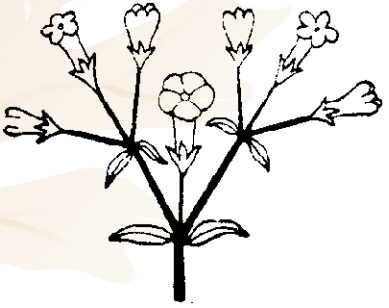


Fig. 2.46 Dichasial cyme

3. Polychasial cyme : It looks like umbel type of inflorescence but here a flower terminates the apex from the base of the apical flower more than two lateral branches develop, e. g. *Viburnum tinus*

Fig. 2.47 Polychasial cyme

Special Type of Inflorescenses

There are three different types of special inflorescences. These are- Cyathium, Hypenthodium and Verticellester.

Cyathium : In some plants like Poinsettia (*Euphorbia pulcherrima* Willd. *ex* Klotzsch) where the flowers develop in a very special type of cup like inflorescence which is known as cyathium inflorescence. Here the inflorescence is covered by a cup like green involucre formed by the union of of bracts. In this cup like receptacle very reduced flowers develop where the most matured single female is placed at the centre. This female flower is surrounded by numerous male flowers. The matured male flowers are near the centre surrounding the female flower and gradually immatured male flowers are towards the periphery. The flowers are very much reduced where the female flower is only with a single pistil that is naked, male flowers are also naked and represented by single stamen only.

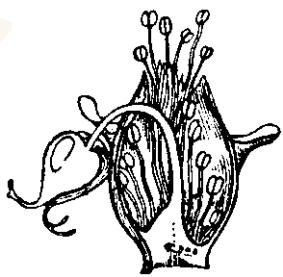


Fig. 2.48 Cyathium

Hypenthodium : Here the flowers develop inside a pear shaped more or less globular receptacle which is having a small pore or opening on the top. This is found in *Ficus* spp. Flowers develop inside the cavity of the receptacle, thus flowers can not be seen from outside.

Fig. 2.49 Hypenthodium

Verticellester : This is a complex type of inflorescence which is found in Ocimum family i. e. Lamiaceae. Here two dichasial cymes develop from each of which two monochasial scorpoid cymes develop forming a false whorl type of inflorescence around the stem. Thus giving the name verticellester which means false whorl.

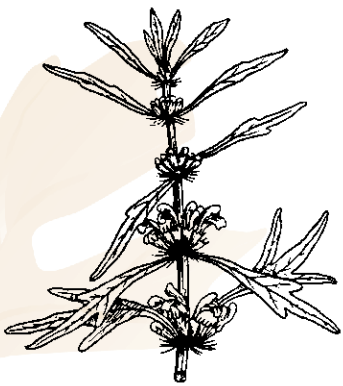


Fig. 2.50 Verticellester

Thus the individual flowers are clustered or displayed in different types of inflorescences making the plants more attractive impressive.

Spectrum of Flowers of Assam

Sweet Acacia

Local Name : **Tarua Kodom**

Botanical Name : ***Acacia farnesiana*** **(L.) Willd.**

Family : **Mimosaceae**

Sweet Acacia is a thorny shrub or small tree with zig zag lenticellate branches. The young shoots are downy and the spines are stipular, straight, about 0.6- 1.5 cm long . The foliages are with 2.5 -7.5 cm long rachis, pinnately compound with 2-8 pairs of pinnae. Each pinna may be up to 2.7 cm long bearing 10-20 pairs of very minute leaflets. It grows wild and native of Tropical America .

During flowering which lasts from September -April the blossoms appear forming clustered heads of 1-1.5 cm diameter with stalk. The blossoms are attractive, fragrant. Though the flowers are minute and inconspicuous the numerous stamens with their yellow colored filaments assume importance, being the chief attraction of the plant. Sepals very minute, five and which are united to form shortly five toothed campanulate minute calyx .Corolla five, more or less united in the lower half. Fruit up to 7.5cm long, pod. Though it is a native of tropical America and introduced in our countries for its flowers which are sources of a volatile oil used in perfumery industry. This is very remarkable as the worldwide demand for natural fragrance is constantly increasing. Bark extract with water is used to gargle in tonsilites.

Fig. 3.1 *Acacia farnesiana* (L) Willd.

Anthocephalus

Local Name : **Kodom or Bor-kodom**

Botanical Name : ***Anthocephalus chinensis*** **(Lamk.) A. Rich.ex Walp.**

[*Anthocephalus cadamba* (Roxb.)Miq.]

Family : **Rubiaceae**

Anthocephalus is a gregarious deciduous tree with very straight trunk and horizontal branches having a tendency to droop, that forms a dense rounded head of large foliages. It is native to South and Southeast Asia. The leaves are very large set on opposite pairs. The foliages are simple, 13-24 X 5 -9.5cm across, elliptic, ovate or oblong- elliptic, stipulate, stipules inter- petiolar. The flowers although minute and inconspicuous but aggregated compactly on spherical heads in such a way that they become very unique in appearance. The flowers that appear during April and May are minute, pale orange colored, united by the confluent calyx tube.Sepals five, persistent,the calyces are pale

green or creamish in color so an immatured head reflects the color of numerous minute calyces with which it is covered i. e. pale green or creamish. Petals five united to a funnel shaped corolla. Stamens inserted inside the throat of corolla. Carpels two, syncarpous, style comes out of the corolla tube or exerted. The petals being orange in color and as they grow outwards much beyond the calyces a head turn into an orange colored very attractive delicate ball like structure which is just like a tennis ball. Later on in full bloom condition numerous white colored stigmas of each flower projected and become prominent when the head turns into dull white appearance. When ripen the ball become yellowish and on which numerous small fruits are inserted on a central fleshy mass making the tree very graceful with cluster of golden balls.

The decoction of the leaves are used for gargling ,the bark is considered as tonic and febrifuge.Thus in Anthocephalus many small scented flowers are arranged in very compact spherical heads which are displayed on short stalks at the end of the twigs.

Anthocephalus is commonly planted as avenue tree and rated as third category soft wood used for packing box, planks and manufacture

Fig. 3.2 *Anthocephalus chinensis* (Lamk.) A. Rich. ex Walp.

Allamanda

Local Name : **Lota Korobi , Ghonta-phul**

Botanical Name : ***Allamanda* species**

Family : **Apocynaceae**

Allamanda because of its beauty and long flowering period is a valuable inclusion in parks ,gardens and avenues as well. It is native to Tropical America. This beautiful plant was named as Allamanda in honour of Dr. Allamand (of Leyden) who sent this plant to Linnaeus.

Commonly called Allamanda means actually the species *Allamanda cathertica* L. which is a sub erect scandent unarmed shrub. The leaves are arranged in whorls that are oblanceolate , sub sessile , 4.5-13 X 2.5- 6.5 cm , petiole with interpetiolar glands .

The blossoms are large showy, golden yellow that develop in axillary panicled cyme type of inflorescences. Each flower is with five fid green calyx 1.5 cm in length. Corolla 5 cm in length, golden yellow with 1.5 cm long cylindrical corolla tube and five rounded corolla lobes, throat hairy. Stamens five which are sub sessile attached to the tip of the corolla tube with a tuft of white hairs at the base and a sharp hairy ridge below. Carpel with one celled ovary and many ovules, about 1.2- 1.5 cm long, slender, white style and urn shaped stigma.

Fig. 3.3 *Allamanda cathertica* L.

The genus *Allamanda* includes varieties like *A.cathertica* var. *grandiflora*, *A.cathertica* var. *hendersonii*, *A. cathertica* var. *nobilis* , *A. cathertica* var. *schottii*, *A. cathertica* var. *williamsii*, *Allamanda nerifolia* Hook., *Allamanda violacea* , etc.

***A.cathertica* var. *grandiflora*-** which is with pale yellow colored large flowers , free flowering.

***A.cathertica* var. *hendersonii* -** that bears orange yellow flowers with five white spots at throat ,tinged brown , thick and wax like .

A. cathertica* var. *nobilis - which is with 3-4 leaves in whorls , oblong , tapered at base , abruptly slender pointed with large bright yellow flowers without markings.

***A. cathertica* var. *schottii* -** leaves oblong, four in whorls with large yellow flowers throat striped rich brown .

***A. cathertica* var. *williamsii* -** which is of erect habit and can be made into bush .

Besides different varieties of *Allamanda cathertica* the genus has some other species .

***Allamanda nerifolia* Hook. -** which are erect , glabrous shrub with oblong foliages. The blossoms are between funnel and bell shaped , corolla tube 2.5 cm long , deep golden yellow streaked orange which develop in many flowered panicles. It is native to

Fig. 3.4 *Allamanda nerifolia* Hook.

Allamanda violacea - This species is also known as Cherry Allamanda. It is common in gardens which is an erect or climbing shrub. The leaves are in whorl of 3-5, with large , rosy purple blossoms that are displayed in axillary cymes .

These are propagated mainly by stem cutting.

Fig. 3.5 *Allamanda violacea*

Camel's Foot Tree

Local Name : **Kanchan Phul /Kurol**

Botanical Name : ***Bauhinia variegata* L.**

Family : **Caesalpiniaceae**

Camel's Foot Tree is a small or medium sized very attractive tree with very unique pattern of foliages where each leaf consists of two leaflets that are joined for about three quarter of their length to from a single leaf with two equal lobes at the apex making the "Camel's foot" like structure thus pertaining the English name Camel's foot tree.

It is interesting that leaves fall during cold season and among the falling leaves from the month of January to March large purple pink or

white very showy blossoms develop in few flowered racemes. Thus very attractive brilliantly colored blossoms ultimately cover the bare branches making the plant most beautiful of all Indian trees. Each blossom is with a five toothed spathaceous calyx. Petals five, free, white, purple or mauve colored. In purple variety out of 5 petals four are light purple and the fifth one much darker. It is native to South eastern Asia, from China to Pakistan and India.

Fig. 3.6 *Bauhinia variegata* L.

Bauhinia with white, purple, carmine pink colored blossoms are also very common that gives eye catching beauty to the plants in full bloom.

Fig. 3.7 *Bauhinia variegata* var. *candida*

Fig. 3.8 *Bauhinia purpurea* L.

Black Berry Lilly

Local Name : **Suryakanti Phul/Chandonsita**

Botanical Name : ***Belamcanda chinensis* (L.) DC.**

Family : **Iridaceae**

Black Berry Lily is an ornamental plant with very beautiful Gladiola like long, flat, ribbon shaped foliages. It is native to China. The plant is a perennial herb about 60-90 cm height, often grows in aggregation. During flowering long scape comes out singly from each matured plant. Each scape bears very beautiful blossoms which ranges from red to orange yellowish but mostly orange. The petals are spotted very beautifully with red spots. The pod opens full showing clusters of black seeds resembling very much black berries thus offering the common name Black Berry Lily.

Fig. 3.9 *Belamcanda chinensis* (L.) DC.

Silk Cotton Tree

Local Name : **Simolu**

Botanical Name : ***Bombax ceiba* L.**

Family : **Bombacaceae**

Silk Cotton tree is a very attractive deciduous tree with its large showy blossoms in larger quantities on leafless branches provide unique appearance and beauty that hardly comparable with others. The branches are more or less horizontal and develop in whorls from the main trunk. They bear 5-7 foliate palmately compound leaves with 10- 25 cm long petiole , 12- 24 X 7-10 cm , lanceolate to elliptic leaflets. Old leaflets fall before new leaves appear in February to March then new leaves appear during April along with flowering. It is native to Tropical Asia, temperate Asia and parts of Australia.

The blossoms are large 10- 11 cm across , showy with five, united fleshy sepals and five larger petals, dark scarlet, fleshy , free ; stamens numerous united in five bundles that are scarlet which make the flower

uniquely decorative. Stamens total sixty five out of which fifty are in five bundles of ten each and remaining fifteen in another whorl which are as long as petals each with a single purple anther . Such decorative vibrantly colored large showy flowers that too on leafless branches turning the whole tree red is really amazing. Often plants with yellow or yellowish pink flowers are not uncommon.

Silk Cotton tree is one of the best known of all Indian flowering trees for its very showy large crimson bloom that appear in early spring on bare branches before most other trees produce their flowers.

Fig. 3.10 *Bombax ceiba* L.

Bougainvillea

Local Name : **Kagoj phul /Bagan-bilash**

Botanical Name : ***Bougainvillea spectabilis* willd.**

Family : **Nyctaginaceae**

Bougainvillea is a very rewarding and beautiful perennial ornamental plant which excel in brilliance of their color and profuse flowering almost throughout the year that vary from cream, deep pink, yellow to scarlet. It is native to South America from Brazil west to Peru and South to Southern Argentina.

It is a very common thorny ornamental plant which is very hardy, versatile, climbing or straggling shrub that exhibit wide adaptability to varied soil and climatic conditions. It looks strikingly beautiful

when in full bloom with simple alternate, elliptical or ovate leaves. Here flowers develop in cluster of three of which each flower bears one brightly colored paper like large showy bract at the base in a unique pattern. Hence the local name of the plant "Kajoj phul" i.e. paper flower.

Fig. 3.11 *Bougainvillea spectabilis* (pink)

Flowers are tubular and smaller than bracts. Thus the attractive part of Bougainvillea are not the petals rather the enlarged showy, brightly colored paper like bracts that bloom almost round the year.

Bougainvillea has 14 species which is native to South America of which three are having ornamental value because of their very attractive bracts. Those are-

Bougainvillea spectabilis Willd, *Bougainvillea peruviana* Humb & Boup and *Bougainvillea glabra* Choicy. Besides these, the cultivars can be grouped under three hybrid groups, namely- *Bougainvillea buttiana* (*glabra* X *peruviana*), *Bougainvillea specto-peruviana* and *Bougainvillea* X *specto-glabra* (Pal & Swarup, 1974)

Fig. 3.12 *Bougainvillia spectabilis* (white)

Angel's Trumpet/Brazil's White Trumpet

Local Name : **Dangor - Dhotura/Goch-Dhotura**

Botanical Name : ***Brugmansia suaveolens* (Willd.) Bercht. & Presl.**

Family : **Solanaceae**

Angel's trumpet or Brazil's white trumpet is a shrub with many branched trunk. It is native to Mexico. It bears large Datura like foliages as well as flowers. The blossoms are remarkably beautiful that bloom very densely which are large showy white, trumpet shaped, about 24-32 cm long, sweetly scented. The corolla is slightly recurved to five main points. Thus such densely placed large showy, drooping trumpet like overlapping blossoms give the plant tremendous exotic impression when in full bloom.

Fig. 3.13 *Brugmansia suaveolens* (Willd.) Bercht. & Presl.

Flame of the Forest/Forest Flame

Local Name : **Polash**

Botanical Name : ***Butea monosperma*** **(Lamk.) Taub.**
(*B. frondosa* Koen. ex Roxb.)

Family : **Papilionaceae**

Flame of the forest is a small or medium sized deciduous tree with parrot beak shaped striking vibrantly colored orange- red blossoms. It

is native to Tropical subtropical parts of the Indian subcontinent and Southeast Asia, ranging across India, Bangladesh, Nepal, Sri-Lanka, Myanmar, Thailand, Laos, Combodia, Vietnam, Malyasia and Western Indonesia. The flowers develop in racemes crowded towards extremities of leafless branches making the plant eye catching providing its common name "Flame of the forest." The foliages are trifoliate with broad rounded, three, dark green leaflets , two of which are placed oppositely and the third one is larger. The leaves mostly fall in cold season. The trifoliate leaves appear just following the flowers before which the trees remain faded distorted and unattractive. During February to March clusters of flowers open up. The blossoms are butterfly like but much larger up to 6 cm long , bright orange - red . The buds before opening are covered with small calyx. They are densely clothed with brown velvet making a surprising contrast color with the red petals when burst open. Five sepals are bell shaped, fleshy grey, silky inside. Petals five unequal, orange - red, silvery tomentose outside; vexillum 2.5 cm broad recurved giving the flower parrot beak like appearance; wings fulcate adhering the keels . Fruit is only one seeded pod, 8 - 12 x 3 4 cm across , pendulous , silky tomentose .

Thus such vibrantly colored large showy beak like blossoms in cluster make the plant extravagantly beautiful and very impressive. The tree is most important host of lac insect. Flowers also provide a brilliant yellow dye. Root extract is effective to control high blood pressure.

Fig. 3.14 *Butea monosperma* (Lamk.) Taub.

Poinciana

Local Name : **Radhachura**

Botanical Name : ***Caesalpinea pulcherrima*(L.) Sw.**

Family : **Caesalpiniaceae.**

Poinciana is at present an uncommon spiny ornamental shrub or very small tree with compound leaves. It is originating from West Indies. Flowers are very beautiful shaded with yellow orange and red with very delicate long and bright colored stamens which make the blossom extravagantly beautiful. They develop in raceme type of inflorescence making the plant very attractive when in bloom. hEach flower is with five sepals and five, free petals not so equal of which one is slightly larger, one petal smaller with long claw which are shaded with orange, yellow and red. Stamens ten which are very attractive, delicate, almost equal in length, provide additional beauty to the blossoms.

Fig. 3.15 *Caesalpinea pulcherrima* (L.) Sw. (red)

It has another variety which is yellow in color.

Fig. 3.16 *Caesalpinea pulcherrima* (L.) Sw (yellow)

Canna/Indian Shot

Local Name : **Parijat or Kolaboti**

Botanical Name : ***Canna indica* L.**

Family : **Cannaceae.**

This well known Canna plant resembles largely with turmeric plant which grow in aggregation. It is very common ornamental plant in parks avenues, home gardens. The importance of Canna plant lies not only in its beautiful blossoms but also for its long lasting oblong large foliage that forms thick clumps. The plant is peculiar in its morphology as the under ground rhizome portion is the actual stem whereas the aerial stem like portion resembling banana plant is pseudostem formed by the petioles of the leaves. During flowering each plant raises a long strong stalk like a candle stick bearing many large showy vividly colored blossoms. They may be yellow, pink,

scarlet or even shaded according to the variety. The peculiarity of this ornamental plant is that here the perianth members or the calyx-corolla are not the attractive part rather the beauty of the flower is due to modified petal like stamens known as petaloid staminodes.

Fig. 3.17 *Canna indica* L. (red)

Each flower is bisexual, epigynous and asymmetrically zygomorphic. Perianth 6 members in two whorls. Stamens six in two whorls of these only that is the median posterior member of the inner whorl is fertile bearing only 1/2 anther i.e with only one anther lobe;

five other stamens are reduced to petaloid staminodes forming the showy part of the blossom. Style is also petaloid, ovary inferior. Fruit is a loculicidal warty capsule with persistent calyx.

There are many species or hybrid varieties often planted in the study area. It can be easily propagated by rhizome cutting.

Fig. 3.18 *Canna indica* L. (yellow)

Bottle Brush

Local Name : **Bottle Brush**

Botanical Name : ***Callistemon lanceolatus* (Sm.) Sweet**

Family : **Myrtaceae**

Bottle brush is an evergreen small tree with peculiarly drooping branches bearing attractive, long linear- lanceolate leaves. During flowering season from May to December brilliant red colored flowers develop in terminal leaf bearing spikes. The flowers are sessile, bracteate with leafy green bracts; five united sepals; five whitish green petals. Stamens numerous, scarlet, monadelphous having very long filaments. Thus numerous striking stamens which are longer than petals are the prominent parts of the flowers. They make the inflorescence more attractive giving the appearance of a bottle cleaning brush hence the common name of the plant is Bottle brush. Much drooping branches with delicate dense blossoms make the plant extravagantly beautiful.

Fig. 3.19 *Callistemon lanceolatus* (Sm.) Sweet

Though the plant is indigenous to Australia, some species are largely found in other tropical region.

Some important species of *Callistemon* are as follows:

Callistemon citrinus (Curtis) Skeels

Plant is a shrub up to 4.5 metres or a small tree with linear lanceolate 3.8 x 8.8cm long leaves. Flowers develop in cylindrical 5-10 cm long spikes with prominent stamens having shades of red.

Callistemon linearis (Schrad. & J. C. Wendl.) Colv.ex Sweet

This is also known as Narrow leaved bottle brush. Plants are 1-1.5 metres high shrub with silky shoots and leaves when young. Leaves are narrow linear 5-12.5 cm x 0.12-0.25 cm. The flowers are densely packed in cylindrical, 7.5-12.5 cm long spikes with crimson stamens faintly tinged with green but anthers dark crimson.

Callistemon rigidus R. Br.

This is also known as Stiff bottle brush. The plant is a tall shrub with linear to linear lancealate leaves 5-12.5 cm x 0.5 cm sharply pointed leaf apices. Flowers are in 7.5-10cm long dense spikes with dark red stamens.

Callistemon pinifolius J.C.Wendl.).ex Sweet

This is also known as Pine bottle brush. It is a tall shrub with filiform 7.5-12.5 cm long leaves. The leaves are silky and pale lilac when quite young. Flowers develop on about 5-7.5 cm long spikes with yellowish green stamens and yellow anthers.

Callistemon saligrus (Sm.)Colv.ex Sweet

This is also known as White bottle brush. The plant is a shrub or small tree, leaves 5-11 cm long linear to linear- lanceolate thin but firm. The flowers are pale yellow in cylindrical spikes. It is with two varieties var *albus* and var. *viridiflorus* of which *C. saligrus* var. *albus* is with white flowers and *S. saligrus* var. *viridiflorus* is with green or greenish yellow flowers.

Callistemon viminalis (Sol.ex Gaertn.)G. Don ex Loudon

This is also known as Weeping bottle brush. The plant is a bushy shrub or small tree with arching stems as if they are weeping. Leaves

are 2-6 cm long, lance shaped, flowers bright red in spikes. Its another veriety Captain Cook is a shrub with rounded lance shaped leaves and bright red flowers while var. Rose Opal is a shrub, narrow leaved with deep red flowers that fade to rose pink color.

Yellow Oleander

Local Name : **Korobi**

Botanical Name : ***Cascabala thevetia* (L.) Lippold**
(*Thevetia nerifolia* Juss.ex Steud.)

Family : **Apocynaceae**

Yellow Oleander is a most common flowering plant that bloom for several months throughout the year. It is native to Tropical America, probably Mexico. It is a small tree with latex which provides attractive flowers for a long period as well as forms decorative clumps of dense permanent green lanceolate foliages throughout the year.

The blossoms are large , yellow, funnel shaped with five small sepals and five petals which unite to from about 4 cm long corolla tube. It widens towards upper portion while inside the mouth of the corolla tube stamens are connected. Fruits are large drupe, 5 cm across with fleshy green pericarp or fruit wall, distinctly triangular and single seeded.

Fig. 3.20 *Cascabala thevetia* (L.) Lippold (yellow)

Though yellow one is very common, there are varieties with saffron or white blossoms. All these bear large variously colored very beautiful blossoms. They are born in small clusters among green long lanecolate dense permanent leaves.

Fig. 3.21 *Cascabala thevetia* (L.) Lippold (saffron)

Fig. 3.22 *Cascabala thevelia* (L.) Lippold (white)

Cassia

Various species of Cassia are seen to grow wildly with very attractive blossoms; others are widely planted as very popular ornamental plants. Some of them are as follow-

C.glauca, C.siamea, C.nodosa, C.javanica, C.fistula, C.tora, C.sophera, etc

Some species though exotic, are mingled with the native vegetation in such a way that it is troublesome to distinguish them from the locally available ornamental plants. These are considered very valuable inclusion in home gardens, parks, avenues. Some species are as follows-

C. glauca Lamk, *C.fistula* L. and *C. siamea* Lamk. with yellow flowers while *C. nodosa* Warm.ex Roxb.and *C.javanica* with pink flowers.

Candle Bush / Empress Candle Plant

Local Name : **Khorpat**

Botanical Name : ***Cassia alata* L.**

Family : **Caesalpiniaceae**

This is a common wildly growing species of Cassia with 22-60 cm long pinnately compound leaves. It is known as Candle Bush Flower because the inflorescences look like yellow candle from far. It is native to Mexico. The plant of Candle Bush Flower may be up to 6 metre height which is mostly ignored when not in bloom. At the time of flowering 15-30 cm long racemes come out which bear very attractive bright yellow blossoms that bloom during July to November. Though wild, it deserves a place as ornamental plant because of its beauty in full bloom condition. Leaf extract is often used in skin problem.

Fig. 3.23 *Cassia alata* L.

***Cassia auriculata* L. :** These are tall evergreen branched shrubs. Leaves are 7-10 cm long, auricled, foliaceous stipules, leaflets are in 7-9 pairs, 1.5- 2.5 cm long with an orange, erect gland between each pair of leaflets, oblong to obovate and aromatic. The flowers are in compound corymbose racemes, yellow. Pods pale brown, oblong, 5-15 cm long, compressed, base tapering.

***C. bicapsularis* (L.)Roxb. :** Plants are bushy up to 3 metre in height, glabrous. Leaves 4-8 cm long, leaflets 3-5 pairs, ovate, elliptic or round. Showy, pale yellow colored flowers are displayed in axillary racemes.

***C.biflora* L. :** It is a small bushy plant of about a metre height with small

pinnate leaves with bright yellow flowers occur in pairs.

Golden shower tree / Indian Laburnum

Local Name : **Sonaru**

Botanical Name : ***Cassia fistula* L.**

Family : **Caesalpiniaceae**

Golden shower tree is a messenger of spring with its large drooping golden yellow cluster of flowers along with newly formed bright parrot green leaves that form just a fantastic combination. It is native to Indian subcontinent and adjacent regions of Southeast Asia. It is a much branched medium sized tree with unipinnately compound leaves 22-44 cm long having 4-8 pairs of leaflets. The blossoms are yellow and cluster in 20-40 cm long attractive drooping racemes. Each flower has five free sepals ; five free striking yellow, obovate, clawed petals; ten unequal stamens. Fruit slender about 50-60 cm long cylindrical within which numerous flat seeds are embedded in the dark blackish brown pulp.

The pulp of the fruit is laxative and diuretic, useful in tongue sore, piles liver disorder etc.

Fig. 3.24 *Cassia fistula* L.

Pink Cassia / Pink Mohur

Local Name : **Gulopia Cassia/Bandor lathi**

Botanical Name : ***Cassia nudosa* Warm. ex Roxb.**

Family : **Caesalpiniaceae**

Pink Cassia is a very well known flowering tree species with closely set pink flowers decoratively arranged all over the branches. It is a medium sized tree with very wide spreading crown where the branches form a broad umbrella like dome. The outer branches have a tendency to droop till they nearly touch the ground. It has pinnately compound leaves that arranged in rows. The tip of the leaflets are pointed. During flowering season attractive pink flowers cover the whole branches making the whole plant pink.

Each flower is with five sepals which are about 0.5 cm long; petals five about 1.8- 2.5 cm long; out of five stamens three are longer and curved with large globose thickenings in the middle of the filaments, four stamens are shorter and rest of the three stamens are minute and sterile. Such very decorative peculiarly shaped prominent stamens with attractive pink colored petals provide extravagant beauty to the plant.

Fruits are cylindrical and about 50- 60 cm in length. During April - May the full bloom trees provide eye catching beauty to the nature which form a choice for avenue and for land scaping.

Fig. 3.25 *Cassia nudosa* Warm. ex Roxb.

Periwinkle

Local Name : **Nayantora**

Botanical Name : ***Catharanthus roseus*** **(L.) G. Don**

Family : **Apocynaceae**

Periwinkle is a richly flowering perennial plant. It is native to the Indian Ocean Island of Madagascar. It forms much branched stalks foliated with simple, alternate, elliptical leaves. In the time of flowering mainly during rainy season (except winter) the branches are covered with pink blossoms, that develop in axillary or in terminal position. The blossoms are star shaped, pink with five petals and light green corolla tube about 3.5 cm long; five sepals, persistent, smaller; five stamens hidden inside the mouth of the corolla tube; two carpels, united above the region of style and stigma but ovaries free of which each ovary develops into individual fruit . Thus two long fruits develop from each ovary at the place of single flower about 4.5 cm long, follicles. The variety with pink rose colored flowers is called variety 'Roseus'.

Fig. 3.26 *Catharanthus roseus* (L.) G. Don. var. *roseus*

Periwinkle is a very valuable ornamental perennial because of its attractive blossoms that bloom almost round the year. This is also a very valuable medicinal plant, the leaf extract of which contain alkaloid like Vincristine, Vinblastine etc. The extract of leaves is used to control diabetic sugar.

It may produce white colored blossoms also which is called 'Alba' variety.

Fig. 3.27 *Catharanthus roseus* (L) G. Don var. *alba*

Plumed Cocks Comb / Silver Cocks Comb

Local Name : **Lehetisak**

Botanical Name : ***Celosia argentea* L.**

Family : **Amaranthaceae**

Silver cocks comb is a wildly growing annual herb about 30 cm - 1 metre height which is often found as a weed in crop fields or as wasteland weed. It is native perhaps to India. The plant bears linear lanceolate leaves. Though flowers are minute inconspicuous still

hundreds of such white pink, dark pink, mauve scarious flowers develop compactly on elongated spike at the end of branches give vivid appearance to this weed while in full bloom. It is interesting to note that tender shoots of this plant is used as green vegetable and have some medicinal properties.

Fig. 3.28 *Celosia argentea* L.

Cockscomb

Local Name : **Kukura - joba/ Kukura-phul/ Murga- phul**

Botanical Name : ***Celosia cristata* L. (=*Celosia argentea* L. var. *cristata* L.)**

Family : **Amaranthaceae**

Cockscomb is a very common beautiful annual ornamental plant native to India which is profusely branched and about 1- 2 m high. It bears alternately placed, simple, lanceolate very attractive foliages that changes color form green to mauve. The flowers are in dense velvetty crested inflorescence with brilliant colors which is very unique in texture and appearance as if the whole inflorescence is a crest of a rooster and thus providing the common name Cockscomb. Thus the beauty lying behind the unique Cockscomb like blossoms are the hundreds of tiny flowers that are packed in very dense brightly colored inflorescence displayed above the graceful foliages. It is commonly planted as an ornamental plant in home yards, gardens, temple yards.

Besides striking beauty, the flowers are considered astringent used in diarrhea and to control menstrual discharges.

Fig. 329 *Celosia argentea* L. var. *cristata* L.

Queen of the Night/Night blooming Jasmine/ Night Scented Jessamine

Local Name : **Hasnahana**

Botanical Name : ***Cestrum nocturnum* L.**

Family : **Solanaceae**

Queen of the Night is a much branched straggling shrub which is also known as The Night blooming Cestrum or Hasnahena, Lady of the Night etc. It is native to West Indies. The plant is a branched shrub with simple , lanceolate leaves.

The blossoms are too much scented specially at night which are off white to greenish white in color, tubular of funnel shaped. Numerous such inconspicuous flowers are displayed on a branched cyme inflorescence which are quite insignificant in their beauty but the demand of the plant is its extravagant fragrance.

Fig. 3.30 *Cestrum nocturnum* L.

Chrysanthemum

Local Name : **Indramaloti/ Indra mallika/ Chandramallika**

Botanical Name : ***Chrysanthemum coronarium* L.**

Family : **Asteraceae**

Chrysanthemums are one of the most beautiful and richly colored aromatic winter perennial plant. The species *Chrysanthemum coronarium* is native to Mediterranean while the species *Chrysanthemum coccineum* is native to Persia. The plant bears simple, alternate foliages which are divided by long notches into several lobes that are also indented but the upper leaves are not so lobed. During flowering pure white or light yellow colored blossoms are set in bunches which are shaped like Marigold. In each blossom the ray florets are arranged towards the periphery of the head while the disc florets at the centre. In some varieties disc florets are completely concealed by the richly developed ray florets. There are different hybrid- varieties which bear unbelievably beautiful blossoms of pure white, dark scarlet, lemon yellow, maroon, purple color as if winter season flower garden is incomplete without Chrysanthemums.

It is important as a natural source of insecticide due to presence of an active compound pyrethin that can attack the nervous system of insects.

It can be easily propagated by cutting.

Fig. 3.31 *Chrysanthemum coronarium* L. (yellow)

Fig. 3.32 *Chrysanthemum coronarium* L. (purple)

Gynandropsis / Shona African Cabbage

Local Name : **Bhutmula**

Botanical Name : ***Cleome gynandra* L.**
[*Gynandropsis pentaphylla* (L.) DC.]

Family : **Cleomaceae**

Gynandropsis is a wild strongly smelling herb but because of its beauty it is often cultivated as a garden ornamental species. Probably this is native to Africa but now widespread in many parts of the world. The plant is a herb with palmately compound pentafoliate leaves having about 5- 8.5 cm long petiole , the leaflets are stalk less usually five in number about 1.2- 4 X 0.7 2.5 cm in size , the middle one is the largest .

The blossoms are white or pinkish purple or shaded with dark pink to light pink to white that open in very attractive long corymb like racemes. Each flower has four free sepals; four free, clawed petals ;

six prominent stamens which are placed on a long androphore having long filaments and purple anthers. Two carpels united and placed on a gynophore. Such type of blossoms with both androphore and gynophores beside very attractive colored flowers in long raceme make the plant strikingly beautiful, when grow very densely. Fruit is a capsule about 5- 10 cm long and 0.5 cm in diameter on a long stalk having many kidney shaped brown or black seeds inside.

Fig. 3.33 *Cleome gynandra* L.

Red Glorybower / Japanese Glorybower

Local Name : **Ronga Pyramid-phul**

Botanical Name : ***Clerodendrum japonicum* (Thunburg) Sweet.**

Family : **Verbenaceae**

Japanese Glorybower is a common shrub growing wildly which is not usually considered as an ornamental plant but in full bloom condition it attracts special attention. It is a shrub bearing large more or less ovate- heart shaped foliages. The most striking feature of the plant are the large terminal inflorescences that may attain a length of about 45- 55 cm. The long pyramidal, terminal inflorescence bears numerous slender tubular red flowers about 1.2- 2 cm long. Each part of the inflorescence including the flowers, pedicels, whole stalk of the inflorescence are red that makes the whole inflorescence red. As the plant produces root suckers so it spread vegetatively thus it can form clonal strands apparently of several plants together. Another much similar species is also found commonly in the study area which is known as Pagoda flower i.e. *Clerodendrum paniculatum*, of which the leaves gradually becoming smaller upwards; lamina ovate-cordate, deeply 3-7 lobed.

Fig. 3.34 *Clerodendrum japonicum* (Thunberg) Sweet

Bridal Rose / Rose Glorybower

Local Name : **Thopagolap Nefafu**

Botanical Name : ***Clerodendrum philippinum* Schauer.**

Family : **Verbenaceae**

Bridal Rose or Rose Glorybower is a small shrub which is of about six feet height. It is native to south East Asia particularly China and Japan. It bears large broadly oval mostly heart shaped oppositely placed foliage leaves which are of foetid smell. The blossoms are like tiny Roses or Rose buds which develop in tight rounded terminal clusters of highly perfumed flowers each with five Rosy or purple calyx that is very beautiful before the opening of the corolla.

Showy double or treble petal bearing white colored rose like flower besides providing spectacular beauty is attractive for its sweet scent. Though wild it is often planted in home gardens particularly for its pure white beautiful blossoms that develop compactly and more particularly with its unique sweet scent.

Fig. 3.35 *Clerodendrum philippinum* Schauer.

Bleeding Heart

Local Name : **Bleeding Heart**

Botanical Name : ***Clerodendrum thomsoniae* Balf.**

Family : **Verbenaceae**

Bleeding heart is a perennial twining vine with simple heart shaped leaves that are oppositely placed. It is often planted as an ornamental plant which is popular for its beautiful spectacular dramatic blossoms. This is native to Tropical America.

It is very pretty with cream colored heart shaped calyx which remain sealed like a balloon that bursts into heart shaped structure with scarlet red interior petals protruding out of the calyx and thus get the name Bleeding heart. Each calyx of the flower is made up of five sepals and each corolla is composed of five petals. Stamens are prominent and along with long style exerted beyond the petals. Such decorative blossoms born in cluster of cymes of about 8-20 flowers together make the plant spectacular during flowering. As the day passes the white blossoms that are the persistent calyces turn from white to pale pink or lavender, then eventually become tan as they dry up.

Fig. 3.36 *Clerodendrum thomsoniae* Balf.

This is a very demanding ornamental plant with such unique brilliant blossoms that bloom mainly during warmer months but flowers are seen sporadically throughout the year. This can be propagated very easily by stem cutting.

Fig. 3.37 *Clerodendrum thomsoniae* Balf. (close up)

Butterfly creeper/Blue Pea/Cordofan Pea

Local Name : **Aparajita**

Botanical Name : ***Clitoria ternatea* L.**

Family : **Papilionaceae**

Butterfly creeper is one of the most common ornamental climber with very curious butterfly like blue blossoms. It is native to the tropical Asia. The plant is very hardy, it grows to a fair size forming dense clump and produces good number of beautiful blossoms without attention every year. The foliages are compound with 5-7 oval or sub-elliptical leaflets.

The flowers are of brilliant blue with five sepals that are united. Out of five petals one is larger much attractive known as vexillum having blotches at the centre as if it is the beauty spot of the flower. The two lateral petals are known as wings and the two innermost greenish petals are called keels. Stamens are hidden inside the petals their number being ten in two bundles, nine united in a bundle and one is free. One carpel which is hairy, included inside the furrow of the staminal tube. Fruit a long flat pod about 7cm long.

Fig. 3.38 *Clitoria ternatea* L. (white)

Fig. 3.39 *Clitoria ternatea* L. (blue double)

The flower may be single or double. Another white variety is also commonly found. Root extract of this variety is effective in irregular menstruation.

Cosmos

Local Name : **Cosmos**

Botanical Name : ***Cosmos* spp.**

Family : **Asteraceae**

Cosmos, due to their longivity, unique appearance as well as striking beauty of variously colored blossoms is one of the most demanding flower which belongs to Asteraceae or Sunflower family. It is native to Mexico . It is a herb or sub shrubby plant, 15-90 cm high which is erect, much branched having oppositely placed simple rough surfaced foliage. The foliages are divided by long notches into several lobes, which are also indented. Two types of florets i.e. peripheral ray florests and central disc florests develop on flattened convex bowl like rachis, which is known as head or capitulum like that of sunflower. The ray florets are brilliantly colored, salver shaped, much attractive with central smaller, tubular, dark orange disc florets providing unique appearance when in full bloom. Some common species in the study area are *C. bipinnatus* Cav., *C. caudatus* Kunth, *C. sulphureus* Cav.etc. All the species bear variously colored blossoms like-pink, orange, yellow, violet etc.

Fig. 3.40 *Cosmos sulphureus* Cav. (orange)

Fig. 3.41 *Cosmos sulphureus* Cav. (yellow)

Sacred Garlic Pear/Temple Plant

Local Name : **Barun**

Botanical Name : ***Crataeva religiosa* Forst. f.**
(*Crataeva nurvala* Buch.-Ham.)

Family : **Capparidaceae**

Crateva or Sacred Garlic Pear is an evergreen, moderate sized tree with trifoliate palmate leaves bearing striking vibrantly colored, large, showy pure white blossoms. It is native to Japan, Australia, much of Southeast Asia and several Pacific islands. The flowers are pure white to pale yellow which appear in terminal corymbs along with new graceful soothing light green foliages during April and thus giving a

striking beauty to the plant. Each flower has four sepals adhere at the base to the fleshy lobed disk. The four petals are long-clawed and all arranged on the upper side of the flower that is pure white but as soon as it blooms turn into pale yellow or cream colored. Stamens numerous purple in color and exceed the white petals in length being about 5 cm long thus giving the flower a unique combination that too with newly developed bright green leaves .They bloom during March-May on a short column at the base of a gynophore . Fruit is a many seeded berry.Very delicate graceful flowers grow in cluster on long slender stalk at the extremities of branches.

Fig. 3.42 *Crataeva religiosa* Forst. f.

Crotalaria

Local Name : **Ghonta korna/Otoshi-phul**

Botanical Name : ***Crotalaria pallida* Ait. (*C.striata* DC.)**

Family : **Papilionaceae**

It is a beautiful shrub planted for its beautiful bright yellow blossoms. It is native to Tropical Central America. It bears simple

obovate, oblong or linear alternately placed leaves. The blossoms are bright golden yellow butterfly like that develop in long raceme making the plant very beautiful. One remarkable feature of this flower is that it usually blooms at the time of scarcity of flowers usually in the months of November-January.

Each flower is zygomorphic with five united sepals and five butterfly like petals of which one is larger called vexillum. The two lateral ones are called wings and two smaller innermost ones are known as keels.Inside the keels there are ten stamens. Fruit is a pod which is oblong, turgid with many loose seeds. Dried fruits produce sound when shaked.

Fig. 3.43 *Crotalaria pallida* Ait.

Crinum Lily

Local Name: Bon - Nohoru

Botanical Name: *Crinum pratens* Herb. (=*C. asiaticum* L.)

Family: Amaryllidaceae

Crinum Lily is a large flower bearing ornamental plant with tufts of long, backwardly arching attractive foliages that develop from underground Onion like but larger bulbs. During flowering in rainy season it develops a long stalk on which many about 6-12 flowers are displayed. The blossoms are large white with slender spreading petals and a very long green floral tubes which are often mistaken as the stalks or pedicels of the flowers. Each flower bears .linear lance shaped 5- 9 cm long petals forming the white spidery flower. The long arching attractive wine purple stamens add spectacular beauty to the white blossom. It has different species like-*Crinum amoenum*, *C. defixum, C. moorei* which are commonly found in the study area.

Fig. 3.44 *Crinum pratens* Herb.

Dahlia

Local Name : **Dalia**

Botanical Name : ***Dahlia pinnata* Cav.**

Family : **Asteraceae**

Dahlias are very demanding winter ornamental plant for garden display and decoration which is native to Mexico, Central America and northern South America. The plant is a herb with simple leaves. The blossoms are called heads with ray florets and disc florets like Sunflower, which may be of varying color like-yellow, violet, purple, scarlet or the florets of a head may even be flecked with another color.

Dahlias with such decorative blossoms bloom during winter bring pleasure through its beauty. They are of high demand for gardening.

Fig. 3.45 *Dahlia pinnata* Cav. (orange)

Fig. 3.46 *Dahlia pinnata* Cav. (maroon)

Datura

Local Name : **Dhotura**

Botanical Name : ***Datura metel* L.**
(*D. fastuosa auct. non* L.)
and *D. stramonium* L.

Family : **Solanaceae**

Datura is a branched perennial shrub with large obscurely beautiful funnel shaped blossoms which are white with purple shading. *Datura metel* is native to India and Southeast Asia. The foliages are simple, obscurely lobed and alternately placed. The flowers are large, pentamerous, and white or purplish. It develops solitarily with five green, united, tubular sepals. Five petals united to form a funnel shaped corolla which may be white or mixed with purple. Five stamen are alternate with the petal members and attached near the corolla base. Two carpels are syncarpous with superior ovary. Fruit is five valved

with sharp spines. *D. metel* bears flowers which are purplish outside but white inside and fruit with blunt spines. While *D. stramonium* bears white or purple flowers smaller than *D. metel* and fruits with sharp spines. The blossoms open at night and emit very pleasant out fragrance. Leaf extract is helpful in eczema and used to kill lice.

Fig. 3.47 *Datura metel* L.

Fig. 3.48 *Datura stramonium* L.

Gulmohor / Goldmohur

Local Name : **Krishna chura**

Botanical Name : ***Delonix regia*** **(Bojer.)Raf.**
(*Poinciana regia* Bojer.)

Family : **Caesalpinaceae.**

Gulmohor is a very large tree of unique appearance and beauty when in full bloom. It is native to Madagascar but at present rare in the wild. Leaves are large, feathery, bi-pinnately compound leaves having 11-18 pairs of pinnae with numerous minute leaflets. Flowers are gorgeous showy dark red, with five free,thick sepals and five long clawed petals, one of the petal is larger and having white as well as pinkish blotches.Each flower with its beautiful five petalled corolla along with delicate brightly coloured stamens is extravagantly beautiful, attractive making the environment the same.

Fig. 3.49 *Delonix regia* (Bojer.) Raf.

Water Hyacinth

Local Name : **Pani Meteka/ Meteka**

Batanical Name : ***Eichhornia crassipes* (Mart.) Solms.**

Family : **Pontederiaceae**

Water Hyacinth is a wildly growing aquatic herb with magnificient blooms. It is native to South America. The plant is a herbaceous plant with simple heart shaped leaves having sheathing bases and spongy inflated petiole. It grows gregariously forming pure colony with vivid display of flowers which are of striking violet colored on stalks of spikes straight out of the rosette of leaves. These magnificient violet colored blossoms develop in terminal racemes with spathaceous bracts bearing bisexual, hypogynous flowers with minute bracts and bracteoles. Each blossom is having six perianth members in two whorls, three in each whorl ,all are petal like very beautiful violet colored, free; stamens six in two whorls, members of the outer whorl adnate to the sepals and inner row adnate to the petals.

Such brilliantly colored cluster of flowers in full bloom form neat, compact, cushion like growth. This can be of 30-45 cm height. The blossoms have yellowish blotches which pertain additional beauty to them.

Fig. 3.50 *Eichhornia crassipes* (Mart.) Solms.

Coral Tree

Local Name : **Modar/ Lam**

Botanical Name : ***Erythrina indica* Lam. (=*E. stricta* Roxb.)**

Family : **Papilionaceae**

Coral tree is a very attractive most popular spring flower for its easily visible scarlet flowers almost on leafless tree that attract our view from very far. It is native to the low elevation deciduous forests of South Asia. This is a fairly large spiny plant almost leafless when in bloom. The foliages are pinnately trifoliate, leaflets 7.5-17.5 cm across, mostly ovate. The blossoms are bright coral red pertaining the name "Coral tree" that develop on 15-22.5 long secund or one sided horizontal raceme. Each flower is about 3.5-5 cm long with five united brownish sepals. Five petals are free long butterfly shaped with one longer scarlet, ovate or obovate vexillum which is folded longitudinally ; wings two and 2 smaller keels inside, 1.9-2.4 cm light greenish. Pod 10-20 cm long, spindle shaped with 3-4 kidney shaped reddish seeds.

Fig. 3.51 *Erythrina indica* Roxb.

Crown of Thorns

Local Name : **Kontok-mukut**

Botanical Name : ***Euphorbia milii* Desm.**
(*E.splendens* Boj.ex Hook.)

Family : **Euphorbiaceae**

It is a spiny shrub which is native to Madagascar. The plant is of Cactus type where the plant body is fleshy and with spines. It is much branched. The foliages are spatula shaped with milky latex. The red colored bracts form the attractive part of the blossoms where the main flowers are inconspicuous. Usually *Euphorbia milii* is rarely found, but now a days subspecies *splendens* is very common which is with larger foliages as well as larger showy bracts and bloom at the tip of branches.

Fig. 3.52 *Euphorbia milii* (subspecies *splendens*)

Poinsettia

Local Name : **Lalpat**

Botanical Name : ***Euphorbia pulcherrima* Willd.ex Klotzsch**

Family : **Euphorbiaceae**

Poinsettia is also known as Mexican flame leaf plant is one of the very attracting plants of chrismas season. It is native to Maxico and Central America (Chittenden and Syndge, 1956). Unique characteristic of Poinsettia is the milky latex and inconspicuous flowers which are over shadowed by striking red leaves. Rosettes of red leaves which look like flowers develop at the end of the green branches. It is a much branched garden shrub with brilliant red floral leaves towards the extremities of branches during flowering. Green foliage leaves are simple. Flowers are unisexual, inconspicuous and develop in a cup shaped special type of inflorescence called cyathium. Each cup shaped cyathium bears a female naked simple flower at the centre other flowers being male. Anyway brightly colored leaf shaped bracts make the plant strikingly beautiful and having high demand as an ornamental plant.

Some of the cultivars which are used as ornamental plant are as follows-

"Alba"- A medium sized plant with cream -white floral bracts.

"Annette Hegg"- A compact much branched bush. Leaves ovate small; bract small, broad, red.

Ecke's white: Stems slender, involucres, leaves bright green, ovate; bracts creamy.

Eckespoint Lilo: Compact growth, much branched, leaves dark green, leaves ruby red.

Eckespoint celebrate: Suitable for single stem plant, bracts big bright red.

Eckespoint Lemon drop: Medium sized plants ; bracts golden yellow.

Eckespoint pink peppermint: Medium sized plants; bracts bronzed- pink.

Eckespoint celebrate 2: A free branching, multi-bloom plant; bracts bright red.

Lilo white: Plants much branched, dwarf; bracts white.

Menorca: Plants vigorous; bracts vivid red and red white cyathia.

Plenissima: It is also known as double Poinsettia.It bears inflorescence of circle of vermilion red, large, elliptic lanceolate bracts and cluster of narrow bracts at the centre.

Rosea: It is known as pink Poinsettia. Plant bushy, bracts obovate rosy with darker veins.

Fig. 3.53 *Euphorbia pulcherrima* Willd.ex Klotzsch

Bonfire/Indian Almond Colored Sterculia

Local Name : **Kath Udal/ Jori Udal**

Botanical Name : ***Firmiana colorata*** **(Roxb.) R.Br. (=*Sterculia colorata* Roxb.)**

Family : **Sterculiaceae**

Bonfire or Indian Almond Colored Sterculia is a medium size tree with alternately set large more or less round foliages that are with several broad lobes and with long petiole that are deciduous. It is native to Sri Lanka, southwest India, east wards to Burma, Bangladesh. The tree becomes more eye catching during full bloom. In the month of March numerous stiff, erect dense clusters of narrow brilliant scarlet

blossoms appear mostly at the ends of the twigs which provide a beauty to the leafless tree. Bonfire tree is often mistaken as Coral tree due to same flowering period and structure from far as well. But morphologically both of them are quite different. In Bonfire the whole clusters of flowers become red where the unopen buds, stalks of the flowers, opened flowers all are bright scarlet. Thus the whole inflorescence looks as a mass of coral making the plant very much attractive and unique in appearance. Of course this is not a very common species.

Fig. 3.54 *Firmiana colorata* (Roxb.) R. Br.

Cape Jasmin

Local Name : **Togor/Gondhoraj**

Botanical Name : ***Gardenia angusta* (L.) Merr. (=*G. jasminoides* J. Ellis; *G. florida* L.)**

Family : **Rubiaceae**.

Cape Jasmin is a perennial, dense evergreen ornamental plant which is very popular owing to its beautiful pure white delicate and extraordinarily sweet scented blossoms. It is native to Southern China and Japan. It is a large shrub or small bushy tree that is frequently branched, though crowded with simple, dark green glossy foliages set in opposite manner or in whorl of three near the ends of twigs. Young

leaves and shoot have a very bright varnished look due to resinous substance, each pair of opposite leaves bear a pair of stipules.

The blossoms are large, showy pure white color which gradually turn into creamish. They develop solitarily near the end of branch lets which are delicately sweet scented pertaining the local name "Gondhoraj" meaning *king of scent*. Each flower is with about 3cm long green calyx which become 5-6 ridged ending in subulate sepals. The corolla is up to 7.5 cm in diameter, double, white in color. Corolla tube stout 7.5 cm long, lobes numerous, double, white very fragrant.

Fig. 3.55 *Gardenia angusta* (L.) Merr.

Glory Lily / Flame Lily

Local Name : **Ulat Chandal/Angi Sikha/Ulu Chandan**

Botanical Name : ***Gloriosa superba* L.**

Family : **Liliaceae**

Glory Lily is one of the most unusual splendid flower bearing perennial climber which is also known as Flame Lily, Climbing Lily, Tigers claw etc. It is native to Tropical Africa and Asia. The scientific name *Gloriosa superba* very nicely expresses the beauty of this flower

where *Gloriosa* indicates full of glory while *superba* specifically describes its superb alluding to the striking red and yellow flowers. The plant bears alternately placed unique type of leaves where the leaf apices modified to wiry tendril that help in climbing.

As the name indicates really the blossoms are strikingly beautiful that develop solitarily which are bisexual very showy, pendulous about 4.5 -7 cm in diameter on a very long up to 20 cm long pedicel. In bud condition the petals remain pale green and face downward but as the blossom attains maturity the green petals elongate and wrinkle ultimately bend backward that is taking upward position. The uniqueness of the flower is that the petals gradually change their color from green to orange to scarlet spectrum of color with crisply much waved margins. Such beautiful spectrum of colored upwardly placed petals along with extremely prominent graceful curved six stamens that follow the petals in their downwardly backward position give the blossom splendid beauty. In India a postal stamp was issued by postal department to commemorate this beautiful dramatic flower. It contains alkaloid colchicine.

Fig. 3.56 *Gloriosa superba* L.

Ginger Lily / White Ginger Lily

Local Name : **Dulal Champa**

Botanical Name : ***Hedychium coronarium*** **Koenig. var.*coronarium***

Family : **Zingiberaceae**

Ginger Lily looks mostly like that of a large ginger plant that bear large showy remarkably sweet scented blossoms almost throughout the year. It is originally from Himalayan region and native to Nepal and India. The uniqueness of this flower being that the showy parts of the flower are not the petals rather they are modified stamens. Each flower has five whitish transparent sepals next to which is the whorl of three inconspicuous petals. Striking five stamens modified in such a way that provide extravagant beauty to the species. The petal like stamens is arranged in two whorls. Out of five stamens the median posterior member of the inner whorl is fertile having one anther with two lobes. The lateral two stamens of the inner whorl united to form a petal like labellum. Remaining two stamens are modified to petal like structure which are the most prominent showy part of the blossom. The pure white, very fragrant blossoms develop in spikes at the axils of green leafy bracts providing striking beauty to the plant.

This can be very easily propagated from the rhizome or small plantlet from the main plant of which segments should be used. The best time for propagation is after the flowers fade away.

Fig. 3.57 *Hedychium coronarium* Koening var.*coronarium*

Sunflower

Local Name : **Suryamukhi Phul/Beli Phul**

Botanical Name : ***Helianthus annus* L.**

Family : **Asteraceae**

Sunflower is planted generally as an ornamental plant in home gardens and parks. It is native to the Americas. It is also cultivated in large scale for edible sunflower oil known as velvet queen. It is an erect usually unbranched annual herb of about 0.7- 3.5 cm height. The foliages are large, alternate, oval having long petiole, lamina 10-30 X 5-20 cm across but the lower leaves are often opposite and heart shaped.

The whole blossom is not a single flower rather an inflorescence which is a cluster of many flowers that is known as head or capitulum type of infloresence. It is terminal on the main stem large about 10-40 cm in diameter, sometimes drooping heads on the lateral branches are smaller. It is very interesting that the whole head or capitulum rotates to face the sun providing the name Sunflower.

It bears two types of florets- tongue shaped or legulate ray florets towards the periphery and disc florets at the centre of the head. The outer ray florets are very attractive dark yellow or orange in color and the central disc florets are tubular which mature into seeds. Thus the heads are golden yellow with brownish centre which bloom from the month of November to December.This is solely propagated by sowing seeds.

Fig. 3.58 *Helianthus annus* L.

Heliconia / Lobster Claws or Parrot Flowers

Local Name : **Heliconia**

Botanical Name : ***Heliconia* species**

Family : **Strelitziaceae**

Heliconia with its brilliant colored drooping spathy blossoms on miniature banana like plant body is of unique appearance. It blooms during March-April. It is somewhat a new introduction in Assam. It is native to Tropical American countries, Bolivia, Columbia, Costarica, Equador, Panama and Peru. Though it is a new introduction at present is a very popular ornamental plant. Heliconia is often grown for its attractive long lasting spathy floral spadix and gracefully arching foliages. There are 90 species of Heliconia and most important species of ornamental value are *H.bihai* (L.)L. *H.stricta* Huber, *H.rostrata* Ruiz & Pav. *H.latispatha* Benth. etc.

Helicona is a perennial plant and grows in aggregation. It can be grown easily without much care. It has underground rhizome. It bears simple broadly lanceolate leaves with long petiole. At the time of flowering the spikes come out with very attractive spathes having a profusion of yellow, orange and red shading that become pendulous.

Due to its brilliantly colored spathy pendulous long lasting blossoms this becomes an interesting and decorative plant which was until recently little known in the state of Assam.

Fig. 3.59 *Heliconia* species

Cotton Rose / Changeable Rose

Local Name : **Sthalpodmo**

Botanical Name : ***Hibiscus mutabilis* L.**

Family : **Malvaceae**

Cotton Rose with its large, showy, delicate, vividly colored pink flowers in a medium sized tree that appear during autumn. It bears simple foliages, 3-7 lobed, 15-20 X 11-14.5cm, petioles 7-12 cm long, with stipule. The blossoms are large, showy which are whitish in the morning but gradually turn pale pink to deep pink by evening. Due to the fact it is also known as Changeable Rose.

Fig. 3.60 *Hibiscus mutabilis* L. (in morning)

Each flower is with 8-12 epicalyx segments. Five sepals connate up to middle and enlarging in fruit. Petals are very attractive, delicate with two whorls of many corolla lobes. Stamens numerous and united in a bundle. Fruit is a capsule. It is native to China and is commonly found in the study area for its beautiful blossoms that brings the message of sweet autumn. It is propagated by stem cutting.

Fig. 3.61 *Hibiscus mutabilis* L. (in afternoon)

China Rose

Local Name : **Joba**

Botanical Name : ***Hibiscus rosa -sinensis* L.**

Family : **Malvaceae**

China rose is popularly known as the shoe flower and it is native to China. The flower wakens with sunrise and sleeps when sun sets. This is a large, very common evergreen shrub having simple, dark green, ovate leaves with serrated margins. Flowers develop solitarily having 6-10 epicalyces and five united green sepals. Five petals are free but united at the base with the staminal tube. Stamens prominent numerous united in a bundle, through the staminal tube the style passes out and with five- fid stigma. Richly flowering China rose covers an immense range and diversity of varieties of form and color, which is very popular commonly growing garden plant. This has been cultivated in a great number of varieties of different color from white, through every shade of pale pink, deep pink, yellow, saffron, light red up to coral red. They may be single or double. Flowers as well as leaves of red Hibiscus is very useful for any hair problem and make hair silky and attractive.

Fig. 3.62 *Hibiscus rosa-sinensis* L.

Another species ***H. schizopetalus*** (Mast.) Hook.f. which is also known as Fringed Rose Mallow or Japanese Lantern is a very interesting species of *Hibiscus* which was introduced from eastern Africa. It has ovate, elliptic and very beautifully shaped foliages. It is a very rewarding and beautiful species of *Hibiscus* that bears red or orange red blossoms which are drooping with much fringed petals and unusually long staminal tube giving uniqueness to the species.

Fig. 3.63 *Hibiscus schizopetalus* (Mast.) Hook. f.

Fig. 3.64 *Hibiscus rosa-sinensis* L. (white)

Hibiscus cannabinus L. is one of the most well known species of *Hibiscus* that has a profusion of quite beautiful large flowers. Though exactly not known probably it is native to Southern Asia. The plant is up to eight feet high. Leaves are simple but much deeply lobed. Each flower is with hairy epicalyx and five hairy sepals. Petals five, reddish purple with a dark blackish brown centre. Numerous stamens united to form a common bundle that comes out from the centre of the flower.

Fig. 3.65 *Hibiscus cannabinus* L.

There are many other local races of *Hibiscus* that bear unbelievably beautiful blossoms which are often planted as ornamental plant. One variety of leafy, acidic edible *Hibiscus subdarifa* L. locally called "Tengamora" is seen to be planted as an ornamental plant. It is an undershrub with sour leaves. The foliages as well as the whole plant body are red in color. The blossoms are very beautiful, reddish pink with a dark brownish centre. In the centre of the flower single monadelphous bundle of the stamens is present.

Fig. 3.66 *Hibiscus subdarifa* (red variety)

Chinese Hat Plant / Cup and Saucer Plant

Local Name : **Manu Kota Phul/ Chatrapushpa**

Botanical Name : ***Holmskioldia sanguinea*** **Retz.**

Family : **Verbenaceae**

A large Straggling perennial wild shrub with profuse drooping branches found mostly in tropical Asia and native to the Himalayan low lands. It bears oval foliage, 5-15 X 3.5 -9 cm crenate or crenate serrate with 4-6 pairs of lateral nerves having 1.2-2.5 cm long petiole. The

blossoms are zygomorphic striking vibrantly colored which develop in short axillary and terminal clusters. It blooms from October to January. Each flower is with five-petalled two lipped corolla. The calyx is the most attractive part of the flower which is brilliant scarlet or orange red and umbrella shaped. The calyces are permanent and increase in size with age that is accrescent in fruit. The beauty of this plant is mainly for its permanent very decorative and vibrantly colored scarlet united umbrella shaped calyces. Corolla 1.2- 2.5 cm long with 2cm long corolla tube which is curved, limb oblique, unequally five lobed. Stamens didynamous, exerted. Ovary of two celled carpels having one ovule in each cell with terminal style and shortly bifid stigma . Fruit is drupaceous that is included within the permanent calyx. Though wild it deserves plantation.

Fig. 3.67 *Holmskioldia sanguinea* Retz.

Garden Balsam / Rose Balsam / Common Balsam

Local Name : **Keru-phul/Balsam/ Damdeuka/ Horgori-phul**

Botanical Name : ***Impatiens balsamina* L.**

Family : Balsaminaceae

Balsams are a common inclusion in gardens with varieties of color which is native to southern Asia. In full bloom condition they form multicolored cushion like growth. They are branched small herb with transparent fleshy stem bearing simple, alternately placed narrowly or broadly lanceolate leaves with deeply serrated margins.

The ear-ring like blossoms develop in axillary fascicles which are bisexual, hypogynous with five sepals of which one is modified to honey bearing tail like spur, lateral two sepals are smaller. The petals are orbicular, retuse, multicolored may be white, light pink, deep pink, maroon, scarlet, spotted or even single flower shaded with multiple colors. Out of five petals the anterior petal is larger. The whole flower looks like a traditional ear-ring hence the local name of the flower is "Keruphul". Stamens 5, free. Ovary five-celled with numerous ovules. Fruit is a capsule which is pointed, elliptic, oblong, turgid, transparent, hairy outside that bursts in five valves that become coiled inward with numerous brown small spherical seeds inside on a central axis.

Fig. 3.68 *Impatiens balsamina* L.

There are a number of hybrid varieties with varying color of flowers and dwarf nature of plant developed and are commonly grown. They are usually propagated by seeds.

Fig. 3.69 *Impatiens balsamina* L.

Cypress Vine / Cordinal Vine

Local name : **Kunjolota /Toru lota**

Botanical Name : ***Ipomoea quamoclit* L.**
(*Quamoclit pinnata* Boj.)

Family : **Convolvulaceae**

Cypress Vine or Cordinal Vine is an attractive but rather uncommon ornamental climber. It is native to Tropics of America. It bears much delicate glossy scarlet blossoms along with fringed, fish

skeleton like evergreen foliages. The plant is very beautiful, slender stem climber having pinnate- partite leaves with filiform segments. The salver shaped scarlet, dazzling blossoms are displayed on long axillary few flowered cymes. Each flower is with unequally lobbed five calyx segments. Petals five which are united to form a salver shaped corolla. Five stamens are not so prominent and they are inserted inside the corolla tube. Fruit is a four lobed capsule with four black glossy seeds.

Fig. 3.70 *Ipomoea quamoclit* L.

Ixora

Local Name : **Rongilal Phul/ Rongon**

Botanical Name : ***Ixora coccinea* L.**

Family : **Rubiaceae**

Ixora is a richly flowering perennial bushy, ornamental plant that is much important for home gardens and parks avenues. The plant is much branched foliated with simple oppositely placed leaves and a pair of stipules to the right angle of the foliage pairs. It is demanding for its aggregated brightly colored scarlet or dark orange blossoms that are

displayed on terminal or axillary dense clustered corymbs. They develop mostly on each and every branch making the plant very much showy. Each flower has four petals which are united forming a long and colored corolla tube. Stamens are not so prominent alternating with the petal members at the mouth of corolla tube, united with the petals.

There is a species with white flowers also and it is botanically known as *Ixora alba* L.

Fig. 3.71 *Ixora coccinea* L.

Mimosa leaved Jacaranda

Local Name : **Jacaranda**

Botanical Name : ***Jacaranda mimosifolia* D.Don**

Family : **Bignoniaceae**

Jacaranda is a very beautiful tree with very minute leaflets placed bipinnately as in Mimosa or in Gulmohor tree. It is native to Argentina and Brazil. Each bipinnately compound leaf is about 37 cm long with very small leaflets. Due to similarity in leaf structure it is often mistaken as Gulmohar, when not in bloom.

During flowering (March-April) very beautiful blossoms come out in terminal panicles of 40-90 flowers. The flowers are displayed in large, erect loose sprays at the end of branches. They are of very brilliant purplish blue or lilac color and make the tree very attractive. Each flower is with five petals that are united to from a tube and expands above forming two lips. The upper corolla lip has two rounded lobes where as the lower one is having three lobes. Stamens five but four are fertile. Out of five stamens two are longer than the other two, fifth stamen is sterile.

This tree is found occasionally as roadside tree with its very magnificient display of brilliantly bluish purple flowers clustered in large panicles along with new gracefully colored leaves.

Fig. 3.72 *Jacaranda mimosifolia* D.Don

Jasminum

Local Name : **Gutimali / Kirkirilota**

Botanical Name : ***Jasminum laurifolium* Roxb.var. *lauri folium***

Family : **Oleaceae**

Jasminum is a much branched straggling shrub with opposite bifarious leaves that are elliptic lanceolate to linear lanceolate. It is native to North America. During flowering beautiful floral buds come out. The buds are reddish out side which are displayed on 3- flowered terminal peduncled cymes. Pure white dense flowered blossoms are very beautiful with about 1.5-2 cm long partially reddish corolla tube. Corolla lobe 10-12 and strap shaped. The flowers are made into garlands and often used as a very demanding decorative item.

Fig. 3.73 *Jasminum laurifolium* Roxb.var. *lauri folium*

Star Jasmine / Downy Jasmine

Local Name : **Khorika jai**

Botanical Name : ***Jasminum multiflorum* (Burm.f.) Andrews**

Family : **Oleaceae**

Star Jasmine or Downy Jasmine is very well known flower which is a scandent shrub pubescent when young. It is native to India. Often cultivated in gardens, and is popular for its pure white blossoms and more particularly for its sweet scent. The branches are covered with

permanent oppositely placed simple, entire foliages which are more or less pubescent beneath having 3-4 pairs of lateral nerves. The blossoms are double, pure white, highly perfumed, arranged in short peduncled cymes. Calyx pubescent, segment twice the length of the tube being 0.7-1.7 cm long with yellowish hairs and nearly as long as the corolla tube. Corolla tube 1.5.-1.7 cm long, lobes shorter than the tube.

Fig. 3.74 *Jasminum multiflorum* (Burm.f.) Andrews

Arabian Jasmine

Local Name : **Duwamali**

Botanical Name : ***Jasminum sambac* (L.) Ait.**

Family : **Oleaceae**

Arabian Jasmine is a very beautiful evergreen frequently branched erect shrub or somewhat climber. The branches are displayed with permanent, simple oppositely placed ovate even orbicular foliages that are glabrous above but pubescent beneath, with three pairs of lateral nerves. It is native to Arabia.

The blossoms are pure white which bloom from March to June. They are double about 2.5 cm across develop axillary solitarily or in 3-

flowered cymes. Here calyx segments pubescent, 6-8, linear up to 0.7 cm long. Corolla tube is up to 1.7 cm long white. Two stamens are included in the corolla tube. The plant is very rewarding not only for its permanent dense clustered leaves but for its pure white very sweet scented blossoms for a long period. It is usually propagated from plantlets develop near the main bush.

Fig. 3.75 *Jasminum sambac* (L.) Ait.

Bryophyllum

Local Name : **Soru-pategoja**

Botanical Name : ***Kalanchoe blossfeldiana***

Family : **Crassulaceae**

It is a very large genus which is found all over the world. It resemble very much with common Bryophyllum. There are numerous cultivars of this species. The plant is very decorative both in their blossoms and in the shape and color of its foliages. They usually grow in clumps and about 20- 30 cm tall. They have succulent, ovate, glossy green leaves but turn reddish green during flowering The leaves are like the leaves of Bryophyllum but smaller and do not produce foliar

buds at the leaf margins. At the time of flowering firm stalks terminate in large, flat umbel like inflorescence. Each inflorescence bears small, brilliant red colored blossoms during November to March. Each flower is with four distinct, united, attractive petals. They can be grown in flower gardens or in tubs especially effective in groups. There are different varieties that bear white, pink or orange blossoms. Propagation of this species is very easy by division of the roots or by cuttings.

Fig. 3.76 *Kalanchoe blossfeldiana*

Fig. 3.77 *Kalanchoe blossfeldiana* (close up)

Byrophyllum

Local Name : **Pategoja/Dupar Tenga**

Botanical Name : ***Kalanchoe pinnata*** **(Roxb.) Pers.**
(*Bryophyllum pinnatum* Roxb.)

Family : **Crassulaceae**

Bryophyllum is a decorative erect shrub for its blossoms and beautifully shaped colored and thick foliage. It is more or less branched and about 1.0 -1.4 m high. It is native to Tropical Africa.

It blooms in October to January. It grows up to 1.4m in clumps and regenerated from foliar buds. Its blue grey thick , succulent leaves are simple or pinnately compound having elliptic or ovate leaflets about 9.5- 13 cm long, margins serrate .The uniqueness of the leaves of Bryophyllum is that many small plantlets develop on the notches of the leaf margins which can grow into matured plants after getting detached from the main plant thus pertaining the name Live leaf resurrection plant .This is also known as Miracle Plant, Mother of thousands, Air plant etc.

During flowering the firm terminal stalk bears greenish pink tubular pendulous flowers in bunches which make the plant very attractive. Each flower is with a whorl of calyx that is tubular, cylindrical, inflated, brownish or purplish, 3.5- 4.5 cm long, very curious that remain hermetically sealed in buds like balloons that burst into cylindrical bell like very attractive blossoms .They are having about 5 cm long corolla which are inflated at the base and then constricted, tubular ,reddish or purplish. The tips of the lobes are pointed which are displayed pendulously on large terminal panicles providing unique beauty to the plant.

Bryophyllum has much demand not only for its decorative foliage or blossom but it is considered useful in curing or controlling urinary problems and kidney disorder. It is used as antiseptic, astringent, anti-inflammatory. This plant is very easy to propagate which can be done by cutting of small seedling near the main plant or from matured leaf that develops new plantlets from the notches of the margins. The plant can live for many years in one place and bloom inexhaustibly every year.

Fig. 3.78 *Kalanchoe pinnata* (Roxb.) Pers.

Crape Flower / Queen Crape Myrtle / Pride of India

Local Name : **Azar / Ghugura/ Jarul**

Botanical Name : ***Lagerstroemia reginae* Roxb. (=*L. flosreginae* sensu Cl.)**

Family : **Lythraceae**

Crape flower in its full bloom is a very beautiful plant widespread in wild and native to tropical southern Asia. This is a medium sized tree, though wild, but often planted for its remarkably beautiful flowers and timber. The foliages are simple, elliptic, oblong, lanceolate, petiolate, exstipulate 10-20 X 3.5-7.5 cm long. The leaves usually turn copper colored or reddish and fall off gradually until new foliages appear in March- April, variable in shape nearly in opposite pairs or partly alternate.

Brilliantly colored mauve purple blossoms cluster in about 50 cm long raceme providing a unique appearance and beauty to the plant during April to June. Each flower is with six sepals united to form a funnel shaped tube having grooved surface which are

persistent up to the fruits. Petals six, free which are inserted at the apex of the calyx tube with distinct claw, the margins of the petals are much crumpled and wavy with deeper colored veins. Stamens many inserted near the base of the calyx tube with long filaments. Carpels five united having long curved style. Fruit is a hard capsule with crown of persistent sepals. Free six petalled much attractive violet colored flowers grow in wide, open clusters at the ends of branches with crumply wavy boarders hence offering the accurate name Crape flower.

The leaves and bark are purgative and seeds are narcotic while the root is astringent and stimulant.

Fig. 3.79 *Lagerstroemia regionae* Roxb.

Turk's Cap/Turk's Turban

Local Name : **Kukura- Joba/ Muja-joba/ Jolokia- joba/ Tikoni Joba**

Botanical Name : ***Malvaviscus arboreus* Cav.**

Family : **Malvaceae**

Turk's Cap or Turk's Turban is an evergreen, much branched plant with simple lance shaped leaves. They are alternately placed each being 12-15X 5-7 cm long gradually becoming narrow at the tip which is

pointed. The peculiarity and the demand of the flower is due to the fact that it blooms more or less throughout the year. It is native to south eastern United States, Mexico, Central America and South America.

Each flower develops solitarily at the axil of leaf with about 4cm long stalk having 7-8 leafy epicalyces and united green sepals. The dark crimson colored 7 cm long, five petals with broadened tips are twisted in such a way that the blossoms never fully open. The flower look like ripen red Chilly from far hence the local name of the plant is "Muja-joba" means unopened Hibiscus and "Jolokia- joba" means red Chilly like Hibiscus. It has a very pale pink almost white colored variety also.

Fig. 3.80 *Malvaviscus arboreus* Cav. (pale pink)

Fig. 3.81 *Malvaviscus arboreus* Cav. (red)

Indian Rhododendron / Singapore Rhododendron/ Malabar Melastome

Local Name : **Phutuki/Phut/ kola/ Phutuka**

Batanical Name : ***Melastoma malabathricum* L.**

Family : **Melastomaceae**

Indian Rhododendron form wild clump of attractive perennial bushes resembling the Azaleas. It is native to tropical Asia, Australia and Polynesia. The bushes are covered with very attractive lanceolate or elliptic, sharply veined, oppositely set foliages. Though wild it attracts attention because of its vividly colored Azalea like mauve purple five-petalled blossoms. The flowers are displayed in cluster of 1-5 at the end of branch lets. The prominent, uniquely designed stamens provide additional beauty to the flower where they are double the number of petals. The stamens are much decorative because they have long, bright yellow colored filaments with purple anthers. The connectives of the anthers are produced at base terminating the two anther lobes. The shorter stamens are with yellow anthers having tubercles in front. Such naturally designed, dramatic stamens with vividly colored petals make the plant very beautiful. Though wild often planted in home gardens for its beauty. Fruit is baccate with rather deep purple pulp inside which is edible; leaves are applied to stop bleeding in cuts.

Fig. 3.82 *Melastoma malabathricum* L.

Ceylon Iron Wood / Iron Wood Tree

Local Name : **Nahar/Nageswar**

Botanical Name : ***Mesua ferrea* L.**

Family : **Clusiaceae**

Iron wood tree is specially planted for its durable hard wood that is known as "Indian Iron Tree, Ceylon Iron wood or Iron wood tree". It is a very slow growing tree named after the heaviness and hardness of its timber. It is native to tropical southern Asia. It is very well organized medium sized pyramid shaped tree. It has remarkably attractive spring flower which is known for its fragrance and foliages that changes colors from coppery to dark green. The branching stems are thickly covered with evergreen, simple, oppositely placed, lanceolate foliages. The upper surface of the leaves are shining and whitish wax like powdery beneath. The leaves are coppery when young. In full bloom condition during spring, pure white blossoms with decorative yellow stamens centrally provide a pleasing and beautiful arrangement over the cushion of evergreen branches. The flowers are large, very showy, bisexual, regular, exquisitely fragrant with four sepals. The petals are purely white, four in number and much exceeding the sepals. Numerous dense delicate bright yellow colored stamens forming yellow mass in the centre provides unique beauty to the blossoms.

Fig. 3.83 *Mesua ferrea* L.

Yellow Jade Orchid Tree

Local Name : **Titasopa / Champaphul**

Botanical Name : ***Michelia champaca* L.**

Family : **Magnoliaceae**

Yellow Jade Orchid tree is an evergreen, tall, beautiful tree. It is native to India. The plant has simple, broadly oval or lanceolate 20-25 cm long, dark green stipulate leaves. The foliages are shining above, lamina 12.5- 22.5 X 6.5- 9.5 cm and in bud covered with hood like stipule that fall off as the leaf grows.

It bears highly perfumed, pale golden yellow blossoms. It is also a much demanding plant for its high quality wood. The flowers are strongly scented, very showy, golden yellow about 5 cm across axillary rarely terminal, solitary develop from buds which are ovoid with spathe like bracts that are ovate, about 2.5 cm long, as broad or broader than long ,often silky outside. Tepals fifteen in three whorls of five each. They are oblong or oblanceolate, gradually narrower towards centre, the five outermost tepals are the largest, and the inner members are smaller while the median ones are slightly narrower than outer. Stamens numerous which are spirally arranged yellow with broad connective having projected tip of 0.5 cm length. Carpels numerous, spirally arranged on a conical

Fig. 3.84 *Michelia champaca* L.

stalked torus which are transformed to fruit about 10-20 cm long spike. Though the carpels are contiguous in flowers but generally distant in fruit due to elongation of the axis.

The tree is often found in the vicinity of temples or near roadside which is considered very sacred by the Hindus. The plant is having some medicinal uses of which the flowers are used to cure rheumatism, cough, etc; seeds are used for healing cracks in feet, the sweet scented oil obtained from the flowers is used in ophthalmic and gout.

Bullet Wood Tree/ Asian Bullet Wood Tree

Local Name : **Bokul**

Botanical Name : ***Mimusops elengi* Roxb.**

Family : **Sapotaceae**

Bullet wood tree is an evergreen tree with its dense foliage as well as very sweet scented flowers. It is native to southern India to Burma. It bears simple alternately placed elliptical, dark green leaves the upper surface of which are smooth, glossy. The tree is extremely well organized with very straight trunk bearing numerous spreading branches, the ends of which tend to rise thus giving a very thick globular head to the tree making it uniquely beautiful in appearance.

The blossoms which appear during October to November are solitary or in small clusters, off white, very fragrant and star shaped. Each flower is having six lobed green calyx; corolla thirteen which are about twenty four lobed, biseriate with lobes lanceolate looks like star; stamens 8 small, staminodes 8 fimbriate. Gynoecium with 6-8 celled ovary, cells 1 ovuled, style subulate.

Thus the flowers bearing numerous sepals , petals and stamens that too spread stiffly outwards in such a way that each flower take the form of very beautiful flattened star.

Fruit is a globular or elliptical berry turning dark orange when ripe which are edible. The star like fallen smaller blossoms are used for making garlands and for perfumery.

The edible ripe fruits have some medicinal properties against constipation and it is digestive also. Because of the striking beauty and

many other advantages this is a valuable inclusion in institutional campuses, gardens and parks avenues. This can be propagated by seeds and seedlings should be transplanted while still smaller. Bark extract mixed with warm water used to gargle to control pyrrhoea, bleeding of gums or other dental problem.

Fig. 3.85 *Mimusops elengi* Roxb.

Four O' Clock plant/ Marvel of Peru

Local Name : **Godhuli Gopal/ Sandhamaloti**

Botanical Name : ***Mirabilis Jalapa* L.**

Family : **Nyctaginaceae**

Four O' clock plant is a very common perennial that bears a profusion of shining, brightly colored blossoms in the evening thus pertaining the English or the local name as four O' clock plant and Godhuli Gopal respectively. It is native to Tropical America. The foliages are heart shaped set oppositely on the branches. The blossoms provide very pleasing and beautiful decoration with their variously colored flowers. Each flower is covered at the base by five sepaloid green bracts. Perianth members are five in number and attractive brightly colored. The color may range from white to pale pink, dark

pink, mauve, yellow even a flower may be shaded with mixed color of white, pink etc. Fruit is an achene which is pot shaped black with longitudinal ridges and furrows on the surface that are enclosed within persistent bracteoles.

Fig. 3.86 *Mirabilis jalapa* L.

Fig. 3.87 *Mirabilis jalapa* L. (yellow)

Arrow Leaf Pond Weed/Arrow Leaf Monochoria

Local Name : **Jonaki- phul/Khowa meteka**

Botanical Name : ***Monochoria hastata* (L.) Solms.**
(*M. hastaefolia* Presl.)

Family : **Pontederiaceae**

Arrow Leaf Pond Weed is a wild growing perennial emergent herb of marshy areas with arrow head shaped foliages. It is native to Temperate and Northern Australia. This is also known as Arrow leaf Monochoria or Arrow leaf Pond weed. During flowering it forms very attractive light blue violet colored delicate blossoms from the axils of leaf sheath which are of unique appearance.

It has arrow shaped, sharply defined foliages decorated by axillary clusters of vibrantly colored brilliant star like cluster of blossoms in compact head like inflorescence. Each inflorescence is erect or sub- erect, sub-umbellate to shortly racemose of 10 - 40 flowers, the peduncle of the inflorescence is distinctly shorter than associated leaf petiole. Each blossom is with 1-3 cm long pedicel, six perianth segments of vividly light blue violet color having reddish blotches as beauty spot. Stamens are of different lengths. Spike is often used as vegetable having medicinal properties.

Fig. 3.88 *Monochoria hastata* (L.) Solms.

Orange Jasmine/Orange Jassamine

Local Name : **Kamini**

Botanical Name : ***Murraya paniculata* (L) Jacq.**
(=*Murraya exotica* L.)

Family : **Rutaceae**

Orange Jasmine is a very well known evergreen flowering plant with large clusters of white, fragrant flowers that appears from March and continued till September. It is native to India. It is not only attractive for sweet flowers but demanding for its evergreen, glossy, green very beautiful foliages. They have better longevity. Due to these facts the leaves or the small twigs are used for decoration purpose and for making flower bouquet. It is a well organized, small tree with frequently branched stem having compound leaves with 3-9 elliptical, lanceolate, about 2.5- 5 x1-3.5 cm leaflets, the upper surface of which are glossy dark green coriaceous do not dry off soon.

The blossoms are very showy, white born in small dense cluster, in terminal or axillary corymbose cyme or solitary mostly at the ends of the branches and at the axils of the compound evergreen foliages. The flowers are pedicellate, bisexual, complete, exquisitely fragrant about 2.5 cm long. Sepals five in number and they are minute, acute, green. Petals are five in number which are white, free , deflexed or bend at the back, oblong lanceolate, spreading above. Ten prominent delicate stamens add beauty to the flower which are inserted around an elongated disc and alternating with the petals. Gynoecium of 2-3 carpels, syncarpous, ovary superior, 2-3 locular. There are two ovules in each chamber in axile placentation. Fruit is a berry upto 1.2 cm long, egg shaped, narrowed at ends, rugose, red, orange red when ripen, and seeds oblong. One striking feature is that free petals shed turning the ground whitish. It is commonly grown in gardens, home yards or as hedge for its glossy green permanent foliages and large cluster of very fragrant flowers.

Fig. 3.89 *Murraya paniculata* (L.) Jacq. (= *Murraya exotica* L.)

Mussaenda

Local Name : **Charai-atha, Musanda**

Botanical Name : ***Mussaenda erythrophylla Schum & Thom.***

Family : **Rubiaceae**

Mussaenda is a large scandent shrub with elliptic or oblong lanceolate leaves, 6.5- 9 x1.2- 3.5 cm across. It is native to African and Asian Tropics and Subtropics. Flowers are in rather dense terminal cymes. The sepals are modified to petal like colored structures. Thus morphologically the attractive parts of the flower are the modified sepals. Corolla tubular, not prominent, lobes five, funnel shaped above. Stamens are inserted at the mouth of the corolla tube. It can be propagated by stem cutting.

Fig. 3.90 *Mussaenda erythrophylla* (pink)

Fig. 3.91 *Mussaenda erythrophylla* (white)

Lotus

Local Name : **Podum**

Botanical Name : ***Nelumbo nucifera* Gaertn.**
(*Nelumbium speciosum* Willd.)

Family : **Nelumboaceae**

Lotus is an aquatic herb with leaves floating on water or slightly above the water but its rhizomes are attached down with mud which is also known as sacred lotus or Indian lotus. It is native to Tropical Asia and Queensland. The leaves of Lotus are very large, orbicular or round or peltate, leathery, very shiny and with intersecting veining pattern that radiates out from the centre towards the margins. Lamina 40-90 cm across with very long petiole. The leaves as well as the flowers are born much high above the water surface unlike those of Water Lily.

The blossoms are strikingly beautiful, large, showy, develop solitarily, white or pale pink standing above water on long stalk. Each floral bud is very attractive, pointed at the tip that unfurl into a multi petalled blossom with numerous attractive floral parts having a central head. In the centre of the flower on the cone shaped receptacle numerous free carpels are sunken.

Besides striking beauty its leaves and flowers are considered as very sacred. This is a flower of antiquity and very closely associated with culture, tradition religion. It is considered as the queen of water garden and is the national flower of India.

Fig. 3.92 *Nelumbo nucifera* Gaertn.

Nerium / Oleander

Local Name : **Rokto Korobi/ Ronga Korobi**

Botanical Name : ***Nerium oleander* L.**

Family : **Apocynaceae**

Nerium is an exotic evergreen large shrub of about 3-4 metre height that remains leafy round the year. It is native to India and the Mediterranean. It bears simple linear lanceolate leaves placed oppositely or in whorls. During the month of June to October it bears sweet scented rosy pink attractive blossoms that are displayed on single or double cymes. Each blossom is about 3.8 cm across with about 1.2 cm long corolla tube at the top of which five stamens are placed at the centre of the flower adding beauty to it. Fruit is a follicle and about 15-20 cm long.

Fig. 3.93 *Nerium oleander* L.

Night Jasmine

Local Name : **Sewali**

Botanical Name : ***Nyctanthes arbortristis* L.**

Family : Nyctaginaceae

The season autumn reminds the sweetest flower of Night Jasmine as if it is the true messenger of sweet autumn. It is native to Southern Asia, from Pakistan and Nepal south through Northern India and southeast to Thailand. It is a small deciduous tree. The whole plant is rough with quadrangular stem and oppositely placed simple, oval foliages with serrated margins.

Extravagantly sweet honey scented white blossoms open out in bracteate heads placed in small dense clusters at the end of short stalks in terminal trichotomous cymes from September to December. Each blossom is having five green, united funnel shaped sepals and five petals which are 5-8 lobed, salver shaped white. About 1.5 cm long dark orange colored corolla tube below makes the flower very unique in appearance. Petals are partially joined to form the tube that is of brilliant bright orange color but the upper parts of the petals which are not joined together are pure white in color and very delicate. It bears round, compressed, leathery capsule. One remarkable characteristic of Night Jasmine is that the flowers open towards evening, in full bloom at night and flowers fall off in the morning thus carpeting the ground beneath. That is why it is rightly called as "Tree of Sadness".

The plant is rather unattractive when not in bloom. The plant has some medicinal properties. The leaves as well as the flowers are often used to control diabetic sugar, cold, cough, dyspepsia, sore throat, fever, rheumatism, sciatica. Tender leaves and fresh or dried flowers are eaten in curries.This is propagated by seedlings which grow under the main blooming plant after the formation of flat seeds.

Fig. 3.94 *Nyctanthes arbortristis* L.

Red Water Lily

Local Name : **Ronga Bhet Phul/ Mokua**

Botanical Name : ***Nymphaea rubra* Roxb. ex Andrews**

Family : **Nymphaeaceae**

Red Water Lily is a rhizomatous aquatic plant with very brilliant blossoms. It is native to Afghanstan, Australia, Bangladesh, Combodia, China, India, Indonesia, Laos, Malayasia, New Guinea, Philippines, Sri Lanka,Taiwan, Thailand and Vietnam. It bears leaves which are orbicular or peltate 15-30cm, petiole and lower surfaces of them are reddish. Leaves are strongly veined, pubescent beneath but sagittate when young.

Flowers are of very attractive dark pink color with numerous floral members along with yellow centre usually 7.5-12.5 cm in diameter. Sepals are oblong, greenish outside with 5- 10 ribs. Petals are numerous, oblong to linear that gradually narrows and ultimately passing into stamens. Stamens are many with filaments that are flattened at the base. Carpels ten to twenty, confluent with the disk. Fruit is a spongy berry with ellipsoid seeds.

Fig. 3.95 *Nymphaea rubra* Roxb. ex Andrews

There are *Nymphea* with white, blue or bluish, red, white flowers belonging to the species like- *N. nouchali* Burm.f; *N. pubescens* Willd.; *N. alba* L. etc.

Orchids

Assam comprises of 293 species of Orchids that occupies 44.39 per cent of the Orchid flora of Northeast India. Orchids are usually perennial herb. They are mostly epiphytic, sometimes terrestrial. The epiphytic herbs are often with leaf bearing stem swollen forming pseudobulb. They have aerial roots covered by valamen. It is a spongy water absorbing tissue. Saprophytic species are without green leaves. In epiphytic species leaves are thick and fleshy. They are simple, usually linear, ovate or orbicular, often have closed sheaths. Orchids are very popular for their long lasting decorative blossoms. The flowers are displayed on spike, raceme or panicle or may develop solitarily. Each flower is bisexual, epigynous, and showy. It has six perianth members that are arranged in two whorls. The perianth members are differentiated into outer calyx and inner corolla. Very rarely the outer perianth members are also petaloid. One of the unique character of Orchid flower is that the median posterior member of the inner whorl is somewhat different from other perianth members. It is known as labellum or lip. This labellum or lip assumes various shapes with beautiful dense coloration provide uniqueness to the flower. Stamen is only one rarely two. Gynoecium is with three united carpels. Out of three stigmas two are fertile and one is sterile. The sterile one is known as rostellum. The single filament of the flower united with gynoecium to form a common structure called gynostegium. Some Orchid species are described below:

Dendrobium Aphyllum (Roxb.) C.E.C. Fisch.

This is an Orchid that blooms in late spring. It is very attractive and easily cultivable. It is with long pendulous stems that become leafless in resting period. During spring carry numerous flowers. The flowers are fragrant, very pale pink. The flowers are epigynous, bisexual, labellum or lip present and shows resupination of ovary. They develop in bunches of spikes. They remain in hanging condition on leafless plant and gives the sheltering tree an eye catching beauty.

Fig. 3.96 *Dendrobium aphyllum* (Roxb.) C.E.C Fisch.

Dendrobium fimbriatum Hook.

This is a very beautiful orchid species. It is distributed in India, China and Southeast Asia. It has erect or arching cane stems. The flowers are very beautiful and develop in spike. The spike may be upto 20 cm long and bears about twenty flowers. The flowers are attractive golden yellow colored. They are epigynous, bisexual, pollens in pollinia and shows resupinatin of ovary. They have labellum or lip blotched with contrast dark brown coloration. The specific name *fimbriatum* indicates the fimbriate margin of the labellum or lip. This is the unique character of this species of *Dendrobium* that is *D. fimbriatum*.

Fig. 3.97 *Dendrobium fimbriatum* Hook.

Dendrobium moschatum (Buch.-Ham.) Sw.

This is also a very beautiful orchid. It is a perennial, semievergreen herb. The foliages are simple, lanceolate and placed alternately. The blossoms are very attractive and develop in late or in mid spring. Each flower has six perianth members and arranged in two whorls. The perianth members of both the whorls are petaloid and yellow in color. The median posterior member of the inner whorl is modified to labellum. It is yellow but decorated with brownish blotch. Such beautiful blossoms along with bright green foliages are a delight for the passersby.

Fig. 3.98 *Dendrobium moschatum* (Buch.- Ham.) Sw.

Dendrobium nobile Lindl.

This is one of the most demanding members of Orchid family. It is considered as a critically endangered species. It is distributed in Assam, Bhutan, Myanmar, Thailand Laos and Vietnam. It is a sympodial orchid of which the foliages are simple, strap shaped, persistent. The flowers are very beautiful with six perianth members. They are epigynous, bisexual, pollens in pollinia and shows resupinatin of ovary. All members are petal like but the median posterior member of the inner whorl is modified to labellum or lip. The tepals are shaded with dark and pale pink. This labellum is also colored like the other tepals but printed with brownish blotch.

Fig. 3.99 *Dendrobium nobile* Lindl.

Vanda

Local Name : **Bhatou Phul**

Botanical Name : ***Vanda tessallata*** **(Roxb.) Hook.f.**
(*Vanda roxburghii* R. Br.)

Family : **Orchidaceae**

It is a herbaceous epiphytic orchid with aerial hanging roots, stem partially covered with sheathing leaf bases. Leaves are long lanceolate without stipule and petiole, thickly coriaceous, fleshy and flat.

The blossoms are very attractive, bisexual, epigynous, and medianly zygomorphic which develop in large showy lax racemes. Each flower is with six perianth members which are in two whorls. The outer whorl has three sepals that are free, equal in size. The inner whorl consists of three petals that are free and irregular in size. The median posterior member of this inner whorl is larger and somewhat attractive which is termed as labellum or lip that is provided with a spur. Stamen only one, small rostellum, pollinia two, globose- ovoid. Gynoecium with three carpels, united, stigma trifid, sticky, situated below the rostellum and facing the labellum or the lip. Fruit is a long capsule.

Fig. 3.100 *Vanda tessallata* (Roxb.) Hook.f.

Rhynchostylis retusa (L.) Bl.

The most common orchid, which is used traditionally in Assam during Bihu festival. This is the state flower of Assam and more

popularly known as “Fox Tail Orchid or Kopouphul”.This is closely associated with culture and tradition of the state. The leaves are simple, fleshy, deeply channelled and retuse. Flowers develop on axillary, long, pendent raceme. It is densely flowered, cylindrical and may be up to 30 cm long. The flowers are very decorative and with six perianth members. The perianth members are pink spotted and has a bunch of more than hundred flowers.

Fig. 3.101 *Rhynchostylis retusa* (L.) Bl.

Pink Sorrel

Local Name : **Bor Tengesi**

Botanical Name : ***Oxalis debilis*** **H.B. K. var.** ***corymbosa*** **(DC.) Lour. (=*O. corymbosa* DC.)**

Family : **Oxalidaceae**

Pink Sorrel of the Oxalidaceae family is a perennial stem less herb which is similar to yellow sorrel but with larger leaves and different flowers. It is native to South America. This well known wild herb having palmately three foliate radical leaves with long petiole. The leaves are divided into three obovate leaflets. Each leaflet is notched at the tip and arranged palmately. All the leaflets are of equal size. Very attractive light pink blossoms come out on sub umbellate long stalks. Decorative trifoliate leaved herb with vividly colored flowers on long upright stalk makes the plant very pleasant. Each flower is with five greenish sepals and five petals. The petals are brilliant pink in color and usually fused at the base and petals have distinct colored venation pattern. Fruit is a small capsule having many seeds inside. Often seen as pot plant but it is a very commonly growing wild herb in the study area.

It is used as green leafy vegetable having medicinal value. The leaves contain oxalic acid, consumption of which in small quantities is alright but it should not be eaten in large amount as the oxalic acid can bind body's calcium supply. So person with rheumatism arthritis, kidney stones, gout or hyper acidity should be conscious of consuming it.

Fig. 3.102 *Oxalis debilis* H.B. K. var. *corymbosa* (DC.) Lour.

There is another species *Oxalis triangularis*, which in professional literature called as *Oxalis regnellii* is a very cute shade loving pot herb. It has very attractive dark red foliages that are open close to the ground. The leaves are with long petiole and have three radially developed more or less triangular leaflets. During flowering several floral scapes come out, each of which bears four to five flowers. Each flower is very beautiful, faintly pink. The plant has high demand which is decorative for their blossoms as well as for the shape and color of foliages. It can be easily propagated by bulbous rhizome.

Fig. 3.103 *Oxalis triangularis*

Screw Pine

Local Name : **Keteki phul**

Batanical Name : ***Pandanus fascicularis* Lamarck**

(=*P. tectorius* Soland ex Parkinson)

Family : **Pandanaceae**

Screw pine lookes like a miniature palm tree with stilt root. It is native to Malyasia, Eastern Australia and the Pacific island. The

foliages are very large long arching, lanceolate, spiny along both the margins and on the under surface midrib, forming a tuft at the end of the un- branched stem. Flower inconspicuous which is unisexual, naked that is without sepal-petal though not showy but popular for its sweet scent. They are arranged in separate male and female inflorescence, where the male inflorescences are of branched panicle and female inflorescence is simple forming a cylindrical head.

Though not attractive for the beauty of the blossoms but remarkable for its unique sweet scent.

Fig. 3.104 *Pandanus fascicularis* Lamarck

Midday flower/Noon flower

Local Name : **Dupori Phul / Diphori phul**

Botanical Name : ***Pentapetes phoenicea* L.**

Family : **Sterculiaceae**

Midday flower is an erect spreadingly branched herb of about 0.5-1 cm height which is native toTropical South Asia from Sri Lanka to India to northern Australia and Phillipines. At the time of blooming the plant becomes very attractive. It has alternately placed linear lanceolate foliages of about 6-10 cm length and with toothed margins. The flowers are very attractive and born at the axils of leaves. Each flower is about 2.5-3.5 cm across that open at noon or midday thus conferring the common name Midday flower or Noon flower. They bloom from the month of August to November and of late seen very rarely. Each flower is with five sepals and five very attractive scarlet petals that bloom for a very limited period of the day. At the centre of the flower the petals are shaded radially with brown color. Here the stamens are present which are very decorative and of various shape and size. Fruit is a five valved rounded capsule of about 1 cm diameter. It is usually propagated by seeds.

Fig. 3.105 *Pentapetes phoenicea* L.

Passion Flower

Local Name : **Junuka Phul /Sankhuya Chakra Goda Podma/Jhumka lota**

Botanical Name : ***Passiflora adenophylla* Mast.**

Family : **Passifloraceae**

Passion flower is an ornamental climber with simple palmately tri-lobed alternately displayed leaves having entire margins, stipulate with petioles. Flowers develop solitarily and about 5 cm across. Each blossom is with three green bracteole on the pedicel near its tip and with prominent receptacle. It is very much decorative, dark purple colored, develop solitarily. Calyx with five sepals. Petals five in number, purplish blue or whitish in color develop solitarily. Usually a row of filiform segments within the corolla arise lower down the shallow basal cup surrounding the gynophores. It is called corona which is made up of slender filaments within the corolla and the coronal filaments are flat, blue and white in color. This whorl of corona makes the flower very decorative. Stamens five, arising on the apex of a gynandrophore. Thus the whole flower become decorative with various parts providing the local name "Sankhaya chakra Goda Padma". The lobed evergreen leaves with prominently beautiful blossoms is a very valuable inclusion in home gardens, balcony, verandah grills.

Fig. 3.106 *Passiflora adenophylla* Mast.

White Plumeria / White Frangipani

Local Name : **Boga- Gulonch /Son-chompa/ Kathgolap**

Botanical Name : ***Plumeria alba* L.**

Family : **Apocynaceae**

Temple Tree is a common medium sized deciduous tree that bears large Anemone like very fragrant flowers with yellow eyes in the centre on white ground. It is native to West Indies. The plant is a small tree with milky latex and 15-30 cm long foliage that develop in clusters at the apices of the branches which fall down during winter making the plant naked.

The blossoms appear during March-April that are very much showy, large actinomorphic, sweet scented. They are displayed on cymose inflorescence from the tip of the branches. The flowers are stalked, bracteate, complete, and pentamerous with five sepals which are free. Petals five in number, fleshy, united to form a salver shaped corolla with a corolla tube below. They are white but yellow at the

Fig. 3.107 *Plumeria alba* L.

centre with a clear tinge of pink on outer sides which make the flower more beautiful. Stamens inconspicuous, five, epipetalous that is united with petals and inserted on the mouth of the corolla tube. Carpels two, united. This is a very popular plant in temple premises, roadsides and any other place. It has some medicinal properties. The juice of leaves is used against boils and in inflammation of body parts. The milky juice of the plant is mixed with Coconut oil and is applied locally to cure skin problem.

This is easily propagated by stem cutting mainly during rainy season.

Comman Frangipani / Red Plumeria

Local Name : **Ronga Gulonch**

Botanical Name : ***Plumeria rubra*** **L. var. *acutifolia* (Poir) Bailey (=*P. acutifolia* Poir)**

Family : **Apocynaceae**

This is a small deciduous tree, fleshy with shinning bark and milky juice. It is also native to West Indies. The foliages are large, narrow,

Fig. 3.108 *Plumeria rubra* L. var. *acutifolia* (Poir) Bailey

pointed, densely crowded near the end of the branches. It is a deciduous plant but young trees remain green throughout the year.

Very beautiful, sweet scented flowers develop in crowded clusters on downy red stalks make the plant very rewarding. The flowers are large showy, the petals are broadly oval, red in color with a clear yellow eye at the centre making the blossoms exquisitely beautiful. Stamens are not prominent inserted within the corolla tube. This tree is correctly known as "Common Frangipani" and called as "Red Plumeria". This is also propagated by stem cutting during summer.

Tuberose

Local Name : **Rojoni Gondha**

Botanical Name : ***Polianthes tuberosa* L.**

Family : **Asparagaceae**

Tuberose is a very demanding ornamental herb with gracefully long narrow arching leaves. It is native to Mexico. It is a perennial plant with bulb. It is prized for its beautiful foliages and super fragrant flowers. The foliage are simple, long, radical. At the time of flowering a candle stick like stalk comes out. On this stick numerous tube like stalkless, white, showy flowers are displayed. It may be single or double of which the single variery is very fragrant. The blossoms are showy, actinomorphic with six perianth members in two whorls, tube shaped. Stamens six and are attached with the perianth that is epiphyllous. Carpels three, syncarpous.

Tuberose is very valuable for cut flower because each stick bearing pure white showy sweet scented blossoms last for very long time that open slowly and continuously until the opening of the very last floral bud. It is a widely used as ornamental plant for decoration and for making of highly prized flower bouquet for which is cultivated commercially in very large scale.

The plant is left in one place for many years and the matured plants bloom almost throughout the year developing long spikes. The small plantlets that develop in aggregation or in clumps should then be divided and planted in new place keeping some distance at least at intervals of 15 cm.

Fig. 3.109 *Polianthes tuberosa* L.

Portulaca

Local Name : **Hahthengia**

Botanical Name : ***Portulaca pilosa* L**

Family : **Portulacaceae**

Portulaca is a very interesting plant which is also known as Kiss me quick, Hairy pig weed, Pink Purslane etc. It is a fleshy herb which forms neat, compact light green carpet with prostrate sub-erect

succulent stems. It bears spirally arranged fleshy small linear to lanceolate leaves that are 0.5- 2.0 x 0.1-0.3 cm in size with acute apex. This is native to North America.

The blossoms are very strikingly colored, dark pink. It develops axillary solitarily or in terminal clusters or in fascicles. Each flower is about 1.2- 2.3 cm in diameter and is surrounded by involucres of six to nine bracts. Each blossom is with five calyx lobes that are about 0.3 cm long. Corolla with double or treble petals which are spreading, fan shaped dark pink to purple. Ten yellow anther bearing stamens are placed at the centre of the flower. Fruit is a kidney shaped capsule. This ornamental herb gives a carpet like appearance to the ground where they grow. By their brilliantly colored flowers the place attracts special attention almost throughout the year.

This can be propagated by division of branches that develop roots from the nodes.

Fig. 3.110 *Portulaca pilosa* L.

Rangoon Creeper / Chinese Honey Suckle

Local Name : **Maloti phul / Madhobi Lota**

Batanical Name : ***Quisqualis indica* L.**

Family : **Combretaceae**

Rangoon creeper is a rapidly growing scandent shrub. It is a very attractive flower bearing ornamental plant. It has simple, oval, lanceolate foliages which are of 5-10 x 3.5 5. 5 cm size and are placed oppositely.

The five petalled highly perfumed blossoms excel in brilliance of its color which are very dark pink almost reddish shaded with white and light pink which are arranged in bunches. Besides sweet scent the vividly colored clustered flowers with densely foliated branches make the plant very attractive for every nature lover. Each flower is pentamerous bisexual, actinomorphic. It has five sepals that are united to form a green slender calyx limb which is up to about 6.2 cm long and downward. Petals five elliptical as if they are placed on long slender calyx limb that develop in cluster making the plant very beautiful and pleasing.

It is a native of Philippines and New Guinea which is often planted as an ornamental plant that bloom from April onwards throughout the rainy season.

Fig. 3.111 *Quisqualis indica* L.

Rose

Local Name : **Golap**

Botanical Name : ***Rosa* spp**

Family : **Rosaceae**

Rose, the queen of flowers is the most popular flower in the world. Plant is usually a prickly shrub with imparipinnately compound leaves having adnate stipule where the leaflets are ovate with dentate margins. The blossoms are strikingly beautiful that develop solitarily or arranged in cymose inflorescence. Each flower has five, persistent sepals adnate to the thalamus. Petals five to numerous very delicate showy, sweet scented with numerous yellowish stamens at the centre.

Fig. 3.112 *Rosa* sp (red)

There are different varieties of Rose and new ones are developing continuously which are in different shades from white to light pink, dark pink, scarlet, mauve, yellow, orange and so on.

Fig. 3.113 *Rosa* sp (white)

Fig. 3.114 *Rosa* sp (pale pink)

Ashok Tree

Local Name : **Ashok**

Botanical Name : ***Saraca asoca* (Roxb.) de Willde**
(S. *indica sensu* Bak.)

Family : **Caesalpiniaceae**

Ashok tree is a medium sized spreading evergreen tree with drooping branches that bloom in cluster with a profusion of yellowish orange or red shading. This is an important plant in the culture and tradition of India and its adjacent areas.Not only the blossoms but its foliages are also attractive. The leaves are of purplish pink and drooping when young. They are paripinnately compound with three to six pairs of 7.5-25 cm long, oblong lanceolate leaves.

The brilliant blossoms that begin to open in February continued up to June are with orange red shading and develop in compact branched corymbs making it more and more beautiful. The flowers are sweetly scented with four sepals ranging from yellowish orange to scarlet that is not green as usual sepals instead strikingly colored like petals. The flowers have no petal. The beauty of the flowers depends on colored sepals and on the small vividly colored bracts. The stamens are slender, seven to eight, strikingly colored prominent and with purple anthers add beauty to the cluster of flowers.

The delicately scented flowers are yellow or orange when open but gradually turn into brilliant vermillion color by the action of sunlight. They are born in great profusion of compact branched corymbs close to the spreading branches showing very much resemblance with Ixora flower.

Fruit is a four to eight seeded pod. This has remarkable medicinal properties. The flowers or the floral buds are used against cardiac problems and to cure diabetes. The bark of Asoka tree is employed to cure internal haemorrhages and for beautifying body color complexion. In acute dysentery pounded flowers mixed with water is considered very useful. This tree is considered very sacred by the Hindus and the Budhists.

This is propagated by seedlings though percentage of seed germination is comparatively low.

Fig. 3.115 *Saraca asoca* (Roxb.) de Willde

Fig. 3.116 *Saraca asoca* (Roxb.) de Willde (close up)

Night Queen

Local Name : **Nishapori**

Botanical Name : ***Selenicereus grandiflorus* Britton & Rose**

Family : **Cactaceae**

Night queen, as the name indicates, is a very interesting and decorative night blooming flower which is also called as Night blooming Cereus, Queen of the Night, Vanilla Cactus etc. It is a Cactus species originating from Mexico, Central America. This is popular not only for its white very decorative large showy pendent flowers but also for the vegetative body. The vegetative body is very uncommon which is modified, flat, and succulent. Thus the plant body is a stem that takes the shape of leaves but with distinct nodes and internodes.

On this leaf like fleshy, flat stem, very curious conical buds come out which enlarges very slowly and burst into large white multi-petalled funnel shaped flowers which are up to 20 cm in diameter. They develop solitarily with long basal corolla tube.

Flowers are very much decorative and exquisitely fragrant. It blooms at night but droops down before morning. Therefore it is called Night Queen.

Fig. 3.117 *Selenicereus grandiflorus* Britton & Rose

Agathi / Humming Bird Tree

Local Name : **Bok-phul**

Botanical Name : ***Sesbania grandiflora* (L.) Poir.**

Family : **Papilionaceae**

Agathi or Humming bird tree is a medium sized tree with pinnately compound leaves that bears large pure white butterfly like showy blossoms. It is native to tropical Asia and is wide spread in India, Indonesia and Philippines. The foliages are paripinnately compound about 15-30 cm long and bearing twenty to sixty leaflets that are about 2.5 cm long , oblong in shape.

The blossoms are pure white, very large about 7-10 cm long, pea flower shaped. They are displayed in cluster of 2-4 on short axillary racemes of course pendulously that bloom from September to December mainly. Each flower has five united, green sepals. Petals five in number of which one is larger i.e. the vexillum; two wings and two smaller keels inside. Stamens ten and out of which nine united in one bundle and one is free. Fruit is a very long pod. Though it is grown

Fig. 3.118 *Sesbania grandiflora* (L.) Poir.

for its edible flowers which otherwise provide picturesque beauty to the nature. The tender leaves, pods and flowers are used as vegetable. It has medicinal properties also. In early stages of small pox the bark is used as a tonic.

This is propagated by seedlings sowing seeds which develop in long pods.

African Tulip Tree/Fountain Tree/Scarlet Bell Tree/ Tulip Tree

Local Name : **Akash Neem**

Botanical Name : ***Spathodia campanulata*** **Beauv.**

Family : **Bignoniaceae**

Tulip tree is a large evergreen densely foliated avenue tree with vividly colored bright scarlet flowers. It is native to Tropical forests in a broad area of Sub-Saharan Africa. It bears dark green compound foliages with four to eight pairs of opposite leaflets. The leaflets are ovate, lanceolate, 5-10 x 2.5-5 cm across with a terminal leaflet at the tip. In English this Tulip Tree is also known as "Scarlet bell", "Fountain Tree" etc. these names indicate the characters of flowers where the name Scarlet Bell says its bright red colored bell shaped flowers; the name "Fountain Tree" holds good because if and when flower buds are squeezed water comes out as if like water fountains.

The blossoms come out in the form of velvety and olive green buds that burst into large, red bell shaped flowers displayed on many flowered terminal panicles. Each flower is about 9-13 x 4-6 cm across. In cold weather velvetty brown floral buds appear in spherical masses mostly at the ends of branches which burst into large branching brilliant colored clusters of erect blooms. Each flower is with five sepals which united to form a boat shaped structure, olive green in color with prominent lines that cover the petals in buds split down one side and curves backward to disclose the bell shaped beautiful blossoms. Five petal members are united to form a bell shaped scarlet corolla with a corolla tube at the base that grow towards up and take the form of a bell. The petals are united in such a way except at the apices so, it becomes cup like, the free ends of the petals are bluntly pointed with wavy edges and bordered by a

very fine yellowish margin. Stamens four that are yellow long exerted beyond the corolla mouth with dark brown anthers at the tip. Brilliantly colored large blossoms with unaccountable beauty and distinctive charm attract special attention when the plant is in full bloom.

Fig. 3.119 *Spathodia campanulata* Beauv.

Crape Jasmine

Local Name : **Kathmaloti/kathanda phul / Nitya Phul/Sagoli phul**

Botanical Name : ***Tabernaemontana divaricata* (L.) R. Br.**

Family : **Apocynaceae**

Crape Jasmine with large pure white blossom is of unique appearance and beauty. It is native to Tropical areas of India. It is more or less dichotomously branched dense shrub bearing latex. The foliages are simple, elliptical or lanceolate with smooth glossy upper surface, petiolate that are oppositely set.

The purely white blossoms 2.5-3.5 cm across and displayed on corymb like terminal cymes. Calyx five lobed, lobes broadly ovate,

connate basally, persistent. Petals five, united to form a corolla tube below. The tube is 1.5-2.5 cm long within the throat of the corolla tube stamens are inserted. Corolla may be double also which is commonly found in *Tabernaemontana divaricata* 'Flore Pleno' variety. Each stamen has very short filament and arrow shaped anther. Carpels two distinct, from which two follicles develop. The follicles become bend outwards. When matured they burst with red inner side where the black seeds are intermingled.

Fig. 3.120 *Tabernaemontana divaricata* (L.) R.Br. ('Pinwheel')

The flowers have medicinal properties.

Fig. 3.121 *Tabernaemontana divaricata* (L.) R. Br.('Flore Pleno')

Marigold

Local Name : **Narzii or Gendhamalati**

Botanical Name : ***Tagetes* species**

Family : **Asteraeae**

Because of their beauty and other advantage marigolds are very demanding ornamental plant. They are used for landscaping as well as have high market demand. They form thick clumps of deep green much serrated attractive opposite or sub oppositely placed dark green foliages on branched stem. It is a member of the Daisy family. In India *Tagetes erecta* and *Tagetes patula* are most commonly growing species. The large flowered *T. erecta* is known as American Marigold and smaller flowered *T.patula* is commonly known as French Marigold. It is an annual or perennial strongly aromatic herb of upright growth. The foliages are simple pinnately divided.

During flowering they bear beautiful, Daisy like single or double blossoms with delicately radiating florets. It is native to Central and South America (Kaplan 1960). There are a numerous species with

Fig. 3.122 *Tagetes* species

different size, shape of plant as well as in size, shape and color of the flowers. Some important species are: *T. erecta*, *T. patula*, *T. tenuifolia*, *T. lucida*, *T. lacera*, *T. lemmonii* etc.

Tagetes patula L. is also known as French Marigold or Dwarf Marigold or Dwarf French Marigold is an annual, small herb, growing up to 50 cm. The leaves are simple but deeply sinuate appearing pinnately compound usually opposite having aromatic glands. The flowers develop in cluster forming very attractive head or capitulum with vividly colored florets that are yellow, orange, reddish brown, maroon and blended mixtures. The blossoms may be single or double about 1.2 -3.7 cm wide head with petal like ray florets towards the periphery and disc florets at the centre. In full bloom condition dense cushion of such vividly colored blossoms make the plants very spectacular. Paste of leaves can stop bleeding in cut.

Fig. 3.123 *Tagetes* species

Yellow Elder

Local Name : **Tecoma**

Botanical Name : ***Tecoma stans* (L.) Juss.ex Kunths**

Family : **Bignoniaceae**

Yellow Elder is a much branched beautiful large shrub with evergreen, oppositely set very graceful foliages. The foliages are divided into many, usually pointed, narrow, toothed or deeply divided leaflets with an odd leaflet at at the apex which is the largest one. It is native to Tropical America.

Very attractive brilliant bright yellow large showy flower are displayed in clusters at the tips of numerous slender twigs making the plant more and beautiful when in full bloom. Each flower has inconspicuous five toothed calyx. Petals five in number which are united into a wide, spreading tube with five rounded lobes at its mouth. Fruits are slender, curved capsule which remain hanging in bundle among the evergreen leaves. Thus Yellow Elder is a very attractive ornamental shrub with vividly colored bright yellow erect cluster of flowers along with very graceful foliages.

Fig. 3.124 *Tecoma stans* (L.) Juss.ex Kunths

Portia Tree/Indian Tulip Tree

Local Name : **Porosh Pipul**

Botanical Name : ***Thespesia populnea* (L.) Soland. ex Corr. (=*T. macrophylla* Bl.)**

Family : **Malvaceae.**

Portia Tree is a medium sized, quick growing tree having spreading branches. The branches are crowded with dense evergreen foliages make the plant very suitable as a shade tree. The foliages are simple, heart shaped deep green resembling Pepul leaves but the tail is shorter than that of Peepul leaf.

It bears large showy funnel shaped yellow blossoms. Each blossom is with deep red eye at the centre that fade to dull purple before it withers. They are displayed axillary solitarily or two together. Each flower has five sepals forming bell shaped, persistent calyx. Five crinkly petals 5-7 cm in diameter, yellow but turns mauve. It has numerous stamens in one bundle forming a staminal tube as a central column. Though the plant blooms in all seasons but blooms densely during hot season.

It is native to America and grown as avenue tree in our country. Various parts of the plant are used medicinally where fresh capsule is bruished and applied locally on the forehead to get rid from migraine. Roots are taken as a tonic; bark of the plant is used to cure dysentery.

Fig. 3.125 *Thespesia populnea* (L.) Soland. ex Corr.

Scarlet Clock Vine

Local Name : **Plulosarjya / Song-lota**

Botanical Name : ***Thunbergia coccinea* Wall.**

Family : **Thunbergiaceae**

Scarlet Clock Vine is a profusely branched ornamental climber bearing attractive long pendent evergreen branches. It is native to Southeast India. The foliages are lanceolate elliptic or ovate lanceolate having remotely toothed margins and up to 5cm long petiole.

The flowers develop in long pendent lax elongated racemes with prominent bracts and bracteoles. Numerous inflorescences come out as green pendent garlands which change their color from green to brownish to shaded during flowering period. They grow very slowly so remain attractive for a period of 4-5 months. Hence this is often planted near entrance for its pendent decorated garland like long lasting inflorescences. The flowers are little inconspicuous in comparison to bracts and bracteoles with sepals forming a minute rim, petals are lobed and orange red in color. Stamens four, didynamous. The prominent bracts and bracteoles are the chief cause of attraction of the plant. They are long lasting, about 2.5 cm in length and change their color from green to reddish that too passing through different shades of colors. It can be very easily propagated by stem cutting.

Fig. 3.126 *Thunbergia coccinea* Wall.

Fig. 3.127 *Thunbergia coccinea* Wall. (close up)

Bush Clock Vine

Local Name : **Beguni Ghonta Phul**

Botanical Name : ***Thunbergia erecta* (Benth.) T. And.**

Family : **Thunbergiaceae**

Bush Clock Vine is a much branched perennial ornamental plant with simple dark green foliages which is native to Western Africa. The

plant is evergreen having a height of 4-6 feet. It becomes very attractive when it bears trumpet shaped, glossy dark purple colored blossoms with yellow throat. Each flower is with five petals which are united to form the trumptet shaped corolla having a long, off white corolla tube. Four stamens of the flower are placed inside the corolla tube of which two are longer than the other two that is didynamous. Such beautiful blossoms that bloom in large number make the plant unbelievably beautiful. This ornamental plant that bloom more or less round the year can be very easily propagated by cutting usually from the small plantlets that develop near the parent bush.

Fig. 3.128 *Thunbergia erecta* (Benth.) T. And.

Tree Marigold/Mexican Sunflower/Japanses Sunflower

Local Name : **Soru Suryamukhi/Bon Narzii / Goch Narzii**

Botanical Name : ***Tithonia diversifolia*** **(Hemsl.) A.Gray.**

Family : **Asteraceae**

Tree Marigold is very rewarding and beautiful perennial much branched large shrub rather small tree like, about two three metres high

but with large Marigold like blossoms for which it is known as Tree Marigold. It is also called as Mexican Sunflower, Japanese Sunflower etc. This is as beautiful and gives as much pleasure as Sunflower which blooms sporadically almost throughout the year mainly in winter. It is native to Mexico and Central America. The foliages are simple, alternately placed 10- 40 cm across, mostly 3- 7 lobed rarely entire.

The flowers born in cluster like sunflower in head type of inflorescence of about 15 cm diameter. Each head is with 11- 15 ray florets which are attractive dark yellow or orange colored and the centrally placed tubular disc florets. At the time of flowering the whole plant becomes attractive with large, showy, blossoms each of which are not single flower but clusters of flowers. It also grows in wild condition and often planted for its strikingly beautiful blossoms. This is propagated by seeds.

Fig. 3.129 *Tithonia diversifolia* (Hemsl.) A.Gray.

Fairly Lily

Local Name : **Boga Piyaj phul**

Botanical Name : ***Zephyranthes candida* (Lindl.) Herb.**

Family : **Amaryllidaceae**

Fairly Lily is a very beautiful, exotic plant with strap like almost equal sized dense foliages that form a foot high clump. It is native to regions of South America including Argentina, Uruguay, Paraguay and Chile. They develop white flowers with six white petals and yellow stamens. The blossoms are very beautiful which are set individually on firm stalks. The individual flowers though are short lived but new scapes are constantly produced from other plants of the clump thus they bloom ceaselessly throughout the rainy season. They are often planted in both sides of entrance that grow into clumps in row. They grow in such an organized manner with deep green grass like foliages when bloom attracts special attention.

Fig. 3.130 *Zephyranthes candida* (Lindl.) Herb.

Pink Rain Lily

Local Name : **Piyaj- phul**

Botanical Name : ***Zephyranthes rosea* (Lindl.) Spreng.**

Family : **Amaryllidaceae**

Pink Rain Lily is a perennial ornamental plant which grows from exactly onion like globular underground bulb. They grow in mass. It is native to Carrabean. The foliages are very attractive grass like or strap shaped 12- 20 cm long forming dense beautiful tufts giving the plant an exotic appearance. During flowering, flower bearing scapes come out radically. Each scape bears very attractive funnel shaped solitary, large, bright rose pink colored blossoms. Each flower is about 2.5 cm in diameter and about 2.5-3.5 cm in length.Thus in rainy season during flowering the uniformly developed cushion of tufts of plants with exposed scapes of rose pink blossoms is very rewarding. It is a perennial herb which can last a long time in one place. It can easily be propagated by underground Onion like bulbs.

Fig. 3.131 *Zephyranthes rosea* (Lindl.) Spreng.

Zinnia

Local Name : **Zinnia**
Botanical Name : ***Zinnia elegans* Jacq.**
Family : **Asteraceae**

Zinnias are one of the most important winter seasonal ornamental plants. It is native to Maxico. The plant is a small very compact herb with oppositely displayed, simple, almost sessile leaves that vary in shape from linear to ovate. The blossoms are very richly colored and bring much pleasure in winter flower garden which has a range of appearance from a single row of petals to dome shaped that ranges in color like- white, yellow, orange, red purple, lilac, carmine pink etc. Here the individual blossom is a compact group of florets or an inflorescence that is known as head or capitulum with ray florets at the periphery of the head and disc florets at the centre. The peripheral ray florets are more attractive, delicately radiating than the central disc florets.

Zinnias with other winter seasonal ornamentals like- Dahlias, Cosmos, Sunflower, Marigolds with their richly colored blossoms that flower inexhaustibly provide unbelievable beauty to the garden, thus bringing pleasure through its beauty. Some species of *Zinnia* are- *Z. elegans* Jacq., *Z. linearis* Benth. This very popular ornamental plant is usually grown from seeds.

Fig. 3.132 *Zinnia elegans* Jacq. (Profusion orange)

References

ASTEC. 2004 : ***State of Environment- Assam*****,2004, Assam Science Technology and Environment Council. Guwahati-781003 (Assam).**

Baruah A.2013: *Plant Taxonomy*: Eastern Book House Publisher, Guwahati-1, Assam

Baruah B.2012: *B.Sc. Botany* : Kalyani Publisher, New Delhi(INDIA).

Benthall, AP. 1933: *The Trees of Calcuta*. Thacker Spink & Co. Ltd. London.

Bhattacharya, S.K. 1969-71 : The Brahmaputra Valley and Tectonics, *Jr. Geol. Soc. Of Assam* , vol I , Geol Soc. Assam.

Bhattacharjee, S.K. 2006:. *Flowering shrubs and Seasonal Ornamentals,* Pointer Publishers, Jaipur(INDIA).

Bor, NL. & M.B. Raizada, 1954 : *Some beautiful Indian Climbers and Shrubs* . The Bombay Natural History Society, Mumbai, pp. 267-274.

Bora , A. K. and Das, D 1998: Flood and Erosion Hazards in the River Island of Majuli, Assam. Paper presented at the 9th conference of the Indian Institute of Geomorphologists (IGI), Delhi University, New Delhi.

Bora,A. K.2007: Physiological Background of Assam in *Geography of Assam* by A.K. Bhagabati, A.K.Bora and B. K. Kar, Rajesh Publication, New Delhi.

Bora, A. 2010 : *Asamor Udvid Aru Sarai : Parisayatmak Biwaran* (*Indigenous plants & birds of Assam*). Complied and Published by Prof. Alak Kumar Buragohain, Registrar, Tezpur University.

Borthakur, S. K. 2OO9: Flowers. In *Assam : Land and People* published by Hitesh Deka- Guwahati Commerce College, Guwahati-Assam.

Borthakur, M. 1968 : Some aspects of Weather in the Brahmaputra Valley , *Jr. of the Assam Sc. Soc* , Vol-xi.

Borthakur , M. 1986 : Weather and Climate of North East India ,

North Eastern Geographer , Vol 1q , No-1 & 2

Chittenden, F.J. & Synge, PM, 1956 : *Dictionary of Garden*. The Royal Horticultural Society. Lond. U.K. Oxford University Press.

Chowdhury S. 2005: *Assam's Flora*, Assam Science Technology and Environment Council Guwahati-3 (Assam).

Das, H.P. 1970 : *Geography of Assam* , National Book Trust , New Delhi

Das, M. M. 1981 : Pattern of Soil Distribution in Assam , *North Eastern Geographer* Vol XIII, no. 1&2.

Das, M.M. 1985 : Physiographic Frame of Assam , *North Eastern Geographer* , Vol.17 No.1 & 2

Dutta, A.C.1995: *Botany for degree students*, Oxford University Press,Calcutta.

Dutta , S.K. 1969-71 : Assam Through Ages , *Jr. Geol. Soc. Of Assam* , vol. 1, Geol . Soc. Of Assam.

Gangulee H.C. K.S. Das & C. Dutta. 1997: College Botany, Vol-I. New Central Book Agency.

Gammie, G. A. 1895: Report on a Botanical Tour in the Lakhimpur District, Assam in *Rec. Bot. Surv. India*, 1(5) : 61-88.

Goswami, D.C. 1985: Brahmaputra River, Assam , India : Physiography, Basin Denudation and Channel Aggradations , *Water Resources Research* 21, pp. 959-978

Griffith, W. 1847: *Journals of Travels in Assam, Burma, Afganisthan and the neighbouring Countries*, Calcutta.

Holttum, R.E. 1970t : "Bougainvillea" In: Flowering Vines of the World: An Encyclopaedia of Climbing Plants. (Ed) Menninger, E.A. New York, U.S.A. : Hearth ide press Inc.

Hooker, J.D. (1872-1897): *The Flora of British India* Vol. 1. London.

Hooker, J.D. 1906: A Sketch of the Flora of British India, London.

Jain, S.K. & R.R. Rao. 1997: A Handbook of Field and Herbarium Methods. Today & Tomorrow's, Printers and

Publishers, New Delhi.

Kalpan, L. 1960 : Econ. Bot. 14 : 200-202

Kanjilal, U.N. ; P.C. Kanjilal; A. Das & C. Purakayastha. 1934: *Flora of Assam*. Vol-I Bishen Singh Mohendra Pal Singh, Dehradun(India).

Kanjilal, U.N. ; P.C. Kanjilal, & A. Das. 1938: *Flora of Assam*. Vol-II. Bishen Singh Mohendra Pal Singh, Dehradun(India).

Kanjilal, U.N., P.C. Kanjilal; A. Das. & R.N. De. 1939: *Flora of Assam* .Vol-III. Bishen Singh Mohendra Pal Singh, Dehradun(India).

Kanjilal, U.N. ; P.C. Kanjilal; A.Das. & R.N. De. 1940: *Flora of Assam* Vol-IV. Bishen Singh Mohendra Pal Singh, Dehradun(India).

Khanikar, G. 2013: *Sahajlabhya Bon Dorobar Gunagun* (on Medicinal plants), Khanikar Puth Bharal, Golaghat, Assam.

Masters , J. W. 1844: *Journ. Agric. & Hort. Soc*., India 3(2) : 6-10.

Nath , N. 2006: Dicot Flora of Goalpara District, Assam, Ph. D. Thesis (Unpublished).

Nath , N. 2009: *Sundor Phulbur* (A book on beautiful flowers), Techno Ed Publication, Guwahati-3 (Assam).

Pal, B. P. and Vishnu Swarup. 1974. : In: Bougainvilleas. New Delhi, India, Indian Council of Agricultural Research.

Pal, P & M. Mitra 2006. Allamanda. : In: Flowering shrub & Seasonal Ornamentals. ed. Prof. S.K.Bhattachorya. Pointer Publication. Jaipur (India)

Pal, P. 2006: Poinsellia, in Flowering shrub & Seasoual Organamentals. ed. Prof. S. L. Bhattacharya. Pointer Publication Jaipur (India)

Pancho, J.V. and A.E. Bardenas. 1959: *Bongainvillea*s in the Philipines. *Baileya* 7(3:91-100).

Pandey P. 1999. *Modern Practical Botany* Voll I S. Chand & Company Ltd. New Delhi (INDIA).

Saikia, K.S. 2014: *Biluptir Pothot Axomar Tholua Phulraji,* in Goriyoshi (September issue)

Santra, S.C.; T.P. Chatterjee & A.P. Das. 2004: *College Botany* (practical, Vol-II). New Central Book Agency Kolkata(India).

Sarmah, S.K. 1969: Some observations on the Rainfall of Assam, *Jr. Assam Sc. Soc.*, 12.

Sharma, S.C. 1986: Horto- Taxonomical Studies on Bougainvilleas. Ph.D. Thesis. Kanpur University, Kanpur (INDIA).

Srinivas, M. 2006: Bougainvillea in *Flowering Shrub & Seasonal Ornamentals* (ed. S.K. Bhattacharjee). Pointer Publishers, Jaipur.

Swarup, V. and B. Singh 1964 : Pollen morphology and hairs in classification of Bongainvillea. *Indian Jour. Hort*. 21:155-164.

Swarup, V. and B. Singh 1995: Generic Resources of Bougainvilleas. In: *Advances in Horticulture* Vol.-12 (Eds.) K.L. Chadha and S.K. Bhattacharje. Malhotra Publishing House, New Delhi.

Taher, M. 1974 : Fluvial Process in the Brahmaputra Plain, *Geog. Rev. of India* , Vol36, no.7.

Taher , M. 1986 : Physiographic Frame work of North East India , *North Eastern Geographer*, Vol.18, no 1 & 2.

Takhtajan , A.L. 1969: *Flowering plants : origin and dispersal* (English translation by C. Jeffry), Edinburg.

Tanaka, T. 1958: The Origin and dispersal of *Citrus* fruits having their centre of origin in India in *Indian Journ. Hort*. 15: 101- 115.

Vanek, V. 1971: *Garden Flowers*. The Hamlyn Publishing Group. New York.

Vermeulen, N.1995: The complete Encyclopedia of House Plants. Rebo Publishers, The Netherlands.

Zadoo, S.N. ; R. P. Roy, and T.N. Khoshoo, 1975: 'Cytogenetics of Cultivated *Bougainvilleas* I.Morphological Variation'. *Proc. Indian Natn. . Sci. Acad*. 41B. 121-132, 1975a.

Zadoo, S.N. ; R.P. Roy and T.N. Khoshoo, 1975:

'Cytogenetics of Cultivated *Bougainvilleas* II Pollination Mechanism and breeding system.' Proc. Indian Natn. Sci. Acad. 41B : 498- 502, 1975b.

Zadoo, S.N.; R.P. Roy and T.N. Khoshoo, 1975: 'Cytogenetics of Cultivated *Bougainvilleas* IV. Meiotic system'. *La Cellule* 71:311-322, 1975c.

Zadoo, S.N.; R.P. Roy and T.N. Khoshoo, 1975: 'Cytogenetics of Cultivated *Bougainvilleas* V. Tetraploidy and restoration of fertility in sterile cultivars.' *Euphytica.* 24 :517-524, 1975d.

Zadoo, S.N.; R.P. Roy & T.N. Khoshoo, 1975: Cytogenetics of Cultivated *Bougainvilleas* VI. Hybridization.'. *Z. Pflanzenzuchtg.* 75 : 114 - 137, 1975.