KEYS TO THE ANGIOSPERM FLORA OF BOTANICAL GARDEN

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INTRODUCTION

The Botanical Garden, the Arboretum and the Dhanvantri are the highly significant and diverse parts of the botanical treasure of the Maharaja Sayajirao University of Baroda (MSU). The Botanical Garden lies on the banks of one of the tributaries of river Vishwamitri (so called Bhuki Nala) just behind the Arts faculty and about one km away from Bus and Railway stations. The Arboretum is situated on the distal part of the Bhuki nala next to the Administrative building of the Maharaja Sayajirao University of Baroda and P. G. Boys Hostel. The Dhanvantri is official residence of Hon' Vice Chancellor, MSU, opposite to Kamati Baug. The Botanical Garden, the Arboretum and the Dhanvantri are spread in approximately 12 acres of land.

BARODA

Baroda is a junction, on the Western Railway lying 240 miles to the North of Bombay. From it, routes to Delhi and Ahemdabad bifurcate. Ahemdabad is 44 and half miles from Baroda.

The beautiful and well planned city of Baroda is a district town in the Bombay State and it was the Capital of the former Baroda State for the past cenctuary and a half. Prior to its existence as a capital, it was a district town during the Hindu, Pathan, Gujarat Sultan and Mugal rules, Baroda has been in existence for a period of over 3000 years. Its active ruler Shrimant Shri Sayajirao – III (1875-1939 A. D.) beautified it with many pars, magnificent buildings and made it one of the most attractive cities of Gujarat.

The surroundings of the city of Baroda resemble those of other towns and hamlets in Gujarat. One of the striking features of the city of Baroda is the Vishvamitri River and the great stone-bridge which crosses the main stream of Vishvamitri. The river vishvamitri takes its rise from the hills of 'Pavagadh' which is 27 miles North-East of Baroda.

Along the bank of the Vishvamitri River, there are fine public gardens with summer-houses, band-stand, Zoo for various animals and tasteful flower beds.

In the city also, there are beautiful gardens like Laxmi vilas Palace Garden, Jubilee Garden which glorify the city; Maarpura Palace Garden, which is around 5 miles in the outskirt of the city is also a place of interest.

In short, the city abounds in gardens, special public highways and magnificient institusions which have inceased its grandeur and importance. Most of the land of this city is utilized and cultivated, so the area has a less forest value except a few spots in the outskrits.

THE M. S. UNIVERSITY OF BARODA

The most attractive and significant feature of Baroda now is The Maharaja Sayajirao University which is a Residential University.

Modern Baroda owes its beauty spots, its educational institusions and its master pieces of architecture to the insight and vision of Shri Sayajirao of Baroda. The Maharaja Sayajirao University of Baroda is the culmination of the glory of the active achievements and dreams of one of the great men of modern India.

LOCATION OF THE UNIVERSITY AREA

The M. S. University area is located very near the Baroda Station. A road joining the main road from the North near the station leads to the industrial area. One branch of this road leads to M. S. University which occupies the old Resident's bunglow. Near this, the University Library and the Halls of Residance for the University students are located. These buildings and surrounded by fine gardens with lawns, beds of flowers and large trees.

Just two furlongs from the Baroda Station along the Northern side of the main-road leading to the city are situated well-planned specious, buildings of Faculty of Education and Psychology, Faculty of Science, Faculty of Arts, Faculty of Commerce etc. In the large compound enclosing these structures are well laid parks and excellent Botanical Gardens.

All the area mentioned above (The University Campus) was selected for Botnical exploratons in the First instance and observations were made from time to time during the months of March to June. In this paper, an attempt is made to prepare a short account of the vegetation growing in the University Campus. This will serve as a background for more thorough explorations in the Campus as well as other parts of Baroda in different seasons.

GENERAL ASPECT OF THE VEGETATION (MARCH-JUNE)

The vegetation along the different tracts of the University has a considerable influence of the Environmental conditions such as climate, altitude and moisture in the soil during the different seasons; and accordingly the nature of growth and the type of vegetation vary according to seasons. During hot season (March-June) due to excessive heat and temperature and less moisture, very few plants survive; the majority of them being the xerophytic weeds, a few undershrubs, herbs and grasses. The perennial trees also exist but only few bear flowers and fruits while others lose their foliage. The whole area thus appears dry in the summer season.

THE FLORA AND VEGETATION OF BARODA AND ENVIRONS:

The flora and vegetation of Baroda and environs Barring a few references to Baroda by Woodrow and Cooke in the Cooke's 'Flora of the Presidency of Bombay'and a few papers published before or during the course of author's investigations on the flora and vegetation of environs, very little is known about the subject. At least there has never been in the past a systematic and comprehensive work on the flora of this area extended over a number of years.

To start with, Phatak and Joshi (1955, 1956) published two sketchy accounts of the flora of M.S. University campus. The first one was based on summer observations and the second on their monsoon observations. Both these papers have their quota of scientific inaccuracies and hence deserve no consideration.

Chavan and Mehta (1955, 58) save a good account of the grasses of the M.S. University campus and those of Baroda The work on the grasses of Baroda and environs has especially been of great help in the compilation of the present work.

Phatak and Oza (1957) published their observations on the weeds of the M.S. University campus. Although the area worked out is very small, the information presented is quite valuable and useful. The same authors in1958* published a list of 73 useful weeds of Baroda and Pavagadh. Oza (1962), based probably on his earlier observations on the weeds of the university campus, published a list of 39 lawn weeds of Baroda.

Phatak and Satakopan (1957) published a description of pond vegetation at Harni. The work is quite informative.

Shah (1963) published an account of the vegetation of Baroda based on his collection of Baroda plants during the year 1954. The work is apparently a mere compilation of all the available data on the subject published by others till then.

A review of the previous work done shows that only a few parts of whole area have been surveyed so far and that there is not a single work based on careful observations spread over a considerably long period.

The work on the problem was started in January 1957 with the study of the Cyperaceae of Baroda and environs. The scope of the work was further extended and various localities in different parts of Gujarat were visited in the subsequent years. As regards the study of the flora and vegetation of Baroda and environs, during the year 1957, the flora of the M.S. University campus was more particularly studied to get myself acquainted with the local plants. It was then decided to expand the area of work and collect data from places within approx. 13 Km. radius with M.S. University as the center. Immediately a cursory survey of the whole area was undertaken to decide the vegetational pattern. It was observed that majority part of the area was under cultivation and hence the weed flora of the cultivated fields, waste land or the ruderal flora and the hedge flora formed the most dominant aspect of the vegetation.

The six years of intensive study on the flora and vegetation of Baroda and environs along with the Cyperaceae of Gujarat has resulted in the publication of several research notes and papers in some of the leading Journals.

Even though the area is a plain and biotically much disturbed, we have been able to study the various aspects of the vegetation in all the seasons of the year. These observations being repeated for four years reveal data of importance.

The area under study displays a remarkable diversity of floristic composition, although it is a part of a thickly populated and highly industrialized region of Gujarat.

VEGETATION ALONG THE BANKS OF RIVER VISHWAMITRI

The vertical zonation of vegetation exhibited by these rivers is, to a very great extent, affected by biotic factors like grazing, clearing the banks for cultivation, removal of sand or clay for construction purposes, construction of embankments, widening of the rivers etc.

The river Vishwamitri takes its origin in the Pavagadh hills, which lie (45 km.) to the N.E. of Baroda. The river flows through the city of Baroda. During monsoon, the river is in space and the banks are flooded. After monsoon, the water level goes down, exposing the banks throughout. In the month of October, the banks are all muddy showing sparse vegetation. It is only during the dry months that both the permanent and the ephemeral vegetation of the banks could be studied simultaneously. The study is restricted to about (16 km.) of the bank area including that of its tributaries. The permanent vegetation of the elevated banks (upper storey) consists of a number of tree species which may be listed in their order of abundance as follows: *Acacia nilotica, Pithecellobium dulce, Pongamia pinnata, Borassus flabellifer, Streblus asper, Ficus benghalensis, Prosopis spicigera, Limonia acidissima, Aegle marmelos, Ailanthus excelsa, Phoenix sylvestris and Ficus glomerata* (Photo Plate No. 4).

During monsoon a number of climbers on low shrubs or trees along hedges and annual herbs are also met with here. Middle storey is occupied by a number of communities of *Xanthium strumarium, Argemone mexicana, Galotropis gigantea, C. procera, Peristrophe bicalyculata, Achyranthes aspera* var. *porphyristachya, Kirganelia reticulata, Sorghum halepense, Pongamia pinnata* (in various stages of development), *Lantana camara* var. *aculeata, Tephrosia hamiltonii, Alhagi pseudalhagi, Abutilon indicum* and *Ziayphus mauritiana*. During monsoon, the bare areas are occupied by a number of erect or prostrate herbaceous species. Mention may be made of *Cassia tora, C. Occidentalism, Crotalaria medicaginea, Xanthium strumarium, Hybanthus enneaspermus, Sida acuta, S. alba, Bergia odorata, Heylandia latebrosa, Convolvulus microphyllus, Evolvulus alsinoides, Solanum surattense, Enicostema verticillatum, Tricholepis glaberrima, Elytraria acaulis* and *Boerhavia diffusa*.

Growing as emerged or amphibious hydrophytes were recorded plants like *Scirpus littoralis* var. *subulatus, Cyperus difformis, Eclipta prostrata* and *Scirpus maritimus*. The water surface vegetation shows an association of *Ipomoea aquatica* and *Spirodela polyrhiza* floating along the fringes of the banks at a number of places, while the submerged aquatic communities include *Hydrilla verticillata, Ceratophyllum demersum* and *Vallisneria spiralis*. *Hydrodyction* sp. at a few places formed large mats on the water surface.

With a few heavy showers in the month of July, the river swells considerably and inundates completely the lowermost storey with the result that the ephemeral vegetation described above is

totally destroyed. During this period of the monsoon, there is a fluctuation in water level and whatever the plants present are subjected to periodic flooding. It has been observed that *Cynodon dactylon* survives inspite of the flooding and forms the dominant community of such mud flats. This state continues till the months of October-December, when the water level decreases to its maximum.

THE ARBORETUM

The Arboretum was established somewhere in 1962 under the supervision and guidance of Prof. A. R. Chavan (Former HOD, Department of Botany) then the Superintendent of the Botanical Garden. Arboretum harbours 411 species of Angiosperms inclusive of 129 trees, 32 shrubs, 24 climbers, 80 herbs and 148 plots of different medicinal plants which are under cultivation.

The rare and endangered plant species present in the Arboretum includes *Hyphaene indica, Mallotus phillippensis, Careya arborea, Cochlospermum religiosa* etc. Some of the exclusive plants of the Garden are *Butea monosperma* var. *lutea, Givotia rotteriformis, Ochna obtusa, Gauzuma ulmifolia, Gledistsia tricanthos, Kigelia pinnata, Kleinhovia hospitata, Milletia racemosa, Fillicium decipiens* and various species of *Terminalia* genus. The beauty of the garden owes to plants like *Paulownia* sp., *Saraca indica, Couroupita guianensis, Butea monosperma, Spathodea campanulata, Tecoma stans, Cassia fistula, Delonix regia, Dombeya wallichii, D. natalensis* and *Sterculia urens*.

The medicinal plant plots have plants like *Acorus calamus, Alpinia galanga, Aloe ferox, Artemisia annua, Asparagus racemosus, Centella asiatica, Coleus forskohlii, Enicostema littorale, Fagonia cretica, Pedalium murex, Plumbago indica, Lotus garcini, Lycium europaeum, Monsonia senegalensis, Piper longum, Pavonia odorata, Rivinia humilis, Stevia rebaudiana, Uraria picta, Vogelia indica* and many other species that might of interest to the society.

There are many interesting plants such *Mimosa pudica* (Touch-me-not plant), *Biophytum sensitivum* (Telegraphic plant), *Rauwolfia serpentina* (Resperpine plant) and a number of economically useful aromatic plants such as *Cymbopogon martini* (Palmarosa oil), *Pogostemon heyneanus* (Patchouli oil), *Ocimum basilicum* (Basil oil) and *Vetiveria zizanoides*. The garden has 43 plants with aromatic fragrance which could be enjoyed by visitors throughout the different seasons of the year.

There is also germplasm collection of approximately 300 seeds procured from across the state, country and world. This also includes endangered germplasm of *Aristolochia guttata*, *Commiphora wightii*, *Hyphaene indica* and many other rare species. The Arboretum also has two green houses, glass house, fernery and artificially created aquatic pond in the centre.

Figure 1: Arboretum, The M. S. University Campus, Vadodara

DHANVANTARI

Dhanvantari is the official residence of the Honorable Vice-Chancellor of Baroda University. Pre-independence, this was the official residence of the chief physician of the Princely State of Baroda and therefore the name of the God of healing '*Dhanvantari*' was given to the building. This place, as the name signifies, is a repository of medicinal and other useful herbs. The total number of plants located here is more than 160 (the actual number varies with the season), out of which about 150 are used in various Indian systems of medicine especially Ayurveda and by ethnic tribes of

the state of Gujarat. Here, the chief attractions are *Sterculia foetida* (Kadaya), *Garcinia indica* (Kokam), *Hyphaene indica* (Branching palm) and *Couropita guinensis* (Cannonball tree).

BOTANICAL GARDEN OF MSU

INTRODUCTION

The Botanical Garden and the Arboretum are few of the highly significant parts of the Botany department. Botanical Garden lies on the banks of one of the tributaries of river Vishvamitri (so called Bhuki Nala) just behind the Faculty of Arts at about one km away from Bus and Railway stations and the Arboretum is situated next to the Administrative building of the Maharaja Sayajirao University of Baroda and P. G. Boys Hostel. The Botanical Gardens and Arboretum are spread in approximately 20 acres of land.

BOTANICAL GARDEN

Botanical Gardens are sanctuaries where the germplasm of the rare/threatened/endemic plants are conserved and multiplied. In the Maharaja Sayajirao University of Baroda, Vadodara, we are lucky enough to have three such places where the precious plants are protected and nurtured i. e., the Botanical Garden, Arboretum and Dhanvantari. The Botanical Garden, established in 1920's, has the largest collection of plant varieties. The Garden of the main capus also contains a good number of rare plants. The Arboretum is the largest Garden, in terms of space, was created in 1960's with the view to preserve the living trees. This garden was planned in such a way that the plants were arranged following one of the most popular classificatory schemes i. e., Bentham and Hooker's classification. So that the students who enter the Garden will be presented with the ideas of plant identification and grouping. Dhanvantari, the official residence of the Hon' Vice chancellor of the M. S. University, is another sanctuary of the plants. This campus was the residence of the Royal physician of the princely state of Baroda, in the past. As the name 'Dhanvantari' (The God of healing) signifies this place is replete with medicinal plants and thus a repository of useful plants.

In the beginning, the Earth there was one Botanical garden i. e., the Garden of Eden. At present we have more than 2500 botaical gardens spread throughout the entire world. The Kew Garden, by far, is the largest internationally; while in India, The Botanic Gardens of Botanical Survey of India (BSI), Howrah occupies the premier place.

The Botanical Garden at The Maharaja Sayajirao University of Baroda was established somewhere in 1920's under the supervision and guidance of Prof. Shivra Vinayak Shevade, F.I.S., F.R.A.S (Former HOD, Biology, Baroda College) who acted as the Superintendent of the Botanical Garden. Initially, the Botanical Garden was spread from existing Garden towards that of Vikram baug (on the same place of the present residential quarters), Pratapgunj on one hand and on the other hand towards the Technology division, Fatehgunj. The main objective during that period was to grow the maximum diversity of trees. Presently the Botanical Garden is restricted to half acre of land behind the Faculty of Arts and harbours approximately 206 species of Angiosperms, 11 Gymnosperms, 12 Ferns and 17 Orchids.

A few of endangered and rare plant species present in the garden are *Commiphora wightii, Hyphaene indica, Strychnos potatorum, Pereskia, Talinum* sp., *Hydnocarpus* sp., *Equisetum* sp., *Filicium decipiens, Ochna obtuse, Haematoxylum campechianum* etc. Some of the exclusive plants of the Garden are *Annona muricata, Beaumontia grandiflora, Bilbrgia* sp., *Strophanthus wallichii, Givotia rottleriformis, Gauzuma ulmifolia, Kigelia pinnata, Kleinhovia hospitata, Milletia racemosa, Pterospermum acerifolium* and various species of *Terminalia* genus. The beauty of the garden owes to plants like *Saraca indica, Couropta guianensis, Butea monosperma, Spathodea campanulata, Tecoma stans, Cassia fistula, Dombeya wallichii and D. natalensis.* There is also *Elaeis guinensis (*Oil palm) which is exclusively seen in this gaeden only, brought by the Maharaja of Vadodara.

The Gymnosperms which made the Garden a home include *Cycas circinalis* and *C. revoluta* (Almost 90-year-old), *C. rumphii, Zamia furfuraceae, Zamia* sp. and *Podocarpus gracilo*r.

The garden also has etile Fern and Cactus House having a collection of some rare ferns belonging to the genus of *Adiantum, Nephrolepis, Tectaria, Echinopsis, Ferocatus, Notocactus, Opuntia, Perieskiopsis, Aloe* sp., *Pereskia* the only member of the Cactaceae family, having broad perennial leaves, is another unique feature here.

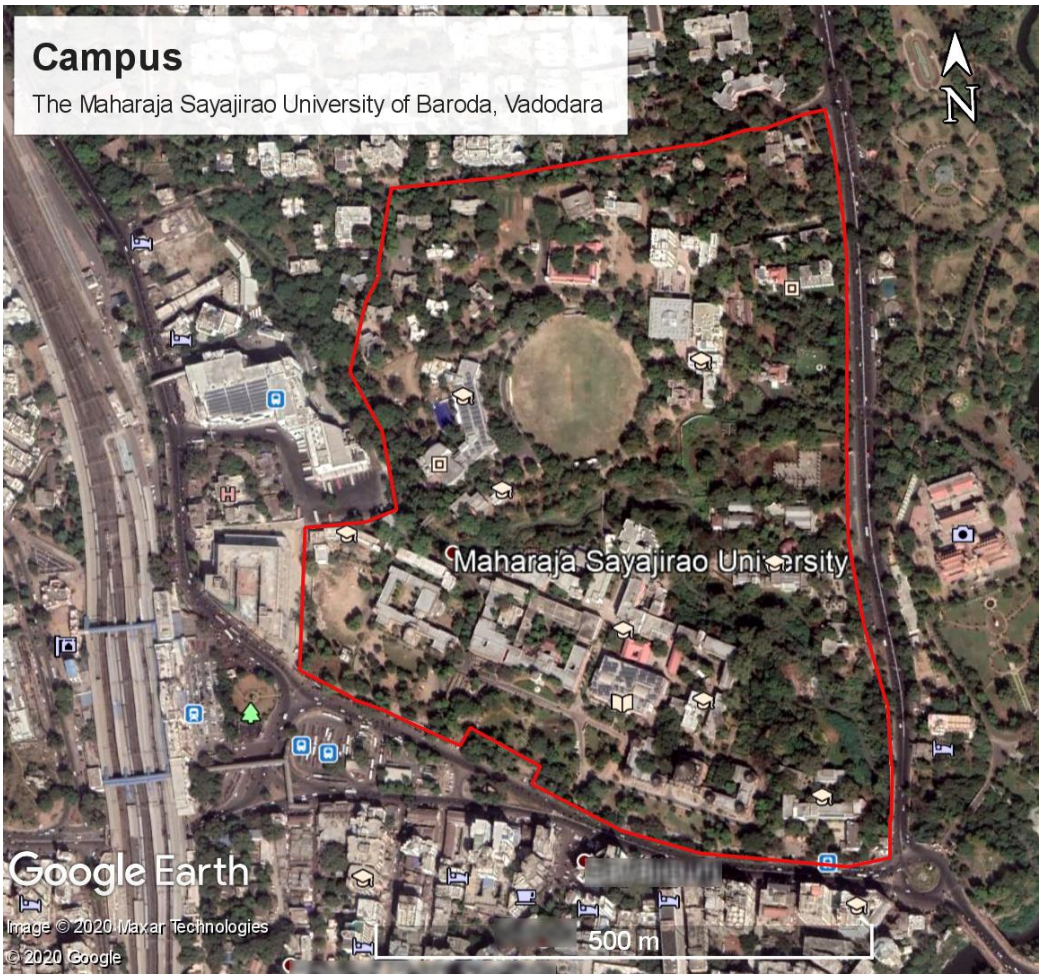


Figure 2: The M. S. University Campus, Vadodara

THE BOTANICAL GARDENS WERE NURTURED BY:

The Botanical and Arboretum has been natured by various Botanists of the department during the last 10 decades and efforts are being made to enrich the living germplasm collection by bringing various plant species of Gujarat State and from rest of the country and the world. Of the various luminaries of the Department, Prof. S. V. Shevade [B. Sc., Dip. in Agr. (Cambridge), F.S.S., F.R.S.H.] deserves a special mention here. Prof. S. V. Shevade was born in 1880, received his education at Rajaram high school, Elphinstone College and College of Science. (Now called as College of Engineering.). He was the Professor of Biology at Fergusson College in the year of 1902-1903. He was appointed as Professor of Biology, Baroda College in 1920 and a year later as Resident Professor. He was also the Honorary General Secretory, college Union, Baroda College.

Prof. Atul Mehta, Prof. S. D. Sabnis and Prof. S. J. Bedi were other teachers who contributed significantly to the growth of Arboretum.

BOTANICAL GARDENS FROM THE PAST RECORDS

The Flora of the University campus, Baroda was studied by Pathak and Joshi in 1955 and was published in the in-house Journal of the M. S. University of Baroda. Later Sabnis (1967) has reported 898 plant species from the Baroda and its environs. In these studies, the authors had reported 336 plant species from the University campus, which included 329 Angiosperms (287 dicots and 2 monocots) and 7 Gymnosperms. The tree diversity of Vadodara was studied by Joshi and Pathak (1955), Thaker *et al*. (1999), Oza (2000), Tadvi (2009) and they have recorded approximately 200 different types of trees. 18 species were reported by Pathak and Joshi (1955) which were not observed presently in the University campus are listed in Table 1:

Table 1: The plant species which are lost from Campus

SR. NO.	**PLANT NAME**	**FAMILY**	**NOTES**
1	*Acampe wightiana*	Orchidaceae	-
2	*Cactus gigantium*	Cactaceae	-
3	*Callicarpa lanata* L.	Verbenaceae	Small tree in B.G.
4	*Calycopteris floribanda* Lamk.	Combretaceae	-
5	*Cardulovica palmate*	Cyclanthaceae	Panama Palm
6	*Carissa arduina* Lamk.	Apocynaceae	-
7	*Ceratonia siliqua*	Caesalpiniaceae	Locust bean
8	*Dodonea viscosa* L.	Sapindaceae	-
9	*Ilex paraguariensis* Hook	Ilicinae (Aquifoliaceae)	-

10	*Jacquemontia violacea* Choisy.	Convolvulaceae	-
11	*Monochoria hastaefolia* Presl.	Pontederiaceae	-
12	*Potamogeton indicus* Roxb.	Potamegetonaceae	In pond of B.G.
13	*Pterospermum suberifolium* Lamk.	Sterculiaceae	-
14	*Sabal palmetto*	Palmae	A small palm, flowers yellow, white scented
15	*Sagitta sagittaria*	Alismaceae	In water pond
16	*Strophanthus bovinii*	Apocynaceae	-
17	*Swietenia mahogany*	Meliaceae	-
18	*Tecoma radicans* Juss.	Bignoniaceae	A big climber in Chameli baug

Of the missing plants reported above, *Ilex paraguariensi* St. Hill. (Paraguay tea, Mate) is a native tree of Paraguay, the leaves of which are used to prepare tea. The leaves, resembling tea leaves, contain 2% caffeine, tannins and vitamins. Mate is a stimulating drink, having diaphoretic and diuretic properties. *Sabal palmetto* Lodd. (Cabbage palm, Palmetto) a native to the South-eastern United States, is another important plant lost. These tall palms yield a highly elastic and durable fiber from the petioles of leaves known as Palmetto fibre. *Ceratonia siliqua* (Carob) had been introduced from Persia is the source of Carob fruits and Carob gum.

MANUAL OF CITES

CITES (Convention on International Trade of Endangered Species of Wild flora and Fauna) regulates the removal of species from the wild conditions and trade across international borders.

CITES Appendices are of 3 categories (1, 2, 3) in which Appendix-1 lists the threatened species, Appendix-2 includes those which are vulnerable and Appendix-3 includes species with require close vigil. The CITES Appendices are also shifted from one Appendix to another or deleted as required, depending on the situation.

Other International Organizations for Biodiversity Conservation are:

A. IUCN (International Union for Conservation of Nature and Natural Resouces)
B. Species Survival Commission (SSC)
C. TRAFFIC (Trade Record Anlysis of Flora and Fauna in Commerce)
D. Convention on Biological Diversity (CBD)
E. World Wide Fund for Nature (WWF)
F. World Conservation Monitoring Centre (WCMC)

Table 2: Threatened medicinal plants which are preserved in Botanical garden & Arboretum (based on IUCN)

SR. NO.	**SPECIES**	**STATUS***
1	*Garcinia indica* Choiss.	VU
2	*Garcinia talbotii* Raizada ex Santapau	LC
3	*Tephrosia jamnagarensis* Santapau	EN
4	*Dolichandron falcata* (Wall. Ex DC.) Seem.	LC
5	*Radermachera xylocarpa (Roxb.)* Roxb. ex K. Schum.	NT
6	*Acorus calamus* (Linn.)	LC
7	*Commiphora stocksiana* (Engl.) Engl.	EN
8	*Balanites aegyptiaca* (L.) Del.	LC
9	*Bombax insigne* Wall.	CR

10	*Stereospermum chelonoides* (L.f.) DC.	LC
11	*Pterocarpus santalinus* L.f.	EN
12	*Sterculia guttata* Roxb.	CR
13	*Dalbergia latifolia* Roxb.	VU
14	*Bauhinia malabarica* Roxb.	LC
15	*Pterocarpus marsupium* Roxb.	NR
16	*Tecomella undulata* (Sm.) Seem.	EN
17	*Chlorophytum borivilianum* Santapau & R.R. Fern.	EN
18	*Hardwickia binata* Roxb.	LC

*(CR = Critically endangered; EN= Endangered; NR= Near Threatened; VU =Vulnerable; LC = Least Concern)

Table 3: Locally Threatened medicinal plants which are preserved in Botanical garden & Arboretum.

SR.NO.	**PLANT SPECIES**	**Status**
1	*Averrhoa bilimbi* Linn.	Rare, Endemic
2	*Beaumontia grandiflora* Wall.	Rare, Cultivated
3	*Eleocarpus sphaericus (Gaertn.)* K. Schum	Rare, Cultivated
4	Aphanamixis polystachya (Wall.) R.Parker	Rare, Cultivated
5	*Parkia roxburghii* G. Don.	Rare, Cultivated
6	*Polyalthia cerasoides* (Roxb.) Hook.f. & Thomson	Extinct in Wild, Cultivated

7	*Oroxylum indicum* (L.) Kurz	Rare
8	*Justicia wynaadensis* (Nees) T. Anderson	Endemic
9	*Barleria Lawii* T. Anderson	Endangered
10	*Barleria gibsonii* Dalzell	Vulnerable
11	*Dendrobium barbatulum* Lindl.	Vulnerable
12	*Dendrobium microbulbon* A. Rich.	Near Threatened
13	*Dendrobium ovatum* L. Kraenzl.	Endangered
14	*Habenaria foliosa* A. Rich.	Vulnerable
15	*Habenaria grandifloriformis* Blatt. & McCann	Endangered
16	*Habenaria longicorniculata* J. Graham	Endangered
17	*Phanera vahlii* (Wight & Arn.) Benth.	Critically Endangered
18	*Butea monosperma var. lutea* (Witt.)	Endangered
19	*Ipomoea kotschyana* Hochst. ex Choisy	Vulnerable
20	*Talinum portulacifolium* (Forssk.) Asch. Ex Schweinf	Critically Endangered

PREPARATION OF KEYS

A key is a device, which when properly constructed and used, enables a user to identify an organism. Keys are devices consisting of a series of contrasting or contradictory statements or propositions requiring the identifier to make comparisons and decisions based on statements in the Key as related to the material to be identified.

TYPES OF KEYS

Two types of Keys:

(A) Dichotomous Keys

a) Indented keys (Yoked)
b) Braceted Keys

(B) Poly clave (Multiple Access or Synoptic)

(A) Dichotomous Keys:

Keys in which the choices allow only two (mutually exclusive) alternative couplets. In constructing a Key, contrasting characters are chosen that divide the full set of possible species into smaller and smaller groups.

a) Indented keys:

Indents the choices (leads) of the couplet an equal distance from left margin.the two choices of the couplet are usually labeled 1 or 1'. The user goes to the next indented couplet following the lead that was selected.

b) Bracketed keys:

It provides both choices side-by-side. The choices of the couplet must be numbered (or lettered). It is very helpul in the previous couplet is given. This key has exactly the same choices as the first example. The choices are separated, but it is easy to see the relationships.

- It keeps the two leads of every couplet and easier for comparision.
- They will group taxa.
- Do not give visual presentation of group.

(B) Poly clave Keys:

This key is based on the identification of organisms by a process of elimination. There is a series of characters and character states. Each state is followed by a number or code for the species that possess that feature.

PREPARATION OF FLORAL FORMULA

Floral Formula is a means to represent the structure of a flower using numbers, letters and various symbols, presenting substantial information about the flower in a compact form. It can represent particular species, or can be generalized to characterize higher taxa, usually giving ranges of organ numbers.

The formula is made up of floral characters. I have used different symbols for the floral formula.

Symbols:

K **:** Calyx

C **:** Corolla

P **:** Perianth

A **:** Stamen

St. **:** Staminodes

G **:** Ovary

$\underline{\mathbf{G}}$ **:** **S**uperior ovary

$\bar{\mathbf{G}}$ **:** Inferior ovary

L **:** Locule

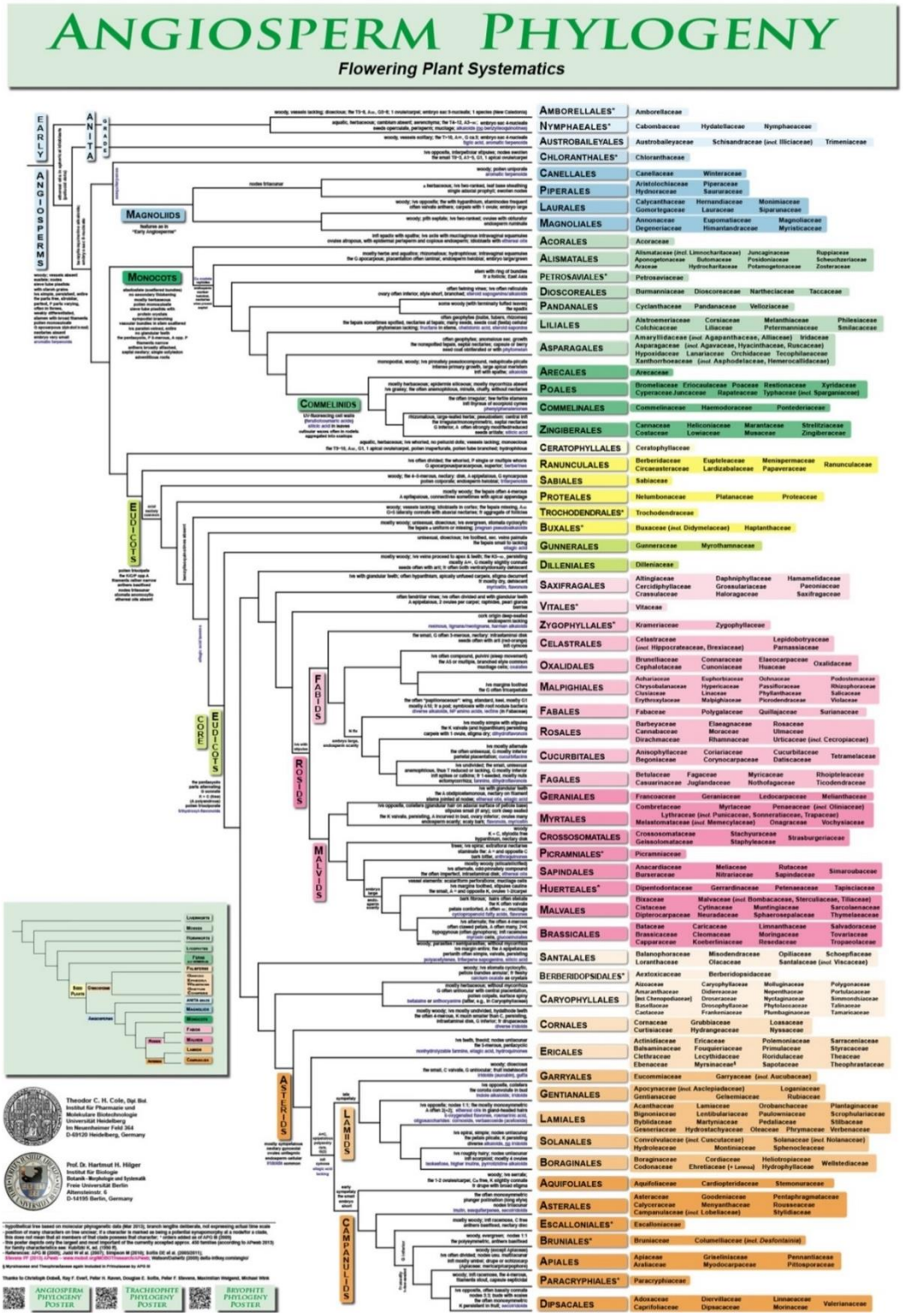
CA. **:** Carpel

Ov. **:** Ovule

$ **:** Infenite/ many

> **:** More than

APG-III CLASSIFICATION (2009)



We have studied so many plant orders and families of APG classifications which are as follows in Table 9. I have created a formula and identification keys from the following orders and families of APG-III Classification (2009).

Table 4: Formula and identification keys prepared here are according to the orders and families of APG-III Classification (2009)

SR. NO.	ORDER	SR. NO.	FAMILY
1	PIPERALES	1	Aristolochiaceae
		2	Piperaceae
2	MAGNOLIALES	3	Anonaceae
		4	Magnoliaceae
3	ZINZIBERALES	5	Cannaceae
		6	Heliconiaceae
		7	Sterlitziaceae
		8	Costaceae
		9	Musaceae
		10	Zingiberaceae
4	RANUNCULALES	11	Menispermaceae
		12	Ranunculaceae
		13	Papaveraceae (Fumariacae)
5	SEXIFRAGALES	14	Hamamelidaceae
		15	Crassulaceae
6	OXALIDALES	16	Oxalidaceae
7	MALPIGHIALES	17	Malpighiaceae
		18	Ochnaceae

SR. NO.	ORDER	SR. NO.	FAMILY
		19	Passifloraceae (Turneraceae)
		20	Linaceae
		21	Phyllanthaceae
		22	Violaceae
8	FABALES	23	Fabaceae (Ceasalpinaceae, Mimosaceae)
		24	Polygalaceae
9	ROSALES	25	Moraceae
		26	Rhamnaceae
		27	Ulmaceae
		28	Urticaceae
10	MYRTALES	29	Combretaceae
		30	Myrtaceae
		31	Lytheraceae
		32	Onagraceae
11	SAPINDALES	33	Anacardiaceae
		34	Meliaceae
		35	Rutaceae
		36	Burseraceae
		37	Sapindaceae
		38	Simaroubaceae
12	MALVALES	39	Malvaceae (Bombacaceea,

SR. NO.	ORDER	SR. NO.	FAMILY
			Sterculiaceae, Tiliaceae)
		40	Bixaceae (Cochlospermaceae)
		41	Muntingiaceae
13	BRASSICALES	42	Brassicaceae
		43	Capparaceae
		44	Moringaceae
		45	Salvadoraceae
14	SANTALALES	46	Loranthaceae
		47	Santalaceae (Viscaceae)
15	CARYOPHYLLALES	48	Amaranthaceae (Chenopodiaceae)
		49	Molluginaceae
		50	Nyctaginaceae
		51	Phytolacaceae
		52	Plumbaginaceae
		53	Polygonaceae
		54	Portulacaceae
		55	Tamaricaceae
16	ERICALES	56	Ebenaceae
		57	Sapotaceae
		58	Balsaminaceae
		59	Primulaceae

SR. NO.	ORDER	SR. NO.	FAMILY
17	GENTIANALES	60	Apocynaceae (Asclepiadaceae)
		61	Rubiaceae
18	LAMIALES	62	Acanthaceae
		63	Bignoniaceae
		64	Lamiaceae
		65	Orobancaceae
		66	Pedaliaceae
		67	Oleaceae
		68	Plantaginaceae
		69	Scrophulariaceae
		70	Verbenaceae
19	SOLANALES	71	Solanaceae (Nolanaceae)
		72	Convolvulaceae (Cuscutaceae)
20	BORAGINALES	73	Boraginaceae
		74	Cordiaceae
		75	Heliotropiaceae

IDENTIFICATION KEYS (BRACKETED KEYS)

1. *ZINGIBERALES*

Families:

1a. Anther cells contiguous, filaments short, connective produced into a narrow appendage, stigma sub globose, spikes usually produced from the rootstock…….. ..... **ZINGIBERACEAE**

1b. Anther cells linear, filaments long, connective Not produced into a narrow appendage, stigma with a semilunar pit/ciliate, spikes usually produced at the top of leafy stem **COSTACEAE**

2a. Calyx and corolla are distinct, 5-stamens are Not perfect, stigma distinctly more or less Not 6-lobed **3**

2b. Calyx and corolla are Not distinct, 5-stamens are perfect, stigma distinctly more or less 6-lobed ..... **MUSACEAE**

3a. False petals fused together at the base and their margins are curved inwards and presence of half anther cells..... **CANNACEAE**

3b. False petals are Not fused together at the base and their margins are curved inwards and absence of half anther cells **4**

4a. Presence of swollen area or pulvinus at the junction of petiole and leaf blade..... ..... **MARANTACEAE**

4b. Absence of swollen area or pulvinus at the junction of petiole and leaf blade..... **5**

5a. Many ovules in each locule, capsular fruit and arillate seeds ..... --- **STERLITZIACEAE**

5b. One ovule in each locule, schizocarpic fruits, seeds are Not arillate..... **6**

6a. Ovary prolonged to a slender hypanthium like neck, flowers are malodorous..... ..... **LOWIACEAE**

6b. Ovary Not prolonged to a slender hypanthium like neck, flowers are Not malodorous ..... **HELICONIACEAE**

2. *MALVALES*

Families:

(1) Bixaceae*
(2) Malvaceae (Bombacaceae, Sterculiaceae, Tiliaceae) *
(3) Cistaceae*
(4) Cytinaceae*
(5) Muntingiaceae*
(6) Sarcolaenaceae*
(7) Dipteroarpaceae*
(8) Neuradaceae
(9) Sphaerosepalaceae*
(10) Thymelaeaceae – *Gnidia glauca*

(Note: *mark indicates families included during study)

KEY TO THE FAMILIES

1a. Leaves are Simple, stamens are Monoadelphous, Monothecous anthers..... .....**MALVACEAE**

1b. Leaves are compound, stamens are Polyadelphous, Dithecous anthers..... .....**BOMBACACEAE**

2a. Flowers are unisexual/bisexual and borne in panicles, petals absent, staminodes are present .....**STERCULIACEAE**

2b. Flowers are bisexual, borne in cymes, petals present, Staminodes are absent..... ..... **TILIACEAE**

3a. Palmately Veined, Presence of Intruded Placenta, Seeds are often Coloured..... .....**BIXACEAE**

3b. Not Palmately Veined, Not Intruded Placenta, Seeds are Not often Coloured.....**4**

4a. Plants are Resinous trees with Simple Leathery leaves .....**DIPTEROCARPACEAE**

4b. Plants are Not Resinous trees with Not Simple Leathery Leaves.....**5**

5a. Plants with Tetramerous flowers, Cauducous Sepals, Presence of Gynobasic like Disc, Presence of Gynobasic style.....**SPHAEROSEPALACEAE**

5b. Plants Without Tetramerous flowers, Not Cauducous Sepals, Absence of gynobasic like Disc, Absence of Gynobasic style **6**

6a. Stellate hairs present, flowers with extra staminal Disc .....**SARCOLAENACEAE**

6b. Stellate hairs absent, flowers without extra staminal Disc **7**

7a. Plants are shrubs or herbs with opposite leaves, many stamens on a nectary disc, Fruits are Not Edible.....**CISTACEAE**

7b. Plants are Not shrubs or herbs without opposite leaves, Not many stamens on a nectary disc, fruits are Edible ..... **MUNTINGIACEA**

3. *MYRTALAES*

Families:

(1) COMRETACEAE
(2) MYRTACEAE*
(3) PENAEACEAE (incl. OLINIACEAE)
(4) LYTHRACEAE (incl. PUNICACEAE, SONNERATIACEAE, RAPACEAE) *
(5) MELASTOMATACEAE (incl. MEMECYLACEAE) *
(6) ONAGRACEAE*
(7) VOCHYSIACEAE

KEY TO THE FAMILIES

1a. Leaves are alternate with two glands at the leaf base and presence of inferior unilocular ovary and presence of winged fruit ..... **COMBRETACEAE**

1b. Leaves are opposite/whorled without two glands at the leaf base and absence of inferior unilocular ovary and absence of winged fruit **2**

2a. Superior ovary with prominent hypantium and petals same that of sepals..... ..... **LYTHERACEAE**

2b. Inferior ovary without prominent hypanthium and Not petals same that of sepals **3**

3a. Presence of gland-dotted leaves, presence of intrastaminal vein in leaves..... .....**MYRTACEAE**

3b. Absence of gland-dotted leaves, absence of intrastaminal vein in leaves **4**

4a. Presence of tetramerous flowers with a long nectariferous hypanthium with tetra locular ovary ..... **ONAGRACEAE**

4b. Absence of tetramerous flowers without a long nectariferous hypanthium without tetra locular ovary .....**MELASTOMATACEAE**

LYTHRACEAE

a) PUNICACEAE*
b) SONNERATIACEAE*
c) TRAPACEAE*

1a. Plants are floating aquatic annuals with rosette leaves with swollen petioles with bilocular ovary ..... **TRAPACEAE**

2b. Plants are Not floating aquatic annuals without rosett leaves without swollen petioles without bilocular ovary..... **2**

2a. Plants are small trees with quadrangular twigs, flowers having a coloured hypanthium ..... **PUNICACEAE**

2b. Plants are large trees without quadrangular twigs, flowers Not having a coloured hypanthium ..... **SONNERATIACEAE**

4. *SOLANALES*

Families:

(1) CONVOLVULACEAE (incl. CUSCUTCEAE) *
(2) SOLANACEAE (incl. NOLANACEAE) *
(3) HYDROLEACEAE
(4) MONTINIACEAE
(5) SPHENOCLEACEAE

KEY TO THE FAMILIES

1a. Presence of twining habit **2**

1b. Absence of twining habit **3**

2a. Not Parasitic plant, milky latex, plaited corolla, unequal stamens..... ..... **CONVOLVULACEAE**

2b. Parasitic plant, Not milky latex, Not plaited corolla, equal stamens..... ..... **CUSCUTACEAE**

3a. Plicate corolla, stamens often hooded over the stigma and ovary with many ovules on the swollen placenta..... **SOLANACEAE**

3b. Not Plicate corolla, stamens Not hooded over the stigma and ovary without many ovules on the swollen placenta..... **NOLANACEAE**

5. *BRASSICALES*

Families:

(1) BATACEAE
(2) CARICACEAE*
(3) LIMNANTHACEAE

(4) SALVADORACEAE*
(5) BRASSICACEAE*
(6) CLEOMACEAE*
(7) MORINGACEAE*
(8) TOVARIACEAE*
(9) CAPPARAEAE*
(10) KOEBERLINIACEAE
(11) RESEDACEAE*
(12) TROPAEOLACEAE

KEY TO THE FAMILIES

1a. Actinomorphic flowers..... **2**

1b. Zygomorphic flowers..... **5**

2a. Simple leaves **3**

2b. Compound leaves..... **4**

3a. Ovary is often elevated on a gynophore with unilocular ovary having many ovules with parietal placentation and absence of strong Odour..... **CAPPARACEAE**

3b. Ovary is not often elevated on a gynophore with multilocular ovary with 6 carpels with axile placentation and presence of strong Odour. ..... **TOVARIACEAE**

* Mostly herbaceous (4)

4a. Leaves are Palmately compound, tetramerous flowers with cruciferous corolla, tetradynamous stamens. ..... **BRASSICACEAE**

4b. Leaves are mostly pinnately dissected, Not tetramerous flowers without cruciferous corolla, Not tetradynamous stamens..... **CLEOMACEAE**

* Presence of glandular stipules (5)

5a. Soft stemmed trees with compound leaves, 5-stamens and presence of staminodes, seeds are 3-winged. ..... **MORINGACEAE**

5b. Herbs with pinnatified leaves, many stamens and absence of staminodes, seeds are Not 3-winged. ..... **RESEDACEAE**

6a. Stiff unbranched thin-barked trunks crowned by the large leaves with the milky sap, monoecious or dioecious. ..... **CARICACEAE**

6b. Not stiff unbranched thin-barked trunks crowned by the large leaves without the milky sap, only dioecious. ..... **SALVADORACEAE**

6. *GENTIANALES*

Families:

(1) APOCYNACEAE (incl. ASCLEPIADACEAE) *
(2) LOGANIACEAE*
(3) GENTIANACEAE*
(4) GELSEMIACEAE*
(5) RUBIACEAE*

KEY TO THE FAMILIES

* Presence of opposite/opposite decussate leaf.

1a. Stipules are present **2**

1b. Stipules are absent..... **3**

2a. Gynostegium present and pollen grains form pollinia. ..... **ASCLEPIADACEAE**

2b. Gynostegium absent and pollens are granular. ..... **APOCYNACEAE**

3a. Ovary inferior and presence of inter and intrapetiolar stipules. ..... **RUBIACEAE**

3b. Ovary superior and absence of inter and intrapetiolar stipules. **4**

4a. Mostly herbs, petals united to form a corolla tube with versatile anthers..... ..... **GENTIANACEAE**

4b. Not herbs, petals Not united to form a corolla tube without versatile anthers..... .....**LOGANIACEAE**

7. *SANTALALES*

Families:

(1) BALANOPHORACEAE
(2) MISODENDRACEAE
(3) OPILIACEAE
(4) SCHOEPFIACEAE
(5) LORANTHACEAE*
(6) OLACACEAE*
(7) SANTALACEAE (incl. VISCCACEAE) *

KEY TO THE FAMILIES

1a. Hemi parasitic(root) tree **2**

1b. Not Hemi parasitic(root) tree **3**

2a. Distinct calyx and corolla and ovules pendulous from the top of a free central placentation. ..... **OLACACEAE**

2b. Not distinct calyx and corolla and ovules pendulous from the top of a basal placentation. .....**SANTALACEAE**

3a. Monochlamydous unisexual only ..... **VISCACEAE**

3b. Dichlamydous uni. /bisexual.....**LORANTHACEAE**

8. *LAMIALES*

Families:

(1) ACANTHACEAE*
(2) LAMIACEAE*
(3) OROANCACEAE*
(4) PLANTAGINACEAE*
(5) BIGNONIACEAE*
(6) LENTIBULARIACEAE*
(7) PAULOWNIACEAE
(8) SCROPHULARIACEAE*
(9) BYBLIDACEAE
(10) MARTYNIACEAE*
(11) PEDALIACEAE*
(12) STILBACEAE
(13) GESNERIACEAE*
(14) HYDROSTACHYACEAE
(15) OLEACEAE*
(16) PHRYMACEAE
(17) VERBENACEAE*

KEY TO THE FAMILIES

1a. Parasitic **2**

1b. Not parasitic **3**

2a. Semi parasitic, with leaves, sometimes calyx Not Spathaceous, staminodes are present ..... **SCROPHULARIACEAE**

2b. Not semi parasitic, without leaves, sometimes calyx Spathaceous, staminodes are absent .....**OROBANCACEAE**

3a. Actinomorphic flowers.....**OLEACEAE**

3b. Zygomorphic flowers.....**4**

4a. Presence of tiny bladders on aquatic representatives or other forms of insect traps.... .....**LENTIBULARIACEAE**

4b. Absence of tiny bladders on aquatic representatives or other forms of insect traps.....**5**

5a. Pinnately compound leaves, presence of winged seeds.....**BIGNONIACEAE**

5b. Not pinnately compound leaves, absence of winged seeds **6**

6a. Generally aromatic herbs, verticillasters inflorescence, Gynobasic style, basal axile placentation.....**LAMIACEAE**

6b. Not aromatic herbs, modified cyme inflorescence, terminal style, Not basal axile placentation .....**VERBENACEAE**

7a. Plants are slimy herbs with specialized mucilaginous hairs and fruits are having hooks or horns or prickles .....**PEDALIACEAE**

7b. Plants are Not slimy herbs without specialized mucilaginous hairs and fruits are Not having hooks or horns or prickles .....**PLANTAGINACEAE**

8a. Prominent bracts and bracteoles, bi labiate corolla, unequal or appendaged anther lobes and retinacula .....**ACANTHACEAE**

8b. Not prominent bracts and bracteoles, Not bi labiate corolla, Not unequal or appendaged anther lobes and retinacula .....**GESNERIACEAE**

9. *ERICALES*

Families:

(1) ACTINIDIACEAE
(2) ERICACEAE
(3) POLEMONIACEAE
(4) SARRACENIACEAE

(5) BALSAMINACEAE*
(6) FOUQUIERIACEAE
(7) PRIMULACEAE*
(8) STYRACACEAE
(9) CLETHRACEAE
(10) LECYTHIDACEAE*
(11) RORIDULACEAE
(12) THEACEAE
(13) EBENACEAE*
(14) MYRSINACEAE
(15) SAPOTACEAE*
(16) THEOPHRASTACEAE

KEY TO THE FAMILIES

1a. Ovary inferior, stamens Monoadelphous ..... **LECYTHIDACEAE**

1b. Ovary superior, stamens Not Monoadelphous **2**

2a. Herbs **3**

2b. Shrubs and trees **4**

3a. Zygomorphic flowers, coherence of anthers about the ovary, resupinate present, ovary pentalocular, specialized seed dispersal mechanism present..... ..... **BALSAMINACEAE**

3b. Actinomorphic flowers, Not coherence of anthers about the ovary, resupinate absent, ovary unilocular, specialized seed dispersal mechanism absent..... .**PRIMULACEAE**

4a. Absence of milky sap, leaves covered by basifixed hairs, uni/bisexual flowers, ovules in pairs, style single, seeds without shiny coat ..... **EBENACEAE**

4b. Presence of milky latex, leaves covered by medifixed hairs, bisexual flowers, one ovule, style-4, seeds with shiny coat ..... **SAPOTACEAE**

10. *ROSALES*

Families:

1. BARBEYACEAE
2. ELAEAGNACEAE
3. ROSAEAE*
4. CANNABACEAE*
5. MORACEAE*
6. ULMACEAE*
7. DIRACHMACEAE
8. RHAMNACEAE*
9. URTICACEAE (incl. CECROPIACEAE) *

KEY TO THE FAMILIES

1a. Hypanthium present and bisexual flowers **2**

1b. Hypanthium absent and unisexual flowers **3**

* Inferior ovary

2a. Adnate stipules, apocarpous pistils, indefinite stamens, petals are Not clawed, disc Not intrastaminal ..... **ROSACEAE**

2b. Not adnate stipules, syncarpous pistils, definite stamens, petals are clawed, intrastaminal disc ..... **RHAMNACEAE**

3a. Presence of watery sap, oblique leaves, deciduous stipules, unilocular ovary with one pendulous ovule, two styles, samara or drupe ..... **ULMACEAE**

3b. Presence of stinging hairs, oblique leaves, Not deciduous stipules, unilocular ovary with one basal ovule, one style, fruit an achene/nut ..... **URTICACEAE**

4a. Flowers small, presence of milky latex, perianth of 4 tapals, single pendulous ovule, 2-stigmas ..... **MORACEAE**

4b. Flowers large, absence of milky latex, Not perianth of 4 tapals, Not pendulous ovule, Not 2-stigmas.....**CANNABACEAE**

11. *MALPIGHIALES*

Families:

(1) ACHARIACEAE
(2) EUPHORBIACEAE*
(3) OCHNACEAE*
(4) PODOSTEMACEAE
(5) CHRYSOBALANACEAE
(6) HYPERICACEAE
(7) PASSIFLORACEAE*
(8) RHIZOPHORACEAE
(9) CLUSIACEAE*
(10) LINACEAE*
(11) PHYLLANTHACEAE*
(12) SALICACEAE
(13) ERYTHROXYLACEAE
(14) MALPIGHIACEAE*
(15) PICRODENDRACEAE
(16) VIOLACEAE*

KEY TO THE FAMILIES

1a. Actinomorphic flowers without spurred petal.....**2**

1b. Zygomorphic flowers with large spurred anterior petal .....**VIOLACEAE**

2a. Unisexual flowers.....**6**

2b. Zygomorphic flowers.....**3**

3a. Climbing habit with axillary tendrils, flowers showing corona and presence of gynandrophore .....**PASSIFLORACEAE**

3b. Not climbing habit without axillary tendrils, flowers Not showing corona and absence of gynandrophore.....**4**

4a. Mostly herbs, presence of 5-stamens alternating with staminodes.....**LINACEAE**

4b. Not mostly herbs, absence of 5-stamens alternating without staminodes **5**

5a. Woody with hairs, bi bracteolate flowers, petioles have a pair of fleshy glands and sepals having a pair of abaxial glands near the base, presence of clawed petals..... .....**MALPIGHIACEAE**

5b. Woody without hairs, Not bi bracteolate flowers, petioles has Not a pair of fleshy glands and sepals Not having a pair of abaxial glands near the base, absence of clawed petals .....**OCHNACEAE**

6a. Presence of yellow resinous juice and all floral whorls are more than 5 in number... .....**CLUSIACEAE**

6b. Absence of yellow resinous juice, and Not all floral whorls are more than 5 in number....**7**

7a. Habit with milky latex, without pinnate leaves, mostly cyathium inflorescence, 3-styles and seeds are Not 3-gonous.....**EUPHORBIACEAE**

7b. Habit without milky latex, with pinnate leaves, Not mostly cyathium inflorescence, styles are 2-fid and seeds are 3-gonous.....**PHYLLANTHACEAE**

12. *RANUNCULALES*

Families:

(1) BERBERIDACEAE*
(2) EUPTELEACEAE
(3) MENISPERMACEAE*
(4) RANUNCULACEAE*
(5) CIRCAEASTERACEAE
(6) LARDIZABALACEAE
(7) PAPAVERACEAE*

KEY TO THE FAMILIES

1a. Bisexual flowers..... **2**
1b. Unisexual flowers **3**
2a. Herbaceous habit, without latex, compound leaves, reduced or modified petals, many stamens spirally arranged and presence of apocarpous pistils..... **RANUNCULACEAE**
2b. Herbaceous habit with latex, simple lobed leaves, Not modified petals, many stamens Not spirally arranged and presence of syncarpous pistils..... **PAPAVERACEAE**
3a. Lianous habit, trimerous flowers, double whorl of sepals and presence of horse-shoe shaped seeds ..... **MENISPERMACEAE**
3b. Not Lianous habit, Not trimerous flowers, Not double whorl of sepals and absence of horse-shoe shaped seeds..... **BERBERIDACEAE**

13. *SAPINDALES*

Families:

(1) ANACARDIACEAE*
(2) MELIACEAE*
(3) RUTACEAE*
(4) SIMAROUACEAE*
(5) BURSERACEAE*

(6) NITRARIACEAE

(7) SAPINDACEAE*

KEY TO THE FAMILIES

1a. Leaves are aromatic compound, gland-dotted, stamens are free .....**RUTACEAE**

1b. Leaves are Not aromatic compound, Not gland-dotted, stamens fused forming a stamina tube ..... **MELIACEAE**

2a. Flowers mostly unisexual or rarely bisexual, intrastaminal disc present which may get modified to a gynophore, fruit is a schizocarp separating to samaroid mericarps or samara .....**SIMAROUBACEAE**

2b. Flowers Not mostly unisexual or rarely bisexual. Intrastaminal disc absent which may Not get modified to a gynophore, fruit is Not a schizocarp or samara.....**3**

3a. Resinous bark, sticky leaves due to residous glands, intrastaminal disc present, mostly unisexual flowers..... **ANACARDIACEAE**

3b. Not Resinous bark, Not sticky leaves, intrastaminal disc absent, mostly bisexual flowers **4**

4a. Pulvinate leaf base, small polygamous flowers, extra staminal unilaterally expanded disc, filaments hairy..... **SAPINDACEAE**

4b. Not Pulvinate leaf base, dioecious flowers, intrastaminal disc, filaments are Not hairy .....**BURSERACEAE**

14. *MAGNOLIALES*

Families:

(1) ANNONACEAE*

(2) EUPOMATIACEAE

(3) MAGNOLIACEAE*

(4) DEGENERIACEAE

(5) HIMANTANDRACEAE

(6) MYRISTICACEAE*

KEY TO THE FAMILIES

1a. Stipules are present **2**

1b. Stipules are absent..... **3**

2a. Perianth Not differentiated into calyx and corolla ..... **MAGNOLIACEAE**

2b. Perianth is differentiated into calyx and corolla **3**

3a. Flowers are monoecious with trimerous, tapals are arranged spirally around the base of an elongate thalamus ..... **ANNONACEAE**

3b. Flowers are dioecious without trimerous, tepals are Not arranged spirally around the base of an elongate thalamus .....**MYRISTICACEAE**

15. *BORAGINALES*

Families:

(1) BORAGINACEAE*
(2) CORDIACEAE*
(3) HELIOTROPIACEAE*
(4) CODONACEAE
(5) EHRETIACEAE
(6) HYDROPHYLLACEAE
(7) WELLSTEDIACEAE

KEY TO THE FAMILIES

1a. Presence of filaments filiform, style terminal ..... **BORAGINACEAE**

1b. Absence of filaments filiform, style Not terminal **2**

2a. Calyx tubular, inflorescence cymes/heads/spikes, stamens as many as corolla- lobe, style twice-forked..... **CORDIACEAE**

2b. Calyx Not tubular, inflorescence terminal scorpioid cymes, stamens-5, style long.... .....**HELIOTROPIACEAE**

16. *FABALES*

Families:

(1) FABACEAE*
(2) CEASALPINIACEAE*
(3) MIMOSACEAE*
(4) POLYGALACEAE*

KEY TO THE FAMILIES

1a. Actinomorphic flowers.....**MIMOSACEAE**

1b. Zygomorphic flowers.....**2**

2a. Posterior petal innermost, petals typically 5 and distinct..... **CEASALPINIACEAE**

2b. Posterior petal Not innermost, petals Not 5 and Not distinct **3**

3a. Corolla Papilaonaceous, mostly stamens are diadelphous, presence of marginal placentation, ovary unilocular with many ovules, fruits-legume.....**FABACEAE**

3b. Corolla Not Papilaonaceous, Not diadelphous stamens, presence of axile placentation, ovary bilocular with one ovule, fruit-loculicidal capsule..... .....**POLYGALACEAE**

17. *CARYOPHYLLALES*

Families:

(1) AMARANTHACEAE (incl. CHENOPODIACEAE) *
(2) BASELLACEAE
(3) AIZOACEAE
(4) CARYOPHYLLACEAE

(5) MOLLUGINACEAE*
(6) POLYGONACEAE*
(7) DIDIEREACEAE
(8) NEPENTHACEAE
(9) PORTULACACEAE*
(10) DROSERACEAE
(11) NYCTAGINACEAE*
(12) SIMMONDSIACEAE
(13) DROSOPHYLLACEAE
(14) PHYTOLACACEAE*
(15) TALINACEAE
(16) CACTACEAE
(17) FRANKENIACEAE
(18) PLUMBAGINACEAE*
(19) TAMARICACEAE*
(20) BASELLACEAE

KEY TO THE FAMILIES

1a. Presence of basal placentation **4**

1b. Absence of basal placentation..... **2**

2a. Plants having scale-like leaves, Presence of axile placentation. ..... **TAMARICACEAE**

2b. Plants Not having scale-like leaves, Absence of axile placentation **3**

3a. Presence of calyx 5-lobed, ovary unilocular with one pendulous ovule..... ..... **PLUMBAGINACEAE**

3b. Absence of calyx 5-lobed, ovary multilocular with Not pendulous ovule **4**

4a. Herbs with ovary multilocular with many ovules ..... **MOLLUGINACEAE**

4b. Herbs, shrubs or trees with ovary multi pistillate with one ovule..... ..... **PHYTOLACACEAE**

5a. Presence of colored bracts, petaloid calyx, 1-carpellate ovary... ..... **NYCTAGINACEAE**

5b. Absence of colored bracts, Not petaloid calyx, Not unicarpellate ovary..... **6**

6a. Absence of fleshy leaves, Presence of nodal ochreas, ovary unilocular with one ovule .....**POLYGONACEAE**

6b. Presence of fleshy leaves, Absence of nodal ochreas, unilocular ovary with many ovules .....**PORTULACACEAE**

7a. Absence of fleshy habit, scarious bracts and bracteoles, filaments connate below and forming a staminal tube..... **AMARANTHACEAE**

7b. Presence of fleshy habit, Not scarious bracts and bracteoles, Not filaments connate below and Not forming a staminal tube..... **CHENOPODIACEAE**

FLORAL FORMULAS FOR FAMILIES

1. *PIPERALES*

Families:

A) ARISTOLOCHIACEAE

Distinguishing Characters:

This family distinguished by only one whorl of perianth, flowers irregular, ovary inferior.

Formula: $P_3 + A_6 + \bar{G} + L_{4-6} + OV._{\$}$

Genus:

A small free-flowering with ovate, cordate leaves. The flowers have a slightly dialated tube which is suddently bent upwards, the upper part dialated into a cordate cup-shaped limb of a rich brown ornamented with creamy-white marings. Perianth colored. Stamens-6.ovary inferior, 6-celled with many ovules..... .....***Aristolochia elegans*** **Mast.**

B) PIPERACEAE

Distinguishing Characters:

The plants are mostly herbs or vines with aromatic oils.flowers in dense axillary spikes. Flowers are bi/unisexual.ovary superior unilocular with an erect basal ovule.

Formula: $P_0 + A_{2-6} + \underline{G} + CA_{1-4}. L_1 + Ov._1$

Genus:

A succulent slender much branched herb with wea procumbent glabrous stems. Leaves are broadly ovate acute cordate, 5-7 nerved, opposite. Terminal and leaf-opposed spikes. Perianth-0. Stamens -2, anther cells confluent. Ovary 1-celled, ovule solitary, erect.....***Paperomia pelluida*** **H.B & K.**

2. *MAGNOLIALES*

Families:

A) ANNOANACEAE

Distinguishing Characters:

Trimerous flowers having 3 sepals, 6 petals, stamens in spirals and with enlarged connectives, multipistillate gynoecium.

Formula: $K_3 + C_6 + A_{\$} + \underline{G} + CA_{1>} L_1 + Ov._{1/\$}$

Genus:

Anther cells concealed by the overlapping connective and petals conniving at the concave base ..... ***Artabotrys* R.Br.**

B) MAGNOLIACEAE

Distinguishing Characters:

Trees or shrubs with large flowers having elongated thalamus on which spirally arranged stamens and apocarpous pistils are arranged.

Formula: $P_{>3} + A_{\$} + \underline{G} + Ca_{\$} + Ov._2$

Genus:

Deciduous stipules which are in pairs, perianth not differentiated into calyx and corolla which are deep yellow or orange in colour, 3 or more seriate, stamens numerous, gynophore stipitate ..... ***Michelia champaca* (L.) Baill.ex pierre**

3. *ZINGIBERALES*

Families:

A) CANNACEAE

Distinguishing Characters:

Leaves are spirally arranged. There is only one stamen. All five staminodes also are petalloid.

Genus:

Petalas are 3 bracts like structures below the false petals. they are fused together at the base and their margins are curved inwards. each flowers have 3 slightly false petals.3 sepals and their bases are also surrounded by a floral bract and bracteoate. Papery capsules, sub globose, mature brown-blackish seeds..... ***Canna*** **L.**

B) HELICONIACEAE

Distinguishing Characters:

Plants are similar to sterlitziaceae but there is only one ovule per locule, fruit schizocarpic, seeds not arillate and the median sepal posterior.

Genus:

Bisexual zygomorphic flowers, flowers subtended by brightly colored bracts, 5-stamens .....***Heliconia*** **L.**

C) STRELITZIACEAE

Distinguishing Characters:

Plants are rhizomatous banana like herbs with bisexual zygomorphic flowers. There are 5 stamens, many ovules in each locule, capsular fruits and arillate seeds.

Genus:

The flowers, which emerge one at a time from the spathe, 3 orange sepals, 3 purplish-blue/white petals. Two of the blue or white petals are joined together to form an arrow- like nectary.....***Strelitzia reginae*** **Banks**

D) MUSACEAE

Distinguishing Characters:

Plants are perennial herbs with massive sympodial corm, spirally arranged leaves and sheathing leaf bases forming a psedostem. Inflorescence is a collection of monochasial cymes each in the axil of a boat shaped bract clustered to a cone-like structure. Flowers Irregular, apparently bisexual, functionally unisexual with 5 petalloid tapals fused and the remaining free one containing nectar, 5-fertile stamens, gynoecium og 3 carpels united to a trilocular inferior ovary containing many ovules in axile placentation. Ovules in many cases do not develop to seeds. Fruit fleshy.

Formula: $K_{3\text{-}5} + C_1 + A_5 + \bar{G} + L_3 + Ca_3 + Ov._{\$}$

Genus:

Leaves oblong, inflorescence pendulous, calyx tubular,3-5 lobed, corolla a single convex membranous petal as long as the calyx, stamens 5-perfect, anthers linear, ovary 3-locular, ovles many, style filiform, stigma subglobose..... ..***Musa paradisiaca* L.**

E) COSTACEAE

Distinguishing Characters:

Herbs with long leafy stems, rootstock tuberous, leaves oblong with broad sheaths, spirally arranged, acute or acuminate, glabrous above and silky pubescent beneath base rounded, Flowers in terminal heads, flowers white.

Formula: $K_3 + C_3 + A_1 + \bar{G} + CA_3 + L_3 + Ov._{\$}$

Genus:

Flowers white, in very dense spikes, bracteole solitary below the calyx, calyx short funnel shaped, teeth-3, corolla tube short, corolla lobes large, stamen 1-perfect, filament forming with the connective an oblong petaloid with the contiguous linear anther cells situated in its middle, lip large obovate with incurved margins. Ovary 3-celled, ovules many, axile placenta, style filiform, stigma with a semilinear marginally ciliate foveola.***Costus speciosus* (J. Konig) sm.**

F) ZINGIBERACEAE

Distinguishing Characters:

Aromatic oils, ligule, differentiation of calyx and corolla, labellum and the single stamen.

Formula: $K_3 + C_3 + A_1 + \bar{G} + CA_3 + L_3 + Ov._{\$}$

Genera:

Herbs with elongate leafy stems and horizontal rootstocks. Leaves oblong/lanceolate, flowers in terminal racemes or panicles, bracteoles large, calyx loosely tubular, 3-toothed, corolla tube cylindric, corolla lobes oblong, the upper usually broader and more convex than the lateral. Stamens 1-perfect, filament flattened, anther-cells diverging at the top, lip spreading, often orbicular with incurved margins, ovary 3-celled, ovules few or many on each placenta, style filiform, stigma subglobose .....***Alpinia calcarata* L.**

Herbs with short stems or stemless, rootstock often tuberous. Leaves 2 spreding horizontally, lying flat on the surface of the ground, leaves are rotund-ovate, deep green. Flowers the centre of the plant between the leaves, fugacious, fragrant. Calyx as long as the outer bracts. Coroola lobes lanceolate pure white, petals 3, corolla –lobes equal, stamen 1- perfect, connective prodced into a quadrate 2-lobed appendage, filament short, anther 2-celled, lip broad, usually 2-fid. Ovary 3-celled, ovules many on 3 axile placentas, style long, filiform, stigma turbinate..... .....***Kaempferia galanga* L.**

4. *RANUNCULALES*

Families:

A) RANUNCULACEAE

Distinguishing Characters:

Herbaceous habit, divided or compound leaves, reduced or modified petals, many stamens spirally arranged and apocarpous pistils.

Formula: $K_{3-\$} + C_{3-\$} + A_{\$} + \underline{G} + L_1 + Ca._{\$} + Ov._{1/\$}$

B) MENISPERMACEAE

Distinguishing Characters:

The unisexual flowers (dioecious plants in most cases), lianous habit, calyx 3/6 (2 series) and corolla also of equal number, horse-shoe shaped seeds.

Formula:

For male flowers: $K_{3-6} + C_{3-6} + A_6 + G_0$

For female flowers: $K_{3-6} + C_{3-6} + St._{6/0} + \underline{G} + CA_{1/3-6} + L_1 + Ov._{1/\$}$

Genera:

Climbing shrubs, leaves cordate or truncate at the base. Flowers in axillary or terminal elongate racemes or panicles. Flowers yellow, the males fascicled, the females usually solitary, bracts lanceolate. **Male flowers:** sepals: 3 outer very small, ovate-oblong, acute, 3– inner larger, membranous, concave. Petals: each loosely embracing a stamen, claw cuneate, staamens-6, filaments free. **Female flowers:** petals cneate-oblong, with entire margins, staminodes -6, clavate, ovaries -3, stigmas forked, style-scar. Drupes 1-3 ..... ***Tinospora cordifolia*** **Miers.**

Climbing or sarmentose shrubs, flowers in axillary, usually short panicles. Sepals 6, in 2-series, the inner larger. Petals-6, shorter than the sepals. **Male flowers:** stamens embraced by the petals; anthers subglobose. **Female flowers:** staminodes 6 or 0. Ovaries 3; styles usually cylindric. Fruit a Drupe, usually compressed..... ..... ***Cocculus*** **Dc.**

C) PAPAVERACEAE

Distinguishing Characters:

Plants are laticiferous herbs with lobed simple leaves, solitary large flowers bearing two caducous sepals, four to many petals, many stamens, syncarpous ovary containing many ovules in parietal placentation and a sessile stigma.

Formula: $K_2 + C_{4-\$} + A_\$ + \underline{G} + CA_{2-\$} + L_1 + Ov._\$$

Genus:

Herbs with yellow latex. Leaves inciso-pinnatifid, usually spinoso-dendtate or rigidly setose, spiny on the margins, prickles very sharp yellow. Flowers terminal. Bracts foliaceous. Sepals 2-3, concave. Petals 4-6. Stamens indefinite. Ovary covered with soft spines; Ovary 1-celled; ovules many, on 4-7 parietal placentas, stigma 4-7 lobed, capsule oblong, short, dehiscing at the top by short valves..... .....***Argemone Mexicana*** **L.**

D) FUMARIACEAE

Formula: $K_2 + C_4 + A_6 + \underline{G} + CA_2 + L_1 + Ov._{2/2>}$

Genus:

Herbs. Stems and branches glabrous. Leaves multifid, glaucous, narrow-linear, acute, mucronate. Flowers white oe palw rose with purple tips, bracts membranous. Sepals-2, small. Petals-4, the 2-outer dissimilar, the lower flate or concave, the upper spurred at the base. Stamens-6, diadelphous. Ovary 1-celled..... .....***Fumaria parviflora*** **Lam.**

5. *SAXIFRAGALES*

Families:

A) HAMAMELIDACEAE

Distinguishing Characters:

The plants are shrubs or trees with stellate hairs, simple leaves, bi/unisexual flowers.

Formula: $K_4 + C_5 + A_4 + St._{4\text{-}6} + \bar{G} + Ca._2 + L_2 + Ov._1$

Genus:

Shrubs or small trees. Leaves alternate, ovate, elliptic to obovate often tinged purple, densely valvate hairy, finelytoothed to entire margin. Terminal raceme, bracts linear or lanceolate. Flowers stellately pubescent. Sepals-4, unequal, gamosepalous, light pin, ovate. Petals-5, red apex obtuse or rounded. Stamens-4, filaments very short, connective elongated into a horn, anthers ovoid, staminodes 4-6, scale-like, alternate with stamens. Carpels-2, ovary inferior,

bilocular, one ovule per locule, axile placentation, stellately pubescent. 2-Styles, 2-Stigmas.....***Laropetalum chinense*** **(R.Br.) Oliv.**

6. *OXALIDALES*

Families:

A) OXALIDACEAE

Distinguishing Characters:

Herbs producing fleshy rhizomes or bulb like tubers having estipulate palmately compound trifoliate leaves. Regular flowers. Calyx-5. Corolla-5. Stamens-10, obdiplostemonous with filaments connate at the base, (monoadelphous). Pentalocular ovary. 5-styles.

Formula: $K_5 + C_5 + A_{10} + \underline{G} + CA_5 + L_1 + Ov._{\$}$

Genus:

A small procmbent herb, stems rooting, pubescent. Leaves palmately 3- foliate, stipules small, oblong, adnate to the petiole, leaflets long, obcordate, cuneate at the base, subsessile, glabrous with ciliate margins. Flowers axillary. Sepals-5, oblong-obtuse, hairy outside. Petals-5, yellow, oblong, rounded at the apex, emarginated, twice as long as the sepals. Stamens-10, free or united at the base. Ovary 5-celled, ovules 1-many in each cell, styles-5, stigma papillose. Capsule linear-oblong, 5-angled, shortly beaked .....***Oxalis corniculata*** **L.**

7. *MALPIGHIALES*

Families:

A) LINACEAE

Distinguishing Characters:

Plants are mostly herbs. Stamens 5 alternating with staminodes. Ovary 3-5 celled, ovules 1-2 in each locule.

Formula: $K_5 + C_5 + A_5 + St._5 + \underline{G} + L_{3-5} + Ov._{1-2}$

Genus:

Herbs sometimes subfrutescent, stems solitary or few, leaves linear-lanceolate, attenuated at both ends, acute at the apex. Flowers in corymbose panicles. Sepals: the two outer elliptic, acuminate with entire membranous margins; the 3 inner broader, acuminate, with ciliate margins, all strongly 3-nerved, the middle nerve alone reaching the apex. Petals blue, fugacious. Sepals-5, Petals-5, Stamens-5 alternating with minute or setiform staminodes. Ovary 5-celled, 2 ovules in each locule ..... ***Linum usitatissimum* L.**

B) MALPIGHIACEAE

Distinguishing Characters:

The plants are woody, opposite leaves and bibracteolate flowers. Petiole has a pair of fleshy glands. Flowers are with sepals having a pair of abaxial glands near the base, clawed petals, and 10 stamens connate at the base. Gynoecium of 3 carpels partly fused. Ovule solitary per locule.

Formula: $K_5 + C_5 + A_{10} + \underline{G} + L_3 + Ca._3 + Ov._1$

Genus:

Stem cylidric, glabrous, leaves opposite, pair of gland at the leaf base which is obliquely arranged, glabrous leaves, acute apex. Two stipules alternately arranged, sepals alternate with petals, gaosepalous, calyx-5, apex tailed. Corolla polypetalous, yellow, clawed-shaped. Stamens10, anthers seggeted, basifixed, red anthers, arranged in two whorl, outer one is large, inner one is small. Ovary is 3-locular, superior, one ovule in each locule, style absent, stigma-trifid, star-like capsule with wings..... ***Tristellateia australasiae* A.Rich**

C) OCHNACEAE

Distinguishing Characters:

Flowers are large with 5-sepals, many stamens with poricidal dehiscence and deeply lobed ovary raised on a disc or gynophore. Fruit is baccate with carpels separating ito fleshy cocci.

Formula: $K_{4\text{-}5} + C_{4\text{-}12} + A_{10/\$} + \underline{G} + L_{1\text{-}10} + Ov._{1\text{-}2}$

Genus:

Glabrous trees or shrubs. Leaves alternate, oblong –lanceolate, eliptic oe obovate, usually acute, finely serrulate. Flowers fragrant. Sepals-5 coriaceous, elliptic-oblong with close parallel veins. Petals 5-12, a little longer than the sepals. Stamens indefinite, deciduous; filaments very short; anthers long, linear, stamens inserted at the base of the disk. Styles completely combined, longer than the stamens. Ovary 1-10 celled, deeply 3-10 lobed, ovule solitary in each cell. Stigmas simple or capitate.....***Ochna squarrosa* L.**

D) PASSIFLORACEAE

Distinguishing Characters:

The climbing habit, axillary tendrils, corona, gynandrophore and the mucilaginous pulpy arils of seeds.

E) VIOLACEAE

Distinguishing Characters:

Zygomorphic flowers, spurred anterior petal. Stamens are basally connate; gynoecium is tricarpellary.

Formula: $K_5 + C_5 + A_5 + \underline{G} + L_1 + Ca._3 + Ov._\$$

Genus:

Herb, with many diffuse or ascending branches, glabrous or more or less pubescent. Leaves linear/lanceolate, subsessile, entire or serrated margins. Stipules gland-tipped, bracts small. Sepals-5, long lanceolate, acute, keeled. Petals unequal, the 2 upper ones oblong, slightly longer than the sepals, the 2 lateral longer, falcate, the lowest much larger than the others, having a orbicular or obovate limb with a long claw which is curved behind into a short spur. Stamens -5. Ovary sessile, 1-celled, ovules many, on 3 parietal placentas, style clavate, stigma oblique. Capsules subglobose..... ***Ionidium heterophyllum* vent.**

8. *FABALES*

Families:

A) FABACEAE

Distinguishing Characters:

This family is the most advanced group with a specialized papilionaceous flower, diadelphous/monoadelphous stamens and vexillary aestivation.

Formula: $K_5 + C_5 + A_{10} + \underline{G} + CA_1 + L_1 + Ov._{\$}$

Genus:

A much-branched herb, leaves ovate-rhomboid, nerves prominent, stipules large, foliaceous, flowers in terminal/lateral, racemes, bracts linear-lanceolate. Calyx-membranous, tube short, campanulate, acute. Corolla long, bluish-purple/white. Anthers dimorphous. Ovary sessile, style long. Pods densel villous when young, softly pubescent when ripe. Seeds 10-15 .....***Crotolaria verrucosa* L.**

B) CAESALPINIACEAE

Distinguishing Characters:

Herbaceous habit, zygomorphic flowers, stamens 10 variously heteromorphic, fruit a legume or lomentum.

Formula: $K_5 + C_5 + A_{10} + \underline{G} + Ca._1 + L1 + Ov._{\$}$

Genus:

Annual herb, leaves long, rhachis with a gland between each of the 2 lowest pairs of leaflets. Stipules long. Flowers subsessile pairs in the axils of the leaves. Calyx 5, ovate acute. Petals 5, pale yellow, oblong, obtuse. Stamens-10, the 3 upper reduced to minute staminodes. Ovary sessile/stalked, ovules many, style short/elongate. Stigma terminal. Pods -5-8***Senna tora* (L.) Roxb.**

C) MIMOSACEAE

Distinguishing Characters:

This is a woody family with regular actinomorphic flowers and numerous stamens. leaves are bi/tripinnate having a pulvinus and the stipules are often modified to spines.

Formula: $K_5 + C_5 + A_{5-\$} + \underline{G} + Ca._1 + L1 + Ov._{2-\$}$

Genus:

The tree is armed with short straight stipular thorns. Leaves 2-pinnate, stipules various. Flowers usually in globose heads or cylindric spikes 5-merous. Calyx-5, corolla-5, stamens monoadelphous, Ovary sessile/stalked, ovules many. The pods are curiously twisted and the seeds are embedded in a sweet whitish edible pulp....***Pithcellobium dulce*** **(Roxb.) Benth.**

D) POLYGALACEAE

Distinguishing Characters:

The apparent papilionaceous corolla, monoadelphous stamens with poricidal dehiscence, crested petal and bilocular ovary.

Formula: $K_5 + C_{5/3} + A_8 + \underline{G} + CA_{2-3} + L_{1-3} + Ov._{1/>1}$

Genus:

Annual, usually branched from the base or nearly so; leaves narrow-linear; wings with a green midrib; capsule not margined. Flowers yellow in axillary/extra-axillary, few flowered racemes, bracts minute or hairy. Sepals unequal the 2 inner larger (wings) usually petaloid. Petals-3, united at the base with the stamina sheath, the lower one keeled and generally crested. Stamens -8, filaments united for their lower half into a split sheath. Ovary 2-celled; ovule 1 in each cell, pendulous. Capsule 2-celled, loculicidal, 2-seeded.....***Polygala erioptera*** **L.**

9. *ROSALES*

Families:

A) ULMACEAE

Distinguishing Characters:

This family is distinguished by the stinging hairs, unilocular ovary with a single basal ovule and style and cymose inflorescences on short shoots.

Formula: $P_{(4-8)} + A_{(4-8)} + \underline{G} + CA_2 + L_1 + Ov._1$

Genus:

A large deciduous tree. Leaves elliptic, acuminate, glabrous, entire. Flowers usually male and hermaphrodite mixed in short racemes. Sepals-4. Stamens-4-8, filaments glabrous, anthers pubescent. Ovary pubescent, 1-celled, stalked, styles long. Samara nearly orbicular with reticulately veined wings..... .***Holoptelea integrifolia*** **(Roxb.) Planch.**

10. *MYRTALES*

Families:

A) COMBRETACEAE

Distinguishing Characters:

This family is distinguished by inferior unilocular ovary with 4-6 pendulous ovules. The wings on the fruit in some plants are also distinctive.

Formula: $K_{4-5} + C_{0/4-5} + A_{5-10} + \bar{G} + CA_{2-5} + L_1 + Ov._{1-7}$

Genus:

Shrubs or small trees. Leaves alternate, midrib prominent, pink; petiolate, entire. Flowers small, yellow, in dense globose axillary heads. Calyx-tube pubescent; broadly triangular. Calyx-tube compressed, 2-winged, produced above the ovary; limb campanulate/ureolate, 5-fid. Petals-0. Stamens-10, biseriate, anthers small, cordate. Ovary inferior, 1-celled, ovules-2, pendulous, style filiform, stigma simple. Fruit packed in dense heads, small, 2-winged, fruit

(with wings) longer than broad; wings with entire margins; peduncles branched. One seeded..... ***Anogeissus latifolia* wall.**

B) LYTHERACEAE

Distinguishing Characters:

The family is distinguished by hypanthium, superior ovary and many stamens.

Formula: $K_{3-6} + C_{3-6} + A_{\$} + \underline{G} + CA_{2-\$} + L_{1-6} + Ov._{\$}$

Genus:

Annual herbs, stem usually 4-gonous. Leaves opposite, sessile, linear-oblong, leaves narrowed at the base. Flowers in dense axillary clusters or short cymes. Calyx long, tube hemispheric, teeth-4, calyx 3-6. Petals -3-7 or 0. Stamens 2-8, inserted in the middle of the calyx-tube. Filaments filiform. Ovary superior, 1-5 celled, ovules-many. Capsule globose, red***Ammania baccifera* L.**

11. *SAPINDALES*

Families:

A) SIMAROUBACEAE

Distinguishing Characters:

Trees and shrubs with alternate pinnately compound leaves, unequal sided leaflets. Flowers are mostly unisexual.

Formula: $K_{3-5} + C_{3-5} + A_{10/>10} + \underline{G} + L_{1-6} + Ov._{1}$ (FEMALE FLOWER)

Genus:

Trees. Leaves alternate, pinnate, leaflets alternate/sub-opposite, leaflets coarsely toothed. Flowers in terminal/axillary. Calyx-5-fid. Petals-5. Disk-10 lobed. Stamens-10 in the male, 2-3 in the hermaphrodite and 0 in the female flowers. Filaments very short or filiform, filaments shorter than the anthers. Ovary 2-5 partite, ovule-1, styles connate. Fruit Samaras 1-5, large, membranous.....***Ailanthus excelsa* Roxb.**

B) BURSERACEAE

Distinguishing Characters:

The aromatic leaves, resin ducts in the bark. Leaves are pinnately compound having a winged rachis. Flowers are polygamous.

Formula: $K_{3-5} + C_{3-5} + A_{10/10>} + \underline{G} + CA_{3-5} + L_{2-5} + Ov._{2}$ (FEMALE FLOWER)

Genus:

Trees usually with papery bark. Leaves alternate, deciduous, imparipinate, leaflets opposite, usually serrate. Flowers hermaphrodite, small, white, axillary racemes or panicles. Calyx small, 5-toothed, persistent. Petals-5, narrowed at the base. Disk annular. Stamens-10, alternately long and short, inserted at the base of the disk. Ovary sessile, 3-celled; ovules -2 in each cell, pendulous, style short, stigma 3-lobed. Drupe trigonous .... ***Boswellia serrata***

C) ANACARDIACEAE

Distinguishing Characters:

The plants are mostly evergreen trees or shrubs with resinous bark and generally sticky leaves due to resinous glands. Compound leaves. Flowers mostly unisexual.

Formula: $K_{3-5} + C_{3-5} + A_{1/1-10} + \underline{G} + CA_{1-5} + L_{1/1-6} + Ov._{1}$

Genus:

Trees. Leaves alternate, simple, leaves thickly coriaceous. Flowers sessile, greenish-white, terminl/axillary, bracts small, caduceus. Calyx –lobes short, ovate, ciliate, 3-5 toothed. Petals ovate-oblong, 4-5. Stamens-10, a little shorter than the petals, filaments flattened, anthers about as long as the filaments. Ovary-1 perfect, villous, the other 4 are reduced to cylindrical filaments. Drupe small.....*****Buchanania Lanzan*** **Spreng.**

12. *MALVALES*

Families:

A) BIXACEAE

Distinguishing Characters:

Palmately veined stipulate leaves and large flowers, stamens many, ovary penta-carpellary with intruded placenta. Seeds are often colored.

Formula: $K_{4-5} + C_{4-5/0} + A_{\$} + \underline{G} + L_1 + Ov._{2-\$}$

Genus:

A small evergreen tree. Leaves ovate, glabrous on both surfaces, entire. Flowers bisexual, terminal, panicled. Pedicels 5-glandular beneath the calyx. Sepals-5, deciduous, the two smaller concave, the three larger oblong. Petals-5, large, white/pink, obovate. Stamens many, anthers oblong. Ovary 1-celled, ovules many on 2-parietal placentas. Style curved, stigma very shortly 2-lobed. Capsule loculicidally 2-valved .....***Bixa orellana* L.**

B) MALVACEAE

Distinguishing Characters:

The family can be easily distinguished by the epicalyx, stamens monoadelphous and many, ovary pentalocular with many ovules.

Formula: $K_5 + C_5 + A_{\$} + \underline{G} + L_{2-5} + Ca._{2-5} + Ov._{1/1>}$

Genus:

Shrubby, much branched. Leaves lanceolate, sharply serrate, glabrouson both sides. Calyx lobes triangular, acute, Sepals-5. Corolla nearly twice as long as the calyx, yellow, petals connate at base and with the stamina tube. Staminal tube divided at the top into numerous antheriferous filaments. Ovary 5-12 cells; carpels 5-9, ovule 1 in each cell, pendulous, styles as many as the carpels, stigmas terminal. Fruit globose.....***Sida acuta* Burm.f.**

C) BOMBACACEAE

Distinguishing Characters:

This family is easily identified by the flowers are large and showy, polyadelphous androecium, woody capsule.

Formula: $K_{3-5} + C_5 + A_{\$} + \underline{G} + CA_{2-5} + L_5 + Ov._{\$}$

Genus:

A tree, leafless in the hot season, trunk unarmed. Leaves glabrous, petioles longer than the leaflets, leaflets 7-9, glabrous, obovate, acuminate. Pedicels solitary or clustered, 1-flowered. Calyx long truncate or slightly 2-lobed, densely silky hairy within. Corolla showy, scarlet or white, petals-5, stellately tomentose outside. Stamens indefinite, inserted at the base of the calyx, Staminal bundles consisting of 50 or more unequal filiform filaments, united into 5 bundles opposite to the petals. Ovary ovoid, 5-celled, many ovuled, stigma 5-lobed. Capsule oblong, loculicidally 5-valved .....***Bombax insigne*** **Wall.**

D) STERCULIACEAE

Distinguishing Characters:

The members of this family are tall trees with simple or palmately lobed or digitate leaves. Flowers are unisexual or polygamous and borne in panicles.

Formula: $K_{4-5} + C_{0/5} + A_5 + St._{0/5} + \underline{G} + L_{4-5} + Ov._{2-\$}$ (FEMALE FLOWER)

Genus:

Large tree, trunk erect. Leaves shallowly palmately lobed, glabrous above, velvety beneath, lobes-5, caudate-acuminate, base cordate. Flowers yellow, hermaphrodite or female mixed with many males. Calyx campanulate, hairy on both surfaces. Calyx 4-5 fid. Petals-0. Male flowers: staminal column short, filaments 10. Bisexual flowers: carpels usually 5, a short gynophore, style short, thick, hairy, stigmas-5. Stamens in a ring round the carpels***Sterculia urens*** **Roxb.**

E) TILIACEAE

Distinguishing Characters:

The family is distinguished by stellate hairs, free stamens and pentacarpellary ovary.

Formula: $K_{3-5} + C_{3-5} + A_{\$} + \underline{G} + CA_{2-\$} + L_{2-10} + Ov._{2-\$}$

Genus:

A shrub. Leaves ovate-elliptic, acuminate, crenate-serrate, glabrous. Flowers small axillary/terminal cymes. Sepals-5. Petals-5, gland exceeding half the petal. Stamens numerous, inserted on a turbinate often glandular torus. Ovary 2-4 celled, ovules 2-many in each cell, style subulate, stigma short, 2-5 lobed.....***Grewia orientalis* L.**

13. *BRASSICALES*

Families:

A) MORINGACEAE

Distinguishing Characters:

The plants are soft stemmed trees with compound leaves, perigynous irregular flowers. Sepals-5. Petals-5 dissimilar. Stamens-5 (many staminodes) and a Tri-carpellary ovary. Seeds 3-winged.

Formula: $K_5 + C_5 + A_5 + St._{5-7} + \underline{G} + Ca._3 + L_1 + Ov._{\$}$

Genus:

A fast growing, deciduous tree. leaves alternate, 2-pinnate, the pinnae and pinnules imparipinnate, opposite, leaflets opposite. Sepals-5. Petals-5. Stamens-5, insertedon the edge of the disk, declinate, 5-perfect opposite the petals alternating with staminodes. Ovary 1-celled, tri-carpellary, parietal placentation. Ovules numerous. Capsule elongate, seeds 3-winged.....***Moringa oleifera* Lam.**

B) SALVADORACEAE

Distinguishing Characters:

The plants are small trees with a slightly gamopetalous. Gynoecium bicarpellary, superior uni/bi-locular ovary containing 1-2 ovules.

Formula: $K_4 + C_4 + A_4 + \underline{G} + CA_{1-2} + L_{1-2} + Ov._{1-2}$

Genus:

A large much-branched evergreen shrub or small tree. Leaves fleshy, glaucous. Flowers greenish-yellow, in axillary/terminal. Bracts ovate. Sepals-4. Petals-4. Stamens-4, stamens shorter than corolla. Ovary 1-celled, ovule solitary, style very short, stigma broad. Drupe globose .....***Salvadora persica* L.**

C) BRASSICACEAE

Distinguishing Characters:

Herbaceous habit, leaves are mostly pinnately dissected. Flowers bisexual, regular and tetramerous borne in racemes. stamens ate tetradynamous.

Formula: $K_4 + C_4 + A_6 + \underline{G} + CA_2 + L_2 + Ov._{\$}$

Genus:

An Herb. Leaves are pinately dissected. Flowers bisexual, yellow. Sepals-4. Petals-4, cruciferous corolla. Stamens are tetradynamous, stamens-6 (2-seriate), 2-outer opposite the lateral sepals, the 4 inner larger in pairs opposite the other sepals. Ovary 2-celled, by a septum joining the placentas, ovules many, 1-2 seriate, on 2 parietal placentas. Style short. Fruit 2-valved pod, leaving the seeds on the replum. .....***Brassica juncea* (L.) Czern.**

14. *SANTALALES*

Families:

A) SANTALACEAE

Distinguishing Characters:

Hemiparasitic attaching to the roots of other plants. The leaves are generally small, flowers small with 4-5 tepals fused to form fleshy calyx cup, stamens opposite the tepals and a gynoecium of 3 carpels.

Formula: $P_{4-5} + A_{4-5} + \bar{G} + Ca._{3} + L_1 + Ov._{2-3}$

Genus:

A small tree with drooping branches. Leaves elliptic-lanceolate, subacute, glabrous, entire. Flowers brownish-purple, in axillary/terminal cymes. Perianth campanulate, limb of 4 segments. Stammens-4, exserted, alternating with 4 scales. Ovary half-inferior, unilocular, tri-carpellary with 2-3 ovules. Style elongate, stigma 2-3 lobed. Drupe globose***Santalum album*** **L.**

B) LORANTHACEAE

Distinguishing Characters:

Plants are epiphytic shrubs. Simple leaves. large and showy flowers. Calyx cup-shaped, Petals 5-6, stamens opposite to petals.

Formula: $K_{4-6} + C_{4-6} + A_{4-6} + \bar{G} + Ca._{3-4} + L_1 + Ov._{1}$

Genus:

A large bushy branch parasite. Leaves coriaceous, opposite, ovate, elliptic, obtuse, mid-rib prominent. Flowers axillary. Calyx long, tube cylindric, 5-toothed. Corolla scarlet/orange/pink/white, lobes-5. Anthers linear. Stamens as many as and opposite to corolla lobes. Ovary inferior, 1-celled, ovule solitary, erect, style slender. Fruit a berry***Loranthus longiflorus*** **Desr.**

15. *CARYOPHYLALES*

Families:

A) AMARANTHACEAE

Distinguishing Characters:

This family having scarious and membranous perianth and filaments connate below and the staminal tube often resembling a small sympetalous corolla.

Formula: $P_5 + A_{1-5} + \underline{G} + CA_{2-3} + L1 + Ov._{1/1>}$

B) NYCTAGINACEAE

Distinguishing Characters:

This family is distinguished by the colored bracts, unequal stamens, unicarpellate pistil and the persistent calyx base in fruit.

Formula: $P_{3-5} + A_{5-\$} + \underline{G} + Ca._1 + L_1 + Ov._1$

C) PLUMBAGINACEAE

Distinguishing Characters:

Family having calyx 5-10 ribbed, gamopetalous corolla, stamens-5, Ovary pentacarpellary with one ovule. Styles-5.

Formula: $K_5 + C_5 + A_5 + \underline{G} + Ca._5 + L_1 + Ov._1$

Genus:

A perennial herb. Leaves ovate, entire, subacute. Calyx long, narrowly tubular, persistent densely covered with glandular with stalked glands. Teeth small, with membranous margins, calyx 5-toothed. Corolla white, tube long, with equal or slightly unequal entire lobes. obovate-oblong, acute. Stamens-5, anthers linear-oblong, anthers exserted. Ovary pentacarpellary, unilocular with one ovule. Capsule oblong ..... ***Plumbago zeylaica* L.**

D) TAMARICACEAE

Distinguishing Characters:

The plants are small trees with sinuous branches, scale like small alternate leaves and minute flowers in spike like racemes.

Formula: $K_5 + C_5 + A_{5-\$} + \underline{G} + CA_{2-5} + L_1 + Ov._{2-\$}$

Genus:

A shrub. Leaves minute, scale-like, ovate-lanceolate, acuminate. Flowers terminal racemes. Sepals-5, ovate-elliptic with white membranous margins. Petals-5, rose-colored, elliptic-obovate, with minutely denticulate margins. Stamens-10, alternately long and short, glands of the disc separating the filaments. Ovary 1-locular with 2-many ovules, Styles-3, short .....***Tamarix ericoides*** **Rottler & Willd.**

16. *ERICALES*

Families:

A) BALSAMINACEAE

Distinguishing Characters:

Zygomorphic flowers, very peculiar androecial situation and coherence of anther about the ovary and stigma and elastic dehiscence of capsule.

Formula: $K_5 + C_5 + A_5 + \underline{G} + Ca._5 + L_5 + Ov._1$

B) EBANACEAE

Distinguishing Characters:

A dioecious tree. Simple leaves covered by hairs. Flowers small.

Formula:

Male flower: $K3\text{-}7 + C3\text{-}7 + A3\text{-}7/\$ + G_0$

Female flower: $K_{3-7} + C_{3-7} + St._{<3-7} + \underline{G} + CA_{3-8} + L_{4-10} + Ov._{1-\$}$

Genus:

Trees or shrubs. Leaves alternate. Flowers dioecious. Calyx gamosepalous, 3-7 fid, pubescent. Corolla pubescent, lobes 3-7. **Male flowers:** stamens 4-many, attached to the base of the corolla, filaments in pairs, anthers linear/lanceolate. Ovary rudimentary or 0. **Female flowers:** Staminodes 0-16. Ovary globose, 4-10 celled, ovules solitary in each cell, styles 1-4. Fruit globose, supported by the calyx..... ***Diospyros*** **Linn.**

C) PRIMULACEAE

Distinguishing Characters:

Herbs with pentamerous flowers and pentacarpellary unilocular ovary having free central placenta.

Formula: $K_5 + C_5 + A_5 + \underline{G} + CA_5 + L_1 + Ov._{\$}$

Genus:

Annual herb. Stem and branches 4-gonous, glabrous. Leaves sessile, opposite, ovate, acute, glabrous, entire, gland-dotted. Flowers axillary, solitary. Calyx long, segments narrow, lanceolate, acuminate, calyx 5-partite. Corolla 5-partite, rotate/ infundibuliform. Stamens -5, inserted at the base of the corolla, filamens filiform, villous. Ovary globose, ovules many, style simple, stigma obtuse..... ..... ***Anagallis arvensis*** **Linn.**

17. *GENTIANALES*

Families:

A) APOCYNACEAE

Distinguishing Characters:

Absence of gynostegium, the pollen grains distinct (not in pollinia).

Formula: $K_5 + C_5 + A_5 + \underline{G} + CA_2 + L_{1-2} + Ov._{2-\$}$

Genus:

A tall tree with milky juice, branches whorled. Leaves 4-7 in a whorl, oblong-lanceolate, obtuse or bluntly acuminate, dark green above pale and covered with a whitish bloom beneath. Flowers greenish-white, in umbellatly branched, many flowerd pubescent capitate cymes, bracts oblong pubescent. Calyx 5-lobed, long, pubescent, oblong, obtuse, ciliate. Corolla hypocrateriform, tube cylindric, corolla tube long villous inside the mouth with a ring of hairs. Stamens near the top of the tube, anthers free, subacute. Carpels pubescent, 2, ovules many in each carpel, style filiform, stigma minute or 2-fid. Follicles-2, long***Alstonia scholaris*** **R.Br.**

18. *LAMIALES*

Families:

A) ACANTHACEAE

Distinguishing Characters:

Presence of floral bracts and bracteoles, usually bilabiate corollas associated with the bilocular ovary and presence of retinacula in some genera.

Formula: $K_5 + C_5 + A_{2/4} + \underline{G} + CA_2 + L_2 + Ov._{1/\$}$

Genus: Distinguishable characters of *Barleria* sp.

Bark with white-dotted swollen lines. White flowers, solitary, short internode, at the top inflorescence, glandular calyx .....***Barleria lawii*** **T. Anders.**

Leaves ovate, glabrous, large bracteoles-2, bract minute, disc prominent.....***Barleria grandiflora*** **Dalzell**

Pungent smell from leaves. Leaves are villouse .....***Barleria acuminata*** **Nees**

Stem bark are same as *B. lawii*. Flowers are yellow. Anthers are longer than *B. lawii*. Anther filament slightly attached to anther.....***Barleria prionitis*** **L.**

B) OROBANCHACEAE

Distinguishing Characters:

This family is distinguished by root parasites. Leaves reduced to scales and flowers borne on terminal spikes or racemes. Gynoecium of 2 carpels, syncarpous unilocular ovary with many ovules.

Formula: $K_{4-5} + C_5 + A_4 + \underline{G} + Ca._2 + L_1 + Ov._{\infty}$

Genus:

Scapigerous scaly herbs, stem simple or branched, scales acute. Flowers in dense spikes or racemes. Bracts scale-like, bracteoles 2/0. Calyx unequally 4-fid or 2-partite, segments entire or 2-fid with rarely a 5^{th} tooth or segment. Corolla 2-lipped, upper lip erect, 2-fid; lower 3-lobed. Stamens -4, didynamous, anther cells parallel. Ovary 1-celled with man ovules, style simple, stigma funnel-shaped or 2-lobed..... ***Orobanche aegptiaca*** **Pers.**

C) PLANTAGINACEAE

Distinguishing Characters:

Scapigerous herbs. Leaves usually radical. Scapes axillary. Flowers small, spicate. Corolla scarious.

Formula: $K_4 + C_4 + A_4 + \underline{G} + CA_2 + L_{1-4} + Ov._{1-8}$

GENERA:

Scapigerous herbs. Leaves usually radical. Scapes axillary. Flowers small, greenish, spicate. Sepals-4, persistent, elliptic, obtuse, concave, scarious. Corolla lobes rounded, concave, obtuse, apiculate, glabrous, lobes-4. Stamens-4, filaments filiform, persistent, anthers large, versatile. Ovary 1-4 celled, ovules 1-8 in each celled ..... ***Plantago ovate*** **Forsk.**

D) VERBENACEAE

Distinguishing Characters:

Flowers are zygomorphic, calyx-5 with unequl lobes, mostly bilabiate corolla, stamens didynamous and gynoecium of 2 carpels.

Formula: $K_{4-5} + C_{4-5} + A_4 + \underline{G} + CA_2 + L_{2-4} + Ov._2$

Genus:

Herbs or shrubs. Leaves elliptic, obtuse or acute, coarsely serrate, glarous. Flowrers sessile, long, spikes. Calyx long, embranous, tubular, teeth-4, acute. Corolla deep blue/pink, glabrous, 5-lobed. Perfect stamens 4, filaments hairy below. Ovary 2 celled, ovule solitary in each cell, style long, filiform..... .....***Stachytarpheta indica*** **(L.) Vahl, Enum.**

19. *SOLANALES*

Families:

A) CONVOLVULACEAE

Distinguishing Characters:

Presence of plaited corolla, the erect sessile ovules with axile placentation.

Formula: $K_5 + C_5 + A_5 + \underline{G} + CA_2 + L_{1-4} + Ov._2$

Genus:

A perennial herb with a small woody branched rootstock. Leaves numerous, elliptic-oblong, obtuse, strongly apiculate, acute at the base, densely covered with silky hairs. Flowers light blue solitary/2. Calyx densely silky, Sepals-5, long, lanceolate, very acute. Corolla infundibuliorm /subrotate., Limb plicate. Stamens-5. Ovary 2-celled, ovules-4, styles-2, distinct from the base, each cleft into 2 linear or subclavate stigmas. Capsule-2 valved .....***Evolvulus alsinoides*** **Linn.sp.**

B) SOLANACEAE

Distinguishing Characters:

This family distinguished by the actinomorphic corolla, the typically 4 or 5 stamens, the usually plicate corolla.

Formula: $K_5 + C_5 + A_5 + \underline{G} + CA_2 + L_2 + Ov._{\$}$

Genus:

Annual branched herb with large green leaves and long, trumpet-shape, white-pinkish flowers. The lower leaves are the largest, short-stalked, oblong-elliptic, shortly acuminate at the apex, decurrent at the base, the upper one sessile and smallest. In terminal many flowered inflorescences. Calyx-5 narrowly triangular lobes. Petals-5. Stamens-5. Ovary superior, ovules many on swollen placenta..... .....***Nicotiana tabacum* L.**

20. *BORAGINALES*

Families:

A) BORAGINACEAE

Distinguishing Characters:

The family is distinguished by actinomorphic flowers, anthers connivent into a cone, connectives much produced, twisted at the apex, ovary 4-lobed,

Formula: $K_5 + C_5 + A_5 + \underline{G} + CA_2 + L_4 + Ov_1$

Genus:

Annual, erect, much-branched. Leaves variable, sessile, ovate, obtuse, clothed above with stiff hairs springing from white tubercles, less hairy and villous beneath. Flowers pale violet-blue, solitary and leaf-opposed and in terminal few-flowerd cymes. Calycx long, hispid with long hairs, sepals-5. Corolla infundibuliform, thinly hairy inside, petals-5. Stamens-5, cone of anthers large and very pointed, clothed on the back with dense white hairs. Anthers included with a few hairs at the base, inserted on the corolla tube, the produced connectives linear.

Ovary ovoid, 4-lobed, ovules subhorizontal, style long, 4 nutlets.....***Trichodesma indicum*** **R.Br.**

B) CORDIACEAE

Distinguishing Characters:

The family is distinguished by simple rough leaves, helicoid cymes, regular corolla with scales and style twice-forked and 4 nutlets.

Formula: $K_5 + C_{4-8} + A_{4-8} + \underline{G} + CA_2 + L_4 + Ov._1$

Genus:

A deciduous tree. Leaves alternate, broadly ovate, obtuse, entire or the margins more or less sinuate-dentate, glabrous and more or less scabrous above base rounded or cordate. Calyx long, inside pubescent, 5-lobes. Corolla tube as long as the calyx, lobes-5, oblong, obtuse. Stamens-5, filaments hairy at the base. Ovary 4-celled, ovule solitary in each cell, erect, style terminal, elongate, bipartite, the branches again bipartite, stigma capitate. Drupe ovoid .....***Cordia Myxa*** **L.**

ANGIOSPERM PLANTS OF BOTANICAL GARDEN & ARBORETUM

21. PIPERALES

Families:

C) ARISTOLOCHIACEAE

Distinguishing Characters:

This family distinguished by only one whorl of perianth, flowers irregular, ovary inferior.

Formula: $P_3 + A_6 + \bar{G} + L_{4-6} + OV._{\$}$

Genus:

A small free-flowering with ovate, cordate leaves. The flowers have a slightly dialated tube which is suddently bent upwards, the upper part dialated into a cordate cup-shaped limb of a rich brown ornamented with creamy-white margins. Perianth colored. Stamens-6. ovary inferior, 6-celled with many ovules..... .....***Aristolochia elegans*** **Mast.**

D) PIPERACEAE

Distinguishing Characters:

The plants are mostly herbs or vines with aromatic oils. flowers in dense axillary spikes. Flowers are bi/unisexual. ovary superior unilocular with an erect basal ovule.

Formula: $P_0 + A_{2-6} + \underline{G} + CA_{1-4}. L_1 + Ov._1$

Genus:

A succulent slender much branched herb with weak procumbent glabrous stems. Leaves are broadly ovate acute cordate, 5-7 nerved, opposite. Terminal and leaf-opposed spikes. Perianth-0. Stamens -2, anther cells confluent. Ovary 1-celled, ovule solitary, erect.....***Paperomia pelluida*** **H.B & K.**

22. *MAGNOLIALES*

Families:

C) ANNOANACEAE

Distinguishing Characters:

Trimerous flowers having 3 sepals, 6 petals, stamens in spirals and with enlarged connectives, multipistillate gynoecium.

Formula: $K_3 + C_6 + A_{\$} + \underline{G} + CA_{1>} L_1 + Ov._{1/\$}$

Genus:

Anther cells concealed by the overlapping connective and petals conniving at the concave base ..... ***Artabotrys* R.Br.**

D) MAGNOLIACEAE

Distinguishing Characters:

Trees or shrubs with large flowers having elongated thalamus on which spirally arranged stamens and apocarpous pistils are arranged.

Formula: $P_{>3} + A_{\$} + \underline{G} + Ca_{\$} + Ov._2$

Genus:

Deciduous stipules which are in pairs, perianth not differentiated into calyx and corolla which are deep yellow or orange in Colour, 3 or more seriate, stamens numerous, gynophore stipitate ..... ***Michelia champaca* (L.) Baill.ex pierre**

23. *ZINGIBERALES*

Families:

G) CANNACEAE

Distinguishing Characters:

Leaves are spirally arranged. There is only one stamen. All five staminodes also are petaloid.

Genus:

Petals are 3 bracts like structures below the false petals. they are fused together at the base and their margins are curved inwards. each flowers have 3 slightly false petals.3 sepals and their bases are also surrounded by a floral bract and bracteoate. Papery capsules, sub globose, mature brown-blackish seeds..... ***Canna* L.**

H) HELICONIACEAE

Distinguishing Characters:

Plants are similar to sterlitziaceae but there is only one ovule per locule, fruit schizocarpic, seeds not arillate and the median sepal posterior.

Genus:

Bisexual zygomorphic flowers, flowers subtended by brightly colored bracts, 5-stamens .....***Heliconia* L.**

I) STRELITZIACEAE

Distinguishing Characters:

Plants are rhizomatous banana like herbs with bisexual zygomorphic flowers. There are 5 stamens, many ovules in each locule, capsular fruits and arillate seeds.

Genus:

The flowers, which emerge one at a time from the spathe, 3 orange sepals, 3 purplish-blue/white petals. Two of the blue or white petals are joined together to form an arrow- like nectary..... ***Strelitzia reginae*** **Banks**

J) MUSACEAE

Distinguishing Characters:

Plants are perennial herbs with massive sympodial corm, spirally arranged leaves and sheathing leaf bases forming a pseudo stem. Inflorescence is a collection of monochasial cymes each in the axil of a boat shaped bract clustered to a cone-like structure. Flowers Irregular, apparently bisexual, functionally unisexual with 5 petaloid tapals fused and the remaining free one containing nectar, 5-fertile stamens, gynoecium of 3 carpels united to a trilocular inferior ovary containing many ovules in axile placentation. Ovules in many cases do not develop to seeds. Fruit fleshy.

Formula: $K_{3-5} + C_1 + A_5 + \bar{G} + L_3 + Ca_3 + Ov._{\$}$

Genus:

Leaves oblong, inflorescence pendulous, calyx tubular,3-5 lobed, corolla a single convex membranous petal as long as the calyx, stamens 5-perfect, anthers linear, ovary 3-locular, ovules many, style filiform, stigma sub globose.....***Musa paradisiaca*** **L.**

K) COSTACEAE

Distinguishing Characters:

Herbs with long leafy stems, rootstock tuberous, leaves oblong with broad sheaths, spirally arranged, acute or acuminate, glabrous above and silky pubescent beneath base rounded, Flowers in terminal heads, flowers white.

Formula: $K_3 + C_3 + A_1 + \bar{G} + CA_3 + L_3 + Ov._{\$}$

Genus:

Flowers white, in very dense spikes, bracteole solitary below the calyx, calyx short funnel shaped, teeth-3, corolla tube short, corolla lobes large, stamen 1-perfect, filament forming with the connective an oblong petaloid with the contiguous linear anther cells situated in its middle, lip large obovate with incurved margins. Ovary 3-celled, ovules many, axile placenta, style filiform, stigma with a semi linear marginally ciliate foveola.***Costus speciosus*** **(J. Konig) sm.**

L) ZINGIBERACEAE

Distinguishing Characters:

Aromatic oils, ligule, differentiation of calyx and corolla, labellum and the single stamen.

Formula: $K_3 + C_3 + A_1 + \bar{G} + CA_3 + L_3 + Ov._{\$}$

Genera:

Herbs with elongate leafy stems and horizontal rootstocks. Leaves oblong/lanceolate, flowers in terminal racemes or panicles, bracteoles large, calyx loosely tubular, 3-toothed, corolla tube cylindric, corolla lobes oblong, the upper usually broader and more convex than the lateral. Stamens 1-perfect, filament flattened, anther-cells diverging at the top, lip spreading, often orbicular with incurved margins, ovary 3-celled, ovules few or many on each placenta, style filiform, stigma sub globose .....***Alpinia calcarata*** **L.**

Herbs with short stems or stemless, rootstock often tuberous. Leaves 2 spreading horizontally, lying flat on the surface of the ground, leaves are rotund-ovate, deep green. Flowers the center of the plant between the leaves, fugacious, fragrant. Calyx as long as the outer bracts. Corolla lobes lanceolate pure white, petals 3, corolla –lobes equal, stamen 1- perfect, connective produced into a quadrate 2-lobed appendage, filament short, anther 2-celled, lip broad, usually 2-fid. Ovary 3-celled, ovules many on 3 axile placentas, style long, filiform, stigma turbinate..... .....***Kaempferia galanga*** **L.**

24. *RANUNCULALES*

Families:

E) RANUNCULACEAE

Distinguishing Characters:

Herbaceous habit, divided or compound leaves, reduced or modified petals, many stamens spirally arranged and apocarpous pistils.

Formula: $K_{3-\$} + C_{3-\$} + A_{\$} + \underline{G} + L_1 + Ca._{\$} + Ov._{1/\$}$

F) MENISPERMACEAE

Distinguishing Characters:

The unisexual flowers (dioecious plants in most cases), Lianous habit, calyx 3/6 (2 series) and corolla also of equal number, horse-shoe shaped seeds.

Formula:

For male flowers: $K_{3-6} + C_{3-6} + A_6 + G_0$

For female flowers: $K_{3-6} + C_{3-6} + St._{6/0} + \underline{G} + CA_{1/3-6} + L_1 + Ov._{1/\$}$

Genera:

Climbing shrubs, leaves cordate or truncate at the base. Flowers in axillary or terminal elongate racemes or panicles. Flowers yellow, the males fascicled, the females usually solitary, bracts lanceolate. **Male flowers:** sepals: 3 outer very small, ovate-oblong, acute, 3– inner larger, membranous, concave. Petals: each loosely embracing a stamen, claw cuneate, staamens-6, filaments free. **Female flowers:** petals oblong, with entire margins, staminodes -6, clavate, ovaries -3, stigmas forked, style-scar. Drupes 1-3 ***Tinospora cordifolia*** **Miers.**

Climbing or sarmentose shrubs, flowers in axillary, usually short panicles. Sepals 6, in 2-series, the inner larger. Petals-6, shorter than the sepals. **Male flowers:** stamens embraced by the petals; anthers sub globose. **Female flowers:** staminodes 6 or 0. Ovaries 3; styles usually cylindric. Fruit a Drupe, usually compressed..... .....***Cocculus* Dc.**

G) PAPAVERACEAE

Distinguishing Characters:

Plants are laticiferous herbs with lobed simple leaves, solitary large flowers bearing two caducous sepals, four to many petals, many stamens, syncarpous ovary containing many ovules in parietal placentation and a sessile stigma.

Formula: $K_2 + C_{4-\$} + A_\$ + \underline{G} + CA_{2-\$} + L_1 + Ov._\$$

Genus:

Herbs with yellow latex. Leaves inciso-pinnatifid, usually spinoso-dentate or rigidly setose, spiny on the margins, prickles very sharp yellow. Flowers terminal. Bracts foliaceous. Sepals 2-3, concave. Petals 4-6. Stamens indefinite. Ovary covered with soft spines; Ovary 1-celled; ovules many, on 4-7 parietal placentas, stigma 4-7 lobed, capsule oblong, short, dehiscing at the top by short valves..... .....***Argemone Mexicana* L.**

H) FUMARIACEAE

Formula: $K_2 + C_4 + A_6 + \underline{G} + CA_2 + L_1 + Ov._{2/2>}$

Genus:

Herbs. Stems and branches glabrous. Leaves multifid, glaucous, narrow-linear, acute, mucronate. Flowers white, pale rose with purple tips, bracts membranous. Sepals-2, small. Petals-4, the 2-outer dissimilar, the lower flate or concave, the upper spurred at the base. Stamens-6, diadelphous. Ovary 1-celled..... .....***Fumaria parviflora* Lam.**

25. *SAXIFRAGALES*

Families:

B) HAMAMELIDACEAE

Distinguishing Characters:

The plants are shrubs or trees with stellate hairs, simple leaves, bi/unisexual flowers.

Formula: $K_4 + C_5 + A_4 + St._{4-6} + \bar{G} + Ca._2 + L_2 + Ov._1$

Genus:

Shrubs or small trees. Leaves alternate, ovate, elliptic to obovate often tinged purple, densely valvate hairy, finely toothed to entire margin. Terminal raceme, bracts linear or lanceolate. Flowers stellately pubescent. Sepals-4, unequal, gamosepalous, light pin, ovate. Petals-5, red apex obtuse or rounded. Stamens-4, filaments very short, connective elongated into a horn, anthers ovoid, staminodes 4-6, scale-like, alternate with stamens. Carpels-2, ovary inferior, bilocular, one ovule per locule, axile placentation, stellately pubescent. 2-Styles, 2-Stigmas.....***Laropetalum chinense* (R.Br.) Oliv.**

26. *OXALIDALES*

Families:

B) OXALIDACEAE

Distinguishing Characters:

Herbs producing fleshy rhizomes or bulb like tubers having estipulate Palmately compound trifoliate leaves. Regular flowers. Calyx-5. Corolla-5. Stamens-10, obdiplostemonous with filaments connate at the base, (Monoadelphous). Pentalocular ovary. 5-styles.

Formula: $K_5 + C_5 + A_{10} + \underline{G} + CA_5 + L_1 + Ov._{\$}$

Genus:

A small procumbent herb, stems rooting, pubescent. Leaves Palmately 3- foliate, stipules small, oblong, adnate to the petiole, leaflets long, obcordate, cuneate at the base, sub sessile, glabrous with ciliate margins. Flowers axillary. Sepals-5, oblong-obtuse, hairy outside. Petals-5, yellow, oblong, rounded at the apex, emarginated, twice as long as the sepals. Stamens-10, free or united at the base. Ovary 5-celled, ovules 1-many in each cell, styles-5, stigma papillose. Capsule linear-oblong, 5-angled, shortly beaked .....***Oxalis corniculata* L.**

27. *MALPIGHIALES*

Families:

F) LINACEAE

Distinguishing Characters:

Plants are mostly herbs. Stamens 5 alternating with staminodes. Ovary 3-5 celled, ovules 1-2 in each locule.

Formula: $K_5 + C_5 + A_5 + St._5 + \underline{G} + L_{3-5} + Ov._{1-2}$

Genus:

Herbs sometimes sub frutescent, stems solitary or few, leaves linear-lanceolate, attenuated at both ends, acute at the apex. Flowers in corymbose panicles. Sepals: the two outer elliptic, acuminate with entire membranous margins; the 3 inner broader, acuminate, with ciliate margins, all strongly 3-nerved, the middle nerve alone reaching the apex. Petals blue, fugacious. Sepals-5, Petals-5, Stamens-5 alternating with minute or setiform staminodes. Ovary 5-celled, 2 ovules in each locule ..... ***Linum usitatissimum* L.**

G) MALPIGHIACEAE

Distinguishing Characters:

The plants are woody, opposite leaves and bi bracteolate flowers. Petiole has a pair of fleshy glands. Flowers are with sepals having a pair of abaxial glands near the base, clawed petals, and 10 stamens connate at the base. Gynoecium of 3 carpels partly fused. Ovule solitary per locule.

Formula: $K_5 + C_5 + A_{10} + \underline{G} + L_3 + Ca._3 + Ov._1$

Genus:

Stem cylindric, glabrous, leaves opposite, pair of gland at the leaf base which is obliquely arranged, glabrous leaves, acute apex. Two stipules alternately arranged, sepals alternate with petals, gamosepalous, calyx-5, apex tailed. Corolla polypetalous, yellow, clawed-shaped. Stamens10, anthers segeted, basifixed, red anthers, arranged in two whorls, outer one is large, inner one is small. Ovary is 3-locular, superior, one ovule in each locule, style absent, stigma-trifid, star-like capsule with wings..... ***Tristellateia australasiae*** **A.Rich**

H) OCHNACEAE

Distinguishing Characters:

Flowers are large with 5-sepals, many stamens with poricidal dehiscence and deeply lobed ovary raised on a disc or gynophore. Fruit is baccate with carpels separating into fleshy cocci.

Formula: $K_{4\text{-}5} + C_{4\text{-}12} + A_{10/\$} + \underline{G} + L_{1\text{-}10} + Ov._{1\text{-}2}$

Genus:

Glabrous trees or shrubs. Leaves alternate, oblong –lanceolate, elliptic, obovate, usually acute, finely serrulate. Flowers fragrant. Sepals-5 coriaceous, elliptic-oblong with close parallel veins. Petals 5-12, a little longer than the sepals. Stamens indefinite, deciduous; filaments very short; anthers long, linear, stamens inserted at the base of the disk. Styles completely combined, longer than the stamens. Ovary 1-10 celled, deeply 3-10 lobed, ovule solitary in each cell. Stigmas simple or capitate .....***Ochna squarrosa*** **L.**

I) PASSIFLORACEAE

Distinguishing Characters:

The climbing habit, axillary tendrils, corona, gynandrophore and the mucilaginous pulpy arils of seeds.

J) VIOLACEAE

Distinguishing Characters:

Zygomorphic flowers, spurred anterior petal. Stamens are basally connate; gynoecium is tricarpellary.

Formula: $K_5 + C_5 + A_5 + \underline{G} + L_1 + Ca._3 + Ov._{\$}$

Genus:

Herb, with many diffuse or ascending branches, glabrous or more or less pubescent. Leaves linear/lanceolate, sub sessile, entire or serrated margins. Stipules gland-tipped, bracts small. Sepals-5, long lanceolate, acute, keeled. Petals unequal, the 2 upper one's oblong, slightly longer than the sepals, the 2 lateral longer, falcate, the lowest much larger than the others, having an orbicular or obovate limb with a long claw which is curved behind into a short spur. Stamens -5. Ovary sessile, 1-celled, ovules many, on 3 parietal placentas, style clavate, stigma oblique. Capsules sub globose ..... ***Ionidium heterophyllum* vent.**

28. *FABALES*

Families:

E) FABACEAE

Distinguishing Characters:

This family is the most advanced group with a specialized Papilaonaceous flower, diadelphous/Monoadelphous stamens and vexillary aestivation.

Formula: $K_5 + C_5 + A_{10} + \underline{G} + CA_1 + L_1 + Ov._{\$}$

Genus:

A much-branched herb, leaves ovate-rhomboid, nerves prominent, stipules large, foliaceous, flowers in terminal/lateral, racemes, bracts linear-lanceolate. Calyx-membranous, tube short, campanulate, acute. Corolla long, bluish-purple/white. Anthers dimorphous. Ovary sessile, style long. Pods densely villous when young, softly pubescent when ripe. Seeds 10-15 .....***Crotolaria verrucosa*** **L.**

F) CAESALPINIACEAE

Distinguishing Characters:

Herbaceous habit, zygomorphic flowers, stamens 10 variously heteromorphic, fruit a legume or lomentum.

Formula: $K_5 + C_5 + A_{10} + \underline{G} + Ca._1 + L1 + Ov._{\$}$

Genus:

Annual herb, leaves long, rachis with a gland between each of the 2 lowest pairs of leaflets. Stipules long. Flowers sub sessile pairs in the axils of the leaves. Calyx 5, ovate acute. Petals 5, pale yellow, oblong, obtuse. Stamens-10, the 3 upper reduced to minute staminodes. Ovary sessile/stalked, ovules many, style short/elongate. Stigma terminal. Pods -5-8***Senna tora*** **(L.) Roxb.**

G) MIMOSACEAE

Distinguishing Characters:

This is a woody family with regular actinomorphic flowers and numerous stamens. leaves are bi/tripinnate having a pulvinus and the stipules are often modified to spines.

Formula: $K_5 + C_5 + A_{5\text{-}\$} + \underline{G} + Ca._1 + L1 + Ov._{2\text{-}\$}$

Genus:

The tree is armed with short straight stipular thorns. Leaves 2-pinnate, stipules various. Flowers usually in globose heads or cylindric spikes 5-merous. Calyx-5, corolla-5, stamens Monoadelphous, Ovary sessile/stalked, ovules many. The pods are curiously twisted and the seeds are embedded in a sweet whitish edible pulp....***Pithcellobium dulce*** **(Roxb.) Benth.**

H) POLYGALACEAE

Distinguishing Characters:

The apparent Papilaonaceous corolla, Monoadelphous stamens with poricidal dehiscence, crested petal and bilocular ovary.

Formula: $K_5 + C_{5/3} + A_8 + \underline{G} + CA_{2-3} + L_{1-3} + Ov._{1/>1}$

Genus:

Annual, usually branched from the base or nearly so; leaves narrow-linear; wings with a green midrib; capsule not margined. Flowers yellow in axillary/extra-axillary, few flowered racemes, bracts minute or hairy. Sepals unequal the 2 inner larger (wings) usually petaloid. Petals-3, united at the base with the stamina sheath, the lower one keeled and generally crested. Stamens -8, filaments united for their lower half into a split sheath. Ovary 2-celled; ovule 1 in each cell, pendulous. Capsule 2-celled, loculicidal, 2-seeded.....***Polygala erioptera*** **L.**

29. ***ROSALES***

Families:

B) ULMACEAE

Distinguishing Characters:

This family is distinguished by the stinging hairs, unilocular ovary with a single basal ovule and style and cymose inflorescences on short shoots.

Formula: $P_{(4-8)} + A_{(4-8)} + \underline{G} + CA_2 + L_1 + Ov._1$

Genus:

A large deciduous tree. Leaves elliptic, acuminate, glabrous, entire. Flowers usually male and hermaphrodite mixed in short racemes. Sepals-4. Stamens-4-8, filaments glabrous, anthers pubescent. Ovary pubescent, 1-celled, stalked, styles long. Samara nearly orbicular with reticulately veined wings..... .***Holoptelea integrifolia*** **(Roxb.) Planch.**

30. *MYRTALES*

Families:

C) COMBRETACEAE

Distinguishing Characters:

This family is distinguished by inferior unilocular ovary with 4-6 pendulous ovules. The wings on the fruit in some plants are also distinctive.

Formula: $K_{4\text{-}5} + C_{0/4\text{-}5} + A_{5\text{-}10} + \bar{G} + CA_{2\text{-}5} + L_1 + Ov._{1\text{-}7}$

Genus:

Shrubs or small trees. Leaves alternate, midrib prominent, pink; petiolate, entire. Flowers small, yellow, in dense globose axillary heads. Calyx-tube pubescent; broadly triangular. Calyx-tube compressed, 2-winged, produced above the ovary; limb campanulate/ureolate, 5-fid. Petals-0. Stamens-10, biseriate, anthers small, cordate. Ovary inferior, 1-celled, ovules-2, pendulous, style filiform, stigma simple. Fruit packed in dense heads, small, 2-winged, fruit (with wings) longer than broad; wings with entire margins; peduncles branched. One seeded.....***Anogeissus latifolia*** **wall.**

D) LYTHERACEAE

Distinguishing Characters:

The family is distinguished by hypanthium, superior ovary and many stamens.

Formula: $K_{3\text{-}6} + C_{3\text{-}6} + A_{\$} + \underline{G} + CA_{2\text{-}\$} + L_{1\text{-}6} + Ov._{\$}$

Genus:

Annual herbs, stem usually 4-gonous. Leaves opposite, sessile, linear-oblong, leaves narrowed at the base. Flowers in dense axillary clusters or short cymes. Calyx long, tube hemispheric, teeth-4, calyx 3-6. Petals -3-7 or 0. Stamens 2-8, inserted in the middle of the calyx-tube. Filaments filiform. Ovary superior, 1-5 celled, ovules-many. Capsule globose, red***Ammania baccifera*** **L.**

31. *SAPINDALES*

Families:

D) SIMAROUBACEAE

Distinguishing Characters:

Trees and shrubs with alternate pinnately compound leaves, unequal sided leaflets. Flowers are mostly unisexual.

Formula: $K_{3-5} + C_{3-5} + A_{10/>10} + \underline{G} + L_{1-6} + Ov._{1}$ (FEMALE FLOWER)

Genus:

Trees. Leaves alternate, pinnate, leaflets alternate/sub-opposite, leaflets coarsely toothed. Flowers in terminal/axillary. Calyx-5-fid. Petals-5. Disk-10 lobed. Stamens-10 in the male, 2-3 in the hermaphrodite and 0 in the female flowers. Filaments very short or filiform, filaments shorter than the anthers. Ovary 2-5 partite, ovule-1, styles connate. Fruit Samaras 1-5, large, membranous.....*Ailanthus excelsa* **Roxb.**

E) BURSERACEAE

Distinguishing Characters:

The aromatic leaves, resin ducts in the bark. Leaves are pinnately compound having a winged rachis. Flowers are polygamous.

Formula: $K_{3-5} + C_{3-5} + A_{10/10>} + \underline{G} + CA_{3-5} + L_{2-5} + Ov._{2}$ (FEMALE FLOWER)

Genus:

Trees usually with papery bark. Leaves alternate, deciduous, imparipinate, leaflets opposite, usually serrate. Flowers hermaphrodite, small, white, axillary racemes or panicles. Calyx small, 5-toothed, persistent. Petals-5, narrowed at the base. Disk annular. Stamens-10, alternately long and short, inserted at the base of the disk. Ovary sessile, 3-celled; ovules -2 in each cell, pendulous, style short, stigma 3-lobed. Drupe trigonous .... ***Boswellia serrata***

F) ANACARDIACEAE

Distinguishing Characters:

The plants are mostly evergreen trees or shrubs with resinous bark and generally sticky leaves due to resinous glands. Compound leaves. Flowers mostly unisexual.

Formula: $K_{3-5} + C_{3-5} + A_{1/1-10} + \underline{G} + CA_{1-5} + L_{1/1-6} + Ov._{1}$

Genus:

Trees. Leaves alternate, simple, leaves thickly coriaceous. Flowers sessile, greenish-white, terminal/axillary, bracts small, caduceus. Calyx –lobes short, ovate, ciliate, 3-5 toothed. Petals ovate-oblong, 4-5. Stamens-10, a little shorter than the petals, filaments flattened, anthers about as long as the filaments. Ovary-1 perfect, villous, the other 4 are reduced to cylindrical filaments. Drupe small.....*****Buchanania Lanzan*** **Spreng.**

32. *MALVALES*

Families:

F) BIXACEAE

Distinguishing Characters:

Palmately veined stipulate leaves and large flowers, stamens many, ovary penta-carpellary with intruded placenta. Seeds are often colored.

Formula: $K_{4-5} + C_{4-5/0} + A_{\$} + \underline{G} + L_1 + Ov._{2-\$}$

Genus:

A small evergreen tree. Leaves ovate, glabrous on both surfaces, entire. Flowers bisexual, terminal, panicled. Pedicels 5-glandular beneath the calyx. Sepals-5, deciduous, the two smaller concave, the three larger oblong. Petals-5, large, white/pink, obovate. Stamens many, anthers oblong. Ovary 1-celled, ovules many on 2-parietal placentas. Style curved, stigma very shortly 2-lobed. Capsule loculicidally 2-valved .....***Bixa orellana* L.**

G) MALVACEAE

Distinguishing Characters:

The family can be easily distinguished by the epicalyx, stamens Monoadelphous and many, ovary pentalocular with many ovules.

Formula: $K_5 + C_5 + A_{\$} + \underline{G} + L_{2-5} + Ca._{2-5} + Ov._{1/1>}$

Genus:

Shrubby, much branched. Leaves lanceolate, sharply serrate, glabrous on both sides. Calyx lobes triangular, acute, Sepals-5. Corolla nearly twice as long as the calyx, yellow, petals connate at base and with the stamina tube. Staminal tube divided at the top into numerous antheriferous filaments. Ovary 5-12 cells; carpels 5-9, ovule 1 in each cell, pendulous, styles as many as the carpels, stigmas terminal. Fruit globose ..... ***Sida acuta* Burm.f.**

H) BOMBACACEAE

Distinguishing Characters:

This family is easily identified by the flowers are large and showy, Polyadelphous androecium, woody capsule.

Formula: $K_{3-5} + C_5 + A_{\$} + \underline{G} + CA_{2-5} + L_5 + Ov._{\$}$

Genus:

A tree, leafless in the hot season, trunk unarmed. Leaves glabrous, petioles longer than the leaflets, leaflets 7-9, glabrous, obovate, acuminate. Pedicels solitary or clustered, 1-flowered. Calyx long truncate or slightly 2-lobed, densely silky hairy within. Corolla showy, scarlet or white, petals-5, stellately tomentose outside. Stamens indefinite, inserted at the base of the calyx, Staminal bundles consisting of 50 or more unequal filiform filaments, united into 5 bundles opposite to the petals. Ovary ovoid, 5-celled, many ovules, stigma 5-lobed. Capsule oblong, loculicidally 5-valved ..... ***Bombax insigne* Wall.**

I) STERCULIACEAE

Distinguishing Characters:

The members of this family are tall trees with simple or Palmately lobed or digitate leaves. Flowers are unisexual or polygamous and borne in panicles.

Formula: $K_{4-5} + C_{0/5} + A_5 + St._{0/5} + \underline{G} + L_{4-5} + Ov._{2-\$}$ (FEMALE FLOWER)

Genus:

Large tree, trunk erect. Leaves shallowly Palmately lobed, glabrous above, velvety beneath, lobes-5, caudate-acuminate, base cordate. Flowers yellow, hermaphrodite or female mixed with many males. Calyx campanulate, hairy on both surfaces. Calyx 4-5 fid. Petals-0. Male flowers: staminal column short, filaments 10. Bisexual flowers: carpels usually 5, a short gynophore, style short, thick, hairy, stigmas-5. Stamens in a ring round the carpels***Sterculia urens* Roxb.**

J) TILIACEAE

Distinguishing Characters:

The family is distinguished by stellate hairs, free stamens and pentacarpellary ovary.

Formula: $K_{3-5} + C_{3-5} + A_{\$} + \underline{G} + CA_{2-\$} + L_{2-10} + Ov._{2-\$}$

Genus:

A shrub. Leaves ovate-elliptic, acuminate, crenate-serrate, glabrous. Flowers small axillary/terminal cymes. Sepals-5. Petals-5, gland exceeding half the petal. Stamens numerous, inserted on a turbinate often glandular torus. Ovary 2-4 celled, ovules 2-many in each cell, style subulate, stigma short, 2-5 lobed.....***Grewia orientalis* L.**

33. *BRASSICALES*

Families:

D) MORINGACEAE

Distinguishing Characters:

The plants are soft stemmed trees with compound leaves, perigynous irregular flowers. Sepals-5. Petals-5 dissimilar. Stamens-5 (many staminodes) and a Tri-carpellary ovary. Seeds 3-winged.

Formula: $K_5 + C_5 + A_5 + St._{5-7} + \underline{G} + Ca._3 + L_1 + Ov._{\$}$

Genus:

A fast growing, deciduous tree. leaves alternate, 2-pinnate, the pinnae and pinnules imparipinate, opposite, leaflets opposite. Sepals-5. Petals-5. Stamens-5, inserted on the edge of the disk, declinate, 5-perfect opposite the petals alternating with staminodes. Ovary 1-celled, tri-carpellary, parietal placentation. Ovules numerous. Capsule elongate, seeds 3-winged.....***Moringa oleifera* Lam.**

E) SALVADORACEAE

Distinguishing Characters:

The plants are small trees with a slightly gamopetalous. gynoecium bicarpellary, superior uni/bi-locular ovary containing 1-2 ovules.

Formula: $K_4 + C_4 + A_4 + \underline{G} + CA_{1-2} + L_{1-2} + Ov._{1-2}$

Genus:

A large much-branched evergreen shrub or small tree. Leaves fleshy, glaucous. Flowers greenish-yellow, in axillary/terminal. Bracts ovate. Sepals-4. Petals-4. Stamens-4, stamens shorter than corolla. Ovary 1-celled, ovule solitary, style very short, stigma broad. Drupe globose .....***Salvadora persica* L.**

F) BRASSICACEAE

Distinguishing Characters:

Herbaceous habit, leaves are mostly pinnately dissected. Flowers bisexual, regular and tetramerous borne in racemes. stamens ate tetradynamous.

Formula: $K_4 + C_4 + A_6 + \underline{G} + CA_2 + L_2 + Ov._{\$}$

Genus:

An Herb. Leaves are pinnately dissected. Flowers bisexual, yellow. Sepals-4. Petals-4, cruciferous corolla. Stamens are tetradynamous, stamens-6 (2-seriate), 2-outer opposite the lateral sepals, the 4 inner larger in pairs opposite the other sepals. Ovary 2-celled, by a septum joining the placentas, ovules many, 1-2 seriate, on 2 parietal placentas. Style short. Fruit 2-valved pod, leaving the seeds on the replum. .....***Brassica juncea* (L.) Czern.**

34. *SANTALALES*

Families:

C) SANTALACEAE

Distinguishing Characters:

Hemi parasitic attaching to the roots of other plants. The leaves are generally small, flowers small with 4-5 tepals fused to form fleshy calyx cup, stamens opposite the tepals and a gynoecium of 3 carpels.

Formula: $P_{4-5} + A_{4-5} + \bar{G} + Ca._{3} + L_{1} + Ov._{2-3}$

Genus:

A small tree with drooping branches. Leaves elliptic-lanceolate, subacute, glabrous, entire. Flowers brownish-purple, in axillary/terminal cymes. Perianth campanulate, limb of 4 segments. Stammens-4, exserted, alternating with 4 scales. Ovary half-inferior, unilocular, tri-carpellary with 2-3 ovules. Style elongate, stigma 2-3 lobed. Drupe globose***Santalum album*** **L.**

D) LORANTHACEAE

Distinguishing Characters:

Plants are epiphytic shrubs. Simple leaves. large and showy flowers. Calyx cup-shaped, Petals 5-6, stamens opposite to petals.

Formula: $K_{4-6} + C_{4-6} + A_{4-6} + \bar{G} + Ca._{3-4} + L_{1} + Ov._{1}$

Genus:

A large bushy branch parasite. Leaves coriaceous, opposite, ovate, elliptic, obtuse, mid-rib prominent. Flowers axillary. Calyx long, tube cylindric, 5-toothed. Corolla scarlet/orange/pink/white, lobes-5. Anthers linear. Stamens as many as and opposite to corolla lobes. Ovary inferior, 1-celled, ovule solitary, erect, style slender. Fruit a berry***Loranthus longiflorus*** **Desr.**

35. *CARYOPHYLALES*

Families:

E) AMARANTHACEAE

Distinguishing Characters:

This family having scarious and membranous perianth and filaments connate below and the staminal tube often resembling a small sympetalous corolla.

Formula: $P_5 + A_{1-5} + \underline{G} + CA_{2-3} + L1 + Ov._{1/1>}$

F) NYCTAGINACEAE

Distinguishing Characters:

This family is distinguished by the colored bracts, unequal stamens, unicarpellate pistil and the persistent calyx base in fruit.

Formula: $P_{3-5} + A_{5-\$} + \underline{G} + Ca._1 + L_1 + Ov._1$

G) PLUMBAGINACEAE

Distinguishing Characters:

Family having calyx 5-10 ribbed, gamopetalous corolla, stamens-5, Ovary pentacarpellary with one ovule. Styles-5.

Formula: $K_5 + C_5 + A_5 + \underline{G} + Ca._5 + L_1 + Ov._1$

Genus:

A perennial herb. Leaves ovate, entire, subacute. Calyx long, narrowly tubular, persistent densely covered with glandular with stalked glands. Teeth small, with membranous margins, calyx 5-toothed. Corolla white, tube long, with equal or slightly unequal entire lobes. obovate-oblong, acute. Stamens-5, anthers linear-oblong, anthers exserted. Ovary pentacarpellary, unilocular with one ovule. Capsule oblong ..... ***Plumbago zeylanica* L.**

H) TAMARICACEAE

Distinguishing Characters:

The plants are small trees with sinuous branches, scale like small alternate leaves and minute flowers in spike like racemes.

Formula: $K_5 + C_5 + A_{5-\$} + \underline{G} + CA_{2-5} + L_1 + Ov._{2-\$}$

Genus:

A shrub. Leaves minute, scale-like, ovate-lanceolate, acuminate. Flowers terminal racemes. Sepals-5, ovate-elliptic with white membranous margins. Petals-5, rose-colored, elliptic-obovate, with minutely denticulate margins. Stamens-10, alternately long and short, glands of the disc separating the filaments. Ovary 1-locular with 2-many ovules, Styles-3, short ..... ***Tamarix ericoides*** **Rottler & Willd.**

36. *ERICALES*

Families:

D) BALSAMINACEAE

Distinguishing Characters:

Zygomorphic flowers, very peculiar androecial situation and coherence of anther about the ovary and stigma and elastic dehiscence of capsule.

Formula: $K_5 + C_5 + A_5 + \underline{G} + Ca._5 + L_5 + Ov._1$

E) EBANACEAE

Distinguishing Characters:

A dioecious tree. Simple leaves covered by hairs. Flowers small.

Formula:

Male flower: $K_{3-7} + C_{3-7} + A_{3-7}/\$ + G_0$

Female flower: $K_{3-7} + C_{3-7} + St._{<3-7} + \underline{G} + CA_{3-8} + L_{4-10} + Ov._{1-\$}$

Genus:

Trees or shrubs. Leaves alternate. Flowers dioecious. Calyx gamosepalous, 3-7 fid, pubescent. Corolla pubescent, lobes 3-7. **Male flowers:** stamens 4-many, attached to the base of the corolla, filaments in pairs, anthers linear/lanceolate. Ovary rudimentary or 0. **Female flowers:** Staminodes 0-16. Ovary globose, 4-10 celled, ovules solitary in each cell, styles 1-4. Fruit globose, supported by the calyx..... ***Diospyros*** **Linn.**

F) PRIMULACEAE

Distinguishing Characters:

Herbs with pentamerous flowers and pentacarpellary unilocular ovary having free central placenta.

Formula: $K_5 + C_5 + A_5 + \underline{G} + CA_5 + L_1 + Ov._{\$}$

Genus:

Annual herb. Stem and branches 4-gonous, glabrous. Leaves sessile, opposite, ovate, acute, glabrous, entire, gland-dotted. Flowers axillary, solitary. Calyx long, segments narrow, lanceolate, acuminate, calyx 5-partite. Corolla 5-partite, rotate/ infundibuliform. Stamens -5, inserted at the base of the corolla, filaments filiform, villous. Ovary globose, ovules many, style simple, stigma obtuse..... ..... ***Anagallis arvensis* Linn.**

37. *GENTIANALES*

Families:

B) APOCYNACEAE

Distinguishing Characters:

Absence of Gynostegium, the pollen grains distinct (not in pollinia).

Formula: $K_5 + C_5 + A_5 + \underline{G} + CA_2 + L_{1-2} + Ov._{2-\$}$

Genus:

A tall tree with milky juice, branches whorled. Leaves 4-7 in a whorl, oblong-lanceolate, obtuse or bluntly acuminate, dark green above pale and covered with a whitish bloom beneath. Flowers greenish-white, in umbellately branched, many flowerd pubescent capitate cymes, bracts oblong pubescent. Calyx 5-lobed, long, pubescent, oblong, obtuse, ciliate. Corolla hypocrateriform, tube cylindric, corolla tube long villous inside the mouth with a ring of hairs.

Stamens near the top of the tube, anthers free, subacute. Carpels pubescent, 2, ovules many in each carpel, style filiform, stigma minute or 2-fid. Follicles-2, long***Alstonia scholaris*** **R.Br.**

38. *LAMIALES*

Families:

E) ACANTHACEAE

Distinguishing Characters:

Presence of floral bracts and bracteoles, usually bilabiate corollas associated with the bilocular ovary and presence of retinacula in some genera.

Formula: $K_5 + C_5 + A_{2/4} + \underline{G} + CA_2 + L_2 + Ov._{1/\$}$

Genus: Distinguishable characters of *Barleria* sp.

Bark with white-dotted swollen lines. White flowers, solitary, short internode, at the top inflorescence, glandular calyx .....***Barleria lawii*** **T. Anders.**

Leaves ovate, glabrous, large bracteoles-2, bract minute, disc prominent.....***Barleria grandiflora*** **Dalzell**

Pungent smell from leaves. Leaves are villous.....***Barleria acuminata*** **Nees**

Stem bark are same as *B. lawii*. Flowers are yellow. Anthers are longer than *B. lawii*. Anther filament slightly attached to anther.....***Barleria prionitis*** **L.**

F) OROBANCHACEAE

Distinguishing Characters:

This family is distinguished by root parasites. Leaves reduced to scales and flowers borne on terminal spikes or racemes. Gynoecium of 2 carpels, syncarpous unilocular ovary with many ovules.

Formula: $K_{4-5} + C_5 + A_4 + \underline{G} + Ca._2 + L_1 + Ov._{\$}$

Genus:

Scapigerous scaly herbs, stem simple or branched, scales acute. Flowers in dense spikes or racemes. Bracts scale-like, bracteoles 2/0. Calyx unequally 4-fid or 2-partite, segments entire or 2-fid with rarely a 5th tooth or segment. Corolla 2-lipped, upper lip erect, 2-fid; lower 3-lobed. Stamens -4, didynamous, anther cells parallel. Ovary 1-celled with man ovules, style simple, stigma funnel-shaped or 2-lobed..... ***Orobanche aegptiaca*** **Pers.**

G) PLANTAGINACEAE

Distinguishing Characters:

Scapigerous herbs. Leaves usually radical. Scapes axillary. Flowers small, spicate. Corolla scarious.

Formula: $K_4 + C_4 + A_4 + \underline{G} + CA_2 + L_{1-4} + Ov._{1-8}$

GENERA:

Scapigerous herbs. Leaves usually radical. Scapes axillary. Flowers small, greenish, spicate. Sepals-4, persistent, elliptic, obtuse, concave, scarious. Corolla lobes rounded, concave, obtuse, apiculate, glabrous, lobes-4. Stamens-4, filaments filiform, persistent, anthers large, versatile. Ovary 1-4 celled, ovules 1-8 in each celled ..... ***Plantago ovate*** **Forsk.**

H) VERBENACEAE

Distinguishing Characters:

Flowers are zygomorphic, calyx-5 with unequl lobes, mostly bilabiate corolla, stamens didynamous and gynoecium of 2 carpels.

Formula: $K_{4-5} + C_{4-5} + A_4 + \underline{G} + CA_2 + L_{2-4} + Ov._2$

Genus:

Herbs or shrubs. Leaves elliptic, obtuse or acute, coarsely serrate, glabrous. Flowers sessile, long, spikes. Calyx long, membranous, tubular, teeth-4, acute. Corolla deep blue/pink, glabrous, 5-lobed. Perfect stamens 4, filaments hairy below. Ovary 2 celled, ovule solitary in each cell, style long, filiform..... .....***Stachytarpheta indica*** **(L.) Vahl, Enum.**

39. ***SOLANALES***

Families:

C) CONVOLVULACEAE

Distinguishing Characters:

Presence of plaited corolla, the erect sessile ovules with axile placentation.

Formula: $K_5 + C_5 + A_5 + \underline{G} + CA_2 + L_{1-4} + Ov._2$

Genus:

A perennial herb with a small woody branched rootstock. Leaves numerous, elliptic-oblong, obtuse, strongly apiculate, acute at the base, densely covered with silky hairs. Flowers light blue solitary/2. Calyx densely silky, Sepals-5, long, lanceolate, very acute. Corolla infundibuliform /subrotate., Limb plicate. Stamens-5. Ovary 2-celled, ovules-4, styles-2, distinct from the base, each cleft into 2 linear or subclavate stigmas. Capsule-2 valved .....***Evolvulus alsinoides*** **Linn.sp.**

D) SOLANACEAE

Distinguishing Characters:

This family distinguished by the actinomorphic corolla, the typically 4 or 5 stamens, the usually plicate corolla.

Formula: $K_5 + C_5 + A_5 + \underline{G} + CA_2 + L_2 + Ov._{\$}$

Genus:

Annual branched herb with large green leaves and long, trumpet-shape, white-pinkish flowers. The lower leaves are the largest, short-stalked, oblong-elliptic, shortly acuminate at the apex, decurrent at the base, the upper one sessile and smallest. In terminal many flowered inflorescences. Calyx-5 narrowly triangular lobes. Petals-5. Stamens-5. Ovary superior, ovules many on swollen placenta..... .....***Nicotiana tabacum* L.**

40. *BORAGINALES*

Families:

C) BORAGINACEAE

Distinguishing Characters:

The family is distinguished by actinomorphic flowers, anthers connivent into a cone, connectives much produced, twisted at the apex, ovary 4-lobed,

Formula: $K_5 + C_5 + A_5 + \underline{G} + CA_2 + L_4 + Ov_1$

Genus:

Annual, erect, much-branched. Leaves variable, sessile, ovate, obtuse, clothed above with stiff hairs springing from white tubercles, less hairy and villous beneath. Flowers pale violet-blue, solitary and leaf-opposed and in terminal few-flowered cymes. Calyx long, hispid with long hairs, sepals-5. Corolla infundibuliform, thinly hairy inside, petals-5. Stamens-5, cone of anthers large and very pointed, clothed on the back with dense white hairs. Anthers included with a few hairs at the base, inserted on the corolla tube, the produced connectives linear. Ovary ovoid, 4-lobed, ovules sub horizontal, style long, 4 nutlets.....***Trichodesma indicum* R.Br.**

D) CORDIACEAE

Distinguishing Characters:

The family is distinguished by simple rough leaves, helicoid cymes, regular corolla with scales and style twice-forked and 4 nutlets.

Formula: $K_5 + C_{4-8} + A_{4-8} + \underline{G} + CA_2 + L_4 + Ov._1$

Genus:

A deciduous tree. Leaves alternate, broadly ovate, obtuse, entire or the margins more or less sinuate-dentate, glabrous and more or less scabrous above base rounded or cordate. Calyx long, inside pubescent, 5-lobes. Corolla tube as long as the calyx, lobes-5, oblong, obtuse. Stamens-5, filaments hairy at the base. Ovary 4-celled, ovule solitary in each cell, erect, style terminal, elongate, bipartite, the branches again bipartite, stigma capitate. Drupe ovoid .....***Cordia Myxa*** **L.**

ADVANTAGES OF BRACKETED KEYS OVER OTHER KEYS:

In the present studies bracketed keys were preferred owing to its more acceptability in present day scenario. (Smith, 2014; Bhatt, 2020).

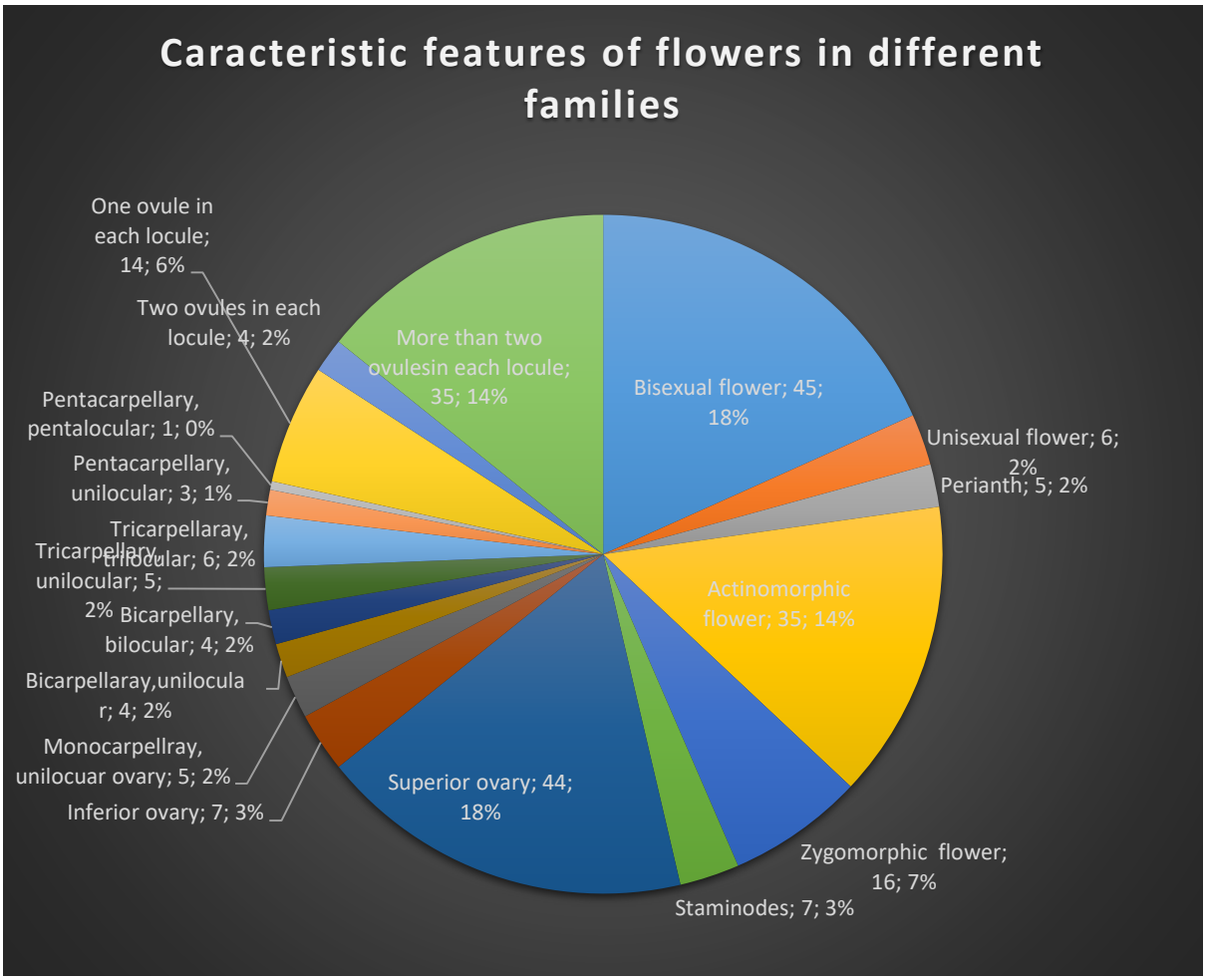
- When properly constructed one can quickly and easily run through this key both forward and backward. It is also more economical in terms of space because it is an un-indented.
- Here the two leads of the same couplet are always directly below each other. This has the advantage that it is very easy to compare the two alternatives, but on the other side the couplets need to be numbered in some way so that we know where we have go to next.
- It keeps the two leads of every couplet and easier for comparision.
- Utilise the space in each page efficiently and so they are cheaper to print.
- They will group taxa.
- In this case, numbering system must be present in choice of couplet. The choices can be easily separated and this is most helpful if previous couplet is there.

The analysis of floral formula in relation to families showed that of the:

- Out of 51 families 45 families were having bisexual flower.
- 6 families (Simaroubaceae, Menispermaceae, Burseraceae, Sterculiaceae, Ebenaceae, Ulmaceae.) showed Unisexual flower
- 5 families (Aristolochiaceae, Ulmaceae, Santalaceae, Amaranthaceae, Nyctaginaceae.) were represented by perianth
- 35 families had actinomorphic flower
- 16 families had zygomorphic flower
- Staminodes were present in 7 families (Menispermaceae, Hamamelidaceae, Linaceae, Sterculiaceae, Moringaceae, Ebanaceae, Cannaceae.)
- 44 families had superior ovary
- 7 families had inferior ovary
- 5 families (Fabaceae, Ceasalpinaceae, Mimosaceae, Piperaceae, Nyctaginaceae) had monocarpellary, Unilocular ovary
- 4 families (Hamamelidaceae, Brassicaceae, Acanthaceae, Solanaceae,) had bicarpellary, bilocular ovary
- 4 families (Fumariaceae, Ulmaceae, Salvadoraceae, Orobancaceae.) had bicarpellary, unilocular ovary
- 4 families (Violaceaea, Moringaceae, Santalaceae, Loranthaceae.) had tricarpellary, Unilocular ovary
- 6 families (Zingiberaceae, Costaceae, Cannaceae, Strelitziaceae, Musaceae, Malpighiaceae) had tricarpellary, trilocuar ovary
- 3 families (Oxaliaceae, Plumbaginaceae, Primulaceae) had pentacarpellary, unilocular ovary

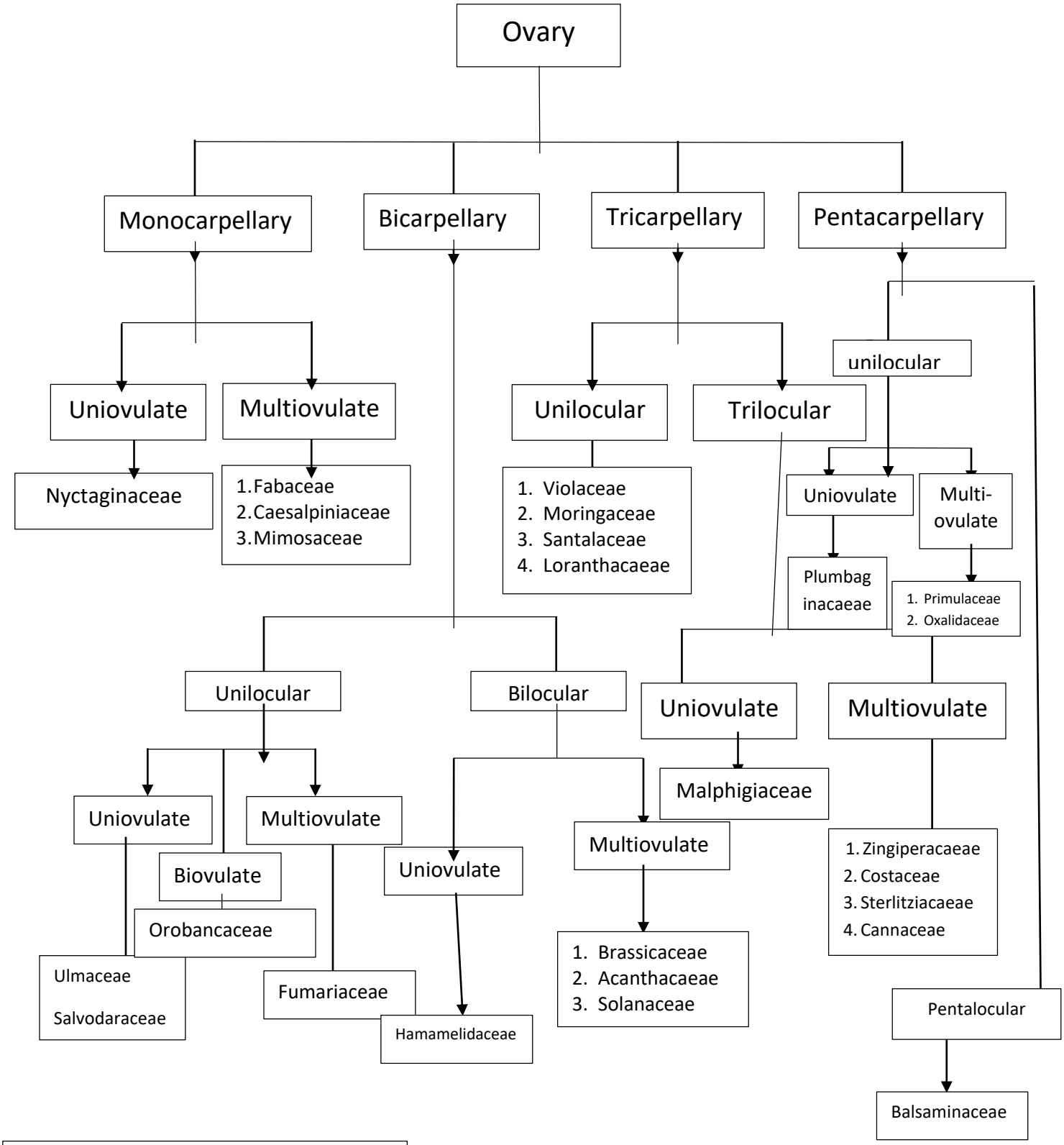
- 1 family (Balsaminaceae) had pentacarpellary, pentalocular ovary
- 14 families had one ovule in each locule
- 4 families (Linaceae, Burseraceae, Verbenaceae, Convolvulaeae) had two ovules in each locule.
- 35 families had more than two ovules in each loculse

Chart 1: Pie chart:



Characteristic features of flowers	Families
Bisexual flower	45
Unisexual flower	6
Perianth	5
Actinomorphic flower	35
Zygomorphic flower	16
Staminodes	7
Superior ovary	44
Inferior ovary	7
Monocarpellary, unilocular ovary	5
Bicarpellary, unilocular ovary	4
Bicarpellary, bilocular ovary	4
Tricarpellary, unilocular ovary	4
Tricarpellary, trilocular ovary	6
Pentacarpellary, unilocular ovary	3
Pentacarpellary, pentalocular ovary	1
One ovule in each locule	14
Two ovules in each locule	4
More than two ovules in each locule	35

CLASSIFICATIONS OF FAMILIES BASED ON CARPELS, LOCULES AND OVULES



***Multiovulate**: More than one ovule

Table 5. PLANT SPECIES OF THE BOTANICAL GARDEN AND ARBORETUM

SR. NO.	SPECIES	FAMILY	OCCURRENCE
1	*Abelmoschus moschatus* Medic. Syn. *Hibiscus abelmoschus* L.	Malvaceae	ARB
2	*Abrus precatorious* L.	Fabaceae	ARB, BG
3	*Abutilon glaucum* (Cav.) Sw. Syn. *Abutilon muticum* G. Don	Malvaceae	ARB
4	*Abutilon indicum* Sweet. Syn. *Sida indica* L.	Malvaceae	ARB, BG
5	*Acacia auriculiformis* A. Cunn *ex* Benth.	Mimosaceae	ARB
6	*Acacia chundra* Willd. Syn. *A. catechu* var. *sundra* Prain.	Mimosaceae	ARB
7	*Acacia nilotica* (L.) Del subsp. *indica* (Benth.) Brenan. Syn. *A. nilotica* (L.) Del., *A. arabica* Willd.	Mimosaceae	ARB
8	*Acacia pennata* Willd.	Mimosaceae	ARB
9	*Acalypha ciliata* Forsk.	Euphorbiceae	ARB
10	*Acalypha hispida* L.	Euphorbiceae	ARB
11	*Acalypha indica* L.	Euphorbiceae	ARB
12	*Acalypha wilkesiana* Muell.	Euphorbiceae	BG

SR. NO.	SPECIES	FAMILY	OCCURRENCE
13	*Achyranthes aspera* L.	Amaranthaceae	ARB
14	*Acorus calamus* L.	Araceae	ARB
15	*Adansonia digitata* L.	Bombacaceae	ARB
16	*Adenanthera pavonia* L.	Mimosaceae	ARB
17	*Adenium obesum* (Forssk.) Roem. & Schult.	Apocynaceae	BG
18	*Adhatoda vasica* Nees. Syn. *Justicia adhatoda* L.	Acanthaceae	ARB
19	*Adina cordifolia* Hook. f. *ex* Brandis	Rubiaceae	ARB
20	*Aegle marmelos* Corr.	Rutaceae	ARB
21	*Aerva lanata* (L.) Juss. Syn. *Achyranthes lanata* L.	Amaranthaceae	ARB
22	*Aganosma caryophyllata* G. Don.	Apocynaceae	BG
23	*Agave americana* L. Syn. *A. augustifolia* Haw.	Liliaceae	ARB
24	*Ageratum conyzoides* L.	Asteraceae	ARB
25	*Ageratum houstonianum* Mill.	Asteraceae	FS
26	*Ailanthus excelsa* Roxb.	Simarubaceae	ARB
27	*Alangium salvifolium* (L.f.) Wang.	Alangiaceae	ARB
28	*Albizia julibrissin* Durazz.	Mimosaceae	BG

SR. NO.	SPECIES	FAMILY	OCCURRENCE
29	*Albizzia amara* Boiv.	Mimosaceae	BG
30	*Albizzia lebbek* Benth. Syn. *Mimosa lebbeck* L.	Mimosaceae	ARB
31	*Albizzia procera* (Roxb.) Bth.	Mimosaceae	BG
32	*Alhagi pseudoalhagi* Desv. Syn. *Alhagi camelorum* Fisch.	Fabaceae	ARB
33	*Allamanda cathartica* L. var. *hendersonii* Bailey.	Apocynaceae	BG
34	*Allium cepa* L.	Liliaceae	ARB
35	*Allium sativum* L.	Liliaceae	ARB
36	*Aloe barbadensis* MilL. Syn. *A. vera* auct.	Liliaceae	ARB
37	*Alpinia nutans* (L.) Roscoe. Syn. *A. speciosa* Schum.,	Zingiberaceae	ARB
38	*Alstonia scholaris* R. Br.	Apocynaceae	ARB
39	*Alternanthera bettzickiana* (Regel) G. Nicholson	Amaranthaceae	BG
40	*Alternanthera pungens* H. B. & K. Syn. *Alternanthera repens* (L.) Link.	Amaranthaceae	ARB
41	*Alternanthera sessilis* (L.) DC. Syn.*Gomphrena sessilis* L.	Amaranthaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
42	*Alysicarpus longifolious* (RottL. Ex. Spr.) Wight & Arn.	Fabaceae	ARB
43	*Alysicarpus racemosus* Benth. Syn. *A. belgaumensis* var. *racemosus* Baker.	Fabaceae	ARB
44	*Alysicarpus vaginalis* (L.) DC. Syn. *Hedysarum cylindricum* Poir.	Fabaceae	ARB
45	*Amaranthus caudatus* L.	Amaranthaceae	ARB
46	*Amaranthus hybridus* L. var. *paniculatus* (L.) Thell.	Amaranthaceae	ARB
47	*Amaranthus spinosus* L.	Amaranthaceae	ARB
48	*Amaranthus tricolor* L. var. *tristis* (Prain) Nayar. *et al.* Syn. *Amaranthus gangeticus* L.	Amaranthaceae	ARB
49	*Amaranthus virdis* L. Syn. *Amaranthus gracilis* Desf.	Amaranthaceae	ARB
50	*Amberboa ramosa* (Roxb.) Jeffrey *Syn. Carduus ramosum* Roxb.	Asteraceae	ARB
51	*Ammania baccifera* L. Syn. *A salicifolia* Hiern.	Lythraceae	ARB
52	*Amorphophallus campanulatus* (Roxb.) Bl. *ex* Decne.	Araceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
53	*Ampelocissus latifolia* L.	Vitaceae	ARB
54	*Anacardium occidentalis* L.	Anacardiaceae	FS, ARB
55	*Andrographis echioides* (L.) Nees.	Acanthaceae	ARB
56	*Andrographis paniculata* (Burmf.) Wall.	Acanthaceae	ARB
57	*Anethum graveolens* L. Syn. *Peucedanum graveolens* Benth & Hk.	Apiaceae	ARB
58	*Anisochilus carnosus* Wall.	Lamiaceae	ARB
59	*Anisomeles heyneana* Bth.	Lamiaceae	ARB
60	*Annona muricata* L.	Annonaceae	BG
61	*Annona reticulata* L.	Annonaceae	BG, ARB, DH
62	*Annona squamosa* L.	Annonaceae	BG, ARB, DH
63	*Anogeissus sericea* Brandis.	Combretaceae	ARB
64	*Antigonon leptopus* Hook & Arn.	Nyctaginaceae	FS
65	*Antirrninum majus* L.	Oleaceae	ARB
66	*Arachis hypogaea* L.	Fabaceae	ARB
67	*Areca catechu* L.	Arecaceae	BG
68	*Argemone mexicana* L.	Papvaraceae	BG, ARB, DH
69	*Argyreia nervosa* (Burm. f.) Boj. Syn. *Convolvulus nervosa* Burmf.	Convolvulaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
70	*Aristida hystricula* Edgew.	Poaceae	ARB
71	*Aristolochia bracteolata* Lamk. Syn. *A. bracteata* Retz.	Aristolochiaceae	ARB
72	*Aristolochia indica* L.	Aristolochiaceae	BG
73	*Artabotrys hexapetalus* (L. f.) Bhandari. Syn. *A. hexapetala* L. f.	Annonaceae	BG
74	*Artemisia annua* L.	Asteraceae	ARB
75	*Arthraxon lancifolius* (Trin) Hochst. Syn. *Andropogon lancifolius* Trin.	Poaceae	ARB
76	*Artocarpus altilis* (Parkinson) Fosberg	Moraceae	ARB
77	*Artocarpus hetrophyllus* Lamk. Syn. *A. integrifolia* L.	Moraceae	ARB
78	*Artocarpus lakoocha* Roxb.	Moraceae	BG
79	*Asclepias curassavica* L.	Asclepiadaceae	BG
80	*Asparagus dumosus* Bak.	Liliaceae	ARB
81	*Asparagus plumosus* Bak.	Liliaceae	ARB
82	*Asparagus racemosus* var. *javanicus* Baker. Syn. *A. racemosus* Willd.	Liliaceae	ARB
83	*Averrhoa carambola* L.	Averrhoaceae	BG

SR. NO.	SPECIES	FAMILY	OCCURRENCE
84	*Azadirachta indica* A. Juss. Syn. *Melia azadirachta* L.	Meliaceae	ARB, FS
85	*Bacopa monnieri* (L.) Wetts. Syn. *Moniera cuneifolia* Michx	Scrophulariceae	ARB
86	*Balanties aegyptiaca* (L.) DeL. Syn. *Ximenia aegyptiaca* L.	Balanitaceae	ARB
87	*Baliospermum montanum* (Willd.) MuelL. Arg. Syn. *Jatropha montana* Willd.	Euphorbiceae	ARB
88	*Bambusa arundinacea* (Retz.) Roxb. Syn.*Bambusa bambos* Voss.	Poaceae	BG
89	*Barleria prionitis* L.	Acanthaceae	ARB
90	*Barringtonia acutangula* (L.) Gaertn.	Barringtoniaceae	BG
91	*Basella alba* L. Syn. *B. rubra* L.	Basellaceae	ARB
92	*Bauhinia purpurea* L.	Caesalpinaceae	ARB
93	*Bauhinia racemosa* Lam.	Caesalpinaceae	ARB
94	*Beaucarnea longifolia* Baker.	Liliaceae	BG
95	*Beaumontia grandiflora* Wall.	Apocynaceae	BG
96	*Beloperon guttata* Brandeg.	Acanthaceae	BG

SR. NO.	SPECIES	FAMILY	OCCURRENCE
97	*Bergia suffruticosa* (Delile) FenzL. Syn. *B. odorata* Edgew	Elatinaceae	ARB
98	*Beta vulgaris* L.	Chenopodiceae	ARB
99	*Bidens biternata* (Lour.) Merr & Sherff. Syn. *Bidens pilosa* auct.	Asteraceae	ARB
100	*Bilbergia amoena* (Lodd. et al.) Lindl.	Bromeliaceae	BG
101	*Biophytum sensitivum* (L.) DC. Syn. *Oxalis sensitiva* L.	Oxalidaceae	ARB
102	*Bixa orellana* L.	Bixaceae	ARB
103	*Blainvillea acmella* (L.) Philip. Syn.*B. latifolia* DC., *Verbesina acmella* L.	Asteraceae	ARB
104	*Blepharis maderaspatensis* (L.) Roth.	Acanthaceae	ARB
105	*Blepharis repens* (Vahl.) Roth.		
106	*Blumea lacera* DC. Syn. *Conyza lacera* Burm.	Asteraceae	ARB
107	*Blumea membranacea* DC.	Asteraceae	ARB
108	*Boehmeria scabrella* (Roxb.) Gaud. *Syn. Urtica sacbrella* Roxb.	Urticaceae	ARB
109	*Boerhavia chinensis* (L.) Aschers & Schwein	Nyctaginaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
110	*Boerhavia diffusa* L. Syn. *B. repens* L.	Nyctaginaceae	ARB
111	*Boerhavia verticillata* Poir. Syn. *B. stellata* Wight.	Nyctaginaceae	ARB
112	*Bombax ceiba* L. Syn. *Salmalia malabarica* (DC.) Schott & End.	Bombacaceae	ARB
113	*Borreria articularis* (L. f.) F.N. Will. Syn. *Borreria hispida* L.	Rubiaceae	ARB
114	*Boswellia serrata* Roxb.	Burseraceae	ARB
115	*Bougainvillea glabra* Choisy.	Nyctaginaceae	ARB
116	*Bougainvillea spectabillis* Willd.	Nyctaginaceae	ARB
117	*Brassica campesteris* L. var. sarson Prain.	Cruciferae	BG
118	*Brassica juncea* (L.) Czernajew. Syn. *Sinapis juncea* L.	Cruciferae	BG
119	*Breynia retusa* (Dennst.) Alston. Syn. *Breynia patens* (Roxb.) Rolfe.	Euphorbiceae	ARB
120	*Brya ebenus* (L.) DC.	Fabaceae	ARB
121	*Buddleia davidii* Franch.	Buddlejaceae	BG
122	*Buddleja asiatica* Lour.	Buddlejaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
123	*Butea monosperma* (Lamk.) Taub. Syn. *Erythrina monosperma* Lamk., *B. frondosa* Koenig. *ex* Roxb.	Fabaceae	ARB
124	*Cadaba fruticosa* (L.) Druce Syn.*C. farinosa* Forsk. *C. indica* Lam, *Cleome fruticosa* Forsk.	Capparidaceae	BG, DH
125	*Caesalpinia bonduc* (L.) Roxb. Syn.*C. crista* L., *C. binducella* Fleming.	Caesalpinaceae	ARB
126	*Caesalpinia coriaria* Willd.	Caesalpinaceae	ARB
127	*Caesalpinia pulcherrima* (L.) Swartz. Syn.*Poinciana pulcherrima* L.	Caesalpinaceae	ARB
128	*Caesulia axillaris* Roxb.	Asteraceae	ARB
129	*Cajanus cajan* (L.) Millsp. Syn.*Cytisus cajan* L.	Fabaceae	ARB
130	*Cajanus scarabaeoides* (L.) Grah. ex. Wall. Syn. *Atylosia scarabaeoides* Benth.	Fabaceae	ARB
131	*Calamus rotang* L.	Arecaceae	BG
132	*Calliandra hybrid L.*	Mimosaceae	BG
133	*Callistemon lanceolatus* DC.	Myrtaceae	ARB
134	*Calotropis gigantea* (L.) R. Br. Syn. *Asclepias gigantea* L.	Asclepiadaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
135	*Calotropis procera* (Ait.) R. Br. Syn. *Asclepias procera* Ait.	Asclepiadaceae	ARB
136	*Canavalia gladiata* DC. Syn.C. *ensiformis* Baker.	Fabaceae	1
137	*Canna flaccida* Salisb.	Cannaceae	BG
138	*Canna indica* L.	Cannaceae	BG
139	*Cannabis sativa* L.	Cannabinaceae	ARB
140	Capparis decidua (Forsk.)Edgew. Syn.*Capparis aphylla* Roth.,	Capparidaceae	FS
141	*Capparis sepiaria* L.	Capparidaceae	FS
142	*Capparis zeylanica* L. Syn *Capparis horrida* L.	Capparidaceae	FS
143	*Caralluma crenulata* Wallich.	Asclepiadaceae	BG
144	*Cardiospermum halicacabum* L.	Sapindaceae	ARB
145	*Careya arborea* Roxb.	Lecythidaceae	ARB
146	*Carica papaya* L.	Caricaceae	ARB
147	*Carissa congesta* Wight.	Apocynaceae	ARB
148	*Carmona microphylla* (Lam.) G. Don	Oleaceae	
149	*Carvia callosa* (Nees) Bremek.	Acanthaceae	ARB
150	*Caryota urens* L.	Arecaceae	BG

SR. NO.	SPECIES	FAMILY	OCCURRENCE
151	*Cassia absus* L.	Caesalpinaceae	ARB
152	*Cassia angustifolia* Vahl.	Caesalpinaceae	ARB
153	*Cassia auriculata* (L.) Roxb.	Caesalpinaceae	ARB
154	*Cassia fistula* L.	Caesalpinaceae	ARB
155	*Cassia italica* (MilL.) Lamk. Syn. *Senna italica* Mill., *C. obvata* Collad.	Caesalpinaceae	ARB
156	*Cassia javanica* L.	Caesalpinaceae	ARB
157	*Cassia occindentalis* L.	Caesalpinaceae	ARB
158	*Cassia renigera* Wall.	Caesalpinaceae	FS
159	*Cassia roxburghii* DC.	Caesalpinaceae	ARB
160	*Cassia siamea* Lamk.	Caesalpinaceae	ARB
161	*Cassia sophera* L.	Caesalpinaceae	ARB
162	*Cassia tora* L.	Caesalpinaceae	ARB
163	*Casuarina equisetifolia* Forst.	Casuarinaceae	ARB
164	*Catharanthus pusillus* (Murr.) G.Don. Syn. *Vinca pusilla* Murr., *Lochner pusilla* Kschum.	Apocynaceae	ARB
165	*Catharanthus roseus* (L.) G.Don. Syn.*Vinca rosea* L., *Lochnera rosea* Reich.	Apocynaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
166	*Cayratia trifolia* (L.) Domin. Syn. *C. carnosa* (Lamk.) Gagnep. *Vitis carnosa* wall.	Vitaceae	ARB
167	*Celastrus paniculatus* Willd. *Syn. Scutia paniculata* G.Don. *C. paniculatus* Roth.	Celeasteraceae	ARB
168	*Cenchrus ciliaris* L. Syn. *Pennisetum cenchroides* Rich., *P. ciliare* L.	Poaceae	ARB
169	*Centella asiatica* (L.) Urb. Syn. *Hydrocotyle asiatica* L.	Apiaceae	ARB
170	*Cerbera odollum* Gaertner	Apocynaceae	BG
171	*Ceropegia* sp.	Asclepiadaceae	
172	*Cestrum nocturnum* L.	Solanaceae	ARB
173	*Chenopodium album* L.	Chenopodiceae	ARB
174	*Chloris barbata* Sw.	Poaceae	ARB
175	*Chlorophytum tuberosum* (Roxb.) Baker.	Liliaceae	ARB
176	*Choris virgata* Sw.	Poaceae	ARB
177	*Cicca acida* (L.) Merrill. Syn.*Cicca disticha* L.	Euphorbiceae	BG
178	*Cicer arietinum* L.	Fabaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
179	*Cieba pentandra* (L.) Gaertn. Syn. *Bombax pentandrum* L.	Bombacaceae	ARB
180	*Cissampelos pareira* L.	Menispermaceae	BG, ARB, DH
181	*Cissus quadrangularis* L. Syn. *Vitis quadrangularis* walL.	Vitaceae	ARB
182	*Cissus repanda* VahL. Syn. *Vitis repanda* Wt & Arn.	Vitaceae	ARB
183	*Citrullus colocynthis* (L.) Schard. Syn.*Colocynthis vulgaris* Schr.	Cucurbitaceae	ARB
184	*Citrus lemon* (L.) Burm. Syn.*C. medica* var. *limon* L.	Rutaceae	ARB
185	*Citrus medica* L.	Rutaceae	ARB
186	*Citrus reticulata* Blanco. Syn. *C. aurantium var reticulata* Blanco.	Rutaceae	ARB
187	*Clematis trifoliata* Thunb.	Ranunculaceae	BG, ARB
188	*Cleome gynandra* L. Syn.*Gynandropis gynandra* (L.) Briquet.	Capparidaceae	FS
189	*Cleome viscosa* L.	Capparidaceae	FS
190	*Clerodendron multiflorum* (Burm. F.) OKuntze. Syn.*C. phlomidis* L.	Lythraceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
191	*Clerodendron serratum* (L.) Moon. Syn. *Volkameria serrata* L.	Lythraceae	ARB
192	*Clerodendron siphonanthus* R. Br.	Lythraceae	ARB
193	*Clitoria ternatea* L.	Fabaceae	ARB
194	*Coccinia grandis* (L.) J.O.Voigt. Syn. *C. cordifolia* (L.) Cogn.	Cucurbitaceae	ARB
195	*Coccoloba uvifera* L.	Oleaceae	ARB
196	*Cocculus hirsutus* (L.) Diels. Syn. *Menispermum hirsutum* L.	Menispermaceae	BG, ARB, DH
197	*Cochlospermum gossypium* (L.) DC.	Cochlospermacea e	ARB
198	*Cocus nucifera* L.	Arecaceae	BG
199	*Coldenia procumbens* L.	Ehretiaceae	ARB
200	*Coleus forskohlii* (Poir.) Briq. Syn. *Coleus barbatus* Benth.	Lamiaceae	ARB
201	*Colocasia esculenta* (L.) Schott. Syn.*Arum colocasia* L.	Araceae	ARB
202	*Combretum coccineum* Lam. Syn. *Poivrea coccinea* DC.	Combretaceae	ARB
203	*Commelina benghalensis* L.	Commelinaceae	ARB
204	*Commelina forskalaei* Vahl.	Commelinaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
205	*Commiphora wightii* (Arn.) Bhandari Syn. *C. roxburghii* (Stocks.) Engler.	Burseraceae	ARB
206	*Convolvulus microphyllus* Sieb ex Spreng.	Convolvulaceae	ARB
207	*Corchorus aestuans* L. Syn. *C. acutangulus* Lamk.	Tiliaceae	ARB
208	*Corchorus capsularis* L.	Tiliaceae	ARB
209	*Corchorus olitorius* L.	Tiliaceae	ARB
210	*Corchorus tridens* L.	Tiliaceae	ARB
211	*Cordia dichotoma* Forst. Syn. *C. obliqua* Willd.	Ehretiaceae	ARB
212	*Cordia domestica* Roth. Syn. *Cordia fulvosa* Wt.	Ehretiaceae	FS
213	*Cordia gharaf* (Forsk.) Ehrenb *ex* Asch. Syn. *C. rothii* Roem & Schult.	Ehretiaceae	ARB
214	*Cordia rothii* Roem. & Schult.	Ehretiaceae	FS, ARB
215	*Cordia sebestena* L.	Ehretiaceae	ARB
216	*Coriandrum sativum* L.	Apiaceae	ARB
217	*Corymbia citriodora* (Hook.) K. D. Hill & L.A. Johnson Syn. *Eucalyptus citriodora* Hook.	Myrtaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
218	*Costus speciosus* (Koenig ex Retz.) Sm. Syn. *Banksia spaciosa* Koenig ex Retz.	Zingiberaceae	ARB
219	*Couropita guinanensis* Aubl.	Lecythidaceae	ARB
220	*Crataeva tapia* L. Syn. *C. religiosa* Forst.f.	Capparidaceae	FS
221	*Crinum asiaticum* L.	Liliaceae	BG
222	*Crotalaria verrucosa* L.	Fabaceae	ARB
223	*Crotolaria juncea* L.	Fabaceae	ARB
224	*Crotolaria medicaginea* Lam.	Fabaceae	ARB
225	*Crotolaria vestita* Baker.	Fabaceae	ARB
226	*Croton bonplandianum* Baill.	Euphorbiceae	ARB, BG, FS
227	*Cryptostegia madagascariensis* Bojer *ex* Decne	Asclepiadaceae	FS
228	*Cucumis melo* L. var. *melo* L.	Cucurbitaceae	ARB
229	*Cuminum cyminum* L.	Apiaceae	ARB
230	*Curculigo orchioides* Gaertn.	Liliaceae	ARB
231	*Curcuma amada* Roxb.	Zingiberaceae	ARB
232	*Cuscuta chinensis* Lamk.	Cuacutaceae	ARB
233	*Cuscuta reflexa* Roxb.	Cuacutaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
234	*Cymbopogon citratus* Stapf. Syn. *Andropogon citratus* DC.	Poaceae	ARB
235	*Cymbopogon martini* (Roxb.) Wats.	Poaceae	ARB
236	*Cymbopogon schoenanthas* (L.) Spreng. Syn. *Andropogon schoenathus* L.	Poaceae	ARB
237	*Cynodon dactylon* (L.) Pers. Syn. *Panicum dactylon* L.	Poaceae	ARB
238	*Cyperus rotundus* L. Syn. *Cyperus rotundus* L.	Cyperaceae	ARB
239	*Dactyloctenium aegyptium* (L.) Beauv. Syn. *Cynosurus aegyptius* L.	Poaceae	ARB
240	*Dalbergia latifolia* Roxb.	Fabaceae	ARB
241	*Dalbergia sissoo* Roxb.	Fabaceae	ARB
242	*Datura arborea* L.	Solanaceae	ARB
243	*Datura innoxia* Mill. Syn. *Datura metel* Siams.	Solanaceae	ARB
244	*Datura metel* L. Syn. *Datura fastuosa* L.	Solanaceae	ARB
245	*Delonix regia* (Boj.) Raf. Syn.*Poinciana regia* Boj.	Caesalpinaceae	ARB
246	*Dendrocalamus strictus* (Roxb.) Nees. Syn. *Bambos stricta* Roxb.	Poaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
247	*Dendrophthoe falcata* (L.f.) Etting. Syn. *Loranthos longiflorus* Desr.	Loranthaceae	ARB
248	*Derris indica* (Lam.) Bennet. Syn. *Pongamia pinnata* (L.) Pierre.	Fabaceae	ARB
249	*Desmodium gangeticum* DC.	Fabaceae	ARB
250	*Desmodium triflorum* DC.	Fabaceae	ARB
251	*Dichanthium annulatum* (Forssk.) Stapf. Syn. *Andropogon annulatus* Forsk.	Poaceae	ARB
252	*Dichrostachya cinerea* Wt & Arn.	Mimosaceae	ARB
253	*Digera muricata* (L.) Mart. Syn. *D. arvensis* Forsk.	Amaranthaceae	ARB, BG, DH
254	*Digitaria cilliaris* (Retz.) KoeL. Syn. *Panicum cillare* Retz.	Poaceae	ARB
255	*Dimeria ornithopoda* Trin. Syn. *Andropogon filiformis* Roxb.	Poaceae	ARB
256	*Dinebra retroflexa* (Vahl.) Panz. Syn.*Cynosurus retroflexus* Vahl.	Poaceae	ARB
257	*Dioscorea bulbifera* L. Syn. *D. sativa* Thunb.	Dioscoreaceae	ARB
258	*Dioscorea pentaphylla* L. Syn. *Dioscorea triphylla* L.	Dioscoreaceae	ARB
259	*Diospyros cordifolia*Roxb.	Ebenaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
260	*Diospyros malabarica* (Descer.) Kostel	Ebenaceae	BG
261	*Diospyros melanoxylon* Roxb. Syn. *D. embryopteris* Pers.	Ebenaceae	ARB
262	*Diospyros montana* Roxb.	Ebenaceae	ARB
263	*Dipteracanthas patulus* (Jacq.) Nees. Syn. *Ruellia patula* Jacq.	Acanthaceae	ARB
264	*Dipteracanthas prostratus* (Poir) Nees. Syn. *Ruellia prostrata* Poir.	Acanthaceae	ARB
265	*Dombeya natalensis* Sond.	Sterculiaceae	ARB
266	*Dombeya wallichi* (Lind.) K. Schum.	Sterculiaceae	ARB
267	*Drypetes roxburghii* (Wall.) Hurus Syn. *Putranjiva roxburghii* Wall.	Euphorbiceae	ARB
268	*Dyerophytum indicum* (Gibsex Wt.) O. Kuntze. Syn. *Vogelia indica* Gibs *ex* Wight.	Plumbaginaceae	ARB
269	*Echinochloa colonum* (L.) Link. Syn. *Panicum colonum* L.	Poaceae	ARB
270	*Echinops echinatus* Roxb.	Asteraceae	ARB
271	*Eclipta prostrata* (L.) L. Syn. *E. alba* (L.) Hassk.	Asteraceae	ARB
272	*Eichhornia crassipes* Solms.	Pontedariaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
273	*Elaeis guineensis* Jacq.	Arecaceae	BG
274	*Elaeocarpus ganitrus* Gaert.	Elaeocarpaceae	ARB
275	*Elytraria acaulis* (L.f.) Lindau. Syn. *Elytraria crenata* Vahl.	Acanthaceae	ARB
276	*Embelia tsjeriam-cottam* (R. & S.) DC.	Myrsinaceae	ARB
277	*Emblica officinalis* Gaertn. Syn.*Phyllanthus emblica* L.	Euphorbiceae	ARB
278	*Emilia sonchifolia* (L.) DC.	Asteraceae	ARB
279	*Enicostema hyssopifolium* (Willd.) I.C. Verd. Syn. *E. littorale* Blume., *Exacum hyssopifolium* Willd.	Oleaceae	ARB
280	*Eragrostis ciliaris* (L.) R. Br. var. *ciliaris* Syn. *Eragrostis ciliaris* (L.) R. Br.	Poaceae	ARB
281	*Eragrostis tenella* (L.) Beauv *ex* Roem & Schult.	Poaceae	ARB
282	*Eranthemum roseum* (Vahl.) RBr. Syn. *Justia rosea* Vahl.	Acanthaceae	ARB
283	*Erythrina indica* Lamk. Syn. *E.variegata* var. *orientalis* (L.) Merr.	Fabaceae	ARB
284	*Erythrina variegata* L.	Fabaceae	BG, ARB
285	*Eucalyptus globulus* Labill.	Myrtaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
286	*Euphorbia hetrophylla* L.	Euphorbiceae	ARB
287	*Euphorbia hirta* L. Syn. *E. pilulifera* Hook.	Euphorbiceae	ARB
288	*Euphorbia milii* Ch.	Euphorbiceae	ARB
289	*Euphorbia neriifolia* L. Syn. *E. ligularis* Roxb.	Euphorbiceae	ARB
290	*Euphorbia pulcherrima* Willd *ex* Klotzsch. Syn. *Poinsettia pulcherrima* R. Graham.	Euphorbiceae	BG
291	*Euphorbia tirucalli* L.	Euphorbiceae	BG
292	*Evolvulus alsinoides* (L.) L.	Convolvulaceae	ARB
293	*Evolvulus nummularius* (L.) L.	Convolvulaceae	ARB
294	*Fagonia cretica* L. Syn. *F. arabica* L..	Zygophyllaceae	ARB
295	*Feronia limonia* (L.) Swingle. Syn. *F. elephantum* Corr.	Rutaceae	ARB
296	*Ficus benghalensis* L.	Moraceae	ARB
297	*Ficus benghalensis* L. var. *krishnae* C. DC	Moraceae	BG
298	*Ficus carica* L.	Moraceae	ARB
299	*Ficus elastica* Roxb.	Moraceae	ARB
300	*Ficus hispida* L .f.	Moraceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
301	*Ficus racemosa* L. Syn. *F. glomerata* Roxb.	Moraceae	ARB
302	*Ficus religiosa* L.	Moraceae	ARB
303	*Filicium decipiens* Thw.	Sapindaceae	ARB
304	*Foeniculum vulgare* Mill.	Apiaceae	ARB
305	*Garcinia mangostana* L.	Clusiaceae	BG
306	*Gardenia resinifera* Roth. Syn. *Gardenia lucida* Roxb.	Rubiaceae	ARB
307	*Gauzuma ulmifolia* Lam.	Sterculiaceae	ARB
308	*Givotia rottleriformis* Grif.	Euphorbiceae	ARB
309	*Gleditsia triacanthos* L.	Mimosaceae	ARB
310	*Gliricida sepium* Walp.	Fabaceae	ARB
311	*Glycosmis pentaphylla* (Retz.) DC	Rutaceae	BG
312	*Gmelina arborea* Roxb.	Verbanaceae	ARB
313	*Gmelina asiatica* L.	Verbanaceae	ARB
314	*Gmelina philippensis* Cham.	Verbanaceae	
315	*Gomphrena celosiodes* Mart. Syn.*G. decumbens* auct.	Amaranthaceae	FS
316	*Gomphrena globosa* L.	Amaranthaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
317	*Goniogyna hirta* (Willd.) Ali. Syn. *Heylandia latebrosa* DC.	Fabaceae	ARB
318	*Gossypium stocksii* Mast.	Malvaceae	ARB
319	*Gravillea robusta* Cunn. *ex* R.Br.	Proteaceae	ARB
320	*Grewia tiliaefolia* Vahl. var. *leptopetala*	Tiliaceae	ARB
321	*Guazuma ulmifolia* Lam. Syn. *G. tomentosa* H.B & K.	Sterculiaceae	ARB
322	*Gymnema sylvestris* (Retz.) Schult.	Asclepiadaceae	ARB
323	*Haematoxylon campechianum* L.	Caesalpinaceae	ARB
324	*Hamelia patens* Jacq.	Rubiaceae	ARB
325	*Helianthus annus* L.	Asteraceae	ARB
327	*Helianthus rigidus* Desf.	Asteraceae	ARB
328	*Helicteres isora* L.	Sterculiaceae	BG
329	*Heliotropium curssavicum* L.	Boraginaceae	ARB
330	*Heliotropium indicum* L.	Boraginaceae	DH
331	*Heliotropium ovalifolium* Forsk.	Boraginaceae	DH
332	*Heliotropium supinum* L. Syn. *H. supinum* var. *malabaricum* C. B. Clarke.	Boraginaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
333	*Hemidesmus indicus* (L.) Schult. Syn. *Periploca indica* L.	Asclepiadaceae	ARB
334	*Hemigraphis latebrosa* (Heyne *ex* Roth) Nees. var. *heyneana.* Bremek	Acanthaceae	ARB
335	*Heterophragma quadriloculare* (Roxb.) K. Schum. Syn. *Bignonia quadriloculare* Roxb.	Bignoniceae	ARB
336	*Hibiscus lobatus* (Murr.) Kuntze. *Solandra lobata* Murr., *H. solandra* L.	Malvaceae	ARB
337	*Hibiscus rosa-sinensi*s L.	Malvaceae	ARB
338	*Hibiscus sabdariffa* L.	Malvaceae	ARB
339	*Hibiscus schizopetalus* Hk.f	Malvaceae	BG
340	*Holarrhena antidysentrica* (Heyne. *ex* Roth.) A. DC. Syn. *Echites antidysenterica* Heyne *ex* Roth.	Apocynaceae	ARB
341	*Hybanthus enneaspermus* (L.) f. Muell.	Violaceae	ARB
342	*Hydnocarpus wightiana* Blume	Hydnocarpaceae	BG
343	*Hydrilla verticillata* (L. F.) Royle. Syn. *Serpicula verticillata* L. F.	Valisanericeae	ARB
344	*Hyphaene indica* Becc. Syn. *Hyphaene thebaica* (L.) Mart.	Arecaceae	FA, DH

SR. NO.	SPECIES	FAMILY	OCCURRENCE
345	*Hyptis suaveolens* (L.) Poit. Syn. *Balleta suaveolens* L.	Lamiaceae	ARB
346	*Impatiens balsamina* L. var. *coccinea* Hk. f.	Balsaminaceae	ARB
347	*Indigofera linnaei* S. I. Ali. Syn. *I. enneaphylla* L.	Fabaceae	ARB
348	*Indigofera tinctoria* L.	Fabaceae	ARB
349	*Ipomoea batatas* (L.) Lamk. Syn. *Batatas edulis* Choisy	Convolvulaceae	ARB
350	*Ipomoea eriocarpa* R. Br. Syn. *Ipomoea hispida* Roem. & Schult.	Convolvulaceae	ARB
351	*Ipomoea fistulosa* Mart. *ex* Choisy. Syn. *I. carnea* Cooke.	Convolvulaceae	ARB
352	*Ipomoea hederifolia* L. Syn. *Ipomoea coccinea*	Convolvulaceae	ARB
353	*Ipomoea nil* (L.) Roth.	Convolvulaceae	ARB
354	*Ipomoea pes-caprae* (L.) Sweet. Syn. *I. biloba* Forsk.	Convolvulaceae	ARB
355	*Ipomoea quamoclit* L. Syn. *Quamoclit vulgaris* Choisy.	Convolvulaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
356	*Ipomoea sepiara* Roxb. Syn. *Convolvulus diversifolius* Schumach. & Thom.	Convolvulaceae	ARB
357	*Ixora arborea* Roxb. *ex* Smith. Syn. *I. parviflora* Vahl.	Rubiaceae	ARB
358	*Ixora coccinea* L.	Rubiaceae	ARB
359	*Jacaranda mimosaefolia* D. Don.	Bignoniaceae	BG
360	*Jacobinia carnea*(Lindl.) G. Nicholson	Acanthaceae	BG
361	*Jacquinia ruscifolia* Jacq.	Theophrastaceae	ARB
362	*Jasminum officinale* L.	Oleaceae	ARB
363	*Jasminum sambac* Ait.	Oleaceae	ARB
364	*Jatropha curcas* L.	Euphorbiceae	ARB
365	*Jatropha glandulifera* Roxb.	Euphorbiceae	ARB
366	*Jatropha gossypifolia* L.	Euphorbiceae	ARB
367	*Justicia procumbens* L.	Acanthaceae	ARB
368	*Kaempferia galanga* L.	Zingiberaceae	ARB
369	*Kalanchoe fedtschenkoi* Hamet & Perrier	Crassulaceae	ARB
370	*Kalanchoe floribunda* Wight & Arn.	Crassulaceae	ARB
371	*Kalanchoe lacinata* DC.	Crassulaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
372	*Kalanchoe mortagei* Raymond- Hamet & H. Perrier	Crassulaceae	ARB
373	*Kalanchoe pinnata* (Lam.) Pers. Syn.*Bryophyllum pinnatum* (Lamk.) Oken.	Crassulaceae	ARB
374	*Kalanchoe tubiflora* Hamet	Crassulaceae	ARB
375	*Kigelia pinnata* (Jacq.) DC.	Bignoniaceae	ARB
376	*Kleinhovia hospita* L.	Sterculiaceae	BG
377	*Lagasca mollis* Cav.	Asteraceae	FS
378	*Lagerstroemia indica* L.	Lythraceae	ARB
379	*Lagerstroemia speciosa* L. Mant. Syn. *Munchausia speciosa* (L.) Pers.	Lythraceae	ARB
380	*Lagerstroemia* sps.	Lythraceae	ARB
381	*Laggera alata* (D. Don) Sch.- Bipex Oliver.	Asteraceae	ARB
382	*Lannea coromandelica* (Houtt.) MerrilL. Syn. *Odina wodier* Roxb., *Dialium coromandelicum* Houtt., L. grandis Engler.	Anacardiaceae	DH
383	*Lantana camara* L. var. *aculeata* (L.) Moldenke. Syn. *Lantana camara* auct.	Verbanaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
384	*Launaea procumbens* (Roxb.) Ramaya & Rajagopala.	Asteraceae	ARB
385	*Launaea residifolia* (L.) O. Ktze. Syn. *Scorzonera residifolia* L.	Asteraceae	ARB
386	*Lawsonia inermis* L. Syn. *L. alba* Lamb.	Lythraceae	ARB
387	*Lepidium sativum* L.	Cruciferae	ARB
388	*Leptadenia reticulata* (Retz.) Wight & Arn. Syn.*Cynanchum reticulatum* Retz.	Asclepiadaceae	ARB
389	*Leucaena latisiliqua* L. Syn. *L. leucocephala* (Lamk.) de Wit.	Mimosaceae	ARB
390	*Leucas aspera* (Willd.) Spreng. Syn. *Phlomis aspera* Willd.	Lamiaceae	ARB
391	*Leucas cephalotes* (Roth.) Spreng.	Lamiaceae	ARB
392	*Leucas stelligera* Wall.	Lamiaceae	ARB
393	*Leucas zeylanica* R. Br.	Lamiaceae	ARB
394	*Lindenbergia muraria* P. Bruhel. Syn. *Lindenbergia uriticaefolia* Lehm.	Scrophulariceae	ARB
395	*Lindernia oppositifolia* Saldhana	Scrophulariceae	ARB
396	*Lobelia nicotianaefolia* Roth. *ex* R. S.	Lobeliaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
397	*Lotus garcini* DC. Syn. *Psoralea tetragonoloba* L.	Fabaceae	ARB
398	*Ludwigia adscendens* (L.) Hara. Syn. *Jussiaea adscendens* L.	Onagraceae	ARB
399	*Luffa acutangula* (L.) Roxb. var. *Acutangula*	Cucurbitaceae	ARB
400	*Luffa cylindrica* (L.) Roem. Syn. *Momordica cylindrica* L.	Cucurbitaceae	ARB
401	*Lycium barbarum* L.	Solanaceae	ARB
402	*Lycopersicon lycopersicum* (L).Airy-Shaw. Syn. *Lycopersicon esculentum* Mill.	Solanaceae	ARB
403	*Madhuca indica* Gmelin. Syn. *Bassia latifolia* Roxb.	Sapotaceae	ARB
404	*Maerua oblongifolia* (Forsk.) A.Rich. Syn. *M. arenaria* var. *glabra* Hook.f.& Thoms.	Capparidaceae	SKM
405	*Magnolia grandifolia* L.	Magnoliaceae	ARB
406	*Mallotus phillippensis* (Lam.) Muell. Arg. Syn. *Croton philippense* Lam.	Euphorbiceae	ARB
407	*Malva* sp.	Malvaceae	ARB
408	*Mangifera indica* L.	Anacardiaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
409	*Manihot esculenta* Krantz.	Euphorbiceae	ARB
410	*Manilkara hexandra* (Roxb.) Dubard. Syn. *Mimusops hexandra* (Roxb.) Dubard	Sapotaceae	ARB
411	*Manilkara zapota* (L.) van Royen. Syn. *Achras zapota* L.	Sapotaceae	ARB, BG, DH
412	*Martynia annua* L. Syn. *M. diandra* L.	Martiniaceae	ARB
413	*Maytenus emarginatus* (Willd.) Ding. Syn.*M. senegalensis (*Lamk) Exell.	Celeasteraceae	ARB
414	*Melhania futteyporensis* Munro ex Mast. Syn. *M. tomentosa* Stocks ex Mast.	Sterculiaceae	ARB
415	*Melia azaderach* L.	Meliaceae	ARB
416	*Melilotus indica* AlL.FL. Pedem. Syn. *M. parviflora* Desf.	Fabaceae	ARB
417	*Melochia corchorifolia* L.	Sterculiaceae	ARB
418	*Mentha virdis* L. Syn. *Mentha spicata* L.	Lamiaceae	ARB
419	*Merremia gangetica* (L.) Cufod. Syn. *Ipomoea reniformis* Choisy.	Convolvulaceae	ARB
420	*Michelia champaca* L.	Magnoliaceae	BOT (1955)
421	*Millettia peguensis* Ali	Fabaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
422	*Millingtonia hortensis* L.	Bignoniaceae	ARB
423	*Mimosa pudica* L.	Mimosaceae	ARB
424	*Mimusops elengi* L.	Sapotaceae	ARB
425	*Mirabillis jalapa* L. Syn.*M. dichotoma* Gater.	Nyctaginaceae	ARB
426	*Mitragyna parvifolia* Korth. Syn. *Stephegyne pervifolia* Korth.	Rubiaceae	ARB
427	*Mollugo lotoides* L.	Molluginaceae	FS
428	*Mollugo pentaphylla* L. Syn. *M. stricta* L.	Molluginaceae	FS, ARB
429	*Momordica balsamina* L.	Cucurbitaceae	ARB
430	*Momordica charantia* L.	Cucurbitaceae	ARB
431	*Momordica dioica* Roxb. *ex* Willd.	Cucurbitaceae	ARB
432	*Monsonia senegalensis* Guill and Perry. Syn. *M. chumbalensis* Wt.	Gerniaceae	ARB
433	*Monstera deliciosa* Liebm.	Araceae	ARB
434	*Morinda tomentosa* Heyne ex Roth. Syn. *Morinda tinctoria* var. *tomentosa* Hook.f.	Rubiaceae	ARB
435	*Moringa concanensis* Nimmo.	Moringaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
436	*Moringa pterygosperma* Gaertn. Syn. *M. oleifera* Lamk.	Moringaceae	ARB
437	*Morus alba* L. Syn. *M. india* L.	Moraceae	ARB
438	*Mucuna pruriens* Baker. Syn. *M. prurita* Hook.	Fabaceae	ARB
439	*Muntingia calabara* L.	Muntinginaceae	FS
440	*Murraya koenigii* Spreng.	Rutaceae	ARB
441	*Murraya paniculata* (L.) Jack.	Rutaceae	ARB
442	*Musa paradisiaca* L.	Musaceae	BG
443	*Mussaenda luteola* Del.	Rubiaceae	BG, ARB
444	*Najas minor* L.	Najadaceae	ARB
445	*Nelumbo nucifera* Gaertn. *Syn. Nelumbium speciosum* Willd.	Nymphaeceae	BG
446	*Nepenthes khasiana* Hook f.	Nepenthaceae	ARB
447	*Neptunia oleracea* Lour.	Mimosaceae	ARB
448	*Nerium indicum* L. Syn. *N. indicum* Mill.	Apocynaceae	ARB
449	*Nerium oleander* L.	Apocynaceae	ARB
450	*Nervilia discolor* (Bl.) Schltr. Syn. *Cordyla discolor* Bl.	Orchidaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
451	*Neuracanthus sphaerostachyus* (Nees.) Dalz.	Acanthaceae	ARB
452	*Nicotiana plumbaginifolia* Viv.	Solanaceae	ARB
453	*Nothosaerva brachiata* (L.) Wight. Syn. *Illecebrum brachiatum* L.	Amaranthaceae	ARB
454	*Nyctanthes arbor-tristis* L.	Oleaceae	ARB
455	*Nymphaea pubescens* Willd. *Syn. N. stellata* Willd.	Nymphaeceae	BG
456	*Nymphaea stellata* Willd.	Nymphaeceae	BG
457	*Nymphoides parvifolium* (Griseb.) O. Ktze.	Menyanthaceae	ARB, BG
458	*Ochna obtusa* DC.	Ochnaceae	BG, ARB
459	*Ocimum basilicum* L. Syn. *O. pilosum* Willd.	Lamiaceae	ARB
460	*Ocimum canum* Sims.	Lamiaceae	ARB
461	*Ocimum gratissimum* L.	Lamiaceae	ARB
462	*Ocimum sanctum* L.	Lamiaceae	ARB
463	*Olenlandia affinis* DC.	Rubiaceae	ARB
464	*Olenlandia corymbosa* L.	Rubiaceae	ARB
465	*Oligochaeta ramosa* (Roxb.) Wagenitz. Syn. *Volutarella ramosa* (Roxb.) Santapu.	Asteraceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
466	*Opuntia elatior* MilL. Syn. *Opuntia dillenii* Haw.	Cactaceae	ARB
467	*Oroxylum indicum* (L.) Vent. Syn. *Bignonia indica* L.	Bignoniaceae	ARB
468	*Oryza sativa* L.	Poaceae	ARB
469	*Ougeinia oojeinensis* (Roxb.) Hoc.	Fabaceae	BOT
470	*Oxalis corniculata* L.	Oxalidaceae	ARB
471	*Papaver rhoes* L.	Papvaraceae	BG
472	*Parkinsonia aculeata* L.	Caesalpinaceae	ARB
473	*Parthenium hysterophorus* L.	Asteraceae	ARB
474	*Paspalum scorbiculatum* L. Syn. *P. orbiculare* Forst.	Poaceae	ARB
475	*Passiflora edulis* Sims.	Passifloraceae	ARB
476	*Pavetta crassicaulis* Bremk.	Rubiaceae	BG
477	*Pavonia odorata* Willd.	Malvaceae	ARB
478	*Pedalium murex* L.	Pedaliaceae	ARB
479	*Pedilanthus tithymaloides* Poit.	Euphorbiceae	ARB
480	*Peltophorum pterocarpum* (DC) Backer *ex* K. Heyne.	Caesalpinaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
481	*Pennisetum setosum* (Sw.) L. C. Rich. Syn. *Cenchrus setosus* Sw.	Poaceae	ARB
482	*Pentatropis spirallis* (Forsk.) Decne. Syn. *Asclepias spirallis* Forsk.	Asclepiadaceae	ARB
483	*Peperomia pellucida* (L.) H. B. & K. Syn. *Piper pellucidum* L.	Piperaceae	BG
484	*Pergularia daemia* (Forsk.) Chiov. Syn. *Pergularea extensa* (Forsk.) Choiv., *Asclepias daemia* Forsk., *Daemia extensa* R. Br.	Asclepiadaceae	ARB
485	*Peristrophe bicalyculata* (Retz) Nees.	Acanthaceae	ARB
486	*Petrea volubilis* L.	Verbanaceae	ARB
487	*Petunia nyctaginiflora* Juss. Syn. *Petunia violacea* Lindl.	Solanaceae	ARB
488	*Phaseolus vulgaris* L.	Fabaceae	ARB
489	*Phoenix sylvestris* (L.) Roxb.	Arecaceae	ARB
490	*Phyla nodiflora* (L.) Greene. Syn.*Verbena nodiflora* A. Rich.	Verbanaceae	ARB
491	*Phyllanthus amarus*Webster. Syn. *P. niruri* Auct.	Euphorbiceae	ARB
492	*Phyllanthus maderaspatensis* L.	Euphorbiceae	ARB
493	*Phyllanthus urinaria* L.	Euphorbiceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
494	*Physalis minima* L.	Solanaceae	ARB
495	*Pimenta dioica* Merr.	Myrtaceae	ARB
496	*Pistia stratiotes* L. Syn. *Pistia stratiotes* var. *cuneata* Engler.	Araceae	ARB
497	*Pisum sativum* L.	Fabaceae	ARB
498	*Pithecelobium dulce* (Roxb.) Benth.	Mimosaceae	ARB
499	*Plantago ovata* Forsk.	Plantaginaceae	ARB
500	*Pluchea lanceolata* (DC.) Clarke. Syn. *Berthelotia lanceolata* DC.	Asteraceae	ARB
501	*Plumbago indica* L. Syn. *P. rosea* L.	Plumbaginaceae	ARB
502	*Plumbago zeylanica* L.	Plumbaginaceae	ARB
503	*Plumeria obtusa* L.	Apocynaceae	FS
504	*Plumeria rubra* L. Syn. *Plumeria acutifolia* Poir.	Apocynaceae	FS
505	*Polianthes tuberosa* L.	Liliaceae	ARB
506	*Polyalthia longifolia* (Sonn.) Thw. *Syn. Uvaria longifolia* Sonn.	Annonaceae	BG, ARB, DH
507	*Polygala erioptera* DC.	Polygalaceae	ARB
508	*Portulaca grandiflora* Hook.	Portulacaceae	BG

SR. NO.	SPECIES	FAMILY	OCCURRENCE
509	*Portulaca oleracea* L.	Portulacaceae	BG
510	*Portulaca quadrifida* L.	Portulacaceae	BG
511	*Potentilla lineata* Trevir *ex* Reich.	Rosaceae	ARB
512	*Pothos cathartica* Schott.	Araceae	ARB
513	*Pothos scandens* L.	Araceae	ARB
514	*Prosopis chilensis* (Molina) Stuntz. Syn. *Prosopis juliflora* DC.	Mimosaceae	ARB
515	*Prosopis spicigera* L.	Mimosaceae	ARB
516	*Pseuderanthemum atropurpureum* L. H. Bailey	Acanthaceae	BG
517	*Pseudocalymma alliaceum* (Lam.) Sandwith	Bignoniaceae	ARB
518	*Psidium guajava* L.	Myrtaceae	ARB
519	*Psoralea corylifolia* L.	Fabaceae	ARB
520	*Pterospermum acerifolium* (L.) Willd.	Sterculiaceae	ARB, FS
521	*Pueraria tuberosa* DC. Syn. *Hedysarum tuberosum* Roxb.	Fabaceae	ARB
522	*Pulicaria angustifolia* DC.	Asteraceae	ARB
523	*Pulicaria wightiana* Benth. Syn. *Callistephus wightianus* DC.	Asteraceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
524	*Punica granatum* L.	Punicaceae	ARB
525	*Pupalia lappacea* (L.) Juss. Syn.*Achyranthes lappacea* (L.) Juss.	Amaranthaceae	ARB
526	*Quassia amara* L.	Simarubaceae	BG
527	*Quisqualis indica* L.	Combretaceae	ARB
528	*Raphanus sativus* L.	Cruciferae	ARB
529	*Rauvolfia serpentine* (L.) Benth. *ex* Kurz	Apocynaceae	ARB
530	*Rauvolfia tetraphylla* L. Syn. *Rauvolfia canescens* L.	Apocynaceae	BG
531	*Ravenala madagascariensis* Sonnert.	Musaceae	BG
532	*Ravenia spectabilis* (Lindl.) Planch. *ex* Griseb.	Rutaceae	BOT
533	*Rhododendron acuminatum* Hook.f.	Ericaceae	ARB
534	*Rhynchosia minima* DC.	Fabaceae	ARB
535	*Ricinus communis* L.	Euphorbiceae	ARB
536	*Rivinia humilis* L. Syn. *Rivinia lavis* L.	Phytolaccaceae	BG
537	*Rosa indica* L.	Rosaceae	ARB
538	*Roystonea regia* (HBK) O. F. Cooke. Syn.*Oreodoxa regia* HBk.	Arecaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
539	*Ruellia tuberosa* L.	Acanthaceae	ARB
540	*Ruscus aculeatus* L.	Ruscaceae	BG
541	*Russelia equisetiformis* Schl & Cham. Syn.*Russelia juncea* Zucc.	Scrophulariceae	
542	*Ruta graveolens* L.	Rutaceae	ARB
543	*Salvadora persica* L .	Salvadoraceae	FS
544	*Samanea saman* Merr. Syn. *Pithecolobium saman* Benth.	Mimosaceae	ARB
545	*Sansevieria zeylanica* Willd. Syn. *S. roxburghiana* Schultz f.	Liliaceae	BG
546	*Santalum album* L.	Santalaceae	ARB
547	*Sapindus emarginatus* Vahl. Syn. *S. trifoliatus* auct. Non L.	Sapindaceae	ARB
548	*Sapindus laurifolius* Vahl. Syn. *S. trifoliatus* auct.	Sapindaceae	ARB
549	*Saraca asoka* (Roxb.) de Wilde.	Caesalpinaceae	ARB
550	*Scaevola taccada* (Gaertn.) Roxb. Syn. *S. koenigii* Vahl.	Goodeniaceae	ARB
551	*Scindapsus aureus* Engl.	Araceae	BG
552	*Scoparia dulcis* L.	Scrophulariceae	FS

SR. NO.	SPECIES	FAMILY	OCCURRENCE
553	*Securinega leucopyrus* (Willd.) Muell. Syn. *Flueggea leucopyra* Willd.	Euphorbiceae	ARB
554	*Semecarpus anacardium* L.	Anacardiaceae	ARB
555	*Sansiveria thrysiflora* Thunb.	Liliaceae	BG, FS
556	*Sesamum indicum* L.	Pedaliaceae	ARB
557	*Sesbania bispinosa* (Jacq) Faw & Rendle. Syn. *S. aculeata* Pers.	Fabaceae	ARB
558	*Setaria verticillata* (L.) Beauv. Syn. *Panicum verticillatum* L.	Poaceae	ARB
559	*Sida acuta* Burm. f. Syn. *Sida carpinifolia* Mast.	Malvaceae	ARB
560	*Sida alba* L. Syn. *S. spinosa* L.	Malvaceae	ARB
561	*Sida cordata* (Burm. F.) Borss. Syn. *S.veronicifolia* Lamk.	Malvaceae	ARB
562	*Sida cordifolia* L.	Malvaceae	ARB
563	*Sida rhombifolia* L.	Malvaceae	ARB
564	*Sida veronicifolia* L.	Malvaceae	ARB
565	*Siegesbeckia orientalis* L.	Asteraceae	ARB
566	*Smilax zeylanica* L. Syn. *Smilax microphylla* Roxb.	Smilacaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
567	*Solanum melongena* L.	Solanaceae	ARB
568	*Solanum nigrum* L.	Solanaceae	ARB
569	*Solanum pseudo-capsicum* L	Solanaceae	ARB
570	*Solanum surattense* Burm. Syn. *S. xanthocarpum* Schard & wendL.	Solanaceae	ARB
571	*Solanum sysimbrifolium* Lamk.	Solanaceae	ARB
572	*Solanum tuberosum* L.	Solanaceae	ARB
573	*Sopubia delphinifolia* (L.) G. Don.. Syn. *Gerardia delphinifolia* L.	Scrophulariceae	BG, ARB
574	*Spathodea campanulata* Beauv.	Bignoniaceae	ARB
575	*Sphaeranthus indicus* L.	Asteraceae	ARB
576	*Spilanthes calva* DC. Syn. *Spilanthes acmella*	Asteraceae	ARB
577	*Spirodela polyrrhiza* (L.) Scleid.	Araceae	ARB
578	*Spondias pinnata* (L.) F.	Anacardiaceae	ARB
579	*Stemodia serrata* Bth.	Scrophulariceae	BG, ARB
580	*Stemodia viscosa* Roxb.	Scrophulariceae	BG, ARB
581	*Sterculia foetida* L.	Sterculiaceae	ARB
582	*Sterculia urens* Roxb.	Sterculiaceae	ARB
583	*Stewia rebaudiana* Bertoni	Asteraceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
584	*Streblus asper* Lour. Syn. *Epicarpus orientale* Bl.	Moraceae	ARB
585	*Stevia rebudiana*	Asteraceae	ARB
586	*Strophanthus gratus* L.	Apocynaceae	BG
587	*Strychnos nux-vomica* L.	Loganiceae	BG
588	*Synedrella nodiflora* (L. ex. Willd.) Gaertn.	Asteraceae	ARB
589	*Syzygium cumini* (L.) Skeels. Syn. *Eugenia jambolana* Lamk.	Myrtaceae	ARB
590	*Syzygium rubicundum* Wt. & Arn. Syn. *Euginia rubicunda* Wt.	Myrtaceae	ARB
591	*Tabebuia argentea* Britt.	Bignoniaceae	ARB
592	*Tabebuia pentaphylla* Hemsl.	Bignoniaceae	ARB
593	*Tabebuia rosea* (Bertol.) DC.	Bignoniaceae	ARB
594	*Tabernaemontana coronaria* Stapf.	Apocynaceae	ARB
595	*Tabernaemontana divaricata* (L.) R.Br.	Apocynaceae	ARB
596	*Tagetes patula* L.	Asteraceae	ARB
597	*Tagetus erecta* L.	Asteraceae	ARB
598	*Talinum portulacifolium* (Forsk.) Aschers & Schweinf. Syn. *Orygia portulacifolium* Forsk.	Portulacaceae	BG

SR. NO.	SPECIES	FAMILY	OCCURRENCE
599	*Tamarindus indica* L.	Caesalpinaceae	ARB
600	*Tamarix aphylla* (L.) Karst.	Tamaricaceae	BG
601	*Taraxacum officinale* Webber. Syn. *Leontodon taraxacum* L.	Asteraceae	
602	*Taverniera cuneifolia* Arn. Syn. *T. nummularia* Baker.	Fabaceae	ARB
603	*Tecoma stans* (L.) H.B.K. Nov. Syn. *Bignonia stans* L.	Bignoniaceae	ARB
604	*Tecomella undulata* (Smith) Seem. Syn. *Tecoma undulata* G. Don.	Bignoniaceae	ARB
605	*Tectona grandis* L.	Verbanaceae	ARB
606	*Tephrosia collina* Sharma	Fabaceae	ARB
607	*Tephrosia jamnagerensis* Sant.	Fabaceae	ARB
608	*Tephrosia purpurea* Pers.	Fabaceae	ARB
609	*Tephrosia villosa* Wt. & Arn. Syn.*Tephrosia hirta* Ham.	Fabaceae	ARB
610	*Teramnus labialis* Spr.	Fabaceae	ARB
611	*Terminalia arjuna* (Roxb.) W. & A.	Combretaceae	ARB
612	*Terminalia bellirica* Roxb.	Combretaceae	ARB
613	*Terminalia catappa* L.	Combretaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
614	*Terminalia chebula* Retz.	Combretaceae	ARB
615	*Terminalia crenulata* Roth. Syn. *T. tomentosa* Cooke.	Combretaceae	ARB
616	*Terminalia paniculata* Roth.	Combretaceae	ARB
617	*Tetrapogon tenellus* (Roxb.) Choiv. Syn.*Chloris tenella* Roxb.	Poaceae	ARB
618	*Thespesia populnea* (L.) Sol *ex* Correa. Syn. Hibiscus populneus L.	Malvaceae	ARB
619	*Thevetia peruviana* (Pers.) Merrill. Syn. *Thevetia nerifolia* Juss *ex* steud.	Apocynaceae	ARB
620	*Thunbergia erecta* (Benth.) T. Anders	Acanthaceae	BG
621	*Thunbergia fragrans* Roxb.	Acanthaceae	BG
622	*Tinospora cordifolia* (Thunb.) Miers	Menispermaceae	BG, ARB
623	*Trachispermum ammi* (L.) Sprangue Syn. *Sison ammi* L.	Apiaceae	ARB
624	*Tradescantia spathacea* Sw.	Commelinaceae	ARB
625	*Trianthema portulacastrum* L. Syn. *T. monogyna* L.	Aizoaceae	ARB
626	*Tribulus terrestris* L.	Zygophyllaceae	ARB
627	*Trichodesma amplexicaule* Roth.	Boraginaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
628	*Trichodesma indicum* (L.) Lahmann. Syn. *Borago indica* L.	Boraginaceae	ARB
629	*Trichodesma zeylanicum* (Burm. f.) R. Br.	Boraginaceae	ARB
630	*Trichosanthes bracteata* (Lamk.) Voigt. Syn.*Trichosanthes palmata* Roxb.	Cucurbitaceae	ARB
631	*Trichsanthes doica* Roxb.	Cucurbitaceae	ARB
632	*Tridax procumbens* L.	Asteraceae	ARB
633	*Trigonella foenum-graecum* L.	Fabaceae	ARB
634	*Triphasia trifoliata* DC.	Rutaceae	BG, ARB
635	*Tristellateia australasiae* A. Rich	Malpighiaceae	BG
636	*Triumfetta rhomboidea* Jacq. Syn. *T. bartramia* L.	Tiliaceae	ARB
637	*Triumfetta rotundifolia* Lamk.	Tiliaceae	ARB
638	*Tylophora indica* (Burm. f.) Merrill. Syn.*T. asthmatica* Wight & Arn.	Asclepiadaceae	ARB
639	*Typha angustata* Chaubard	Typhaceae	ARB
640	*Uraria picta* Desv.	Fabaceae	ARB
641	*Urginea indica* (Roxb) Kunth. Syn. *Scilla indica* Roxb.	Liliaceae	ARB
642	*Utricularia* sp.	Utriculariaceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
643	*Vallaris solanacea*(Roth.) O. Ktze.	Apocynaceae	ARB
644	*Ventilago denticulata* Willd.	Rhamnaceae	BG
645	*Vernonia anthelmintica* Willd.	Asteraceae	ARB
646	*Vernonia cinerea* (L.) Less Syn. *Conyza cinerea* L.	Asteraceae	ARB
647	*Vetiveria zizanoides* (L.) Nash. Syn.*V. zizani* Stapf.	Poaceae	ARB
648	*Viola odorata* L.	Violaceae	ARB
649	*Vitex negundo* L.	Verbanaceae	ARB
650	*Vitex trifolia* L.	Verbanaceae	ARB
651	*Vitis vinifera* L.	Vitaceae	ARB
652	*Voacanga africana* Stapf.	Apocynaceae	ARB
653	*Waltheria indica* L.	Sterculiaceae	ARB
654	*Wedelia chilensis* L.	Asteraceae	ARB
655	*Wedelia chinensis* (Osbeck) Merr.	Asteraceae	ARB
656	*Withania somnifera* (L.) DunaL. Syn. *Physalis somnifera* L.	Solanaceae	ARB
657	*Wrightia tinctoria* R. Br.	Apocynaceae	ARB
658	*Xanthium strumarium* L. Syn. *X. indicum* Koenig ex Roxb.	Asteraceae	ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
659	*Xeromphis spinosa* (Thunb.) Keay. Syn. *Randia dumetorum* (var.) *longispina* Lamk.	Rubiaceae	BG
660	*Yucca gloriosa* L.	Yuccaceae	BG
661	*Zea mays* L.	Poaceae	ARB
662	*Zingiber officinale* Rox.	Zingiberaceae	ARB
663	*Zinnia elegans* Jacq.	Asteraceae	ARB
664	*Zizyphus mauritiana* Lamk. Syn. *Z. jujuba* Lamk.	Rhamnaceae	ARB, FS
665	*Zizyphus nummularia* (Burmf) WT& Arn. Syn. *Rhamnus nummularia* Burm.	Rhamnaceae	ARB, FS
666	*Zornia diphylla* Pers.	Fabaceae	ARB
GYMNOSPERMS			
667	*Abies pindrow* Royle	Pinaceae	ARB
668	*Afrocarpus falcatus* (Pilg.) C.N.Page Syn. *Podocarpus gracilior*	Podocarpaceae	BG, ARB, FS
669	*Araucaria columnaris* (G. Forst.) Hook.	Araucariaceae	BG, ARB, DH
670	*Cycas circinalis* L.	Cycadaceae	ARB, FS

SR. NO.	SPECIES	FAMILY	OCCURRENCE
671	*Cycas revoluta* Thunb.	Cycadaceae	ARB, FS
672	*Cycas rumphii*	Cycadaceae	ARB, FS
673	*Ginkgo biloba* L.	Ginkgoaceae	ARB
674	*Juniperus* sps.		
675	*Pinus rouxburghii* Sargent	Pinaceae	ARB
676	*Platycladus orientalis* (L.) Franco Syn. *Thuja orientalis*	Araucariaceae	BG, ARB, DH
677	*Zamia furfuracea* L. f.	Zamiaceae	BG, ARB
678	*Zamia* sp.	Zamiaceae	BG, ARB
PTERIDOPHYTES			
679	*Adiantum lunnatum* L.	Polypodiaceae	BG
680	*Adiantum pedatum*	Polypodiaceae	BG
681	*Adiantum trapeziforme*	Polypodiaceae	BG
682	*Asplenium nidus*	Polypodiaceae	BG
683	*Azolla pinnata*	Salviniaceae	ARB
684	*Equisetum debile* L.	Equisetaceae	BG
685	*Marselia quadrifida* L.	Marseliaceae	BG, ARB

SR. NO.	SPECIES	FAMILY	OCCURRENCE
686	*Nephrolepis biserrata*	Polypodiaceae	BG
687	*Salvinia* sp.	Salviniaceae	ARB

Abbreviation:

ARB: Arboretum

BG: Botanical Garden

FS: Faculty of Science

DH: Dhanvantri

Table 6. LIST OF TREES OF ARBORETUM:

Batch No	Name of Tree	Lat. (GPS)	Long. (GPS)	Accuracy (GPS)
2	*Cycas revolute*	22.320423	73.179996	3
3	*Caryota urens*	22.320484	73.179994	6
5	*Cycas circinalis*	22.320484	73.179982	3
9	*Tabernaemontana coronaria*	22.320421	73.179851	6
11	*Biota orientalis*	22.320541	73.179738	3
13	*Jacaranda mimosifolia*	22.320439	73.179832	3
14	*Nerium oleander*	22.320459	73.179792	3

Batch No	Name of Tree	Lat. (GPS)	Long. (GPS)	Accuracy (GPS)
20	*Tabernamontana coronaria*	22.320311	73.179727	3
24	*Azadirachta indica*	22.320461	73.179650	6
26	*Jacaranda mimosifolia*	22.320416	73.179768	3
28	*Ailanthus excels*	22.320358	73.179942	3
29	*Phoenix sylvestris*	22.320398	73.179827	3
30	*Ficus religiosa*	22.320333	73.179812	3
31	*Cordia domestica*	22.320419	73.179747	3
32	*Voacanga Africana*	22.320240	73.179655	3
33	*Michelia champaca*	22.320289	73.179649	6
35	*Magnolia grandifolia*	22.320314	73.179642	6
37	*Cycas carcinalis*	22.320307	73.179565	6
39	*Phoenix silvestris*	22.320250	73.179819	3
40	*Azadirachta indica*	22.320243	73.179801	3
41	*Polyalthia longifolia*	22.320266	73.179745	3
42	*Polyalthia longifolia*	22.320263	73.179753	3
43	*Ailanthus excels*	22.320251	73.179737	3
44	*Albizia saman*	22.320217	73.179735	3
58	*Strablus asper*	22.320170	73.179576	3
59	*Streblus asper*	22.320165	73.179500	3

Batch No	Name of Tree	Lat. (GPS)	Long. (GPS)	Accuracy (GPS)
60	*Azadirachta indica*	22.320176	73.179513	3
61	*Holoptelea integrifolia*	22.320154	73.179488	3
62	*Delonix regia*	22.320128	73.179468	3
64	*Ficus hispida*	22.320177	73.179500	3
66	*Prerocarpus marsupium*	22.320196	73.179298	3
68	*Ficus racemosa*	22.320225	73.179454	3
69	*Holoptelea integrifolia*	22.320228	73.179264	3
70	*Streblus asper*	22.320204	73.179237	3
71	*Ailanthus excels*	22.320211	73.179204	3
72	*Azadirachta indica*	22.320221	73.179065	3
73	*Azadirachta Indica*	22.320192	73.179024	3
77	*Ailanthus excels*	22.320313	73.179035	3
78	*Vocanga Africana*	22.320355	73.178991	3
79	*Voacanga Africana*	22.320286	73.178963	3
80	*Alangium salvifolium*	22.320391	73.179161	3
80	*Alangium salvifolium*	22.320553	73.179287	3
82	*Moringa oleifera*	22.320464	73.179406	6
82	*Moringa oleifera*	22.320462	73.179374	4
84	*Caesalpinia pulcherima*	22.320530	73.179417	6

Batch No	Name of Tree	Lat. (GPS)	Long. (GPS)	Accuracy (GPS)
87	*Boswellia serreta*	22.320546	73.179382	3
87	*Boswellia serrate*	22.320629	73.179372	3
89	*Garuga pinnata*	22.320535	73.179402	3
89	*Garuga pinnata*	22.320597	73.179380	3
93	*Jatropha glandulifera*	22.320571	73.179196	3
97	*Couropita guianensis*	22.320526	73.179149	4
99	*Barleria sp*	22.320524	73.179161	3
112	*Eucalyptus globulus*	22.320550	73.178833	5
114	*Acacia nilotica*	22.320629	73.178810	5
116	*Alstonia scholarensis*	22.320550	73.179035	5
118	*Lagerstromia parvifolia*	22.320547	73.179160	6
119	*Alstonia scholaris*	22.320629	73.179232	3
120	*Moringa olifera*	22.320577	73.179348	4
123	*Caeselpinia pulcherima*	22.320598	73.179372	4
126	*Madhuca longifolia*	22.320639	73.179404	5
126	*Madhuca longifolia*	22.320637	73.179418	6
127	*Murraya paniculata*	22.320658	73.179362	4
129	*Diospyros melanoxylon*	22.320632	73.179290	6
130	*Sterculia foetida*	22.320679	73.179256	4

Batch No	Name of Tree	Lat. (GPS)	Long. (GPS)	Accuracy (GPS)
131	*Sapindus trifoliatus*	22.320751	73.179248	6
132	*Artocarpus heterophyllus*	22.320657	73.179040	5
133	*Thevetia peruviana*	22.320675	73.178982	8
135	*Vitex negundo*	22.320706	73.178992	7
136	*Vitex negundo*	22.320696	73.179081	6
137	*Garcinia indica*	22.320636	73.179093	6
138	*Lichi chinensis*	22.320653	73.179088	5
139	*Bryaebenus DC*	22.320725	73.179083	6
140	*Sapandus emarginatus*	22.320676	73.179167	4
142	*Diospyros melanoxylon*	22.320765	73.179166	6
143	*Terminalia chebula*	22.320705	73.179237	3
144	*Terminallia arjuna*	22.320732	73.179305	4
145	*Terminalia bellirica*	22.320755	73.179338	4
146	*Roystonia regia*	22.320704	73.179353	4
146	*Roystonea regia*	22.320739	73.179384	3
147	*Calliandra hybrid*	22.320623	73.179363	3
148	*Artocarpus altilis*	22.320728	73.179288	5
156	*Barringtonia asiatica*	22.320809	73.179369	8
157	*Saraca Ashoka*	22.320759	73.179272	3

Batch No	Name of Tree	Lat. (GPS)	Long. (GPS)	Accuracy (GPS)
158	*Hibiscus pileaceous*	22.320770	73.179242	3
159	*Lagerstromea*	22.320763	73.179145	7
160	*Premna orientalis*	22.320745	73.179146	3
163	*Citrus limon*	22.320743	73.179114	3
164	*Juniperous*	22.320695	73.179101	3
167	*Dalbergia latifolia*	22.320666	73.178793	5
168	*Polyalthea longifolia*	22.320690	73.178800	5
171	*Azadirachta indica*	22.320735	73.178866	5
172	*Senna siamea*	22.320755	73.179008	6
177	*Garcinia indica*	22.320848	73.179044	6
179	*Garcinia indica*	22.320765	73.179134	3
180	*Oroxylum indicum*	22.320802	73.179047	6
181	*Adenanthera microsperma*	22.320837	73.179108	3
182	*Ailanthus excels*	22.320841	73.179100	3
184	*Adhatoda vasica*	22.320869	73.179045	4
185	*Aegle marmelos*	22.320813	73.179343	9
186	*Artocarpus heterophyllus*	22.320810	73.179355	4
187	*Harmatoxylon campacchianum*	22.320795	73.179373	17
188	*Spondias pinnata*	22.320870	73.179361	6

Batch No	Name of Tree	Lat. (GPS)	Long. (GPS)	Accuracy (GPS)
189	*Anthocephalus chinensis*	22.320811	73.179387	3
189	*Neolamarckia cadamba*	22.320856	73.179365	3
201	*Mitragyna parvifolia*	22.321233	73.179455	6
208	*Caryota urens*	22.321305	73.179463	3
210	*Caryota urens*	22.321294	73.179371	3
263	*casuarina equsetifolia*	22.321402	73.179353	3
274	*Artabotrys hexapetalous*	22.321593	73.179516	6
356	*Peltophorum pterocarpum*	22.321574	73.179922	3
361	*Peltophorum pterocarpum*	22.321559	73.179729	3
362	*Mitragyna parvifolia*	22.321660	73.179700	3
387	*Sterculia foetida*	22.321075	73.179157	3
388	*Gleditsia tricanthos*	22.321086	73.178978	8
395	*Bombyx ceiba*	22.321014	73.179136	3
396	*Milletia peguensis*	22.321086	73.178992	3
397	*Madhuca longifolia*	22.320995	73.178960	4
398	*Casia fistula*	22.321134	73.178933	3
399	*Eucalyptus*	22.321160	73.178890	3
410	*Tabebuia rosea*	22.321323	73.179276	6
411	*Bombax ceiba*	22.321302	73.179339	4

Batch No	Name of Tree	Lat. (GPS)	Long. (GPS)	Accuracy (GPS)
412	*Mangifera indica*	22.321301	73.179246	6
422	*Moringa oleifera*	22.321201	73.179051	3
423	*Albizia procera*	22.321262	73.179062	3
428	*Dalbergia sisoo*	22.321267	73.178962	3
431	*Casia fistula*	22.321264	73.178856	3
439	*Dalbergia sissoo*	22.321728	73.178484	3
440	*Dalbergia sissoo*	22.321756	73.178417	3
441	*Cordia domestica*	22.321850	73.178371	3
444	*Alangium salvifolium*	22.321936	73.178318	3
452	*Adensonia digitata*	22.321311	73.178846	3
453	*Adensonia digitata*	22.321359	73.178799	3
455	*Adansonia digitata*	22.321464	73.178780	3
459	*Adansonia digitata*	22.321731	73.178480	3
472	*Sterculia foetida*	22.321554	73.179110	3
474	*Lagerstromia parvifolia*	22.321325	73.179187	6
475	*Lagerstroemia parvifolia*	22.321466	73.179094	4
477	*Lagerstroemia speciosa*	22.321461	73.179148	4
478	*Elaeocarpus sphaericus*	22.321531	73.179099	3
478	*Elaeocarpus sphaericus*	22.321561	73.179065	3

Batch No	Name of Tree	Lat. (GPS)	Long. (GPS)	Accuracy (GPS)
480	*Gauzuma umlifolia*	22.321613	73.178974	3
481	*Gmelina arborea*	22.321439	73.178961	3
482	*Kleinhovia hospital*	22.321463	73.178849	3
483	*Dilbergia sissoo*	22.321483	73.178788	3
486	*Murraya paniculata*	22.321494	73.178951	3
487	*Limonia acidissima*	22.321495	73.178955	7
492	*Greviliea robusta*	22.321554	73.179147	3
493	*Thevetia peruviana*	22.321551	73.179140	3
494	*Sapindus emarginatus*	22.321609	73.179061	3
495	*Artocarpus heterophyllus*	22.321620	73.179027	3
498	*Ailanthus excels*	22.321529	73.178908	3
506	*Ixora pavetta*	22.321916	73.179115	3
507	*cassia javanica*	22.321812	73.178971	3
508	*Bauhinia purpurea*	22.321794	73.178906	3
513	*Butea monosperma*	22.321598	73.178676	3
514	*Gliricidia sapium*	22.321602	73.178693	5
518	*Cassia fistula*	22.321921	73.179069	3
519	*Anogeissus sericea*	22.321934	73.178717	3
521	*Cicca acida*	22.322021	73.178978	3

Batch No	Name of Tree	Lat. (GPS)	Long. (GPS)	Accuracy (GPS)
522	*Terminalia bellirica*	22.321885	73.178836	3
524	*Careya arborea*	22.321695	73.178610	5
526	*Albizzia lebbeck*	22.321683	73.178588	3
527	*Achras zapota*	22.321869	73.178566	3
530	*Schelichera oleosa*	22.321965	73.178578	3
534	*Casearia eliptica*	22.322016	73.178724	10
536	*Terminalia arjuna*	22.322024	73.179014	3
539	*Haldina cordifolia*	22.322077	73.178978	3
540	*Mitragyn parvifolia*	22.322063	73.178970	3
544	*Miliusa tomentosa*	22.321987	73.178609	6
545	*Gardenia resinifera*	22.321857	73.178595	3
554	*Radermachera xylocarpa*	22.322082	73.178556	3
555	*Dilochandron falcate*	22.322081	73.178610	3
557	*Azadirechta indica*	22.321990	73.178777	3
560	*Morinda pubescens*	22.322091	73.178992	3
561	*Bergera koenigii*	22.322105	73.179001	4
562	*Azadirachta indica*	22.322103	73.178995	3
564	*Holorrhena antidysentrica*	22.322031	73.178811	7
570	*Stereospermum marsupiu*	22.322085	73.178551	3

Batch No	Name of Tree	Lat. (GPS)	Long. (GPS)	Accuracy (GPS)
575	*Cordia rothii*	22.322179	73.178545	6
577	*Prosopis juliflora*	22.322107	73.178625	6
578	*Madhuca longifolia*	22.322193	73.178532	3
579	*Ceiba pentandra*	22.322135	73.178636	3
580	*Alstonea scholaris*	22.322277	73.178518	10
584	*HibiscusÂ tiliaceus*	22.322277	73.178896	3
585	*CasseariaÂ elliptica*	22.322284	73.178905	3
587	*Terminalia bellirica*	22.322254	73.178881	4
588	*Kigelia Africana*	22.322414	73.179055	3
594	*Gmelina arborea*	22.322193	73.178532	5
595	*Bombax ceiba*	22.322171	73.178444	6
595	*Bombyx cieba*	22.322237	73.178537	3
596	*Syzygium cumini*	22.322150	73.178500	6
602	*Emblica officinalis*	22.322313	73.178552	3
604	*Cordia sebastena*	22.322328	73.178650	3
606	*Fernandoa adenophyllum*	22.322368	73.178675	3
607	*Oroxylum indicum*	22.322345	73.178743	3
608	*saracca ashoca*	22.322377	73.179016	3
609	*Annona reticulate*	22.322246	73.178859	3

Batch No	Name of Tree	Lat. (GPS)	Long. (GPS)	Accuracy (GPS)
610	*Vitex negundo*	22.322267	73.178939	3
611	*Diospyros melanoxylon*	22.322344	73.178918	3
613	*holoptelea integrifolia*	22.322395	73.179029	3
622	*Ceiba pentandra*	22.322323	73.178625	3
624	*Thespesia populnea*	22.322335	73.178497	3
677	*Carissa congesta*	22.320945	73.179262	3
679	*Artocarpus heterophyllus*	22.320862	73.179247	6
680	*Artocarpus heterophyllus*	22.320879	73.179158	6
683	*Gliricidia sepium*	22.320871	73.178910	4
688	*Auroxylum indicum*	22.321042	73.179213	4
689	*Adenanthera microsperma*	22.320944	73.179250	3
690	*Terminalia catappa*	22.320911	73.179167	4
691	*Oroxylum indicum*	22.320945	73.179253	5
692	*Thespesia populnea*	22.320903	73.179174	10
696	*Ficus benghalensis*	22.321093	73.179216	3
698	*Diospiros melanoxylon*	22.320951	73.179161	3
706	*Cassia fistula*	22.321079	73.179218	6
712	*Mangifera indica*	22.321052	73.179414	3
717	*Polyalthaea longifolia*	22.321044	73.179442	6

Batch No	Name of Tree	Lat. (GPS)	Long. (GPS)	Accuracy (GPS)
724	*Mitragyna parvifolia*	22.320989	73.179435	6
726	*Filicium decipiens*	22.320992	73.179550	6
727	*Hibiscus tilieceas*	22.321011	73.179558	5
729	*Madhuca longifolia*	22.321009	73.179562	6
730	*Prosopis cineraria*	22.320861	73.179483	3
732	*Semecarpus anacardium*	22.320822	73.179454	4
736	*Sterculia foetida*	22.320903	73.179486	3
737	*Hymenodictyon orixense*	22.320880	73.179528	6
738	*Sapandus emarginatus*	22.320853	73.179576	6
743	*Cassia fistula*	22.320905	73.179483	5
744	*Putranjiva roxburghii*	22.320839	73.179539	4
745	*Cochlospermum religiosa*	22.320895	73.179482	3
747	*Meyna laxiflora*	22.320805	73.179524	4
748	*Kigelia pinnata*	22.320804	73.179547	3
749	*Dombeya wallichi*	22.320770	73.179489	3
750	*Dombeya natalensis*	22.320752	73.179484	3
751	*Ficus religiosa*	22.320780	73.179545	5
752	*Butea monosperma*	22.320731	73.179794	3
754	*Commiphora wightii*	22.320707	73.179558	6

Batch No	Name of Tree	Lat. (GPS)	Long. (GPS)	Accuracy (GPS)
756	*Nyctanthus arbor-tristis*	22.320703	73.179541	6
759	*Vitex trifolia*	22.320734	73.179547	6
760	*Thespesia populnea*	22.320800	73.179544	3
761	*Woodfordia fruticosa*	22.320727	73.179494	3
764	*Maytenus emarginata*	22.320666	73.179516	6
765	*Commiphora wightii*	22.320638	73.179499	3
766	*Holarrhena antidysentrica*	22.320625	73.179514	3
770	*Catunaregam spinosa*	22.320599	73.179521	6
772	*Cicca acida*	22.320566	73.179515	4
773	*Holarrhena antidysent*	22.320587	73.179485	6
775	*Flacourtia indica*	22.320594	73.179529	3
776	*Tecomella undulate*	22.320578	73.179510	3
777	*Grewia tiliaefolia*	22.320537	73.179518	3
778	*Tecomella undulate*	22.320518	73.179522	3
780	*Saracca indica*	22.320546	73.179512	3
781	*Cordia domestica*	22.320540	73.179546	3
782	*Santalum album*	22.320614	73.179662	3
783	*Syzygigium cumini*	22.320503	73.179894	3
784	*Phoenix sylvestris*	22.320508	73.179901	3

Batch No	Name of Tree	Lat. (GPS)	Long. (GPS)	Accuracy (GPS)
785	*Caryota urens*	22.320527	73.179964	3
787	*Cycas revolute*	22.320469	73.179975	3
789	*Azadirachta indica*	22.320630	73.180064	3
790	*Eucalyptus globulus*	22.320609	73.180013	3
791	*Bixa Orellana*	22.320573	73.179995	4
794	*Bixa Orellana*	22.320613	73.180041	3
799	*Mallotus phillippensis*	22.320619	73.180067	3
801	*Mallotus phillippensis*	22.320618	73.180024	3
803	*Eucalyptus globulus*	22.320683	73.180057	3
804	*Feronia acidissima*	22.320764	73.179959	3
811	*Soymida febrifuga*	22.320843	73.180033	3
812	*Balanites aegyptiaca*	22.320898	73.179931	3
838	*Acacia catechu*	22.321469	73.179476	3
843	*Bauhinia acuminate*	22.321470	73.179493	3
967	*Lawsonia inermis*	22.321024	73.179127	5
	Dillenia indica	22.321617	73.179500	3
	Eucaplyptus globulus	22.321829	73.178805	5
	Bauhinia malabarica	22.321796	73.178769	3
	Azadirechta indica	22.321446	73.179330	4

Batch No	Name of Tree	Lat. (GPS)	Long. (GPS)	Accuracy (GPS)
	Bauhinia malabarica	22.321532	73.179082	6
	Ochna obtuse	22.321532	73.179082	3
	Pterospermum acerifolium	22.321261	73.178885	3
	Vitex	22.320619	73.179061	3
	Strablus asper	22.320609	73.178799	5
	Calophyllum sp.	22.320481	73.178914	4
	Podocarpus macrophyllus	22.320676	73.179068	3
	Madhuca indica	22.320627	73.179085	5
	Anthocephalus kadamba	22.320594	73.178942	4
	Acacia auriculiformis	22.320640	73.178978	5
	Dendrocalamus strictus	22.320682	73.179786	3

Table 7. LIST OF CACTUS

SR.NO.	PLANT SPECIES
1	*Acanthocereus tetragonus* (L.)
2	*Cereus uruguayanus*
3	*Cleistocactus strausii* (Hesse) Backeb.
4	*Echinocactus* Link & Otto
5	*Echinocactus texensis* Hopffer
6	*Echinopsis chanaecereus H. Friedrich & Glaetzle*
7	*Echinopsis eyriesii* (Turpin) Zucc.
8	*Ecinopsis subdenudata Cardenas*
9	*Epostoa guentheri*
10	*Espostaa lanata* Britton & Rose
11	*Euphorbia canariensis* L.
12	*Euphorbia baioensis S.Carter*
13	*Euphorbia lactea* Haw.
14	*Euphorbia milii* Des Moul.
15	*Euphorbia nerifolia* L.
16	*Euphorbia tirucalli* L.
17	*Euporbia lactea* f. 'cristata'
18	*Ferocactus cylindraceus* (Engelm.) Orcutt

SR.NO.	PLANT SPECIES
19	*Ferocactus glaucescens* (DC.) Britton & Rose
20	*Gymnocalycium anisitsii* Britton & Rose.
21	*Gymnocalycium baldianum* Speg.
22	*Gymnocalycium mihanovichii* Britton & Rose.
23	*Malocactus matanzanus* Leon
24	*Malocactus sexicola*
25	*Mammilaria elongata* DC.
26	*Mammillaria pennispinosa* Krainz
27	*Mammillaria compressa* DC.
28	*Mammillaria elongata var. Rufocrocera*
29	*Mammillaria gracilis* Care.
30	*Mammillaria longimamma* DC.
31	*Mammillaria prolifera* (Mill.) Haw.
32	*Mammillaria winterae* Boed.
33	*Oppuntia ficus-indica* (L.) Mill.
34	*Opuntia cacanapa Griffiths & Hare*
35	*Opuntia falcata* Ekman & Werderm.
36	*Trichocereus bridgesii* Britton & Rose.
37	*Turbinicarpus lophophoroides* Buxb. & Baceb.

Table 8. LIST OF SUCCULENTS

SR. NO.	PLANT SPECIES	FAMILY
1	*Aloe aristata* (Haw.) Boatwr.	Aspodelaceae
2	*Aloe maculata* All.	Aspodelaceae
3	*Aloe variegata* L.	Aspodelaceae
4	*Aloe vera* (L.) Burm.f.	Asphodelaceae
5	*Bryophyllum pinnatum* (Lam.)Oken	Crassulaceae
6	*Carpobrotus edulis* (L.) N.E. Br	Aizoaceae
7	*Cotyledon orbiculata* L.	Crassulaceae
8	*Crassula ovate* (Miller) Druce	Crassulaceae
9	*Cryptanthus bivittatus* (Hook.) Regeel	Bromeliaceae
10	*Echeveria elegans* Rose	Crassulaceae
11	*Echeveria lilacina* Kimn.& Moran	Crassulaceae
12	*Echeveria purpusorum*	Crassulaceae
13	*Echeveria secunda* Booth ex Lindl	Crassulaceae
14	*Echveria gibbiflora* DC.	Crassulaceae
15	*Gasteria pillansii* (L.) Haw.	Asphodelaceae
16	*Hawotthia cleriperla*	Asphodelaceae
17	*Hawarthia cymbiformis* (Haw.) Duval	Asphodelaceae
18	*Hawarthia limifolia* G.D. Rowley	Aspodelaceae

19	*Hawarthia obtusa*	Asphodelaceae
20	*Hoya kerrii* Craib.	Apocynaceae
21	*Kalanchoe blossfeldiana* Poelln.	Crassulaceae
22	*Kalanchoe daigremontiana* A.Berger	Crassulaceae
23	*Kalanchoe gastonis-bonnieri* Raym.	Crassulaceae
24	*Kalanchoe marmorata* Baker	Crassulaceae
25	*Kalanchoe orgyalis* Baker	Crassulaceae
26	*Kalanchoe pinnata* (Lam.) Oken	Crassulaceae
27	*Kalanchoe tomentosa* Baker	Crassulaceae
28	*Pachyphytum oviferum* J.A. Purpus	Crassulaceae
29	*Pilea microphylla* (L.) Liebm.	Urticaceae
30	*Portulacaria afra* Jacq.	Didiereaceae
31	*Sampervivum tectorum* L.	Crassulaceae
32	*Sansevieria ehrenbergii* Baker.	Asparagaceae
33	*Sedum morganianum* E. Walther	Crassulaceae
34	*Sedum sediforme* (Jacq.) Pau	Crassulaceae
35	*Sedum spathulifolium* Hook.	Crassulaceae
36	*Sensevieria trifaciata* (Prain) Mabb.	Asparagaceae
37	*Tillandsia cyanea* Barfuss & Till	Bromeliaceae
38	*Tillandsia ionantha* Planchon	Bromeliaceae

Table 9. LIST OF ORCHIDS

SR. NO.	PLANT SPECIES
1	*Aerides maculosum* Lindl.
2	*Dendrobium microbulbon* Blatt.& McC.
3	*Dendrobium peguanum* Lindl.
4	*Eulophia Herbacea* Lindl.
5	*Geodrum laxiflorum* Griff.
6	*Habernaria grandifloriformis* Blatt.
7	*Habernaria marginata* Colebr.
8	*Oberonia falconeri* Hk.
9	*Oberonia mucronata* (D.Don)
10	*Peristylus constrictus* (Lindl.)
11	*Peristylus lawii* Wt.
12	*Rynchostylis retusa* (L.) Blume
13	*Vanda tessellat* (Roxb.) Hk.
14	*Vanda testaceae* (Lindl.) Reichb.

Table 10. LIST OF PTERIDOPHYTES

SR.NO.	*PLANT SPECIES*	FAMILY
1	*Azolla pinnata* R.Br.	Salviniaceae
2	*Nephrolepis cordifolia* (L.) K.Presl	Nephrolepidaceae
3	*Nephrolepis exeltata* (L.) Schott	Nephrolepidaceae
4	*Phymatosorus scolopendria* (Burm.f.) Copel.	Polypodiaceae
5	*Pteris vittata* L.	Pteridaceae
6	*Salvinia molesta* D. Mitch	Salviniaceae
7	*Thelypteris dentata* (Forssk.) Brownsey & Jermy	Thelypteridaceae
8	*Thelypteris prolifera* (Retz.)	Thelypteridaceae
9	*Athyrium hohenackerianum (Kze.)*	Athyriaceae
10	*Athyrium falcatum Bedd.*	Athyriaceae
11	*Athyrium parasnathense (C.B.Cl.) ex Mehra & Bir*	Athyriaceae
12	*Aleuritopteris bicolor (Roxb.) Fraser-Jenk.*	Cheilanthoideae
13	*Aleuriopteris formosana (Hayata)*	Cheilanthoideae
14	*Cheilanthes tenuifolia (Burm.f.) Sw.*	Pteridaceae
15	*Lindsaea ensifolia Sw.*	Lindsaeaaceae
16	*Lindsea heterophylla Dryand.*	Dennstaedtiaceae
17	*Psilotum nudum (L.) P.Beauv.*	Psilotaceae

17	*Equisetum ramosissimum Desf.*	Equisetaceae
18	*Tectaria coadunate (Wall. ex Hook. & Grev.) C.Chr.*	Tectariaceae
19	*Tectaria polymorpha (Wall. Ex Hook.) Copel.*	Tectariaceae
20	*Leptochilus decurrens Blume*	Polypodiaceae
21	*Marsilea minuta L.*	Marsileaceae
22	*Adiantum philippense L.*	Adiantaceae
23	*Adiantum caudatum L.*	Pteridaceae

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