

Student Study Project on

**REPRODUCTIVE BIOLOGY OF SELECTED PLANT SPECIES TELANGANA  
BOTANICAL GARDEN, DR. BRR. GOVERNMENT COLLEGE, JADCHERLA,  
MAHABUBNAGAR DISTRICT, TELANGANA.**



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Submitted to

**DEPARTMENT OF BOTANY**

**Dr. B. R. R. GOVT. DEGREE COLLEGE, JADHCHERLA**

**MAHABUBNAGAR Dt., TELANGANA.**

**June 2022**

## DECLARATION

We hereby declare that the project work entitled with "REPRODUCTIVE BIOLOGY OF SELECTED PLANT SPECIES IN TELANGANA BOTANICAL GARDEN, DR. B RR. GOVERNMENT COLLEGE, JADCHERLA, MAHABUBNAGAR DISTRICT, TELANGANA." is a genuine work done by us under the supervision of **Dr. B. Sadasivaiah**, for the Department of Botany, Dr. BRR Government College, and it has not been under the submission to any other Institute/University either in part nor in full, for the award of any degree.

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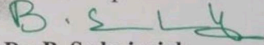
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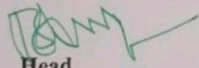
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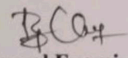
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*.....**K.Sravani, K.Nandini, S. Kavya, K.Shashirekha***



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## CHAPTER – I INTRODUCTION

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Since the time of Darwin the Plants-Pollinator interactions have been a central topic for evolutionary biologist as a model system for the study of adaptation and evolution since Fredrico Delpino first put forward this concept plant pollinator syndrome traditionally. (Delpino 1873-1874; Faegri & Van der Pijl 1979; Fenster et al., (2004). To reflect conugent adaptations of flowers for pollination by specific types of animal the pollination syndromes were suites of floral traits, such as shape, colour and odour that were hypothesised (Van der Pijl 1961; Faegri & Van der Pijl 1979; Fenster et al .2004). In describing specialised plant pollinator relationships the predictive power of the pollination syndrome has been widely accepted. (Drawing 1862; Vogel 195; Faegri & Van der Pijl 1979; Fenster et al. (2004). However, for ecological genaralisation in pollination system or diverse animal visitors of palnt taxa, the modern studies of pollination ecology have emphasized the tendency (Waser et al .1996; ollerton et al .2006,2009). Furthermore ,it might be difficult to attribute a flower to a specific pollination syndrome as there was not always a clear boundry between different pollination syndrome .Thus , in modern pollination ecology the validity of pollination syndromes does not always apply .

With emphasis on different underlying factors. There are aiternative approaches to interpret plant pollinator interactions. For example Functionalclassification of flower types ,interpreting modern plant pollinator relationships provided atypology , based on Muller's (1881) by Ellis & Ellis –Adam(1993) . The relative length of the corolla tube and tounge of the insect pollinator, nectar volume per flower and diet of insects were considered significant especially the correlations between floral morphology traits and insects in thin typology. (Ellis & Ellis –Adam 1993; Waser & ollerton. (2006). Generally olfactory cues,such as odour also responds even to pollinator visual cues of plant species ( Galen 1989;Fenster et al .2004; Pauw 2006 ; Parachnowitsch & Kessler 2010; Kulbaba & Worle 2012). The pollination syndrome , the roles of floral scent compositions in chemical communications with pollinators highlighted in modern pollination ecology though the odour features were considered an important component of traditional (Raguso 2008 ; Schiestl & Dotterl 2012 ). Notably through specific floral sent compounds in scented flowers, floral sent compositions could potentially mediate plant –pollinator interactions , and



promote specialization in pollination systems (Raguso 2008; Shuttleworth & Johnson 2009; Soler et al. 2010).

*Senna auriculata* is a leguminous tree in the subfamily Caesalpinioideae. It is commonly known by its local names Thangedu. It is the State flower of Telangana.<sup>[1]</sup> It occurs in the dry regions of India and Sri Lanka. It is common along the sea coast and the dry zone in Sri Lanka. *Avaramsenna* is a much branched shrub with smooth cinnamon brown bark and closely pubescent branchlets. The leaves are alternate, stipulate, paripinnate compound, very numerous, closely placed, rachis 8.8-12.5 cm long, narrowly furrowed, slender, pubescent, with an erect linear gland between the leaflets of each pair, leaflets 16-24, very shortly stalked 2-2.5 cm long 1-1.3 cm broad, slightly overlapping, oval oblong, obtuse, at both ends, mucronate, glabrous or minutely downy, dull green, paler beneath, stipules very large, reniform-rotund, produced at base on side of next petiole into a filiform point and persistent. Its flowers are irregular, bisexual, bright yellow and large (nearly 5 cm across), the pedicels glabrous and 2.5 cm long. The racemes are few-flowered, short, erect, crowded in axils of upper leaves so as to form a large terminal inflorescence; stamens barren; the ovary is superior, unilocular, with marginal ovules. The fruit is a short legume, 7.5-11 cm long, 1.5 cm broad, oblong, obtuse, tipped with long style base, flat, thin, papery, undulately crimped, pilose, pale brown. 12-20 seeds per fruit are carried each in its separate cavity.

Traditionally, *Buddleja* species are inferred as pollinated by Butterflies and therefore commonly known as a "Butterfly Bush" proct. *Buddleja asiatica* is an evergreen shrub or small tree growing from 1-8 metres tall. The plant is sometimes harvested from the wild for local use as a medic, perfume, food colouring etc. It is often cultivated as an ornamental from the tropics to the warm temperate zone, the cut flowers last well in water. The plant is sometimes used as a fish poison. Habitat was second growth forest sandy river banks, grass, savannah, landslips and deserted village sites. Open places edges of open forest, open woodlands, from near sea level to 2,800 meters in southern China. The plant is likely to be damaged or killed by temperatures lower than 0°C. So long as the plant is well mulched it resprouts freely from the base if cut back by severe weather. Requires a sunny position, succeeding in most reasonably good soils so long as they are well drained the plant has escaped from cultivation and become naturalized in some areas of the tropics. Hybridizes freely with other members of this genus. Any pruning is best done after flowering. An excellent plant for bees and butterflies. Edible uses: in *Buddleja* the root is used in the preparation of a fermented liquor; flowers are sometimes cooked and eaten as a



flavoring a yellow liquid obtained from boiling the flowers is used as a coloring for rice and also medicinal uses plan has been used as an abortifacient and also in the treatment of skin complaints.

*Bauhinia acuminata* is a species of flowering shrub native to tropical south eastern Asia. Common names include dwarf white bauhinia, white orchid-tree and snowy orchid-tree.[1] The exact native range is obscure due to extensive cultivation, but probably from Malaysia, Indonesia (Java, Borneo, Kalimantan, Lesser Sunda Islands), and the Philippines. The plant has a number of ethnobotanical uses around the world. The roots are used by the Javanese to treat cough and cold and in India the leaves and bark are used to treat asthma.[5] It is also used in many culinary dishes of Odessa.

Cipadesa is a genus of plant belonging to the family meliaceae. Cipadesa is monotypic with the single species *Cipadesa buccifera*. The species is endemic to western Ghats of India and Sri Lanka. It is a host plant for many moth species. It is a small shrub with only 5 metres tall leaves compound imparipinnate, Lamina elliptic, Apex acute to acuminate base acute, cunate or alternate with entire margin flowers or white coloured and show axillary panicles in inflorescence. Fruit is a globose drupe with *Cipadesa buccifera* of meliaceae family. Is an ethnobotanically important plant and is widely used in folklore, medicine for treating a range of maladies including diabetes, Dysentery, Malaria, Rheumatism piles, Headache and psoriasis.

#### Objectives:

- To know the common pollinators for the selected species
- To know the visiting times of visitors
- To know the growth patterns of gynoecium per day
- To know the best pollinators of flowers

## REVIEW OF LITERATURE

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Pollination Strategies of Some Perennial Weed Species, Weeds have evolved a number of adaptations to thrive even under adverse conditions. One of the adaptations is their ability to set seeds even under pollination uncertain environments through autogamous self-pollination. Autogamous pollination which provides reproductive assurance (RA) is critical in annual weeds as they get only one chance to set seeds in their life; if they miss this chance their survival is threatened. In perennial weeds, however, RA through autogamous self-pollination is not so critical as they get repeated chances to set seeds; lack of seed set in some years does not affect their survival. There is very little information on pollination strategies of perennial weeds particularly of Indian species (Shivanna, 2014). The flowers of *Cassia didymobotrya* and *C. auriculata* have three types of fertile anthers that differ in orientation, size, shape, and pollen production. Flowers with right-handed or left-handed style deflections, i.e., enantiostylous flowers, occur in the same raceme. In Israel, both species are pollinated by pollen collecting buzzing females of *Xylocopa pubescens*. Vibrations of the carpenter bee are necessary for release of pollen from poricidal anthers and, in *C. didymobotrya*, also for absorption of pollen through the stigmatic opening into a cavity of the style tip. The largest anthers supply pollen for pollination. Pollen for consumption by the bee, on the other hand, appears to be supplied by all fertile anthers. (Rivka Dulberger, 1981).

Magnitude of temporal fluctuations of composite environment and their impacts on *Cassia auriculata* (Linn.) performance Aim of the present study was to access the temporal impacts of energy, community and edaphic variables on performance of a woody perennial *Cassia auriculata*, and thus, to evaluate role of this species during various resource pulse events in hot arid region. Different environmental (top-down and bottom-up) and species variables were temporally quantified at six arid younger alluvial sites of the Indian Thar desert (Manish Mathur, 2018). Metabolic Profile of *Cassia Auriculata* L. Extracts by High Performance Liquid Chromatography Present study involves characterization of medically secondary metabolites such as phenolic compounds namely Ellagic acid, Catechol, Gallic acid, Quercetin, anthraquinone were detected by qualitative High Performance Liquid Chromatography (HPLC) analysis. *Cassia* family is



well known source of anthraquinone glycosides and its derivatives in the various parts of plants (Radheshyam et al.).

*Senna auriculata* (L.) Roxb commonly known as “tanner’s cassia”, is extensively used in Indian System of Medicines to cure several diseases. The indigenous traditional knowledge about preparation of “Avarekayi tea” from the flowers by the inhabitants of ‘Eregojja’ village in district Chikmagalur, Karnataka was gathered which is supposed to be beneficial for diabetic patient. Besides, the plant being used to cure various ailments has also been discussed in the present communication (Ranbir Singh et al. 2014). Altitudinal food preference of bumblebee species (Hymenoptera: Apidae) from Indian Himalaya. This paper describes the food preferences of bumblebee species available in the lower and upper reaches of North-east and North-western Indian Himalaya. These anthophilous insects are completely dependent on pollen and nectar on the high altitude flora and in turn help in their pollination. At higher reaches these insects are one of the most efficient pollinators and are responsible for the conservation of high altitude vegetation germplasm. Depending upon the altitude, different species have different host plants in the Himalayas (Hussain Raina et al., 2019)). Mite-plant mutualism: leaf domatia of African plants house beneficial mites. Leaf domatia, specialized chambers or hair tufts in the vein axils on the underside of leaves, are present in many woody angiosperm species. Recent surveys on four continents have shown that mites are commonly associated with leaf domatia. This study extends the list to include the African continent (Pauw, A. 1992).

*Bauhinia variegata* (Kachnar) is an important medium size fodder tree species of hilly region on which farmers depend during the lean period when grasses are dry, less digestible and unpalatable. Its leaves are highly nutritious and palatable. But farmers are lacking with genotypically superior genotypes which can produce nutritious fodder. Therefore, selection and breeding of the species is essential to produce better offspring which can augment the farmers demand (Anand & Huse, 2013). *Buddlejadavidii* and *Buddlejayunnanensis*: Exploring features associated with commonness and rarity in *Buddleja*. *Buddlejadavidii* is a widespread shrub in Asia while *B. yunnanensis* is a narrowly endemic species limited to Yunnan Province, China. To explore whether floral volatiles, morphological characters of flower and seed and breeding system are correlated with their distributions, we measured length and width of corolla, trichome density at corolla throat, level of stigma/anthers relationship, seed size and weight (Chenet et al. 2011).



*Maeruaa petala* (Roth) M. Jacobs is a rare tropical deciduous tree species. Leaf fall and leaf flushing occur almost simultaneously during late December-mid-February while flowering occurs during March- April. Further, nesting sites of bee and bird pollinators need to be provided for their availability during the flowering season of the tree species for maximizing fruit/seed set (Kumar&Aluri, 2021). *Rhynchosia beddomei* is an endemic deciduous shrub. It flowers during December- March with peak flowering during January. The flowers are hermaphroditic, nectariferous, self-compatible and have explosive pollination mechanism adapted for pollination by bees, especially carpenter bees. They do not fruit through autonomous selfing but fruit through manipulated selfing, geitonogamy and xenogamy mediated by pollen vectoring bees (Aluri, et al., 2017).

Floral biology and breeding system of *Bauhinia forficata* (Leguminosae: Caesalpinioideae), a moth-pollinated tree in southeastern Brazil. *Bauhinia* trees have a wide variety of pollination and breeding systems that are affected by geographic distribution. *Bauhinia* species with nocturnal anthesis are usually chiropterophilous and/or sphingophilous. *B. forficata* Link has floral features that are typical of the sphingophilous condition and this report describes the floral biology, pollination, and breeding system of a population of this species in a small fragment of semideciduous forest in southeastern Brazil ((Neto, 2013). Study on Pollen morphology of some insect pollinated plants The present paper deals with the study of Pollen morphology of insect pollinated flowers. The collected specimens were identified, classified and studied at the Botany Department of Dagon University, by using the available literatures. Palynological contribution to the systematic and taxonomy of *Bauhinia* s.l. (Leguminosae: Cercideae). This study examines how pollen morphological structures can be used as taxonomic characters in systematic studies. Pollen grains of the first branching taxa in the Cercideae phylogeny, such as *Cercis* and *Adenolobus*, are unspecialised; they are isopolar, tectate, tricolporate, and released in monads. Surface ornamentation may be micro-reticulate or perforate, and psilate to rugulate. Aperture membranes are granular to coarsely granular (Banks et al., 2013). Floral Traits and Pollination Systems in the Caatinga, a Brazilian Tropical Dry Forest. *Background and aims* Pollination is a critical stage in plant reproduction and thus in the maintenance and evolution of species and communities. The Caatinga is the fourth largest ecosystem in Brazil, but despite its great extent and its importance few studies providing ecological information

are available, with a notable lack of work focusing on pollination biology.( Machado.et al. ,(2004).)

Sunbirds serve as major pollinators for various populations of *Firmianakwangsiensis*, a tree endemic to South China. Loss of local, effective pollinators may potentially limit plant reproductive success but the plant– pollinator interactions could be rescued if the plant does not reject other pollen vectors. *Firmianakwangsiensis* H.H. Hsue (Malvaceae) is an endangered tree endemic to limestone areas in South China.((Huang, et al., 2018)) Establishing Permanent Preservation Plots in Bannerghatta National Park for long-term ecological studies to moni... Tropical forests are the cradles of biodiversity. However, biodiversity varies greatly across geographical scales.((Kakkar,et al. 2018).) Studies on Avifauna of Attappady and Anaikatty, Western Ghats, Southern India. Bird population studies were done using fixed width line transect method. A total of 13 transects were laid for the study, where five were in AHADS plantation sites, five in AHADS biomass sites and three sites are located in Anaikatty. A total of 108 species of birds belonging to 36 orders were recorded from the study sites in Attappady and Anaikatty. Of these 47 species were insectivores (42%), 17 species were omnivores (15%), 14 species were frugivores (13%).(Balasubramanian,.(2017))

Survey of thrips in Sri Lanka: A checklist of thrips species, their distribution and host plants. Thrips of Sri Lanka have been poorly studied despite their significance to agriculture and horticulture of the country. A survey of thrips and their host plants was conducted in several parts of Sri Lanka during 2005-2008, with a view to record the species present, their distribution, host plant relationships and damage caused. Over 1,000 plant species comprising crops, ornamental plants, weeds, shrubs, and trees were examined for thrips in 22 study sites, representing a range of habitats in nine districts covering 12 agrochemical regions of the country.(Tillekaratne, et al (2011)) Systematics of *Buddleja* (Scrophulariaceae): phylogenetic relationships, historical biogeography, and phylogenomics. Plants display incredible diversity, in morphology and spatial distribution, which can best be understood in an evolutionary context. The reconstruction of how this diversity has evolved can illuminate patterns and trends in the evolution of functionally and ecologically important traits and on how modern plant communities have formed around the globe. Case studies of individual

taxa that encompass such diversity allow for thorough taxonomic sampling and detailed analysis of traits and distribution. (Chau. (2017).

Pollinators, Flowering Plants and Conservation Biology. The ultimate fate of many plants may depend on preserving their mutualistic relationships with pollinators and with the web of organisms that affect both plant and pollinator. (Kearns, (1997)) Antibacterial Activity, Preliminary Phytochemical Screening and <sup>1</sup>Hnmr Analysis of *Senna auriculata* and *Abutilon indicum*. The present investigation has been undertaken to find out the antibacterial activity of crude and step gradient solvent of methanol, chloroform and benzene in flower and whole plant of *S. auriculata* and *A. indicum* respectively. The extracts were analyzed for antimicrobial activity using (Devi et al. (2014).)





### **About District**

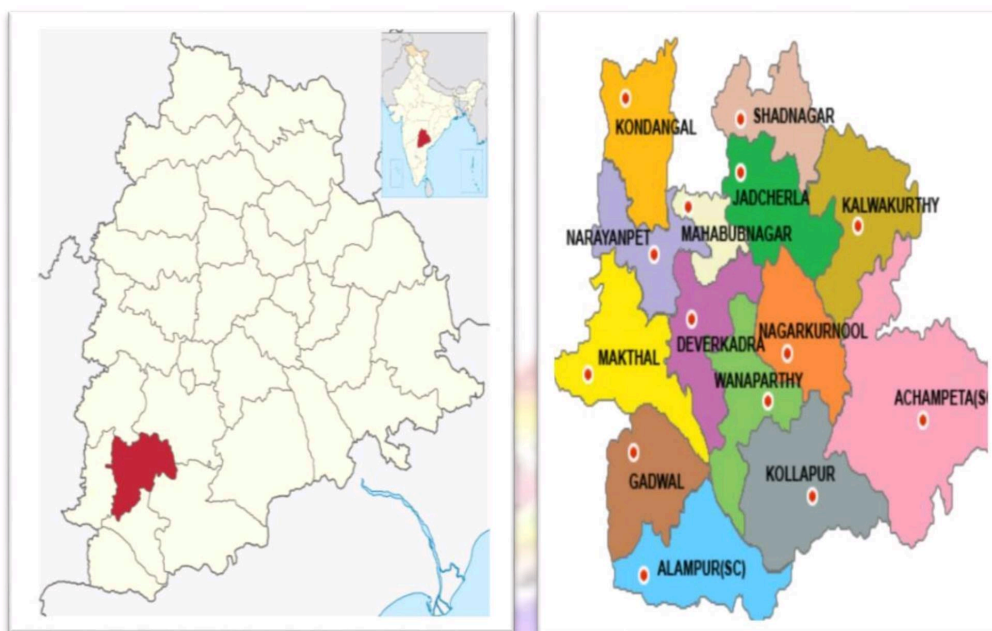
Mahabubnagar is the largest district in telangana state in terms of area (5,285. 1 sq. km) covered. It is also known as palamoor. It is located between 15° 55' and 17° 29' N latitudes and between 77° 15' and 79° 15' E longitudes. The area of the district is 5,285.1 sq. kms. It is bounded on the north side by Rangareddy district, on the east side by Nagarkurnool district, on the south by Wanaparthi and Jogulamba – Gadwal districts and on the west by Karnataka state. The Krishna river flows through the district, as well as the Tungabhadra. The district has most interesting place called the famous banyan tree called Pillalamrri, which is about 4 km from the town. It is 700 year old banyan tree, looks like a large green umbrella and its branches extend over an area of 3 acres.

### **Climate**

Generally, the climate of Mahabubnagr district is pleasant from January to March with an average temperature varies from 24° to 30°C and in April and May the climate is too hot with an average temperature of 35°C-45°C. The maximum temperature ranges during this season is 45°C and minimum is 30°C. The average rainfall for Mahabubnagar district is about 600-900mm.

### **About Collage**

Dr. B.R.R Government College Jadcherla was established in 1963 by the merchants association under private management to center of the educational needs of the people Jadcherla and surrounding villages. It was started with a great vision and mission to impart higher education to the poor and the transform it into a knowledge society. The college was taken over by the government in 1970 and named after the first chief minister of Hyderabad state Dr. Brugula Ramakrishna Rao. It is located in a predominantly rural settings in the town of Jadcherla, 16 Kms. from the district headquarter Mahabubnagar.



### **Telangana Botanical Garden**

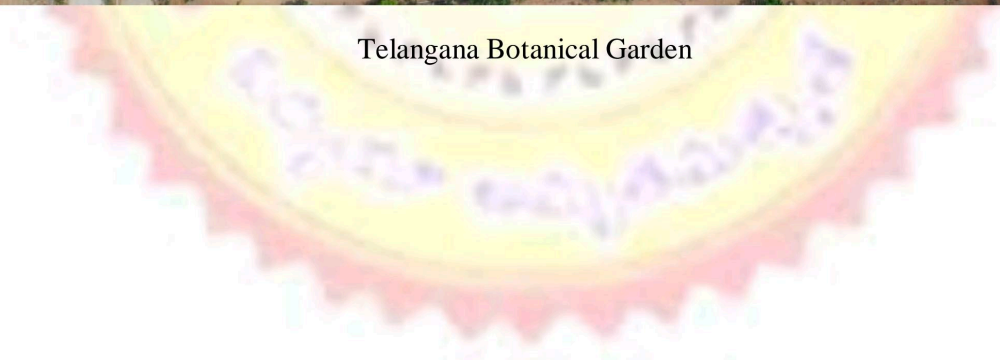
Telangana Botanical Garden (TBG) was established in 2020 at Dr. Burgula Ramakrishna Rao Government College, Jadcherla, Mahabubnagar district, Telangana with a unique idea OF Dr. B. Sadasivaiah, Assistant Professor of Botany. The garden established in 6.5 acres of land in the college premises. Out of 6.5 acre, 3 acres are in the shape of the geographical map of Telangana state with demarcation of 33 districts. Other than map area (3.5 acres) yet to be planned. In 2019 a small Botanical Garden was established with Special interest of Dr. B. Sadasivaiah, Assistant Professor of Botany of the College in 1 acre. The 1 acre land was demarcated with 7 different sections namely Ornamental Section, Medicinal Section, Endemic section, Threatened Section, Xerophyte section, Fruit arboretum and Forest section.

The Telangana Botanical Garden was attracted the Chief Minister of Telangana state and he sanctioned Rs. 50 lakhs for the development. Within a span of 1.5 year a total of 4500 saplings of 457species were planted in the garden. Among them around 130 species are medicinally important, 20 are palm trees, 70 are ornamentals, 150 are wild trees, 10 RET species, 10 Endemic species, 10 Gymnosperms, 10 species of spices, which are collected from Eastern Ghats forests especially Nallamalais of Telangana.

To attract all the age groups Butterfly garden, RasiVanam, NakshatraVanam, Sacred forest, Kartheekavanam, Timber yielding plants, Gum yielding parts, wild edible plants, wild ornamentals and fruits sections were established in the garden. Green Net house, Vanajeevi View Point, 12 lakhs litre capacity water percolation pit are the another attractive areas of Garde



Telangana Botanical Garden





CHAPTER – IV

## MATERIALS AND METHODS

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The study was carried out from January to May in 2022 about 5 months in Telangana Botanical Garden for flower visitors. Inflorescence visitor observations were conducted at peak flowering times. Initially, we patrolled selected plant species and gathered information of all possible visitors from 9:00am to 10:30am every day. Subsequently; diurnal visitors were recorded at 9:00-9:45, 10:00-10:15h. Floral visitors of all the selected 4 species namely *Bauhinia acuminata*, *Buddlijaasiatica*, *Cipadessabaccifera* and *Senna auricuiata* were recorded from January-May 2022. Studied about how many visitors have visited, how many times visited and how much time visitor visit the plant like visitors, visitor time, visitor frequency and date, time all listed in table. A flower visit was defined as the period between first landing on the inflorescence and final departure. Floral visitors were recorded by observer and photo graphed with smart phone to allow classification in to different functional groups honeybee, bumblebee, butterfly, hawk moth, hoverfly, fly and sunbird. In each plant species, 4 different branches were selected for bud counting, flower counting. The length of gynoecium was measured every day from pollinated flowers.

CHAPTER – V

## RESULTS AND DISCUSSION

### *Senna auriculata*

*Senna auriculata* is a leguminous tree in the subfamily Caesalpinioideae. It is commonly known by its local names Thangedu. It is the State flower of Telangana.<sup>[1]</sup> It occurs in the dry regions of India and Sri Lanka. It is common along the sea coast and the dry zone in Sri Lanka. *Avaramsenna* is a much branched shrub with smooth cinnamon brown bark and closely pubescent branchlets. The leaves are alternate, stipulate, paripinnate compound, very numerous, closely placed, rachis 8.8-12.5 cm long, narrowly furrowed, slender, pubescent, with an erect linear gland between the leaflets of each pair, leaflets 16-24, very shortly stalked 2-2.5 cm long 1-1.3 cm broad, slightly overlapping, oval oblong, obtuse, at both ends, mucronate, glabrous or minutely downy, dull green, paler beneath, stipules very large, reniform-rotund, produced at base on side of next petiole into a filiform point and persistent. Its flowers are irregular, bisexual, bright yellow and large (nearly 5 cm across), the pedicels glabrous and 2.5 cm long. The racemes are few-flowered, short, erect, crowded in axils of upper leaves so as to form a large terminal inflorescence stamens barren; the ovary is superior, unilocular, with marginal ovules. The fruit is a short legume, 7.5–11 cm long, 1.5 cm broad, oblong, obtuse, tipped with long style base, flat, thin, papery, undulately crimped, pilose, pale brown. 12-20 seeds per fruit are carried each in its separate cavity.

**Table-1**

#### **List of Visitors on *Senna auriculata***

S.NO.	Name of the visitors	Foraging schedule	Forage collected
1	<i>Apis dorsata</i>	100-150	Nectar + Pollen
2	<i>Apis cerana</i>	115-130	Nectar + Pollen
3	<i>Caratina</i>	120-160	Nectar + Pollen
4	<i>Xylocopa</i>	90-110	Nectar
5	<i>Polistes carolina</i>	80-100	Nectar + Pollen
6	<i>Pieris napa</i>	60-80	Nectar + Pollen



According to this table we observe 6 different types of visitors visited *Senna auriculata*. *Ceratina* was highly visited 120-160 times and *Perisnapi* was visited low number of times 60-80. *Apis dorsata* was visited 100-150 times, *Apis cerana* visited 115-130 times, *Xylocopa* was visited 90-110 times, *Polistes Carolina* was visited 80-100 times.

### ***Buddleja asiatica***

Traditionally, *Buddleja* species are inferred as pollinated by Butterflies and therefore commonly known as a “Butterfly Bush” proct. *Buddleja asiatica* is an evergreen shrub or small tree growing from 1-8 metres tall. The plant is sometimes harvested from the wild for local use as a medicine, perfume, food colouring etc. It is often cultivated as an ornamental from the tropics to the warm temperate zone, the cut flowers last well in water. The plant is sometimes used as a fish poison habitat was second growth forest sandy river banks, grass, savannah, landslips and deserted village sites. Open places edges of open forests, open woodlands, from near sea level to 2,800 meters in southern China. The plant is likely to be damaged or killed by temperatures lower than 0° C. So long as the plant is well mulched it resprouts freely from the base if cut back by severe weather. Requires a sunny position, succeeding in most reasonably good soils so long as they are well drained the plant has escaped from cultivation and become naturalized in some areas of the tropics. Hybridizes freely with other members of this genus. Any pruning is best done after flowering an excellent plant for bees and butterflies edible uses have in *buddleja* are the and powdered root is used in the preparation of a fermented liquor flowers are sometimes cooked and eaten as a flavoring a yellow liquid obtained from boiling the flowers is used as a coloring for rice and also medicinal uses plant has been used as an abortifacient and also in the treatment of skin complaints.

**Table-2: List of Visitors on *Buddleja asiatica***

S.No.	Name of the visitors	Foraging schedule	Forage collected
1	<i>Pieris rapae</i>	120-140	Nectar + Pollen
2	<i>Lasiommata megera</i>	150-170	Nectar + Pollen
3	<i>Bombus</i>	75-95	Nectar + Pollen
4	<i>Papilio polyxenes</i>	155-170	Nectar + Pollen
5	<i>Colias croceus</i>	160-180	Nectar + Pollen
6	<i>Bombus lapidarius</i>	80-100	Nectar + Pollen
7	<i>Ceratina</i>	140-165	Nectar + Pollen
8	<i>Xylocopa</i>	50-65	Nectar + Pollen



According to this table we observe 8 different types visitors visited Buddlejaasiatica. Coliascroceus was highly visited 160-180 times and Xylocopa was visited low number of times 50-65. Ceratina was visited 140-165 times, Bombus lapidaries visited 80-100 times, Papillopolyxenes was visited 155-170 times, Bombus was visited 75-95 times, Lasiommatamegera was visited 150-170, Pierisrapae was visited 120-140.

### ***Bauhinia acuminata***

*Bauhinia acuminata* is a species of flowering shrub native to tropical south eastern Asia. Common names include dwarf white bauhinia, white orchid-tree and snowy orchid-tree.[1] The exact native range is obscure due to extensive cultivation, but probably from Malaysia, Indonesia (Java, Borneo, Kalimantan, Lesser Sunda Islands), and the Philippines. The plant has a number of ethnobotanical uses around the world. The roots are used by the Javanese to treat cough and cold and in India the leaves and bark are used to treat asthma.[5] It is also used in many culinary dishes of Odessa.

**Table-3. List of Visitors on Bauhinia acuminata**

S. No.	Name of the visitors	Foraging schedule	Forage collected
1	Bombus	114	Nectar + Pollen
2	Apis	102	Nectar + Pollen
3	Aves	93	Nectar
4	Rhopalocera	30	Nectar + Pollen
5	Apis dorsata fabricius	33	Nectar + Pollen

According to this table we observe 5 different types visitors visited Bauhinia acuminata. Bombus was highly visited 114 times and Rhopalocera was visited low number of times 30. Apis was visited 102 times, Aves was visited 93 times, Apis dorsata fabricius was visited 33 times.

### ***Cipadessa baccifera***

*Cipadessa* is a genus of plant belonging to the family Meliaceae. *Cipadessa* is monotypic with the single species *Cipadessa baccifera*. The species is endemic to western parts of India and Sri Lanka. It is a host plant for many moth species. It is a small shrub with only 5 metres tall leaves compound imparipinnate, Lamina elliptic, Apex acute to acuminate base acute, cuneate or

alternate with entire margin flowers or white coloured and show axillary panicles in florescence fruit is a globose drupe with *Cipadesabacciferamiq* of meliaceae family. Is an ethnobotanically important plant and is widely used in folklore, medicine for treating a range of maladies including diabetes, Dysentery, Malaria, Rheumatism piles, Headache and psoriasis.

#### **List of Visitors on *Cipadessabaccifera***

S.NO.	Name of the visitors	Foraging schedule	Forage collected
1	<i>Polistescarolina</i>	110-140	Nectar + Pollen
2	<i>Polistesversicolor</i>	50-65	Nectar + Pollen
3	<i>Rhopalocera</i>	40-45	Nectar + Pollen
4	<i>Sphexpensylvanicus</i>	60-74	Nectar + Pollen

According to this table we observe 4 different types visitors visited *Cipadessabaccifera*. *Polistescarolina* was highly visited 110-140 times and *Rhopalocera* was visited low number of times 40-45. *Polistesversicolor* was visited 50-65 times, *Sphexpensylvanicus* visited 60-74 times.



**Plants**



**Buddleja asiatica**



**Cipadessa baccifera**



**Bauhinia acuminata**



**Senna auriculata**



Based on field observations 6 different types visitors visited *Senna auriculata* by daily *Caratina* was visited most frequently and followed by *Perisnapi*, *Apis dorsata*, *Apis cerana*, *Xylocopa*, *Polistes Carolina*. In *Buddleja asiatica* 8 different types visitors visited. *Colias croceus* was frequently visited and *Lasiommata megera*, *Ceratina*, *Papilio polyxenes*, *Pieris rapae*, *Bombus lapidarius*, *Bombus*, *Xylocopa*. We observe 5 different types visitors visited *Bauhinia acuminata*. *Bombus* was frequently visited and *Apis*, *Apis dorsata*, *Aves*, *Rhopalocera*. In *Cipadessa baccifera* 4 different types visitors were observed. *Polistes carolina* was frequently visited and followed by *Sphex pensylvanicus*, *Polistes versicolor*, *Rhopalocera*.



CHAPTER – VII  
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