

## THEMATIC BOTANIC GARDEN

One of its kind in India !!!

Broadly speaking a Botanic Garden or Botanical Garden is a garden dedicated to the collection, cultivation and display of a wide range of plants labelled with their botanical names for scientific study and display to the public for general awareness. In a way Botanic Garden displaying a variety of plants also help in ex-situ conservation of valuable plant diversity.



### A new concept of Botanic Garden- SNU Thematic Botanic Garden

The Thematic Botanic Garden was conceptualized in the form of a main Garden having separate theme gardens of different category of plants within. Thematic Botanic Garden is a unique concept where cultivated and wild plants of economic importance and vulnerable from the conservation point of view are grouped together based on their uses or taxonomic groups. Besides playing a crucial role in conservation and research on various genotypes conserved in the Garden it provides an opportunity to people to see a wide range of plants belonging to the same theme/category/group at one place which is otherwise not possible in a classical Botanic Garden. Each theme/group/category is in the form of mini gardens within a large main Garden.

The unique Thematic Botanic Garden, conceptualized and established with the objective of increasing awareness about a wide variety of plants with which we deal in our daily life and conserving their unique germplasm for education and research purpose, is the first of its kind in northern India. It provides an opportunity to the visitor to explore plants, which are becoming rare and uncommon but economically important due to various anthropogenic factors which otherwise are not observed in any of the Botanic Gardens, except in their native range of cultivation.

### Location of SNU Thematic Botanic Garden

The Thematic Botanic Garden is located in an area of 4.2 ha (10.4 acres) near the eastern boundary of the sprawling campus of Shiv Nadar University. About one fourth of the area adjacent to the boundary is part of Bil Akbarpur Wetlands where natural population of Equisetum is conserved. After eco-restoration of the area during 2014 planting started during February 2015.



Location of Thematic Botanic Garden in the Campus

### Plant diversity introduced

The Thematic Botanic Garden has about 3000 plants belonging to 805 plant species including varieties. All these species belong to 152 families and 472 genera. The Garden has been provided with a bio-fencing of *Carrisa carandus* (Karonda) plantation on all the four sides. The boundary plantation consists of a total of 81 plant species belonging to 29 families. Of the 81 plant species, 59 belonged to small to large-sized trees and 22 shrub species.

For increasing the plant diversity in the Garden and conservation of the germplasm about 50 rare and economically valuable tree species were planted along the path and in between the theme gardens. Some of these trees which can be observed in the Garden are: Barringtonia, Boabab (Kalpvriksha), Buddha Coconut, Camphor Tree, Chinar, Indian Tree of Heaven, Fern Leaf Tree, Fiddle-Leaf Fig, Kattha, Lemon-Scented Gum, Magnolia, Mahogany, Mahua, Red Sandalwood, Rudraksh, Sandalwood Tree, Spathodea, Shikakai, Reetha, Singapore Cherry, Tea Tree, West Indian Elm, Willow Trees (4 species), etc.

Equisetum is one of the oldest living genera of vascular plants and is also the sole living representative of a large and ancient group of Equisetales, which inhabited the Earth during Jurassic period. The Botanic Garden has natural population of *Equisetum ramosissimum* (Horsetail), a living fossil species which is being conserved in the wetland part of the Garden. One can walk to the Equisetum trail to observe luxurious growth of Equisetum in wild.

### Theme Gardens

The Thematic Botanic Garden has 12 Theme Gardens as listed below;

1. Medicinal Plants Garden
2. Ferns and Fern-Allies Garden (Fern House)
3. Rare, Endangered & Threatened (RET) Plants Garden
4. Palm Garden
5. Gymnosperms Garden
6. Ficus Garden
7. Hydrophytes Garden (Aquatic Plants)
8. Butterfly Garden
9. Bamboo Garden (Bambusetum)
10. Fruit Plants Garden
11. Spices, Condiments and Herbs Garden
12. Xerophytes Garden (Arid & Semi-Arid Zone Plants)

#### 1. Medicinal Plants Garden

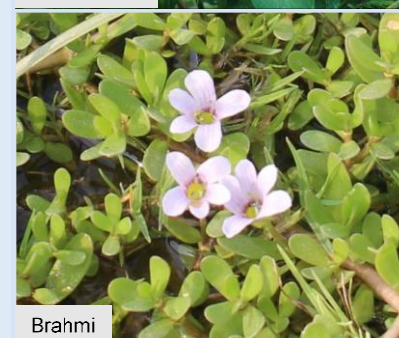
As we enter from the main gate of the Thematic Botanic Garden the first Theme Garden we see is Medicinal Plants Garden. Behind the Welcome Rock we can find a cluster of four trees of Harad, Bahera, and Amla used in Ayurvedic medicines as *Trifala*, and Arjun the bark of which is used for various cardiovascular ailments. A total of 180 species of medicinal plants have been planted in the Botanic Garden. Most of these plants are growing as wild in SNU and surrounding areas of Chithara Village Panchayat. Some of the important medicinal plants in the Garden are: *Akarkara*, *Aloe vera*, *Ashwagandha*, *Asthma Plant*, *Bhang*, *Bhringraj*, *Bhui Amla*, *Brahmi*, *Chandan*, *Clove*, *Giloy*, *Gokhru*, *Gotu Kala/Brahmi*, *Guggul*, *Haldi*, *Insulin Plant*, *Isabgol*, *Kali Musli*, *Kapoor*, *Kulanjan*, *Lavender*, *Punarnava*, *Reetha*, *Safed Musli*, *Sarpagandha*, *Shikakai*, *Vajradanti*, *Vasaka*, etc.



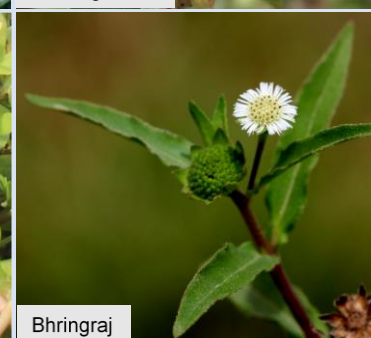
Insulin Plant



Ashwagandha



Brahmi



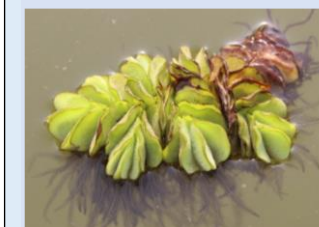
Bhringraj

#### 2. Ferns and Fern-Allies Garden (Fern House)

A fern is a member of a group of vascular plants (plants with xylem and phloem) that reproduce by producing spores and has neither seeds nor flowers. Ferns have complex leaves called megaphylls. Most ferns are leptosporangiate ferns producing coiled fiddleheads that uncoil and expand into fronds. Ferns usually grown in gardens and as indoor plants, are herbaceous perennials but they lack woody growth. The Fern House has a collection of more than 25 species of ferns, including terrestrial, aquatic and epiphytic ferns, and 3 species of Bryophytes including mosses and liverworts.



Fern House (outside and inside view)



Salvinia, an aquatic fern



Plagiochasma (liverwort) along with mosses

#### 3. Rare, Endangered & Threatened (RET) Plants Garden

Adjacent to the Medicinal Plants Garden is Rare, Endangered & Threatened (RET) Plants Garden where five RET species are conserved. Ten plants of *Saraca asoca* (Sita Ashok), five plants each of *Commiphora wightii* (Guggul), and *Commiphora mukul* (Guggul), and one plant each of *Gardenia gummifera* (Gummy Gardenia), *Sapindus mukorossi* (Soapnut) designated as rare and endangered category have been planted in the RET Garden. These species are becoming rare in their natural population due to threats such as habitat destruction, climate change or pressure from invasive species.



Sita Ashok in RET Garden

#### 4. Palm Garden (Palmetum)

Palms are woody monocotyledons belonging to the family Arecaceae (old name Palmae). Palms are one of the multi-use monocots confined to tropical regions of the world. Palms have great in economic importance, providing a range of products necessary for daily life. The aesthetic value of palms is no less important than their traditional and commercial values, especially for landscaping purpose in gardens. In Palm Garden 34 species of palms have been assembled such as *Areca catechu* (Supari Palm), *Beaucarnea recurvata* (Nolina Palm), *Bismarckia nobilis* (Bismarck Palm), *Caryota urens* (Fish Tail Palm), *Dypsis lutescens* (Areca Palm), *Livistona chinensis* (Chinese Fan Palm), *Phoenix dactylifera* (Date Palm), *Ravenala madagascariensis* (Travellers Palm), *Rhapis excelsa* (Lady Palm), *Roystonea regia* (Royal Palm), *Wodyetia bifurcata* (Fox Tail Palm), etc.



Date Palm

#### 5. Gymnosperms Garden

Gymnosperms, woody perennials, are a group of seed-producing vascular plants that includes conifers, pines, cycads, Ginkgo, Ephedra and Gnetum. The term "Gymnosperm" comes from the Greek composite word meaning "naked seeds", after the unenclosed condition of their seeds in a fruit. The Gymnosperms Garden has a number of 33 Gymnosperm plant species including cycads, pines, etc. planted on a mound representing the hill. The important Gymnosperms are: *Abies pindrow*, *Agathis robusta*, *Araucaria bidwillii*, *A. cunninghamii*, *Cedrus deodara*, *Cycas circinalis*, *Dioon edule*, *D. spinulosum*, *Ginkgo biloba*, *Pinus roxburghii* (Chir Pine), *Zamia furfuracea*, etc.



Cycad species



Pine species

## 6. Ficus Garden

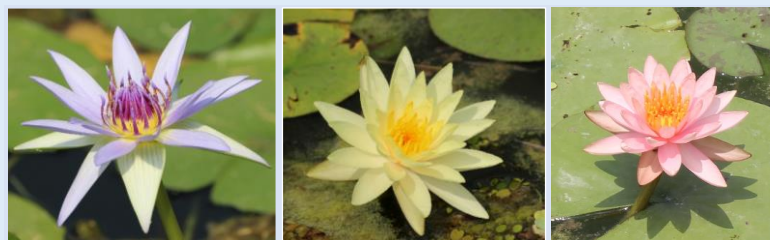
Ficus Garden, only one of its kind in the country, is situated adjacent to Butterfly and Hydrophytes Gardens. Ficus belongs to Fig family, Moraceae. Many of the Ficus trees have their role as keystone species in various ecosystems and provide home to numerous species of birds, butterflies, monkeys, bats and insects. The *Ficus religiosa*, native to the Indian subcontinent, is one of the important religious trees of India. *Ficus racemosa* (Cluster Fig Tree or Goolar) is a popular medicinal plant in India, which has long been used in Ayurveda for various diseases/disorders including diabetes and liver disorders. A total of 24 plant species including varieties of Ficus have been assembled in the Ficus Garden including *Ficus benghalensis*, *F. benamina*, *F. elastica*, *F. hispida*, *F. krishnae*, *F. lyrata*, *F. natalensis* subsp. *leprieurii*, *F. racemosa*, *F. religiosa*, *F. retusa*, *F. virens*, etc.



Unique pocket-like leaf of Krishna Ficus, and Goolar tree with numerous fruits

## 7. Hydrophytes Garden (Aquatic Plants)

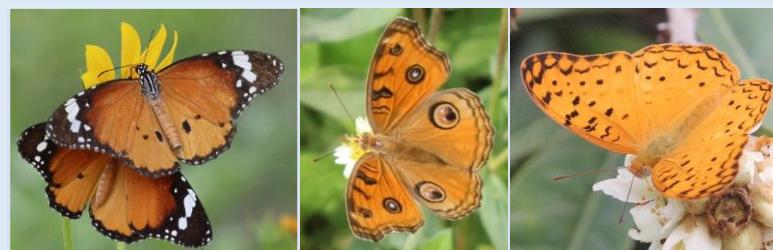
Hydrophytes or aquatic plants are found in swampy or marshy habitats. Hydrophytes Garden consisting of an aesthetically designed pond is situated within the Butterfly Garden next to the Palm Garden. The Hydrophytes Garden has a collection of 31 hydrophytes such as *Nelumbo nucifera*, *Hydrilla verticillata* (Water thyme), two species of Potamogeton, *Ceratophyllum demersum* (Coon's Tail), *Vallisneria spiralis* (Tape Grass), *Eichhornia crassipes* (Water Hyacinth), *Typha domingensis* (Elephant Grass, Reed), several *Nymphaea* spp. (Water Lily), *Pistia stratiotes* (Water Lettuce), *Cyperus alopecuroides* (Foxtail Flatsedge), etc. and aquatic Pteridophytes (*Azolla pinnata*, *Marsilea quadrifolia*, *Salvinia adnata*) and Algae (*Nitella* sp., *Chara* sp.).



Different varieties of Water Lilies

## 8. Butterfly Garden

Butterflies are some of the most attractive and remarkable insects on earth. The types of plants used in making a Butterfly Garden decides which species of butterflies will visit the garden. This is done by planting known larval and adult host plants. The Butterfly Garden has been developed around the aquatic plants pond since butterflies prefer moist areas and a waterbody like a pond provides conducive microclimatic conditions for butterflies. A total of 128 host and nectar plant species were planted in the Butterfly Garden to attract several species of butterflies. A record number (35 species) of butterflies have been observed from the Thematic Botanic Garden, including the Butterfly Garden. Some of the common butterflies: Plain Tiger, Striped Tiger, Peacock Pansy, Caper White, Leopard, Common Grass Yellow, Danaid Eggfly, Common Lime, Common Mormon, etc.



Plain Tiger

Peacock Pansy

Leopard

## 9. Bamboo Garden (Bambusetum)

Bamboo Garden or Bambusetum is situated next to the Butterfly Garden along the eastern side of the Garden where 14 species of Bamboos are conserved viz., *Bambusa heterostachya* (Malay Dwarf Variegated Bamboo), *B. nana* (Hedge Bamboo), *B. ventricosa* (Buddha Belly Bamboo), *B. vulgaris* (Golden Bamboo), *Dendrocalamus giganteus* (Giant Bamboo), *D. longispathus* (Long-Sheath Bamboo), *Guadua angustifolia* (Colombian Timber Bamboo), etc. Bambusetum also includes *Dendrocalamus asper*, which is an edible species of bamboo and cultivated for its tender shoots used in Chinese cuisine.



A view of Bamboo Garden

## 10. Fruit Plants Garden

India is one of the largest producer of fruits in the world and is known as fruit basket of world. The major fruits grown in India, both belonging to tropical and temperate climates, are Mango (national fruit), Grapes, Apple, Apricots, Cherry, Peach, Plum, Orange, Kinnow, Kiwi, Banana, Avocados, Guava, Loquat, Lychee, Papaya, Sapota, Pineapple, Walnuts, Almonds, Coconut, etc. which can be seen in the Garden. The Garden also has many of the traditional fruits such as Khirni, Barhal, Kaitha, Phalsa, etc. which are getting disappeared due to food preference of younger generation and changing socio-economic conditions. This fruit conservatory has a total of 106 variety of fruit plants which provides an opportunity to see most of the fruit plants at one place itself. Exotic fruits such as Avocado, Dragon fruit, etc. can also be seen.



Almonds

Water Apple

Dragon Fruit

Phalsa

Cherry

Loquat

## 11. Spices, Condiments and Herbs Garden

India is known as the 'home of spices'. There is no other country in the world that produces as many kinds of spices as India. The Spices, Condiments and H Garden has about 50 plant species. Some of the important spices and condiments plants in the Garden are All Spice, Indian Bay Leaf, Black Pepper, Cinnamon, Cardamom, Curry Leaf, Hing, Nutmeg (Jaiphal), Oregano, Rosemary, Thyme, Turmeric, etc. Annual species of herbs such as Garlic, Onion, Fennel, Coriander, etc. are also raised annually during the season.



Cardamom

Indian Bay Leaf

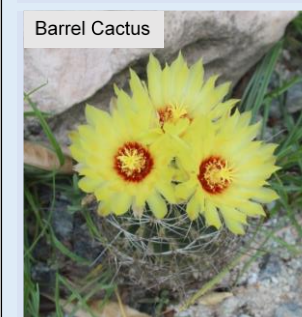
## 12. Xerophytes Garden (Arid & Semi-Arid Zone Plants)

The last Theme Garden in the Thematic Botanic Garden is Xerophytes Garden situated on a raised area simulating sand dunes and semi-arid zone with rocky out crops. A total of 108 xerophytic plant species/taxa have been planted in the Xerophytes Garden. Xerophytic trees such as *Acacia concinna* (Sikakai), *Ailanthus excelsa* (Indian Tree of Heaven), *Albizia lebbek* (Siris), *Butea monosperma* (Flame of the Forest), *Dichrostachys cinerea* (Sickle Bush), *Parkinsonia aculeata* (Jerusalem Thorn), *Prosopis cineraria* (Khejri Tree), *Salvadora persica* and *S. oleoides* (Miswak), *Senegalia catechu* (Cutch Tree, Khair), *S. senegal* (Gum Arabic Tree) were planted around the mound.

In addition, *Agave* spp., numerous Cactii and *Euphorbia* spp., *Barleria prionitis* (Vajradanti), *Commiphora wightii* and *C. mukul* (Guggul), *Capparis decidua*, *Calotropis procera*, and *Yucca* spp. among others are planted on the sandy mounds among the rocks.



A view of Desert Garden



Barrel Cactus



Blind Prickly Pear



Royle's Spurge

## Wetland part of the Garden

The low-lying wetland area of the Garden adjacent to the eastern boundary wall is largely the conservation area of a living fossil species *Equisetum ramosissimum* (Horsetail). In rainy season, area is equipped with profuse growth of White Water Lily. The wetland part of the garden has bushy growth of tall grass species such as *Saccharum spontaneum* (Kans), *S. munja* (Munj) and *Phragmites karka* (Tall Reed).



Naturally growing White Water Lily during monsoon



*Equisetum ramosissimum* (Horsetail), a living fossil species

## Wild Fauna in and around Thematic Botanic Garden

Due to large diversity of terrestrial and aquatic plant species the Garden has become a home to several species of birds, mammals, reptiles, and insects, especially butterflies, moths, dragonflies, damselflies, spiders, beetles, etc. This was possible due to the large variety of plants providing shelter, food and protection from various predators. Hence, the Thematic Botanic Garden is aptly referred to as the Biodiversity Garden encompassing both diverse flora and fauna.

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