



# **Anthesis**

**2011-12; Volume 7  
Special Focus: Gardens**

**Annual Publication of  
Gargi College Botanical Society**



Department of Botany  
Gargi College (University of Delhi)  
Siri Fort Road, New Delhi-110049

**Dedicated to**



(August 17, 1932 to February 3, 2012)

**DR. CHHAYA BISWAS**  
Founder of  
The Department of Botany, Gargi College

**Superannuated in 1993 as  
Principal, Gargi College**

## **ANTHESIS 2011-2012**

### ***Contents***

All the topics listed below have been hyper-linked to the corresponding articles. Ctrl-click on the topics to read the article. You can come back to the contents page by Ctrl-clicking on the link at the end of every article.

- [From the Principal's Desk](#)
- [From the Editor's Desk](#)
- [Fibonacci Numbers – The Golden Rule of Nature](#)
- [Interesting Facts About Earth and Ozone](#)
- [The Proteaceae: Family of Beautiful Flowers](#)
- [Famous Botanist: William Roxburgh](#)
- [The Chocolate Tree](#)
- [The Colourful World of Algae](#)
- [CSIR Techno-fest 2010: A Report](#)
- [Botanical Excursion To Nainital](#)
- [Science at Gargi - A Brief Overview](#)
- [Recent Trends In Biotechnology](#)

- [Gargi College Botanical Society : A Glance at the Beginning](#)
- [Department of Botany](#)
- [Alumni of Botany Department, Gargi College](#)
- [Departmental News](#)
- [Pathfinder Award 2011 Winning Project](#)
- [Botanical Fun Pages](#)
- [Poems](#)
- [Answers To Crossword](#)
- [Contact Us](#)

Cover photograph by Dr. Geeta Mehta: *Paphiopedilum exul*, Lady's Slipper Orchid

## *From the Principal's Desk*



I congratulate the Department of Botany and its editorial team led by Dr. Gita Mathur for bringing out the second number of **e-Anthesis** (volume 7 of Anthesis). What a pleasure it was to read the last one! The range and number of articles was breath taking. Its inclusiveness, bringing into its fold, not only the present faculty, students and lab staff, but also superannuated teachers and alumni who have distinguished themselves, was thoughtful and highly commendable. Students' researched essays were impressive indeed and poems evoking botanical names so passionately, gave a sonorous dignity to the flowers known by ordinary names to the laymen. And how beautiful the photographs were including, even those of the common

algae! Keep up the good work.

I believe the theme of the new volume is 'Botanical Gardens'. We are indeed lucky that we live in a city that is known for the number and splendour of its gardens. Their botanical value, ecological and conservational, is of course the staple food of the Botany discipline. Their economic value, tourism, fisheries, florist are best left to commerce. As a student of Humanities, I extoll their human value. Many a time I have seen in parties strangers instantly bonding because they recognize each other as fellow walkers at Lodhi Gardens! Personally, I find open spaces very inspiring. I did a major part of my reading, while on study leave to pursue doctoral work, at Nehru Park. In the midst of nature you can create your best. Away from the dins of the material life, in the presence of something vast, where buds magically unfold to display exquisite beauty, where birds chirp in excitement, you suddenly feel cleansed of the petty concerns of everyday life and the soul begins to dance to the rhythms of the Universe. Nature can be our guide and philosopher, said Wordsworth. "Be like the flower, turn your face to the sun," advised Khalil Gibran.

I wonder if the self-elevating exhilaration that a garden can provide has now become unknown to today's young. Malls and pubs, multiplexes and cafes lure them away from classes, from culture and everything on which their future's wellbeing depends. Today botanical gardens too try to innovate and attract. The Garden of Five Senses for example is an attempt to provide a novel and integrated experience. But the way to enjoy a garden is not to picnic and play in it, but simply to sit and gaze and soak in the elixir of life. Botanists, do you agree?

Happy reading of e-Anthesis, volume two and May God Bless You All.

**Dr. Meera Ramachandran**

[Click here to go back to contents](#)

## From the Editors's Desk

Anthesis has now completed six years of publication, being the first of its kind to have been published in electronic form. Volume 7 is now ready and heartened by the tremendous response of the last publication, we hereby continue our journey into the digital world.



Starting from a mere 21 pages in the 1<sup>st</sup> volume, we have now crossed over 80 pages in the current one. This indeed is a great achievement for us all in the Botany Department!!

We have dedicated this issue to Dr. Chhaya Biswas, founder of the Botany Department of Gargi College and Superannuated as principal in 1993, who left for her heavenly abode on 3<sup>rd</sup> February, 2012.

Anthesis is the technical term for opening of a flower bud, and true to this, each issue is a dedication to the flourishing students of the department, nurtured with care by our teachers. This is also a step towards our commitment to the environment, and as botanists, we yet again do our bit to save paper by this mode of publishing Anthesis 2012.

The previous publication was copied on CDs and pendrives and made into an email-friendly PDF version as well, and in this form it reached all the students



of the department as well as the alumni, and the enthusiasm we saw superceded all our expectations.



In today's era of "Conservation", we all understand the importance of protecting our environment, both plants and animals alike. Keeping this in mind, this year our focus is on Botanical Gardens and Sanctuaries. Our teachers have pitched in whole-heartedly and a picture coverage of various botanical gardens around the world visited by them now occupies the place of honour in our publication. A wide plethora of interesting reads have been included, ranging from Extraterrestrial plants to Botanical Beads and exotic plants like Rafflesia. This time too, yet more of our alumni have sent write-ups about what they did after graduation from here and their fond memories of the department.

The section on the departmental news has been retained, with pictures of the newly joined teachers and lab staff and the various achievements of the department, including University positions and Projects conducted under the Star College Scheme.

The crossword is sure to prove to be a brain teaser for the budding botanist!!

I would like to thank all the teachers and students who have contributed their time and effort for writing articles, editing, collecting information and helping in compiling and reviewing this volume of eAnthesis.

At the end I would like to thank our Principal Dr. Meera Ramachandran for her encouragement throughout the progress of this volume. I also acknowledge the help and support received from our Teacher Incharge Dr. Aparajita Mohanty



**SOHINI DEB  
BOTANY HONS. IIIrd YEAR**

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[Click here to go back to contents](#)

# **COLOURS OF EXTRATERRESTRIAL PLANT LIFE**

**BY: SOHINI DEB  
BOTANY(H) IIIrd YEAR**

Plants are green as we know them. But is it the way of nature or another of nature's happy coincidences??

Apparently not, as a trip to another galaxy may have us trodding on black grass, according to a new model by Nancy Kiang, a biometeorologist at the NASA Goddard Institute for Space Studies in New York. Working alongside colleagues at the California Institute of Technology's Virtual Planetary Laboratory (VPL) in Pasadena, she modelled the solar and atmospheric conditions of other planets to see which ones might be suitable for photosynthetic life, and what those photosynthesisers might look like.

H.G. Wells gave Mars a "vivid blood-red" kingdom of plants in his novel "The War of the Worlds" back in 1898. But the finding of extraterrestrial life is now no longer science fiction material. And looking for the physical and chemical signs of fundamental life processes: biosignatures, could be a promising start. Photosynthesis, in particular, could produce very conspicuous biosignatures. Although some organisms live off the heat and methane of oceanic hydrothermal vents, the rich ecosystems on the planet's surface all depend on sunlight.



**An artist's concept of plants might look like on other planets  
Image credit: NASA/Caltech/T.Pyle(SSC)**

Earth provides a variety of colours and pigments to choose from — from the comforting, cheery greens of our land plants to the dull purples of some photosynthetic bacteria, and the bright reds of certain seaweeds. The colour reflected by each organism, and thus the colour that it appears to be, is made up of the wavelengths that the photosynthesizer has shunned — mostly those that are not particularly useful for them. The colour of a plant, therefore, can depend on the quality of light the plant receives and that, in turn, depends on the properties of the local source of light and the atmosphere that filters out the light.

The sunlight that strikes Earth's surface, for example, is rich in green light, but land plants apparently shun this seemingly rich source of energy. That could be because green light is not as rich in photons as red light and not as energetic as blue light. Thus some researchers assume that reflection of green light was the product of an evolutionary growth —one of those cases in which the path of evolution yielded the most efficient option.

Black plants- is that a possibility? Red dwarfs, which are low-mass stars having a mass of less than half that of the Sun and lower energy and core temperatures, for example, emit only a fraction of the visible light produced by our own Sun, meaning that plants on planets around these stars will probably hoard all the visible light they can absorb, rather than

reflecting back any particular wavelength. That means they would probably look black.

And then the question arises that is there a colour that a plant couldn't be? Supporters of this study think that it's unlikely that plants will be blue, no matter what planetary environs is present. The team thinks that all plants will be keen to suck up high-energy blue light - so that would rule out bright blue leaves. "In general, plants will want to use blue light if they can," says Victoria Meadows, an astronomer at the California Institute of Technology in Pasadena, California, and a collaborator on the study.

Earth is the only place in the universe known to harbour life. However, recent advances in planetary science have changed fundamental assumptions about the possibility of life in the universe, raising the estimates of habitable zones around other stars and the search for extraterrestrial microbial life. Given that we have yet to find bacteria, let alone little green men or purple palms, on any other planet, it might seem slightly ridiculous to spend time working out what colour plants elsewhere in the Universe must be. But these models could be useful because they could help astronomers design their space telescopes with the perspective of a search for photosynthetic life, according to astronomer Eric Ford from the Harvard-Smithsonian Center for Astrophysics in Cambridge, Massachusetts. An alternate approach could be to study the composition of the atmosphere with spectroscopy to determine if plant life may be present.

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[Click here to go back to contents](#)

## **BOTANICAL BEADS**

**BY: HUMERA NASEEM  
BOTANY (HONS.) II<sup>nd</sup> YEAR**

Today most people think of natural jewellery as shiny pieces of corals, pearls and precious or semi-precious stones, polished and set in gold or silver. Who would ever believe that some of the most unusual and striking jewellery in the world comes from plants?

Almost any plant part can be used to make beads and jewellery. Leaves, stems, bark, roots, and petals have all been used, although beads made of colourful and durable seeds, fruits and woods are the most common. Large seeds can also be used as pendants. The polished wooden beads, colourful seeds and pieces of palm, bamboo and tropical hardwoods are strung on fine nylon filaments or gold or silver chains, producing attractive necklaces, bracelets, earrings etc. that rivals any synthetic costume jewellery. In terms of aesthetic beauty and intrinsic value, plant jewellery may rank as high as any gemstone. Some of the examples are *Coix lacryma jobi*, *Adenanthera pavonina*, *Euterpe oleraceae*, *Canna indica* etc.

### ***Coix lacryma jobi* –**



*Coix lacryma jobi* commonly called as job's tear or tear grass belongs to the family poaceae. It is normally grown in gardens as an annual. The seed produced are tear-shaped and seems to pop out in a continuous string from the stalk. As the seeds mature, their colours turn from pea green to shades of green brown and dark chocolate.

These seeds are used as beads in jewellery. It is used with its natural colour and sometimes the seeds are coloured with various dyes to make colourful jewellery articles. Unlike other seeds used as beads in jewellery these grow already to use as a bead with a hole through the middle and a hard, shiny coating.

Besides its use in jewellery it is also used as a source of food (cereal) and medicine.

### ***Adenanthera pavonina*-**

*Adenanthera pavonina* commonly referred to as red sandalwood is another botanical bead which is highly used in jewellery making. It belongs to the family Fabaceae.

It is a beautiful tree with pinnately compound leaves and dense racemes of fragrant, light yellow flowers. The fruit is a curved pod which contains the seeds. The seeds are exposed

when these pods curl back, and are used in necklaces and ornaments.



Seeds are very similar in shape and size and have a uniform weight of about four grams. It takes about 4 grains to make 1 gram and therefore in India, the seeds apart from its being used as beads, have been used as far back as history records as units of weight for fine measures of gold for instance.

### *Euterpe oleraceae*-

*Euterpe oleraceae* commonly called as acai palm belongs to the family Arecaceae. It produces small, round purple fruit (drupe).



The exocarp is the outer covering whereas the mesocarp is pulpy and thin. It surrounds the hard endocarp which contains a single large seed the seed comprises 80% of the mass of the acai berry, so after processing the berry for pulp and juice the remaining seeds are used as beads and therefore it is a great eco-friendly way to use the leftovers.

As they are seeds, the size does vary, so 10 mm is an average measurement. One of the most attractive features of these beads is the natural dark brown marking on it which appears quite randomly on it.

After the seeds are cleaned and dried a hole is drilled and the seeds are dyed in the desired colour and finally polished. These are then put together into unique and beautiful designs.

### *Canna indica*-

One of the most commonly used beads in natural seed jewellery comes from a beautiful wild flower *Canna indica* commonly called Indian shot. It belongs to the family Cannaceae. The flowers are hermaphrodites and seeds are produced in seed pods.



The seeds are small, globular, black to brownish in color, hard and heavy enough to sink in water. After collecting the seeds they are sorted according to their size and a hole is drilled through which a bead (seeds) are strung together. Often beads as spacers between these seeds they are mixed with silver trinkets and gemstones.

### *Elaeocarpus ganitrus*

*Elaeocarpus ganitrus* commonly called as rudraksha belongs to the family Elaeocarpaceae and holds a lot of importance in Hinduism as its seeds are used as prayer beads. It is an evergreen tree and the white flowers grow in bunches. The fruits produced are initially green in colour and turn blue upon maturity.



Within each pulpy berry (fruit) lies a single round seed (bead) which has a rough surface and a hole runs through it from top to bottom. Apart from its traditional use as in japa malas it is along with other beads and gems made into beautiful jewellery.

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[Click here to go back to contents](#)

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# WATER HYACINTH: AN AQUATIC WEED

BY: DEEKSHA  
BOTANY (HONS.) IIIrd YEAR

Water hyacinth, though bearing beautiful mauve flowers, is the commonest aquatic waterweed. It spreads very fast over a short period of time. It clogs the water bodies completely. Botanically, water hyacinth is called *Eichhornia*, and comes under the family Pontederiaceae.

The most common water hyacinth species is *E. crassipes*. It is an erect, free-floating, stoloniferous, perennial herb and is native to tropical and subtropical South America. The leaves are thick, glossy, broad and ovate in shape, floating above the water surface. The petioles of leaf are short, bulbous and produced in an uncrowded condition which provides a stable platform for vertical growth. Leaves are arranged in whorls of 6 to 10. During the reproductive stage the plant produces a single spike which is supported by an erect stalk. The inflorescence consists of 8-15 conspicuously attractive flowers, which vary from lavender to pink in colour. A single flower has 6 petals and displays a central yellow fleck.



Each inflorescence can produce more than 3,000 seeds and a single rosette can produce several inflorescences each year. The seeds are small, long lived and remain as viable sediments for 15 to 20 years. Roots are purple-black in colour, feathery and freely hanging. Vegetative growth occurs by single apical meristem present on each stem. These meristems produce leaves with axillary buds or are reproductive in nature, producing flowers. The plant also reproduces by runners or stolons which eventually result in the formation of daughter plants. It grows best in water which is high in macronutrients, has warm temperature, neutral pH and high light intensities.

It forms a dense mat that clogs the water bodies and makes them useless. It blocks the water flow and sunlight from reaching the native aquatic plants. Dense mats of water hyacinth interfere with navigation, recreation, irrigation and power generation. Under these mats, low oxygen condition are developed which causes the death of fishes and other aquatic animals. It also creates good breeding conditions for vectors which are the cause of various human and animal diseases.

Two weevils (*Neochetina eichhorniae* and *N.bruchi*), moths (*Niphograptia albiguttalis* and *Xubida infusella*) and micro fungi such as *Alternaria alternate*, *Drechslera hawaiiensis*,



*Ulocladium atrum* are used to control the growth of water hyacinth biologically. The growth of water hyacinth is also controlled by chemical and mechanical application but these methods are expensive, so the best way of its control is to prevent the accumulation of excessive nutrients.

But apart from its hazardous effects, water hyacinth has several uses as well. It is used as cattle food and in the production of biogas. It is also used in waste water treatment due to its fast growth and ability to tolerate high levels of pollution. In Southeast Asia traditional handicrafts are made from the various parts of this plant. In Bangladesh, a fertilizer is produced from water hyacinth. It also used in the bio-

cleaning of industries due to its extreme tolerance, and high capacity for the uptake of heavy metals.

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[Click here to go back to contents](#)

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# RAFFLESIA: THE CORPSE FLOWER

BY: KAVITA SHARMA  
BOTANY (HONS.) IIIrd YEAR

Found by an Indonesian guide Sir Thomas Stamford Raffles, who was the leader of expedition working for Dr. Joseph Arnold in 1818, in the Indonesian rain forest, *Rafflesia* is a parasitic flowering plant genus. It consists of approximately 28 species with four incompletely characterized species which were recognized by William Meijer in 1997. They are all found in South Eastern Asia on the Malay Peninsula, Borneo, Sumatra, Thailand and Philippines.



Stems, leaves or true roots are not present in this plant so it cannot perform photosynthesis and thus cannot make its own food. It is an endo-parasite of vines seen in the genus *Tetrastigma*\_(Vitaceae), which spreads its absorptive organ called the haustorium inside the vine tissue. The only visible part seen outside the host vine is the five petaled flower.

In some species such as *R. arnoldii*, the flowers are over 100 cm in diameter and 10 kg in weight and if 5-7 days old then undergo wilting. The flowers are red in color with white spots. *R. baletai* which is known as the smallest species has flowers which are 12 cm in diameter. The flowers of this plant appear and smell of rotting flesh, hence it is locally called as “corpse flower” or “meat flower”. The vile smell of this flower attracts insects such as flies, which act as pollinators.

*Rafflesia arnoldii* is the species which is rare and very difficult to find. It is very difficult to find the flower as the buds are developed in many months and the flower lasts for only few days. When the plant is ready to reproduce a bud is formed and develops over a period of time. Then the cabbage like head which is formed opens to reveal the flower. The meat rotting foul smell attracts flies and beetles for pollination. The fruits are round in shape, are filled with smooth flesh and have hard coated seeds which are eaten and spread by tree shrews and other mammals.

*Rafflesia* flower is popularly known as the largest flower in the world but it is also the heaviest. *Rafflesia* is the official state flower of Indonesia, also Sabah state in Malaysia, as well as for the Surat Thani Province, Thailand. *Rafflesia* is regarded as the third largest national flower of Indonesia. In Indonesia it is known as “padma raksasa”. It causes economic benefit by ecotourism.

It is used in different ways by the locals. In Thailand, young buds of flower are eaten as popular feast. In Peninsular Malaysia, *Rafflesia* buds are used by women to prevent internal bleeding and compress the womb after delivery. Men use it as an energy drink or as an amorphous remedy. However, the buds and flowers of *Rafflesia* carry high content of tannin and carbolic acid, therefore their excessive use can be very dangerous and lethal.

Due to the disappearance of Borneo and Sumatra forests it is assumed that its survival number is reduced and many of its species are very near to extinction. The efforts done by environmentalists to recreate the species have till now proved to be unsuccessful.

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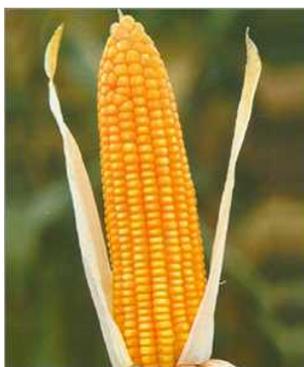
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## PETROCROPS

BY: NEETU SHARMA and AISHWARYA DHALL  
BOTANY (HONS.) IIIrd YEAR and IIInd YEAR

With the impending depletion of the fossil fuel reserve on one side, the ever increasing demand for energy and the threat of environmental pollution and global warming through greenhouse gas emission, it becomes necessary to search for viable energy sources.

Petrocrops are plants that yield compounds like biodiesel. They are certain species of flowering plants belonging to different families which convert a substantial amount of photosynthetic products into latex. The latex of such plants contains liquid hydrocarbons of high molecular weight about 10,000Da. These hydrocarbons can be converted into transportation fuel like petroleum. Therefore, hydrocarbon producing plants are called petroleum plants or petroplants and their crops as petrocrops. Natural gas is also one of the products obtained from hydrocarbons. Food crops such as corn, rapeseed, sugarcane, etc have been used in the production of biofuels. Biofuels can be produced through direct combustion or gasification of the crops to create electricity and heat or by converting them to liquid fuels such as ethanol for use in vehicles.



Some important families of petroplants are-

Euphorbiaceae, Apocynaceae, Asclepiadaceae, Sapotaceae, Moraceae, Dipterocarpaceae. Among all the energy crops, sugarcane (*Saccharum officinarum*) is known to give the highest amount of alcohol per hectare. It is a good source of fuel in the form of bagasse. Cassava or manioc (*Manihot esculenta*) is another petrocrop that has long term potential as an energy crop.

Moreover, a large number of xeric plants belonging to family Euphorbiaceae, Asteraceae, Asclepiadaceae and several other families have hydrocarbons or crude oils in their

tissues. They are regarded as promising fuel producing plants. Mainly latex producing plants and wild plants are good sources of hydrocarbon.

Description of some petrocrops:

**Guayule (*Parthenium argentatum*)**

**Family-Asteraceae**

A bushy, silver-grey wild plant contains about 25 per cent rubber hydrocarbon. Latex contains hydrocarbons of high molecular weight and can be converted into light hydrocarbon fraction. The biocrude can then be converted into liquid fuel by fluidized catalytic cracking (FCC) as in oil refinery.



*Euphorbia tirucalli*



*Calotropis procera*



*Calotropis sp.*



*Cryptostegia grandiflora*



*Pedilanthus tithymaloides*



*Parthenium argentatum*

## **Euphorbias**

## **Family-Euphorbiaceae**

Two important species are Gopher plant (*Euphorbia lathyris*) and Milk Bush (*E. tcalli*). Former contain latex having high percentages of hydrocarbon like material, mostly triterpenols and fatty acid ester and other fatty acid derived lipids, and sugars. These materials can be cracked to form a crude oil similar to that obtained from petroleum. The latter is a perennial shrub or small succulent, spineless tree about 5-10 m high with cylindrical branches that are clustered irregularly and bear caducous leaves. Hydrocracking of the biocrude yields liquid fuel.

## **Rubber Bush (*Calotropis procera*)**

## **Family-Asclepediaceae**

Rubber Bush or Akund is a perennial shrub with broad, opposite decussate, thick leaves and scented purple-spotted pink flowers that are arranged in umbellate inflorescences. The dried latex contains 53-85 per cent resins and 11-23 per cent rubber hydrocarbons.

## ***Pedilanthus tithymaloides***

## **Family-Euphorbiaceae**

It is a small shrub with erect, thick, zigzag, branched stem bearing fleshy green deciduous leaves and occasional small spray of red flowers.

## ***Cryptostegia grandiflora***

## **Family-Asclepediaceae**

It is also called as Indian Rubber Vine. It has good potential for being as a source of hydrocarbons.

## **IMPORTANCE:**

Petrocrops contribute a significant share of global primary energy consumption. It has been estimated that biofuels so obtained can replace the use of fossil fuels. Also these biofuels are more ecofriendly since they generate lesser carbon dioxide emissions. Moreover these crops are renewable, non-polluting and available world wide as agricultural residues, short rotation forests and crops. Some petrocrops also have the potential to form myccorhizal association with VAM fungi under natural conditions. This improves the quality of soil as well as the biocrude content.

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[Click here to go back to contents](#)

# NEEM- THE WONDER PLANT

BY: NIKITA DALAL  
BOTANY (HONS.) II<sup>nd</sup> YEAR

Kya aap 'DATUN' karte hain? Ever wondered how villagers keep a check on cavities, bleeding gums, plaque formation, discolouration of teeth and other dental problems even though they have limited access to modern dental care? Here is why people in Indian villages still prefer twigs of neem- *Azadirachta indica*, keekar- *Acacia arabica*, Guava- *Psidium guajava*, Miswak-*Salvadora perisca*, neem being the most popular of them all, instead of toothpaste and a toothbrush.



AP / Rajesh Kumar Singh



Unaware of the properties of datun, people in Indian villages use datun for their oral hygiene. Neem twigs become fibrous when chewed, which helps in removing plaque build-up on teeth and around gum-line.

Apart from this, chewing neem spreads the neem extract to all parts of the mouth thus taking complete care of mouth. Neem is a multi-purpose plant with divine values. It has anti bacterial properties too which inhibits the growth of *Streptococcus mutans*, *S. salivarius* and *S. mitis* - bacteria responsible for dental caries.

It has been rightly called the "Nature's Drug Store" since it also has anti-fungal properties which combats yeast/*Candida albicans* growth which if ignored can cause thrush and other tooth problems. Not only this, neem purifies the blood, prevents bad breath, has healing property for any kind of ulcers in mouth. Indeed this tree

justifies the status of sanctity given to it for centuries with divine properties instilled in its every molecule.

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[Click here to go back to contents](#)

# MEDICINAL IMPORTANCE OF COCONUT

BY: AISHWARYA DHALL  
BOTANY (HONS.) II<sup>nd</sup> YEAR



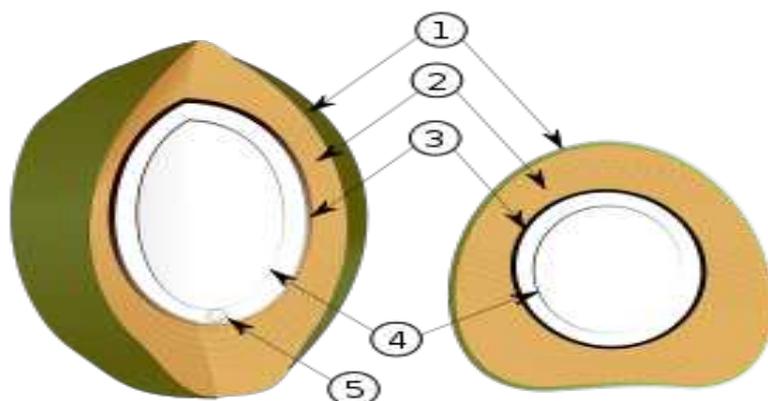
Botanical name-*Cocos nucifera*  
Family-Arecaceae

Coconut, also called “functional food” (due to its many health benefits beyond its nutritional content) is a highly nutritious and fibrous fruit. In Sanskrit, the coconut palm is known as kalpa vriksha meaning “tree that gives all that is necessary for living”. For years it has been providing us its benefits in the form of meat, juice, milk, and oil. People from many diverse cultures, languages, religions, and races scattered around the globe have revered the coconut as a valuable source of both food and medicine.

## DESCRIPTION:

The coconut palm is a tall tree having a single trunk growing up to 30 meters tall. Its bark is smooth and grey, marked by ringed scars left by fallen leaf base. It has pinnate leaves 4–6 meters long with bright green leaflets. The inflorescences that arise at leaf axils are enveloped by carinate spathe. The female flowers are borne basally while male flowers at apex. Flowers bear lanceolate petals, 6 stamens and an ovary consisting of 3 connate carpels. The fruit is a drupe with a thin, smooth, grey-brownish epicarp, a fibrous, 4-8 cm

thick, mesocarp and a woody endocarp. Inside this endocarp there is a seed rich in reserve substances located in the endosperm which is partly liquid (coconut milk), partly solid (flesh).



Layers of the coconut fruit

- (1) Exocarp / Epicarp
- (2) Mesocarp
- (3) Endocarp
- (4) Endosperm
- (5) Embryo

So, lets take a small peek at its medicinal importance-

### **Use of Coconut in Medicine**

For thousands of years coconut products have held a respected and valuable place in local folk medicine. In traditional medicine around the world, coconut is used to treat a wide variety of health problems like: abscesses, asthma, baldness, bronchitis, bruises, burns, colds, constipation, cough, dropsy, dysentery, earache, fever, flu, gingivitis, gonorrhoea, irregular or painful menstruation, jaundice, kidney stones, lice, malnutrition, nausea, rash, scabies, scurvy, skin infections, sore throat, swelling, syphilis, toothache, tuberculosis, tumors, typhoid, ulcers, upset stomach, weakness, and wounds.

### **MEDICINAL USE OF COCONUT OIL**

Coconut has been used as a remedy for infections of Candida or other fungi. The medium-chain fats produce an anti-microbial effect against a wide range of micro-organisms found within the body. Caprylic acid too acts as a weapon against Candida and other unwanted fungal species. The acid diffuses into the membrane of these cells before dissolving it, spilling the contents and causing immediate cell death.

Consumption of the oil also lowers total cholesterol, triglycerides and low-density-lipoproteins all of which are linked to increased risk of heart attacks. The polyphenol contents of the oil prevent the formation of plaques. These plaques cause atherosclerosis, a condition in which an artery wall thickens as a result of the accumulation of fatty materials such as cholesterol.

Coconut oil also helps in weight loss. The medium-chain fats in coconut oil take a different route in the human body compared to other fats. Other fats diffuse from the intestines into the lymphatic system and only then into the blood stream. Their medium-chain equivalents travel directly to the liver for oxidation. This results in an increased rate of fat burning following their consumption, hence leading to weight loss.

## MEDICINAL USE OF COCONUT WATER

Coconut water has been found to have excellent rehydrating properties. It also kills intestinal worms and checks urinary infections. Its application on the body helps in prevention of prickly heat and summer boils and subsides the rashes caused by small pox, chicken pox, measles, etc. It aids the quick absorption of the drugs and makes their peak concentration in the blood easier by its electrolytic effect. It is used as blood plasma substitute because it is sterile, does not produce heat, does not destroy red blood cells and is readily accepted by the body.

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[Click here to go back to contents](#)

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## WORLD OF DAZZLING PLANT COLOURS

**BY: SURBHI SHARMA**  
**BOTANY(HONS.) IIIrd YEAR**



Whenever we come across beautiful specimens of flowers in nature the first question that comes to mind is how these peculiar and exquisite patterns are created in nature, which are so difficult to recreate artificially. The colours of a flower are such that they have always fascinated people from different walks of life be it toddlers or adults.

The persona and the impact of the colours are such that they make the entire environment around them, look refreshing and stunning. The colour of organisms/flowers can be attributed to

two reasons, either due to the presence of certain pigments like anthocyanins which impart colour or it can be due to the reflection of light from the surface of plants. The next question that comes to mind is that why at all are the flowers coloured? This is because of various reasons, the most important being pollination. One such example is of *Ophrys speculum*, this orchid is pollinated by a hairy wasp *Colpa aurea*. Here the male wasps leave the burrows for above ground existence, four weeks before the females emerge for open air mating. The orchid opens its flowers about the same time the males appear, and they are similar in colour, appearance and odour as that of female wasps. The males being inexperienced, consider the flowers as their female counterparts and perform the act of pseudo-copulation. The male wasps repeat the act with a number of flowers and carry the pollinia from one flower to another flower, and hence bring about pollination. But colours are not always for a useful purpose, sometimes seemingly purposeless colours

are also present in plants, eg- yellow anthers of some conifers and red stigma of *Corylus avellana*. In certain plants the white colour present is mainly due to the reflection of light between the intercellular spaces and the surface between cells.

Flower colours, from red to purple to blue, are mostly from anthocyanins, a type of flavonoid. Although there are many colours, only a few anthocyanidins, chromophores of the pigments, have been found. Unlike chlorophyll and carotene, anthocyanins are not attached to cell membranes, but are dissolved in the cell sap. The colour of the pigments is stable in plants for a few days to one month but the extracted anthocyanins are, nevertheless, unstable and quickly lose colour by hydration in a neutral aqueous solution. Anthocyanins absorb blue, blue-green, and green light. Therefore, the light reflected by leaves containing anthocyanins appears red. The color produced by these pigments is sensitive to the pH of the cell sap. If the sap is quite acidic, the pigments impart a bright red color; if the sap is less acidic, its color is more purple. Anthocyanin pigments are responsible for the red skin of ripe apples and the characteristic purple colour of ripe grapes. Anthocyanins are formed by a reaction between sugars and certain proteins in cell sap. This reaction does not occur until the concentration of sugar in the sap is quite high. The reaction also requires light. This is why apples often appear red on one side and green on the other as the red side was sun facing and the green side was in shade.

Some people believe that spring is the true flower season as during this season diversity of flower colours is seen. But such individuals are not aware of the term 'Autumn Colours'. During summer, the leaves of trees are factories producing sugar from carbon dioxide and water by the action of light on chlorophyll. Chlorophyll causes the leaves to appear green. The leaves of some trees, such as birches and cottonwoods, also contain carotenes; these leaves appear brighter green, because



carotene absorbs blue-green light. Water and nutrients flow from the roots, through the branches, and into the leaves. The sugars produced by photosynthesis flow from the leaves to other parts of the tree, where some of the chemical energy is used for growth and some is stored. In autumn the days become shorter and the temperature at night also decreases, due to this environmental change certain physiological changes appear in plants. One of the most important change is the development of a membrane which is corky in nature. This membrane prevents/stops the flow of nutrients into the plant, as a result the plant becomes nutrient deficient, the chlorophyll content in the plant decreases and the characteristic green colour fades. In some leaves the sugar content

increases and the sugar present reacts to form anthocyanins. Due to this, the faded yellow colour of leaves that was produced due to the disappearance of chlorophyll turns to red. Such a phenomenon is seen in *Acer rubrum* (red maple) and *Quercus rubra* (red oak). This process is essential at the onset of winter to let the trees know that the time has arrived to reduce their physiological activities. This is also because of the fact that winters are comparatively harsh and unfavourable for plants to flourish as compared to summers. These colours, ki.e. yellow, orange; etc are also present in summers but are not visible as then the green colour of the chlorophyll dominates.



Red Maple



Cherry tree in autumn

The range and intensity of autumn colors is greatly influenced by the weather. Low temperatures destroy chlorophyll, and if they stay above freezing, promote the formation of anthocyanins. Bright sunshine also destroys chlorophyll and enhances anthocyanin production. Dry weather, by increasing sugar concentration in sap, also increases the amount of anthocyanin. So the brightest autumn colors are produced when dry, sunny days are followed by cool, dry nights. Also autumn colours in characteristic trees are a source of attracting tourists and travelers to regions where these trees occur like in Kashmir, India ; New England; Michigan; Canada; etc. Next question that comes to mind is, why does the plant need to spend its energy on such leaves which are at the verge of falling. The answer to this question is that the pigments like anthocyanins, xanthophylls, etc., which result in the formation of these variety of colours are protective and essential for the plant. Some scientists think that the anthocyanins help the trees keep their leaves on the trees a bit longer. The pigments protect the leaves from the sun, and lower their freezing point, giving some frost protection. The leaves remain on the tree longer, and more of the sugars, nitrogen and other valuable substances can be removed before the leaves fall. Also, when the leaves decay, the anthocyanins seep into the ground and prevent other plant species from growing in the spring and the phenomenon is known as allelopathy.

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# ENTOMOPHILY AT A GLANCE

**BY: SHREYA SATIJA  
BOTANY(HONS.) IIInd YEAR**

The word pollination creates an image of a bee sitting on an attractive flower, collecting nectar, not knowing that it is loading on pollen grains to deliver them on another flower. The most common pollinators we can think of are the bees. But it is interesting to know how exactly this phenomenon of pollination takes place.



## Honey Bees

On their lower and hind limbs of the bees, a special structure is present. This structure is called corbicula. This modified structure acts like a pollen basket and through this, the pollen grains are carried to another flower.



## Euglosine bees

Not all the bees are attracted towards the nectar, some bees like Euglosine bees visit flowers to collect floral scent from orchids and while doing so, they pollinate the orchid flowers.

## Bumble bees

Yet another type of bees living in cracks of boards, called Bumble bees. These are common pollinators. The bumble bees are said to do buzz pollination. When they grab the anthers, the pollen grain-bearing structure, the bees buzz their flight muscles which release the pollen grains.

## Carpenter bees

Another type of pollinating bees are carpenter bees. These resemble bumble bees but carpenter bees are solitary bees and do not live in hives, rather they live in tree trunks. In the early spring these make a hole in wood of tree trunk thus making a small tunnel. This bee then lays its eggs in this tunnel. It fills the brood cells with fluid derived from pollen sacs so that the developing young ones get sufficient nutrition. Later this



female bee seals the tunnel and allowing itself to die.

### Wasps

Most interesting example of wasp pollinator is the fig wasp. These wasps belong to Araonidar family. They have a 48 hour life span, female wasps have wings whereas the male wasps lack wings. Male wasps have two functions, first is to mate with the female wasps, and secondly, to chew the interior of the fruit so as to make a way for the female wasps to escape out of fruit. The inflorescence bears an opening called ostiole, around this ostiole, male flowers are present and the lower end contains the female flowers which show heterostyly. The longer styled flowers cannot be pollinated by the wasps but the female wasp, which has a long ovipositor, lays eggs in these flowers.

The short styled flowers are pollinated by the female wasps bringing pollen from other inflorescences and these grow into seeds. The task of pollination is done while the female wasp lays eggs. And the female dies allowing the developing fruit to absorb nutrition from its body. These eggs will further give rise to adult male and female wasps which mate while the seeds are still developing. Soon after mating, the fertilized female wasps move through the chewed space created by the male wasps and escape through the ostiole. While exiting the pollen grains stick to the body of female wasps which further pollinate the next inflorescence they enter to lay eggs. This way, both the wasp and the fig tree have coevolved ensuring the survival of both.

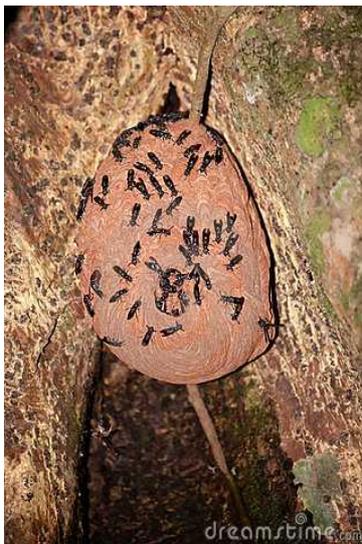


Fig Wasps

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# SPECIAL FOCUS: BOTANICAL GARDENS AND WILDLIFE SANCTUARIES



## BOTANICAL GARDENS – AN EX-SITU CONSERVATION STRATEGY!!!

**BY: AISHWARYA DHALL and NIKITA DALAL  
BOTANY (HONS.) IIInd YEAR**

In today's time, extinction of a large number of both plant and animal species can be seen, and hence biodiversity is at stake. Conservation has now become a global concern and is a primary topic of discussion in the UN World Summit for Sustainable Development. Thus, restoration, rehabilitation and preservation of endangered species is of prime importance. **Botanical gardens** provide one of the best ways of conservation to conserve biodiversity since it. Botanical garden is an ex-situ conservation method wherein special plant collections which could be herbs, tropical plants, alpiners or exotic plants that are endangered are taken care of. These gardens are mostly maintained by scientific research organizations where they maintain documented collection of living plants. Furthermore, these gardens may have greenhouses or shade-houses in order to provide optimum conditions for the endangered species.



Also, beside conservation, botanical gardens have more to offer us-

- \* Due to destruction of habitat of certain plant species, their conservation becomes more important, horticulture and proper cultivation skills help conserve such sensitive species.
- \* Botanical gardens also have seed banks wherein seeds of endangered species can be stored at lower temperatures.
- \* Botanical garden is a medium of living collection of plants giving us first hand information

on its behavioral and survival patterns thus helping in research as well.

\* Botanical gardens provide information to the common man about the importance of plant biodiversity and its other uses.



LET'S KEEP THE PLANTS SMILING!!!

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## KEUKENHOF TULIP GARDENS, AMSTERDAM

**DR. GEETA MEHTA**

Keukenhof, which literally means “Kitchen garden” is the world’s largest and the most beautiful spring flowers garden in the world. It is located near Lisse, Netherlands and spread over an area of 32 hectares. After the cold and dark winter, everyone looks forward to the spring which brings with it the sun and its warmth. The tulips begin to emerge then. The park is open to the viewers from March 22nd to May 20th. Millions of tourists visit to see the beautiful flowers.

The garden was established in 1949 and growers from all over Netherlands and other parts of Europe could exhibit the hybrids developed by them. This helped the Dutch export industry to grow and presently they are the biggest flower exporters in the world.

More than seven million bulbs are planted in Keukenhof. There are more than 100 varieties of Tulips. Bulbs of Hyacinths, Narcissus, Daffodils and several other flowers are also planted in large numbers. The garden layout is planned very nicely and these flowers present a spectacular, fairy tale-like view.







## **STATE BOTANICAL GARDEN-EKRAM KANAN, BHUBANESWAR,** **ORISSA**

**DR. GITA MATHUR**

Located about 18kms from Bhubaneshwar, State Botanical Garden spread over 173 acres, is situated near to the sprawling green Nandankanan Zoological Park. The lake which flows through the center separates the State Botanical Garden from Nandankanan park. State Botanical Garden is a perfect place for plant enthusiasts and nature lovers with a rich collection of plants, medicinal trees, shrubs and herbs. Besides, the Botanical Garden also houses a Childrens Park with swings, merry-go-round, sliding chute, etc. for children and an Artificial Zoo with models of animals. The Garden remains open to Public all days except on Mondays from 7.00 AM to 5.00 PM.

The plants are well arranged in various gardens like – a Rosarium, with a huge collection of 1000 varieties of roses; a Medicinal Garden containing 200 species of medicinal trees, shrubs and herbs; a Landscape Garden demonstrating lawn, trees and shrubs; a Japanese garden in Tsukiyama-niwa style with flowing streams; a Cacti house; a Bonsai house and a Glass house containing 60 species of indoor plants like Aglaonema, Philodendron, Calathea, Cordyline, Diffenbachia, Spathiphyllum, Peperomia etc.

A Regional Plant Resource Centre was established here in 1985 as a recreational garden with an aim to provide a green lung for the inhabitants of Bhubaneswar – the capital city of Orissa. Gradually it became a dynamic and vibrant research organization of the State Government with a focus on the conservation of plant biodiversity. Over the years, it has made significant contributions in the field of ex situ and in situ conservation and assessment of genetic diversity of various groups of plants and its related aspects. With strengthening of scientific manpower and laboratory facilities, it expanded its areas of research which witnessed large outputs in terms of analysis of genetic assessment of plant groups through cyto-taxonomic and molecular techniques.

As a reference center for all matters pertaining to plant resources of the region, RPRC is endeavoring to collect conserve and propagate species of specialized and unique plant communities. The center boasts of a diverse collection of medicinal plants, bamboos, trees of rare & endangered species in its arboretum. The Centre's collection of cacti (850var.) continues to be one of the major attractions for naturalists. The living collection of Orchids got a boost during the year, by addition of 43 number of wild orchids species, made possible due to arduous exploration undertaken to unexplored forests areas of Orissa and adjoining states.

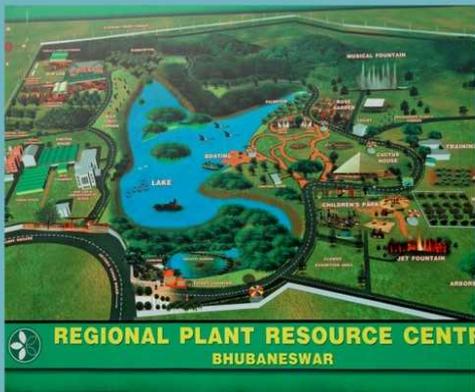
An innovative venture initiated during the year led to germplasm collection of 52 species of wild fruit plants of the state, and it's nutrient and anti-nutrient quality is being investigated, so that domestication and breeding potential can be recommended. All the living collections, seed accessions, herbarium collections etc was also recently put on a web for access to the public. The thrust of the research in the institute has been realigned to make it socially relevant.

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## OOTY BOTANICAL GARDEN

DR. GITA MATHUR

This garden was laid out in 1847 by the Marquis of Tweedale and is spread over 55 acres. Lush green well maintained lawns, rare tree species (like the cork tree which is probably the only such tree in India, the paper bark tree and the monkey puzzle tree - monkeys cannot climb this tree), a 20 million year old fossilized tree, an Italian-style garden bordering a clear pool, a vast variety of flowering bushes and plants in myriad hues (exotic and ornamental), fern house with a vast range of ferns and orchids, are some of the many highlights of this garden. A flower show along with an exhibition of rare plant species is held every year in the month of May at this garden. The Garden is maintained by the Horticulture Department of the Government of Tamil Nadu and has a very wide variety of plants that include different types of roses, imported shrubs, rare flowering plants etc.

This is a must visit place if you are at Udhagamandalam (Ooty). It is located within the city limit and lies on the lower slopes of Doddabetta peak. It ascends the slopes of the hill at an elevation of 2250–2500 metres above Mean Sea Level. The garden has 140 cm average rain fall. Maximum temperature goes upto 28 degree centigrade. Minimum temperature falls upto 0 degree centigrade in winter. This garden covers an area of 22 Ha and is located at a height of 2250 meters of MSL. There is a beautiful green lawn and trees collected from different parts of the world. There is an Italian garden and Lily pond with colorful flowers.

The present Botanical Gardens are divided into **6 sections** namely Lower Garden, New Garden, Italian Garden, Conservatory, Fountain Terrace and Nurseries.

### **Lower Garden**

The lower garden comprises the entrance and the lower lawns. The entrance of the garden leads into an extensive lush green lawn of Kikiyu grass (*Pennisetum clandestinum*) which is known for its springy vigour. A fern house with 127 species of ferns is situated on the left along the road leading to Raj Bhavan amidst another expanse of lawns and historic gatehouses. The prime attractions in this section are the carpet-bed design of the map of the Indian Union laid out with selective plants and the fossil trunk of a 20 million year old tree, erected on a pedestal.

Tree species of botanical interest such as *Hymnosporum flavum*, *Cordyline australlis*, *Cedrus deodara*, *Cupressus funebrils*, *Araucaria bidwillii*, *Cupressus macrocarpa*, *Cryptomeria japonica*, *Eucalyptus maculate*, *Eucalyptus citriodora*, *Salix babylonica*, *Salix heterophylla*, *Podocarpus taxifolia*, *Dracena lanuginosa*, *Pinus patula*, *Rhododendron arboreum*, *Quercus montana*, *Quercus cerris*, *Quercus Serrata*, *Quercus griffithi*, *Quercus illex*, *Magnolia grandiflora* etc., can be seen alongside the lawn.

### **New Garden**

The New garden developed recently, comprises the area between the front garden and the crescent-shaped pond at the bandstand. This section consists of: a rose garden with three hundred varieties of Hybrid Tea Roses, Floribunda and Polyanthas rose varieties, a large number of flowerbeds designed to match the slopes and contour of this area, carpet-bed emblems of the Government of Tamil Nadu and the Government of India and natural ponds with aquatic plants.

Important tree species such as *Taxodium mucronatum*, *Pieris ovalifolia*, *Juniperus*

*virginiana*, *Eucalyptus eugenoides*, *Pinus wallichiana*, *Photinia lindleyana*, *Pinus canariensis*, *Ginkgo biloba*, *Araucaria cunninghamii* and *Cupressus lawsoniana* are planted all over the section.

### **Italian Garden**

This garden was first laid out by Italian prisoners of World War I, who were shifted to Ooty. They were placed under the control of the Military station in Ootacamund. Asters, ageratum, balsam, begonia, petunia, pansy, phlox, cosmos, zinnia and perennial flowers like salvia, larkspur, and dahlia are the main attraction in this garden.

The informal landscape of the garden from the entrance, merge into the formal fashioned beds laid out in an Italian pattern, surrounding the centrally situated octagonal bandstand. This part of the garden looks attractive with several varieties of colourful annuals. In the foreground, is a crescent-shaped lily pond for growing several varieties of aquatic plant species. The tree species grown in this part of the garden are *Prunus cerasoides*, *Saurauja nepaulensis*, *Grevillea hilliana*, *Aesculus punduana*, *Pinus sabineana*, *Cupressus torulosa*, *Syncarpia glomulifera*, *Pinus roxburghii*, *Albizzia julibrissin* etc.

### **The Conservatory**

The public conservatory was constructed in 1912 with the objective of grouping various flowering plants. Colourful annuals and perennials like Cineraria, Schizanthus, Calceolaria, Balsam, Cyclamen, Gloxinia, Tuberous begonia, Coleus, Geranium, Chrysanthemum, Primulas, Tydea, Achemenes etc., find a place in this conservatory.

The bog garden lies towards the east of this conservatory and forms an adjunct to provide a good site for marsh loving plants such as the Weeping willow, Hedychium, Arum, Hydrangea etc.

### **The Nurseries**

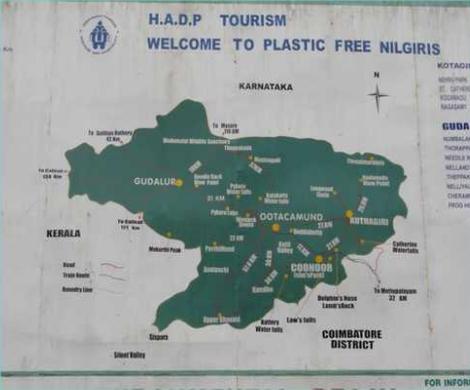
The nurseries which are about 300 feet above the lower lawns, consist of eight glass-houses and a series of terraces for introduction and breeding of exotic plants. The glass-houses are utilized for growing Begonias, Ferns, Cacti, Succulents, Orchids and Bulbous plants for providing a continuous supply of potted plants to be grouped periodically in the conservatories. The terraces are utilised for growing plants for cut flowers, seed and also for trial purposes.

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**GREIFSWALD BOTANIC GARDEN AND ARBORETUM**

Photographs contributed by

## DR. SHWETA VANDANA

**Greifswald Botanic Garden and Arboretum** (total area 9 hectares, German: *Botanischer Garten und Arboretum der Universität Greifswald*), was founded in 1763. It is one of the oldest botanical gardens in Germany, and one of the oldest scientific gardens in the world. It is associated with the University of Greifswald in Greifswald, Germany.

The Botanic Garden consists of 16 greenhouses (German: *Gewächshaus*) and the adjacent outdoor area (German: *Freiland*). The total area of the Botanic Garden is two hectares. The Botanic Garden is located at *Grimmer Str. 88*. It contains about 7,000 plants.

Source of the above information is:

<http://en.wikipedia.org/>



## **GARDENS IN SRINAGAR**

Photographs contributed by

**DR. GITA MATHUR**

### **Jawaharlal Nehru Memorial Botanical Garden, Cheshmashahi, Srinagar**

This beautiful landscape garden took birth in the year 1969 on the enchanting Zabarwan mountain slopes near famous Mughal Garden Cheshmashahi, overlooking the panorama of Dal-Lake. This pleasure garden complex extends over an area of about 80 hectares and consists of several styles of gardens with unending joy for seekers of solace on informal and undulated landscape. It comprises of four components- Recreational Garden, Botanical Garden, Research Section, and Plant Introduction Centre. A beautiful lake spread over an area of 17 hectares with joy riding boats is also the attraction of the garden. The garden provides a 3.5 Kilometer joyride, a pleasant water garden, inspiring colour feast of spring, fragrance and colour pageantry of roses, riot of colours in summer, changing autumn colours and captivating twitter of water falls. Over 1.5 Lakh ornamental plants, representing about 300 plant species have been planted in the garden.

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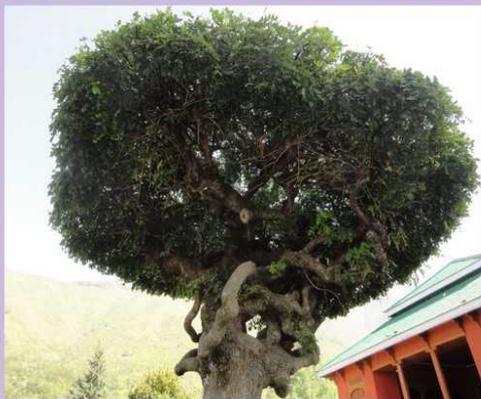








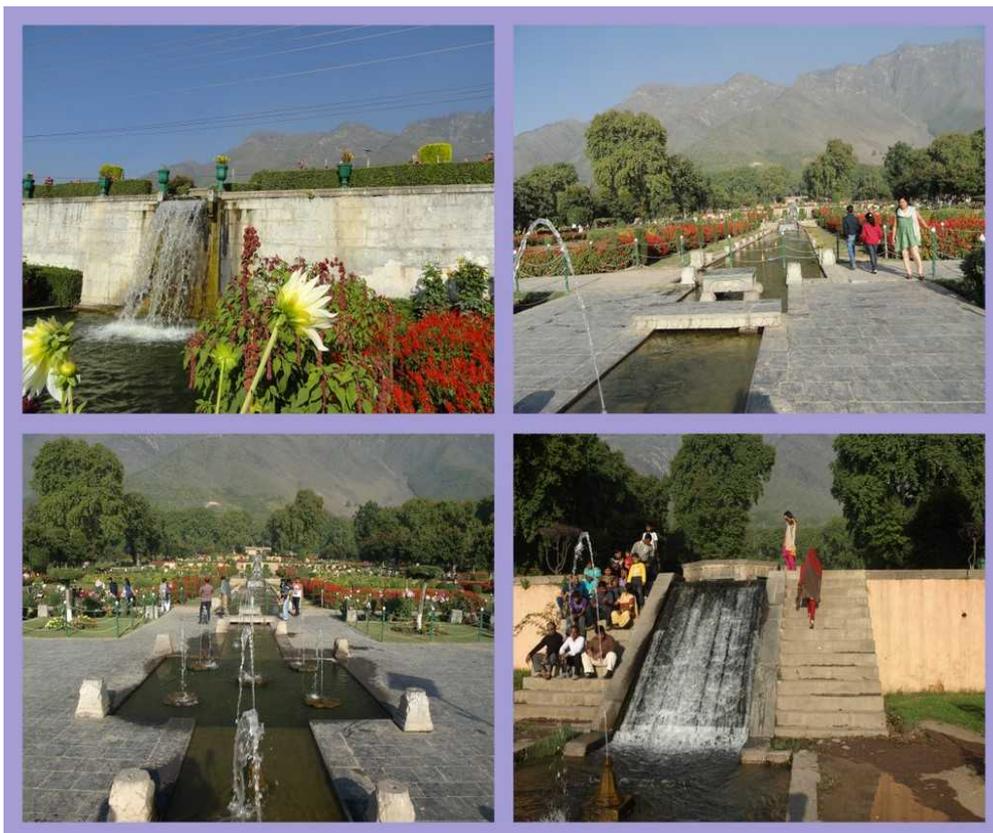


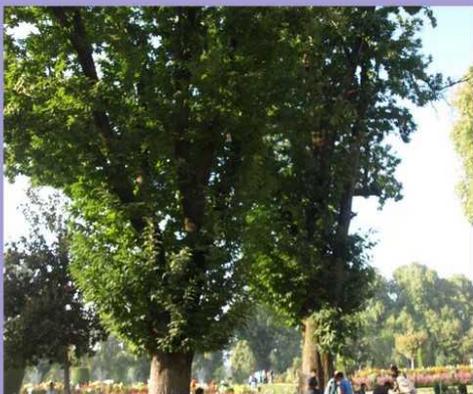


**Nishat Garden**

Nishat garden, the garden of Delight, the largest Mughal Garden on Dal-Lake was laid out by Asaf Khan, brother of Nur Jahan, wife of Jahangir, in the year 1632 A.D. It is located on Dal-Lake about 2.5 Kilometers to the south of Shalimar and commands a magnificent view in the west and has a panoramic back drop of mountains in the East. The garden had originally 12 terraces. Enchanting central water channel, rippling fountains in large tanks and channels and sparkling cascades amidst bountiful colours, lush lawns and mighty chinars are principal features of this pleasure garden. The garden is spread over an area of about 20 ha.

This garden of the royal spring was built in 1642 A.D. by Ali Mardan Khan, the Governor of Kashmir during the reign of Emperor Shah Jahan. It is a terraced garden situated 9 Km away from Srinagar and about 2 Km up from the main road in a mountain side overlooking Dal-Lake. Fountains play in the central water channel starting from the famed spring located in the upper most terrace. It is famous for its pure, sparkling and cool mineral water. To cope up with the ever-increasing tourist traffic the garden has been extended in recent years. It has also been lit recently with multicoloured garden lights. This has proved an added attraction for tourists as well as locals. The garden extends over an area of 6.20 ha.







## **MAINAU ISLAND, GERMANY**

**Photographs contributed by**

**MR. HARJINDER SINGH,**

**Superannuated TA, Botany Department, Gargi College.**

Germany's Mainau (pronounced "My-now") Island is an unexpected, semi-tropical destination with a decidedly Mediterranean flair. Located near the border of Germany and Switzerland, Mainau is nicknamed "The Flower Island" and is a wonderful place to spend the day wandering among the flower gardens,

Mainau, a small island on Lake Constance (a.k.a. the Bodensee) is just 3 miles from the city of Konstanz. The 45 hectare (111 acre) island is the most popular tourist destination in the region, drawing over a million visitors a year. To roam the paved paths lined with thousands of blossoms, shrubs, and trees is a treat for the senses.

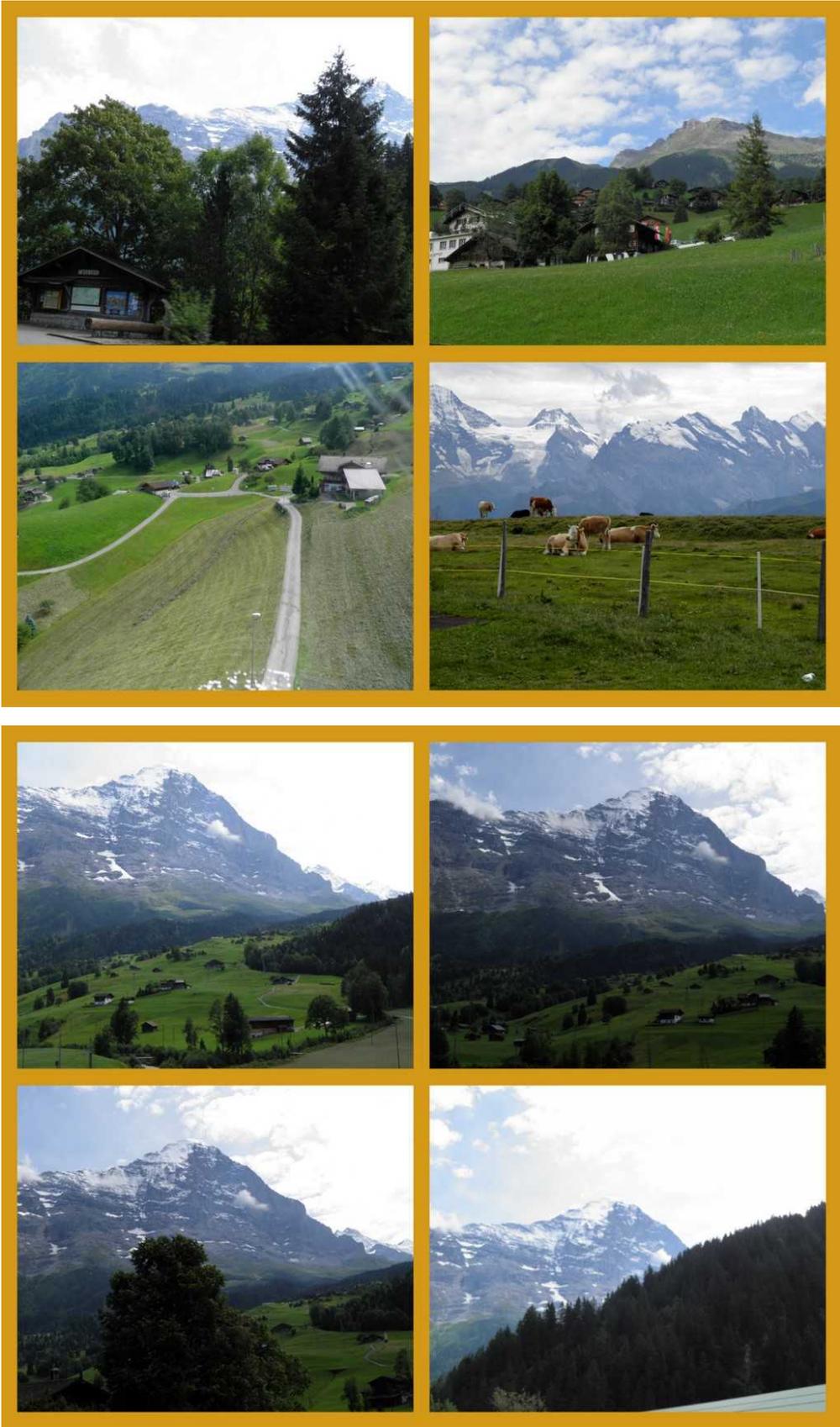
In the early 1827 Prince Nikolaus von Esterházy created a botanical garden that was later expanded in 1871 by Grand Duke Friedrich I to include an arboretum and an Italian rose garden. Some of the trees are over 150 years old. In the 1930's, Swedish Prince Lennart Bernadotte I, the great grandson of Grand Duke Friedrich I, bought the island from his father, Prince Wilhelm. The young prince, who renounced his Swedish royal lineage when he married a commoner, Karin Nissvandt and had 4 children with her, devoted the rest of his life to the privately-operated park. For his work, he was awarded the title of Count Bernadotte af Wisborg, by Grand Duchess Charlotte of Luxemburg. In 1972, Count Lennart remarried to Countess Sonja Bernadotte and had 5 more children. He developed the island into a "miniature garden paradise" that has benefitted the area.

Mainau is open the year around. The orchids, over 3,000 of them, kick off the Flower Year with their spectacular blooms followed closely by fragrant hyacinths, snowdrops, bluebells and other colorful blooms. The stars of spring are the million tulips that bloom against a backdrop of snow covered Alpine peaks. In late May, rhododendrons in shades of red, white and salmon-colored blanket the slopes.

June and July are peak months for over 20,000 roses that bloom in the Italian Rose Garden. With 1200 varieties from which to choose, the choice is difficult, but each year visitors pick one variety to be the "Rose Queen." Summer is prime blooming season and flowers of every kind and color line the paths and are displayed in skillfully designed beds. Children love the "Begonia Duck" and the "Flowers Peacock." Gardeners create these fantasy birds from thousands of flowers planted on a netting wire base.

Source of the above information is:

<http://www.highonadventure.com/hoa11feb/janet/mainauisland.htm>





# **BHARATPUR BIRD SANCTUARY**

**BY: SOHINI DEB**

**BOTANY(HONS.) IIIrd YEAR**

Keoladeo National Park formerly known as the Bharatpur Bird Sanctuary, situated in Rajasthan, India is a famous avifauna sanctuary which was declared a protected sanctuary in 1971 and is also a declared World Heritage Site.

The national park was named after a Keoladeo (Shiva) temple within its boundaries. The park was a hunting ground for the maharajas of Bharatpur, a tradition dating back to 1850, and duck shoots were organised yearly in honour of the British viceroys. In one shoot alone in 1938, over 4,273 birds such as mallards and teals were killed by Lord Linlithgow, the then Governor-General of India.

More than 300 species of birds are found in this small wildlife park OF 29 sq.kms; of which 11 sq.kms are marshes and the rest scrubland and grassland. Thousands of rare and highly endangered birds such as the Siberian Crane come here during the winter season and over 230 species of birds are known to have made the National Park their home. Migratory birds at Bharatpur bird sanctuary include several species of cranes, pelicans, geese, ducks, eagles, hawks, warblers, larks etc.



**RUDDY SHELL DUCK**



**EGRETS**



**BRONZE WINGED JACANA**



**BLACK WINGED STILT**



**WATERLANDS AND GRASSLANDS OF THE SANCTUARY**

- ORIGINAL PICTURES

**References:**

<http://www.bharatpursanctury.com/>

[Click here to go back to contents](#)

# **SCIENCE SEMINAR: A REPORT**

**BY: NIKITA SINGHAL and ALANKRITI  
BOTANY (HONS.) IIIrd YEAR**

## **Biotechnology in Human Welfare**

An Interdisciplinary Seminar "Biotechnology in Human Welfare" under the Star College Scheme (funded by DBT) was held on the first day of SCINTILLATIONS, the Science festival on 12th January 2012 in the auditorium. The seminar was inaugurated by lighting of a lamp and a brief introduction about the speakers.

Three eminent Professors from different universities gave lectures on various topics which are in demand these days.

Prof. Vani Brahmachari (from Ambedkar Centre for Biomedical Research) spoke on Epigenetics – the lack of correlation between genotype and phenotype, its mechanism, genomic imprinting, Fragile X Chromosome.

Prof. Rakesh Bhatnagar (from Jawaharlal Nehru University) spoke on Anthrax - its toxic components, proteins, types, *Bacillus anthracis*, vaccines, genetically modified crops, edible vaccines, Phytoremediation, therapeutics, resistance to pest and diseases, drought and salinity, production of high yielding hybrids, Bt cotton, Flavr Savr tomato, Bt brinjal and other advantages.

Dr. P. Ananda Kumar (from Indian Agricultural Research Institute) spoke on the role of biotechnology in improving food security, the improved nutritional quality of Golden Rice by the expression of enzyme of beta carotene pathway in rice endosperm, abiotic stress tolerance, hybrid production, vaccine against HIV, nitrogen use efficiency.

All these lectures gave extra knowledge and helped us to know about different fields of science for research work.

This seminar was patronised by Dr. Meera Ramachandran and coordinated by Dr. Shashi Tyagi, Dr. Aparajita Mohanty and Dr. Shashi Chawla. This was organized by All Faculty Members of Science Departments.

[Click here to go back to contents](#)



# BOTANICAL EXCURSION TO YAMUNA BIODIVERSITY PARK

**BY: SHAHEDA PARVEEN and TAMMANNA BEGUM**  
**BOTANY (HONS.) IIIrd YEAR**





Modern high-yielding crops are a result of years of cross-breeding of traditional land races and wild varieties of crop plants. Early settlers and farmers realized the qualities of one plant of the same species, can be transferred to another, and this marked the beginning of the creation of high-yielding and disease resistant crops. This indicates that it is important to conserve the essential varieties of crop plants that are becoming extinct.

### YAMUNA BIODIVERSITY PARK

**Yamuna Biodiversity Park - an unique biodiversity conservation effort, started with the collaboration between DDA and CEMDE, University of Delhi.**

**Yamuna Biodiversity Park, in the beginning, was spread over 156 acres. The area was typical flood plains but with high sodic soils with little vegetation.**

**By introducing different plant communities having abilities to recycle unwanted salts through succession, the land is being transformed into productive land.**



**यमुना जैव विविधता उद्यान**

Transformation of hunter and gathering community to pastoral one was more of an accidental development. The knowledge of how to produce plant was the very basis of civilization. This knowledge along with the help of wandering human communities to settle down, soon agriculture developed and that was the beginning of pastoral lifestyle.

This wetland, opposite to this board is unique, with a depth of 8 ft. It harbours an amazing 5,000 species.

- Red Crested Pochard, a threatened migratory bird is a winter visitor here. Currently, this species is not recorded anywhere else in Delhi.
- Rare and threatened birds like Darter have made this wetland their permanent home.
- The terrestrial tree cover fringing the wetland on the right side are used by hundreds of Lesser Cormorants. Their numbers and presence is marked by the 'white' trees which have been 'white-washed' by their droppings.
- Marshy vegetation consisting of *Phragmites*, *Typha*, *Echinochloa* and *Paspalum* support many dragonflies, damselflies and other water insects. There are no mosquitoes here as dragonflies and damselflies consume mosquito larvae, acting as natural and non-polluting pest control.
- Submerged aquatic vegetation together with phytoplankton and zooplankton form food base for both fish and birds. Some of the fish in this wetland weigh up to 25 kg.

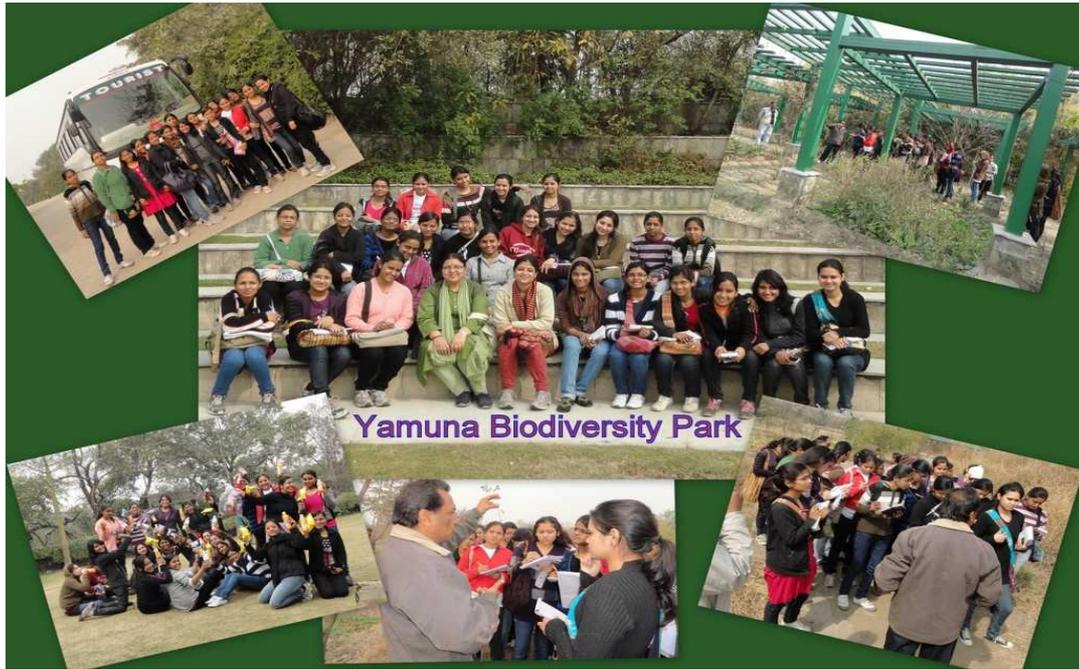
### Conservatory of Fruit Plants

People inhabiting the Yamuna flood plains have a wide range of fruit yielding plant species. Many of these are still cultivated in the form of traditional land races and are on the verge of extinction. These are genes that have potential application in modern cultivars. This domesticated gene pool comprising 50 fruit yielding plant species is being conserved in the Conservatory. This includes 7 varieties of Guava, 7 varieties of Citrus species, besides the land Khair along with other unexploited fruit trees of potential economic value.

Wetlands with different shapes, size, depth and hydrologic regime have been created amidst grasslands and forest communities to provide a range of ecological services:

- Holding substantial amount of rainwater and flood water, and thus creating effective rainwater harvesting.
- Preventing flooding of low lying areas (with human settlements).
- Recharging subsoil aquifers and ensuring sustainable levels of water in bore-wells for other parts of Delhi.
- Buffering local ambient temperature. Water bodies absorb and release much more heat than soil/rocks.
- Sequestering significant amounts of CO<sub>2</sub>.
- Providing habitat for aquatic flora and fauna, especially threatened and rare birds.
- Purifying waters included polluted waters.

The three Wetlands performing different functions are found in the visitor area viz. Migratory ducks' wetland (Wetland II), Resident ducks' wetland (Wetland I) and 'Jyoti' point.



Yamuna Biodiversity Park



A trip was organised to the Yamuna Biodiversity Park on the 14<sup>th</sup> of February, 2012 for the Botany (Hons.) IIIrd year students. We observed various types of artificial ecosystems and methods for reclamation of land and restoration of ecosystem biodiversity.

## WHAT IS BIODIVERSITY?

Biodiversity, short for biological diversity, is the term used to describe the variety of life found on Earth and all of the natural processes. This includes ecosystem, genetic and cultural diversity, and the connections between these and all species. Thus, in essence, biodiversity represents all life. India is one of the mega biodiversity centers in the world and has two of the world's 18 'biodiversity hotspots' located in the [Western Ghats](#) and in [the Eastern Himalayas](#).

## WHAT IS A BIODIVERSITY PARK?

Biodiversity Park is an artificial wetland created to attract and study migrating birds.

It is a federally designated non-profit land preservation and ecological management firm to protect and conserve the biodiversity.

India contains a great wealth of biological diversity in its forests, its wetlands and in its marine areas. There are 358 species of mammals, 1224 species of birds, 408 reptile species, 197 amphibians, 2546 species of fishes and 15,000 plant species in India.

There are about 97 biodiversity parks in India, the **Yamuna Biodiversity Park** being one of them which is the capital's most visited public place and a prominent centre for learning about the environment.

## YAMUNA BIODIVERSITY PARK

**LOCATION-** The Yamuna Biodiversity Park is presently spread over an area of approximately 457 acres near Wazirabad village on the flat alluvial plains of the Yamuna, just 15 kms north-east of Connaught Place, and 4 kms north of ISBT.

**DEVELOPMENT-** To restore and preserve the lost natural heritage of life system of Delhi, DDA has collaborated with the Centre for Environmental Management of Degraded Ecosystem (CEMDE). It has been especially created to replicate the lost ecosystems of the Yamuna River.

The Park's habitat started in July 2002. At that time it was just a barren land. By 2004, it had over 500 varieties of fruit plant species, over 550 variety of seeds species, over 650 variety of stratified grass, tree, shrubs and forest herbs species, about 5.8 kilometers stretch of three-layered bamboo setups along the boundary wall, separating the park from locality villages--all naturally growing in an artificial eco-system.

The total area of the Yamuna Biodiversity Park is planned to be 457 acres, of which 157 acres have been developed as part of the first phase and comprises wetland, grassland, forest area, an amphitheatre and an herbal garden. The remaining 300 acres will be developed as part of the second phase. Yamuna Biodiversity Park (YBP) has already become the second home for migratory birds that come here from higher altitudes of India and also from as far as Siberia and Africa. This is the first man made forest in Delhi.

**pH OF THE SOIL 9.28(salinity)** -Phytoremediation in the Yamuna Biodiversity Park helped conduct research on the ability of different tropical grasses to reduce alkalinity in soils.

**DETAILS-** The Yamuna Biodiversity Park comprises of **green house** (fig.), **net house** (fig.), nature interpretation center, main nature trail, meandering water body and wetlands, with ancillary facilities in visitor's area. So far, 107500 numbers of saplings of different species found in the Yamuna river basin have been planted in as well as 1500 number of

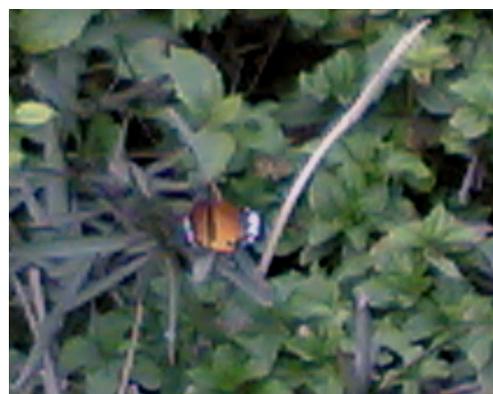
saplings of different varieties of fruit trees have been planted in the orchard area. Around 10 types of different ecosystem are there.

It acts as a heritage site and repository of approximately 50 threatened communities of Yamuna river basin. . It is designed to conserve the wild genetic resources of agricultural crops and enhance ground water recharge and augment fresh water availability.

**BIRDS SIGHTED IN YBP-** It serves as an ideal alternative habitat for migratory and resident bird species. During summer Golden Orioles, Black, red and silver headed Munias and Prinias, cormorants can be spotted. Green pigeons have started returning from high altitude to this park.

The best season to visit Yamuna Biodiversity Park is from February to June when migratory ducks from Siberia, China and Europe can be seen here in seven acres of deep wetlands created for such birds. Similarly Red crested Pochards are another attraction of the park. The migrated birds are expected to start arriving from the last week of October and by December the park is expected to be full of these birds.

- . 60 species of butterfly (common castor butterfly) and silk moth are found here.
- . Red vented bulbul
- . 3 species of Parakeet (a parrot species).
- . 14 species of migratory ducks.



**ANIMALS CITED IN YBP-** Mongoose, Civet and Cheetah have been cited in this park.

#### **PLANT SPECIES-**

**Medicinal:** This Park has about 350 species of medicinal plants. Plants which are basically native of North India especially Delhi like *Saal*, *Halduo*, *Churel*, *Saja*, *Khaja*, *Mokha*, *Wild Kadam*, *Tilospora indica* etc that are not normally found in Delhi now.

**Bambusetum:** the climbing *Ochlandra*, shrub like *Arudinaria*, the pole like golden bamboo and the belly shaped Buddha-belly bamboo. Presently, 37 species of bamboos are grown in the Bambusetum. One can see nests of the scaly breasted munia and the red vented bulbul and regularly sight the common castor butterfly hovering over the emerging juvenile bamboo shoots.

**Sacred Grove:** A total of 30 species of *Ficus* have been planted in this area, which is being developed to showcase plants of religious importance.

**Fruits plants:** People inhabiting the Yamuna river basin cultivate a wide range of fruit yielding plant species. Some of the primitive cultivars are still cultivated in backyards. The gene pool of Yamuna Biodiversity Park represents 451 varieties belonging to 50 fruit species, which are maintained in the Conservatory.

- . There are 8 varieties of Anar ,
- . 6 varieties of *Sapota*,
- . 57 varieties of Guava,
- . 7 varieties of citrus species,
- . Besides threatened species such as *Feronia* and *Khirni* along with other unexploited fruit trees of potential economic value.

. Jamun, orange, grapes and ber.

**WET LANDS:** A major attraction is the wetlands teeming with 19 kinds of fishes and resident and migratory aquatic birds throughout the year. 16 migratory water bird species like ferruginous Pochard, common pochard, northern Shoveler and northern pintail visit the park annually. Yamuna Biodiversity Park comprises of two wet lands, one of which is long and narrow is 1.8km long; and the second, which is more open and deep, is spread over about 2 hectares. These wetlands are now home to hundreds of migratory birds as well as native bird species. The islands looks white because of birds nitrogenous waste.

#### **PURPOSE OF THE WET LANDS.**

- . It adds to the diversity of habitats
- . It performs the much-needed ecological functions of water purification, groundwater recharge and storage of rainwater,
- . It provides the soil for raising the ground level to avoid flooding in the post monsoon period so that the development of terrestrial ecosystems and plant communities can go ahead unhindered.
- . It helps to preserve the aquatic genetic resources (invertebrates, turtles, fishes, zoo- and phytoplanktons) of the river.



This park is the only known wintering home for the red crested pochard - a Siberian bird with a red head and an orange beak. These wetlands also support dragonflies and damselflies called winged biological control agents. “These are vital to an ecosystem as they help control harmful insects like mosquitoes. It has a positive impact on the local weather patterns and conserve the micro and macro ecosystems.

#### **NATURE INTERPRETATION CENTRE (NIC):**

NIC is envisaged to play an important role in imparting Nature Education particularly to school and college students, who are the decision-makers of tomorrow. NIC is a beautiful classical building with elegant lighting, attractive interior designs, and panels depicting various biodiversity levels, touch screens, and visual-aids that provide an insight into the basic concepts of biodiversity.



[Click here to go back to contents](#)

*Department of Botany*

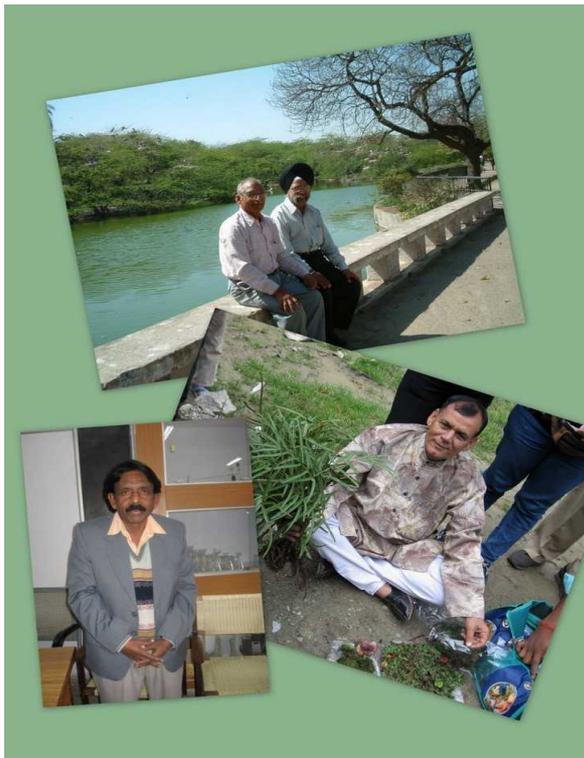
**Faculty:**





<b>Superannuated</b>	<b>Current Faculty</b>
Dr. Chhaya Biswas	Dr. Shashi Tyagi
Dr. Pushpa Markandan	Dr. Usha Prasad
Dr. Ahalya Chintamani	Dr. Gita Mathur
Dr. Bharati Bhattacharyya	Dr. Kiran Prabha
Dr. Lalita Sehgal	Dr. Geeta Mehta
Dr. Krishna Kumar	Dr. Aparajita Mohanty
	Dr. Shweta Vandana
	Dr. Priyanka Pandey
	Dr. Leisan Judith
	Dr. Jasmeet Kaur Abat
	Dr. Ishani Sinha
	Dr. Nivedita Mishra
	Dr. Anuradha Yadav
	Dr. Gurjeet Kaur

## Laboratory Staff





### **Superannuated**

Mr. H.S. Sawhney

Mr. Kapileshwar Pandey

Mr. P.D. Raturi

Mr. J.S. Negi

Mr. Vishwanathan S.

Mr. Liaquat Ali

### **Current**

Mr. D.D. Sharma

Mr. H.C. Dhirwal

Mrs. M.D. Sharma

Mrs. Shashi Bala

Mr. Ashok Kumar Rana

Mrs. Rajni

Mr. Arun Kumar

Mr. Pancham Singh

Mr. Vijay Kumar Pandey

Mr. Umesh Kr. Goswami

Mr. Vaseem Ahmed

### **Museum Curator:**

Mr. Ganga Singh

[Click here to go back to contents](#)

## Alumni of Botany Department, Gargi College

### Dr. Deboleena B. Chattopadhyaya



After graduating from Gargi with Botany (hons) in 1996, I did my Masters from M.S University, Vadodara. Subsequently I did my M.phil in plant molecular biology from Delhi University and finally completed my Ph.D from Jawaharlal Nehru University. During my ph.D, I worked on chickpea BAC library. Currently I am working as a research associate in National institute of Plant Genome Research (NIPGR).

After passing out from Gargi , I have studied in several places, but those carefree Gargi days are exceptional. Those memories- studying in lecture theatres, struggling in the practical labs to get the best of the sections, taking in between breaks in the canteen, eating out in the sun, going to Mithas for little celebrations and many more are very special to me. Here all my teachers at the botany department nurtured me tenderly to grow up as a confident individual. Our batch was very vibrant and we shared a very special relationship with our teachers. The immense care, affection and dedication of all my teachers are unparalleled. I cherish those memories of our botanical excursion to Ooty. Starting from playing antakshari in the train to collecting samples for the herbarium , our teachers were ever enthusiastic. It was a week long trip but none of us missed home. We had an overwhelming experience during our departmental picnics and the Gargi fests. Till today, when I walk in the corridors of the botany department I have the nostalgic memories of my student days. Last year I got the opportunity to teach in Gargi and at that time I realized what tremendous efforts my teachers had put in to make me what I am today. I pay my due respect to all my teachers in the department. My best wishes to all my juniors and I would suggest them to enjoy every moment at Gargi as it would have an everlasting impact.

### Sita Lakshmi



Summing up in just a few lines my experience as a student of Botany honours in Gargi College is quite a Herculean task in itself. It was here, during the marvelous 3 years, under the constant nurture provided by teachers that my life was steered from a state of demureness into youthful dynamism. And it brings immense pride to see our Botany division growing sturdier in line with the name of our annual botanical fest "*Ficus*". The constant support and encouragement which came our way from all the faculty members ensured that we developed curiosity, passion and love for our subject. Perhaps the most enriching experience for me was to experience botany at various levels, along with theoretical knowledge, through photography, debating, excursions, and other such creative escapades.

I continued my quest with plants and nature and took up environmental studies as my subject for post-graduation at TERI University. Here my understanding of ecology and environment was given yet another dimension, that of sustainability, of social and cultural significance. From there I moved on to Indian Institute of Science in Bangalore as a project associate and got to do some interesting work on climate change and forestry, biofuels, and also delve into the international arena of climate change dialogue.

Later I also got an opportunity of a year-long fellowship at International Center for Science and High Technology, UNIDO, housed in Trieste, Italy, where I worked on developing decision support tools to assess the sustainability of biofuel production systems. Currently I am working with The Energy and Resources Institute (TERI) in New Delhi on a plethora of issues related to decentralized energy alternatives, waste management, air pollution management, and environmental policy amongst others.

Gargi, particularly the Botany, experience will perhaps never leave my side. It seems like yesterday that we were frantically collecting samples for our herbarium sheets, drowning myriad shaped fungi into bottles of Formalin, striving to cut the leanest possible section for our permanent slides, laboriously giving details to the sketches in our practical files, and yet it seems like a far-flung dream. Such is the irony of precious memories “sometimes you wonder whether memories are something you had or something you lost”.

In the end all I can convey to my juniors is to make the most of their time at Gargi, it will perhaps one day become the best days of your life as well, just as they have become for me.

## Astha Batra



After graduating from Gargi in Botany Honours (2004), I went on to do a Masters in Natural Resources Management from TERI University. I choose to pursue a Masters in this field I was deeply interested in environmental matters and my curiosity for this subject was primarily evoked during third year of my bachelors when we were introduced to subjects such as ecology. After completing my post graduate I worked with a bilateral funding agency – India-Canada Environment Facility for a few months assisting in monitoring of various environmental projects. I then moved on to work for Federation of Indian Chambers of Commerce and Industry (FICCI) in the Environment and Climate Change sector for close to four years concentrating on global carbon markets and design and implementation of domestic and international capacity building projects and programs. In the middle of 2010 I migrated to Melbourne and embarked on my sustainability journey in

Australia through doing a course in carbon accounting and by being awarded a scholarship to undertake a fellowship program at the Centre for Sustainability for Leadership. I am currently working with a non-governmental organisation focusing on identifying and implementing low carbon growth opportunities for emissions reduction.

Special memories:

- Loved the long practicals where we could easily go down to the canteen and coffee stand to grab food and especially the hot tomato soup on cold foggy days!
- My friends and I particularly looked forward to roaming around in the gardens to make “botanical friends”.
- Memorable feelings included collecting plants that we thought were amazing or something new and would run back to the labs to get them identified only to find out it was a common weed!

## Bhavya Khullar



Like many others who had a vague idea of what they want of life after stepping out of the school, I filled every possible admission form that I could get hold of. To discover that my percentage allows me admission to Gargi, I rushed to occupy my seat in one of the reputed colleges of Delhi University. No doubt that I was happy the first day I came in, but happier that my journey was a beautiful one. I became friends with the 3 most adorable girls I know, Rashmi, Neha and Tanaya. The learning process was an easy one, at times I got stuck, rushed but alas managed to score well (5<sup>th</sup> rank in South Campus, DU). After B. Sc. from Gargi, I qualified a few entrances (and failed a few too) for pursuing an M. Sc. (TERI, Jamia Hamdard, Thapar University, Dept. of Botany) and chose to be at TERI for the next 2 years. While I was at TERI, I qualified the Indian National Science Academy Summer Research Fellowship, CSIR NET JRF LS (Rank 91), ICMR JRF, IIT Kharagpur LLB entrance (Rank 8), and GATE Biotechnology (Percentile 98.03) and again, I failed a few too. While I was waiting for these results, I got a call letter from Evalueserve (KPO in Gurgaon) to work in the Intellectual Property Division at a handsome package. I worked there for 10 months after which I got selected to pursue Ph. D. in Immunology at Translational Health Science and Technology Institute (an autonomous Inst. of DBT, Gurgaon). For almost a year since I have joined, I have been working to understand the role of CD80 in Minimal Change Disease. I will be working on the same project for the next 4 or more years.

My story may sound long and confusing giving to you an impression that I don't know what I want, but this puts me in a position to make a statement.

Life may force you to choose what it offers, to make the best of it will always demand your sincere efforts. Put your heart and soul into what you do, and the fruits will be delicious.

## Rashmi Sasidharan



I belong to the 2008 batch of the Botany Department in Gargi. Just the name of Gargi evokes happy nostalgia, so much so that I can't believe that the fun-filled, joyous learning experience in terms of academics, extra-curricular activities and countless other things got over three years ago! I simply don't know how to put the three-year experience in such a small space.

Honestly, I had set my foot in college with no ambitions but just to have fun! There, in the lecture theatre, the teachers sat beaming at every prospective student coming in for admission. Later, I came to know that the entire faculty has the same enthusiasm and for the next three years all of that enthusiasm and love for the subject was to trickle down on to the students.

I really miss the practical classes and the vibrant Botanical garden of the college. I used to roam around in the Botanical garden for no reason! While traveling, I would say out the scientific names of trees (in my head, of course!). I think I also drove my mother mad once, by saying that we were eating members of the same family, for having Shimla mirch-aloo-tamatar ki sabzee!! The thrill of tissue culture experiments, anthocyanin extraction, fungi and algae hunting in the college field, the excursion to Dharamshala, all remain with me.

By third year, the so called 'environment bug' bit me, and I think it showed in the Narmada Bachao Andolan being choreographed in the *Ficus* fest. The fest was over, the exams were conducted and we were all bid adieu! Sighhh! I wish I could have stayed longer.....!

For my Masters programme, I got into the Department of Environmental Studies in the University of Delhi for M.Sc Environmental Biology. Just after completion of first year of Masters, I was selected for the Summer Research Fellowship Programme of the Indian Institute of Science, Bangalore. It was another experience of a life time. There I had worked on a project for conservation of birds in Bangalore.

In 2011, I completed my post-graduation and secured the top position. As I write this, I am looking forward to the Convocation Ceremony to be held by the end of February.

Further, I plan to try to get into Civil Services with one of my optional subjects being Botany. It was a childhood dream and now I have one more reason to follow it - to help contribute to policy changes for better conservation strategies and, better mitigation and adaptation plans in India, in response to the inevitable climate change.

I thank the Faculty for being so wonderful. Last, but not the least, I extend my best wishes to all the students of the Department. Do enjoy these precious moments of your life.

## Yamini Panchaksharam



Writing this article for *Anthesis* reminds me that this May it will be exactly a decade since I first held the Gargi College prospectus. I still recall having a word with Geeta Mehta ma'am during the students' counseling session, asking

questions countless students before me might have asked her. I finally opted for Zoology with Botany and Chemistry as subsidiary subjects. However, they never seemed to be 'Subsidiary subjects' owing to the enthusiasm with which the Botany and Chemistry sessions were conducted! I honestly enjoyed the Botany practicals, be it slicing and observing TS or LS of different plant stems and roots or watching the pH strips change colour during the soil cum water tests. Further, the diagrams we had to draw in our practical files tested our patience to the limit. My batchmates couldn't understand why I'd spend time drawing the plant specimen provided when I could copy the diagram from the practical manual. Well, the two just looked different most of the time! By the time I was completing my second year practical file I had started getting my Botany Department friends into trouble! One day Chintamani ma'am sent two of her students to have a look at my *Cycas* and *Pinus* diagrams and to draw them like that in their files. I'm glad the two students didn't feel too inclined to box my ears!

It was during the second year Botany and Zoology lessons that I came across the exciting subject of Ecology. My interest in the subject has just kept growing ever since. I ended up enrolling for a Masters' course in Natural Resources Management at TERI University which gave me an overview of different subjects that appear to be independent but linked nevertheless. The two highlights of the programme were when I landed an internship with the Yale School of Forestry and the Environment at Yale University (I focused on forest statistics) and a job with the Freshwater & Wetlands Programme at WWF-India. Between 2007 and 2009 I got a fair idea about the Ramsar Convention (It is specific to wetlands) and its implementation in India. As I was assisting project work, I got a glimpse of some of WWF's project sites like the Upper Ganga (in Bulandshahr district, UP), Harike wetlands, river Chambal and Bharatpur. Later, I got involved in the Himalayan High Altitude Wetlands project which took me to the unbelievable landscape of Ladakh. My two years at WWF fueled my interest in water science and I got an opportunity to study M.Sc. in Water Science, Policy and Management at the University of Oxford (2009-10). The year went by at lightening speed as we discussed several issues, submitted ever so many term papers, spent sleepless nights prior to exams and puzzled over research questions while working on our Masters' thesis. The thesis brought me back full circle to my Zoology roots as I was studying about water quality and Crayfish (They look like lobsters!). After graduating I returned to WWF-India and have been involved in project management for the Himalayan High Altitude Wetlands project. This took me back to the amazing blue lakes of Ladakh – Tsomoriri and Tsokar. Last summer I was part of a team that undertook a bathymetry survey of one section of lake Tsomoriri. It was a wonderful experience to be sitting in an inflated boat, noting down depth and temperature data and rowing once in a while, even though the skin on my nose peeled off completely due to the strong sunrays! Having said this I am still interested in learning about zooplankton (including macroinvertebrates) associated with wetlands and their role as biological indicators of this ecosystem. And so I do plan to return to researching this subject in the coming year.

I am glad I have had the opportunity to stay in touch with some of my lecturers and batchmates at Gargi. They have seen me burst into tears of frustration during dissections, jump for joy when I'd get my experiments right and wished me the very best when I had the least idea of what lay ahead. I'm sure the current batch and future batch of students will feel the same way.

## Madhurima Kahali



I passed out from Gargi in 2007. Thereafter, I went to Calcutta University for my Masters' programme. Currently, I am doing my PhD from The Department of Genetics, Delhi University, South Campus. My tenure in Gargi College, Botany Department was a beautiful learning phase; learning phase, not only academically, but also learning how to be a better person. Here, I learnt how to mix with different people, how to adjust, and most importantly, how to love the place you are in. When I sit down to think of my college days, I can clearly visualize the corridor, the labs, the lecture halls, it seems just like yesterday. Coming to the things I miss the most about the department, the excursions and our fest, Ficus tops the list. My college tenure would have no meaning if I don't mention here the most important part of it, the teachers. The teachers we had, made all the difference. We learnt so much from them, as a student, as a child, as a person, that it really can't be summed up in few words..I

would really like to conclude this by saying thanks to our teachers, the Botany Department, and Gargi College. I would really love to be a part of this family again, this time, maybe on the other side of the bench!

## Nidhi Gupta



After graduating from Gargi, I joined MSc. Program on natural resource management in TERI University. Currently, I am pursuing PhD program in marketing and consumer behaviour group at Wageningen University, The Netherlands. My PhD research is on "factors influencing societal response to nanotechnology". I will be submitting my thesis in September 2012.

Twelve years ago when I stepped for the first time in Gargi College, Botany Dept. I did not know that my life is about to change forever as the BEST was just about to happen!!"

Summer of 2000, Just like any other student going through the application process, I was so thrilled to start my college life which meant freedom from boring uniforms and feeling of total liberation from the monotonous routine of school life and sheer fright of board exams. Along with this wonderful feeling, I was loaded with numerous apprehensions like whether I will make it the final list of selected candidates, and whether Gargi is the right choice?

That is when I met Dr Shashi Tyagi with her gracious smile and ever so confident persona. She spoke to me for few minutes and her personality was so endearing that in those few minutes I was absolutely confident that there is no other place than Gargi where I would like to study Botany. After 3 most exciting years in Gargi, I faced the same anxiety while giving competitive exams for MSc programs. To my surprise again, Dr Tyagi was absolutely sure that I would end up getting an admission and there is nothing to worry, and she was right again!

The 3 year programme which encompassed a rich fusion of well-balanced courses in pure and applied Biology as well as Chemistry and Zoology opened new vistas in my understanding. A dedicated faculty and well-equipped laboratories gave me a unique opportunity to develop a strong theoretical as well as practical base and encouraged my desire to learn and to this day I owe all my success and accomplishments to my gurus in Gargi.

The one on one interaction with the teachers made us one big happy family. We were lucky to have the best faculty members in our department, who not only taught us botany, but guided us as mentor, appreciated us as mother, laughed with us as friends, and protected us as guardian. Personally for me studying Botany in Gargi was the most enriching experience. Be it Dr Chintamani's humour while teaching algae, Dr Pushpa Markandan's go getter attitude, Dr. Geeta Mehta's and Dr Bhattacharya's commitment to perfectionism or Dr Gita Mathur's enthusiasm and zest for making her students real scientists, each and every faculty member has left a mark in my life. Excursion trip to the Western Ghats and Goa was the most thrilling experience as it brought us even more closer to our teachers. I still cherish the fun and excitement that went on in organising FICUS and even more in winning inter college competitions. All this and more that cannot be defined in just few words has gone into making us what we are today. I would like to thank each and every one in the Botany Department to help me grow as a person and give me the confidence to ask questions...well mostly the sensible ones!

## Preeti Garg



The time spent at Gargi college, those are wonderful memories in every way. The teachers were all such a big inspiration to me to carry on in the field of botany. It makes me proud to have been their student, even more so since I moved abroad. Thanks to facebook I recently got in touch with some of them and here I am writing this piece for Anthesis. Thinking of the times at Gargi, in my memory the best part of it all for me was the lab work - the practicals! I could never get enough from microscopy and I always felt so at home

drawing the plant habits, cutting sections and observing under the microscope do the drawings and so on. The tight college time table made us, me and my two classmates and friends Aparajita and Sonali come on holidays too to make those slides, thanks to our kind Lab Assistants then. We enjoyed it a lot as we had the quite lab all to ourselves. After finishing my B.Sc. (Honours) in Botany from Gargi College (1994), I did M.Sc. in Plant Science from Lucknow University. From there I went to Germany where, after finishing my German language courses, I started doing my Ph.D. in plant molecular biology at Hamburg University. I worked on the characterization of a maize mutant called etched1 (<http://www.ncbi.nlm.nih.gov/pubmed/15165185> or Plant J. 2004 Jun; 38(6):923-39.) Through chloroplast import experiments I could show that it is transported into the chloroplasts. Work on this gene is still going on. Afterwards, I started working in a lab at the same Institute at Hamburg University on methyl transferases, a topic of epigenetics (my dream topic then!) which was supposed to be financed by a biotech company but unfortunately the project did not get through. So, I had to drop it but I continued to work

with my group there on another maize gene which had been found through a cDNA bank screening, MCM6 (<http://www.ncbi.nlm.nih.gov/pubmed/16407440> or Plant Physiol. 2006 Feb; 140(2):512-27. Epub 2006 Jan 11.). I worked on that project for two years before becoming a full time mom to my son. I have worked for a year at the biotech company Eppendorf (eppendorf tubes!) with headquarters in Hamburg since then. While at home, being a workaholic, I used whatever free time I had into food blogging (<http://pg-kitchenstories.blogspot.com/>). It turned out to be more like a full time job than a past time. But that was before my second child was born. Right now I am too short of time to do anything else except for taking care of my baby daughter but I wish to start working professionally again as soon as possible and my search for a job is practically on.

### **Shailja Bahuguna**

Gold Medal in MSc Geoinformatics (2009-11), TERI University



I am an alumna of Department of Botany, Gargi College of the batch 2006-2009. After graduating from Gargi, I took admission in MSc Geoinformatics at TERI University. Masters in Geoinformatics is an interdisciplinary course which has its elements derived from the fields of Geography, Physics, and Information Technology and has its application in the fields of Natural Resources Management, Health Management, Asset Management, Transportation, Planning and Infrastructure.

During the two year programme, I carried out my dissertations at Regional Remote sensing Centre-Nagpur and Regional Remote Sensing Centre-Jodhpur, Indian Space Research Organisation (ISRO). I am presently working as Research Assistant at Department of Civil Engineering, Indian Institute of

Technology (IIT), Delhi.

Gargi holds a special place in my life. The three years of learning and growth in Botany department were wonderful and full of excitement. Each new day brought a new learning. I remember on the very first day of the college, our batch received a warm welcome from all the faculty members gathered in the Botany lab. They introduced us to the department curriculum and other activities the college was then involved in. With time, the interaction between teachers and students became open and free. The unforgettable field trips worked towards building the teacher-student bond stronger. There were emotions, care and teachings besides the course curriculum. I don't know if I remember all the things said by all the teachers but few memories are still fresh as if they happened only yesterday.

Now when I think over these, a smile spreads on my face

- The hurry we used to make for picking up the best microscopes
- Asking for drawing sheets in the practical class
- Jumping into drains for algae collection
- Leaving college late in the evenings for Ficus preparations
- Spending long hours in permanent slide preparation

I feel privileged that I was mentored in Gargi and I am thankful to all my teachers and

supporting staff who were there with me in this wonderful journey.

## Dr Gurjeet Kaur

Assistant Professor (Botany), Gargi College



It is a real pleasure for me to write for 'Anthesis' and pay respectful homage to the Botany department, my lovely teachers and the lab staff. It is a tough job to pen down all those wonderful memories of three golden years that I spent in Gargi College. For me teaching has been a passion, so it really feels like a dream come true when I got an opportunity to teach in my alma mater. Though the difference now is that I can experience the life from the other side.

After completing my B.Sc. Botany (Hons) from Gargi College (Batch 2000-2003), I joined Jamia Hamdard (Hamdard University) for M.Sc. Environmental Botany programme and later did my Ph.D in Botany from the same University. Topic of my thesis was 'Biochemical and molecular studies of metabolic coupling between nitrogen and sulphur assimilation in rapeseed (*Brassica rapa*). I also worked as a JRF (CSIR) and SRF (NASI). Before joining Gargi

as an assistant professor, I worked as a scientist in NAM S&T Centre (Centre for Science and Technology of the Non-Aligned and Other Developing Countries). It is an Inter-Governmental Organization which encourages the collaboration and sharing of scientific knowledge among scientists and scientific organizations of the developing world. I also got an opportunity to attend a short training program on "Advances in Biotechnology" conducted by 'The Energy and Research Institute' (TERI). This program was sponsored by DBT. Through this program I got the opportunity to interact with various scientists working in various government departments, research institutes and universities across India. I was also associated with CSE (Centre for Science and Environment) for a program called "Agenda for survival" where I learnt in depth about various aspects of environment.

These days, I am also contributing in two books. One is based on 'Nanotechnology' and the other is on 'Nutrients Signalling'. In the Nanotechnology book, my focus area is 'Botany in relation to Nanotechnology'; and for the other book, I am writing a chapter on 'Nutrient Signalling in Plants'. Both the books have other contributing authors/scientists of repute from all over the world.

I feel blessed to work with my lovely teachers of the Botany department who have been my inspiration since my student days. Now after so many years, I still see the same dedication and energy in them. I joyfully remember my dear teachers Dr. B. Bhattacharya, Dr. A. Chintamani, Dr. P. Markandan, Dr. L. Sehgal and Dr. K. Kumar whom I really miss in the department.

I clearly remember that day in Gargi when I entered the college as a quiet, shy 1<sup>st</sup> year student who didn't even know what was 'Botany' called in hindi when asked by a final year student during introduction day with seniors. They asked me to go and find out. That was the start of my journey with botany, a journey which I am still cherishing. The department, the teachers and my lovely friends in the college transformed me into a confident human being.

The botanical excursion and the field trips were the best time of the year. I still remember our trip to Goa and Kohlapur. Studying and exploring the flora of a new place, collecting specimens, spending whole night pressing them and making herbariums was great fun and adventure. Used to enjoy the 'Ficus' time to the fullest.

Still remember the time when I used to chill out with my friends at the back stairs of the college canteen, those free periods spent in the college library, observing the specimens in the botanical museum.

I would like to thank my teachers who have given me an opportunity to write for 'Anthesis' as it has taken me a decade back and I can see each day that I had spent joyfully in the college. I will always be deeply indebted to my alma-mater, Gargi and my botany department. What I am today is because of my teachers, department and college.

[Click here to go back to contents](#)

## Departmental News

### Awards and Results

Name	Current Class	Result of	Position in Class	Position in Delhi University	Position in South Campus	Photograph
Charu Singh	B.Sc. (H) Botany I	Semester I	I		I	
Neha Tanwar	B.Sc. (H) Botany I	Semester I	II			
Sonam Shishodia	B.Sc. (H) Botany II	Semester I	I			
Nandni Rajpoot	B.Sc. (H) Botany II	Semester I	II			
Humera Naseem	B.Sc. (H) Botany II	Semester II	I			
Nandni Rajpoot	B.Sc. (H) Botany II	Semester II	II			
Aishwarya Dhall	B.Sc. (H) Botany II	Semester III	I			

Surbhi	B.Sc. (H) Botany II	Semester I III				
Sonam Shishodia	B.Sc. (H) Botany II	Semester II III				
Sohini Deb	B.Sc. (H) Botany III	B.Sc. (H) Botany II	I	I	I	
Surbhi Sharma	B.Sc. (H) Botany III	B.Sc. (H) Botany II	II		III	
Sapna	Alumni	B.Sc. (H) Botany III	I		II	
Monika Rajput	Alumni	B.Sc. (H) Botany III	II		III	

## Wedding Bells



**Dr. Shweta Vandana married Dr. Tamâs Bela Feheř**



**Mr. Umesh Kr. Goswami married Ms. Asha Goswami**

## Patter of Tiny Feet



Dr. Judith Leisan blessed with a daughter, Mansak on November 23, 2011.

[Click here to go back to contents](#)



## Projects

- Abstract accepted for paper presentation and published in the proceedings of the conference  
Sohini Deb and Aparajita Mohanty (2011) "**Maturase-K gene as marker for genetic diversity studies and its implication on conservation strategies**" at International conference on "Issues for climate change, land use diversification and biotechnological tools for livelihood security" in October 2011
- Project implemented under the Star College Scheme funded by Department of Biotechnology, Govt. Of India on the "**Use of PCR-RFLP technique for analysis of mat-K region of chloroplast genome in *Solanum nigrum***" by Sohini Deb and Surbhi Sharma, Botany Hons. IIIrd Year
- Project implemented under the Star College Scheme funded by Department of Biotechnology, Govt. Of India on the "**Use of PCR-RFLP technique for analysis of mat-K region of chloroplast genome in *Solanum tuberosum***" by Alankriti and Heena Massey, Botany Hons. IIIrd Year

[Click here to go back to contents](#)

**Botany teachers bid Farewell to superannuating faculty of other departments of Gargi College**





## Department Bids Farewell to Mr. Liaquat Ali



**2012: Inter-College Science Festival , held on 13.01.12**



[Click here to go back to contents](#)

## Botanical Fun Pages

### STRAIN YOUR BRAINS

Identify the hidden names of the trees in the crossword.

P	Y	O	B	O	T	T	L	E	B	R	U	S	H	A	Y	W	A	L	A	P	E	E	P
N	U	Z	P	C	V	W	E	F	X	C	H	I	N	A	R	M	U	V	R	D	U	X	A
B	Y	T	R	C	E	D	A	X	W	T	G	B	L	A	K	I	L	R	G	V	C	N	L
J	G	M	R	V	R	V	S	Q	L	K	U	M	A	H	U	A	N	V	A	W	A	W	M
T	V	A	H	A	R	S	H	I	N	G	A	R	Q	B	W	Z	W	D	E	X	L	P	S
B	C	G	T	Y	N	B	O	V	T	B	M	G	O	O	L	A	R	I	Y	V	Y	Q	Z
I	H	Y	R	V	E	J	K	N	U	F	T	B	G	V	R	T	U	B	J	Y	P	B	A
B	A	B	O	O	L	O	I	P	U	Y	B	N	E	E	M	A	D	W	Q	D	T	I	H
V	M	T	B	R	U	N	X	V	K	P	A	S	U	I	L	W	R	S	W	A	U	M	A
X	P	U	W	B	Q	W	Z	J	A	M	U	N	B	J	N	W	A	L	S	C	S	A	M
T	A	I	J	R	W	U	S	W	D	W	K	L	A	W	D	E	K	I	H	M	O	W	A
P	O	A	M	A	W	I	K	D	A	R	J	U	N	O	L	W	S	P	I	S	N	U	L
M	U	B	A	M	B	O	O	S	M	U	R	R	A	Y	A	M	H	W	S	I	W	B	T
P	O	M	W	D	N	W	B	C	B	E	R	O	P	M	W	F	E	N	H	M	I	U	A
R	T	V	W	H	N	U	M	Y	B	I	B	V	W	N	W	I	Z	W	A	N	J	O	S
B	A	N	Y	A	N	B	U	Y	B	O	U	R	B	M	I	G	U	L	M	O	H	U	R
Q	N	W	A	N	K	U	M	Z	W	M	U	L	B	E	R	R	Y	L	O	U	B	T	D

## **"SCINTILLATIONS" : A REPORT**

**BY: NIKITA SINGHAL  
BOTANY (HONS.) IIIIRD YEAR**

This year the Gargi College Botanical society (GCBS) festival, '*Ficus*' was held along with the departmental fests of all the science departments of Gargi College, as a part of the SCIENCE FESTIVAL. Appropriately named "SCINTILLATIONS" (a spark), the event was organised on 13<sup>th</sup> January 2012, and started with the traditional lighting of the lamp in the auditorium.

This was followed by a brief introduction about the different science societies by the presidents of the respective societies. This was followed by Saraswati Vandana, Ganesh Vandana and Shlokas performed by the students.

Various activities and competitions were organised for student participation such as Salad Making and Flower Arrangement by *Ficus* (GCBS), Best out of Waste and Bilingual Debate on "Is Janlokal bill the correct approach to tackle corruption" by Zenith (the Life science and Physical science Society), Circuit making and Science Quiz by Quasar (the Physics Society), Ad-Mad and Tattoo Making by Germs (the Microbiology Society), and Scientific Collage and Scientific Rangoli by Albatross (the Zoology Society).

The event brought forth a plethora of talent from students and saw immense participation with a lot of excitement and joy. The Salad Making competition had forty entries! Delicious and attractive salads were presented and it was a tough job for the judges to select a winner. Scintillations was sponsored by Selrocked customised prints, Sai creation, RP Cricket academy, Oriflame, Cocoberry, Fortis hospital and Coca Cola.

**The prestigious Dr. Chintamani trophy for maximum participation by a college or department went to the Microbiology department for winning the maximum number of prizes .**

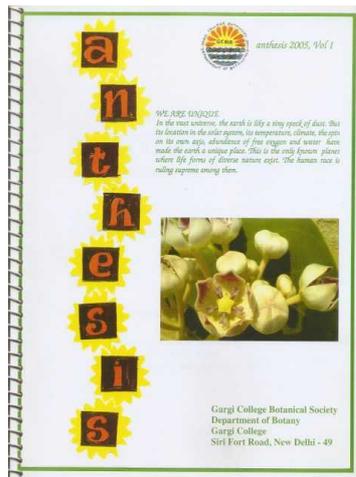




# Anthesis: the Journey so Far

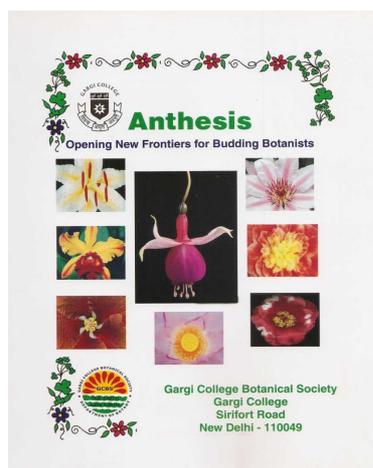
Anthesis was first published in 2005 as a photocopied and spirally bound version; soon we got sponsorships to produce a printed version. Now Anthesis has a new avatar as we are producing eAnthesis since Volume 6. This electronic version is proof of our concern for the environment as well as our technological advancement.

## GCBS Anthesis Volume 1 (2005-06)



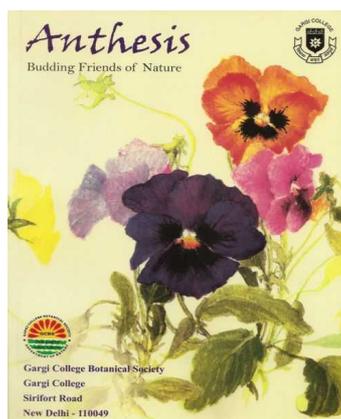
Articles	Page No.
Dr. Anish Shukla	1
<b>Botany inside</b>	2
Barsha Kapoor	3
Obaswaraj And Ghazal	4
Dr. Bharati Bhattacharyya	5
<b>Human Affection Almond: Evolution of eAnthesis</b>	6
Mounika Sood	7
<b>Advances in Molecular Entomology</b>	8
Dr. Sangeeta Sharma	9
<b>Black Catfish</b>	10
Dr. Sangeeta Sharma	11
<b>Hanging Garden Of Botany</b>	12
A.P. Jayaraj	13
<b>Mendelian: 100 years on</b>	14
Trivedi Rishu	15
<b>Can The Rice Genome Sequence Feed Human Population?</b>	16
Dr. Aparajita Acharya	17
<b>Web Of Life</b>	18
Shreya Prakash	19
<b>Ecosystem Degradation</b>	20
Shikha Garg	21
<b>Journey Of A Soul</b>	22
Ujjwal Singh	23
<b>Ecosystem Degradation</b>	24
Pooja Doshi	25
<b>Climate</b>	26
Barsha Kapoor	27
<b>Cartoons</b>	28
<b>An interesting survey</b>	29

## GCBS Anthesis Volume 2 (2006-07)



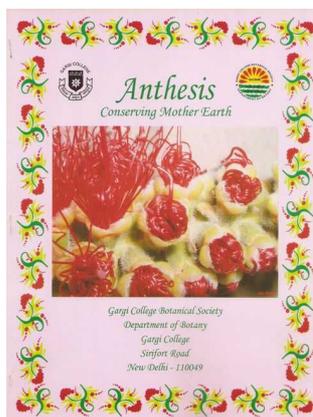
S.No.	ARTICLES	PAGE No.
1.	ARC PLANTS SENSITIVE ? - Nehraia Dhalia	1-2
2.	PLANTS SYMBOLIZING INDIA - Parul Dagar	3-4
3.	SAFED MUSLI - A DIVYA AUSHADHI - Raksha Roshniak	5-6
4.	TOWARDS GRFFN AND FAN DFL-IT - Chinnak Subashetty	7-9
5.	THE FAMILY OF BEWILDERMENT AND CONTROVERSY - Sneha Datta	9
6.	WILD MEDICINAL PLANTS OF GARGI COLLEGE CAMPUS - Prachi Tripathi	10-12
7.	INTRODUCTION TO INTELLECTUAL PROPERTY - Divya Khanna	13-15
8.	EAT YOUR SPINACH - Navyot Sahoo	16
9.	WAKE UP - Hina Ghazal	17
10.	SOMATIC EMBRYOGENESIS - Gauri Sharma	18-20
11.	HOTSPOTS IN PINKIL - Nisha Arora	21-22
12.	PLANT BIO-REACTOR - Aneshi Gupta	23-24
13.	BIO-SAFETY - Aranya Mehrood	25-26
14.	GCBS ANNUAL REPORT	27-28
15.	COSMOLOGY	29
16.	FLOWERS AND PLANTS FOR EVERY COSMICAL SIGN - Gamanjeet, Gaur	30-32

## GCBS Anthesis Volume 3 (2007-08)



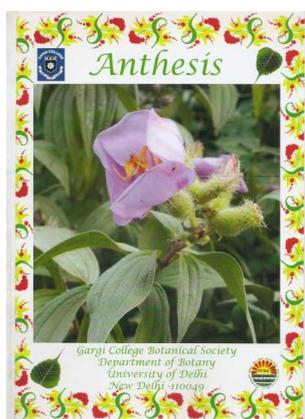
S. No.	Articles	Page No.
1.	The Reason 'The Marigolds Boil in Nature' - Abori Eshelin - Ananya Chakraborty & Anjali Das	1
2.	Human Population and Resource Utilization - Arju Sharma	5
3.	In Search of First Flower - Pooja Ghosh	8
4.	"Love Story of A Bull" - Sneha Gupta	9
5.	Boons and Banes of Plants - Indira Bhatnagar	10
6.	India as a Megadiverse Nation - Shradha Jain	14
7.	Forensic Botany as a Tool in Death Investigations - Neha Sharma	15
8.	GCBS Rocks - Rajat Khosla	19
9.	RNA Interference - The Process and The Possibilities - Jyoti Deb	20
10.	Earth - Kavita Sharma	22
11.	Computer and Taxonomy - Namulata Chakraborty	23
12.	Go Papaya!! - Sneha Gupta	25
13.	Home Remedies for Beauty - Ananya Chakraborty	28

## GCBS Anthesis Volume 4 (2008-09)



S. No.	Articles	Page No.
1.	From the Desk of Dr. Neeta Ramachandran - Dr. Sneha Narasimhan	1
2.	Editorial Board - Divyanshu Dhanraj	2
3.	Sustainable Agriculture - Prabha H. Pillai	3
4.	Origin of Flowers - Nigita Holganzkar	4
5.	Evolution - Shivani Nigam	6
6.	The Botany Lesson - Sneha Datta	8
7.	Bio-Fuel - Arju Sharma	11
8.	Latest in Biotechnology - Sneha	12
9.	The Beauty Decides on GH Crops - Divyanshu Dhanraj	13
10.	A Lesson Called Life by Plants - Pranav Chakraborty	14
11.	News from Across the World - Sneha Sharma	17
12.	Thermal Cycles on Bury Street House Gases - Sneha Sharma	18
13.	Phenols in Biotechnology - Sneha	19
14.	A Friendly Chat With Prof. Anil Grover - Divyanshu Dhanraj	20
15.	An Individual Journey - Sneha	21
16.	The Thinkers - Researchers Seek Clues to Aging in our DNA - Sneha Ghosh	22
17.	Facts - Sneha Anand and Sneha	23
18.		24

## GCBS Anthesis Volume 5 (2009-10)



S. No.	Title	Page Number
1	BIOFUELS AND ALGAE	01
2	KELAN VAISHANAN SRIKANTH "BITION QUANTA FROM MANGALORE"	05
3	CARBON CREDITS	07
4	THE FUTURE OF HYDRO PROTOCOL	08
5	BIOFUELS	13
6	STAY HEALTHY	12
7	BIODIESEL - 2009	16
8	BE BEHIND, LATELY BEHIND	17
9	CRESTED FAUCON	18

## GCBS e-Anthesis Volume 6 (2010-11)



[Click here to go back to contents](#)

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