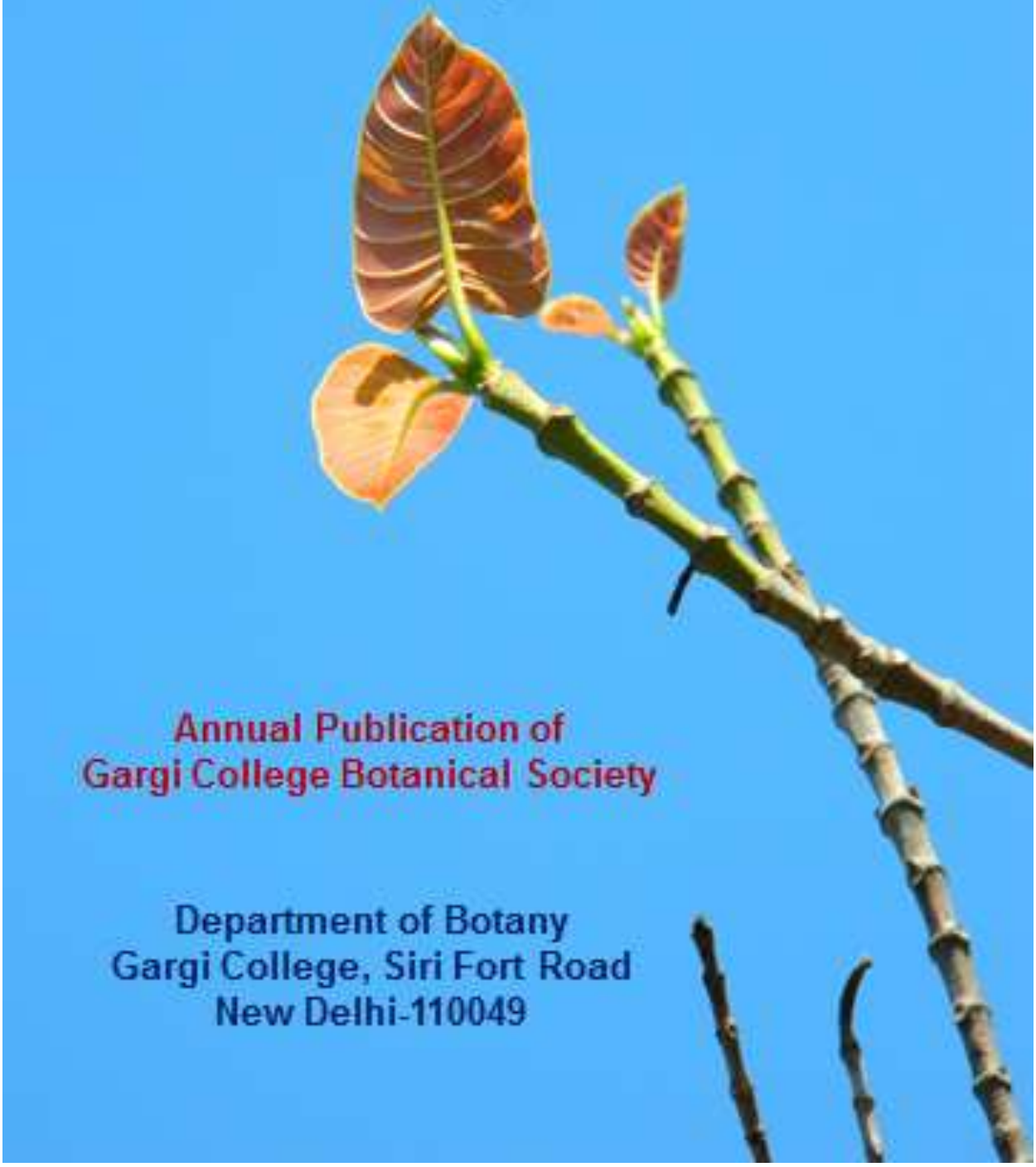
Anthesis

Volume 8, 2012-2013



Annual Publication of
Gargi College Botanical Society

Department of Botany
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Anthesis

Volume 8: 2012-2013

Special Focus: Plant Curios

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Cover photo: Monalisha Mahapatra

Anthesis

Volume 8

2012-2013

Special Focus: Plant Curios

From The Principal's Desk

I have great pleasure in writing about Anthesis, annual magazine of Gargi College Botanical Society called 'Taru' which means tree. Botany is very close to my heart and I have spent 45 years learning about plants and processes which are really mysterious and amazing.

Plants are our heritage. The existence of human race is impossible without plants. They not only provide us food, cloth, shelter, medicine etc. but also help in our well-being. Many new discoveries are being made using plants in modern areas of biology. We should live in harmony with nature. They are the most versatile renewable resources.

I congratulate all the students, teachers and all contributors for spreading importance of plants through Anthesis. I have read all the earlier issues of Anthesis with great joy. I wish all the members success in future endeavors.

Dr. Shashi Tyagi
Principal (Acting)

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From The Editor's Desk

Anthesis has successfully completed a long journey of 7 years. Time has changed and so have we, fortunately. It's the third year of Anthesis being published in electronic form, a step taken towards our commitment to the environment, as we are going to save paper by this mode of publishing. Volume 8 is now ready. Although simple in concept, Anthesis has been a brilliant success. It has constantly received the tremendous and overwhelming response of the readers.

Anthesis Vol. 7 had its special focus on 'Botanical Gardens and Sanctuaries', keeping in mind the importance of conservation in today's era and the enthusiasm we received superseded all our expectations. There are 117 pages in current publication. e-Anthesis vol. 8 has its special focus on **'Plant curios'.**

We bring into light some plant species that raises curiosity in every human eye either they have evolved unusual appearances or surprising methods of obtaining nutrients, adapting to their environment or achieving reproduction. Such plants have evolved in ways that make them stand out from their counterparts. A wide plethora of interesting reads have been included ranging from The Moisturizing Plant: *Aloe vera* to new *Nepanthes sp.* and unusual Orchid and from Strangler Figs to Botanical solutions for health problems. This time too, yet more of an alumni have sent write ups about what they did after graduation and their success story.

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

There is a section of botanical fun pages which readers will surely enjoy. It includes 'Crossword' and 'Poems'.
Words in fact, are inadequate to express my gratitude to all the teachers and students who have contributed their time and efforts for writing articles for this volume of Anthesis. I hope they will be happy to see their

edited articles with value addition done by use of additional information and photographs

This is my first experience as editor and I have learnt a lot about editing, collecting information, compiling and reviewing articles for this volume of e-Anthesis. This has generated a team spirit and capacity for cooperation among us. I thank my editorial team for this experience and wish to express my heartfelt gratitude and indebtedness to Dr. Gita Mathur for being our guiding force. Dr. Aarti Gupta very readily edited many articles for which I thank her.

At the end I would like to thank our Principal Dr. Shashi Tyagi for her invaluable guidance and constant encouragement throughout the progress of this volume. I also acknowledge the help and support received from our Teacher In Charge Dr. Leisan Judieth.

Sonam Shishodia
Editor, Anthesis Vol. 8

Editorial Board

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Aloe vera: The Natural Moisturizer

Barkha Arora
Botany (Hons.) I year

Miracle plant' or 'natural healer plant' all these names are not sufficient to completely describe this plant. *Aloe vera* being succulent is easy to grow. The leaves are dense, clumpy, fleshy, light green with sharp toothed margins. These are closely related to aloe which occurs naturally in Northern Africa. It has long been a popular houseplant not only in India but all over the world. It is a plant of many surprises. It flourishes in warm and dry climate and it also looks like a cactus with fleshy thorny leaves. In fact, it is a member of the Lily family (Can you imagine this plant is related to onion and garlic on one hand and the beautiful big lily ornamental flowers available with the florist). Inspite of the dry weather, this plant remains moist. It does so by closing its stomata to prevent moisture loss, its thick waxy cuticle that prevents water loss, water storage cells which store a lot of water and mucilaginous cells and survives in dry conditions where other plants wither and die off. There are around 400 species of aloe, but it is the *Aloe barbadensis Miller* (Aloe vera or true aloe) plant which is mostly used for mankind because of their medicinal properties. Aloe vera has a bitter taste which can be unpleasant in the raw state. It is possible to get acclimatized to the taste of plain *Aloe vera* gel, but if you cannot, then the addition of some fruit juice helps to make it more palatable. There is

a lot of confusion between *Aloe vera* gel and *Aloe vera* juice with the two often being thought synonymous. The term gel refers to the extract from the core of the leaf, whereas juice refers to the 'Aloe Latex' a bitter substance found just under the skin of the leaf.

Uses of *Aloe vera:*

- Ancient records show that the benefits of *Aloe vera* have been known for centuries, with its therapeutic advantages and healing properties over 4000 years.
- Its antiquity was first discovered in 1862 in an Egypt. While Egyptian Queens associated its use with their physical beauty.
- In the Philippines, it is used with milk for treatment of kidney infections.
- Today in Japan, it is commonly used as an ingredient in commercially available yoghurts.
- People in Tamil Nadu, India, use *Aloe vera* as a vegetable in dishes which is eaten along with Indian bread (nan).
- *Aloe* gel is used to heal minor wounds and is very effective for first and second degree burns and skin irritations. It is also known as the 'burn plant'.
- It is also used in treating Eczema and Psoriasis and a product called 'Aloe Propolis Cream' is made using Aloe.
- It is also brewed into a beverage. It has been used in treatment of constipation, ulcers, diabetes, headaches, arthritis and cough. But its oral consumption does have some side effects which include pain, electrolyte imbalances and diarrhoea.
- It also helps in treating minor vaginal irritation.
- It has been helpful to patients with severe skin diseases. It acts as moisturizer and hydrates the skin. After being absorbed into the skin, it stimulates the fibroblast cells and causes them to regenerate themselves faster and makes the skin look smoother and younger.
- Because *Aloe vera* is natural, it works gently within the intestinal tract and cleans out the bowel. It greatly reduces bloating discomfort and helps ease stress.
- *Aloe vera* gel is used to make desserts.
- It often used as sunscreen.

Home remedies using *Aloe vera*:

- ➔ To get rid of acne scars take *Aloe vera* leaves and mix it with lemon juice and almond oil or apply a thin layer of *Aloe vera* juice as an acne mask. Allow mask to dry for 15 minutes and rinse face with cold water.
- ➔ One of the home remedies for asthma is to boil some *Aloe vera* leaves in a pan of water and breathe in the vapour.
- ➔ To avoid cramping and diarrhoea, drink *Aloe vera* juice. Either diluted with apple or cranberry juice, or drink just the *Aloe vera* juice. It should not be taken in excess.
- ➔ As a home remedy to treat sunburn or other minor burns, apply small amounts of *Aloe vera* juice directly onto the skin for soothing relief.

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Banana Tree is Not a Tree!

Shikha Singh
Botany (Hons.) II Year

It's probably rare that we have heard that banana tree is a herb, but the fact is they are. By seeing a 9 ft., or upto 9ft long stem, anyone can think that it is a tree, but in case of banana it is not true. Banana tree are not tree, in actual, they are perennial herb (giant herb). Its trunk are not true one, they are false stem (pseudo stem), because it is formed from tightly wrapped leaves, not a woody stem. And according to definition of herb, "herb is a flowering plant with a fleshy stem rather than a woody stem".
Banana plant are produced from the pieces of corm (known as bit, is a piece of rhizome or a short underground stem that carries a bud) or suckers (an offshoot from a parent plant).After the plant had fruit, they died off and are replaced by others that arise from underground stem.

The banana stem at top has flower that bears fruits. Banana fruit is actually a berry, as berries are identified as many seeded with a fleshy layer. A banana plant produces only one bunch or hand in its life of around 1 year, but that hand may have 100 to 400 bananas.
The fruit is sterile and unable to produce a plant from the seed. Banana is a parthenocarpic fruit which develops without fertilisation. After fruiting the plant dies and banana plant grows when one of its shoots is planted.
Whether it is a tree or an herb, do eat bananas, as it is a rich source of potassium.

Photo: Dr. Gita Mathur

Small but special variety “Yelagiri Bananas”, famous the world over, photograph taken in Yelagiri, Karnataka

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Welwitschia: Two-Leaved Wonder of Desert

Pranati Gogoi
Botany (H) II year

Welwitschia is a gymnosperm with only one species namely *Welwitschia mirabilis. Welwitschia* belongs to the family Welwitschiaceae which is endemic to the Namib Desert of Southwestern Africa near the coast of Angola and Namibia. The most characteristic feature of this plant is the presence of deep tap roots that penetrate to a depth of 1-1.5 m before dividing into numerous thin roots. The trunk is cone shaped that gives rise to two permanent leaves from its base which spreads over the hot sand of the desert. This plant was discovered in 1959 by an Austrian physician, explorer and botanist, Friedrich Welwitsch. The estimated lifespan of *Welwitschia* is 400-1500 years.

FORM AND FUNCTION

In *Welwitschia*, along with the development of height, the two permanent leaves develop outward owing to the growth of the meristematic zone. The zone keeps on adding tissue at the base of each leaf resulting in a bilobed crown and later to a circular disc surmounted by a band of meristematic tissue.

One of the conspicuous features of *Welwitschia* is the presence of large, gigantic leaves with open pores (stomata). They are responsible for

carrying out the process of photosynthesis during the daytime in a dry, arid desert. It is assumed that there occurs near about hundred days of brief morning fog in the Namib Desert when water gets accumulated in the leaves and used during the day for photosynthesis. Recently, a study showed how CO_2 gets stored in organic acids and is taken up by the leaves during the daytime through open stomata.

REPRODUCTIVE STRUCTURES

Welwitschia is diecious i.e. it has separate and female plants. In *Welwitschia*, branched reproductive shoot systems arise from the meristematic tissue at the bases of the two permanent leaves.

Male Cone: The male cone consists of opposite and decussate cone scales. It comprises of two lateral bracts and a perianth of two parts, showing decussate arrangement. These are followed by a whorl of six microsporangiophores, one opposite to each lateral bract and two opposite each perianth part. Each microsporangiophore has a protuberance at the base and bears a synangium of three fused sporangia at the tip.

Female Cone: The cones are green in color but become scarlet red at maturity. The female cones are simple than the male cones in the sense that the flowers are not bisporangiate. Whereas, there are no flowers in the axil of a few lower bracts. The fertile shoot is made up of a pair of basal bracteoles and a pair of fused bracteoles surrounding an ovule.

POLLINATION

At the time of pollination the integument of a fertile ovule in the female stobili elongates and a pollination drop is formed at the tip. A cell in the nucellus of the female ovule undergoes meiosis, but no cell walls are formed between the four haploid nuclei. The four nuclei and their derivatives undergo repeated mitosis without cell wall formation. It is only later that cell walls form around several nuclei. No archegonia are formed. Subsequent development of the female gametophyte is without parallel in other gymnosperms or in angiosperms. Some of the multinucleate female gametophyte cells grow into the nucellus of the ovule, into which the nuclei migrate. Pollen tubes, which grow downward in the nucellus from the male pollen grains after pollination meet and fuse with the upwardly growing multi-nucleate tubes of the female gametophyte. “Fertilization bulbs” are formed within which fusion takes place between a male gamete and one nucleus of the female gametophyte cells. A zygote is formed and the young embryo then grows downward within the female gametophyte tube towards the cellular female gametophyte.

CONCLUSION

One of the physical features that distinguish the Gnetophytes from other gymnosperms is the presence of vessels in the xylem (wood). The possession of vessels is characteristic of the flowering plants (angiosperms) as well, and has led to the speculation that Gnetophytes may have been close to the ancestral stack of some angiosperms.

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Wolffia - Smallest Flowering Plant

Nianglawmkim
Botany (Hons.) II year

Looking at the environment around us, we can find flowering plants of varying sizes: from the small lilies to the tall eucalyptus trees. *Wolffia*, the smallest of them all, belongs to the family Lemnaceae. Known to the layman as duckweed or watermeal, the aquatic plant resemble specks of cornmeal floating on still or slow moving water. Most species of *Wolffia* are greatly distributed throughout the world and they form dense homogeneous clonal population in places where they are found.

DESCRIPTION:

Wolffia species are free-floating rootless thalli, generally globoid to ovoid or flattened in structure. Their size may vary from 0.4-1.3mm in length and 0.2-1.0mm on width. They may be green or yellow-green in colour. The plant body is minute , with granular or mealy texture when rubbed between fingers of hands. It is small enough to slip through the eye of an ordinary sewing needle, and at least 5000 plants could be packed into a thimble.

Two of the smallest species- *W.angusta* and *W. globosa* are less than 1mm long.

FLOWERING AND REPRODUCTION:

Wolffia produces a single bisexual microscopic flower, in a depression on the top surface of the plant body. The minute flower consists of a single pistil and a stamen, but no petals or sepals. Since the stigma is generally receptive before the anther is mature , a condition known as protogyny, the flower typically requires cross pollination from a different *Wolffia* plant with a mature anther that is ready to shed its pollen. After pollination, the ovary develops into a one-seeded fruit called a utricle, which also holds the record for the world's smallest fruit.

However, flowering is not commonly seen in *Wolffia* as it reproduces primarily by vegetative propagation or budding. This is accomplished as the main plant or "mother frond" produces a "daughter frond". They form a single, funnel-shaped budding pouch at the basal end .The daughter plants are produced in the basal budding pouch.

OCCURENCE AND DISTRIBUTION:

Duckweeds have a worldwide distribution, especially in the temperate and tropical regions. The plant mostly prefers a quiet freshwater lake or marshes and slow moving waters. The wide distribution of the plant species still remains an enigma. Being carried from pond to pond on the feet of water fowl (tucked neatly under the duck's body during flight, hence the name duckweed), probably explains the distribution of some *Wolffia* species. In the south-eastern United States, there are records of *Wolffia* plant bodies being carried by a tornado, and they have been reported in the water of melted hailstones!

ECONOMIC IMPORTANCE:

Wolffia species seems not to be considered invasive and might actually have a great economic value. They are composed of about 40% proteins, about the same as soybean, making them a potential high-protein human food source. They have historically been collected from the water and eaten as a vegetable in much of Asia*. W. microscopa*, the Indian species is a plausible food source for people as they are quite palatable. In Thailand, *W. globosa*, known as khai-nam, are eaten.

Apart from these food sources, the plants are used by researchers to study basic plant development, plant biochemistry, photosynthesis, the toxicity of hazardous substances and much more. Genetic engineers are cloning duckweed genes and modifying duckweeds to inexpensively produce pharmaceuticals. Environmental scientists are using duckweeds to remove unwanted substances from water. Aquaculturists find them an inexpensive source for fish farming. Moreover, duckweed and associated micro fauna are an important food source for certain water fowl. They are potentially valuable for waste-water reclamation.

References:

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Cuscuta – The Devil's Ringlet

Aakanksha Sharma
Botany (Hons.) II year

Photo: Dr. Gita Mathur

The *Cuscuta* plant, commonly also known as Dodder, is recognized around the whole world for its characteristic feature, parasitism. Other popular names include Witch's Hair, Golden Thread, Pull Down etc. The parasite is the only member of the family Cuscutaceae but now has been made a member of the morning glory family on the basis of work of the Angiosperm phylogeny group 1.

Dodder is identified in nature as a plant that has stems which are leafless or leaves highly reduced to spines with very less amount of chlorophyll or no chlorophyll present. The plant has the capability of surviving on its own but is adapted in environment to reach to the nearby green plants through chemosensory clues and obtain nutrition from them. It has germination period that ranges from 5-10 days and if within this period it does not find a suitable host, it eventually dies. Before finding a host it derives its nutrition from its embryo or cotyledons though present but are vestigial.

Occurrence and morphology: This parasite is spread all over the world highly confined to regions of sub-tropical and tropical with the highest number of species diversity and other parts like temperate regions. Cuscuta survives rarely in cooler temperatures with only 4 species restricted to Northern Europe. It has seeds that are produced from mid-summer to autumn and produce a fruit similar in color to that of its vines and a size resembling that of a pea. Seeds are produced in large quantities but are extremely minute. They can last in the soil from a time period between 5-10 years or even much more longer due to a hard and tough coating around their seed. The seeds germinate either near the ground surface or in the soil. It has flowers ranging from colors like white to pink to creamy yellow.

Parasitism: Dodder first attaches to the host plant and then wraps around it, if the host provides it with sufficient and enough nutrients then the parasite develops a tube like structure called haustoria and inserts into the host's vascular system deriving all the nutrition from it and slowly but ultimately causing its death. It is found to grow up till high and huge canopies in tropical forests over trees and shrubs but in temperate regions is restricted to lower vegetation. The very common plants affected by this sucking monster are:

Dahlia, Chrysanthemum, Clover, Potatoes, Petunias, Alfalfa, Flax, Bouganvillia and Lantana

The debilitating by Cuscuta of host plant, makes the plant highly affluent to viral diseases and also carries the ability of transferring disease from one plant to another.

In times of threat prevention is better than cure: A large number of countries prohibit the coming in of dodder seeds and have strict laws abiding non-entry of plants affected by Cuscuta. The farmers are thoroughly checked on their clothes so that their clothes are not carrying any dodder seeds when moving from an infested region to non-infested area. Various herbicides, one of them Dacthal is sprayed in farms to prevent the parasite's growth. If Cuscuta has not choked the host plant it is easy to remove but if not, then the host should be pruned to a length lower than Cuscuta because it may grow again through haustoria. Farmers find Dodder to be enormously destructive and an extremely dangerous weed causing loss of various commercial plants as mentioned above.

Cuscuta could be useful to one had never imagined!!!! – Although very unpopular among the farmers. Cuscuta has immense medicinal uses which are practiced today although rarely but has immense good effects like:

- Treatment against jaundice, spleen, diuretic problems
- Cures scurvy and sciatica
- Can be applied to skin to treat scrofula derma

- Chinese herbalists used it for solving problems like impotence, dry eyes, ringing in ears, frequent urination
- Western herbalist use stems of Cuscuta to prepare a remedy for cough and cold by boiling the stem with ginger and allspice to prepare a decoction that gives relief to the throat

  Hence everything in nature is created with some fruitful advantages that bring joy and some disadvantages that harm but at last complete the meaning of life…..yes life!!! So what if it is a plant.

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Mangroves: Brilliant Adapters

Umama Khan
Botany (Hons.) IInd year

Photo: Dr. Gita Mathur Mangroves growing in Goa

Mangroves are a specialized group of salt-tolerant, terrestrial plants that inhabit shorelines between low and high tide levels. Mangroves live life on the edge. With one foot on land and one in the sea, these botanical amphibians occupy a zone of desiccating heat, choking mud, and salt levels that would kill an ordinary plant within hours. Yet the forests mangroves form are among the most productive and biologically complex ecosystems on Earth. Birds roost in the canopy, shellfish attach themselves to the roots, and snakes and crocodiles come to hunt. Mangroves provide nursery grounds for fish; a food source for monkeys, deer, tree-climbing crabs, even kangaroos; and a nectar source for bats and honeybees.

Mangroves are various types of trees up to medium height and shrubs that grow in saline coastal sediment habitats in the tropics and subtropics. Mangroves dominate three-quarters of tropical coastlines. The saline conditions tolerated by various mangrove species range from brackish water, through pure seawater, to water concentrated by evaporation to over twice the salinity of ocean seawater.

The intertidal existence to which these trees are adapted represents the

major limitation to the number of species able to thrive in their habitat. High tide brings in salt water, and when the tide recedes, solar evaporation of the seawater in the soil leads to further increases in salinity. The return of tide can flush out these soils, bringing them back to salinity levels comparable to that of seawater. At low tide, organisms are also exposed to increases in temperature and desiccation, and are then cooled and flooded by the tide. Thus, for a plant to survive in this environment, it must tolerate broad ranges of salinity, temperature, and moisture, as well as a number of other key environmental factors-thus only a select few species make up the mangrove tree community.
Mangrove plants require a number of physiological adaptations to overcome the problems of anoxia (low oxygen), high salinity and frequent tidal inundation (an overflow or a flood).

Photo: Dr. Gita Mathur Mangroves growing in Goa

Wherever they live, they share one thing in common: They're brilliant adapters. Each mangrove has an ultra filtration system to keep much of the salt out and a complex root system that allows it to survive in the intertidal zone. Some have snorkel-like roots called pneumatophore that stick out of the mud to help them take in air; others use prop roots or buttresses to keep their trunks upright in the soft sediments at tide's edge. The plants' interlocking roots stop river borne sediments from coursing out to sea, and their trunks and branches serve as a palisade that diminishes the erosive power of waves.

Adapations for salt exclusion or salt excretion allows mangroves to live where other terrestrial plants cannot.

Red mangrove: *Rhizophora mangle*

Through physiological adaptations, mangroves are able to live in harsh saline environments. Red mangroves occur where soil salinities range from 60-65 parts per thousand (ppt) while black and white mangroves are found in soils with over 90 ppt salinities. Salinities effectively limit competition from other plants, while mangroves have salt exclusion or salt excretion adaptations allowing survival in these environments.

The ability to exclude salts occurs through filtration at the surface of the root. Root membranes prevent salt from entering while allowing the water to pass through. This is effective at removing the majority of salt from seawater. The red mangrove is an example of a salt-excluding species.

On the other hand, salt excretes remove salt through glands located on each leaf. Black and white mangroves are both salt excretes. White mangroves develop thickened succulent leaves, discarding salt as the leaves eventually drop.

Specialized root structures allow mangroves to live in oxygen-poor sediment

Pneumatophores of black mangrove

Mangrove trees are adapted for survival in oxygen-poor or anaerobic sediments through specialized root structures. Plants require oxygen for respiration in all living tissues including the underground roots. In soils that are not waterlogged, air diffusion between sediment grains can supply this requirement. However, in waterlogged soils, these spaces fill with water containing lower oxygen levels than air.

In contrast to most plants, mangroves have poorly developed, shallow below-ground root systems while having well-developed aerial roots. These aerial roots allow for the transport of atmospheric gases to the underground roots. Red mangroves have prop roots extending from the trunk and adventitious roots from the branches. Although the black mangrove does not have prop roots, small air roots can be seen extending vertically from the soils surrounding the trunk. These air roots, called pneumatophore , extend upward from the underground roots above the soil surface. During low tides, air is taken up through open passages in the pneumatophore and transported to living root tissues.

Root adaptations make it possible for mangroves to live in the soft sediments along the shoreline

Root adaptations increase stability of mangrove trees in the soft sediments along shorelines. Red mangroves have prop roots descending from the trunk and branches, providing a stable support system. Shallow wide spreading roots, surrounds the trunks of black mangroves, adding to the structural stability of the tree. Other species of mangrove trees grow at higher elevations, in drier soils; do not require specialized root structures.

Photo: Dr. Gita Mathur Mangroves growing in Goa

Nutrient uptake

The biggest problem mangroves face is nutrient uptake. Because the soil is perpetually waterlogged, little free oxygen is available. Anaerobic bacteria liberate nitrogen gas, soluble iron, inorganic phosphates, sulfides, and methane, which make the soil much less nutritious .Pneumatophores (aerial roots) allow mangroves to absorb gases directly from the atmosphere, and other nutrients such as iron, from the inhospitable soil. Mangroves store gases directly inside the roots, processing them even when the roots are submerged during high tide.

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Lotus: Our Unique National Flower

Neha Tanwar
Botany (Hons.) II year

Photo: Dr. Gita Mathur

Lotus flowers and young fruits growing in Ranganathittu Bird Sanctuary, Bangalore, Karnataka.

Order – proteales
Family- Nelumbonaceae
Genus- *Nelumbo*

The lotus has deep religious meaning to Hindus and Buddhists, to whom the lotus flower symbolizes beauty, purity and divinity. In Hinduism the sacred lotus represents the sun, and is associated with mother goddesses as a symbol of fertility.

Lotus is an aquatic plant whose leaves and flowers rise above the water surface while its roots are anchored to the pond bed. Leaves are disc shaped and about 90cm long. Flowers are large and attractive with lots of petals. They may be rosy-pink or white color. They are sacred in Buddhist and Hindu religions and are frequently represented in South Asian art and literature.

Interesting facts about lotus:

- The lotus has long been considered a close relative of water lilies. However recent molecular researches have shown that the closest living relatives of the sacred lotus are the plane trees (*Platanus* spp., Platanaceae) and members of the protea family (Proteaceae).
- Lotus seeds are the world's longest lived seeds. Lotus seeds can still germinate when they are 1300 years old.
- In yoga, one of the main postures for meditation is known as the padmasana or lotus position. The head is held high and the body adopts a cross-legged seated position.
- In India, honey made by bees visiting lotus flowers is said to be a tonic called 'padmamadjhu' or 'makaranda' and is used for eye disorders.
- Preliminary studies has been done on ancient lotus seeds reveal the presence of an enzyme called L-isoaspartyl methyltransferase which play a role in anti-ageing through their repair of proteins. By further studies and report might prove and support the long-held traditional belief among Asian cultures that lotus is a symbol for fertility and re-birth.

Pollination mechanism in lotus is very unique. The flowers open in the morning and close in the evening. They give shelter to insects at night and these insects bring about pollination. In the morning flowers open again and insects escape.

Lotus has a crown of attractive petals, pink or white, seen in ponds and rivers mostly in muddy water. To become a botanist it is not enough to only see the things but also to observe them and relate to ourselves, this I learnt from my respected teachers. *Nelumbo nucifera* is protogynous (female reproductive organ matures early than male). It’s flower lasts only for 3-4 days. Within these 3-4 days flower shape undergoes changes by petal movements and pollination.

The lotus flower is bowl shaped and nectar-less, having a large chamber enclosed by petals and a large number of stamens. A large obconical receptacle resembling a shower head is centrally located and contains the female flower parts and eventually the seeds. The female flower structures, the stigmas, poke through the holes in the receptacle. The

male flower parts, the stamens, are thickly set in multiple rings completely surrounding the receptacle. The stamens have yellow anthers at their ends that produce pollen, which contains protein and which pollinators need for food. The stigmas have a sticky surface so pollen grains stick to them.

On the first day i.e. day-1 they open only partially, exposing the tips of the stamens, which are not yet releasing pollen but are releasing scent. The stigmas are sticky and ready to receive pollen, and pollinators enter. Day-1 flowers close completely at dusk, appearing like unopened buds. The next day (day-2), the petals open again and the stamens begin to release pollen. Stigma receptivity continues during Day-2, so self-pollination might occur during the process of insect visitation. Cross-pollination may also occur when insects trapped within the lotus flower on the first night put pollen already on their bodies from other flowers onto the stigma. In the evening, the petals close again but much more loosely. On the third day the flower opens again, but the stigmas are dry and the stamens begin to wilt. On subsequent days the petals and stamens fall off, leaving only the receptacle with the developing seeds.

Organisms are provided with many strategies by nature to survive, for instance, in the case of lotus Beetles are non-specialized pollinators but Lotus flowers are built to attract beetle pollinators. Lotus flowers generate heat, the flower breaks down its starches to provide increased flower temperatures during the evening and early morning hours. This rewards beetles trapped inside the closed flower at night with a snug, warm environment that allows them to remain active, feeding and pollinating. The heat also helps spread the flower's fragrance, advertising its readiness for pollinators. Flowers can regulate their overnight temperature to between 86 and 95 degrees Fahrenheit, even if the outside temperature is only 50 degrees Fahrenheit.

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New *Nepanthes* sp. and an Unusual Orchid

Dr. Bharti Bhattacharyya
Botany Faculty 1969 - 2006

Scientists have discovered a flesh-eating plant so large that it can swallow and devour rats whole. They are lured into its slipper-like mouth

to drown or die of exhaustion before being slowly dissolved by digestive enzymes.

Natural history explorer Stewart McPherson, who runs Redfern Natural History Productions, discovered the plant during an expedition to Mount Victoria in the Philippines, with fellow botanists Alastair Robinson and Volker Heinrich.

The plant, a member of the 'pitcher' family, grows more than 4ft long. The team said in a statement: 'That one of the largest carnivorous plants

has remained undiscovered until the 21st century is remarkable.

The newly-discovered *Nepenthes attenboroughii* (left), which is named after British nature expert Sir David Attenborugh, can swallow mice like its cousin the *Nepenthes northiana* (right)

'Many pitcher plants trap not only insects, but also rodents including mice and rats, and the new species - *Nepenthes attenboroughii* - is certainly large enough to catch such big prey!'

Details of the discovery, named *Nepenthes attenboroughii* in honor of naturalist Sir David Attenborough, were published in the Botanical Journal of the Linnean Society.

The plants produce large 'pitchers' which are big, hollow, water-filled leaf structure. The plant then secretes nectar to attract insects and some rodents. The prey falls in and cannot escape back up the slippery, waxy interior of the trap.

Mr McPherson, 26, from Poole, told the Mail Online: 'The victim drowns in the pitcher and acids and enzymes in the fluid within the trap break down the remains of the prey.

'The fluid breaks down the soft parts of the prey, and generally, only the bones of the prey remain

Mr McPherson said pitchers were usually colorful to attract prey, especially insects, which they needed to survive. 'All pitcher plants are carnivorous plants. They need to acquire nutrients by trapping and digesting animals (mainly insects) because they grow in really hostile areas where nutrients are scarce in the soil,' he said.

'This new species which was discovered in the Philippines produces pitcher traps that are green with purple blotches, and they stand out clearly from surrounding vegetation.'

The team said the structure of its leaves, pitchers and flowers suggests strongly that the new species is a close relative of the great *Nepenthes rajah* from Borneo and may be related to the *Nepenthes* flora of Palawan and Borne.

Sir David, 83, was thrilled to have the exotic plant named after him. He said: 'I was contacted by the team shortly after the discovery and they asked if they could name it after me. I was delighted and told them,

'Thank you very much'. 'I'm absolutely flattered. This is a remarkable species and the largest of its kind.'

It is one of 13 new species the team has discovered during three years of expeditions in South East Asia. The botanists also discovered strange pink ferns and blue mushrooms they could not identify during the same trip. Mr McPherson's company is working on a documentary and has produced books about the new species.

Botanists named the plant *'Nepenthes attenboroughii'* after nature expert Sir David Attenborough.

An Unusual Orchid, Cute, Quirky But Endangered!

Beautiful and bizarre, *Rhizanthella gardneri* is a critically endangered species of orchid in the state of Western Australia. It is also known as Western Underground Orchid, belongs to Family Orchidaceae, and was discovered in the spring of 1928 in the wheatbelt of Western Australia. Professor Mark Brundrett from Wheatbelt Orchid Rescue Project in Western Australia has commented – “It is one of the most beautiful, strange and iconic orchids in the world.”

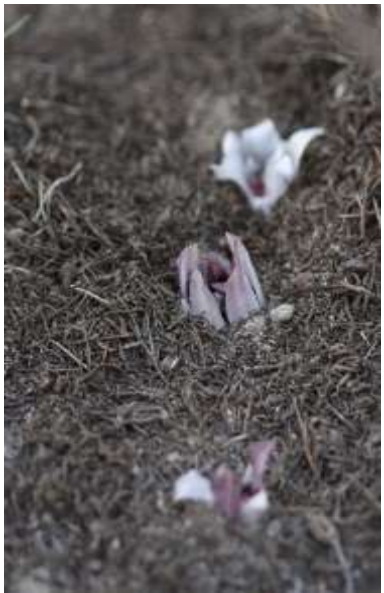
The white leafless plant is made up of a fleshy underground storage stem or tuber which produces flower-head comprising about 150 tightly packed tiny buds. It blooms in the months of May and June. Flowers are small, 2.5 to 3 cm and dark maroon or deep violet in colour.

This unusual orchid is critically endangered, with only fifty known plants in the wild, found in five locations in Western Australia. Because of its

rarity, the locations of the orchids are a secret. They are also very difficult to find. One needs all the help one can get since it often takes hours of searching under shrubs on hands and knees to find them.

Rhizanthella gardneri leads a very peculiar life. The plant spends its entire growth cycle underground; even when it flowers, the blooms are several centimeters below the soil surface. Unlike most other plants, this orchid does not photosynthesize its own food but has instead evolved a parasitic relationship with a fungus associated with the roots of the broom brush shrub. (Certain types of fungi live symbiotically with some kinds of plants – the fungi provide the plants with mineral nutrients and water, and in turn, the host plants provide the fungi with photosynthesized carbohydrates.) Dr. Etienne Delannoy, the lead author of a scientific paper about *Rhizanthella gardneri* recently published in *Molecular Biology and Evolution*, said that just one underground orchid exists in plants, most plants and algae have about 110 genes in their chloroplasts, but not all of those genes are encoded for photosynthesis. Sorting out the functions of those other genes has been difficult to do in photosynthesizing plants. But the cells in the non-photosynthesizing underground orchid still retain their chloroplasts, and those chloroplasts should only contain genes that encode for functions other than photosynthesis. Dr. Delannoy and his team sequenced the chloroplast genome of *Rhizanthella gardneri* and found that it only has 37 genes, the smallest number known in any plants. Those 37 genes contain the instructions for synthesizing four important plant proteins. This discovery has provided a significant step towards understanding the full purpose of chloroplasts in plant cells, and could help scientists understand the evolution and functions of other cell organelles

Yes, that's really an amazing plant! For example, there's a very tight relationship between the orchid, the fungus, and the broom bush, to such an extent that the seeds of this orchid can germinate only when infected by this particular fungus, provided that the fungus is actually mycorrhizing [living in symbiosis with] the broom bush. The seeds are



fleshy which is unique to orchids. They can be eaten by rats and still germinate

The species is classified as Vulnerable on the 1997 **IUCN Red List** of Threatened Plants and listed on Appendix II of the **Convention on International Trade in Endangered Species of Wild Fauna and Flora** (CITES).Threats to habitat include drought, the encroachment of salt and a decline in health of the host plant. Remaining populations of the underground orchid are isolated in the fragments of habitat that persist today.

Three of the known populations of *Rhizanthella gardneri* are protected within nature reserves and a concerted initiative has been launched to safeguard this species for future generations. A partnership between the Millennium Seed Bank of the Royal Botanic Gardens, Kew, Australia's Endangered Species Program and Perth's Kings Park and Botanic Gardens are undertaking DNA fingerprinting and seed-banking of this rare orchid in an attempt to establish a propagation programme.

Cross-Bred Giant Pitcher Plant

(Editor's additional information)

A giant new carnivorous pitcher plant in Rainforest Biome, at the Eden Project - *Nepenthes griggus var giganticus* after Tim Grigg, the skilled horticulturist who cross-bred it from two established types of outsized pitchers. With a length of nearly two metres and a tubular capacity estimated at 30 litres, the hybrid is thought to be easily the biggest pitcher plant ever bred in captivity.....

Courtesy:https://www.facebook.com/theedenproject

For more information on Eden's plants, activities and events, go to www.edenproject.com

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Figs: Sacred to Stranglers

Nikita Dalal

Botany (Hons.) III year

Since ages, figs (*Ficus*) has been considered as religious. Hindus, Jains and Buddhists consider *Ficus religiosa* as sacred. Christians gave figs a

prominent role and some species of figs are considered holy in Muslims as well. Figs come in all shapes and sizes. Some are trees, while others

Photos: Dr. Gita Mathur

Strangler Figs growing in Arboratum at Forest Research Institute, Dehra Dun.

Photos: Dr. Gita Mathur

Strangler Figs growing in Ranganathittu Bird Sanctuary, Bangalore, Karnataka.

are bushes or vines, it grows in tropical or sub-tropical regions. Native to Asia and the middle-east this tree belongs to Moraceae family.

Other than its sacred group of trees, figs also have a group of monsters called ‘Strangler Figs’. The *Ficus* species that forms this group are : *Ficus aurea* (Florida Strangler Fig), *Ficus barbata* (Bearded Fig), *Ficus benghalensis*, *Ficus citrifolia*, *Ficus craterostoma*, *Ficus tinctoria*, *Ficus macrophylla*, *Ficus obliqua, Ficus virens, Ficus watkinsiana.* These species of figs initially was an adaptation for growing in dark forest where plants had to compete for receiving light. These plants begin their life as epiphytes when their seeds germinate in crevices of the host tree and the young trees encase the host in a tangle of roots and trunks, ultimately strangling it to death. These stranglers not only grow their roots to envelop the roots of the host tree but also they envelop the host tree to reach upto the sunlight zone above the host canopy to attain light. The fig's crown grows foliage which soon overshadows the tree. Eventually, the host tree dies leaving the fig with a hollow trunk, making fig a columnar tree with a hollow central core. This agent of death might provide an important niche and food source to many rainforest creatures.

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Buckwheat

Aditi Sharma
Botany (Hons.) III year

Buckwheat refers to several species of plants belonging to dicot Family Polygonaceae. It is a fruit not a grain. Buckwheat is not related to wheat as their name may suggest, as they are not cereal/grasses. There are many wild varieties of Buckwheat which are known.

Buckwheat is high in its fibre content. For detoxification of our body and weight loss Fibre is important that makes our body clean. Better we look and more is the digestion with more fibre intake through consumption of Buckwheat.

Common Buckwheat is **Fagopyrum esculentum.** Since the plant is not related to wheat the grain-like use of the crop terms it as a pseudo cereal. It is a short seasonal crop that grows well in low-fertility or acidic soils, but the soil must be well-drained.

Flowers of Buckwheat are very fragrant and attractive to the bees which make use of them to produce strongly flavoured, special honey. It can be served as alternative to rice or as porridge.

Many health benefits are associated with buckwheat the nutrients of it contribute towards the blood sugar control. The high in insoluble fibre

content of buckwheat can help in avoiding gallstones.

Whole grain breakfast involving consumption of buckwheat can help in preventing heart failure and other cardiovascular diseases, high blood pressure and high cholesterol levels in postmenopausal women's.

Common name of buckwheat in Hindi: kuktu also known as Japanese buckwheat.

Cultivation areas of Buckwheat in India include :
Leh, Pahal Gaon, Srinagar, Udhampur,Chamba, Kangra, Lahaul & Spiti, Kinnaur, Mandi, Kullu, Shimla, Utarkashi, Chamoli, Pauri, Siliguri and Darjeeling, Assam, Meghalaya, Nagaland, Manipur, Almora & Manipur.

Nutritional Value of Buckwheat:
Calories and Macronutrients: 583 Calories are provided by each cup of buckwheat. High in carbohydrate content with 122-136 g per cup. It has only 1 g of saturated fats.

Dietary Fibres: 17g of dietary fibres are provided per cup. These fibres lower our risk to heart diseases as the bad LDL (low density lipoprotein) cholesterol level is lowered in our blood.
Vitamins: It is high in B vitamins including niacin, folate, thiamine and pantothenic acid. For energy metabolism and heart health these vitamins are important.
Minerals: 782g potassium per cup of buckwheat is provided and it is naturally almost sodium –free. A cup of buckwheat has 393 mg of magnesium whereas the wheat has only 242 mg.
Health Benefits of Buckwheat :
It contains higher levels of zinc, potassium, copper and manganese than provided by other cereals. A very high level of proteins second highest to that of oats. It also provides high amino acid as compared among the plant sources. It is well balanced in protein content not only that it is rich in lysine.
It helps in slowing down the rate of glucose absorption by its high soluble fibre content. It is especially important in people with diabetes and among people trying to maintain balanced blood sugar levels.
It serves as a potential source for resistant starch which is often considered as third type of dietary fibre as it possesses benefits of some of the soluble and insoluble fibres.
Additional health benefits provided by buckwheat protein includes when used as functional ingredient serves to treat hypertension, obesity and

constipation when taken in sprouts form or in form as extracts either from the groat or hull it has abound benefits. It is thus important to mention that it is naturally gluten-free whole grain and play a role in gluten free diet for people that are gluten-intolerant.

Delicious Dishes from Buckwheat:

Several varieties of Pancakes, Flour, Buckwheat Flat bread, Salads, Muffins, Puddings, Soba Noodles and Dipping Sauces has been in the platter for most of the North America, Europe and Asia.

Indian Dishes from Buckwheat :

Buckwheat and sprouts khichdi (protein rich recipe), Buckwheat Dhoklas (Acidity Recipe), Buckwheat Handvo (Non-Fried Snacks), Buckwheat Dosa, Moong and Buckwheat Khichdi, High Fibre Chilas, Stuffed Buckwheat Pancakes.

Recipe for Buckwheat Dosa :

Cooking time : 20 mins
Preparation time : 5 mins
10 dosas can be made

Ingredients :

1 cup Buckwheat (kuttu)
1 tbsp urad dal (black split lentils)
1tbsp oil
1 tbsp mustard seeds (rai/sarson)
¼ tbsp hing (asafoetida)
1 tbsp finely chopped green chillies
1 tbsp finely chopped coriander leaves
Salt to taste

Method to prepare :

1. Blend to smooth powder a mixture of buckwheat and urad dal.
2. To the oil heated in a pan add mustard seeds.
3. Add asafoetida (hing) and sauté for a few seconds when seed crackle starts.
4. With the tempering combine the buckwheat – urad dal powder mixtures prepared earlier and mix well.
5. Now add green chillies, coriander, salt and approximately 1 ¾ Cup of water and mix well into batter.
6. Pour the prepared batter into greased non-stick pan and spread it in form of a thin circle.
7. Cooking to be done till both the sides are golden brown and then fold it over in to make a semicircle.
8. Repeat the same procedure to make more dosas from the same

batter.
9. The dosa is ready to be served with sambhar and coconut chutney.

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Medicinal Properties of Brassica Species

Dr. Renu Mundhara Soni

1. ***Brassica alba***

Synonym: *Sinapis alba* L.
Family: Cruciferae; Brassicaceae.



Shoot with flowers and fruits(1), enlarged fruits(2) Seeds(3)

Habitat: Native of Europe and West Asia. Cultivated in North India.
English: White Mustard.
Ayurvedic: Siddhaartha, Shveta Sarshapa, Sarshapa-Gaura.
Unani: Khardal Safed.
Action: Stimulant to gastricmucosa, increases pancreatic secretions; emetic (used in narcotic poisoning),diaphoretic, rubefacient. (As a counter-irritant it increases flow of blood to a specific area.) Used externally as a poultice in bronchitis, pleurisy, intercostals neuralgia, chilbains. Seeds contain glucosinolates,

inalbin in *B. alba* and sinigrin in *B.juneja* oil are toxic constituents. The oil with toxic constituents should be avoided in gastrointestinal ulcers and kidney disorders. When moistened, sinigrin in the seeds is degraded to allyl isothiocyanate, a potent irritant volatile oil. Glucosinolates are goitrogenic. Excessive consumption of *Brassica* sp. vegetables may alter absorption of thyroid hormone in G2 tract.

2. ***Brassica campestris***
Family: Cruciferae; Brassicaceae.



Shoot with flowers and fruits(4) enlarged fruits(5) Seeds(6)

Habitat: Cultivated as an oil-yielding crop.
English: Field Mustard, Turnip Rape.
Ayurvedic: Sarshapa, Siddhaartha.
Unani: Sarson.
Action: Stimulant, diuretic, emetic, rubefacient, counter-irritant. Used externally for bronchitis and rheumatic pains (increases flow of blood to a specific area). Powdered seeds are used as a tea for colds, influenza and fever. The seeds contain glycosinolates (the derivatives are responsible for toxicity).The concentration of the major glucosinolate, gluco-napin, varies from 0.64 to 1.8% in the oil-free meal of Indian brassicas. The glucosinolates in rapeseed meal split upon enzymatic hydrolysis to produce glucose, potassium, hydrogen sulphate and a sulphur containing compound which undergoes intra-molecular rearrangement to give rise to the anti-nutritional factors, isothiocyanates or thiocyanates.The volatile oil of mustard is given internally in colic; in overdoses it is highly poisonous and produces gastro enteric inflammations. It is employed externally as a liniment for rheumatic pains. Adulteration of mustard oil with argemone oil (*Argemone Mexicana,* frequently found growing in brassica fields), by accident or by design,

has led to the widespread epidemics of dropsy and glaucoma due to an alkaloid anguinarine. Black mustard contains sinigrin, which on hydrolysis by enzyme myrosin, produces allyisothiocynate; the white mustard contains sinalbin, which produces *p*-hydroxybenzyl isothiocynate. Mucilage contains sinapine.

Dosage _ Seed—500 mg to 1g paste.

3. ***Brassica juncea***
Family: Cruciferae; Brassicaceae.

Shoot with flowers and fruits(7), enlarged leaf, flowering(8) and fruiting twig(9)

Habitat: Cultivated in Punjab, West Bengal, Uttar Pradesh and Gujarat.
English: Chinese Mustard, Brown Mustard.
Ayurvedic: Raajikaa, Aasuri Raai,Tikshnagandhaa.
Action: Raai is a substitute for Mustard. Antidysenteric, stomachic, diaphoretic, anthelmintic. Increases pancreatic secretions. A decoction of seeds is given in indigestion and cough. Used externally as a counter-irritant in several complaints of nervous systems.

4. *Brassica napus*
Family: Cruciferae; Brassicaceae.



Shoot with flowers and fruits(10), enlarged leaf, flowering (11) and fruiting twig(12)

Habitat: Cultivated in Punjab,Bengal and Bihar.
English: Mustard, Indian Rape.
Ayurvedic: Krishna-Sarshapa, Raajakshavaka, Kattaka,
Unani: Kaali Sarson.
Action: Emollient, diuretic, ant catarrhal. The oil gives brassino steroid—brasinolide. Seeds give an anti-thyroid compound, 5-vinyl-2-oxazolidinethone; thioglucosides and thioglucosinolates. The seed oil is said to dissolves gallstone.

5. *Brassica nigra*.
Family: Cruciferae; Brassicaceae.



Shoot with flowers and fruits(13), enlarged leaf, flowering and fruiting twig(14), Fruits with seeds(15)

Habitat: Cultivated in Punjab, Uttar Pradesh and Tamil Nadu.
English: Black Mustard.
Ayurvedic: Banarasi Raai, Raajika (var.).
Unani: Khardal Siyah.
Action: Seeds are used for treating coryza with thin excoriating discharge with lacrimation, sneezing and hacking cough, nostril blockage and dry and hot feeling of pharyngitis. The seeds contain glucosinolate sinigrin, which produces allyl isothiocyanate when mixed with warm water. Allyl isothiocynate acts as a counterirritant when diluted (1:50).

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Bioluminescence: A World of Light

Nikita Dalal
Botany (Hons.) III Year





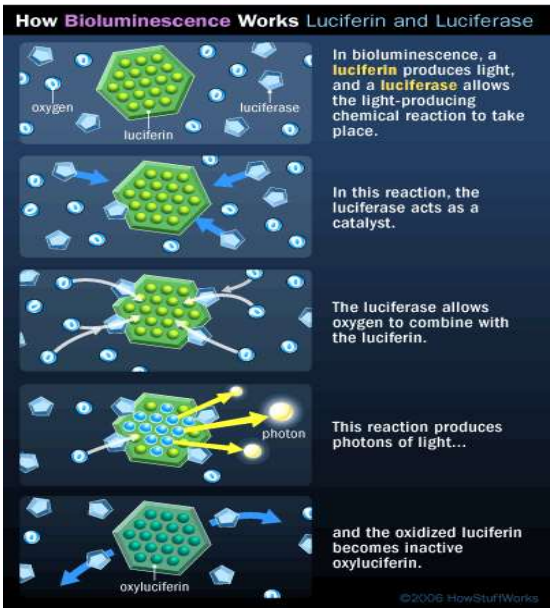
Bioluminescence: The first image that develops in our brains after hearing this term is of some organism that emits light. Well, that is true. Bioluminescence (the term is hybrid of Greek word bios: living and Latin word lumen: light) is the production and emission of light by a living organism. Marine creatures, fungi, bacteria and even insects are bioluminescent. In coastal regions, the main organism causing bioluminescence is a dinoflagellate (*Noctulica scintillans*) which is single celled alga found in the sea. Bioluminescent Bays of Puerto Rico is an excellent example. The water of this bay is fluorescent blue in colour which gives you an amazing experience when you swim in it.

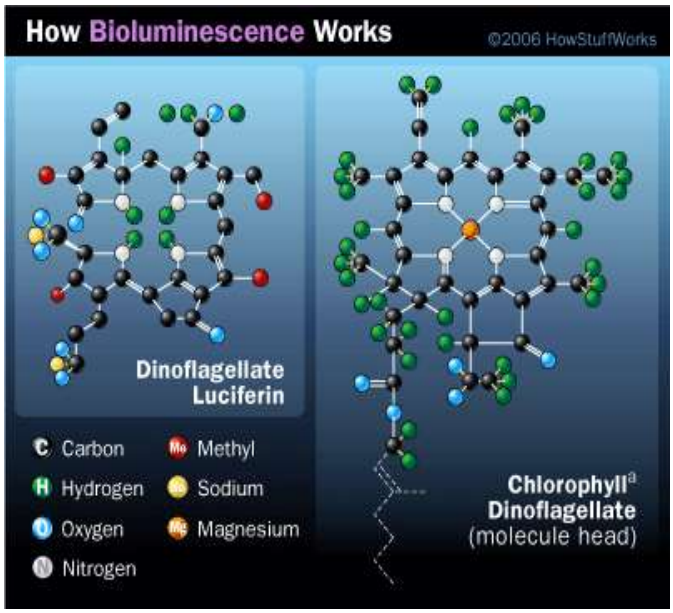

***Noctulica scintillans* algae responsible for light**

These organisms generally glow when disturbed and are responsible for MILKY SEA (glowing water). Disturbance can be tides, storms, swimming marine lives, passing by ships. Bioluminescence – a response to disturbance is a life saving technique for these marine organisms, let's see how. The burglar alarm theory will possibly explain how the dinoflagellates survive in disturbing conditions. If a small fish begins to feed on the plankton, the disturbed plankton emits a flash of light, which attracts larger fish which are likely to be the predators of the small fish. In other words, the flash of a light is an alarm that warns nearby big animals of the presence of smaller animals. Apart from predation prevention, certain other uses of bioluminescent are:

- **Communication:** Fireflies flash at one another in a species-specific pattern, often in order to find a mate.
- **Locating food**: In the twilight depths of the ocean, some fish species use their light like a spotlight to find prey.
- **Attracting prey**: Some species, like the angler fish, use a luminescent lure to attract other fish.
- **Camouflage:** In the darker parts of the ocean, it's hard to see anything below you, but it's easy to see the silhouette of what's above you. For this reason, some species produce spots of light on their undersides, which blur their outlines and allow them to blend in with the light from above. This is also known as **counter-illumination.**
- **Self-defence:** When threatened, some animals release a cloud of bioluminescent fluid.

Here is how bioluminescent works at the molecular level. Luciferin a light producing protein (in some cases called photo protein) when binds to oxygen produces photons of light therefore to us it appears as If the





organism is glowing. This luciferin-oxygen reaction is catalysed by luciferase enzyme. They are generic terms rather than the names of particular chemicals. Lots of different substances can act like luciferins and luciferases, depending on the species of the bioluminescent life form. For example, the luciferin coelenterazine is common in marine bioluminescence. Dinoflagellates that obtain food through photosynthesis use a luciferin that resembles chlorophyll. Their luminescence is brighter after very sunny days. Sometimes, the light production is caused by neurological, mechanical, chemical or as-yet-undiscovered mechanisms. Often the light production requires the presence of oxygen or ATP.

These beautiful organisms are now being used in many research fields and are still the target of many other research fields especially due to the unique action of luciferin and luciferase. These organisms may also serve as street lights in future since we are running short of energy sources the only problem will be the low light intensity. Luciferin is used as a fluorescent dye.

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Plants Get Wounds

Dr. Gita Mathur

Photos: Dr. Gita Mathur

Photo: Dr. Gita Mathur

Azadirachta indica the 'neem' tree is a source of medicine used for wound healing by human beings. The trees are living too, do we ever see how we injure them and give them wounds!

Here are two photographs of trees growing in the protected monument compound of Qutub Minaar. In the first photo see how iron nails hammered into the tree trunk have caused wounds in a line. Display boards are nailed into trees everywhere and as you travel on busy roads of the city you can see similarly injured tree stems everywhere.

In the second photo note how big branches have been cut and massive wart-like growths of the stem have resulted in the injured areas to protect the wounds from infections. Can we ever feel the pain this causes? We think

about trees as just being there for us to exploit! We do not hesitate to inflict injury on the very organism which gives us fresh air to breath, food to eat, shelter and furniture and above all, medicine to heal our wounds. Let us learn to be considerate towards ones who care for us.

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Plants Do SPEAK!

Nikita Dalal

Botany (Hons.) lll year

A new research at Bristol University and the study published in the journal Trends in Plant Sciences reveals that plants too may have a language and that they too might be conversing. There are growing evidence that while they appear to be passively swaying in the breeze, plants are in fact actively communicating with each other in a constant chatter or 'clicking' noises. In the experiments the scientists used powerful loudspeakers to listen to corn saplings, and heard clicking sounds coming from their roots. When they suspended their roots in water and played a continuous noise at a similar frequency to the clicks,

they found the plants grew towards it. Plants are known to grow towards light, and research earlier in 2012 from Exeter University found cabbage plants emitted a volatile gas to warn others of danger such as caterpillars or garden shears.

Researchers say this is the first solid evidence that plants have their own language of noises, inaudible to human ears. But the scientists suspect sound and vibration may play an important role in life of plants.

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Botanical Solutions to Health Problems

Shalini Singh
Botany (Hons.) II Year

Many of us face some common problems on daily basis. So here are some solutions to your problems...

For cough treatment:

1. Add turmeric powder, ginger powder and a teaspoon of honey to warm milk.
2. While preparing your tea, add few tulsi leaves and crushed ginger to it along with black pepper; it is much relief for cough and cold.

For pimples treatment:

1. Prepare a paste by mixing pinch of turmeric, lemon juice, curd and a pinch of turmeric to 1 teaspoon of gram flour. Apply on the spot and spot and leave for 20 minutes. Wash with water and feel the difference.
2. Apply very small quantity of garlic paste to the infected area and leave for 10-15 minutes. Do not keep it for long if irritation starts within 7-10minutes.
3. Neem leaves power mixed with rose water and lemon juice also gives relief.

For dark circles treatment:

1. Apply potato juice to the under eye area and leave for 15-20minutes. Potato is a good natural bleaching agent.

For stomach-ache treatment:

1. Take dry ginger, black pepper, roasted cumin seeds, dry mint leaves, coriander, asafetida, garlic and rock salt in equal quantities. Grind them well and make a fine powder. Have 1 tsp. of this mixture, along with a glass of warm water, after meals.
2. Prepare a paste of fenugreek seeds. Now, add this paste to a bowl of curd. This is one of the most effective ways to treat stomach cramps and pain.
3. Combine 2 tsp. lemon juice and 1 tsp. ginger juice. Add ¼ tsp. sugar to this mixture and have it two times in a day.

For hair fall treatment:

1. Prepare herbal oil by boiling olive or coconut oil with fenugreek seeds, cumin seeds, garlic pods, dried lemon peels, curry leaves, or Indian gooseberry. Allow the ingredients to settle in the container. Massage the scalp using fingertips everyday with this oil. This will help to cool your body down, improve blood circulation, and nourish the scalp with essential nutrients for stopping hair fall.
2. Mix amla juice with yogurt and apply on scalp. Leave for an hour. Wash with lukewarm water. This will remove excess of oil from your scalp and thus allowing hair follicle to breathe and thereby reducing hair fall.
3. Make a mixture at home of amla, shikakai and dry neem leaves, apply on scalp and leave it on for an hour before washing.

For dandruff treatment:

1. Soak a handful of fenugreek seeds in some water overnight. Next day, grind the seeds to a paste. Apply this on your scalp and leave to rest for a couple of hours. Rinse your hair with shikakai or ritha
2. Tea tree oil is a natural home remedy for dandruff. Tea tree oil has natural antiseptic and antibiotic properties, which make it best to get rid of dandruff. You can apply tea tree oil directly to the scalp, or add few drops to your regular shampoo.

3. Apply neem leaves paste on your scalp to fight dandruff as it is a very effective home remedy. Neem leaves is successful in treating lice, treating dandruff and many other eruptions on the scalp.

For scar treatment:

1. Apply the juice directly on your acne scars using a cotton ball. Let your skin soak up the lemon juice for a while before washing it off with water. Lemon juice improves the appearance of dark acne scars and blemishes by lightening them as it is a natural bleaching agent.
2. Slice up a tomato and place it over your face. Tomatoes are rich in vitamin A that hinders overproduction of sebum that causes acne. Vitamin A also has antioxidant qualities that refreshes and renews scarred and damaged skin.
3. Natural moisturizers like olive oil and honey when massaged on the scarred skin moisturize the quality that softens the skin's texture and reduces visibility of acne scars.

For headache treatment:

1. Make a paste with water and cinnamon powder and apply it on the head.
2. Massage your head with coconut oil/almond oil/eucalyptus oil. This will help the blood circulation in the head thus give instant relief from headache.
3. If you are suffering from repetitive headache, eat an apple with salt in empty stomach daily. After this drink warm water or milk. Consume this continuously for 10 to 15 days for better results.

For sunburn treatment:

1. Mash tomatoes and mix with an equal amount of buttermilk. Apply on the affected area.
2. Mix honey with lime or lemon juice in a ratio of 80/20 and then apply this on the affected area. Leave for 15-20 minutes then wash.
3. Potato juice/cucumber juice/ aloe vera gel can be applied to the affected area for instant relief.

For constipation treatment:

1. Consumes foods with high roughage and fiber, like guava and pears

2. Have at least 2 glasses of orange juice everyday
3. Consume figs and papaya fruits
4. Consume spinach juice
5. Try having lemon juice in warm water with a pinch of salt.

HAPPY HEALING ….

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Simple Observations*:* Scientific Explanations

Sonam Shishodia and Nikita Dalal
Botany (Hons.) III year

Why does cutting onions bring tears in our eyes?

Onion's tissues and cells have some compounds that are released in a sort of a mist when the knife cuts through them. This compound is some kind of a sulfoxcide. It is said that the mist containing this compound forms sulfuric acid when it encounters the wet surfaces in our noses and eyes. This causes irritation. Eyes fill up with water and noses run, presumably to wash out the irritating effect of this incursion. It has been suggested that cutting onions under a layer of water could reduce the problem. Also, a table fan blowing the air over the cutting board used for onion chopping might lessen the amount of vapor wafted into our face. Some people suggest that if you cut onion close to a lighted kitchen burner the problem is reduced. It might be due to the fact that near a burner upward convection of hot air takes the vapour out of reach of our eyes.

How does exposure to Sun help produce Vitamin-D in human beings?

Vitamin D is soluble in fat. It is akin to sterols in structure and it functions like a hormone. Ergocalciferol and Cholecalciferol, both sterols are the precursor substances for the synthesis of vitamin-D and are referred to as provitamins. Ergocalciferol is designated as vitamin-D2 and cholcalciferol is known as vitamin-D3. D2 is provitamin found in plants and D3 is the one present in animals. In humans, D3 is synthesized from 7-dehyrocholesterol. The conversion takes place in the skin (dermis and epidermis) on exposure to sunlight. The Provitamins;D2 and D3 as such are not biologically active. They are mobilized identically in the human body and converted into active forms of vitamin-D.vThe active vitamin-D is calcitriol. Conversion of provitamins into active calcitriol takes place

in two separate steps. The first step occurs in the liver where the provitamin is converted into calcitriol, which is active vitamin. Sunlight is very necessary for this synthesis of provitamins from which active vitamin D is formed. The incident UV-rays in the sunlight help in the complex process. Humans make 90 percent of their vitamin D naturally from sunlight exposure to their skin. It is done specifically from the ultraviolet B exposure to the skin, which naturally initiates the conversion of cholesterol in the skin to vitamin-D3.Few foods naturally contain or are fortified with supplemental vitamin D. Food-derived vitamin-D amounts to just 10 percent of our daily requirements. In contrast, exposure to the sun makes thousands of units of vitamin-D naturally in a relatively short period of time.

Why does paper tear easily?

Paper may look smooth and solid, but it is not. If you could see it magnified, you would see that it is made of many tiny fibers and pushed together. If you pull on the paper, the fibers easily come apart and the paper tears. Paper is made by beating wood and rags with water to make a pulp, and then spreading out the pulp into a thin layer and drying it. A certain amount of glue may be added to the pulp to help the paper fibers to stick together. But little glue is added when making newspapers or paper tissues. The paper fibers are held loosely together, and this kind of paper tears easily.

The kind of paper that is used to make book pages contains more glue and it does not tear so easily. Cardboard is a thick kind of paper containing strong glue, and it is difficult to tear it. Soaking paper in water may dissolve the glue so that it then tears very easily.

How do erasers work?

Erasers eradicate pencil markings by lifting graphite from the paper

you've written on. As you write, particles of graphite from your pencil mingle with and cling to particles in the cellulosic fiber of the paper. Modern erasers are made from petroleum-based synthetic rubber compounds, typically polyvinyl chloride. Because the particles in the polymer that make up an eraser are stickier than paper, those graphite particles get stuck to the eraser instead. Some erasers are stickier than others and absorb graphite particles more easily, giving you a cleaner, less-abrasive result.

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Options After Botany Honours

Sharfaa Hussain

Botany (Hons.) II year

Botany itself is a vivid course. It's a vast career field in its own. Botany scientifically is the detailed study of plants from smallest bacteria to higher plants. Including algae, fungi etc. Plants have intrigued people for thousands of years. They provide aesthetic beauty as well as materials for our basic needs. Hence studying them will help us and the world in return.

MASTER COURSES

It is very important to realize what large opportunities are awaiting us. Now we are undergraduate Botany students. Once we complete our graduation the thought of M.Sc i.e., post graduation arises. And we are lucky enough to have huge number of choices. For masters we can opt for the following courses –

BOTANY, BIOMEDICAL SCIENCE, BIOSCIENCE, LIFE SCIENCE, MOLECULER BIOLOGY, GENETICS, BIOTECHNOLOGY,

ENVIRONMENTAL SCIENCE, TOXICOLOGY, BIO-INFORMATICS, MARINE BIOLOGY etc. According to one's personal interest one can choose any of the above fields and enjoy learning it. But it is necessary to get through the entrance examination in order to secure a seat in post graduation.

It does not end here. At present stage, acquiring a doctorate degree is almost equal to must. One can also persuade for post doctorate if willing to become a researcher or scientist.

REQUIREMENTS FOR A SMOOTH CAREER

1. A Good percentage in both graduation and post-graduation.
2. EXTRA-CURRICULAR ACTIVITIES: Other valuable experiences include participation in Science fairs and science clubs. It also helps to have summer jobs or internships related to biology, such as working in parks, plant nurseries, farms, experiment stations, laboratories, camps, or for florists or landscape architects. Hobbies such as camping, photography, and computers are also useful.
3. If possible, one should do an undergraduate research project seeking help from Professors. The project might include helping the professor with his/her research or pursuing one's own independent interests. This experience will help us decide which area or areas of botany we like best. It will also give us valuable insight into how science works.

JOB OPPURTUNITIES

One of the best things about plant science is the number of different specialties and career opportunities from which we can choose. This diversity allows people with different backgrounds, aptitudes, and interests to find satisfying careers in plant biology. More than many other scientific fields, botany continues to provide opportunities.

Among the career opportunities available to a person who enjoys the outdoors are positions as an ecologist, taxonomist, conservationist, forester, or plant explorer. Our work may take us to foreign and exotic lands. It may allow you to live and work in the great outdoors.

A p**e**rson with a mathematical background might find biophysics, developmental botany, genetics, modeling, or systems ecology to be exciting fields.

Someone with an interest in chemistry might become a plant physiologist, plant biochemist, molecular biologist, or chemotaxonomist.

Many people do not realize that most of the basic biological processes are the same in both plants and animals. Plants, however, are easier to grow and manipulate. Plant structure may appeal to a person who enjoys microscopy and the beauty of intricate form and design. Person fascinated with microscopic organisms may choose microbiology, phycology or mycology.

On a larger scale, ornamental horticulture and landscape design requires artistic use of plant form and colour.

A person concerned about the world food supply might study plant pathology (diseases) or plant breeding.

Plant biologists who enjoy working with people have a wide range of avenues in teaching and public services.

People who are interested in public sector can join Botanical Survey of India (BSI), National Institute of Oceanography (NIO), Indian Agricultural Research Institute (IARI), Indian Council of Forestry Research and Education (ICFRE) etc. as Project Assistant, Technical Assistant, Field Assistant or Scientific Assistant.

So with these many vast courses we can definitely excel in our life. We just need to do well.

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Plant Curios – Photo Gallery

Photos: Monalisha Mahapatra

Photos: Nikita Dalal and Monalisha Mahapatra

Photos: Nikita Dalal

Photos: Monalisha Mahapatra

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Botanical Excursion – Karnal

Foot Walk to The

"Land of Excellent Vegetables and Amazing Greenhouses"

Aakanksha Sharma
Botany (Hons.) II year

A one day excursion was organized by the Botany department of Gargi College on the 11th of October '2012 to the Centre of Excellence in Vegetables at Gharaunda, District Karnal in Haryana. The students of 2nd year Botany Honors became a part of this trip and were accompanied by Dr. Shashi Tyagi and Dr. Geeta Mehta.

This center in Gharaunda is a collaboration of Israel with India which was setup in 2010 and is enriching farmers by imparting them training and also providing seeds along with awareness about the advantages of poly houses and latest technology of growing vegetables. The area of the whole center covers a total area of 25 acres.

The students began their journey at 9:00 clock in the morning and reached the spot at 12:00a.m. Firstly, all the students received a warm welcome by the esteemed staff of the center and next were taken to visit the Greenhouses. There, the students saw the unordinary. The High-tech greenhouse was maintained at a temperature of about 32-35 degrees Celsius with a special filter paper at the door of greenhouse to avoid any insects or worms to come inside .The students saw a variety of wonderful vegetables growing inside which were off-season. Such beautiful ones included cherry tomatoes, various kinds of bell peppers total 19 out of which red, orange, yellow and surprisingly violet and chocolate were the ones one had never heard off or seen, other vegetables included were cucumbers and brinjals. All these vegetables were not grown on soil but rather a special medium called vermiculite which was sterilized. The farmers involved in the task of caring and growing these vegetables were highly skilled.

Latest technology machines and gadgets were a part of maintaining these farms; others included water harvesting system such as the drip irrigation method that efficiently and feasibly fulfilled the demands of harvesting the farms as well as meeting the requirement of water for the localities or residents of the place. Lastly, a presentation was shown, which glorified about the advantages of having such farms and lime lighted their future prospects in raising economy of India and increasing employment in such sectors.

The excursion was splendid and became a wonderful and cherish able part of everyone’s memory which they carried their homes. The journey ended with immense joy and happiness with chalice of knowledge to feed their minds.

Photos: Aakanksha Sharma

Photos: Aakanksha Sharma

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A Visit to McDonald's Factory

Sonam Shishodia
Botany (Hons.) III year

A One day visit to Mc Donald's Factory in Greater Noida was organized by Gargi College for its Science students on 23rd August 2012. A total of 35 Science students became the part of the trip and were accompanied by Dr. Shashi Tyagi and 3 other teachers from science departments. Mc Donald's is the World's largest chain of fast food restaurants which became a symbol for the American way of life. So it was really a much awaited trip for each one of us. We began our journey at 9 O'clock in the morning. Once aboard the bus; we began singing at the very top of our voice. We thoroughly enjoyed the outing. Somewhere in the middle of all this, we reached the Mc Donald's factory. It was 10:30 AM.

The first thing that welcomed us was the aroma! that feel-good, sweet-smelling, warm fragrance of oven fresh buns, biscuits etc. We all sniffed and let it fill us up as we entered the gates of the factory. The esteemed staff of the factory welcomed us all. The factory premises of Mc D. were covered by nets to prevent the entry of insects such as flies. Also they employ many test to assess the cleanliness of the environment as told to us by one of the instructors who took us inside the factory.

We assembled in a room where all instructions were given to us before reaching the main plant. Refreshments were given to all of us. After filling our stomachs we proceeded for the main plant. We were asked to cover our hair with a scarf; we had to cover our feet with polybags and then sanitize our hands.

After all this we entered the Main Plant, and then began the actual tour! Dough was being moulded into buns; gigantic ovens that hissed and buns sailing on endless waves of conveyer belts. We were shown the moulding section and the packaging section. Witnessing the manufacturing process with one's own eyes is an unforgettable experience. The students were then taken around the factory and each process was explained to us in easy to understand and clear manner. We could see for ourselves how efficiently, hygienically and smoothly Mc D. was carrying out manufacturing operations.

After this we returned back to the same room where we had assembled earlier, a question and answer session was held where all questions asked by the students and teachers were answered by the management. All in all, the Industrial visit to Mc Donald's factory was a complete success. It was no less thrilling. It has been memorable visit. We gained buckets full of knowledge. Content smile lit up our faces!

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Pathfinder 2013 Award-winning Project

Amplification and Bioinformatics Analysis of a gene conferring tolerance against temperature stress from *Brassica juncea*: a step towards developing thermotolerant crops

Neha Tanwar and Manisha
Botany (Hons.) II year

Abiotic stresses (including salinity, drought, low and high temperatures) limit agricultural productivity and the geographical distribution of plants. Unlike animals, plants are sessile and their ability to adapt to stress is crucial for survival under natural environment. In order to meet increase food demands our focus has always been to increase the crop productivity. After green revolution, which was aimed to increase the crop yields now the focus has shifted to bring barren areas under cultivation. To grow crops in these areas, crops need to be designed to tolerate stress imposed by that area.

In Arabidopsis, some genes have been shown to be involved in conferring thermotolerance to the plant. Aim of the study was to amplify and sequence one such gene from Indian mustard (*Brassica juncea,* an oil and vegetable crop). Once the gene was found, in future it can be functionally validated and its expression can be modulated to confer thermotolerance in *Brassica*.

Our first step was to screen literature to find out genes that have been shown to be involved in conferring tolerance against temperature stress in *Arabidopsis*. Out of all the enlisted genes, HOT5 was selected. It encodes for a glutathione-dependent formaldehyde dehydrogenase (also known as class III type alcohol dehydrogenase) and is required for the acclimation of plants to high temperature and for fertility.

The gene was selected and its nucleotide sequence was retrieved from the NCBI (http:// www.ncbi.nlm.nih.gov/nuccore/ NM_001203539.1).PCR primers were designed against the sequence using Genefisher program (Giegerich et al., 1996)

S.No	Primer Sequence	GC Content (%)	Tm
1.	5′ATGGCGACTCAAGGTCAGGTT 3′	52.3	66.9
2.	5′ TCATTTGCTGGTATCGAGGACA 3′	50	61.6

B. juncea seeds were procured from IARI (Indian Agriculture Research Institute), New Delhi. Seeds were sterilized and plated on germinating paper to produce seedlings.

Those Seven days old seedlings (1g) were extracted in 1ml of CTAB buffer (containing 100mM Tris HCl pH 8.0, 20mM EDTA, 1.4M NaCl 2% CTAB and 2% PVP) and the extract was filtered through muslin cloth. The filtrate (500µl) was poured into 1.5 ml microcentrifuge tube containing 100ul of choloroform:isoamyl alcohol (24:1 v/v). The tube was gently shaken and incubated at 65°C for about one hour.

The solution was allowed to cool to room temperature and sufficient 24:1 chloroform: isoamyl alcohol was added to nearly fill the tube. The mixture was shaken to form an emulsion and was centrifuged at 7000 rpm at RT for 7 min to separate the phases. The top aqueous phase was transferred to clean microcentrifuge tube and two volume of cold (-20°C) absolute ethanol was added to precipitate the DNA. The DNA was spooled out and was washed firstly with 76% ethanol and 0.2 M sodium acetate for 10 min, and 10 mM ammonium acetate for 10 min. and finally in 76% ethanol for 10min. The DNA was air dried at room temperature and was dissolved in 400µl of TE (pH 8.0). The quantification was done using both spectrophotometer as well as agarose gel electrophoresis (AGE).

PCR amplification of gene was done using the designed primers. Genomic DNA (1 µl), forward and reverse gene specific primers (Table 2; 0.4 µM each), dNTPs (0.1 µM), 10X Taq buffer (2.5 µl) and Taq DNA polymerase (1 unit) in nuclease free water were taken in a 0.2ml PCR tube. The components were mixed and centrifuged to collect the contents at the bottom of the PCR tube. Amplification of HOT5 gene involved 32 cycles of PCR reaction in PCR machine (applied biosystems 2720 thermal cycler) with initial denaturation temperature of 94°C for 2min followed by 50sec denaturation at 94°C, annealing for 1min and 2min extension at 72°C. Annealing temperature was varied from 50°C to 65°C For optimization. The final extension for 10 min was carried out after which the reaction was terminated at 4°C. The amplicon was checked by running the PCR product on 1% agarose gel along with DNA ladder (1 kb).

After getting PCR amplicon it was eluted and was purified using Nucleospin Extract II

(Macherey Nagel, followed as per the manufacture's protocol).

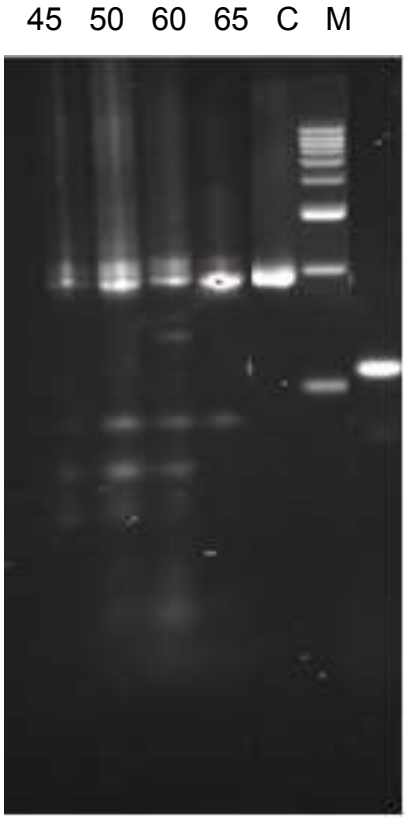

Fig. 2 PCR was done with genomic DNA at vary annealing temperature (45, 50, 60, 65°C). C lane stands for cDNA and M for ladder.

A prominent band at approximately 1800 bp was obtained along with other bands also. As the annealing temperature was increased (65°C) non-specific amplification was removed and only one band persisted (Figure 4b).

As HOT5 gene contains introns therefore to obtain coding domain sequence, cDNA from B. juncea seedlings was amplified with same set of primer at 65°C. A single prominent band at approximately 1150bp was obtained (Figure 2 lane C). Amplified PCR product was excised and was eluted from 1% agarose gel (Nucleospin Extract II). After elution the product was checked and a single band of molecular weight 1.15 kb was observed and was sequenced.

The sequence homology analysis was performed using BLASTn tool in NCBI database. The sequenced gene was found to be most identical with alcohol dehydrogenase class III of *Brassica oleracea* (complete cds) with 94% similarity followed by HOT5 gene from Arabidopsis. The nucleotide sequence of BjHOT5 is shown in Figure 3. Amino acid sequence was predicted using Expasy translate tool and was found to be 379 aa long.

ATGGCGACTCAAGGTCAGGTTATCACATGCAAAGCTGCGGTGGCTTACGAGCCGAACAAACCTCTGGTCA
TCGAAGATGTTCAAGTCGCTCCCCCTCAGGCCGGTGAGGTTCGCATCAAGATCCTCTTCACCGCTCTCTG
TCACACCGACGCCTACACTTGGAGCGGCAAGGATCCTGAAGGTCTCTTTCCTTGTATCCTCGGTCACGAG
GCTGCTGGGATTGTTGAGAGTGTTGGTGAAGGTGTGACTGAAGTTCAACCTGGGGATCATGTTATCCCTT
GTTACCAAGCTGAGTGCCGTGAATGCAAGTTCTGCAAATCCGGCAAGACTAACCTCTGCGGCAAGGTTCG
TTCCGCTACTGGTGTTGGGGTCATGATGAGCGACCGTAAGAGCCGGTTCTCCGTTAATGGAAAACCCATT
TATCACTTCATGGGTACCTCCACGTTTAGTCAGTACACTGTTGTTCATGATGTTAGTGTCGCCAAGATCG
ATCCTCAGGCTCCTTTGGAGAAGGTCTGCCTTCTTGGTTGTGGTGTTCCCACTGGCCTTGGAGCAGTTTG
GAACACTGCAAAAGTTGAGCCTGGGTCAAATGTTGCCATTTTTGGTCTTGGGACCGTGGGGCTTGCTGTT
GCTGAGGGTGCGAAAACAGCTGGTGCTACAAGGATCATTGGCATTGATATTGACAGCAAGAAGTATGAAA
CTGCAAAGAAGTTTGGTGTTAATGAGTTTGTGAACCCAAAGGACCACCAAAAGCCAATTCAGGAAGTGAT
TGTTGATCTCACTGATGGCGGTGTTGACTACAGCTTTGAGTGTATTGGAAATGTCTCCGTGATGAGATCC
GCATTGGAGTGCTGTCACAAGGGATGGGGAACTTCGGTTATAGTTGGTGTTGCAGCATCAGGACAAGGGA
TATCAACCCGACCGTTCCAACTCGTGACTGGTCGTGTGTGGAAAGGAACAGCTTTTGGTGGTTTCAAGAG
TCGAACCCAAGTGCCTTGGCTTGTAGAGAAGTATATGAACAAGGAGATCAAAGTGGATGAGTACATAACG
CACAACATGACCTTGGGAGAGATCAACAAGGCTTTTGGCCTGTTGCATGAAGGTACTTGCCTTCGTTGTG
TCCTCGATACCAGCAAATGA

Figure 3: Nucleotide sequences of *Brassica juncea* HOT5 gene

MATQGQVITCKAAVAYEPNKPLVIEDVQVAPPQAGEVRIKILFTALCHTDAYTWSG
KDPEGLFPCILGHEAAGIVESVGEGVTEVQPGDHVIPCYQAECRECKFCKSGKTNL
CGKVRSATGVGVMMSDRKSRFSVNGKPIYHFMGTSTFSQYTVVHDVSVAKIDPQAP
LEKVCLLGCGVPTGLGAVWNTAKVEPGSNVAIFGLGTVGLAVAEGAKTAGATRIIG
IDIDSKKYETAKKFGVNEFVNPKDHQKPIQEVIVDLTDGGVDYSFECIGNVSVMRS
ALECCHKGWGTSVIVGVAASGQGISTRPFQLVTGRVWKGTAFGGFKSRTQVPWLVE
KYMNKEIKVDEYITHNMTLGEINKAFGLLHEGTCLRCVLDTSK

Figure 4: Predicted amino acid sequence (379 amino acid) of *B. juncea* HOT5 gene

The nucleotide sequence of BjHOT5 was compared with that of AtHOT5 (Figure 5). Sequence comparison showed 0% gaps (0/1140) and 92% identity (1045/1140).

```
Brassica        ------------------------------------------------------------
Arabidopsis     AAGAAGACCACACTACTCTCTCTATCTCTCTTTCTCTCTATCTCTCTCTATCTCTCTCAT 60


Brassica        --------------ATGGCGACTCAAGGTCAGGTTATCACATGCAAAGCTGCGGTGGCTT 46
Arabidopsis     TTCTTCCTGCGTCAATGGCGACTCAAGGTCAGGTTATCACTTGCAAAGCTGCGGTGGCTT 120
                              ************************* ******************


Brassica        ACGAGCCGAACAAACCTCTGGTCATCGAAGATGTTCAAGTCGCTCCCCCTCAGGCCGGTG 106
Arabidopsis     ACGAGCCGAACAAGCCTCTGGTCATCGAAGATGTGCAAGTGGCTCCACCTCAAGCTGGTG 180
                ************* ******************** ***** ***** ***** ** ****


Brassica        AGGTTCGCATCAAGATCCTCTTCACCGCTCTCTGTCACACCGACGCCTACACTTGGAGCG 166
Arabidopsis     AGGTTCGGATCAAGATCCTCTACACTGCTCTTTGTCACACCGACGCTTACACTTGGAGCG 240
                ******* ************* *** ***** ************** *************


Brassica        GCAAGGATCCTGAAGGTCTCTTTCCTTGTATCCTCGGTCACGAGGCTGCTGGGATTGTTG 226
Arabidopsis     GCAAGGATCCTGAAGGTCTCTTTCCTTGTATTCTAGGTCATGAGGCTGCTGGGATTGTTG 300
                ******************************** ** ***** ******************


Brassica        AGAGTGTTGGTGAAGGTGTGACTGAAGTTCAACCTGGGGATCATGTTATCCCTTGTTACC 286
Arabidopsis     AGAGTGTTGGTGAAGGAGTAACTGAAGTTCAAGCTGGAGATCATGTTATCCCTTGTTATC 360
                **************** ** ************ **** ******************** *


Brassica        AAGCTGAGTGCCGTGAATGCAAGTTCTGCAAATCCGGCAAGACTAACCTCTGCGGCAAGG 346
Arabidopsis     AAGCTGAGTGTCGTGAATGCAAGTTTTGCAAATCTGGGAAGACTAACCTTTGTGGCAAGG 420
                ********** *************** ******** ** ************ ** *******


Brassica        TTCGTTCCGCTACTGGTGTTGGGGTCATGATGAGCGACCGTAAGAGCCGGTTCTCCGTTA 406
Arabidopsis     TGAGATCTGCTACTGGTGTTGGGATTATGATGAATGACCGTAAGTCGAGGTTCTCGGTTA 480
                *  * ** *************** * *******  *********    ******* ****


Brassica        ATGGAAAACCCATTTATCACTTCATGGGTACCTCCACGTTTAGTCAGTACACTGTTGTTC 466
Arabidopsis     ATGGGAAACCCATTTATCACTTCATGGGTACTTCCACGTTTAGTCAGTATACTGTTGTTC 540
                **** ************************** ***************** **********


Brassica        ATGATGTTAGTGTCGCCAAGATCGATCCTCAGGCTCCTTTGGAGAAGGTCTGCCTTCTTG 526
Arabidopsis     ATGATGTTAGCGTCGCCAAAATTGATCCTACTGCTCCTTTGGATAAAGTTTGCCTTCTTG 600
                ********** ******** ** ******   *********** ** ** **********


Brassica        GTTGTGGTGTTCCCACTGGCCTTGGAGCAGTTTGGAACACTGCAAAAGTTGAGCCTGGGT 586
Arabidopsis     GATGTGGTGTTCCCACTGGCCTTGGAGCAGTTTGGAATACTGCAAAAGTAGAACCAGGGT 660
                * ********************************** *********** ** ** ****


Brassica        CAAATGTTGCCATTTTTGGTCTTGGGACCGTGGGGCTTGCTGTTGCTGAGGGTGCGAAAA 646
Arabidopsis     CAAATGTTGCCATTTTCGGTCTTGGCACTGTTGGACTTGCTGTTGCCGAGGGTGCGAAAA 720
                **************** ******** ** ** ** *********** *************


Brassica        CAGCTGGTGCTACAAGGATCATTGGCATTGATATTGACAGCAAGAAGTATGAAACTGCAA 706
Arabidopsis     CAGCTGGTGCTTCAAGGATCATTGGCATTGACATCGATAGCAAGAAGTATGAAACTGCAA 780
                *********** ****************** ** ** **********************


Brassica        AGAAGTTTGGTGTTAATGAGTTTGTGAACCCAAAGGACCACCAAAAGCCAATTCAGGAAG 766
Arabidopsis     AGAAGTTTGGTGTTAACGAATTTGTGAACCCAAAGGATCACGACAAGCCAATTCAGGAAG 840
                **************** ** ***************** *** * ****************


Brassica        TGATTGTTGATCTCACTGATGGCGGTGTTGACTACAGCTTTGAGTGTATTGGAAATGTCT 826
Arabidopsis     TGATTGTCGATCTCACTGATGGCGGTGTTGACTACAGCTTTGAGTGCATCGGGAATGTCT 900
                ******* ************************************* ** ** *******


Brassica        CCGTGATGAGATCCGCATTGGAGTGCTGTCACAAGGGATGGGGAACTTCGGTTATAGTTG 886
Arabidopsis     CCGTGATGAGAGCTGCATTGGAGTGCTGTCACAAGGGATGGGGAACTTCGGTCATAGTTG 960
                *********** * ************************************* *******


Brassica        GTGTTGCAGCATCAGGACAAGGGATATCAACCCGACCGTTCCAACTCGTGACTGGTCGTG 946
Arabidopsis     GTGTTGCAGCATCAGGACAAGAGATATCAACTCGTCCGTTCCAACTCGTGACTGGCCGTG 1020
                ********************** ********* ** ******************** ****


Brassica        TGTGGAAAGGAACAGCTTTTGGTGGTTTCAAGAGTCGAACCCAAGTGCCTTGGCTTGTAG 1006
Arabidopsis     TGTGGAAAGGAACAGCTTTTGGTGGTTTCAAGAGTCGAACCCAAGTGCCTTGGCTTGTAG 1080
                ************************************************************
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Figure 5: Alignment of nucleotide sequences of *B. juncea* HOT5 and *Arabidopsis* HOT5 gene.

Also amino acid sequence of BjHOT5 was compared with HOT5 proteins reported in genbank by multiple alignment tool where more than two sequence are compared. The Multiple alignment was performed using Clustalw. The program recognizes a consensus residue and based on that residue other amino acid that fall in that consensus positions are marked. Comparison of predicted amino acid sequence of BjHOT5 was done with other HOT5 proteins sequence from *Arabidopsis thaliana* (AT5G43940), *Brassica oleracea* (AFP72379.1), *Oryza sativa* (A2XAZ3), *Zea mays* (P93629), Ricinus communis (XP_002533630). Multiple sequence alignment of amino acid is shown in Figure 6. Multiple alignment is a key starting point for the prediction of protein secondary structure, residue accessibility, function and identification of residues important for specificity. In a residue by residue alignment, it was apparent that certain regions of a protein, or perhaps specific amino acids, are more highly conserved than others. This information may be suggestive as to which

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Brassica_juncea         --MATQGQVITCKAAVAYEPNKPLVIEDVQVAPPQAGEVRIKILFTALCHTDAYTWSGKD 58
Brassica_oleracea       --MATQGQVITCKAAVAYEPNKPLVIEDVQVAPPQAGEVRIKILFTALCHTDAYTWSGKD 58
Arabidopsis             --MATQGQVITCKAAVAYEPNKPLVIEDVQVAPPQAGEVRIKILYTALCHTDAYTWSGKD 58
Ricinus                 --MATQGQVIICKAAVAYEPNKPLVIEDVQVAPPQAGEVRVQILFTALCHTDAYTWSGKD 58
Oryza_sativa            MASSTQGQVITCKAAVAWEANKPMTIEDVQVAPPQAGEVRVKILFTALCHTDHYTWSGKD 60
Zea                     MASPTQGQVITCKAAVAYEPNKPLVIEDVQVAPPQAGEVRVKILFTALCHTDHYTWSGKD 60
                           .****** ******:*.***:.***************::**:******* *******

Brassica_juncea         PEGLFPCILGHEAAGIVESVGEGVTEVQPGDHVIPCYQAECRECKFCKSGKTNLCGKVRS 118
Brassica_oleracea       PEGLFPCILGHEAAGIVESVGEGVTEVQPGDHVIPCYQAECRECKFCKSGKTNLCGKVRS 118
Arabidopsis             PEGLFPCILGHEAAGIVESVGEGVTEVQAGDHVIPCYQAECRECKFCKSGKTNLCGKVRS 118
Ricinus                 PEGLFPCILGHEAAGIVESVGEGVTEVQPGDHVIPCYQAECRDCKFCKSGKTNLCGKVRA 118
Oryza_sativa            PEGLFPCILGHEAAGIVESVGEGVTEVQPGDHVIPCYQAECRECKFCKSGKTNLCGKVRA 120
Zea                     PEGLFPCILGHEAAGIVESVGEGVTDVQPGDHVIPCYQAECKECKFCKSGKTNLCGKVRS 120
                        *************************:**.************::****************:

Brassica_juncea         ATGVGVMMSDRKSRFSVNGKPIYHFMGTSTFSQYTVVHDVSVAKIDPQAPLEKVCLLGCG 178
Brassica_oleracea       ATGVGVMMNDRKSRFSVDGKPIYHFMGTSTFSQYTVVHDVSVAKIDPKAPLEKVCLLGCG 178
Arabidopsis             ATGVGIMMNDRKSRFSVNGKPIYHFMGTSTFSQYTVVHDVSVAKIDPTAPLDKVCLLGCG 178
Ricinus                 ATGVGVMMNDRKSRFSINGKPIYHFMGTSTFSQYTVVHDVSVAKIDPKAPLEKVCLLGCG 178
Oryza_sativa            ATGVGVMMNDRKSRFSINGKPIYHFMGTSTFSQYTVVHDVSVAKINPQAPLDKVCLLGCG 180
Zea                     ATGVGVMMNDMKSRFSVNGKPIYHFMGTSTFSQYTVVHDVSVAKINPQAPLDKVCLLGCG 180
                        *****:**.* *****::*****************************:* ***:********

Brassica_juncea         VPTGLGAVWNTAKVEPGSNVAIFGLGTVGLAVAEGAKTAGATRIIGIDIDSKKYETAKKF 238
Brassica_oleracea       VPTGLGAVWNTAKVEPGSNVAIFGLGTVGLAVAEGAKTAGATRIIGIDIDSKKYETAKKF 238
Arabidopsis             VPTGLGAVWNTAKVEPGSNVAIFGLGTVGLAVAEGAKTAGASRIIGIDIDSKKYETAKKF 238
Ricinus                 VPTGLGAVWNTAKVEAGSIVAVFGLGTVGLAVAEGAKAAGASRIIGIDIDSKKYDRAKDF 238
Oryza_sativa            VSTGLGAVWNTAKVEAGSIVAIFGLGTVGLAVAEGAKSAGASRIIGIDIDSKKFDVAKNF 240
Zea                     VPTGLGAVWNTAKVESGSVVAVFGLGTVGLAVAEGAKAAGASRVIGIDIDNKKFDVAKNF 240
                        *.*************.** **:***************:***:*:******.**:: **.*

Brassica_juncea         GVNEFVNPKDHQKPIQEVIVDLTDGGVDYSFECIGNVSVMRSALECCHKGWGTSVIVGVA 298
Brassica_oleracea       GVNEFVNPKDHQKPIQEVIVDLTDGGVDYSFECIGNVSVMRAALECCHKGWGTSVIVGVA 298
Arabidopsis             GVNEFVNPKDHDKPIQEVIVDLTDGGVDYSFECIGNVSVMRAALECCHKGWGTSVIVGVA 298
Ricinus                 GVTEFVNPKDHDKPIQQVIVDLTDGGVDYSFECIGNVSVMRSALECCHKGWGTSVIVGVA 298
Oryza_sativa            GVTEFVNPKDHDKPIQQVIVDLTDGGVDYSFECIGNVSVMRSALECCHKGWGTSVIVGVA 300
Zea                     GVTEFVNPKEHDKPIQQVLVDLTDGGVDYSFECIGNVSIMRAALECSDKGWGTSVIVGVA 300
                        **.******:*:****:*:********************:**:****..************

Brassica_juncea         ASGQGISTRPFQLVTGRVWKGTAFGGFKSRTQVPWLVEKYMNKEIKVDEYITHNMTLGEI 358
Brassica_oleracea       ASGQEISTRPFQLVTGRVWKGTAFGGFKSRTQVPWLVEKYMNKEIKVDEYITHSMTLGEI 358
Arabidopsis             ASGQEISTRPFQLVTGRVWKGTAFGGFKSRTQVPWLVEKYMNKEIKVDEYITHNLTLGEI 358
Ricinus                 ASGQEISTRPFQLVTGRVWKGTAFGGFKSRSQVPWLVDKYMKKEIKVDEYITHNLTLVEI 358
Oryza_sativa            ASGQEISTRPFQLVTGRVWKGTAFGGFKSRSQVPWLVEKYLNKEIKVDEYVTHSMNLTDI 360
Zea                     ASGQEISTRPFQLVTGRVWKGTAFGGFKSRTQVPWLVDKYMKKEIKVDEYITHNMNLADI 360
                        **** ************************:******:**::********:**.:.* :*

Brassica_juncea         NKAFGLLHEGTCLRCVLDTSK 379
Brassica_oleracea       NKAFDLLHDGTCLRCVLSTSD 379
Arabidopsis             NKAFDLLHEGTCLRCVLDTSK 379
Ricinus                 NKAFDLMHEGDCLRCVLSVHD 379
Oryza_sativa            NKAFDLLHEGGCLRCVLATDK 381
Zea                     NDAFHLLHEGGCLRCVLAMQI 381
                        *.** *:*:* ******
```

residues are more crucial for maintaining a protein structure or function.

Figure 6: Multiple sequence alignment (amino acid). The predicted amino acid sequence of BjHOT5 was aligned with HOT5 gene of Arabidopsis, *Brassica oleracea*, Ricinus, Oryza and Zea. Multiple alignment was performed using CLUSTALW. Symbols at the bottom of each column denote degree of conservation observed in each column. '*' means residues in each column are identical in all sequences in alignment, ':' means that alignment conserved substitutions have been observed while ';' denotes semi-conserved

```
Brassica        AGAAGTATATGAACAAGGAGATCAAAGTGGATGAGTACATAACGCACAACATGACCTTGG 1066
Arabidopsis     AAAAGTACATGAACAAGGAGATAAAAGTGGATGAATACATAACACACAACTTGACCTTGG 1140
                * ***** ************** *********** ******** ****** *********

Brassica        GAGAGATCAACAAGGCTTTTGGCCTGTTGCATGAAGGTACTTGCCTTCGTTGTGTCCTCG 1126
Arabidopsis     GAGAAATCAATAAGGCTTTCGATCTATTGCACGAAGGTACTTGCCTTCGTTGTGTCCTCG 1200
                **** ***** ******** *  ** ***** ****************************

Brassica        ATACCAGCAAATGA---------------------------------------------- 1140
Arabidopsis     ATACCAGCAAATGACTATATGGGTCCTCTCTGCTTTAATCTATGTGTTCTTGTGACTTTC 1260
                **************

Brassica        ------------------------------------------------------------
Arabidopsis     GTCTTTTATCGGTATTGACATTTCCTAAGAGCAACAGACTACTCTACTCGTGTGTGTCTC 1320


Brassica        ------------------------------------------
Arabidopsis     GTTTCTATCTTATGCTTCAATAAAATATCAATTAAGACCGAAA 1363
```

The evolutionary history of BjHOT5 was inferred from phylogenetic analysis is depicted as a distance tree. Phylogenetic tree was constructed using Clustalw software. The phylogram branced into various groups. HOT5 protein from dicots *B. juncea*, *B. oleracea*, Arabidopsis and Ricinus formed as separate group from monocots rice and maize (Figure 7).

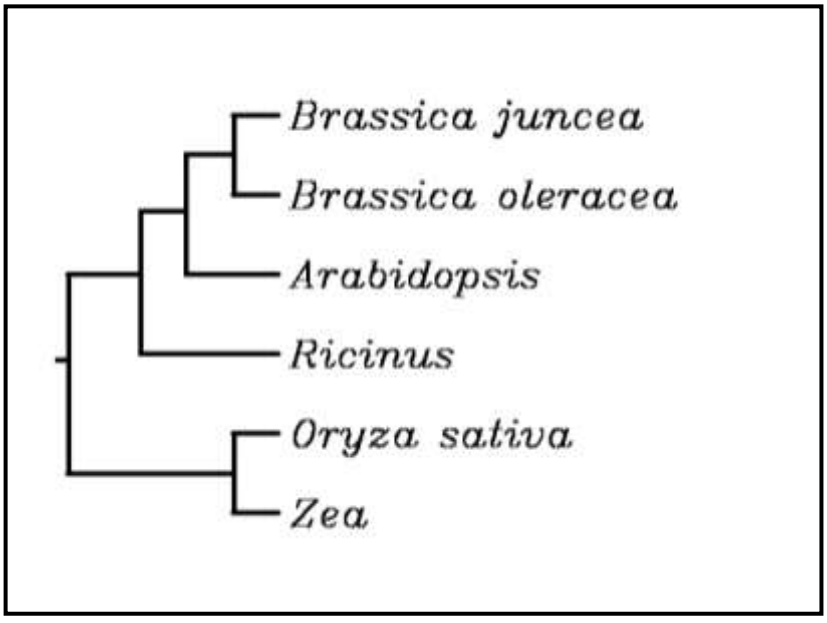

Figure 7: Phylogenetic analysis of BjHOT5 with other similar proteins in plants.

Aiming at identifying conserved domains within BjHOT5 protein sequence, Conserved Domain Database (CDD, NCBI) was employed. Conserved domains are recurring units in polypeptide chain, determined and classified by comparative analysis. These include pattern of amino acids typical of a particular catalytic site or binding site for a regulator of a protein. The position of conserved domains are marked (Figure 8). BjHOT5 contains an alcohol dehydrogenase GroES-like domain, Zn-dependent alcohol dehydrogenase, class III multi-domain.

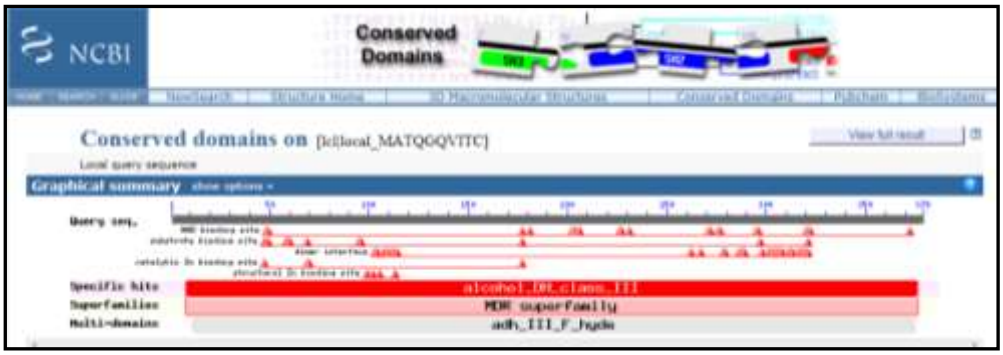

Figure 8: A graphical representation showing conserved domains in BjHOT5

BjHOT5 was predicted to encode a protein of 379 amino acids. Phylogenetic analysis confirmed homology of BjHOT5 protein with dicots (*B. oleracea*, Arabidopsis and Ricinus) while monocots formed separate group. Conserved Domain database (CDD, NCBI) was used for identification of conserved domains in BjHOT5. Alcohol dehydrogenase NAD binding domain and Zinc binding domain were found. NAD binding domain is found in many dehydrogenases of metabolic pathways. Zinc containing alcohol dehydragenase binds two atoms of zinc per subunit.

Presently our focus was to find out the gene which may be responsible for thermotolerance in *Brassica juncea* through the designed primer pair. Further studies may involve amplification of BjHOT5 with Taq Polymerase having a proof-reading activity, Cloning of the amplicon in *E. coli*, Over-expression of the protein for functional validation, Thermotolerant transgenic *Brassica juncea* crops can be designed with modulated expression of the gene which can withstand high temperature stress.

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Departmental News

Awards and Results

Sohini Deb receiving the Gold Medal for scoring the first Position in B.Sc. (Honours) Botany in 2012, at the Convocation of University of Delhi, held on March 19, 2013, from the **Vice Chancellor, Professor Dinesh Singh**. **President of India**, **Honourable Pranab Mukherjee** was the Chief Guest at the convocation.

CONGRATULATIONS! Gargi is proud of you!

Name	Current Class	Result of	Position in Class	Position in South Campus	Photograph
Deepika Dixit	B.Sc. (H) Botany I	Semester I	I		

Pooja	B.Sc. (H) Botany I	Semester I	II		
Charu Singh	B.Sc. (H) Botany II	Semester II	I	I	
Neha Tanwar	B.Sc. (H) Botany II	Semester II	II		
Charu Singh	B.Sc. (H) Botany II	Semester III	I		
Prachi Sharma	B.Sc. (H) Botany II	Semester III	II		
Humeera Naseem	B.Sc. (H) Botany III	Semester IV	I		
Dhisharika Sachdeva	B.Sc. (H) Botany III	Semester IV	II		
Nikita Dalal	B.Sc. (H) Botany III	Semester V	I		
Sonam Shishodia	B.Sc. (H) Botany III	Semester V	II		

Nandni Rajpoot	B.Sc. (H) Botany III	Semester V	II		

GCBS Executive Council

Post	Name	Photograph
President	Nikita Dalal	
Vice-President	Shalini Singh	
Treasurer	Sonam Shishodia	
Secretary	Priyanka Sharma	
Executives	Leena Arora	
	Pooja Jangir	

	Priyanka Rawat	

A New beginning: Inauguration of TARU: Gargi College Botanical Society

Nikita Dalal, President, 'Taru'
Botany (Hons.) III year

Photos: Monalisha Mahapatra

The new session had already begun and the new union of Botany was elected. To officially give them their post, Department of Botany, Gargi College organized an inaugural function of Gargi College Botanical Society on 22nd September 2012. It was a fresh start for a new upcoming

session; Botany union was ready to take on their responsibilities and posts.

The event was presided by Dr. Meera Ramchandran (Former Principal, Gargi College), Dr. Shashi Tyagi (Current Acting Principal of the college), Dr. Leisan Judieth (Teacher-in-charge), Dr. Renu and Dr.

Jasmeet Kaur (Advisors) and rest of the teachers of Botany Department

with the students of all the three batches. The lamp was lit by Dr. Meera Ramchandran, Dr. Shashi Tyagi and the Botany union members as Light symbolizes knowledge which is the everlasting wealth that is capable of removing ignorance just as the light removes darkness. Dr. Meera Ramchandran was greeted with a potted plant. Dr. Shashi Tyagi named

Gargi College Botanical Society as 'TARU' meaning '*Vriksha'.* Followed by the lightening of the lamp, Dr. Meera Ramchandran addressed the gathering. The office bearers were given the badges. The office bearers took the pledge to fulfil their duties to the best. Events like 'Salad making' and 'Slogan writing' were organised, students actively participated in it. Inauguration of 'TARU' was a great success. It marked a new beginning with a new name.

Annual Report of GCBS-TARU

Taru president – Nikita Dalal

In this session of 2012-2013 our Botany Department inaugurated the Gargi College Botanical Society (GCBS) during which GCBS was named as "TARU".
Several events were organized such as Factory visit to Mc Donalds to Noida with Dr. Shashi Tyagi (now our acting Principal) and 35 students from the Science Department. An excursion to Indo-Israel Centre of Excellence for vegetable in Ghauranda, Karnal with Dr. Shashi Tyagi and Dr. Geeta Mehta.
A two day Bioinformatics Seminar on 'Role of Bioinformatics in Genomics' wherein Lectures were delivered by Dr. Sandeep Dass, Department of Botany (University of Delhi) and Dr. Mukesh Jain (National Institute of Plant Genome Research). On the next day of the seminar, students were given hands on training in the Bioinformatics

Lab. This seminar was organised by Bioinformatics Infrastructure Facility funded by Department of Biotechnology (BIF DBT).
A seminar regarding overseas studies was held by the “Chopras”.
Dr. Monalisa Sen guided the students at a counselling session who discussed educational and career options in Science after Graduation.
A seminar on Ethical issues on using animals for research work was also held.
Students of our department have made us proud by their participation in several events such as:

- Neha Tanwar and Manisha Yadav Botany(H) 2nd year
  Winners of the Pathfinder Award 2012-2013 .
  The topic of their project was - Amplification and bioinformatic analysis of a gene conferring tolerance against temperature stress from *Brassica juncea*: a step towards developing thermotolerant crop.Here a gene conferring thermotolerance in *Arabidopsis* was used to make primer and these designed primers were then used for PCR with *Brassica* genome .Thereafter an amplicone of desired size gene was sequenced and bioinformatic analysis was done.
- Neha Kumari : Botany(H)1st year
  1st prize in Rangoli making in Reverie 2013: Annual Fest of Gargi College
  2nd prize in Bharti College in Rangoli Making.
  2nd prize in Poster making in Gargi college.
- Kritika Khanna of Botany(H)1st year : Judo Player
  Bronze medal winner at the Intercollege Sports Meet.
  Silver medal winner at Mata Sundari College Sports Meet.
- Anindiya Tripathi of Botany(H) 1st year Kshitij member(Streetplay Society)
  1st prize in Asian business
  2nd prize in Dyal singh (Faculty of Law), Jamia milia and NIFT.
  She has participated in many other colleges like KNC, SRCC (cleared prelims), PGDAV, Khalsa College, Lady Irwin College, JMC, Sri Venkateswara College
- Anjali Mehra, Botany(H) 1st year Member of Musical Society
  1st prize in Khalindi college, IP college for women and Guru Gobind Singh college.
  2nd prize in St.Stephens, Daulat Ram college
  3rd prize in Hindu college.
- Monalisha Mahapatra of Botany(H) 3rd year member of HUES (Fine Arts Society Gargi College) won the 3rd prize in Mood Indigo

and IIT Bombay, 1st prize in Reverie 2013 Annual Fest of Gargi College for photography
2nd in DCAC, Ramjas college, Kirori mal college
2nd runner-up in ISM Dhanbad.

- Nikita Dalal of Botany (H)3rd year : Member of Gargi Quest team 3rd position in the Quest 2013 which is organised every year by CSEC, University of Delhi for undergraduate students.

Hope we get to see more such talented students come up, participate and make our Department proud in the years to come!

A Glance at the events:



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Science Seminar and Fest: A Report

Sonam Shishodia, Botany (Hons.) III year
Shalini Singh, Botany (Hons.) II year

An Interdisciplinary Seminar "Health and well-being" under the Star College
Scheme was held on the second day of SCINTILLATIONS, the Science festival on 19th February 2013 in the auditorium. The seminar was inaugurated by lighting of a lamp by the principal Dr. Shasi Tyagi and the speakers were presented potted plants by Presidents of Science departments. Two eminent Professors gave lectures on topics which are in demand these days.

Prof.Sayed E husnain (from School of Biological Sciences, IIT Delhi) spoke on ‘Genetic Disorders: Application of Stem Cells and Synthetic Biology’.

Dr.Sameer Bakshi (Add. Professor Medical Oncology, IRCH and AIIMS) spoke on ‘Cancer Medicine: From Basic Science to Bedside’.

The lectures threw light on the growing rates of Cancer in India. Why do cells grow in an uncontrollable Fashion in Cancer? The systemic treatment of cancer which involves chemotherapy, targeted therapy and stem cell transplantation. Chemotherapy was discussed thoroughly, answering issues like: How it is given? Why is cancer Chemotherapy toxic?
Stems cells and their uses were the main focus of both the lectures. Their types, means to harvest them and their preservation were discussed in details. These lectures gave extra knowledge and helped us to know about different fields of science for research work.

This seminar was patronized by Dr. Shashi Tyagi and coordinated by Dr. Jasmeet Kaur, Dr Renu Mundhara Soni and Dr. Nivedita Misra. This was organized jointly by faculty members of all science departments of the college.

Science Fest - "SCINTILLATIONS"

Photos: Dr. Gita Mathur

Photos: Dr. Gita Mathur

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Presidents of Gargi College Botanical Society

Dr. Gita Mathur

No. of Years old	YEARS	NAME	ADVISOR / S	TIC
Started	1994-95	Kusum Yadav	G Mathur	AC
1	1995-96	Nandini Das	G Mathur	AC
2	1996-97	Saloni Mathur	UP & GMe	LS
3	1997-98	Sarika Upadhyaya	UP & GMe	LS
4	1998-99	Ragini Rai	ST & DJ	KK
5	1999-2000	Sagarika Sarkar	ST & DJ	KK
6	2000-2001	Pinky Aggarwal	KP & AC	ST
7	2001-2002	Ishani Sinha	KP & SD	ST
8	2002-2003	Nidhi Gupta	PM & SD	UP
9	2003-2004	Swati Chugh	BB & SD	UP
10	2004-2005	Neethi V. Rao	GMa & GMe	GMa
11	2005-2006	Neena Priyanka	GMa & GMe	GMa
12	2006-2007	Madhulika & Urvashi Bhatia	KP &	KP
13	2007-2008	Bhavya Khuller	GMe & AM	GMe
14	2008-2009	Yashika Sharma	AM & PK	GMe
15	2009-2010	Neha Singh	KP & SV	KP
16	2010-2011	Rashmi Sanchita	PP & LJ	AM
17	2011-2012	Nikita Singhal	IS & PP	AM
18	2012-2013	Nikita Dalal	RMS & JK	JD

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Department of Botany: Faculty

(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


gm


gm

Superannuated Faculty	Current Faculty
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. Priyanka Pandey
	Dr. Leisan Judith
Faculty who moved to other Universities	Dr. Jasmeet Kaur Abat
Dr. Kavita Walia	Dr. Nivedita Mishra
Dr. Asha Juneja	Dr. Renu Mundra Soni
Dr. Deepa Jethwani	Dr. Shachi Aggarwal
Dr. Shweta Vandana	Dr. Maya Verma
	Dr. Aarti Gupta

Dr. Shashi Tyagi has taken charge as Principal (Acting) of Gargi College.

Wedding Bells

Dr. Ishani Sinha married Mr. Adam Jadav

Dr. Ishani Sinha was President Gargi College Botanical Society (2001-2002);
And teacher advisor of eAnthesis Volume 7 (2011-2012)

Patter of Tiny Feet

- Dr. Priyanka Pandey was blessed with a son, Keshavanand, April 2012

- Dr. Shachi Aggarwal was blessed with a daughter, Ishanvi on March 10, 2013

CONGRATULATIONS!

Department of Botany: Laboratory Staff

Superannuated	Current
Mr. H.S. Sawhney	Mr. D.D. Sharma
Mr. Kapileshwar Pandey	Mrs. M.D. Sharma
Mr. P.D. Raturi	Mrs. Shashi Bala
Mr. J.S. Negi	Mr. Ashok Kumar Rana
Mr. Vishwanathan S.	Mrs. Rajni
Mr. Liaquat Ali	Mr. Arun Kumar
Mr. H.C. Dhirwal	Mr. Pancham Singh
	Mr. Vijay Kumar Pandey
	Mr. Umesh Kr. Goswami
	Mr. Vaseem Ahmed
	Mr. Sunil Kumar Rahul
	Museum Curator: Mr. Ganga Singh

Department Bids Farewell to Mr. H.C. Dhirwal after his retirement

My Experiences at Gargi

Dr. Pushpa Markandan
Botany faculty 1969-2005

I had the good fortune to join Gargi as a lecturer in the department of Botany on 16th July 1969 and served the college for a little over 3 decades till 2005. During this long period, I enjoyed many interesting experiences, some of which I am sharing with you people now.

Earlier our college was in an old school building near Lajpat Nagar. As there was only one teacher in Botany department, three more were appointed and I was one among them. It was my first day in the college. It was a hot day and as I was anxious I felt hotter. As I entered the staff room another teacher was already there whom I had not met before. She had come well dressed in a Kancheepuram saree with diamond ear rings and gold bangles and a matching necklace. On the contrary, I was thin and small built and dressed in

simple attire - a cotton saree without any make up. My fellow-colleague was perspiring. As she noticed me entering she ordered to bring a glass of water. Without a word, I fetched the glass, cleaned it and went away searching the drinking water and finally gave her. At that time the bell rang. I had to go for the first class, so I fetched the chalk and the register. Upon seeing this the teacher (who thought me till then that I was an assistant in the lab) was quite surprised. When I came from the class before introducing herself, she profusely apologised. I told her nothing to worry; as she was thirsty and elder to me she has every right to order and I do not mind. However, from that day onwards we became thick friends and the friendship remains like that till today.

It was customary in those days that people joining will be kept on probation for one year; however, this wasn't what happened in my case. One fine morning I was taking a lecture for 1st year B.Sc. general class. As it was first period and some of my students came only by 9.15 am (as they were to come from Faridabad by train and another city bus) I used to leave the lecture hall door open to allow the late comers to enter without disturbing me for permission.

I was busy drawing something on the board with my back was turned to the class and so did not notice SOMEBODY enter and take a seat. After about 10 minutes the class was roaring laughter in laughter. When I asked them what the reason was, they told me "Madam, Principal Madam was here and just now she went out." I was quite afraid that I had not seen or even greeted her. On the same day during coffee break, a peon came and said PRINCIPAL is calling you. I was thinking that she is going to fire me and went in trembling. But to my surprise she asked me jokingly "Did you know that I attended your class today?" I replied, "Sorry madam, I did not see you as I was busy". She said "That is exactly what I expect - you were so busy drawing on the black board. I am very pleased with you and have this reward. Saying this she handed over a paper. Without waiting for a minute there I left the scene and reached teacher's room. Everyone wanted to know why I had been called. I read the piece of paper in which it was written "you are made permanent from the date of your joining." Needless to say that my joy found no limits!

I loved my students very dearly; although strict in class I used to help them in the library, museum etc. whenever I had time. Once I was taking a practical class for II year Hons. It was a cytology practical which the students dislike very much. To encourage them, I used to tell that the student showing the best stage in meiosis (should be very clear with proper staining) will be suitably rewarded. A student got such a stage and in that thrill she forgot her surrounding and called out "Mummy! Come here and see! She had such a nice feeling for me, as for her mother and it came out unknowingly. I was very happy to know her mind as well as the good slide she had prepared. I used to get energy from hearing the well-being of our old students like Ratna Roy Chowdhary (who has many students abroad in her lab and an internationally famous scientist), Saroj Dhar, a well-known scientist in I.I.T Delhi and many others.

Another experience: one day as usual, I was in 1st B.Sc. Gen theory class, there were 55-58 students present and in such a huge class as personal guidance is not possible I used to ask them questions frequently. One such instance, I found a girl fast asleep; I asked her neighbor to wake her and shot a question. She did not utter a word and bent her head. Seeing this, all the students laughed. I told them all to keep quiet. As I do not like to be insulted, I thought the same way for her, and made a comment pointing to other students: "How do we know what she is thinking? Perhaps she is thinking better. Who knows? May be one of these days she will become better than you people and even get a Nobel Prize. Although I said this to console her – much to my surprise, 4-5 years later, a previous student informed me the same girl was working with a Nobel laureate abroad. I was extremely happy then that although she has not yet received any award she is working on human genetics with a well-known scientist and my prophesy had indeed come true.

Once a rich student threw a lunch party to all staff as she got admission in a reputed university. At that time I had only few years' services and did not know personally many staff and Principal. When I went to her house, our Principal Mrs. Thakur Das was already there and so also many teachers like Mrs. Dhar. As I was shy, I went in and sat in a corner. Soon Principal came to me and told to dance with her! I told her

I cannot do any such thing as I have not danced in my life (I had a village upbringing). She did not listen and made me and others like Ms. Jamuna to dance. Only then did we know how friendly and simple and adorable our principal was.

To sum up I would like to mention large number of good friends I gained (names omitted) from not only dept. of Botany but also from Hindi, History, Sanskrit, English, Sports, Zoology, Physics and Chemistry during the years of my stay in Gargi. Their sincerity in work and love towards me had great influence in shaping my future life which I recognize with much gratitude now. Although some of them are no more I would like to remember Ms. Jamuna (Zoology) who inculcated in me spiritual thoughts; that is why now in a way to thank her I am able to give spiritual lectures in Kerala. Those 36 years in Gargi I never felt tired or sick - rather I was always running around upstairs and downstairs as well as in fields to collect plants for the museum. In those days we had out station excursions too and as I was unmarried I joined many trips to Kashmir, Dalhousie, Nainital, Simla, Musoorie, Rameswaram, Oottakamand etc. This helped make our bond between students and teachers closer.

To sum up: if at all I am given another birth as human, I would certainly like to serve Gargi in any capacity I get.

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Alumni of Botany Department, Gargi College

Sarika Nupur

Member Editorial Board Anthesis: Volume 1.

It gives me immense pleasure to write in the alumni column for Anthesis. The 7th volume of Anthesis reminds me that it has been 7 years since I passed out from the Botany Department of Gargi College. I can never forget how we worked hard with ardor and enthusiasm for our first annual publication of Botany department, our Anthesis volume 1.

After graduating in 2006, I pursued M.Sc. in Natural Resources Management from TERI University, New Delhi. After completion of the second semester in M.Sc., I got an opportunity for training at CCMB, Centre for Cellular and Molecular Biology, Hyderabad, in the project 'Characterization of *Crocodylus palustris* specific genomic/genic microsatellite markers for cross species transferability' in 2007. During the last semester, I got placed in ACC Limited to work at their waste management division. I worked on providing eco-friendly waste disposal solution for hazardous and non-hazardous industrial waste through co-processing in the cement kiln. In the period of two and a half years spent at ACC, I learnt about various aspects of industrial waste management and explored alternative substitutes for conventional fuels and raw materials for sustainability and energy security. I had taken a break from my job in 2011 to take up my new responsibility as a mother. I hope to get back to working soon in the area of renewable energy and energy management.

As I was an outstation student, my journey at Gargi began with homesickness, anxiety and apprehension in the new environment in a new city. These feelings faded soon as I realized that I not only became a part of the Botany Department but a part of a lovely family where teachers were great mentors, guardians and friends and the supporting staff was always ready to help. The warmth, affection, love and guidance from the teachers helped me a great way that I felt completely at home and reassured. It is certainly difficult to mention in few lines how

enriching and blissful the years at Gargi have been. Apart from studies, our teachers always encouraged us for extra-curricular activities and inter-college events which made us confidant and vibrant individuals. My special memories at Gargi include our excursion tours to Dehradun, Mussorie, Uttarkashi, Gangotri, Rishikesh and Dhanaulti which brought me closer to botany, nature and our teachers. I specially loved everything about the practicals, section cutting, physiology and ecology experiments, long hours in labs, drawing for file, visit to botanical garden, herbarium specimens and so on. Internal assessment was introduced in college from our batch and that was a pleasant involvement through assignments and presentations. The most eagerly awaited occasion of the year was ***Ficus*** and I felt like participating in each and every event. I am thankful to my teachers for their constant motivation which made it possible to win II prize in the national paper presentation contest for Prof. B. M. Johri Rolling Shield and trophies at various inter-college competitions. The three years at Gargi are definitely the most cherished and most precious ones. Through this column, I take the opportunity to thank all my teachers of the Botany department, whatever little I have been able to do… I owe it to you entirely and I will continue my quest to make my teachers proud.

I wish to congratulate my juniors for being a part of our botany department family and wish them all the best for further endeavors they take up in life.

Dr. Aparajita Das

Botany (Hons.) 1994

Dr Aparajita Das is presently working at Amity University UP Sector 125, Noida, Uttar Pradesh. Currently she is teaching as well as pursuing research in the field of plant microbe interactions of economically important plants. She graduated in Botany (Hons.) in 1994 from Gargi College, DU and completed her post graduation in Botany in 1996 from Delhi University. She has qualified CSIR NET in Life Sciences and has B.Ed from Meerut University. She has obtained her Ph.D from Amity University, UP, Noida on thesis 'Interaction of a Medicinal Plant *Coleus forskohlii* with Symbiotic Fungus *Piriformospora indica* for Secondary

Metabolites Evaluation'. Before joining Amity University, she was actively involved in research work in the field of plant tissue culture, *in vitro* conservation and cryopreservation for about seven years in National Bureau of Plant Genetic Resources (ICAR), New Delhi in various *in vitro* conservation and cryopreservation projects. She has publications in research journals and has coauthored eighteen chapters in several books related to Plant tissue culture and Microbiology. Recently her research project has been recommended for funding under SERB DST Fast Track Proposals for Young Scientist Scheme.

What I remember about Gargi College
I joined Botany Department, Gargi College in 1991and completed my graduation in 1994. The first thing that comes to my mind about my college is the beautiful red colored building. I still remember my teachers Gita Mathur (GM), Shashi Tyagi (ST), Geeta Mehta (GMe), Bharti Bhattacharya (BB), Phuspha Markandan (PM), Usha Prasad (UP), Kiran Prabha (KP) Madams. It is because of these teachers that I could build a strong foundation in Botany. My teachers not only motivated me to study hard but also helped me learn a lot of things about life which helped me to grow as a human being. All the very best! Thank you for giving me this opportunity!

Dr. Monalisa Sen

B.Sc. Gen Group B 1999

MSc Environmental Biology from University of Delhi

PhD in Environmental Studies from University of Delhi.

Monalisa Sen has over twelve years of experience in the field of biodiversity and conservation. She has worked on Avifauna and Community Dynamics in the Aravallis for her doctoral research. She has experience of working in the field of restoration ecology, livelihood enhancement and biodiversity conservation. She has immense understanding of the issues relevant to biodiversity conservation in the Aravallis and the Eastern Himalayas. She has been actively working on the conservation issues in Eastern Himalayas and has been instrumental in ensuring the success of many conservation initiatives in Arunachal Pradesh.

She presently works in the Biodiversity and Conservation unit of InsPIRE Network for Environment (which was earlier known as Winrock International India) as a Programme Officer.

Gargi College Alumni Association invited her for a counselling session on Education and Carrier Options for science students. LT 33 was packed to capacity and the session was highly motivating and informative.

Dr. Monalisa Sen writes:
"This Wednesday, the 6th of March 2013 was a very special day. I was invited by Gita ma'am to interact with the present students of the college on the various career options which they have in front of them. As I walked into the college, I was reminded of the first day when I had come to Gargi, as a student in the year 1996….. College still seemed the same, even after 14 years. ……. the same hustle and bustle in the corridor, the same smell of H_2S outside the chemistry department…and the numerous posters and notices on the notice board. As I approached the Botany department, I was welcomed by the very familiar, warm smile of Gita ma'am. Ma'am took me around the college and saw the new office set-up, union room, coffee shop and book stall which have come up now.

As I walked into the room to interact with the students, the feeling was overwhelming. The session was organized in room number 33…… a room where I had attended so many classes during the three years of my graduation from Gargi. The difference today was that instead of sitting among the students, I was standing on the podium, with the students listening to me. The session was very nice and well attended…. I hope the students found it to be useful. I was touched by the momento which Gita ma'am gave me…an idol of Goddess Saraswati.

After the session, met some of my other teachers- Dr Kiran Prabha, Dr Geeta Mehta, Dr Rita Bhatla and Dr Shashi Puri….. The feeling of still being remembered by all the teachers, even after a gap of 14 years cannot be worded. The experience of being in Gargi again was wonderful and will be more than happy to help out the alumni association and the students in whatever way I can…

Thank you so much Gita ma'am for inviting me and refreshing the memories of my graduation days at Gargi…Thank you so much ma'am."

Dr. Renu Mundhara Soni

Gold Medal for first position in M.Sc Botany (1999), D.U, North Campus

I graduated as a student of 1997 batch of Botany (Hons.). I remember the day when I entered Gargi College for my admission in B.Sc (Hons) Botany in 1994. At that time Dr. Usha Prasad was incharge for admission and she helped me during my admission process After completing my graduation I enrolled for M.Sc, M.Phil and Ph.D from Botany Department North Campus. After completing my Ph.D I worked as assistant professor in various D.U. colleges: Aurobindo, ANDC and Hansraj. At present I am working in Gargi. It gives me great pleasure to teach in the institution from where I learnt the subject. I am very happy to be a part of the Alumni and excited to write about my experiences. Our batch and the Botany society has very close association as the society was started in 1994 at that time we were in first year. I would like to thank our teaching and non teaching staff for providing a good platform to develop extracurricular and teaching skills. College provided ample opportunities to indulge in various extra-curricular activities

I fondly remember those days when Dr. Bharti Bhattacharya, taught us Taxonomy and clarified my concepts of this subject. During our Botany Festival, Ficus, I realised the importance of Taxonomy as there was a Botanical rangoli competition and I had made L.S Cyathium (inflorescence of family Euphorbiaceae). The rangoli was very beautiful, all the teachers appreciated it, but I did not get any prize because instead of writing L.S Cyathium I had written L.S. flower. I feel happy when I teach this subject now.

My other teachers, Dr. A. Chintamani, Dr. Pushpa Markandan and Dr. Lalita Seghal were masters in algae, fungi and anatomy respectively. Dr. Krishna Kumar was specialist in Pteridophytes and Embryology. She never allowed us to leave the Lab. without dissecting the embryo or endosperm. Dr. Shashi Tygagi developed my interest in Plant Physiology. I like to teach physiology and even now when I am sharing practicals classes with her I learn many things from her. She is very approachable. Dr. Usha Prasad made us very clear about Genetics and

Cell biology. As a colleague I came to know that she bakes very delicious cakes. Dr. Gita Mathur, always enthusiastic, taught us Bryophytes, Ecology and Economic Botany making the subjects very interesting. Dr. Kiran Prabha taught us Ecology and Physiology. As a student we were close to her as her daughter was my batch-mate. Dr. Geeta Mehta taught us Gymnosperms and Economic Botany, making the subject easier. She helped me a lot when I was a student and even now does so. Lastly, I would like to thank Dr. Gita Mathur for giving me this opportunity to express my gratitude to my teachers and non-teaching staff, who are always very helpful.

Distinguished Alumni Awards

Gargi College Alumni Association (Manaswini) honoured the following three alumni of Botany Department with Mementos for Distinguished Alumni Awards at the Alumni Reunion held in the college auditorium on January 6, 2013.

Dr. Sheela K. S.

B. Sc. Hons Botany; 1982

Associate Professor in Physical Education

- Post Graduation; 1984 Lakshmibai National College of Physical Education, Jiwaji University
- M.Phil 1985 Lakshmibai National College of Physical Education, Jiwaji University
- Ph. D. 1997 Lakshmibai National College of Physical Education, Jiwaji University

Awards & Honours

- Gold Medallist In M.Sc. Physical Education
- Coordinator of Refresher Course in Physical Education in 2007
- Represented University Thrice in Volleyball

- Co-authored a Book on Fitness, Aerobics and Gym Operations

Dr. Kavita Vasudeva

B. Sc. Hons Botany; 1988

- M.Sc. (Biotechnology) from Jawaharlal Nehru University (1988-1990) New Delhi
- PhD (Microbiology) from University of Delhi (1990-1995), with four Research publications, in International Journals.
- Joined Microbiology Deptt, Gargi College in 1995 as Assistant Professor.
- Worked as Guest Faculty at Centre for Biotechnology, Jawaharlal Nehru University, New Delhi

Academic Achievements

- Restructuring and redesigning of syllabus of B Sc. (Hons) Microbiology, University of Delhi, for papers on Biochemistry , Molecular biology and microbial genetics , Recombinant DNA technology and bioinformatics
- Have set entrance exam paper of B.Tech for MP Rohailkhand University.and for All India level entrance exam conducted by DRDO.
- Designing of syllabus of B.tech (Biotechnology),of Kurukshetra University.
- Reviewer for Two International Research Journals, including Bioremediation.
- Published seven Research Papers in International Journals
- Life member of AMI (Association of Microbiologist of India)

Awards and Fellowships

- Awarded DBT FELLOWSHIP (1988) for perusing M.Sc. in Biotechnology.
- Awarded Junior research fellow (JRF), by University Grants Commission, after clearing the (UGC-CSIR-NET) examination conducted by Council for Scientific and Industrial Research (CSIR)(1990), both JRF and Lectureships, Also awarded senior fellowship (SRF) for two years.
- Was Awarded Japanese Govt. Monbusho Research Fellowship 2000.
- Awarded Major Research project , worth ten lacs,(3 year duration) by UGC , in 2008, with which biotechnology reasearch lab was established in college, and which was successfully completed in 2011, with two International Research Publications.
- Interdisciplinary Research project entitled "**Synthesis and Characterization of Novel nanomaterials using green methods for anti-microbial applications",** awarded by Delhi University, (M**ay 2012**)

Dr. Karunaa Paal Gupta

B. Sc. Hons Botany; 1988

DU topper in 2nd year of graduation.

Masters in MICROBIOLOGY from University of Delhi South Campus with flying colours in the year 1990.

Cleared UGC-NET examination and registered for the Ph.D in MICROBIOLOGY Department of All India Institute of Medical Sciences.

Taught undergraduate students in Delhi University and in K.L. Mehta Dayanand College in Faridabad. Later, was the acting head of the

department of Biotechnology Department in Manav Rachna International University, Faridabad.

From there on, to give expression and freedom to her creativity, she moved on to paintings and dress designing and now has her own boutique at Munirka, Delhi has an art gallery as well at the basement of her residence in Faridabad.
Karuna is a self-taught three dimensional ornamental and structural ceramic artist and is trying to carve a niche in the art world.

She has done nearly 170 art works, experimenting with a variety of media like glass, mirror, wood particle board and canvas.

Exhibitions held:
2011 at "THE LALIT", Connaught Place (4th May to 4th June 2011).

2011 at Indian Habitat Centre New Delhi from 6th June to 10th June 2011

2012 at "THE LALIT" Connaught place from 7th October to 7th September 2012.

2012 at AIFACS Gallery, Rafi Marg from 15th October to 21st October 2012.

She blends folk elements into different styles and projects a new dimension to folk art in her signature of work that is 3 dimensional ceramic arts. Critics from the art world immensely appreciate her work and she has received many awards.

1988- BSc. Botany honours 2nd year gold medalist
1989- 7th in the university in B.Sc Botany honours
1992- cleared the PhD enterance test of all india institute of medical sciences and enrolled as a PhD scholar in the dept. of microbiology
2002-2004:: acting head of the dept. of biotecnology in manav rachna international university, faridabad
2011- honoured with the aadhi aabadi 3rd women achievers award in the field of art, held at kamani auditorium on 18th november 2011
2012- famous art critics, shree keshav malik jee, shree sunit chopra and shree ram sutar(the eminent sculptor of india) highly aclaimed my style of paintings.

Karuna remembers her college days as follows.

Oh God, what wonderful and the most memorable 3 years of my college life were. College life' is that phase in one's life when one learns the most important lessons of his/her life. It is for the first time in college when an individual is left to himself to make his own decisions. The importance of maintaining good and healthy relations with seniors, batch mates, friends and the faculty is known in this very important phase of life called 'College life'.

Being a part of Gargi College, was the most respectful to my life. Today I feel privileged being an ex student of The Gargi College. The art of making things happen while working in a group or a team by coordinating with each other is well learnt during college days. For instance, when I worked in a group of four members on a project, it was the sense of being in one team that bind all of us together and motivated all of us to put in a collective effort in working towards achieving the goal of project completion with excellence. It is one of the most important lessons learnt in college that is very useful to me even now as a professional.

Today, as a professional, when I am asked to work in a team, it is very easy for me to co-ordinate well with my team mates. It is just because I have already worked in a team when I was in college. I developed the habit of listening to the ideas of all the people working in a group and have an elaborate discussion among the team members to decide on what needs to be done.

College was so fun. I can’t even express my thoughts about my college life. I remember my first day at college. I had looked forward to this day from my school days. Life at college meant for me a new life. I was no more a young girl but a young woman. When I entered my college for the first day, I looked around with a mixed feeling of perplexity and joy. I was puzzled as I was not habituated to the ‘college-ways’ of things. The students in batches were moving up and down the corridors for their classes. The professors and the teachers were coming smilingly and exchanging greetings with the students in a friendly manner.

I wish I could get back to those few memorable years and just enjoy to the fullest.

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Botanical Fun Pages

Crossword

Ayushi Gupta
Botany (Hons.) I year

Find common names of 25 flowers in the crossword below. Email your answers to gcbsonline@gmail.com. You may be the winner of a surprize gift!

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

Poems

I Love a Tree

Nidhi Tomar
Botany (Hons.) I year

When I pass to my reward.
Whatever that may be,
I'd like my friends to think of me
As one who loved a tree.

I may not have a statesman's poise
nor thrill a throng with speech

But I may benefit mankind
If I set out a beech.

If I transport a sapling oak
To rear its mighty head
Twill make for them a childhood shrine,
That will not soon decay.

Of if I plant a tree with fruit,
On which the birds may feed,
Then I have fostered feathered friends
And that's a worthy deed.

For winter when the days grow short
and spirits may run low
I'd plant a pine upon the scape
T'would lend a cheery glow.

I'd like a tree to mark the spot
where I am laid to rest
For that would be the epitaph
That I would like the best.

Though it's not carved upon a stone
For those who come to see
But friends would know that resting there
Is she, who loved a tree

My heart is glad; my heart is high
With sudden ecstasy!
I have given back, before I die,
Some thanks for every lovely tree
That dead men grew for me.

Perennial Bliss

Aakanksha Sharma

Botany (Hons.) II year

The rays of the sun falling on my face

Glittering golden the earth’s base.

The drops of dew on lush green grass, the windblown trees fluttering like a dance.

Smiling marigolds in my garden, to see them blooming I forget my burdens.

Cheerful chirping of the birds, a soothing song with no words.

Words are not a need the tune does it all

The magic it acquires, the blessing it has worn.

Nature’s not beauty because beauty does not heal

But is a white patch on earth’s dark screen.

I call earth dark and not the patch, the reason for it is a scratch.

Scratch not just heard or seen but sensed in the spiritual part

The scratch of sorrows and miseries that tears this part, apart.

No one in this world can stitch this torn piece

But yes there is an infinite that binds it tightly.

Oh! Yes I speak of the wonder, the precious gift of lord

That fills our lap with presents of joy and rewards.

Has it ever asked the same in return? No, it gathers the quality of abundant love.

Nature our saver, nature our shield but then why do we exploit the respect worthy?

Let’s bow our heads and thank to our almighty for the wonderful things it has given

And pledge to protect, preserve and most of all respect

the magnificent perennial bliss of nature.

Farewell to Seniors April 2012

Photos: Dr. Gita Mathur

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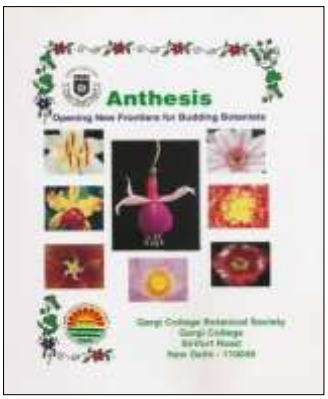
Anthesis: The Journey So Far

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 e-Anthesis since Volume 6. This electronic version is proof of our concern for the environment as well as our technological advancement. Here's a look at the seven earlier volumes

GCBS Anthesis Volume 1 (2005-06)

GCBS Anthesis Volume 2 (2006-07)



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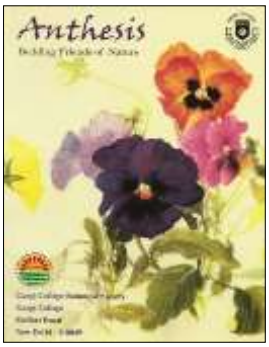

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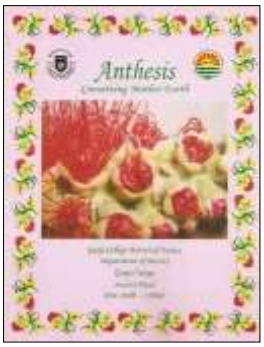

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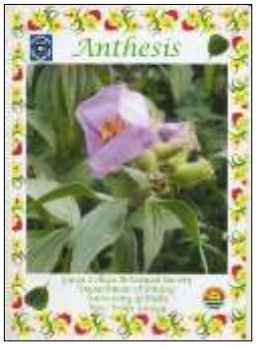

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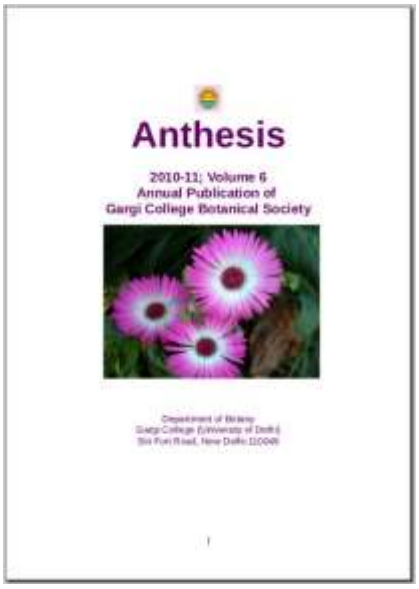

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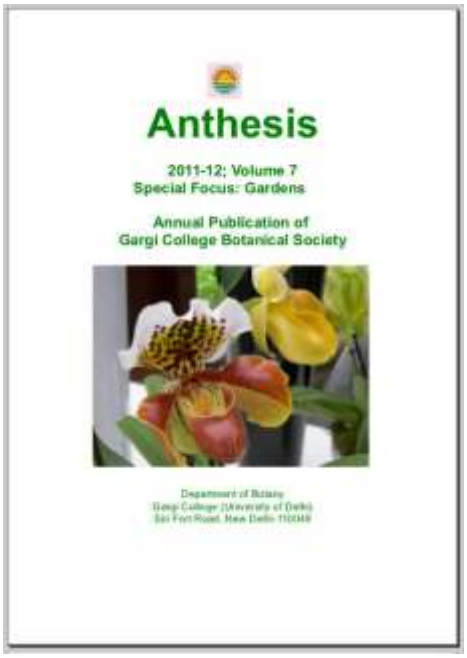

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Please give us your feedback and valuable suggestions for the next volume by emailing us at gcbsonline@gmail.com.

Requests for e-copies and CD's of this volume may also be sent to this email address.

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eAnthesis 8: Team at work

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