# Anthesis

## 2010-11; Volume 6
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## Gargi College Botanical Society

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

# ANTHESIS 2010-2011

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Cover photograph by Dr. Gita Mathur: *Mesembryanthemum criniflorum*

## *From the Principal's Desk:*

I am delighted that the Botany Department is bringing out its magazine ***'Anthesis'*** this year in e-form. Paper is made out of tree barks and who else but Botanists will feel the pain of trees being cut for man's avid and irresponsible consumption. I do hope that your example will be followed by others in the college. A few years ago, as electronic communication systems were fast becoming accessible to more and more people, it was felt that this will lead to paperless offices. But alas, I find that there is one kind of technology that is proving a great obstacle to achieving this goal. If you haven't already guessed, then I am referring to the printer and the photocopier.

The other day I was inside a multi-national bank. I saw a customer asking the lady behind a glass window if he could know the credit balance in his account. The lady pressed a few keys in her keyboard and out came an expensive looking A4 paper from a printer with one line printed on it, which she slid under the window. The customer looked at the paper, noted a figure on the palm of his hand and then tore up the paper and dropped the pieces in the nearest litter bin. I almost had a tear in my eyes to see this casual wastage of paper.

Come March-April, I see students lining up outside the photocopier's shop and carrying away armload of papers. When we of my generation were young, we read the books and made notes of only what was necessary, sometimes even in abbreviated forms. By this process we went over the important texts twice. 'The more you photocopy, the less you will read', is a motto I keep repeating. Is anyone listening?

If we are concerned that we should not deplete natural resources and thereby invite disrespect from our descendants, then we need to constantly ponder over our choices and actions and deliberate whether there isn't a better way of doing things. Recently at a discussion in the University, I was one of the few who supported the move to do away with the common pre-admission form that is printed in lakhs by the University each year, since I felt it didn't

serve much purpose. I cited the kindness to trees that this decision would entail. In fact when I took over as Principal I discontinued the college pre-admission form, which also led to a great reduction in the number of prospectuses to be printed. Do you have a story to tell about a decision that you took at some time in your life that was aimed at saving a natural resource? Please share it with me.

I would like Botany department along with the Eco club of the college to initiate a 'save paper, save a tree, breathe easy' campaign. I was delighted to read in the last issue of ***Anthesis*** a poem in the voice of a bud, which reaches out lovingly to a little girl, only to get strangled and plucked. There were other interesting articles on the service flora renders to man, such as on beauty and health remedies, forensic botany and the holy plan of nature. It is indeed a great tribute to the faculty that they have been able to instil such passion for the subject in their students. Botany Honours students have been producing excellent results in the college and I hope the present batches will surpass their predecessors.

I keenly await the release of this issue and congratulate in advance the entire team of ***Anthesis*** and of the department for their excellent output. May God Bless You All.

Dr. Meera Ramachandran

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## *From the Editor's Desk:*

Anthesis has completed five years of publication. Volume 6 is now ready and we are going forward by entering the digital world. Anthesis is the technical term for opening of a flower bud, and true to this, we are opening up by going global. eAnthesis will be available online too.


This is also a step towards our commitment to the environment, as we are going to save paper by this mode of publishing Anthesis 2011. Being Botanists we fully understand that paper <=> trees. It is now time to act and put into practice what we believe in. We hope this will start a trend not only in Gargi but in other colleges too.

We can see many advantages of making Anthesis an e-publication.

- We are going to give out copies of eAnthesis 2011 in the form of CD's and eAnthesis will be available to anyone who wants a copy on a pen-drive.
- Link to the online eAnthesis will be sent to all interested.
- This way we will reach more readers and readership will not be limited by number of printed copies.
- We will certainly save the cost of printing.
- Students are learning the skills for this mode of publication.
- Many active discussion sessions have instilled confidence in students.
- This will give our students an edge over their peers.
- Writing, modifying and editing are so much more conveniently done without having to write and rewrite the articles.
- Value addition in the form of photographs is a great asset and makes reading more enjoyable.
- We have added photographs of our Gold Medal winners too.
- Most of the photographs are self clicked or scanned by the editors, those downloaded from the net have been checked for belonging to free domain.
- Students have been made to understand copyright issues and all articles have been cross-checked to prevent plagiarism.

Another first in this volume is the addition of a section where our alumni have sent write-ups about what they did after graduation from here and what they remember about Botany department. This will generate an interaction among our present and old students. It will also help students to get informed guidance from their seniors.

Other new sections added with this issue are on ‘Famous Botanist’ and ‘Famous plant’. In this issue the articles on 'Father of Indian Botany' and on the 'Chocolate Tree' mark the beginning of these sections. These sections will be looked forward to in forthcoming volumes.

A small compilation on academic and laboratory staff has been added for the first time. Superannuated members will be among us always through this mode. We will bring out write-ups on distinguished members in a section of ‘Featured Members’ from the next volume.

The readers will enjoy the fun pages in this issue.

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

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

**Dr. Gita Mathur**

eAnthesis Team of Students and Teachers
Editors
Dr. Gita Mathur [Teacher]
Sohini Deb [Bot. H. II Year]
Members:
Dr. Priyanka Pandey [Teacher]
Pallavi Singh [Bot. H. III Year]
Nikita Dalal [Bot. H. I Year]

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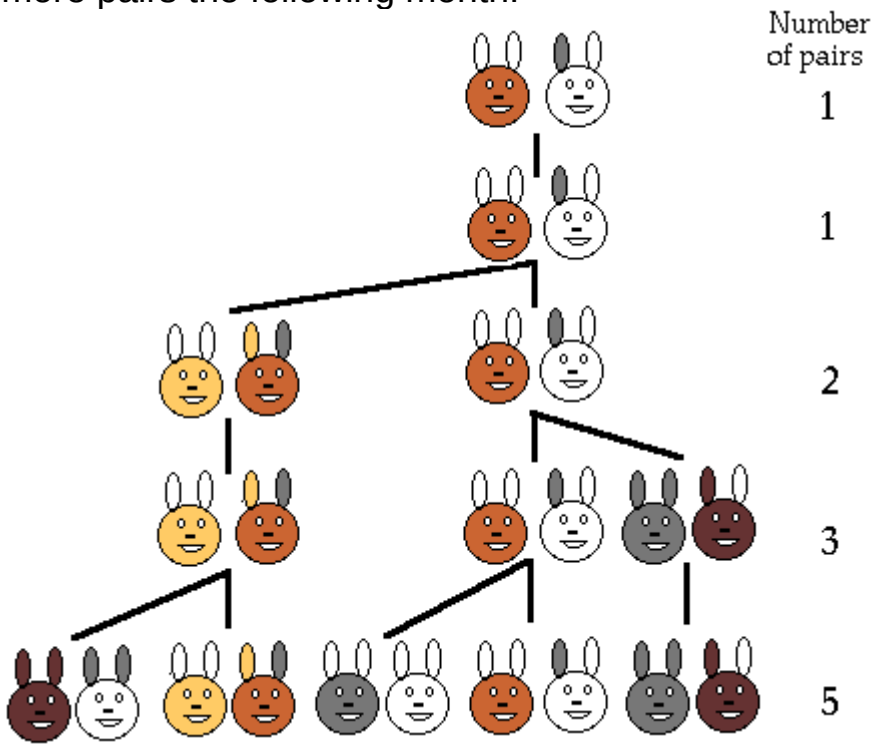
## *Fibonacci Numbers – The Golden Rule of Nature*

**Sohini Deb**
Botany(Hons.) IInd Year

In 1202, Italian mathematician Leonardo Pisano (also known as Fibonacci, meaning "son of Bonacci") pondered the question: Given optimal conditions, how many pairs of rabbits can be produced from a single pair of rabbits in one year? This experiment dictates that the female rabbits always give birth to pairs, and each pair consists of one male and one female. Suppose two newborn rabbits are placed in a fenced-in yard and left to breed. Rabbits can't reproduce until they are at least one month old, so for the first month, only one pair remains. At the end of the second month, the female gives birth, leaving two pairs of rabbits. After three months, the original pair of rabbits produces yet another pair of newborns while their earlier offspring grow to adulthood. This leaves three pairs of rabbit, two of which will give birth to two more pairs the following month.




The order goes as follows: 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89,144 and on to infinity. Each number is the sum of the previous two. This series of numbers is known as the Fibonacci numbers or the Fibonacci sequence. The ratio between the numbers (1.618034) is frequently called the golden ratio or golden number. At first glance, Fibonacci's experiment might seem to offer little beyond the world of speculative rabbit breeding. But the sequence frequently appears in the natural world -- a fact that has intrigued scientists

for centuries.

The most beautiful examples of the occurrence of the Fibonacci sequence in nature are found in a variety of trees and flowers, generally associated with some kind of spiral structure. For instance, leaves on the stem of a flower or a branch of a tree often grow in a helical pattern, spiralling around the branch as new leaves form further out.

**Spiral arrangement of branches in pine tree** *

**Spiral arrangements of leaves in succulents***

Leaf arrangements of some common plants
One estimate is that 90 percent of all plants exhibit this pattern of leaves involving the Fibonacci numbers.
Some common trees with their Fibonacci leaf arrangement numbers are:
**1/2** elm, linden, lime, grasses
**1/3** beech, hazel, grasses, blackberry
**2/5** oak, cherry, apple, holly, plum, common groundsel
**3/8** poplar, rose, pear, willow
**5/13** pussy willow, almond
Petals on flowers
On many plants, the number of petals is a Fibonacci number:
buttercups have 5 petals; lilies and iris have 3 petals; some delphiniums have 8; corn marigolds have 13 petals; some asters have 21 whereas daisies can be found with 34, 55 or even 89 petals.

**Calla lily (1 petalled)***

**Fuchsia (3 petalled)***

**Dianthus (5 petalled)**

**Marigold (8 petalled)***

(In the above pictures Calla Lily is not a true lily. It belongs to family Araceae. Botanical name is *Zantedeschia elliottiana*.The white 'petal' is technically a spathe. The petals in Marigold are Ray Florets as this is a member of family Asteraceae.)

Many flowers offer a beautiful confirmation of the Fibonacci mystique. A daisy has a central core consisting of tiny florets arranged in opposing spirals. There are usually 21 going to the left and 34 to the right. An aster may have 13 spirals to the left and 21 to the right. Sunflowers are the most spectacular example, typically having 55 spirals one way and 89 in the other; or, in the finest varieties, 89 and 144.

**Dahlia showing spiral arrangement of ray florets***

**Pine cones** are also constructed in a spiral fashion, small ones having commonly with 8 spirals one way and 13 the other.

kinds of spirals appear in are 8 to the right, 13 to the Fibonacci triangle.

**Pineapple**- The most interesting is the pineapple - built from adjacent hexagons, three three dimensions. There left, and 21 vertically - a

Seed heads

These **poppy seed** heads have 13 ridges on top.

**Cauliflower**- Very few would have noticed, but this amazing rule of nature can be observed even in an ordinary cauliflower. It is almost a pentagon in outline. Looking carefully, we can see a centre point, where the florets are smallest and the florets are organised in spirals around this centre in both directions. Moreover if we take a closer look at a single floret, it shows its own little florets all arranged in spirals around a centre.

**Rationale**- The reason behind this phenomenon seems to be that this arrangement forms an optimal packing of the seeds so that, no matter how large the seed head, they are uniformly packed at any stage, all the seeds being the same size, no crowding in the centre and not too sparse at the edges. In case of leaves, this ensures that all the leaves are so arranged so that they get optimum sunlight.

*(Pictures taken by Sohini in Nainital on college Botanical excursion in October 2010)

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## *Interesting Facts About Earth and Ozone*

**Shubhangi Jain**
M. Sc. 4th semester
Department of Botany
University of Delhi


The word **ozone**, what is the first thing that comes to your mind when you hear it or read about it?

Let me guess, ozone hole and by hole you may imagine as if a hole in your clothes, because we go by the literal meaning of it, but actually to understand it you can look up to a crack in your ceiling.

Now in order to understand more about ozone, let us learn some facts about our unique planet earth.

Condie (2005, pp.8-9) offers the following analysis:

- The earth's near circular orbit results in a more or less constant heat amount from our sun. If the orbit were more elliptical the earth would freeze over in the winter and heat up to high temperatures in the summer. Higher life forms could not survive if that were the case.
- If the earth were much larger, the force of gravity would be too strong for higher life forms to exist.
- If the earth were much smaller, water and oxygen would escape from the atmosphere and higher life forms could not survive.
- If the earth were only 5% closer to the sun, the oceans would evaporate and greenhouse gases would cause a rise in surface temperatures that would be too high for any life forms.
- If the earth were only 5% further away from the sun, the oceans would freeze over and photosynthesis would be reduced greatly, which would lead to a decrease in atmospheric oxygen. Higher relief forms would not be able to survive.
- If plate tectonics did not exist on the earth, there would be no continents and so terrestrial higher life forms would not be able to exist. The earth appears to be the only planet we have discovered so far that has plate tectonics.
- If the earth did not have a magnetic field of just the right strength then

lethal cosmic rays would kill most life forms on the planet.

❖ If the earth did not have an atmospheric ozone layer to filter out the sun's harmful UV radiations higher life forms could not exist.

❖ If the earth's axial tilt was either greater or smaller, surface temperatures would be too extreme for life to exist. Without the moon the earth's spin axis would wobble too much to support life.

❖ Without Jupiter's huge gravity field the earth would be bombarded by meteorites and comets and higher life forms would not survive.

❖ The diversification of mammals and hence humans only took place because of the asteroid collision 65 million years ago.

➢ If there were changes in any of these characteristics then we would not exist; it is as simple as that. It looks like chance that all these characteristics came together on one planet as they did.

Ozone ($O_3$) is a gas composed of three oxygen atoms. It occurs in two layers in the atmosphere:

- Stratospheric ozone
- Tropospheric ozone

The troposphere generally extends to a level about 6 miles up, where it meets the second layer, the stratosphere. The stratosphere extends upward from about 6 to 30 miles. The stratospheric ozone protects life on Earth from the sun's harmful ultraviolet (UV) rays. The tropospheric ozone or ground-level ozone is an air pollutant that is harmful to breathe and it damages crops, trees and other vegetation. It is a main ingredient of urban smog.

We know about stratospheric ozone a lot so learn more about ground level ozone:

❖ Ground – level ozone is formed in the air by the photochemical reaction of sunlight and nitrogen oxides ($NO_x$) which is facilitated by a variety of volatile organic compounds (VOCs), which are photochemically reactive hydrocarbons.

❖ The chemical structure and reactivity of various VOCs play an important role in the oxidation process.

❖ Under the influence of sunlight, ozone may be formed by reaction of $NO_X$ and VOCs even if their sources of emissions are hundreds of kilometers away.

❖ Three factors influence $O_3$ concentrations:

1. Intensity of solar radiations.
2. Absolute concentrations of $NO_x$ and VOCs.
3. Ratio of $NO_x$ and VOCs.

❖ Changes in sunlight lead to diurnal and seasonal variations in ozone concentrations.

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## *The Proteaceae: Family of Beautiful Flowers*

**Dr. Bharati Bhattacharyya**

Cricket mania is on! World Cup is going on and soon will be followed by IPL. Many of us are interested in the game. But have you ever given a thought to the names of various teams? The New Zealand team is called “The Kiwis”. The Kiwis are known to everybody as the flightless bird from New Zealand. The South African team, similarly, is known as the “Proteas”. *Protea* is a flowering plant genus belonging to the family Proteaceae.

Mainly restricted to the southern Hemisphere, Proteaceae is a fairly large family with approximately 80 genera and less than 2000 species. Together with Nelumbonaceae and Platanaceae they make up the order Proteales. Although it is one of the smaller families of the plant world, it is amongst the highly interesting ones. Members of Proteaceae are mainly restricted to Australia and South Africa. However, various members are reported from tropical Asia, Malaysia, New Zealand, Chile, mountains of tropical Africa and Madagascar. *Grevillea robusta* is fairly common in the Indian Subcontinent. Only two species are known from New Zealand, but fossil evidence suggests better distribution earlier (Pole 1998).

Genera of Proteaceae are highly variable in their morphology and *Banksia* is one of the striking examples of adaptive radiation in plants (Mast and Givnish 2002). Hence it is almost impossible to prepare a simple diagnostic identification key for the family. They are generally trees or shrubs except for some species of *Stirlingia* that are herbs. *Banksia coccinia* (Scarlet Banksia), *Dryandra formosa*, *Embothrium* sp., *Grevillea robusta*, *Hakea* spp., *Protea cynaroides* (King Protea) and *Telopea speciosissima* (New South Wales Waratah) are some of the interesting members.
What makes this family so interesting is not only its beautiful inflorescences that sell as cut flowers, but also its history. The most primitive living members of the family Proteaceae inhabit the tropical rain forests in north-eastern Queensland, Australia but the more advanced and specialized ones grow in the heath-lands – a very distinctive feature of parts of Australia and South-West Africa. Here, these members have become adapted to prolonged periods of drought and the threat of recurrent fires. The plants here are sclerophyllous i.e. with small, hard and leathery leaves.

Fossil pollen from South Australia dating back to 80 million years before present (MYBP) has been attributed to the Proteaceae with a fair degree of confidence (Rourke 1988). There is enough fossil evidence to show that forms ancestral to modern Proteaceae were once dispersed over the vast southern supercontinent – the Gondwanaland. Later, powerful forces with the

earth resulted in the fragmentation of this supercontinent into separate land masses – India, Australia, South America, Antarctica and Africa. These land masses shifted to their present positions carrying with them the predecessors of their present floras. Proteaceae is truly a Gondwanian family and its members inhabit virtually every land mass considered a remnant of the ancient supercontinent Gondwanaland. The fossil record shows that the tropical plants flourished in the southwest of Africa during the middle Cretaceous period i.e. about 100 million years before present (MYBP). Approximately, this was the time of break-up of Gondwanaland, indicating a warm humid climatic regime. As time passed, however, cold masses of water from the now-frozen Antarctica seas moved up northwards and hit the west coast of South Africa. This resulted in the formation of arid areas along the western coastline and a more markedly seasonal climate in the south-western Africa. Plant life, including the Proteaceae, got adapted and evolved in response to this Mediterranean like climate that developed here during the Pliocene i.e. Approximately 1.5 to 2 million years ago before present time (MYBP). It is suggested that the sclerophyllous heathland developed during this period.

It is assumed that the family and its five sub-families diversified before the fragmentation of the supercontinent and hence, all of them are well over 90 million years old. Its present distribution is due to continental drift and not dispersal across ocean gaps. From ecological point of view, too, the Proteaceae are interesting. Presence of large inflorescences makes them highly attractive to both insects and their predators like birds and lizards and also nectarivorous birds like sunbirds, sugarbirds and honeyeaters.

The fire – adapted species may be Resprouters i.e. having thick rootstock buried in the soil that gives rise to new shoots after a fire or Reseeders meaning that adult plants disperse their seeds only when they are killed in fire. The mature seeds are retained within a hard woody cone. The seeds get stimulated by the ensuing smoke and germinate quickly. This phenomenon is known as ‘serotiny’(Rourke J, 1988)

Although many people still consider Proteaceae to be ‘wild flowers’, some genera are important for domestication. Examples are various species of *Leucospermum, Telopea, Banksia* and *Protea*, used by the cut-flower industry for their large, beautiful inflorescences. Two species of *Macademia* are grown commercially for edible nuts. *Gevuina avellana*, the Chilean hazelnut tree is cultivated for its edible nuts in Chile and New Zealand. These nuts are also used in pharmaceutical industry for skin treatment because of its moisturizing properties and as ingredient in sunscreen lotions.

The genus *Protea* with 100 species grows in tropics (high altitudes) and

South Africa of which 69 are endemic to southwest Cape. Impressed by its diversity of form Linnaeus named the genus after Proteus, a Greek god who was able to assume different shapes at will. The aptness of the name is borne by its varied growth habit from dwarf shrubs with subterranean stems to trees in savannah woodland. The size and shape of the inflorescences also differ. *P. odorata* has the smallest inflorescence with 20 to 30 mm diameter of the head whereas in *P. cynaroides* it may be up to 30 cm in diameter. *P. repens* or Sugar bush is another important species. It is the source of nectar from which a thick syrup, 'bossiestroop' is prepared. To make this product, hundreds of open flower heads are gathered and the copious nectar is shaken out in a clean container. Later, it is strained, boiled and bottled for use as sugar substitute or treating coughs and chest complaints.

**Sources**: 1.) Wikipedia
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*Banksia coccinia*- scarlet Banksia

*Dryandra formosa*

*Protea cynaroides*

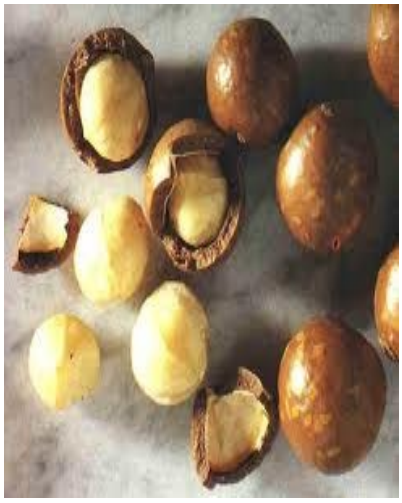
*Grevillea punicea*

*Grevillea robusta  tree*

*Grevillea robusta*

*Hakea* sp.

*Hakea* sp.




*Macadamia* sp. – Hazel Nuts

*Grevillea punicea*

*Telopea speciosissima*

*Leucospermum* sp.

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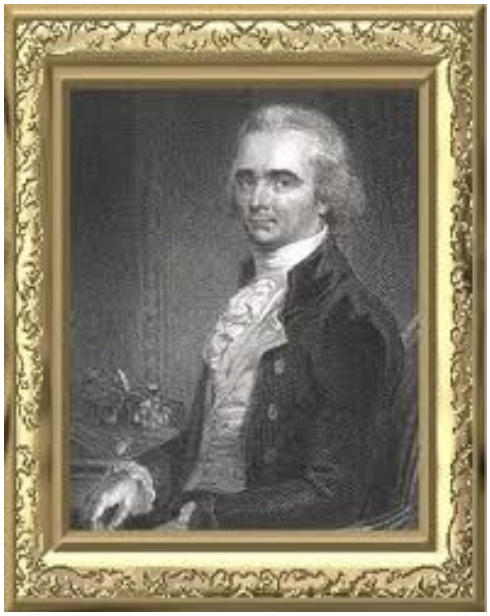
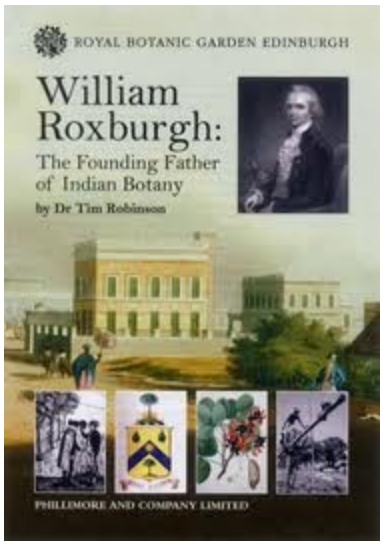
## *Famous Botanist: William Roxburgh*

**Surbhi Sharma**
Botany Hons. II Year






William Roxburgh, also called the **"Founding Father of Indian Botany "** due to his immense contributions in the field of Botany, was a native of Aryshire, in North Britain , and was born in Underwood on 29th June 1759. He was brought up in the centre of the Edinburgh Enlightenment, with all the patronage and intellectual curiosity that this entailed.
His early years passed away rapidly amidst the romantic scenery that seemed to have inspired the muse of his countrymen. While in Edinburgh he attended the classes of various eminent professors in the University and paid particular attention to medicine.

After joining the East India Company as an Assistant Surgeon on one of their ships, he joined the staff of the General Hospital at Madras. Soon, he was Company Naturalist, describing many species for the first time which inspired some beautiful water colour drawings by Indian artists, copies of which were sent to Sir Joseph Banks at Kew. In 1790 he became Naturalist to the Madras Government, and in 1793 he was asked by the Government of Bengal to take charge of the Calcutta Botanical Gardens. There he continued his previous experimental work as well as looking into the introduction of a wide range of crops. He always looked for ways to improve the lot of native workers, to reduce the impact of frequent famines, he suggest labour-intensive methods by developing local skills and introducing suitable plants that could be used for food.
Roxburgh worked assiduously to catalogue the contents of the garden and

had detailed illustrations made of the plants. The complete catalogue of the garden's plants was published in 1814 as *Hortus bengalensis.*

He also bought to the notice of the society:-

- Certain resins, called *Dammer* which when boiled up with oil were used instead of pitch in marine yards of India.
-A drying oil extracted by incision from the *Olexylon balsamifera ,* which was grown abundantly in Chittagong and was used in painting.
-Vegetable substances containing the tannin and astringent principles.
-About 20 substitutes for flax and hemp
-The coarse silk spun by the wild Tussah, and domesticated Berinda worm, the latter of which was as soft as shawl wool and incredibly durable.
-Also the very fine, delicate, silky wool, the produce of two trees *Bombax petandria* and *Heptaphylla.*
Immediately after this William Roxburgh left Bengal and made Chelsea his residence. During this time he contributed another paper to the Society of Arts.

He also communicated many valuable observations related to the resin of *Valeria indica* which exhibited all the electrical power of amber, the orange dying drug called '*Wassuntagandha'* together with directions for growing plants at sea. In 1812 he favoured the society with the observation on growth of teak tree and in 1813 obtained a second gold medal for his communications on the growth of trees in India.

It is because of his immense contribution that some of the following species of plants have been named after him:-

- The Chir Pine, ***Pinus roxburghii***, named after William Roxburgh, is a pine native to the Himalaya.

-***Rosa roxburghii*,** is also called chestnut rose. Chestnut Rose', originated in China, and was introduced from the Botanic Garden at Calcutta around 1824. It is named for William Roxburgh who was then superintendent of the garden.
The 'Chestnut Rose' is readily distinguished by its greyish-dark brown, exfoliating bark. During the winter, the plant seems entirely dead. However it is, in fact, all but indestructible, and is a great starter rose for timid gardeners.

-***Cassia roxburghii***, It is commonly called as Ceylon senna, red cassia. Red cassia is a fairly large "shower" tree with featherlike pinnately compound leaves and twigs covered with a dense carpet of fine, soft hairs. Red cassia produces clusters of pink, rose or orange flowers in axillary and terminal, often branched, racemes. Red cassia is native to Sri Lanka and southern India. The fruit is a typical legume which it is cylindrical and indehiscent (does not split open by itself).

***Chrysophyllum roxburghii*,** it is also called Indian apple star. The tree is up to 30 m tall. The bark is dark grey, with longitudinally arranged corky lenticels.
The leaves are simple, alternate, distichous, canaliculate, pubescent when young, later they become glabrous and narrow oblong to elliptic-oblong. The inflorescence is axillary with dense clusters; flowers are white and the pedicel is 0.3-0.5 cm long.

Roxburgh Monument at Acharya Jagadish Chandra Bose Indian Botanic Garden, Calcutta

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## *The Chocolate Tree*

**Deeksha**
Botany(Hons.) IInd Year

### Do chocolates grow on the trees?

After studying botany, I can say yes. Yes, chocolates are borne on trees. The name of the chocolates tree is cacao tree. Chocolates are nothing but the extract of roasted kernels of ripe seeds of the cacao tree. Botanically the cacao tree is known as *Theobroma cacao* belonging to the family Sterculiaceae.

The cacao tree grows to a height of up to 7.6m-12.2m and it is profusely branched. Leaves of cacao are arranged spirally on the main trunk but they are arranged alternately on the branches. Leaves are dark green in colour and oblong to ovate in shape. Flowers are small and white, yellow or rose in colour. Flowers are borne in a cushion like thing which is present on the bark and older branches of the tree.

The mature fruit is technically a berry but commonly it is called a pod. Cacao pod is like a cucumber in shape and it is about 10cm in diameter and 22.5 to 30cm in length. Inside the pod there is 20 to 40 flat or round shape seeds embedded in a white pink or brown, aromatic, sweet pulp.

For the manufacture of chocolates, mature fruits are split open by slashing the husk (outer covering of the fruit) with a cutlass. Then the husk is removed and seeds and pulps are scooped out and then they are allowed to ferment. During fermentations sugars present in the pulp is converted into alcohol and finally into acetic acids. Cacao Seeds develop a chocolate brown colour as they are killed by the penetrations of alcohol and acetic acids.

Cacool an essential oil is responsible for the characteristic aroma. After fermentations, the fully fermented seeds are then washed and spread on the mats in the sun for drying. After drying, seeds are polished either by machine or by trampling the wet seeds with bare feet. After polishing, seeds are cleaned and then they are machine cracked.

Heavier cotyledons or 'nibs' are separate from the shell through a process called winnowing. Then the nibs are grounded into an oily paste called as bitter chocolate. Then sugars, milk, and cocoa butter (another product of a cacao tree) are mixed in this oily paste or bitter chocolate. This mixture is then refined and moulded to form chocolates.

The nibs can also be crushed, fat removed by hydraulic pressing and dried to get chocolate powder used extensively in confectionery.

(The photographs are courtesy Shalinee Bhardwaj, a senior who passed Botany Hons from Gargi in 1993)

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By S.L. Kochar

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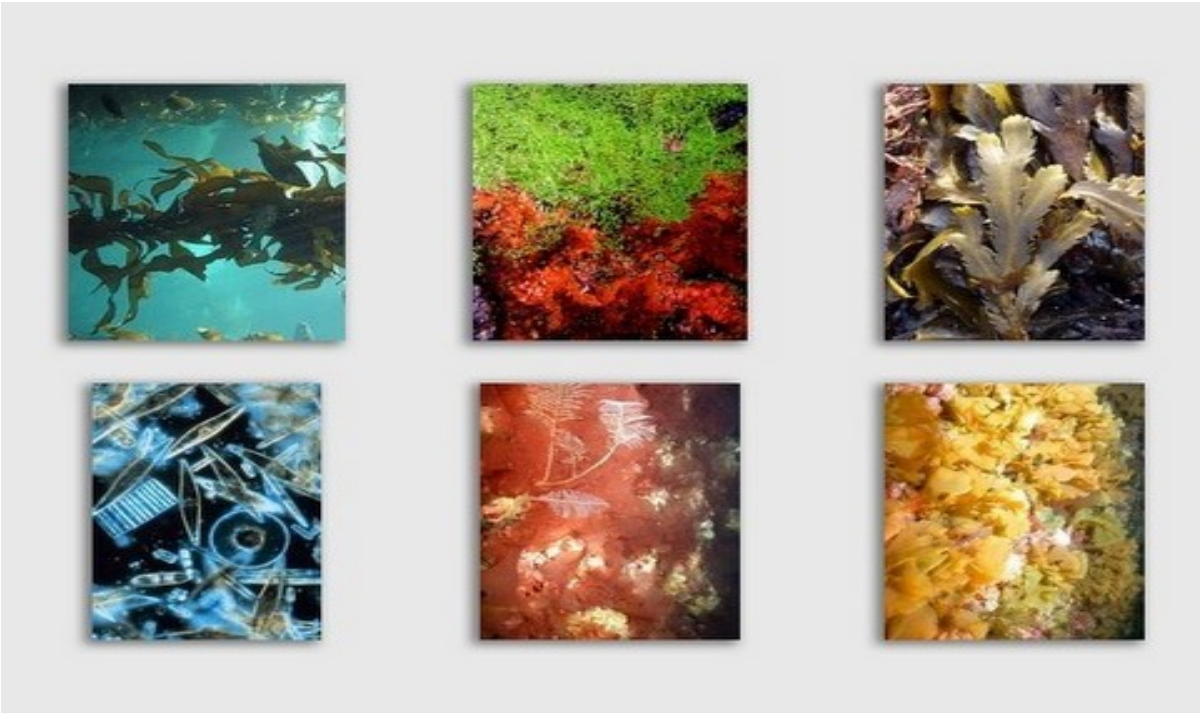
## *The Colourful World of Algae*

**Nikita Dalal**
Botany Hons I year

Blue-Green, Green, Yellow, Golden-Brown, Brown, Red- these are not just colours, but actually represent distinct orders of algae.



Have you ever wondered why all higher plants are green while most of the algae are coloured? This is because algae are found in deep seas and oceans where the penetration of light depends on the plants growing on the surface and in different layers.

Algae belonging to different orders have various colours due to different pigments present in their plastids. Every pigment has its own absorption spectrum and lambda max which is the wavelength at which it has maximum absorption of light. For example, peaks of light absorption for Chlorophyll a are 400 to 450 nm and 650 to 700 nm while for chlorophyll b are 450-550 nm and 600-650 nm, for chlorophyll d it is 710 nm whereas for Xanthophyll it is 400-530nm.

Most of the algae are autotrophic and they use solar energy to photosynthesize. The key molecule for photosynthesis is **Chlorophyll a** since it is present in the center of Photosystem I and Photosystem II. Therefore its presence is a must in algae for photosynthesis.

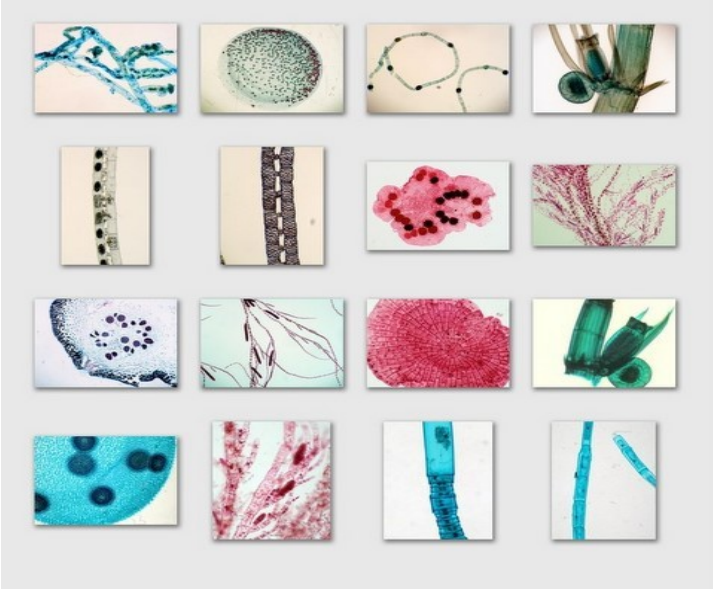
In addition to Chlorophyll a, Rhodophyta the **RED ALGAE** possess chlorophyll d, biliproteins (R- Phycoerythrin and R-Phycocyanin). Phycoerythrin absorbs light at 545 nm (yellowish green light). Phycobilins are especially efficient for absorbing red, orange, yellow and green light. These are wavelengths that are not absorbed by chlorophyll a. At greater depths algae often contain more phycobilins that capture green light, which is relatively more abundant at such depths.

Phaeophyta, the **BROWN ALGAE** possess chlorophyll c, beta carotene and Xanthophylls (major xanthophylls being fucoxanthin, diatoxanthin and violaxanthin). Xanthophyta, the **YELLOW-GREEN ALGAE** possesses chlorophyll e, beta carotene and xanthophylls.

**BROWN AND GOLDEN BROWN ALGAE** use Fucoxanthin and chlorophyll a/c complex to absorb blue and green light which reach the ocean depths. Chlorohyll b functions photosynthetically as a light harvesting pigment transferring absorbed light energy to chlorophyll a. Chlorophyll c functions as an accessory pigment to photosystem II. Light tends to become blue-green as it courses down the water column, and this light is better absorbed by the biliproteins than chlorophyll a.

To conclude, all these colourful algae which make the water-plants in the oceans look so colourful have basically developed the unique pigment systems as survival strategies.....the beauty with a purpose indeed.

The following pictures are of some of the algae we routinely study in Botany practical classes.



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## *CSIR Techno-fest 2010: A Report*

**Sohini Deb & Surbhi Sharma**
Botany(Hons.) IInd Year

On 18 November, 2010 an educational trip was organized by our college to CSIR techno-fest, which was part of the India International Trade fair (IIFT) held every year at Pragati Maidan, New Delhi. This fair was held to throw light on the cultural diversity and industrial competence of India, hence drawing millions of people from all over the world. Some of the students of our college got an opportunity to witness such a prestigious event and to be aware of the various developments taking place in science and technology. The exhibition showcased CSIR`s expertise in the field of science and technology.

-The Council of Scientific & Industrial Research (CSIR) --the premier industrial R&D organization in India was constituted in 1942 by a resolution of the then Central Legislative Assembly. CSIR aims to provide industrial competitiveness, social welfare, strong S&T base for strategic sectors and advancement of fundamental knowledge.

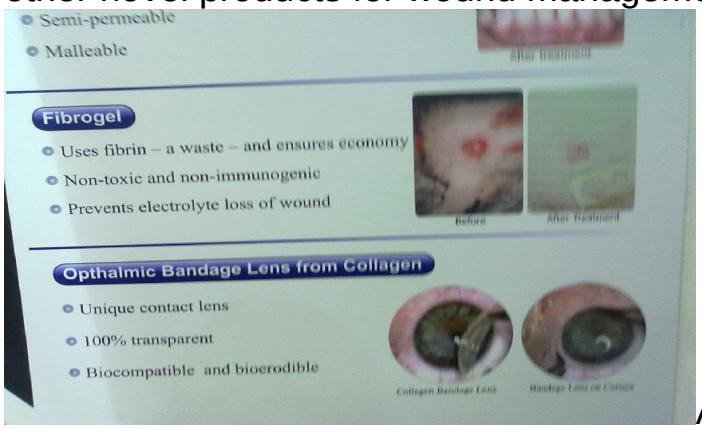
An ensemble of 37 state-of-art institutes, today CSIR is among the world's foremost scientific research and industrial research organization. Since its establishment, CSIR is dedicated towards fulfilling its mission of providing scientific industrial research and development that maximizes the economy, environmental and social benefits for the people, thus transforming the way of living for the common masses of our country.

All the events were organized in hall number 11 of Pragiti Maidan. The added attractions of the mega-event were special talks, and interacting sessions with captains of the industry, leading technopreneurs and academicians. A quiz competition was also organized on all public days for students. In this fest more than 100 industry beneficiaries of CSIR`s technology participated for highlighting their partnership with CSIR. The participating industry persons also shared their experience with the audience in various theme sessions.

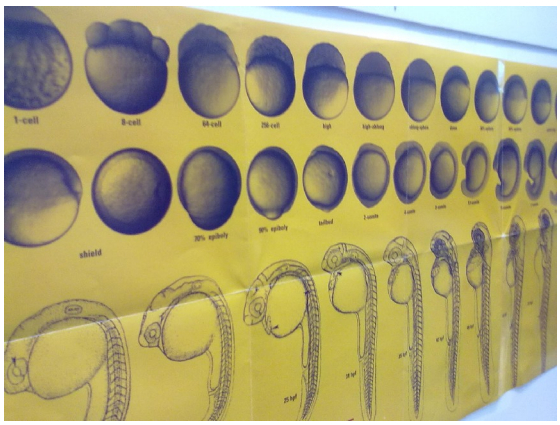
For the students, the trip was a great learning experience because of the exposure we got and the various new things that we learnt.
Here are listed some interesting things we learnt along with photographs clicked by us.


The use of Jatropha oil as biodiesel was one such novel idea. This is being used for tourism also in the Gir Safari park.

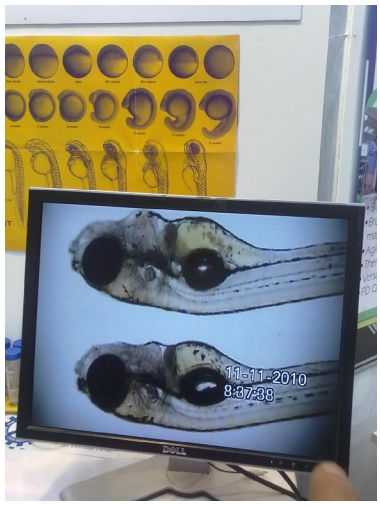
We were also made aware of the significant leads in biomaterial research at CSIR. India's first cultured epidermis had been developed at CSIR besides other novel products for wound management.




Another very interesting study which captivated us was the study of cardiovascular diseases in zebra-fish. This is a highly relevant study as it has been found that the developmental stages of this organism hold a close resemblance to that of humans.

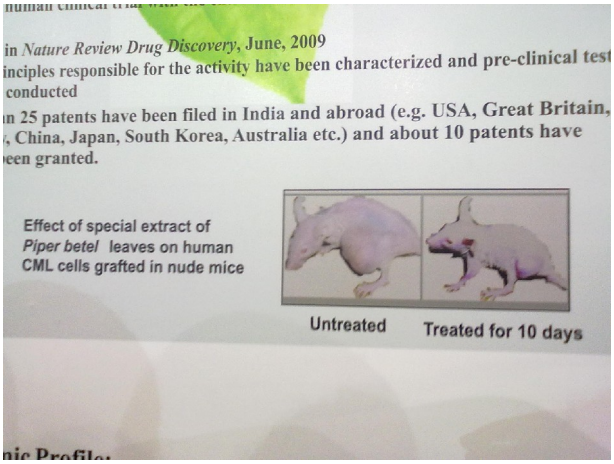


Developmental stages of embryo of zebra-fish




Photographs of zebra-fish with normal heart (Top) & diseased heart (Bottom)

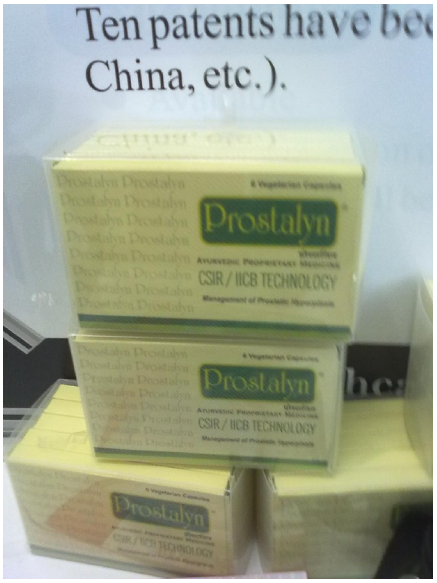
We were also made familiar with the equipments used in molecular biology experiments, eg.,
High speed refrigerated centrifuge, ultra-centrifuge, freeze dryer-cum-freeze vacuum refrigeration system, UV-Vis spectrophotometer and ELISA reader and radio TLC analyzer.




Another path-breaking work done at CSIR was the discovery of anti-leukaemia activity of paan (*Piper betel*).


Risorine, a medicine for tuberculosis has also been developed from extract of Trikatu

Prostalyn, a medicine against prostate cancer has also been developed from *Murraya koenigii*, the homely 'curry-patta' which we use in our daily cooking.



We also got to see many plants which we study in our classes including many endangered plants like *Psilotum* and *Ginkgo biloba*.


*Selaginella bryopteris*


*Psilotum nudum*

*Adiantum*, the walking fern

*Pteris vittata*


*Ginkgo biloba*, the maidenhair tree

The exotic flowers on display further added to the beauty.

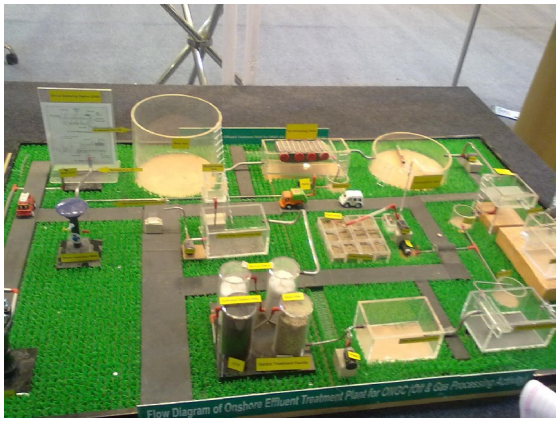

Flowers of *Alstroemeria*

Varieties of *Chrysanthemum*

Beside industry, CSIR technofest also offered visitors a glimpse of exciting

science and technology landscape covering various landscapes encountered in our daily life.


Water management plant




Onshore effluent treatment plant of ONGC

For us this visit was a great learning experience. We thank our college for this exposure and hope our college will continue to take us for such visits.

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## *Botanical Excursion To Nainital*

**Alankriti and Sohini Deb**
Botany (Hons.) IInd year

The excursion trip is eagerly awaited by the students. In the semester system from this year onwards, excursions are not the part of curriculum, therefore we as the current batch of II$^{nd}$ Year Botany Hons. are amongst the few lucky ones to experience this fun educational trip to **Nainital.**

I N

**THE BUS HEADING TOWARDS NAINITAL**

Our journey began on the night of 19$^{th}$ October, 2010 when we assembled in our college premises at 10:00 PM in the night. Everybody was very excited, and our much awaited journey began. Early in the next morning, we reached Nainital and checked in the **hotel Pavilion**.

Breakfast was followed by a brief rest and a lunch break, then we packed satchels with our equipments necessary for the collection of specimens, and armed with our camera, we headed out towards Mall Road on foot in the lookout for damp walls along the road. It was a new way of revising what we

had learnt from textbooks, as we saw the pictures in books coming to life. Collection was the only thing on our minds and each small plant seemed to be made of gold for us.

**STUDENTS BUSY COLLECTING SPECIMENS**

**ONE OF THE SPECIMENS COLLECTED- *Targionia***

By evening, we reached Mall Road, and after a visit to the Naini Devi temple and some shopping, we headed back to the hotel and cleaned and pressed our specimens, eager for dinner and some sleep after the journey and the long day. The next morning dawned bright and sunny, and after a hearty breakfast, we set out on the lake tour to Bhimtal. Sat-tal and Naukuchiatal.

**STUDYING THE PINE TREE IN SAT-TAL AT NAUKUCHIATAL**

**THE TEACHERS TAKING A BRIEF RESPITE**

The lake-sides with the huge shady pines provided a varied flora for us to explore.

After coming back to the hotel, we were treated to local specialties in lunch like Bhatt-ki-dal and Kaddu-ki-sabzi, which we all enjoyed. After a brief rest, it was time for a visit to the Mall Road again for some more shopping.

On our return to the hotel, we set a huge bonfire after which we gathered in one of the rooms for a fun chat session which finally culminated in a scary session of ghost stories.

Next morning after breakfast, half of us voted to go to the cave gardens with Dr. Geeta Mehta and Dr. Gita Mathur and the rest set out on a trek with Dr. Priyanka Pandey and Dr. Usha Prasad to Snow View point. Our lab staff and excursion organizer also escorted the two groups to the trips. Both groups had the times of their lives exploring the locations and on meeting at the hotel again, an argument promptly ensued as to which location was better!!

THE VISIT TO THE CAVE GARDENS

THE TREK TO SNOW VIEW POINT

On return to the hotel, we were pleasantly surprised and touched to find that our teachers had arranged for Chinese food for lunch keeping our preferences in mind. As evening approached, we packed our bags with a heavy heart to get ready for the journey back but nevertheless we were all contented and happy with our collections, experience and the bond we had all formed during the trip. We reached college early next morning, tired but happy to meet our parents again, even though we had hardly missed their absence due to the care and concern of our teachers; the memories of this trip etched in our minds forever.

THE EXCURSION GROUP

## LIST OF PLANTS STUDIED:

1. ***Adiantum*** **(Pteridophyte)**
2. ***Anoectangium*** **(Bryophyte)**
3. ***Artemesia*** **(Medicinally important plant)**
4. ***Asplenium*** **(Pteridophyte)**
5. ***Asterella*** **(Bryophyte)**
6. ***Athyrium filix-femina*** **(Pteridophyte)**
7. ***Cedrus*** **(Gymnosperm)**
8. ***Ceterach dalhousiana*** **(Pteridophyte)**
9. ***Cheilanthus*** **( Pteridophyte)**
10. ***Dryopteris rigida*** **(Pteridophyte)**
11. ***Entodon*** **(Bryophyte)**
12. ***Equisetum*** **(Pteridophyte)**
13. ***Funaria*** **(Bryophyte)**
14. ***Gleichinia*** **(Pteridophyte)**
15. ***Grevillea robusta*** **(Wood yielding plant)**
16. ***Mnium*** **(Bryophyte)**
17. ***Pellia*** **(Bryophyte)**
18. ***Pinus*** **(Gymnosperm)**
19. ***Plagiochasma*** **(Bryophyte)**
20. ***Pogonatum*** **(Bryophyte)**
21. ***Polytricum*** **(Pteridophyte)**
22. ***Populus*** **(Wood yielding plant)**
23. ***Selaginella*** **(Pteridophyte)**
24. ***Targionia*** **(Bryophyte)**

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## *Science at Gargi - A Brief Overview*

**Dr. Shashi Tyagi**
Vice Principal

The Science Departments of Gargi College started functioning in 1967 with a few teachers, some students and one course. Since then, we have taken long strides and have emerged today as one of the best women colleges in the country. Now, we have five B.Sc. (Hons) courses, two B.Sc. programmes and M.Sc. Chemistry, a sprawling faculty of about 60 science teachers and strong pupil strength of about 700. We have been ranked as one the top science colleges by Outlook and India Today.

Our Science departments have constantly endeavoured for excellence and in lieu of their consistent efforts, have received a string of distinctions like Centre of Potential for Excellence from UGC, Star College award from Department of Biotechnology (DBT), Ministry of Science and Technology, along with, many research projects from different agencies.

Our teachers maintain high profile in the academia, which is evident from their research and teaching. Several faculty members have received prestigious awards and recognitions. Some have worked abroad for higher studies on national and international grants. Our teachers routinely publish research papers.

We have been offering one or the other add-on courses:

Introduction to Biotechnology and Bioinformatics
Introduction to Computational Biology- A Practical Approach
Introduction to Forensic Sciences
Environment Management
Biomedical Sciences

As for infrastructure and collateral support, we are at the high end of the spectrum. Our Science Departments have received more than Rs.2 crores from different agencies to upgrade our infrastructure. In addition to well furnished fourteen science laboratories, we have also developed a tissue culture lab. We have developed a molecular biology laboratory, and physics research laboratory and bioinformatics infrastructure facility. We appreciate the fact that our students are doing small research projects in addition to normal classroom experiments. We take pride in the fact that our students have grabbed the top positions in the University exams, year after year. They are able to acquire admission into top institutes and universities both in India

and abroad. Also, some of them have been successful in obtaining coveted academic posts in top institutes in the country.

We are confident that with good infrastructure, dedicated faculty and motivated students, we will reach great heights.

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**Monika Rajput and Sapna Bhati**
B.Sc. Botany (H.) III Year

## Bt Brinjal

"Are Bt brinjals really harmful to us?"
The lecture on "Bt brinjal challenges ahead" was delivered by Raj Bhatnagar of ICGEB New Delhi, in the seminar organized by the Science Departments on 11th March 2011. The lecture was an eye opener and it revealed that using bio-pesticides on crops is not as harmful as it was thought to be. Bio-pesticides are certain types of pesticides derived from natural materials such as animals, plants, bacteria and certain minerals. Using bio-pesticides in modern agriculture is a need of today's market as they provide-

1. Crop insurance and
2. Gives a cosmetic appeal to the crop

In the light of the advancements in science, it is essential for each one of us to have awareness about Bt brinjals. Bt stands for *Bacillus thurigiensis* which is a gram positive bacterium that kills insects. The bacterium is found everywhere in soil. Organic farmers use Bt as insecticides. Bt strains produce a complex mixture of toxins that kill certain types of insects. Bt strains are active against a wide range of larvae of beetles, mosquitoes and insect vectors.
But the question which arises is that do these Bt strains, which are toxic to insects, have the same effect on humans?
To understand this concept we must know about the similarity or dissimilarity between the insect and human gut for the conditions that are essential for *B. thurigiensis* to function. For *B. thurigiensis* to act, three important events are necessary

1. Activation
2. Docking with the receptor
3. Oligomerization leading to pore formation

For the activation of *B. thurigiensis* strains, pH plays an important role. It has been found through several studies that pH of the insect gut is alkaline which is essential for the activation of protein produced by *B. thurigiensis*. The pH of human gut is acidic. Bt protein is digested within one minute in the acidic pH. Therefore in around one minute, the proteins are degenerated due to acidic pH in the human gut.
But there is a possibility that within this 1 minute, *these proteins* may lead to

toxicity which can be harmful for human beings. Research on this topic showed that in the human gut protease enzymes are different from those which are present in the insect gut are. The proteases present in the human gut does not allow the proteins produced by *B. thurigiensis* to undergo oligomerization and cuts it into small irregular patterns; which does not happen in the case of insect gut. The proteases present in the insect gut are responsible for proper and precise processing of the protein to develop a functional Bt toxin. Therefore the human system does not allow the soil bacterium *Bt* toxin to become functional.
There are also other differences like: gene for the receptor of *B thurigiensis* protein is located in the insect gut, it acts as a signature for a particular class of insect but there are no such signatures in the human gut. Thus, Bt brinjal or any other crop which has been genetically engineered are not harmful to human beings

**Nanotechnology & Nanobiotechnology**

Prof. Amarnath Maitra gave a talk on the topic “NANOTECHNOLOGY & NANOBIOTECHNOLOGY” in the same seminar organised by the Science Departments on 11$^{th}$ March 2011.
Nanotechnology is an amalgamation of science and technology and it deals with the study of physical properties of the materials dominated by surface atoms. At the nanoscale, different laws of physics come into play and the traditional properties of materials undergo changes. To understand the basic concept of nanotechnology, an analogy from common experience can be drawn as a monkey walking on a rope can be considered as an electron of the surface atom of a nanoparticle and the rope as the axis along which it can

move. It is also interesting to note that in the medieval period, glass windows were painted using nano-sized metal particles. Different nano-particles of gold atom have different colours due to the phenomenon called as Surface Plasmon Resonance. The Tyndall effect reveals the dispersion of gold nanoparticles in medium like water.

Nanobiotechnology is not similar to Nanotechnology. Nanobiotechnology cannot be explained by using the definition of conventional Nanotechnology and it can be understood as an integral part of cell biology. It is that science which deals with the entities that enter the cell through endocytosis and have miniscule dimensions measurable in nanometers (nm). Nanomedicine is a novel therapeutic approach in Nanobiotechnology and it helps in estimation of quantity of drug needed for curing diseases like cancers. It can be of great potential as the side effects of the modern treatments are almost reduced to negligible amounts by the use of required medicine in nanodoses which are good enough to destroy the site of disease without deleterious effects on the cell or the body as such. Also wastage of drugs is drastically reduced.

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## *Gargi College Botanical Society: A Glance at the Beginning*

**Dr. Gita Mathur**

GCBS was the outcome of enthusiastic Botanists of Gargi College. It started in 1994 with the Inaugural Lecture on "The Wonderful World of Plants" by an eminent Botanist Professor H. Y. Mohan Ram. The constitution of GCBS was formulated by the then GCBS advisor Dr. Gita Mathur during the session 1994-95 and was duly signed by the then Principal Dr. Hema V. Raghavan and the then teacher Incharge Dr. Ahalya Chintamani. It was officially released by a distinguished botanist Professor B. M. Johri in April 1995.


GCBS Inter-College Botanical Festival named "*Ficus*" was started in 1995 and was inaugurated by Dr. Chaaya Biswas, the founder of our Gargi Botany Department. Here are some pictures of the Inaugural Function and the lecture.

## **Presidents** of Gargi College Botanical Society

| 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 |

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

Release of the first Volume of Anthesis by Dr. Meera Ramachandran

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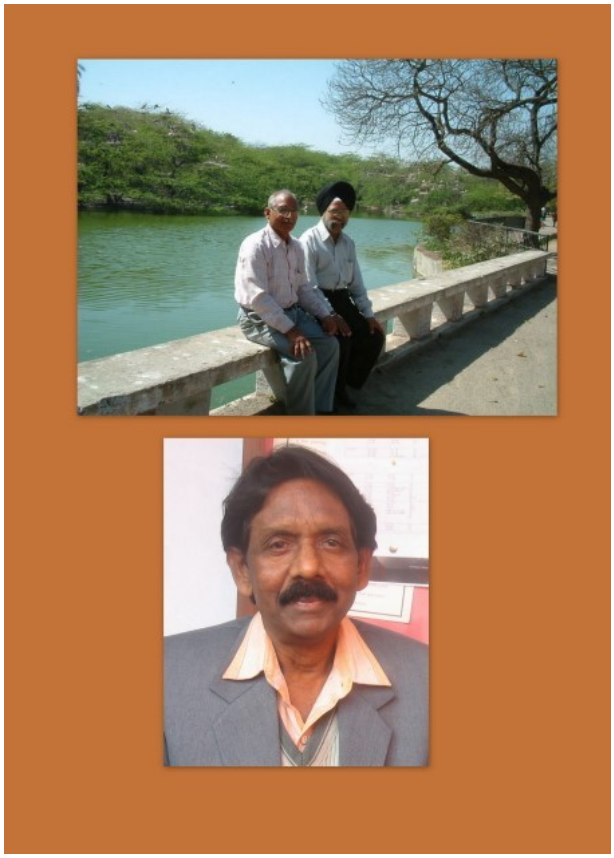
## *Deparment of Botany*

### Faculty:


| Superannuated | 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. Shweta Vandana (on study leave)) |
| | Dr. Priyanka Pandey |
| | Dr. Leisan Judith |
| | Dr. Anupama Razdan |
| | Dr. Pardeep Kumar |
| | Dr. Debolina |
| | |

## Laboratory Staff



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## *Alumni of Botany Department, Gargi College*

### Dr. Sheela Kumari S.

I am a Botany Hons. 1982 batch graduate from Gargi College and it gives me real pleasure to write for 'Anthesis' and recall what it was like to study nature scientifically from inspired teachers I remember with respect and affection.

It is with the utmost thrill that I remember the first day I walked into Room no. 26 (Lecture theater 3 now) to see whether I qualify for admission to Botany H or not. After having filled the form and taken the admission, a wait for the first day of college began. And finally when the D-day came amidst scares of ragging, it is with pleasure that I report that I survived the crucial first week without having been ragged !!!

It still fills me with wonder when I walk into Lecture theatre 3 and see the place where I sat and imagine my teachers lecturing, standing on the platform. Incidentally, the room is still the same. The same feeling of wonderment fills me when I walk into the lab and am able to sit where the teachers sit. I find myself doubly blessed when I realize that I have been given a chance by the universe to stay in touch with my roots as also experience life from the other side.

I have fond memories of my trip to Dalhousie as a part of Botanical Collection excursion, to the Yamuna Embankment, to the Siri Fort area and our very own college ground in search of plants to press.

Even though I changed my academic stream from Botany H to Physical Education (did M. Sc. And Ph.D. in Physical Education), I am still amazing myself and my friends when I am able to recall the botanical names of some plants accurately. The great amount of joy experienced as a result is unparalleled.

As a continuation to this process of joyful remembrance, I would like to recall all my dedicated teachers and later on colleagues, beginning with Dr. Chhaya Biswas, Dr. Bharati Bhattacharya, Dr. A. Chintamani, Dr. Pushpa Markandan, Dr. Asha Juneja, Dr. Lalita Sehgal, Dr. Krishna Kumar, and Dr. Walia. Each teacher left her stamp on me and my classmates by their absolute concern with not only academics but also by their helpful, ever available encouraging

selves. I would also like to remember Mr. Pandey, Mr. Prem Dutt Raturi, Mr. Liaquat Ali, and Mr. D.D. Sharma who were also instrumental in making the Botany H experience memorable.
Finally, I thank Dr. Gita Mathur for having given me this opportunity to pay respectful homage to my beloved Teachers and Laboratory Staff of 1979-1982.

Dr.Sheela Kumari.S
Associate Professor
Department of Physical Education
Gargi College

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**Ishani Sinha**
**President GCBS 2001-02**

After I completed my B.Sc. from the Botany Dept. of Gargi College in 2002, I joined the two-year M.Sc. program in the School of Life Sciences in Jawaharlal Nehru University. I completed the course successfully in the year 2004 and went on to pursue my Ph.D., again from the School of Life Sciences, JNU. During the course of my Ph.D., I characterized the function of two transcription regulatory proteins in the fungus *Candida albicans*, and studied their role in gene expression. I completed my Ph.D. thesis last summer and will be awarded my degree after the *viva voce*.

Thinking about the three years spent in Gargi College Botany Department never fails to make me smile. This was the place where I grew up from being a sheltered, quiet, shy girl to a young adult, confident of her abilities and ready to take on the world. The most important factor in this metamorphosis was the fostering and encouragement I received from my teachers. I can never forget their dedication to impart knowledge, with their animated expressions and energetic efforts in the classrooms, in the practical labs, as well as on field trips. Their enthusiasm was infectious, brimming with genuine love for the subject that I too, gradually came to enjoy and appreciate.

Although I moved away from the study of Botany in my further academics, the training I received in those three years has always been with me, helping me along in every one of my endeavours. The foundations for whatever I am today, and will be in the future, were laid in the Botany department of Gargi College, and for that, I will be forever indebted.

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**Madhulika**
President GCBS 2007

After my graduation in Botany Hons. from Gargi College in 2007 I completed my M. Sc. Plant Sciences from Banasthali Vidyapeeth. Then I joined as a SRF in Directorate of Maize Research in the year 2010 February and am also pursuing my Ph. D. simultaneously.

I feel that at Gargi I was really groomed very well. The shy attitude of mine totally vanished over there, the teachers in our department. specially were so friendly that you got to speak out your self without any hesitation. "ANTHESIS" came in shape for the first time when I was in my third year. It was a joint effort of our enthusiastic teachers and the students. I really feel very happy to hear that it has come so far, turning into an e-Book. I send my best wishes to my own department and regards to all my teachers and a very bright future to all my juniors.

Madhulika
SRF
Maize Physiology
Directorate of Maize Research
Pusa Campus
New Delhi-110012

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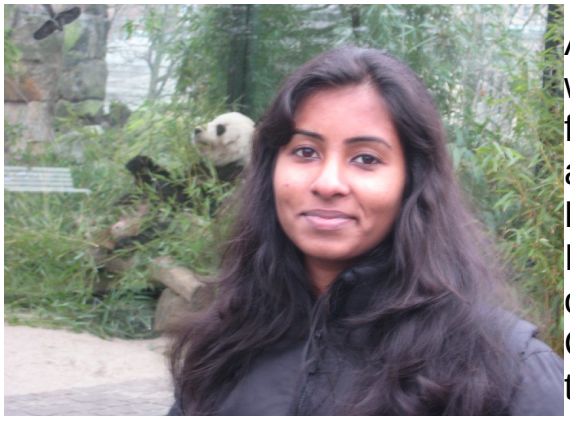
## Drishya Nair



After dedicating three years to the wonderful world of Fauna, I shifted my focus to Environmental Science. Currently I am doing Masters in Climate Science and Policy from The Energy and Resources Institute (TERI). In between the 'hot topics' of Global warming, Climate change and GHG Mitigation I again got a chance to visit the world of Halophytes by working two months at The Indian Institute of Science, Bangalore. Currently I am interning at Freie University Berlin as an exchange student and working on the topic Predicament of balancing growth of Biofuels and Agriculture: A comparative study of Germany and India'. And I owe a major part of my achievements to my moulders in Gargi College Botany Department.

Trees are the earth's endless effort to speak to the listening heaven.

Here are my memories of Botany Department, Gargi College:

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## Sheeja Gopalan

This is Sheeja Gopalan from Life Sc. batch (2008). I have finished my M.Sc. in BIOTECHNOLOGY & BIOINFORMATICS from SRM University, Chennai last year...with 89.62 %.... I got selected by BCIL for a six month training with stipend and I am undergoing the same from OncQuest Laboratories Pvt Ltd. , Delhi, where I have to do a project as well.

I have missed Gargi a lot.. and all the three labs… Botany, Zoology and Chemistry, where we got a chance to learn a lot of things...where the teachers have taught us so nicely.....making us understand the basics very well...

---

## Namrata Dhaka
## Gold Medal for First Position in M.Sc. Genetics, DU. 2010

After graduation, I did Masters in Genetics from University of Delhi, South Campus. At present, I am a Research Scholar and University Teaching Assistant in the Department of Genetics at South Campus.

I really don't know how to sum up in a paragraph what I remember about the Botany Department because I fondly remember so many things that even though three years are about to pass since I graduated, it seems that it was just yesterday when I became a part of the Department, little knowing that I would love to be associated with it and with the World of Plants forever. The labs where we learnt, laughed, ate, enjoyed, the hours that we used to spent struggling to get a perfect section (and never getting one) in the practical classes, the Botany Museum with the characteristic smell of preserved specimens, the Freshers' and Farewell parties and Ficus - the events which we always looked forward to, the annual trip which was probably the best time we had in college…….there is so much that one can just go on. But the one thing that is the most memorable and which actually makes the Department so special is of course the Faculty, who really make these three years a wholesome learning experience and A LOT OF FUN!

---

**Shalinee (Singh) Bhardwaj**
**M.Sc. Botany DU Topper 1995**

From the green pages of my life…
*Tabernaemontana divaricata, Solanum melongena, Amaranthus,Lantana*…and many more. I still remember them with the same fervour, even after 21 long, energetic and enjoyable years.
I first came face to face with these silent expressions of nature's bounty and life in 1990, the year I joined Botany Department of Gargi College as an undergraduate. Botany literally grew on me as I passed college to further complete M.Sc. from the Department of Botany, Delhi University and then B.Ed. Later, when I joined Dr Gita Mathur in her research on Brinjal, back at Gargi, believe me Brinjal was never the same again and so was Botany. It was a great learning experience and I owe my strong basis in life to this one research project. Later, I joined Gargi as a Lecturer in the Department of Education where I worked for four committed years. Every experience changes you as a person; it's up to us in which way we evolve.
Currently I am based in Doha, Qatar; putting my interest in writing to print! I am working as a feature writer/magazine coordinator for a leading publishing company and enjoying every moment of it too.
I may have come a long way but some things remain unchanged like, my memories of the time spent at Gargi. We were those luckier ones who thoroughly enjoyed munching on the peanuts and heavenly *samosas* of the college canteen, sitting on the mini amphitheatre like stairs on the huge terrace that is now accommodating the Microbiology and Education Departments. Never to be forgotten are the excursions, that mad rush to collect all available samples! (Hey gals, please take care while plucking them, remember we are botanists!). The ecology field experiments, that peculiar smell of the botany lab, and of course the dedicated teachers—I remember it all as if it were only yesterday.

When you become a botanist from Gargi, you know you are going to be the best one!

---

**Chinchak Satapathy**
Students' Union, Gargi College

After completing my three exhilarating years of graduation from Gargi College, I opted for my Masters from Teri University. The only similarity between my two courses was “Ecology” for I took up Industrial Ecology as my Major subject in my Masters. In the year 2010, I had the opportunity to study Industrial Ecology and Life Cycle Assessment Courses at FES, Yale University, USA. In the same year, I joined Bayer, a German MNC as a start of my career.

Gargi College Botanical Department…….I remember the botany corridor where we made all our planning for Anthesis and Ficus, did our Plant Physiology practicals and shared our coffee in winters. The Botany lab where my batch had an awesome time making slides, staining our hands with Safranin and making Herbariums. My three years as a Gargiite were not limited to Botany Department rather the Department helped me sprawl into various new endeavours. I remember all the help from my faculties to pursue extracurricular activities and guidance to improve my performance. I would specially like to mention the firm belief and support I received from my teachers. I remember those extra classes and notes I got from them and I always felt easy with them discussing Botany updates and even sharing late evening noodles. Adding to all the fun and excitement at the Department we had our extremely helpful Lab Staffs, of which I was specially attached to Ali Sir and Pancham Sir. I can’t forget the pain taken by them to help me conduct late evening practical for I used to miss my practical due to other commitments in college. I am grateful to our Botany Department for providing me those wonderful three years and supporting this creeper and in turn I promise to grow and flourish to make our Department proud.

## Yamini Deb

Gold Medal for topping DU B.Sc Hons Botany 2005


After graduation I remember wanting to do something which was thematically little more diverse than studying plants. I got admission in Environmental Biology where I studied for the next two years and looked for research avenues within and outside India. I was offered a Masters in Molecular Life Sciences Course in University of Bern and took up this course as it involved a full year of research project. Having worked in a “mixed” group for my previous masters, I realised that I truly missed working solely with plants. In the University of Bern, I found the opportunity to work with multiple disciplines while still staying true to my Botany roots. I was given the opportunity to work in collaboration with physicists and graphic modellers. Hence my work on the role of various tissue layers in the shoot apical meristem (SAM) towards plant patterning came into being.

I work under the supervision of Prof. Cris Kulemeier on manipulating auxin transport in plants using cell ablation as a tool. I kill cells at critical regions within the shoot apical meristem using various technologies like micromanipulators, lasers and also use transgenic lines. The resultant developmental changes in the plant phyllotaxis and vein patterning may give us some clues as to the role of outermost L1 layer versus the future midvein tissue in the developing leaf, in plant patterning. My project also involves causing damage within a plant structure without damaging the outer layers. For this we use different kinds of lasers and also do in-house development and calibration of the equipment to suit our experimental purposes. This involves understanding principles of photonics and working closely with our collaborators in the physics department. In addition as the data generated is analysed by programmes developed specifically to understand the inner workings of SAM. So far we have been successful in developing the technology and will soon get data giving us some clues to our problem.

I started in Gargi College with Botany (Hons.) in 2002. We were among the last batches to be taught by Dr. Pushpa Markandan, Dr. Krishna Kumar, Dr. Lalita Sehgal and Dr. Bharati Bhattacharya Ma'ams. We were a blessed batch indeed. Most students would agree with me in that the best college memories came out of our yearly excursion trips. Specimen collection, pressing and preserving, and general enjoyment of the trip trumped any other activity throughout the year (other than GCBS fest). My best memory is of the last excursion trip our batch made to Himachal Pradesh. We were walking with Mathur Ma'am and discussing mosses overlooking Chadvick falls at the last leg of the trip. As usual we were in a mad rush to collect the last bits of specimens before we made our trip back home. She was helping us identify different ferns and mosses. On our way back, she was telling us about the beauty of the hills and how it took years for the poor *Funaria* to establish on the rock only to be ripped off by a bunch of enthusiastic college kids. I felt guilty about being one of those kids. But I also knew whenever I would next see a bunch of fruiting mosses I will always remember her and think whose specimen book will this moss grace. I knew at that point that I would always be a botanist at heart and no matter which country or which University I go to, the first thing I will do is read up their flora. I am grateful to my teachers for being the driving force for my continued love of plants. Over the years whenever I find myself in trouble, I always have rushed to my Gargi College teachers for wisdom and till now have never been disappointed! The Department has been my second home and I hope it is so for all the girls who aspire to have their curiosity tickled by questions like 'why are leaves flat?'

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## Neethi Rao
## Gold Medal for First Position in M.Sc. Genetics, DU. 2007

Some things are meant to be and I think Gargi College was one of those things in my life.

I've always been a little impatient of people who rave about their schools in the most glowing terms. After all, that is the only school they know, the only experience they've had and so they cannot possibly compare it with any other. But now that more years than those spent in college have passed since I stepped out of Gargi I can confidently say I am what I am today because of this college and my experience at the Botany Department. I know that my future will also owe much to this experience.

I am a scientist today but it was my teachers at Gargi that made me one. My curiosity was awakened here by the questions our teachers posed before us. They made us all botanists just by treating us as such. They challenged us to be more than just passive recipients. Before we knew it we were looking at every plant on the road and naming its family; sectioning the vegetables our mothers asked us to slice in the kitchen.

My favourite parts about studying Botany though, were the outdoor expeditions. The trips to the lower Himalayas, the hikes to some of the most beautiful hills and of course the smell of formalin; and the fights amongst us all for the choicest specimen for herbarium. Even when back in the Delhi heat, one could always walk out and pretend to be working. I miss that the most today working in a lab, not knowing if it is day or night outside.

What I most grateful for though, are the friends I made in college. College is a time for growing up, for overcoming our fears and discovering the world. Those that have seen you bumbling through practical files, worrying about exams and arguing over boyfriends become friends for life.

College is like an ice cream – to be enjoyed greedily before it melts. Coz

melt it does, far sooner than one would like.

Neethi V Rao
Ph.D. Candidate
University of Virginia
(Our lab focuses on studying circadian rhythms using fruit flies.)

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**Dr. Saloni Mathur**
President GCBS (1996-1997)
Treasurer GCBS (1995-1996)
Seretary GCBS (1994-1995)
**Gold Medal for topping DU B.Sc Hons. Botany 1997**

Oblivious of the wonderful world of plants around me, the 3 years at Gargi College, Department of botany, changed my perception and outlook towards these life sustaining magnificent organisms. The informative lectures coupled with in-depth practical sessions not only made learning fun and easy but also set the basis for pursuing higher education and research. The college provided ample opportunities to indulge in various science- and extra-curricular activities which brought out my potential to best. After completing M.Sc. in Plant Molecular Biology from University of Delhi South Campus, I worked on regulatory aspects of a promoter from a virus that infects rice for the doctorate degree. Subsequently, I have been working on various aspects of high throughput genomics in rice, tomato and wheat. I will always be deeply indebted to my alma-mater, Gargi.

## Kavita Sharma

Pursuing M.Sc. Plant Biotechnology from Banaras Hindu University
Recently, I did training in Bioinformatics from National Institute of Immunology, Delhi.
Gargi College is very close to my heart because it is the place where I used to fly like a butterfly in the canteen, playground, botanical garden, corridors…… The library of Gargi is really nice and one can really utilize their free time in studying there and using the books present there to the best extent possible. Today, I feel very proud in telling my teachers about my Gargi Botany Department teachers who are totally dedicated towards their profession and are always ready to help students at any point of time. The way they teach theory and practical class is outstanding. The well equipped labs for doing various subject related practical's, tissue culture lab and sufficient number of lab assistants are the key feature of Botany Department. It also organizes a trip every year to one of the beautiful places in India that are rich in Flora for specimen collection, that is the time when I really developed interest in plants and is the most memorable period of my college life. It has a well maintained Botanical Garden also where I and Sulakshna used to visit almost every day to view and gain knowledge from various plants growing there and bringing the interesting one to the class and asking teachers about them. Gargi Department fest was the event closest to my heart because it was the time when we used to learn various things with a lot of fun with the friends and teachers.
Now being in my M.Sc I am not able to enjoy myself the way I used to do in Gargi. I really wish to go back to my bachelors' days and enjoy each moment again but as per the rule  Life has to move on…….At the end, I want to wish my juniors "ALL THE BEST " for their career.

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## *Departmental News*

### Awards and Results

| Name | Class | Position in Delhi University | Position in South Campus | Photograph |
|---|---|---|---|---|
| Sohini Deb | B.Sc. (H) Botany I | I | I |  |
| Surbhi Sharma | B.Sc. (H) Botany I | | III |  |
| | | | | |
| Sapna | B.Sc. (H) Botany II | | II |  |
| Monika Rajput | B.Sc. (H) Botany II | | II |  |
| | | | | |
| Prachi Jain | B.Sc. (H) Botany III | I | I |  |
| Payal Khullar | B.Sc. (H) Botany III | | II |  |

## Gold Medals Received at DU Convocation 2011

### 1) Prachi Jain

**Gold Medal for First Position in B.Sc. Hons. Botany 2010**


### 2) Pooja Ghosh

**Gold Medal for First Position DU in B.Sc. Hons. Botany 2008**
**Gold Medal for First Position DU in M.Sc. Environmental Biology 2010**



### 3) Namrata Dhaka

**Gold Medal for First Position in M.Sc. Genetics, DU. 2010**

# Pratibha Samman Samaroh 2011

Award received by Sohini Deb, Botany (H.) IInd Year for '1st Position Holder' and 'College Topper' for the Ist Year university exam results in 'Pratibha Samman Samaroh 2011' organised by DUSU, held at Sir Shankar Lal Memorial Hall, DU on 18th March 2011.



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***Pathfinder Award 2011 Winning Project :***

# Study of Artificial Colouring and Extent of its Penetration in Green Vegetables

**Sohini Deb and Surbhi Sharma**
Botany(Hons.) IInd Year

Fruits and vegetables are considered to be the most important source of vitamins and minerals in the diet of an individual and without them the word 'Food', itself is not feasible. But even these are coloured to make them look fresh and appealing to the customer.

So in order to accurately know the risk one might face from this malpractice and the extent of harm caused by it, this project was carried out by Sohini Deb and Surbhi Sharma of Botany (Hons.) IInd Year, Botany(Hons.) under the guidance of Dr. Gita Mathur and Dr. Geeta Mehta of the Department of Botany, Gargi College, University of Delhi.

The competition was judged by two very eminent scientists, Dr. S.V.Eswaran, Head, Department of Chemistry, St. Stephens College, Delhi University and Professor Subhasis Ghosh, Professor, School of Physical Sciences, JNU and Dr. Meera Ramachandran, Principal, Gargi College, University of Delhi, and this project was jointly awarded the Pathfinder Award,2011.

This study is about the artificial colouring of green vegetables by malachite

green.This study was conducted with locally available fruits and vegetables in order to enable the individuals to ascertain the presence of colours and also get a near accurate estimation of the extent of penetration of these harmful chemicals in our food articles of daily use.

Malachite green is a powerful, though toxic medication with anti-protozoal and anti-microbial properties. Malachite green is effective against fungi and gram-positive bacteria. In the fish-breeding industry it has been used to control the fungus *Saprolegnia,* a water mold that kills the eggs. But Malachite Green is suspected of being a carcinogen as well as teratogen (a chemical that can alter DNA make-up), and respiratory poison, its toxicity being temperature and pH dependent, being more toxic with rising temperature and lower pH.

Green color is an indicator of freshness in green vegetables. In order to have on the spot assessment of the vegetables being sold, various vegetable markets in South Delhi were visited and the different types of vegetables being sold at the competitive rates were observed.

We stopped at some particular shops wherein green vegetables having abnormal shine and brightness were being sold. Some of these vegetables were spinach, beans, cabbage, capsicum etc. On physical examination, these appeared to have been coated with toxic green color and they left a green mark on our bare hands.

On being specifically asked about the extra brightness of the green vegetables, the vendors attributed this to the freshness.However on being insisted as to why these were more green as compared to their counterparts with other vendors, they reluctantly agreed that they heard that these might have been colored by the supplier.They also added that these colorful vegetables are considered fresh and fetch more price because the people preferred to buy greener looking vegetables.

It was decided to work on vegetables as these are used in every household on a daily basis. The following vegetables were selected:

Pods –Beans
Leaves –Spinach
Fruits –Bitter Gourd
Roots –Radish* & Carrot*
Stem –Potato*

*Were selected as these are non-green & hence pigment penetration would be easier to observe.

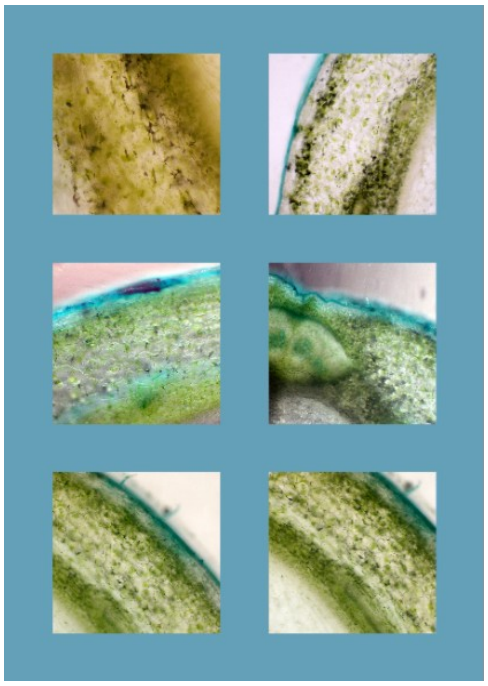
It was observed that not only the skin or the vegetable surface gets coloured but the colour also penetrates a few layers of cells inside. Penetration of colour is also through the cut end of the stalk of the vegetable and this reaches the inner layers to.

Surface penetration makes the vegetables look greener. Entry into deeper layers may be more difficult to note visually. Hence free-hand sectioning was done for treated vegetables and anatomical details studied.
In potato, the colour was found to have penetrated through the entire cortex region despite the presence of many layered skin. Periderm or the skin of potato becomes deeply pigmented and the colour spreads inside depending on the concentration of the dye used.
Potato being a modified stem bears lenticels. These are small aeration pores in the periderm, they may be responsible for deep uptake of the dye.
Also note the starch grains in the cells, they do not take up the dye.

MORPHOLOGY OF *Spinacia oleracea* (SPINACH)
Figure 1 CONTROL (left) AND COLOURED (right)LEAVES
Figure 2 -CONTROL(left) AND COLOURED(right) STALKS

In the spinach the stalk shows darker green coloring and through sections it was seen that the colour has reached the vascular bundles. This leads us to believe that it would have been conducted through the xylem tissue into the entire leaf.
Deep bright green colour is clearly seen in leaf lamina, this makes the market value higher for treated spinach leaves.

In the beans too, the colour has penetrated the exocarp and reached deeper layers. Beans are technically fruits having Exocarp, mesocarp and endocarp. Both exocarp and mesocarp are impregnated with the dye, this is seen to be concentration dependent.
Presence of green colour in the vascular bundle (located in mesocarp) indicates uptake from cut end of the stock, thus the dye is being conducted.

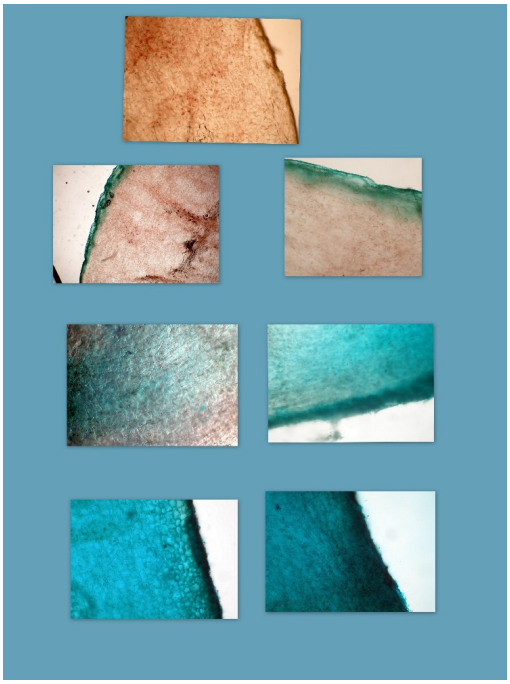


SECTIONS OF *Phaseolus vulgaris* POD

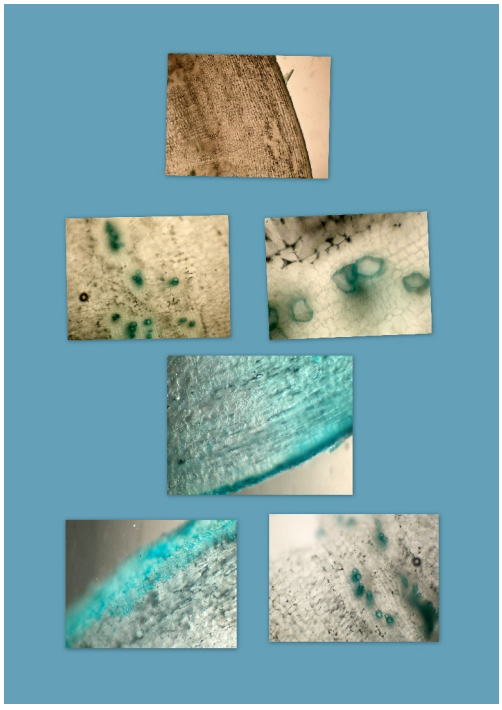
Figure 1(right)-CONTROL SECTION OF BEANS
Figure 2 ( left)-T.S. POD 3% MG TREATED
Figure3 (right) & Figure 4 (left) T.S. POD 5% MG TREATED
Figure5 (left) & Figure 6 (right) T.S. POD 10% MG TREATED

Carrot shows much lesser surface penetration till about 1/6 of radius. This plant was found to be a good system for this study due to absence of green chlorophyll and presence of carotenoids which give the typical orange colour. But it can be seen that the colour is not conducted through the vasculature.

SECTIONS OF *Daucus carota* (CARROT) ROOTS
Figure 1 (left) CONTROL T.S. ROOT
Figure 2 & Figure 3- T.S. ROOTS 3% MG TREATED
Figure 4 & Figure 5 -T.S. ROOTS 5% MG TREATED
Figure 6 & Figure 7- T.S. ROOTS 10% MG TREATED



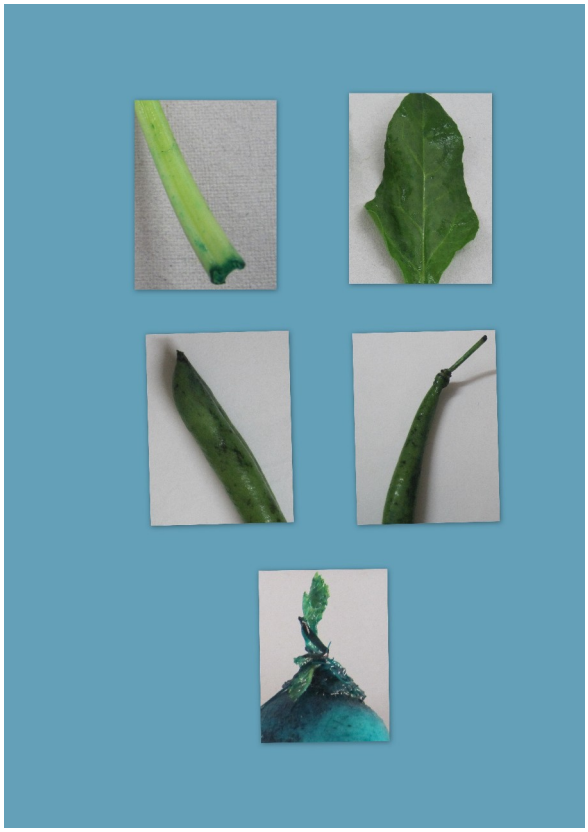
In radish, the surface penetration is greater, up to 2/3 of the radius. This vegetable provided a simple system for study due to absence of any pigment or storage material like prominent starch grains of potato.
Also it was seen that in radish, the colour had been conducted through the vasculature, thus being present in the whole root.



SECTIONS OF *Raphanus sativus* (RADISH) ROOTS

Figure 1- CONTROL T.S. ROOT
Figure 2 & Figure 3- T.S. ROOTS 3% MG TREATED
Figure 4 –T.S. ROOTS 5% MG TREATED
Figure 5 & Figure 6- T.S. ROOTS 10% MG TREATED

Thus it can be seen that even though removal of thick peel can remove the toxic dye for surface absorbers, making the vegetable edible but the dye cannot be removed from deeper layers or vascular tissue hence such harmful vegetables cannot be eaten.



SUGGESTIONS FOR CONSUMERS

Figure 1-COLOURED RING AT THE STALK BASE IN *Spinacia oleracea*

Figure 2-GLOSSY GREEN COLOUR OF *Spinacia oleracea* (SPINACH) LEAF

Figure 3 & Figure 4- DARK GREEN PATCHES ON *Phaseolus vulgaris*(BEANS) PODS

Figure 5- EXCESS ARTIFICIAL COLOUR ON THE PEDICEL IN *Raphanus sativus*(RADISH)

From this study it was concluded that in order to step this malpractice of colouring the vegetables consumed by millions people are over the world, it is essential on our part to be aware of this malpractice. Also whenever consumers go to the market in order to buy vegetables, they should not be attracted to vegetables which have an abnormal green colour as compared to their counterparts. Certain sings should also be kept in mind while buying few vegetables. One should always look at the cut end of the stalk in vegetables like spinach, coriander etc. as the vegetables which are artificially colour will have a green coloured ring at the base of stalk. Sometimes, the vendors might be smart enough to cut the coloured stalk end, in that case one should look for vascular bundles which are visible as small green dots on the cut end of the stalk. Also in case of vegetables like pointed gourd {parval} which is extensively coloured one should look at the pedicel or the point of attachment and hence should refrain from buying such vegetables. Another vegetable which is coloured by the vendors in order to increase the marketability of the product is beans, which can also be recognised by presence of a ring at the pedicel. Also, in leafy vegetables like spinach, lettuce; etc small green spots are visible on lamina, due to which coloured vegetables can be distinguished from non-coloured ones. One should be aware of the fact that everything that glitters is not gold, rather than the physical appearance of the vegetables should concentrate on quality of the vegetable.

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## *Botanical Fun Pages*

## GCBS Activities 2010-11

### Office Bearers:

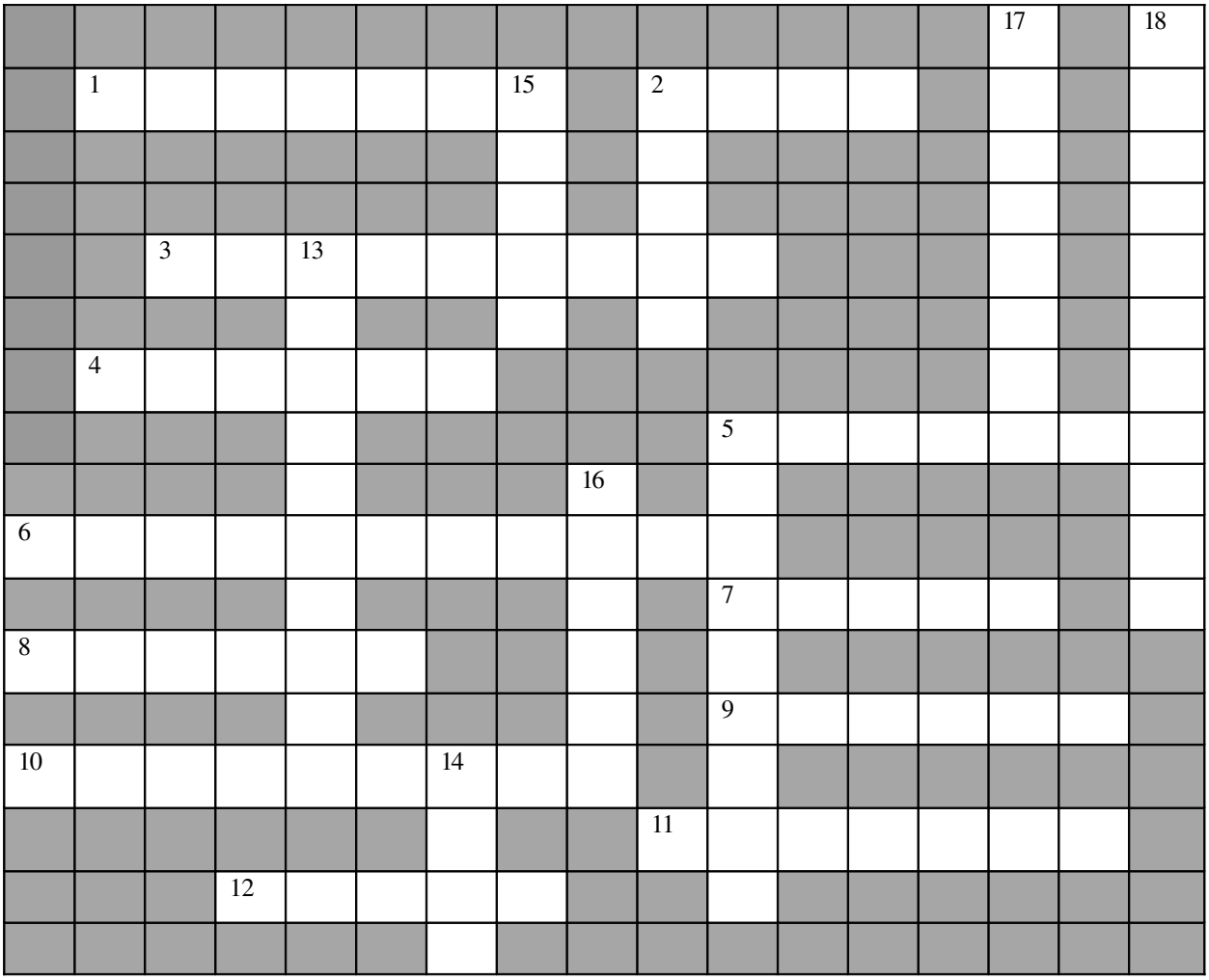
| | |
|---|---|
| President | Rashmi Sanchita |
| Vice-President | Aakriti |
| Treasurer | Shilpi Chaudhary |
| Secretary | Nikita Dalal |
| Teacher Advisors | Dr. Leisan Judith<br>Dr. Priyanka Pandey |

## Ficus 2011: Inter-College Botany Festival of GCBS, held on 02.02.11

**Above is photo coverage of Ficus 2011**

**The festival was graced by Dr Shailendra Goel, Associate Professor from Department of Botany University of Delhi. He enlightened the students on "Apomixis". We also had a special guest, Ms Mahima Sharma, an alumnus of our college. Various competitive events were held in the form of Botanical rangoli, Collage making, Salad making, Botanical puzzle and Dumb charade.**

# STRAIN YOUR BRAINS



## Across

1. Study of entire set of genetic material
2. Organ where photosynthesis takes place
3. Relationship between 2 organisms for mutual benefit.
4. Cell wall of fungi is made up of_____.
5. Association between algae and fungi
6. Flowering plants are scientifically known as _____
7. It is one of the stop codons.
8. Pyrimidine found in RNA only.
9. A cluster of genes in prokaryotes
10. The outermost cellular protective layer in plant organs
11. Bond between two amino acids
12. Unicellular eukaryotic model organism

## Down

2. A multiplicative pathway of bacteriophage
5. Suicide bags of cells
13. Amino acid containing Sulphur
14. Non vascular plant that reproduces by spores
15. Three letter code for one amino acid
16. Self replicating proteins
17. A non proteinaceous enzyme
18. Mobile elements in DNA/Chromosomes

After finishing the crossword, see the answers by clicking Here.

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## *Poems*

### Walking Through The Meadow

Surbhi Sharma

Walking through the woods I see a flash of light , on

wondering what it is I realize it is the bioluminescent fungi

easterly winds blow along take me to the place where I belong

Amid the rocks where lichens reside, paving way for

the vegetation colourful and bright

Tearing apart the silence of the woods is a plop sound that made me stop,

Trembling in fear I look around , only to find *Sphagnum* fooling around

Birds glide swiftly in the midst of sky accompanying

Sulphur showers from the *Pinus* nearby

Long bushy ferns flow like fluid when touched by a

Dash of wind dancing as if to the beats of it

By the stream *Pellia* persists in all its vigour and glory

Expanding its brood to cover a whole story

Competing with it is *Funaria* nearby with

Seta elongating and capsules held high

All these camouflage together and make a wonderful

Picturesque gorge, that forces me to ponder my

thoughts that there’s a world beyond my lawn

## SPRING

Kimi Bhuyan

Its a new awakening!
The naked earth is warmed with
Green grasses and chirping birds.
O! its nothing but spring,
the season of freshness.
The whole world seems
full of eternal bliss;
as sweet as a dew drop
trickling from a leaf.

When blows the sensual breeze,
*Pinus* pollen enjoy with their
Lord given fairy wings.
flowering angiosperms covers the earth
with scintillating beauty....
Ah! the sulphur shower here
adds a glaze!!

The moss capsules heave up
to weave their dream;
and the sporangia on the mother ferns
rest and enjoy basking in sun's kissing glory..

---

## A New Day Everyday
**Dr Priyanka Pandey**

With the chirpings of birds, I awake
With the light of dawn, I raise
With the rising sun, I pray
I pray to Lord…….
To give the strength to work and live
The mid-noon brings new ideas to implement…..
The dusk enlightens the engrossed mind
Setting sun raises new hopes for yet another day……..
The night is solacing and I wait again for a new day, new chirpings…..
And a new dawn to begin once again
To continue till a new gain every day……

---

## Greenery
Dr. Gita Mathur

Drip, drip, drip the raindrops did fall
Drop, drop, drop they splashed on the wall
To enjoy the fun *Riccia* sprang up
And *Marchantia* displayed its gemma cup
Moss capsule swayed from side to side
To show that it was having a fine ride
On its long seta it promptly stood
To prove that nothing was finer than its hood
*Funeria, Bryum* and many others were born
*Anthoceros* came out to show its long horn
The place was full of greenery
Oh! it was a fine scenery.

---

## Poems contributed by Dr. Ahalya Chintamani

Organisms are a riddle wrapped in a mystery inside an enigma

### Phycology

The blue green algae are not algae anymore- anymore!
It seems they are not lost but gone before
By a stern decree despotic
Since they are all prokaryotic
The blue greens cannot be algae anymore
Euglena not an alga anymore
Whatever people thought of it before
Its form is somewhat plastic
And its pellicle is somewhat elastic
So Euglena is not an alga anymore
Spirogyra is not an alga anymore- anymore
Though it passed nuclei from pore to pore
Since it has not swimming gametes
It's reclassified with trametes
Spirogyra is not an alga anymore
Red algae are not algae anymore- anymore
Though the reddest weeds abound on every shore
Since their microsporulation is devoid of flagellation
The red algae cannot be algae anymore
You cannot regard an alga as a plant- as a plant
However much you want to, you just can't
You should keep/ throw away your Fritsch
For the algae are not algae anymore

Anon

### The Blushing of Fungus

There lived a little fungus in the lower phycocene
When lands were mostly mudflats- but the sea were fresh and green
He utilized the substrates most molecularly mixed
That other organisms diligently fixed
But soon it grew less easy to get food of any kind
And free amino acids are extremely hard to find
He varied his cytology, his hyphae and his sex
But life became precarious for little fungus X
His protoplasm languished to a catalonic state
Extinction seemed to loom as his inevitable fate
Till getting even hungrier and pale and very thin
He swallowed some prokaryotes with phycoerythrin

Resisting lytic enzymes in the fungus inside
They integrated with cells and somehow multiplied
Transforming into plastids (as some scientists believe)
Which gave the cells of Fungus X an ultimate reprieve
For when the sun began to shine despite the cloudy skies
He learned to take up $CO_2$ and photosynthesize
His metabolic processes were changed from A to Z
“I have turned into a modophyte” the red, exfungus said
He blushed a little as he spoke, and added with a grin
I should not be alive without that phycoerythrin
This points to a conclusion as the little fungus said
Confronted with starvation one is better red than dead

Anon

## The Cure

A roughish young tobacco (well you know what youngsters are) picked up a nasty virus from a dirty old cigar. It got into his phloem, and it spread from node to node and multiplied its genome by the old mosaic code. His buds began to shrivel and his leaves began to wilt.
Till urged by irritation (and perhaps a sense of guilt)
He sought a plant pathologist in hopes to find a cure. For virulent chlorosis, he no longer could endure. He found a large commercial plant where leaves are cured and dried. They greeted him with open arms and welcomed him inside. They doctored up his nicotine cut down on his tar and finally released him as another Fat CIGAR!

Author- Rolph Lewin
(collected from Kluwer Academic Publishers, Netherlands)

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## *ANSWERS TO CROSSWORD:*

ACROSS-
1) GENETIC
2) LEAF
3) SYMBIOSIS
4) CHITIN
5) LICHENS
6) ANGIOSPERMS
7) OCHRE
8) URACIL
9) OPERON
10) EPIDERMIS
11) PEPTIDE
12) YEAST

DOWN-
2) LYTIC
5) LYSOSOMES
13) METHIONINE
14) MOSS
15) CODON
16) PRIONS
17) RIBOZYME
18) TRANSPOSONS

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