

AUGUST 2022

 **GARDENIA**

BOTANY DEPARTMENT



National Education Society's
**RATNAM COLLEGE OF ARTS, SCIENCE AND
COMMERCE**

NES COMPLEX , NATIONAL HIGH SCHOOLMARG, BHANDUP-WEST, 400078



DR. R. VARADARAJAN

Founder - President
NES-SVB group of Institutions

From – Head of the Department

*All power is within you; You can do anything and everything –
Swami Vivekananda*

The third edition brought to the readers is indeed a gratuitous gift and hard work put in by staff and students in the past one year.

The students put in their best efforts for the projects and one of the project was selected for the final round of 16th AVISHKAR Research Convention 2021 of University of Mumbai.

Six students have been awarded DD Kosambi Young Scientist award (Three in October 2021 and three in June 2022) by CUBE (Collaboratively Understanding Biology Education), Homi Bhabha Centre for Science Education (HBCSE) for their exemplary research work on Biological Model organisms.

The mentors were also appreciated by HBCSE by conferring them SK Mahajan award–2021 for Popularizing Scientific pursuit to Dr.Sunita Chahar and KS Krishnan Mentor award–2022 to Dr.Sunita Chahar and Ms.Nalini Singh for mentoring the students at the CUBE platform.

Undergraduate students are constantly motivated to take up new tasks, projects to keep them abreast with the latest in life sciences. Everyday causeries are held by the professors in the department.

It is great to see students coming forward for the seminars, discussions and learning presentation skills.

My heartiest compliments to the students' editorial team and staff members Mrs.Mamta Yadav and Mrs. Shweta Belose for their contribution and compilation.

Dr. Sunita Chahar

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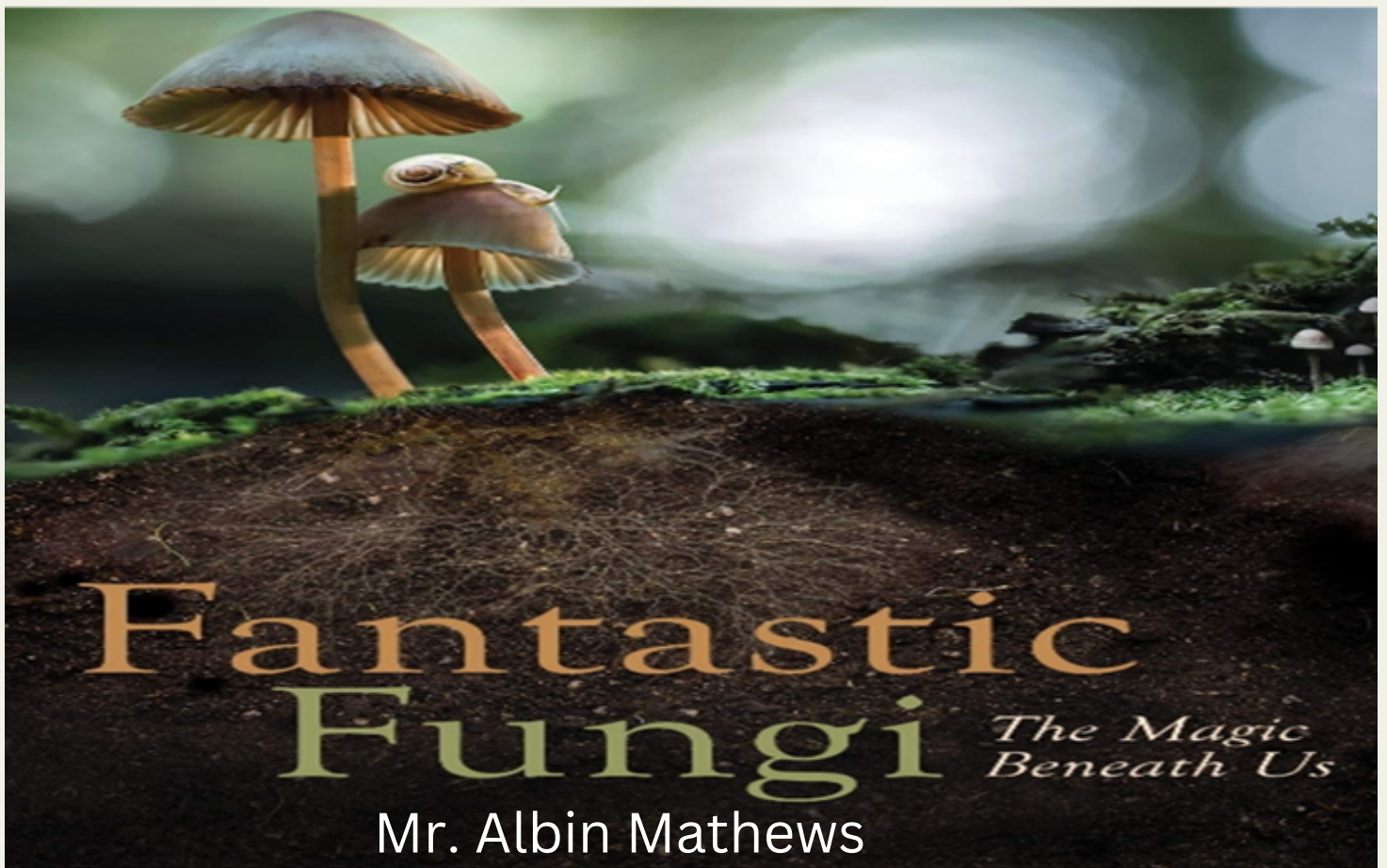
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Do fungi speak

We all consider mushrooms as quiet , silent organisms , but they are actually the above ground , sporing fruit belonging to a fungus connected to a large organism by a root network called *mycelium*



How do they communicate ?

Published by a journal Royal Society Open Science it was observed that some fungi use electrical impulses to share and process information internally. When signal activity spikes, it creates intricate patterns that may function like words in human speech. It is estimated fungi vocabulary could consist of about 50 words

Fungi can send electrical impulses underground through long, thread-like structures called *hyphae*, which expand to form a network of *mycelium*. *Hyphae* are sort of work like nerve cells transmitting signals to other parts of the human body. Some studies have shown electrical activity increases when the *hyphae* of wood-digesting fungi touch wooden blocks, which may indicate fungi use these impulses to share information about food or injury

For the study four fungi species—ghost fungi (*Omphalotus nidiformis*), caterpillar fungi (*Cordyceps militaris*), split gill fungi (*Schizophyllum commune*), and *enoki* fungi were analyzed. Fungi's chit-chat using tiny electrodes connected to *hyphae* to measure spikes in signal activity.

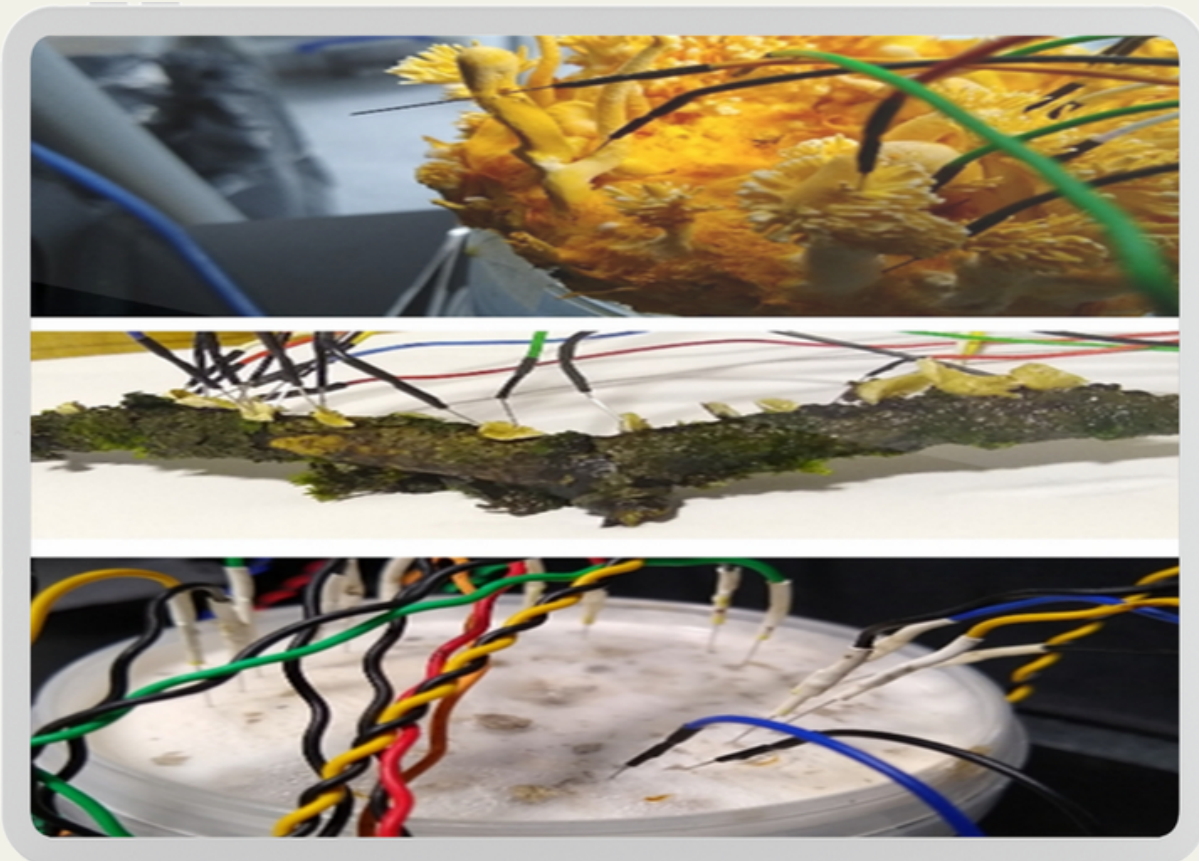


HOW THE RESEARCH WAS DONE?

Each spike in activity was organized into groups and given a linguistic and information complexity analysis. Spikes varied in duration and length, with some impulses lasting up to 21 hours. The clusters of electrical points resembled a human vocabulary of up to 50 words. However only 15 - 20 fungal words are frequently used. Fungal words are also similar in length to human words.

A fungal word length averaged over four species is 5.97 which is of the same range as an average word length in some human languages, e.g. 4.8 in English and 6 in Russian

In terms of complexity, split-gill mushrooms produced "remarkably diverse" sentences, according to the study. While the research shows fungi produce patterns of electric signals, there's no way to tell what they are talking about, if they are at all.



Reference

[https://royalsocietypublishing.org/doi/10.1098/rsos.211926?
utm_campaign=fullarticle&utm_medium=referral&utm_source=inshorts](https://royalsocietypublishing.org/doi/10.1098/rsos.211926?utm_campaign=fullarticle&utm_medium=referral&utm_source=inshorts)

A microscopic view of several cells, likely yeast or similar organisms, with glowing red nuclei. The cells are arranged in a cluster, with some in the foreground and others in the background. The background is a dark, blueish-grey color, and the cells are illuminated from the side, creating a strong contrast between the glowing nuclei and the surrounding cytoplasm.

MISCONCEPTIONS OF CELL DIVISION



INTRODUCTION

Ms. Sashi Bist

A major thrust in science education research over the past three decades has been the documentation of students' misconceptions in a wide range of subject areas (Pfundt and Duit, 2004). The term "misconceptions" has been coined to describe alternative conceptions, naive theories or views of science which are not consistent with concepts currently accepted by the community of scientists. Students' misconceptions are often deeply rooted, instruction-resistant obstacles to the acquisition of scientific concepts and remain even after instruction. Misconceptions are part of a larger knowledge system that involves many interrelated concepts that students use to make sense of their experiences. Students hold misconceptions that were developed before and during their early school years. These misconceptions may be compounded by the teacher or the textbook.

If higher education curriculum designers knew students' misconceptions, it might be helpful to prepare effective teaching strategies. Teachers can play an important role in teaching scientific concepts and, from a constructivist perspective, students should gain meaningful knowledge about biological concepts like cell division. Biologically literate students should be able to use and apply basic biological concepts when considering biological problems or issues. Prior studies have shown that students experience difficulties in learning concepts related to the cell division process (Kindfield, 1994). Cell division constitutes the basis for genetics, reproduction, growth, development, and molecular biology subjects in the biology curriculum. As a matter of fact, a majority of the students or teachers evaluated topics such as gene, DNA, chromosome, and cell division as difficult to learn topics.

PURPOSE

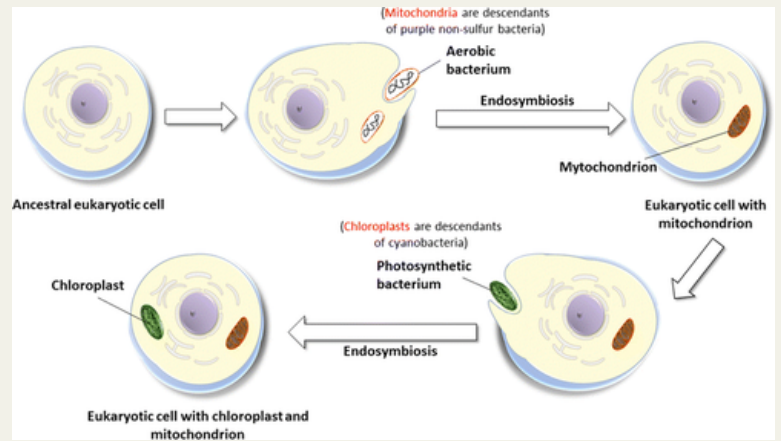
The purpose of this study was to identify biology student teachers' misconceptions of cell divisions using drawings and interviews. This study focuses on the misconceptions that biology student teachers possess about the cell division processes and both the content and scope of these misconceptions.

MISCONCEPTION

- 1 The organelles, such as mitochondria and chloroplasts, dissolve and vanish during cell division and then are reformed.
- 2 Centrioles are found in the nucleus of a cell.
- 3 DNA replication occurs in the prophase during the process of cell division.
- 4 DNA replication occurs between prophase and metaphase during cell division.
- 5 Interphase is the resting phase of mitosis.
- 6 DNA replication takes place only in the meiosis process.
- 7 Chromosomes are formed as a result of shrinkage and thickening of spindle fibers.
- 8 In mitosis, homologous chromosomes separate in the anaphase.
- 9 The chromosome number is doubled in the prophase of mitosis and halved in the anaphase of mitosis.
- 10 Meiosis occurs in the reproductive (sperm or egg) cells

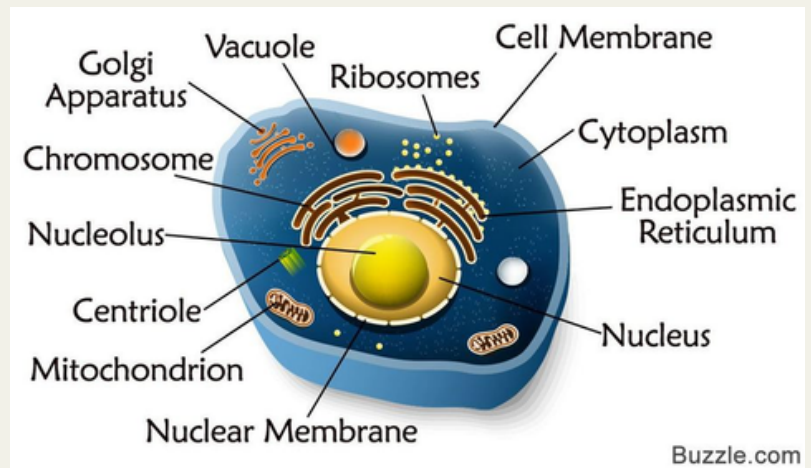
The organelles, such as mitochondria and chloroplasts, dissolve and vanish during cell division and then are reformed.

In cell division mitochondria and chloroplasts have to be duplicated, their genomes replicated and then the population of mitochondria and chloroplasts segregated to daughter cells.

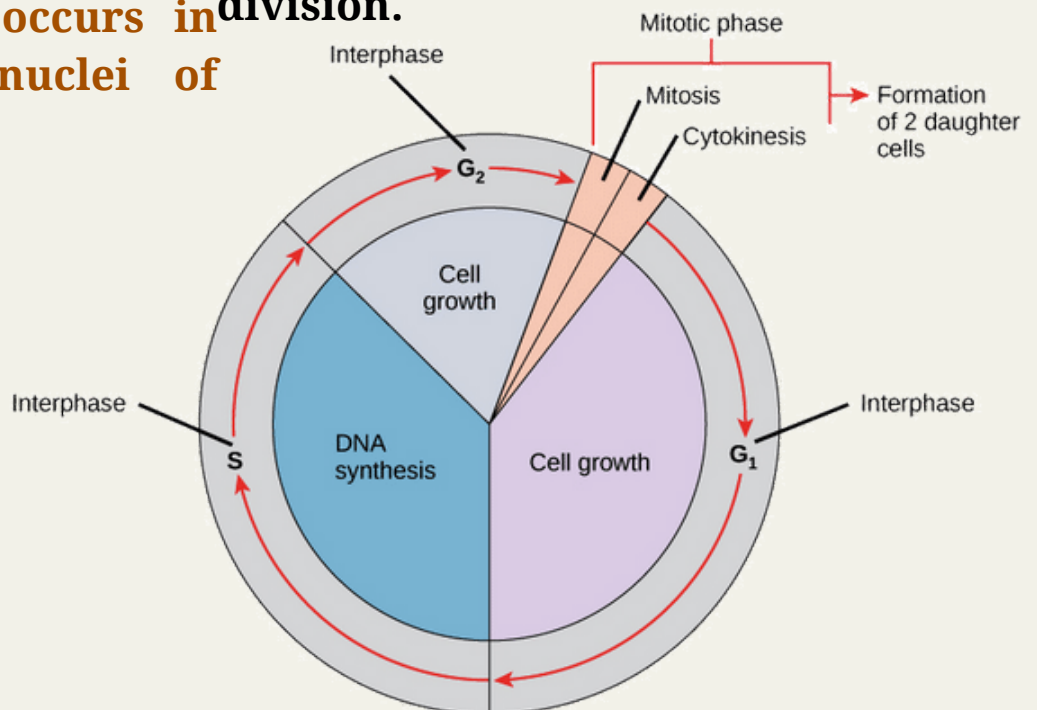


Centrioles are found in the nucleus of a cell.

Centrioles are the centrosome located near the nucleus in the animal cell and some lower plant cells.



DNA replication occurs in the prophase during the process of cell division. DNA replication occurs in the interphase nuclei of eukaryotic cells.



Interphase is the resting phase of mitosis.

This phase was formerly called the resting phase. However, interphase does not describe a cell that is merely resting; rather, the cell is living and preparing for later cell division, so the name was changed

Conclusions and Recommendations

In summary, biology student teachers have many misconceptions related to cell division. Misconceptions are often resistant to elimination through conventional teaching strategies (Bahar, 2003; Wandersee et al., 1994). Therefore, new teaching strategies, such as conceptual maps, conceptual networks, semantic features analysis and conceptual change texts (Novak and Canas, 2004; Tekkaya, 2003), are chosen and students' conceptions are taken into account when preparing lessons. Student-centered learning activities should be implemented with a conceptual development towards the scientific concept

In this respect, it is recommended employment of the drawing method for determination of the misconceptions and learning difficulties for further studies.

REFERENCES

article1380539915_Dikmenli.pdf

MICROGREENS



**THE PRATCTICAL GUIDE TO
GROW MICROGREENS INDOOR AND
OUTDOOR FOR FUN OR BUISNESS**



INTRODUCTION

Mr. Ujjwal Mourya

- As you can predict from the name, microgreens are tiny plants. They are incredibly short and small. They are about 1-3 inches tall. They Have an aromatic flavor and concentrated nutrient content. Microgreens can be harvested a week to 10 days after germination once plant first true leaves have emerged.
- Microgreens are very convenient to grow, as they can be grown in a variety of locations, including outdoor, in green houses and even on your windows still..



How to Grow Mung Bean Microgreens on Growing Paper(Tissue paper)?

Growing paper is another method of growing your mung bean microgreens. Sometimes, it can be flat, and sometimes, you can also find one with ridges around the edges. A growing paper can fit well into container.

•*You can grow mung bean microgreens yourself. This article will cover everything you need to know about how to grow mung bean microgreens: the equipment you need, a guide to assist you on how to grow mung beans microgreens.*

•*Mung bean microgreens have a very fast growth rate, you can actually harvest them in just one week, and they are very nutritional. They are small and green in color.*

•*Compared to their size, microgreens provide quite a surprising amount of nutrients. You can add them to almost any kind of diet. There are many ways To grow mung beans microgreens such as in soil,with grow mat,in wood shavings ,on growing paper.But we use the tissue (growing paper) To grow mung beans microgreens. You will learn how to speed up growth of your munbeBean Microgreens, benefits of including it in your diet.*

EQUIPMENT NEEDED FOR MICROGREENS

Container

Tissue paper

Seeds

Spray can

Light Source

Light Source

There are two types of light source—the natural and the artificial lights. For the natural light, all you need is a sunny window. That simple! If all of your windows are shaded and there is no illumination in the space you plan to use, you'll need to replicate the sun with grow lights, this is the artificial way. You can use both goosenecks grow lights and grow light panels to grow your mung beans with excellent results.

Steps to grow microgreens on growing paper

Step 1 – Prepare The Paper

To do this, put the paper inside your nursery tray. You can also use a paper towel; just make sure whatever kind of paper you want to use does not get soggy. Also bear in mind that the paper must be feasible to use for agricultural activities, like growing your microgreens. Soak the paper for couple of hours. After this, drain the tray of all excess water.

Step 2 – Plant The Seeds

Plant the seed on the paper by just spreading it. You can add water to the nursery tray, if there is any need to.

Step 3 – Harvest

Once again, harvest your microgreens after 3-4 days.

How Can You Speed Up Growth?

Making your mung beans microgreens grow faster is easy. You can soak it before planting. Put it in some warm water for couple of hours, or better still, soak it overnight. Drain and rinse it before planting.

What Are the Benefits of Eating moong Microgreens?

- Like other microgreens, the moong bean microgreens have a lot of nutritional values.
- Let us have a look at some of them:

- **Vitamins:-**

The mung bean microgreen contains some vitamins, which are of utmost importance to the body. Out of the reference daily intake of Vitamin B1, a cup of mung bean microgreen contains about 22%, it also contains other vitamins, like vitamin B2, vitamin B3, vitamin B5, and vitamin B6.

- **Nutrients:-**

It does not only provide the body with vitamins, it supplies other healthy nutrients, such as calories, which give the body sufficient energy, a healthy supply of fat of less than one gram; fibres, and even carbs.

- **Minerals:-**

Mung bean microgreens supply the body with adequate supply of minerals, both the macro minerals and the microminerals. A cup of mung bean microgreens contains 15% of the reference daily intake for potassium, 30% of the reference daily intake for magnesium, and many others.

- And also help in reduction of high blood pressure, in digestion, weight loss.
- And many more benefits of eating mung bean microgreens.
- Luckily, mung bean microgreens are easy to cook and include to one's meal plan. Hence, one gets all the nutritional benefits that are inherent in it.

REFERENCES

Floral Bookmark

Ms. Jyoti Pal



A bookmark is a thin marking tool, commonly made of card, leather, or fabric, used to keep track of a reader's progress in a book and allow the reader to easily return to where the previous reading session ended.

History

The earliest existing bookmark dates from the 6th century AD and it is made of ornamented leather lined with vellum on the back and was attached with a leather strap to the cover of a Coptic codex (Codex A, MS 813 Chester Beatty Library, Dublin).



Materials

- fresh flowers or leaves
- heavy books
- heavy weight (optional)
- clear contact paper
- scissors





Instructions

- Pick your flowers or leaves. (Freshly picked works best.)
- Place them in a thick, heavy book. Make sure that they are slightly spaced apart. Also ensure that they're placed in such a way that when the book closes, they'll flatten nicely.
- If you have it, place a heavy weight on the book. We used a 20 lb dumbbell and it worked really well! Alternatively, stack a few more heavy books on top of the one with the flowers in it.
- Wait at least 2 days and open the book up. If they're sufficiently pressed, you're ready to go! If you want them more flat or dry, leave for another day or two.
- Cut a bookmark-shaped strip of clear contact paper. Remove the backing and place it on a surface with the sticky side up. Then stick some pressed flowers to it. It looks cool if some of them hang over the edge! You can trim later.
- Next, cut a slightly larger piece of contact paper and sandwich the flowers between the two pieces.
- Finally, trim the larger contact paper to the size of the smaller one.



REFERENCES

<https://www.wikihow.com/>

MAKE YOUR OWN TERRARIUM

A LOCAL EXPERT SHOWS YOU HOW

Ms. Anchal Nishad



What is terrarium?

A terrarium is usually a sealable glass container containing soil and plants, and can be opened for maintenance to access the plants inside. However, terraria can also be open to the atmosphere rather than being sealed. Terraria are often kept as decorative or ornamental items. Closed terraria create a unique environment for plant growth, as the transparent walls allow for both heat and light to enter the terrarium.

Types

Terrariums are classified into two types: closed and open. Closed terrariums are sealed shut with a lid, door or cork. Open terrariums have access to fresh air, most commonly through a hole drilled into the glass container.

open terrarium



Closed terrarium



History

The first terrarium was developed by botanist Nathaniel Bagshaw Ward in 1842. Ward had an interest in observing insect behaviour and accidentally left one of the jars unattended. A fern spore in the jar grew, germinated into a plant, and this jar resulted in the first terrarium. The trend quickly spread in the Victorian Era amongst the English. Instead of the terrarium, it was known as the Wardian case.

Ward hired carpenters to build his Wardian cases to export native British plants to Sydney, Australia. After months of travel, the plants arrived well and thriving. Likewise, plants from Australia were sent to London using the same method and Ward received his Australian plants in perfect condition. His experiment indicated that plants can be sealed in without ventilation and continue thriving. Wardian cases were used for many decades, by Kew Gardens and others, to ship plants around the British Empire.



Step five: landscaping and decorating

Now that your plants are transferred into their new home, you can landscape your creation. Living decorative elements, such as different types of mosses, combined with whimsical figurines give the terrarium personality.



Step six: maintain

The key things to remember are to not place it in a sunny window and to not over water it.

A terrarium with a properly fitted lid will only need to be watered once every few weeks and will thrive in any room with a window or artificial light source, making it ideal for the home or office.



REFERENCES
<https://en.wikipedia.org>



How to Make a Terrarium

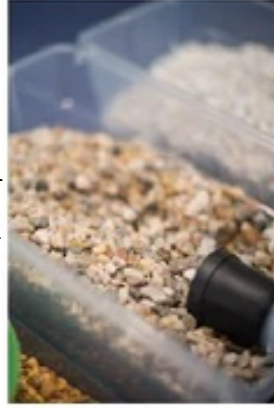
Step one: the jar

Selecting a container for your terrarium, a clear glass jar of any size with a tight-fitting lid will work best.



Step two: stones and rocks

The bottom layer of the terrarium will be a base layers of stones to assist with water drainage and air circulation.



Step three: soil

As with any sort of gardening, choosing the right soil is imperative in order for plants to thrive in their new environment.



Step four: plants

On to the fun part, selecting what plants will live in the habitat you just created. You can visit local nurseries and look for plants in two-inch pots to transfer into your jar, or you can even dig up plants and moss from your own backyard. Generally one to three plants will fit inside one terrarium, depending upon the jar's size. Plants that work well in container gardens include variegated spider ferns, nerve plants, and black mondo grass.





Van Mahotsav

History

The first Indian national tree plantation week was organized by M.S. Randhawa from 20 to 27 July 1947. Randhawa had been inspired by ideas of a forest week, the festival of trees, or arbor days in various countries. The first event of 20 July 1947 was inaugurated with the planting of Bauhinia saplings by Khurshid Ahmad Khan, commissioner of Delhi in the morning and the afternoon, another ceremony was held at the Purana Qila led by the Vice President of the Interim Government, Nehru. Another day was called Ladies Day and involved planting at the Qutb Minar with participants including Lady Mountbatten. Nehru spoke to say "...It was a matter of surprise to him that so far no interest had been taken in tree plantation. Large tracts of the country had become deserts owing to the negligence of the people who cut trees without realizing their great value... There should be a law that no one should cut a tree unless he had first planted a new one in its place." Gandhi was in Delhi at the time and noted it in his prayer speech "The official who originated the idea of tree planting did not do it for fancy nor was it meant only for the monied men. It began with them so that others would copy them and thus add to the wealth and rainfall of India. Deforestation led to diminished rainfall. Moreover, trees required little care except in the early stages. An acre of land used for growing fruit trees would yield more fruit than a crop of wheat on the same area..." The tradition was continued and made into a national activity in 1950 by the Minister of Food and Agriculture Kanaiyalal Maneklal Munshi who moved it to the first week of July and renamed it as Van Mahotsav in 1950.

History

Ms. Sashi Bisht

The first Indian national tree plantation week was organized by M.S. Randhawa from 20 to 27 July 1947. Randhawa had been inspired by ideas of a forest week, the festival of trees, or arbor days in various countries. The first event of 20 July 1947 was inaugurated with the planting of Bauhinia saplings by Khurshid Ahmad Khan, commissioner of Delhi in the morning and the afternoon, another ceremony was held at the Purana Qila led by the Vice President of the Interim Government, Nehru. Another day was called Ladies Day and involved planting at the Qutb Minar with participants including Lady Mountbatten. Nehru spoke to say "...It was a matter of surprise to him that so far no interest had been taken in tree plantation. Large tracts of the country had become deserts owing to the negligence of the people who cut trees without realizing their great value... There should be a law that no one should cut a tree unless he had first planted a new one in its place." Gandhi was in Delhi at the time and noted it in his prayer speech "The official who originated the idea of tree planting did not do it for fancy nor was it meant only for the monied men. It began with them so that others would copy them and thus add to the wealth and rainfall of India. Deforestation led to diminished rainfall. Moreover, trees required little care except in the early stages. An acre of land used for growing fruit trees would yield more fruit than a crop of wheat on the same area..." The tradition was continued and made into a national activity in 1950 by the Minister of Food and Agriculture Kanaiyalal Maneklal Munshi who moved it to the first week of July and renamed it as Van Mahotsav in 1950.

Aims

By encouraging Indians to support tree planting and tending, festival organizers hope to create more forests in the country. It would provide alternative fuels, increase production of food resources, create shelter-belts around fields to increase productivity, provide food and shade for cattle, offer shade and decorative landscapes, reduce drought, and help to prevent soil erosion. The first week of July is just the right time for planting trees in most parts of India since it coincides with the monsoon.



Nehru planting a tree at the Purana Qila on 20 July 1947



M.S. Randhawa planting a tree



Lady Mountbatten planting a tree at Qutb Minar

We do celebrated Vanmahotsav in our college by taking small steps



REFERENCES
<https://en.wikipedia.org>

Botanical Name

Ms. Shruti Manchekar



Common name : Onion

Botanical name : *Allium cepa*

Common name : Tomato

Botanical name : *Solanum lycopersicum*



Common name : Chilli

Botanical name : *Capsicum frutescens*

Common name : Garlic

Botanical name : *Allium sativum*



Common name : Ginger

Botanical name : *Zingiber officinale*

Common name : Curry tree

Botanical name : *Murraya koenigii*





Common name : Haldi

Botanical name : *Curcuma longa*

Common name : Holy Basil

Botanical name : *Ocimum tenuiflorum*



Common name : True cardamom

Botanical name : *Elettaria cardamomum*

Hydra- A great model system for Regeneration studies

Sakshi Beloshe, Archita Rajbhar, Jyoti Vishwakarma, Nalini Singh.

Hydra

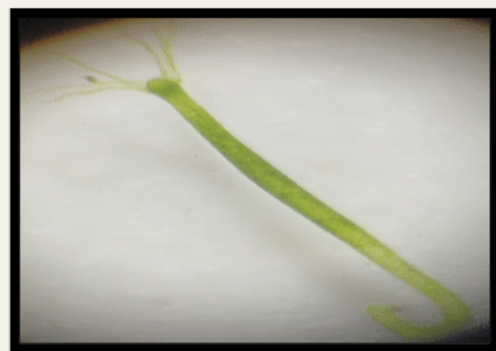
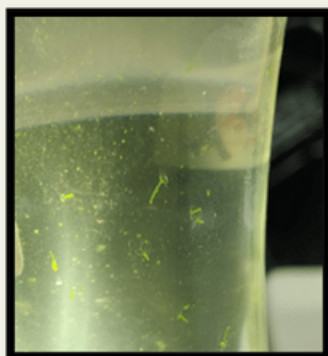
H. viridissima is currently the only known Hydra species that has a symbiotic relation with photosynthetic unicellular *Chlorella* algae. This is being cultured by department of botany students. They have been maintaining this Hydra since past three months and have popularised this model system among their Peer group in the class and in the CUBE platform of HBCSE. They have also distributed the Hydra to students who are interested to culture it.

Feed of Hydra

The Hydra feeds on *Moina* which is commonly called as water flea, which again requires separate maintenance. The students have enthused students of schools as well.

This Chlorohydra is a great model system to study regeneration studies.

Also, its Symbiosis with *Chlorella* is very peculiar. If the culture / Chlorohydra doesn't get sufficient sunlight, the *Chlorella* is out of the Hydra and settles down in the container.



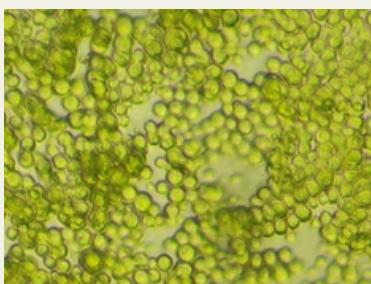
Chlorohydra in Bottle culture

Peculiar Symbiotic association

The algae supply nutrients produced via photosynthesis to the Hydra. Because the algae live in the vacuoles of the cells, they are protected from the digestive enzymes of the Hydra. During long period of darkness, such as storms or blooms that block sunlight, algae loss starts from the tentacles, hypostome and growth region. When light conditions return, the algae undergo rapid multiplication and can repopulate the host in approximately two days. Chlorella undergo asexual reproduction which is in correlation with the division of the host. Chlorohydra is been found reproducing by budding in the culture bottles. The Hydra regulates the population of the Chlorella algae by digesting excess algae or controlling algal cell division.



Budding in Hydra



Chlorella Alga



Moina/Water Flea



Feather in the Cap

**Ratnam College has been Declared
as the Regional Resource Center of
C.U.B.E**

Collaboratively Understanding Biology Education

CUBE Regional Resource Centre Award - 2022

CUBE MHSS, Goa

CUBE Chaitanya College, Pamgarh

CUBE Adarsha Vidyalaya, Mumbai

CUBE Elphinstone College, Mumbai

CUBE NES Ratnam College, Mumbai

CUBE Ashoka University, Delhi NCR

CUBE SN College Varkala, Thiruvananthapuram

CUBE Regional Institute of Education Bhopal, (NCERT)

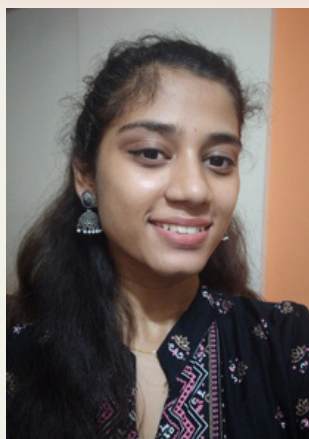
CUBE Dr. Shyama Prasad Mukherjee University, Ranchi

CUBE K.J.Somaiya College of Science & Commerce, Mumbai



D.D. Kaushambi Young Scientist Award 2022

CONGRATULATIONS !!



Ms. Sakshi Beloshe



Ms. Archita Rajbhar



Mr. Md. Owais

Collaboratively Understanding Biology Education

D D Kosambi Young Scientist Award- 2022

- | | |
|---|--|
| Enas Shirin Fatma- Hira Public School, Tanda, UP | Dhanraj Tribhuvan- CUBE Elphinstone College, Mumbai |
| Neha Ubale- CUBE Elphinstone College, Mumbai | Mohammad Owais - NES Ratnam College |
| Neha Rane - CUBE Sawantwadi Sindhudurg | Gaurav Mhapralkar - KJSSC, Mumbai |
| Pritesh Parab- CUBE Elphinstone College, Mumbai | Anindita Mandal- KJSSC, Mumbai |
| Sakshi Beloshe - NES Ratnam College | Shreejit Panikar- KJSSC, Mumbai |
| Archita Rajbhar- NES Ratnam College | Anup Kumar- NES Ratnam College |
| Ashritha Patta - CUBE St.Xavier's college Mumbai | Iram Bano - Sir Sayyed High School, Mumbai |
| Meghraj Kamath- CUBE MHSS, Goa | Faizaan Shaikh- Adarsha Vidyalaya, Mumbai |
| Rati Chaturvedi- CUBE Andaman & Nicobar | Ishita Sonowal- CUBE Elphinstone College, Mumbai |
| Mansi Prasad- CUBE Elphinstone College | Seethalakshmi C.R- SN college Nattika |
| Rechel Tirkey- CUBE DSPMU, Ranchi | Tejasri- CUBE Nellore |
| Man Masih Beck - CUBE DSPMU, Ranchi | Vyom Gupta- Allen House, Kanpur |
| Bhawna Solanki- CUBE University of Delhi | Rahil Mudgal- Allen house, Kanpur |
| Azlamia- University of Kerala, Kariavattom campus , Thiruvananthapuram , Kerala | Thikan Sahu- Chaitanya College, Pamgarh |
| | Aarushi Chitkara - CUBE St. Xavier's College, Mumbai |
| | Srujal Jain- CUBE Elphinstone College, Mumbai |

K.S. Krishnan Student Mentor Award 2022

CONGRATULATIONS !!

**Dr. Sunita Chahar- Head, Department of Botany
&
Ms. Nalini Singh- Ph.D. Student**



Collaboratively Understanding Biology Education (CUBE)

KS Krishnan Student Mentor Award 2022

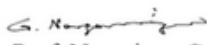
**is conferred to the following CUBE members for their exemplary contribution
in mentoring new members**

Batul Pipewala
Dr.Sunita Chahar
Bhagwati Sahu
Nalini Ravindra Singh
Meenakshi Kumaraguru
Sreedevi V Menon
Reji Johnson Thaikkattil

Kolkata
N.E.S. Ratnam College of Arts, Science & Commerce
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Adarsha Vidyalaya, Chembur, Mumbai
Adarsha Vidyalaya, Chembur, Mumbai


Prof. M. C. Arunan
Coordinator, CUBE


A metaStudio.org Initiative 


Prof. Nagarjuna G.
Coordinator, metaStudio

Kishore Bharati

Research Publications

Staff and students of the department of Botany at NES Ratnam College are actively involved in carrying out various research projects. The findings of these research Projects are shared with the peers at various platforms. Here is the glimpses of the few works carried out and published during the academic year 2021-22.

INFLUENCE OF CHITOSAN SOLUTION ON THE VIABILITY OF ARBUSCULAR MYCORRHIZAL SPORES

Nalini Singh & Sunita Chahar

ABSTRACT: The study was aimed to fortify the ArbuscularMycorrhizal Fungal (AMF) spores, widely used in Bio-fertilizers with chitosan and check the influence of chitosan on the viability of AMF spores. Chitosan was prepared from shrimp shells using chemical method involving demineralization, deproteinization and deacetylation. AMF spores were kept in three different concentrations of chitosan (0.1%, 0.5 %and 1%) which was prepared in 0.1% acetic acid and 0.1% ascorbic acid. Spore viability was checked by the MTT 3-(4, 5 dimethylthiazol-yl-2, 5-diphenyl-2H-tetrazolium bromide) after a day, 10th day, 20th day and 30th day. Highest number of viable spores was observed in chitosan dissolved in 0.1% ascorbic acid as compared to chitosan in acetic acid.

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MYCORRHIZAL RICHNES S IN TINOSPORA CORDIFOLIA

Sunita Chahar

ABSTRACT: *Tinospora cordifolia*, commonly known as Giloy or Amrita or even heart-leaved moonseed is known to be a great immunity booster, and is used in Ayurvedic medicines. It belongs to family Menispermaceae. The present study was carried out to investigate the ArbuscularMycorrhizal Fungi (AMF) associated with the roots of this plant and if this plant has any affinity to the AMF. Trap culture was established to study the different species of ArbuscularMycorrhizal Fungi. Spore density was found to be 1600 ± 24 spores /100g soil. A total of 19 species of ArbuscularMycorrhizal Fungi were isolated. Nine species of *Glomus*, five species of *Acaulospora*, one species of *Gigaspora*, one species of *Ambispora* and one species of *Rhizophagousirregularis* were identified. There were some unidentified species of *Acaulospora*. The root colonization by the fungi was 96% and the fungal structures observed were fungal hyphae, arbuscules, vesicles, pelotons and intraradical spores. Dark Septate Endophytic Fungi were also observed in the roots.

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ISOLATION AND MORPHOLOGICAL IDENTIFICATION OF ROOT KNOT NEMATODE FROM CUCUMBER ROOTS

Nalini Singh & Sunita Chahar

ABSTRACT: The root-knot nematodes are one of the major pests affecting the yield of many economically important annual and perennial crops worldwide in tropical and subtropical climatic zones. The infected plants show symptoms like root galling, stunted growth, yellowing of leaves, and wilting. The root-knot nematodes are one of the most destructive and difficult diseases to control in agricultural sector. In the present study, infected roots of cucumber plant containing root knot nematodes were brought from the cultivated fields of Pune district. Nematodes were isolated and identified based on morphological characters. The genus was found to be *Meloidogyne* and species incognita.

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DIVERSITY OF ARBUSCULAR MYCORRHIZAL FUNGI IN THE FABACEAE PLANTS PRESENT IN SANJAY GANDHI NATIONAL PARK, BORIVALI, MUMBAI, MAHARASHTRA

Shweta Belose & SunitaChahar

ABSTRACT: The Arbuscular Mycorrhizal Fungal diversity was studied in the 10 selected plants belonging to family Fabaceae present in the Sanjay Gandhi National Park (SGNP), Borivali , Mumbai , Maharashtra. The plants selected were *Leucaena leucocephala* , *Butea monosperma* , *Cassia fistula* , *Delonix regia* , *Tamarindus indica* , *Peltophorum pterocarpum* , *Pongamia pinnata*, *Saraca indica*, *Acacia catechu*, *Pithecellobium dulce*. Rhizospheric soil and roots were collected and screened for the presence of arbuscular mycorrhizal fungi. Based on morphological characters of spores, 42 species belonging to seven genera were identified. Maximum spore density, species richness & root colonization were observed in *Delonix regia*. From the trap culture of *Delonix regia*, 11 AM species were recovered. *Glomus* and *Acaulospora* were the dominant genera in all the plants. Root colonization in the plants was in the form of hyphae, arbuscules, vesicles and auxillary cells. Maximum root colonization was also observed in *Delonix regia*.

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EFFECT OF CHITOSAN ON PLANT GROWTH AND MYCORRHIZATION IN ZEA MAYS

Nalini Singh & Sunita Chahar

ABSTRACT: In recent years, use of chitosan as soil amendment material has increased and has been among the effective approach to promote plant growth and pest control. Arbuscular Mycorrhizal Fungi (AMF) is a natural bio-fertilizer which helps plant to absorb water and nutrient more efficiently. In the present study different concentrations of chitosan (i.e 0.1, 0.5, 1.0, 5.0 and 10 mg/ml) were used on Zea mays along with AMF Rhizophagus irregularis. The chitosan treatment was given with an interval of 14 days for a period of 120 days. A positive response in shoot biomass has been observed in plants colonized with Arbuscular Mycorrhizae (AM) treated with chitosan. Chitosan was found to have no effect on mycorrhization until the concentration of chitosan was increased to 10 mg/ml, where mycorrhization decreased.

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BUTTERFLY DIVERSITY IN BHANDUP (WEST), MUMBAI, MAHARASHTRA, INDIA

Sunita Chahar, Sneha Dubey and Niketa Panchal

ABSTRACT: A study of butterfly diversity was carried out in the Bhandup (west), Mumbai Maharashtra. The area selected for the study was N.E.S.Ratnam College campus and Kukreja residential complex. Both the complexes are situated in highly populated suburb of Mumbai, but these two being the oldest establishments have more than 200 wild and cultivated plants. The study was carried out from October 2019 to February 2021 except for the rainy seasons. A total of 39 species of butterflies belonging to five families, Hesperidae, Lycaenidae, Nymphalidae, Papilionidae and Pieridae were recorded. Nymphalidae family is the dominating family with 14 species spotted in this period of study. The dominant butterflies in the area are Euploea core, Moduza procris, Pachliopta hector, Rathinda amor, Udaspes folus, Delias ecucharis, Acraea violae, Pareronia hippia and Papilio polymnestor. The area has cultivated and wild plants which serve as host plant for laying the eggs and nectar plants for nectar. The dominant plants in these two complexes are Stachytarpheta indica, Lantana camara, Mangifera indica, Citrus limonia, Achras sapota, Ixora coccinea, Vinca rosea, several species of Tagetus, Cosmos. The wild flora is dominated by species of Cleome, Phyllanthus, Alternanthera, Capparis, Vernonia, Clitoria and several species of grasses. There are trees older than 70 years like Ficus benghalensis, Ficus religiosa, Couropita guanensis, Tamarindus indica, Caesalpinia sps, etc.

Journal of Emerging Technologies and Innovative Research Volume - 8 | Issue - 09 | September - 2021 |ISSN: 2349-5162 .

EFFECT OF ROOT KNOT NEMATODE (MELOIDOGYNE INCOGNITA) ON THE GROWTH OF CUCUMBER PLANT.

Sunita Chahar, Nalini Singh & Poonam Yadav

ABSTRACT: Root knot nematode, *Meloidogyne incognita*, is one of the biggest problems in the production of cucumber. This plant parasitic nematode depends on root sap to survive, which causes improper supply of water and minerals to the plant. Some of the basic symptoms of these nematodes on plants are galling of roots, yellowing of leaves and stunted growth in plants. In the present study, a pot experiment was conducted to study the effect of root knot nematode on the growth of the cucumber plant. The infected plants showed decreased leaf size, shoot weight, nutrients and chlorosis of leaves as compared to the control.

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RESPONSE OF BOTTLE GOURD PLANT TO ROOT KNOT NEMATODE (*MELOIDOGYNE INCOGNITA*) INFECTION.

Sunita Chahar, Nalini Singh & Akanksha Yadav

ABSTRACT: ABSTRACT: A pot experiment was conducted to study the effect of root knot nematode (*Meloidogyne incognita*) on growth of bottle gourd plant. Nematode infected plants showed decreased chlorophyll content, shoot mass as well as nitrogen & phosphorous contents as compared to non infected plants. The leaves showed curling & galls were developed on the roots after 30 day of infection.

Bioinfolet Volume - 18 | Issue - 04 | December - 2021 |ISSN: 0976-4755 | Page No. 546-547.

SYNTHESIS AND CHARACTERIZATION OF CHITOSAN PREPARED FROM SHRIMP SHELL

Nalini Singh & Sunita Chahar

ABSTRACT: The present study deals with synthesis and characterization of Chitosan from the Shrimp shell waste from the local market in Mumbai, Maharashtra. In order to obtain Chitosan, shrimp shell waste undergoes chemical extraction process which involves demineralization, deproteinization and deacetylation. Chitosan, a soluble biopolymer in any solvent with pH less than 6.5, was extracted by deacetylation of chitin (deprotenized product) with 60% NaOH for 24 hours at 60°C. Chitosan solubility was analysed with two solvents i.e acetic acid and ascorbic acid of 1% concentration. The degree of deacetylation was calculated by the acid-base titration method and was found to be 77.90%, the Chitosan obtained were characterized by Fourier transform infrared spectroscopy (FTIR) and scanning electron microscopy (SEM).

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Diversity of arbuscular-mycorrhizal fungi in the agricultural fields of Kanhauri village, district Rewari, Haryana, India

Sunita Chahar

ABSTRACT: The Arbuscular Mycorrhizal Fungal diversity was studied in seven plants from the agricultural fields of Kanhauri village, district Rewari, Haryana. The rhizospheric soils and roots were collected from the plants of *Brassica juncea*, *Allium cepa*, *Chenopodium album*, *Argemone mexicana*, *Parthenium hysterophorus*, *Solanum xanthocarpum* and *Cannabis sativa* in the month of March 2021. Rhizospheric soils were screened for the presence of Arbuscular Mycorrhizal fungal spores by wet sieving and decanting method of Gerdeman and Nicolson (1963). The roots were checked for percent root colonization by Phillips and Hayman method (1970). Based on morphological characters of spores, species belonging to eight genera (*Racocetra*, *Dentiscutata*, *Funeliformis*, *Rhizophagus*, *Glomus*, *Acaulospora* & *Sclerocystis*) were identified. Maximum spore density, species richness & root colonization were observed in *Solanum xanthocarpum*. *Rhizophagus* was the dominant genera and *Funneliformis mosseae* had the highest isolation frequency. Root colonization in the plants was in the form of hyphae, arbuscules, vesicles and auxillary cells. The soils are sandy loam with a pH of 6.69, total Nitrogen 0.21%, available phosphorus 22.7Kg/hectare, Potassium 27ppm and organic matter 2.24%.

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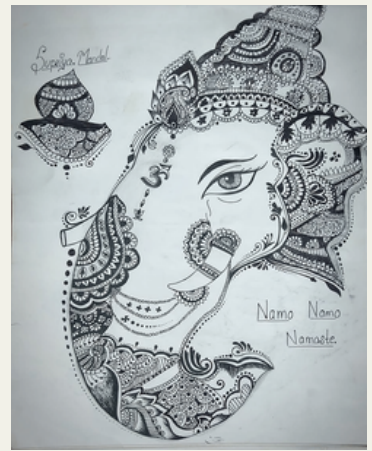
BIODIVERSITY OF AM FUNGI IN SELECTED MEDICINAL PLANTS OF MAHARASHTRA NATURE PARK, MUMBAI.

Mamta Yadav & Sunita Chahar

ABSTRACT: The objective of the study was to find out biodiversity of AM fungi associated with selected medicinal plants in Maharashtra Nature Park, which was a dumping ground of Mumbai city almost four decades ago. The ten plants selected for the study were *Bombax ceiba*, *Bauhinia variegata*, *Madhuca longifolia*, *Piper longum*, *Asparagus racemosus*, *Ocimum sanctum*, *Plectranthus amboinicus*, *Bryophyllum pinnatum*, *Costus igneus* and *Justicia adhatoda*. Root zone soil and roots were collected from a depth of 20cm during the period between March 2019 and June 2019. The soil and roots were screened for Arbuscular Mycorrhizal (AM) spore count and root colonization. Highest spore density was found in *Madhuca indica* (296 spores/20 g of soil), while minimum spore density was found in *Asparagus racemosus* (42 spores/20 g of soil). The dominant AM genera found were *Acaulospora* and *Glomus*. *Gigaspora* was found in two plants. Isolation Frequency of *Acaulospora* was 90% and that of *Glomus* was 70%. Spore density found was highly variable in the ten plants. Maximum root colonization (100%) was found in *Bryophyllum pinnatum* while minimum root colonization of 30% was found in *Piper longum*. Root colonization in the roots was in the form of arbuscules, vesicles, spores (intra radical and extra radical spores), hyphae and sporocarps. Another type of potentially beneficial fungi, namely dark septate endophytic fungi (DSEF) was observed associated with the roots of *Asparagus racemosus*.

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Art
Gallery



Drawn by
Supriya Mandal
SYBSc. CB



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by Shashi Bisht*



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