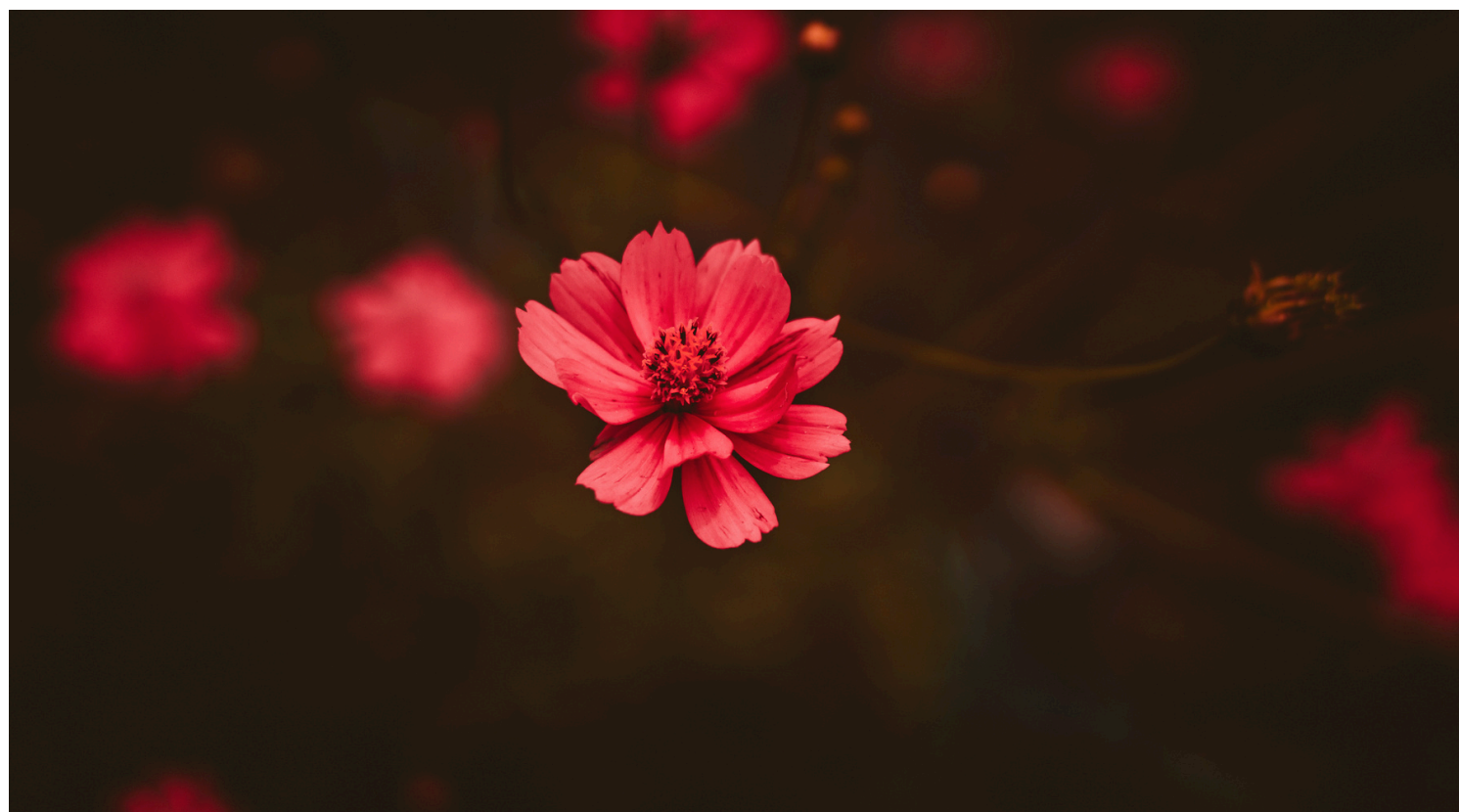


Department of Botany presents

Gulmohar Newsletter



FROM THE EDITOR'S DESK

Welcome to a new edition of the Gulmohar newsletter for the year 2021-22. In this edition, we have put up some fascinating articles and photographs.

We bring you an article about Composting and all you should know about Basket Gardening. Did you know about the astounding carnivorous plants? If not, then check out our article on it! In our next article, learn more exciting facts about Anti-Ageing. Next, we have an article on entrance exams after B.Sc. in Botany. We also have added a Phytogeographic Map showing the Flora of States of India, don't miss it out!

Finally, yet significantly, we have added feedback about our Workshop on Organic Gardening conducted recently by our Department. Last but not least, don't forget to check out our amazing photo gallery!

HAPPY READING!

WHAT'S IN THIS ISSUE!

- Composting
- Basket Gardening
- Anti-Ageing
- Astounding Carnivores
- Entrance Exam in Botany After B.Sc.
- Map of Flora of States
- Feedback On Organic Gardening Course
- Photo Gallery

PREPARING COMPOST FROM LEFTOVER FLOWERS AT HOME

Summer is here, and so is gardening! We all relish these vacations by visiting our native places. It is the time to make your stay more productive by making compost for your garden. Most flowers are good compost ingredients. Flowers are considered a green composting material and as rich sources of nutrients. Simple and well-known flowers like Marigold, Roses, Mogra, etc., can be used.

FLOWERS TO AVOID:

1. You must avoid using any flower that is dead due to some plant disease.
2. Avoid flowers exposed to chemical pesticides.
3. Avoid flowers that are difficult to decompose or include poisonous compounds.

DIRECTIONS TO FOLLOW:

1. Collect the flowers, separate the petals, sun dry them, and toss them in a compost bin or any container. Small earthen pots will be a great option.
2. Mix 2 tablespoons of Cow dung or Soil with the dried petals. Add a few drops of water and mix well.
3. Cover the container with a mesh or a muslin cloth to avoid flies to enter the mixture. Be very careful with the covering procedure.
4. Keep the container undisturbed in a clean place.
5. After every 3-4 days remove the Covering and add a few drops of water and mix it well.
6. Follow this procedure for 30 days You will notice that the compost has reduced to 1/4th of the original amount.
7. After 30 days the compost is ready to be powdered and used.

USES:

1. It is a great way to recycle the flowers present at home.
2. Plants can flourish with this homemade fertilizer.
3. It is a cost-effective method.
4. It is Eco-friendly.

SCAN THE QR CODE FOR A STEP-BY-STEP VIDEO



INTRODUCTION

Basket Gardening is a way to use up the wicker baskets in our homes. It adds a rustic touch to your home and is very portable. Using wicker baskets is also a very eco-friendly way as wicker baskets last a long time. Even after the plant dies or needs repotting, the baskets can be reused.

WHY USE WICKER BASKETS?

Wicker baskets are eco-friendly and you don't need to spend a lot of money on buying expensive planters especially if you're just starting out pursuing your gardening hobby. Aside from being eco-friendly and budget-friendly, you can also hang the baskets on hooks and save on space. They also give the space an aesthetic appeal.

MATERIALS TO SELECT:

- a wicker basket (any wicker basket which is at least 5 cm deep will work)
- dry grass or coconut coir
- vegetable waste
- gravel, small stones
- soil / potting mix
- seeds (small plant seeds like mustard and fenugreek would be the best to start with. you can also plant succulents and small flowering plants like petunias and geraniums are good choices.)
- gardening tools
- water

PROCEDURE:

- Gather all the materials needed in one area
- In your basket spread out dry grass or coconut coir in an even layer – this layer helps with moisture retention as well as drainage
- You can then add vegetable waste such as onion peels and coriander stems which are cut into small pieces for a more even spread – this will act as fertilizer
- Next, add small stones or gravel – this will help with drainage
- Then you can add soil or potting mix
- Using your fingers to poke small holes in the soil, insert the seeds in and cover up the seeds with more soil
- Sprinkle some water on top, just enough to wet the soil
- You can place the baskets near the windows in direct or indirect sunlight as required by the plant and water only when the top layer of soil feels dry

DO'S AND DONT'S:

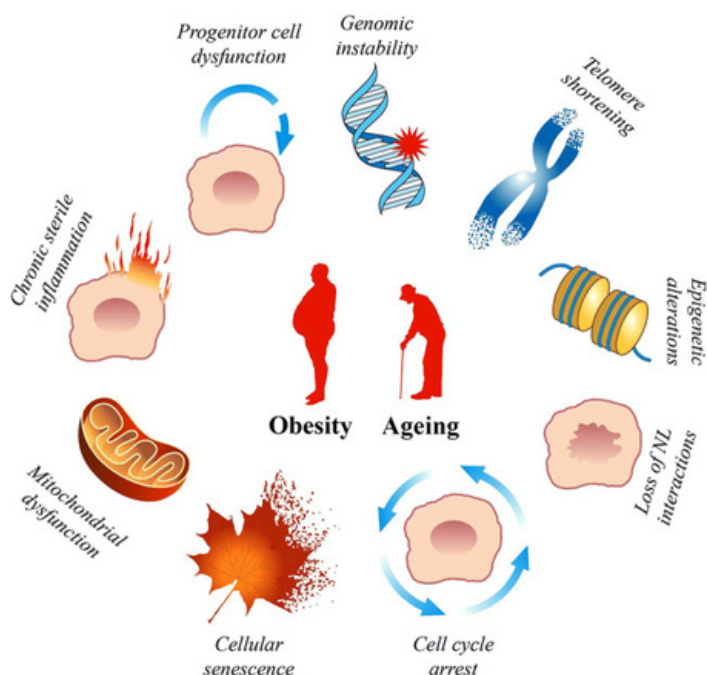
- Don't overwater the soil as it may cause the soil to erode with water.
- Make sure that the plant gets enough sunlight.
- Make sure you put enough fertilizer for the plants to grow.



Ageing is a term used when the cells of the body does not function the way it is intended, resulting in senescence. Ageing can occur due to 2 main reasons: 1) Chronological time. 2) Environmental stress. The underlying factor is the body starts to lose its stability, followed by weakness and disease. Research shows many factors that can be considered a reason for ageing. Improper diet, obesity, unhygienic conditions, UV exposure, pathogenic interference or simply old age. Conditions remain the same though: Oxidative stress, DNA methylation, Telomere shortening, etc.

A) OXIDATIVE STRESS:

It is caused by imbalance between production and accumulation of Reactive Oxygen Species (ROS) in cells and the ability of our body to detoxify them in time. ROS helps with proper working of the body and are normal by-products of oxygen metabolism during protein phosphorylation, apoptosis, etc. But add in environmental stress like UV, pollutants, heavy metals, ionizing radiations. The production of Hydrogen Peroxide, Oxygen singlets, Hydroxyl radicals are significantly increased. At higher levels they lead to oxidative stress and affect structures of membranes, lipids, proteins, DNA. Uncontrolled production of ROS can cause several chronic and degenerative diseases, accelerates ageing, trauma and stroke and may even delay maturation.



B) DNA METHYLATION:

The said stress if overcomes our adaptive homeostasis capacity, ageing gets accelerated and the most suspected epigenetic change is DNA Methylation. It occurs at the 5' position of the cytosine residues of the cytidine-guanine dinucleotides. Reduction in the levels of DNMT's (DNA methyltransferases) could be the cause. Result is, loss of heterochromatin and gene silencing, genomic instability. This further reads up as an evident factor for senescence, and in turn related to telomere shortening. Researchers have come up with an age clock called the DNAm age clock which specifically reads the changes that might happen in a cell at a molecular level with a prediction error of less than 5 years. Cell status and concentration of insulin, glucose, triglycerides and cholesterol can also be understood. It provides the exact age of the body which is but a difference between DNAm age and the chronological age. Through DNAm age clock, effects of interventions such as calorie restriction and Rapamycin promoting anti-ageing factors are studied intensively.

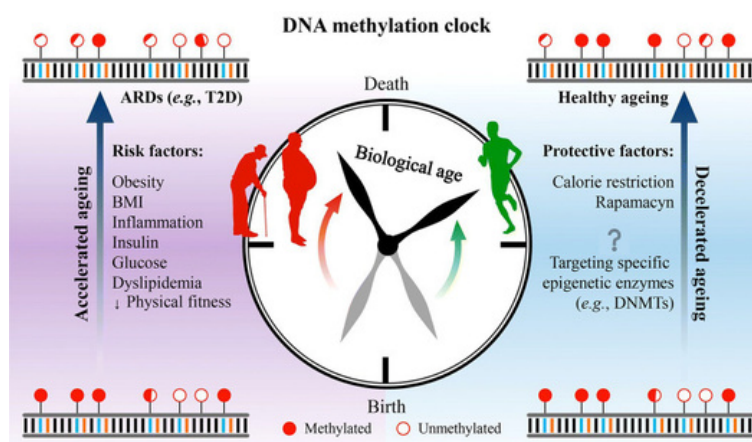
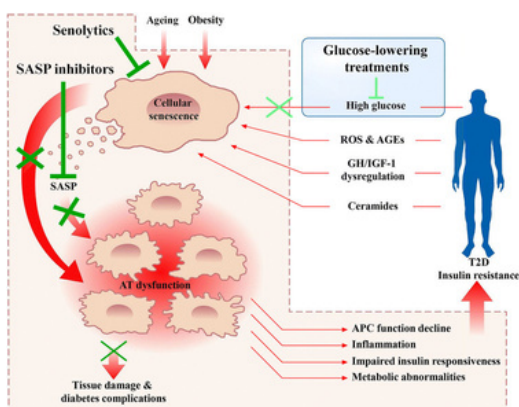
COUNTER MEASURE: ANTI-AGEING:

Human body already has enzymatic and non-enzymatic molecules like SOD, CAT, L-arginine, lipoic acid, etc. to fight against oxidative stress. Besides these, we also can have exogenous treatment through diet and nutrition. Vitamin E is known to have effects on oxidative stress. It modulates NF- κ B pathway and oxLDL-induced foam cell formation to inhibit inflammation and monocyte invasion. Flavonoids act as anti-oxidants. They inhibit enzymes responsible for the production of free radicals. Rutin and Phenolic compounds like Hesperidin are antioxidants. Dietary restrictions can be a promising method for antiageing, thus reducing the cause of obesity and diabetes. GH supplementation as well as GH reduction has also been researched upon with promising results on mice, worms, flies and yeasts.

GREEN CONTRIBUTION FOR HEALTHY AGEING:

- Green Tea (*Camellia sinensis*): Cancer treatment, protects from UV induced carcinogenesis, reduce oxidative damage.
- Coffee (*Coffea arabica*): Has antioxidants like chlorogenic acid, quinic acid and ferulic acid. They help reduce wrinkles, treat pigmentations, fights UVB irritation by regulating pro-collagen, scavenge ROS.
- Olive Oil: α -, β -, γ -, and δ -tocopherol and α -, β -, γ -, and δ -tocotrienol molecules are present in the olive oil extracts that help fight inflammation.
- Celery: Extracts contain apigenin that protects skin from UV damage and has anti-inflammatory properties.
- Turmeric (*Curcuma longa*): Contains curcumin that has antimutagen, free radical scavenging and anti-inflammatory properties.
- Licorice (*Glycyrrhiza glabra L*): Ethanol extracts from this plants have anti-oxidation properties, chelates metal ions and donates hydrogen while scavenging ROS.
- *Populus nigra*: Extracts from these plant types show strong modulation of transcription of genes involved in antioxidant defenses and cell renewal.
- *Illicium anisatum*: This essential oil has good antioxidant, antielastase and low cytotoxic properties.

- Tropical cabbage fern (*Poypodium leucotomos*): Their extracts prevent cells from UV damage. It inhibits proteolytic enzymes that break the skin protein and stimulates TIMP's, structural collagens and TGF - β in fibroblasts. Administered orally or topically.
- Milk thistle (*Silybum marainum*): Silymarin from this plants act as a sunscreen and provide antiphotocarcinogenic protection.
- Pomegranate (*Punica granatum*): Its catechin extracts protect HaCaT cells against UVB induced ROS production.
- Soyabean: Isoflavone extracts from soyabean cakes prevent skin apoptosis, erythema and inflammation reactions.
- Rice: Rice wine anti ageing treatment help stop epidermal barrier disruption caused by UV exposure. It also stimulates pro-collagen synthesis, reduces MMP-1 and tumor necrosis factor α expression. It promotes laminin - 5 glycoprotein production.
- *Articum lappa*: Their extracts help matrix metabolism stimulation for mature skins and reduces the amount of wrinkles significantly.
- *Areca catechu*: Its purified phenolic extract CC - 517 inhibits elastase from the extra cellular matrix and helps improve the integrity of the capillary walls.



References:

1. [Oxidative Stress: Harms and Benefits for Human Health - PMC \(nih.gov\)](#)
2. [Molecular basis of ageing in chronic metabolic diseases - PMC \(nih.gov\)](#)

3. [\(PDF\) Molecular basis of ageing \(researchgate.net\)](#)
4. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3569896/>

THE NATURE'S MARVEL:

Tall up within the magnificent slopes of India's northeastern state of Meghalaya lays a tricky and unordinary carnivore: A Pitcher Plant. The species is known prevalently as 'monkey cups' since the creatures were watched drinking water from these tropical pitchers. Over the past few decades, wild populaces of the species have been declining due to dangers from human exercises, basically, broad mining, moving development, and intemperate collection. Pitcher plants are carnivorous plants that pull in, slaughter and process creepy crawlies. The plants have jug-like pitchers, which work as traps that 'hunt' prey, creepy crawlies that inquisitively approach the pitcher edges and end up falling interior. Regularly incapable to elude the elusive internal dividers and sticky liquid inside the pitcher, the terrible casualties pass on; chemicals at the foot of pitcher digest the prey and release nutrients needed by the plant. Utilizing chemicals or microbes, carnivorous plants process their prey through a handle of chemical breakdown practically equivalent to absorption in creatures. Nutrients are taken up by special glands localized on the inner surface of the pitchers. These glands also secrete the hydrolyzing enzymes into the digestion fluid. Although this is known for more than 100 years, our knowledge of the pitcher fluid composition is still limited. Only in recent years some enzymes have been purified from the pitcher fluid and their corresponding genes could be identified. The conclusion items, especially nitrogenous compounds and salts, are retained by the plants to empower their survival beneath something else minimal or threatening natural conditions.

TRIBAL NAMES OF THE PITCHER:

As the plant is at risk of extinction, it is included in the Negative List of Exports of the Government of India and is a Schedule VI species under the Wildlife Protection Act, 1972.



It is also listed under Appendix I of CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora), prohibiting the trade of this species. In Hindi, pitcher plants are known as 'Ghatparni' whereas neighborhood tribes have their possess names for *N. khasiana*. The Khasi people refer to the plant as 'Tiew-rakot' meaning 'devouring plant'; the Garo call it 'Memang-koksi' which implies 'basket of the apparition or devil's'. Pitchers are misleading: they utilize different methodologies to draw creepy crawlies. A few pitchers transmit elegant fragrances. Interestingly the edges of the pitchers shine blue beneath bright light

PITCHER IS AT RISK:

Overexploitation and living space destruction is one of the most danger to plants in a broad human collection. Over the past few decades, an expansive extent of *N. khasiana* territories have been annihilated and indeed the remaining populaces have endured an extreme drop as a result of unsustainable poaching and aimless collection by understudies of botany. "Unsustainable harvests due to marvelous increment of medicine by the neighborhood restorative specialists have to driven too quick consumption of the species in its natural habitat. The species is additionally detailed to be sent out by nearby plant collectors to other states of India and has, hence, driven to its advance exploitation,

SPREAD OF THE PITCHER:

Pitcher plants are found in a wide range of habitats with poor soil conditions, from pine barrens to sandy coastal swamps, and rely on carnivory to obtain nutrients such as nitrogen and phosphorus. India's pitcher plant intervened colonization into Southeast Asia *Nepenthes*, comprising more than 120 species that fundamentally occupy the warm and muggy tropics with their dissemination expanding from Madagascar to Southeast Asia to Australia; the biggest differences are seen in Borneo, Sumatra, and the Philippines with a wide cluster of pitchers of different shapes and sizes. But as it were one species, *N. khasiana*, is found in India. In a 2018 consider a group of analysts had shed light on the advancement and hereditary run of the cryptic *Nepenthes* plants. "The most later common predecessor of *N. khasiana* (Meghalaya) and *N. distillatoria* (Sri Lanka) was likely seen in Africa "The discoveries recommended the colonisation of *Nepenthes* into Southeast Asia started from the Indian subcontinent."

MYTHS:

The liquid from unopened pitchers is utilized by neighborhood tribes for therapeutic purposes such as; eye drops to remedy cataracts and night visual deficiency, treat stomach afflictions, diabetes, skin conditions and other illnesses. Because of their decorative esteem, the plants were supposedly collected to offer locally for approximately 50 to 100 rupees per plant conjointly sent out to other states. Rampant coal and limestone mining as well as moving (jhum) development in living spaces of the plant have expanded the sketchiness of vegetation and radically influenced the recovery of the pitcher plant. Development of streets and urbanization are an included risk.

PROTECTION AND PRESERVATION:

What is being done to spare this species? Various in-situ and ex-situ (off-site) preservation measures have been actualized by the North Eastern Slope College in Shillong and other legislative associations. Strategies like tissue culture, micropropagation, and germplasm conservation have been utilized to protect *N. khasiana*. Tandon the Timberland Office of Meghalaya is engendering the plants through tissue culture and reintroducing them in the East Khasi Slopes of Meghalaya. "The villagers are presently presenting and taking care of plants in nature," The quality pool in developed plants is little and so compelling preservation and security of their normal living spaces is imperative. Upholding exchange directions and teaching villagers is critical agreeing. Several organizations are included in ceaseless mindfulness and educative programs.

CONCLUSION:

The pitcher plant is nothing less than nature's astounding work of art. It is one of a kind and needs to be protected at all costs!

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https://en.wikipedia.org/wiki/Pitcher_plant

<https://www.sciencedirect.com/science/article/abs/pii>

<https://www.britannica.com/plant/pitcher-plant>

<https://www.worldwildlife.org/magazine/issues/fall-2020/articles/tropical-pitcher-plants-are-beautiful-but-deadly>

<https://www.deccanherald.com/science-and-environment/fatal-attraction-indias-only-pitcher-plant-is-at-risk-908316.html>

1. GATE XL

Graduate Aptitude Test in Engineering (GATE) (XL- life science) also referred to as a National level entrance exam, is regulated by the IITs and IISCs rotationally. The GATE Exams are being held for candidates seeking admissions in M. Tech/ ME and other programs provided by IITs, NITs, and other institutions and colleges.

Purpose:

Qualifying GATE is mandatory for seeking admission or financial assistance to:

1. Masters or Direct Doctoral programs in Engineering/Technology/Architecture.
2. Doctoral programs in relevant exams of Science in MHRD/Govt. supported institutes.
3. Recruitment in some PSUs
4. Some PSUs companies are IOCL, NTPC, DRDO, GAIL, SAIL, POSOCO, and HPCL.

Website: <https://gate.iitkgp.ac.in/>

2. CSIR-NET

The National Testing Agency (NTA) has been entrusted by the Council of Scientific and Industrial Research (CSIR), with the task of conducting the Joint CSIR- NET.

Purpose :

Indian nationals for Junior Research Fellowship (JRF) and for Lectureship (LS) /Assistant Professor in Indian universities and colleges subject to fulfilling the eligibility criteria laid down by UGC. Online applications for JRF/NET are invited twice a year on all India basis through Press Notification of Joint CSIR NET for JRF and LS/AP.

Website: <https://csirnet.nta.nic.in>

References :

- scoop.eduncle.com
www.biotechnika.org
www.sarvgyan.com

3. ICAR

ICAR NET (Indian Council of Agriculture Research NET). Every year The Agriculture Scientists Recruitment Board (ASRB) invites applications for ASRB NET, also known as ICAR NET. Candidates who are appearing for ICAR NET exam must be aware of ICAR ASRB NET Syllabus & Exam Pattern in order to crack the exam. Knowing the ICAR NET Exam Syllabus & Exam Pattern will help candidates in understanding the paper pattern and section-wise distribution of marks.

Purpose :

ICAR NET exam is conducted to recruit Lecturers / Assistant Professors in State Agricultural Universities and other Agricultural Universities. Every year The Agriculture Scientists Recruitment Board (ASRB) invites applications for ASRB NET, also known as ICAR NET.

Website : <https://icar.org.in/>

4. TIFR

TIFR GS is an entrance exam organized by Tata Institute of Fundamental Research in order to provide admission to candidates in postgraduate science courses offered by it.

TIFR GS for Biology is also known as JGEEBILS (Joint Graduate Entrance Examination for Biology and Interdisciplinary Life Sciences). It is the primary route by which TIFR Centres (DBS-Mumbai/NCBS-Bangalore/TIFR-Hyderabad) receive applications for the graduate programme in Biology.

Purpose :


To provide admission to candidates in postgraduate science courses. The Institute runs a graduate programme leading to the award of PhD, Integrated MSc-PhD, and MSc degrees in certain subjects.

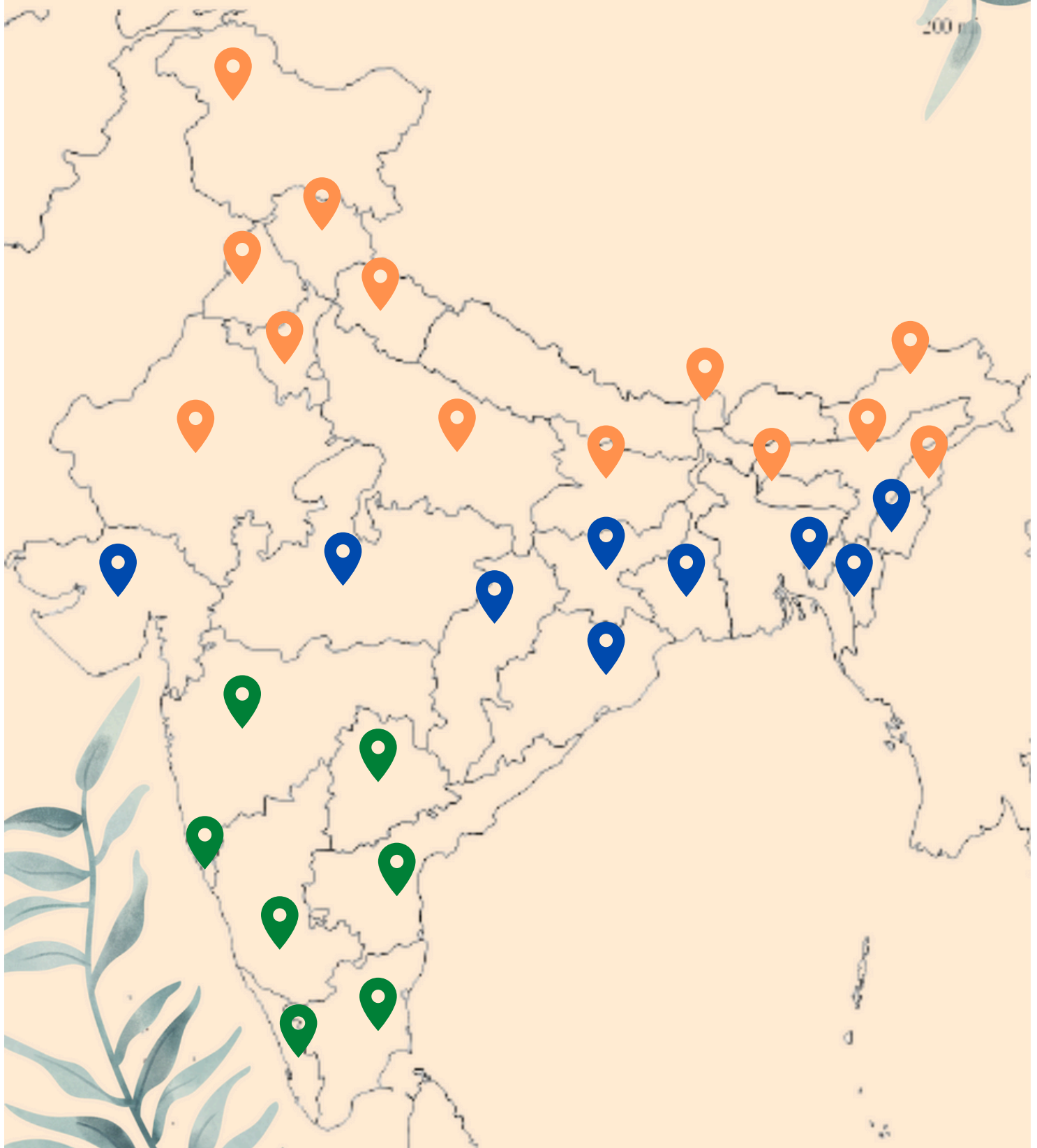
Website : <http://univ.tifr.res.in/>

As mentioned above, there are a large number of courses available. Please make sure that you take your own time and think before choosing a course. Another thing to keep in mind is whether the course suits the student's aptitude or not!

"Everybody is a Genius. But If You Judge a Fish by Its Ability to Climb a Tree, It Will Live Its Whole Life Believing that It is Stupid."

Flora of States

Tap on the 
To explore the state's flower, fruit and tree.



A FOUR DAY WORKSHOP ON ORGANIC GARDENING

The Department of Botany took the initiative to inculcate more knowledge among students as they were deprived of practical knowledge due to Covid. A Four-day Organic Farming Workshop was organized for all the students of T. Y. B. Sc. Botany. This course was conducted by Mrs. Bhakti Khot who is a well-experienced person in landscape gardening and is the Director of NuTreegrow Consultants. These lectures helped all the students to know more about gardening and its essence of it.

The first day started with great enthusiasm as the students were about kitchen gardening, A thing that even every common man loves to do. The need for sufficient place, adequate water, trimming, and harvesting was excellently taught and demonstrated. Seeds for vegetables like Tomato, Radish, Cucumber, etc., were sown and were taken care of. Everyone took great interest and was busy solving their doubts so as on how to raise a beautiful kitchen garden.

A great initiative to grow various Microgreens was done on day 2. The basics and the practical demonstration were made clear for the growth of nutritious Microgreens. Different potting medium, climate, and the usage of different containers were taught and was practically performed as well. The luxuriant growth of different varieties of Microgreens such as Fenugreek, Red amaranth, Mustard, Green amaranth, etc., was planted as well as observed in the following days.

Organic compost preparation at home and at a large scale level was taught with the proper amount and concentration of ingredients. A great amount of knowledge was provided by my madam on Dry and Wet waste. The concepts on how to segregate the waste and the materials to be selected for compost were excellently provided by our mentor. The methods taught were completely Eco-friendly. A new sense of gardening arose among students after this session.

The need for indoor plants and the different types of plants that purify our home was shown with the importance of each. As the pests remain a great nuisance, many natural formulations of pest control were given a boost. The session ended with great pomp as the students were provided with their respective certificates as well as a booklet containing information for the budding gardeners.

These 4 days just felt like a moment as the sessions were really enjoyable and informative. Students were really satisfied with their practical work as well as the knowledge that they have gained during the course of time.





Bauhinia purpurea L.
Family: Leguminosae
Vedant Khokrale (F.Y.B.Sc.)
Location: Nagla Block, SGNP



Salvinia auriculata
Family: Salviniaceae
Jeba Reshma Nadar (T.Y.B.Sc.)
Location: Go Green nursery, Karnala



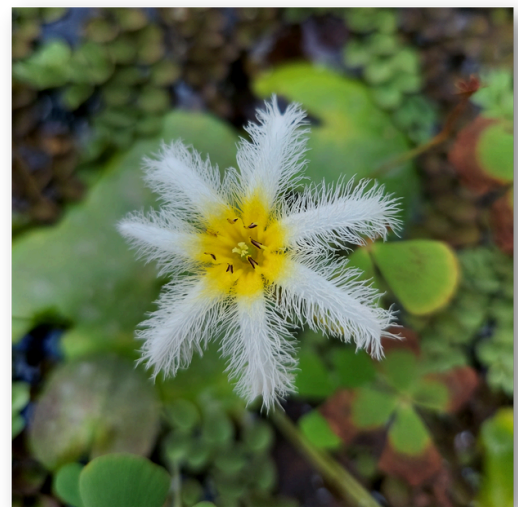
Plumeria obtusa
Family: Apocynaceae
Siddhesh Kolambkar (S.Y.B.Sc.)
Location: Karwar, Karnataka



Torenia fournieri
Family: Linfarniaceae
Trishik Jogi (T.Y.B.Sc.)
Location: SIES College, Sion



Galphimia glauca
Family: Malpighiaceae
Raghavi Vasanth Kumar (T.Y.B. Sc.)
Location: Ambernath



Nymphoides indica
Family: Menyanthaceae
Shubham Patkar
Location: St. Xavier's College, Mumbai

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