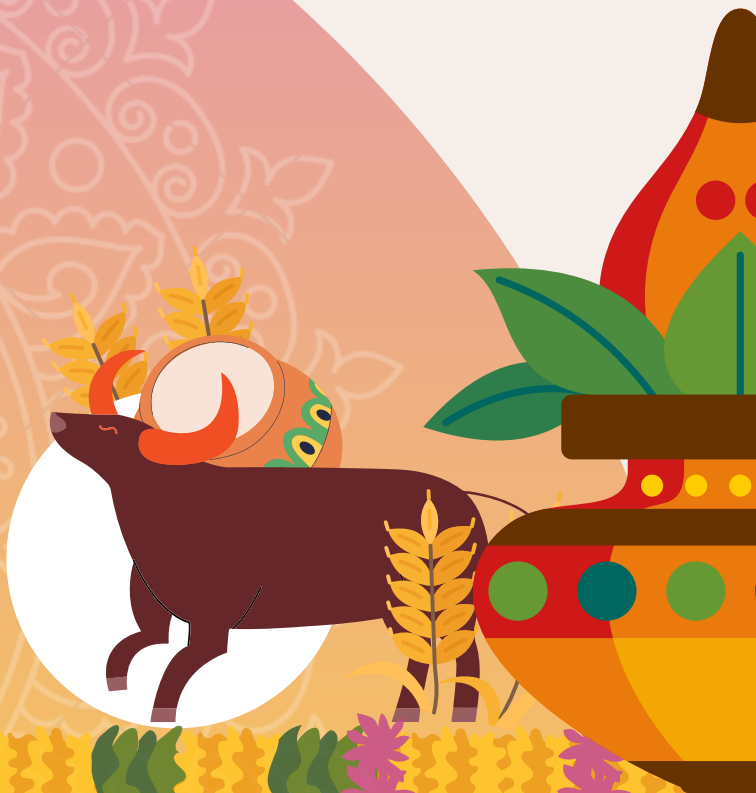
ARBORETUM

Monthly Newsletter
Antheia
The Botanical Society, Miranda House,
University of Delhi

IN THIS ISSUE

- Harvesting festivals of India
- Mushroom Vegan Leather
- Space station
- Recent news



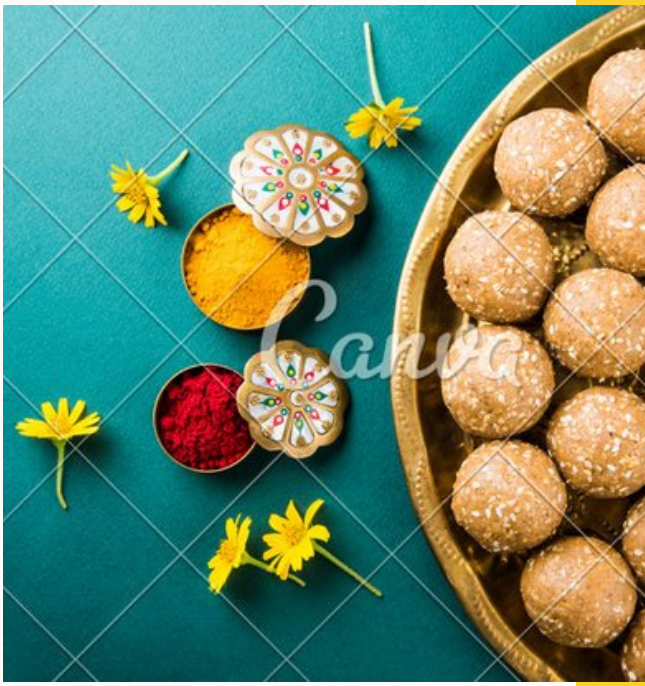
HARVESTING FESTIVALS OF INDIA

LIFE BECOMES A FESTIVAL ONCE GAIETY AND CULTURE BLEND ALONG.

Harvest festivals are an integral component of India's cultural heritage, and over the centuries, the tradition has evolved in numerous forms and has assimilated itself into the native practice. India is a primarily associated agricultural country, and it's well-known that 67% of its total population earns its livelihood from agriculture. Double monsoon led to 2 harvests being reaped in one year. Plants and animals were thought of as paramount to the survival of the Indians, and this resulted in their worship and reverence.

Indian agriculture is split into two main seasons, Kharif and Rabi crops. The Kharif cropping season is from February to October throughout the southwest monsoon, and the Rabi cropping season is from October-March (winter). The Kharif crop is reaped from September to October, whereas the Rabi crop is harvested from February to April.

Some harvest festivals of India celebrated throughout the year are:



1. PONGAL:

The word Pongal means "to boil over", or "overflow", and also the symbolism of the harvest is well known with an associate overflowing bowl of a sweet rice dish by a similar name. The festival lasts for four days and the second day is the most reassuring. The festival has its birthplace in Tamil Nadu, typically celebrated within January.

2. LOHRI:

It marks the harvest season in Punjab, celebrated on January 13th each year. Lohri commemorates the passing of the solstice marking the pinpoint of the winter season and the starting of more extended and hotter days. It's primarily related to harvesting rabi crops seeded within the winter.

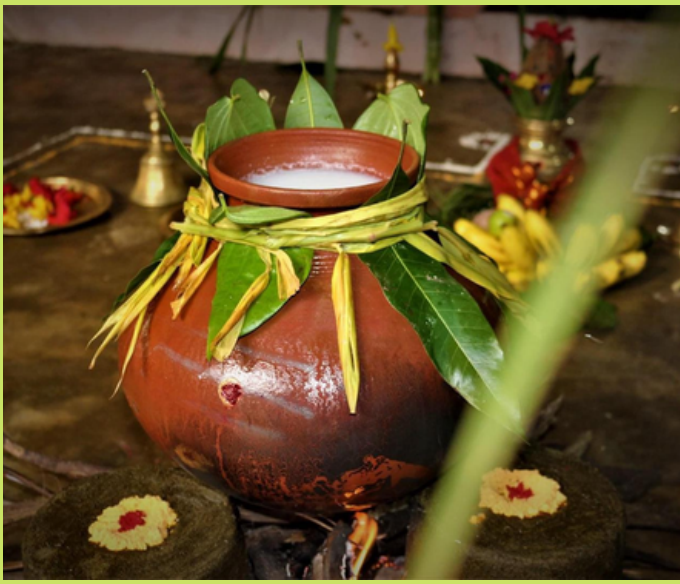
3. MAKARA SANKRANTHI:

Makara Sankranthi is a harvest festival, and as its name suggests, it falls within January. Like all harvest festivals, the Makar Sankranthi is auspicious, and it's synonymous with folks giving due to the Gods, particularly the Sun God. It marks the sun's evolution from DhanuRashi (Sagittarius) to Makara Rashi (Capricorn).

The sun reaches its south dip, so it starts moving northward.

Like these festivals, there are many more festivals celebrated in different regions of India under other names like Ugadi in southern parts of the country, Bihu, Dree, or Wangala festivals in the north-eastern areas, or Gudipadwa in Maharastra.

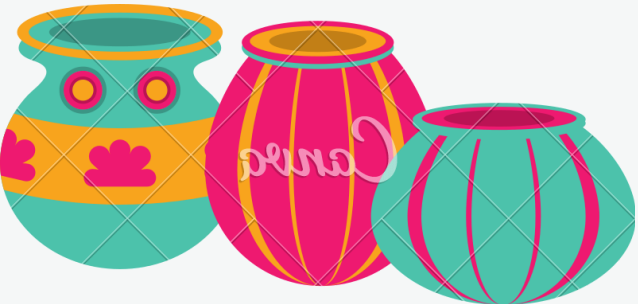
4. BAISAKHI:



The Vaisakhi or Baisakhi marks the start of the harvest season in a geographic area and is usually celebrated within January. For the Hindus, it's the beginning of the year, and it's marked as Vishu in Kerala. Also, the celebration includes fireworks, buying clothes, and fascinating displays known as 'VishuKani. Bohag Bihu in the province is well known for organizing huge feasts, music, and performing arts.

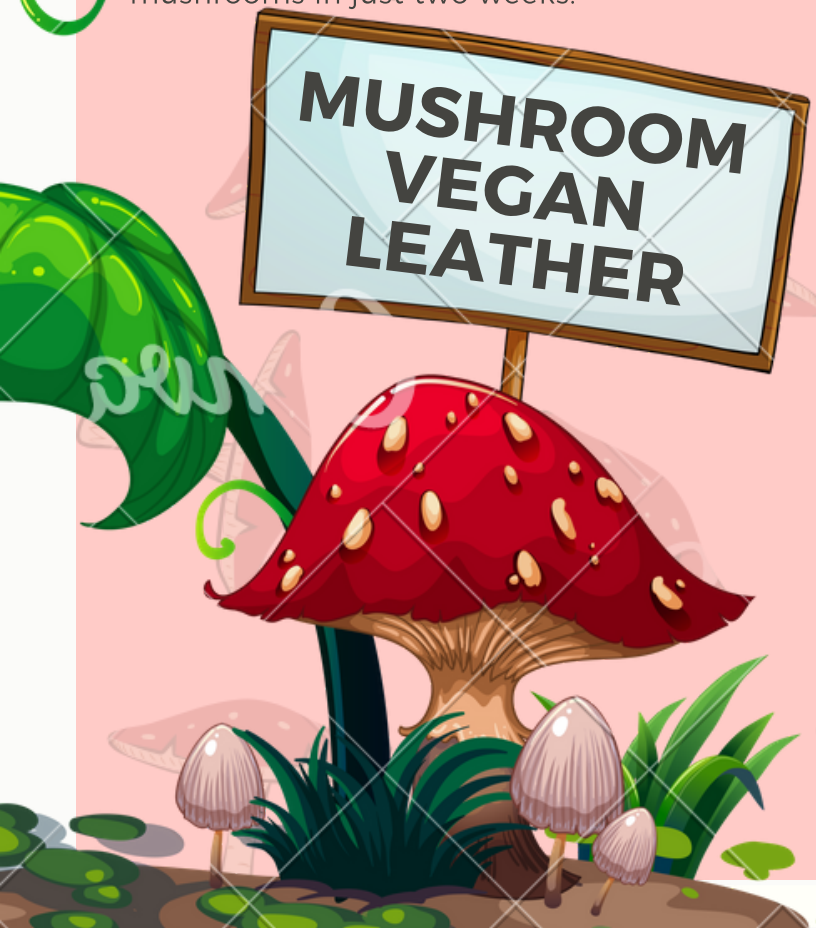
5. ONAM:

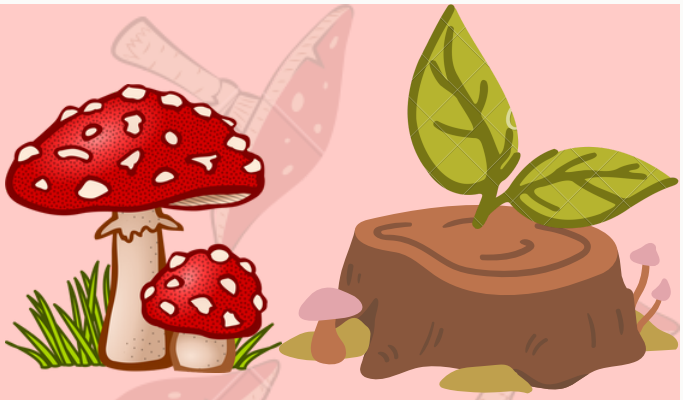
It is the reaping festival of Kerala celebrated throughout August/September. Onam was at first related to the tradition of the fertility cult; however, later clad to be the identity of the land and is well known with the ThiruvonaSadhya – ancient Kerala Meal with a minimum of fifty completely different dishes completed with the Onam Pattu and Pulikali.



Vegan leather is created from natural or plant products instead of animal skin. Most are made from PVC & polyurethane, which release harmful toxins when washed into the ocean. The growing concern of animal activists & environmentalists paved the way to create a new **eco-friendly** vegan leather derived from fungi.

Mushrooms are the humble fungi that thrive in some of the most inhospitable places. They are nature's recyclers, feeding off decay and needing very few resources to succeed. The material used for making mushroom leather is mycelium, which is found everywhere, often called **"Earth's natural internet"**- Paul Stamets. They are the fibrous root-like structures of filamentous mushrooms. Oyster mushrooms are pretty famous for this as they produce dense mats of mycelium. Mushrooms are grown in giant dark bags of saw specks of dust & go from spores to mushrooms in just two weeks.





To form vegan leather, Scientists control the condition only to get the mycelium and not the mushrooms (a fruiting body) in a whole life cycle of a fungus. This leather is durable, supple to touch, versatile, waterproof, has higher tensile strength than synthetic, deer's, and lamb's leather. It can be engineered. Therefore, it can be customized for thickness, density, an endless range of colours, patterns, textures & 3-D features.

This is **environmentally friendly** in many ways. We can control and grow multiple sheets of mycelium on the same agricultural waste making it a carbon-negative process. We can grow it in lab conditions, which will save land surface area & it doesn't produce CO2 as it happens with the cows and pigs and; most important, at the end of product life, this leather is biodegradable, and mycelium is a benefit to the earth, not a pollutant. It is cruelty-free and has exceptionally affordable inputs, and a batch can come to maturity in just two weeks versus the three years it might take for an animal to mature.

Mushroom leather is a bio-fabric that carries the beauty of nature and deep history of tradition and possibilities for the future. Hence, mushroom leather will soon substitute traditional animal leather as the demand for earth-friendly products boosts.

REFERENCES-

1.) https://fungi.com/blogs/articles/mycelium-explained
2.) https://www.mylo-unleather.com/stories/mushroom-leather/
3.) https://www.rmit.edu.au/news/all-news/2020/sep/vegan-leather-made-from-mushrooms

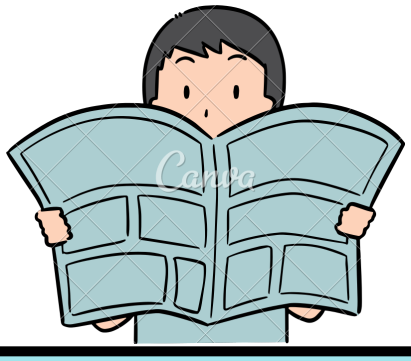
HOW DO PLANTS GROW IN SPACE?

Exploring advanced plant habitat

Growing plants on Earth is effortless. Isn't it? But did anyone ever think about how plants grow beyond Earth's atmosphere?
Plants did grow satisfactorily even outside Earth circumstances in the space station.

Such plants are grown in the space garden known as "**veggie**" -vegetable production system equipped with 'pillow' - a clay-based growth media enriched with fertilizer, distributing water, nutrients, & air in a healthy balance around the roots.
In the absence of gravity, or more precise to say in microgravity, plants were provided with one of the most crucial environmental factors, light by light-emitting diodes (LEDs) placed just above plants which elicit a spectrum of light suited for plant growth. These LEDs emit red, blue & green light, which helps plants to orient themselves & guide their development by enabling them to synthesize food.
To maintain the atmosphere in Space, different inside bellows chamber units are placed to insulate veggie from the surrounding environment.
After the veggie as Plants curating system in Space, another plant life-supporting system called' Advanced Plant Habitat' was also created. This system is nearly autonomous, with more additional LEDs & chambers. This system was followed by veggie-3, which was also launched with more advanced features. The fundamental strategy to grow plants in Space is invariably to provide a different atmosphere from the Space's atmosphere similar to the Earth & deliver nutrient media so that plants can endure there.
Such experiments to grow plants aid astrobiologists study the influence of gravity on plant growth, gene expression & cell cycle, which may open the doors to more scientific advancement & research.

RECENT NEWS



1-Extinct in The Wild- Boesenbergia albolutea and Boesenbergia rubrolutea

Two plant species- Boesenbergia albolutea and Boesenbergia rubrolutea classified under Zingiberaceae, the ginger family of flowering plants, are now extinct in the wild. Once discovered from the hills of Meghalaya and Andaman Island more than 125 years ago, the two are also among the least explored species of the genus Boesenbergia. Ten species classified under this genus, including the two mentioned above, have been reported in India. Botanists believe climate change, human interference, over-exploitation and natural calamities to be the main reasons for their disappearance. Boesenbergia rubrolutea was reported as endemic to Meghalaya in 1995, and the research further classified the species as endangered since the species was restricted to an extremely narrow piece of land of one State and facing immediate danger of extinction and thus concluded that the species needs pressing conservation. After their first collection, neither of the two species were reported ever again. Based on examining databases of various herbaria, field visits, available literature, the researchers have recommended listing them as **'Extinct in the Wild (EW) (IUCN 2019)'** under the **IUCN Red List category**. The solitary herbarium specimens of the two are preserved at the Royal Botanic Garden, Kew.

2- New grafting technique to combat the disease threatening cavendish bananas

Grafting is described as a technique of joining the shoot or stem of one plant with the radicle or root of another, so they continue to grow together as one. Till now, it was thought impossible to graft grass-like plants of the group known as monocotyledons because they lack a particular tissue that lies between vascular bundles called the vascular cambium in their stem but recently, scientists have found a novel way to combine two species of monocot varieties by using **embryonic tissue from their seeds**. The technique proved beneficial as it protects the plant from pathogen and pest attacks by combining valuable traits of two grafted species.

During research at the University of Cambridge, it was discovered that root and shoot tissues taken from the seeds of monocot grasses representing their earliest embryonic stages could fuse efficiently. By utilizing this technique, World's banana industry, based on a single variety famed as **Cavendish banana- a clone** that can withstand long-distance transportation is flourishing. This variety has no Genetic diversity and has brilliant disease resilience, and since they are sterile so if diseased, they can't spread into future generations by Reproduction. The technique allows monocots of the same or two different species to be grafted effectively. This technique adds disease resistance and other beneficial properties like salt tolerance to grass-like plants without resorting to genetic modification for lengthy breeding programs. It's fantastic that the University of Cambridge has played such an essential role in saving food crops and fruits

3-CYANEA HELUENSIS, A DISCOVERY IN REMOTE AREAS OF HAWAI

The age of discoveries is not over yet .....

"Every flower bloom at its own Pace and time, and a blooming flower means nature is beaming." A recently realized plant, possibly the only one of its kind, was recently found Deep in a Hawaiian forest named Cyanea heluensis".

The rare plant has been found in the remote part of West Maui. While examining the steep slopes of Helu above LAHAINA, botanist Hank Oppenheimer and Jennifer higashino found a single extensive plant in the deep shade of a healthy Ohia forest. The plant is similar to other native plants known as haha but has Duniya sleeves and gently curved, long, white flowers which resemble uncooked french fries. From mid-summer to October, this tropical plant begets several hands worth of finger-like white flowers, followed by green fruits, and then mature into orange berries. There is no record of the plant being previously discovered, and this was probably due to the steep terrain it was found in. Birds usually pollinate the flowers of this and other related species, and the orange fruits are attractive to fruit-eating native Birds that would disperse the Seeds. Cyanea heluensis has been added to 250 species managed by the University of Hawaii's plant extinction prevention program, and botanists have successfully produced new growth of the plant using a specialized growth media since the species is significantly less in no. C. heluensis belongs to a group of plants called cyanea, the most species-rich genus in Hawaii originated from a single introduction 8 to 10 million years ago. Dozens of native plants like this one are now only kept alive in nurseries.

This species quickly Falls into the critically endangered category, which represents species facing a very high chance of extinction in the wild. Plants like this one are also facing potential loss and decline of most or all of its AVN pollinators and dispersal Agents, threats such as landslides in free fall, herbivory by alien legs and rats, and competition with exotic plants. Hence, it's also essential to work upon their conservation.

4-BRT SANCTUARY TURNS BLUE

The hills surrounding Biligiri Ranganathaswamy Temple (BRT) Tiger Reserve, in Chamarajanagar district, Karnataka are bathed in a dreamy shade of blue as the mountains witness enormous Neelakurinji blooms. This stellar phenomenon occurs once every 12 years and can be observed only in forests and hilly regions of Western Ghats.

Strobilanthes kunthiana, popularly known as Kurinji or Neelakurinji in Tamil and Malayalam, is a shrub that belongs to the genus Strobilanthes and is usually 30-60 cm tall. Neelakurinji is derived from "Neela", which means 'blue' and "kurinji", which means "flower" in the local language. The plant is called so because of its purplish-blue flowers spread like carpet on the endless rolling hills. This species is also believed to possess medicinal values.

About 146 varieties of Strobilanthes kunthiana flowers are reported in India, spread across the Western Ghats region in Karnataka, Kerala, and Tamil Nadu.

Nilgiri hills, which directly means "the blue mountains", are called so because the blooming rare bluish-purple flowers of Neelakurinji cover these hills every 12 years. This is the first time that these flowers are blooming in the sanctuary

Feedback Form

https://docs.google.com/forms/d/e/1FAIpQLSf2RdTaS2pv6HD8RSBgnoDNg7id901tJ9i44sxdteye5sm9Hg/viewform?usp=sf_link

The Team

EDITORS: ANGEL MALHOTRA, GARIMA RAO, SAMRIDHI, SANDHYA.
CONTENT: SHUBHRA SINGH, NANCY, SHAILZA, KHUSHI, SAPANA, ANSHIKA, SAMRIDHI
PR: ANJALI PANDEY, IRYA, KHUSHI, PRATEEKSHA, PRITI GUPTA, VANSHIKA, PRIYANKA, BIDYALUXMI, PRITI KULHARI, YOSHITA BHARDWAJ, AYUSHI SHIVRAYAN, NEELAM VISHWAKARMA, HARSHA