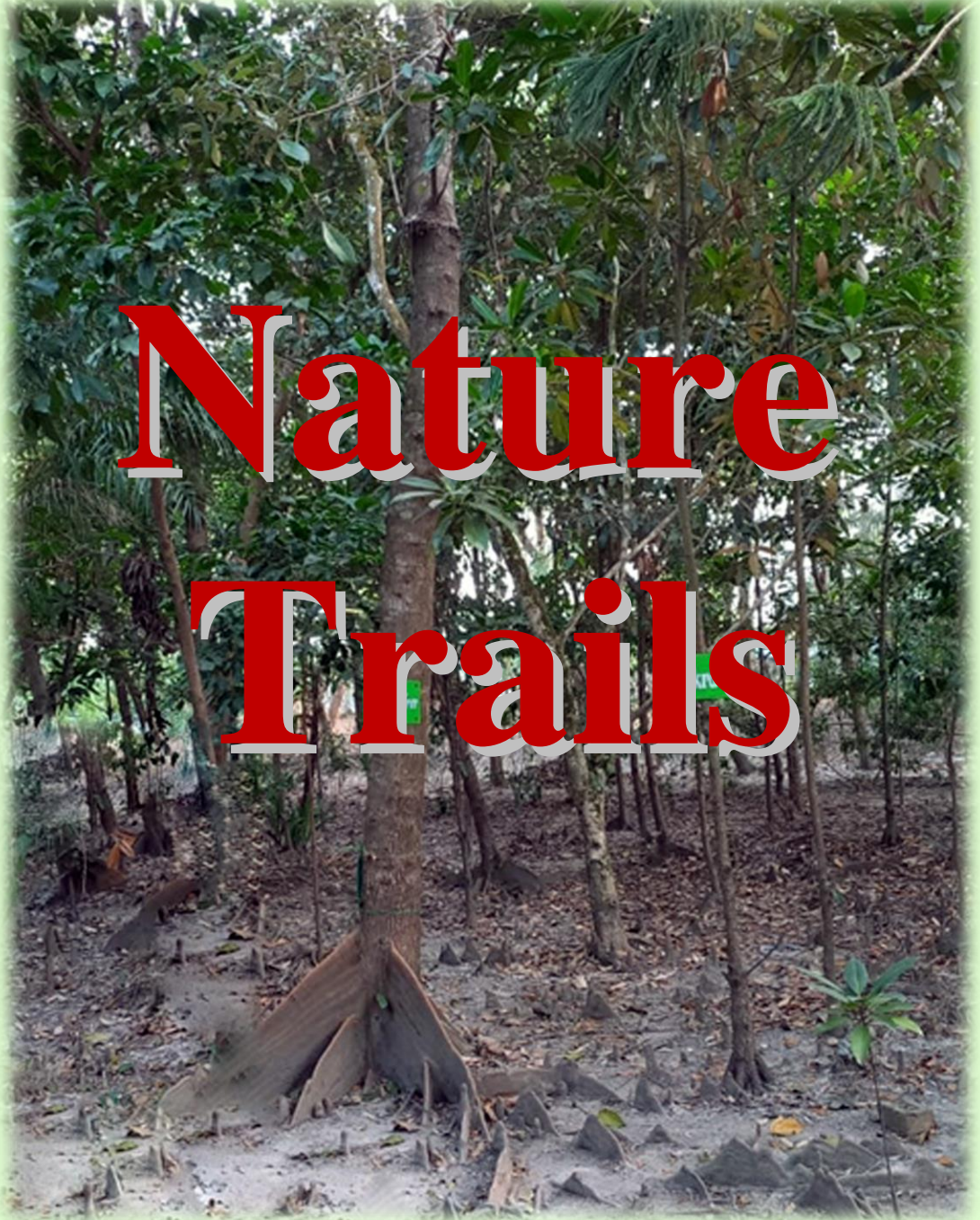


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**E-Newsletter of the Department of Botany, Dudhnoi College and
Alumni Association of Botany Department, Dudhnoi College**

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Contents

Editor’s Page	1
A Worth Remembered Tour to the Largest Mangrove Forest of the World: Treasure Trove of Amazing Natural Diversity.....	3
A Review on the Orchids of Goalpara District, Assam	11
The “Chinese Key” Member of the Zingiberaceae Family	15
The Rare Discovery of Relictithismia	18
Climate Crisis And Continued Deforestation may Result in Significant Damage to the Animal World.....	19
Photo Story	20

Editor's Page

Six of Nine Planetary Boundaries Breached by Human Activity

Planetary boundaries are a concept introduced in Earth system science to define the safe operating space for humanity within which the Earth system can function sustainably. Proposed by a group of scientists led by Johan Rockström in 2009, the concept identifies nine key Earth system processes and sets boundaries for each. These boundaries represent the "safe limits" beyond which human activities risk destabilizing the Earth's essential systems, potentially leading to abrupt or irreversible environmental changes. The nine planetary boundaries are:

Climate Change: This boundary is defined by a concentration of atmospheric CO₂ equivalent (carbon dioxide and other greenhouse gases) below 350 parts per million (ppm). Exceeding this concentration could lead to dangerous interference with the climate system.

Biosphere Integrity: This boundary encompasses the loss of biodiversity and the integrity of ecosystems. It is primarily measured by the rate of species extinction and the extent of habitat loss.

Stratospheric Ozone Depletion: This boundary concerns the depletion of the ozone layer, which protects life on Earth from harmful ultraviolet radiation. The boundary is defined by maintaining a certain level of ozone concentration in the stratosphere.

Ocean Acidification: This boundary is defined by a decrease in the pH of the ocean due to increased absorption of CO₂, leading to adverse effects on marine life, particularly organisms with calcium carbonate shells or skeletons.

Biogeochemical Flows: This boundary focuses on the disruption of natural nutrient cycles, primarily nitrogen and phosphorus, which can lead to eutrophication, loss of biodiversity, and other ecological imbalances.

Land System Change: This boundary relates to the conversion of natural ecosystems to human-dominated land uses, such as agriculture, urbanization, and deforestation, which can lead to loss of biodiversity, soil degradation, and changes in hydrological cycles.

Freshwater Use: This boundary concerns the consumption and management of freshwater resources, aiming to prevent depletion of aquifers, degradation of water quality, and disruption of aquatic ecosystems.

Atmospheric Aerosol Loading: This boundary involves the release of particulate matter and aerosols into the atmosphere, which can affect climate, air quality, and human health.

Chemical Pollution: This boundary addresses the release of synthetic chemicals into the environment, including pollutants such as heavy metals, pesticides, and industrial chemicals, which can have harmful effects on ecosystems and human health.

Nature Trails, Volume: 2, Issue: 2, April 2024

Unfortunately, humans have exceeded the safe limits of several of these planetary boundaries, indicating unsustainable practices and potential risks to Earth's systems. Specifically, six of the nine boundaries have been breached to varying degrees:

- Climate Change
- Biosphere Integrity
- Land System Change
- Biogeochemical Flows
- Ocean Acidification
- Atmospheric Aerosol Loading

While addressing these challenges necessitates global cooperation, we must not overlook the significance of individual and community efforts. Student community can play a crucial role in addressing these challenges:

- ✓ Students can educate themselves and others about the importance of sustainability and the impact of human activities on the environment. They can engage in discussions, organize workshops, and raise awareness through social media campaigns to foster understanding and action.
- ✓ Students can volunteer or participate in local conservation efforts to protect biodiversity and ecosystems. They can join environmental clubs, participate in tree-planting events, and advocate for the preservation of natural habitats in their communities.
- ✓ Students can advocate for sustainable practices within their educational institutions, urging them to implement energy-efficient technologies, reduce waste generation, and support environmentally friendly policies.
- ✓ Students interested in science and technology can contribute to research and innovation aimed at addressing environmental challenges. They can participate in citizen science projects, develop sustainable technologies, and contribute to academic research on topics related to sustainability and environmental conservation.

Students can make a meaningful difference by actively engaging in these efforts to address the breaches of planetary boundaries and moving towards a more sustainable future.

Shahadev Rabha

A Worth Remembered Tour to the Largest Mangrove Forest of the World: Treasure Trove of Amazing Natural Diversity

Dr Dipali Deka

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Salt-tolerant plant communities grown in tropical and subtropical intertidal areas of the world characterized by high temperatures (26°C - 35°C) and rainfall (1000-3000 mm) are called mangroves. So, the group of trees and shrubs grown in the coastal intertidal zone constitute mangroves which include almost 80 different species distributed all over the world. These plant species grow in areas with low-oxygen soil. In these areas, fine sediments accumulate in the soil due to the slow movement of water. Mangrove forests are also known as 'mangrove swamps' or 'Mangals'.

One can discover nature's secrets in such forests for which mangroves may be regarded as 'magical forests'. Mangroves straddle the connection between land and sea on one hand and nature and humans on the other. Areas where mangroves occur include estuaries and marine shorelines.

Mangrove forests help people experience nature by providing birding, fishing, paddle boarding, snorkelling, kayaking etc. It also provides therapeutic calm and relaxation which comes from enjoying a peaceful time in nature. It also plays an important role as a nursery for commercial fish stocks which provide economic benefits to the local communities.

The plant species of the mangrove forests grow in humid climates, saline environments, waterlogged soil or muddy soil, the edges of the deltas and along the side of the coast. In India, the fertile deltas of the rivers Krishna, Cauvery, Mahanadi, Godavari and Ganga are comprised of mangrove forests.

Climate, salt water, tidal fluctuation and soil type are four different factors which may limit the distribution of mangroves. The plant species of mangrove forests grow in waterlogged soil. They are capable of tolerating salinity ranging from 2% to 90% and the habit of these plant species ranges from shrubs to tall trees. These types of forests are known as 'Sundarbans' in West Bengal which is given after the name of the largest delta. The researchers and the tourists are eager to know the unknown facts related to the amazing forests, lifestyle and cultural heritage of local people, tiger-land and particularly wildlife of Sundarbans. A considerable number of vast islands of Sundarbans are scattered in different corners of Sundarban delta, the vegetation and wildlife of which is still found to be unexplored. From the anthropological, ecological and historical point of view, these islands are regarded as most significant. The anthropological background of the local people of these islands, their cultural heritage and their struggle for survival are still untold.

Generally, it is believed that the name 'Sundarban' means beautiful forest in Bangla and it has been derived from the special plant of the forest known as '**Sundari**'. Some people believe that Sundarban has been derived from the word 'Samundar-ban' or 'Samudra-ban', which means the forests situated near the sea.

Geographical location:

Sundarban is located slightly south of the tropic of cancer in the coastal areas of India and Bangladesh at latitude 21° 32 minutes and 22° 40 minutes North; Longitude 88° 03 minutes and 89° East.

Mangrove forests are very important for Sundarbans. There are three reasons in this regard, such as

- Mangrove peat absorbs water during heavy rain.
- Mangroves protect water quality by removing nutrients and pollutants.

- It provides the necessary habitat for many commercial fish and shellfish.
- It protects species which are the source of a considerable amount of seafood.



Fig.: *Heritiera fomes* Buch.-Ham. (Sundari tree) with beautiful Pneumatophores

The largest contiguous area of mangrove forest is around the Sundarbans National Park in India and the Sundarbans mangrove forest in Bangladesh, both are recognised by UNESCO as "World Heritage Sites".

Sundari, Passur and Nypa are three endemic plant species of the West Bengal Sundarban area. Bengal tiger, Bengal monitor lizard and Salvator lizard are three endemic animal species there. The mangrove reserve located in the vast delta of the Ganges, south of Kolkata is the largest and only mangrove reserve in the world inhabited by tigers. The 'Royal

Nature Trails, Volume: 2, Issue: 2, April 2024

Bengal Tiger Reserve', 'Sundarban National Park' and three Wildlife Sanctuaries namely 'Sajnekhali Wildlife Sanctuary', 'Lathian Island Wildlife Sanctuary' and 'Holiday Island Wildlife Sanctuary' are included in this reserve.

Table: Area of Sundarbans

A. Indian Sundarbans (Total - 4267 km²)		
Sundarbans National Park	1,330 km ²	Sundarbans Tiger Reserve 2,588 km ²
Sajnekhali WL Sanctuary	362 km ²	
Sundarbans buffer area	896 km ²	
Lothian WL Sanctuary	38 km ²	24 – Parganas (S) Forest Division 1,679 km ²
Holiday WL Sanctuary	6 km ²	
Other areas of 24 - Parganas (S)	1,635 km ²	
B. Bangladesh Sundarbans (Total - 6087 km²)		
Khulna Range	1,613 km ²	
Chandpai Range	1,316 km ²	
Sharankhola Range	1,332 km ²	
Satkhira Range	1,826 km ²	
Total (India + Bangladesh)	10,354 km²	

In 1987 the Ministry of Environment and Forests launched the Mangrove Conservation Program through which 38 mangrove areas were identified for intensive conservation in the country. State-wise list of mangrove areas identified by the ministry may be mentioned as follows-

State		Mangrove areas
a.	West Bengal	1. Sundarbans
b.	Orissa	2. Bhaitarkanika 3. Mahanadi 4. Subarnarekha 5. Devi 6. Dhamra 7. MGRC 8. Chilka
c.	Andhra Pradesh	9. Coringa 10. East Godavari 11. Krishna
d.	Tamil Nadu	12. Pichavram 13. Muthupet 14. Ramnad 15. Pulicat 16. Kazhuveli
e.	Andaman and Nicobar	17. North Andamans 18. Nicobar
f.	Kerala	19. Vembanad 20. Kannur
g.	Karnataka	21. Coondapur 22. Dakshin Kannada 23. Mangalore Forest Division 24. Karwar
h.	Goa	25. Goa
i.	Maharashtra	26. Achra-Ratnagiri 27. Devgarh Vijay Dur 28. Veldur

		29. Kundalika-Ravdana 30. Mumbara-Diva 31. Vikroli 32. Shreevardhan 33. Vaitarna 34. Vasasi-Manori 35. Malvan
j.	Gujarat	36. Gulf of Kutchh 37. Gulf of Khambat 38. Dumas-Ubhrat

Based on the recommendation of the National Committee on Mangroves and Coral Reefs these areas are identified considering their unique ecosystems, biodiversity etc. Activities like protecting mangrove plants, raising mangrove plantations, treating catchment areas, taking steps for biodiversity conservation and sustainable resource utilisation, arranging awareness programs etc are recommended in these reserve areas.

Mangroves trap sediments and so contribute to land building. It prevents soil erosion and excessive shifting of coastlines. As natural sewage treatment, mangroves are of great use. A recent commercial use of mangroves is observed for recreation and ecotourism.

About 124 species of Angiosperms 128 species of algae and 25 species of mangroves have been recorded in the Sundarban area. *Nypa fruticans* (Nipah Palm), *Acanthus volubilis*, *Sonneratia alba* (Mangrove apple), *Sonneratia caseolaris* (Crab apple mangrove), *Aegialtis rotundifolia*, ***Heritiera fomes*** (Sundari), *Xylocarpus granatum* (Cannonbal mangrove), *Ceriops tagal* (Tagal mangrove) and *Lumnitzera racemosa* (Sandy mangrove) are identified as rare and endangered plant species of the reserve.



Fig.: Sunset in Sundarban mangrove areas

About 40 species of mammals, 165 species of birds, 170 species of fishes, 56 species of reptiles, 67 species of crabs, 10 species of prawns and 25 species of molluscs are reported from Sundarban. Among the animal species worth mentioning are *Panthera tigris* (Tiger), *Crocodilus porosus* (Saltwater crocodile), *Felis viverrina* (Fishing cat), *Felis benghalensis* (Indian Leopard cat), *Varanus flavescens* (Yellow monitor), *Lipidochelys olivacea* (Olive

ridley sea turtle), *Ertmochetys imbricata* (Hawksbill sea turtle) and *Chelonia myrdus* (Green sea turtle).



Fig.: Pneumatophores of *Xylocarpus mekongensis* Pierre



Fig.: *Rhizophora mucronata* Lamk. with aerial root

About 40 species of mammals, 165 species of birds, 170 species of fishes, 56 species of reptiles, 67 species of crabs, 10 species of prawns and 25 species of molluscs are reported from Sundarban. Among the animal species worth mentioning are *Panthera tigris* (Tiger), *Crocodilus porosus* (Saltwater crocodile), *Felis viverrina* (Fishing cat), *Felis benghalensis* (Indian Leopard cat), *Varanus flavescens* (Yellow monitor), *Lipidochelys olivacea* (Olive ridley sea turtle), *Ertmochetys imbricata* (Hawksbill sea turtle) and *Chelonia myrdus* (Green sea turtle).



Fig.: *Crocodilus porosus* Schneider taking rest in sun on muds of Sundarban



Fig.: *Panthera tigris* L. at mangrove forest

We four bosom friends (all are passionate travellers) namely Dr Snigdha Sarkar (Retd. Associate Professor in Botany, Rangia College), Dr Nilakshee Devi (Professor, Dept. of Botany, Gauhati University), Minakshee Devi (School Teacher, Guwahati) and me visited Sundarbans of West Bengal through a travel agency located at Dispur, Guwahati namely 'Travfolks Holidays'. There we had a very pleasant stay at 'Sundarban Tiger Camp', Dayapur, from 4th January to 8th January 2024. This tour is one of the worth remembered tours in our lives.



Fig.: On the way to 'Sundarban Tiger Camp' at Dayapur by motor boat

Nature Trails, Volume: 2, Issue: 2, April 2024

Sundarban is a delta which is formed by the influence of 3 big rivers such as the Ganges, Brahmaputra and Meghna. Many reasons made us interested in travelling to Sundarban. The area is blessed with rich flora, fauna and magical scenery of nature. The site is made up of a complex network of tidal waterways, mud flats and small islands covered with salt-tolerant mangrove forests which are the best example of a peculiar ecosystem.

We spotted different kinds of animals like fishing cats, wild boars, leopard cats, rhesus monkeys and many other exotic wildlife species. We also spotted incredible reptiles like pythons, water monitors etc. We were amazed to observe innumerable plant species growing in this fascinating area. Anyone may have a wonderful experience watching varieties of birds in Sundarban like *Leptoptilos javanicus*, *Ardea alba*, *Ichthyophaga leucogastar*, *Butorides striata*,

Pericrocotus cinnamomeus, *Pachycephala cinerea*, *Picus chlorophus*, *Ardea goliath*, *Numentus arquata*, *Heliastur indus*, *Anhinga melanogastar*, *Egretta garzetta*, *Anas clypeata*, *Anas acuta*, *Anas panelope*, *Gallus gallus* etc. So, we took some souvenirs with the world of birds in this area. Among mammals of that area the most common are *Panthera tigris*, *Rousettus leschenaultii*, *Sus scrofa*, *Anoxyx cinereus*, *Axis axis*, *Felis chaus*, *Prionailurus bengalensis*, *Paradoxurus hermaphroditus*, *Prionailurus viverrinus* etc. Our minds were filled with tranquillity when we observed the beautiful surroundings at this tiger reserve.

The calm and peaceful environment of Sundarban touched our hearts in the real sense, the soft rustling of leaves, the breathtaking view of the luxuriant green trees, chirping sounds of beautiful birds of the region pulled us into serenity. Any person who has travelled to Sundarban once would like to visit that peaceful place again and again. ■

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Facts

- 1,533 species are linked to mangroves, with 15% facing extinction.
- Extinction threats affect 50% of mangrove-associated mammals, 22% of fishes, 16% of plants, 13% of amphibians, and 8% of bird and reptile species.
- 44% of species face increasing extinction risks, with 89% experiencing worsening conditions.
- Mangroves store significant carbon, averaging 1,000 tonnes per hectare.
- Mangrove loss from 1996-2020 emitted CO₂ equivalents to 4 times global fossil fuel and cement emissions in 2018.
- Mangrove deforestation accounts for nearly one-fifth of global deforestation emissions, with economic damages estimated at US\$6–42 billion annually.

Source: [UNEP](#)

A Review on the Orchids of Goalpara District, Assam

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Orchids are the most highly evolved and diverse group of flowering plants. They belong to the family Orchidaceae. Orchids are cosmopolitan in distribution and are found in almost every habitat on Earth except glaciers. Their richest diversity is found in the tropics.

The family Orchidaceae is the second largest family after Asteraceae. According to POWO (2024) total of 36,566 species belonging to 704 genera are found all over the world. The family Orchidaceae encompasses about 6-11% of all species of seed plants. The largest genera are *Bulbophyllum* (2,000 species), *Epidendrum* (1,500 species), *Dendrobium* (1,400 species) and *Pleurothallis* (1,000 species).

The family is treated under the series Microspermae by Bentham and Hooker (1862). The family Orchidaceae was placed under a separate order Orchidales by the majority of later workers including Hutchinson (1959), Takhtajan (1969) and Cornquist (1981). However, Throne (1983) placed the family Orchidaceae under the superorder Orchideae of the order Liliales. Willis (1973) divided the family Orchidaceae into 3 subfamilies viz. Apostasioideae, Cyripedioideae and Orchidoideae.

The family Orchidaceae is considered as most highly evolved family among Monocotyledons because of the presence of certain advanced characters such as pollinia, epiphytic habit, labellum etc. They are characterized by epiphytic and terrestrial habits. Flowers are zygomorphic, hermaphrodite, epigynous, resupinated; perianth 6 in two whorls and the posterior segment of the inner whorl developed as lip or labellum. The flower has peculiar structures such as labium, column and rostellum. Stamens 1-2, one or two staminode pollen grains united into pollinia. Gynoecium tricarpeal, inferior unilocular with parietal placentation; the fertile stamen is adherent to the style and forms with it the column or gynostemium. Stigma 2 or 3 lobed, in some two fertile and one sterile and modified into rostellum.

Orchids are mainly pollinated by insects or birds which are attracted to the shapes, colours and fragrances of the flowers. Most members of the family Orchidaceae rely heavily on association with one or several species of mycorrhizae for their nutrition. Their seed germination also fully depends on a symbiotic association with soil-borne fungi, usually *Rhizoctonia* spp.

The family Orchidaceae has various ethnobotanical and economic importance. They have numerous varieties of exquisitely beautiful blossoms which are sold commercially in the market. One of the most economically important products in the family is the delicious spice known as Vanilla. Vanilla comes from several species of perennial vines of the genus *Vanilla* native to Mexico and tropical America. Many of the epiphytic Orchids are used as traditional medicine e.g. the Juice of *Rhynchosyris retusa* (L.) Blume is used in ear pain and cleaning (Basumutary *et al.*, 2004).

Study area:

The Goalpara district was established in the year of 1983 and it is located between 25°53'-26°30' north and Longitude 90°7'- 91°5' East. The Goalpara district has a boundary with Brahmaputra in the North, Garo Hills of Meghalaya in the South, Kamrup District in the East and Dhubri District in the West. The district has a total area of 1824 sq. Km where 36,91527 hectares area is covered by forest and total 10,200 hectare area are cultivated lands. As per the 2011 census report the total population of the district was 10,08,959 where 5,14,162 were male and 4,94,797 were female. The district is very diverse in culture, a total of 6 different

languages are reported to be spoken in the district i.e. Assamese, Bodo, Rabha, Garo, Bengali and Nepali.

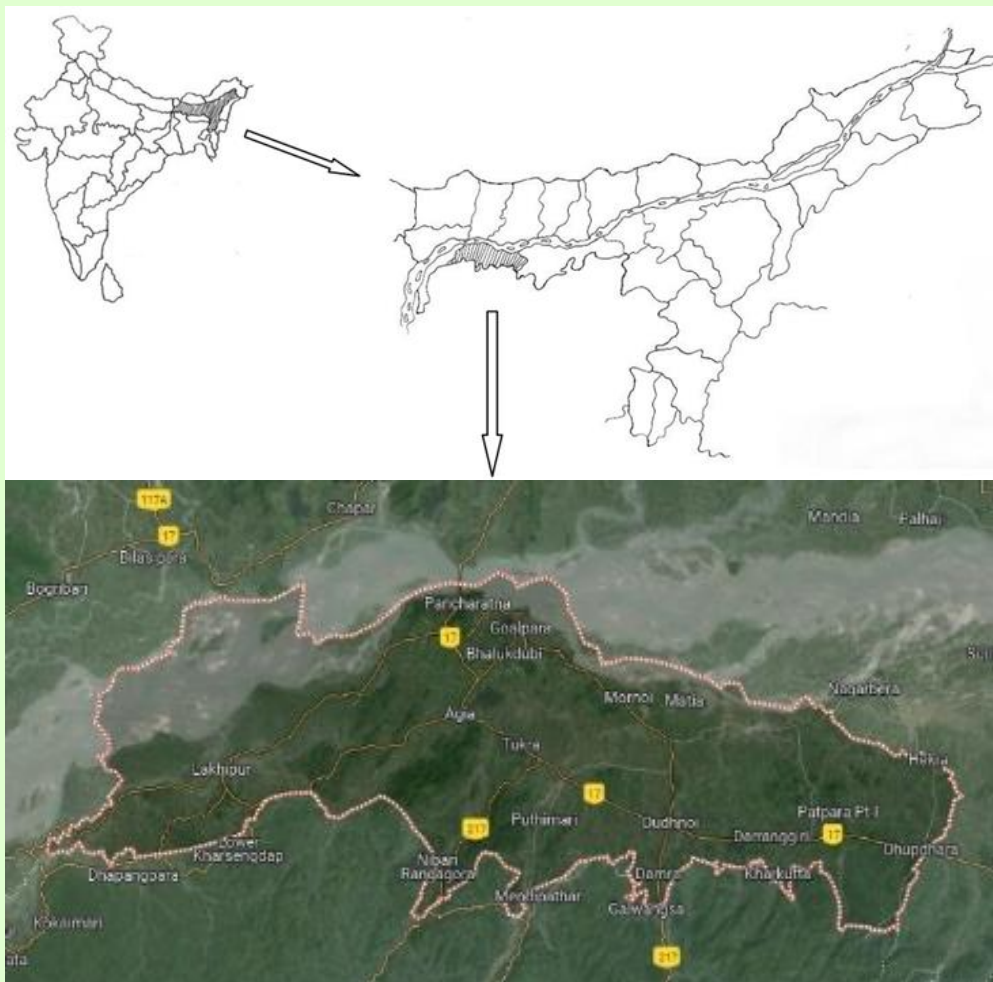


Fig.: Map of Goalpara District

Diversity of orchids in Goalpara district:

The district is very rich in the diversity of Orchids. Ahmed *et al.* (2003) reported the presence of 25 species in the Goalpara district and stated majority of them as epiphytes. However, Barooah & Ahmed (2014) reported the presence of 21 species in the district.

Table: List of species found in Goalpara District

Sl No.	Scientific name	Habit
1	<i>Chiloschista lunifera</i> (Rchb.f.) J.J.Sm.	Epiphytic
2	<i>Cleisostoma racemiferum</i> (Lindl.) Garay	Epiphytic
3	<i>Cleisostoma subulatum</i> Blume	Epiphytic
4	<i>Cymbidium aloifolium</i> (L.) Sw.	Epiphytic
5	<i>Cymbidium elegans</i> Lindl.	Epiphytic
6	<i>Dendrobium anceps</i> Sw.	Epiphytic
7	<i>Dendrobium aphyllum</i> (Roxb.) C.E.C. Fisch	Epiphytic
8	<i>Dendrobium jenkinsii</i> Wall. ex Lindl.	Epiphytic

9	<i>Dendrobium lituiflorum</i> Lindl.	Epiphytic
10	<i>Dendrobium moschatum</i> (Banks) Sw.	Epiphytic
11	<i>Hetaeria affinis</i> (Griff.) Seidenf. & Ormerod	Terrestrial
12	<i>Luisia brachystachys</i> (Lindl.) Blume	Epiphytic
13	<i>Luisia tristis</i> (G.Forst.) Hook.f.	Epiphytic
14	<i>Oberonia acaulis</i> Griff.	Epiphytic
15	<i>Oberonia mannii</i> Hook.f.	Epiphytic
16	<i>Oberonia obcordata</i> Lindl.	Epiphytic
17	<i>Papilionanthe teres</i> (Roxb.) Schltr.	Epiphytic
18	<i>Papilionanthe uniflora</i> (Lindl.) Garay	Epiphytic
19	<i>Pinalia acervata</i> (Lindl.) Kuntze	Epiphytic
20	<i>Rhynchostylis retusa</i> (L.) Blume	Epiphytic
21	<i>Vanilla borneensis</i> Rolfe.	Climber

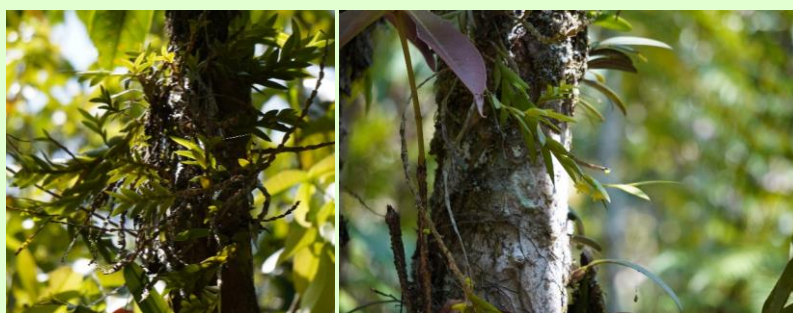


Dendrobium aphyllum (Roxb.) C.E.C. Fisch



Dendrobium lituiflorum Lindl.

Papilionanthe teres (Roxb.) Schltr.



Dendrobium anceps Sw.

Conclusion:

The Goalpara District is very rich in the diversity of Orchids. Apart from their diversity and rich distribution the family Orchidaceae has various economic and medicinal importance. However, due to the considerable pressure of increasing human population the growth and survival of many orchids in Goalpara District is reducing gradually. In addition, the age-long practice of shifting cultivation, illegal logging, cutting trees for road construction etc. has also removed the natural forest cover of the district destroying the habitat of orchids. Orchids are some of the best known and loved plants but many species belonging to the family Orchidaceae are being driven to extinction by either direct or indirect human activities. ■

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Microplastics: The long legacy left behind by plastic pollution

~ [WHO](#)

Plastic pollution, generating over 430 million tonnes annually, is a global crisis. Microplastics, small (usually measuring less than 5 millimeters in length) but pervasive, contaminate oceans and enter the food chain, posing health risks to humans and marine life. They originate from various sources, including the breakdown of larger plastic items, microbeads used in cosmetics and personal care products, and synthetic fibers shed from textiles during washing and cigarettes. Measures to reduce microplastic pollution include policy changes, sustainable product design, and consumer awareness campaigns. Collaborative efforts are crucial for combating this pervasive threat and protecting both the environment and human health.



The “Chinese Key” member of the Zingiberaceae family

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Boesenbergia rotunda (L.) Mansf. commonly known as ‘Chinese keys’ or ‘Fingerroot’ in English, ‘Temu Kunci’ in Malaysia and ‘Krachai Dang’ in Thailand, is a rhizomatous herb belonging to the genus *Boesenbergia* under the family Zingiberaceae. It is a ginger species that grows in Southeast Asia, India, Sri Lanka and Southern China where it is commonly used as a food ingredient and in ethnomedicinal preparations. It is a rhizomatous geophyte and grows primarily in the wet tropical biome. The native range of the species is from Assam to China and West Malaysia.

It is a small perennial plant of about 15-40cm in height. Its leaves are broad and light green while the leaf sheath is red. Each shoot consists of 3-5 elliptic-oblong red sheathed leaves of about 7- 9cm in width and 10-20cm in length. The underground portion of the plant consists of a small globular shaped central subterranean rhizome of 1.5-2cm in diameter from which several slender and long tubers sprout all in the same direction like the fingers of a hand so commonly known as ‘fingerroot’. The tubers are about 1-1.5cm thick in diameter and 5-10 cm long. The tissue of the tuber is looser, softer and more watery than the central rhizome. The middle part is more swollen than the head and bottom part. The colour of both the central rhizome and the tubers is dependent on the variety of the species. They are strongly aromatic. The flower appears between the leaf sheaths at the bottom of the trunk and blooms one at a time. The petals are white or light pink. These beautiful flowers are usually hidden at the base of the foliage making them unnoticeable.



Habit and Flower of *B. rotunda*

It is a common edible ingredient in many Asian countries such as Malaysia, Thailand, Indonesia, India and China. In Thailand, this plant is used as an aphrodisiac among Thai folk and as self-medication by AIDS patients. Chaudhury & Rafei (2001) reported that in Indonesia, *B. rotunda* is typically used to prepare “jamu,” a popular traditional tonic for women after childbirth as well as a beauty aid for teenage girls and to prevent leukorrhea. In Malaysia, it is normally cultivated at small home ranches and used as a condiment in food such as curry and soup due to its aromatic flavour which promotes appetite (Chuakul and Boonpleng, 2003). Besides this, it is also used as a traditional medicine to treat illnesses such as rheumatism, muscle pain, febrifuge, gout, gastrointestinal

disorders, flatulence, carminative, stomach ache, dyspepsia and peptic ulcer also in diuretic. The fresh rhizomes are used to treat inflammatory diseases such as dental caries, dermatitis, dry cough and cold, tooth and gum diseases, swelling, wounds, diarrhoea and dysentery. It is also used as an antifungal and antiparasitic agent to heal fungal infections as well as an antiscabies agent to get relief from skin itches caused due to mite bites. The leaves are consumed to alleviate food allergies and poisoning (Eng-Chong *et al.*, 2012).

Hundreds of compounds were isolated and elucidated ranging from flavonoids, chalcone derivatives, esters, kawains, terpenes and terpenoids. One such medicinal function of this species is antimicrobial activity against the bacteria *Helicobacter pylori* which is a prominent gram-negative bacteria that causes gastritis, dyspepsia and peptic ulcer and has been linked to the development of gastric and colon cancer. The compounds such as Pinostrobin and Red oil from the roots of *B. rotunda* were found to possess antimicrobial activity against *H. pylori* (Bhamarapavati *et al.*, 2006). Some of the important compounds are β -Pinene (Jantan *et al.*, 2001), Pinostrobin chalcone (Shindo *et al.*, 2006), Pinocembrin, Geraniol (Morikawa *et al.*, 2008), Panduratin A (Win *et al.*, 2008), Quercetin (Jing *et al.*, 2010) etc.



Rhizome of *Boesenbergia rotunda*

It can be concluded that with the advent of genomics, transcriptomics, proteomics and metabolomics, new insights on the biosynthetic pathways of *B. rotunda* metabolites can be elucidated, enabling researchers to predict the potential bioactive compounds responsible for the medicinal properties of the plant. The vast biological activities exhibited by the compounds obtained from *B. rotunda* can be studied through drug discovery, polypharmacology and drug delivery using nanotechnology. ■

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Begonia naraharii

In March 2024, Scientists at CSIR-Northeast Institute of Science and Technology (NEIST), Jorhat discovered a new flowering plant species in Arunachal Pradesh named *Begonia naraharii*. It belongs to the *Begonia* genus and *Begoniaceae* family. The plant, distinguished by its vivid blue iridescence in direct light, was found in the Mishmi Hills of Arunachal Pradesh's Lohit district by B. Hajong, a PhD Scholar, with assistance from P. Bharali, a scientist at CSIR-NEIST. It was named after Prof. G. Narahari Sastry, former director of CSIR-NEIST, in recognition of his contributions to the region.



Reference: <https://doi.org/10.11646/phytotaxa.637.3.7>

Source: *The Hindu*

The Rare Discovery of Relictithismia

Jimari Santok

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Fairy lanterns, also known as Thismiaceae, are uncommon plants primarily found in tropical regions, although they can also be found in subtropical and temperate climates. Unlike most plants, they do not possess green pigment and do not undergo photosynthesis; instead, they rely on fungal mycelia in the soil for sustenance. As a result, they often remain hidden beneath fallen foliage, only emerging briefly to produce delicate, glass-like flowers above ground. These plants are exceedingly rare and elusive, with approximately 100 species identified within the family, many of which are known only from initial discovery, sometimes based on a single specimen.

A recent study has documented the discovery of a new species and genus of fairy lanterns in Japan. These tiny, translucent white plants also subsist on fungi. In a country renowned for its thorough botanical research, the identification of a new plant genus is an exceptionally rare occurrence, not having taken place in nearly a century. The contribution of Japanese amateur researchers has been instrumental in uncovering previously unknown species. This newly discovered plant does not fit into any existing genus, such as *Thismia*, due to its distinct characteristics, necessitating the collection of additional specimens for further study.



Plants that rely on fungi for nutrition and have limited geographical distribution are particularly vulnerable to environmental changes. Therefore, future research will focus on ecological studies aimed at understanding the relationships between *Relictithismia* and its fungal hosts, as well as assessing the impact of environmental alterations on these associations. ■

Source: ScienceDaily

Climate Crisis and Continued Deforestation may Result in Significant Damage to the Animal World

Hirupriya Rabha

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Deforestation refers to the clearing or thinning of trees and forests, when deforestation occurs, much of the carbon stored by trees is released back into the atmosphere as carbon dioxide, which contributes to climate change. As a result of deforestation and degradation, some tropical forests now emit more carbon than they capture, turning them from a carbon 'sink' into a carbon source.

A recent study reports that the combination of global warming and extreme heat events, alongside the continued expansion of deforestation in the world, may be devastating for many species of animals, especially those that know how to climb trees. The researchers explain that the climate crisis and global warming force animals to look for more comfortable places to stay to escape the extreme heat, just as we look for a shady area on a hot day.



The problem is in many places of the world the density of trees is decreasing, mainly due to phenomena such as deforestation and the expansion of the use of trees for various purposes such as construction, etc which creates a situation where, on the one hand, due to climate change, the animals will depend more on trees for their survival, while on the other hand, the destruction of habitats will lead to a decrease in the availability of trees.

This research demonstrates that trees are crucially important to the ability of animals to cope with climate change, and in many cases, their availability can be, for the animals. It proves how important it is to preserve forested areas and trees in general, especially in light of the changing climate. This research will be used to build more effective programs for the conservation and restoration of natural areas so that we can provide the animals with what they need to survive. ■

Source: ScienceDaily

Photo Story

1.



Celebration of Sri Sri Saraswati Puja at Dudhnoi College, 14th February 2024.

2.



Department of Botany handed over Rs. 10,000.00 to honorable Principal of Dudhnoi College as contribution to the College Fund for the second time on February 23, 2024. In 2023, the department contributed Rs. 5,000.00. The funds were generated from the sale of vermicompost and mushroom products by the Botany Department.

3.



Present status (April, 2024) of the Horticultural Garden cum Nursery maintained by Dept. of Botany, Dudhnoi College
