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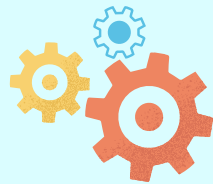


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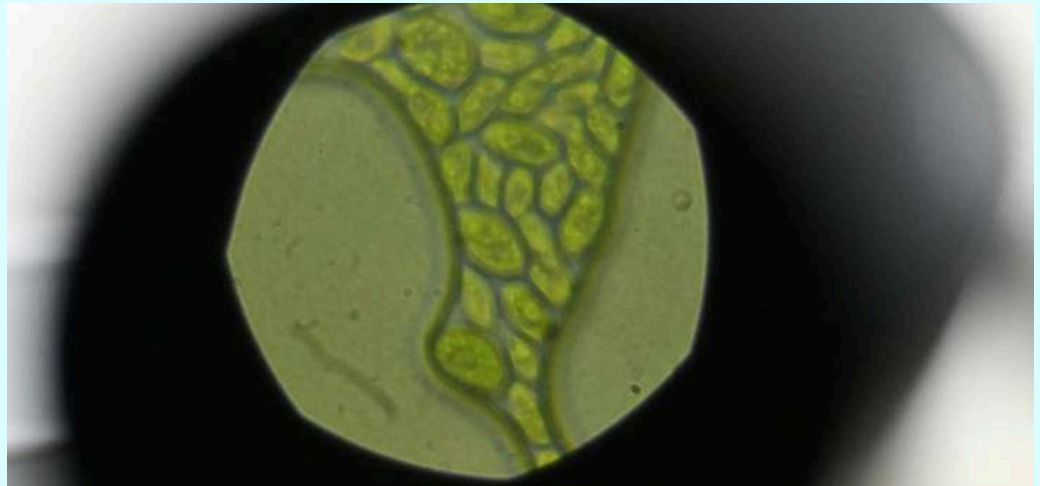
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## SCIENCE & TECHNOLOGY

### CSIR-IICT scientists identify microalgae as a potential protein supplement

Microalgae are “under-exploited crops” and do not compete with traditional food crops for space and resources.



*Microalgae are “under-exploited crops” and do not compete with traditional food crops for space and resources*

CSIR-Indian Institute of Chemical Technology (IICT) scientists have spotlighted the potential of Chlorella Growth Factor (CGF), a protein-rich extract derived from the microalgae ‘Chlorella sorokiniana’, as an ideal ingredient for a wide range of food and feed applications.

Microalgae are “under-exploited crops” and do not compete with traditional food crops for space and resources. The latest research study by noted scientists S. Venkata Mohan and M. Hemalatha showed that CGF, with its rich amino acid content and superior protein quality, presents a promising alternative protein source that can significantly contribute to human and animal diets. The scientists at the institute’s bioengineering and environmental sciences lab asserted that its beneficial properties extend beyond basic nutrition, promoting overall health, immunity, and well-being. Hence, CGF could become a valuable supplement for enhancing dietary intake and supporting sustainable food and feed production systems.

Source: <https://www.thehindu.com/sci-tech/science/csir-iict-scientists-identify-microalgae-as-a-potential-protein-supplement/article68262725.ece>



## Catalytic boost for cheaper biodiesel production

A global team comprising Assam-based scientists developed a superhydrophobic catalyst that can cut biodiesel cost from about \$1.2 now to 37 cents per litre



A team of scientists from Assam, Odisha, China, and the United Kingdom have developed a water-repellent catalyst that can cut the cost of producing “environmentally benign” biodiesel substantially from the current levels.

The process of arriving at the “spherical superhydrophobic activated carbon catalyst” to withstand water by-product during the production of biodiesel – pursued as a substitute for diesel, an exhaustible fossil fuel – has been published in the latest issue of the peer-reviewed *Advanced Functional Materials*, a high impact journal of the international materials science community.

The authors of the study are Arpita Das, Kangkana Saikia, and Samuel Lalthazuala Rokhum of Southern Assam’s Department of Chemistry, National Institute of Technology (NIT) in Silchar, Chandrakanta Guchhait and Bimalendu Adhikari of NIT Rourkela in Odisha, Da Shi of the University of Cambridge in the United Kingdom, and Hu Li of the Guizhou University in China.

Superhydrophobic catalysts, imitating the anti-wetting or water-repulsing properties of natural surfaces such as lotus leaves, are deemed crucial for their ability to prevent the poisoning of active sites by water, produced in situ or as a by-product.

“Our novel superhydrophobic catalyst can be a game-changer in the field of biodiesel production. It stands out because of unmatched robustness; it can withstand the water by-product during biodiesel production,” Dr. Rokhum told *The Hindu*. “This means the catalyst remains highly effective and can be reused multiple times, making the catalytic process more efficient and cost-effective,” he said.

Source: <https://www.thehindu.com/sci-tech/science/catalytic-boost-for-cheaper-biodiesel-production/article68304211.ece>

## New research heralds breast cancer diagnosis with just a drop of blood

The discovery of biomarkers to help in early detection reduces the economic burden of the family in particular and society in general, says the scientist who led the research.



Students for a pink ribbon to raise awareness on breast cancer

The CSIR-Centre for Cellular and Molecular Biology (CCMB) scientists in association with clinicians of the Regional Cancer Centre (RCC) in Thiruvananthapuram (Kerala) have identified a potentially cost-effective and non-invasive method to detect various kinds of breast cancer from just a drop of blood.

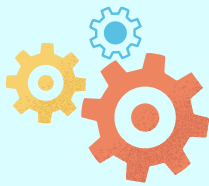
The researchers have analysed microRNA signatures in hundreds of human cancer samples and identified 439 microRNAs (miRNAs) that are associated with invasive breast cancer, of which 107 qualified to be potential biomarkers for the stratification of different types, grades and stages of invasive ductal carcinoma., according to CSIR-CCMB Chief Scientist Lekha Dinesh Kumar, who led the research.

Most of the cellular processes in a body are regulated by miRNAs molecules which are 23-25 base small non-coding RNA molecules. Identification of miRNAs involved in the regulation of the initiation and progression of breast cancer holds great promise for the development of molecular tools for early diagnosis and prognosis, said Dr. Lekha.

The scientist explained that cancer cells shed DNA/RNA into the circulation called ‘Circulating Nucleic Acids (CNAs) and tumour-specific genetic changes, including DNA, RNA, and proteins, which are detectable in plasma or other body fluids of cancer patients to identify the earlier stages of cancer development.

Based on this principle, the identified biomarkers could be made into a liquid biopsy system that might prove to be a boon for developing countries, where cancer could be detected from one drop of blood. “Our study has paved the way for the application of miRNAs as biomarkers and would open up new vistas in developing a refined, cost-effective, and non-invasive method in breast cancer diagnosis,” the CSIR-CCMB Chief Scientist said.

Source: <https://www.thehindu.com/sci-tech/health/new-research-heralds-breast-cancer-diagnosis-with-just-a-drop-of-blood/article68311570.ece>



## IISc designs device to make infrared light visible, with diverse applications in defence and optical communications



*The Indian Institute of Science team used a 2D material to design what they call a non-linear optical mirror stack to increase or up-convert the frequency of short infrared light to the visible range, combined with widefield imaging capability.*

Researchers at the Indian Institute of Science (IISc) have fabricated a device to increase or up-convert the frequency of short infrared light to the visible range. This up-conversion of light has diverse applications, especially in defence and optical communications, said IISc.

“The human eye can only see light at certain frequencies (called the visible spectrum), the lowest of which constitutes red light. Infrared light, which we can’t see, has an even lower frequency than red light. IISc researchers have now fabricated a device to increase or up-convert the frequency of short infrared light to the visible range,” IISc said.

### 2D material used

The institute added that in a first, the IISc team used a 2D material to design what they call a non-linear optical mirror stack to achieve this up-conversion, combined with widefield imaging capability. The stack consists of multilayered gallium selenide fixed to the top of a gold reflective surface, with a silicon dioxide layer sandwiched in between.

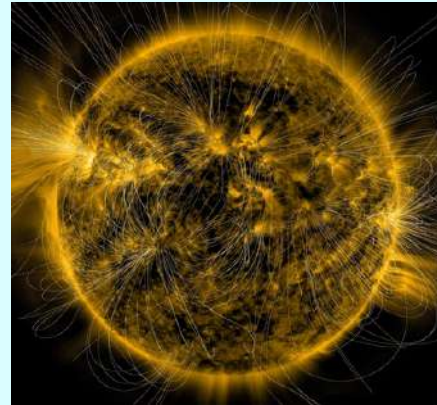
It said that traditional infrared imaging uses exotic low-energy bandgap semiconductors or micro-bolometer arrays, which usually pick up heat or absorption signatures from the object being studied. However, existing infrared sensors are bulky and not very efficient. They are also export-restricted because of their utility in defence. There is, therefore, a critical need to develop indigenous and efficient devices.

The method used by the IISc team involves feeding an input infrared signal along with a pump beam onto the mirror stack. The nonlinear optical properties of the material constituting the stack result in a mixing of the frequencies, leading to an output beam of increased (up-converted) frequency, but with the rest of the properties intact. Using this method, they were able to up-convert infrared light of a wavelength of around 1,550 nm to 622 nm visible light. The output light wave can be detected using traditional silicon-based cameras.

*Source: <https://www.thehindu.com/news/cities/bangalore/iisc-designs-device-to-make-infrared-light-visible-with-diverse-applications-in-defence-and-optical-communications/article68311625.ece>*

## Sun’s magnetic field flips the script: New study places origin closer to the surface

Discovery could help accurately forecast intensity of solar flares



Till now, scientists have believed the Sun’s powerful magnetic field, responsible for solar storms that impact Earth, originated deep within the star. However, a new paper by researchers at Massachusetts Institute of Technology and University of Edinburgh has thrown a wrench into the theory. The Sun’s dynamo, the process generating the magnetic field, might be located much closer to the surface, in the star’s outermost layers, it has suggested.

These findings published in journal Nature could help in predicting solar cycles more accurately. “Our results are contributing to understanding the solar cycle better. We want to forecast if the next solar cycle will be particularly strong, or maybe weaker than normal,” Daniel Lecoanet, assistant professor at Northwestern University, told Down To Earth (DTE).

Every 11 years, the sun’s magnetic field undergoes a cycle, known as the solar cycle. The cycle is based on the sunspots, regions where the magnetic field is much higher than anywhere else on the Sun. Sunspots are few at the beginning of a solar cycle (solar minimum) and reach their highest in the middle of the cycle (solar maximum) before decreasing again. Lecoanet explained that previous models (which assumed the solar magnetic field is generated deep within the Sun) were unable to accurately predict whether the next solar cycle would be strong or weak.

They hope to predict the solar cycle in the same way that hurricanes are forecast. “We want to see whether a solar cycle would be strong or weak. This work is not trying to make predictions about individual solar storms,” he adds. The team used numerical simulations to model the sun’s magnetic fields. The study’s model takes into account torsional oscillations, which are cyclical patterns in how gas and plasma flow within and around the sun.

*Source: <https://www.downtoearth.org.in/news/science-technology/sun-s-magnetic-field-flips-the-script-new-study-places-origin-closer-to-the-surface-96290>*



## Two antlion species found for first time in India, Thailand



*Pseudoformicaleo nubecula*

*Creoleon cinnamomeus*

Researchers have found two poorly known antlion species of Myrmeleontidae family of order Neuroptera from India, Thailand, and Vietnam. They are *Pseudoformicaleo nubecula* and *Creoleon cinnamomeus*. The research team of the Shadpada Entomology Research Lab, Christ College (Autonomous), Irinjalakuda, Thrissur, are behind the findings.

The antlion species *Pseudoformicaleo nubecula* (Gerstaecker, 1885) was found in India from Kalashamala, Mulamkunnathukavu, and Irinjalakuda in Thrissur; Aroor and Elamaram in Malappuram; Periyar in Kasaragod; and in Thailand from Chiang Dao in Wiang Haeng district.

Another antlion species *Creoleon cinnamomeus* (Navás, 1913) was found in India from Vazhayur in Malappuram; Madayipara in Kannur; Kalashamala in Thrissur; and in Vietnam from Phú Quốc island.

Doctoral scholar Suryanarayanan T.B.; research supervisor Bijoy C., Assistant Professor of Christ College; and Hungarian scientist Levente Ábrahám are behind the discovery. The findings have been published in the recent issue of international scientific journals such as *Journal of Insect biodiversity and Oriental Insects*.

*Pseudoformicaleo nubecula* has been reported in other countries such as Australia, China, Indonesia, Japan, Malaysia, Palau, Papua New Guinea, Sri Lanka and Vietnam. While *Creoleon cinnamomeus* has been reported only from China, Sri Lanka, and Vietnam.

“Adults of antlions are misidentified as damselflies by non-taxonomists because of their morphological resemblance. Antlions can be easily distinguished by their long distinct antennae. They come under order Neuroptera, which includes holometabolous insects, while the damselflies come under order Odonata, which includes hemimetabolous insects,” says Dr. Bejoy.

The research was conducted with financial assistance from the Council of Scientific and Industrial Research. The Shadpada Entomology Research Lab has a special emphasis on research in such organisms.

Source: <https://www.thehindu.com/sci-tech/energy-and-environment/two-antlion-species-found-for-first-time-in-india-thailand/article68263575.ece>

## Global project ‘paints’ evidence of air pollution in India

The Air of the Anthropocene project has been exhibited at gallery shows in Los Angeles, Belfast, and Birmingham



*Birds fly through a hazy sky in Bengaluru.*

Researchers and artists joined forces for a so-called “painting with light” international project to make invisible air pollution in India visible, demonstrating the health risks posed to the population.

Combining digital light painting and low-cost air pollution sensors, the scientific team produced photographic evidence of pollution levels in cities across three countries – India, Ethiopia and the U.K. – to spark debate among local communities.

Their findings, published in ‘Nature Communications Earth & Environment’ on June 8, 2024, record how photographs taken as part of the ‘Air of the Anthropocene’ initiative stimulated discussion around the impact of air pollution.

The illustrations covered two children’s playgrounds in India, 500 km apart — one in urban Delhi, the other in rural Palampur — with PM2.5 values at the Palampur playground at least 12.5-times less than those measured in Delhi.

“Air pollution is the leading global environmental risk factor. By painting with light to create impactful images, we provide people with an easy-to-understand way of comparing air pollution in different contexts — making something that was largely invisible visible,” said Francis Pope, an environmental scientist from Birmingham University and co-creator of the project with artist Robin Price.

“Air of the Anthropocene creates spaces and places for discussion about air pollution, using art as a proxy to communicate and create dialogues about the issues associated with air pollution,” he said.

Air pollution also varied dramatically between locations in Ethiopia — a kitchen using biomass stoves for food preparation where PM2.5 concentrations in the room were up to 20-times greater than what was measured nearby outdoors.

Source: <https://www.thehindu.com/sci-tech/energy-and-environment/global-project-paints-evidence-of-air-pollution-in-india/article68254930.ece>



# ENVIRONMENT

## Climate conference in November to emphasise 'peace' and 'truce'



The annual climate conference to be held here in November will lay particular stress on “peace” and “truce” to enable countries to focus on climate solution amid ongoing conflicts, a top adviser to the Azerbaijan government said at a media briefing this week.

The 29th edition of the Conference of Parties (COP) — as the climate conference is called — is set to further agenda points decided in the 28th edition in Dubai such as a firm commitment to “transition away from the use of fossil fuels in a just, orderly, and equitable manner, and accelerating action in this critical decade, to achieve net zero by 2050.”

The choice of Azerbaijan as the host means that it will preside over COP-29 proceedings and try to steer countries into achieving consensus on addressing the climate crisis. Most countries have agreed on the urgency of the problem and the need to keep temperatures from rising 1.5C above pre-industrial levels by the end of century.

A long-standing criticism and a matter of deep division between developed and developing countries is that a 2009 commitment by developed countries to mobilise \$100 billion a year between 2020 and 2025 for developing countries has only been partially realised. A major item that is expected to be firmed up in 2024 is to decide a new annual target above \$100 billion and agreement on whether these will be in the form of grants or loans.

Source: <https://www.thehindu.com/sci-tech/energy-and-environment/climate-conference-in-november-to-emphasise-peace-and-truce/article68259858.ece>

## Human-induced environmental changes are spiking the risk of disease outbreaks: What a new study says

Biodiversity loss, which refers to the loss of plant or animal species at a local or worldwide scale, has the biggest impact, according to the study. It was followed by climate change and introduction of non-native species.



As human activities continue to degrade the planet, the risk of infectious disease outbreaks is increasingly becoming more likely. Four human-induced global changes — biodiversity loss, introduction of non-native species, climate change, and chemical pollution — are the leading drivers of disease spread not just among humans but also plants and animals, according to a new study.

The research, ‘A meta-analysis on global change drivers and the risk of infectious disease’, published in the journal Nature earlier this month, has been carried out by a team of 20 researchers from US-based universities such as the University of Notre Dame, Yale University, Oregon State University, and the University of Connecticut.

Previous studies have also highlighted the link between disease spread and environmental changes but their approach was much more targeted. For example, a 2023 study found that warmer temperatures could be leading to a wider spread of malaria in Africa. The latest study has found that these changes are influencing infectious disease risk across the world and species.

### What are the findings of the study?

Although the spread of diseases can be influenced by a variety of factors, the researchers focused on five key global change drivers — biodiversity loss, climate change, chemical pollution, non-native species, and habitat loss. They then compiled data from nearly 1,000 previous studies and looked at how these drivers influenced infectious disease outcomes — like the number of cases and severity — for plants, animals, and humans on every continent except for Antarctica.

Source: <https://indianexpress.com/article/explained/explained-climate/environmental-changes-risk-disease-outbreaks-9342346/>



## Air pollution killed 8.1 million globally, 2.1mn in India in 2021: Report

As per the report, air pollution is considered to be one of the biggest killers globally, second only to high blood pressure. In fact, it outranks tobacco consumption as a leading cause of death and disability, said the report.



*As per data, there has been a steady increase in the number of deaths attributable to air pollution in India, barring a small dip seen during the pandemic.*

Air pollution has caused 8.1 million deaths around the world in 2021 with China and India accounting for more than half of the global burden at 2.3 and 2.1 million deaths respectively, according to the recently released State of Global Air Report.

As per the report, air pollution is considered to be one of the biggest killers globally, second only to high blood pressure. In fact, it outranks tobacco consumption as a leading cause of death and disability, said the report. Of the total deaths, 700,000 were children under the age of 5 years. “Air pollution poses an enormous — and growing — public health challenge,” the report states.

### India bears the brunt

Even though the situation is bleak globally, India is among the countries which bears the highest brunt of air pollution. India with 2.1 million deaths and China with 2.3 million deaths due to air pollution, account for 55% of the global burden. Not only the particulate matter, Indians are also exposed to high levels of ozone. Short-term exposure to ozone has been linked to exacerbation of asthma and other respiratory symptoms while long term exposure is linked to Chronic Obstructive Pulmonary Disease — a condition where the lungs remain inflamed obstructing the airflow. The report states that 489,000 deaths globally were attributable to ozone exposure in 2021 — of these deaths nearly 50% or 237,000 deaths took place in the country. India also reported the highest number of pollution-linked deaths in children under the age of five in 2021 with at least 169,400 deaths attributed to air pollution.

As per data, there has been a steady increase in the number of deaths attributable to air pollution in India, barring a small dip seen during the pandemic.

Source: <https://indianexpress.com/article/india/air-pollution-killed-8-1-million-globally-2-1mn-in-india-in-2021-report-9403131/>

## What are the findings of the 2024 Hindu Kush Himalayas snow update?

What does the report by the International Centre for Integrated Mountain Development highlight? How important is snow persistence? How much of a role does climate change play in river basins receiving low levels of snowmelt this year?



The Ganga river basin — India’s largest — reached a record low snow persistence in 2024, the Hindu Kush Himalaya snow update of the International Centre for Integrated Mountain Development (ICIMOD) has reported. The Brahmaputra and the Indus basins have suffered similarly, threatening water supply to millions of people. “Tragically this is yet another postcard from the frontlines of a climate crisis that is accelerating even beyond scientists’ projections and causing huge challenges in one of the most populated regions of the world,” Miriam Jackson, Cryosphere Lead at ICIMOD and a contributor to reports of the UN Intergovernmental Panel on Climate Change,

### The story so far:

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### What is snow persistence?

Snow persistence is the fraction of time snow is on the ground. When this snow melts, it provides water to people and ecosystems. In the river basins of the Hindu Kush Himalaya (HKH), snowmelt is the biggest source of water in the streams. Overall, it contributes 23% of the runoff to the region’s 12 major river basins every year. The HKH mountains extend around 3,500 km over eight countries — Afghanistan, Bangladesh, Bhutan, China, India, Nepal, Myanmar, and Pakistan. These mountains are also called the “water towers of Asia” because they are the origins of 10 crucial river systems on the continent — Amu Darya, Indus, Ganga, Brahmaputra, Irrawaddy, Salween, Mekong, Yangtze, Yellow river, and Tarim. These river basins provide water to almost one-fourth of the world’s population and are a significant freshwater source for 240 million people in the HKH region.

Source: <https://www.thehindu.com/sci-tech/energy-and-environment/hindu-kush-himalayas-snow-update-2024-findings/article68307604.ece>



# AGRICULTURE

## CMFRI and INCOIS join forces to improve oceanography research and fisheries management



To enhance the sustainable utilisation of India's marine fisheries, the ICAR-Central Marine Fisheries Research Institute (CMFRI) has entered into a memorandum of understanding (MoU) with the Indian National Centre for Ocean Information Services (INCOIS). This agreement, signed by CMFRI Director, Dr. A Gopalakrishnan and INCOIS Director, Dr. T Srinivasa Kumar, aims to foster collaboration on a range of research initiatives, including improved fishing advisories and fisheries management.

Under the MoU, CMFRI and INCOIS will collaborate on joint projects leveraging their expertise in operational oceanography, fishery oceanography, fishing advisories, ecological and environmental impact assessments, remote sensing and GIS applications, biodiversity, fisheries management, geosciences, and outreach and awareness. This partnership will involve sharing resources and personnel for targeted research efforts.

Dr. A Gopalakrishnan emphasised the significance of this collaboration, noting that it would substantially enhance research capabilities in oceanography and marine fisheries management. "By combining the expertise and resources of both institutions, we can gain deeper insights into marine ecosystems and develop data-driven solutions for sustainable fisheries management. This collaboration is also crucial for securing the livelihoods of coastal communities and ensuring the health of the ecosystem for future generations," he added.

### Improved Fishing Advisories

INCOIS Director Dr. T Srinivasa Kumar highlighted the benefits to the fishing community, saying that the collaboration would refine existing technologies to provide more accurate and effective potential fishing zone advisories. This would enable fishermen to optimise their fishing operations and catches, thereby improving their efficiency.

The agreement also includes joint exploratory surveys to collect vital geotagged fishery and ecological data, which are essential for understanding fish populations, distribution patterns, and the overall health of the marine ecosystem. Additionally, it facilitates the exchange of datasets between the two institutions for specific research programmes.

Source: <https://agriculturepost.com/allied-sectors/fisheries/cmfri-and-incois-join-forces-to-improve-oceanography-research-and-fisheries-management/>

## ICRISAT highlights innovative solutions to combat aflatoxin contamination in groundnut



This World Food Safety Day, June 7, 2024, the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) sheds light on the health risks of aflatoxin contamination in groundnut. In line with this year's theme, "Prepare for the Unexpected," the organisation underscores successful farm-level interventions to tackle this issue.

Groundnut kernels, prized for their oil content, are a nutritional powerhouse, rich in protein, antioxidants, essential minerals, and vitamins, and a staple in diets worldwide. Developing countries produce nearly 95 per cent of the world's groundnuts, with India and China contributing the majority. Other key producers include Nigeria, Senegal, Sudan, and Argentina.

### Aflatoxin's Impact on Human Health

Aflatoxin, known as the "hidden poison," severely affects human health, particularly in children. It causes delayed development, stunted growth, severe liver damage, and increases the risk of liver cancer. Contaminated crops expose millions to chronic aflatoxin exposure, leading to health issues and economic losses for farmers due to rejected produce.

The aflatoxin-producing strains that commonly infect groundnuts are *Aspergillus flavus* and *Aspergillus parasiticus*. The International Agency for Research on Cancer has classified them as Group 1 carcinogens, a proven human carcinogen, based on their toxicity and prevalence in milk.

Drinking milk from dairy animals that have eaten feed contaminated with aflatoxin can increase the risk of cancer. This is a significant food safety concern globally.

Source: <https://agriculturepost.com/farm-inputs/agrochemicals/icrisat-highlights-innovative-solutions-to-combat-aflatoxin-contamination-in-groundnut-on-world-food-safety-day/>



# AGRICULTURE

## Best Agrolife to launch under patent 'Nemagen' insecticide in July 2024



Best Agrolife (BAL), one of the leading manufacturers of speciality and patented agrochemicals in India, has announced the launching of an under-patent formulation, with the brand name 'Nemagen' in July this year. The company has received the 9(3) Formulation Indigenous Manufacture (FIM) registration for the product, BAL said.

In recent years, lepidopteran pests have expanded their host range and developed resistance to existing pesticides. Consequently, these pests have caused 30-50 per cent of crop damage and substantial economic losses, highlighting an urgent need for advanced insecticide solutions.

“Nemagen, a highly effective broad-spectrum insecticide, is formulated with a unique combination of Chlorantraniliprole, Novaluron, and Emamectin Benzoate. This blend offers control over a wide array of pests, particularly targeting lepidopteran pests such as shoot and fruit borers, and also proving effective against Coleoptera and Diptera pests,” BAL claimed.

“With the expansion of lepidopteran pests causing significant crop damage, Nemagen addresses a critical need in the agricultural market, promising substantial demand. The market size for this segment is approximately ₹6300 crore and Best Agrolife will capture a share of ₹500 crore out of it in the first two years. Its versatility allows for application at various stages of crop growth, making it suitable for use on vegetables, field crops, fruit crops, and pulses,” the agrochemical manufacturer said.

“The launch of Nemagen is a strategic move by Best Agrolife Group to enhance its portfolio of speciality agrochemicals, positioning the company for future revenue growth. Nemagen’s low toxicity profile promotes sustainable farming practices, aligning with global trends toward environment-friendly agricultural solutions,” the company claimed.

“The proprietary blend of active ingredients in Nemagen underscores Best Agrolife Group’s dedication to innovation, addressing the evolving needs of modern agriculture. In addition to Nemagen, the company offers a comprehensive portfolio of innovative solutions, including Warden Extra, Orisulam, and Tricolor,” the company said.

Source: <https://agriculturepost.com/farm-inputs/agrochemicals/best-agrolife-to-launch-under-patent-nemagen-insecticide-in-july-following-fim-registration/>

## Scientists urge to explore the potential of deep-sea mesopelagic fishes within Indian EEZ



Marine fishery scientists have highlighted the significant potential of the largely untapped mesopelagic resources within India’s Exclusive Economic Zone (EEZ). This discussion took place at a workshop on sustainable harvest and utilisation of mesopelagic fishes, organised by the Mangalore Regional Centre of ICAR-Central Marine Fisheries Research Institute (CMFRI) on Friday.

The mesopelagic zone, situated 200-1000 meters below sea level, is home to many small fish that are crucial to ecosystem dynamics. Despite being the most abundant vertebrates globally, mesopelagic fishes, including lantern fishes, remain largely unexploited.

Most of these fish are not consumed directly by humans due to their high lipid or wax ester content. However, marine scientists note that they are a rich source of protein, lipids, and minerals, making them valuable for the fishmeal industry, poultry and animal feed, and crop fertilisers. Experts suggest conducting a pilot study to accurately estimate the potential yield of these fish and to assess factors such as economic viability for their sustainable utilisation.

### Govt Support

At the workshop, Neetu Kumari Prasad, Joint Secretary at the Department of Fisheries, Government of India, pledged government support for entrepreneurial initiatives focused on the sustainable utilisation of mesopelagic resources. She said, “Government schemes provide options to develop mechanisms for utilising these fishes. Offshore resources are poorly explored. We should plan to extend fishing activities beyond territorial waters and tap into the resources within the EEZ.”

Source: <https://agriculturepost.com/allied-sectors/fisheries/scientists-urge-to-explore-the-potential-of-deep-sea-mesopelagic-fishes-within-indian-eez/>



# HEALTH

## Are you sleeping after 1 am? It can affect your mental health, says study

Dr Shaunak Ajinkya, consultant psychiatrist, Kokilaben Dhirubhai Ambani Hospital, Mumbai, explains the science



If you go to sleep after 1 am, you could be at a higher risk of developing mental health issues, regardless of your lifestyle and whether you are a morning person or a night owl. So says a new study by Imperial College, London, reinforcing that sleep is not a luxury but a necessity for our brain to function optimally.

The study finds that people who went to bed before 1 am had healthy mental profiles. But surprisingly, people who keep late hours and are comfortable staying awake till 1 am and beyond, experienced the poorest mental health. The research analysed data of 73,888 people from the UK Biobank, who slept seven hours daily. “Most of my patients have trouble sleeping beyond six hours,” says Dr Shaunak Ajinkya, consultant psychiatrist, Kokilaben Dhirubhai Ambani Hospital, Mumbai, So let’s understand what really happens.

### How do irregular habits disrupt circadian rhythms?

Our bodies operate on a natural 24-hour cycle known as the circadian rhythm, which is regulated by the brain in sync with the natural environment. However, consistently going to bed after midnight leads to a mismatch between our body’s internal clock and the external world. This mismatch not only makes it difficult to fall asleep, stay asleep, or have a refreshing sleep but also causes chronic sleep deprivation. This triggers mental disorders like anxiety and depression.

### How late hours impact sleep quality?

Late bedtimes shorten sleep periods if you need to wake up early for work. They also suppress the production of the sleep hormone melatonin, which is released by the brain’s pineal gland that regulates sleep-wake cycles. Sleep is a complex process with various stages, each playing a crucial role in our mental and emotional well-being. Deep sleep, for instance, repairs and rebuilds the body, while REM (rapid eye movement phase when dreams occur) sleep strengthens our memories and helps regulate our emotions. However, a late bedtime significantly curtails the time spent in these vital healing stages.

Source: <https://indianexpress.com/article/health-wellness/sleeping-after-1-am-mental-health-study-9392335/>

## Can chewing ginger help in case of a sudden heart attack?

If the affected person is not breathing and is unconscious, CPR (cardio-pulmonary resuscitation) should be promptly started, said consultant neurologist Dr Sudhir Kumar, Apollo Hospitals, Hyderabad



We had heard of Aspirin, but never about chewing ginger in case of a heart attack. This is why when we saw Ayurveda practitioner Guru Manish Ji suggesting that chewing a piece of adrak can help with a sudden heart attack, we immediately reached out to experts to verify the claim. “Ask the patient to chew vigorously on a piece of ginger. This is according to proven research texts,” he said on the RealHit podcast.

### Let’s first understand what happens during a heart attack

A serious heart attack is known as ST-segment elevation myocardial infarction (STEMI) and occurs when a major coronary artery is completely blocked. According to the National Center for Biotechnology Information (NCBI), STEMI is the most acute manifestation of coronary artery disease and is associated with great morbidity and mortality. “Early diagnosis and immediate reperfusion are the most effective ways to limit myocardial ischemia and infarct size and thereby reduce the risk of post-STEMI complications and heart failure,” it reads.

### What are the benefits of ginger?

According to another NCBI research, among natural entities, ginger is an extensively used and well-known functional food and condiment, possessing plentiful bioactivities, like anti-inflammatory, antioxidant, and antimicrobial properties in several disorders management.

### Does the claim hold true?

A heart attack is a medical emergency and if it is not treated on time, it can even result in death. “There is no research-based evidence of the efficacy of chewing ginger in acute heart attack cases. However, there is evidence of using Aspirin before any medical help arrives. Taking Aspirin early or before hospitalisation may improve survival rates in cases of heart attacks,” said Dr Sudhir Kumar, consultant neurologist, Apollo Hospitals, Hyderabad.

Source: <https://indianexpress.com/article/lifestyle/health/myth-or-fact-chewing-ginger-sudden-heart-attack-experts-weigh-9361111/>



# HEALTH

## Landmark 30-year study links ultra-processed foods to higher risk of early death: Know why this is concerning for India

This is especially concerning in a country like India, according to Dr Bharathi Kumar, Fortis Hospital, Nagarbhavi, Bangalore, as we're increasingly becoming dependent on ultra-processed foods.



A major 30-year study published in The BMJ has raised concerns about the link between ultra-processed foods and a higher risk of premature death. The research, conducted in the United States, highlighted the importance of reevaluating our diets for long-term health.

The study defined ultra-processed foods as those that undergo significant industrial processing. This often involves the addition of colours, emulsifiers, flavours, and other additives. It found a particularly strong association between early death and consumption of specific processed food categories, including:

- Ready-to-eat meat products
- Sugary drinks
- Dairy-based desserts
- Highly processed breakfast foods

While the researchers don't advocate for a complete ban on all ultra-processed foods, they emphasise the importance of "limiting consumption of certain types" to promote long-term well-being.

### Why is this concerning for India?

This is especially concerning in a country like India, according to Dr Bharathi Kumar, Fortis Hospital, Nagarbhavi, Bangalore, as we're increasingly becoming dependent on ultra-processed foods.

A World Health Organisation report, co-authored by the Indian Council for Research on International Economic Relations, revealed massive growth in India's processed food sector. However, a closer look reveals a trend shift.

Source: <https://indianexpress.com/article/lifestyle/health/ultra-processed-foods-early-death-risk-indians-9325557/>

## How much fibre should you ideally have in a day?

Consuming an excessive amount of fibre can trigger a series of uncomfortable reactions within your body



Fibre is a dietary superstar, lauded for its role in digestive health, blood sugar control, and even cancer prevention. However, as with most things in life, moderation is key.

G Sushma, Clinical Dietician at CARE Hospitals, Banjara Hills, Hyderabad, explained what happens when you overdo your fibre intake.

### The discomfort zone

"Consuming excessive fibre can trigger a series of uncomfortable reactions within your body," said Sushma. When you overload your system with fibre, it struggles to keep up with processing all that bulk. This can lead to a trio of unpleasant digestive issues: bloating, gas, and diarrhoea. Essentially, you're giving your digestive system more work than it can handle, leading to disruptions in your normal bowel movements.

"While fibre is undoubtedly beneficial for health, consuming excessive amounts can have negative consequences," cautions Sushma. Overdoing it can lead to bloating, gas, and diarrhoea. These issues arise because fibre bulks up stool, and when there's too much, it can strain your digestive system.

### How much fibre should you eat?

The ideal amount of fibre varies depending on factors like age, gender, and calorie intake. However, Sushma recommended a general guideline of 25-30 grams of fibre per day for adults. This amount provides health benefits without overwhelming your digestive system. Remember, exceeding this recommendation can lead to unwanted side effects.

Source: <https://indianexpress.com/article/lifestyle/health/what-happens-fibre-health-risks-9314063/>



# HEALTH

## Our body only needs 5 grams sugar; find out where the remaining goes in case of excess consumption

It's important to understand that the difference in sugar processing goes beyond a simple number. The key lies in how the body handles the sugar



*Excessive sugar intake can disrupt the balance of good and bad bacteria in your gut*

Sugar. It's everywhere, from the obvious treats to hidden sources in processed foods. While a little sweetness can be a delightful part of life, overindulging in sugary foods can wreak havoc on your body.

Contrary to popular belief, your body doesn't require a specific amount of added sugar. However, it does rely on glucose, a simple sugar, as its primary fuel source for cells, according to Kanikka Malhotra, a clinical nutritionist and diabetes educator. This glucose is primarily derived from carbohydrates in your diet, but your liver can also manufacture some on its own.

Though your body only needs 5 grams of sugar in the form of glucose, it's important to understand that the difference in sugar processing goes beyond a simple number. The key lies in how the body handles the sugar, said Malhotra.

In a healthy person, insulin, a hormone produced by the pancreas, acts like a key, unlocking the door for glucose to enter cells and be used for energy.

In someone with diabetes, either the body doesn't produce enough insulin, or the cells become resistant to its effects. This leads to a buildup of sugar in the bloodstream, a condition known as hyperglycemia.

When you consume excessive sugar, your body prioritises using it for energy, explained Malhotra. The liver can store some of this glucose as glycogen, a readily available energy source.

However, if overloaded, the excess sugar gets converted into fat and stored throughout the body. She said this can contribute to weight gain and increase your risk of developing chronic health problems like heart disease, type 2 diabetes, and some cancers.

Source: <https://indianexpress.com/article/lifestyle/health/what-happens-eat-foods-high-sugar-9362032/>

## Climate change is linked to worsening brain diseases – new study

Many of the components of the brain are, in fact, working close to the top of their temperature ranges, meaning that small increases in temperature or humidity may mean they stop working so well together.



*Climate change will affect many people with neurological diseases, often in many different ways.*

Climate change is making the symptoms of certain brain conditions worse, our new review has found. Conditions that can worsen as temperature and humidity rise include stroke, migraines, meningitis, epilepsy, multiple sclerosis, schizophrenia, Alzheimer's disease and Parkinson's.

Our brains are responsible for managing the environmental challenges we face, especially higher temperatures and humidity, for example by triggering sweating and telling us to move out of the sun and into the shade.

Each of the billions of neurons in our brain is like a learning, adapting computer, with many electrically active components. Many of these components work at a different rate depending on the ambient temperature, and are designed to work together within a narrow range of temperatures. Our bodies, and all their components, work well within these limits to which we have adapted over millennia.

Humans evolved in Africa and are generally comfortable between 20°C to 26°C and 20% to 80% humidity. Many of the components of the brain are, in fact, working close to the top of their temperature ranges, meaning that small increases in temperature or humidity may mean they stop working so well together.

When those environmental conditions move rapidly into unaccustomed ranges, as is happening with extreme temperatures and humidity related to climate change, our brain struggles to regulate our temperature and begins to malfunction.

Some diseases can already disrupt perspiration, essential to keeping cool, or our awareness of being too hot. Some drugs used to treat neurological and psychiatric conditions further complicate the problem by compromising the body's ability to react – reducing sweating or disturbing the temperature-regulating machinery in our brain.

Source: <https://indianexpress.com/article/lifestyle/health/climate-change-brain-diseases-new-study-9338965/>



# S&T COOPERATION FOR GLOBAL SOUTH

## CDP57: Optimizing Southeast Asian Population Dynamics through South-South and Triangular Cooperation



Denis Nkala, Chief, Intergovernmental and UN Systems Affairs, UNOSSC.

The 57th Session of the United Nations Commission on Population and Development (CPD57) reviewed the status of the 30-year implementation of the Programme of Action of the International Conference on Population and Development (ICPD) and its contribution to the follow-up and review of the 2030 Agenda for Sustainable Development.

On the sidelines of CPD57, three Association of South-East Asian (ASEAN) Countries organized a side-event, together with UNFPA and UNOSSC as co-organizers.

“Experts tell us that whatever countries in the region do on the population and development agenda will shape the future of global development itself,” said Ms. Dima Al-Khatib, Director of the United Nations Office for South-South Cooperation during the Opening segment. “We have a generational opportunity to propel shared progress in and through Southeast Asia by leveraging South-South cooperation on population dynamics in the region – enabling neighbors to profit together from practices already tested by peers – and to extend these benefits to other regions.”

H.E. Mr. Antonio Lagdameo, Permanent Representative of the Philippines to the UN, and Pio Smith, UNFPA Regional Director for Asia and the Pacific, also spoke during the opening Segment of the event titled “Optimizing Southeast Asian Population Dynamics through South-South and triangular Cooperation”.

Source: <https://unsouthsouth.org/2024/05/31/cdp57-optimizing-southeast-asian-population-dynamics-through-south-south-and-triangular-cooperation/>

## Building Sustainability Through South-South and Triangular Cooperation: 10th Hydropower for Today Forum



The 10th Hydropower for Today Forum with the theme “Green Hydropower Promotes Sustainable Development in Rural Areas” was successfully held in Hangzhou, China 22-23 May.

Moving forward, participants agreed to promote the high-quality development of hydropower, boost global economic growth and strengthen cooperation through South-South and triangular cooperation to accelerate the implementation of the UN 2030 Sustainable Development goals, and work together to create a better future of peace, development and win-win cooperation.

“We come together with a shared purpose – to explore innovative solutions and forge South-South and triangular partnerships that can advance us toward sustainable development, particularly in the realm of renewable energy and hydropower,” said Ms. Dima Al-Khatib, Director of the United Nations Office for South-South Cooperation. “In the Global South, small hydropower emerges as an innovative technological solution, offering clean and renewable energy alternatives, fostering rural development, mitigating climate change, and nurturing job creation. Through harnessing the natural flow of rivers and streams, small hydropower not only addresses energy access disparities, but also demonstrates environmental stewardship and empowers communities, thus significantly advancing sustainable development while building resilience for a future of equity and prosperity.”

The forum was co-hosted by the Ministry of Water Resources, China, and the United Nations Industrial Development Organization, and organized by the International Centre on Small Hydro Power, the International Network on Small Hydro Power, and PowerChina Huadong Engineering Corporation Limited.

Source: <https://unsouthsouth.org/2024/05/31/the-10th-hydropower-for-today-forum-showcased-green-energy/>



# S&T COOPERATION FOR GLOBAL SOUTH

## Small Island Developing States are the Single Largest Beneficiary of the IBSA Fund and the India-UN Fund



The Governments of India, Brazil, and South Africa, in collaboration with the United Nations Office for South-South Cooperation (UNOSSC), showcased the commitment of South-South cooperation Trust Funds to supporting resilience in Small Island Developing States (SIDS) during a side-event at the 4th International Conference on Small Island Developing States (SIDS4).

“The goal is to benefit most those countries which are not getting access to development finance, driven by the demand of those countries, and with projects tailor-made to their needs and that have direct impact in communities,” said H.E. Ambassador Yojana Patel, Deputy Permanent Representative of India to the United Nations.

“Participation by the SIDS in UNOSSC-managed South-South Funds is very vibrant and results in a wealth of diversity of knowledge and approaches in the projects they implement,” said Ms. Dima Al-Khatib, UNOSSC Director. “At UNOSSC we look forward to further advancing a reinvigorated agenda for SIDS resilience and prosperity.”

In the presence of Ministers and Ambassadors from partnering countries, the event featured results from completed and ongoing projects, as well as invited deliberations on catalytic approaches in support of the implementation of ‘The Antigua and Barbuda Agenda for SIDS (ABAS) – a Renewed Declaration for Resilient Prosperity’ in the years to come.

“A successful UNCDF project is expanding access to parametric insurance among vulnerable and remote populations,” said H.E. Filipo Tarakinikini, Permanent Representative of Fiji to the United Nations. “Development partners can scale this solution to facilitate climate change adaptation through parametric insurance.”

“An information technology in education project was implemented as a response to the Samoa Pathway to increase connectivity and access to technology in partnership with UNDP,” noted H.E. Dionisio Babo Soares, Permanent Representative of Timor-Leste to the United Nations.

Source: <https://unsouthsouth.org/2024/05/30/sids4-ibsa-and-india-un-fund-champion-advocacy-and-support-for-sids-resilience-at-sids-conference/>

## New Development Bank Seminar in Cairo Emphasizes Importance of South-South Partnership



The New Development Bank (NDB), in coordination with the Ministry of International Cooperation, Egypt, organized a Seminar on ‘Navigating New Horizons’, 11-12 June 2024 in Cairo, Egypt.

The seminar, held for the first time outside the founding BRICS Member States, followed Egypt’s joining of the NDB in March 2023 and its official approval for BRICS membership earlier this year. The seminar aimed to facilitate a deeper understanding of Egypt’s development priorities and the NDB’s mandate, with a focus on forging partnerships aligned with the Sustainable Development Goals (SDGs).

“The NDB is an exemplary model of South-South development financing, leveraging infrastructure development to drive industrialization, stimulate economic growth, and assist emerging markets and developing countries in achieving their development goals,” said UNOSSC Director Dima Al Khatib. As a panelist in the session on “Enhancing Global Development through South-South Cooperation,” Ms. Dima Al Khatib shared insights on how to unlock the vast potential of South-South cooperation in the face of today’s development challenges and opportunities. She highlighted the UN’s perspective on South-South cooperation and the importance of aligning development efforts with the SDGs. The discussions provided valuable insights into the opportunities and challenges facing development finance and sustainable infrastructure in the region. Southern-led development finance, exemplified by NDB’s commitment, significantly supports developing countries in tailoring sustainable development agendas to their unique domestic circumstances.

The two-day seminar featured high-level speakers, including H.E. Dr. Mostafa Madbouly, Prime Minister of the Arab Republic of Egypt, and insightful discussions on the role of the NDB in supporting Africa’s development agenda. Key themes included the importance of infrastructure development, the need for sustainable and inclusive growth, and the role of South-South cooperation in addressing Africa’s development challenges.

Source: <https://unsouthsouth.org/2024/06/12/new-development-bank-seminar-in-cairo-emphasizes-importance-of-south-south-partnership/>



# S&T COOPERATION FOR GLOBAL SOUTH

## Youth Leadership at the Core of Greening Technology Transfer in the Global South



Following the launch of the pilot project “Greening Higher Education: Promoting the Role of Science, Technology, and Innovation in SDG Impacts through Meaningful Youth Engagement and Leadership among the South-South University Cooperation Network” by UNESCO International Institute for Higher Education (UNESCO IESALC) and the United Nations Office of South-South Cooperation (UNOSSC) at COP28 in Dubai in December 2023, the two UN offices have joined hands once again. During the United Nations Economic and Social Council (ECOSOC) Youth Forum UNESCO IESALC and UNOSSC organized a partnership discussion, bringing together youth leaders from various regions and stakeholders who have taken actions in the space of Greening Higher Education and committed to continue working with the UN in the realization of SDG4 on Education and SDG 13 on climate change through strong partnerships. While co-hosted by UNESCO IESALC and UNOSSC, UNESCO SDG4 Youth & Student Network, UNICEF, National Geographic Learning, University of Helsinki, Education Above All and Technological University Dublin supported the event as partners.

The event “Greening Higher Education Institutions: bridging SDG4 and SDG 13” provided education stakeholders and communities with the knowledge to drive a green transformation in higher education. Harnessing the resources of higher education institutions and cooperating with partners in different sectors is critical to achieving this objective successfully. Furthermore, the shift to a sustainable society requires the incorporation of green concepts into science, technology, and innovation (STI), including the value and promotion of youth led projects for green STI aimed at a sustainable future. It also stressed the essential role that higher education, especially through young people’s leadership and engagement, should play in fostering a sustainable and environmentally conscious society, building the basis for a better tomorrow for today’s and future generations.

Source: <https://unsouthsouth.org/2024/04/18/youth-leadership-at-the-core-of-greening-technology-transfer-in-the-global-south/>

## IsDB: 50 Years of Championing South-South Cooperation in its Member Countries and Beyond



As we pass the midpoint of the implementation of the 2030 Agenda, the world is falling short of meeting most of the Sustainable Development Goals. Nearly 40 per cent of all developing countries suffer from severe debt problems.

Responding to the priorities of the Global South since its establishment in 1974, the Islamic Development Bank (IsDB) has been providing innovative, sustainable and predictable development financing, said UNOSSC Director Ms. Dima Al-Khatib, during a discussion highlighting IsDB’s 50 years of championing South-South cooperation in its Member Countries and beyond. The discussion was held alongside the IsDB 2024 Annual Meetings and Golden Jubilee celebrations in Riyadh.

The importance of scaling up innovative development finance is reflected in various recent international forums and respective agreements, including the 21st Session of the High-Level Committee on South-South Cooperation; the Science, Technology, and Innovation (STI) Summit; and the Third South Summit, among others. Here it is important to note that Member States emphasize that Southern-led development finance provides essential support to developing countries in the implementation of their sustainable development agendas, adapted to their specific domestic conditions.

During the IsDB discussion, panelists exchanged views and ideas on the various ways and means to scale up South-South cooperation, emphasizing the huge potential of South-South cooperation to assist the countries from the Global South to achieve the sustainable development goals, among internationally agreed development goals.

Source: <https://unsouthsouth.org/2024/04/30/isdb-50-years-of-championing-south-south-cooperation-in-its-member-countries-and-beyond/>



## OTHERS

### Study shows elephants might call each other by name

Could it be that elephants address each other by the equivalent of a name? A new study involving wild African savannah elephants in Kenya lends support to this idea



In this undated photo, an African elephant family comforts a calf in Samburu National Reserve, Kenya. A new study in *Nature Ecology & Evolution* demonstrates that elephants respond to individual names, one of the few animal species known to do so.

Over the years, researchers who study elephants have noticed an intriguing phenomenon. Sometimes when an elephant makes a vocalization to a group of other elephants, all of them respond. But sometimes when that same elephant makes a similar call to the group, only a single individual responds.

Could it be that elephants address each other by the equivalent of a name? A new study involving wild African savannah elephants in Kenya lends support to this idea.

The researchers analyzed vocalizations - mostly rumbles generated by elephants using their vocal cords, similar to how people speak - made by more than 100 elephants in Amboseli National Park and Samburu National Reserve. Using a machine-learning model, the researchers identified what appeared to be a name-like component in these calls identifying a specific elephant as the intended addressee. The researchers then played audio for 17 elephants to test how they would respond to a call apparently addressed to them as well as to a call apparently addressed to some other elephant.

The elephants responded more strongly on average to calls apparently addressed to them. When they heard such a call, they tended to behave more enthusiastically, walk toward the audio source and make more vocalizations than when they heard one apparently meant for someone else.

The study's findings indicate that elephants "address one another with something like a name," according to behavioral ecologist Mickey Pardo of Cornell University and formerly of Colorado State University, lead author of the study published on Monday in the journal *Nature Ecology & Evolution*.

Source: <https://www.thehindu.com/sci-tech/science/study-shows-elephants-might-call-each-other-by-name/article68276175.ece>

### Explore the nocturnal wilderness at herp walks in Visakhapatnam

Embark on a nocturnal adventure in the Eastern Ghats in Visakhapatnam with herp walks, discovering hidden reptiles and amphibians



A chameleon spotted at Simhachalam Hills during herp walks in Visakhapatnam

The silence of the night is broken by the sighing of trees in the breeze. Armed with flashlights, cameras, and curious minds, a group of about 15 members, led by Nature educators, embark on a trail to explore the unknown in the Eastern Ghats near Kambalakonda forests in Visakhapatnam.

The first herp walk of the season has just begun when the group spots the Brahminy blind snake on the edge of a leaf litter. One of the world's smallest snakes, this one - although common - is rarely seen. As research scientist of Kambalakonda Yagnapathy Adari lights it up with his torchlight, the non-venomous snake zigzags into the soil. The snake can be as small as a shoe lace and is probably the second smallest snake in the world behind the Barbados thread snake. "This is a rare sight as these snakes are barely visible on land as they are burrowers, mostly living in underground tunnels and emerging at dusk. One truly weird thing about the Brahminy blind snake is that all of them are female," explains Yagnapathy as he carefully shifts the torch away.

The night is wrapped in a muddle of distant sounds - the rhythmic croaking of frogs, the rustling of leaves, the quavering call of the nightjar and the occasional hoot of an owl. Venturing deeper into the trek route, the two guides leading the group explain how these sounds are part of the intricate communication system of the forest's nocturnal inhabitants. In the next two hours, the group discovers many hidden inhabitants of the diverse biodiversity of the region: the wolf spider with spiderlings, the elusive Indian clouded gecko, speckled forest skink and firefly nymph gearing up to make its way to light the night sky.

Source: <https://www.thehindu.com/sci-tech/energy-and-environment/explore-the-nocturnal-wilderness-at-herp-walks-in-visakhapatnam/article68310849.ece>