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Member

EXECUTIVE ASSISTANT
Suman Gulalia

**ADDRESS FOR
CORRESPONDENCE**



Zaheer Science Foundation,
4 Udyan Marg,
New Delhi 110001

 Tel: 011-23745697

 **EMAIL**
zsfindia@gmail.com

 **WEBSITE**
www.zaheersciencefoundation.org

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RRI Scientists Predict 'Petal-Like' Structures in the Sun's Corona During 2026 Eclipse

A team of solar physicists at the Raman Research Institute (RRI), Bengaluru, led by senior professor Dibyendu Nandi, has predicted the magnetic structure of the Sun's corona during the total solar eclipse on August 12, 2026. The eclipse will be visible across parts of Europe and will offer scientists a rare opportunity to test computational models of solar magnetism and space weather.

The team predicts that the corona may display several large-scale, petal-like structures along with smaller, elongated features. If confirmed during the eclipse, these structures could provide important insights into the complex magnetic environment surrounding the Sun.

Why Study the Corona?

The solar corona is extremely faint compared with the Sun's bright surface and is difficult to observe directly. During a total solar eclipse, the Moon blocks the bright solar disk, making the corona visible from the ground. This provides an ideal opportunity to test scientific theories and computational models.

Studying the corona is important for understanding solar flares, storms and coronal mass ejections. These powerful events release huge amounts of plasma and charged particles into space. When they reach Earth, they can disrupt communication and GPS systems, affect power grids, damage satellites and expose astronauts to harmful radiation.

Scientists therefore use computer simulations to study the Sun's magnetic behaviour and understand how solar eruptions develop. Improved models could help advance space-weather forecasting.

Novel Modelling Approach

Nandi's research group is among several teams worldwide using eclipse observations to test models of solar magnetism. For this prediction, the researchers used two computational models based on a theoretical framework developed by Nandi and his colleagues.

A data-driven model incorporating several years of solar observations was used to predict the Sun's surface magnetic-field distribution for August 12. Data available up to August 10, 2026, were used to generate the forecast and subsequently predict the structure of the coronal magnetic field.

"Calibrating the model with past solar observations is essential to obtain accurate estimations," Nandi said. He added that comparing predictions with actual observations is vital for improving models and developing better methods for forecasting solar activity. The research team includes Sagnik Saha of RRI, Priyansh Jaswal of IISER Kolkata, Shaonwita Pal of the Indian Institute of Astrophysics, Soumyaranjan Dash of the U.S. National Solar Observatory, and Chitradeep Saha of the University of Reading, UK.

Eclipse Not Visible from India

The eclipse will begin at 9:04 p.m. IST on August 12, 2026, with totality lasting about two minutes and 18 seconds. It will not be visible from India because it will occur at night. Most of Spain will experience totality, while parts of Western Europe, northwestern Africa and the United States will see a partial eclipse.

Observations during the eclipse will provide an important test of the RRI team's prediction and could help scientists better understand the Sun's magnetic activity and its effects on space weather.

Source: <https://www.thehindu.com/sci-tech/science/team-led-by-rri-scientists-predicts-petal-like-structures-in-suns-corona-during-eclipse/article71336095.ece>, <https://www.thehindu.com>

New study captures Sun's early warning signs before solar flares

Small-scale bursts of energy detected hours before major solar flares could offer clues for improved flare forecasting

Scientists have identified small, short-lived brightenings in the Sun's atmosphere that appear in the hours before major solar flares and cluster near the locations where the flares eventually erupt. The findings provide new insights into how solar flares develop and could contribute to more reliable space weather forecasting.

The study was conducted by researchers from the Manipal Centre for Natural Sciences and Manipal Academy of Higher Education, in collaboration with scientists from the Indian Space Research Organisation (ISRO), the Department of Space, and other academic institutions.

The team analysed simultaneous ultraviolet (UV) and X-ray observations from three payloads aboard the Aditya-L1 mission. The Solar Ultraviolet Imaging Telescope (SUIT) observed the Sun through 11 near-ultraviolet (NUV) filters, allowing researchers to examine different layers of the solar atmosphere, from the upper photosphere to the chromosphere.

NUV observations are particularly valuable because most ultraviolet radiation is absorbed by Earth's atmosphere and cannot be observed effectively from the ground. SUIT's observations were complemented by two X-ray instruments—the Solar Low Energy X-ray Spectrometer (SoLEXS) and the High Energy L1 Orbiting X-ray Spectrometer (HEL1OS). These instruments measure X-ray emissions generated by energetic processes in the solar corona.

By combining UV and X-ray observations, the researchers were able to investigate how changes in the lower solar atmosphere are connected to energy release in the corona during the build-up to a flare.

Analysing several solar flare events observed in SUIT's magnesium II (Mg II h) filter, the researchers detected numerous small, short-lived brightenings, described as "transient events", in active regions before major flares occurred. Some of these events were accompanied by corresponding X-ray signatures, suggesting that they involved the release of magnetic energy.

Importantly, the transient events were not randomly distributed. They tended to cluster around the locations where the major flares subsequently developed. According to ISRO, this pattern suggests that repeated small-scale releases of magnetic energy may gradually destabilise the magnetic field in an active region, eventually contributing to the eruption of a much larger flare.

The findings offer valuable clues about the physical processes that precede and trigger solar flares. Understanding these early changes could help scientists develop more reliable methods for forecasting flares.

Improved solar-flare prediction is important for space weather monitoring, as powerful solar eruptions can affect satellites, astronauts, communication and navigation systems, power infrastructure, and other space- and ground-based technologies. The study therefore represents another step towards understanding and predicting the Sun's potentially disruptive activity.

Source: <https://www.thehindu.com/sci-tech/science/new-study-captures-suns-early-warning-signs-before-solar-flares/article71407804.ece>, <https://www.thehindu.com>

Three new cascade frog species discovered in Northeast India; one named after Kerala social worker Padmini Varkey

Study also records five cascade frog species in India for the first time



Scientists have discovered three new species of cascade frogs in the biodiverse forests of Northeast India and recorded five other species in the country for the first time.

The findings, published in the peer-reviewed *Bulletin of the Museum of Comparative Zoology*, are the result of more than 15 years of extensive field research across northeastern India.

The study, led by Prof. S. D. Biju of the Department of Environmental Studies, Delhi University, examined more than 300 geographic populations of cascade frogs inhabiting fast-flowing forest streams. Combining DNA analyses with detailed morphological comparisons of adult frogs and tadpoles, the researchers established that populations from Tripura, Nagaland and West Bengal represent three species previously unknown to science.

The newly identified species are Ammachi's Cascade Frog (*Amolops ammachi*), discovered in the Jampui Hills of Tripura; Sendenyu Cascade Frog (*Amolops sendenyu*), found in Nagaland and named after Sendenyu village; and Beautiful Cascade Frog (*Amolops bella*), discovered in West Bengal and named for its striking green body, marked with yellowish-green or reddish-brown mosaic patterns.

A. ammachi has been named in honour of the late Kerala social worker and philanthropist Padmini Varkey, affectionately known as 'Ammachi', meaning 'mother'. The name recognises her compassion and lifelong service to people in need.

The study also records five cascade frog species in India for the first time, expanding the known diversity and distribution of the genus *Amolops* in the country. They are the Marbled Cascade Frog (*Amolops afghanus*), Nepal Cascade Frog (*Amolops nepalicus*), Wangyal's Cascade Frog (*Amolops wangyali*), Medog Cascade Frog (*Amolops medogensis*) and Pianma Cascade Frog (*Amolops bellulus*).

"This study is the result of more than 15 years of work to comprehensively study India's cascade frogs. It is a taxonomically challenging group, but we have now clarified several confusing aspects of their biology, which will aid in the proper identification and conservation of these species. Our study reaffirms that many Indian faunal groups remain poorly studied and harbour undiscovered biodiversity, particularly in the less-explored northeastern States, which form part of two internationally recognised biodiversity hotspots," said Prof. Biju, the lead author.

DNA-based dating reveals evolutionary history

To reconstruct the evolutionary history of cascade frogs, the researchers used DNA-based dating analyses. Their findings indicate that the frogs underwent extensive diversification around 32 million years ago, during the Eocene-Oligocene transition, a period marked by significant biological and environmental change.

The study suggests that cascade frogs experienced multiple waves of colonisation from east to west across Asia. It also identifies the early uplift of the Himalayas as a key factor that shaped the present-day distribution and diversity of these amphibians.

Source: <https://www.thehindu.com/sci-tech/science/three-new-cascade-frog-species-discovered-in-northeast-india-one-named-in-honour-of-kerala-social-worker-padmini-varkey/article71335586.ece>
<https://www.thehindu.com/>



Researchers at the University of Delaware are testing an unusual approach to improving hurricane forecasts: using sharks as mobile, near-real-time ocean observers.

Sharks fitted with small electronic sensors can collect valuable information about ocean conditions as they swim and dive. The CTD tags measure temperature, depth and electrical conductivity, which is closely related to salinity. Scientists hope these measurements will improve oceanographic, atmospheric and climate models and provide a clearer picture of hurricane intensity before storms reach land.

“Animal-borne sensors have been used successfully by oceanographers for years,” said Aaron Carlisle, a professor in the University of Delaware’s School of Marine Science and Policy. He noted that such technology has been particularly useful with elephant seals in remote polar regions, where traditional observations are difficult.

Sharks could offer a new advantage because they are abundant, widely distributed and generally easier to access than protected marine mammals. Traditional shark tagging has mainly focused on tracking movement and habitat use, but researchers are now exploring how the animals can also collect environmental data.

For hurricane research, scientists are targeting species that can gather useful measurements and surface frequently enough for their tags to transmit data to satellites. Shortfin mako sharks, blue sharks, smooth hammerheads and juvenile great white sharks have been identified as promising candidates in the North Atlantic.

The researchers are particularly interested in the temperature of the ocean’s upper mixed layer. This layer stores the heat that fuels hurricanes, meaning warmer water can contribute to stronger storms.

“We are really most interested in the heat content of the top layer of the ocean,” Carlisle said. “Warmer mixed layer equals stronger hurricane.”

The tagging process begins in early May, when highly migratory shark species move closer to the coast from their winter habitats farther offshore. Researchers travel about 50 to 65 kilometres offshore aboard a research vessel, where they deploy baited lines and typically wait two to three hours for a shark to take the bait.

Once captured, a sensor is attached to the shark’s dorsal fin in a process Carlisle compares to a “pit crew” during an auto race. The procedure usually takes less than five minutes. Whenever the shark surfaces, the tag can communicate with orbiting satellites and transmit the data it has collected.

Researchers also take steps to minimise the impact on the animals. The tagging is conducted under institutional animal-care oversight, and the tags are designed to detach naturally as their attachment materials corrode. Each shark receives a health check before being released.

Scientists say protecting the animals is essential because stressed or injured sharks may behave unnaturally, potentially affecting the accuracy of the data.

By turning sharks into roaming ocean sensors, researchers hope to fill gaps in ocean observations and ultimately improve scientists’ ability to predict how powerful future hurricanes could become.

Source: <https://www.thehindu.com/sci-tech/science/scientists-turn-to-sharks-for-better-hurricane-predictions/article71327523.ece>, <https://www.thehindu.com/>



Five captive-bred slender-billed vultures (*Gyps tenuirostris*) were released into the wild in Assam on Friday, marking the first-ever release of the species bred in captivity anywhere in the world.

The vultures, along with five captive-bred white-rumped vultures (*Gyps bengalensis*), were transported from the Bombay Natural History Society (BNHS) Vulture Conservation Breeding Centre at Rani, near Guwahati, to the Jatayu Soft Release Centre in the Biswanath Division of Kaziranga National Park and Tiger Reserve.

BNHS Deputy Director Sachin Ranade said captive-bred white-rumped vultures had been released previously, but the release of the slender-billed vultures was a global first.

The 10 birds were moved to an acclimatisation aviary in Tewaripal, Biswanath, about three months ago. They were released in the presence of Assam Environment and Forest Minister Jayanta Mallabaruah, senior Forest Department officials and conservationists.

India's *Gyps* vulture population has declined by about 99% over the past two decades, largely because of veterinary painkillers that are toxic to the birds when they feed on treated livestock carcasses. Although the government has banned diclofenac, aceclofenac, ketoprofen and nimesulide for veterinary use, vultures continue to face other threats, including pesticide poisoning.

The BNHS has been working with the Assam Forest Department on vulture conservation and captive breeding since 2007.

The newly released birds have numbered blue rings on their legs and tracking tags on their backs. Researchers will monitor their movements and behaviour to determine whether they adapt successfully to the wild and interact with existing vulture populations.

"This is the first such release of the captive-bred slender-billed vulture in the world," Ranade said.

Poisoning remains a serious concern in Assam. More than 700 vultures, including Himalayan griffons, have died from accidental secondary poisoning since 2018. Such incidents often occur when vultures feed on carcasses contaminated with toxic pesticides, sometimes used illegally to kill stray or feral dogs.

Forest officials regularly conduct awareness campaigns urging communities not to use banned veterinary medicines or apply pesticides to animal carcasses. They also encourage people to allow vultures to perform their natural role as scavengers.

The release of the 10 captive-bred birds is therefore an important milestone for vulture conservation, offering hope for rebuilding Assam's declining vulture populations while providing scientists with an opportunity to study how captive-bred birds adapt to life in the wild.

Source: <https://www.thehindu.com/news/national/assam/assam-records-worlds-first-ever-release-of-captive-bred-slender-billed-vultures/article71317644.ece>, <https://www.thehindu.com/>

Ti-Po: Assam's Traditional Apong Finds a Premium New Identity

Japan has sake and Korea has makgeolli. Assam now has Ti, a premium bottled expression of Po Apong, the traditional rice wine of the Mising community.

Made from rice, foraged herbs and burnt rice husk, apong has long been an integral part of Mising culture. Ti—meaning “a satisfactory drink” in Mising—transforms this home-brewed tradition into a premium beverage while retaining its distinctive character.

Unlike cloudy makgeolli or clear sake, Ti has a bourbon-like appearance. At 14% alcohol, it offers a profile reminiscent of sake, with sweet and smoky finishing notes alongside fruity and nutty flavours.

The idea was developed by Dipankar Kalita, Abhijit Pegu and singer-composer Joi Barua. Recognising that bottling an indigenous, traditionally home-brewed drink would require more than modern technology, the founders combined Mising brewing traditions with scientific filtration and preservation techniques. The company has patented technology for removing spoilage-causing microbes and for multiple-stage filtration.

At the heart of the process are local women brewmasters. Over two years, the team sampled apong from numerous households, evaluating consistency, acidity, sweetness, colour, smokiness and preservation. This process eventually led to a group of 20 women whose expertise forms the foundation of Ti's production. The brand has also partnered with Polo SHG in Laimekuri and Aaradha SHG in Memberchuk, creating sustainable livelihoods while keeping the traditional craft within the community.



Ti's distinctive flavour comes from Assam's forests. More than 60 botanicals are foraged seasonally by women collectors, who select what the forest offers rather than following a fixed recipe. These herbs are used to prepare e-pob, the traditional fermentation starter.

Semi-cooked rice is coated with e-pob and finely burnt rice husk. The combination creates tiny fermentation chambers around individual grains, where native yeasts and microbes transform the rice into alcohol. Fermentation takes place in batches of just five to seven kilograms, with brewmasters relying on sight, scent and time rather than automation.

“It is this human judgement that makes every batch distinctive,” says Joi Barua. The founders accept small-batch production as the price of preserving quality and authenticity.

Technology, therefore, plays a supporting role. Ti uses scientific filtration, hygienic production and clean bottling to make Po Apong commercially viable without stripping away its traditional identity. Chief winemaker Ajoy Shaw (DipWSET) oversees the modern production process.

The result is a drink rooted in Mising heritage but presented for a contemporary audience. Ti pairs particularly well with Indian chakna, tandoori dishes, kebabs, smoked meats, pepper-forward recipes and savoury snacks, where its smoky, fruity and nutty character can balance spice and refresh the palate.

Source: <https://www.thehindu.com/food/features/apong-assams-traditional-rice-wine-is-now-bottled-as-tipol/article71252292.ece>, <https://www.thehindu.com/>



A global Centre of Excellence (CoE) for accelerated sugarcane genetic improvement will be established at the Indian Sugarcane Breeding Institute in Coimbatore at an estimated cost of ₹90 crore.

The Centre will focus on developing high-yielding sugarcane varieties with better sugar recovery and greater resistance to climate stresses, pests and diseases.

Harshvardhan Patil, president of the National Federation of Cooperative Sugar Factories, said the Union government was expected to contribute ₹45 crore, with the remaining amount coming from the sugar industry. The investment would be made over the next four years.

The Union government, Indian Council of Agricultural Research (ICAR), Indian Sugar & Bio-energy Manufacturers Association (ISMA), National Federation of Cooperative Sugar Factories (NFCSF) and the Sugarcane Breeding Institute are expected to sign an agreement soon for establishing the Centre.

Faster development

Mr. Patil said sugar mills that once operated for nearly 200 days a year were now running for only about 100 days in many cases. Sugarcane production has been affected by pests, extreme weather, high temperatures and waterlogging. Developing a new sugarcane variety currently takes nearly 14 years. The new Centre aims to bring this down to about eight years through accelerated genetic improvement.

The Centre will develop varieties with higher cane yield and sugar recovery, improved tolerance to drought, floods, salinity and heat stress, and greater resistance to major pests and diseases.

The varieties will also be assessed for better ratooning ability and their suitability for sugar, ethanol, bioenergy and sustainable agriculture.

Focus on Tamil Nadu

S. Arunraj, Additional Director of the Directorate of Sugar, Tamil Nadu, said nearly 1.31 lakh hectares were under sugarcane cultivation in the State and the area had been declining.

Tamil Nadu is the country's sixth-largest sugar-producing State but has the highest sugarcane productivity. However, extreme heat in major growing areas has affected sugar recovery, which currently stands at around 8%. Mr. Arunraj said the CoE could help develop varieties capable of maintaining higher sugar recovery under such stressful conditions.

AI to aid farmers

Tamil Nadu is also exploring the use of artificial intelligence (AI) in sugarcane farming. Mr. Arunraj said a State delegation would visit Maharashtra to study AI-based technologies used by farmers.

Around two lakh sugarcane farmers in Maharashtra are reportedly benefiting from AI applications. Tamil Nadu is considering similar initiatives to support its farmers.

Prakash Naiknavare, Managing Director of the Federation, said a delegation had recently visited sugarcane farms and facilities at the Sugarcane Breeding Institute.

According to P. Govindaraj, Director of the Institute, the new Centre would bring together trained personnel, world-class infrastructure and international collaborations to accelerate the development of high-performing, climate-resilient sugarcane varieties.

Source: <https://www.thehindu.com/news/cities/Coimbatore/a-global-centre-of-excellence-to-come-up-in-coimbatore-for-research-on-sugarcane/article71291724.ece>, <https://www.thehindu.com/>

How Scientists Are Using Menstrual Blood to Treat Osteoarthritis



Menstrual blood, long regarded as biological waste, is increasingly being recognised as a valuable source of biological information and therapeutic materials. Similar to saliva and blood plasma, menstrual fluid contains immune cells, endometrial tissue, proteins, genetic fragments, and other biomarkers. Scientists are now exploring these components for non-invasive disease detection and regenerative medicine, with promising applications ranging from cancer screening to cartilage repair.

A Non-Invasive Source of Stem Cells

Research into menstrual blood gained momentum in 2007, when scientists successfully isolated stem cells from the endometrium—the uterine lining that naturally breaks down and regenerates every month without scarring. These menstrual-blood-derived stem cells were found to be highly adaptable and capable of rapid growth in laboratory conditions.

Their potential extends beyond basic research. Scientists have used these cells to develop uterine organoids, miniature functional models that can help researchers study diseases such as endometriosis and investigate exposure to chemicals including phthalates and parabens. Unlike bone-marrow stem cells, which require a painful and invasive extraction procedure, menstrual stem cells can be collected non-invasively, making them an attractive option for future therapies.

Potential in Disease Detection and Regenerative Medicine
Menstrual blood may also provide a simpler approach to disease screening. A large population-based study published in *The BMJ* in 2025 found that menstrual blood collected from sanitary pads could be analysed for human papillomavirus (HPV) DNA and precancerous cervical lesions with accuracy comparable to clinician-collected cervical samples. Although the approach is not applicable to people who do not menstruate, it could provide a convenient, inexpensive, and potentially home-based screening method.

Researchers are also investigating menstrual-blood-derived stem cells for conditions such as heart disease, liver fibrosis, and Niemann-Pick disease type C1. Experimental studies have shown reductions in inflammation, cell death, and tissue damage, although these applications remain at an early stage.

Promise for Osteoarthritis

One of the most promising developments concerns osteoarthritis, a condition affecting hundreds of millions of people worldwide. A 2026 study published in *Scientific Reports* investigated extracellular vesicles (EVs) produced by menstrual-blood-derived stem cells. EVs are tiny membrane-bound particles containing proteins, lipids, RNA, and signalling molecules that help cells communicate.

When researchers introduced these EVs to human cartilage cells, the cells absorbed them and produced new extracellular matrix—the structural material essential for healthy cartilage. Under inflammatory conditions, the EVs also reduced markers associated with cartilage breakdown. Importantly, they increased progesterone-receptor expression in cartilage cells, potentially helping restore hormonal signalling that may decline after menopause.

These findings raise the possibility of developing treatments that could not only relieve osteoarthritis pain but also slow or repair cartilage damage.

However, significant challenges remain. Scientists still need to establish long-term safety, determine how the cells and EVs behave in the human body, and develop consistent methods for producing high-quality therapeutic products. Variations between donors and differences in laboratory conditions can also affect results.

Despite these challenges, menstrual blood is emerging as a promising and accessible resource for diagnostics, stem-cell research, and regenerative medicine, particularly in the search for new approaches to osteoarthritis.

Source: <https://www.thehindu.com/sci-tech/science/how-scientists-are-using-menstrual-blood-to-treat-osteoarthritis/article71446510.ece>



Scientists uncover why Friedreich's ataxia mainly affects Eurasians

Friedreich's ataxia (FRDA) is a rare genetic disorder that progressively damages the nervous system and heart. Symptoms usually begin between the ages of 5 and 15, with affected individuals developing problems with balance, coordination, speech, swallowing, hearing and vision. They may also experience fatigue, loss of sensation and curvature of the spine. Most patients eventually die young, often from heart disease, and there is currently no cure.

According to Ashwin Dalal, a medical geneticist at the Nizam's Institute of Medical Sciences in Hyderabad, the institute diagnoses about one FRDA case every month. Almost all patients come from consanguineous marriages—marriages between relatives such as cousins. Such marriages increase the risk of rare genetic disorders.

FRDA has long puzzled scientists because it is largely restricted to people of European, North African, West Asian and South Asian ancestry. It has rarely or never been reported among populations in sub-Saharan Africa, East Asia and parts of Southeast Asia. A new study by researchers at the University of Oklahoma Health Sciences Center, published in *Human Molecular Genetics* on June 9, offers an explanation.

How the disease develops

FRDA occurs when mutations affect the FXN gene, which produces frataxin, a protein essential for mitochondria—the cell's energy-producing structures. Low levels of frataxin impair energy production and cause toxic substances to accumulate, damaging energy-hungry cells such as those in the heart, brain and spinal cord.

The most common disease-causing mutation involves an unusual expansion of a repeated DNA sequence within an intron of the FXN gene.

Normal versions contain relatively few repeats, while affected individuals can have 100 to 1,500. When the repeats expand excessively, the DNA adopts a closed structure that suppresses frataxin production.

FRDA develops when a person inherits two expanded variants, one from each parent. People carrying only one are generally unaffected but can pass the variant to their children.

Tracing the mutation's origins

The researchers found that about 95% of disease-causing expanded variants can be traced to just two long-normal variants. These appear to have undergone rare “protomutations” at two separate points in Eurasian history.

The mutations did not immediately cause disease. Instead, they gradually developed into intermediate “pre-mutations”, which later underwent sudden expansions during one or a few generations, producing disease-causing variants.

Because individuals with FRDA often die prematurely, expanded variants tend to decline in populations. Protomutations and pre-mutations, however, do not cause the same severe disease and can persist as genetic reservoirs, continually generating new expanded variants.

The researchers also analysed ancient DNA and found evidence that both protomutations were present in Europe and Western Asia at least 9,000 years ago, but not in Neanderthals or Denisovans.

The findings help explain why FRDA is concentrated in certain populations and could guide research into why these particular DNA variants are prone to expansion. Understanding this process may eventually help scientists develop ways to prevent or slow the genetic changes responsible for the disease.

Source: <https://www.thehindu.com/sci-tech/science/friedreich-ataxia-scientists-find-why-a-cruel-genetic-disorder-affects-only-eurasians/article71352059.ece>, <https://www.thehindu.com/>



Iron- and Zinc-Fortified Millet Does Not Harm Toddlers' Gut Health

A nine-month study among toddlers in Mumbai's urban slums has found that iron- and zinc-fortified pearl millet does not cause detectable harmful changes to the developing gut microbiome. The findings could strengthen the case for bio-fortified millets as a food-based strategy to combat iron deficiency in young children.

The study, published in *Nature Communications*, was led by researchers at Cornell University's Joan Klein Jacobs Centre for Precision Nutrition and Health, in collaboration with researchers from Mumbai's SNDT Women's University and the Centre for the Study of Social Change.

The researchers enrolled 223 children aged 12 to 18 months. They were given foods prepared with a bio-fortified variety of pearl millet developed through traditional cross-breeding. The variety contains nearly three times more iron and zinc than standard pearl millet. The SNDT team helped develop the millet-based recipes and distributed the food across 20 sites in partnership with the Mumbai-based NGO.

Iron deficiency affects about one in four people globally and is particularly concerning among young children because it can impair brain development and increase vulnerability to infections. Iron supplements are widely used to address the problem, but previous studies have suggested that they can sometimes disrupt the gut microbiome, encouraging harmful bacteria while reducing beneficial microbes. Such changes may also contribute to digestive problems such as diarrhoea and constipation.

The researchers therefore explored whether bio-fortified food could provide a safer, more sustainable alternative.

Their findings were encouraging. Children who consumed the fortified millet showed increased activity in microbial pathways linked to fighting pathogens, including the production of natural antibiotic-like compounds. Pathways associated with antioxidant metabolism also increased, potentially supporting a healthier gut environment. Meanwhile, markers associated with harmful bacteria were lower by the end of the study.

The researchers say bio-fortified crops could offer advantages over supplements because they can be grown, prepared and consumed like ordinary foods, reducing dependence on distribution systems and daily supplementation practices.

The findings may also support India's efforts to promote millets as a nutritious and sustainable food. India produces more than 40% of the world's millets, including pearl millet (bajra), sorghum (jowar) and finger millet (ragi).

The study suggests that iron- and zinc-rich pearl millet could help address childhood nutrient deficiencies without negatively affecting the developing gut microbiome.

Source: <https://www.thehindu.com/sci-tech/health/millet-fortified-with-iron-zinc-does-not-harm-toddlers-gut-health-study-finds/article71313232.ece,,https://www.thehindu.com/>



New legless amphibian species discovered in Maharashtra's Western Ghats

The newly identified caecilian, Gegeneophis chandgadi, was discovered in Chandgad, Kolhapur, and named after the region's local dialect.

A multi-institutional team of researchers has discovered a new species of subterranean, legless amphibian, commonly known as a caecilian, in Maharashtra's northern Western Ghats.

Named *Gegeneophis chandgadi*, the species was identified in Buzawade village in Chandgad, Kolhapur district. The discovery highlights the hidden biodiversity that persists beneath agricultural and residential landscapes, even outside protected forest areas.

The research team comprised scientists from the Zoological Survey of India (ZSI), Western Regional Centre (WRC), Pune; Yashwantrao Chavan Mahavidyalaya, Halkarni; Savitribai Phule Pune University; and the Mhadei Research Centre, Goa.

The findings were published in a research paper titled 'Exploring cryptic diversity in *Gegeneophis* Peters (Amphibia: Gymnophiona: Grandisoniidae) with a novel species from the northern Western Ghats, Maharashtra, India'.

The researchers stated that the newly identified taxon did not match the descriptions of any previously known species of *Gegeneophis*.

The species was established through a combination of molecular analysis and detailed morphological and meristic examinations, which involve studying physical characteristics and counting specific anatomical features.

Caecilians are elusive amphibians that spend much of their lives underground. Their elongated, limbless bodies can make them difficult to distinguish from earthworms or blind snakes. Their subterranean lifestyle and cryptic appearance have also contributed to the under-recognition of their diversity.

The newly discovered species was named after the Chandgad dialect, reflecting the linguistic identity and cultural heritage of the region. The researchers also acknowledged the role of local residents, whose traditional ecological knowledge helped them locate the amphibian.

According to the ZSI, the discovery of *Gegeneophis chandgadi* in a human-inhabited area demonstrated that important subterranean biodiversity could survive beyond formally protected forests. It also underscored the importance of exploring agricultural and residential landscapes in biodiversity research.

The study was conducted by Sahil Shikalgar, Rahul N. Patil, Pranjal Adhav, Nirmal U. Kulkarni, N. C. Hirgond, N. P. Gramapurohit, Basudev Tripathy, and K. P. Dinesh.

Source: <https://www.thehindu.com/sci-tech/science/new-species-of-legless-amphibian-discovered-from-maharashtra/article71459475.ece>, <https://www.thehindu.com/>



Ancient masters of flight, dragonflies and damselflies are also sensitive indicators of ecological change, offering scientists valuable clues about the health of wetlands, forests and farmlands.

For children, flying often inspires wonder. Paper planes take to the air, eyes follow soaring birds, and dragonflies become tiny helicopters of the imagination. These insects are indeed extraordinary fliers and belong to a lineage whose ancestors were among the earliest flying organisms on Earth.

Around 300 million years ago, their ancient relatives possessed aerodynamic features similar to those of modern dragonflies, but were vastly larger, with wingspans reaching up to 72 cm.

India is home to about 600 species of Odonata, the order that includes dragonflies and the more slender damselflies. New species continue to be discovered, particularly in biodiversity-rich regions such as the Northeast and the Western Ghats. At the same time, ecological surveys are reporting declining populations and the disappearance of some species.

Dragonflies are important partly because their life cycle links aquatic and terrestrial ecosystems. Their young, known as nymphs, live in ponds, wetlands and streams before emerging as winged adults. Both stages are predators. Nymphs feed on mosquito larvae, other aquatic insects and crop pests, while adults hunt leafhoppers and other insects that can damage crops.

A single growing dragonfly nymph can consume large numbers of mosquito larvae, making these insects valuable components of aquatic food webs and agricultural ecosystems.

Their sensitivity to environmental changes also makes dragonflies useful ecological indicators. Pesticides, particularly systemic insecticides such as fipronil, can affect their populations. These chemicals are absorbed by plants and can make plant tissues toxic to insects. Persistent or excessive pesticide use may therefore reduce dragonfly numbers. Conversely, healthy populations of dragonflies and their nymphs can indicate relatively well-managed agricultural habitats.

Climate change is another emerging threat. Several Western Ghats species depend on specialised habitats where water seeps through wet forest soils into mountain streams. Changing patterns of drought and intense rainfall can disrupt these fragile ecosystems and threaten endemic species. The blue hawklet (*Hylaeothemis apicalis*), a striking dragonfly with blue-green eyes, has become increasingly difficult to encounter in the wild.

Yet these insects continue to surprise scientists. Research into their remarkable eyes has found that dragonflies possess at least 16 genes coding for visual opsins—the proteins involved in detecting light and colour. Humans have four major visual opsins, whereas dragonflies have a much more diverse visual system, enabling them to detect a broader range of light, including ultraviolet wavelengths.

Dragonflies are therefore more than beautiful aerial hunters. Their presence—or absence—can provide clues about the health of the ecosystems around us. As their populations face growing pressures, protecting these ancient fliers also means protecting the wetlands, streams, forests and farmlands on which countless other species depend.

Source: <https://www.thehindu.com/sci-tech/science/dragonflies-are-bellwethers-of-earths-ecosystems/article71418019.ece>, <https://www.thehindu.com/>