

SCIENCE & TECHNOLOGY

CHANDRAYAAN-3: ALL YOU NEED TO KNOW ABOUT THE MISSION AND WHAT HAPPENS AFTER ITS SUCCESSFUL MOON LANDING

What is a soft landing, why did India send Chandrayaan-3 to the Moon's south pole and what happened after the landing was accomplished? We explain.

India's Moon mission Chandrayaan-3 scripted history by successfully landing on the lunar surface at 6:04 pm on August 23. With the Lander accomplishing a 'soft landing' on the Moon's south pole, India becomes the only country to have ever done so. A rover, which is a small vehicle that is meant to move around on the Moon's surface, then came out of the Lander. On August 24, ISRO released a video of how this happened on X.



ISRO's Chandrayaan-3 soft landed on the Moon's south pole on August 23, 2023, around 6 pm. (Photo via X.com/ISRO)

When Chandrayaan-3 took off for the Moon on July 14, we explained the basics of the mission – how a mission launches into Space, what the Chandrayaan-1 and Chandrayaan-2 missions were, etc. You can click here to read it. Here, we further explain why a 'soft landing' was crucial to the mission, what makes landing on the south pole a difficult feat, and what is to happen after the landing.

What is a soft landing, and why did Chandrayaan-3 land on the south pole?

According to ISRO, the mission's three objectives were to demonstrate a safe and soft landing on the lunar surface, to demonstrate a Rover roving on the Moon and to conduct in-situ scientific experiments.

Source: <https://indianexpress.com/article/explained/explained-sci-tech/chandrayaan-3-landing-moon-explained-8904598/>

Dr. G. Thyagarajan -Patron
Dr. T. Ramasami - Patron
Prof. Zahid H. Khan- Advisor
Dr. Ram Bhooj- Advisor

Dr. Tabassum Jamal
Chairperson

Dr. D. Shailaja Donempudi
Vice-Chairperson

Dr. Mohd. Rais
Secretary

Mohd. Asad Ullah Khan
Treasurer

Dr. Manish Mohan Gore
Joint Secretary

Dr. Seema Wahab
Member

Dr. Mohammad Irfan Qureshi
Member

Prof. Pramesh N. Kapoor
Member

Dr. Enna Dogra Gupta
Member

Dr. Abhishek Kumar
Member

EDITOR/COORDINATOR

Dr. Manish Mohan Gore

Dr. Enna Dogra Gupta

Executive Assistant
Suman Gulalia

ADDRESS FOR CORRESPONDENCE

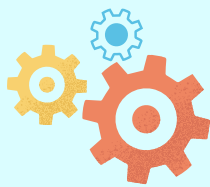


Zaheer Science Foundation,
4 Udyan Marg,
New Delhi 110001

Tel: 011-23745697

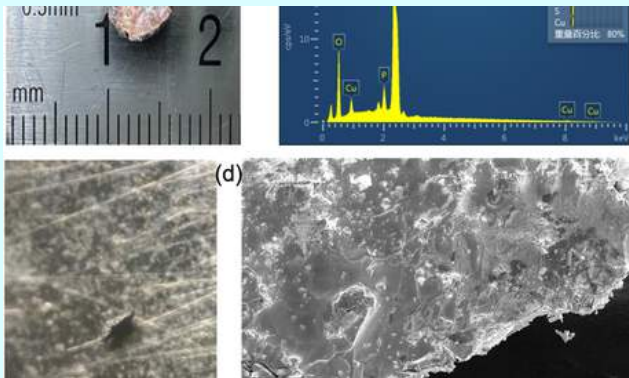
EMAIL
zsfindia@gmail.com

WEBSITE
www.zaheersciencefoundation.org



HOW SCIENTISTS FOUND THAT LK-99 IS PROBABLY NOT A SUPERCONDUCTOR

Independent scientists have found that the material reported by a South Korean team to be a superconductor is actually an insulator.



a) An LK-99 sample synthesised by Guo, et al. (2023); b) X-ray spectroscopy of the sample indicated the presence of different elements; c) a partly levitating sample; d) a scanning-electron microscope image of the sample. | Photo Credit: arXiv:2308.03110v2

When we use a room heater on a cold day and cosy up with a cup of tea, little do we think of the physics that makes the heater work. Most electrical conductors resist the flow of electric current, converting some of the electrical energy into heat. With a heater, we use this effect to generate the warmth that we feel. While this property of conductors allows us to stay warm in the winter, in most instances, it is undesirable. For example, a substantial amount of electricity generated is lost while being transmitted between power plants and our factories and households as heat. Tiny wires inside computers and cellphones dissipate heat, draining the batteries in the process. So it is natural that scientists are looking for materials that can conduct electricity without resistance, especially for applications where heat loss is a deal-breaker.

An elusive material

More than a century ago, scientists discovered that many metals become superconducting – i.e. allow current to flow with zero resistance – if cooled to below -250°C . This gave birth to a big physics puzzle: why does a material become a superconductor at all? The breakthrough came in the 1950s and 1960s, when scientists developed a theory of superconductivity. With this theory, they found that superconductors aren't just materials with zero resistance: they have a remarkable new quantum state in which the electrons in the material work together. Several fantastic properties of superconductors then came to light, opening the door to new technologies – including advanced medical imaging, 'maglev' trains, and quantum computers.

Source: <https://www.thehindu.com/sci-tech/science/lk-99-room-temperature-superconductor-hype/article67233834.ece>

HOW UIDAI IS USING AI TO TACKLE PAYMENT FRAUDS

The technology uses a combination of both finger minutiae and finger image to check the liveness of the fingerprint captured. The measure was implemented after instances of people creating fake fingerprints using silicone to syphon off money from unsuspecting individuals' bank accounts were reported.

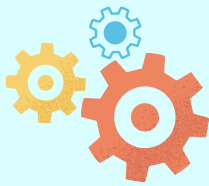


To prevent AePS frauds by the use of spoofed fingerprints during Aadhaar authentication, the UIDAI has rolled out an in-house Artificial Intelligence/Machine Learning technology-based Finger Minutiae Record – Finger Image Record (FMR-FIR) modality which is able to check the liveness of a fingerprint to detect the use of cloned fingerprint during the authentication process. (Representational image/File)

As more frauds related to the Aadhaar-enabled Payment System (AePS) come to the fore, the Unique Identification Authority of India (UIDAI), has turned to artificial intelligence-based systems in a bid to limit the cases — this includes developing technologies around fingerprinting and facial recognition.

Minister of State for Finance Bhagwat Karad told Parliament on Monday (July 31) that to prevent AePS frauds by the use of spoofed fingerprints during Aadhaar authentication, the UIDAI has rolled out an in-house Artificial Intelligence/Machine Learning technology-based Finger Minutiae Record – Finger Image Record (FMR-FIR) modality which is able to check the liveness of a fingerprint to detect the use of cloned fingerprint during the authentication process. In May this year, Airtel Payments Bank collaborated with the National Payments Corporation of India (NPCI) to roll out a facial recognition-based authentication measure for such transactions. The technology has been developed in-house by the UIDAI.

Source: <https://indianexpress.com/article/explained/explained-sci-tech/how-uidai-is-using-ai-to-tackle-payment-frauds-8871408/>



SCIENCE & TECHNOLOGY

INDO-FRENCH TEAM DEVELOPS NEW TECHNIQUE TO SEARCH FOR CLOSELY MERGING SUPERMASSIVE BLACKHOLES

An international team of astronomers and computer scientists from India and France have developed a new technique to search for closely merging supermassive black holes.

The team has devised a numerical technique to automatically search for double nuclei galaxies which could help them predict what could happen when neighbouring galaxies like the Milky Way and the Andromeda collide.

According to the Department of Science and Technology who have supported this study, scientists need to study collisions between galaxies to predict uncertainties like whether the solar system would survive or be ripped apart from the violent mixing of stars and gas between the galaxies when they collide.

For this, they need to hunt for closely merging galaxies. However, only a handful of such galaxies are known, as they are very rare. During the merging process, the nuclei of the individual galaxies come closer resulting in the formation of double nuclei galaxies.

In order to hunt for more merging galaxies in the open sky, an international team of Astronomers and Computer Scientists from APPCAIR, BITS Pilani, Goa campus, Indian Institute of Astrophysics (IIA), Indian Institute of Science Education and Research, Allahabad University, and the Paris Observatory, France, have developed a new algorithm which has led to the discovery of thousands of double-nuclei galaxies.

“Out of these, 159 were confirmed to have pairs of accreting supermassive black holes or active galactic nuclei (AGN) as they are usually called,” the department stated. For this study, the team crafted a specialised image processing technique called GOTHIC that can automatically detect galaxies that visually resemble the galaxy MRK 739, which is one of the earliest detected dual AGN. GOTHIC used sophisticated image processing techniques and data from one of the largest optical surveys, the Sloan Digital Sky Survey (SDSS) to detect such nuclei pairs.

Source: <https://www.thehindu.com/news/national/karnataka/indo-french-team-develops-new-technique-to-search-for-closely-merging-supermassive-black-holes/article67168181.ece>

NASA, SPACEX SEND ASTRONAUTS FROM FOUR NATIONS TO SPACE STATION: WHO ARE THEY, WHAT IS THE MISSION

During their stay at the space station, the Crew-7 astronauts will conduct more than 200 science experiments and technology demonstrations to prepare for missions to the Moon, Mars, and beyond.



A Falcon 9 rocket lifts off on NASA's SpaceX Crew-7 mission, taking four crew members to the International Space Station (ISS), from the Kennedy Space Center in Cape Canaveral, Florida, U.S., August 26, 2023.

Four astronauts from four countries, including the US, Denmark, Japan, and Russia, launched aboard a SpaceX rocket towards the International Space Station (ISS) from NASA's Kennedy Space Center in Florida on Saturday (August 26). This was the first US take-off in which all the astronauts atop the spacecraft belonged to a different country — until now, NASA had always included two or three of its own on its SpaceX flights.

Known as Crew-7, the mission includes NASA astronaut Jasmin Moghbeli, ESA (European Space Agency) astronaut Andreas Mogensen, JAXA (Japan Aerospace Exploration Agency) astronaut Satoshi Furukawa, and Roscosmos cosmonaut Konstantin Borisov. They are expected to reach the ISS on Sunday, replacing four astronauts living up there since March. The fresh batch of astronauts will stay at the ISS for the next six months and will conduct a host of different experiments.

Source: <https://indianexpress.com/article/explained/explained-sci-tech/nasa-spacex-astronauts-launch-8910839/>



PLASTIC POLLUTION WIDESPREAD IN WATER BODIES ACROSS THE WORLD

Two papers published in Nature have found evidence for widespread plastic contamination of coral reefs and freshwater lakes. The reef study finds that larger fragments (mostly debris from the fishing industry) make up most of the plastic found, and these macroplastics are especially abundant in deep reefs. The assessment of freshwater lakes and reservoirs reveals that all assessed bodies of water were contaminated with microplastics.

Hudson Pinheiro from the California Academy of Sciences, San Francisco and colleagues surveyed global reefs for macroplastics (over 5 cm) and other debris in 84 shallow (less than 30 metres deep) and deep (30-150 metres) coral ecosystems at 25 locations across the Pacific, Atlantic and Indian Ocean basins. Debris was found in 77 of the 84 sites including in some of Earth's most remote and near-pristine reefs, such as in uninhabited central Pacific atolls. Macroplastics accounted for 88% of the debris found. Levels of macroplastics were highest in the deep reefs. In most surveyed areas, fishing vessels were identified as the main source of plastic, such as lines and discarded traps. The findings contrast with the global pattern observed in other nearshore marine ecosystems, where macroplastic densities decrease with depth and are dominated by consumer items.

In the second study, Veronica Nava from the University of Milano-Bicocca, Milan, Italy, and others sampled the surface waters of 38 lakes and reservoirs in 23 countries mainly concentrated in the Northern Hemisphere. They found microplastics (over 250 microns) in all sample sites. "Our results indicate that two types of lakes are particularly vulnerable to plastic contamination: lakes and reservoirs in densely populated and urbanised areas and large lakes and reservoirs with elevated deposition areas and high levels of anthropogenic influence," they write.

They found plastic concentrations varying widely among lakes. In the most polluted lakes, plastic concentrations were found to "reach or even exceed those reported in the subtropical oceanic gyres, marine areas collecting large amounts of debris". "Our findings highlight the importance of including lakes and reservoirs when addressing plastic pollution, in the context of pollution management and for the continued provision of lake ecosystem services," they note.

Source: <https://www.thehindu.com/sci-tech/science/plastic-pollution-widespread-in-water-bodies-across-the-world/article67131796.ece>

78 SPECIES OF BIRDS ARE FOUND ONLY IN INDIA: REPORT

There is a rich diversity of 10,906 bird species in the world, and of them, India is home to 1,353, Zoological Survey of India scientist Amitava Majumder said



A study by ZSI has revealed that there are as many as 78 bird species which are found only in India. There is a rich diversity of 10,906 bird species in the world, and of them, India is home to 1,353, Zoological Survey of India scientist Amitava Majumder said.

These 1,353 bird species account for 12.4% of the global avian diversity, he said. According to the International Union for Conservation of Nature (IUCN) categorisation, 25 of the 78 bird species, which are found only in India, are classified as 'threatened', the scientist said.

"Seventy-eight bird species are found only in the country's geographical region. On the occasion of the 75th Independence year, we have focussed on 75 such species in the book, '75 Endemic Birds of India'," Mr. Majumder told PTI.

These selected winged species exhibit "remarkable distribution patterns" across various regions of the country, he said. Twenty-eight bird species are restricted to the Western Ghats, 25 to the Andaman and Nicobar Islands, four to the Eastern Himalayas and one each to the Southern Deccan plateau and Central Indian Forest, the scientist said.

Source: [https://www.thehindu.com/news/cities/kolkatal/78-species-of-birds-are-found-only-in-india-report/article67171123.ece?](https://www.thehindu.com/news/cities/kolkatal/78-species-of-birds-are-found-only-in-india-report/article67171123.ece?cx_testId=11&cx_testVariant=cx_1&cx_artPos=0&cx_experienceId=EXKWL3XAQS9E#cxrecs_s)

[cx_testId=11&cx_testVariant=cx_1&cx_artPos=0&cx_experienceId=EXKWL3XAQS9E#cxrecs_s](https://www.thehindu.com/news/cities/kolkatal/78-species-of-birds-are-found-only-in-india-report/article67171123.ece?cx_testId=11&cx_testVariant=cx_1&cx_artPos=0&cx_experienceId=EXKWL3XAQS9E#cxrecs_s)



ENVIRONMENT

GRASSLANDS ARE NOT WASTELANDS: RESTORATION PROJECT IN MAHARASHTRA SHOWS THE WAY

Grasslands in India continue to battle a perception problem, the seeds of which were sowed by the British who classified them as wastelands



As grasslands in India continue to battle a perception problem, the seeds of which were sowed by the British who classified them as wastelands, a project in Pune, Maharashtra is quietly paving a new path for conservation of these open natural ecosystems.

Pune-based The Grasslands Trust (TGT) and Bengaluru-based Ashoka Trust for Research in Ecology and the Environment (ATREE) are in the process of developing a pilot site to exhibit a working model for grasslands restoration.

The Grasslands Trust was started with a focus on the conservation of the biodiversity of open savannah grasslands in and around Pune. Mihir Godbole from TGT said the Trust was working with ATREE on the GPS-collaring of wolves and other carnivores when the team began to realise how degradation of grasslands was causing an imbalance in the ecosystem.

Source: <https://www.thehindu.com/sci-tech/energy-and-environment/hope-for-hessarghatta-as-restoration-project-in-maharashtra-is-showing-that-grasslands-are-not-wastelands/article67202200.ece>

NCBS TO COLLABORATE WITH A HOST OF ORGANISATIONS FOR FOREST RESEARCH AND CONSERVATION

The institutes intend to take a multidisciplinary approach towards education, research, and training in the field of forest genomics and the study of ecosystem to ensure conservation



A view of National Centre for Biological Sciences (NCBS) campus in Bengaluru. | Photo Credit: File photo

National Centre for Biological Sciences - Tata Institute of Fundamental Research (NCBS-TIFR) signed Memorandums of Understanding (MOUs) with Research and Training Organisation of Ministry of Environment, Forests, and Climate Change (MoEFCC), and a host of other organisations, on August 24 as a step towards building a partnership forest education, research and conservation.

Source: <https://www.thehindu.com/sci-tech/energy-and-environment/ncbs-to-collaborate-with-a-host-of-organisations-for-forest-research-and-conservation/article67233830.ece>

Indian Council of Forestry Research and Education (ICFRE), Indira Gandhi National Forest Academy (IGNFA), Central Academy for State Forestry Service (CASFS), Institute of Forest Genetics and Tree Breeding (IFGTB), and Forest Survey of India (FSI), are the other organisations that are a part of the collaborative effort.

Through these MoUs, the institutes intend to take a multidisciplinary approach towards education, research, and training in the field of forest genomics and the study of ecosystem to ensure conservation.

Dr. Jayaram Chengalur, Director of TIFR, Mumbai, emphasised the importance of a collaborative approach, noting that each institute brings its own set of unique and complementary skills to provide solutions to complex problems of conservation in India. “It is particularly important today, in this new era, with challenges of biodiversity, the ecosystem coming under stress, as well as stress due to climate change,” Mr. Chengalur said. One of the main objectives of the MoUs is to take practical measures to conserve different species of trees.



ENVIRONMENT

THREE-QUARTERS OF CHILDREN IN SOUTH ASIA FACE EXTREME HEAT: UN

The UN warns children in Afghanistan, Bangladesh, India, Maldives and Pakistan are at "extremely high risk" of the impacts of climate change



A man walks across an almost dried-up bed of river Yamuna amid hot weather in New Delhi, India, May 2, 2022. In the past 30 days, nearly 5,000 heat and rainfall records have been broken or tied in the United States and more than 10,000 records set globally, according to the National Oceanic and Atmospheric Administration. Since 2000, the U.S. is setting about twice as many heat records as cold.

Three-quarters of children in South Asia are already facing dangerously high temperatures, the highest level worldwide, as the impact of climate change grows, the United Nations warned Monday.

About 460 million children are exposed to extreme heat in South Asia, or 76% of children, compared to a third of children globally, the United Nations children's agency said.

"With the world at global boiling, the data clearly show that the lives and well-being of millions of children across South Asia are increasingly threatened by heat waves and high temperatures," said Sanjay Wijesekera, UNICEF Regional Director for South Asia.

The UN warns children in Afghanistan, Bangladesh, India, Maldives and Pakistan are at "extremely high risk" of the impacts of climate change, defining extreme high temperatures as 83 or more days in a year over 35 degree Celsius (95 degree Fahrenheit).

Children cannot adapt as quickly to temperature changes, and are not able to remove excess heat from their bodies.

"Young children simply cannot handle the heat," added Wijesekera. "Unless we act now, these children will continue to bear the brunt of more frequent and more severe heatwaves in the coming years."

Source: <https://www.thehindu.com/sci-tech/energy-and-environment/three-quarters-of-children-in-south-asia-face-extreme-heat-un/article67167617.ece>

THE CLIMATE-FRIENDLY COWS BRED TO BELCH LESS METHANE

The arrival of commercially available genetics to produce dairy cattle that emit less methane could help reduce one of the biggest sources of the potent greenhouse gas, scientists and cattle industry experts say.



Burps are the top source of methane emissions from cattle.

When Canadian dairy farmer Ben Loewith's calves are born next spring, they will be among the first in the world to be bred with a specific environmental goal: burping less methane.

Loewith, a third-generation farmer in Lynden, Ontario, in June started artificially inseminating 107 cows and heifers with the first-to-market bull semen with a low-methane genetic trait. "Selectively breeding for lower emissions, as long as we're not sacrificing other traits, seems like an easy win," Loewith said.

The arrival of commercially available genetics to produce dairy cattle that emit less methane could help reduce one of the biggest sources of the potent greenhouse gas, scientists and cattle industry experts say. Burps are the top source of methane emissions from cattle. Semex, the genetics company that sold Loewith the semen, said adoption of the low-methane trait could reduce methane emissions from Canada's dairy herd by 1.5% annually, and up to 20%-30% by 2050.

The company this spring began marketing semen with the methane trait in 80 countries. Early sales include a farm in Britain and dairies in the US and Slovakia, said vice-president Drew Sloan.

Source: <https://indianexpress.com/article/world/climate-change/the-climate-friendly-cows-bred-to-belch-less-methane-8883139/>



AGRICULTURE

BIOPRIME AGRISOLUTIONS LAUNCHES PLANT-MICROBES LIBRARY TO DRIVE SUSTAINABLE AGRICULTURE INNOVATION



The initiative aims to unlock the hidden potential of microbial communities residing within plants, revolutionising the way crop resilience, productivity, and plant protection are approached

Bioprime Agrisolutions, a startup in agricultural biotechnology, has launched the Bionexus library, a collection of plant-associated microbes in India. This groundbreaking initiative aims to unlock the hidden potential of microbial communities residing within plants, revolutionising the way crop resilience, productivity, and plant protection are approached, the startup announce on 7th July. Recognising that every plant is a complex ecosystem comprising diverse microbial organisms that interact symbiotically and influence the plant's growth and performance, Bioprime Agrisolutions has developed a cutting-edge high throughput screening process. This innovative approach scrutinises the physiological and biochemical responses of plants to microbes, enabling the identification and validation of promising leads for further comprehensive plant studies and omics.

“The Bionexus library currently houses a collection of over 15,000 microbial isolates, sourced from over 300 locations spanning the length and breadth of India. These invaluable resources include samples from regions as diverse as Tawang in Arunachal Pradesh; Gujarat; Pangong Tso in Leh; Sonmarg in Kashmir; to caves in Kerala. The collection houses microbes from sea level to 16,500 Ft, from pH-5 to 11, from rainfall of 210 mm to 11430 mm, from -8C to 70C. This covers vast habitats like grasslands, rainforests, lakes, caves, deserts, glaciers, river basins, hot water and sulphur springs and mines to name a few. This extensive microbial diversity database will provide researchers and scientists with unprecedented insights into India's unique microbial ecology, particularly crucial in the face of climate change and the urgent need for sustainable agriculture. These efforts have already yielded results with more than 2000 novel microbes with significantly higher activities,” Bioprime Agrisolutions said.

Source: <https://agriculturepost.com/agri-research/bioprime-agrisolutions-launches-plant-associated-microbes-library-to-drive-sustainable-agriculture-innovation/>

JOHA RICE – THE NUTRACEUTICAL OF CHOICE IN DIABETES MANAGEMENT

Towards that direction, scientists at IASST, an autonomous institute of the Department of Science and Technology explored the nutraceutical properties of aromatic Joha rice



Joha rice, aromatic rice cultivated in the Northeastern region of India is effective in lowering the blood glucose and preventing diabetes onset and hence is an effective nutraceutical of choice in diabetes management.

Joha is a short-grain winter paddy known for its significant aroma and noteworthy taste. The traditional claims are that the consumers of Joha rice have low incidence of diabetes and cardiovascular diseases, but these needed scientific validation.

Towards that direction, scientists at the Institute of Advanced Study in Science and Technology (IASST), an autonomous institute of the Department of Science and Technology explored the nutraceutical properties of aromatic Joha rice. Rajlakshmi Devi along with Paramita Choudhury in their research explored the nutraceutical properties of aromatic Joha rice. Through in vitro laboratory analysis, they detected two unsaturated fatty acids viz., linoleic acid (omega-6) and linolenic (omega-3) acid. These essential fatty acids (which human cannot produce) can help maintain various physiological conditions. Omega-3 fatty acid prevents several metabolic diseases such as diabetes, cardiovascular diseases, and cancer. Joha has also proved to be effective in lowering the blood glucose and preventing diabetes onset in diabetic rats.

Source: <https://dst.gov.in/joha-rice-nutraceutical-choice-diabetes-management#:~:text=Johd%20rice%2C%20aromatic%20rice%20cultivated,significant%20aromd%20and%20noteworthy%20taste.>



AGRICULTURE

NMIMS SAST'S STUDENTS PUBLISH PATENT FOR CHEMICAL-FREE STORAGE OF FRUITS AND VEGETABLES

The design provides a controlled environment for stored produce, minimising decay, bacterial growth, and wilting. It incorporates natural and plant-based ingredients in the anti-microbial unit to prevent food spoilage



Two students of final year B.Sc. (Hons.) Agriculture students at NMIMS School of Agricultural Science & Technology (SAST), Pawan Rajput and Manoj Mali, have published a patent titled “Chemical-Free Storage-cum-Selling Device for Enhanced Shelf Life of Fruits and Vegetables.” This groundbreaking invention showcases the innovative capabilities and practical knowledge of the students, highlighting the success of the systematic programme structure at the Shirpur (Dhule district) in Maharashtra-based SAST, the school said on Friday.

“The programme structure at SAST follows a comprehensive approach, focusing on fundamental education in the first year, applied aspects in the second year, technology aspects in the third year, and field training throughout the final year. During their third year, Pawan Rajput and Manoj Mali studied courses on post-harvest technology and food processing, where they identified the gaps in the storage, packaging, and processing of perishable fruits and vegetables,” NMIMS SAST informed.

“Their realisation of the challenges faced by resource-poor small and marginal farmers, including price fluctuations and post-harvest wastage, during their village attachment programme in rural areas of Dhule and Jalgaon in Maharashtra, became the driving force behind their innovative idea. After extensive research and analysis of current practices, storage structures, and packaging materials, they developed a vacuum storage device design equipped with accessories that regulate temperature, inhibit microbial growth, and absorb undesirable gases,” the agricultural institutions further said.

Source: <https://agriculturepost.com/agri-research/nmims-sasts-students-publish-patent-for-chemical-free-storage-of-fruits-and-vegetables/>

BIOPRIME AGRISOLUTIONS UNVEILS INDIA'S LARGEST PLANT-ASSOCIATED MICROBES LIBRARY TO DRIVE SUSTAINABLE AGRICULTURE INNOVATION

This groundbreaking initiative aims to unlock the hidden potential of microbial communities residing within plants, revolutionizing the way we approach crop resilience, productivity, and plant protection.



Bioprime Agrisolutions, a pioneering startup in agricultural biotechnology, has announced the launch of the Bionexus library, a first-of-its-kind and the largest collection of plant-associated microbes in India. This groundbreaking initiative aims to unlock the hidden potential of microbial communities residing within plants, revolutionizing the way we approach crop resilience, productivity, and plant protection.

Recognizing that every plant is a complex ecosystem comprising diverse microbial organisms that interact symbiotically and influence the plant's growth and performance, Bioprime Agrisolutions has developed a cutting-edge high throughput screening process. This innovative approach scrutinizes the physiological and biochemical responses of plants to microbes, enabling the identification and validation of promising leads for further comprehensive plant studies and omics.

Dr. Renuka Diwan, Co-Founder & CEO of Bioprime Agrisolutions, expressed her excitement about this groundbreaking endeavor: “The launch of the Bionexus library marks a significant milestone in our journey toward sustainable agriculture. By focusing on the intricate relationship between plants and their associated microbial communities, we are unraveling nature's secrets to unlock the full potential of our crops. This library will fuel innovation, enabling us to develop novel products and solutions that enhance crop resilience, productivity, and protection.”

Source: <https://www.biovoicenews.com/bioprime-agrisolutions-unveils-indias-largest-plant-associated-microbes-library-to-drive-sustainable-agriculture-innovation/>



HEALTH

A SILENT THREAT TO MALE REPRODUCTIVE HEALTH: NEW STUDY RAISES CONCERNS ON USE OF COMMON HERBICIDE CLETHODIM

The findings, recently published in the peer reviewed scientific journal Chemosphere, highlights the risks associated with clethodim-based herbicide exposure on male reproductive function and early embryonic development



In a collaborative effort, researchers from Kasturba Medical College (KMC), Manipal Academy of Higher Education (MAHE), Manipal, and Yenepoya Research Center, Mangaluru, have unveiled alarming insights into the potential impact of the widely used herbicide clethodim on male reproductive health.

The findings, recently published in the peer reviewed scientific journal Chemosphere, highlights the risks associated with clethodim-based herbicide exposure on male reproductive function and early embryonic development. The study utilised laboratory mouse model to explore the consequences of clethodim exposure. The results of this study have raised concerns on male reproductive health, revealing a spectrum of effects including a reduction in testicular weight, a decrease in germ cell population, lower levels of serum testosterone, abnormalities in sperm, and compromised pre-implantation embryo development, a release from MAHE said on Thursday, August 24.

The research underscores the necessity for heightened awareness and rigorous examination of the implications of clethodim-based herbicides on male reproductive health. The findings warrant reevaluating the use of such herbicides to ensure the health and safety of both humanity and environment, the release said.

Source: https://www.thehindu.com/sci-tech/health/a-silent-threat-to-male-reproductive-health-new-study-raises-concerns-on-use-of-common-herbicide-clethodim/article67230478.ece?cx_testId=10&cx_testVariant=cx_1&cx_artPos=0&cx_experienceId=EXDJ12CX29QX#cxreecs_5

ICMR STUDY ON LONG COVID: WHAT ITS KEY FINDINGS SAY ON POST-COVID-19 CONDITIONS, VACCINE EFFICACY

The ICMR study defines “post Covid-19 conditions” as persistent or new onset of fatigue, breathlessness, or cognitive abnormalities.



A study by the Indian Council of Medical Research published recently said that nearly 6.5% people hospitalised with Covid-19 died in the following year. This is comparable to data from across the world.

What were the major findings of the study?

The study is based on the data of 14,419 patients across 31 hospitals. It includes patients who were hospitalised since September 2020, meaning the infections are likely to have been caused by the original, delta, or omicron coronavirus variants. Besides, it looks at outcomes only in those who were hospitalised with moderate to severe disease.

Apart from the findings mentioned above, the study found that 17.1% of the participants experienced post-Covid-19 conditions such as lethargy and breathlessness, and cognitive abnormalities like brain fog and difficulty in concentrating. It also said that people were nearly three times more likely to die if they experienced these post-Covid-19 conditions.

The study put in a caveat that the exact definition of “post-Covid-19 conditions”, as given by World Health Organization or Centers for Disease Control and Prevention (CDC) could not be used, as they came out after patient enrolment had already begun. The ICMR study defines “post Covid-19 conditions” as persistent or new onset of fatigue, breathlessness, or cognitive abnormalities.

Source: <https://indianexpress.com/article/explained/explained-health/icmr-study-on-long-covid-what-are-its-key-findings-8908222/>



HEALTH

MODERN ANTIDEPRESSANTS CAN REDUCE RISK OF DEPRESSIVE RELAPSE FOR BIPOLAR PATIENTS, ACCORDING TO UBC AND NIMHANS STUDY

Bipolar disorder, earlier known as manic-depressive disorder, is prevalent in about 1% of the population and tends to be a lifelong illness



A new international study led by researchers from University of British Columbia (UBC) and NIMHANS has found that treatment with modern antidepressants can help prevent patients with Bipolar I disorder from relapsing into a depressive episode.

“The findings, published in the New England Journal of Medicine on August 3, challenge current clinical practice guidelines, and could change how bipolar depression is managed globally,” said Y.C. Janardhan Reddy, head of the Department of Psychiatry and OCD Clinic at NIMHANS.

What is bipolar disorder?

Bipolar disorder, earlier known as manic-depressive disorder, is prevalent in about 1% of the population, and tends to be a lifelong illness. Bipolar disorder has two phases — depression and mania. “Patients can sometimes develop mania, and other times depression, in a cyclical fashion,” said Professor Reddy, who is the principal investigator of the study in India.

“Antidepressants are effective in treating depression and in preventing relapse of depression in ‘recurrent depressive disorder’, often called ‘unipolar depression’. However, depression also occurs in the context of bipolar disorder. While there is effective medication to treat and prevent acute mania, treatment and prevention of bipolar type of depression have been challenging, despite the advent of many medications recently,” Professor Reddy told The Hindu on August 3.

Source: <https://www.thehindu.com/sci-tech/health/medicine-and-research/modern-antidepressants-can-reduce-risk-of-depressive-relapse-for-bipolar-patients-according-to-ubc-and-nimhans-study/article67153431.ece>

CONJUNCTIVITIS CASES SURGE AFTER HEAVY RAINS: WHAT PRECAUTIONS SHOULD WE TAKE TO PREVENT REDNESS, BLURRY VISION AND EYE DISCOMFORT?

‘Cold compresses are good. But consult an ophthalmologist as OTC drops can cause more harm than good. Do not use steroid eye drops on your own unless prescribed by the doctor,’ says Dr Neetu Sharma, Consultant, Ophthalmologist at Fortis Hospital, Noida



Conjunctivitis is an irritation or inflammation of the conjunctiva, which is a protective membrane that sheaths the white part of the eyeball. (Source: Wikimedia Commons)

Amid heavy rainfall in Delhi and nearby areas over the past few weeks, there has been a surge in the number of conjunctivitis and eye flu patients. Doctors from across the city have said that while this happens every year, this year it has been aggravated because of the unusual showers, flooding and increased moisture in the atmosphere.

According to Dr Soveeta Rath, Paediatric Ophthalmology, Strabismus and Neuro Ophthalmology at Dr Shroff's Charity Eye Hospital, Daryaganj, cases have gone up by almost 50 to 60 per cent. “Mostly children have been affected. Every third child has red eyes or conjunctivitis. Last week there were 30 children with conjunctivitis in the OPD,” she says.

What is conjunctivitis and how does it spread?

Conjunctivitis is an irritation or inflammation of the conjunctiva, which is a protective membrane that sheaths the white part of the eyeball. Also known as pink eye, it is most often caused by a viral or a bacterial infection and is highly contagious. It can occur with colds or symptoms of a respiratory infection, such as a sore throat. Wearing contact lenses that aren't cleaned properly or aren't your own, can cause bacterial conjunctivitis.

Source: <https://indianexpress.com/article/health-wellness/conjunctivitis-cases-surge-heavy-rains-precautions-8861232/>



HEALTH

WHO REPORT ON TOBACCO CONTROL: KEY FINDINGS, HOW INDIA FARES

Across the world, there are 300 million fewer smokers today, with the prevalence of smoking declining from 22.8% in 2007 to 17% in 2021.



With a focus on second-hand smoking, the report says that almost 40% countries now have completely smoke-free indoor public spaces. (Representational image/File)

Bengaluru finds special mention in a World Health Organisation (WHO) report on tobacco control measures released on August 3, 2023.

Hundreds of enforcement drives, putting up 'No Smoking' signs, and creating awareness about the effects of smoking and second-hand smoke resulted in a 27% reduction in smoking in public places in the city, the report said.

Across the world, there are 300 million fewer smokers today, with the prevalence of smoking declining from 22.8% in 2007 to 17% in 2021.

Fifteen years ago, WHO had developed the MPOWER measures – monitor tobacco use and prevention policies; protect people from tobacco smoke; offer help to quit tobacco; warn about dangers of tobacco; enforce bans on tobacco advertising; and raise taxes on tobacco products. The report assesses the implementation of these measures.

What does the report say?

In the 15 years since the MPOWER measures were first introduced, 5.6 billion people in the world – or 71% of the entire population – remain protected by at least one of the measures. This has increased from just 5% of the population in 2008.

Source: <https://indianexpress.com/article/explained/explained-health/who-report-on-tobacco-control-key-findings-how-india-fares-8871988/>

CINNAMON AND ITS ACTIVE COMPONENTS PREVENT PROSTATE CANCER: NATIONAL INSTITUTE OF NUTRITION STUDY

A release issued by NIN said that as part of this study, adult rats were given cinnamon or its bioactive compounds through the diet before induction of cancer and the rats were fed for 16 weeks.



A study by the ICMR-National Institute of Nutrition (NIN) has demonstrated that cinnamon and its active components - cinnamaldehyde & procyanidin B2 — administered orally to rats had an inhibitory effect on early-stage prostate cancer.

The study titled 'Chemopreventive effect of cinnamon and its bioactive compounds in a rat model of premalignant prostate carcinogenesis' published in the international peer reviewed journal Cancer Prevention Research aimed to assess the chemopreventive efficacy of cinnamon (CN) and its bioactive compounds (cinnamaldehyde or procyanidin B2) in vivo in male rats. A release issued by NIN said that as part of this study, adult rats were given cinnamon or its bioactive compounds through the diet before induction of cancer and the rats were fed for 16 weeks.

"It was observed that feeding cinnamon or its active compounds resulted in 60-70% of rats showing normal prostate histologically," noted the release. "We tried to decipher the probable mechanism(s) for the chemopreventive effect and observed that cinnamon and its active components could mitigate oxidative stress, decrease spread of cancer cells in the prostate gland. Interestingly, we also observed beneficial effects on bone mineral content and decrease in bone degeneration in these rats", said Dr Ayesha Ismail, scientist F and Head of Endocrinology Division, who led the study.

Source: <https://www.thehindu.com/sci-tech/health/cinnamon-and-its-active-components-prevent-prostate-cancer-national-institute-of-nutrition-study/article67235369.ec>



S&T COOPERATION FOR GLOBAL SOUTH

PM MODI BACKS BRICS EXPANSION, CALLS FOR BLOC'S SPACE EXPLORATION CONSORTIUM

Significantly, India also proposed a permanent membership of G20 to the African Union. "I am confident that our BRICS partners will support this in G20," PM Modi said



Prime Minister Narendra Modi addresses Plenary session I of BRICS summit in South Africa's Johannesburg on Wednesday. (PTI Photo)

At the opening plenary session of the 15th BRICS summit in Johannesburg, Prime Minister Narendra Modi on Wednesday backed the expansion of the five-nation grouping and stated that India has given highest priority to countries of Global South under its G20 presidency.

"India fully supports the expansion of BRICS and welcomes move to move forward on this based on consensus," PM Modi said during the open plenary session of the BRICS (Brazil, Russia, India, China and South Africa) summit. The BRICS brings together five of the largest developing countries of the world, representing 41 per cent of the global population, 24 per cent of the global GDP and 16 per cent of the global trade. A total of 23 countries, including Saudi Arabia, UAE and Argentina, have expressed interest in joining the BRICS.

Significantly, India also proposed a permanent membership of G20 to the African Union. "I am confident that our BRICS partners will support this in G20," PM Modi added.

Even as India prepares to make a historic landing on the moon with its Chandrayaan-3 mission, PM Modi called for establishing a BRICS space exploration consortium. "We are already working on the BRICS satellite constellation, but to move a step further, we should think about establishing a BRICS space exploration consortium," he said at the leaders's summit.

Source : <https://indianexpress.com/article/india/pm-modi-plenary-session-brics-summit-updates-8905616/>

WITH ONE EYE ON CHINA, JAPAN BACKS SRI LANKA AS A PARTNER IN THE INDO-PACIFIC

While Japan is Sri Lanka's largest creditor, about 10% of its debt is held by China, which lent Colombo billions to build sea ports, airports and power plants as part of its Belt and Road Initiative.



Japanese foreign minister Yoshimasa Hayashi, left, shakes hands with his Sri Lankan counterpart Ali Sabry after their meeting in Colombo, Sri Lanka on Saturday, July 29, 2023. (AP Photo)

Japan's Foreign Minister Yoshimasa Hayashi said Saturday that Sri Lanka is a key partner in a Tokyo-led initiative aimed at building security and economic cooperation around the Indo-Pacific but also at countering an increasingly assertive China.

Sri Lanka, strategically located in the Indian Ocean, is integral to realizing a free and open Indo-Pacific, Hayashi said. He was speaking after a meeting with his Sri Lankan counterpart, Ali Sabry, in the capital, Colombo.

The initiative, announced by Japanese Prime Minister Fumio Kishida in March includes Japan's assistance to emerging economies, support for maritime security, a provision of coast guard patrol boats and equipment and other infrastructure cooperation. Last year Sri Lanka, which owed \$51 billion in foreign debt, became the first Asia-Pacific country since the late 1990s to default, sparking an economic crisis.

While Japan is Sri Lanka's largest creditor, about 10% of its debt is held by China, which lent Colombo billions to build sea ports, airports and power plants as part of its Belt and Road Initiative. In March, China agreed to offer Sri Lanka a two-year moratorium on loan repayments.

Hayashi said that he conveyed expectations for further progress in Sri Lanka's debt restructuring process. He welcomed Sri Lanka's efforts under an agreement with the International Monetary Fund, which includes anti-corruption measures and transparency in the policy-making process.

Source : <https://indianexpress.com/article/world/with-one-eye-on-china-japan-backs-sri-lanka-as-a-partner-in-the-indo-pacific-8866735/>



S&T COOPERATION FOR GLOBAL SOUTH

INDIA'S G-20 OPPORTUNITY FOR AN AFRICAN RENAISSANCE

By presenting itself as a more participative and less exploitative alternative, India can make its ties with Africa a win-win ecosystem for the 21st century



Like an absentee landlord, Africa is flagging its demands nowadays on multilateral fora such as BRICS (Brazil, Russia, India, China and South Africa), the G-20 and the United Nations General Assembly. For a continent with 54 countries, over a quarter of the “Global South”, it is populated at BRICS and the G-20 by South Africa, an atypical representative of the Black continent.

Challenges and disruptors

Africa, in general, and the Sahel region in particular, are passing through several existential challenges such as misgovernance, unplanned development, the dominance of ruling tribes and corruption. Recently, new disruptors such as the Islamic terror, inter-tribal scrimmage, changing climate, runaway food inflation, urbanisation and youth unemployment have further strained the traditional socio-political fabric. As the past military interventions by France, the United States and Russia's Wagner Group to curb the militancy have shown, they frequently become part of the problem. These interventions have costs: keeping dictatorships in power to protect their economic interests, such as uranium in Niger, gold in the Central African Republic and oil in Libya.

Until recently, African nationalists took pride in the continent having seen the last of generals in power. But thanks to the socio-political disorder highlighted, the past decade has seen the generals coming back in Egypt, Burkina Faso, Mali, and Niger. The armed forces in Libya and Sudan have split and are vying for supremacy. While most military establishments in these countries are relatively weak and incapable of defeating the Islamists and tribalists, their top brass do not lack political ambitions. The reasons for the return of generals are complex and often specific to the national situation.

Source : <https://www.thehindu.com/opinion/lead/indias-g-20-opportunity-for-an-african-renaissance/article67232034.ece>

HOW THE G20 BECAME A PREMIER FORUM FOR INTERNATIONAL ECONOMIC COOPERATION

As we gear up for the G20 Heads of State and Government Summit in New Delhi, to be held on September 9 and 10, we take a look at the forum's origins and evolution.



G20 Leaders Summit on Financial Markets and the World Economy in Washington, D.C. on 15 November 2008. (Photo via Wikimedia Commons)

New Delhi is gearing up to host the G20 Heads of State and Government Summit on September 9 and 10.

The summit will see heads of state/government from all the G20 members (minus Vladimir Putin of Russia), the invited heads of state from other partner nations, and representatives of global organisations such as the UN, IMF, World Bank and WTO, congregate in Delhi. It is the culmination of all the G20 processes and meetings held throughout the year in cities across India, among ministers, government officials, and civil society members and organisations.

A brief introduction to the G20

The G20 or the Group of Twenty comprises 19 countries (Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Republic of Korea, Mexico, Russia, Saudi Arabia, South Africa, Turkey, United Kingdom, and the United States) and the European Union.

These members represent around 85 per cent of the global GDP, over 75 per cent of global trade, and about two-thirds of the world population. As a forum for international economic cooperation, it plays an important role in shaping and strengthening global architecture and governance on all major international economic issues.

Unlike the UN, G20 does not have a permanent secretariat or staff. Rather, the G20 Presidency rotates annually among the members – the Presidency is responsible for bringing together the G20 agenda, organising its workings and hosting summits. India holds the Presidency from December 1, 2022, to November 30, 2023.

Source : <https://indianexpress.com/article/explained/explained-global-g20-forum-international-origins-explained-8914213/>



OTHERS

505-MILLION-YEAR-OLD JELLYFISH FOSSILS MAY BE THE OLDEST EVER FOUND

The specimens are evidence of how little the squishy, tentacled predators have changed over the history of life on Earth.



A life reconstruction of a group of *Burgessomedusa phasmiformis* swimming in the Cambrian sea. Credit... Christian McCall

Jellyfish have been floating through Earth's oceans seemingly forever. But pinning down the exact origin of these squishy sea creatures, which are some of the earliest complex animals, is difficult. They rarely show up in the fossil record because jellyfish are 95 percent water and are prone to rapid decay.

"If you see a jellyfish outside of the water, a couple hours later it's just a ball of goo," said Jean-Bernard Caron, a paleontologist at the Royal Ontario Museum in Toronto. But Dr. Caron and other scientists recently described a cache of jellyfish fossils from the Cambrian period that found an improbable pathway to preservation. In a paper published on Wednesday in the journal *Proceedings of the Royal Society B*, the scientists posit that these 505-million-year-old animals are among the oldest swimming jellyfish known to science.

"These new fossils represent the most compelling evidence of Cambrian jellyfish to date," said David Gold, a paleobiologist at the University of California, Davis, who was not involved in the new study.

The jellyfish specimens were found in the Burgess Shale, a fossil-rich site in the Canadian Rockies that provides a glimpse of life during Earth's Cambrian explosion. Like other soft-bodied creatures found at the site, the gelatinous jellyfish are preserved in stunning detail. Most still possess upward of 90 fingerlike tentacles, which stick out of the creature's bell-shaped body like the strings at the end of a tassel rug. Some even retain their stomach contents and gonads.

Source: <https://www.nytimes.com/2023/08/01/science/oldest-jellyfish-fossil.html>

IISC SCIENTISTS DISCOVER 600-MILLION-YEAR-OLD OCEAN WATER FROM HIMALAYAS, FROZEN MICROBES ARE COMING BACK TO LIFE AND MORE

Find the latest news and updates from the world of science.



Scientists have discovered droplets of water trapped in mineral deposits in the Himalayas that were likely left behind from an ancient ocean which existed around 600 million years ago.

From figuring out why the universe exists to how ants know how much food their colony needs, here are this week's top findings and discoveries from the field of science.

Measuring helium in distant galaxies may give physicists insight into why the universe exists

A recent study found that the Subaru telescope's new measurement of the amount and type of helium in faraway galaxies may offer a solution to the long-standing mystery of matter-antimatter asymmetry problem. Last year, the Subaru Collaboration – a group of Japanese scientists working on the Subaru telescope – released data on 10 galaxies far outside of our own that are almost exclusively made up of hydrogen and helium. Using a technique that allows researchers to distinguish different elements from one another based on the wavelengths of light observed in the telescope, the Subaru scientists determined exactly how much helium exists in each of these 10 galaxies. Importantly, they found less helium than the previously accepted theory predicted.

Scientists discover 600-million-year-old ocean water from Himalayas

Scientists have discovered droplets of water trapped in mineral deposits in the Himalayas that were likely left behind from an ancient ocean which existed around 600 million years ago. The study conducted by scientists of IISc and Niigata University, Japan, shows that the 600-million-year-old ocean water from the Himalayas can provide the evolution of oceans, and even life, in Earth's history. Exposures of such marine rocks in the Himalayas can provide some answers on palaeo oceans, the institute said.

Source: <https://www.thehindu.com/sci-tech/science/iisc-scientists-discover-600-million-year-old-ocean-water-from-himalayas-frozen-microbes-are-coming-back-to-life/article67138119.ece>



OTHERS

OLDEST YET FOSSILS OF A PLANT-EATING DINOSAUR FOUND IN RAJASTHAN

The Indian landmass could have been an important place for the early evolutionary history of sauropod dinosaurs.



Fossils associated with the backbone of *Tharosaurus indicus*.

In a paper published recently in *Scientific Reports*, scientists from IIT Roorkee have characterised dinosaur fossils from the Middle Jurassic period, found in the Thar desert near the Jaisalmer Basin by the Geological Survey of India. They discovered that they had uncovered remains of a sauropod dinosaur, which is the same clade as the long-necked herbivores in Jurassic Park – only these happened to be the oldest known fossils of this particular kind of sauropod.

Belonging to the family Dicraeosauridae and from the superfamily Diplodocoidea, these fossils are the first dicraeosaurid sauropods to have been found in India. And at 167 million years old, they are the oldest known diplodocoid fossils in the world. The scientists named the dinosaur *Tharosaurus indicus*, with Tharo deriving from the Thar desert; saurus from the Greek ‘sauros’, or lizard; and indicus from its Indian origin. The fossils were found by Triparna Ghosh, Pragya Pandey, and Krishna Kumar from the Geological Survey of India.

167 million years old

“The most fascinating feature about sauropods is their size,” said Debajit Datta, a postdoctoral researcher in Sunil Bajpai’s group at IIT Roorkee and one of the lead authors of the paper. “They can grow more than a hundred feet. There are many sauropod groups that are even longer than the blue whale.”

However, members of the Dicraeosauridae family of sauropods – to which *Tharasaurus* belongs – were not nearly as large. This family was unique: its members were smaller and had shorter necks and tails compared to the other long-necked sauropods.

Source: <https://www.thehindu.com/sci-tech/science/tharosaurus-indicus-jaisalmer-basin-oldest-plant-eating-dinosaurs/article67262586.ece>

WASPS USE GEOMETRY TO CORRECT MISTAKES WHILE BUILDING THEIR NESTS

This study shows the immense computational ability possessed by wasps



The wasps usually collect fibres from plants and wood and mix them with their saliva to create water-resistant nests, often preferring to build their nests in and around human habitation. Yellow wasps stinger also contains venom. | Photo Credit: Konwar Ritu Raj/The Hindu

At least one species of wasps have shown an intuitive knowledge of geometry that help construct and correct mistakes while building nests, new research has shown.

These tiny architectural experts build nests from paper-like materials made from wood pulp and hardening saliva. The nests are built by placing hexagonal (six-sided) structures side by side to make a straight structure. Led by Dr. Shivani Krishna, a team of researchers at Ashoka University, studied the nests of *Polistes wattii* commonly known as yellow paper wasps found on the grounds of the university.

last year in *Scientific Reports*, research has found that during the construction process, if a pentagon (five-sided) cell is constructed instead of a hexagon, the wasps will add a heptagon (seven-sided) cell to correct the mistake. Conversely, when a heptagon is added during the construction, the wasps will insert a pentagon.

“This is done to make sure that the nest, often hanging from walls or trees, is built straight. If the extra cell is not introduced, the nest will not be stable and end up shaped like a hat or a saddle,” said Dr. Krishna while speaking to *The Hindu*.

‘Somewhat of an enigma’

But strangely, in India, while sauropod fossils from the Early Jurassic and the Late Cretaceous period have been found, very few have from the Middle or Late Jurassic period, which would be about 160-180 million years ago.

Source: <https://www.thehindu.com/sci-tech/energy-and-environment/wasps-nest-geometry-pentagon-heptagon-ashoka-university/article67030895.ece>