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SCIENCE & TECHNOLOGY

‘Outstanding work’: IIT-M team makes mineral nanoparticles with water

Infusing soil with silica nanoparticles made using the technique could transform agriculture

B.K. Spoorthi, who just completed her PhD at IIT Madras, looking at an experiment in progress.

Water drops are ubiquitous around us and come in different sizes. They can be as large as a raindrop or as small as aerosol particles released from a spray can.

They can be even smaller — invisible to the naked eye — when they come as microdroplets. The latter are just a thousandth the size of a typical raindrop. “We think that droplets are very tiny, and they are not important enough,” Thalappil Pradeep, a chemist at IIT Madras, told The Hindu.

Dr. Pradeep led a study recently published in the journal Science that showed microdroplets of water can break minerals down into nanoparticles. The team involved researchers from IIT Madras and the Jawaharlal Nehru Centre for Advanced Studies, Bengaluru. “This outstanding work adds significantly to the growing body of evidence that water droplets enable chemical transformations that bulk water does not make possible,” Richard Zare, a chemist at Stanford University who wasn’t involved in the study, told The Hindu.

Source:https://www.thehindu.com/sci-tech/science/iit-madras-scientists-mineral-nanoparticles-with-water-agriculture-applications/article68384580.ece

inStem's fabric offers protection from pesticides

The fabric deactivates the pesticide and breaks it down into non-toxic products

Researchers at the Institute for Stem Cell Science and Regenerative Medicine (inStem), in Bengaluru have developed an anti-insecticide fabric that effectively neutralises organophosphate-based pesticides. In an earlier work published about six years ago, the team had developed a gel for topical dermal application to deactivate the pesticides. But considering that compliance might be poor, the researchers looked at another alternative that is as effective in deactivating the insecticide but at the same time does not reduce compliance.

When esters present in organophosphate-based pesticides enter the body they bind and inhibit an enzyme (acetylcholinesterase or AChE) critical for neuromuscular function from working. Therefore, inhibition of this important enzyme is implicated in learning deficits, suffocation, paralysis, muscle weakness among others.

In a paper published recently in Nature Communications, the team led by Dr. Praveen Kumar Vemula from inStem coated the cotton fabric with small molecules, rendering the final product the ability to deactivate the insecticide. "The small molecules are covalently bonded with the cellulose of the fabric making the cloth not only breathable but also durable," says Dr. Vemula. The small molecules that are covalently bonded with the fabric are nucleophile in nature, and can detoxify the pesticides upon contact through nucleophile-mediated hydrolysis, says Dr. Vemula. "The fabric attacks the pesticide molecule and breaks it into non-toxic products. The pesticide is deactivated even before it reaches the skin surface," he says. The fabric with covalently-bonded small molecules was developed in collaboration with Sepio Health Pvt Ltd, a spin-off company from inStem.

Source:https://www.thehindu.com/sci-tech/science/instems-fabric-offers-protection-from-pesticides/article68344723.ece

CSIR innovation: New compact utility tractor can help uplift the small and marginal farmers

A newly developed compact, affordable and easily manoeuvrable utility tractor catering for small and marginal farmers could help them increase agricultural productivity while keeping the cost low. An MSME has planned to set up a manufacturing plant for mass production of tractors for supply to farmers.

Marginal and small farmers comprise over 80 per cent of cultivators in India. A large population of them still depend on bullock-driven farming in which operational costs, maintenance costs and poor returns pose a challenge. Though power tillers are replacing bullock-driven ploughs, they are cumbersome to operate. Tractors on the other hand are unsuitable for small farmers and unaffordable for most small farmers.

In order to address these challenges, CSIR-Central Mechanical Engineering Research Institute (CSIR-CMERI) based in Durgapur, West Bengal, has developed a compact, affordable and easily manoeuvrable tractor of low horsepower range to meet the requirement of the marginal and small farmers, with support from the SEED Division of Department of Science and Technology (DST), Government of India.

They have promoted the technology among several existing self-help groups (SHGs), and efforts were made to create new SHGs, particularly for this technology. CSIR-CMERI is also discussing licensing it to local companies for large-scale manufacturing so that the benefits can reach the local farmers.

The tractor has been developed with a 9 hp diesel engine with 8 forward and 2 reverse speeds, PTO with 6 splines @540 rpm. The total weight of the tractor is around 450kg, having front and rear wheel sizes of 4.5-10 and 6-16 respectively. The wheelbase, ground clearance, and turning radius are 1200 mm, 255mm, and 1.75m respectively.

Source:https://agriculturepost.com/farm-inputs/farm-mechanisation/csir-innovation-new-compact-utility-tractor-can-help-uplift-the-small-and-marginal-farmers/

Scientists found a bacteria tricked a wasp to get rid of its males

A new study reports Wolbachia may have taken it a bit too far, after scientists found it manipulated the evolution of Encarsia formosa wasps

Tomato leaf with whitefly nymphs (white) parasitised by Encarsia formosa wasps (black), May 17, 2003. These wasps were among the world's first agents of biological pest control.

A hundred years ago, two American researchers named Marshall Hertig and Simeon Burt Wolbach discovered that mosquitoes harboured bacteria within their cells. Other researchers later found similar bacteria in the cells of most insects and many other arthropods. The genus to which the bacteria belonged was named Wolbachia.

Wolbachia bacteria are also present in insect eggs but they are absent in the sperm. This means females can transmit Wolbachia to their offspring whereas males can't — from the bacteria's point of view, an evolutionary dead-end. As a result, Wolbachia have evolved ways to manipulate their insect hosts to produce more female than male progeny.

A new study reports that the bacteria may have taken it a bit too far this time. Researchers from Shenyang Agricultural University (SAU), China, published a paper in the June 3 issue of the journal Current Biology showing that Wolbachia bacteria had manipulated the wasp Encarsia formosa to entirely get rid of its males.

The farmer-friendly amazon

E. formosa wasps are of interest to agricultural scientists because they provide an efficient way to control whiteflies. Whiteflies feed on the sap of plant leaves, causing productivity losses, and are thus a major agricultural pest. Whiteflies belong to the insect order Hemiptera whereas wasps belong to the insect order Hymenoptera. The wasp seeks out the nymphs (or larvae) of whiteflies and lays its eggs on them. When the eggs hatch, the larvae that emerge penetrate the nymph, feed on its tissues, grow to adulthood, and in the process kill the nymph.

The progeny wasps emerge from the nymph's carcass. As a parasitoid of whiteflies, the female wasp is in effect a search and destroy weapon. The male wasps are superfluous to this role.

Source:https://www.thehindu.com/sci-tech/science/scientists-found-a-bacteria-tricked-a-wasp-to-get-rid-of-its-males/article68403072.ece

Scientists find how the same ear senses murmurs and listens to screaming music

Two sensitive proteins in our ears break when loud sounds reach the ear, preventing it from reaching the hair cells, an IISER Mohali study found

Humans can perceive sound in the range of 20 Hz to 20 kHz in frequency and 5-120 dB in intensity

A tree that is flexible enough to shake in a gentle breeze will undoubtedly be uprooted during a squall. On the other hand, a hardy tree that resists the force of a strong gale will hardly shudder during a gentle breeze. But unlike the tree, our ears can handle both ends of the spectrum.

The human auditory system, a marvel of nature, doesn't only detect the faintest sound signals but also demonstrates remarkable resilience in the face of thunderous noises. This adaptability allows us to distinguish the gentlest whispers from our loved ones and immerse ourselves in the thundering music of a nightclub.

Recent research has unveiled a fascinating mechanism that allows our auditory system to adapt to various sound environments. Just as our pupils dilate in the dark and contract in bright light, our ears have mechanisms that help adjust to 'see' in dim sound environments and protect us from harsh sound environments.

How do we hear?

At the heart of our auditory system are intricate hair cells nestled within the human cochlea. Each cochlea houses around 16,000 of these flask-shaped sensory cells, each with a cluster of hairlike projections called stereocilia. These stereocilia, arranged like a staircase from the shortest to the tallest, are the key to our hearing.

Two adjacent stereocilia are connected by a filamentous extracellular tether called a tip link. These tip links, functioning like a complex network of connections, are pivotal in our hearing process, converting sound waves into electrical signals our brain can interpret.

Source:https://www.thehindu.com/sci-tech/science/scientists-find-how-the-same-ear-senses-murmurs-and-listens-to-screaming-music/article68399665.ece

ENVIRONMENT

Animals on islands face a greater risk of extinction

Warm-blooded island species tend to evolve a slower metabolic rate compared with their mainland counterparts, making it harder for them to bounce back when under stress

The giant rodent Desmarest's hutia on a beach in Cuba—an example of gigantism encountered in animals that live on islands.

Life tends to move at a slower, more leisurely pace for people who live on islands. It turns out this languidity even extends to island-dwelling animals as well. New research published in Science Advances reveals that many warm-blooded island species evolved a slower metabolic rate compared with their mainland counterparts—a feature that gives them a survival edge in resource-scarce environments but puts them at a heightened risk of extinction when humans are added to the mix.

"When the environment changes or invasive animals come to islands, island species have a low ability to defend themselves," says co-lead author Ying Xiong, a zoologist at Sichuan Agricultural University in China. "We found a general metabolic rule that helps to explain this."

The new findings add to what scientists know about "island syndrome," or the tendency for island-bound species to evolve differences compared with mainlanders in physiology , ecology, and behavior. While some studies have identified metabolic differences as a feature of island syndrome, those previous works tended to be one-offs that focused on a single species or group, says co-lead author Roberto Rozzi, curator of paleontology at the Central Repository of Natural Science Collections at the Martin Luther University Halle-Wittenberg in Germany.

The new study pulls together, for the first time, Rozzi says, a "more or less comprehensive" dataset examining the metabolic rates of warm- and cold-blooded island species. Rozzi, Xiong and their colleagues turned to published papers and existing databases to compile metabolic and ecological information for 2,118 warm-blooded species, including 193 from islands, and 695 cold-blooded species, including 38 from islands.

Source:https://www.scientificamerican.com/article/why-animals-living-on-islands-are-at-greater-risk-of-extinction/#:~:text=New%20research%20published%20in%20Science,are%20added%20to%20the%20mix

ZSI scientist discover new species of dogfish shark Squalus hima from India

Scientist behind the discovery said that species belonging to the genus Squalus and Centrophorus are exploited for their liver oil that contains high levels of squalene (or squalane is when it is processed for products)

The new species of deep-water dogfish shark Squalus hima

Scientists from the Zoological Survey of India (ZSI) have discovered a new species of deep-water dogfish shark Squalus hima from Sakthikulangara fishing harbour in Kerala along the Arabian Sea.

Scientists from the Zoological Survey of India (ZSI) have discovered a new species of deep-water dogfish shark Squalus hima from Sakthikulangara fishing harbour in Kerala along the Arabian Sea.

Squalus is a genus of dogfish sharks in the family Squalidae. commonly known as spurdogs, and are characterized by smooth dorsal fin spines.
The discovery has been made by a team of scientists led by Bineesh K. K Scientist at the Marine Biology Regional Centre of ZSI and the discovery has recently been published in the journal Records of the ZSI.

"This species has been largely misidentified with S. mitsukurii and S. lalannei. However, morphological, meristic, morphometric evidence support it to be a separate and undescribed species. Squalus hima sp.nov differs from other species by the number of precaudal vertebrae, total vertebrae, teeth count, trunk & head heights, fin structure and fin colour," said by Sweta Beura, lead author of the publication.

In the Indian coast, two species of Squalus are found from the southwest coast of India and the new species, Squalus hima n.sp. very similar to Squalus lalannei, but differs in many characteristics. The species belonging to Squalus megalops group are characterised by an angular short snout, a small mouth almost as wide as the snout, first dorsal fin origin behind the pectoral fins, and body without any spots.

Dr. Bineesh explained that the shark species belonging to the genus Squalus and Centrophorus are exploited for their liver oil that contains high levels of squalene (or squalane is when it is processed for products). It is in high demand for pharmaceutical industries particularly for making high end cosmetic products and anti cancerous products.

Source:https://www.thehindu.com/sci-tech/energy-and-environment/zsi-scientist-discover-new-species-of-dogfish-shark-squalus-hima-from-india/article68393567.ece

ENVIRONMENT

Two species of flower flies reported for the first time in Kerala

Researchers of the Shadpada Entomology Research Lab of Christ College, Irinjalakuda, make the discovery

Mesembrius quadrivittatus

Researchers of the Shadpada Entomology Research Lab (SERL) of Christ College, Irinjalakuda, have reported two species of flower flies for the first time from Kerala.

Mesembrius bengalensis and M. quadrivittatus have been discovered from the Kole wetlands and Vilagan Kunnu hillocks of Thrissur district by Athul Sankar C., a research scholar at SERL; Bijoy C., Assistant Professor, Christ College (Autonomous), Irinjalakuda; and Shaji E.M., Associate Professor, K.K.T.M Government College, Pullut.

Flower flies belong to the family Syrphidae of order Diptera and are commonly called flower files because they are frequent visitors of flowers like many bees and wasps. They are flies that evolved to mimic bees or wasps to escape from their predators, explains Dr. Bijoy.

Flower flies are important pollinators. Larvae of these flies are excellent biological control agents and nutrient recyclers, he adds. A literature survey by the same team revealed a rich diversity of 59 species of flower flies from Kerala. These new records add two more species to the existing list.

The recent study is published in the journal ENTOMON, the official publication of the Association for Advancement of Entomology. “Along with the report, key characteristics of the species are also imaged, which will help with easy identification in public platforms and will help understand the distribution of species with public participation” said Mr. Sankar.

Source:https://www.thehindu.com/sci-tech/energy-and-environment/two-species-of-flower-flies-reported-for-the-first-time-in-kerala/article68422186.ece

Time to make climate change part of environmental impact reports

The WHO estimates that climate change is expected to cause approximately 2.5 lakh additional deaths per year between 2030 and 2050

If one thing is apparent from the changing weather over the last few years, it is the repeated extremes that we have encountered. Extreme heat and humidity, storms that cause severe and ruinous flooding and wreak havoc across wide areas in urban settlements, and very cold winters. It is clear that climate change is touching human lives and our health in myriad ways. As the World Health Organisation (WHO) says, “Climate change threatens the essential ingredients of good health — clean air, safe drinking water, nutritious food supply, and safe shelter — and has the potential to undermine decades of progress in global health.”

Further, the WHO estimates that between 2030 and 2050, climate change is expected to cause approximately 2,50,000 additional deaths per year from malnutrition, malaria, diarrhoea and heat stress alone. The direct costs to health are estimated to be between $2 and 4 billion per year by 2030. Regions with weak health infrastructure — mostly in developing countries — will be the least able to cope without assistance to prepare and respond.

The World Bank records that as the global climate crisis escalates, the devastating impact it will have on human health and well-being will also accelerate. No one anywhere around the globe is beyond its reach, though millions of people — notably women, children, the elderly, ethnic minorities, people with pre-existing health conditions, and those living in poverty — are among the most vulnerable. A recent study done in India by the faculty of Public Health at the Sri Ramachandra Institute of Higher Education and Research (SRIHER) in Chennai showed that working in extreme heat can double the risk of stillbirth and miscarriage for pregnant women, shocking researchers as they had previously underestimated the impact.

Source:https://www.thehindu.com/sci-tech/energy-and-environment/time-to-make-climate-change-part-of-environmental-impact-reports/article68417334.ece#:~:text=Further%2C%20the%20WHO%20estimates%20that,billion%20per%20year%20by%202030.

ENVIRONMENT

Antelope-like mammal from Bhutan recorded at lowest elevation in Assam

The vulnerable mainland serow was hitherto found to inhabit areas at altitudes between 200 and 3,000 metres above the mean sea level

A mainland serow rummaging through Assam's Raimona National Park

The mainland serow, a mammal that appears somewhere between a goat and an antelope, has been recorded at the lowest elevation beyond Bhutan, its natural home.

A team of scientists recorded a lone mainland serow (Capricornis sumatraensis thar) at 96 metres above the mean sea level in western Assam's Raimona National Park. It was not the only first for the elusive animal; it was found within a radius of 1 km from a human habitation.

The finding with photographic proof was published as a scientific paper in the latest issue of the Journal of Threatened Taxa. The paper was authored by M. Firoz Ahmed, senior scientist at biodiversity conservation group Aaranyak, senior conservation biologist Dipankar Lahkar, Nibir Medhi, Nitul Kalita, Kachugaon Forest Division's DFO Bhanu Sinha, forest officials Pranjal Talukdar, Biswajit Basumatary, and Tunu Basumatary, Assam University's associate professor Ramie H. Begum, and Abhishek Harihar, the director of Tiger Programme, Panthera.

According to the International Union for Conservation of Nature, the mainland serow inhabits areas at altitudes of 200-3,000 metres. The animal habitat is across the India-Bhutan border in Phibsoo Wildlife Sanctuary and the Royal Manas National Park in the Himalayan country.
There are three other species of the animal – Japanese serow, red serow (found in eastern India, Bangladesh, and Myanmar), and Taiwan or Formosan serow.

"The discovery of the mainland serow near the Ganda Bajrum anti-poaching camp in the western range of Raimona National Park is good news for biodiversity conservation aspects. Our goal is to conserve this species and other wildlife in the national park," Mr Sinha said.

Dr Ahmed said the spotting of the mainland serow would augur well for conservation efforts toward recovering the population of certain species and restoring degraded habitats in Raimona, once a victim of poaching for bushmeat and habitat alternation due to logging.

Source:https://www.thehindu.com/sci-tech/energy-and-environment/antelope-like-mammal-from-bhutan-recorded-at-lowest-elevation-in-assam/article68339890.ece

Scientists report trees absorb methane as well

The new evidence reinforces the importance of trees for our climate system while showing there is still much to learn about these ecosystems

Researchers measure methane exchange on upland trees in Peru

Tree bark in the world's forests absorbs the greenhouse gas methane, Vincent Gauci, Professorial Fellow, School of Geography, Earth and Environmental Science, University of Birminghammy and his colleagues have demonstrated for the first time on a global scale – a discovery that could have big implications for tackling climate change.

As trees photosynthesise, their leaves take up carbon dioxide (CO_2) and lock it away as biomass in their trunks and branches providing a long-term store of carbon. But now, our large-scale study proves that there's another way that trees absorb greenhouse gases – so forests can provide even more climate benefits than previously thought.

Methane has contributed about a third of the observed climate warming since preindustrial times. Concentrations of methane in the atmosphere have been rising rapidly for the best part of two decades. That's a real problem for Earth's climate because methane traps much more heat in the atmosphere than the equivalent amount of CO_2. But while CO_2 can last in the atmosphere for hundreds of years, methane has a lifetime of around ten years.

This short atmospheric lifetime means that any changes to sources of methane or processes that remove methane from the atmosphere (known as methane sinks) can have rapid effects. If removal is enhanced, this can be a quick climate win helping to mitigate escalating climate change. That's why researchers are so interested in understanding how methane gets into the atmosphere and how different processes remove it. It's why my team of ecologists and climate scientists have been studying the exchange of methane between tree bark, a surface that had previously been overlooked for its climate contribution, and the atmosphere.

Wetlands are known to be the primary natural source of methane – trees in swamps and floodplains can emit methane from the lower portions of their trunks. But methane exchange in trees growing on free-draining soils that don't flood – that includes most of the world's forests – has not been well-studied, until now.
We measured methane exchange on hundreds of tree stems in forests along a climate gradient spanning the Amazon and Panama, through to Sweden and forests near Oxford in the U.K. We used a simple plastic chamber that wrapped around the tree trunk which was then connected to a laser-based methane analyser.

Source:https://www.thehindu.com/sci-tech/energy-and-environment/scientists-report-trees-absorb-methane-as-well/article68449640.ece#:~:text=Tree%20bark%20in%20the%20world's,implications%20for%20tackling%20climate%20change.

CITES eases export of agarwood from India, move to benefit lakhs of farmers

Given that agarwood is cultivated in different parts of India, especially in the northeast, the development is going to benefit lakhs of farmers in Assam, Manipur, Nagaland, and Tripura

Aquilaria malaccensis (agarwood) is utilised in numerous applications such as in the aroma industry, in medicine preparations, preparations of air fresheners and purifiers.

India has successfully prevented inclusion of Aquilaria malaccensis (agarwood) in the Review of Significant Trade (RST) of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The CITES also notified a new export quota of highly valuable and aromatic resinous wood and oil of Aquilaria malaccensis (agarwood) from India from April 2024.

Since agarwood is cultivated in different parts of India, especially in the northeast, the development is going to benefit lakhs of farmers in certain districts of Assam, Manipur, Nagaland, and Tripura.

Aquilaria malaccensis was listed in Appendix II of CITES for the first time in 1995 based on India's proposal at CoP9 in 1994. The removal of India from the RST for Aquilaria malaccensis was achieved based on a non-detriment findings (NDFs) study of the plant species by the Botanical Survey of India (BSI), Ministry of Environment Forest and Climate Change (MoEFCC).

The NDF prepared by the BSI suggested that "harvesting of plants or collection of seeds/ seedlings/saplings and other propagules should not be allowed from the existing wild populations or plants in the protected areas and reserve forests". However, the NDF added that harvest of plants should be allowed from home/community gardens, plantations on leased/patta lands, private or community plantations, or any other types of small-scale/large-scale plantations.

The export quota recommended by the NDF for 2024–2027 stands at agarwood chips and powder/sawdust is 1,51,080 kg/year and agarwood oil is 7,050 kg/year.."The absence of an export quota for a long period and other trade-related restrictions in India caused an increase in informal trade/export of agar chips, oil, powder etc. to the Middle East and other foreign countries. It also caused an increase in costs of agarwood chips and oil in the global market as India is a major agarwood trading nation with which most importing countries have long trade records." the NDF report said.

Source:https://www.thehindu.com/sci-tech/energy-and-environment/cites-eases-export-of-agarwood-from-india-move-to-benefit-lakhs-of-farmers/article68457796.ece

Advanta, nurture.farm partner to launch Nutrifeed Germination Scheme for forage crops

Advanta and nurture.farm have collaborated to launch its Nutrifeed Germination Scheme. This scheme is a trailblazer and aims to protect dairy farmers from germination failure of forage crops (Forage Millet Hybrids Nutrifeed), thus helping them sustain themselves during periods of crises. As a part of the risk cover, the farmers are compensated if the seed does not germinate within 15 days of sowing. For the unversed, forage crops include sorghum, millet and corn. Germination failure in the case of these crops leads to widespread losses for farmers; thus, this scheme helps bridge essential gaps.

Prashant Belgamwar, Regional Head – Asia & Africa and International Vegetables, Advanta Enterprises, said, "Our Hybrid Nutrifeed has set a benchmark for green fodder. Farmers love and value this hybrid due to its immense yield potential, multi-cuts that ensure regular availability of fodder, a very low infestation of pests and diseases, highly nutritious fodder with high protein content and high digestibility, which reduces dependability on concentrates and leads to higher milk production and ultimately more earnings for the farmers. Nutrifeed truly is 'Hare Chaare mein Bemisaal'. By extending the germination risk cover in partnership with nurture.farm, we are giving the confidence to farmers that their risk gets covered if the seed fails to germinate because of environmental stress. He can go ahead with confidence and take strides in his dairy farming."

"The germination risk cover was born out of our conviction for our product Nutrifeed. Through Nutrifeed, we have developed a product that ensures germination by engineering a seed quality that is resistant to weather and environmental changes. Partnering with nurture.farm to offer farmers a germination risk cover scheme is our promise to them of assured germination and minimising any and all risk, be it weather, temperature, crop loss or financial risk," Belgamwar added.

Source:https://agriculturepost.com/allied-sectors/dairying/advanta-nurture-farm-partner-to-launch-nutrifeed-germination-scheme-for-forage-crops/

AGRICULTURE

India ranks 3rd in egg production and 8th in meat production in the world: Parshottam Rupala

Department of Animal Husbandry and Dairying, under the Ministry of Fisheries, Animal Husbandry & Dairying, has made significant strides in improving the livestock sector in India. Union Minister Parshottam Rupala addressed the media today, highlighting the department's achievements and initiatives over the past nine years.

In his address, Minister Rupala emphasised the importance of livestock and poultry in improving the socio-economic conditions of rural communities. Livestock activities provide livelihood opportunities and supplement incomes in rural areas, contributing to agricultural diversification and overall growth in rural incomes.

The Department of Animal Husbandry and Dairying has implemented various programmes aimed at controlling and eradicating major livestock diseases, as well as developing infrastructure. These initiatives are crucial for increasing per-animal productivity, which in turn leads to higher production of milk, meat, and other livestock products for both domestic consumption and exports. The department has also collaborated with other ministries and stakeholders to support farmers in increasing their income through the livestock sector.

India's livestock sector has experienced significant growth, with a compound annual growth rate of 7.93 per cent from 2014-15 to 2020-21. The contribution of the livestock sector to the total agriculture and allied sector gross value added (GVA) has increased from 24.38 per cent in 2014-15 to 30.87 per cent in 2020-21. In 2020-21, the livestock sector contributed 6.2 per cent of the total GVA.

According to the 20th Livestock Census, India has a substantial livestock population, including 303.76 million bovines, 74.26 million sheep, 148.88 million goats, 9.06 million pigs, and 851.81 million poultry.

Source:https://agriculturepost.com/allied-sectors/poultry/india-ranks-3rd-in-egg-production-and-8th-in-meat-production-in-the-world-parshottam-rupala/

Rallis India introduces 'Mark Plus' herbicide for effective weed control in soybean and groundnut crops

Rallis India, a Tata Enterprise and a leader in the Indian agri-inputs industry has launched a new herbicide called 'Mark Plus' nationwide. This herbicide offers effective weed control for crops like groundnut and soybean, providing broad-spectrum management. Initially available in Maharashtra, Madhya Pradesh, and Gujarat, Mark Plus will be rolled out across India to other key markets, the company announced today.

"Mark Plus is a potent herbicide targeting the 'pre-emergence' segment for soybean and groundnut crops. Developed through advanced research, it features a new formulation with two active ingredients being introduced in India for the first time. Mark Plus operates through dual mechanisms: it inhibits ALS (an enzyme essential for weed growth) and disrupts microtubule formation (critical for cell division in weeds). This dual action ensures comprehensive and long-lasting weed control," Rallis India said.

Elaborating the benefits of the newly launched herbicide, S Nagarajan, Chief Operating Officer of Rallis India, said, "We are excited to introduce Mark Plus, an effective and advanced herbicide designed to meet the critical need for weed control in groundnut and soybean crops. This unique product aligns perfectly with our commitment to addressing the evolving needs of farmers."

Rallis India, a subsidiary of Tata Chemicals and a member of the US$150 billion Tata Group, is one of India's premier agriculture science companies. With over 75 years of experience serving rural markets, Rallis offers a comprehensive portfolio of products and solutions for Indian farmers. The company is renowned for its deep understanding of Indian agriculture, consistent engagement with farmers, high-quality agrochemicals, and expertise in branding and marketing. Rallis boasts a robust product portfolio in seeds and crop care, accessible through a vast distribution network of 7,000 dealers and over 100,000 retailers across India. Additionally, Rallis has marketing alliances with several multinational agrochemical companies.

Source:https://agriculturepost.com/farm-inputs/agrochemicals/rallis-india-introduces-mark-plus-herbicide-for-effective-weed-control-in-soybean-and-groundnut-crops/

HEALTH

Screen all pregnant women for gestational diabetes with point-of-care test, suggests new study

A HbA1c test that can be administered by a health worker at home in the first trimester could be a game-changer; provides test access to women in rural or remote areas, allows for early intervention

Researchers from India, London and Africa have proposed that the oral glucose tolerance test (OGTT) used to determine if a pregnant woman has developed gestational diabetes be replaced by an HbA1c test that can also be used at the point of care. They have recommended that this be administered in early pregnancy, during the first trimester itself.

In a paper published in The Lancet Diabetes and Endocrinology, authors argued that HbA1c offers a simple screening test for gestational diabetes, allowing those at highest risk to receive early intervention and greatly reduces the need for OGTTs. Researchers used the results from STRiDE, a prospective cohort study, set up in seven centres in south India and seven in western Kenya. Participants were also included from the PRiDE cohort in the U.K.

Testing at home

The proposal is significant for India. More than 90% of gestational diabetes cases are estimated to occur in low-income and middle-income countries. Currently, guidelines recommend that mothers take an OGTT, which is a concentrated 75 g oral solution at fasting, and then wait two to three hours to do a follow up, at the 24 to 28 week stage. This throws up a lot of challenges, particularly in screening women who are in far-flung rural areas and in hard-to-reach areas. In such situations, a trained health care worker can instead be given a point-of-care testing kit and, with just a drop of blood, test the woman for HbA1c at her own home.

The study concluded that in India, a HbA1c result of 4.9 rules out diabetes, while women who have a score of 5.4 or above can be 'ruled in' for gestational diabetes. If the risk score classifies them in the lowest risk group, they would not have to take an OGTT; only those in the intermediate group between these two values would have to do the more complicated test. "We roughly estimated this will be around 25% of all pregnant women," explained P. Saravanan, professor at the Warwick Medical School in the U.K.'s University of Warwick, and one of the authors of the study.

Source:https://www.thehindu.com/news/national/screen-all-pregnant-women-for-gestational-diabetes-with-point-of-care-test-suggests-new-study/article68345657.ece

Tiny animals use stolen genes to fight infections – and could fight antibiotic resistance too

Bdelloid rotifers have genes that have been copied from different kinds of life, including bacteria and fungi, and use them to fight infections -- they could perhaps be allies in the hunt for antimicrobials to tackle resistant infections

A little-known group of microscopic animals has spent millions of years copying recipes for antibiotics from bacteria and using them to fight infections, we have shown in a new paper. We think this unusual defensive strategy could offer short-cuts in the race to develop antimicrobial treatments.

More than 1.2 million people worldwide are killed by drug-resistant bacteria each year. Antibiotics are used to treat serious bacterial infections. Similar drugs called antifungals treat infections caused by yeasts and moulds, which are also on the rise. Together, these antimicrobial chemicals are essential to modern medicine, but with resistance increasing, the World Health Organisation recently warned of a pressing need for new drugs.

Like many scientists, we were concerned about antimicrobial resistance, but we didn't think our day-to-day research had much to do with it. We spend our time looking down microscopes at tiny animals, about a hair's breadth in size. Most people have never heard of these creatures. They have a strange name: bdelloid rotifers. Pronounced DELL-oid WROTE-if-furs, it means "crawling animals that carry wheels on their heads". They live everywhere in the world with freshwater: in ponds, streams and lakes, even where the water sometimes dries up or freezes, like moss, soil, puddles and ice sheets.

About one in ten of their genes have been copied from different kinds of life, including bacteria, fungi and even plants. To give some idea of how out of place these genes are in animals, imagine a cat with blades of grass scattered among its fur, or a dog whose tail is a mushroom.

No other animals are known to import genes on such a scale. Earlier research found that the rotifers have been picking up DNA that doesn't belong to them for millions of years, but a big puzzle is what they are doing with these thousands of stolen genes.

Source:https://www.thehindu.com/sci-tech/health/tiny-animals-use-stolen-genes-to-fight-infections-and-could-fight-antibiotic-resistance-too/article68421581.ece

HEALTH

Physicians urged to teach people the need to reduce salt intake

IIT-Madras, Sapiens Health Foundation conduct workshop on low-salt diet

Sapiens Health Foundation and IIT-Madras' Department of Medical Sciences and Technology held a workshop on low-salt diet.

The Directorate of Public Health and Resolve to Save Lives, a New York-based non-governmental organisation, collaborate to hold the workshop organised at the Indian Institute of Technology Madras for physicians.

Director of Public Health T.S. Selvavinayagam said reducing the burden of non-communicable diseases (NCDs) was a major public health challenge. Under the Makkalai Thedi Maruthuvam, he said over 75 lakh people had been found to have high blood pressure, while 25 lakh to 30 lakh people had hypertension and diabetes.

The most effective method to bring down hypertension was to reduce salt intake, he said. "You need to touch on modifiable risk factors such as salt, sugar, and transfat," Dr. Selvavinayagam said to the gathered physicians, adding that the Uppu Kuraipom (reduce salt consumption) campaign was a method to address the NCDs.

Under the Chief Minister's Health Insurance Scheme (CMCHIS), the highest amount was spent on haemodialysis with the government settling claims of over ₹100 crore, he said, blaming the lifestyle modifications and the instant attraction to fast foods. The challenge was tackling the hidden sources of salt, which included takeaway and trend of eating out. He likened the public interventions required to that used for tobacco prevention.

"Every dollar spent on intervention will give not less than US $12 in returns. The returns are manifold such as preventing mortality, complications, and prolonging the healthy years." Rajan Ravichandran, nephrologist and chairman of the foundation, said it was necessary to have statutory guidelines and labelling on food packets that would offer details on the amount of salt in it.

Source:https://www.thehindu.com/news/national/tamil-nadu/physicians-urged-to-teach-people-the-need-to-reduce-salt-intake/article68351919.ece#:~:text=Under%20the%20Makkalai%20Thedi%20Maruthuvam,reduce%20salt%20intake%2C%20he%20said.

ICMR ready to transfer technology for commercialisation of TB detection kit

The technology is expected to bring in affordable, faster, and easy-to-use testing for detection of tuberculosis

About 1,000 samples can be simultaneously tested within two hours.

Indian Council of Medical Research (ICMR) has begun work on bringing in affordable, faster and easy-to-use testing technology for detection of tuberculosis (TB).

The Council has invited Expressions of Interest (EOI) from organisations, companies, and manufacturers for undertaking 'Transfer of Technology' for the commercialisation of A CRISPR Cas based TB detection system for the detection of Mycobacterium TB.

Developed by ICMR-RMRCNE Institute, Dibrugarh the technology is touted as the "world's cheapest TB testing system". The system can detect the TB bacteria using DNA from a patient's saliva for a very low cost, can identify the bacteria with preliminary symptoms, and test over 1,500 samples simultaneously within approximately two hours.

"It is so simple that it can be used even in the primary health centre of a village," noted researchers at the Institute. TB kills an estimated 480,000 Indians every year or over 1,400 patients every day. Additionally, the country also has more than a million 'missing' TB cases annually, which are not notified. Most remain either undiagnosed, or unaccountably and inadequately diagnosed and treated in the private sector.

A senior Health Ministry official had noted that India's goal to achieve rapid decline in the burden of TB morbidity and mortality, while working towards the elimination of TB in the country by 2025 has plateaued. He added that there is now a move to rework the protocol to tackle the disease, specifically TB medication and its duration, to reboot the TB-free initiative with zero deaths, disease, and poverty resulting from the disease.

Source:https://www.thehindu.com/sci-tech/health/in-major-breakthrough-icmr-develops-low-cost-tuberculosis-test/article68441244.ece

HEALTH

Why jeera, kalonji and ajwain are all you need to prevent gut infection in the rains

Know top tips to include them in your daily diet smartly

Cumin stimulates the secretion of pancreatic enzymes, aiding in the digestion of fats, proteins and carbohydrates

The monsoon brings with it a risk of infections, particularly water-borne ones, and often leads to digestive disorders besides weakening immunity. But some everyday spices like jeera (cumin), kalonji (black cumin or nigella seeds), and ajwain (carom seeds) can prevent microbes from eating into your gut.

JEERA (CUMIN)
These seeds are rich in essential nutrients, including iron, magnesium, calcium, and vitamins A, C, and E. In fact, their high vitamin C content makes the stomach more resilient to infections. They can provide relief from the urge to vomit and settle the stomach after a meal.

Cumin stimulates the secretion of pancreatic enzymes, aiding in the digestion of fats, proteins and carbohydrates. Its natural compound thymoquinone in jeera protects the liver. This is beneficial during the rainy season when digestive disorders like indigestion, bloating and diarrhea are prevalent. It has antioxidants like cuminaldehyde, which can help reduce inflammation, often aggravated by the damp weather.

KALONJI (BLACK CUMIN)
These seeds are packed with essential fatty acids, amino acids and minerals like calcium, iron and potassium. Thymoquinone, the principal antioxidant in kalonji, wards off microbes. It stimulates the secretion of digestive juices and enzymes, preventing issues like gas, bloating and constipation. The anti-inflammatory properties of kalonji make it effective in preventing ulcer development and repairing the stomach lining against the effects of alcohol.

AJWAIN (CAROM SEEDS)
Ajwain seeds contain essential oils, including thymol, which is known for its strong antimicrobial and antiseptic properties. They also provide dietary fibre, vitamins and minerals.

Ajwain helps alleviate indigestion, gas and bloating by enhancing gastric juice secretion and speeding up digestion in the intestines. Simultaneously, it can treat peptic ulcers as well as sores in the food pipe, stomach and intestines.

Source:https://indianexpress.com/article/health-wellness/jeera-kalonji-ajwain-to-prevent-gut-infection-in-rains-9439473/

As thoughts become digitised, who will protect our neurorights?

The right to safeguard one's mental statuses and thoughts from surveillance are precious fundamental rights but technological advancements may cheapen them in some contexts

Neurotechnologies have come a long way since the development of electroencephalography (EEG). Invented a hundred years ago, the EEG has had a significant impact on our knowledge of the human brain and various treatments of brain disorders. Many researchers expect that soon there will be wearable EEGs that could directly assist human cognitive functions. Elon Musk's Neuralink has also kindled hope about using brain-computer links to help physically impaired people restore some lost function.

The 1990s was popularly known as the 'decade of the brain' as research on neuroscience and neurotechnologies received a big boost from various governments. The European Union's 'Human Brain Project' and the subsequent 'BRAIN' initiative were some of the major initiatives. Today, research in these areas is also supported by private companies, especially in the life sciences sector, and is also more extensive than before, including brain pathophysiology, deep-brain stimulation, and neuromarketing.

Neurotechnologies range from the magnetic resonance imaging (MRI) that health workers routinely use to the rarer brain-computer interfaces (BCI). In the last few decades, the type of sensory information these technologies have become able to record has expanded considerably. Sophisticated biosensors that can record a person's physiological activities, behavioural responses, and emotions are no longer fiction.

How is neurodata valuable?

The digitisation of neuro-data raises great opportunities as well as concerns. Not all neurotech users are care-seekers, as smartwatches, apps, and 'embeddables' are integrated more into day-to-day activities. After users' devices collect these data, there will be an option to transmit them to healthcare providers and private companies, who will have an incentive to integrate them in a larger knowledge framework to offer, say, real-time tracking of health indicators and personalised suggestions.

Source: https://www.thehindu.com/sci-tech/science/as-thoughts-become-digitised-who-will-protect-our-neurorights-explained/article68409006.ece

India-UN Fund: Enhancing Forecasting and Flood Resilience Through South-South Cooperation in Suriname

H.E. Ambassador of India to Suriname, UNDP DRR Minister, and Permanent Secretary at the computer handover ceremony equipped with ArcGIS software

An India-UN Development Partnership Fund project in support of Suriname is harnessing weather forecasting technology to protect communities from the unpredictable forces of nature. Suriname has experienced increased levels of rainfall, which recently affected over 6.4% of its gross domestic product and 5.6% of its agricultural land, presenting a significant concern to a critical economic sector.

With support from the India-UN Development Partnership Fund, and in collaboration with United Nations Development Programme and Suriname Ministry of Public Works, the 'Enhanced Early Warning Services Delivery to Communities of Suriname in Order to Build their Resilience to Flooding due to Excess Rainfall' project is building national capacities and developing an early warning system for hydrometeorological hazards.

This initiative plays an important role in mitigating potential negative impacts by enabling timely and effective responses to such events.

The initial phase of the project saw the handover of cutting-edge equipment, including computers equipped with the sophisticated ArcGIS software, to the Ministry. This technology, pivotal for geographical information management and disaster response planning, promises to revolutionize how Suriname anticipates and mitigates flood risks. During the handover ceremony, representatives from the Ministry of Public Works, including Permanent Secretary Sergio Kadosoe and Minister Riad Nurmohamed, expressed their commitment to this cause.

"By implementing ArcGIS Pro tool using high-tech computers, we can significantly improve the timely reporting of managing natural disasters, from forecasting to mitigation and recovery," said Truus Warsodikromo, Chief of the Suriname Forcasting Branch. "These new skills are a necessary part of the process leading to the ultimate aim of becoming an expert in the fields of meteorology, climatology, and hydrology."

Source:https://unsouthsouth.org/2024/05/31/india-un-fund-enhancing-forecasting-and-flood-resilience-through-south-south-cooperation-in-suriname/

STI Forum Calls for Scaling Up South-South Cooperation for Sharing Digital Innovation

The ninth annual Multi-Stakeholder Forum on Science, Technology, and Innovation for the Sustainable Development Goals (STI Forum), held from May 9 -10, 2024, centered around the theme: 'Science, Technology, and Innovation for Reinforcing the 2030 Agenda and Eradicating Poverty in Times of Multiple Crises: The Effective Delivery of Sustainable, Resilient, and Innovative Solutions.'

The fifth session of the Forum focused on harnessing the power of digital innovation for sustainable peace and resilience in the context of climate change (SDG 16). This session focused on promoting peaceful and inclusive societies, providing access to justice for all, and building effective, accountable, and inclusive institutions at all levels. The session also highlighted new opportunities and assessed their related social, environmental, and ethical challenges.

"We have science and technology to address development challenges, however capacities to leverage them remain uneven," said UNOSSC Director Dima Al-Khatib at the STI Forum session on harnessing digital innovation for sustainable peace and resilience in the context of climate change. "Unrest, violence, and conflict continue, exacerbated by an increasing number and magnitude of climate-related disasters."

Building the peaceful and inclusive societies envisioned in the 2030 Agenda is a daunting and urgent challenge. Unrest, violence, and conflict continue, are exacerbated by an increasing number and magnitude of climate-related disasters.

"In the Global South, we see these interlocking challenges play out with particular sense of urgency," said the Director.

Source:https://unsouthsouth.org/2024/07/01/sti-forum-calls-for-scaling-up-south-south-cooperation-for-sharing-digital-innovation/

India-UN Fund: 16 Caribbean Countries Join Hands to Eliminate Mother-to-Child Transmission of Diseases

Toward combatting mother-to-child transmission of diseases like HIV, Syphilis, Hepatitis B, and Chagas, 16 Caribbean nations are coming together under a project proposal to be funded by the India-UN Development Partnership Fund, and to be implemented by the Pan American Health Organization (PAHO). This initiative, 'Strengthening the EMTCT plus strategy within maternal and child health services' aims to eliminate mother-to-child transmission of infectious diseases.

"Together, as Caribbean nations we acquire knowledge, share experiences and enhance the competencies of health care providers for an efficient and sustainable EMTCT Plus program," says Dr. Julio Sabido, CEO Ministry of Health and Wellness, Belize. "This approach accelerates the adoption of effective health strategies across the region, and also fosters a sense of solidarity and collective responsibility. Infectious diseases do not know national boundaries, so only collective action would be truly effective."

Dr. Julio Sabido, CEO Ministry of Health and Wellness, Belize, states that the project will enhance efforts among 16 Caribbean countries, ensuring the right of every child to be born and remain free of HIV and syphilis and other perinatal transmitted infections.

The World Health Organization (WHO) highlights that despite significant progress in eliminating the mother-to-child transmission of HIV and syphilis, challenges remain. For HIV, the goal has been set to reduce the mother-to-child transmission rate to 2% or less. However, in some regions, these rates continue to rise, indicating a pressing need for intensified efforts.

In the Caribbean, strides towards eliminating congenital syphilis are evident, yet some areas report rates as high as 1.8 cases per 1,000 live births, significantly above the WHO's elimination target of 0.5 cases per 1,000 live births. At the heart of the project's strategy is a commitment to enhancing maternal and child health (MCH) services.

Source:https://unsouthsouth.org/2024/07/01/india-un-fund-16-caribbean-countries-join-hands-to-eliminate-mother-to-child-transmission-of-diseases/

The Global South Session at Tokyo UN Studies Conference Calls for Strengthening Institutional Negotiating Capacities

Ambassador Amr Aljowaily, the strategic advisor to the African Union Commission, chaired a special session on the Global South forum at the annual conference of the Academic Council on United Nations Studies (ACUNS), urging the importance of enhancing negotiating capabilities through institutional memory among the negotiators of the Global South.

The conference, which was held in Tokyo, was jointly organized by the United Nations University and the University of Tokyo.

Speakers at the session included Secretary-General of the Organisation of Southern Cooperation Sheikh Manssour Bin Mussallam; Executive Director of the South Centre Dr. Carlos Correa; Director of United Nations Office for South-South Cooperation (UNOSSC) Dima Al-Khatib; Senior Specialist, of the United Nations Institute for Training and Research (UNITAR) Philippe Aubert; and Professor Katie Verlin Laatikainen editor of "Group Politics in UN Multilateralism".

"The global development cooperation architecture is witnessing a significant transformation," said Dima Al-Khatib, Director of the United Nations Office for South-South Cooperation (UNOSSC). "Southern development partners are playing an increasingly influential role in multilateral fora, bringing new perspectives, resources, and innovative approaches to the forefront of the international development agenda."

For example, the 2023 21st Session of the High-Level Committee on South-South Cooperation underscored the importance of a cohesive United Nations system-wide strategy to leverage South-South and triangular cooperation to support Member States. "In recent years," Director Al-Khatib said, "demand from Member States for UN system assistance in this area has surged, as illustrated by various inter-governmental processes, including Third South Summit, LDCV, and SIDS4."

Source:https://unsouthsouth.org/2024/07/02/the-global-south-session-at-tokyo-un-studies-conference-calls-for-strengthening-institutional-negotiating-capacities/

HLPF: Exchanges of Innovative Solutions for Debt Relief – Country Experiences and the Role of South-South and Triangular Cooperation

The United Nations Office for South-South Cooperation (UNOSSC) in partnership with the Government of Sri Lanka, serving as the President of the High-Level Committee on South-South Cooperation, organized an High-Level Political Forum on Sustainable Development side-event entitled "Exchanges of Innovative Solutions for Debt Relief: Country Experiences and the Role of South-South and Triangular Cooperation" on 11 July 2024.

The event harnessed the potential of South-South and triangular cooperation in addressing debt distress through knowledge exchanges, underscoring the importance of collaborative efforts in finding sustainable solutions. The event is a direct response to the UN General Assembly resolution on South-South Cooperation its 78th session which urged the UN development system to facilitate knowledge exchanges on debts.

"The implications of debt distress on sustainable development in the Global South are profound," said UNOSSC Director Ms. Dima Al-Khatib in her welcoming remarks, noting the alarming rise in external debt and its detrimental effects on sustainable development. She emphasized the need for innovative solutions and reforms in international financial architecture to better support developing countries. She highlighted that debt distress is a pressing challenge that affects numerous countries across Africa, Latin America, and Asia.

The external debt stocks of developing countries have surged to an alarming $11.4 trillion in 2023, more than double what it was a decade ago. This growing burden, exacerbated by economic shocks and the current international financial architecture, significantly hinders sustainable development.

Source:https://unsouthsouth.org/2024/07/11/hlpf-exchanges-of-innovative-solutions-for-debt-relief-country-experiences-and-the-role-of-south-south-and-triangular-cooperation/

2024 High-Level Political Forum Highlights the Importance of South-South and Triangular Cooperation in Achieving the SDGs

The 2024 High-Level Political Forum (HLPF) on Sustainable Development spotlighted the pivotal role of South-South and triangular cooperation in advancing the global development agenda. During the HLPF numerous successful initiatives were highlighted where countries of the Global South have driven progress in areas such as poverty reduction, healthcare, and climate resilience, among others. These partnerships not only foster mutual growth and innovation but also serve as vital mechanisms for achieving the Sustainable Development Goals and all other internationally agreed development goals.

The HLPF emphasized the need to strengthen and expand South-South and triangular cooperation to enhance development impact.

Speaking at the HLPF plenary meeting on Small Island Developing States: Implementing the outcomes of the fourth SIDS Conference, UNOSSC Director Dima Al-Khatib, emphasized that transfer of knowledge, experiences and solutions is the backbone of UNOSSC's SIDS support toward coherent implementation of the new Antigua and Barbuda Programme of Action for SIDS (ABAS).

"UNOSSC stands ready to work closely with all partners to achieve their aspirations through SDG-anchored development," said the Director. "For example, our Global Thinkers Network offers ready intellectual capital, while our newly revamped South-South Galaxy knowledge-sharing platform offers over 950 solutions specific to Global South priorities." She also encouraged participants to read and utilize the new Guidelines for the Integration of South-South and Triangular Cooperation into the Country- and Regional-level Work of the United Nations Development System.

Source:https://unsouthsouth.org/2024/07/25/2024-high-level-political-forum-highlights-the-importance-of-south-south-and-triangular-cooperation-in-achieving-the-sdgs/

OTHERS

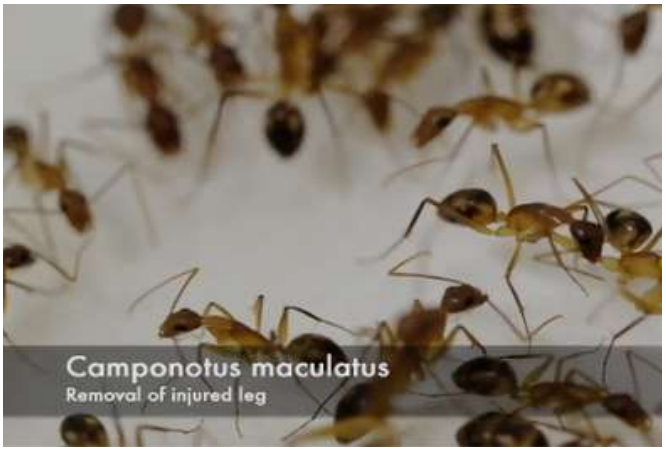
Indian scheme to provide 300 research grants for women

Three hundred women in India have been selected to receive a research grant that will run over three years as part of a scheme to support and empower female scientists. The Council of Scientific and Industrial Research (CSIR) initiative is designed to encourage more women to participate in cross-disciplinary research, including the chemical sciences.

On International Women's Day 2023, the CSIR launched – for the first time – a special call for research grants for female scientists branded CSIR-ASPIRE which took in over 3000 submissions across the country. Eligibility criteria stated the principal investigator must be a woman actively carrying out R&D in science and engineering. After an independent review, the research committee chose 301 research proposals to support. The grants, which do not exceed INR2.5–3 million (£236,000–£282,000), will be provided for staff, contingency and minor equipment. The grant also subsidises international travel to enable global exposure and foster international collaboration.

Source:https://www.chemistryworld.com/news/indian-scheme-to-provide-300-research-grants-for-women/4019702.article

An ant that selectively amputates the infected limbs of wounded sisters



Saving lives through surgery is no longer exclusive to humans. In a study publishing July 2 in the journal Current Biology, scientists detail how Florida carpenter ants, a common, brown species native to its namesake, selectively treat the wounded limbs of fellow nestmates -- either by wound cleaning or amputation. When experimentally testing the effectiveness of these "treatments," not only did they aid in recovery, but the research team found the ants' choice of care catered to the type of injury presented to them.

"When we're talking about amputation behavior, this is literally the only case in which a sophisticated and systematic amputation of an individual by another member of its species occurs in the animal Kingdom," says first author Erik Frank, a behavioral ecologist from the University of Würzburg.

Wound care among ants is not an entirely new phenomenon. In a paper published in 2023, it was discovered that a different group of ants, Megaponera analis, use a special gland to inoculate injuries with antimicrobial compounds meant to quell possible infections. What makes Florida carpenter ants (Camponotus floridanus) stand out is that because they have no such gland, they appear to be using only mechanical means to treat their nestmates.

The researchers found that this mechanical care involves one of two routes. The ants would either perform wound cleaning with just their mouthparts or perform a cleaning followed by the full amputation of the leg. To select which route they take, the ants appear to assess the type of injury to make informed adjustments on how best to treat.

In this study, two types of leg injuries were analyzed, lacerations on the femur and those on the ankle-like tibia. All femur injuries were accompanied by initial cleaning of the cut by a nestmate, followed by a nestmate chewing off the leg entirely. In contrast, tibia injuries only received the mouth cleaning. In both cases, intervention resulted in ants with experimentally infected wounds having a much greater survival rate.

Source:https://www.sciencedaily.com/releases/2024/07/240702135415.htm