SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Image source: nal.res.in

India Takes a Big Leap in Domestic Propulsion Development

- **CSIR-NAL has developed a new small gas turbine engine, giving boost to India's goal of self-reliance in defence technology.**
- **The small engine can be used in unmanned military systems such as tactical UAVs and cruise missiles.**
- **Named the NJ-100, it is capable of producing 100 kilograms-force of thrust.**
- **The development of this engine opens a new chapter in the story of domestic propulsion development in India, which has relied on foreign suppliers for such engines.**

CSIR-CIMAP Develops High-yielding Mint Variety

- **To improve the financial condition of farmers living in the border areas, CSIR-CIMAP has developed CIM Unnati, a high-yielding mint variety.**
- **CIMAP scientists successfully grew this along on 500 acres of land, dotted with bunkers near the Indo-Pak border in Punjab's Ferozepur.**
- **CIMAP's scientists claimed the new variety has helped farmers earn additional Rs 60,000 in 120 days.**

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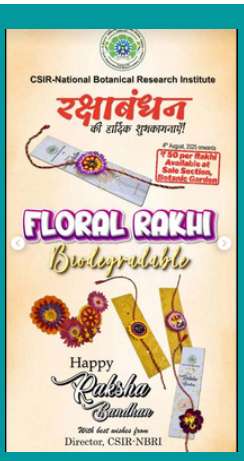

Image Source: nbri.res.in

CSIR-NBRI Develops Eco-friendly Floral Rakhis

- **CSIR-NBRI in Lucknow has developed floral biodegradable rakhis.**
- **The rakhis are made from natural and dried flowers.**
- **These rakhis are available at the institute for a price of Rs 50.**

CRRI's all-weather Technology Revolutionizing Road Construction in Uttar Pradesh

- **CSIR-CRRI's Modified Mix Seal Surfacing (MSS+) technology is turning road construction into a sustainable affair in Uttar Pradesh.**
- **This technology not only enhances road quality but also significantly reduces carbon emissions.**
- **The technology eliminates the need for heating aggregates and bitumen, allowing for road construction in various weather conditions.**

Image source: cgrihp.res.in

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Lichens Indicators of Climate Change in the Himalayas

- A study by CSIR-NBRI, North Eastern Hill University, Shillong, Meghalaya, Space Applications Centre-ISRO, Ahmedabad, and others has discovered that lichens could act as indicators of the changing climate in the Himalayas.
- Lichen is a colony of algae or cyanobacteria living symbiotically among fungus or bacteria. You would've seen them as a crusty or leaf like growth on rocks, walls and trees.
- They are known to be incredibly sensitive to their environment.
- The researchers conducted the study from the western region of Jammu and Kashmir to the eastern ranges of Arunachal Pradesh.
- They analyzed various traits of 1475 lichen species, such as its growth form, the type of algae it partners with, or how it attaches to a surface.

A Revolutionary New Find by CSMCRI Holds Potential to Free up our Land Resources

- CSIR-CSMCRI scientists are exploring Ulva, a green seaweed as "tomorrow's wheat of the sea".
- Ulva, also called sea lettuce, is an edible green alga.
- Packed with 26% protein and 66% carbohydrates, it has an exceptional nutritional profile.
- It has an astonishing level of productivity. It can yield between 25 and 40 tonnes of dry weight per hectare per year, dwarfing the output of traditional land-based crops like soybean (2.1 tonnes), wheat (4.1 tonnes), and maize (5.1 tonnes).
- This means that if sea-cultivation of Ulva is taken up, it could reduce the pressure on finite land resources.

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Cells can Revive from Near-Death through Self-Programming

- CSIR-CCMB scientists found that cells can program themselves to recover from a near-death phase.
- This revival accelerates wound healing, tissue repair, regenration and stem cell production across organisms.
- The finding reshapes our understanding of life, death and healing at the cellular level.
- This is not good for regenerative medicine as such revival could allow cancer cells to survive therapies.

Effect of Climate Change on Telangana studied by CSIR NGRI

- As per the latest CSIR-NGRI's study, Telangana may see temperatures rise by up to 2.94 °C with the sharpest increase in minimum temperatures.
- Precipitation is projected to rise by 15-50% altering water availability and increasing evaporation loses.
- Over half the workforce dependent on farming faces threats due to reduced freshwater resources and uncertain crop yields.
- The proportion of vulnerable people is expected to climb from 28% at the start of the century to 59% by mid-century.

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BBMP Plans to Use Ecofix Technology for Fixing Potholes

- The Bruhat Bengaluru Mahanagara Palike (BBMP) has decided to use Ecofix technology developed by CSIR-Central Road Research Institute in collaboration with startup Ramuka Global Services to provide a long-term solution to the city's persistent pothole problem.
- Traditional methods like cold mix and hot mix have proved temporary and ineffective, especially during heavy rains.
- Pilot trails in Bengaluru as well as successful use in other states, showed faster pothole filing and improved road strength.

Nano-based Technology Can Help in Early Detection of Parkinson's Disease

- Scientists at Scientists at the Institute of Nano Science and Technology (INST), Mohali, in collaboration with CSIR-IMTECH, Chandigarh, have developed a nanotechnology-based tool that could enable the early detection of Parkinson's Disease.
- The device works by tracking changes in α-synuclein, a brain protein that acts as a key marker in Parkinson's. Normally harmless, α-synuclein can clump into toxic forms that damage brain cells.
- Detecting this shift early can provide a breakthrough in diagnosis and treatment.
- The team used gold nanoclusters coated with amino acids to distinguish between normal and toxic forms of the protein. This sensitive biosensor was tested successfully in lab experiments and human-derived cells, proving both safe and effective.