In this issue

Ultraviolet-B Radiation

Flavonoid synthesis, functions

Ultraviolet light of wavelengths ranging from 280 to 315 nanometres damages biological macromolecules, generates reactive oxygen species and disturbs normal cellular processes. Though stratospheric ozone reduces the amount of these UV-B radiations, some amount does come through. Plants, unlike animals, cannot escape from these radiations. And so, they have evolved mechanisms to protect themselves, by producing higher amounts of flavonoids.

Flavonoids not only protect plants from UV-B, and scavenge reactive oxygen species, but also have a variety of other physiological functions, including protection from herbivory, insects and microbes. A Review Article in this issue examines the transcriptional control of flavonoid biosynthetic pathways, their transportation and accumulation in different tissues and their various functions.

Understanding of the roles of intensity of radiation, time of exposure, developmental stage of plants, environmental factors and the genetic makeup of the particular species or cultivars, in modulating the biosynthesis of flavonoids will help not only agriculture and horticulture, but also the pharmaceutical industry, say the authors. Turn to **page 176** for more.

Predicting Seismic Vulnerability

Rapid visual screening

From the assessment of damage to buildings by previous earthquakes, one can make reasonably good predictions on how buildings will fare in future earthquakes. So, countries such as Japan, Canada and the US have created handbooks and codes for conducting rapid visual screening.

Recently, researchers from the Indian Institute of Technology, Dhanbad examined the damage done by the 2015 Nepal earthquake and the 2016 Imphal earthquake. And they found that the existing schemes for rapid visual screening do not work well in the context of earthquakes in the Himalayan region.

In a Research Article on **page 352** in this issue, they suggest a few modifications that can provide us a tool to assess the seismic vulnerability of locations with similar geological and socio-economic conditions, as well as the materials and technology used for constructing habitats.

Extreme Gust Storm

Events in Bengaluru

During the pre-monsoon, Bengaluru experiences gust storms – extreme events where the wind speed goes above 100 kilometres per hour, uproots trees and damages property. These events are quite different from cyclones. They occur when drops of rain from vast clouds move over a dry area and evaporate, cooling the air and creating a cold wave front. The horizontal temperature gradient is the driving force of the gust storms.

A Research Article in this issue examines the storm events in 2018 and 2019 using data from a ground-based automated weather station, a radiosonde and two satellites. For insights on these short-lived events that wreak havoc in the city, turn to **page 343**.

Growing Silica Nanoparticles

Finding the right rice variety

Silica nanoparticles have properties that find applications in agriculture and medicine as well in producing materials that have unique properties, including in the composite material for the body of fighter planes. But, as with most nanoparticles, the properties of silica nanoparticles vary depending on size and morphology. Producing the right type of silica nanoparticles is a technological challenge.

In a Research Article in this issue, Manpreet Kaur from the College of Basic Sciences and Humanities, and Anu Kalia from the Punjab Agricultural University, Ludhiana provide clues for a solution to the problem: grow the right variety of rice.

They took the seeds of three basmati and six parimal varieties of rice, and from the husk, extracted silica nanoparticles. The shapes and sizes of the most abundant silica nanoparticles in each variety, they tell us, are distinct and specific to those varieties.

India produces more than 160 million metric tons of rice per year and about 10% of the amount is rice husk. And more than 10% of the rice husk is composed of silica. So millions of tons of nanosilica go waste every year. For the trick to valorise rice husk turn to **page 335**.

Past Climates in India

Preparing for the future

Scientists have been digging up the signatures of past climates of India from various terrestrial and marine sources – fluvial sediments, lake deposits, marine sediments, ice cores, speleothems and tree rings. Sediment characteristics, pollens, elemental concentration, foraminifera, coccolithophores, the isotopic composition of carbonates and organic matter provide the climatic proxies to reconstruct the past. In recent years, many new clues about interactions between various climatic components of the earth system and underlying mechanisms have, therefore, surfaced.

Current Science dedicates the Special Section on paleoclimates of India to Rengaswamy Ramesh in memory of his immense contribution to the area. Read the thirteen Research Articles that follow the preface on **page 186** in this issue, to understand the past, to be prepared for the future.

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