In this issue

Crop Biodiversity

Tips, tools and technology

Commercial cultivation of crops by humans hijacked the selection and evolution of crops from nature's hands. Starting with breeding through cross fertilisation and selection to creating seed banks of superior varieties to tissue culture and mass propagation, to tissue banks and germplasm collecting missions, it took a long time for humans to become a major force in natural selection.

But almost overnight, in comparison it seems, humans are becoming masters in natural selection, at least, so far as agricultural crops are concerned. The decoding of the genetic codes of crop plants has reached a high pace due to new sequencing techniques. Delineating genetic diversity using molecular markers is becoming a common procedure. And molecular assisted selection for discarding seedlings with undesirable traits is becoming part of agricultural practice.

When human self interest intervenes into natural selection, it disregards randomness that can throw up unusual, but potentially useful traits. In focusing only on 'useful' traits determined by the pressure for production to feed billions, often, some traits necessary to face the unexpected may be lost. There is a need to be alert to this possible consequence.

Thankfully, India has 22 agro-biodiversity hotspots and hundreds of wild species that are closely related to economically important crops. A richness that needs to be conserved, preserved and used in research. Researchers from the ICAR-Indian Institute of Horticultural Research give us tips and digital tools for leveraging on the progress in biotechnology to use genetic resources to meet the requirements of the world, while safeguarding and improving agricultural biodiversity. See the General Article on **page 2019**.

Shallow Hydrothermal Systems

Driving biogeochemical cycles

Hydrothermal systems in shallow sea waters can lead to the evolution of microbial populations that harvest both light and chemical energy sources. So biodiversity in shallow water hydrothermal systems is richer than in deep water hydrothermal systems that are fuelled by chemical energy alone. Scientists from the CSIR-National Institute of Oceanography, Goa, the Bharathidasan University, Tamil Nadu and the University of Azores, Portugal report the details of the microbial community at a shallow water hydrothermal vent at Espalamaca, Portugal, in a Research Article on **page 2110** in this issue. They selected a vent field at a depth of 35 meters as case study. They collected samples of sediments, water from the bottom and at the top, both from the vent area as well as from a nearby non-vent area for comparison.

Most microorganisms do not lend themselves to culturing techniques. But thankfully, amplification of 16S tRNA gene and comparison of the sequences in gene banks allow identification of extant species. The researchers found that the microbial community is consistently richer in the shallow vent region than in the non-vent region. Only about 15% of the organisms are common to both vent and non-vent regions, separated by a mere 500 metres.

The scientists confirm the presence of methanol dehydrogenase, carbonic anhydrase and sulphur oxidizing genes from the vent sediments. Genes for methanol dehydrogenase, carbonic anhydrase and sulphur oxidising genes are abundant too. These shallow hydrothermal vent bacteria play a vital role in global biogeochemical cycles, say the scientists.

Public acceptance

A lead to landfills

Dhanbad city, Jharkhand. More than a million people cramped into an area of about 350 square kilometres. 440 tonnes of municipal solid waste every day. 11 sites are found suitable for use as landfill, from environmental considerations. Which site should we use?

Researchers from the IIT Dhanbad set out to find suitable sites. They designed 22 questions. One set that elicits personal information and a second set that harvests knowledge and concerns about landfills. 150 people were contacted. 137 responses were selected for analyses.

While resolving a potential geopolitical problem by feeling the pulse of the people before making controversial decisions, researchers align their tools to suit democracy. Read the details of a lesson for all municipal councils in a Research Article on **page 2122** in this issue.

Short-nosed Fruit Bats

Response to distress calls

Short-nosed fruit bats, *Cynopterus sphinx*, live in small harems, within the fronds of palm leaves or behind creeping vines. When entangled in mist nets, they emit audible distress calls. Long phrases of loud, multi-harmonic calls with irregular time structure. The call parameters are adequate to recognise the sex and the individual, even for trained human listeners. And bats of the same species respond by flying towards the call.

Researchers in Madurai and Thiruchirappalli were curious. Does the sex of the caller influence males and females distinctly? Do bats of the same species, but from a different location, respond in a similar fashion?

The home range of these bats is less than a square kilometre. The team identified two locations 15 kilometres from each other.

The researchers caught bats from one location and recorded their calls. Then they placed mist nets in the second location during evening and played back the sounds during foraging hours, well into the night. The mist nets caught more bats when they played back the distress calls. So conspecifics, even from far away regions, do respond to the call. But how about the differences in the responses of the two sexes? And why do they come? To save the bats that are caught? To mob and attack predators?

Read the Research Communication on **page 2150** in this issue.

K. P. Madhu
Science Writing Consultant
scienceandmediaworkshops@gmail.com