In this issue

Earthworm Gut Bacteria

Ecology meets economics

The earthworm, *Perionyx excavatus*, is often found on compost heaps. Though the name suggests that it excavates into soil, it is often found crawling on the surface. *Glyphidrilus spelaeotes*, another earthworm, lurks in submerged paddy fields. It can survive under the lower oxygen conditions for longer. Though both are earthworms, they live in different ecological conditions. Though both survive on plant detritus, and, therefore, must have gut bacteria that help the digestion of cellulose, the difference in ecological niches must reflect on the diversity of the gut bacteria found in both species.

A Research Article on **page 1474** in this issue examines the differences between the culturable cellulose degrading bacteria in the guts of both species of earthworms. The authors took a reference strain of *Cellulomonas celulans*, a bacterium with well-known cellulose degrading activity, to compare the activity of the distinct 16 bacteria cultures (eight from each species of earthworm). The cellulase activity of most of the cultured strains turned out to be higher than that of the reference strain.

They also discovered that the degree of polymorphism in esterase isozymes – enzymes for the degradation of lignocellulosic residues – of the cultured isolates from the earthworms of paddy fields was low: only 4 compared to the 12 polymorphic isozymes from the gut isolates of *Perionyx excavatus*. This is an indication of earthworm ecology impacting the evolution of gut bacteria.

Besides providing insights into evolution, the exercise also brought out strains that can be used in applications: for quick recycling of crop residues in field conditions and in the composting process.

Optimising Weedicide Use

Reducing collateral damage

Between sowing and harvest, farmers have to fight weeds. Manual weeding is laborious. Enter weedicides – spraying became a practice, at least among those who could afford it. Enter environmentalists. People became aware of the collateral damage due to the chemical drift. Enter researchers with solutions: reduce the use of weedicides by contact application. Enter sensors and image processing. And it is the right time for a technique of applying weedicides where required, in the exact amounts required.

So it is that on **page 1485** in this issue, researchers from Kharagpur, Bhopal and Shimla provide us a Research Article that describes just such a system.

Nepal Earthquakes

Shocks and after-shocks

25 April 2015. The world woke up to the devastating shock let loose by a 7.8 M_w earthquake with hypocentre located in the Gorkha district of Central Nepal. What people saw was the surface phenomena – the destruction of buildings and monuments, the suffering of people... What nobody saw was the rupture it caused in the Main Himalayan Thrust located about 100 kilometres from Kathmandu, at a depth of about 16 kilometres.

After about 17 days, on 12 May, there was yet another earthquake in Nepal – this time in the Kodari region.

Now, in a Research Communication, scientists from the CSIR-National Geophysical Research Institute, Hyderabad, the NIT Rourkela, and the National Centre for Seismology, New Delhi, examine available data on the co-seismic slip distribution and after-shocks. They computed the poroelastic relaxation of coseismic pore pressure and the changes in Coulomb stress in the surrounding volume, containing the Main Himalayan Thrust, after the Gorkha earthquake. And, thus, they bring out the delayed triggering of one earthquake by the other.

Read on from **page 1534**.

Carbon Capture for Climate Change

A solution to increasing emissions?

From air entrapped in ice cores we see that, in the past 420,000 years, the concentration of atmospheric CO_2 has ranged from 180 to 280 parts per million by volume. But in recent decades, it has been increasing and has touched 400 parts per million by volume. To mitigate the chances of global warming due to this rapid increase in greenhouse gas, efforts have been taken, internationally, to reduce emissions and resort to renewables. But given the increase in population and the rising demands for energy, these steps may not help reduce the carbon dioxide concentration.

Thankfully, in the recent past, there have been many developments in the technologies for carbon capture, sequestration and storage. Perhaps these technologies can step in to save us?

Scientists at the IISER Bhopal give us a critical Review Article on **page 1430**.

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