In this issue

The introduction of high-yielding varieties of cardamom improved the productivity of the hundred odd farmers. More than 95% of the total area under cardamom cultivation now, grows one variety – ‘green gold’. The variety responds well to fertilizers and performs well under more open forests. So farmers lop the trees to allow more sunlight. The practice dries up the surface and reduces pests. But the variety is a heavy consumer of surface soil nutrients. It is succulent and, thus, more attractive to insect pests: the shoot and capsule borers, thrips, root grubs and whiteflies.

Thus, ultimately, farmers end up using more fertilizer and pesticide. A General Article on page 1058 in this issue looks at the relationships, within the ecosystem of trees, cardamom, pests and the climatic and meteorological variables, to seek a solution.

Architects of Soil
Earthworm as ecosystem engineers

During the monsoons, the dry dead ground is abuzz with activity. New blades of grass shoot up out of the soil. Birds become regular visitors in the backyard where earthworms are found crawling about on soil and gravel.

But, for the most part, the earthworms remain hidden underground.

Down, below the surface of the earth, these worms change the texture of the soil. The burrowing activity of the earthworms, their secretions and faeces have an effect on soil architecture, porosity and water retention capability. Earthworms help release the locked carbon and nitrogen in organic matter which makes the earth more fertile. This has earned them the title of soil engineers.

About 6000 species of earthworms have been recorded worldwide. But due to lack of adequate knowledge of their specific actions, we are unable to make use of nature’s very own service providers. Now scientists have gathered and consolidated data that highlights the role of earthworms in improving soil characteristics. By determining the economic value of these ecological services, policies on soil management can be improved, they suggest. In a Review Article on page 1064 find how nature’s very own ecosystem engineers plough and till the soil.

Seeing inside Clouds

Light detection and ranging (LIDAR) – a simple trick in remote sensing – throws light, and examines whatever is backscattered, to get some idea of what is causing the backscatter.

Scientists at the National Atmospheric Research Laboratory, Gadanki tweaked the trick a bit to look into clouds. They used both photon count from the back scatter as well as the analogue measurement of the photomultiplier and glued the data together to reduce the turbid character of the air between the clouds and the instrument.

If you use a linearly polarized second harmonic Nd : YAG laser and collect parallel and perpendicular polarization components of the backscatter separately, you can ‘see’ the atmosphere in a different light – from the ground up to 30 kilometres, with a resolution of about 30 metres. And if you look through this dual polarized LIDAR, you can see into the clouds, and distinguish water from ice, because the ratio between the parallel and perpendicular polarized backscatter is near zero in the case of spherical water droplets, ice crystals and aerosols, that are non-spherical, have higher values.

In a Research Communication on page 1134 in this issue, researchers from IIT Bombay, the VIT University, Vellore and NARL, Gadanki compare their results with the data on the same set of clouds from the CALIPSO satellite. A low-cost ground-based instrument can do as good if not better than a satellite when it comes to cloud gazing.

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