In this issue

Exposure to Climate Change
Mapping India's districts

Vulnerability to climate risks depends on exposure to climate indicators. The indicators vary between Indian districts. To identify the districts most at risk, researchers at the National Institute of Advanced Studies, Bengaluru, first examined type 1 climate indicators: changes in precipitation, and maximum and minimum temperature. Out of 766 districts, there were 78 exposed to these due to the projected climate change. Heat waves, cold waves, droughts and floods are associated with type 1 climate indicators. The researchers found that 10 out of 78 districts were exposed to most of these parameters. By taking into account extreme rainfall events and cyclones also, they could identify two districts out of ten that are most at risk.

To read about the Indian districts that need to take steps for climate adaptation and preparedness, turn to the General Article on **page 124** in this issue.

Early Solar System
Clues from chondrites

Asteroids in the asteroid belt undergo collisions and gravitational perturbations that put some of them into earth crossing orbits. They plunge into the earth's atmosphere as meteorites. A large percentage of the meteorites that fall on the earth's surface are chondrites, containing chondrules, spherical grain-like inclusions. Chondrules form as molten or partially molten droplets in space before being accreted to their parent asteroids. So chondrules hold one of the keys to understanding the early solar system.

Besides chondrules, chondrites contain calcium–aluminium-rich inclusions – the oldest solids in the solar system. Short-lived radionuclides of aluminium-26 decay into magnesium-26 with a half-life of only about 72,000 years. So the isotopic composition of these inclusions serves as a chronometer to understand the early evolution of the solar system.

A Research Article in this issue examines the morphology, mineral phases and isotopic compositions of two calcium–aluminium-rich inclusions from chondrites recovered from Leoville, two chondrules from the Queen Alexandra range, a mega chondrule from Semarkona and a plagioclase-rich chondrule from Chainpur. To get some clues about the conditions in the early solar system, turn to the Research Article on **page 191** in this issue.

Indian Snow Leopards
Genetic variations

Genetic diversity in snow leopards is comparatively low, perhaps due to a bottleneck event sometime between 6000 and 8000 years ago. Growth in human populations and consequent land-use changes put further pressure on snow leopard populations. Now there are approximately 2500–3500 adult snow leopards in the wild. Only about 500 live in the Indian Himalayas.

Habitat fragmentation has led to geographic separation and now there are indications that snow leopards in the Himalayas have evolved into three subspecies. Signs of in-breeding depression have become apparent. To check which populations are facing genetic decline that undermines the chances of long-term survival of the species, researchers collected faecal samples from all three regions and screened for variations in mitochondrial DNA, in the microsatellite and in the genes for the major histocompatibility complex. Since the scat samples were from only 32 unique individuals from three locations, the results are only indicative of the genetic status of snow leopards in India.

The genetic variation suggests that neutral selection is insignificant, but that purifying selection cannot be ruled out. Interestingly, variations in snow leopards housed in Indian zoos show positive selection. Genetic mixing of leopards from different subspecies may explain this, say the researchers.

Since snow leopards have high dispersal ability, perhaps providing mobility corridors between the three subspecies may help conserve snow leopards in India. Wild life enthusiasts in the Indian Himalayas must read the Research Article on **page 204** in this issue.

The Sandalwood Tree
Seeking suitable hosts

Sandalwood is a semi-parasitic plant. It sucks nutrition from other plants nearby by inserting a haustarium into their roots. While some plants have evolved ways to avoid such parasitism, some tolerate it while yet others tend to suffer from it. Since sandalwood is an economically important tree, it is also important to find out the best host species for the tree.

To investigate the factors involved in the host–parasite interactions, the ICAR-Central Agroforestry Research Institute, Jhansi, initiated a study on sandalwood in 2020. They sowed three kilograms of sandalwood seeds on raised beds prepared by using red soil in the open field as well as in a root trainer cup filled with different potting media in green net house conditions. In a Research Account in this issue they report some surprising and interesting observations on the interactions of the three-year-old seedlings with other plants. Turn to **page 130**.

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