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Gravitational lensing

Magentic fields are ubiquitous in the Universe, being present from planets to huge extragalactic sources. The measurement of large-scale magnetic fields in the cosmos is clearly important for understanding their origin and also their role in the structure formation at large. Stellar magnetic fields, for example, can be measured with the help of Zeeman effect, while the fields in extragalactic sources are estimated using radio observations. Indeed, spiral galaxies have been reported to possess magnetic fields having a strength of several microgauss coherent over scales of tens of kiloparsecs. An intruiging question concerns the existence and magnitude of ordered magnetic fields in elliptical galaxies.

The phenomenon of gravitational lensing provides a valuable tool for this purpose and this has been used by Narasimha and Chitre (**page 1506**) to measure magnetic fields in the intervening lensing objects. The advantage of using multiple images of a polarized background source is the availability of different lines of sight separated by several kiloparcsecs. The authors develop a method of differential Faraday rotation, by taking the differences between Faraday rotation angles between various images of the same source. This conveniently removes any contribution from the source itself and from our Galaxy.

One of their remarkable results is the demonstration of the existence of large scale magnetic fields in an elliptical galaxy at a redshift of 0.88 (when the universe was less than 40% of its present age). Notably the Faraday rotation of this elliptical galaxy is so close to that of a Spiral Galaxy in their sample with its redshift of 0.89. Did most galaxies have ordered magnetic fields when they were young? Perhaps, during merger and growth, some galaxies have their fields entangled, while others like the Milky Way galaxy retained them!

Rhizobacterial diversity

Both wheat and mandua are important crops of northern region in Uttarakhand and Uttar Pradesh. Rhizobacteria associated with the roots of plants play a key role in plant growth productivity, soil health and ecosystem dynamics resulting in promontory, deleterious or growth neutral influences. The functionality of the rhizobacterial community is influenced critically through action of root exudates that may harbour a multitude of low molecular weight substances. Microbe–microbe interactions can lead to displacement of beneficial forms. In the paper on rhizobacterial diversity of *Triticum aestivum* (wheat) and *Eleusine coracana* (mandua), S. Mittal and B. N. Johri (**page 1530**) show that a larger number of isolates from the latter crop were similar based on numerical analysis of phenotypic characteristics. This crop is grown organically in the Central Himalayan region. Much reduced numerical similarity in wheat isolates could be attributed to use of inorganic fertilizers in the Indo-gangetic belt. However, based on functional analysis of the recovered gene pool, much greater diversity was associated with wheat, compared to mandua rhizosphere, suggesting the crucial role of root colonization genes and root exudates. Molecular characterization by BOX-PCR and ARDRA substantiated the phenotypic data. Cluster analysis showed that bacterial isolates from any one crop were placed in a separate and distinct cluster. Sequencing data showed predominance of genera, *Bacillus* and *Pseudomonas*. Thus, change in cultivation practice and plant type could exert considerable influence on rhizobacterial diversity which is a key component in sustainable production systems.

Ethnobotany

A knowledge of traditional uses of plants by aborigenes has always formed the starting point for all bioprospection and drug development programmes in modern times. Such a study of ethnobotany helps in recording all underutilized or unutilized plant resources among a given ethnic tribe.

India being an emporium of numerous Adivasi cultures has a tremendous potential for ethnobiological studies for shortlisting biological resources for further scientific scrutiny and product development, for human welfare.

The Andaman & Nicobar group of islands in the Bay of Bengal are inhabited by several aboriginal tribes such as Great Nicobarese, Onges, Jarwas, Sentinelese, Shompens and Nicobarese, among whose ethnic cultures of the bioresources are still untapped. Documenting all such resources in the form of comprehensive databases is highly essential not only for their sustainable utilization but also for establishing patents/ custodianships for sharing royalties as and when any product based on the biological material is released. Unfortunately, in India such classical areas of science are not receiving due attention (causes being many) and the number of taxonomists and field botanists who are to undertake such studies are dwindling. At the same time, the rich forest biodiversity with its associated tribal cultures are also vanishing drastically before we are able to assess and document all the biological resources of the country. The article by M. V. Sharief and R. R. Rao in this issue (**page 1623**) is hoped to enthuse other young botanists to revitalize these classical areas.