Salinity stress tolerance in plants

The productivity of plant is greatly affected by various environmental stresses. Soil salinity affects plant growth and development by way of osmotic stress, injurious effects of toxic Na⁺ and Cl⁻ ions and to some extent Cl⁻ and SO₄²⁻ of Mg²⁺, and nutrient imbalance caused by excess of Na⁺ and Cl⁻ ions. Salinity response is multigenic, as a number of processes involved in tolerance mechanisms are affected, such as various compatible solutes/osmolites, polyamines, reactive oxygen species (ROS) and antioxidant defence mechanism, ion transport and compartmentation of injurious ions. Various genes/cDNA encoding stress-related proteins such as LEA and proteins involved in the above-mentioned processes have been identified and isolated. Besides these, there are genes/cDNA encoding proteins involved in regulating other genes/proteins. The signal transduction process involves hormones like ABA and JA, which induce early and response genes, leading to responses at molecular and physiological levels. Strategies to improve salinity stress tolerance have also been discussed (page 407).

Oceanographic validity of coastal buffer zones

Ever since the Coastal Regulation Zone (CRZ) Notification was formulated in 1991, we observe a continuous discord over its scientific validity. Considering the natural coastal hazards that relentlessly afflict the inhabitants of the east coast of India, Mascarenhas (page 399) examines whether or not vulnerable coasts should be occupied, urbanized or regulated. Coastal ecosystems such as sand dunes, coastal forests and wetlands have an inherent protective potential and hence offer a natural buffer protection that needs to be harnessed. As such, natural coastal landforms should be able to migrate, develop and evolve freely and naturally in form and space. An ideal coastal development programme is the one that recognizes coastal geological processes, preserves coastal features and promotes afforestation of natural landforms. Efforts should therefore be directed towards adaption or managed retreat by implementing adequate setback zones.

Antifilarials

Development of new antifilarials requires animal models exhibiting the complete human disease syndrome so that the efficacy of the new compounds can be reliably assessed and extrapolated to human situation. The non-human primate Indian leaf monkey (Presbytis entellus) was found to be susceptible to the human lymphatic dwelling filaria Brugia malayi, and this model develops the characteristic human filarial disease manifestations such as episodic febrile attacks, limb oedema and eosinophilia. P. K. Murthy et al. report (page 422) the studies on the responses of this model developed by them to known antifilarials diethylcarbamazine and ivermectin and a new compound 82-437 developed by CDRI (an orally active adulticidal antifilarial), to determine the suitability of the model for tertiary screening of potential new antifilarials. The model was found to respond to the antifilarials in a predictable manner with respect to the parasitological profile, absolute eosinophil count, immunological responses and lymph node histopathology and the responses largely resembled those known in human subjects.

Phytochemicals versus phytomedicines – Ashwagandha products in withanolide way

Therapeutic properties of food and medicinal plants stem from non-ubiquitous bioactive secondary phytochemicals synthesized by them in prodigal amounts. Ashwagandha is one of the most valued Ayurvedic medicinal plant. Its unique secondary metabolites (withanolides) have been ascribed adaptogenic, anticancer, immunomodulatory, anti-stress and neurological effects, e.g. Withaferin A (one of the predominant withanolide) inhibits COX-2 without affecting COX-1, desired for a non-irritating anti-inflammatory drug. A variety of Ashwagandha preparations are commercially available but their labels lack phytochemical descriptions. With concerns of compositional consistency of Ashwagandha products in focus, Sangwan et al. (page 461) have analysed withanolides in some commercial Ashwagandha products. Their results revealed wide variations in the phytochemical contents that may reverberate in blotchy health benefit(s), and convolute development of quantifiable/testable pharmacopoeia. They emphasize the need for stringent phytochemical standardization of herbal products and discuss the sources of variations that need to be tuned.