

Objectives

Exploring suitable biomarkers in some Indian lichens to serve as an early-warning bio-indicator system for changing environment (GAP 215825):

- **Screening of sites with respect to environment changes viz. control sites (Upper Himalaya), industrial sites, commercial and residential sites in foot hill areas of the Himalayas for collection of lichens.**
- **Identification of tolerant species of lichens from particular areas and preparation of inventory to develop lichen zone map around specific source of pollution as well as check the role of urban air pollutants on the performance of tolerant species.**
- **To assess temporal variation of pollutants deposition in the selected species in order to reveal possible adaptations of the species against changing environment.**
- **Biochemical studies including antioxidant systems in selected lichen species under identified metal/metalloid stress to identify biomarkers in selected species against known source of pollutants.**
- **To determine threshold levels of toxic substances in lichen thallus (by simultaneous assessment of morphological, physiological and ultra structural damage) to develop sensitive/tolerant species as well explore factors responsible for the changing lichen flora in these areas.**