AIR QUALITY MONITORING POTENTIAL OF LICHENS

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Although appearing to be a single organism, lichen is actually a symbiotic partnership between a fungus and one or more photosynthetic organisms, an alga or cyanobacterium. Typically, the fungal partner provides most of the composite organism's structure and mass, thus exchanging physical protection for carbohydrates manufactured by the photosynthetic partner. Together, the fungus and its partner(s) can inhabit a much wider variety of habitats and conditions than any could on their own. Lichens are extremely sensitive to the impacts of habitat modification and air pollution, which is a major environmental issue both in developed and developing countries. This sensitivity is the foundation of their use as biological monitors or indicators of air pollution. In this respect, they serve as early warning detectors of environmental damage in much the same way that Pap tests are used to detected cancer in early treatable stages. Lichens exhibit changes in health, biodiversity and elemental composition long before any other plant or animal species exhibit any visible symptoms. SO2 is considered to be the primary factor causing the death of lichens in most urban and industrial areas, with fruticose lichens being more susceptible to SO2 than many foliose and crustose species. Ozone, PAN and nitrogen oxides are also toxic to lichens in sufficient concentrations. Distribution mapping is the first classic field method used to indicate air quality using lichens. The total number of species per site (richness), the percentage of the quadrants in which particular species can be found (frequency), presence or absence of indicator species, and the estimated or measured cover are different parameters used in monitoring of lichens. In Sri Lanka, there were no previous data on the relationship of lichens with air pollutants. Thus, studies were conducted to correlate ambient Sulphur dioxide (SO2) and Nitrogen dioxide (NO2) levels with corticolus lichens. Thirty-one sites falling on six transects extending upto 40 Km from Colombo city to suburbs were selected and area of each site was 1Km2. Computed lichen diversity (Shannon's diversity) on each site. It was evident that lichen diversity values increased when moving away from the city while SO2 and NO2 decreased concurrently, indicating that lichen diversity assessments can be successfully exploited in pollution monitoring in tropical countries as well.