Use of Lichens as Indicators of Air Quality in Jeju Island, Korea

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Lichens have been used as biological indicators of environmental pollution. As lichens show high sensitivity to air quality, hundreds of studies have linked lichen communities to air quality. In the present study, attempts were made to correlate air quality and lichen diversity in Jeju island, one of the new seven wonders of nature, and to find out whether lichens can be used as a bio-indicator for air quality assessment. The study was conducted on 3 broadleaf and 3 pine trees in each 17 survey places. On each trees, the transparency lichen grid was installed on the trunk of a tree to identify lichens and record areas on the grid. After, the data were analyzed by Shannon index values(SDI), Index of atmosphere purity(IAP) and compared sensitivity of the lichens to SO2 according to Hawksworth&Roses scale. In the results, both SDI and IAP values were higher in broadleaf trees than in pine trees. Since pine trees are disadvantageous for lichens to inhabit, broadleaf trees showed more accurate values. In most survey places, SDI and IAP values showed similar except for 2 pollutant emission areas. Mountain areas showed the highest IAP values and coastal&populated areas showed the smallest values. Also, the number of lichens classified sensitive to SO2 pollution by Hawksworth&Roses scale coincided more with SDI values than IAP values. Compared to European criteria of IAP values, Jeju has a clean air quality in all areas, mostly over 40. Conclusively, these results strongly suggest that lichen’s diversity has direct connection with the clean atmospheric environment of Jeju. Thus, lichens can be used as a biological indicator for long term monitoring for air.

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