

ABSTRACT

Responses of Lichens to Air Pollution from
the Bauxite-Alumina Industry in Jamaica

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The influence of the bauxite-alumina industry in Jamaica on aspects of the physiology and on the elemental content of transplanted Usnea angulata and Ramalina anceps as well as on the patterns of distribution, sexual status and host specificity of the surrounding indigenous lichen flora were studied.

Transplanted specimens exposed by both a "clothes-line" as well as a "bark-type" technique were evaluated after specified intervals of time. Potassium and Na lost to an incubating medium and those quantities residual in the tissues were determined by flame photometry. Specimens exposed close to the bauxite-alumina plants in the downwind direction and for the longer exposure periods suffered the greatest K^+ loss. Reduction in residual K^+ was, however, found to be a more reliable indicator of injury. Correlation coefficients between the K^+ and Na^+ data indicate that in some tissues, Na^+ is accumulated at the expense of K^+ . The bark-transplanted specimens showed less damage than did those transplanted by the "clothes-line"

technique.

Twenty elements (Ti, I, Mg, V, Al, Mn, Cl, Ca, Sm, La, Ce, Br, As, Sb, Sc, Th, Cr, Fe, Zn and Co) were determined in the transplanted specimens by Instrumental Neutron Activation Analysis. Specimens closest to the plants and in the downwind directions had the highest levels of Ti, V, Al, Mn, Cl, Ca, Sm, La, Ce, Sb, Sc, Th, Cr, Fe and Co. Dispersion and accumulation patterns suggest that Sm, La, Ce, Sc, Th, V, Al, Cl, Mn and Fe could be recommended individually as indicators of pollution from the industry.

The lichen flora around two bauxite-alumina factories was compared with control locations. Species diversity around the plants was lower than at the control sites and a higher percentage of empty ascocarps was found in the specimens downwind of the factories. No host-lichen specificity was indicated.