

Abstract:

A study was carried out to understand the role of acid and aluminum on the destruction of plant roots. The detoxification effects of calcium (e.g. from liming), plant extracts, magnesium, and iron were also studied. Alligator grass (*Alternanthera philaxeroides*) was used for the study because of its availability and adaptation to laboratory conditions. Healthy stems from this plant were placed in deionized water at acidities varying between pH 3 and pH 8 to find the effects of acid alone. Another set was placed in solution containing varying concentrations of aluminum at acidities between pH 3 to pH 8. The third set contained 10 ppm aluminum and leaf extracts obtained by soaking dry leaves in deionized water for a month. The solutions were maintained at pH 4.5 and pH S.O. In a fourth set, magnesium and iron were added to the solution. The results obtained showed the plant roots developed between pH 4 and pH 8. At pH 3 no roots developed and plants died quickly. Between pH 5 and pH 8 plants could withstand relatively high concentrations of aluminum without ill effect. Below pH 5 the presence of 1 ppm aluminum stopped root growth. The presence of leaf extracts significantly reduced the toxic effect of aluminum at pH 4.5. The presence of magnesium and/or iron reduced aluminum toxicity but calcium which may be introduced by liming did not reduce its toxicity at pH 4.5. Further, the presence of high concentrations of calcium ions at low pH may have a deleterious effect in plant growth.