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Title: The soil acidity tolerance of birdsfoot trefoil entries as determined by a root-length bioassay.

Birdsfoot trefoil (Lotus corniculatus, L.) is regarded as an acid-tolerant, leguminous plant. This conclusion seems to be based upon study of a limited number of entries, and in several cases, cultivars were evaluated on acid subsoils. Tolerance of soil acidity appeared to vary among some entries studied by Baligar et al. (1985. *Commun. Soil Sci. and Plant Anal.* 16:1079-1093), indicating genetic variability for soil acidity tolerance. Screening a large number of plant entries can be laborious. Solution culture investigations are often used, since solution Al composition and pH can be carefully controlled. Short-term bioassays based upon root-length development in soil have been successfully employed to screen large numbers of cereal and nonforage legume species, identifying not only acid tolerant entries, but soils with extreme chemical challenges as well. We sought to use the root-length bioassay for small-seeded legumes, such as birdsfoot trefoil, as an aid in identifying entries most tolerant of typical Appalachian soil chemical conditions.

Application of methodology commonly used for screening large-seeded species did not seem to work for birdsfoot trefoil. We discovered that soil physical conditions included important features that controlled root elongation, and that as bulk density and soil water increased, the root length of three-day-old birdsfoot trefoil seedlings decreased. The response was affected by soil textural class as well (Belesky et al., 1991. *Plant and Soil*, in press). Results from the short-term bioassay were compared to a study in which plants were grown in limed and nonlimed soil. Soil acidity tolerance indices, based upon root length, were not the same for all entries evaluated by short-term bioassays and grow-out tests in soil. The soil acidity stress in our studies was much greater (> 200 μM Al) based upon soil solution Al concentration than that imposed in other studies. In both the short-term bioassay and grow-out test, AU-Dewey ranked as most tolerant of soil acidity conditions regardless of soil textural class.