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Title: Enhancing early seedling development of birdsfoot trefoil: Use of rock phosphate for seed coating and field application on acid soils.

Coating seeds with amendments such as CaCO_3 or rock phosphate was implemented to enhance early seedling development of birdsfoot trefoil. Coating seeds of Fergus and AU-Dewey birdsfoot trefoil enhanced shoot mass and leaf number. Seed coating affected the number of nodules along the top 3 cm of root, improving nodule formation (when compared to soil-coated seed) by up to eightfold for AU-Dewey and less so for Fergus. The occurrence of nodules is positively correlated with other features on the aerial portion of the plant, including leaf number, stem length, and shoot mass. This suggests that rapid nodule development in a favorable rhizosphere environment is associated with plant responses that occur well into the early development period of the seedling. Coating seeds to enhance the seedling rhizosphere may be beneficial in low-input situations where traditional mechanized and chemical-based agricultural practices may not be feasible.

Studies are underway, or are being planned, to evaluate rock phosphate as a soil amendment in pasture situations. Birdsfoot trefoil is being used as an indicator species since it is not normally found in unimproved pastures in this region. A mixture of Fergus, AU-Dewey, and Leo birdsfoot trefoil was surface broadcast on hillside plots in early May 1990, and sheep concentrated in a given replicate to enhance seed-soil contact through treading. Prior plot treatment included 0, 50, 100, and 200 kg P ha⁻¹ applied as pulverized rock phosphate in September 1989. All treatments were replicated three times. Soil P (Bray-1 extractable) was 4 mg P kg⁻¹ in the surface 6 cm prior to treatment. Rock phosphate application increased extractable P in treated soils 8 months after application, to about 7 mg P kg⁻¹ when 50 kg P ha⁻¹ was applied, and 12 mg P kg⁻¹ when 200 kg P ha⁻¹ was applied. Botanical composition assessments showed that trefoil was increased by tenfold when 100 or 200 kg P ha⁻¹ was applied as rock phosphate when compared to nontreated control plots. The current study will be continued and a new study established at an additional location in 1991.

Twenty birdsfoot trefoil entries are also being evaluated for persistence in grazed trefoil-switchgrass stands on an exposed low soil fertility site in southern West Virginia.