How Should You Manage Phosphorus and Potassium Fertility to Enhance Alfalfa Yield and Persistence? (A09-cunningham100644-Oral)

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Abstract:

Application of phosphorus (P) and potassium (K) enhances alfalfa yield, but the plant mechanisms leading to improved performance are not well understood. Over the last five years, we have thoroughly studied an alfalfa stand provided 20 fertilizer treatments including all possible combinations of five K rates (0, 100, 200, 300, and 400 kg/ha/year) and four P rates (0, 25, 50, and 75 kg/ha/year). We measured the effects of fertilization on yield and its components, plant persistence, nutrient removal, as well as soil test P and K values. Additions of P and K increased forage yield through enhanced mass/shoot, not shoots/plant or plants/area. Addition of P actually decreased plants/area, while K application had no effect on plant populations. Surprisingly, alfalfa plants died during summer (May to December) not over winter (December to May). Removal of K in the forage exceeded K application even in plots receiving 400 kg K/ha/year. Removal of P in the forage exceeded the 25 kg P/ha fertilizer application, but the 50 or 75 kg P/ha rates more than equaled forage P removal rates. Soil K concentrations only increased in plots receiving 300 and 400 kg/ha where forage growth was limited because no P fertilizer was applied.

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