PHOSPHORUS AND POTASSIUM EFFECTS ON YIELD COMPONENTS, NUTRIENT ACCUMULATION AND PERSISTENCE OF ALFALFA (*MEDICAGO SATIVA* L.)

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Our objective was to determine why phosphorus (P) and potassium (K) are essential for high yield by analyzing alfalfa yield components. Plots of P treatments (0, 25, 50, and 75 kg/ha) and K treatments (0, 100, 200, 300, and 400 kg/ha) arranged in a factorial design were replicated four times. Forage was harvested four times per growing season (1998-2000), and yield, mass per shoot, shoots per area, and herbage nutrient concentrations determined. In May and December, plants were dug to determine plant populations, and roots were analyzed for sugar, starch, protein, and total amino nitrogen (N). Yield increased with P and K application, however, yield responses due to K application were not observed in the first harvest. Yield increases were due to increased mass per shoot. Plant populations decreased with P application, with plants dying during the summer (May to December) rather than winter. Plant populations were unaffected by K. Analysis of the roots in May and December indicated that protein concentrations decrease with K application. P fertilization increased both protein concentration and total amino N concentrations. Starch levels decreased in May with P application, while starch levels in December increased with additional P.

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