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PREDICTION OF QUALITY VARIABLES OF *VICIA* SPECIES IN THE FIELD BY REFLECTANCE MEASUREMENTS

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ABSTRACT

Reflectance measurements potentially offer a more rapid and less expensive assessment of growing conditions than traditional chemical analysis using leaf tissue or plant sap. A field experiment was conducted during 2007-2008 period to investigate relationships between canopy reflectance and nitrogen (N), phosphorus (P), potassium (P), acid detergent fiber (ADF) and neutral detergent fiber (NDF) contents of *Vicia sativa*, *Vicia pannonica* and *Vicia villosa*. Measurements of canopy reflectance were made using a hand-held spectroradiometer. Linear equations between each forage variable and reflectance or first derivatives reflectance had r^2 ($0.14 \leq r^2 \leq 0.77$ and $0.33 \leq r^2 \leq 0.81$, respectively) in R760 and R740 wavelengths. In stepwise regression of the reflectance (in 440, 550, 640 and 760 nm wavelengths), the highest r^2 of predicted and measured N, P, K, ADF and NDF contents of vetch species were (0.77, 0.79, 0.64, 0.70 and 0.77, respectively), in stepwise regression of the first derivatives of reflectance (in 430, 540, 630 and 740 nm wavelengths), the highest r^2 of predicted and measured N, P, K, ADF and NDF contents of vetch species were (0.81, 0.83, 0.66, 0.83 and 0.83, respectively). Our results suggest that major quality parameters of vetch species can be rapidly and nondestructively predicted using canopy reflectance data.

Keywords: Vetch, spectroradiometer, reflectance, remote sensing, quality parameters