Research Article

Studies on hyper spectral reflectance behaviour of maize (*Zea mays* L.) under various fertility levels

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Summary

Stress in vegetation is distinguished by using plant canopy spectral reflectance data by virtue of its notable absorption in red and blue segments of visible spectrum due to chlorophyll and its higher green reflectance in the near infra-red. The chlorophyll concentration in plant canopy is mainly attributed to the nutrient availability/deficiency in growth media. Hence, it was hypothesized that, spectral data of crop canopy under varying fertility levels may focus light on growth and development of crop. Therefore, a field experiment was conducted in winter season 2009-10 at Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, India using maize as test crop in *Vertisols* under varying fertility levels. The experiment was laid out with six treatments, replicated four times in two factor Randomized Block Design. The hyper spectral measurements showed decrease in red and increase I NIR reflectance by maize upto 82 DAS and reversed thereafter. Amongst all treatments, higher absorbance of red wavelength and reflectance of NIR by maize canopy was observed in growth media received 100 kg N,50 kg P_2O_5,30 kg S,20 kg $ZnSO_4$ and two sprays 2 per cent Fe at silking and cob development stage. It was noticed that hyper spectral observations should be centralized between 550 to 670 nm and 750 to 1050 nm wavelength bands during 51 to 82 days after sowing in maize, for getting discrimination due to various nutrient applications. Chlorophyll was found to be most influencing factor contributing to total spectral reflectance. Further, it was concluded that even with the hyper spectral data it was difficult to identify/discriminate the specific nutrient deficiency in crop plant.

Key words : Hyper spectral reflectance, Maize, Soil fertility levels, Chlorophyll, Plant nutrient deficiency

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