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INTEGRATED DATA ANALYSIS AS A TOOL TO REVOLUTIONIZE PLANT BREEDING

SELECTION OF VEGETATION INDICES TO ESTIMATE THE LEAF NITROGEN CONTENT IN CORN



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Introduction

Vegetation indices (VIs) provide information about the crop, assisting in management decisions in the *Zea mays* L. corn, especially in fertilizing crop treatments.

Objective

Therefore, the objective of this work was to determine the best VIs in the estimation of leaf nitrogen content in corn.

Materials and methods

In the crop seasons 2017/2018 and 2018/2019, two experiments were carried out with maize cultivation in the experimental field of the Federal University of Mato Grosso do Sul, Chapadão do Sul Campus. The design used in the experiment was a randomized block design with three repetitions in a factorial scheme. The first factor was composed of 11 open-pollinated maize cultivars and the second factor was composed of two contrasting levels of Nitrogen (N) (60 kg ha⁻¹ and 180 kg ha⁻¹). At 50 days after emergence, when the crop was in full flowering, samples from the middle third of five diagnostic leaves were collected to obtain the N content. The wavelengths evaluated were green (550 nm), red (660 nm), Rededge (near infrared; 735 nm) and NIR (infrared wavelength; 790 nm). Through the evaluated lengths, the vegetation indices were calculated: NDVI, NDRE, GNDVI and SAVI. The statistical analyzes evaluated were the path analysis, considering the Nleaf content as the main dependent variable and the wavelengths and IVs as explanatory. Subsequently, a multiple regression analysis was performed, evaluating the relationship of selected indices with leaf nitrogen content.

Results and discussion

The path analysis showed a high coefficient of determination ($R^2=0.7573$) and a residual effect of medium magnitude (0.4926). The vegetation indices that had high magnitude correlation with leaf nitrogen were Rededge, NIR and SAVI, the first showing a positive correlation and the other a negative correlation. After selecting these IVs, a multiple regression analysis was performed, evaluating the relationship of the IVs with the Nleaf. The multiple regression coefficients between the main variable Nleaf and the vegetation index NIR were expressed in a negative and moderate way (-31.59). Between NF and Rededge, the coefficient was positive and high (73.07). The coefficient between Nleaf and SAVI were positive, with low magnitude (9.24).

Conclusion

The spectral variables NIR, Rededge and SAVI proved to be better than the others in the determination of leaf nitrogen, especially Rededge.

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