COMPUTATIONAL INTELLIGENCE IN PREDICTING LEAF NITROGEN CONTENT IN MAIZE

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RESUMO

Technological innovations in agriculture made it possible to solve several problems inherent in the area. The research hypothesis was that through vegetation indices (IVs) and with the use of artificial neural networks it is possible to estimate the leaf nitrogen content in corn. The objective was: (i) to determine the best IVs in the prediction of leaf nitrogen content in corn; (ii) search for the best RNA in the prediction of leaf nitrogen. In 2017/2018 and 2018/2019, two corn crops were evaluated in the experimental field of the Federal University of Mato Grosso do Sul, Chapadão do Sul Campus. The design used in the experiment was randomized blocks with three repetitions in a factorial scheme. The first factor was composed of 11 corn cultivars and the second by two contrasting doses of nitrogen (N) being 60 kg ha-1 and 180 kg ha-1. The evaluated wavelengths were green (550 nm), red (660 nm), Rededge (near infrared; 735 nm) and NIR (infrared wavelength; 790 nm) and the Normalized Difference Vegetation Index (NDVI), Index Red Edge with Normalized Difference (NDRE), Green Normalized Difference Vegetation Index (GNDVI) and Soil Adjusted Vegetation Index (SAVI). The statistical analyzes evaluated were trail analysis, multiple regression by means of Pearson correlations (r) between the evaluated characters and for Nleaf prediction, artificial neural networks of the Multilayer Perceptron type were used. The spectral variables NIR, Rededge and SAVI proved to be better than the others in determining leaf nitrogen. The artificial neural network is an efficient method for the prediction of nitrogen in corn, enabling the monitoring of the nutritional status of plants and assisting in the recommendation of fertilization.

PALAVRAS-CHAVE: Index vegetation, Artificial neural networks, Zea mays

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