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Linking Leaf Color Charts and Crop N-Status to Guide Fertiliser Application in Highland Rice Production Systems of Rwanda

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Abstract

In farmers' fields or on experimental field stations sophisticated measurements for monitoring crop nutrient status are often not available. However, the nutrient status of the rice crop is an important indicator to guide fertiliser application strategies for nitrogen (N). Farmers aim to improve fertiliser applications with regards to crop, planting date, and region rather than following blanket N recommendations. The International Rice Research Institute has developed a Leaf Color Chart (LCC) as a diagnostic tool based on the greenness value of leaves to help farmers decide when to apply fertiliser. This method does not take into to account differences in leaf greenness that are due to variety, plant type, or leaf thickness. The aim of this work was to determine the influence of leaf thickness on the accuracy and transferability of LCC values with regards to actual, genotypic N status.

The study was conducted at two sites differing in altitude along a temperature gradient in Rwanda from May-November 2017. Two contrasting rice varieties were used. Each variety was subjected to two nitrogen application rates (80 kg ha^{-1}, 160 kg ha^{-1}). A Minolta SPAD-Meter was used to evaluate the crops current N status using the youngest fully developed leaf on the main tiller. SPAD and LCC values were recorded one day prior to fertiliser applications, and up to five consecutive days after fertiliser applications at mid tillering, panicle initiation, and heading stage. Following published procedures, SPAD values were corrected for leaf thickness. This way, SPAD values represented the N-status of the plant and were used to calibrate LCC to actual crop N status. Results show crop N status differed significantly between altitudes, varieties, and N application rates. Results will be analysed in terms of method applicability and phenology and will be discussed on the poster.

Keywords: Crop N-status, lCC, rice, SPAD

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