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Assessing Nitrogen Level in Maize (*Zea mays*) with Infrared Thermography

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Abstract

Intensification of agricultural production due to the higher demand of a growing population will continue to increase pressure on natural resources. Because of the important role of N in various physiological processes, such as chlorophyll synthesis, numerous techniques aim to make nitrogen utilisation more efficient, ranging from breeding programs over biological nitrogen fixiation. In addition, deficiency of N will influence grain and plant weight, harvest index, leaf area index and crop photosynthetic rate thus, reducing the supply to the ear and ultimately lower the yields

Infrared Imaging has been widely used to detect crop water status. It is a promising method that aims to substitute direct measurements such as taking soil samples for laboratory analysis. These are time-consuming, mostly not applicable to large populations simultaneously, destructive, sometimes difficult to apply on fields, and simplify/accelerate possible responses to crop stress. In Infrared imaging increase of leaf temperature is directly related to to stomatal closure (cooling effect due to evapotranspiration). And this increase of temperature is captured through infrared camera and images were later analyzed.

Previous studies identified an inverse correlation of N fertilisation levels and canopy temperature in wheat (*Triticum aestivum* L.). , The objective of this study is to detect nitrogen status as early as possible via infrared imaging on maize.. a greenhouse experiment is planned where thermal images of maize (*Zea mays* variety "Amadeo") plants will be taken throughout the growing stages. Four levels of N (50, 75, 100, 150 %) will be applied and time to time soil and leaves samples will be taken for the laboratory nitrogen analysis. Simultaneously, leaf stomatal conductance (gL) will be measured to provide information on the physiological status of the plants.

Keywords: Infrared thermography, nitrogen fertilisation

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