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Using simple RGB Camera to estimate Nitrogen Uptake, Nitrogen Nutrition Index (NNI) and critical Nitrogen: Spring wheat case study.

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The first N_c dilution curve was based on dry matter (DM) power function. This model is limited to point of singularity near zero. Another disadvantage was that it required measurements of DM which is time and labor consuming. Alternatively we proposed a logistic model that starts at zero and on the abscissa assumed a linear relationship between days after emergence (DAE) and DM throughout the relevant stages of wheat growth cycle.

The Objectives of this study were to: 1) To demonstrate the feasibility of digital camera to replace laboratory tests. 2) To Determine critical N (N_c) and Nitrogen nutrition Index (NNI) of spring wheat and 3) Use N% and dry matter yield in order to calculate N uptake by wheat. This last is expected to be a tool to calculate the required amount of nitrogen to obtain maximum yield.

Wheat experiments were conducted in greenhouse lysimeters. Varied rates of N fertilizer (equivalent to 0–180 kg ha⁻¹) and several cultivars varying from shortest to longest ripening growth period. N_c reduced gradually from about 6% to 2% (≈ 60 –20 gr/Kg) when DM increased with DAE from 0 to 14,000 kg/ha during 80 growing days. NNI was stable and clearly distinct between maximal index (1.0) and minimal index (0.2) when (DAE) was about 60; Photographs succeeded to replicate laboratory measurements and obtained a linear regression curve with a unity slope and $r^2=0.93$. Nitrogen use efficiency (NUE) ranged from 50 to 65 kg DM/unit N and from 30 to 50 Kg grain /unit N.