

Correlation among shoot variables of corn plants in response to nitrogen fertilization at different growth stages

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INTRODUCTION

- The response of corn plants to nitrogen fertilization at different growth stages and the correlation among shoot variables in response to this fertilization is an important issue to improve the management of this nutrient, consequently, the yield maximization of corn.

OBJECTIVE

- The objectives of this study were to evaluate the response of the corn crop, and the correlation among shoot variables of this plant, in response to nitrogen fertilization at different growth stages.

MATERIAL AND METHODS

- A corn experiment was conducted under field conditions, from 2011 to 2012, in Piracicaba/SP, Brazil. Treatments were side-dressed with N-urea at different growth stages (V4, V6, V8, V10, and V12), including a control.
- The following variables were analyzed: photosynthetic rate (PR) and stomatal conductance (SC) in a fully developed leaf of each plant with an Infra Red Gas Analyzer [IRGA, mod. Li-cor 6400 (LI-COR Inc., Lincoln, NE USA)] evaluated at the V14 phenological stage; plant height (PH) and leaf area (LA) evaluated at flowering and nitrogen concentration in grains (NCG) evaluated after harvest. The design was in randomized blocks with four replications. Data were subjected to variance analysis using the F test ($p < 0.05$), LSD test for mean comparison and Pearson correlation test to verify the possible correlation between variables. It was applied 30 kg N ha⁻¹ at the time of seeding, and 140 kg N ha⁻¹ as side-dress.



RESULTS

- There were significant differences, in relation to treatments, only for PH and NCG. For the other variables, treatments did not provide significant differences. For PH, treatments differed only from the control. The application of nitrogen side-dressing on the V6 growth stage, presented the highest average for NCG.
- Positive correlations were observed between NCG and PH, LA and SC. NCG presented the highest correlation with LA, showing that the greater the leaf area the more nitrogen is absorbed by the plant and a higher N concentration is found in the grain. This is also observed for the variable PH. The third positive correlation was observed between NCG and SC, most likely due to constant transpiration performed by stomata, which caused the nitrogen flow to rise from root to shoot.

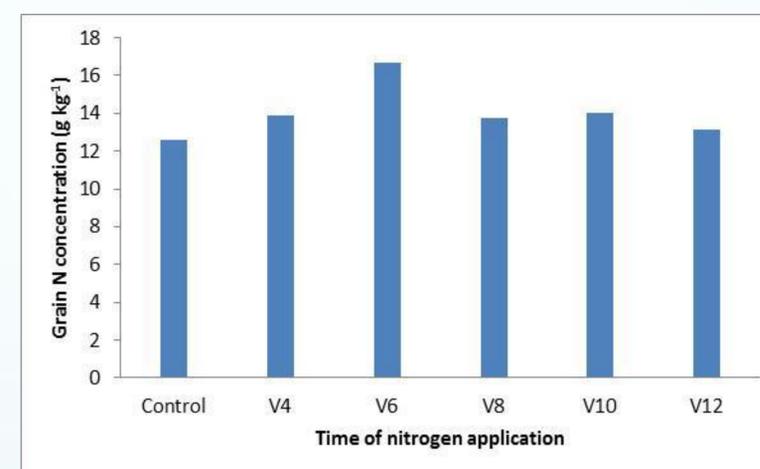


Figure 1. Nitrogen concentration in grains of corn (NCG) in response to nitrogen fertilization at different growth stages.

CONCLUSION

- The side-dress application of nitrogen at the V6 growth stage, provided the highest nitrogen concentration in grain;
- Nitrogen concentration in grain showed positive correlation with leaf area, plant height, and stomatal conductance.