University of
Sao Paulo

Center for Nuclear
Energy in
Agriculture

Ammonia uptake by corn leaves at distinct growth stages

Evandro Luiz Schoninger[1], Adilson Nunes da Silva[2], Lucas Peres Miachon[3], Paulo Cesar Ocheuze Trivelin[1]

1 - Stable Isotopes Laboratory, CENA/University of Sao Paulo, Piracicaba - SP, Brazil. E-mail: schoningerel@cena.usp.br
2 - Crop Science Department, ESALQ/University of Sao Paulo, Piracicaba - SP, Brazil
3 - Soil Science Department, ESALQ/University of Sao Paulo, Piracicaba - SP, Brazil

INTRODUCTION

Plants have the ability to uptake ammonia from the atmosphere through the leaves and can recover partially the N volatilized from urea applied to the soil surface. This study aimed to evaluate foliar uptake of ammonia derived from topdressing urea application at different corn growth stages.

MATERIAL AND METHODS

Brazil

Corn
Piracicaba, State of Sao Paulo
Season of 2011/12
Randomized blocks with four replications

Treatments:
Topdressing urea (labeled at 12 atoms % ^{15}N) application at V4, V6, V10 and V12 growth stages

- Urea application on trays containing soil

- Leaf area (LA) of plants was measured at each time of urea application

Seven days after urea application:
- Soil was dried and analyzed for total N content and ^{15}N abundance
- Plants near tray (●) were collected, dried and analyzed for total N content and ^{15}N abundance

N volatilized (%) = (^{15}N applied - ^{15}N recovered in the soil) / ^{15}N applied x 100

N absorbed (%) = (^{15}N recovered in the plant) / ^{15}N volatilized x 100
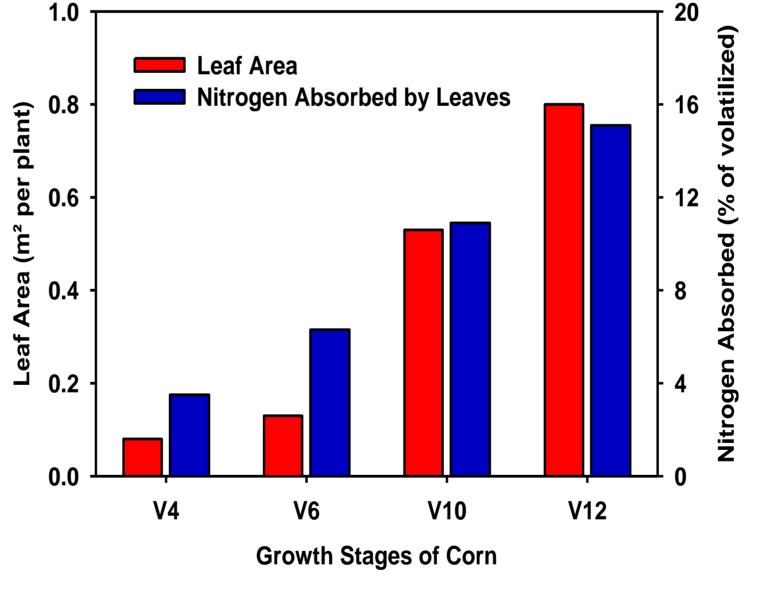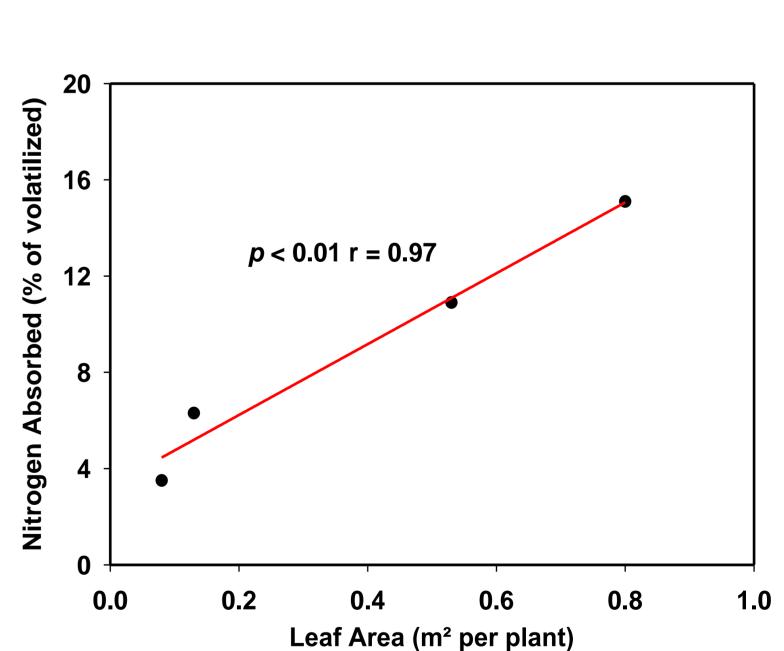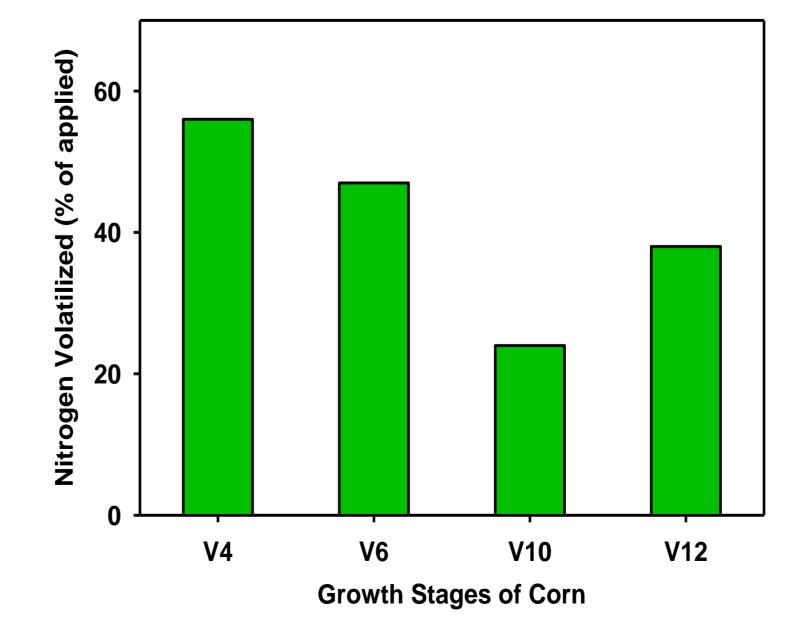
RESULTS

Urea application at V4, V6, V10 and V12 stages provided values of N volatilized of 56, 47, 24, and 38 %, respectively. These differences, with higher values to V4 and smaller to V10 must be, mainly, due to distinct weather conditions in each application time.

To N absorbed by plants, we observed values of 3.5, 6.3, 10.9 and 15.1 % for V4, V6, V10 and V12 growth stages, respectively, and these values differ among themselves by LSD test. The significant correlation between leaf area and N absorbed may explain the highest ammonia uptake by plants in advanced growth stages, due to greater leaf area in older plants.

$p < 0.01$ $r = 0.97$