

Polymer Coated Urea In a Corn Field: Soil Nitrate-N Availability



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INTRODUCTION

The use of controlled release fertilizers like polymer coated urea (PCU) can achieve better synchronization between the corn nitrogen (N) needs and the availability of N in the soil. Actual corn hybrids have the capacity of uptaking N in later growth stages.

The objective of the study was to evaluate the effect of two sources of N, PCU and conventional urea (U), on the availability of soil nitrate-N (NO₃-N) throughout the corn cycle.

MATERIAL AND METHODS

An experiment was carried out in the 2012-2013 growing season, in Piracicaba – São Paulo State – Brazil, in a Typic Hapludox. The experimental design was randomized blocks with four replications. The treatments consisted of 180 kg ha⁻¹ of N applied at seeding (incorporated into the soil) and were: (i) an untreated control (without N), (ii) 100% PCU, (iii) a blend of 50% PCU + 50% U, (iv) 100% U applied at seeding, and (v) 100% U in conventional management (UCM).

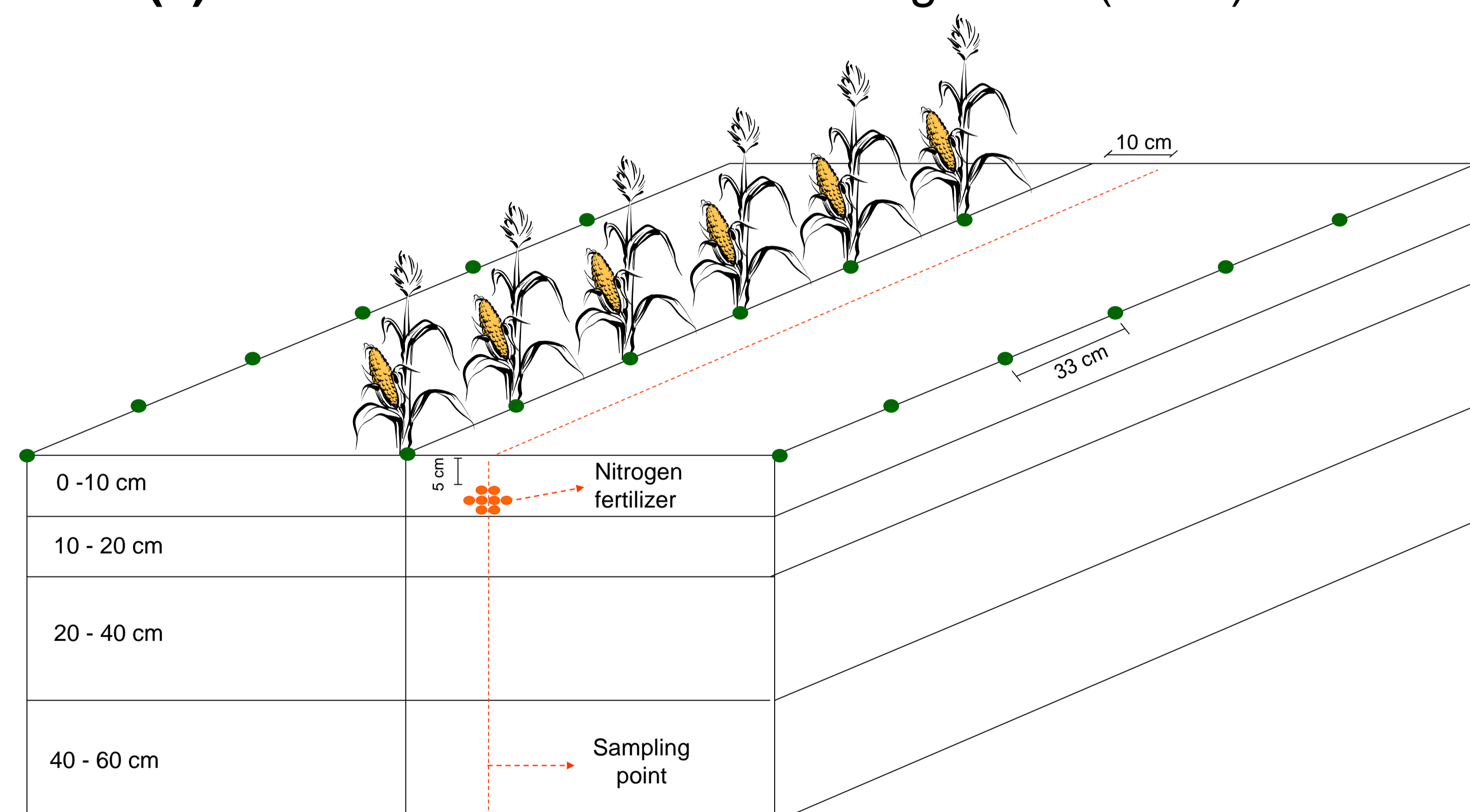


Fig 1. Crop establishment, fertilization and soil sampling scheme

Soil samples were collected at seeding, V4, V12 and R3 corn growth stages. The soil NO₃-N extraction was performed with KCl 1M, soil/KCl ratio 1:10, and the determination, with a FIA (Flow Injection Analysis) equipment.

FIA System



- Peristaltic pump
- Sample injector
- Confluence sites
- Cadmium column
- Spectrophotometer

Data were submitted to ANOVA and when difference was detected, LSD test ($p \leq 0,05$) was performed.

RESULTS

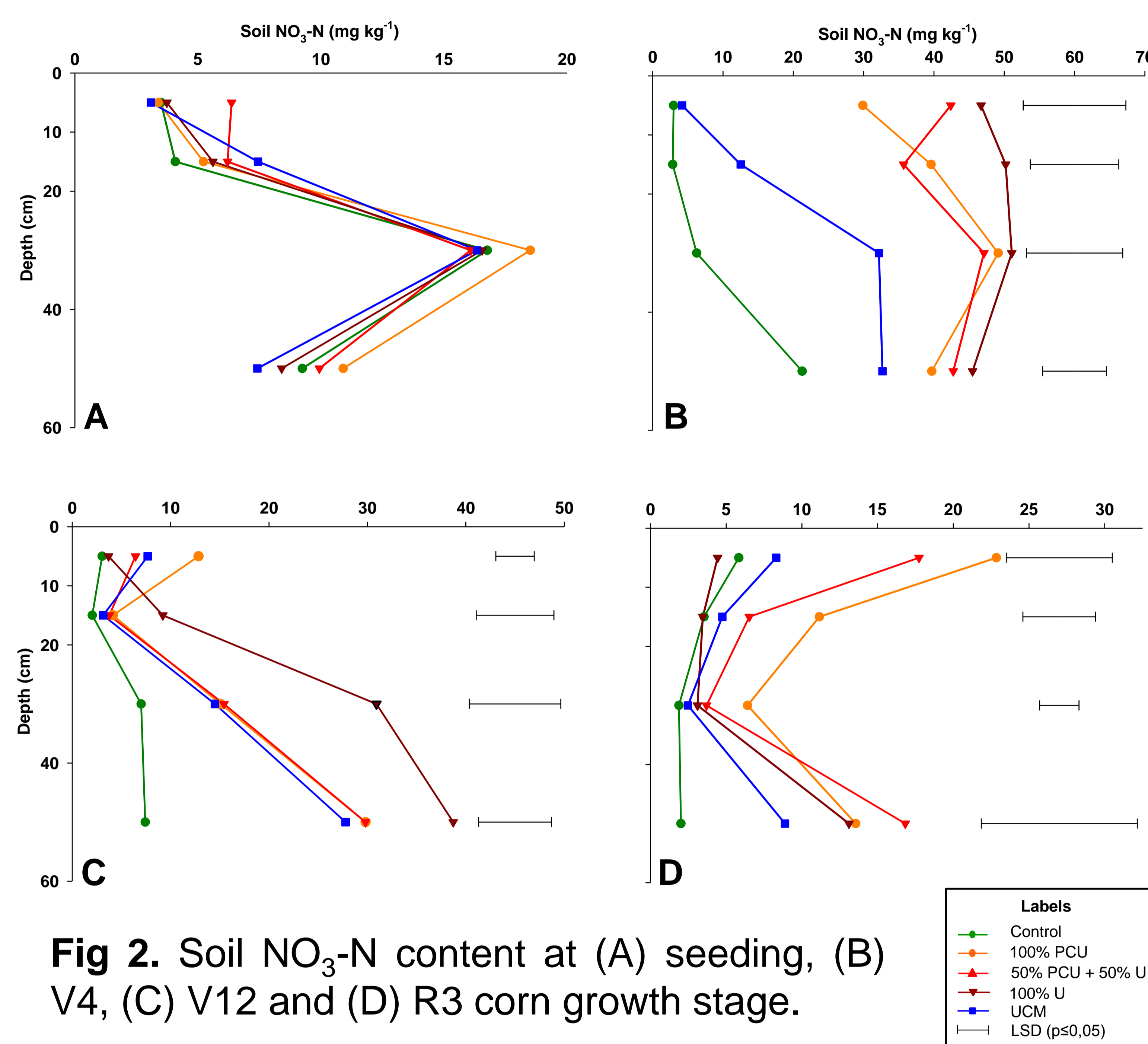


Fig 2. Soil NO₃-N content at (A) seeding, (B) V4, (C) V12 and (D) R3 corn growth stage.

The blend of 50% PCU + 50% U led to a similar amount of NO₃-N availability at V4 that the 100% U treatment, and greater in the next stages, where the differences were observed principally in the top layer (0-10 cm). The 100% URP treatment led to a greater availability of NO₃-N than the other treatments (with U) at the V12 and R3 corn growth stages.

CONCLUSIONS

The use of PCU and blend of PCU + U led to a greater availability of soil NO₃-N in the top layers (0-10 and 10-20 cm) in V12 and R3 growth stages of the corn plants, and that could promote a greater N uptake by corn plants in later growth stages.

ACKNOWLEDGEMENTS:

