

**PROFILE DISTRIBUTION OF NITRATE-
NITROGEN IN AN ALFISOL CROPPED TO
CONTINUOUS COTTON**

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Abstract

Nitrogen (N) fertilization of cotton (*Gossypium hirsutum* L.) has recently come under scrutiny as a potential source of nitrate (NO_3^-) contamination of streams and groundwater. This study was conducted to evaluate the distribution of NO_3^- -N in soil cropped to continuous cotton and determine conditions that might exacerbate the accumulation of NO_3^- -N.

Long-term N fertilization studies were conducted in five side-by-side irrigation blocks at the Southeast Branch Experiment Station at Rohwer, Arkansas, on an Hebert silt loam (fine-silty, mixed, thermic Aeric Ochraqualfs) soil since 1982. Plots were sampled in the early spring (1994) to a depth of 60 in. in 6-in. increments from three replicates of each N-treatment from all five blocks and analyzed for NO_3^- -N.

Soil cropped to dryland cotton showed excessive accumulation (up to 101.2 ppm) of NO_3^- -N in plots treated with 60 lb N/acre and greater. Soils cropped to irrigated cotton did not accumulate as much NO_3^- -N as dryland cotton. Soil NO_3^- -N was unaffected by N treatments at any depth in two of three center pivot irrigated blocks. Slight increases in soil NO_3^- -N were observed under furrow-irrigated conditions with the greatest N treatments (120 and 150 lb N/acre).

Possible paths of exit for soil NO_3^- -N in these studies include leaching, denitrification and plant harvest and removal. Of these plant harvest and removal was probably the most likely path of exit. The accumulation of NO_3^- -N in dryland conditions was probably due to reduced plant uptake of fertilizer N.