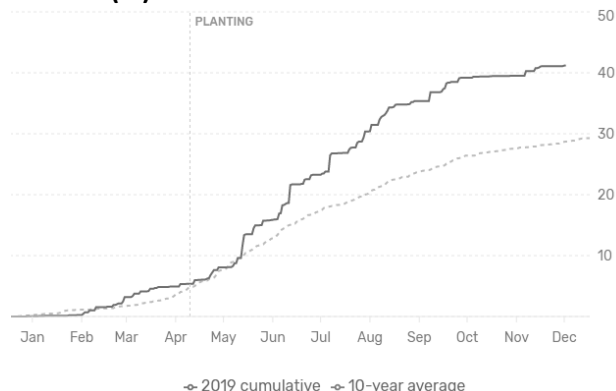


Impact of N-Serve® with Anhydrous Ammonia Application

Study ID: 0118185201902
County: York
Soil Type: Hastings silt loam, 0-1% slopes
Planting Date: 4/14/2019
Harvest Date: 11/5/2019
Seeding Rate: 32,500
Row Spacing (in): 30
Variety: CROPLAN® CP5335VT2P/RIB
Reps: 6
Previous Crop: Soybean
Tillage: No-Till
Herbicides: *Pre:* 3 pt/ac Lexar® on 5/2/2019
Fertilizer: 160 lb/ac N as anhydrous ammonia on 4/8/19

Irrigation: Pivot, Total: 1"
Rainfall (in):



Introduction: N-Serve® by Corteva Agriscience™, is a product with known efficacy for inhibiting nitrification (product information is provided at right). The chemical compound nitrapyrin in N-Serve® temporarily inhibits populations of the bacteria that convert ammonium to nitrite (*Nitrosomonas*) and nitrite to nitrate (*Nitrobacter*). These compounds protect against both denitrification and leaching by retaining fertilizer N in the ammonium form. Ammonium (NH₄⁺) is a positively charged ion (cation) that can be held on negatively charged exchange sites in soils (such as in clays and organic matter); in comparison nitrate (NO₃⁻), which is negatively charged, can be converted to N₂O or N₂ gases in waterlogged conditions, or can leach below the root zone with rain in well drained soils. You can learn more about nitrogen inhibitors at <https://cropwatch.unl.edu/2019/nitrogen-inhibitors-improved-fertilizer-use-efficiency>.

The purpose of this study was to evaluate the impact of N-Serve® applied with anhydrous ammonia on crop yield and soil ammonium and nitrate. Anhydrous ammonia was applied at a rate of 160 lb N/ac on April 8, 2019 on no-tilled ground following a previous crop of soybeans. The study compared 160 lb N/ac with no inhibitor versus 160 lb N/ac with 1 qt/ac N-Serve® (recommended rate). Soil samples were taken on June 13 in V7 corn. Corn was planted 5" off the anhydrous band, and soil samples were collected 2" from the anhydrous band at 1', 2', and 3' depths in both the N-Serve® treatment and check in four replications of the study. Soil samples were analyzed for ammonium-N and nitrate-N.



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Use to delay nitrification of ammoniacal and urea nitrogen fertilizer compositions in the soil by controlling the nitrification process.

Active Ingredients:
 nitrapyrin: 2-chloro-6-(trichloromethyl)pyridine..... 22.2%
 Other Ingredients..... 77.8%
 Total..... 100.0%

Contains petroleum distillates
 Contains 2 lb of active ingredients per gallon.

Product information from: https://s3-us-west-1.amazonaws.com/agrian-cg-fs1-production/pdfs/N-Serve_24_Label1d.pdf

Results:

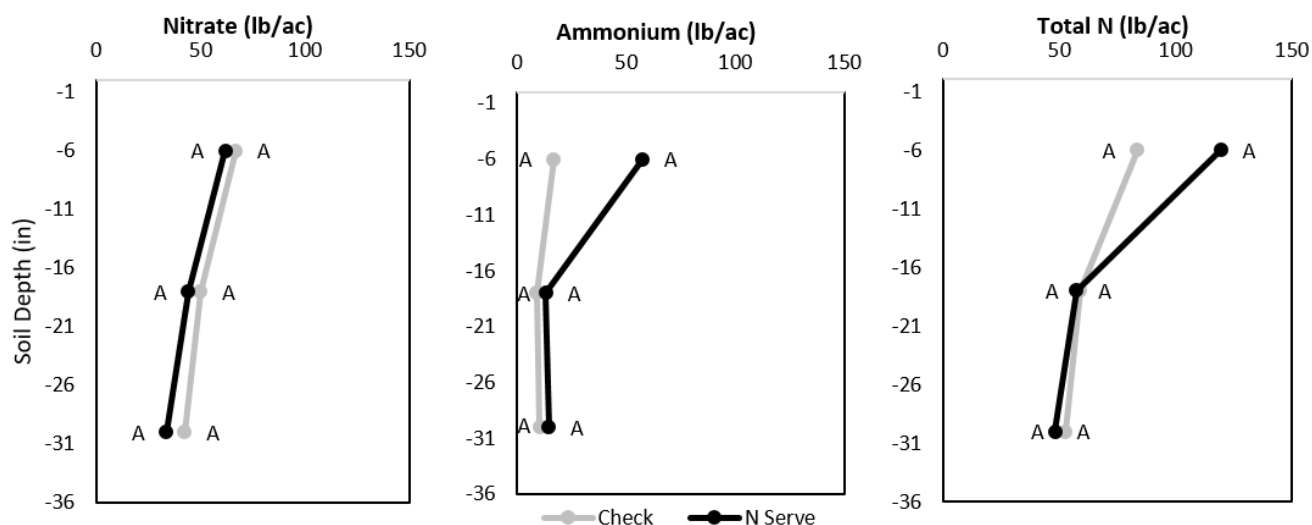


Figure 1. Soil ammonium-N and nitrate-N for check (160 lb N/ac anhydrous ammonia with no inhibitor) and N-Serve (160 lb N/ac anhydrous ammonia with 1 qt/ac N-Serve inhibitor) treatments on June 13 at 1', 2', and 3' depths. Within a sampling depth, points with the same letter are not statistically different at the alpha=0.1 level.

	Stand Count (plants/ac)	Stalk Rot (%)	Moisture (%)	Yield (bu/ac) [†]	Marginal Net Return [‡] (\$/ac)
Check	31,750 A*	12.08 A	15.0 A	264 A	1,010.51 A
N-Serve [®]	30,917 A	9.58 A	14.9 A	264 A	998.71 A
P-Value	0.080	0.638	0.084	0.908	0.131

*Values with the same letter are not significantly different at a 90% confidence level.

[†]Bushels per acre adjusted to 15.5% moisture.

[‡]Marginal net return based on \$3.83/bu corn and \$11/ac (\$47.95/gal) for N-Serve.

Summary:

- Soil samples for ammonium and nitrate concentrations (taken 9 weeks after application) did not differ between where N-Serve[®] was used and where no inhibitor was used (Figure 1).
- Grain moisture was 0.1% drier where N-Serve[®] was used. Stand counts were also 833 plants/ac lower in the N-Serve[®] treatment.
- There was no difference in stalk rot, yield, or net return between the N-Serve[®] treatment and the check.
- Agronomic benefits for a nitrification inhibitor may not be realized every year as rainfall dictates whether nitrogen will be leached, volatilized, or denitrified. This study will be conducted again in 2020.

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