



## STOLLER ENTERPRISES, INC.

*...World leader in crop nutrition...*

TYPES OF NITROGEN . . . IS THERE A DIFFERENCE? - Page 1 of 3

### TYPES OF NITROGEN . . . IS THERE A DIFFERENCE?

Until recently, the common belief was "a pound of nitrogen is a pound of nitrogen. Use the most economical source available". Of course, the loss of nitrogen during application (anhydrous ammonia) and volatilization (urea) should be avoided.

Now, there are certain differences that are being observed....between types and certain periods of application. These observations from the new research are valid. The reasons for the differences, however, may not be correct.

1. Ammonium nitrate has been the most consistent source. Nitrogen performance is normally compared to this source....for whatever reason. Either the other source suffers more loss or there is an effect difference in the plant responses. In fact, the effect of different sources of nitrogen upon the uptake of other nutrients may be even more important.
2. Forty years of horticultural research shows that nitrate nitrogen is more effective for yields and quality than is ammonium nitrogen. Why? Because ammonium nitrogen interferes with the uptake of calcium.

Has anybody done research where ammoniacal nitrogen was used with an abundance of calcium? Yes. Results? The combination was superior to nitrate nitrogen.

3. Ammonium chloride is probably the most superior source of nitrogen. Wheat yields have been 10% to 20% greater when ammonium chloride was compared to ammonium nitrate. Why? When the ammonia changes to nitrate, the chloride controls nitrate uptake (luxury consumption). It acts more like a "controlled release nitrogen".
4. Nitrogen can be taken into the plant and used in three different forms:

Ammonium:  $\text{NH}_4^+$

Nitrates:  $\text{NO}_3^-$

Amine:  $\text{NH}_2$  (foliar urea)

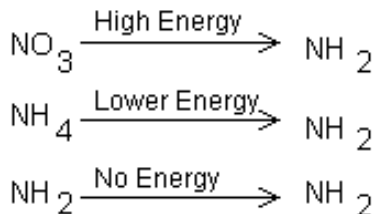


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5. All nitrogen must be converted to amine in order for the plant to make protein.



It takes carbohydrates to supply energy for nitrogen use. This results in less carbohydrates for plant growth. The form of nitrogen will determine the "energy efficiency" of use.

6. Competition with other nutrient uptake.

$\text{NO}_3^-$  competes with other anions:  $\text{SO}_4^{=}$ ;  $\text{Cl}^-$ ;  $\text{P}_2\text{O}_5^{=}$ ;  $\text{B}_2\text{O}_3^{=}$ ;  $\text{Mo}_2\text{O}_3^{=}$

$\text{NH}_4$  competes with other cations:  $\text{K}^+$ ;  $\text{Ca}^{++}$ ;  $\text{Mg}^{++}$ ;  $\text{Zn}^{++}$ ;  $\text{Mn}^{++}$ ;  $\text{Fe}^{++}$ ;  $\text{Cu}^{++}$ ;  $\text{Co}^{++}$

$\text{NH}_2$  competes with none of above

7. When considering the value of nitrogen, the accompanying ion may be of value. This should not be discounted as part of the value.

Ammonium Sulfate: Sulfur as a nutrient and soil acidifier.

Ammonium Chloride: Chloride for disease control and regulation of nitrate uptake.

Calcium Nitrate: Calcium as a nutrient.

Nitro Plus: Calcium and chloride for disease control, calcium nutrition, calcium for hormone effect.

8. What is Nitro Plus?

It is a liquid solution that contains:

Amine Nitrogen: (energy efficient)

Calcium complexed with urea: (hormone effect)

Magnesium complex with urea: (hormone effect)



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Chloride: disease resistance and controlled uptake of nitrogen.

9. Ammoniacal nitrogen is converted to amine in the roots.

Nitrate nitrogen is normally converted to amine in the leaves.

The point of conversion will provide a "sink" for carbohydrate flow in the plant.

Where do you want more carbohydrates to flow?

- In the leaves where they are made?
- In the roots for more healthy root growth?

There is a difference in nitrogen. Several universities are investigating late season application of ammonium nitrogen.

Although the observations are correct, one does not understand the reasons...until one understands The Language of the Plant.