



Most limiting factor

Plants grow until they are stopped by the lack of something they need: light, water, oxygen, carbon dioxide, or essential nutrients.

STUKENHOLTZ LABORATORY NG



















































| Nitrogen | & pH |
|---|--|
| 100 Pounds of <u>Nitrogen</u> Calcium Nitrate | Pounds of CaCO ₃ <u>Neutralized</u> -20 |
| Ammonium Nitrate | 62 |
| Urea | 71 |
| Thio-Sul | 112 |
| Ammonium Sulfate | 110 |
| Anhydrus Ammonia | 148* |
| STUKENHO LABORATO | *final effect |



















| 96.7 4,212,00 | , | | |
|---|---|----------------------|--------------------------------|
| | | 1.55 | Sand |
| 87.3 3,804,00 | | 1.30 | Sandy Loam |
| 74.9 3,260,00 | | 1.20 | Loam |
| 71.7 3,124,00 | | 1.15 | Silt Loam |
| 68.6 2,989,00 | | 1.10 | Clay Loam |
| 65.5 2,717,00 | | 1.05 | Clay |
| | | | |
| 71.7 3,124, 68.6 2,989, 65.5 2,717, | | 1.15 1.10 1.05 | Silt Loam Clay Loam Clay |

| ppm to lb | s/acre [.] ft | |
|-------------------------|---------------------------|--|
| Soil Texture | ppm to lbs per acre ft | |
| Sand | 4.2 | |
| Sandy Loam | 3.8 | |
| Loam | 3.3 | |
| Silt Loam | 3.1 | |
| Clay Loam | 3.0 | |
| Clay | 2.7 | |
| | | |
| STUKEN LABORA | HOLTZ ATORY NG | |



















| Lime Particle Size | | | | | |
|---|-------------------------------|--|--|--|--|
| Mesh Size = Number of wires per inch, each size of grid | | | | | |
| Mesh Size | Relative Liming Effectiveness | | | | |
| >50 | 100% | | | | |
| 10-50 | 50% | | | | |
| <10 | 0% | | | | |
| | | | | | |
| | STUKENHOLTZ LABORATORY MC | | | | |





| %N in Flag L | eaf at Late Boot |
|--------------|---------------------|
| <u>%N</u> | <u>% Protein</u> |
| 4.5 | 15 |
| 4.2 | 14 |
| 4.0 | 13.5 |
| 3.5 | 12 |
| 3.0 | 11 |
| | University of Idaho |







| | RESULTS | | | | |
|----------------|---------|----------------------|-------------------------------------|------------------|-----------------------|
| Crop | WHEAT | SUFFICIENCY RANGE | Topdress or Water Application | | Foliar Application |
| Field | YELLOW | | Units per Acre | | Units per Acr |
| Total N, % | 3.7 | 3.50-4.50 | | Nutrient | |
| Nitrate-N, ppm | 1500 | 2000-4000 | 10 | N | 2 |
| Phosphorus, % | 0.27 | 0.30-0.50 | 10 | P205 | 1 |
| Potassium, % | 3.0 | 2.0-3.0 | 0 | K ₂ O | 0 |
| Calcium, % | 0.49 | 0.35-1.00 | 0 | Ca | 0 |
| Magnesium, % | 0.17 | 0.18-0.50 | 0 | Mg | 0 |
| Sulfur, % | 0.10 | 0.20-0.40 | 20 | S | 0 |
| Zinc, ppm | 24 | 30-50 | 0 | Zn | 0.05 |
| Iron, ppm | 115 | 80-125 | 0 | Fe | 0 |
| Manganese, ppm | 45 | 40-70 | 0 | Mn | 0 |
| Copper, ppm | 7 | 6-12 | 0 | Cu | 0 |
| Boron, ppm | 13 | 9-20 | 0 | в | 0 |
| REMARKS : | | | 1 | | |

| | RESULTS | | | | - |
|----------------|------------|-------------|----------------------|------------------|----------------|
| Crop | WHEAT | SUFFICIENCY | Topdress or Water | | Foliar |
| Field | LOOKS GOOD | RANGE | Application | | Application |
| Total N, % | 3.0 | 3.50-4.50 | Units per Acre | Nutrient | Units per Acre |
| Nitrate-N, ppm | 720 | 2000-4000 | 20 | N | 2 |
| Phosphorus, % | 0.21 | 0.30-0.50 | 15 | P205 | 2 |
| Potassium, % | 2.9 | 2.0-3.0 | 0 | K ₂ O | 0 |
| Calcium, % | 0.45 | 0.35-1.00 | 0 | Ca | 0 |
| Magnesium, % | 0.16 | 0.18-0.50 | 0 | Mg | 0 |
| Sulfur, % | 0.23 | 0.20-0.40 | 0 | S | 0 |
| Zinc, ppm | 30 | 30-50 | 0 | Zn | 0 |
| Iron, ppm | 160 | 80-125 | 0 | Fe | 0 |
| Manganese, ppm | 52 | 40-70 | 0 | Mn | 0 |
| Copper, ppm | 10 | 6-12 | 0 O | Cu | 0 |
| Boron, ppm | 15 | 9-20 | 0 | в | 0 |















- Typical efficiency gain for non-split application = 10-15%
- NSN Urea applied as a topdress in Missouri

 2005 12% gain in efficiency over urea
 2006 no gain

Plots had rain 2 days after Urea application

65



Controlled Release N

Best fit is:

- Where N cannot easily be applied mid season
 - Small grains
 - Drip irrigated Crops
 - Corners
- Large fall N applications
- Where topdress Urea cannot be watered in
 - Flood & furrow irrigated fields
- Severe leaching or denitrification situations
 - Flood irrigation, very sandy soil or clay pans