# Summary of Weyerhaeuser Arborite Trials 2011

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**Trial 1: Evaluation of volatilization from Arborite, Agrotain, N-Zone and urea using semi-open volatilization chambers in the field**

A trial was established in 2011 in Crowley, Louisiana to evaluate the amount and rate of ammonia volatilization loss from four N sources over a 20 day period of time. Arborite treated urea, Agrotain treated urea, N-Zone treated urea, and untreated urea were evaluated. Semi-open volatilization chambers similar to that described by Norman et al. (2009) were used to estimate ammonia volatilization loss. Fertilizer was applied by hand on a dry soil and boric acid treated were used to trap the ammonia gas released. The sponges were removed for analysis and replaced 10, 9, 7, 5, 3, and 1 day before the permanent flood was established and 1 and 5 days post flooding.

Cumulative N losses over the 15 day period are presented in Figure 1. Specific agronomic practices and site descriptions are summarized following Figure 1. Approximate cumulative N loss over the 15 day period was 22, 18, 4, and 3% from urea, N-Zone treated urea, Arborite treated urea, and Agrotain treated urea (Table 1). Both Arborite and Agrotain contain the active ingreadient N-(n-butyl) thiophosphoric triamide (NBPT) and were similar in their effectiveness in slowing volatilization losses as compared to untreated urea.

**Trial 2: Evaluation N fertilizer source, rate, and time of application on rice yield and agronomics**

Trial two was conducted as a companion to trial one in order to evaluate the corresponding rice grain yield loss associated with the four N sources when they applied several days before rice flood establishment. The trial was set up as a randomized complete block design with 4 N sources (Arborite treated urea, Agrotain treated urea, N-Zone treated urea, and urea), two rates of N (60 and 120 lb N/A), and three application timings (10, 5, and 1 days prior to flood establishment, DPF). A check plot which received 0 N was also included as a reference. The trial was conducted at the Rice Research Station in Crowley, Louisiana on a Crowley silt loam soil. A significant rainfall event did occur on 26 April producing 3.35 inches of rain. This occurred 3 days prior to flood establishment. This rainfall event helped to incorporate the 10 and 5 DPF N fertilizer treatments and caused the 1 DPF treatment to be applied onto wet ground.

Analysis of variance results from the factorial arrangement of treatments (not including the check treatment) are presented in Tables 1, 2, and 3 for the main effects, 2-way, and 3-way interactions, respectively. Results from the ANOVA using the randomized complete block design, including the check treatment, is presented in Table 4. Rice grain yield was not significantly affected by the 3-way interaction ($P = 0.25$) but was for the 2-way interaction between N source and time of application ($P = 0.0016$, LSD = 677 lb grain/A). In general, the 5 DPF application timing produced highest rice grain yields (ranging from a high of 9337 lb/A to a low of 9104 lb/A) which were not significantly different between N sources. Grain yields were not statistically different between N sources at the 1 DPF treatment. However, significant yield differences in grain yield did occur between N sources when applied 10 DPF. Urea (7217 lb/A) and N-Zone treated urea (7035 lb/A) were significantly lower than Agrotain treated urea (8640 lb/A) and Abrorite treated urea (8481 lb/A). A significant grain yield difference between Arborite and Agrotain was not observed for the 2-way interaction indicating that both products are equally effective in reducing volatilization when left on a soil surface for ten days. The

rainfall event which occurred 3 DPF could partly explain why the 5 DPF had higher yields as compared with the 10 and 1 DPF treatments. It could be assumed that the fertilizer efficiency of the 5DPF treatment was increased by moving the N into the soil profile from the rainfall event. Conversely, the 1 DPF treatment most likely had a reduced fertilizer efficiency due to an increased rate of volatilization which is possible when urea is applied onto a wet soil surface. Similar findings were observed for total N uptake for the 2-way interaction between N source and time of application supporting this hypothesis.

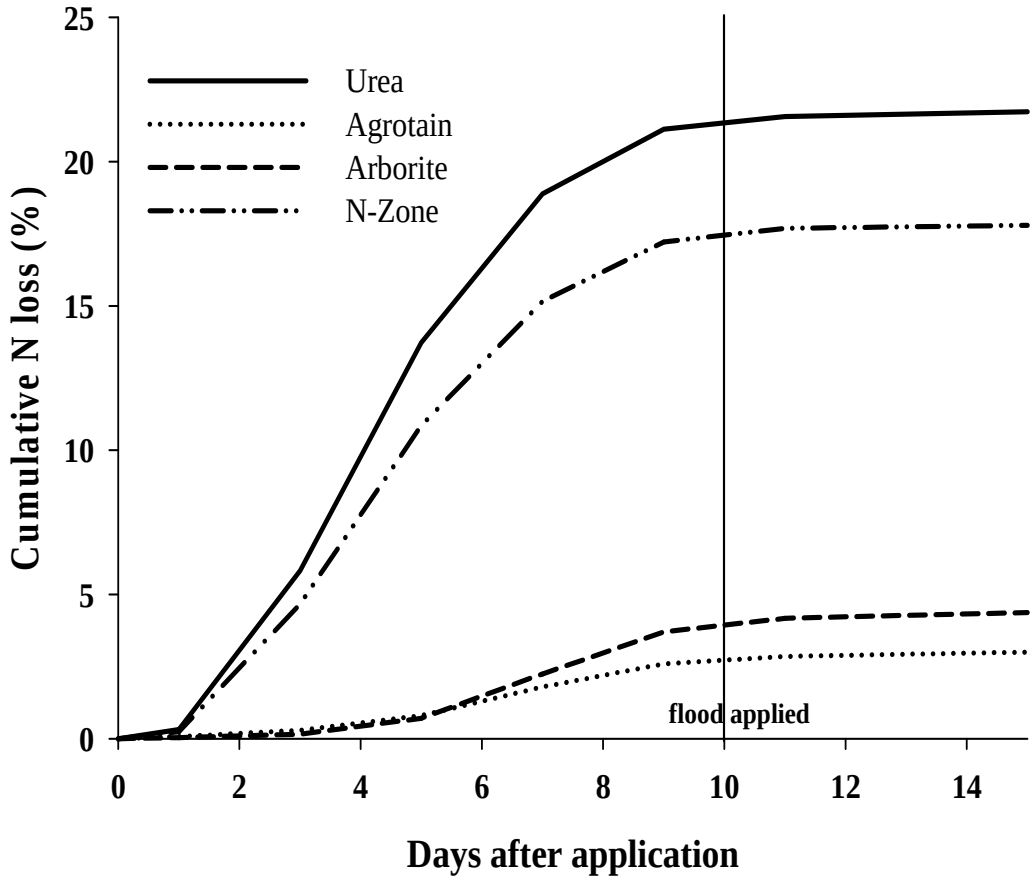


**Figure 1. Ammonia volatilization loss evaluation of Urea and Agrotain, Arborite, and N-Zone treated urea over a 15 day period when surface applied on a Crowley silt loam at the LSU AgCenter Rice Research Station in Crowley Louisiana, 2011.**

**Evaluation of volatilization from Arborite, Agrotain, N-Zone and urea using semi-open volatilization chambers in the field**

**Experiment number**..... : 11-CM-17

**Site and design**..... :
- **Location/Cooperator**..... : Rice Research Station (Crowley Main)
- **Tillage type**..... : Fall Stale
- **Experimental design**..... : Randomized complete block
- **Number of reps**..... : 4
- **Plot size**..... : 4.66 x 16 ft
- **Row width/rows per plot**..... : 8 in / 7

**Soil type**..... : Crowley silt loam
- **% organic matter**..... : 1.2
- **pH**..... : 7.1
- **Extractable nutrients** ppm .... : Ca-1,096; Cu-1.7; Mg-210; P-10; K-58; Na-85; S-7.7; Zn-4.4

**Crop/Variety**..... : Rice / CL151
- **Planting method/date** ..... : Drill seeded / March 15
- **Seeding rate/depth**..... : 33 seeds /$ft^2$ / .75 inch
- **Emergence date**..... : March 24
- **Harvest date** ..... : Non Harvest study

**Seed treatment/cwt**..... : Dithane (fungicide)-114g
Release (gibberellic acid)-10g
Zinc Plus (10% Zn & 4.9% combined sulfur)-296 ml

**Fertilization** ..... : 240 lb/A 0-24-24-2.8, March 16

**Water management**..... :
- **Flush** ..... : March 23, April 7, April 15
- **Flood** ..... : April 29
- **Drain**..... : July 14

**Pest management** ..... :
- **Herbicides**..... : 1.5 qt/A Glyphosate, March 2
  1 qt/A Glyphosate, March 21
  3 qt/A Propanil + .5 oz/A Permit + 1 oz/A Londax, April 6
  2 qt/A Rice Beaux + 2 qt/A Propanil + 1 oz/A Londax + .75 oz/A Permit, April 19
  19 oz/A Clincher, May 27
- **Insecticides** ..... : 0.137 lb ai/cwt Dermacor seed treatment
- **Fungicides**..... : 12 oz/A Quadris, June 18

## Treatment Application

**Application Description:**

| | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| **Date** ..... : | 4/19 | 4/20 | 4/22 | 4/24 | 4/26 | 4/28 | 4/30 | 5/4 |
| **Time of day** ..... : | 3:00 | 11:00 | 8:00 | 8:00 | 1:00 | 1:00 | 8:00 | 9:00 |
| **Application method**..... : | Bcast | sorber | sorber | sorber | sorber | sorber | sorber | sorber |
| **Application timing** ..... : | 10 dpf | 9 dpf | 7 dpf | 5 dpf | 3 dpf | 1 dpf | 1 dpost | 5 dpost |
| **Placement**..... : | NA | NA | NA | NA | NA | NA | NA | NA |
| **Air temperature** ..... : | 85$^{o}$ | 85$^{o}$ | 85$^{o}$ | 85$^{o}$ | 85$^{o}$ | 85$^{o}$ | 85$^{o}$ | 85$^{o}$ |
| **Relative humidity** (%)..... : | 56 | 60 | 85 | 80 | 72 | 41 | NA | 54 |
| **Wind** (mph/direction)..... : | 22/S | 8/SE | 8/S | 10/SE | 16/SE | 12/N | 10/S | 7/NE |
| **Dew presence** (Y/N)..... : | N | N | Y | N | N | N | Y | N |
| **Soil temperature**..... : | 78$^{o}$ | 75$^{o}$ | 75$^{o}$ | 75$^{o}$ | 74$^{o}$ | 71$^{o}$ | 69$^{o}$ | 62$^{o}$ |
| **Soil moisture**..... : | good | good | good | dry | dry | dry | flood | flood |
| **Cloud cover** (%)..... : | 10 | 90 | 90 | 80 | 80 | 0 | 100 | 0 |
| **Applied by**..... : | H | L | H | H | L | L | H | L |

**Application Equipment:**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Equipment** ..... : | Hand | Hand | Hand | Hand | Hand | Hand | Hand | Hand |
| **Operating pressure** ..... : | | | | | | | | |
| **Nozzle type/size**..... : | | | | | | | | |
| **Nozzle spacing/no.** ..... : | | | | | | | | |
| **Boom height**..... : | | | | | | | | |
| **Ground speed (mph)**..... : | | | | | | | | |
| **Incorporation & depth** ..... : | | | | | | | | |

**Crop Stage at Application:**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Height**..... : | 4 inch | 4 inch | 6 inch | 6 inch | 7 inch | 7 inch | 8 inch | 8 inch |
| **No. leaves/tillers**..... : | 3-4 leaf | 3-4 leaf | 4 leaf | 4 leaf | tillering | tillering | tillering | tillering |

**NOTES:**
4/26 - 3.35 inches of rain
6/21 - 50% heading tissue samples taken
9/20 - estimate of ratoon 50% heading

**Table 1. Treamtment means for the main effects of N-source, N-rate, and N application timing.**

**LSU AgCenter, Rice Research Station**

**Evaluation of N source, N rate and N application timing on CL151 rice yield and volaitilization loss.**

Trial ID: 11-CM-18 Protocol ID: Weyerhaeuser1
Location: RRS-Main Study Director: MS, UA, and LSU
Project ID: Investigator: Dustin Harrell
Sponsor Contact: Weyerhaeuser

| Trt No. | Treatment Name | Rate | Rate Unit | Growth Stage | Crop Name | Description | Part Rated | Rating Date | Rating Type | Rating Unit | Sample Size, Unit | Collection Basis, Unit | Crop Stage Majority | Crop Stage Scale |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Rice | Rice | Rice | Rice | Rice | Rice | Rice | Rice | Rice | Rice |
| | | | | | | Tip of panicle | | | | | | | | |
| | | | | | | | | 7/22/2011 | 7/28/2011 | 7/28/2011 | 7/28/2011 | | 11/7/2011 | 11/7/2011 |
| | | | | | 50% Head | Height | Moist | Test Wt. | Yield | 50% Head | Moist | Yield | Total Yield | |
| | | | | | days | in | % | lb/bu | lb/A | days | % | lb/A | lb/A | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | Main | Main | Main | Main | Main | Ratoon | Ratoon | Ratoon | MC+RC | |
| | | | | | | | | | | | | | | |
| | **Table of N Source Means** | | | | | | | | | | | | | |
| 1 | Urea | | | | 97 | 35.3 | 18.5 | 47.2 | 8408 | 54 | 15.2 | 3502 | 11910 | |
| 2 | Agrotain | | | | 98 | 35.8 | 18.3 | 47.3 | 8709 | 54 | 15.6 | 3301 | 12010 | |
| 3 | Arborite | | | | 98 | 36.0 | 18.4 | 47.3 | 8664 | 54 | 15.6 | 3330 | 11994 | |
| 4 | N-Zone | | | | 98 | 34.6 | 18.7 | 47.1 | 8194 | 54 | 15.6 | 3461 | 11655 | |
| | *P* | | | | 0.0539 | 0.1167 | 0.8468 | 0.7081 | 0.0781 | - | 0.0054 | 0.1232 | 0.3685 | |
| | LSD (0.05) | | | | 1 | 1.3 | 1.2 | 0.4 | 431 | - | 0.20 | 198 | 483 | |
| | **Table of N Rate Means** | | | | | | | | | | | | | |
| 1 | 60 lb N/A | 60 | lb ai/a | PF | 97 | 34.1 | 18.1 | 47.3 | 7847 | 54 | 15.2 | 3546 | 11393 | |
| 2 | 120 lb N/A | 120 | lb ai/a | PF | 98 | 36.7 | 18.9 | 47.2 | 9141 | 54 | 15.8 | 3251 | 12391 | |
| | *P* | | | | 0.0173 | 0.0006 | 0.1600 | 0.3107 | 0.0020 | - | 0.0250 | 0.1031 | 0.0203 | |
| | LSD (0.05) | | | | 1 | 0.6 | 1.3 | 0.4 | 405 | - | 0.5 | 405 | 704 | |
| | **Table of N Time of Application Means** | | | | | | | | | | | | | |
| 1 | 10 DPF | | | | 97 | 34.6 | 17.9 | 47.4 | 7843 | 54 | 15.1 | 3543 | 11386 | |
| 2 | 5 DPF | | | | 98 | 36.3 | 19.2 | 47.1 | 9189 | 54 | 16.0 | 3197 | 12386 | |
| 3 | 1 DPF | | | | 98 | 35.3 | 18.5 | 47.2 | 8450 | 54 | 15.4 | 3455 | 11905 | |
| | *P* | | | | 0.0006 | 0.0354 | 0.1086 | 0.3125 | 0.0001 | - | 0.0192 | 0.0083 | 0.0015 | |
| | LSD (0.05) | | | | <1 | 1.2 | 1.2 | 0.4 | 234 | - | 0.6 | 181 | 359 | |

| Trt No. | Treatment Name | Rate | Rate Unit | Growth Stage | Crop Name | Description | Part Rated | Rating Date | Rating Type | Rating Unit | Sample Size, Unit | Collection Basis, Unit | Crop Stage Majority | Crop Stage Scale |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Rice | Rice | Rice | Rice | Rice | Rice | Rice | Rice | Rice | Rice |
| | | | | | | 90 lb N all trt | | | | | | | | |
| | | | | | | | | 11/7/2011 | 11/7/2011 | | | | | |
| | | | | | | Moist | Yield | | | Total Yield | | | | |
| | | | | | | % | lb/A | | | lb/A | | | | |
| | | | | | | | | | | | 3 FT | | | |
| | | | | | | | | | | | 1 ROW | | | |
| | | | | | | | | | | | Main | Main | Main | Main |
| | | | | | | | | | | | 50% HD | 50% Head | 50% Head | 50% Head |
| | **Table of N Source Means** | | | | | | | | | | | | | |
| 1 | Urea | | | | 15.2 | 3502 | 11910 | | | | 197 | 1.02 | 38.1 | 97 |
| 2 | Agrotain | | | | 15.6 | 3301 | 12010 | | | | 210 | 1.12 | 38.5 | 116 |
| 3 | Arborite | | | | 15.6 | 3330 | 11994 | | | | 206 | 1.10 | 38.5 | 113 |
| 4 | N-Zone | | | | 15.6 | 3461 | 11655 | | | | 196 | 1.03 | 38.5 | 99 |
| | *P* | | | | 0.0054 | 0.1232 | 0.3685 | | | | 0.1678 | 0.0342 | 0.2164 | 0.0215 |
| | LSD (0.05) | | | | 0.20 | 198 | 483 | | | | 15 | 0.08 | 0.5 | 13 |
| | **Table of N Rate Means** | | | | | | | | | | | | | |
| 1 | 60 lb N/A | 60 | lb ai/a | PF | 15.2 | 3546 | 11393 | | | | 179 | 0.95 | 38.4 | 83 |
| 2 | 120 lb N/A | 120 | lb ai/a | PF | 15.8 | 3251 | 12391 | | | | 226 | 1.18 | 38.4 | 130 |
| | *P* | | | | 0.0250 | 0.1031 | 0.0203 | | | | 0.0042 | 0.0072 | 0.7845 | 0.0002 |
| | LSD (0.05) | | | | 0.5 | 405 | 704 | | | | 19 | 0.11 | 0.5 | 7 |
| | **Table of N Time of Application Means** | | | | | | | | | | | | | |
| 1 | 10 DPF | | | | 15.1 | 3543 | 11386 | | | | 199 | 1.03 | 38.6 | 101 |
| 2 | 5 DPF | | | | 16.0 | 3197 | 12386 | | | | 210 | 1.17 | 38.3 | 120 |
| 3 | 1 DPF | | | | 15.4 | 3455 | 11905 | | | | 197 | 1.01 | 38.2 | 96 |
| | *P* | | | | 0.0192 | 0.0083 | 0.0015 | | | | 0.2978 | 0.0019 | 0.2776 | 0.0019 |
| | LSD (0.05) | | | | 0.6 | 181 | 359 | | | | 19 | 0.07 | 0.5 | 10 |

**Table 2. Table of treatment means from the factorial analysis of 2-way interactions.**

**LSU AgCenter, Rice Research Station**

**Evaluation of N source, N rate and N application timing on CL151 rice yield and volaitilization loss.**

Trial ID: 11-CM-18 Protocol ID: Weyerhaeuser1
Location: RRS-Main Study Director: MS, UA, and LSU
Project ID: Investigator: Dustin Harrell
Sponsor Contact: Weyerhaeuser

| Crop Name | | | | Rice | Rice | Rice | Rice | Rice | Rice | Rice | Rice | Rice | Rice | Rice | Rice | Rice |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Description | | | | | Tip of panicle | | | | | | 90 lb N all trt | | Tissue | Tissue | Tissue | N Uptake |
| Part Rated | | | | | | | | | | | | | Abvgrd - | Abvgrd - | Abvgrd - | total - |
| Rating Date | | | | | 7/22/2011 | 7/28/2011 | 7/28/2011 | 7/28/2011 | | 11/7/2011 | 11/7/2011 | | 6/21/2011 | 6/21/2011 | 6/21/2011 | 6/21/2011 |
| Rating Type | | | | 50% Head | Height | Moist | Test Wt. | Yield | 50% Head | Moist | Yield | Total Yield | Biomass | N | C | N |
| Rating Unit | | | | days | in | % | lb/bu | lb/A | days | % | lb/A | lb/A | grams | % | % | lb/A |
| Sample Size, Unit | | | | | | | | | | | | | 3 FT | | | |
| Collection Basis, Unit | | | | | | | | | | | | | 1 ROW | | | |
| Crop Stage Majority | | | | Main | Main | Main | Main | Main | Ratoon | Ratoon | Ratoon | MC+RC | Main | Main | Main | Main |
| Crop Stage Scale | | | | | | | | | | | | | 50% HD | 50% Head | 50% Head | 50% Head |
| Trt No. | Treatment Name | Rate | Rate Unit | Growth Stage | | | | | | | | | | | | |
| **Table of N-Source and N-Rate Interaction** | | | | | | | | | | | | | | | | |
| 1 | Urea | | | | 97 | 34.4 | 18.2 | 47.25 | 7950 | 54 | 14.9 | 3625 | 11575 | 179 | 0.98 | 38.4 | 84 |
| 1 | 60 lb N/A | 60 | lb ai/a | PF | | | | | | | | | | | | |
| 2 | Agrotain | | | | 97 | 34.2 | 17.8 | 47.48 | 8173 | 54 | 15.3 | 3431 | 11603 | 187 | 1.00 | 38.4 | 91 |
| 1 | 60 lb N/A | 60 | lb ai/a | PF | | | | | | | | | | | | |
| 3 | Arborite | | | | 97 | 34.3 | 19.1 | 46.96 | 7613 | 54 | 15.3 | 3536 | 11149 | 175 | 0.88 | 38.6 | 74 |
| 1 | 60 lb N/A | 60 | lb ai/a | PF | | | | | | | | | | | | |
| 4 | N-Zone | | | | 97 | 33.5 | 17.4 | 47.55 | 7653 | 54 | 15.2 | 3592 | 11245 | 176 | 0.95 | 38.3 | 81 |
| 1 | 60 lb N/A | 60 | lb ai/a | PF | | | | | | | | | | | | |
| 1 | Urea | | | | 98 | 36.2 | 18.8 | 47.16 | 8866 | 54 | 15.5 | 3378 | 12244 | 216 | 1.05 | 37.8 | 110 |
| 2 | 120 lb N/A | 120 | lb ai/a | PF | | | | | | | | | | | | |
| 2 | Agrotain | | | | 99 | 37.4 | 18.9 | 47.19 | 9246 | 54 | 15.9 | 3171 | 12417 | 233 | 1.25 | 38.5 | 140 |
| 2 | 120 lb N/A | 120 | lb ai/a | PF | | | | | | | | | | | | |
| 3 | Arborite | | | | 99 | 37.7 | 17.7 | 47.54 | 9716 | 54 | 16.0 | 3123 | 12839 | 238 | 1.32 | 38.4 | 151 |
| 2 | 120 lb N/A | 120 | lb ai/a | PF | | | | | | | | | | | | |
| 4 | N-Zone | | | | 98 | 35.7 | 20.1 | 46.72 | 8735 | 54 | 16.0 | 3330 | 12065 | 216 | 1.11 | 38.7 | 117 |
| 2 | 120 lb N/A | 120 | lb ai/a | PF | | | | | | | | | | | | |
| | *P* | | | | 0.1284 | 0.4508 | 0.0862 | 0.118 | 0.1373 | - | 0.9745 | 0.6693 | 0.2127 | 0.5260 | 0.0005 | 0.2083 | 0.0133 |
| | LSD (0.05) | | | | 1 | 1.8 | 2.2 | 0.82 | 799 | - | 0.9 | 242 | 782 | 29 | 0.09 | 0.7 | 20 |
| **Table of N-Source and Time of Application Interaction** | | | | | | | | | | | | | | | | | |
| 1 | Urea | | | | 96 | 33.0 | 17.6 | 47.47 | 7217 | 54 | 14.5 | 3699 | 10915 | 177 | 0.92 | 38.5 | 78 |
| 1 | 10 DPF | | | | | | | | | | | | | | | | |
| 2 | Agrotain | | | | 98 | 35.4 | 18.1 | 47.35 | 8640 | 54 | 15.5 | 3539 | 12179 | 232 | 1.21 | 38.6 | 137 |
| 1 | 10 DPF | | | | | | | | | | | | | | | | |
| 3 | Arborite | | | | 98 | 36.9 | 18.2 | 47.25 | 8481 | 54 | 15.4 | 3455 | 11936 | 218 | 1.09 | 38.7 | 118 |
| 1 | 10 DPF | | | | | | | | | | | | | | | | |
| 4 | N-Zone | | | | 96 | 33.1 | 17.5 | 47.46 | 7035 | 54 | 14.9 | 3478 | 10512 | 171 | 0.88 | 38.6 | 73 |
| 1 | 10 DPF | | | | | | | | | | | | | | | | |
| 1 | Urea | | | | 98 | 36.8 | 19.3 | 47.00 | 9210 | 54 | 15.8 | 3327 | 12536 | 203 | 1.09 | 38.2 | 108 |
| 2 | 5 DPF | | | | | | | | | | | | | | | | |
| 2 | Agrotain | | | | 98 | 36.6 | 18.9 | 47.26 | 9337 | 54 | 16.3 | 2943 | 12279 | 210 | 1.20 | 38.5 | 123 |
| 2 | 5 DPF | | | | | | | | | | | | | | | | |
| 3 | Arborite | | | | 98 | 36.5 | 19.5 | 46.98 | 9105 | 54 | 15.6 | 3166 | 12271 | 213 | 1.22 | 38.1 | 131 |
| 2 | 5 DPF | | | | | | | | | | | | | | | | |
| 4 | N-Zone | | | | 98 | 35.4 | 19.0 | 47.07 | 9104 | 54 | 16.3 | 3352 | 12456 | 213 | 1.16 | 38.6 | 121 |
| 2 | 5 DPF | | | | | | | | | | | | | | | | |
| 1 | Urea | | | | 98 | 36.1 | 18.8 | 47.14 | 8797 | 54 | 15.4 | 3480 | 12277 | 212 | 1.03 | 37.5 | 104 |
| 3 | 1 DPF | | | | | | | | | | | | | | | | |
| 2 | Agrotain | | | | 97 | 35.4 | 17.9 | 47.39 | 8151 | 54 | 14.9 | 3420 | 11572 | 188 | 0.96 | 38.3 | 88 |
| 3 | 1 DPF | | | | | | | | | | | | | | | | |
| 3 | Arborite | | | | 98 | 34.6 | 17.5 | 47.51 | 8408 | 54 | 15.9 | 3367 | 11775 | 187 | 0.99 | 38.8 | 90 |
| 3 | 1 DPF | | | | | | | | | | | | | | | | |
| 4 | N-Zone | | | | 98 | 35.3 | 19.7 | 46.87 | 8443 | 54 | 15.5 | 3553 | 11996 | 202 | 1.04 | 38.3 | 102 |
| 3 | 1 DPF | | | | | | | | | | | | | | | | |
| | *P* | | | | 0.0007 | 0.0003 | 0.4567 | 0.6996 | 0.0016 | - | 0.0756 | 0.1507 | 0.0006 | 0.0011 | 0.0091 | 0.4741 | 0.0008 |
| | LSD (0.05) | | | | 1 | 1.3 | 2.1 | 0.77 | 677 | - | 0.9 | 246 | 654 | 25 | 0.14 | 0.9 | 23 |
| **Table of N-Rate and Time of Application Interaction** | | | | | | | | | | | | | | | | | |
| 1 | 60 lb N/A | 60 | lb ai/a | PF | 96 | 33.3 | 17.4 | 47.50 | 7526 | 54 | 14.9 | 3658 | 11184 | 181 | 0.96 | 38.6 | 85 |
| 1 | 10 DPF | | | | | | | | | | | | | | | | |
| 2 | 120 lb N/A | 120 | lb ai/a | PF | 98 | 35.9 | 18.3 | 47.27 | 8161 | 54 | 15.2 | 3427 | 11588 | 218 | 1.09 | 38.6 | 118 |
| 1 | 10 DPF | | | | | | | | | | | | | | | | |
| 1 | 60 lb N/A | 60 | lb ai/a | PF | 97 | 34.9 | 19.2 | 46.99 | 8414 | 54 | 15.6 | 3336 | 11751 | 184 | 0.96 | 38.3 | 85 |
| 2 | 5 DPF | | | | | | | | | | | | | | | | |
| 2 | 120 lb N/A | 120 | lb ai/a | PF | 99 | 37.8 | 19.1 | 47.16 | 9963 | 54 | 16.4 | 3057 | 13021 | 236 | 1.37 | 38.4 | 156 |
| 2 | 5 DPF | | | | | | | | | | | | | | | | |
| 1 | 60 lb N/A | 60 | lb ai/a | PF | 97 | 34.2 | 17.7 | 47.43 | 7602 | 54 | 15.0 | 3643 | 11244 | 172 | 0.93 | 38.4 | 78 |
| 3 | 1 DPF | | | | | | | | | | | | | | | | |
| 2 | 120 lb N/A | 120 | lb ai/a | PF | 98 | 36.5 | 19.2 | 47.02 | 9298 | 54 | 15.9 | 3268 | 12566 | 223 | 1.08 | 38.1 | 115 |
| 3 | 1 DPF | | | | | | | | | | | | | | | | |
| | *P* | | | | 0.1725 | 0.7848 | 0.1249 | 0.1155 | 0.0882 | - | 0.5614 | 0.502 | 0.0856 | 0.3801 | 0.011 | 0.4658 | 0.4555 |
| | LSD (0.05) | | | | 1 | 1.4 | 1.1 | 0.41 | 727 | - | 0.9 | 203 | 647 | 19 | 0.12 | 0.7 | 46 |

**Table 3. Table of treatment means from the factorial analysis of 3-way interaction.**

**LSU AgCenter, Rice Research Station**

**Evaluation of N source, N rate and N application timing on CL151 rice yield and volaitilization loss.**

Trial ID: 11-CM-18 Protocol ID: Weyerhaeuser1
Location: RRS-Main Study Director: MS, UA, and LSU
Project ID: Investigator: Dustin Harrell
Sponsor Contact: Weyerhaeuser

| Crop Name | | | | Rice | Rice | Rice | Rice | Rice | Rice | Rice | Rice | Rice | Rice | Rice | Rice | Rice |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Description | | | | | Tip of panicle | | | | | | 90 lb N all trt | | | Tissue | Tissue | Tissue | N Uptake |
| Part Rated | | | | | | | | | | | | | | Abvgrd - | Abvgrd - | Abvgrd - | total - |
| Rating Date | | | | | 7/22/2011 | 7/28/2011 | 7/28/2011 | 7/28/2011 | | 11/7/2011 | 11/7/2011 | | | 6/21/2011 | 6/21/2011 | 6/21/2011 | 6/21/2011 |
| Rating Type | | | | 50% Head | Height | Moist | Test Wt. | Yield | 50% Head | Moist | Yield | Total Yield | | Biomass | N | C | N |
| Rating Unit | | | | days | in | % | lb/bu | lb/A | days | % | lb/A | lb/A | | grams | % | % | lb/A |
| Sample Size, Unit | | | | | | | | | | | | | | 3 FT | | | |
| Collection Basis, Unit | | | | | | | | | | | | | | 1 ROW | | | |
| Crop Stage Majority | | | | Main | Main | Main | Main | Main | Ratoon | Ratoon | Ratoon | MC+RC | | Main | Main | Main | Main |
| Crop Stage Scale | | | | | | | | | | | | | | 50% HD | 50% Head | 50% Head | 50% Head |
| Trt No. | Treatment Name | Rate | Rate Unit | Growth Stage | | | | | | | | | | | | | |
| **Table of N-Source x N-Rate x Time of Application Interaction** | | | | | | | | | | | | | | | | | |
| 1 | Urea | | | | 96 | 31.8 | 16.8 | 47.7 | 7117 | 54 | 14.3 | 3697 | 10814 | 169 | 0.89 | 38.6 | 72 |
| 1 | 60 lb N/A | 60 | lb ai/a | PF | | | | | | | | | | | | | |
| 1 | 10 DPF | | | | | | | | | | | | | | | | |
| 2 | Agrotain | | | | 97 | 33.5 | 17.8 | 47.4 | 8187 | 54 | 15.1 | 3811 | 11998 | 209 | 1.14 | 38.6 | 117 |
| 1 | 60 lb N/A | 60 | lb ai/a | PF | | | | | | | | | | | | | |
| 1 | 10 DPF | | | | | | | | | | | | | | | | |
| 3 | Arborite | | | | 97 | 35.3 | 17.9 | 47.3 | 7543 | 54 | 15.5 | 3625 | 11167 | 183 | 0.90 | 38.9 | 79 |
| 1 | 60 lb N/A | 60 | lb ai/a | PF | | | | | | | | | | | | | |
| 1 | 10 DPF | | | | | | | | | | | | | | | | |
| 4 | N-Zone | | | | 96 | 32.5 | 17.2 | 47.6 | 7256 | 54 | 14.8 | 3501 | 10757 | 162 | 0.93 | 38.4 | 73 |
| 1 | 60 lb N/A | 60 | lb ai/a | PF | | | | | | | | | | | | | |
| 1 | 10 DPF | | | | | | | | | | | | | | | | |
| 1 | Urea | | | | 96 | 34.3 | 18.3 | 47.3 | 7317 | 54 | 14.7 | 3700 | 11017 | 185 | 0.95 | 38.4 | 85 |
| 2 | 120 lb N/A | 120 | lb ai/a | PF | | | | | | | | | | | | | |
| 1 | 10 DPF | | | | | | | | | | | | | | | | |
| 2 | Agrotain | | | | 99 | 37.3 | 18.5 | 47.3 | 9093 | 54 | 15.9 | 3268 | 12361 | 254 | 1.29 | 38.7 | 157 |
| 2 | 120 lb N/A | 120 | lb ai/a | PF | | | | | | | | | | | | | |
| 1 | 10 DPF | | | | | | | | | | | | | | | | |
| 3 | Arborite | | | | 99 | 38.5 | 18.5 | 47.2 | 9419 | 54 | 15.2 | 3285 | 12704 | 253 | 1.29 | 38.4 | 156 |
| 2 | 120 lb N/A | 120 | lb ai/a | PF | | | | | | | | | | | | | |
| 1 | 10 DPF | | | | | | | | | | | | | | | | |
| 4 | N-Zone | | | | 97 | 33.8 | 17.9 | 47.3 | 6814 | 54 | 15.0 | 3454 | 10268 | 181 | 0.84 | 38.9 | 73 |
| 2 | 120 lb N/A | 120 | lb ai/a | PF | | | | | | | | | | | | | |
| 1 | 10 DPF | | | | | | | | | | | | | | | | |
| 1 | Urea | | | | 97 | 36.3 | 18.4 | 47.2 | 8735 | 54 | 15.8 | 3463 | 12199 | 175 | 1.01 | 38.4 | 85 |
| 1 | 60 lb N/A | 60 | lb ai/a | PF | | | | | | | | | | | | | |
| 2 | 5 DPF | | | | | | | | | | | | | | | | |
| 2 | Agrotain | | | | 97 | 35.5 | 19.0 | 47.2 | 8933 | 54 | 15.8 | 3002 | 11935 | 194 | 0.91 | 38.2 | 85 |
| 1 | 60 lb N/A | 60 | lb ai/a | PF | | | | | | | | | | | | | |
| 2 | 5 DPF | | | | | | | | | | | | | | | | |
| 3 | Arborite | | | | 98 | 34.3 | 21.8 | 46.2 | 7776 | 54 | 15.3 | 3353 | 11129 | 176 | 0.92 | 38.0 | 78 |
| 1 | 60 lb N/A | 60 | lb ai/a | PF | | | | | | | | | | | | | |
| 2 | 5 DPF | | | | | | | | | | | | | | | | |
| 4 | N-Zone | | | | 97 | 33.5 | 17.6 | 47.4 | 8213 | 54 | 15.6 | 3527 | 11740 | 191 | 1.00 | 38.4 | 92 |
| 1 | 60 lb N/A | 60 | lb ai/a | PF | | | | | | | | | | | | | |
| 2 | 5 DPF | | | | | | | | | | | | | | | | |
| 1 | Urea | | | | 99 | 37.3 | 20.1 | 46.8 | 9684 | 54 | 15.8 | 3190 | 12874 | 231 | 1.18 | 38.0 | 131 |
| 2 | 120 lb N/A | 120 | lb ai/a | PF | | | | | | | | | | | | | |
| 2 | 5 DPF | | | | | | | | | | | | | | | | |
| 2 | Agrotain | | | | 99 | 37.8 | 18.8 | 47.3 | 9741 | 54 | 16.8 | 2883 | 12624 | 226 | 1.48 | 38.8 | 161 |
| 2 | 120 lb N/A | 120 | lb ai/a | PF | | | | | | | | | | | | | |
| 2 | 5 DPF | | | | | | | | | | | | | | | | |
| 3 | Arborite | | | | 99 | 38.8 | 17.2 | 47.8 | 10434 | 54 | 15.9 | 2980 | 13413 | 250 | 1.51 | 38.2 | 184 |
| 2 | 120 lb N/A | 120 | lb ai/a | PF | | | | | | | | | | | | | |
| 2 | 5 DPF | | | | | | | | | | | | | | | | |
| 4 | N-Zone | | | | 99 | 37.3 | 20.5 | 46.7 | 9994 | 54 | 17.1 | 3177 | 13171 | 236 | 1.32 | 38.7 | 150 |
| 2 | 120 lb N/A | 120 | lb ai/a | PF | | | | | | | | | | | | | |
| 2 | 5 DPF | | | | | | | | | | | | | | | | |
| 1 | Urea | | | | 97 | 35.3 | 19.4 | 46.9 | 7998 | 54 | 14.8 | 3716 | 11713 | 193 | 1.03 | 38.0 | 96 |
| 1 | 60 lb N/A | 60 | lb ai/a | PF | | | | | | | | | | | | | |
| 3 | 1 DPF | | | | | | | | | | | | | | | | |
| 2 | Agrotain | | | | 97 | 33.5 | 16.6 | 47.8 | 7398 | 54 | 15.0 | 3479 | 10877 | 156 | 0.95 | 38.4 | 72 |
| 1 | 60 lb N/A | 60 | lb ai/a | PF | | | | | | | | | | | | | |
| 3 | 1 DPF | | | | | | | | | | | | | | | | |
| 3 | Arborite | | | | 98 | 33.5 | 17.5 | 47.4 | 7521 | 54 | 15.1 | 3629 | 11150 | 165 | 0.83 | 38.9 | 66 |
| 1 | 60 lb N/A | 60 | lb ai/a | PF | | | | | | | | | | | | | |
| 3 | 1 DPF | | | | | | | | | | | | | | | | |
| 4 | N-Zone | | | | 98 | 34.5 | 17.3 | 47.6 | 7490 | 54 | 15.1 | 3747 | 11237 | 173 | 0.92 | 38.2 | 77 |
| 1 | 60 lb N/A | 60 | lb ai/a | PF | | | | | | | | | | | | | |
| 3 | 1 DPF | | | | | | | | | | | | | | | | |
| 1 | Urea | | | | 99 | 37.0 | 18.1 | 47.4 | 9597 | 54 | 16.0 | 3245 | 12841 | 232 | 1.03 | 37.0 | 113 |
| 2 | 120 lb N/A | 120 | lb ai/a | PF | | | | | | | | | | | | | |
| 3 | 1 DPF | | | | | | | | | | | | | | | | |
| 2 | Agrotain | | | | 98 | 37.3 | 19.3 | 47.0 | 8905 | 54 | 14.9 | 3362 | 12267 | 219 | 0.98 | 38.1 | 104 |
| 2 | 120 lb N/A | 120 | lb ai/a | PF | | | | | | | | | | | | | |
| 3 | 1 DPF | | | | | | | | | | | | | | | | |
| 3 | Arborite | | | | 98 | 35.8 | 17.4 | 47.6 | 9295 | 54 | 16.8 | 3106 | 12401 | 210 | 1.15 | 38.6 | 115 |
| 2 | 120 lb N/A | 120 | lb ai/a | PF | | | | | | | | | | | | | |
| 3 | 1 DPF | | | | | | | | | | | | | | | | |
| 4 | N-Zone | | | | 99 | 36.0 | 22.0 | 46.2 | 9395 | 54 | 15.8 | 3359 | 12754 | 231 | 1.16 | 38.5 | 128 |
| 2 | 120 lb N/A | 120 | lb ai/a | PF | | | | | | | | | | | | | |
| 3 | 1 DPF | | | | | | | | | | | | | | | | |
| | *P* | | | | 0.0021 | 0.3275 | 0.0262 | 0.0375 | 0.2561 | - | 0.3502 | 0.1414 | 0.4139 | 0.6314 | 0.3162 | 0.8651 | 0.3432 |
| | LSD (0.05) | | | | 1 | 2.2 | 2.6 | 0.84 | 1150 | - | 1.4 | 332 | 1168 | 45 | 0.25 | 1 | 32 |

**Table 4. ANOVA means table for all treatments including untreated control which did not receive N.**

**LSU AgCenter, Rice Research Station**

**Evaluation of N source, N rate and N application timing on CL151 rice yield and volaitilization loss.**

Trial ID: 11-CM-18 Protocol ID: Weyerhaeuser1
Location: RRS-Main Study Director: MS, UA, and LSU
Project ID: Investigator: Dustin Harrell
Sponsor Contact: Weyerhaeuser

| Crop Name | | | | Rice | Rice | Rice | Rice | Rice | Rice | Rice | Rice | Rice | Rice | Rice | Rice | Rice |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Description | | | | | Tip of paniicle | | | | | | 90 lb N all trt | | Tissue | Tissue | Tissue | N Uptake |
| Part Rated | | | | | | | | | | | | | | Abvgrd - | Abvgrd - | total - |
| Rating Date | | | | | 7/22/2011 | 7/28/2011 | 7/28/2011 | 7/28/2011 | | 11/7/2011 | 11/7/2011 | | 6/21/2011 | 6/21/2011 | 6/21/2011 | 6/21/2011 |
| Rating Type | | | | 50% Head | Height | Moist | Test Wt. | Yield | 50% Head | Moist | Yield | Total Yield | Biomass | N | C | N |
| Rating Unit | | | | days | in | % | lb/bu | lb/A | days | % | lb/A | lb/A | grams | % | % | lb/A |
| Sample Size, Unit | | | | | | | | | | | | | 3 FT | | | |
| Collection Basis, Unit | | | | | | | | | | | | | 1 ROW | | | |
| Crop Stage Majority | | | | Main | Main | Main | Main | Main | Ratoon | Ratoon | Ratoon | MC+RC | Main | Main | Main | Main |
| Crop Stage Scale | | | | | | | | | | | | | 50% HD | 50% Head | 50% Head | 50% Head |
| Trt No. | Treatment Name | Rate | Rate Unit | Growth Stage | | | | | | | | | | | | |
| 1 | Urea 60 lb N/A 10 DPF | 60 | lb ai/a | PF | 96 i | 31.8 ij | 16.8 ef | 47.7 a | 7117 hi | 54 a | 14.3 g | 3697 abc | 10814 ij | 169 h | 0.89 ghi | 38.6 a | 72 ijk |
| 2 | Urea 60 lb N/A 5 DPF | 60 | lb ai/a | PF | 97 e-h | 36.3 b-e | 18.4 c-f | 47.2 a | 8735 c-f | 54 a | 15.8 b-e | 3463 b-f | 12199 b-f | 175 gh | 1.01 d-i | 38.4 a | 85 g-j |
| 3 | Urea 60 lb N/A 1 DPF | 60 | lb ai/a | PF | 97 ghi | 35.3 d-g | 19.4 a-e | 46.9 a | 7998 e-h | 54 a | 14.8 efg | 3716 abc | 11713 d-i | 193 d-h | 1.03 d-g | 38.0 a | 96 f-i |
| 4 | Urea 120 lb N/A 10 DPF | 120 | lb ai/a | PF | 96 i | 34.3 e-h | 18.3 c-f | 47.3 a | 7317 ghi | 54 a | 14.7 efg | 3700 abc | 11017 g-j | 185 fgh | 0.95 f-i | 38.4 a | 85 g-j |
| 5 | Urea 120 lb N/A 5 DPF | 120 | lb ai/a | PF | 99 ab | 37.3 a-d | 20.1 a-d | 46.8 a | 9684 abc | 54 a | 15.8 b-e | 3190 e-h | 12874 abc | 231 a-d | 1.18 cd | 38.0 a | 131 cde |
| 6 | Urea 120 lb N/A 1 DPF | 120 | lb ai/a | PF | 99 a-d | 37.0 a-d | 18.1 c-f | 47.4 a | 9597 abc | 54 a | 16.0 a-d | 3245 d-h | 12841 abc | 232 abc | 1.03 d-h | 37.0 a | 113 efg |
| 7 | Agrotain 60 lb N/A 10 DPF | 60 | lb ai/a | PF | 97 ghi | 33.5 g-j | 17.8 c-f | 47.4 a | 8187 d-g | 54 a | 15.1 d-g | 3811 ab | 11998 c-g | 209 b-g | 1.14 c-f | 38.6 a | 117 ef |
| 8 | Agrotain 60 lb N/A 5 DPF | 60 | lb ai/a | PF | 97 ghi | 35.5 c-g | 19.0 b-f | 47.2 a | 8933 cde | 54 a | 15.8 b-e | 3002 gh | 11935 c-h | 194 c-h | 0.91 ghi | 38.2 a | 85 g-j |
| 9 | Agrotain 60 lb N/A 1 DPF | 60 | lb ai/a | PF | 97 ghi | 33.5 g-j | 16.6 f | 47.8 a | 7398 ghi | 54 a | 15.0 d-g | 3479 b-f | 10877 hij | 156 hi | 0.95 ghi | 38.4 a | 72 ijk |
| 10 | Agrotain 120 lb N/A 10 DPF | 120 | lb ai/a | PF | 99 a | 37.3 a-d | 18.5 c-f | 47.3 a | 9093 bcd | 54 a | 15.9 a-e | 3268 d-h | 12361 a-d | 254 a | 1.29 c | 38.7 a | 157 abc |
| 11 | Agrotain 120 lb N/A 5 DPF | 120 | lb ai/a | PF | 99 a | 37.8 abc | 18.8 c-f | 47.3 a | 9741 abc | 54 a | 16.8 ab | 2883 h | 12624 a-d | 226 a-e | 1.48 ab | 38.8 a | 161 ab |
| 12 | Agrotain 120 lb N/A 1 DPF | 120 | lb ai/a | PF | 98 b-f | 37.3 a-d | 19.3 a-f | 47.0 a | 8905 cde | 54 a | 14.9 d-g | 3362 c-g | 12267 b-e | 219 a-f | 0.98 e-i | 38.1 a | 104 e-h |
| 13 | Arborite 60 lb N/A 10 DPF | 60 | lb ai/a | PF | 97 f-i | 35.3 d-g | 17.9 c-f | 47.3 a | 7543 ghi | 54 a | 15.5 def | 3625 a-d | 11167 f-j | 183 fgh | 0.90 ghi | 38.9 a | 79 hij |
| 14 | Arborite 60 lb N/A 5 DPF | 60 | lb ai/a | PF | 98 c-f | 34.3 e-h | 21.8 ab | 46.2 a | 7776 f-i | 54 a | 15.3 d-g | 3353 c-g | 11129 f-j | 176 gh | 0.92 ghi | 38.0 a | 78 h-k |
| 15 | Arborite 60 lb N/A 1 DPF | 60 | lb ai/a | PF | 98 d-g | 33.5 g-j | 17.5 def | 47.4 a | 7521 ghi | 54 a | 15.1 d-g | 3629 a-d | 11150 f-j | 165 h | 0.83 i | 38.9 a | 66 jk |
| 16 | Arborite 120 lb N/A 10 DPF | 120 | lb ai/a | PF | 99 abc | 38.5 ab | 18.5 c-f | 47.2 a | 9419 bc | 54 a | 15.2 d-g | 3285 d-g | 12704 a-d | 253 a | 1.29 c | 38.4 a | 156 a-d |
| 17 | Arborite 120 lb N/A 5 DPF | 120 | lb ai/a | PF | 99 ab | 38.8 a | 17.2 ef | 47.8 a | 10434 a | 54 a | 15.9 a-e | 2980 gh | 13413 a | 250 a | 1.51 a | 38.2 a | 184 a |
| 18 | Arborite 120 lb N/A 1 DPF | 120 | lb ai/a | PF | 98 a-e | 35.8 c-g | 17.4 def | 47.6 a | 9295 bc | 54 a | 16.8 abc | 3106 fgh | 12401 a-d | 210 b-g | 1.15 cde | 38.6 a | 115 ef |
| 19 | N-Zone 60 lb N/A 10 DPF | 60 | lb ai/a | PF | 96 hi | 32.5 hij | 17.2 ef | 47.6 a | 7256 ghi | 54 a | 14.8 efg | 3501 b-f | 10757 ij | 162 hi | 0.93 ghi | 38.4 a | 73 ijk |
| 20 | N-Zone 60 lb N/A 5 DPF | 60 | lb ai/a | PF | 97 f-i | 33.5 g-j | 17.6 def | 47.4 a | 8213 d-g | 54 a | 15.6 cde | 3527 b-e | 11740 d-i | 191 e-h | 1.00 d-i | 38.4 a | 92 f-j |
| 21 | N-Zone 60 lb N/A 1 DPF | 60 | lb ai/a | PF | 98 d-g | 34.5 e-h | 17.3 def | 47.6 a | 7490 ghi | 54 a | 15.1 d-g | 3747 abc | 11237 e-j | 173 gh | 0.92 ghi | 38.2 a | 77 h-k |
| 22 | N-Zone 120 lb N/A 10 DPF | 120 | lb ai/a | PF | 97 ghi | 33.8 f-i | 17.9 c-f | 47.3 a | 6814 i | 54 a | 15.0 d-g | 3454 b-f | 10268 jk | 181 gh | 0.84 hi | 38.9 a | 73 ijk |
| 23 | N-Zone 120 lb N/A 5 DPF | 120 | lb ai/a | PF | 99 a | 37.3 a-d | 20.5 abc | 46.7 a | 9994 ab | 54 a | 17.1 a | 3177 e-h | 13171 ab | 236 ab | 1.32 bc | 38.7 a | 150 bcd |
| 24 | N-Zone 120 lb N/A 1 DPF | 120 | lb ai/a | PF | 99 ab | 36.0 c-f | 22.0 a | 46.2 a | 9395 bc | 54 a | 15.8 b-e | 3359 c-g | 12754 a-d | 231 a-d | 1.16 cde | 38.5 a | 128 de |
| 25 | 0 lb N/A | 0 | lb ai/a | PF | 96 i | 31.3 j | 18.1 c-f | 47.3 a | 5442 j | 54 a | 14.3 fg | 3968 a | 9410 k | 125 i | 0.83 i | 38.4 a | 50 k |
| LSD (P=.05) | | | | | 1.1 | 2.3 | 2.8 | 1.0 | 1011 | 0 | 1.2 | 396 | 1073 | 39 | 0.19 | 1.09 | 29 |
| Standard Deviation | | | | | 0.7 | 1.6 | 2.0 | 0.7 | 715 | 0 | 0.9 | 280 | 759 | 27 | 0.14 | 0.77 | 21 |
| CV | | | | | 0.77 | 4.6 | 10.9 | 1.5 | 9 | 0 | 5.5 | 8 | 6 | 14 | 12.86 | 2.01 | 20 |
| Replicate F | | | | | 10.455 | 2.889 | 1.892 | 1.619 | 15.858 | 0 | 7.407 | 28.683 | 32.695 | 5.241 | 4.739 | 3.970 | 6.627 |
| Replicate Prob(F) | | | | | 0.0001 | 0.0413 | 0.1386 | 0.1924 | 0.0001 | 1 | 0.0002 | 0.0001 | 0.0001 | 0.0025 | 0.0045 | 0.0112 | 0.0005 |
| Treatment F | | | | | 9.850 | 6.674 | 1.972 | 1.521 | 11.373 | 0 | 2.931 | 3.968 | 6.776 | 6.252 | 8.292 | 1.071 | 11.992 |
| Treatment Prob(F) | | | | | 0.0001 | 0.0001 | 0.0145 | 0.0889 | 0.0001 | 1 | 0.0002 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.3971 | 0.0001 |

Means followed by same letter do not significantly differ (P=.05, LSD)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

**Evaluation N fertilizer source, rate, and time of application on rice yield and agronomics.**

**Experiment number**..... : (11-CM-18)

**Site and design**..... :
- **Location/Cooperator**..... : Rice Research Station (Crowley Main)
- **Tillage type**..... : Fall Stale
- **Experimental design**..... : Randomized complete block
- **Number of reps**..... : 4
- **Plot size**..... : 4.66 x 16 ft
- **Row width/rows per plot**..... : 8 in / 7

**Soil type**..... : Crowley silt loam
- **% organic matter**..... : 1.2
- **pH**..... : 7.1
- **Extractable nutrients** ppm .... : Ca-1,096; Cu-1.7; Mg-210; P-10; K-58; Na-85; S-7.7; Zn-4.4

**Crop/Variety**..... : Rice / CL151
- **Planting method/date** ..... : Drill seeded / March 15
- **Seeding rate/depth**..... : 33 seeds /$ft^2$ / .75 inch
- **Emergence date**..... : March 24
- **Harvest date** ..... : July 28
- **Ratoon harvest date**..... : November 7

**Seed treatment/cwt**..... : Dithane (fungicide)-114g
Release (gibberellic acid)-10g
Zinc Plus (10% Zn & 4.9% combined sulfur)-296 ml

**Fertilization** ..... : 240 lb/A 0-24-24-2.8, March 16
90 lb N/A 46-0-0, August 8

**Water management**..... :
- **Flush** ..... : March 23, April 7, April 15
- **Flood** ..... : April 29
- **Drain**..... : July 14
- **Ratoon flood** ..... : August 10
- **Ratoon drain**..... : October 14

**Pest management** ..... :
- **Herbicides**..... : 1.5 qt/A Glyphosate, March 2
  1 qt/A Glyphosate, March 21
  3 qt/A Propanil + .5 oz/A Permit + 1 oz/A Londax, April 6
  2 qt/A Rice Beaux + 2 qt/A Propanil + 1 oz/A Londax + .75 oz/A Permit, April 19
  19 oz/A Clincher, May 27
  1.5 qt/A Basagran, August 9
- **Insecticides** ..... : 0.137 lb ai/cwt Dermacor seed treatment
- **Fungicides**..... : 12 oz/A Quadris, June 18

## Treatment Application

**Application Description:**

| | A | B | C | D |
|---|---|---|---|---|
| **Date** ..... : | April 19 | April 24 | April 28 | |
| **Time of day** ..... : | 3:00 pm | 8:00 am | 2:00 pm | |
| **Application method**..... : | Broadcast | Broadcast | Broadcast | |
| **Application timing** ..... : | 10 dpf | 5 dpf | 1 dpf | |
| **Placement**..... : | soil | soil | soil | |
| **Air temperature** ..... : | 85$^{o}$ | 76$^{o}$ | 71$^{o}$ | |
| **Relative humidity** (%) ..... : | 56 | 80 | 37 | |
| **Wind** (mph/direction)..... : | 22/S | 10/SE | 13/N | |
| **Dew presence** (Y/N)..... : | N | N | N | |
| **Soil temperature**..... : | 78$^{o}$ | 75$^{o}$ | 72$^{o}$ | |
| **Soil moisture**..... : | good | dry | good | |
| **Cloud cover** (%)..... : | 10 | 80 | 0 | |
| **Applied by**..... : | H, L | H | L, F | |

**Application Equipment:**

| | | | |
|---|---|---|---|
| **Equipment** ..... : | Hand | Hand | Hand |
| **Operating pressure** ..... : | | | |
| **Nozzle type/size**..... : | | | |
| **Nozzle spacing/no.** ..... : | | | |
| **Boom height**..... : | | | |
| **Ground speed (mph)**..... : | | | |
| **Incorporation & depth** ..... : | | | |

**Crop Stage at Application:**

| | | | |
|---|---|---|---|
| **Height**..... : | 6 inch | 6 inch | 8 inch |
| **No. leaves/tillers**..... : | 4 leaf | 4 leaf | tillering |

**NOTES:**

4/26 - 3.35 inches of rain
6/21 - 50% heading tissue samples taken
9/20 - estimate of ratoon 50% heading