

# NITROGEN RATE AND TIMING EFFECTS ON WHEAT YIELD 2000-01

J. W. CHAPIN AND J. S. THOMAS  
DEPARTMENT OF ENTOMOLOGY  
CLEMSON UNIVERSITY

**Location:** Edisto Research and Education Center, Barnwell Co. SC, Field B-5 A

**Design:** RCB with six replicates; plot size 8 rows (8" spacing) x 35'

**Soil Type:** Varina sandy loam.

**Rotation:** 1999-2000 wheat

**Variety:** Coker 9835 planted 30 Nov 2000

**Seeding**

**Rate:** 24 seed / row foot (final stand counts taken 25 Jan =  $20.7 \pm 0.3$ /row ft)

**General**

**Fertility:** No pre-plant fertilizer based on soil test.

**Fungicide:** 7.7 oz. Quadris 2.08F was applied to the flag leaf 26 Mar.

**Herbicide:** None

**Insecticide:** 3.87 oz Warrior 1EC was applied 9 March (GS 31).

**Treatments:**

<b>1. 30 lb. N 15 Dec, 30 lb. N 18 Jan (GS 13), 30 lb. N 16 Feb (GS 23);</b>	<b>Total N 90 lb./acre</b>
<b>2. 30 lb. N 15 Dec, 60 lb. N 16 Feb (GS 23);</b>	<b>Total N 90 lb./acre</b>
<b>3. 30 lb. N 15 Dec, 30 lb. N 18 Jan (GS 13), 60 lb. N 16 Feb (GS 23);</b>	<b>Total N 120 lb./acre</b>
<b>4. 30 lb. N 15 Dec, 90 lb. N 16 Feb (GS 23);</b>	<b>Total N 120 lb./acre</b>

\* S-25 N was the nitrogen source for all applications.

**Methods:** The 15 Dec nitrogen, insecticide, and fungicide applications were made with a tractor-mounted, three-point-hitch sprayer delivering 20 gallons per acre (gpa) through Tee Jet 8003 flat fan nozzles at 35 psi. S-25 nitrogen was diluted with water such that only 30 lb. N / acre was applied. The Jan N was also diluted with water and applied with a tractor-mounted CO<sub>2</sub> pressurized sprayer through a shielded boom with Tee Jet 11003 (20 gpa @ 30 psi). In Feb, undiluted N was applied with the same CO<sub>2</sub> sprayer. The sprayer was calibrated to deliver 34 gpa at 1.0 mph for the high rate (90 lb/acre). Lower N rates were delivered by increasing tractor speed. Speed was monitored by radar and application rates were monitored, but not regulated by a Tee Jet 855 spray controller.

**Sampling:** Tillers counts were taken 15 Feb (GS 23) from six replicates of Jan split-N and 15 Dec N treatments by uprooting a one-foot section of row per plot and counting the tillers in the lab. Tillers were categorized as having 3 leaves or less than 3 leaves. Plants per foot were also recorded. Culm counts were taken 1 May by counting the number of headed culms from two, one meter samples per experimental unit. Plots were harvested with an Almaco plot combine. Test weight was taken by funneling a sub-sample of grain through a Seedburo No. 151 filling hopper and weighing one dry pint of grain on an electronic scale. Grain moisture content was measured with a Burrows DMC-700 moisture meter. All yields were adjusted to 13.5% moisture before analysis.

**Analysis:** ANOVA, using SAS PROC GLM. Fisher's protected LSD was used for mean separation ( $P=0.05$ ).

**Notes:** Three plots not within the experimental design which received only 30 lb. N 15 Dec were also harvested. Average yield from these plots was 75.0 bu/ac. The test area was deep-tilled with a Worksaver TerraMax prior to planting. This high yield indicates the presence of residual N made available by breaking the hardpan.

From two weeks after January N treatment until harvest, the split-N treatments "looked better". Split- N plots were green, with a marked increase in biomass, and appeared to have a higher head count. Most agents who estimated yield in these demonstration plots felt that split-N treatments would result in a gain of 5-10 bu/ac. The results indicate that on late-planted wheat in an exceptionally cold growing season, split-N would be at best only marginally profitable where plant stands are adequate. The 120 lb. N rate suppressed yield where significant residual N was available in the subsoil.

**Table 1. Effects of Nitrogen on tiller production at GS 23 (15 Feb), wheat yield, and test weight, Blackville, SC 2000-01.**

Treatment*	Main stems/m (/ft)	3-lf ** tillers/m (/ft)	< 3-lf tillers/m (/ft)	Total** tillers/m (/ft)	Total** tillers /plant	Culms /m (/ft)	Yield bu/ac	Test weight lb/bu
30-30-30	95.1a (29.0)	112.2 a (34.2)	194.5 a (59.3)	306.7a (93.5)	3.2 a	117 a (35.6)	91 a	58.0 a
30-0-60	90.9a (27.7)	96.8 b (29.5)	142.7 b (43.5)	239.4 b (73.0)	2.7 b	117 a (35.6)	87 b	57.7 ab
30-30-60	--	--	--	--	--	119 a (36.2)	87 b	57.3 b
30-0-90	--	--	--	--	--	115 a (35.0)	83 c	57.6 ab

\* S-25 N used as N source. Applications made 15 Dec (pre-emergence); 18 Jan (GS13); 16 Feb (GS 23).

\*\* includes main stem.

Means followed by the same letter are not significantly different, Fisher's protected LSD, ( $P=0.05$ )

Yield LSD ( $P=0.05$ ) = 3.0