

**Winter Wheat Response to Previous Crop  
and Timing of Nitrogen Fertilizer Applications  
Carrington Research Extension Center  
2008**

*Objectives:* Compare winter wheat response to 1) previous crop and 2) nitrogen (N) fertilizer application timing.

*Methods:* To compare winter wheat response to previous crop; ‘Jerry’ winter wheat seed was sown into 5-7 inch spring wheat stubble and 16-24 inch tall field pea regrowth on September 18, 2007 and into soybean stubble on October 23. The fertilizer treatments evaluated were: 1) untreated check, 2) 11-52-0 starter fertilizer, 3) fall applied 28-0-0, 4) 28-0-0 applied 50% in the fall and 50% in the spring, 5) spring applied 28-0-0, and 6) spring applied urea. The fall P<sub>2</sub>O<sub>5</sub> and N soil test results, legume credit, applied N for treatments 3-6, and total N are listed in Table 1. N fertilizer treatments were surface applied on October 25 and April 18, 2008 for the fall and spring timings. The 28-0-0 was applied with a CO<sub>2</sub> hand-boom sprayer with SJ3 streamjet nozzles. The urea was broadcast applied. The winter wheat was harvested August 5 (field pea and spring wheat previous crop trials) and August 19 (soybean previous crop trial).

**Table 1. Fall soil test results, legume credit, and applied and total nitrogen.**

| Previous Crop | Fall Soil Test                         |    | Legume                     |         | Total |
|---------------|--|----|----------------------------|---------|-------|
|               | P <sub>2</sub> O <sub>5</sub><br>(ppm) |    | Credit                     | Applied |       |
|               |  |    | ———— Nitrogen (lb /A) ———— |         |       |
| Field Pea     | 10                                     | 45 | 40                         | 45      | 130   |
| Soybean       | 5                                      | 19 | 40                         | 45      | 104   |
| Spring Wheat  | 8                                      | 65 | 0                          | 66      | 131   |

An excellent stand was established in the field pea regrowth and spring wheat stubble. In the soybean stubble, the planting could be considered dormant seeding since very few seeds actually emerged in the fall. Snow cover in the field pea, spring wheat and soybean residue was 2-4 inches, 3-6 inches, and 0-1 inch respectively when measured on January 15, 2008 (Figures 1-3). Heavy deer feeding occurred on the winter wheat in the field pea and spring wheat residue in early April. In the soybean residue, winter wheat plant development was delayed since germination occurred in the spring. On May 15 winter wheat was in the 4-5 leaf growth stage in the field pea and spring wheat residue while only in the 1-3 leaf growth stage in the soybean residue. Additional N did not increase grain yield in any of the previous crop trials when compared to the untreated check (Tables 2-4). The use of a starter fertilizer did increase grain yield in the spring wheat previous crop trial (Table 3).



**Table 2. Winter wheat response to field pea previous crop and fertilizer timing.**

| Treatment   | Timing          | Rate<br>product/a | # spikes<br>million/a | Plant<br>Height<br>inch | Plant<br>Lodge<br>0-9 | 1000<br>KWT<br>gram | Protein<br>% | Test<br>Weight<br>lb/bu | Grain<br>Yield<br>bu/a |      |
|-------------|-----------------|-------------------|-----------------------|-------------------------|-----------------------|---------------------|--------------|-------------------------|------------------------|------|
| 1           | Untreated Check |                   | 1.1                   | 33.3                    | 0                     | 35.6                | 12.0         | 59.4                    | 57.0                   |      |
| 2           | 11-52-0         | At-planting       | 60 lb                 | 1.0                     | 33.9                  | 0                   | 35.4         | 11.9                    | 59.2                   | 58.9 |
| 3           | 28-0-0          | Fall              | 15 gal                | 1.1                     | 34.1                  | 0                   | 35.0         | 12.5                    | 59.1                   | 60.0 |
| 4           | 28-0-0 / 28-0-0 | Fall/Spring       | 7.5 gal /             | 1.2                     | 34.3                  | 0                   | 35.0         | 12.3                    | 59.0                   | 59.1 |
| 5           | 28-0-0          | Spring            | 15 gal                | 1.1                     | 34.8                  | 0                   | 35.5         | 12.3                    | 59.3                   | 62.0 |
| 6           | Urea            | Spring            | 98 lb                 | 1.0                     | 34.4                  | 0                   | 35.2         | 12.5                    | 59.5                   | 55.9 |
| LSD (P=.05) |                 |                   | NS                    | NS                      | NS                    | NS                  | NS           | NS                      | NS                     |      |
| CV (%)      |                 |                   | 8.94                  | 2.57                    | 0                     | 3.43                | 4.13         | 0.63                    | 14.02                  |      |
| Grand Mean  |                 |                   | 1.1                   | 34.1                    | 0                     | 35.3                | 12.3         | 59.3                    | 58.8                   |      |

**Table 3. Winter wheat response to spring wheat previous crop and fertilizer timing.**

| Treatment   | Timing          | Rate<br>product/a | # spikes<br>million/a | Plant<br>Height<br>inch | Plant<br>Lodge<br>0-9 | 1000<br>KWT<br>gram | Protein<br>% | Test<br>Weight<br>lb/bu | Grain<br>Yield<br>bu/a |      |
|-------------|-----------------|-------------------|-----------------------|-------------------------|-----------------------|---------------------|--------------|-------------------------|------------------------|------|
| 1           | Untreated Check |                   | 1.4                   | 36.4                    | 0                     | 33.9                | 12.4         | 58.4                    | 61.0                   |      |
| 2           | 11-52-0         | At-planting       | 60 lb                 | 1.3                     | 36.2                  | 0                   | 33.1         | 12.2                    | 58.6                   | 71.5 |
| 3           | 28-0-0          | Fall              | 15 gal                | 1.6                     | 36.2                  | 0                   | 32.9         | 12.5                    | 58.2                   | 63.2 |
| 4           | 28-0-0 / 28-0-0 | Fall/Spring       | 7.5 gal /             | 1.2                     | 36.6                  | 0                   | 33.4         | 12.4                    | 58.2                   | 63.3 |
| 5           | 28-0-0          | Spring            | 15 gal                | 1.4                     | 36.4                  | 0                   | 32.9         | 12.5                    | 58.0                   | 66.3 |
| 6           | Urea            | Spring            | 98 lb                 | 1.5                     | 35.8                  | 0                   | 31.8         | 12.9                    | 57.5                   | 59.6 |
| LSD (P=.05) |                 |                   | NS                    | NS                      | NS                    | NS                  | NS           | NS                      | 6.4                    |      |
| CV (%)      |                 |                   | 16.94                 | 3.30                    | 0                     | 5.12                | 2.66         | 1.77                    | 6.57                   |      |
| Grand Mean  |                 |                   | 1.4                   | 36.3                    | 0                     | 33.0                | 12.5         | 58.2                    | 64.2                   |      |

**Table 4. Winter wheat response to soybean previous crop and fertilizer timing.**

| Treatment   | Timing          | Rate<br>product/a | # spikes<br>million/a | Plant<br>Height<br>inch | Plant<br>Lodge<br>0-9 | 1000<br>KWT<br>gram | Protein<br>% | Test<br>Weight<br>lb/bu | Grain<br>Yield<br>bu/a |      |
|-------------|-----------------|-------------------|-----------------------|-------------------------|-----------------------|---------------------|--------------|-------------------------|------------------------|------|
| 1           | Untreated Check |                   | 1.0                   | 29.1                    | 1.0                   | 33.7                | 12.8         | 55.6                    | 46.3                   |      |
| 2           | 11-52-0         | At-planting       | 60 lb                 | 0.9                     | 30.7                  | 1.0                 | 34.6         | 13.1                    | 55.8                   | 51.2 |
| 3           | 28-0-0          | Fall              | 15 gal                | 0.8                     | 30.9                  | 1.0                 | 35.1         | 12.9                    | 56.4                   | 47.0 |
| 4           | 28-0-0 / 28-0-0 | Fall/Spring       | 7.5 gal /             | 0.9                     | 30.7                  | 1.3                 | 33.9         | 13.0                    | 56.5                   | 52.6 |
| 5           | 28-0-0          | Spring            | 15 gal                | 0.8                     | 30.3                  | 1.3                 | 34.4         | 12.9                    | 55.7                   | 48.7 |
| 6           | Urea            | Spring            | 98 lb                 | 0.9                     | 29.3                  | 1.0                 | 33.8         | 12.8                    | 56.8                   | 47.7 |
| LSD (P=.05) |                 |                   | NS                    | NS                      | NS                    | NS                  | NS           | NS                      | NS                     |      |
| CV (%)      |                 |                   | 22.20                 | 5.90                    | 23.83                 | 2.75                | 0.46         | 1.84                    | 16.78                  |      |
| Grand Mean  |                 |                   | 0.9                   | 30.2                    | 1.1                   | 34.2                | 12.9         | 56.1                    | 48.9                   |      |