

# Evaluating Fertilizer Timing in Durum and Barley

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### Objectives

This project investigated the crop response to applying urea (46-0-0) granular fertilizer at different times throughout the growing season. Maximizing crop fertilizer uptake and minimizing urea loss in an irrigated system is very important environmentally as well as financially. This project was initiated as a result of grower interest to determine if supplemental applications would be more economically and environmentally beneficial than one application at planting time.

### Methods

The project was designed to compare five fertilizer timing treatments with *Tradition* barley and *Divide* durum. The experimental design was a randomized complete block replicated four times. Buffer plots were planted between each treatment. Each individual treatment plot was soil sampled (0-36") prior to planting and fertilizer applications to determine available soil NO<sub>3</sub>-N. The previous crop was soybeans. Durum and barley yield goals were 80 and 120 bushels and planting populations were 1.5 million and 1.25 million PLS per acre respectively. The trial was planted on May 15, 2014. Fertilizer was applied using a Barber granular spreader and incorporated by applying a minimum of .50 inches with overhead irrigation. All cultural practices (tillage, planting populations, chemical, irrigation, and fungicide applications) were the same for each treatment to minimize the effects of other variables. The barley plots were harvested August 21 and the durum September 3, 2014 using a small plot combine.

#### 2014 Durum Fertilizer Timing

| Treatment                     | Soil Test (0-36")<br>NO <sub>3</sub> -N (lb/A) | Fertilizer*<br>lbs N/acre/App. | Yield<br>bu/A | 3-year Yield<br>avg bu/A | Test Wt<br>lb/bu | Protein<br>% | 3-year Protein<br>avg. % |
|-------------------------------|--|--------------------------------|---------------|--------------------------|------------------|--------------|--------------------------|
| Check (no fertilizer applied) | 62   | 0                              | 43.3          | 40.0                     | 59.0             | 13.7         | 12.6                     |
| ALL PRE                       | 49   | 151                            | 70.5          | 63.7                     | 59.1             | 16.5         | 15.9                     |
| PRE/POST1                     | 59   | 71                             | 71.1          | 62.5                     | 58.9             | 16.6         | 16.2                     |
| PRE/POST1/POST2               | 58   | 47                             | 68.8          | 61.9                     | 58.8             | 15.7         | 15.8                     |
| PRE/POST1/POST2/POST3         | 75   | 31                             | 59.4          | 57.9                     | 59.0             | 15.2         | 15.0                     |
| POST1/POST2/POST3             | 61   | 46                             | 54.9          | 54.5                     | 58.9             | 15.5         | 16.0                     |
| Mean                          |  |                                | 62.5          | 56.8                     | 59.0             | 15.5         | 15.3                     |
| CV %                          |  |                                | 10.7          | --                       | 0.7              | 2.7          | --                       |
| LSD (0.05)                    |  |                                | 10.1          | --                       | ns               | 0.6          | --                       |

#### 2014 Barley Fertilizer Timing

| Treatment                     | Soil Test (0-36")<br>NO <sub>3</sub> -N (lb/A) | Fertilizer*<br>lbs N/acre/App. | Yield<br>bu/A | 3-year Yield<br>avg bu/A | Test Wt<br>lb/bu | Protein<br>% | 3-year Protein<br>avg. % |
|-------------------------------|--|--------------------------------|---------------|--------------------------|------------------|--------------|--------------------------|
| Check (no fertilizer applied) | 57   | 0                              | 83.3          | 63.3                     | 49.2             | 11.0         | 11.7                     |
| ALL PRE                       | 54   | 126                            | 123.2         | 89.2                     | 50.3             | 11.8         | 12.8                     |
| PRE/POST1                     | 45   | 68                             | 116.1         | 89.7                     | 49.9             | 12.0         | 13.2                     |
| PRE/POST1/POST2               | 60   | 40                             | 123.7         | 90.2                     | 49.7             | 12.6         | 13.3                     |
| PRE/POST1/POST2/POST3         | 63   | 29                             | 112.4         | 84.8                     | 49.6             | 12.0         | 12.9                     |
| POST1/POST2/POST3             | 63   | 39                             | 105.7         | 77.4                     | 49.2             | 11.5         | 13.1                     |
| Mean                          |  |                                | 110.7         | 82.4                     | 49.6             | 11.8         | 12.8                     |
| CV %                          |  |                                | 8.5           | --                       | 0.8              | 4.2          | --                       |
| LSD (0.05)                    |  |                                | 14.2          | --                       | 0.6              | 0.8          | --                       |

\*1st application (ALL PRE) - at planting  
 2nd application (POST1) - 5 leaf T2 stage  
 3rd application (POST2) - flag leaf stage  
 4th application (POST3) - heading stage

### Conclusion

This research project (2012-2014) was designed to compare fertilizer timing treatments with *Tradition* barley and *Divide* durum. What was determined from the research is applying all of the needed Nitrogen at planting is the optimal fertilizer application treatment. The additional supplemental applications throughout the growing season did not result in yield increases or grain quality improvements.