Protocol
Optimum Economic Nitrogen Rate for Winter Wheat

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Justification and Statement of Problem

Near record wheat commodity prices coupled with increasing input costs for corn and soybean have many Wisconsin growers increasing their wheat acres in 2008. A majority of wheat in WI follows soybean, therefore a significant N credit is contributed towards the crop. As N prices continue to climb optimal N management is critical to maximize grower profit. The objective of this experiment in to quantify the effect of spring N rate and timing on winter wheat yield and grain quality.

What can the grower expect to gain from this project?

1. A comparison, on their farm, of current practices and UW recommended practices (if different)
2. A statistical analysis of grain yields from two N rates
3. An economic analysis of N rate, yield, and net income from two fertilization plans.
4. The economic value of soil testing

Experimental design:

- Randomized complete block design with a minimum of three replications.

- Plot dimensions can vary, but each plot (one N rate in one replicate) should be a minimum of 0.5 acres. To facilitate the experiment, determine the effective spread width of the fertilizer spreader you are planning on using and make the plots the same width or a multiple of that width. For example if the fertilizer spreader has an effective spread width of 60', each plot would be a minimum of 60' by 363' to make 0.5 acres. The yield check can be taken from the center of the plot to minimize border effects and over or

underlaps. The harvest width can be the width of the combine by the length of the plot. Please make sure to end trim the plots so there is no edge effect.

Treatments:

1. Normal grower practices (spring timing and N rate) – Please determine their "normal" practices before you discuss our recs.
2. Site specific UW recommendation
    a. N rate will be determined by PPNT
    b. N application timing will be determined by spring tiller count

Example Experiment Layout
Each plot: min of 0.5 acre
whole experiment: min of 3.0 acres

Rep 1 Treatment 1	Rep 1 Treatment 2	Rep 2 Treatment 2	Rep 2 Treatment 1	Rep 3 Treatment 1	Rep 3 Treatment 2

Site Selection: No soil type or cropping system limitations

Detailed Site History: Please see attached Excel spreadsheet for this information

Fall Soil sampling procedure (from A2809):

1. Soil samples should be taken before planting if possible, or as close to planting as you can.
2. Soil samples need to be collected in 1 foot increments to a depth of two feet.
3. Collect five sets of paired cores (0-1 and 1-2 feet) randomly per trial. If there is soil type differences across the experimental area make sure each soil type is sampled. If the area is relatively uniform, then randomly collect samples across the plot area. Number the samples consecutively so we know that 1 and 2 go together, 3 and 4, etc through 10.
4. After collection, soil samples should be kept cool because the nitrate content in moist soil samples stored under warm conditions can increase quickly and cause erroneous test results. If samples cannot be delivered to the soil testing lab with 1-2 days after collection, the samples should be frozen or air dried to prevent changes in soil nitrate content.
5. Fill out Soil nitrate –PPNT cover sheet (attached to email) and submit samples to the UW Soil Testing Lab at Madison
6. An account has been set up at the lab to cover costs (Account ID is …….).

7. Results will be returned to me and the grower. I will forward a copy to the participating agent. Attached to this copy will be the specific N recommendation for the participating grower.

Spring management:

1. The county agent will work with the grower to flag out the experimental area and determine the spring N timing and rate.
2. Timing will be based on spring stem counts. If there are >70 tillers per square foot the N timing will be delayed until just prior to jointing. If the tiller count is < 70 tillers per square foot then N should be applied at greenup. I understand that a grower may not like to have the fertilizer buggy delivered twice for such a small area. If different timings are a burden for the grower, then we will work with the agent to get the fertilizer spread using small equipment.
3. The grower is expected to supply the N for this experiment as they will already be fertilizing. If this becomes a problem please contact me.

Yield measurements:

1. Grain yield (yield monitor or weigh wagon data), moisture, and test weight. Grain samples can be sent to UW agronomy for moisture and/or test weight determinations.