Popup/Starter Fertilizer Challenge

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The Situation

Banding fertilizer around the corn seed during planting is a common practice in the northern Corn Belt. Corn planting is frequently delayed in this region due to cold and wet soils, which result in slow root growth and limited uptake of nutrients during early developmental stages. Growers question whether starter/pop-up fertilizer is even necessary for modern corn hybrids and production practices, yet, often they apply it as "insurance." The last major evaluation of corn response to starter fertilizer in WI was conducted between 1995 and 1997. No response to starter fertilizer was measured, except for late-maturity hybrids planted late. Since then significant production changes have occurred producing higher yields through the use of transgenic crops, improved planting machinery and implements, and continued increases in soil nutrient levels.

Objective

The Wisconsin Corn Growers Association and the Wisconsin Corn Promotion Board have provided funding for farmer-agent-consultant teams to evaluate the agronomic and economic response of corn to popup/starter fertilizer in Wisconsin.

Successful completion of the trial by farmer-agent-consultant teams includes:

1) Soil testing the plot area just before planting
2) Assisting in planting, management and harvesting of treatments (3-6 reps= 6 to 12 plots) with and without Popup/Starter fertilizer (whichever the farmer uses in his production system).
3) Completion of two forms (a Plot Management form and a Data form).

Treatment selection

Before establishing the plots, soil sample the experimental area.

1) Send samples to the UW Soil & Forage Analysis Lab, 2611 Yellowstone Dr, Marshfield, WI 54449
2) Let Joe Lauer know how many locations you will have and he will provide you with a laboratory account number to use.

The target production environments of these trials are the major corn growing regions of Wisconsin during 2018 and 2019. These trials will be conducted on farms by farmer-agent-consultant teams. The trials should be conducted with field-scale equipment and have two basic treatments (with and without popup or starter fertilizer).

The popup/starter fertilizer product and rate used in the trial should be the same product and rate as the farmer typically uses. The suggested Wisconsin recommendation for popup fertilizer rates is 5 lb N/A, 10 lb P2O5/A, and 10 lb K2O/A, and for starter fertilizer the recommended rate is 10 lb N/A, 20 lb P2O5/A, and 20 lb K2O/A.

Experimental design

The treatments should be installed in strips arranged in a randomized complete block design with three or more replications (ideally six) in production fields. It is not important which treatment goes where, but it is important to **write down the order of the treatments in the replicate at the time of seeding**. The plots should be seeded wider than the combine width so you can cut a full combine width from the plot at harvest.

Site Selection

The strips will be dimensioned according to farmer field equipment and field length. **No P or K other than starter/pop-up fertilizer or manure should be applied**, and total N applications will be based on the N recommendation for corn at individual sites. All other production practices will be determined by the individual cooperators.

Machinery and Equipment

All operations, including seeding and combining, will be done by each collaborating farmer with the same equipment used on the rest of the farm.

Data Collection

Plant density at harvest, Plant lodging, Harvested plot length and width, Grain yield, Grain moisture

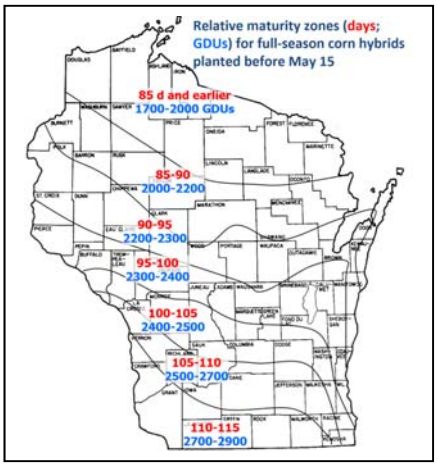
More details

Trial Location on the Farm

The plots should be situated within a field that is also seeded to the crop. The replicates should be placed perpendicular to the natural variability in the field so the yields in the treatment plots will approximate the average yield of the field. Ideally, the treatments should uniformly include the natural variation that is found in the field, without any one treatment being favored or disfavored by some field condition. The plots should not border a creek, fenceline, road, or edge of the field to avoid favoring or penalizing one treatment due to its position in the replicate. Nor should the plots run along the field contour, such that treatments are on different positions along the slope of the field. In this situation, treatments on the lower slope positions would be favored by higher moisture levels. On the other hand, the plots should be less than a five minute walk from a road.

Hybrid selection

Use only "full season" hybrids in the trial. A "full season" hybrid is defined as a hybrid that uses the entire available growing season to reach physiological maturity before killing frost or cool temperatures end the growing season. The Wisconsin corn relative maturity belts in the figure depend upon well drained soils, fall tillage, planting by May 5, and average growing conditions.



Plot Arrangements

The most reliable results are obtained from plots that are at least several feet wider than the combine width and about 1000 to 2500 feet long. This arrangement permits producers to combine full header widths per plot at the time of harvest.

Soil Preparation, Fertilization, Weed and Pest Control

The on-farm test should be managed like the larger crop field surrounding it for all practices except seeding and harvesting of the different treatments.

Harvest

Try to harvest more than 0.1 acre. The exact length and width of each plot must be measured and recorded by each producer or on-farm testing coordinator. The width reported will likely be the width of the combine. **Don't assume that the length of each plot is the same.** Slight differences in the rolling landscape or contour can result in 5 to 10 percent differences in the length of the plots, which will throw off yields. **So be sure to measure the length of each plot.** Each treatment is cut separately and the combine is emptied into a weigh wagon. If a truck is used, the truck will go to the scales with each treatment for a separate weight. An alternative approach is to use bulk seed bags in a truck and unload the harvested plot into separate bulk bags and then weigh them individually at the elevator.

Signing Off

Two signatures are required on the data sheets, one of which must be designated and approved.