

Corn Row Spacing (Narrow and Twin rows) and Plant Density Protocol

Contact Information

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Justification and Statement of the Problem

Over the last 15 years, row spacing for corn production has changed from 30- to 38-inch row spacing to something narrower. A newer development has been the sale of planters with “twin” rows (two rows 7- to 8-inches apart on 30-inch centers). As rows become narrower, other equipment modifications need to be considered such as combine head modification of shields, narrower tires, etc. Proponents of twin rows claim narrow row yield benefits with minimal equipment modification. Popular press articles indicate as much as a 25-28% yield increase with twin rows.

What can the grower expect to gain from this project?

1. A comparison on their farm of their current production practices with newer technologies.
2. Depending upon the number of farms participating, an economic analysis evaluating return on investment and a risk assessment involved with the new practice.

Experimental Design and Treatment selection

The experimental design should be a randomized complete block with at least two, preferably three and ideally four replications. The producer should alternate and randomly assign treatments to the plots. 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.

Protocol treatments for the experiment

Row spacing	Plant density
1. 30-inches	30,000 plants/A
2. 30-inches	35,000 plants/A
3. Twin rows or narrow rows	30,000 plants/A
4. Twin rows or narrow rows	35,000 plants/A

Total number of plots = 2 factors x 2 levels x (3 or 4 reps) = 12 or 16 plots

If there is interest in testing more treatment levels, please call and we can develop experiments on a case-by-case basis.

Machinery and Equipment

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

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, fence line, 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.

Seeding the Hybrids

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.

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. For each treatment, a representative grain sample must be taken at harvest to determine grain quality (i.e. grain moisture and test weight). To take a representative sample take 5 or 6 small samples to fill up the grain sample bag as the grain is being angled into the truck. Be sure to fill out the county, producer, and treatment on each of the grain sample bags.



Wisconsin On-Farm Testing Program Corn Data Sheet

Signature: _____

Signature: _____

Harvest date: _____

Method/Equipment: _____

Overall Trial Notes and Observations:

Plot number	Rep	Hybrid or Treatment	Plant population	Lodging	Plot weight	Plot moisture	Plot length	Plot width	Plot yield *	Test weight	Plot Notes
			no/A	%	pounds	%	feet	inches		lb/bu	
1											1
2											2
3											3
4											4
5											5
6											6
7											7
8											8
9											9
10											10
11											11
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24											24
25											25

* Grain yield (bu/A at 15.5% moisture) = $\frac{\text{Plot grain weight (pounds)} \times (100 - \text{Plot grain moisture \%}) \times 110.485^*}{\text{Plot length (feet)} \times \text{Plot width (inches)}}$

*For ear corn multiply by 90.439

* Silage yield (T dry matter/A) = $\frac{\text{Plot silage weight (pounds)} \times (100 - \text{Plot silage moisture \%}) \times 2.6138}{\text{Plot length (feet)} \times \text{Plot width (inches)}}$