

Agricultural Beet

February 7th, 2020

David Mettler – Research Agronomist

Southern Minnesota Beet Sugar Cooperative
Renville, MN
www.smbcsc.com | 320.329.8305

Conducting On-Farm Trials to Achieve Meaningful Results

On-farm trials are a great way for growers to learn how different practices and products can improve their production. Conducting on-farm trials provides growers with firsthand comparisons that can be used to make future management decisions. The value of on-farm trials depends greatly upon the time spent planning and executing a quality trial to compare the practices or products being tested. This article will give you a simple guide for conducting on-farm trials.

1. Formulate a question

- All trials, including on-farm trials should start with a question. However, it's important to prioritize your objectives to avoid making too many comparisons at the same time. Example: How much benefit does starter fertilizer provide at planting? Keeping the treatment list short will help simplify the trial. To conduct a fair trial comparing starter fertilizers, all other variables need to be constant (ex. same variety across the whole field).

2. Control Variables

- Choose a uniform area of a field with minimal variability. Major differences in soil type or drainage can impact the results of the trial.
- Make sure that the field has received consistent management practices in the recent history (uneven manure applications, partial residue removal, cover crop strips, etc.).

3. Use Replication and Randomization

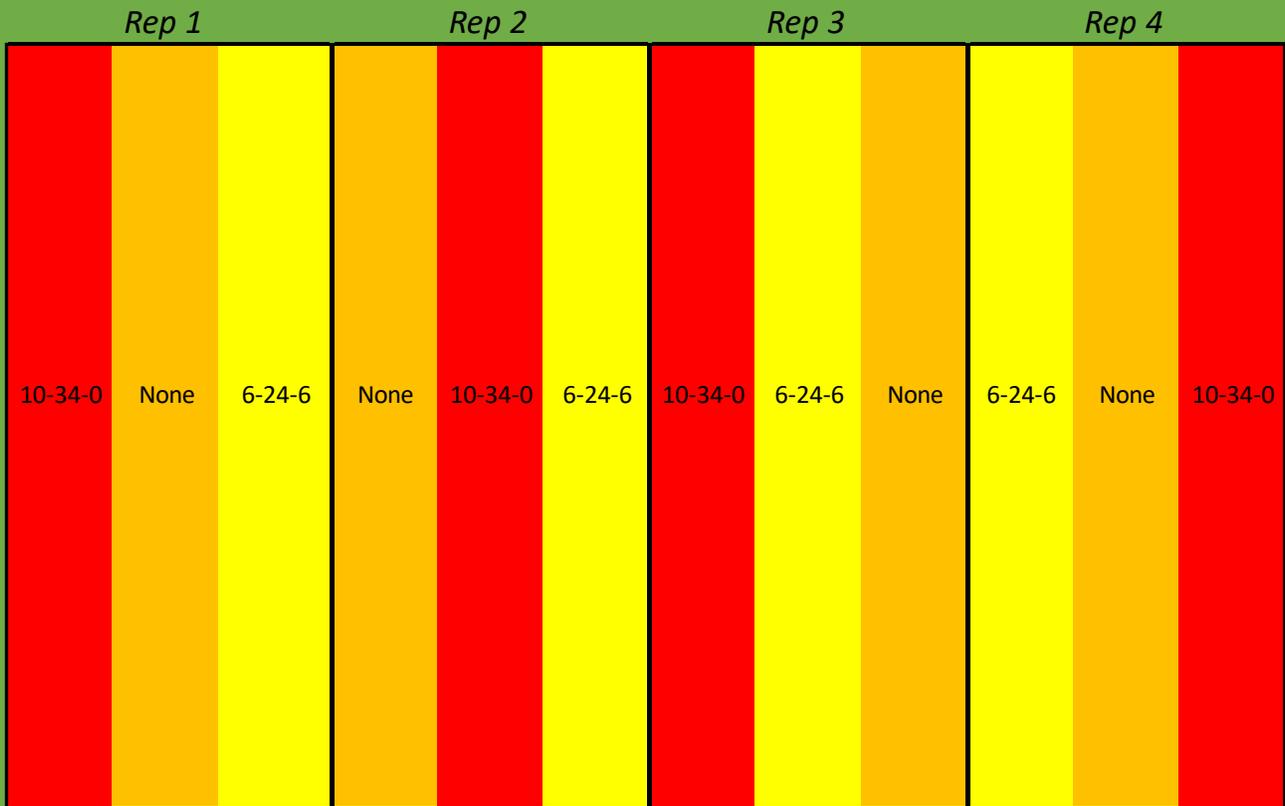
- Some field variability can not be controlled. Repeating each treatment 3 or 4 times randomly across the field will help eliminate the impact of variability on the treatments.
- There is too much variability across a field and between fields to make a valid comparison between different management practices without replication and randomization.

4. Consider Equipment Constraints

- When considering how wide to make your treatment strips, keep in mind all the equipment that will be used in that trial (planter, sprayer, fertilizer truck, harvester, etc.)
- Placing treatments right next to one another can confound the effects of a treatment. (ex. lateral movement of nitrogen). Make sure you aren't harvesting or making observations in the border area between treatments. This may require wider strips to harvest the center portion away from the treatment borders.

5. Take Detailed Notes

- Keeping track of important dates and other observations can be crucial when looking at the differences in the treatments at the end of the year. Did something happen to the field that impacted one treatment more than the others? (ex. spray drift, disease pressure, hail damage, etc.)
- Taking pictures of treatment differences and using other technology to monitor yield can be beneficial tools when sharing information about the results of the trial.



On-Farm Trial Example

The figure above is an example of how an on-farm trial comparing the use of starter fertilizers could be designed. Each of the three treatments is randomly placed one time within each rep. This ensures that field variability should not impact one treatment more than another. Avoid placing any portion of the trial on field edges or headlands. These areas are the most likely to have compaction or increased weed/disease pressure. Having a trial map and flags out in the field are essential to making sure that the treatments are applied in the correct order and don't get mixed up. It can be challenging to collect yield data during harvest but having a map and making sure that everyone in the operation is aware of the trial design will be essential to collecting good data.

Analyzing the results of a trial and determining the cause of treatment differences can be complicated. Statistics can help determine whether the numerical differences that you are seeing in the treatments are caused by the treatment or other uncontrolled factors (soil variation, insect or disease pressure, etc.). Statistics can also give you confidence that the results you saw this year are meaningful and are likely to be repeated in the next year's trial or on your farm.

If you have any questions on how to conduct an on-farm trial or want help with analyzing the results of a trial feel free to contact David Mettler at david.mettler@smbcsc.com or 320-522-3836.

Agricultural Department
Southern Minnesota Beet Sugar
Cooperative

Information Credit:
 Iowa State University Extension
 Mark Bloomquist – Director of Research
 Steve Roehl – Ag Strategy Manager

