Introduction

- Double Cropping
  
  - A method of increasing crop production by growing more than one crop in a season.
  
  - Most popular approach in corn silage rotation is the seeding of winter cereals after corn harvest and harvesting as a forage in May, prior to the next corn crop.
Introduction

Project

- Data collected so far indicate that winter cereals harvested as a forage (flag leaf stage) can remove 80-120 lbs N/acre (high protein forages).
- This large N removal, raises questions about fertilizer guidelines for the winter cereals.
- Typical applications rates at green-up range from 50 to 100 lbs N/acre but no research has been done to determine the actual N needs.
- Our goal is to determine optimum N rates for winter cereals grown as forage under varying field (manure) and growing conditions in New York.

Project Goal

- To determine the nitrogen (N) rate needed to grow winter cereals planted after corn silage for forage harvest.
- 4 replications with a site of 5 different N rates.
  - 0 lbs of N/acre
  - 30 lbs of N/acre
  - 60 lbs of N/acre
  - 90 lbs of N/acre
  - 120 lbs of N/acre
- Sites of 65 by 80 ft.
Supplies

- A plot map
- A 300 ft. measuring tape marked with green and red tape
- A 150 ft. measuring tape
- A striped anchoring pin
- 4 white step-in post
- 20 orange drive way markers
- 80 flags (you will not need all of these, there are extras just in case)
  - 16 pink (control)
  - 16 red (30lbs of N)
  - 16 yellow (60lbs of N)
  - 16 blue (90lbs of N)
  - 16 orange (120lbs of N)
- A soil probe
- 20 soil sample labels
- 40 soil bags (20 plots double bagged)
- 16 bags of fertilizer (you will only need 4 of each, but some extras have been included in case of spillage)
  - 4 red (30 lbs of N)
  - 4 yellow (60 lbs of N)
  - 4 blue (90 lbs of N)
  - 4 orange (120 lbs of N)
- 1 quart container for soil sampling
- Cooler or shipping container, plus ice packs
- Camera (if available)
- GPS (if available)
Prior to Site Setup

- Field history must be on file before the field can be setup. Without the field history, the trial has lost its value for the overall project (all but 6 field histories have been received to date).
- If possible, take photographs of the field.
Site Selection

- Fields of cereal rye, triticale, or wheat to be harvested for forage
- Homogenous looking areas of 65 by 80 ft.

Site Map

65 feet wide, 80 feet long
**Site Setup**

1) Place the first step-in white post. This should be the one in the lower left hand corner of the map.

2) Attach the 300 ft. measuring tape to first post and stretch out to the 80 ft. mark (should be marked in red). Then put in the next white post at the 80 ft. mark, which should be the upper left corner of the site.
Site Setup

3) Next turn 90° and proceed stretching the 300 ft. tape until you have reached the 145 ft. mark (also marked in red). Step in a white post at that mark. This should be the upper right hand corner of your site.

Site Setup

4) Turn 90° and continue stretching the tape until you come to the 225 ft. mark on the tape (again marked in red). There you will put in your lower right hand and last post white post.
**Site Setup**

5) Finish stretching out the 300 ft. tape – this should be at the 290 ft mark on the tape.

6) **Leave 300 ft. tape around the perimeter.**

7) Next take the 150 ft. measuring tape and stretch it diagonally across the rectangle just marked out, from the post in the lower left hand corner to the upper right hand corner. The diagonal should be 103.1 ft. If not, adjust posts accordingly so you get a rectangle of 65 by 80 ft.
Site Setup

1) Attach the 150 ft. measuring tape to the anchoring pin and put in at the 5 ft. mark (green) on the 300 ft. measuring tape around the perimeter. Then stretch the 150 ft. tape across the plot towards to the 220 ft. mark on the 300 ft. It should be 65 ft. across.

Setup of Plots

1) Attach the 150 ft. measuring tape to the anchoring pin and put in at the 5 ft. mark (green) on the 300 ft. measuring tape around the perimeter. Then stretch the 150 ft. tape across the plot towards to the 220 ft. mark on the 300 ft. It should be 65 ft. across.
Setup of Plots

2) Next put in proper color flags along this tape: one at the 5 and 15 ft. marks (pink), 20 and 30 ft. (yellow), 35 and 45 ft. (orange), and 50 and 60 ft. (blue) marks.

Setup of Plots

3) Move the 150 ft. tape and anchoring pin to the 15 ft. mark (green) on the 300 ft. tape and stretch across to the 210 ft. mark (also green). It should be 65 ft. across once again.
Setup of Plots

4) Next place orange driveway markers at the 5, 20, 35, and 50 ft. marks on the 150 ft. tape. After this place flags at the 15 ft. (pink), 30 ft. (yellow), 45 ft. (orange), and 60 ft. (blue) marks on the tape.

Setup of Plots

5) Repeat steps 1-4 another 4 times. The 300 ft. measuring tape and site map will indicate where you should lay out the remaining plots. The plot map will also indicate the change in flag colors due to randomization of the plots within the site.
**Setup of Plots**

1) Place soil label, facedown, in the bottom of the first soil bag. Then place the second bag within the first. This will prevent the label from becoming illegible and ensures that the sample will not be lost as likely in case of bag breakage.

- **Note:** We will provide printed labels for all 20 of the plots at a site.

**Soil Sampling**

1) Place soil label, facedown, in the bottom of the first soil bag. Then place the second bag within the first. This will prevent the label from becoming illegible and ensures that the sample will not be lost as likely in case of bag breakage.

- **Note:** We will provide printed labels for all 20 of the plots at a site.
Soil Sampling

2) Using your choice of soil probes, take a total of eight, 0-8 inch deep samples around the inside perimeter of each plot. Scrape cores into the plastic bag lined bucket. Try not step into or trample the plot while taking samples.

Soil Sampling

3) After all eight subsamples have been taken for a plot, twist inner bag and knot the outer one in order to allow easy unpacking of samples.

4) Place bagged soil samples in a cooler/shipping container with ice packs. Keep samples cool! Call us for transport of samples to the NMSP lab.
Fertilizer Application

1) Ensure that all soil samples have been taken prior to the application of fertilizer!

2) Place all color marked bags of fertilizer in the same color plot before applying the fertilizer. Double check the right color matches are in place. Note: the pink plots do not get any since they are the zero-N controls.

3) At each plot open the corresponding bag and evenly (or as close to evenly as possible) hand broadcast the Agrotain treated urea across the plots.

   Note: Use rubber gloves. The Agrotain treated urea is easier spread when transferred into a one quart containers first. Once you spread the fertilizer, don’t walk over the plots (so walk backwards when applying the fertilizer)

4) Clean up bags
**Finishing Setup**

1) Please make notes on the plot map of the orientation of the site within the field for all of our reference.

2) If possible please note location with a GPS.

3) If feasible determine stand density (which is explained on the next slide).

**Stand Density**

- In the field outside of the site, measure a yard of a cover crop row in two different locations.

- Count the number of plants along that yard length.

- Next count the number of fillers with two or more leaves on each plant within the yard length being measured.

- Record numbers on field activity sheet.
Finishing Setup

4) Take pictures of the site once set up.

5) Take the tapes and clean-up any left-over supplies.

6) Make sure the producer knows where the trial is located and realized that we lose the study if (s)he applied manure or fertilizer to the trial area. Instruct a producers who wants to apply N fertilizer or manure to the rest of the field, to stay away from the four white corner stakes by at least 20 yards.

7) Reminder: No samples can be processed or analyzed if there is no field history on file for that site. We have to be able to group fields based on their field histories to derive N guidelines for growing double crops between corn harvests.

Finishing Setup

6) Fill out field activity sheet and call Shona to arrange for pickup of the samples or mailing to the NMSP.

Mailing address for samples:
Shona Ort
317 Morrison Hall
Dept. of Animal Science, Cornell University
Ithaca, NY 14853
New York On-Farm Research Partnership
http://nmsp.cals.cornell.edu/NYOnFarmResearchPartnership

There is great power from research information when field data are generated through well designed, repeated and widely implemented trials, with proper data collection and statistically valid analyses.

Consider being an on-farm research partner!

Relevant Questions and Sound Science for Agricultural Profitability and Protection of the Environment

Important Phone Numbers

1) Shona Ort: 607-379-8859
2) Greg Godwin: 607-279-4627
3) Quirine Ketterings: 607-229-0120

Questions or Comments