Working with Data

What data provides evidence for effectiveness?

Background Information

The soybeans were planted on May 21, 2019. This was a late planting date as a result of the amount of rainfall that Ohio experienced this year. April and May both experienced record rainfall with a total of 14 days in April and 19 days in May. While the beginning of the season experienced too much water, the end of the season experienced too little water!

On June 11, the test plots were not ready for soil or tissue sampling due to the late planting date. On July 22, the first tissue and soil samples were taken. On August 1, the second set of tissue and soil sampling was completed. The soil was extremely dry and actually broke a soil probe! On October 3, the plot was harvested to analyze the observable physical traits between the treated and untreated areas.

In the test plot, the following were **controlled** variables:

- Type of seed
- Herbicides applied
- Type of soil

The variables that changed were:

- The type of product used during initial planting
- The application of a foliar treatment to a select group of soybeans

Foliar feeding is a technique of feeding plants by applying liquid fertilizer directly to their leaves. Plants are able to absorb essential elements through their leaves. The absorption takes place through their stomata and also through their epidermis.
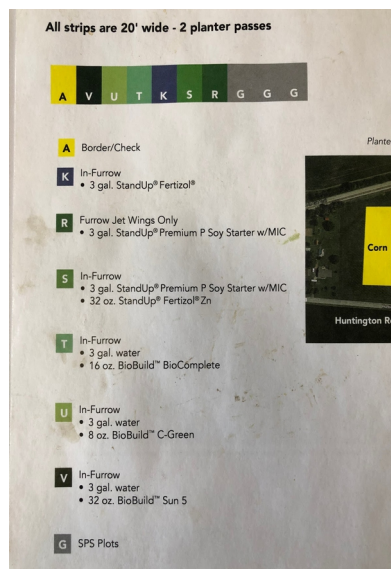
Above are pictures of the plots with the descriptions of the treatments used on each row.

Boosting the Chemistry of Soil

Recommended Nutrient Levels Chart for Soybean Tissue

Crop	Stage Name	N	S	P	K	Mg	Ca	Na	Fe	Mn	B	Cu	Zn
Soybeans	Any V Stage Trifoliate	5.2	0.4	0.4	2.2	0.5	1.2	0.02	95	58	41	13	39
Soybeans	Any R Stage Blossom	4.4	0.3	0.3	1.9	0.42	1.02	0.02	80	49	35	11	33

V stage refers to vegetative growth stage, which is before flowering. R stage refers to reproductive growth stage and occurs once flowering begins. See this site for more specific information: https://crops.extension.iastate.edu/soybean/production_growthstages.html

Note: The soybeans were in an R stage when the foliar spray was used.

In this case study, several different soil treatments were tested and a lot of data was collected. Nutrient availability is one of the factors that products in this case were to increase.

Materials
data spreadsheet with raw data
plot map with variables
information sheets that describe action of variables
example of nutrient data analysis (data analysis to determine effectiveness)

Procedure
1. Read the information sheets about the products used.
2. Determine which data will help to answer the question of whether each product was effective.
3. Arrange the data in a way that can be compared either in your own table or on a new sheet in the spreadsheet.
4. Do some math!
   Are the values equal, greater than, or less than one another?
   Are the values for the check (control) areas the same?
   Does yield differ between the areas that were treated differently?
5. What are some factors that were not controlled that may affect the outcomes?
   How are the test plots arranged?
   Are there repeated trials for each condition across the field?