

Paul C. And Edna H. Warner Endowment Fund for Sustainable Agriculture Report Form

Summary:

The use of humic acid products is being promoted to increase yield and/or quality of forage crops. This project was designed to evaluate the effect of humic acid foliar applications on the yield and quality of alfalfa forage through the use of replicated field trials. A statistical analysis across 4 forage harvests at 2 field locations within Wayne County in 2015 did not show any statistical difference between control plots (no humic acid foliar application) and plots receiving the foliar application of humic acid.

What was done?

The goal of the study was to determine if applications of foliar applied humic acid products alone and in combination with fish fertilizer could increase yield and/or forage quality compared to conventional commercial fertilizer application as a control. A secondary goal was to determine if those applications would provide increased protection or plant resistance from the alfalfa weevil and leafhopper. At each of two field locations, four replicated plots were laid out across the field. A soil sample was collected from the entire study area to provide baseline fertility information. Each plot was composed of two treatment strips and a control strip. Each treatment or control strip was approximately 39 to 40 feet wide by 200 feet in length. At location 1 the treatments were a foliar applied humic acid + fish fertilizer product and a foliar applied growth hormone product. At location 2 the treatments were a humic acid foliar product and a humic acid + fish fertilizer product. Initially foliar treatments were applied when 3-5 inches of growth was visible. Subsequently, foliar treatment applications were made 7-10 days after each harvest. Upon notice from the cooperator that they were going to harvest, green yield weights were collected immediately after the plots were cut by subsampling several 6 foot lengths of a swath width and weighting. From those green weight samples, a quality and dry matter sample was collected in a paper bag and weighed. Those paper bag quality samples were air-dried in forage dry ovens at the OARDC Schaffner farm shop facility. Dry weights were used to calculate forage dry matter (DM) yields and dried samples were submitted to Rock River Lab in Wooster for quality analysis. Although the proposal called for composite forage samples, after the first harvest it was determined that using an NIR forage analysis would allow for more quality samples and thus more complete data collection. Thereafter, samples from each treatment in every replicate at both locations across all harvests were collected and submitted for forage quality analysis which included crude protein (CP)%, acid detergent fiber (ADF)%, neutral detergent fiber (NDF)%, total digestible nutrients (TDN)%, net energy for lactation, relative feed value, relative forage quality and milk/ton. In between harvests plots at each location were visited weekly or bi-weekly and scouted for alfalfa weevil (1st harvest) and potato leaf hopper (2-4th harvests).

What were the results?

Soil test results showed that soil pH and soil phosphorus levels were above critical values, and thus should not be yield limiting, at both field locations. However, soil potassium levels were below critical values at each location. Looking at the raw DM yield and forage data collected presents a variable and confusing picture. Sometimes it appeared that plots with foliar treatment had higher dry matter yields but lower forage quality as compared to control plots, while at other times it appeared that plots with foliar applications had lower dry matter yields but higher forage quality as compared to control plots. There was also considerable variation in plots replicated across the width of the fields. For this reason, it was decided to get the data analyzed statistically. Jeff McCutcheon, Extension educator in Morrow County who has expertise in statistical analysis agreed to analyze the data. Each location was analyzed separately. A statistical analysis showed no significant differences for DM yield, CP%, ADF% or NDF% between the foliar application treatments and the control at any harvest or at any of the study locations. Scouting results for alfalfa weevil and potato leaf hopper did not show any significant differences in pest numbers between foliar treatment and control plots. All plots remained below recommended economic treatment thresholds over the course of the study.

How have the results contributed or will they contribute to sustainable agriculture?

The results from this study will be used in discussions with farmers to make several points that may help them to make better choices and decisions regarding the purchase and use of soil fertility or plant growth products:

- Before considering additional applications of any product to try to increase yield or quality, make sure that soil tests indicate soil pH and major soil nutrients are where they need to be. (Liebig's Law of the Minimum)
- When trying or using any new product, do not automatically believe the sales pitch. Verify results on your farm using some replicated strips including a control.
- Before using a foliar product, focus on the use of soil applied products. Specifically with regard to humic acid, when literature suggests that the benefit comes from feeding soil microbial life, be cautious about seeking that benefit from a foliar applied product.

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