

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

Report Form

Is Foliar Feeding an Economical Way for Organic Dairy Farmers to Boost the Quality and Quantity of Forages?

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Summary: (Describe your project, its objectives and results in one or two sentences)

This project aimed to evaluate the effectiveness of using repeated foliar applications of plant nutrients to maintain high quality alfalfa and mixed grass forage on organic dairy producer farms. Our results did not show consistent, overwhelming benefits of this practice to maintain or increase forage yield or quality, with effectiveness varying across farm fields, crops and cuttings throughout the growing season.

What was done? (One paragraph describing the goals, experiments and how they were performed)

Foliar feeding (application of plant nutrients to leaves) is becoming an increasingly popular practice used by organic dairy producers to manage forage quality throughout the growing season. However, the few scientific studies investigating this practice do not support its effectiveness, especially considering farmer investment in foliar nutrient products. We conducted an experiment in 2018 on seven alfalfa-mixed grass forage sites of four organic dairy farms in Wayne and Holmes Counties. The experimental design was a randomized complete block (RCB) with four replications of two treatments: Treatment #1, control (standard organic management program), which typically involves the application of organic manure in the fall and again in spring, and Treatment #2, the standard management program plus foliar application of a custom blend of two SoilBiotics products, Organic Blend 5-0-0 (9 L/ha) and eFISHnt 5-1-2 (18 L/ha). Treatment #2 was applied at first green-up and 10 days after each cutting for three applications. We collected data after treatment but before the next cutting to estimate forage yield (based on dry weight of biomass samples), in-field plant health (based on

NDVI, normalized difference vegetation index), and various forage quality parameters: *crude protein, soluble protein, acid neutral detergent fiber, relative forage quality, relative forage value* and Brix (sugar content) (based on lab tests of fresh samples). We also collected soil and tissue samples for mineral nutrient analysis before and after the growing season. We performed analysis of variance (ANOVA) (PROC GLM procedure in SAS 9.4) to determine significance between the treatments for any variables measured.

What were the results? (One paragraph on the outcome of the experiments, what was learned from them)

The foliar feeding practice did not increase yield or in-field plant health for any of the sites and cuttings. While a few forage quality parameters were significantly higher or lower than the controlled areas, the inconsistency across sites and cuttings limited the inferences that can be made. No visually detectable effects were observed between the foliar-fed plots and the untreated plots.

How have the results contributed or will they contribute to sustainable agriculture? (One paragraph on how will farmers use this research information and what difference will it make on their farms.)

Organic dairy operations in Ohio and elsewhere face considerable challenges to stay in the market, and they are forced to minimize their production costs. Foliar feeding is a unique approach to survive in a struggling market, giving hope of a much higher quality feed product through a practice that is convenient and relatively inexpensive. However, most, if not all, foliar feeding recommendations come either from business owners or other farmers, with no scientific evidence that this practice is effective. It is important for universities to contribute with research that can help increase understanding of the validity of this practice or improve its efficiency. The results of this experiment were shared with farmers through one-on-one meetings that involved cooperating farmers and foliar fertilizer company representatives to discuss directions of future trials and recommendations for product improvement. More importantly, this project involved organic farmers, the industry (SoilBiotics) and the university, providing a tremendous opportunity for all three groups to learn and work together for the betterment of farmers and sustainable agricultural production.