RESEARCH TRIAL – PROGRESS SUMMARY

PROJECT NAME	DATE
HydroGreen Dairy Trial	2019-2024

COLLABORATORS

Bill Vanderkooi, Jesse Curtis, Lara Hirowatari

HYPOTHESIS

The purpose of this trial is to determine the effects of replacing increasing amounts of Dry Matter Intake Feed – DMIF (forage only, the grain only, combination forage and grain) with HydroGreen in lactating dairy cattle. This project will help us determine the optimal DMIF costs, milk yield, milk components (BF Protein), reproductive performance and general health.

MATERIALS & METHODS

A crossover trial will be conducted at a commercial dairy farm located in Abbotsford, Bristish Columbia. This facility was selected due to their availability of research technicians, ability to feed hydroponic grass, and monitor the outcomes of the trial. A total of 45 lactating cows will be used in one barn with freestalls bedded with sawdust and will be milked in a robotic milking machine. Cows will have access to water ad libitum and be fed using a total mixed ration supplement with a pellet consumed in the robotic milker.

Groups of cows will receive 4 diets during the crossover experiment: (1) control diet (CON): consist of grass haylage, customized TMR mash, whey permeate, energizer RP10, and MXB200. The control diet will be formulated to be 47.6% dry matter, 16.5% crude protein, 30% neutral detergent fiber, and 45.8% forage to concentrate ratio; (2) hydroponically grown grass replacing forage only (HFO); or (3) hydroponically grown grass replacing grain only (HGO). An additional group of hydroponically grown grass that replaces forage and grain at a 50:50 rate may be explored in future work. The level of hydroponically grown grass will be added to the ration with the corresponding dry matter adjustment to the forage and grain amount fed along with the composition of the TMR mash to maintain balanced rations. Within each hydroponic grass group, they will be further subdivided to replace the dry matter % at a rate of 10%, 15%, 20%, and 25%.

The diets will also be kept isonitrogenous throughout the trial. The diets will be fed over a period of 6 weeks alternating from control to treatment diets.

Data Collection
Following enrollment, the following data will be collected:

- Milk samples
    - Pooled milk samples will be collected in duplicate at every treatment period at the end of weeks 3, 4, and 6
        - Components (fat, protein, other solids, milk urea nitrogen, and somatic cell count) will be tested at Pacific milk labs
        - Fatty acid profile at lipid analytical laboratories
- DeLaval robotic data
    - On a daily basis throughout the experimental period, milk production, electrical conductivity, pellet consumption, and number of visits to robot will be captured for each cow.
- Rumination activity
    - The level of rumination will be recorded on each cow daily
- Disease/conditions
    - At each disease/condition occurrence, the date and treatment provided will be recorded
    - Specific diseases that will be monitored include:
        - Ketosis
        - Displaced abomasum
        - Digestive upset
        - Mastitis
        - Metritis
- Reproduction
    - All cases of estrus will be recorded
- Feed samples
    - At the midpoint and end of the experimental period, a TMR sample will be collected to analyze for crude protein, NDF, ADF, calcium, phosphorus, and magnesium by wet chemistry. For each hydroponic grass feeding period, samples will also be collected at the midpoint and end of the experimental period and analyzed using wet chemistry
    - Haylage will be tested weekly for dry matter and monthly for crude protein, NDF, and ADF