LIVING LAB - ATLANTIC

Project Background

- **Prince Edward Island:** Produces 23% of the potato production of Canada;
- **Nitrogen Management:** Mainly uniform application without considering soil spatial variability, no in season application;
- **Potato:** Having low NUE (< 50%) due to shallow root system and cultivated on soils that are susceptible to low water retention, causes N leaching;
- **Precision Agriculture:** Addresses the spatial and temporal variability in soil and crop factors within a field for the purpose of increasing grower revenue and protecting the environment;
- **Management Zones (MZs):** Delineates smaller homogenous units, in which uniform management can be applied and can provide a spatial framework for **precise N management**

Objectives

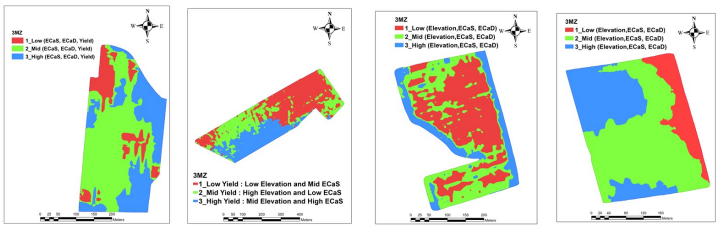
- To study within field spatial variability of commercial fields using apparent electrical conductivity (ECa), topography and tuber yield;
- To conduct experiments for comparison among in season specific N rates at Black Pond sites & VRA N rates based on MZs at Oyster Cover sites;
- To evaluate the effects of MZs and specific and VRA N rates on potato growth, tuber yield and soil residual N (0-15 and 15-30 cm).

Methodology

- **Four commercial sites: s**elected in Kensington (Oyster Cove Farm: OC1 & OC2) & Souris (Black Pond Farm: BP1 & BP2) in Prince Edward Island;
- **Treatments:** OC1 & 2 (uniform vs variable N rate application (VRA)), BP1 & 2 (specific N rates);
- **MZs delineation:** Using ECa (VERIS-3100), topography and yield monitor data;
- **Physicochemical:** Soil properties using an intensive grid sampling;
- **In season N status:** During the growing season, soil ammonium & nitrate plus petiole nitrate (3 times);
- **Harvest evaluation:** at specific sampling points and yield monitor.

Selected Results

- **Delineated MZs in the four commercial fields:**



OC1 **OC2** **BP1** **BP2**

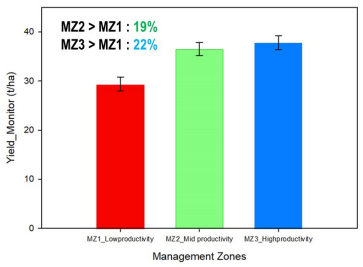


Fig: Effect of MZs on yield (OC1)

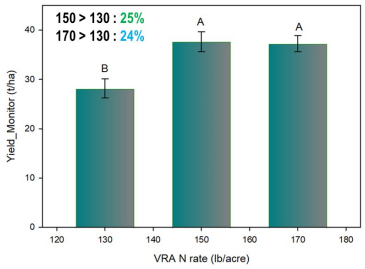


Fig: Effect of VRA on yield (OC1)

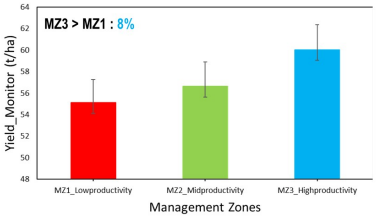


Fig: Effect of MZs on yield (OC2)

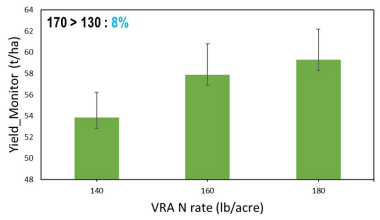


Fig: Effect of MZs on yield (OC2)

Conclusion and future steps

- Preliminary study results indicated that MZs and VRA could be a useful approach in terms of increasing potato tuber yield and tackling high prices of input N fertilizers;
- **In future:** Inclusion of Artificial Intelligence (AI) for in season N prediction; data analysis and publishing of articles

Acknowledgement

• Oyster Cove Farm, Matthews Ramsay; Black Pond Farm, Nathan Ching; PEI Potato Board, Ryan Barnett; Team AAFC;

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