



ACTIVITY 2

SOIL HEALTH FOR MUCK SOILS

Updated Feb 2024

Dr. Mary Ruth McDonald
Led by the Muck Crop Research Station

Soil sampling and analysis

Soil samples were collected from 21 fields of muck soil in the Holland Marsh and 3 fields of mineral soil used for vegetable production near the Holland Marsh. There were at least 2 sub samples per field. Samples were collected in late May 2023, prior to seeding of the carrot crop. The soil samples were sent to SGS Labs for chemical and physical characteristics, to A&L Labs for the VitTellus soil health test and to Harvest Genomics for the microbiome analysis of soil. A sample of muck soil was submitted to the Agri-Food Lab (AFL) at the University of Guelph so they can try their new soil health test (SHAP) on muck soil during fall. SHAP test provides assessment of soil active carbon, potential mineralizable nitrogen, soil respiration, aggregate stability, and organic matter. All these tests for SHAP analysis were effective for high organic matter soil except aggregate stability. Followed by this, soil samples were collected from 9 different muck soil fields on 12 October and submitted to the AFL. Part of same samples were also sent to A&L lab to compare results from two labs offering same soil health tests in Ontario. During fall, when carrots were ready to harvest, productivity samples were taken from all fields. Samples were taken from one-meter rows in each of selected four blocks in the fields from where soil sample was taken. Yield assessment was done to estimate the productivity of each field.

Preliminary analysis from the two years of soil testing indicated the potential to use four indicators to measure soil health. A first report will be shared with the growers at the 2024 Muck Crop Grower Days in April 2024.

Cover crop after carrots

Two field trials are being conducted to determine effective cover crop after carrots at the Holland Marsh. First trial is to compare spring barley seeded before carrot harvest with spring barley and fall rye seeded after carrots are harvested. Pre-harvest broadcasting of barley was done on 25 September and other treatments were seeded on 17 October. In second trial, additional cover crop species of daikon radish, alyssum transplant, barley transplant, and primed and non-primed spring barley, oats and triticale will be compared. We are interested in cover crop that can be established after carrots are harvested in an effective way to control soil loss by wind erosion and also do not over winter which can probably delay onion seeding the following year. Alyssum and barley were seeded on 22 August and 25 September respectively to produce transplants. All the treatments were seeded and transplanted on 14 and 16 October. For both trials assessment of canopy coverage, plant counts, and above ground biomass will be done before cover crops are frost killed. During early spring 2024, winter survival of these cover crops will be assessed.



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Ontario Fruit and Vegetables Convention, Niagara Falls, ON

Feb 21-22, 2023

- Poster: Identifying cover crop species for use on muck soils after carrot harvest - Neem Pandey, K. Schneider, and M.R. McDonald

Grower Information Days- Holland Marsh, ON

April 5, 2023

- Oral presentation: Cover crops and soil health for organic soils – Neem Pandey, K. Schneider, and M.R. McDonald

Annual Conference of Canadian Society of Soil Sciences- Halifax

N.S. June 26-29, 2023

- Poster- Identifying potential cover crops for organic (muck) soil in the Holland Marsh after late carrot harvest- Neem Pandey, K. Schneider, and M.R. McDonald.
- Oral presentation: Establishing a benchmark for soil health in high organic matter (muck) soils - Neem
- Pandey, K. Schneider, and M.R. McDonald