

Smart Agriculture Research

2022 Evaluation: ChrysaLabs Soil Nutrient Sensor

INTRODUCTION

The ChrysaLabs probe is a real-time soil nutrient sensor which measures soil nutrients using spectroscopy. Rather than sending soil samples to a commercial wet laboratory for analysis, soil cores are removed and the ChrysaLabs probe is inserted into the soil to measure soil nutrients and characteristics.

ChrysaLabs is based out of Quebec. The majority of its initial soil calibration data came from across North America, but Western Canada was not the focus during the initial development. For this technology to be used in Western Canada, calibration data was needed. Olds College Centre for Innovation (OCCI) worked with ChrysaLabs to provide them with a large quantity of soil sampling data for calibration of the ChrysaLabs probe. Additionally, OCCI evaluated the probe for its usability and use cases in Western Canada.

OBJECTIVES

- Test ChrysaLabs probe in different soil types and environmental conditions.
- Evaluate ChrysaLabs probe for user experience.
- Collect and send soil sample data to ChrysaLabs for calibration to soils in Western Canada.

STUDY DETAILS

- OCCI tested the ChrysaLabs probe in:
 - Pasture
 - Cultivated crop land
 - Turf
 - Greenhouse soil
 - Horticultural soil
 - Frozen soil*
 - Dry/hard soil
- OCCI collected 600+ samples for calibration data between Fall 2021 and Fall 2022.
- Numerous OCCI researchers used the probe to evaluate the user experience.
- Incorporation of Olds College student labs allowed students to learn about the technology, use the probe and assist with data collection.



RESULTS

- ChrysaLabs scans the soil in less than 30 seconds, and with cellular connectivity the results are available right after scanning to review real-time soil nutrient measurements.
- ChrysaLabs measures many soil nutrients and characteristics:
 - Nitrogen (nitrate)
 - Phosphorous
 - Potassium
 - Sulfur
 - Sodium
 - Magnesium
 - Manganese
 - Iron
 - Copper
 - Boron
 - Calcium
 - Aluminum
 - Zinc
 - Organic matter
 - pH
 - Buffer pH
 - CEC
 - Other parameters in Beta testing
- For comparability to multiple different wet labs, some of the micro and macronutrients are listed in multiple lab methods (ex: Mehlich and DTPA).
- ChrysaLabs has both a mobile and web-based application for review of sample results.
- ChrysaLabs worked well in multiple field types; however, when used in frozen* and dry/hard soils, the hand probe included with the ChrysaLabs probe could not be used. A larger diameter hydraulic probe was required to probe the holes for the Chrysalabs probe. **Disclaimer: ChrysaLabs does not recommend the use of the probe on frozen soil.*

FUTURE RESEARCH

The evaluation of ChrysaLabs is complete. OCCI is exploring future project opportunities with soil nutrient sensors.



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