



INTRODUCTION

Cavity spot (Fig. 1) is an economically important disease of carrots caused by several species of *Pythium* (Fig. 2). There are no diagnostic tools to identify high-risk fields. Many studies have shown that disease risk is not related to the total quantity of *Pythium* in soil. The hypothesis is that some aspects of the soil microbiome, along with pathogen presence, influence the development of cavity spot.



Fig. 1. Symptoms: Sunken, elongated lesions

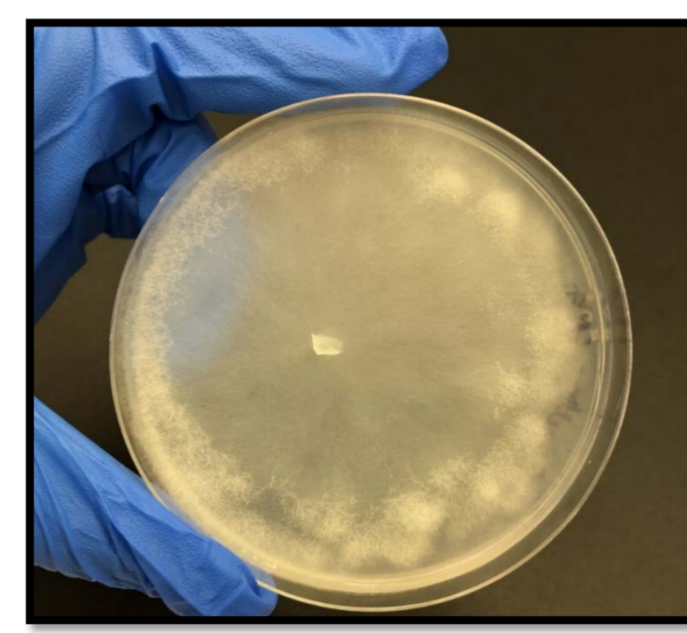


Fig. 2. *Pythium* in culture



Fig. 3. Soil sampling

MATERIALS AND METHODS

- Carrot fields were identified as having low or high-risk of cavity spot in the Holland Marsh, based on disease history and harvest assessment. Cavity spot severity in low-risk fields was 15–21% and in high-risk fields was 38–55% in 2021.
- All fields had high organic matter soils (>54 %) and carrots-onions in rotation.
- Soil was collected (Fig. 3) from 6 fields just before or at carrot seeding. Soil nutrient analysis were performed. A comparative metagenomic analysis of soil samples was conducted by Harvest Genomics, Quebec (Fig. 4).

Objective

To determine if the soil microbiome and soil chemical properties are related to the risk of cavity spot

RESULTS

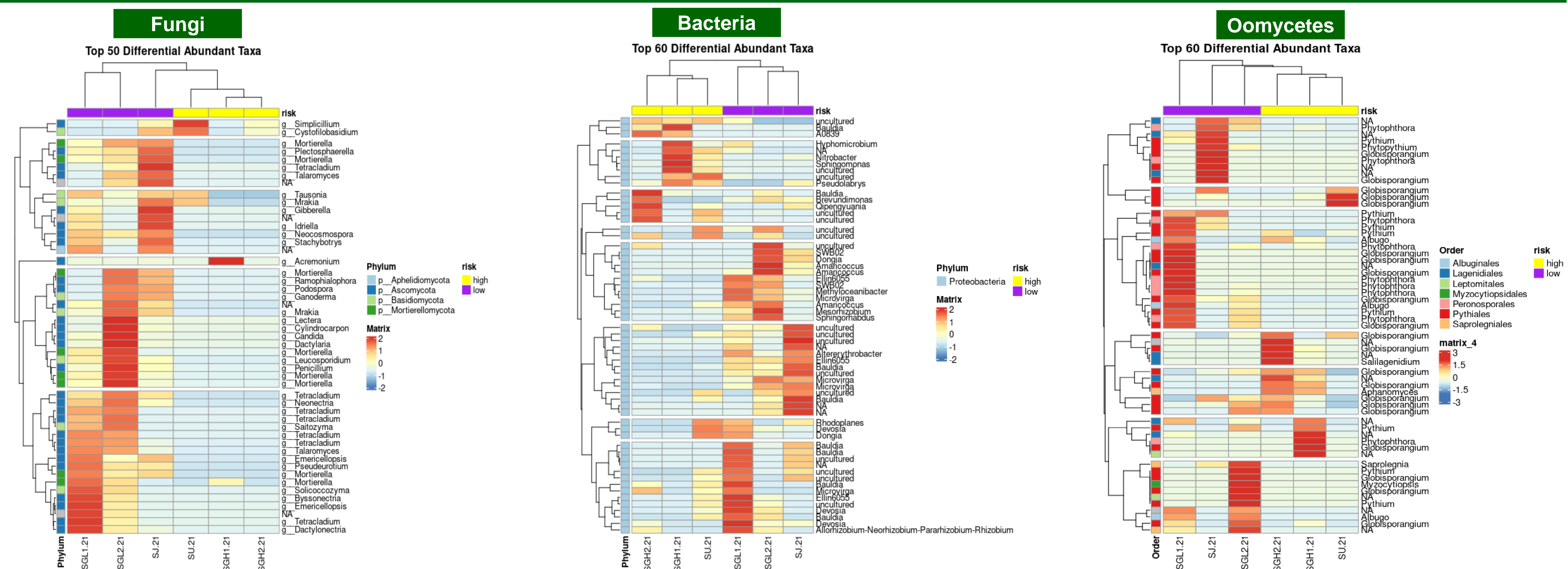


Fig. 4. Metagenomic analysis of six soil samples collected in 2021

❖ The relative abundance of the following microbes was lower in high-risk soils vs low-risk soils: fungi *Mortierella*, *Tetracladium*, and *Fusarium*; bacteria *Bauldia* and *Rhizobium*; and oomycetes *Phytophthora* and *Peronosporales* (Fig. 4).

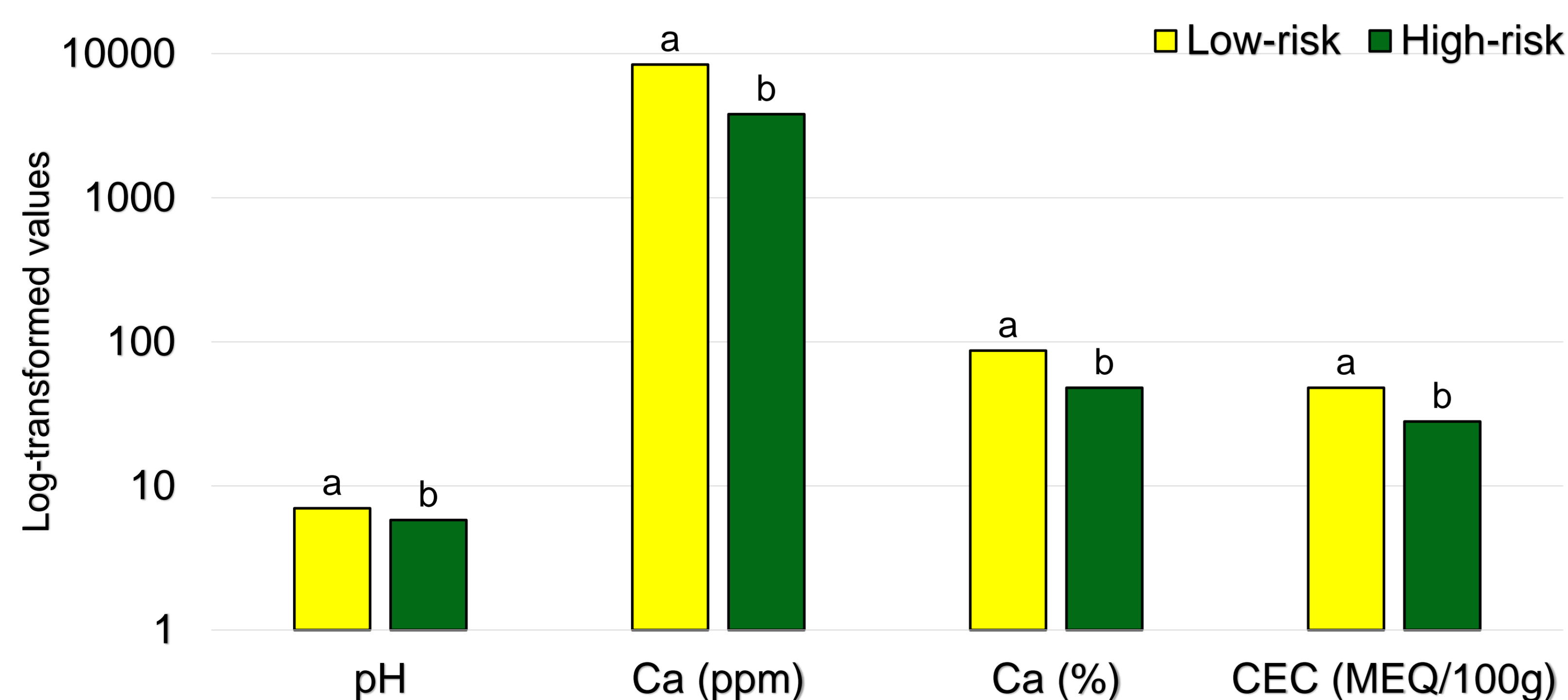


Fig. 5. Association of soil properties with risk of cavity spot.
Ca: calcium, Ca (%): percent calcium base saturation, CEC: cation exchange capacity
*Numbers in a column followed by the same letter are not significantly different, Tukey's test (P -value >0.05)

- ❖ Low-risk soils had a higher average soil pH of ~7 and soil calcium content of 8400 ppm compared to high-risk soils that had an average pH of ~6 and calcium content of 3800 ppm (Fig. 5).
- ❖ There were no significant associations of other soil nutrient concentrations with cavity spot risk.

CONCLUSIONS

- Initial results suggest that the taxa identified, along with soil pH and calcium content, could be used as indicators of cavity spot risk. Studies are continuing.
- Assessment of cavity spot risk before seeding would be very useful for growers.