

NEEDS ASSESSMENTS

RESEARCH

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14. TITLE: Contamination from Harvest Bins (Preliminary Study)

OBJECTIVES

- Preliminarily assess how much bacteria is transferred from the soil or the plants to the bottom of harvest bins and from there into berries when harvesting bins are stacked.

LOCATION: Blueberry Hill Farm, Jonesboro, Maine

PROJECT TIMEFRAME: August 2019

INTRODUCTION

The Food Safety Modernization Act Produce Safety Rule (FSMA PSR) requires that farms take steps to avoid cross-contamination from the soil to harvested produce. The widespread technique of harvesting wild blueberries into bins that were at some point in direct contact with bare soil or on top of plants, with subsequent stacking of these bins presents an unknown level of risk. This risk comes from the possibility of soil collecting in the bottom of the bin when it is in contact with soil and that soil could later fall into the berries in bins that sit under a bin that has been on the ground or on plants. To understand this risk of contamination better, we carried out a small preliminary study.

METHODS

Clean and sanitized bins were placed either on bare soil or on top of wild blueberry plants in the crop field at Blueberry Hill Farm on August 22. These bins stayed in contact with the soil or the plant for either 5 or 30 minutes. In order to simulate the weight of fresh blueberries, two 1-gallon jugs of water were placed on top of the bin stacks during the entire time they were in contact with the soil. After the contact time, the bins were stacked on top of one cleaned and sanitized bottom bin that contained open agar plates for microbial counts. Agar plates in the bottom bin were used to assess total bacteria (APC) and total yeast and molds (APDA). Four plates of each agar were used in each stacking. The stacking was also carried for either 5 or 30 minutes. Controls were carried out where clean sanitized bins that were not put on the soil or plant were stacked on bins with plates. Plates were incubated at 35°C for 2 days (APC) or 25°C for 5 days (APDA). Colony-forming units were counted without visual aids and final average numbers were log-transformed and expressed as total counts per bin.

RESULTS

Results were inconclusive. Microbial load on the controls were sometimes the same or even higher than treatments. Counts on control plates for 5 minutes were higher than counts on control plates for 30 minutes (Figure 1).

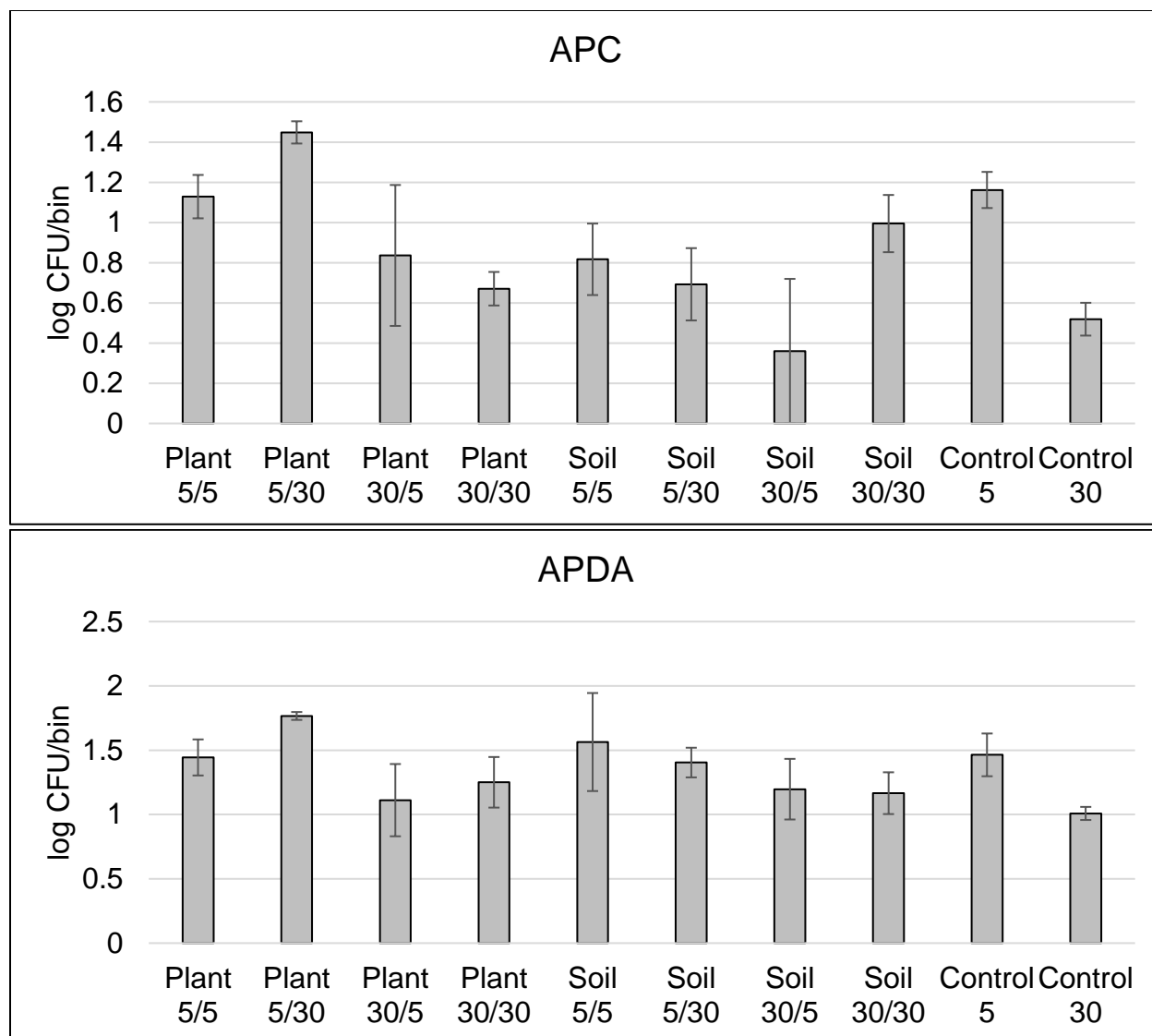


Figure 1. Microbial load expressed as log CFU/ bin for bins laid down on soil and on top of WBB plants for 5 or 30 minutes with subsequent staking on bins with media for 5 or 30 minutes. Results for APC on the top and APDA on the bottom. Error bars represent a 95% Confidence Interval.

DISCUSSION

These results do not support our initial assumptions that longer stacking time would offer higher transfer. It also shows that even when not stacked, microorganisms were finding their way into the plates. This likely happened because the bins do not fully seal when stacked because of their design. Without a proper control, no conclusions can be drawn from the experiment.

CURRENT RECOMMENDATIONS

No recommendations can be made based on this preliminary study. The previous, largely accepted across the country, recommendation that farmers should avoid having harvesting bins getting in contact with the soil when they are to be stacked remains.

NEXT STEPS

Redesign the experiment and try again.

ACKNOWLEDGEMENTS

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