

OrchardWatch: how is the orchard feeling today?

Remote sensing of weather conditions across multiple locations in a single orchard, does it make a difference?

**Jon Clements, Daniel Cooley,
Paul O'Connor and James Krupa**
UMass Amherst

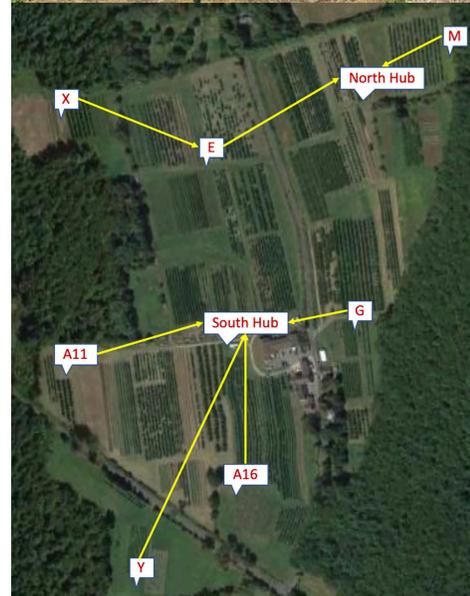
INTRODUCTION

OrchardWatch uses remote sensors to gather environmental data in the orchard. Growers typically collect weather data at a single site on a farm. Management decisions are made based on conditions at that weather station. But conditions around an orchard may be quite different from that one site. This may make site-specific differences in managing orchard pests. We're asking the question, do environmental conditions vary enough from site to site in an orchard that management decisions could target small sections of an orchard, rather than the whole farm or large blocks?

METHODS

We installed nine weather stations (onsetcomp.com) to monitor weather conditions (using hobolink.com) across 50 acres of the UMass Orchard in Belchertown, MA. At each station, OrchardWatch measures the following environmental conditions:

- Air temperature, relative humidity and dew point
- Rainfall
- Wetness
- Solar radiation
- Wind speed and direction
- Soil temperature and moisture



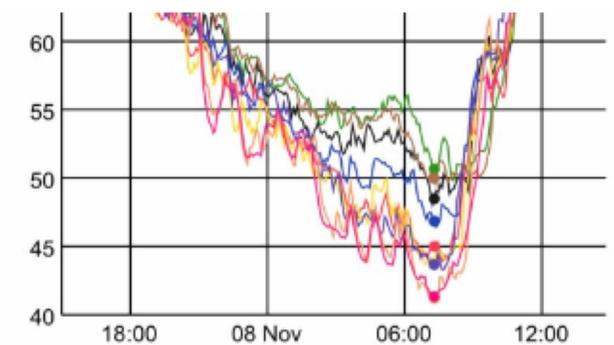
orchardwatch.wordpress.com



This project is supported by the MA Agric. Expt. Station Hatch Funds, the Univ. of Mass. Amherst Center for Ag. & the Env., and the Stockbridge School of Agriculture.

RESULTS

We have only been collecting data since the fall of 2019. Still, we have gleaned a few interesting observations from OrchardWatch. For example, in overnight conditions where an inversion occurs, the temperature difference between locations is as much as 9° F. We plan to look more at such location differences to see if and how they might change orchard management.



07:20

OW-N air Temperature (°F): 48.54
M-air Temperature (°F): 50.72
E-air Temperature (°F): 46.9
X-air Temperature (°F): 45.05
OW-S air Temperature (°F): 43.76
G Temperature (°F): 50.03
A11 Temperature (°F): 43.73
A16 Temperature (°F): 41.26
Y Temperature (°F): 41.38

DISCUSSION

Future plans include installing cameras at each location to capture real-time orchard phenology and sky conditions. Cameras may be able to see pest activity as if one were actually scouting in the orchard. We will investigate machine learning and statistical analysis tools to help develop and improve upon various models such as disease and insect forecasts, thinning, nutritional status and tree growth.