Integrated Cranberry Crop Management for Wisconsin

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This Issue:

Address Correction

If you have any address corrections, additions, or deletions, please let us know.
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Thank you!

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Editor

NDVI Imagery for use in Cranberry Production

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Remote sensing has been used in production agriculture for several years. The goal of utilizing this technology is to identify areas within fields where problems exist and have the opportunity to correct these before there is an impact on yield or plant health. Plants utilize solar radiation for photosynthesis, which means they absorb light that is beneficial for that process. Any other light is reflected in order to avoid overheating the plant. Near-infrared light is a band that is highly reflected by healthy plants.

Utilizing this phenomena, if we measure the near-infrared wavelengths reflected by the plant we can glean an indication of plant health. Measuring near-infrared and visible light reflected from plants simultaneously we can calculate a vegetative index.

Normalized Difference Vegetative Index (NDVI) utilizes visible and near-infrared light and is a value between zero and one that correlates to how green the plant is. Originally, this data was collected by satellites, or manned aircraft, high above the earth's surface. An example of a satellite imagery program is the Landsat Program. This satellite collects images of the earth in multiple spectral bands (including visible light) and has a range of spatial resolutions of approximately 50 – 200 feet square.

Current GPS technology allows producers control equipment within 1 inch or less of the desired location. Variable Rate Application (VRA) gives producers the capability to change rates of inputs at a square foot resolution. With these technologies improving management resolution, higher resolution remote sensing data is required.

Collecting higher resolution remote sensing data can be achieved several ways. Two of these ways are the measurement resolution of the sensor can be increased or the distance from the subject can be decreased. While improvements to sensors have been made, the simplest way to increase measurement resolution is to get closer to the subject or field.

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Machine mounted vegetative index sensors have been utilized for some time to measure the crop in real-time and make adjustments to inputs on-the-go. These sensors are typically used for varying inputs like nitrogen in corn crops during side-dressing applications of nitrogen. At a certain point during the growing season driving over the crop becomes detrimental to crop and soil health limiting their usefulness. So the question becomes "How do we collect vegetative indices data throughout the entire growing season without impacting crop and soil health?"

Enter Unmanned Aerial Vehicles (UAVs). These remote controlled aircraft can provide producers a means of scouting the field (or bed) without having to walk through it. This opens up many opportunities for improved crop management. The simplest system for implementing a UAV in your crop management system is utilizing a visible light camera. These can give you a survey of the beds, or the marsh, to identify problem areas visually and know what areas need attention.

Caption: Dr. Brian Luck test flying a UAV at the University of Wisconsin-Madison.

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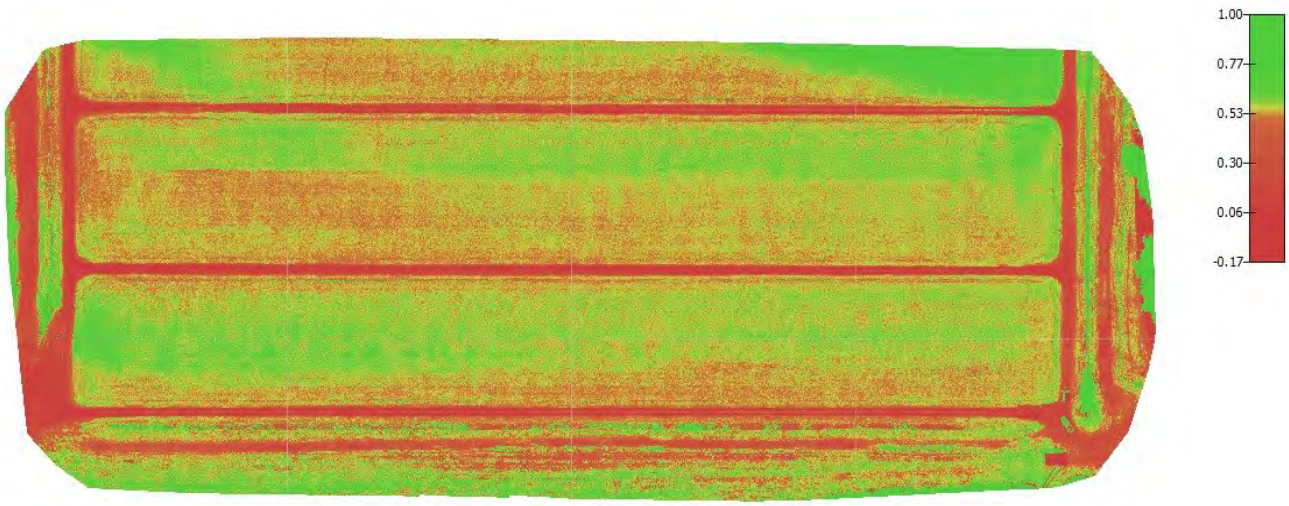
Other "payloads" can be attached to the UAV as well. Research in Dr. Brian Luck's lab at the University of Wisconsin-Madison is seeking to implement an NDVI capable camera on a UAV which will provide a spatial resolution of 3 x 3 inches, or less, for collected georeferenced images. This tighter resolution can provide growers more detailed information about locations in the field that may need attention during the growing season. Other sensors that may be useful are infrared sensors (temperature measurement) and fluorescence sensors (photosynthesis indicator).



Caption: NDVI imagery of cranberry beds. Red areas indicate less green areas and green indicates more green vegetation. The dikes between beds are easily visible as well as areas within beds that may be less green.

Current Federal Aviation Administration (FAA) regulations prohibit the use of UAV's for commercial applications. However, the FAA is working toward new rules regarding small UAV's (less than 55 lb) in the national airspace. This rule was released for public comment in February, 2015 and expected implementation is later this year.

Use of UAV's for data collection and crop management will only increase in the future, but data collection may not be the only use for these devices. Recently, a large commercial UAV was approved for use in the United States capable of carrying a practical payload of 35 lbs. This UAV resembles a full size helicopter with a main rotor diameter of approximately 10 ft. This UAV can be utilized for applying low volume pesticides and other products and remove the need for driving through or around fields. This allows producers to utilize areal application of inputs where safety concerns and other restrictions would not allow. Imagine having the capability to "spot apply" inputs based on remotely sensed data with the same UAV. It's an exciting time to be involved in agriculture!

Cranberry Journal—Grower Update

David Bartling

Manitowish Cranberry Co., Inc.

All fertilizer applications have been finished and after spraying for flea beetle on a select few beds with Actara this morning, I am hoping we are done with the applicator boom for the year.

Our focus has now shifted to preparing our receiving station where we clean and bulk load our fruit and to finish some other tasks before harvest that have not been completed thus far because we've been busy fertilizing and spraying.

We flushed and cleaned culverts and end tubes that have filled with mud and are checking all bulkhead boards as we go around the marsh as well.

Other than another trip around with the mower, things have slowed down some and tomorrow I head to Massachusetts for the August CMC meeting and Cape Cod Cranberry Growers Association Summer Field Day.

I have noticed a couple small spots that have had cranberry fruit worm damage, but the majority of the property looks fairly clean. Only a couple berries, out of the hundred or so I checked, had been infected with cotton ball.

As the vines grow more, it has become more apparent on the few spots where another nozzle on the fertilizer boom needs to be opened, as there is a strip of yellowing vines down part of a center of a bed, or on an edge on another. With me behind the wheel of the boom tractor, there is no one else to point my finger at this time!

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