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Barriers to Scale: Algae Crop Protection Workshop

Dr. Jerilyn A. Timlin (presenting)

Dr. Tom Reichardt

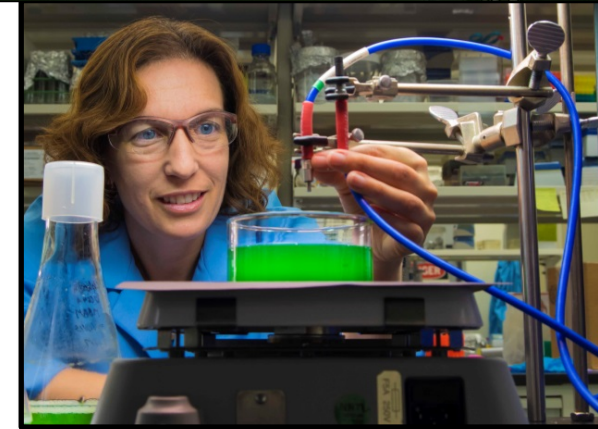
**PANEL 4: CURRENT AND FUTURE PEST MONITORING
PRACTICES**

April 20-21, 2021



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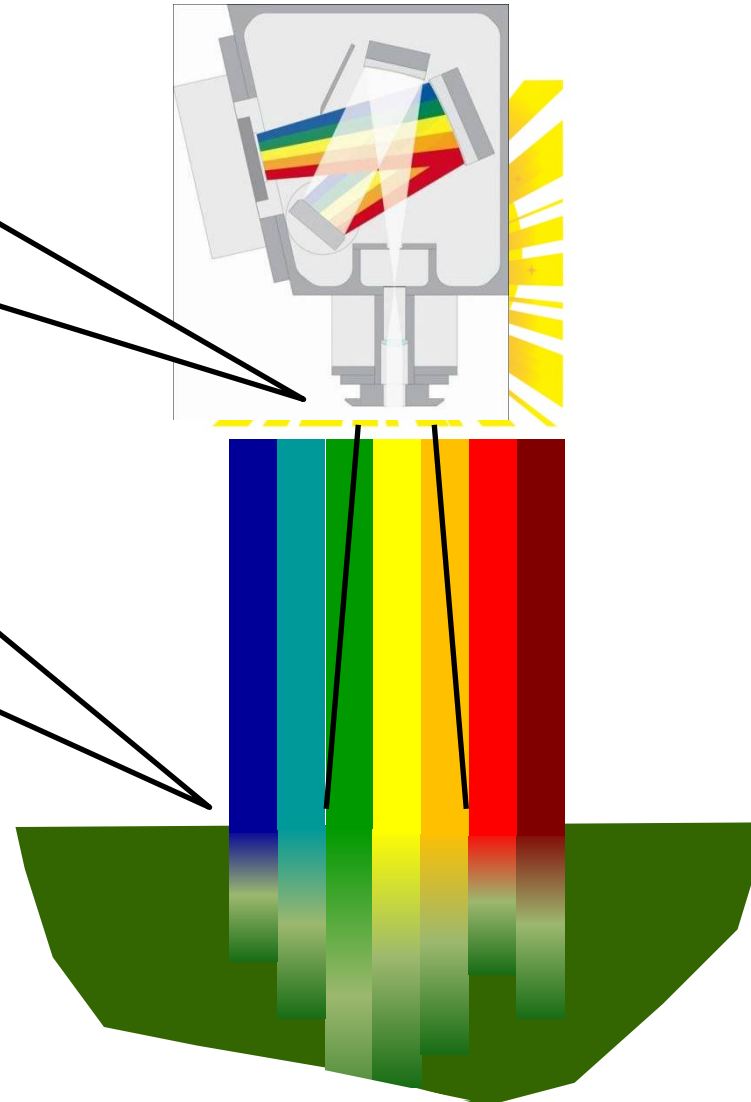
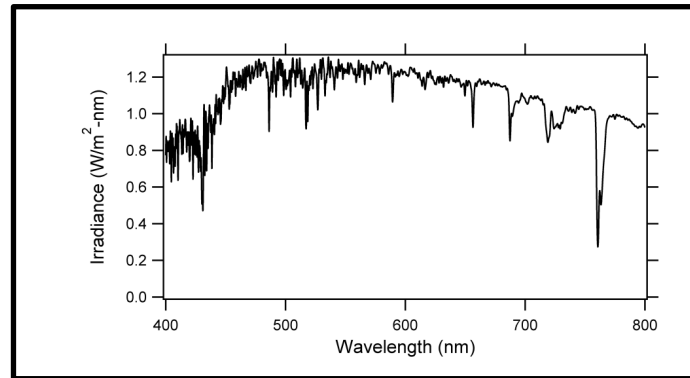
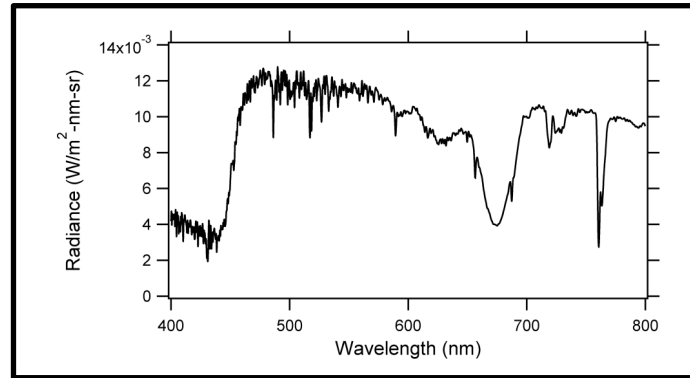


Outlook on Crop Protection – Personal viewpoint

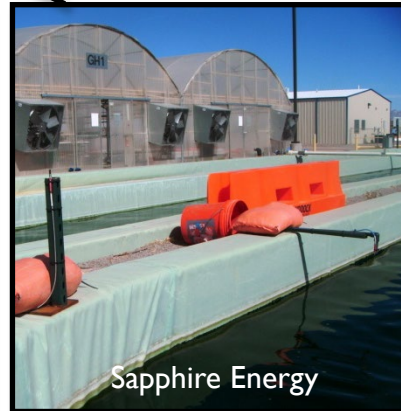
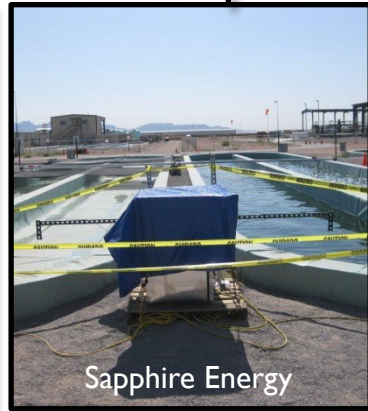
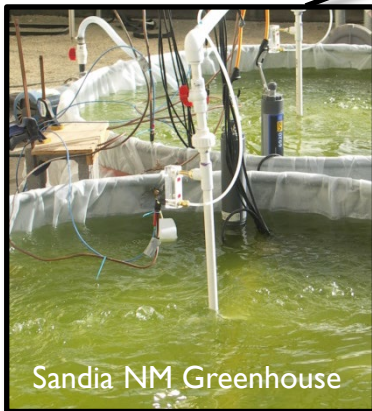
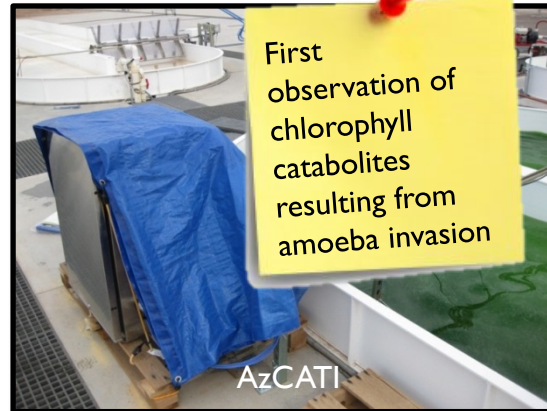
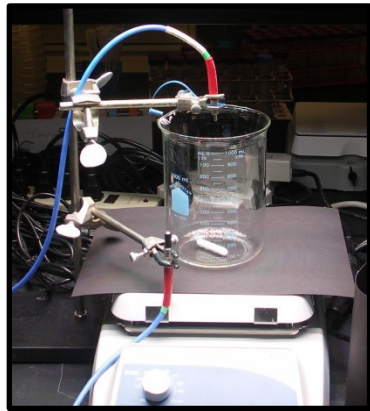
- *What are the key attributes required in a pest monitoring program?*
 - *Response time (min → real-time), multianalytic, automation/skill level (not require specialized skills), cost (per day of operation), sensitivity/specificity*
- *Can crop protection be proactive vs reactive and how does this affect monitoring process or technologies?*
 - *Yes. Early detection will improve mitigation.*
- *Can monitoring rely on a single method?*
 - *A resounding “NO!” Multiple methods working in tandem (perhaps in a tiered approach) to surveil, identify, and remedy will be necessary at scale.*
- *What monitoring strategies are pest vs host specific?*
 - *Both **pest-based** and **host-based** monitoring strategies are important, but not necessarily **pest-specific** and **host-specific**. In many cases “specific” monitoring strategies can be limiting due to the large number of unknown pests and importantly molecular variants. Agnostic strategies could be very successful for surveillance and screening.*
- *Would a pest database or similar service be useful?*
 - *Yes, but what it would contain is critical – not just molecular sequence information, but also physical and optical properties, pigment information, lifecycle, host range, etc.*



Principals of Spectroradiometric Monitoring



Spectroradiometric Monitoring of *Algal Biomass & Algal Predators*



Spectroradiometric Monitoring of Algal Ponds

- Advantages over current practices
 - *In-situ measurement of biomass and pigment optical activity and real-time detection of predator effect*
 - *Extremely rapid (~5-min) measurement times*
 - *Non-sampling/non-contact/stand-off detection*
 - *No laboratory access required*
 - *No extensive pre-calibration required*
 - *Fully autonomous operation, can be 24/7*
- Limitations
 - *Non-specific detection of functional effect on host algae*
 - *Requires characterization of algal optical properties*
 - *Indoor deployment has proven challenging*

