

ADDRESSING THREATS TO AGRICULTURE USING UAS AND ADVANCED REMOTE SENSING TECHNIQUES

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ABSTRACT:

To dramatically expand detection and diagnosis of threats to potato crops in southeast Idaho, Idaho State University is leading a research initiative using non-invasive, near-range, high-resolution imagery data captured with Unmanned Aircraft Systems (UAS). The advantage of using UAS is the capability to scan large areas of potato fields to identify impacts of crop pests and nutrient deficiencies. Potatoes are one of the most important food crops in Idaho and the northwestern U.S., that are susceptible to crop pests. This study uses a novel approach to advance precision agriculture science by utilizing multi and hyperspectral sensors from UAS flights to detect a broader wavelength spectrum that allows discernment of crop health factors. Remote sensing technologies offer the potential to protect U.S. food security via rapid assessments of crop health over large areas. Detected areas can then be prioritized for remediation, thereby limiting the impact of crop losses. An important component of this project has been to collaborate closely with farmers and industry stakeholders specializing in addressing threats to potato crops. Weekly UAS flights employing innovative utilize remote sensing devices scan potato fields operated by grower partners and compliment this with simultaneous spectrometer field scans. Results of field testing are rigorously compared with additional spectroscopic data collected from potato plants that have been stressed by crop pests and pathogens in greenhouse laboratory conditions. This approach can provide early detection of stress and be used in a preventative manner for crop management strategies. Once remote sensing techniques are developed, they are transferable to similar crops and environments and thus can be rapidly repeated globally. data collection Our long-term goals are to determine the best methodology for threat detection and the applicability of this technology to rapidly and cost-effectively inform decision makers and farm producers on the control and mitigation of crop threats and ensure food security by minimizing crop losses.

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