

2017 AFRP Research Project Objectives

Proximal and Remote Sensing of Alfalfa Canopies for Early Detection of Insect Stress and Rapid Integrating Pest Management Decision Making **University of Maryland - Lamp**

Project Award: \$290,000

Objectives:

- Alfalfa is a major forage crop in northcentral and northeastern US, where it is subject to insect stress leading to reduced transpiration and higher canopy temperatures. Here, we focus on early detection of injury using radiation technology with a pest of alfalfa, potato leafhopper. We will employ proximal sensing, e.g. using handheld IR thermometers, to aid on-site, real-time decision-making. We will also employ UAV (unmanned aerial vehicles) and mapping technology to locate stressed areas for targeted management. Our proposal addresses two areas: 1) increase forage yields and quality through improved management (75%), and 2) develop methods to estimate forage yield and quality to reduce producer risks (25%). Our objectives are: 1) to use proximal and remote sensing to assess canopy conditions in existing field plots towards the development of rapid assessment for decision-making of insect pest stress, 2) to validate the technology on a field scale and to develop operational protocols and sensor-UAV interface, and 3) to develop specific guidelines for predicting potato leafhopper injury in alfalfa using proximal and remote sensing, and disseminate those guidelines through extension and allied industry outlets. We will use existing field plots to test and evaluate various proximal and remote sensors to detect early injury from the leafhopper. Then, we will validate methods to detect early stress in whole fields, including producer fields. Adoption of proximal and remote sensing for decision-making will enhance integrated pest management, improve alfalfa forage yield and quality, reduce insecticide use in alfalfa, and improve persistence of alfalfa stands.