United States Department of Agriculture

"Droning" on about Nursery Nutrient Research

Carolyn Scagel & Lloyd Nackley

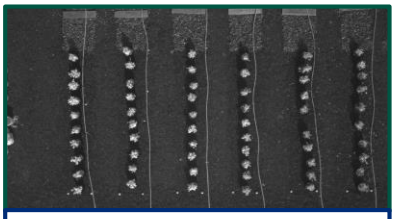
Renovating the run-off pad system. Corrugated plastic panels buried in gravel create a gutter system and plants are placed on top. Run-off are collected from each pad.

Crop health monitoring is a commonly marketed application of remotely piloted aerial systems (RPAS) i.e., drones. Images collected during flights are used to monitor crop health across large areas with diverse topography. Drones are an improvement over human-crewed aerial vehicles (i.e., small airplanes) or LANDSAT imagery because images can be collected more frequently and have better image quality. However, like almost everything else in the Nursery business, there is not a one-size fits all method for deploying drones and some production scenarios are challenging.

RPAS being flown over the run-off pad experiment at NWREC

At the North Willamette Research and Extension Center (NWREC), Dr. Carolyn Scagel and Jesse Mitchell (USDA, Plant Physiology) and Dr. Lloyd Nackley (OSU, Nursery Production) are investigating how RPAS can be used to detect nutrient deficiencies in container grown perennials. Using a "run-off pad", a unique outdoor laboratory that enables researchers to monitor inputs and outputs of nursery fertilizer applications, they are evaluating how three common ornamentals (Rose, Boxwood, and Burning Bush) respond to a range of fertilizers.

The research team collected data on nutrients in the irrigation run-off and leaves, and images from a multispectral camera flown on the Nackley lab RPAS. Data collected during 2020 is being analyzed. The experiment this year revealed a number of opportunities to improve control in nursery fertilization, irrigation, and remote sensing methods. The project is being refined for another growing season next year to develop new methodology for plant stress detection in nursery production systems.



Multispectral imagery collected of the run-off pad by the RPAS. Full fertilized plants are on the left of the image.

Student assistants collected leaf chlorophyll data on boxwood plants

If you have any questions or would like to know more, feel free to reach out to Carolyn Scagel at Carolyn.Scagel@usda.gov or Lloyd Nackley at Lloyd.Nackley@oregonstate.edu

This collaborative research was supported by the USDA, Northwest Nursery Crop Research Center.

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