Research Proposal
OREGON DEPARTMENT OF AGRICULTURE
OAN NURSERY RESEARCH COMMITTEE
Date: October 13, 2023

Principal Investigator:
Lloyd Nackley, Associate Professor, Nursery Production and Greenhouse Management, Oregon State University, Aurora, OR. E-mail: Lloyd.Nackley@Oregonstate.edu

Title: Illuminating Light and Water Needs of High-Value Houseplant Varieties

Collaborators:
Little Prince of Oregon: Mike Hicks, General Manager - Production
Fessler Nursery: Tanner Fessler, Production Manager – Sales

Background

The increasing popularity of houseplants in recent years has presented a significant opportunity for growth within the nursery industry. However, the rapid growth of the houseplant market has outpaced comprehensive research efforts, leaving many questions about the specific lighting and watering needs of various houseplants unanswered. For example, many nursery growers are increasingly considering or implementing supplemental lighting systems to meet the demands of various houseplant species, substantial capital and operating expenses are involved. Optimizing the lighting requirements of houseplants could significantly impact the economic viability of nursery operations. Additionally, it's essential to recognize that overwatering remains a leading cause of houseplant mortality.

These knowledge gaps represent valuable opportunities for the nursery industry to not only boost production but also provide crucial information to consumers regarding the optimal conditions for successful houseplant cultivation. Our grower collaborators support this research and state that this project would provide "*extremely valuable information to learn*." By bridging these gaps, the industry can enhance the overall experience of both growers and plant enthusiasts.

Project Objectives:

The primary aim of this research project is to comprehensively investigate and understand the responses of high-value houseplants to varying light conditions and drought stress. Our key objectives are twofold, directly addressing two significant challenges within the realm of houseplant cultivation.

Firstly, there exists a substantial knowledge gap surrounding the specific lighting requirements of various houseplant species. To address this issue, our research will systematically examine the photosynthetic responses of a diverse range of houseplants, when exposed to different light intensities. By collecting data on these responses, we aim to provide detailed insights into the ideal lighting requirements for different houseplant species, thus enhancing their growth and overall health.

Secondly, overwatering remains a prevalent and avoidable issue, with inadequate knowledge about the water needs of different houseplants contributing to this problem. Our research will identify the water use efficiency, in other words how effectively a plant uses water to support its growth and function, and the low-water (drought) threshold for the same plants we study the light responses.

Methods and Timeline

Winter 2024

Collaborate with partner nurseries to select varieties of interest and allocate dedicated space at both partner nurseries for on-farm research trials. The houseplant types will be high-value varieties selected by our grower collaborators. Our goal is to ensure that the experimental conditions closely mimic those of a typical commercial nursery operation. To maintain the integrity of the study, sampled plants, which may not be suitable for sale, will be isolated from the general sales area.

Create baseline assessment of environmental conditions and begin monthly assessments of plant physiology. Nackley lab team will measure light responses and leaf water use efficiency. They will employ a state-of-the-art leaf gas exchange system, a sophisticated instrument commonly used in plant physiology and ecology research to measure a range of parameters related to gas exchange in plant leaves. This advanced system is designed to deliver precise, real-time measurements of crucial physiological processes, including photosynthesis, transpiration, and stomatal conductance.

Spring – Summer 2024

Continue with monthly assessments at collaborating nurseries. In addition, researchers will gather leaf samples for subsequent laboratory analysis, specifically examining the turgor loss point using an osmometer. The turgor loss point signifies a critical physiological state in plant leaves where cells lose water, causing the plant tissue to become flaccid or limp. This indicator plays a vital role in assessing a plant's water stress level.

Autumn 2024

Analyze data and prepare reports.

The Benefit to Nursery Industry

This research project aims to offer practical solutions to these challenges, thereby improving houseplant cultivation practices and contributing to the continued growth of this thriving market.

Budget **Total $15,500**

- Research Assistant wages and other payroll expenses $12,000
- Materials and supplies $3500
    - Plant materials ($500)
    - Consumables for leaf gas-exchanger ($500)
    - Consumables and fees for osmometer ($2000)
    - Travel expenses ($500)