2025 NCERA-101 Station Report-University of Idaho

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I began my position in Controlled Environment Agriculture at the University of Idaho on September 3, 2024, and I'm honored to join the NCERA-101 group for the first time as part of this new chapter in my career.

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1. New Facilities and Equipment.

- A LI-COR 6800 portable photosynthesis system equipped with a fluorometer has been acquired to assess plant photosynthetic performance under various conditions in controlled environment facilities.
- Most of the greenhouse lighting at the Sixth Street Greenhouse on the Moscow campus has been upgraded to LEDs using PhotoBio T 330W fixtures with the S4 spectrum.

2. Unique Plant Responses.

Our project, funded through the Idaho Micropropagation and Germplasm Laboratory (IMGL) pilot program, builds upon IMGL's previous success in developing a micropropagation protocol for *Mirabilis macfarlanei*, a rare and federally threatened species endemic to Idaho. The primary goal of our project was to evaluate whether this established protocol could be adapted for the cultivation of other North American *Mirabilis* species, with the aim of propagating native flora for conservation and nursery applications.

As demand for native plants continues to grow—driven by their ecological benefits, including improved water and nutrient management, enhanced adaptability to local climates, support for native pollinators, and promotion of biodiversity, the need for reliable and efficient propagation methods has become increasingly critical. Traditional propagation methods, such as seed collection and cuttings, are often insufficient for many native plant species, due to factors such as limited seed availability, low germination rates,

and complex dormancy requirements. These challenges make the mass production of native species costly and difficult for nurseries and growers.

3.Accomplishments:

3.A. Short-term Outcomes:

Our results showed that four *Mirabilis* taxa (*M. laevis var. villosa*, *M. multiflora var. pubescens*, *M. laevis var. crassifolia*, and *M. greenei*) were successfully introduced into tissue culture (Stage I) and successfully multiplied (Stage II). Additionally, two species, *M. laevis var. villosa* and *M. laevis var. crassifolia*, were successfully rooted and established in the greenhouse using modified media. Although *M. greenei* and *M. multiflora var. pubescens* can be rooted in vitro, they have not yet survived the out-planting stage.

3.B. Outputs

The final report for the *Mirabilis* study has been submitted in April 2025. Additionally, plantlets grown from tissue culture in the greenhouse have been successfully transferred to various native planting sites across the state.

3.C. Activities:

The results of this study will be disseminated through a publication and presentations, targeting both the scientific community and relevant stakeholders.

3.D. Milestones:

A key conclusion of the IMGL-funded micropropagation project was that the four *Mirabilis* species demonstrated sufficient similarity to *M. macfarlanei* to apply the same protocol for Stage I (initiation) and Stage II (multiplication). However, significant variation in rooting and out-planting responses among the species highlights the need for species-specific protocols during the later stages of propagation.

4.**Impact Statements**.

Micropropagation is a powerful technique for conserving and restoring native endangered plants by enabling the rapid, disease-free production of genetically identical plantlets from minimal starting material. It is especially useful for species with limited seed availability or poor germination rates and has proven successful in projects like the propagation of *Mirabilis macfarlanei* and related taxa. This method supports both ex-situ conservation and large-scale ecological restoration by providing healthy, uniform plants for reintroduction into native habitats.