

## Optimizing Rooting for Efficient Nursery Production

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### Summary

Propagation can be a significant operational and production expense. Controlled environment management can improve rooting

efficiency and the final quality of the liner. These include light management, root-zone temperature and foliar auxin levels.

### INTRODUCTION

Major barriers to the ornamental woody nursery plant industry include increasing operational and production expenses, workforce availability, and year-round accessibility to high-quality rooted propagative

materials (liners). Ornamental nursery woody plants are often propagated by rooting cuttings, which requires extensive hand labor to dip cuttings in rooting hormones, stick cuttings into media, and the capital

and operational investment of facilities to promote adventitious root development (Fig.1).



**Figure 1.** *Taxus* cutting with healthy, well-formed, and evenly distributed adventitious roots.

To achieve this goal, it is proposed to improve rooting by investigating how environmental management components of

controlled environment production systems and rooting hormone applications can be integrated to improve rooting and overall quality of ornamental nursery liners. The objectives are to identify optimal propagation (1) DLI, (2) root-zone temperatures, and (3) rates of foliar rooting hormone that improve adventitious rooting of ornamental nursery cuttings. Upon completion of this project, efficient, sustainable, and profitable propagation strategies to root ornamental woody nursery cuttings will be identified while also creating resources for propagators to effectively apply recommendations to key taxa.

Despite these steps, rooting failure and cutting loss can still impede economic success (Fig. 2). When plants are propagated without optimal conditions or rooting hormones, uniform rooting is difficult to achieve.



**Figure 2.** Non-uniform rooting in *Buxus* cuttings. The rooting success and quality of this *Buxus* crop varied greatly even when all cuttings were harvested and placed into propagation on the same day. If optimal conditions were achieved in propagation, then rooting would be more synchronized amongst the cuttings.

Greenhouses offer technologies to empower propagators to precisely control the environment, yet optimal propagation conditions and foliar rooting hormone applications to hasten adventitious rooting is largely unknown for ornamental woody nursery cuttings.

Thus, there is a critical need to identify cost-effective strategies such as manipulating the daily light integral (DLI), providing root-zone heating to improve rooting of ornamental nursery cuttings, and

applying foliar rooting hormones to promote efficient, sustainable, and profitable propagation regimens; therefore, this critical need is the overall goal of the project (Fig. 3).



**Figure 3.** Foliar spray applications of rooting hormone using booms reduces hand labor and creates opportunities for easy repeat applications over time.