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Minimizing nutrient leaching and improving nutrient use efficiency of *Liriodendron tulipifera* and *Larix leptolepis* in a container nursery system

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Abstract Fertilization is essential to seedling production in nursery culture, but excessive fertilization can contaminate surface and ground water around the nursery. The optimal fertilization practice is that which maximizes seedling growth and minimizes nutrient loss. We tested three fertilization strategies: (1) constant fertilization (2) a three-stage rate, and (3) exponential fertilization on *Liriodendron tulipifera* and *Larix leptolepis* containerized seedlings. Growth performance, nutrient uptake, and nutrient loss in leaching were measured. Height, root collar diameter, and dry weight of both species were not significantly different among treatments even though the nutrient supply of the exponential treatment was half that of the constant and three-stage treatments. Generally, nutrient losses in leached solutions were higher in constant and three-stage than the exponential treatment. Nutrient use efficiency was calculated as the ratio of the nutrient content of the seedlings to the amount of nutrient applied to the containers. The nitrogen use efficiency in the constant, three-stage, and exponential treatments was 63, 61, and 85% for yellow poplar,

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