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缓释肥和有机肥对长白落叶松容器苗养分库构建的影响

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Effects of controlled-release fertilizer and organic amendment on the construction of nutrients reserves in *Larix olgensis* container seedlings.

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摘要 采用每株施入供氮(N)量为36.36或18.18 mg的缓释肥，并增施0或1.82 g FM有机肥的2×2析因设计，对长白落叶松容器幼苗施肥效果进行研究.结果表明：施肥处理对苗高、地径、生物量和钾(K)的吸收均无显著影响.增施有机肥显著提高了长度>1 cm的一级侧根数量(P=0.040)、主根长(TRL,P=0.012)和主根长与苗高比(P=0.008).高量缓释肥处理下,苗木根N浓度(P=0.035)以及苗干(P=0.005)、根(P=0.037)和苗干+根(P=0.030)中N含量以及苗干中磷(P)含量(P=0.047)均高于低量缓释肥处理；高量缓释肥处理下，增施有机肥使叶片和苗干+根中N浓度提高了137%(P=0.040)和21%(P=0.013)；增施有机肥提高了苗干(P=0.020)、根(P=0.017)和苗干+根(P=0.013)中N浓度.经矢量养分分析,高量缓释肥供给可引起苗体N、P的过量，增施有机肥能明显克服N、P的缺乏，但导致K的损耗.对长白落叶松播种苗的培育,建议采用每株供氮18 mg的缓释肥并配施1 82 g FM有机肥的施肥方法.

关键词： 长白落叶松 缓释肥 有机肥 养分库 根

Abstract： A 2×2 factorial experiment was conducted to study the effect of fertilization on *Larix olgensis* container seedlings. 36.36 or 18.18 mg controlled-release fertilizer (CRF) N and 0 or 1.82 g FM organic amendment (OA) per seedling were applied. There were no significant responses to fertilization in the seedling height, collar diameter, biomass, and potassium (K) uptake. Applying FM OA increased the number of first-order lateral roots with a length > 1 cm (P=0.040), the tap root length (TRL) (P=0.012), and the ratio of TRL to seedling height (P=0.008). Comparing with low application rate CRF N, high application rate CRF N increased the N concentration in root (P=0.035) as well as the N reserves in stem (P=0.005), root (P=0.037), and stem plus root (P=0.030), and the P reserves in stem (P=0.047). Applying 36.36 mg CRF N plus 1.82 g FM OA increased the N concentrations in leaf and in stem plus root by 137% (P=0.040)and 21% (P=0.013), respectively, and the N reserves in stem (P=0.020), root (P=0.017), and stem plus root (P=0.013). Vector analysis revealed that high application rate of CRF N led to the excess of seedlings N and P, while applying FM OA alleviated the N and P deficiency but led to the K depletion. For nursing *L. olgensis* container seedlings, a solution of CRF 18 mg N combined with 1.82 g FM OA per seedling was recommended.

Key words： *Larix olgensis* controlled-release fertilizer organic amendment nutrient reserve root

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