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云南松苗期生长对激素浸种的响应

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The seedling growth of *Pinus yunnanensis* in response to the seeds soaked by exogenous phytohormone

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摘要 云南松苗期生长极其缓慢,尤其是造林3a内具有严重的蹲苗现象.为此,研究试图通过IAA,IBA浸种对其实施促成培育.试验采用3×3回归设计并在田间排列上汲取拉丁方和随机排列的特点进行优化布设,从而建立了最优激素效应方程,据此探讨了激素效应规律、确定了激素最佳用量及最佳配比.结果表明:① 生长量及生物量与激素用量之间的关系呈钟形曲面模式,即各生长指标均存在一个产量峰值.峰值以前,各生长指标随激素用量的增大而提高;峰值以后,各生长指标随激素用量的增大而下降.② 不同生长指标对激素用量及其配比的响应规律具有一定差异,IAA,IBA配合浸种对生物量积累的促进作用依次为树干、叶片和根系,而较高比例的IBA有利于树干的高生长和根系发育、更高比例的IBA有利于树干的粗生长以及树干和叶片的生物量积累.③ 根据激素效应方程,求得最大时的最佳激素用量及最佳配比.其中,最佳IAA用量分别为50,57,53,49,45mg/kg,最佳IBA用量分别为86,143,88,99,107mg/kg,最佳IAA:IBA配比质量分别为1:1.72,1:2.51,1:1.67,1:2.03和1:2.37,对应的苗高、地径生长量及根、干和叶片生物量理论最高产量分别为8.00cm,0.51cm,0.380g,0.387g,1.230g,分别较对照提高了22.64%,66.12%,62.40%,198.00%,83.30%.

关键词: 激素浸种 苗木生长 云南松效应规律 最佳用量 最佳比例

Abstract: The economic and ecological benefit of *Pinus yunnanensis* were restricted by slowly growing in the period of young forests, especially within three years after planting. In order to accelerate the seedling growth, the experiment of growth and biomass increment in response to exogenous phytohormone, IAA (indole-3-acetic acid) in combination with IBA (4-indole-3-ylbutyric acid), was carried out with 3×3 regression design. The phytohormone effect rules, the optimum amount and ratio were discussed and confirmed. The results showed that: ① The relationship between growth interment (or biomass accumulation) and the amount of IAA and IBA can be described by the convex surface models. Each growth index had a maximum value. The growth increment and biomass accumulation were increased with the increasing of IAA and IBA levels when they don't exceed the maximum values, and the growth indexes were decreased as the increasing of IAA and IBA levels when they exceed maximum values. ② The application of phytohormone obviously promoted the growth of seedling, but the regularities of different growth indexes in response to the amount and ratio of IAA and IBA had some differences. The application of IAA in combination with IBA had the promotion for the biomass accumulation of stem, leaf, and root. High IBA level was suitable for stem height growth and root system development, while higher IBA level was advantageous to stem diameter growth, stem and leaf biomass accumulation. ③ The optimum amounts and ratios of IAA and IBA, the reasonable phytohormones ranges and op-curve lines were gained based on phytohormone effect equations of different growth indexes. The optimum IAA for tree height, ground diameter, root system, stem and leaves growth were 50, 57, 53, 49, 45 mg/kg respectively, and IBA were 86, 143, 88, 99, 107 mg/kg respectively. And the corresponding proportion of IAA to IBA were 1:1.72, 1:2.51, 1:1.67, 1:2.03, 1:2.37 respectively. The maximum increments of height, ground diameter were 8.00 cm and 0.51 cm, and biomass of root system, stem, and leaf were 0.380 g, 0.387 g and 1.230 g, respectively, which increased by 22.64%, 66.12%, 62.40%, 198.00%, 83.30% respectively, compared with those without phytohormone treatment.

Key words:

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