

酸铝胁迫下4个速生桉优良无性系的生长反应

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Response of seedling growth of four *Eucalyptus* clones to acid and aluminum stressYANG Mei^{1,2}, HUANG Shou-xian², FANG Sheng-zuo¹, HUANG Xiao-lu^{2,*}

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摘要

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摘要 采用砂土培育法研究不同的酸铝处理对几种桉树优良无性系(巨尾桉9号、巨尾桉12号、尾叶桉4号、韦赤桉3号)幼苗生长及膜透性等变化的影响。试验设: pH 3.0+0 mg/L Al³⁺、pH 3.0+120 mg/L Al³⁺、pH 4.0+0 mg/L Al³⁺、pH 4.0+120 mg/L Al³⁺、pH 4.8+0 mg/L Al³⁺5个处理。结果表明,不同酸铝处理对4个桉树优良无性系形态、生长指标、含水率、叶绿素含量、质膜透性和脯氨酸含量等都产生不同的影响。与对照(pH 4.8+0 mg/L Al³⁺)相比,pH 3.0+120 mg/L Al³⁺处理对桉树幼苗的生长产生的抑制作用明显,叶、芽皱缩、变形,苗高、地径以及各器官含水率降低,质膜透性和叶绿素含量下降,桉树幼苗累积较多的脯氨酸。其中,巨尾桉广林9号对酸铝逆境的抗性优于其它3个无性系。4个桉树优良无性系抗酸铝逆境的能力强弱依次为:巨尾桉9号>巨尾桉12号>韦赤桉3号>尾叶桉4号。因此,选育耐酸铝桉树无性系品种是改善南方富铝化酸性土壤林地生产力的重要策略之一。

关键词: 酸铝胁迫 生长 无性系 桉树

Abstract: Effects of different acid-aluminum treatments on the four Fast-growing *Eucalyptus* clones (*Eucalyptus grandis* × *E. urophylla* Guanglina No.9, *E. grandis* × *E. urophylla* No.12, *E. urophylla* No.4, *E. urophylla* × *E. camaldulensis* No.3) were studied using the cultivation method of sand and soil combination. The acid and Al levels were pH 3.0+0 mg/L Al³⁺, pH 3.0+120 mg/L Al³⁺, pH 4.0+0 mg/L Al³⁺, pH 4.0+120 mg/L Al³⁺ for each clone, and the pH 4.8+0 mg/L Al³⁺ was used as the corresponding control, respectively. The results show that the morphology, growth, water content, chlorophyll content, proline content and membrane permeability in four Fast-growing *Eucalyptus* clones are affected under the different acid-Al treatments. All clones are significantly inhibited under the pH 3.0+120 mg/L Al³⁺ treatment, the leaves and buds are distorted, the seedling heights and collar diameters are depressed, the membrane permeability is degraded, and chlorophyll content and water content are decreased. While the proline contents of the clones are accumulated. The four clones respond to the acid-aluminum differently. *E. grandis* × *E. urophylla* No.9 has the best adaptation to the acid-aluminum treatments from the growth and physiological indexes, such as non-significant morphology change, low amplitude variation of membrane permeability, chlorophyll content and water content, and high amplitude variation of proline content. *E. urophylla* No.4 has the weakest intolerance with great damage, even faded leaves and buds. The resistance intensity is in order of No.9 > No.12 > No.4 > No.3. Choosing and culturing *Eucalyptus* clones with resistance to acid-aluminum should be considered one factor to improve the site productivity on the acid soil with enriched aluminum in the south area of China.

Keywords: acid and aluminum stress growth clone *Eucalyptus*

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