

英国梧桐离体无性繁殖体系的建立

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摘要: 报道了以英国梧桐 [*Platanus acerifolia* (Ait.) Willd.] 变异株的种子为材料建立的植株再生体系。研究结果表明: 用 70% 酒精处理 40 s, 0.1% 升汞处理 40 min, 在不影响种子萌发率的前提下可将污染率降到最低; MS + 6-BA 6 ~ 7 mg/L + NAA 0.2 ~ 0.3 mg/L 为子叶诱导愈伤组织和分化幼芽的最适培养基, MS + 6-BA 0.3 mg/L + NAA 0.01 mg/L 为丛芽扩繁的最适培养基; 培养基中添加适量的 GA₃ 对丛芽的生长具有显著的促进作用; 蔗糖和大量元素的浓度分别为 2.5% 和 2/3 MS 是解决幼苗玻璃化的最适量; 幼苗生根的最适培养基为 1/2 MS + NAA 0.5 mg/L + 6-BA 0.1 mg/L; 无菌种苗的叶片在 MS + 6-BA 1.5 ~ 2.0 mg/L + KT 0.5 mg/L + IBA 0.5 mg/L 的培养基上可直接再生植株, 建立了一步法无菌叶片再生体系。为悬铃木遗传操作和基因转化奠定了良好基础, 也为其他植物尤其是优良树木的遗传改良提供了参考。

关键词: 英国梧桐; 植株再生; 愈伤组织; 玻璃化; 一步法再生体系

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The Establishment of Clone System of *Platanus acerifolia* (Ait.) Willd

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Abstract: To dissolve the problem of falling seeds of Platanaceae, a new regeneration system was established by using the seeds of a mutant *Platanus acerifolia* (Ait.) Willd as explants. The results showed that the seeds were treated for 40 s with 70% alcohol and 40 min with 0.1% mercuric chloride (HgCl₂) was the best distilled method on the premise that the germination of seeds was not influenced. MS + 6-BA 6 - 7 mg/L + NAA 0.2 - 0.3 mg/L was the most suitable medium for callus induction and differentiation of the cotyledon explants; MS + 6-BA 0.3 mg/L + NAA 0.01 mg/L was the most suitable medium of the multi-shoots induction. Adding suitable amount of GA₃ could obviously promote the growth of multi-shoots. 2.5% sucrose concentration and 2/3 MS was the most suitable concentration to avoid vitrification of plantlets. The most suitable rooting medium was 1/2 MS + NAA 0.5 mg/L + 6-BA 0.1 mg/L. In order to solve the problem of pollution that aroused by the floss of young shoots and leaves explants, one-step regeneration system of *Platanus acerifolia* (Ait.) Willd was established by using leaves of tube plantlets as explants. The suitable medium (MS + 6-BA 1.5 - 2.0 mg/L + IBA 0.5 mg/L + NAA 0.5 mg/L) was selected from different regulator combinations. Compared with the method of using cotyledon as explants, the one-step regeneration system had many obvious advantages. It laid the foundation for genetic and transgenic manipulation of Platanaceae and also provided reference for genetic improvement of other plants, especially for elite trees.

Key words: *Platanus acerifolia* (Ait.) Willd; Plant regeneration; Callus; Vitrification; One-step regeneration system

悬铃木是双子叶植物纲金缕梅亚纲的一科, 即悬铃木科 (Platanaceae), 仅悬铃木属 1 属。我国引入栽培 3 种: 美国梧桐 (*Platanus occidentalis* Linn.), 俗称一球悬铃木; 英国梧桐 (*Platanus acerifolia*

(Ait.) Willd), 俗称二球悬铃木; 法国梧桐 (*Platanus orientalis* Linn.), 俗称三球悬铃木^[1,2]。因其生长迅速、高大、冠大荫浓、夏季降温效果好、树干通直、耐修剪、易繁殖, 能适应城市环境和各种土壤条件, 能

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