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品种基因型和2,4-D浓度对青稞成熟胚出愈率的影响

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The Effects of the Cultivar Genotypes and 2,4-D Concentrations on the Rate of Callus Induced from the Mature Embryo of Highland Naked Barley

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摘要

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摘要 成熟胚培养是转基因的关键技术之一, 研究品种基因型和2,4-D浓度对成熟胚培养的影响, 有利于提高青稞转基因的效率。本文采用加入20 g/L麦芽糖的MS培养基 [m (麦芽糖): m (蔗糖) = 1:2] 和完全随机设计, 分析了5种2,4-D浓度对5个青稞品种成熟胚出愈率的影响, 比较了14个青稞品种的成熟胚出愈率。结果表明, 2,4-D浓度和品种基因型均极显著地影响青稞成熟胚出愈率, 两者之间具有显著的交互效应; 青稞成熟胚出愈率随2,4-D浓度的增加而增加, 并在4 mg/L处理中出愈率达到最高, 随后出愈率随2,4-D浓度的增加而降低; 对照(0mg/L)的出愈率极显著地低于其他处理的出愈率, 但其他4个2,4-D浓度处理的出愈率之间没有显著差异; 14个青稞品种的成熟胚出愈率之间具有极显著差异, 其中ZJ45等7个品种出愈率达到了(90.00 ± 7.07)%, 显著高于D-5等6个品种的成熟胚出愈率。ZJ-45等7个品种可用于成熟胚培养; 用PEG和双蒸水先后浸种3h和19h, 将成熟胚置于加入20g/L麦芽糖和4 mg/L 2,4-D的MS培养基 [m (麦芽糖): m (蔗糖) = 1:2] 上培养是ZJ-45等7个青稞品种成熟胚培养的适宜方法。

关键词: 青稞 成熟胚培养 2,4-D浓度 品种基因型 出愈率

Abstract: The mature embryo culture is a key technology for the transgenic of highland naked barley, to study the effect of cultivar genotype and 2,4-D concentration on the rate of callus induced from the mature embryo is helpful for improving the transgenic efficiency of highland naked barley. In the present paper, the MS medium containing 20 g/L maltose (the ratio between maltose and sucrose was 1:2) and completely random design were employed to study the effect of the 2,4-D concentration and cultivar genotypes on the reduction rate of the callus, and compared the reduction rate of callus from the mature embryo of 14 different highland naked barley. The result showed that 2,4-D concentration and cultivar genotype could both impact very significantly on the reduction rate of callus, there was a significant interaction between them; The reduction rate of callus increased with the increment of 2,4-D concentration, reached the maximum in the treat with 4 mg/L 2,4-D, and then decreased with the increment of 2,4-D concentration; The reduction rate of callus was lower very significantly in the contrast(0 mg/L concentration treat) than those in the other treats, but the difference was not significant between the reduction rates of callus in 4 treats with different concentration of 2,4-D; The difference was very significant between the rate of callus induced from the mature embryo of 14 different highland naked barley respectively, the rates of callus induced from the mature embryo of 7 cultivars, include ZJ-45 ect, all reached (90.00 ± 7.07)%, and higher significantly than the rate of callus induced from the mature embryo of 6 cultivars, included D-5 ect, respectively. Seven cultivars, included ZJ-45 ect, are suitable materials for the mature embryo culture; the method, soaking seeds with PEG and double distilled water for 3 h and 19 h successively, and then placing the peeled mature embryos on the MS medium containing 20 g/L maltose (the ratio between maltose and sucrose is 1:2) and 4 mg/L 2,4-D, is a suitable mature embryo culture method for them.

Keywords: highland naked barley mature embryo culture 2,4-D concentration cultivar genotype reduction rate of callus.

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