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The effect of genotype on a barley scutella culture. Histological aspects.

Communication

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Abstract: Cereals are known to be recalcitrant to the induction of morphogenesis *in vitro* and the majority of the methods used are callus-mediated and species/genotype-dependent. In the present investigation, a method of morphogenesis induction from immature scutella of selected barley cultivars was used, and particular attention was paid to histology in the initial stages of the regeneration process in order to confirm whether it occurs directly or indirectly (*via* callus formation). The length of the period from inoculating scutella on the medium to obtaining plantlets depended on the cultivar and the individual scutellum of the barley and varied between 2.5-4 months. The regeneration efficiency and viability of barley scutella was revealed to be highly genotype dependent. The average number of regenerated plants per regenerating scutellum was highest in the case of cv Granal (3.7). A histological analysis of the cultured explants showed both non-morphogenic and morphogenic callus formation. Two types of indirect morphogenetic response were observed: organogenesis (shoot bud formation) and somatic embryogenesis. This is the first report concerning an analysis of *in vitro* regeneration from immature scutella of barley cultivars (Stratus, Ryton, Granal and Binal).

Keywords: *Micropropagation • Organogenesis • Somatic embryogenesis • Hordeum vulgare • Plant tissue culture*

Abbreviations:

BAP – 6-benzylaminopurine;
2.4-D – 2.4-dichlorophenoxyacetic acid;
PAA – phenylacetic acid;
TDZ – thidiazuron.

1. Introduction

In order to improve crop plants using biotechnological methods, we need micropropagation techniques that deliver efficient long-term plant regeneration from a small number of cells that can be altered through transformation, mutation or fusion. Micropropagation is also useful for the multiplication of valuable plants and for maintaining collections or pathogen-free lines. For all these purposes an efficient procedure that does not produce additional variation is needed. Such a procedure should be based on direct morphogenesis, since indirect regeneration *via* the callus may cause many problems due to the somaclonal variability of this tissue [1].

Cereals, especially those planted in temperate zones, are known to be recalcitrant to the induction of morphogenesis *in vitro* [2,3]. The majority of methods for their micropropagation are callus-mediated and genotype-dependent. Studies have shown *in vitro* regeneration from shoot apices [4-6], meristematic segments of young seedlings [7-9] and leaf bases [10]. Some authors have reported the regeneration of adventitious shoots from enlarged shoot apical meristems without a callus phase [3-7] or with only a minimal callus phase [9].

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