Wheat pedicle as an alternative source for plant regeneration

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ABSTRACT

Spike pedicles of three genotypes of Triticum aestivum L., excised successfully from plants 11 to 26 days after anthesis (uninucleate stage), were used as explants for callus induction and plantlet regeneration. The effect of 2,4-D was studied throughout three levels and was found to be crucial for callus induction and plantlet regeneration. The highest concentration of the auxin (6 mg l) gave the best callus induction and plantlet formation, where the moderate one (2 mg l) did not induce any response, neither for callus induction, nor for plantlet regeneration. The effect of explant age is discussed.

***Key words**: pedicle, 2,4-D, wheat,regeneration.*

INTRODUCTION

The application of many biotechnological methods in cereal improvement involves development of regenerable callus cultures. Many cereal explants express embryogenic competence in the presence of 2,4-D (Duncan *et al.*, 1985). This auxin, by itself or in combination with cytokinins, has been widely used to enhance callus induction and maintenance. The transfer of embryogenic callus to a given medium with reduced auxin concentration or without auxin results in the maturation of somatic embryos and regeneration of plants (Castillo *et al.*, 1998). Generally, the auxin 2,4-D was found to be critical for the production of regenerable calli in cereals (Bhaskaran and Smith, 1990). However, Close and Gallagher-Ludeman (1989) presented evidence that the induction of regenerable callus in maize is largely a physiological phenomenon that can be manipulated by genetic background of the explant. Wernicke and Brettell (1982) reported that explants from a single genotype do not respond identically in culture, most likely due to varying gradients of endogenous hormones. Duncan *et al.* (1985) noted that immature embryos collected from the same inflorescence behaved differently in culture, depending on size and location on the inflorescence. Responses of explants from well-nourished plants are different from those of nutrient-deficient plants.

In wheat, different types of explants were used for plant regeneration, such as shoot meristems (Wernicke and Milkovits, 1986), anthers and pollen (Armstrong *et al.*, 1987; Huaping and Konzak, 1989; Lazer *et al.*, 1985), immature embryos (Scott *et al.*, 1990), mature embryos (Mohmand and Nabors, 1991; Kato *et al.*, 1991), leaf segments (Wernicke and Milkovits, 1984; Barcelo *et al.*, 1991; Rajyalakshmi *et al.*, 1991), and longitudinally split shoot tips (Wernicke and Milkovits, 1986). Recently, shoot tip explants were used for rapid production of embryogenic callus, to limit the risk of somaclonal variation (Viertel and Hess, 1996). The capability of wheat