

Peduncle, a Potential Source of Competent Cells for Plant Regeneration in Pearl Millet (*Pennisetum glaucum*)

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ABSTRACT

Based on field observations, experiences and experiments, we conceptualized that in cereals and grasses the lower part of a peduncle, the uppermost and longest internode that bears and supports an inflorescence/panicle (and also supplies nutrients to reproductive bodies and the seed grains) is a repertoire of rapidly dividing and elongating, almost uniform population of highly meristematic cells that are totipotent/pluripotent. These cells/tissues can be potential sources of competent cells for establishment of regenerative/embryogenic cell cultures. These are soft and rich in sugars while enclosed in boot/flag leaf. We used the peduncle as explants for establishment of regenerative tissue culture in *Pennisetum glaucum* (Pearl millet, the Bajra/Bajri). The explants were treated with chilled solution of antioxidants and surface sterilized and cut in to discs/slices (2-4 mm thick). These were cultured on surface of autoclaved agar-gelled (0.8% agar-agar), Murashige and Skoog's (MS) medium containing additives (25 mg/l each of ascorbic-acid, citric-acid, adenine sulphate, and 1mM each of L-asparagines, L-glutamine and L-proline), 3% sucrose and 2.0 mg/l of 2, 4-dichlorophenoxyacetic acid (2, 4-D) as plant growth regulator. These produced pale white/yellowish white/pale and organized callus exhibiting high regeneration potential. The callus cultures were maintained and multiplied the best on MS medium containing 2.0 mg l⁻¹ of with 2, 4-D and 1mM each of glutamine, proline and asparagine. On transfer to culture medium with no auxin or lower concentration (0.5 mg l⁻¹) of 2, 4-D, the cultures organized into embryo-like structures and regenerated into plantlets or produced shoots. From each disc-derived cultures about 10-15 plantlets/shoots differentiated. The differentiated shoots rooted on the same medium. Individual plants were separated from the bunch and transferred to autoclaved soil rite after 25-30 days. About 65-70% of the plantlets acclimatized well to the *ex-vitro* conditions. The peduncle callus-derived plants flowered and set seed.

Key words: Peduncle, competent cell, antioxidants regeneration

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