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Evaluation of selected local rice germplasm for callus induction ability

G M Rathnayake and T D Silva

Department of Plant Science, University of Colombo, Colombo 3.

Ten Sri Lankan rice varieties, that included 4 traditional varieties (Behethheenati, Madathawalu, Mawee and Suwandel) and 6 new improved varieties (At 307, At 308, Bg 300, Bg 358, Bw 361, Bw 272-6B) were screened for their anther culture response. Callus induction was tested on N6 medium, modified N6 medium and SK-I medium. N6 medium was modified by replacing sucrose (30 gL^{-1}) with maltose (60 gL^{-1}) and used with or without supplements of yeast extract (200 gL^{-1}) and $AgNO_3$ (0.014 gL^{-1}). All callus induction media contained the growth regulators, 2,4-D, NAA and kinetin at 0.5, 2.5, 0.5 mgL^{-1} respectively.

N6 medium was superior for inducing anther callus than SK-I medium. On N6 medium anthers of eight varieties out of the ten tested, responded by producing callus. On SK-I medium anthers of only 5 varieties developed callus, and the frequency of callus induction in any variety was ≤ 1%. Callus induction frequency of Bw 361 variety was superior to all other varieties tested. In this variety 65.6% of the cultured anthers produced callus on N6 medium, which was over 3.5 times higher than the next best variety Behethheenati, which recorded a callus induction frequency of 18.6% on the same medium. A callus induction frequency of 12%, which can be considered reasonably high for an indica type, was observed in the traditional variety Madathawalu. Anther response of Bw 272-6B, At 308 and Mawee was moderate, and ranged from 7.5 – 5.7%. Supplementing the N6 medium with yeast extract and $AgNO_3$ proved to be less beneficial than without these additions except for Suwandel and Bg 358. In these two varieties, particularly in Bg 358, addition of the supplements vastly improved its anther culture response, from 0.4% to 20%, clearly indicating a variety x media interaction effect to be present. Bw 361 in which the callus induction frequency was reduced to 24.9% when the supplements were added to N6 medium, still remained the best responsive variety on this medium. Statistical analysis of the data confirmed that varietal and culture media effects, as well as variety x media effects on callus induction were highly significant. The variety Bw 361, in which the anther culture response was very high by indica rice standards, may be singled out for further studies particularly for attempting the second phase of the anther culture process; regeneration of green plants from anther-derived callus.

tara@pts.cmb.ac.lk Tel: (0)11-2585038