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Establishment of transient transformation protocol along with comparison of regeneration potential following introduction of antiporter genes in peanut (*Arachis hypogaea* L.)

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Background: Peanut is a cash crop having outstanding food values. Therefore, it can be used as a supplementary food for hunger and malnutrition affecting Asian countries like Bangladesh. But peanut yield is substantially reduced for abiotic stresses like salinity. As a result, salt tolerant peanut has to be improved to ensure better production where the success of conventional breeding severely hampered due to its cleistogamous nature of pollination. Thus, *Agrobacterium*-mediated genetic transformation may lead the solution.

Aim: Present study was examined with three Bangladeshi peanut varieties, such as, BINA Chinabadam 2, BINA Chinabadam 4 and BINA Chinabadam 6 where two explants, named, decapitated half embryo and embryonic leaflet were transformed with vectors, such as, pBI121, pK7WG2_OsNHX1_1.6 & pK7WG2_AtNHX1_1.6.

Results & Conclusion: Decapitated half embryo showed better *in vitro* regeneration potential than leaflet explant. Hence, transformation study was conducted with 1 day old decapitated half embryo where highest percentage of GUS positive explants were found when OD_{600} was more than 1 at 60 minutes of infection and 3 days of co-cultivation duration in transient assay. Regeneration efficiency on selection media containing 50 mg/l kanamycin was higher in almost all three varieties. In contrast to this, untransformed control explants were able to resist upto 20 mg/l of kanamycin. Moreover, average number of putative transformed shoots was gradually dropped with the increased concentration of kanamycin. Shoots which survived upto 150 mg/l kanamycin were transferred into rooting media for root induction. Finally transformation efficiency was evaluated by calculating the percentage of GUS positive plant parts, such as, leaf, stem and roots among the putatively transformed plantlets. In the current experiment, effect of salinity on peanut seed germination was also observed. The germination rate steadily decreased with the increase of NaCl in the media and finally no germination was observed in MS media supplemented with 150 mM of NaCl and above.

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The use of chlorophyll fluorescence parameters as a drought tolerance indicator on cultivated and wild watermelon under high light and limited soil moisture

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Chlorophyll fluorescence has become increasingly important in evaluating crops for stress resistance. In this study, we investigated the effects of high light and low moisture content on physiological responses of cultivated (Cv) and wild (Ww) species of watermelon. The two species showed different CO2 assimilation responses in both the control and stressed conditions. The CO2 assimilation in Cv under control conditions was lower than that of Ww whereas under stress condition the assimilation of Ww dropped rapidly as compared to that of Cv. The photochemical efficiency of PSII (Fv/Fm) and quantum yield of PSII (PSII) showed a significant difference among the two species. Under the stress conditions the Ww showed a significant reduction as compared to the Cv for both the parameters. Observations on the photochemical fluorescence quenching (qP) and non-photochemical quenching (NPQ) showed varying tendencies with Ww NPQs showing a steady increase under stress conditions while that of Cv showed very insignificant difference under control and stressed conditions. The qP for both samples under stress conditions were non-significant with the progress of stress days. The A/Ci curves showed a major decrease for the Ww while those of Cv did not show much change as the stress days progressed; this can be associated with stomata response of the two species. The Ww stomatas openings decrease to almost non opening during the day as the stress days increased, while those of Cv only reduced their opening a little even at critical soil moisture conditions. Therefore the chlorophyll fluorescence indicators showed reliability to be used in screening for drought tolerant species and evaluating the photosynthetic performance under high light and limited moisture conditions.

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