

IDENTIFICATION OF ABIOTIC STRESS-TOLERANT RHIZOBIAL STRAINS INHABITING *Mimosa pudica* IN ANURADHAPURA DISTRICT, SRI LANKA

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Biological nitrogen fixation by symbiotic relationship of legumes and rhizobia enhances soil fertility. These rhizobia also exhibit tolerance to a range of abiotic stresses including salts, drought, extreme pH, and heat. *Mimosa pudica*, (family *Fabaceae*), a problematic weed, is a nitrogen fixing herb even in extreme and resource-limited environments. Stress tolerant rhizobial populations inhabiting *M. pudica* can be a vital solution to enhance nitrogen fixation under harsh environmental conditions. The current study aimed to screen stress tolerant rhizobial isolates inhabiting *M. pudica* growing in selected locations of Anuradhapura district. Live root nodules of *M. pudica* were collected from six sampling locations and symbiotic rhizobial isolates from root nodules were cultured on ½ Lupin agar medium. To test the tolerance for stress conditions isolates were inoculated to ½ Lupin broth. The growth of 30 isolates was assessed using spectrophotometric absorbance after subjecting three consecutive days to extreme conditions of pH (3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0), salinity (NaCl concentrations 0.1%, 1%, 1.5%, 2%, 2.5%, 3%), temperature (25°C, 30°C, 35°C, 40°C, 45°C), and drought stress (polyethylene glycol 8000 concentrations 0.1% to 0.4%), respectively. Ten isolates; Al-c, Al-d, Md-c, Md-e, Th-d, Ka-a, Ka-b, Ka-c, Ke-c, and Ke-d, were screened based on their survivability under extreme individual stress conditions. Afterwards, screened isolates were exposed to a combination effect of temperature (36°C) and drought (0.3%) and, Md-c, Th-d, Ka-c, Ke-c and Ke-d exhibited significant tolerance ($p < 0.05$). The possibilities of cross inoculation of these isolates may enhance the production of legume crops under stress deprived conditions and may also serve as a potential biofertilizer in marginal conditions.

Keywords: Biological nitrogen fixation, cross inoculation, drought stress, rhizobial isolates, salinity tolerance