Bangladesh J. Agri. 2024, 49(1): 117-127 *DOI: https://doi.org/10.3329/bjagri.v49i1.74071*

EXPLICATING THE SALINITY TOLERANCE OF COWPEA (*Vigna unguiculata* L. Walp.) GENOTYPES AT SEED GERMINATING STAGE

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Abstract

Cowpea is an important food and fodder legume in the arid and semi-arid tropics of the world. Soil salinity adversely affects seed germination, which ultimately reduces crop yield. The present study was carried out to screen the cowpea germplasm and identify the salinity tolerant genotypes at the germination stage. Initially, an experiment with five salinity levels (0, 50, 100, 200, and 250 mM of NaCl) was conducted, and the results showed that 200 mM of NaCl concentration was found to be a sensible salinity stress to assess the salinity tolerance of cowpea genotypes. A total of 29 cowpea genotypes were evaluated under a 200 mM NaCl concentration. Four salinity tolerance indices such as absolute decrease (AD), inhibition index (II), relative salt tolerance (RST), and salt tolerance index (STI) were calculated from germination percentage without stress (GC) and germination with 200 mM NaCl (GS). All the indices showed significant variation in responses to salinity stress among the cowpea genotypes. The results revealed that salinity stress significantly reduced the germinating percentage in cowpea. Total seven cowpea genotypes (G4, G9, G12, G15, G26, G27, and G32) were found to be salinity tolerant lines at the germination stage. The seven genotypes were clustered in the same group. which had the higher RST (G4: 0.58, G9: 0.80, G12: 0.50, G15: 0.60, G26: 0.50, G27: 0.60, and G32: 0.80) and STI (G4: 0.58, G9: 0.80, G12: 0.50, G15: 0.60, G26: 0.50, G27: 0.60, and G32: 0.79) under salinity stress. However, this is a preliminary screening against salinity at the germination stage, and further research is required at the seedling vegetative and reproductive stages for validation.

Keywords: Cowpea, Salinity tolerance index, Seed germination, *Vigna unguiculata*

Introduction

Cowpea (*Vigna unguiculata* L. Walp.) is an important food and fodder legumes in the arid and semi-arid tropics of the world. The diploid chromosome number of cowpea is 2n = 22 and belongs to the family Fabaceae (Paudel *et al.*, 2021). This crop grows well in temperature of about 28ºC (Craufurd *et al.*, 1997). Cowpea provides food for millions of people, mostly in developing countries, with an annual worldwide production is about 4.5 million metric tons (Animasaun *et al.*, 2015). The young leaves,

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