Abstract

Abiotic stress is the most harmful factor concerning the growth and productivity of crops worldwide. Legumes are regarded to be sensitive to salt levels and soil drought status. Cowpea [Vigna unguiculata (L.) Walp.] is well adapted on different environmental conditions and could be used an alternative crop for salt affected soil. The aim of present study was to examine the effect of salinity on the morphological, physiological, biochemical and molecular attributes in cowpea (Vigna unguiculata [L.] Walp.). In the present study 9 genotypes and 3 varieties of cowpea were used. The genotypes were grown in pots under 4 salinity levels of 0.25% 0.35% 0.45% and under control i.e. (without NaCl). Each genotype was grown in triplicate. The petri plate experiment, pot experiment with and without AMF inoculation for the 45 days and 65 day old plants was evaluated for seedling vigour, plant height, number of leaves, number of flowers, number of pod/plant, number of seeds/pod and biomass yield. The performance of the genotypes on the basis of percent reduction and salinity susceptibility index (SSI) revealed that germination over control in genotypes EC-4216, IC-300039, BL-2, and IC-52110 was least effected at different salinity levels. For shoot growth IC-7832, IC-19775, IC-202730 and BL-2 were more tolerant to varying levels of salinity similarly BL-2, EC-4216, IC-214757 and IC-52110 had minimum reduction in number of leaves as compared to the other genotypes. For the shoot/root weight, number of flower and number of pods/plants of genotype EC-4216 BL-2, BL-1 and IC-52110 were comparatively tolerant and had better growth and for seeds/pods genotype EC-4216 BL-2, BL-1 and IC-300039 were least affected to varying levels of salinity under AMF inoculation and without AMF. The biochemical parameters evaluated revealed increased activity of SOD in the genotype BL-2, IC-300039, BL -1and IC-202821 with increased salt treatments in plants without AMF inoculation and under AMF inoculation the genotype EC-4216 demonstrated enhanced activity across the treatments whereas the activity of peroxidase and catalase under both non AMF and AMF inoculation the genotype BL-2, IC-300039, EC-4216 was highly increased with increased salt treatments. The cluster analysis of the RAPD bands revealed more than 90% similarity among the genotype IC-52110, BL-1 and BL-2 and genotype BL-1, BL-2 showed more than 97% similarity. The genotype EC-4216 showed least similarity 48% with other genotypes and separated as a distinct group.