



ABSTRACT

Soil salinity problem is common in arid and semi-arid regions of the world. Salinity is a major factor limiting irrigated agriculture in Pakistan. Salinity causes plant nutrient deficiency and inhibits their growth. Vermi amendments can be used for improving the fertility of salt affected soils. The objectives of the current study were to find out the response of different earthworm species to varying salinity levels and to check the effects of different vermi amendments on the growth of *Sorghum bicolor* (SGS 5000) under low to high salinity levels. Eight dominant earthworm species were collected in different seasons of Lahore from GC University Botanic Garden. A pot experiment was set-up to study the salinity tolerance of collected species of earthworms by subjecting them to various salinity levels. Summer species i.e. *Lampito mauritii* and *Pheritima posthuma* were found to be the most salt resistant species and survived till soil EC_e value of 13.72 mS cm^{-1} . Vermicompost and vermiwash units were set-up and their final products were analyzed for organic carbon, pH, EC, Na^+ , K^+ , Ca^{2+} , Mg^{2+} , N and P. A pot experiment was set up and different vermi amendments and salinity treatments were provided in a factorial combination to *S. bicolor* (SGS 5000) plants to see their effects on growth and biomass parameters. Results showed that salinity significantly decreased plant growth that was enhanced by the application of different vermi amendments. Maximum growth of *S. bicolor* (SGS 5000) plants was recorded when both vermicompost and vermiwash were used together under saline and non-saline conditions. All plant growth parameters showed good results by the application of vermi amendments till salinity level of 13.72 mS cm^{-1} and at salinity levels of 17.62 mS cm^{-1} and above the growth started hindering even after the application of vermi amendments. The results of the current study showed that the application of vermi amendments improved the nutritional balance of the soil and it delayed salt induced damage to the plants under saline conditions so it can help in the bio-reclamation of saline soils.