

Salt tolerance screening of the AVRDC mungbean (*Vigna radiata*) collection

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High salinity soil is a major challenge for food crop cultivation in dry and warm climates where irrigation is needed but water is in shortage. In these locations mungbean is an important pulse crop for cultivation in rotation after the main grain harvest. Integrating improved mungbean varieties can be part of a strategy for increasing smallholder farmer income and ensuring more sustainable production systems. At AVRDC – The World Vegetable Center, a floating hydroponic screening system for salt stress tolerance has been developed. Plants are grown at 30 °C on foam blocks fixed in Styrofoam board floating on a nutrient solution containing different concentrations of salts. To establish a salt tolerance screening protocol for mungbean, solutions of 0 mM, 25 mM, 50 mM, and 75 mM NaCl or MgSO₄ were tested. NaCl delayed germination but most plants survived, at least at the lower doses. Almost all plants failed to grow well with MgSO₄, especially at the higher doses, but even 25 mM caused a severe reduction in plant growth. A protocol based on 50 mM NaCl was used for further screening. The AVRDC mungbean mini-core collection, 296 accessions, was screened. The mini-core is a subset of the entire AVRDC collection of more than 3000 mungbean accessions developed to capture the diversity in the whole collection. At the germination stage, two accessions showed no reduction in germination and a further eight accessions showed more than 90% germination under salt stress conditions. At the seedling stage, seven highly tolerant accessions were identified, but these were not the same as those accessions showing the highest tolerance at germination, indicating that different mechanisms are involved in the two stages. From a combined screening using seedlings and plants up to two months old, 60 accessions were selected as promising and are undergoing further examination. The best lines will be shared with breeders and be used to develop extra-early maturing, drought- salt- and heat-tolerant varieties for production in mid-summer to late autumn for the dryland systems of South and Central Asia. The mini-core collection is also being examined under field conditions in targeted areas in Pakistan and Uzbekistan.

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