



## Assessing the Effect of Salt Stress on Soybean [*Glycine max* (L.) Merrillis] Genotypes Using AMMI and GGE Biplot Analysis

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### Abstract

The genotype × environment interaction manipulates the selection criteria in a multipurpose crop like soybean. A total 108 soybean genotypes were evaluated at normal tap water (Control), field sodicity conditions (pH 9.0 and 9.3) and saline water ( $EC_{iw}$  5.0 and 8.0 dS m<sup>-1</sup>) at ICAR-CSSRI, Karnal from 2017-2020. Yield and associated data were analyzed using the AMMI and GGE biplot. The AMMI analysis of variance for seed yield detected significant effects for genotype, environment and genotype × environment interaction. The environment effect was responsible for the greatest part of the variation, followed by genotype and genotype × environment interaction effects. The 'which-won-where' feature of the GGE biplot identified winning genotypes SL-1226 and SL-1258 in the saline (up to  $EC_{iw}$  8 dS m<sup>-1</sup>) and sodic (up to pH 9.3) and SL-1242 in control conditions whereas, PS-1225 across the environment was the most ideal and these genotypes could be used as donor for breeding soybean for salt tolerance. This indicates that characterization of germplasm using GGE and AMMI model is important for determining visual comparisons, adaptability/stability focusing on overall performance to identify superior genotypes.

**Key words:** Soybean, Salt stress, AMMI analysis, GGE biplot, Genotypes

**Abbreviations:** AMMI= additive main effects and multiplicative interaction; GGE= genotype plus genotype by environment interaction; AEC= average environment coordination; IPCA= interaction principal component axis