



# Clustering of soybean genotypes via Ward-MLM and ANNs associated with mixed models

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**ABSTRACT.** The objectives of this study were to use mixed models to confirm the presence of genetic variability in 16 soybean genotypes, to compare clusters generated by artificial neural networks (ANNs) with those created by the Ward modified location model (MLM) technique, and to indicate parental combinations that hold promise for obtaining superior segregating populations of soybean. A field trial was conducted between November 2014 and February 2015 at Universidade Estadual de Mato Grosso do Sul, Aquidauana, MS. The experimental design consisted of four replications of randomized blocks, each containing 16 treatments. We assessed the following agronomic traits: plant height, first pod height, number of branches per plant, number of pods per plant, number of grains per pod, hundred-grain weight, and grain yield. Mixed models were used to estimate variance components and genetic parameters, and obtain genotypic values for each trait. After verifying the presence of genetic variability for all traits, genotypic

values were submitted to both a Ward-MLM procedure and ANNs to estimate genetic divergence among genotypes. The number of groups formed by both methods was the same, but there were differences in group constitutions. ANN analysis improved soybean genotypes clustering patterns compared to Ward-MLM procedure. Based on these methods, divergent crosses may be made between genotype 97R73 with genotypes AS3797 and SYN9070, whereas convergent crosses may be made between genotypes AS3797 and SYN9070.

**Key words:** *Glycine max*; genetic divergence; clustering method