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106226 Fast Screening of Italian Ryegrass (*Lolium multiflorum*) Half-Sib Progenies Tolerant to Water Deficit.

Poster Number 109

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Tampa Convention Center, East Exhibit Hall

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Half-sib reciprocal recurrent selection in Italian ryegrass has shown promise to maximize the performance of population cross. The objective of this study was to compare tolerance to water deficit in half-sib progenies of the species based on measurements made exclusively on the aerial part, aiming to provide discriminating variables applicable to fast screening trials. Eighteen progenies were evaluated, including a known genotype (BRS14), which was used as a yield reference. This study consisted of successive individual 30-day trials carried out in a controlled environment, with data being collected at harvest. For each progeny, 30 variables related to growth and physiology were measured. Stress was induced by the addition of 0 (control), 100 or 200 g.L⁻¹ PEG8000 to the growing liquid medium, causing osmotic shocks of, respectively, 0, -0.148 or -0.511 MPa. Additionally, three progenies were evaluated in a second replicated trial in order to assess data reproducibility. These data were analyzed by a score assignment technique to determine the variables most useful for detecting responsivity to stress, considering the distribution compatibility in each pair of trials, the similarity level between response shapes to stress levels, and the equality of means between trials within each stress level. For these purposes, tests were performed on location and scale parameters, orthogonal contrasts, and progeny effect within each stress level. A subset of the variables showing the highest scores was then used to determine the most and least tolerant progenies using the Dunnett test for comparisons with the control. Leaf area, leaf area gain, leaf area/shoot length ratio, and leaf area/total dry weight ratio were the variables that scored better and were therefore selected for using in future water stress tolerance screening procedures. Finally, the studied progenies showed high genetic variability for tolerance to water stress, and BRS14 was ranked among the least water stress tolerant genotypes.

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