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Physiological and molecular approaches in breeding for drought tolerance in soybean
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Since 2010, soybean has been the main crop of Uruguay, becoming the force of the agricultural expansion of the country and the region. The dramatic increase in area of soybean tilling has not been accompanied by the increase of soybean productivity. One of the causes of this, is the negative impact that have on soybean yield, the occurrence of frequent drought periods during summer, the growing season of this crop. Advances in breeding for drought tolerance have been slow mainly due to the fact that tolerance to water deficit in plants is governed by several complex factors, including genotype, environment, and the interaction of both. Our project combines 1) phenotyping tools that allow the early prediction of drought tolerance; 2) the development of molecular markers for the genotyping of breeding program lines; and 3) the identification of candidate genes for biotechnology purposes or for using it in the identification of genomic regions associated with drought tolerance. By the combination of the proposed lines of action, carried out by an interdisciplinary group of researchers, the work seeks to potentiate the available soybean germplasm of breeding program in Uruguay. The results obtained to date have allowed the identification of early physiological parameters that classify the genotypes according to their response to the water deficit. Also, the combination of genotyping and phenotyping tools allowed the identification of specific genomic regions associated to drought responses. Finally, the analysis of transcriptomes of previously characterized contrasting genotypes allowed the identification of candidate genes with a possible contribution to drought tolerance. The results show that with a multidisciplinary approach it is possible contribute to the breeding soybean tolerance for drought tolerance.