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Effect of clonal integration on drought and waterlogging response in *Urochloa humidicola*

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Abstract

Clonal integration allows for the sharing of resources such as water, nutrients, and photosynthates among individual subunits of clonal plants, promoting adaptation to diverse environmental and ecological conditions. In livestock production systems, a key aspect in adapting to climate change is the use of forage materials tolerant to abiotic stresses such as water deficit and waterlogging. The accession of *Urochloa humidicola* CIAT 679 (cv. Tully) is a promising forage due to its good adaptation to acidic soils with low fertility, drought, and waterlogging. It also has a high biological nitrification inhibition capacity and efficient propagation through stolons, a reproductive system that allows for the maintenance of clonal integration among shoots of different generations. This study aimed to evaluate whether clonal integration is one of the strategies that confers tolerance to drought and waterlogging in CIAT 679. The treatments consisted of interactions between three stress conditions applied to the recipient clone: drought, control (no stress), and waterlogging, with two conditions of clonal integration: with integration and without integration (cutting between donor plant and recipient plant). Stomatal conductance, transpiration, SPAD index, relative water content (RWC), biomass distribution, and non-structural carbohydrates (NSC) were evaluated in the recipient plants. Stomatal conductance, transpiration, SPAD index, RWC, and NSC were lower in drought and waterlogging treatments that did not have clonal integration, with drought without integration being the most affected treatment. Root biomass was lower in drought treatments with and without clonal interaction, as well as in the waterlogging treatment with integration. This treatment also presented the lowest Root: Shoot ratio. The results suggest that clonal integration contributes to tolerance to waterlogging and drought stress in CIAT 679 plants, possibly through photosynthate translocation.

Keywords: Abiotic stress, CIAT 679, clonal plants, translocation

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