Root system performance under progressive water deficit in forage grasses of the *Lolium-Festuca* complex distinct with respect to drought tolerance

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Abstract

Water deficit is the main constrain affecting plans during a vegetative stage of their growth. Plants respond to these stress conditions at different levels of their organization. However, the processes occurring in the roots are the most significant with respect to the expression of drought tolerance. In the comfortable growth conditions, plant roots play a key role in the maintaining a proper leaf cellular homeostasis. This metabolic balance is, however, disrupted during water deficit and roots, as the first organ, receive the stress signal, and start to adapt to changes in environmental conditions through structural and metabolic and phenotypic modifications. *Lolium multiflorum* is characterized by a high forage quality but also a low level of abiotic stress tolerance, in contrast to *Festuca arundinacea*, which is recognized as a model plant among forage grasses for the studies on drought tolerance. The research plant material for the studies performed here, included two *L. multiflorum/F. arundinacea* introgression forms characterized by a distinct level of drought tolerance in the field and two *F. arundinacea*genotypeswith distinct level of drought tolerance in the pots. The aim of this work was to investigate the selected elements of forage grasses' response to the soil water deficit in these introgression forms. The analysis was focused on the root architecture and the accumulation of selected hormones, primary metabolites, glycerolipids and proteins in roots in the relation to the shoots physiology and phenotype.