

Effects of Flooding and Drought on the Anatomy of *Paspalum dilatatum* .

V. Vasellati, M. Oesterheld, D. Medan and J. Loreti

Abstract

Paspalum dilatatum occupies different topographic positions in the Flooding Pampa, Argentina. Populations from different positions are subjected to various regimes of flooding and drought, both of which may occur in the same growing season. We investigated the constitutive and plastic anatomical traits of *P. dilatatum* populations from habitats with contrasting regimes of flooding and drought. Both events affected root and sheath anatomy, and these effects were similar for clones from different topographic positions. Flooding increased the aerenchymatous tissue in the root cortex and the leaf sheaths and decreased the number of root hairs per unit of root length. Drought decreased the diameter of root metaxylem vessels, thus lowering the risk of embolisms and increasing water-flow resistance, and increased the number of root hairs, thereby increasing water uptake ability. In addition to these plastic responses, all clones showed constitutive characteristics that may confer an ability to withstand sudden events of flooding or drought: a high proportion of aerenchyma, which may maintain aeration before plastic responses take place; sclerenchyma, which may prevent root and leaf sheath collapse by soil compaction; and a conspicuous endodermis, which may protect stelar tissues from desiccation. Both constitutive and plastic anatomical characteristics are likely to contribute to the ability of this species to occupy widely different topographic positions and to resist temporal variations in water and oxygen availability.

Author Keywords: Flooding, drought, aerenchyma, vessels, roots, leaf sheaths, anatomy, *Paspalum dilatatum* Poir