

Abstract

Plants encounter many adverse factors in their environment to which they must adapt in order to make effective use of their environment despite stresses such as water shortage, nutrient deficiency, soil salinization, soil compaction or flooding. This work focuses on the internal structure of the root and its changes in response to environmental stress conditions. Specifically, it focuses on structural modifications of the middle part of the root cortex, which play an important role in optimizing root system functions under stress conditions. It summarizes knowledge on the structure, mode of formation and regulatory mechanisms of aerenchyma formation, which is of great importance for plant survival under hypoxic conditions. These are encountered by many plants in flooded areas, including important agricultural crops such as rice and maize. This paper also analyses the role of aerenchyma in response to other stress factors such as nutrient deficiency, water deficit or substrate compaction. In addition, this work focuses on lesser-known structural modifications of the middle part of the cortex, whose function has not yet been fully understood, but which represent potentially important characteristics of the root system that could be the focus of future breeding of resistant crop cultivars. These modifications include the deposition of secondary cell walls (formation of sclerenchyma, phi-thickenings or peri-endodermal thickenings).

Key words

Root, cortex, aerenchyma, sclerenchyma, phi-thickenings