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Structure and Function of the Root Cap

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Abstract: The root cap (RC) is a multilayered dome of spindle-shaped parenchyma cells that overlies the growing root tip. It is present in the roots of almost all crop species. This paper briefly reviews some topics on the structure and function of the RC in the major crop species such as maize and rice. Special attention is placed on its contribution to the root system formation, that is, the elongation and growth direction of axile roots. The cells produced in the RC meristem are pushed forward as new cells form beneath them, and eventually the cells on the periphery of the RC fall off. The life cycle of RC cells of maize has been studied extensively and ranges from one to seven days. Approximately 4,000 to 21,000 cells are present in a complete maize RC, and 1,400 to 3,200 sloughed cells can be found in the rhizosphere soil per day per root. These cells, called root border cells (RBCs), mix with RC mucilage and play important roles for the root growth in soil. The RBC-mucilage complex effectively reduces the resistance roots experience during penetration into field soil, about 30-40% of the resistance being reduced by the presence of RC alone. The RC is also a tissue integral to gravitropism, and is known to determine the direction of root growth. The size of amyloplasts and coumellae in RCs has a strong influence on determining the growth angle of axile roots. The function of the individual regions of the RC and how the RC tissues and cells are formed should be studied further to advance our understanding regarding the critical roles of the RC in crop root growth.

Keywords: [Exudation](#), [Gravitropism](#), [Growth direction](#), [Mucilage](#), [Root apical meristem](#),

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