

ANTHESIS IN MAIZE: STUDY OF WATER TRANSPORT

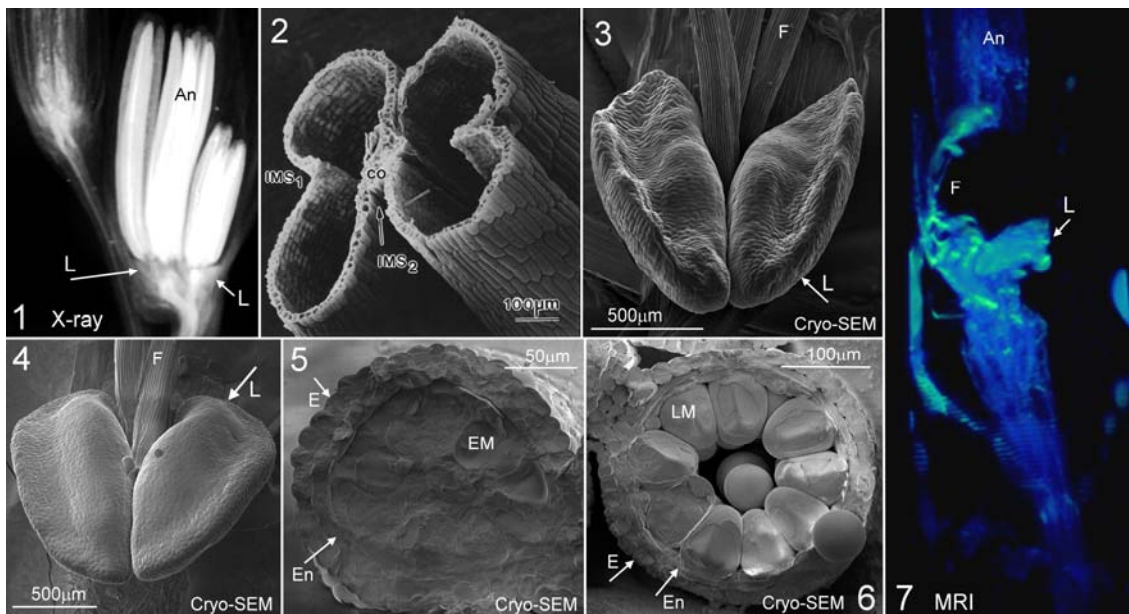
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Studies on the maize (*Zea mays* L.) anthesis indicated that active water-withdraw from the maturing anther is responsible for the preferential removal of water in the anther tissue. Free water in the microsporangial cavity is removed long before anthesis, followed by the removal of water in the epidermal cells, generating tensile forces around the circumference of the anther, which leads to the separation of inter-microsporangia 1 (IMS1) from the underlying connective; then, the subsequent splitting of the IMS1 to form anther pore. Our results showed a sharp increase of glucose and fructose levels in the lodicules at the time of lodicules enlargement (3, 4). Presumably this high sugar concentration creates a high osmotic potential in the lodicules which acts as a sink for water movement. Cryo-SEM studies also revealed that the microsporangial cavity is filled with liquid in the early microspore (EM) stage and gradually become free of liquid at the late microspore (LM) stage, therefore, at anthesis, the inter-pollen spaces are free of water. Results from a non-dehiscent mutant (*ndh*) will also be presented. Photoelastic study on a gelatin model revealed stress distribution in the anther.



(1): 100ps pulse X-ray projection image showing the structure of maize spikelet prior to anthesis; (2): Separation of IMS₁ from connective is the first event in anther dehiscence; lodicules (L) before (3) and after (4) swelling; cryo-SEM of microsporangium at early (EM)(5) and late microspore (LM) stage (6), note the removal of water in the cavity; (7): High resolution MRI image (9.4T; T₂) of a spikelet (with glumes and lemma removed). An: anther, Co: connective, E: epidermal cell; En: endothecium; F: filament; IMS₂: inter-microsporangia 2.