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Anatomy and Ultrastructure of the Developing Radicle in Rice Embryos: An Approach to the Study of Somatic Embryogeny

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Abstract:
The development of the radicle at the basal portion of rice rygotic embryos was studied. Median sagittal sections and transverse sections indicated that a radicle tip arose at the ventral side of the embryo 5 DAA (days after anthesis), apparently inducing the dorsiventrality of the embryo. A radicle was connected to a shoot tip by curved vascular strands, and the distance between the radicle tip and the shoot tip was about 300μm when measured in a straight line. It was demonstrated that the radicle contained root cap, root epidermis, cortex and central cylinder. The radicle's subapical initials originated a root cap, which was formed of more-or-less regular columellae of cells. Coleorhiza enveloped columnar root cap, by which the radicle tip was shown to comes first endogenously. The lateral surface of radicles was covered by a mucilaginous thick cell wall. Plasmodesmata were frequently seen in the cell walls of the cap and the epidermis, and additionally, in the walls separating the cap from thc epidermis. The position of embryos in the ovarian cavity in relation to the nucellar epidermis was transferred from the central to ventral side before these events. The initiation of shoot and root poles and the embryo size at the time are discussed in the context of the similarity of somatic embryoids to zygotic embryos.

Keywords:
Embryogenesis, Oryza sativa, Plasmodesm, Radicle, Ultrastructure, Vascular connection

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