



The Germination Process in Corn

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- Understanding the process helps you troubleshoot problems with germination.

Germination is the renewal of enzymatic activity that results in cell division and elongation and, ultimately, embryo emergence through the seed coat. Germination is triggered by absorption of water through the seed coat. Corn kernels must absorb (imbibe) about 30 % of their weight in water before germination begins. Less than optimum absorption of water (perhaps due to a rapidly drying seed zone) may slow or stop germination. Repeated wetting/drying cycles can decrease seed viability.

By comparison, soybeans must imbibe about 50 % of their weight in water. But since soybeans are approximately 2/3 the weight of corn kernels, the total amount of absorbed water required for germination is relatively similar.

The visual indicators of germination occur in a distinct sequence. First of all, the **radicle root** emerges first, near the tip end of the kernel, within two to three days in warm soils with adequate moisture. In cooler or drier soils, the radicle root may not emerge until one to two weeks after planting.

The **plumule** emerges next, from the embryo side of the kernel, within one to many days of the

appearance of the radicle, depending on soil temperature. The [plumule eventually differentiates into the mesocotyl and coleoptile](#). The coleoptile (commonly called the 'spike') is a rigid piece of plant tissue and has a pointed tip with no visible openings. The coleoptile encloses four to five leaves that were formed during grain maturation the previous year. These leaves begin to enlarge during the germination and [emergence](#) processes.

The **lateral seminal roots** emerge last, near the dent end of the kernel.



Troubleshooting Considerations

When temperatures are optimum, these three parts of the seedling may emerge from the kernel on nearly the same day. Excessively cool soils may delay the appearance of the coleoptile and lateral seminal roots for more than a week after the radicle root emerges. It is not uncommon in cold planting seasons to dig seed two weeks after planting and find only short radicle roots and no visible coleoptiles.

When excessively cold and/or wet soils delay germination and/or emergence, the kernel and young seedling are subjected to lengthier exposure to damaging factors such as soil-borne seed diseases, insect feeding and injury from preplant or pre-emergent herbicides and carryover herbicides from a previous crop



For other information about corn, take a look at the Corn Growers Guidebook on the World Wide Web at

<http://www.kingcorn.org>

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