

Pre-Harvest Sprouting in Wheat

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Wheat has a minimal seed-dormancy mechanism, which can lead to seed sprouting prior to harvest (pre-harvest sprouting). Once wheat seed has reached harvest maturity, it will begin to germinate when exposed to adequate moisture and temperatures. For wheat at a harvest-ripe stage (Feekes 11.4 or Zadock 92), any extended period of wet weather can cause pre-harvest sprouting. Weather conditions for pre-harvest sprouting are not uncommon in the Blacklands and Northeast Texas and occasionally happen in other parts of the state. The extent of pre-harvest sprouting is dependent on: (1) duration and severity of moist conditions prior to harvest, (2) temperatures during such wet weather, (3) the growth stage of ripening grain, and (4) the inherent dormancy level attributable to a variety's genetics.

Germination begins as a wheat kernel absorbs moisture and swells. Visible characteristics of sprouting include kernel swelling, germ discoloration, split seed coat and emergence of the radicle (root) and/or the coleoptile (shoot). Pre-harvest sprouting negatively affects subsequent grain quality (test weight), seed viability, seedling vigor, and milling and baking properties.

Decreased test weight is caused by conversion of starch to glucose (sugar) by the enzyme alpha-amylase. Such starch-to-glucose conversion may indicate that sprouting has begun, even if visible signs of sprouting are minimal. Prolonged exposure to moisture allows germination to continue, resulting in appearance of the root (radicle) and shoot (coleoptile). In advanced cases of pre-harvest sprouting, the upper canopy of fields may appear green.



Left to right: Germ slightly swollen to radical and coleoptile emerged. Picture from Kansas State University.

Growers should question suitability of grain for seed if germination or pre-harvest sprouting has occurred. **Grains with split seed coats or exposed roots or shoots should not be kept for seed.** Low test weight or bleached kernels also can indicate pre-harvest sprouting and point to the need to examine a seed lot further prior to planting or saving grain for seed. Seed quality research from Kansas State University has shown little difference in seed germination at various sprouting levels immediately following harvest; however, after a period of storage, the percent germination of sprouted seeds was reduced substantially. **In any case, preplant germination tests need to be conducted before planting any seed with signs of pre-harvest sprouting, especially for wheat that has been stored for several months prior to planting.**

Additional information on pre-harvest sprouting can be obtained from the following Web-sites.

- 1) <http://www.oznet.ksu.edu/library/crpsl2/sr1115.pdf>
- 2) <http://ipm.missouri.edu/ipcm/archives/v12n14/ipmltr5.htm>

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