

# Wet Weather Can Cause Seeds to Sprout before Harvest

By Bill Wiebold

Corn and soybean seeds possess several mechanisms that prevent sprouting before maturity. The primary mechanism is a growth hormone called abscisic acid (ABA). The concentrations of ABA in corn and soybean seeds peak during the middle of seed filling and begin to decrease as the seeds near maturity. There are mutants of both corn and soybean that do not make ABA. These mutants are called viviparous plants. Nearly all the seeds on these plants germinate before maturity and their ears or pods become masses of germinating seedlings.

For normal corn and soybean plants, only

for germination has been abundant this fall. Normally, corn husks protect mature kernels from moisture that may cause germination. If the ear turns downward at maturity, the husks shed water and the chances of kernels sprouting on the ear are almost eliminated. But, if the ear remains upward and the husks do not completely cover the ear tip, water from rain or even a heavy dew may run down the inside of the husks and pool at the butt end of the ear. Under these conditions, the husks trap water near the kernels and if temperatures are above 50°F kernels will likely germinate. Even if the kernels contained small

from absorbing water by shedding rain water. Frequent rains, continuous drizzle, or foggy days and nights can bathe the soybean pod in enough water that the water soaks through the pod wall and wets the soybean seed. As with corn, even if the mature soybean seeds contain some ABA, continuous or frequent wetting will leach the ABA from the seeds.

A more common reason for soybean seeds sprouting in the pod is that the pod wall has separated or broken. This allows water access to the seeds. During wetting and drying cycles, mature soybean seeds expand and contract. Expanding seeds exert heavy pressure on the soybean pod wall. Soybean pod walls do not expand as much as soybean seeds. The two halves of the pod wall are sutured together and these sutures can rupture if enough pressure is provided by expanding seeds. If the two halves of the pod wall separate and the seed dries and shrinks, the seed may fall from the pod. This is shattering and is the normal way in which the weedy ancestor of soybean dispersed its seeds. Under wet conditions, the seed remains swollen and will not fall from the pod. But, the now exposed seeds will likely germinate if wet enough and if the temperature is above the minimum.

Premature sprouting is quite damaging to grain quality. During germination, seeds release enzymes that break down carbohydrates, proteins and fats. This breakdown releases free sugars, amino acids, and fatty acids. These simple compounds spoil easily in storage. The soybean seed coat and the corn kernel pericarp rupture during germination, and this makes the grain vulnerable to invasion by fungi and insects. The broken seed coverings decrease grain storage time and grain quality.



Figure 1. Kernels sprouting from corn ear.

small amounts of ABA remain in the seed at maturity. For this reason, corn and soybean seeds can be planted shortly after harvest, and they will germinate. Unfortunately, this also means that, seeds from normal corn and soybean plants can germinate on the ear or in the pod if certain weather events occur.

The two primary requirements for seed germination are temperatures above a minimum and moisture. The minimum temperature for corn seed germination is about 50°F or a little cooler. Unfortunately, water

amounts of ABA, ABA is water soluble and will leach out of the wet kernels. Sprouting on the ear is almost always limited to several rows of kernels at the butt end of the ear because this is where water is trapped. Sprouting may occur from uncovered kernels near the ear tip, but weather conditions, such as multiple days of fog or continuous drizzle that keeps kernels constantly wet, are rare.

The minimum temperature for soybean seed germination is also about 50°F. The pod wall helps prevent mature soybean seeds

Bill Wiebold

WieboldW@missouri.edu

(573) 882-0621

Visit our Web site at [ppp.missouri.edu](http://ppp.missouri.edu)