

Freeze Stops Crop Growth, But Cool Weather Slowed Maturity Earlier

COLUMBIA, MO.

First freeze of the fall ends the growing season for crops, but extended cool weather before frost may have stopped crop maturity early, said a University of Missouri Extension agronomist.

"The science of low temperatures and photosynthesis is not perfect, but we expect some reduced yields in both soybean and corn fields because of unusual fall weather," said Bill Wiebold, MU Extension soybean and corn specialist.

When temperatures fall below 40 degrees, little growth occurs. Photosynthesis slows and then stops with low temperatures and reduced day length. Photosynthesis is the chemical process in which chlorophyll in plants converts carbon dioxide and water into starches and sugars for seed fill.

Plants can survive frost at 32 degrees, but a hard freeze at 28 degrees kills most plants. Freezing temperatures can vary across a landscape, with colder temperatures in low-lying areas and north-facing slopes. Lack of wind increases chance of killing freeze.

As of Oct 7, frost from 32-degree temperatures had occurred in much of northwest Missouri. However, no 28-degree temperatures, the killing freeze, were reported, said Pat Guinan, climatologist with the MU Extension Commercial Agriculture Program. Those killing temperatures did occur just across the state line in Iowa and Kansas.

Long-range forecasts call for killing freeze on Sunday, Oct 11. "There is even the possibility of snow in far northern Missouri," Guinan said. "However, snow should be light and not accumulate on warm soils."

"Unfortunately, we are not getting the late freeze that we had last year," Wiebold said. "In 2008, a long, warm fall season helped yields."

Guinan said the median date for a freeze is Oct. 11-16 in counties across far northern Missouri. In most of Missouri the median freeze date is Oct. 16-21. Counties in extreme southwest Missouri and the Bootheel have median freezes from Oct. 26 to Nov. 1.

Delayed planting last spring because of cool, rainy weather put more crops at risk of delayed maturity. Some crops, normally up and growing in springtime, were not planted until after the first day of summer.

Crop observers have noted many fields of green soybean plants late in the season this year, Wiebold said. "Near-perfect growing conditions in the fall have kept the plants alive.

Usually we see the leaves turn yellow and begin to drop by early October."

Farmers worry about whether the soybean seed pods and corn ears have filled and matured before the killing freeze, Wiebold said. Of greater concern is whether the soybean seed matured normally or remained green. Off-color beans can be docked in price at market time.

"Green soybeans don't mature in the bin after harvest," Wiebold added. "Immature soybean seeds contain chlorophyll and appear green. During maturity in normal fall weather, the chlorophyll breaks down and partially bleaches in sunlight. Premature death stops this degradation and the seeds remain green."

The extent of the green-bean syndrome depends on how mature the seeds were when frozen.

"If death occurs late in the seed-filling, the green color is confined to the seed coat," he said. "If death occurs during early to mid fill, the green color remains throughout the interior of the seed."

Soybean buyers dock the price of green beans brought to elevators. In processing, green beans produce green soy oil, an undesirable quality for cooking.

Nearly all soybeans are classified and sold as "yellow soybeans," Wiebold said.

Farmers can check their soybean seed by splitting them with a knife. If only the seed coat is green, the beans should be classified as yellow beans and not docked.

However, if less than 90 percent of the seed interior is yellow, the beans will be classified as "soybeans of other color."

A load of beans containing more than 10 percent seed of other color will be graded "standard" and can receive substantial dockage, he said.

Sometimes early freezing damages seed so badly that they are classified "total damage kernels," the lowest grade.

For the most part, corn has passed the critical stage of maturity called "black layer." This layer, at the base of the kernel where it attaches to the corn cob, seals the kernel off from the plant, stopping nutrient intake. At that point the corn starts to dry for harvest.

Corn killed before black layer forms can be difficult to dry, both on the stalk and in the bin.

"Delaying harvest to allow corn to dry in the field leads to increased risk of cornstalks falling over," Wiebold warned. "The wet season has increased chances for stalk rot." △



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