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CROP AND LIVESTOCK

Update

Potential Yield Losses in Corn From Fall Frost Damage

Bob Nielsen
Professor
Department of Agronomy

Purdue University

Cooperative

Extension

Service

Yield loss to fall frost damage in corn depends on severity of plant tissue death and grain fill stage, according to Bob Nielsen, professor in Purdue's Department of Agronomy.

With all the concern about the risk of a killing fall frost damaging corn before it is mature, many growers are asking about potential yield loss. Well, as usual, it depends. The following thoughts are paraphrased from an excellent publication on the topic, NCH-57, Handling Corn Damaged by Autumn Frost, available from your local Purdue Cooperative Extension Service office.

What Is A Killing Frost? A frost event that damages only the corn plants' leaves decreases yield potential less than a true killing frost that obliterates the leaves, stalk, and husks. Considerable whole plant damage can occur when temperatures fall below 32 degrees F for four to five hours or below 28 degrees for even a few minutes. Less damaging frost can also occur at temperatures greater than 32 degrees when conditions are optimum (clear skies, low humidity, no wind) for rapid heat loss from the leaves to the atmosphere (radiational cooling).

Potential Yield Losses. A killing frost prior to normal black layer formation will force the premature development of the kernel black layer, resulting in incomplete grain fill and lightweight, chaffy grain. Grain moisture content will be greater than 36%, requiring substantial field drydown before harvest.

Yield losses from total plant death prior to kernel black layer are estimated to be 55, 41, and 12% for soft dough, full dent, and half-milk line stages of development, respectively. Yield losses from death of leaves only (not stalk) prior to kernel black layer are estimated to be 35, 27, and 6% for soft dough, full dent, and half-milk line stages of development, respectively. Yield losses are less when only leaves are killed because the surviving stalk can remobilize carbohydrates from the stalk tissue to the developing ear for some time after the damage occurs.

Grain Moisture Concerns. Frosted grain will dry fairly normally, after an initial delay in moisture loss. Remember that even if a corn crop barely reaches black layer before a killing frost occurs, the grain moisture content will still be 30 to 35%. Some field drydown will need to occur before the corn can be safely harvested. Drying rates in the field typically drop to 1/2 to 3/4 percentage points per day in early October, so field-drying grain from 35% to 25% grain moisture content could require two to three additional weeks.

For more information, contact Bob Nielsen at (317) 494-4802 or send e-mail to: rnielsen@dept.agry.purdue.edu