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Harvesting, Drying, and Storing Frost-Damaged Soybeans

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In most years, soybeans planted in Michigan will reach physiological maturity prior to a killing frost. This is usually true even when the frost occurs earlier than normal. Three exceptions are: if the beans are planted in low-lying fields; planted late; or the varieties are not adapted to the growing area. This fact sheet provides important information that will help producers reduce the adverse impacts in the event that some of their soybean fields are damaged by frost.

Frost-damaged beans will probably be wetter than normal and more difficult to thresh. Your first step in adjusting for this condition is to reduce the concave clearance. If acceptable threshing still does not occur, increase the speed of the cylinder. Make incremental adjustments and check your progress after each adjustment.

In order to avoid significant harvest delays, late-planted or frost-damaged soybeans may need to be harvested at moisture levels between 16 and 18% and dried to a safe level for storage (12% for 6 months). Late-planted or frost-damaged beans will contain some green and immature beans. Electronic moisture meters tend to underestimate the moisture levels in green and immature soybeans. To compensate for this, producers should remember to add 1.5 percentage points to the moisture meter readings when testing mixtures of green, immature and mature beans and adjust drying times accordingly.

If only 2 to 3 points of moisture need to be removed, the air temperature is above 60°F and below 75% relative humidity; no supplemental heat is required in drying bins equipped with full perforated floors and fans capable of producing 1 to 2 cfm/bu. However, drying will occur slowly. Drying times depend on initial moisture content, air flow,

grain depth and weather conditions. If you plan to add supplemental heat, be careful as soybeans are more fragile than corn and can be damaged by drying temperatures above 130°F. These temperatures will cause excessive seed coat cracking and split beans.

The relative humidity of the drying air should always be maintained above 40% to protect the integrity of the seed coats and prevent splits. Maintaining relative humidity above 40% is difficult when adding heat as the relative humidity is cut in half for each 20 degrees that air is heated. Producers can control the heat and humidity of the drying air by using short burner cycles or by changing the burner jets. The temperature rise of the drying air is directly proportional to the percent of time the burner is operating. Proportional timers are available that allow calibration of the entire drying cycle by setting a dial to control the percentage of time the burner fires.

Green soybeans contain chlorophyll that causes oxidation of the refined oil, greatly reducing the shelf life. The chlorophyll can be removed from the oil. However, the process adds to refining costs and product losses. Because of this, green and immature soybeans are included in the total damage factor in the U.S. soybean grading standard. Elevators will discount loads containing green and immature soybeans and in some cases may reject entire loads if the damage levels are high. Therefore, the worst plan would be to harvest green or immature soybean and deliver them for sale immediately. A much better alternative is to screen out the small beans, dry the rest to 12% and store them in aerated bins for at least 4 to 6 weeks. The green color will fade after this amount of time and discounts will be significantly reduced.

Soybean Management and Research Technology Information

This factsheet was produced by the SMaRT project (Soybean Management and Research Technology). The SMaRT project is a partnership between MSU Extension and the Michigan Soybean Checkoff program and was developed to increase soybean yields and farm profitability in Michigan. Additional information about increasing soybean yields and profitability can be found online at: www.michigansoybean.org

References

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