

Grain Maize Harvest and Storage

The quality requirements of industrial users (or farmers) of grain maize depend at least as much on grain drying and storage conditions as they do on the harvest stage itself. It is therefore important to focus on achieving the optimum economic yield while monitoring the crop's health status.

The right compromise is probably to harvest at around 22–25% grain moisture. This makes it possible to take full advantage of the crop's yield potential while harvesting before significant field losses occur.

Optimum yield is reached once the transfer of assimilates is complete. At this stage, thousand-grain weight is at its maximum for the number of grains per m^2 present. This stage can be identified by the appearance of the "black layer" at the base of the grain.

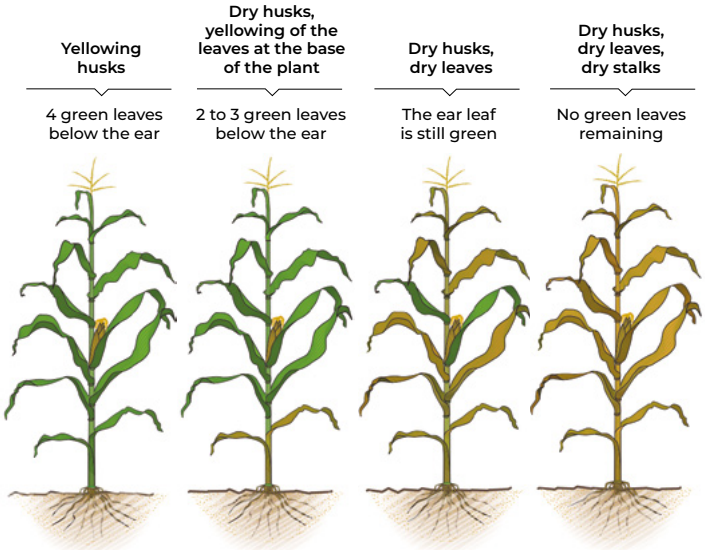
Determining the harvest stage

To visually determine the crop stage, it is important to consider both the grain and the appearance of the vegetative parts of the plant. To assess the crop stage correctly:

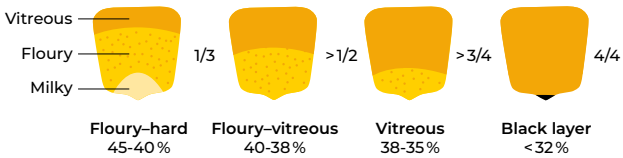
- Assess the overall condition of the vegetative parts to determine the plant's ability to remain active late in the growing cycle and therefore the flexibility available for harvesting after physiological maturity.
- Monitor the grain milk line down to the black layer (and/or accumulated growing degree days) to determine the crop stage.

Observe the crop to determine when to start harvesting

1 Monitor husk yellowing and plant drying



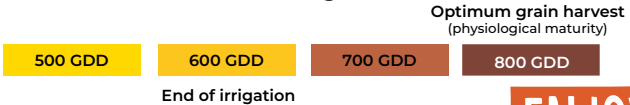
2 Monitor grain filling



The **black layer** indicates that the supply of assimilates to the grain has stopped. In a warm year, when assimilate translocation proceeds normally, it can be a useful indicator of harvest timing.

Caution is required in a cool year: the cessation of assimilate transfer occurs gradually, meaning that the black layer is no longer a reliable indicator of harvest timing.

3 Monitor accumulated temperatures after female flowering



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GRAIN MAIZE HARVEST

Key quality parameters of harvested grain

Quality refers to both technological quality (physical properties and suitability for processing) and food/feed safety (mycotoxins resulting from the presence of Fusarium on the ears). Changing requirements for commercial and sanitary quality are creating new market access conditions, making it necessary to consider the entire crop management process, from the field through to the first stage of processing. Every step of the production process must be carried out carefully in order to bring safe, sound and marketable maize to the market.

Maintaining quality during threshing

The concave clearance and threshing drum speed determine the proportion of broken kernels and the amount of incompletely threshed ears. A clearance of 30 mm at the front and 15 mm at the rear is suitable for early-maturing varieties that thresh easily. This clearance should be increased by 5 to 10 mm for late-maturing varieties with larger ears. For varieties that are more difficult to thresh, the clearance can be reduced to 25 mm at the front and 12 mm at the rear.

Preparing storage facilities

Grain must be received and stored in clean, healthy facilities free from insects and rodent activity. Storage areas should be thoroughly cleaned to remove as much dust as possible and eliminate potential food sources for pests. Facilities can also be treated preventively to prevent infestations, or curatively if an infestation has already occurred. Several conventional and alternative solutions are available to grain storage operators. Particular attention should be paid to the re-entry interval following treatment.

Adjusting the drying process

Drying conditions have a decisive influence on grain quality and industrial value. The risks of deterioration affect the grain's physical quality, commercial quality and end-use value. Drying at excessively high temperatures or too aggressively can damage starch and proteins, reducing the processing value of maize grain, particularly for starch production.

Recommended drying temperatures according to harvest moisture and grain end use

Harvest moisture (%)	Gavage maize	Waxy maize	Starch maize	Animal feed maize
20-24	90-100	100-110	130-140	130-140
25-27	90-100	100-110	130-140	130-140
28-30	80-90	90-100	120-130	130-140
31-34	70-80	80-90	110-120	120-130
35-38	60-70	70-80	100-110	110-120

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Genetic progress is constantly improving the performance (yield, UFL) and characteristics of corn (early vigor, resistance to disease, lodging, pests, water stress, etc.). And the quality of seeds provides guarantees in terms of varietal purity, technological quality, and health quality, allowing the full expression of the varietal innovation offered by breeders.

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Actions to maintain grain quality

[1] Breakage and cracking can also be reduced by improving grain handling.

Quality criterion	Indicators of deterioration	Adjust the combine harvester	Limit the duration of re-storage	Limit drying temperatures and avoid over-drying	Improve cooling ventilation during storage
Commercial quality	Cob fragments	★			
Commercial quality	Broken, cracked and chipped kernels	★		★[1]	
Commercial quality	Browned and heat-damaged kernels			★	
Commercial quality	Mold and germination		★	★	★[1]
Technological quality	Poor Promatest or sedimentation results		★	★	
Technological quality	Poor semolina and hominy yields	★		★	
Sanitary quality	Mycotoxins		★		★