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Integrated Crop Management NEWS



Deciding Between Grain and Forage Harvest for Late Maturing Corn

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Irregular development and lateness of Iowa crops this year are cause for reflection as producers conduct late season evaluation of crops in individual fields, and plan when and how to harvest them for the greatest economic advantage. Late season evaluation involves reviewing normal crop growth and development, assessing the condition of the crops in individual fields relative to normal, and thinking through several autumn season scenarios such as: How will this field develop between now and the normal frost time? What are the concerns or alternatives if a frost comes one or two weeks earlier than normal?

Corn

Most of the Iowa corn crop is intended for harvest as dry grain. If it will reach physiological maturity, it will be more valuable as harvested grain, but may require supplemental drying. If the field or parts of the field fall short of physiological maturity producers can harvest immature corn for silage or use it in grazing programs.

As the corn crop matures, harvestable grain yield will be highest at physiological maturity of the plant. However, highest yield of digestible nutrients as whole plant silage is greatest several days before plant maturity; when the stalk and leaf material remain more digestible. Since the optimum silage harvest comes before grain crop maturity, it is important to have an accurate estimate of the developmental stage of the corn crop.

Visual Indicators of Corn Maturity

As the corn plant is nearing maturity, one of the best means of determining the developmental stage is an occasional look at the developing grain. As kernels mature, the milky, sugary endosperm gradually changes to a solid, starchy consistency. Soon after the grain reaches the "dent" stage, you can usually see the 'milk line' or the boundary between the liquid and solid endosperm. The milk line is easiest to see on the 'back' side of the kernel; the side opposite the embryo or "germ". It is detectable as a relatively distinct line between two shades of yellow. Very soon after dent the milk line is nearest to the dented end of the kernel. As the grain develops the milk line can be seen nearer and nearer to the pointed tip of the kernel. At physiological maturity of the grain, the milk line has reached the tip of the kernel and a "black layer" forms at the tip indicating that all movement of nutrients from the stalk to the kernel have ceased. The grain and stalk continue to dry from that point on.

Table 1. summarizes several characteristics of the developing corn plant. As you review this table note that the greatest harvestable yield of whole plant digestible nutrients (TDN) is at a stage when the milk line has advanced about two-thirds of the distance from the dent to the kernel tip. If you have significant acreage of corn to chop, begin when the most advanced fields or parts of fields are at one-half milk line and try to harvest all the silage when between one-half milk line and maturity. Fortunately, the moisture of the whole plant is about 65 to 70 percent moisture at this stage; ideal moisture for

direct chopping of corn for silage.

Table 1. Effect of harvest stage on yield and quality of corn silage.

Maturity	Whole Plant Moisture	Dry Matter Crude Protein	Dry matter Digestibility	Dry Matter Yield ¹
	%	%	%	Tons/Ac
Early Dent	73	9.9	79.0	5.6
1/2 milk line	66	9.2	80.0	6.3
3/4 milk line	63	8.9	79.6	6.4
No milk line (mature)	60	8.4	78.6	6.3

Adapted from Wiersma, et al. 1993. (Wisconsin, 1988-90 seasons).

¹ Authors note: Yield of 'as chopped silage' will be considerably higher and dependent on many factors.

So, in a "normal" maturity and dry-down season, the decision to chop whole plant corn silage has to be made fairly early. With late planted corn and late maturity risks, frost may force the decision to harvest as silage. If frost comes during the target milk line period, whole plant moisture content should be appropriate for normal ensiling.

There are some ensiling considerations if frost comes when the crop has only reached early dent, or less. Whole plant silage chopped and stored at higher than 70 percent moisture may undergo abnormal or incomplete fermentation and will begin to lose dry matter as seepage (effluent) losses. Use caution when locating a site for silage storage with potential for seepage losses, because off-site movement of silage effluent can become an environmental hazard as a ground or surface water contamination source. It is very difficult to estimate the moisture content of frosted, immature corn. The best method is to chop a few feet into the field and send a representative sample of chopped forage to a test lab for moisture determination.

For more information on determining the development and stages of corn, see ISU Extension publication SR-0048 [How a Corn Plant Develops](#).

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