Disaster Recovery

Livestock

Harvesting immature corn as silage

The excessive moisture of 1993 has created forage quality and quantity deficiencies for many livestock producers. Late planting of the corn crop, stunting of crops by excess moisture and flooding, and the uncertainty of harvest conditions and frost, all set up the opportunity to harvest some of the corn crop as silage. Frost damaged corn can be effectively utilized as silage. While little research has been conducted specifically on silage from corn damaged by frost, data is available on corn silage harvested at varying stages of maturity. If silage is harvested from frost-killed plants before the leaves are lost, the silage should be similar to unaffected plants at the same stage of maturity.

As corn forage advances in maturity, nutrients are translocated from the stalk to the ear and yields of digestible nutrients per acre increase. This is demonstrated in Table 1.

Table 2 shows the effects of stage of corn silage maturity on composition, digestibility and intake. In general, digestibility and feeding value are not different across maturities. Protein tends to be higher for more immature silages. Dry matter intake was less for more immature silages. This is likely due to the high moisture content. It is recommended that frost-damaged corn be allowed to dry to 65 to 70 percent moisture before harvesting as silage.

Table 1. Plant composition and energy yield of whole plant corn silage harvested at three maturities.

	% DM Basis				Tons TDN/acre
Maturity	Grain	Stover	Sugar	Starch	(DM basis)
⅓ milk line	32.4	59.1	9.8	22.2	7.2
⅔ milk line	41.8	50.2	7.1	28.4	7.8
black layer	46.1	45.8	6.6	31.0	7.7

Source *Iowa Beef Handbook (MT1324)* Adapted from *Pioneer Forage Manual. A Nutritional Guide (1990)*

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Table 2. Influence of stage of maturity of corn silage on composition, digestibility, and intake[1]

Stage of Maturity	Dry matter, %	Crude protein %[2]	Dry matter digestibility, %	Voluntary feed intake, % of glaze stage
Blister	21.1	11.7	68.2	78
Early Milk	21	12	67.3	76
Milk-early dough	23.4	11.5	71.0	88
Dough-dent	27.7	10.9	71.9	95
Glaze	33.7	10.2	68.1	100
Flint	41.9	10	68.8	93
Post-frost	48.1[3]	9.6	69.0	88
Mature[4]	71.7	10.9	68.6	87

[1] Johnson and McClure, 1968, average of 2 years
[2] Dry matter basis
[3] Water added at ensiling time, in one year.
[4] One year only.

Summary

Nutritional value of frost-damaged, immature corn harvested as silage is approximately the same as normal corn silage. Silage should be field dried to 65-70 percent moisture for proper storage characteristics, but harvested before leaf loss decreases feeding value. Some reduction in tonnage yield is to be expected as corn maturity is decreased. This will vary depending on stage of maturity, hybrid, and site factors such as stunting due to flooding.

Corn that is stunted due to excessive moisture and flooding should not accumulate high levels of nitrate. Nitrate accumulation may occur in drought stunted corn on soils that are heavily fertilized, but this does not occur in cool, excessively wet weather. Late planted corn that is growing normally and is frost damaged, however, has some potential for nitrate accumulation, although the risk is low. A substantial amount of the nitrate accumulated in plants is dissipated during the ensiling process, rendering even high risk crops such as drought-stressed corn relatively safe. Silage should not be tested for nitrate accumulation until after the ensiling process is completed.

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