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Renewed interest in snaplage displayed

IT is my impression that there was a resurgence of interest among dairy producers and nutritionists in harvesting high-moisture corn as snaplage this past fall.

This is partly due to snaplage being heavily promoted by custom cutters who were eager to secure more business for their forage harvesting crews and partly due to the increasing cost of harvesting with a combine and processing at the bunker.

Recent studies have also confirmed that if harvested at the proper kernel moisture, snaplage can have an extremely high feeding value if harvested, processed and stored correctly.

Pros and cons

Perhaps a place to start is defining snaplage versus high-moisture ear corn (or earlage).

My definition of snaplage is corn harvested by a silage chopper equipped with a snapper head and processed by the chopper's kernel processor. Snaplage contains kernels, cob and varying amounts of husk and ear shank (non-grain components, often termed "trash").

What I term high-moisture ear corn is corn that has been picked or combined (modified to save varying amounts of the cob) and then processed through a tub grinder or roller mill at the storage structure.

Some of the advantages of snaplage include: (1) earlier harvest that fits well between corn silage and dry grain, (2) yields that are 10-15% higher per acre compared to dry grain harvest, (3) potential cost savings compared to harvesting corn and processing at the storage structure, (4) higher ruminal starch availability compared to dry corn and (5) an additional source of fairly digestible fiber if harvested in a timely manner (assuming cobs and trash are not sorted out at the feed bunk).

Some of the disadvantages of snaplage are: (1) fermentation and feed-out losses, (2) the potential for the corn crop to get overly dry, which affects digestibility and palatability, (3) a higher inventory carrying cost and (4) less consistency than dry grain because of changing starch digestibility over time in storage.

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Bottom Line

with
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Harvest moisture

Most nutritionists I talk to who have experience feeding snaplage agree on one key point: It is best to err on the wet side when putting up snaplage. When the crop gets too dry (e.g., kernel moistures ~~greater~~ less than 25%), problems start to mount in terms of digestibility, palatability, inadequate kernel damage and instability in the feed bunk.

To capture the most starch per acre, harvest should not begin until the kernels have reached the black-layer stage and are physiologically mature, which means kernel moistures of 34-36% for most hybrids. I find it best to discuss kernel moisture when making harvest recommendations because most growers own a kernel moisture tester, and the final product can have a varying amount of trash, which affects moisture levels.

The cob carries in more moisture than the kernel, with the traditional thumb rule being that the final mix will be about five percentage units wetter than the kernel (based on ear being about 20% cob). This may cause producers to harvest drier than desired with hybrids that may contain only 10-15% cob. This is another reason for specifying kernel moistures when making harvest maturity recommendations.

As an example of typical yields and nutritional content, Table 1 shows the results of a 2008 hybrid plot harvested as snaplage in southeastern Minnesota.

Targeting kernel moisture levels of 28% or greater generally results in a product that seems to work best in most rations. Nutritionists will need to be cognizant of the fact that starch digestibility in snaplage will increase over time (about two percentage units per month) in this wetter corn, which is especially important if transitioning from feeding drier high-moisture corn. The higher kernel moisture also serves as a proxy to help ensure more desirable cob digestibility.

Value of cob, trash

Snaplage energy values can vary from one operation to another due to differences in the amount of trash the feed contains. Wetter, greener hybrids usually have a higher trash content, which can dilute the feed and lower the energy content.

Research from the University of Idaho Cooperative Extension Service indicates that trash can range from 1% to 22% in samples of snaplage taken from hybrid plots harvested the same day using the same harvest equipment. Variation in trash can also occur in the same hybrid depending upon the time of day and how the snapper head is adjusted (Kezar, 2001).

Table 2 shows how the snaplage acid detergent fiber (ADF) content can be used to approximate the amount of trash in the mix (Kezar, 2001). Table 3 provides a relative perspective of the nutritional content of snaplage harvested on three different dairies in 2008.

In a recent field study (Soderlund et al., 2006) designed to evaluate the yield and nutritional content of four hybrids harvested at four different maturities, it was demonstrated (Table 4) that cob digestibility declines by nearly 20% from harvest period 1 to harvest period 4. Husk and shank also declined somewhat with increasing ear maturity but remained relatively high across all harvest periods.

Maintaining cob digestibility is yet another reason for targeting snaplage harvest at kernel moistures exceeding 28%.

For those new to snaplage, it is not a particularly attractive product when you pick up a handful and notice all the "stringy" husks. It is definitely more difficult to get husks in snaplage chopped as finely as in corn silage, primarily

because when there are only ears feeding into the chopper, there is space between the ears, and they are not held tightly against a thicker crop mat or against the shear bar. Also, with the snapper head, there is no way to control which direction the ears enter the cutter head.

Obtaining a desired chop length is easier with silage because of the thicker crop mat, and with silage, nearly all of the ears enter the feed rolls with the stalk perpendicular to the shear bar (Zumbach, 2008).

There are ways the forage chopper can be modified to reduce the husk particle size, including: (1) the chopping length on the chopper can be set as short as possible to slow down the feed rolls, (2) on some choppers, a different drum bottom can be used with a key stock welded every 2 in. perpendicular to the knives to help cut/tear the feed going through the machine and (3) a recutter screen can be added behind the knife drum before it enters the processor. This does more of the same cutting or tearing of the crop before it enters the processor; however, it slows down crop flow (Zumbach, 2008).

Kernel damage

Nutritionists have learned to pay close attention to the particle size of grain in dry-ground corn or high-moisture shelled corn with typical goals of 800-1,000 microns and with a small standard deviation to avoid excessive fines or large particles. However, I have observed that not as much attention is paid to the grain particle size of snaplage, likely because it is difficult to interpret data from the typical 12- to 14-sieve particle size lab analysis given the confounding effect cob and trash have on the final results.

It may be advisable for nutritionists to begin maintaining a database of snaplage particle size from samples run through the corn silage kernel damage test that is available from several commercial labs. This way, the amount of starch passing the 4.75 mm screen can become a relative target, just as it is when comparing processing in different corn silages.

In addition to setting the chop length as short as possible, be sure the chopper processor has fine-tooth rolls (five to seven teeth per inch — some processors are not this fine) and is set at 2-3 mm with a 30-40% differential (this can be set much higher with snaplage than silage) to maximize kernel shearing/damage.

Fermentation

The moisture level of the grain in snaplage helps determine both the length of the fermentation process and the relative changes in starch digestibility over time in storage. When snaplage is harvested at recommended kernel moistures exceeding 28%, fermentation can be completed in about two to three weeks. That is actually faster than straight high-moisture shelled corn because there are extra sugars brought in with the cob. If the crop gets away from you (e.g., less than 25% kernel moisture), it can take as long as two months to complete the snaplage fermentation process.

Inoculation with products specifically designed for high-moisture corn can be very helpful, and those containing *Lactobacillus buchneri* can be beneficial for maintaining freshness and palatability if feeding snaplage during the spring and summer months.

Producers should also target snaplage bunker densities in the range of 30 lb. of dry matter per cubic foot to provide the anaerobic environment that will help improve both fermentation and feed-out stability (Soderlund, 2008).

A common recommendation today is to wait about 60 days (if possible) before feeding corn silage. While corn silage or snaplage can successfully be fed sooner, waiting may be preferred for both of these crops because of the dynamic changes in volatile fatty acid profiles, pH and starch digestibility during these first two months.

When transitioning from old-crop high-moisture corn or snaplage to new-crop snaplage, ration adjustments may need to be made because of the reduced ruminal starch digestibility in the short-fermented new-crop corn.

1. Analyses from 2008 snaplage hybrid test plot, southeastern Minnesota

Hybrid	Moisture, %	Tons/acre, 100% dry matter	Crude protein, %	NDF, %	Starch, %
A	33.7	6.6	9.3	13.6	63.6
B	33.3	6.5	8.8	16.4	62.2
C	39.4	5.8	8.6	17.1	59.5
D	37.1	6.3	9.1	16.0	61.5
E	39.7	5.7	8.6	17.9	58.9
F	44.5	5.3	9.3	20.6	55.8
G	46.2	5.5	8.8	22.2	55.4
H	47.2	5.9	9.3	21.3	54.6

2. Relationship of trash content to grain, cob and ADF content in snaplage

% trash	% grain	% cob	% ADF
0	85.0	15.0	9.7
5	80.4	14.6	11.1
10	76.5	13.5	12.6
15	72.3	12.7	14.0
20	68.0	12.0	15.4

Source: **University of Idaho Cooperative Extension Service, as reported in Kezar, 2001.**

3. Percent *in vitro* dry matter disappearance by harvest period

Component	Sept. 13	Sept. 20	Sept. 28	Oct. 4
Cob	67.57	55.77	56.23	48.21
Husk/shank	77.09	74.23	68.94	71.29
Whole ear	84.36	84.13	84.26	83.98
Whole ear moisture percentage	51.6	46.2	37.7	29.5

Source: **Soderlund et al., 2006.**

4. Example of three snaplage samples from 2008 harvest

	Sample A (Iowa)	Sample B (New York)	Sample C (Vermont)
Moisture, %	39.2	46.3	41.1
Crude protein, %	6.8	6.8	8.0
ADF, %	11.4	12.9	7.6
Neutral detergent fiber, %	21.9	25.9	18.1
Fat, %	3.2	3.5	3.9
Ash, %	1.7	1.7	1.62
Non-fiber carbohydrates, %	65.9	63.4	69.2
Starch, %	55.8	57.5	64.0
Net energy of lactation, Mcal/lb.	0.86	0.85	0.88

The Bottom Line

Snaplage is a feedstuff that is experiencing renewed interest because of its relative ease of harvest along with its high feed quality if harvested and stored at correct moistures.

Most nutritionists like to err on the wet side when harvesting snaplage, targeting kernel moistures exceeding 28%, which will typically result in snaplage exceeding 34% moisture. These moisture targets will help ensure high cob digestibility and high ruminal starch digestibility (that will increase over time in storage). Just as with corn silage, attention should be given to the chopper/snapper head setup, including length of chop and processor type and settings.

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