

Harvesting Earlage and Snaplage Silage - Insights for Success

Dairy and beef producers have recently adopted a new method of harvesting high-moisture (HM) grain as earlage or snaplage (in this article, snaplage and earlage are used interchangeably). This high-moisture grain product is the result of harvesting the whole ear including husks, cob, ear shank and grain. It is harvested by attaching a corn snapper head to a forage chopper with a kernel processor on-board. This equipment allows for one-step harvest and kernel processing and results in substantial time and fuel savings compared to other methods.



Harvesting earlage increases yield by 10 to 15% compared to harvesting only the HM grain. Earlage will have intermediate feed value to HM grain and corn silage. Quality of earlage depends on how much cob, husk and leaves are included in the final harvested product. In most cases earlage will have NEL more similar to HM grain than corn silage.

Achieving high earlage yields with the highest levels of energy and starch availability is the goal of harvesting earlage. This article will discuss key management techniques for successful harvest of high quality earlage.

Table 1. Average nutrient composition in HM ear corn (100% DM Basis).

Component	Protein %	Starch %	NDF %	Ash %
Grain	9.87	68.99	7.82	1.44
Cob	1.92	-	84.29	1.32
Husk/shank	4.00	-	78.97	3.81
Whole ear	8.23	52.14	23.74	1.56

Proportions (on a dry-weight basis) of a corn plant at maturity:

Grain: 45.9% Stalk: 27.5% Leaf: 11.4% Cob: 8.2% Husk: 7%

Harvest Moisture is Key to Success

- Harvest moisture is the biggest key to success with earlage or snaplage. When harvest moisture is ideal, it increases harvest efficiency and maximizes yield and earlage processing. This results in better fermentation success and maximizes earlage quality and starch availability.
- Ideal harvest moisture is between 36 and 42% for the final snaplage or earlage product (kernel moisture will be at about 34 to 36% at this stage). At this moisture, corn is physiologically mature (black layer is just evident) and maximum starch production has occurred. In addition, the digestibility of the cob is high. Research shows that cob digestibility declines rapidly as drydown occurs.

- If snaplage moisture content gets below ~35%, consider switching to harvesting only the grain as HM corn. This helps prevent potential feeding and digestibility concerns.



Equipment and Equipment Adjustment for Earlage or Snaplage

- Technically, earlage includes only grain and cob and is harvested with a combine adjusted to retain the cob portion after going through the rotor or shelling part of the combine.
- Snaplage is the harvest of whole ears including husks, shanks, cob and some leaves. This product is harvested with a snapping head mounted on a forage chopper. Most major manufacturers of forage chopping equipment also make snapper heads available for purchase, especially for self-propelled choppers.
- As with all equipment operations, set up and adjustment can have a large influence on the quantity and quality of the harvested product. For snaplage, it is critical to retain corn ears, shanks and some leaves, but avoid harvesting excessive leaf or stalk material. In addition, the leaves that are harvested should be cut up or shredded rather than having long leaf strands in the mixture.
- Adjust equipment to maximize kernel and cob damage. This is accomplished by using a very short chopping length and using fine-toothed rollers adjusted 2 to 3 mm apart. Also, the differential speed of the rollers may need to be set higher with snaplage than for silage. All corn kernels should be cracked, and cob pieces should be smaller than your thumbnail. As always, consult your owner's manual for proper adjustment information.

Storage, Fermentation and Feedout

- Snaplage and earlage are high moisture silages that are stored in silos and preserved through fermentation. All types of silos can make good storage structures for snaplage when proper silage storage principles are followed.
- Pack earlage properly to exclude oxygen quickly. Because snaplage is mostly grain, it will achieve a higher density than corn silage and should pack more easily. Use key packing strategies, including thin layers and adequate tractor weight when packing silo bunkers.
- Cover bunkers and silos quickly after filling to prevent oxygen penetration into the silo. Use several layers of plastic when possible, and use tires to hold it down tightly to the packed snaplage.
- Use Pioneer® brand 11B91 HM grain inoculant for best results in fermentation and in maintaining aerobic stability on feedout. This is a high value feed and 11B91 inoculant will help reduce the risk of shrink loss associated with fermentation and feedout.
- For silage bags, monitor plastic for holes and repair as quickly as possible to avoid oxygen penetration into the bag. Check for evidence of wildlife activity around silage bags.
- On feedout, maintain high feeding rates and a clean silage face. This helps to avoid losses due to heating and spoilage.

Performance of Pioneer® Brand Products

Data collected from a 2005 earlage study in LaSalle, Colorado, demonstrates how harvest date can affect grain components and nutrient composition. Table 2 shows that average grain percentage generally increased between the first and last harvest date, and was nearly maximized by the third date. During this same time, cob percent declined from 18 to 14% while husk and leaf percentage remained the same. Hybrids showed some variability for grain percentage over time.

Table 2. Percent grain in HMEC by Pioneer® brand hybrid.

Harvest Date	35A30	34A86	35Y65	35D28
Sept 13	77.2	70.8	70.3	73.6
Sept 20	78.2	73.7	74.7	73.3
Sept 27	82.3	75.6	76.8	74.4
Oct 4	82.2	77.6	77.5	75.4

In this same study, the NDF content was measured for each harvest period. Here we can see the dramatic increase in NDF content of the cob and to a lesser extent the husk and shank with later harvest periods. Keeping non-grain components of snaplage highly digestible is best achieved by maintaining higher moisture content.

Table 3. Percent NDF in HMEC by harvest period (100% DM Basis).

Component	Sept 13	Sept 20	Sept 27	Oct 4
Grain	7.55	8.03	7.89	7.82
Cob	78.92	84.58	85.81	87.86
Husk/shank	76.78	78.51	80.01	80.06
Whole ear	23.53	23.40	23.30	24.74

In 2012, several growers in Wisconsin harvested side-by-side plots of Pioneer® brand corn products as snaplage. The data is presented in Table 4 and provides some insight into the harvest and yield of key corn hybrids for this area in 2012.

Overall, snaplage yields were very good and differed by location. The variation in starch content, NDF, CP and Invitro Starch Digestibility is likely a result of different harvest equipment setup and environmental conditions. These products were very similar in maturity and produced a similar end product. Harvest ease was evaluated by the operator and very few differences were noted among hybrids.

At each location, the product with the highest harvest moisture also had the highest Invitro Starch Digestibility percentage. This indicates in part that the kernels were likely more easily broken and more finely ground.

At two locations, a sample of five ears were harvested, hand shelled and ear components weighed. The grain percentage was very similar among products and between the two locations ranging from 82 to 84%.

Table 4. 2012 Wisconsin Snaplage Trial Pioneer® brand Products.

Coleman, WI – Harvested: 9/12/2012							
Product	Earlage Yield ¹	% ²	Earlage Moist.%	CP %	NDF %	Starch %	Starch Digest. ³
P9910AM1™ ⁴	6.11	102	34.9	8.3	14.8	61.6	63.0
P9917AM1™ ⁴	5.95	99	35.6	8.3	16.8	59.1	62.4
P9807HR ⁵	5.45	91	38.2	8.1	15.9	59.2	66.8
P9748HR ⁵	5.94	99	39.5	8.3	14.1	62.5	69.3
P9630AM1™ ⁴	5.80	97	31.7	8.5	13.7	63.3	60.1
P9519AM1™ ⁶	5.87	98	34.8	8.7	17.0	60.9	64.3
Average	5.85		35.8	8.4	15.4	61.1	64.3
Mosinee, WI – Harvested: 9/13/2012							
Product	Earlage Yield ¹	% ²	Earlage Moist.%	CP %	NDF %	Starch %	Starch Digest. ³
P9910AM1™	6.58	101	38.5	7.7	15.4	60.7	68.9
P9807HR	6.43	99	39.8	8.1	14.0	62.6	71.5
P9748HR	6.26	96	37.0	8.4	13.4	63.3	69.2
P9519AM1™	6.41	99	36.4	8.9	13.2	63.1	65.5
Average	6.42		37.9	8.3	14.0	62.4	68.7
Dorchester, WI – Harvested: 9/21/2012							
Product	Earlage Yield ¹	% ²	Earlage Moist.%	CP %	NDF %	Starch %	Starch Digest. ³
P0115AM1™ ⁴	6.73	96	31.8	7.8	11.1	65.9	58.0
P9910AM1™	6.67	95	29.0	7.9	10.6	66.1	54.2
P9675AM1™ ⁴	7.33	105	28.5	8.2	14.2	64.0	53.4
P9630AM1™	7.11	102	27.2	8.1	12.9	64.1	55.5
P9519AM1™	7.31	105	29.0	8.2	18.0	59.2	55.1
P9411AM1™ ⁴	7.26	104	27.7	8.4	13.2	63.2	55.3
Average	7.07		28.9	8.1	13.3	63.8	55.3

¹Tons/acre at 35% moisture.

²Earlage yield as a percent of P9910AM1/P9519AM.

³In vitro starch digestibility, 7 hour.

⁴ Traits = (AM1, LL, RR2) | ⁵ Traits = (HX1, LL, RR2) | ⁶ Traits = (AM, LL, RR2)

Conclusions

- Earlage or snaplage continues to grow in popularity because it allows the production of a high-energy feed product that is easily harvested, stored and fed. For livestock producers, harvesting corn as earlage or snaplage eliminates grain drying costs and produces an excellent feed for ruminant animals.
- Harvesting high moisture grain as earlage or snaplage results in 15 to 20% higher yields per acre than harvesting only HM grain. Also, it is similar in quality and energy availability.
- Harvest moisture is a big key to success with earlage or snaplage. Targeting 38 to 42% final moisture helps maintain high yields and high quality.

References

DuPont Pioneer Nutritional Insights. 2006. Influence of maturity on yield and quality of HMEC. S.D Soderlund, J. Uhrig, B. Curran and L. Nuzback.

(See page 3 for trademarks.)

**AcreMax**

ABOVE

AM - Optimum® AcreMax® Insect Protection system with YGCB, HX1, LL, RR2. Contains a single-bag integrated refuge solution for above-ground insects. In EPA-designated cotton growing counties, a 20% separate refuge must be planted with Optimum AcreMax products.

**AcreMax 1**

ABOVE/BELOW

AM1 - Contains the Optimum® AcreMax® 1 Insect Protection System with an integrated corn rootworm refuge solution includes HXX, LL, RR2. Optimum AcreMax 1 products contain the LibertyLink® gene and can be sprayed with Liberty® herbicide. The required corn borer refuge can be planted up to half a mile away.



HX1 - Contains the Herculex® 1 Insect Protection gene which provides protection against European corn borer, southwestern corn borer, black cutworm, fall armyworm, western bean cutworm, lesser corn stalk borer, southern corn stalk borer, and sugarcane borer; and suppresses corn earworm.



HXX - Herculex® XTRA contains the Herculex 1 and Herculex RW genes.



HXRW - Contains the Herculex® RW insect protection trait contains proteins that provide enhanced resistance against western corn rootworm, northern corn rootworm and Mexican corn rootworm.



YGCB - The YieldGard® Corn Borer gene offers a high level of resistance to European corn borer, southwestern corn borer and southern cornstalk borer; moderate resistance to corn earworm and common stalk borer; and above average resistance to fall armyworm.



RR2 - Contains the Roundup Ready® Corn 2 gene that provides crop safety for over-the-top applications of labeled glyphosate herbicides when applied according to label directions.



LL - Contains the LibertyLink® gene for resistance to Liberty® herbicide.

Herculex® Insect Protection technology by Dow AgroSciences and Pioneer Hi-Bred. Herculex® and the HX logo are registered trademarks of Dow AgroSciences LLC.

YieldGard®, the YieldGard Corn Borer design and Roundup Ready® are registered trademarks used under license from Monsanto Company.

Liberty®, LibertyLink® and the Water Droplet Design are trademarks of Bayer.

The DuPont Oval Logo is a registered trademark of DuPont.

®, TM, SM Trademarks and service marks of Pioneer. Pioneer® brand products are provided subject to the terms and conditions or purchase which are part of the labeling and purchase documents.