NDSU EXTENSION SERVICE

DAIRY CONNECTION

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■ Editorial

The fall season is quickly arriving. With it the kids are back in school, corn silage is being harvested and the Dairy Convention is not far away. With this issue you'll receive some timely information and a look at the agenda for this year's convention.

Regards,

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Extension Dairy Specialist

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■ ECONOMICS

Bags vs bunkers vs uprights

Storing forages is an important decision for North Dakota dairy and beef managers. The following factors should be considered when being evaluated.

- Initial and annual costs to store forage
- Herd size
- Optimizing forage quality (harvested and stored)
- Feed delivery system

Storage costs

University of Wisconsin agricultural engineers reported silage storage costs including capital investment and annual costs at various herd sizes. The analysis included hay silage stored in eight different systems (Table 1). Capital costs included structures and equipment used in filling, storing and emptying the hay silage and did not include transportation, harvesting, or moving feed to the animals. Silos and gravel pads had a life expectancy of 20 years while equipment was assumed to have 10 years of life expectancy. Annual costs include capital costs, labor, plastic coverings, fuel, and dry matter lost during storage. Forage (hay equivalent basis) was valued at $85 a ton. Tractors were assumed to have other uses besides forage storage and allocated on a proportional basis to handle forage storage. Table 1 summarizes total capital and annual costs per ton of dry matter at two different quantities of stored dry matter (four amounts were calculated in original report).

Capital cost per ton of silage dry matter was highest for new steel oxygen-limiting structures compared to other systems. If refilling occurs with steel oxygen-limiting units (1.5 to 2 times annually), costs will be reduced. Used oxygen limiting and cast in place structures were similar. Silo bags, silage piles, and wrapped bales had the lowest investment. No significant economics of scale occurred

Table 1. Total capital cost and annual cost (in parenthesis) per ton of dry matter for 384 and 768 tons of stored dry matter (Holmes, 1998).

Storage type	384 tons DM	768 tons DM
	$/ton of dry matter	
Steel-glass oxygen limiting (new)	427 (82)	301 (60)
Steel-glass oxygen limiting (used)	268 (55)	187 (41)
Cast-in-place oxygen limiting	285 (58)	186 (41)
Concrete stave	192 (46)	138 (36)
Above ground bunker	152 (45)	103 (37)
Packed silage pile	63 (37)	41 (32)
Bagger	88 (38)	53 (32)
Wrapped bales	64 (36)	38 (32)

above 758 tons of dry matter (other storage amounts evaluated were 1536 and 3072 tons). Capital cost per ton can be important on farms where capital is limiting due to expansion and / or existing debt load.

Oxygen-limiting structures were highest while wrapped bales, bags, and packed silage were the lowest. Good management is needed to achieve values in Table 1. Dry matter losses in storage were estimated to be six percent for oxygen limiting units; 10 percent for concrete stave and bags and 13 percent for piles, bunkers, and wrapped bales. If dry matter losses in bunker silos increase to 18 or 24 percent, the annual cost increases to $49 and $55 per ton of dry matter for 384 tons of stored feed (similar increases occurred at 768 tons).

Herd size factors

After cost, herd size is the next important factor. If a herd size is less than 100 cows plus young stock, large storage structures were not economically feasible, but upright silos, bags and wrapped bales were good choices. If forages are fed in a conventional barn, upright silos minimize weather-related risks and use of tractors to feed cattle. In-line stationary mixers and belt feeders favor tower structures. Bottom unloading structures can provide a constant and consistent supply of fermented forage to cows, but a layer of low quality forage can occur between each cutting or filling period.

Bags favor herds considering expansion with mobile TMR mixers. One major advantage with bags is the ability to segregate forage quality and feed smaller amounts. Smaller bag diameter does not force large amount of forage to be fed to maintain surface forage quality. Remove six inches of forage a day from the face and close the bag. Plastic disposal is an environmental concern.

Processing wrapped bales is a management consideration. Some TMR mixers can not handle, reduce forage length, and mix wet balage. Dairy manager must control intake as cow relish balage and will eat it exclusively if offered free choice in bale feeders. Using wrapper bales require solid management to achieve optimal moisture content (50 to 60 percent), avoid damage to the wrapped bale, and wrapping the bale properly.

Remove six inches of forage per day from the face of the bunker or pile to maintain quality and avoid secondary fermentation. When removing the forage, avoid disturbing the face exposing oxygen to the silage mass. Size bunkers and piles to match minimum feeding rates. Both units MUST be covered with plastic or another oxygen / air barrier.

- Less than 100 cows: tower silos, bags, and wrapped bales
- 100 to 200 cows: tower silos, bags, and narrow bunkers
- Over 200 cows: bags, bunkers, and packed piles

Forage quality

All forage storage systems can be successful if matched to herd size to optimize feed out rate. Wetter forage lowers field loss. Excessive moisture (hay silage over 60 percent moisture and corn silage over 70 percent) can result in an undesirable fermentation and excessive seepage losses. Adding a research proven inoculant can improve fermentation characteristics, lower dry matter loss, increase digestibility, and optimize desirable VFA pattern (over 70 percent lactic acid of the total VFA produced). Rapid harvest and storage maintain forage quality from the field, reduce air exposure, and increase compaction.

Feed delivery system

If the TMR will be used with a mobile mixer and since rapid forage removal is desirable, packed piles, bunkers, and bags are obvious choices. If herd size is less than 100 cows, cows are housed inside a warm facility, and labor wants to work in a favorable environment, tower silos are one logical choice. Wrapped bales allows the use of existing hay harvesting equipment, minimizes labor requirements, and fits smaller herd sizes.

Reference: Holmes, B.J. 1998. Sizing and managing silage storage to maximize profitability, Four State Forage Feeding and Management Conference Proc. Pages 55-64.

■ INDUSTRY

Dairy concerns surveyed

Production cost, prices common concerns	
Cost of production	88%
Milk price structure	78%
Manure / waste management	76%
Environmental concerns	74%
Animal welfare	70%
Cost of facilities / land	68%
Quality assurances	65%
Declining dairy consumption	63%
On-farm food safety	52%
Labeling / regulator compliance	50%

Source: Dairy Veterinary Trends, Vance Research Services. 1999 and Dairy Herd

A 1999 survey of nearly 500 dairy producers across the country indicates that their greatest concern lies in cost of production, followed by milk price structure and manure (or nutrient) management. The chart above shows how producers responded to the question, “How significant do you believe the following issues will be to you and your dairy operation in the next five years?”

■ NUTRITION

Protein – it's RDR or RUP in the diet

Rumen microbes break down degradable protein to small peptides, amino acids, and ammonia. These products can in turn be used by rumen microbes to produce microbial protein that can be digested by the cow in the small intestine. Microbial protein is an excellent quality protein, unfortunately not enough can be produced to supply the requirement for the high producing dairy cow. Therefore, undegradable protein must be available to make up the difference between what the cow requires and what the microbial protein supplies. Feeds vary in their ability to supply undegradable protein and quality will vary by source and depend on digestibility and amino acid composition. If the undegradable protein is indigestible or has a poor amino acid profile it will be of little value. A recent study published in the Journal of Dairy Science (Vol. 82, pages 2585-2595) compared high (18%) and low (15%) crude protein content of diets with and without ruminally protected methionine and a source of unprotected lysine. These two amino acids are generally considered to be first limiting for milk protein production. All diets were composed of alfalfa hay, corn silage, corn grain, soybean hulls, whole cottonseeds, soybean meal, corn gluten meal, animal fat, and a mineral-vitamin mix. Whole soybeans were added only to the diets that contained no supplemental methionine and lysine. Corn distillers grains were in diets with supplemental methionine and lysine. There were no differences in dry matter intake or milk production due to level of protein or amino acid supplementation when diets were fed to early lactation cows averaging over 100 pounds of milk per day. There did tend to be more milk protein concentration and yield when amino acids were included. Higher protein resulted in greater urea production in the liver and as a result more blood urea indicating a less efficient use of dietary protein. The final conclusion was that in early lactation the level of dietary protein was less important for milk protein synthesis than was amino acid profile. This study supports the idea that for milk protein (casein) production proper combinations of protein sources are important especially in early lactation. Commercial supplementation of amino acids should be evaluated based on economic merit relative to other sources of amino acids. These other sources could be but are not limited to fish meal, blood meal, and mechanically extracted soybean meals.

Adapted from Dairy Pipeline, C. Stallings, Virginia Tech

■ REPRODUCTION

Assisting cows during calving — what is too much help?

Over 50% of calf deaths occur within the first 24 hours after birth. Dystocia accounts for almost 70% of these deaths. As producers and researchers have become aware of the susceptibility of the newborn calf, there has been a push towards the use of calving ease sires and recommendations to increase supervision of cows around the time of calving.

The underlying basis is calving ease sires should produce smaller calves that should be delivered with ease, and that by increasing supervision of cows, assistance can be provided early. However, even with use of calving ease sires, the odds of unassisted deliveries have been decreasing while the odds of a birth requiring assistance using extreme force have also been increasing.

With the odds of an unassisted birth decreasing each year, it becomes clear that simply the selection of sires for calving is not diminishing the problem of dystocia. It is possible that increased calving management awareness may account for a large part of this increase.

Research shows the frequency of dystocia increased as the frequency of herd supervision increased suggesting that inappropriate assistance may play a role in the incidence of dystocia. In a study where assistance was given whether it was needed or not, calving difficulty scores increased 2-fold, implying that untimely assistance hinders the calving process.

How can simply helping the calf along actually hinder the birth process and lead to health problems? As much as it may seem like speeding along the birth process and helping the calf out would seem like a good thing, there are actually many consequences.

First, to assist the calf, most producers rupture the "water bag." This fluid filled sac is mother nature's little air bag designed to help protect the calf from the full force of the cow's contraction and to speed up the dilation of the cervix. By rupturing this sac, the calf's head and shoulders must apply pressure to the cervix for dilation. This not only lengthens the time required for cervial dilation, but also increases the force directly on the calf.

Second, by pulling the calf from the vagina, the umbilical cord is ruptured. In a natural (unassisted) delivery, the calf is expelled to its last rib and then both the calf and cow rest. Blood continues to flow through the umbilical cord during this time, even though the calf is now breathing on it's own. Research in our lab has shown that premature rupture of the umbilical cord causes calf lung function to be impaired. The ability of these calves to saturate their blood with oxygen was greatly diminished, not only after birth, but also for the entire eight-week study. Even slight assistance (calving ease score of 2 on a 5 point scale) has been shown to cause an increase in the incidence of retained placenta and metritis, as well as cause significant losses in milk production and a full week increase in days open. So, how and when should one assist during delivery? More research is needed, but here are a few general recommendations that can be stated:

- **Check calf position early during the labor process.** This allows for calf repositioning at a time when contractions are not as forceful.
- **Do not break the water bag.** Calf position and viability can all be checked without breaking the bag.
- **Be patient!** It is uncommon for Holstein cows to be in labor for an hour after the first water bag ruptures. The longest part of the delivery process occurs while

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the cervix is dilating —thus three-fourths of the time should be spent delivering the calf's head and shoulders.

- **Assist by pulling only while the cow is having a contraction**, and hold steady pressure in-between contractions (no more than one person should provide assistance).
- **Deliver the calf until the last rib is expelled.** This allows the umbilical cord to remain attached, while the calf starts breathing. Either movements from the calf or the cow will break the cord (usually within two to three minutes, but can be as long as 20 min.).

Adapted form Hammer and Tyler, Iowa State University

■ MARKETING

Emmons and Morton producers eligible for DOPP

The USDA recently expanded the Dairy Options Pilot Program (DOPP) in North Dakota. DOPP subsidizes the purchase price of put options in an effort to encourage dairy producers to manage their downside price risk. Many North Dakota producers have already chosen to manage their price risk by entering into cash forward contracts with processors. This strategy eliminates downside risk, but it also limits returns should prices move higher. It may be possible, however, for producers with forward contracts to benefit from DOPP and higher prices under the right circumstances.

When producers are in the cash market, a put option is a way to protect against downside price risk while still allowing them to benefit from higher prices. A purchased put option gives its owner the right, but not the obligation, to sell further the futures price moves below the strike price, the greater the value of the put option, which is usually sold by a hedging producer in this situation. These gains offset lower returns in the cash market resulting in a floor price for the milk.

This is the third year for DOPP. Only dairy producers who reside in Emmons and Morton County are eligible. However, they must have attended the DOPP training session held in New Salem on August 29, Linton on August 30, or via internet. If you are interested but weren't able to attend one of the above meetings, call RMA at 406-657-6447 or go to their URL at *http://www@rma. usda.gov* for instructions.

Put options are another tool for producers in the cash market who want to guard against lower prices while remaining in the market should prices move higher.