Tips For Good Silage Management

MINNEAPOLIS, Minn. — With few exceptions, all crops grown in the U.S. can be harvested, conserved, and fed as silage. Since the early 1950s, there has been a steady increase in both the total quantity of forage produced and the percentage of it conserved as silage.

Reasons for the popularity of silage include:

- It is much less weather dependent than haymaking.
- It is more suitable than hay for large-scale livestock production.
- It is adaptable to a wider range of crops such as corn, sorghum, and winter cereals.
- It allows the harvesting of maximum nutrients per acre.

When made by suitable techniques, silage should be well-preserved and lose a minimum of nutrients. These have been the goals since silage-making was introduced here in the 1870s.

Our knowledge of the biochemistry and microbiology of silage fermentation has increased tremendously in the second half of the 20th century. Silage is a product of anaerobic fermentation. It involves the conversion of water-soluble carbohydrates to lactic acid, which drops the pH to a level sufficient to inhibit any further biological activity (change) in the ensiled material when maintained under anaerobic conditions.

In most circumstances, good silage is achieved by encouraging the dominance of lactic acid bacteria and discouraging the activities of plant enzymes, clostridia, coliform bacteria, and yeasts. In the initial stages of ensiling, plant respiratory enzymes oxidize soluble carbohydrates, resulting in heat production and decreased amount of sugars available for fermentation.

Plant proteases hydrolyze proteins to amino acids and peptides. Soluble nitrogen can increase from 20% of the total nitrogen in pre-ensiled corn to over 50% within 24 hours post-ensiling. Silages containing high amounts of soluble nitrogen usually do not support optimum animal production.

The clostridia, coliforms, and yeasts compete with lactic acid bacteria for fermentable carbohydrates, and many of their end products have no preservative action. Clostridia are responsible for secondary fermentation which can convert lactic acid to butyric acid and degrade amino acids to amines and ammonia. Clostridial silages have high nutrient losses, high soluble nitrogen content, low digestibility, and low intake by livestock. Yeasts are linked to aerobic deterioration of silage, particularly during the feedout period.

It is likely that no other ingredient in beef and dairy cattle rations today is as variable in quality as silage. Making consistent, high quality silage requires attention to details and sound management.

Nine of the key factors that affect silage quality are additives, feedout, storage structure, crop, weather, maturity, moisture, chop length and filling, packing, and sealing. Because many of these factors are interrelated, it is difficult to present their significance individually. The silage maker must understand the importance of each.

Crop. Grow the crop(s) that offers the greatest economic advantage and produces the most nutrients per acre. With few exceptions, a satisfactory silage can be made from any crop.

The ideal crop should have adequate fermentable carbohydrates, a low buffering capacity, a physical structure suitable for compacting (to exclude oxygen), and a harvest period of several days.

Maturity. For "hay crop" silage (i.e., alfalfa, clover, orchard grass, hybrid sudan or sorghum-sudan grasses), harvesting at the optimum stage of maturity is often a compromise between increasing yield (quantity) and decreasing quality as the crop matures. For "grain-containing" silages (corn, sorghum, winter cereals) optimum yield and quality normally occur at about the same stage of maturity. The following harvesting guidelines are most common:

- Alfalfa- late bud to 1/10 bloom.
- Perennial grasses- before heads emerge.
- Summer annuals- before heads emerge.
- Corn- fully dented kernels.
- Sorghum- soft-dough kernels.
- Wheat, barley, oats, triticale, rye- boot (maximum protein content);- soft-dough kernels (maximum TDN yield).

Moisture. This is probably the most important factor affecting silage quality. Ensiling a crop too wet can result in seepage, undesirable clostridial activity and butyric acid, high fermentation and storage losses, and reduced silage intake and performance by livestock. Ensiling a crop too dry creates problems in eliminating air (poor compaction), achieving sufficient fermentation to lower the pH for preservation, and preventing spoilage from aerobic deterioration.

Chop Length. Common sense and attention to details are important. Sharp cutter knives, shear bar and knives closely adjusted, and the use of a recutter screen are all daily management decisions during silage harvest.

How fine (or coarse) should silage be chopped? Theoretically, 1/4 to 1/2-inch length is recommended, but fineness varies with the crop, power (fuel) requirement, tonnage per hour, etc. Short chopping permits greater compaction of the crop in the silo versus long chopping. This means there is less oxygen for the plant respiration and aerobic bacteria phases, less heat production in the ensiled material, and a higher nutritive value in silage.

Filling, Packing, Sealing The crop should be harvested and the ing value of the stored produce. Silage additives are receiving wide-spread acceptance in the U.S. as management tools that are essential for silage making.

Farm Calendar

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Thursday, May 16

Northumberland Co. Spring Awards banquet, Sunbury Social Club, Sunbury, 6:30 p.m.

Friday, May 17

Saturday, May 18
Armed Forces Day

Mid-Atlantic Herding Stock Dog Club herding clinic, McVeytown.

Bedford Co. Sheep and Wool Field Day, Bedford Fairgrounds, Bedford, 10 a.m.-6 p.m.

Sunday, May 19

Monday, May 20

Clearfield Co. estate planning, Multiservice Center, 7 p.m.-9:30 p.m.

Tuesday, May 21

Christmas Tree pest management workshop and tour, McCurdy Tree Farm, Dillsburg, 9:30 a.m.-3:30 p.m.

Thursday, May 23

Lancaster Co. Home Horticulture Seminar, Simple Garden Chemistry, Farm and Home Center, 7:30 p.m.-9 p.m.

Milk Producers Voluntary Ag Association annual meeting, Baron's Inn, Greene, N.Y., noon-4 p.m.