

Unit III – Grassland Management Practices

Lesson 3: Harvesting and Storing Forage Crops

The goal of livestock management on a grassland is to provide the best quality forage at the most reasonable cost. When the grassland is unable to provide for the nutritional needs of the herd, supplemental feeding is needed to sustain the animals. The most cost-effective method of supplemental feeding is to harvest and store the forage from the grassland when it exceeds the amount required by the herd and then feed it when needed later. High quality stored forages allow livestock operations to cut costs on supplemental feeds. This lesson will discuss the different methods of harvesting and storing forages.

Why Mechanically Harvest Forages?

As discussed in the previous lesson, grazing best meets the nutritional needs of the herd while the forage is in the vegetative state. If the grassland is providing more forage dry matter than the herd can use at the time, harvesting and storing the forage will keep the forage in the vegetative state and preserve the quality of the forage for later usage. Forage utilization will also be optimized by harvesting when the grassland is producing more than is needed by the herd, which maximizes the yield of the forage. The stored forage can be used to meet the nutritional needs of the herd when pastures are dormant. Finally, some producers sell the harvested forage for profit if it is not needed by the herd.

Methods of Mechanical Harvesting

Two main methods of mechanical harvesting provide feed for livestock—harvesting for hay or harvesting for silage. The forage is cut or chopped and then cured to produce hay or silage.

Hay is harvested at low moisture levels. Although many forages may be cut for hay, alfalfa is most commonly used. Hay can be grown on rough and rolling land that is unsuitable for many crops. The forage is cut and cured by allowing it to dry before being stored. The cutting and curing of hay is important. Too much or too little moisture can affect its quality. Wet weather, for example, can cause a considerable decrease in quality between cutting and

drying the hay. When dry, hay can be stored inside or outside, but protection from the wind and rain will help to preserve its quality.

Silage is forage converted into moist, succulent livestock feed through fermentation. Corn is most commonly used for silage. The forage is cut when moisture is high, wilted to a 60 to 70 percent moisture content, and then cut or chopped into smaller particles. The silage is cured by fermenting it in its storage structure. Additives can be included to increase its feed value or maintain its quality. Silage can be kept for 2 or more years if properly stored.

Storage Methods

Hay may be formed into square bales, round bales, or stacks and then stored in a barn, under temporary cover, or in the field, depending upon the resources available and the size of the bales. The better the quality of the hay, the more important it is to place it under cover. The higher the quality, the faster the hay will rot without protection.

Barns provide the best protection from the wind and rain. Temporary covers of black polyethylene, canvas, or nylon, which prevent water penetration, are sometimes placed on hay stored in the field in large round bales or loose stacks. Covers are an inexpensive form of protection from the wind and rain. The cheapest form of storage is leaving the hay in the field. However, the hay can undergo excessive loss of quality from wind, rain, and sun.

Silage is stored in silos to prevent spoilage and quality loss through the leaching of nutrients. These silos may be either vertical or horizontal. Vertical silos have several benefits. Storage losses are relatively low for all vertical silos. They can be located near the livestock and easily adapted for automatic feeding. The two types of vertical silos are the conventional silo and the oxygen-limiting silo. Conventional silos are made of metal, concrete, or tile. Oxygen-limited units are sealed or lined with fused glass. This difference increases the cost per cubic foot but decreases storage losses.

Horizontal silos are much easier to construct and cost less than vertical silos. However, more leaching of nutrients

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occurs than in vertical silos, and horizontal silos should therefore be located on well-drained land to reduce spoilage. Due to their construction, the silage in horizontal silos also requires extensive packing, or tamping down with heavy equipment. Three different types of horizontal silos are used—bunker, trench, and stack silos. Bunkers are constructed above ground and have concrete floors and concrete or plank walls. Trench silos are dug into well-drained ground or hillsides. The walls and floor may be either soil or concrete. Stack silos are used only for temporary storage or emergency situations. They have no walls and may or may not have a concrete floor. The silage is formed into a pile and compacted. The lack of walls and floor increases spoilage losses greatly, so the silage should be used as soon as possible.

Factors Affecting Forage Quality

Several factors may affect the quality of stored forages. The moisture content of hay and silage can affect its quality. If hay is too moist, it will become moldy. If hay is too dry, leaf loss will occur due to dry and shattered leaves. Silage will become moldy if it is too dry. A reduction in quality may also occur in storage due to improper storage or lack of protection from the environment. A third factor affecting quality is the species composition of the forage. Different species of plants have different storage qualities as well as different palatability and nutritional benefits to livestock. Finally, as discussed in the previous lesson, the quality of the forage depends greatly on its stage of growth when harvested. As a forage reaches maturity, its quality is decreased as reproductive growth starts.

Stage of Growth at Harvest

As discussed in the previous lesson, plants pass through four stages of growth. Plants should be in the boot (grasses) or early bloom (legumes) stage at harvest. The time of harvest depends on the vegetative growth. Quality

(digestibility) and quantity are in an inverse relationship. As maturity and quantity increase, quality decreases. Sometimes a producer may sacrifice quality to increase the quantity of the forage harvested.

Summary

The harvesting and storage of forages is a crucial component of livestock management. Forages may be harvested as hay or silage, which may be stored in a number of different ways. Moisture content, storage method, and time of harvest all affect the quality of stored forage crops. The time of harvest depends on the vegetative growth during the boot or early bloom stage of growth.

Credits

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