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SILAGE PRODUCTION AND FERTILIZATION

Silage can be defined as any plant material that has undergone fermentation or “pickling” in a silo. A silo is a storage structure (bunker, trench, bag, etc.) in which green, moist forage is preserved. The purpose of ensilage is to preserve forage for later use as animal feed. Silage production is important in parts of the Great Plains, especially where there are significant numbers of animals in feeding operations such as dairies and feedlots.

There are several advantages of silage compared to hay and other forage conservation systems. These advantages include less field and harvest losses, many crop options, mechanization of harvesting, storage and feeding, less likelihood of weather damage during harvesting, relatively low loss of nutrients with proper ensilage, and silage can be used in many livestock feeding programs. The disadvantages of silage include its bulkiness in handling and storage, it requires additional equipment and structures for harvesting, storing, and feeding, high potential for loss if not stored properly, not readily marketable off-farm, and silage must be fed soon after removal from the silo to minimize spoilage.

The major factors affecting silage quality are the type of crop, stage of maturity, moisture content, and length of chop. Within forage species the stage of maturity has the greatest effect on quality. The optimal moisture content depends on the crop and type of silo used, but is generally around 65 to 70%. Material ensiled below 50% moisture is usually called haylage. Length of chop is factor since it affects air exclusion in the silo, where fine chopping and packing help ensure proper fermentation.

Many crops, including grasses and legumes, can be preserved through ensilage. The most common and perhaps the best adapted is corn. It is a high energy crop that results in good animal performance. Sorghum (grain and forage) is a popular silage crop in some areas. Alfalfa is also used for silage, but the process of ensilage is somewhat more difficult than with other common crops.

As in hay production, the harvest of a silage crop results in the export of large quantities of nutrients from a field. For example, a 30-ton harvest of corn silage will remove about 250 lb N, 110 lb P₂O₅, and 250 lb K₂O. This is one of the most important points to keep in mind when designing fertility programs for silage crops.

Nitrogen fertilization can affect fermentation of some crops by decreasing the concentration of soluble carbohydrates required to make high quality silage. This is particularly true with cool season grasses since they tend to be relatively low in available carbohydrates to begin with. On the other hand, corn is relatively high in soluble carbohydrates, so nitrogen fertilization is not a concern from this standpoint.

Phosphorus and potassium fertilization of silage crops should be based on soil test information and experience. Nutrient removal data should also be considered. Phosphorus and potassium can be rapidly mined and depleted from soils under silage production if adequate amounts of these nutrients are not applied.

There are many excellent sources of information on the topic of fertilization and ensiling of forages. Among them is a practical handbook entitled *Southern Forages* (available through the International Plant Nutrition Institute, <https://store.ipni.net>). Other good sources are available through land grant universities and local county extension offices.

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