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Grass Silage in Wartime*

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Grass silage has commonly been made with the aid of molasses or mineral acids as preservatives. Wartime defense needs have caused a scarcity of both and even where it is possible to buy them, the cost is likely to be more than they are worth for this purpose. Alternative methods of preserving silage must take their place.

The advantage of grass silages are even more important as the need of conserving feed is increased. The chief advantages are: (1) Crops may be made into good silage in any kind of weather. (2) Feeding value is better conserved, because losses due to rains, sun bleaching, shattering of leaves, and other conditions common in haymaking are reduced, and more Vitamin A (carotene-green color) is preserved. (3) Storage costs are reduced. A cubic foot of grass silage weighs 8 to 9 times as much as a cubic foot of loose hay and contains about 3 times as much feed value. (4) Silage made from grasses, legumes, and cereals fits into a soil conservation program. Practically all grasses, legumes, and cereals can be made into good silage.

Three practical methods of making grass silage are available under existing conditions. These are: (1) use of ground corn, corn and cob meal, or other cereal grains; (2) use of no preservative but allowing the crop to wilt so the moisture content is about 65%; and (3) use of dry or green sugary crops such as sorgo, corn fodder, or other dried roughage.

*Missouri Agricultural Experiment Station Circular 209, published in 1940, gives detailed information on grass silage made and used under peace-time conditions.

Corn or Other Cereal Grains

Corn or other cereal grains make a very satisfactory preservative, although not quite so good as molasses or acid. The sugars of cereal grains break down to form preservative acids similar to those of molasses. For legumes such as alfalfa, sweet clover, or lespedeza, use 150 lbs. of ground shelled corn or ground barley per ton, or 200 lbs. corn and cob meal or other cereal grains such as wheat, rye, sorghum grain, or head chop. For soybeans use 200 lbs. of ground corn or barley, or 250 lbs. of corn and cob meal or other cereal grains. Mixed legumes and grasses require about 125 lbs. of ground corn or barley, or 150 lbs. of corn and cob meal or other cereal grains, while for ordinary grasses and cereals about 75 lbs. of ground corn or barley, or 100 lbs. of corn and cob meal or other cereal grains is recommended.

The corn or cereal grain preservative should be added as the crop to be ensiled passes over the feed table. A hopper arranged above the cutter box and equipped with a stop to regulate the flow of grain so that the approximate amount per ton is added will save much labor and result in a more uniform silage.

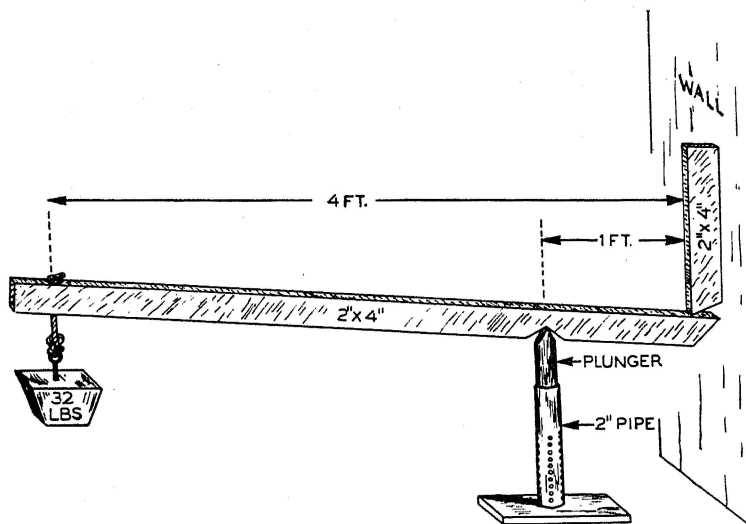
Using No Preservative

This method is not as safe as the use of corn or other cereal grains but gives good results when the crop is allowed to wilt and when great care is used to reduce the moisture content to about 65% (or raising the dry matter content to approximately 35% instead of the 18 to 22% commonly found in freshly cut hay). The time of wilting will vary with the stage of growth and weather conditions. As a rule, the heavy legumes require from 3 to 4 hours but on a dry windy day the crop may be loaded almost as soon as it is cut. There should be just sufficient moisture in the stalks to exude to the surface when a handful is twisted with moderate pressure. The difficulty of determining the dry matter content of crops to be ensiled by wilting has been the chief drawback to this method. However, this difficulty has been largely overcome by means of a simple home-made pressure device developed by the Bureau of Dairy Industry, United States Department of Agriculture. Following is a list of the necessary equipment and a description of the procedure for making the test:

(1) A piece of 2-inch pipe, 12 inches long, open at each end. This pipe to have 4 rows, equally spaced, of 3/16-inch holes 1/2 inch apart on center, 10 holes in each row starting 1/2 inch from the bottom of the pipe. The burrs on the inside of the pipe made by drilling the holes should be smoothed off.

(2) A hard wood plunger 14 inches long, beveled like a cold chisel

on one end and flat on the other, and fitted to a snug but free fit to the inside of the pipe. Treat with linseed oil to make it impervious to moisture.



A simple home-made device for determining the moisture content of crops to be ensiled for grass silage.

(3) A 2x4 lever $4\frac{1}{2}$ feet long. Use flatwise, with a beveled end under a block nailed to a wall. Stand the testing pipe on a flat surface (wooden block or cement floor) near the wall, so the top of the wooden plunger will fit in a groove on the underside of the lever 1 foot from the edge of the block on the wall. A 32-lb. weight hung on the lever 4 feet from the wall block will give a pressure of 140 lbs. on the plunger.

(4) The material to be tested should be chopped with the cutter set for $\frac{1}{4}$ -inch cut. Press the material firmly into the cylinder 6 inches deep, but not hard enough to squeeze out juice. Place under the lever and apply the pressure for one minute. If any seepage occurs from any hole, the moisture content is over 65 to 68%.

Use Dry or Green Sugary Crops

Various combinations of legumes and non-legumes may be satisfactorily ensiled. Where good quality dry sorgo fodder, dry corn fodder, or other dry roughage is available, about 300 lbs. mixed with each ton of grass silage as it goes through the cutter will furnish the necessary sugars for preservation. Green sorgo or corn fodder, or other green non-legume grasses or cereals may also be used and in this case one

load of such crops to two loads of alfalfa, soybeans, sweet clover, or lespedeza will make good silage. Sorgo is a better preservative than corn because it contains more sugar. If storage facilities permit, farmers might well plan on growing and storing each year sufficient sorgo for their next year's grass silage programs.

Salt and bacterial cultures have been recommended for ensiling legumes and other crops. Investigations do not prove that these materials can be relied upon to give good preservation.

Regardless of the method used for ensiling, certain precautions are important in reducing spoilage:

- (1) Material to be ensiled should be chopped with the cutter set for approximately $\frac{1}{4}$ inch.
- (2) Walls of the silo must be air-tight.
- (3) Ensiled material must be evenly distributed and firmly packed.

Feed Grass Silage

Grass silage may replace either corn or sorgo silage, or hay, or both. Silage is generally high in moisture and irrespective of the crop from which it is made must be considered a succulent feed and therefore properly supplemented with grain for the best milk production.

Silage made from grasses, legumes, or early cut cereals contains more protein than that from corn or sorgo. Where grass silage is fed with legume hay, a grain ration containing about 14 to 16% crude, or $10\frac{1}{2}$ to $12\frac{1}{2}$ % digestible crude protein should be fed. Where the roughage is chiefly silage (60-90 lbs. per day), the grain mixture should contain 16 to 18% crude or $12\frac{1}{2}$ to $14\frac{1}{2}$ % digestible crude protein.

Three pounds of corn, sorgo, or grass silage is approximately equal to 1 lb. of dry legume hay for feeding purposes. Cows in milk when fed silage should ordinarily receive a roughage ration of 3 lbs. silage and $1-1\frac{1}{2}$ lbs. hay or other dry roughage daily per 100 lbs. body weight. This usually means 30-40 lbs. of silage and 10-15 lbs. of hay. If silage is the only roughage fed, up to 60-90 lbs. daily may be used, but this practice requires heavier grain feeding than normal to insure the cows receiving sufficient energy for maintenance of milk production at a high level.