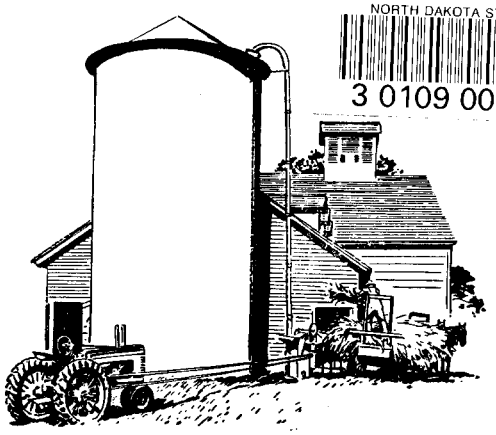

EXTENSION SERVICE
NORTH DAKOTA STATE UNIVERSITY
FARGO, NORTH DAKOTA 58102

FORAGE
Hay • Silage • Haylage

L. A. Jensen
Extension Agronomist

Irvine T. Dietrich
Extension Soil Conservationist

Dr. J. F. Carter
Agronomist
Agricultural Experiment Station

CIRCULAR A-303

MAY 1966

HAY CROPS

Putting up high quality hay is no easy job during wet weather. One rain can do more damage to hay in the swath than to any other crop. But when the weather cooperates, it is worth knowing how to get that high quality hay which is leafy, has good green color, is not coarse and is free of foreign material.

Time of cutting is the first essential to high quality hay and top yields. Cut hay at an early stage, when feed value, digestibility and palatability are high. You still get good tonnage per acre by cutting early. Although yields may be higher in delayed cuttings of some species, quality goes down rapidly as the crop matures. Late harvested hay has lower protein and total digestible nutrients per ton, and is coarse, less palatable and is low in digestibility.

The amount of hay an animal can eat is limited. If the quality is low, animals simply can't eat enough to maintain weight and production. When the forage quality is high, animals will also eat more and produce maximum gains or milk production.

To preserve carotene (vitamin A) and that good quality as indicated by green color, hay must be cured as rapidly as possible and baled or stacked as soon as ready.

Saving the leaves is important, especially in legumes. Alfalfa leaves contain about twice as much protein and minerals as the stems. The leaf loss can be reduced by partly curing hay in the swath and then windrowing before it bleaches and dries.

Hay is safe to stack when the moisture content is less than 25 per cent. Remember, the stems dry out last. If the stems are brittle enough to break when you twist a handful of hay, the hay is dry enough to stack. To prevent molding, have hay drier for baling than for loose stacking.

Hay drying can be speeded up by using crushers, crimpers, or flails. These machines help the stem dry out as fast as the leaves and result in shorter weather exposure while drying in the field. They are especially helpful on legume hay in areas or seasons of frequent rainfall.

PREFERRED CUTTING STAGES FOR HIGH QUALITY HAY

CRESTED WHEATGRASS – Cut when plants begin to head. Cut crested wheatgrass earlier than other grass for best quality.

BROME AND OTHER TAME GRASS – Cut just after heading and while still in bloom.

NATIVE GRASSES – Cut during heading and while still in bloom.

NEEDLEGRASS – Harvest early, before the needles form, or later after the needles have dropped.

OATS AND OTHER CEREAL GRAINS – Cut in late milk or very early dough stage.

ALFALFA GRASS MIXTURES – Cut when the alfalfa is 1/10 in bloom. If the grass makes up 75 per cent or more of the tonnage, use the grass as a guide.

ALFALFA – Cut when 1/10 in bloom.

SWEETCLOVER – Cut in the early bud stage.

MILLET – Cut as soon as headed and not later than full bloom.

SUDANGRASS, including hybrids – Cut from heading to early bloom stages. If two crops are expected, cut first crop at or before the boot stage to promote rapid recovery, to give the second crop a better chance.

JUDGING HAY QUALITY

Factors	Legumes	Grasses	Grass & Legume Mixed
		Points	
LEAFINESS - applies to legumes only. Top quality hay contains 40 per cent or more of leaves and has some leaves attached to the stems.	25	---	15
COLOR AND AROMA - hay should be green, bright and have a good odor.	25	30	25
FOREIGN MATERIAL - low content helps insure greater consumption and less waste of hay.	15	20	20
SOFTNESS AND PLIABILITY - this is an indication of early cutting for high quality, digestibility and palatability.	15	30	20
CONDITION - hay cut, cured and stored properly will be free from dust and moldiness.	20	20	20
Total - - - -	100	100	100

SILAGE CROPS

Many crops can be used for silage. Silage is an excellent feed and is relished by many classes of livestock. If properly preserved, silage will keep for several years. Besides using silage for seasonal feeding, silage is a good way to store feed from year to year for emergencies.

Moisture content of the crop as it goes into the silo is the key to success in making good silage. Most crops will make good silage, provided the moisture content is between 60 per cent to 70 per cent.

Corn, sorghums and cereals harvested at the right time are usually within this range and good silage is, therefore, easy to make from these crops. Legumes and grasses, however, may contain too much moisture for direct chopping and ensiling when harvested at top quality stages.

Legumes, especially, should either be wilted before ensiling or a grain preservative should be added. These crops can be ensiled without wilting by adding 100 to 200 pounds of ground grain or screenings, or 50 to 75 pounds of molasses per ton.

HAYLAGE

Low moisture silage may be the most practical way of storing first crop legumes, especially in eastern North Dakota because the season is often rainy and complete drying as hay is difficult. The crop should be cut early, dried to about 50 per cent (40 to 55 per cent) moisture, chopped short and put in the silo as rapidly as possible. Haylage must be placed in tight upright silos where it can be packed and capped to exclude air. The dryer material requires more attention to air exclusion than regular high moisture silage.

For top quality, time of harvest is just as critical for silage crops as for hay.

PREFERRED CUTTING STAGES FOR HIGH QUALITY SILAGE AND HAYLAGE

ALFALFA – 1/10 to 1/3 bloom.

SWEETCLOVER – late bud to mid blossom -- if one annual cutting, early full bloom for top per acre yield. Place in tightly covered silo to prevent hazard of dicumarol poisoning.

GRASSES – early bloom.

OATS AND PEAS – when oat kernels are in milk to soft dough stage.

OATS AND OTHER CEREALS – when kernels have reached the late milk to to soft dough stage.

SORGHUM AND SUDANGRASS, including hybrids – after seeds have reached the dough stage.

CORN – when the kernels are glazed and dented and while all leaves except the bottom leaf or two are green.

EVALUATING LEGUME OR GRASS SILAGE AND HAYLAGE

	Possible points
I. CROP QUALITY (total 40 points)	
A. Stage of growth at cutting (high leaf content usually indicates high feed value).	
1. Before blossom or early heading	36-40
2. Early blossom	31-35
3. Mid-to-late bloom	21-30
4. Seed stage (stemmy)	15-20
Total in crop quality	

Note: Cereals used for silage should be harvested in dough stage for high feed value and scored accordingly.

II. PRESERVATION (total 60 points)	
A. Color (total 30)	
1. Desirable: Light to dark green, depending on crop and/or additive used. Red clover may have a darker color	25-30
2. Acceptable: Yellowish green indicating bleaching due to improper fermentation or improper application of preservatives	16-24
3. Undesirable: Brown or black indicating excessive heating or spoilage. Predominately white or gray, indicating excessive mold	0-15
B. Odor (total 30)	
1. Desirable: Clean, pleasant with no indication of spoilage	25-30
2. Acceptable: Yeasty, musty, fruity, this indicates slightly improper fermentation	16-24
3. Undesirable: Burnt odor indicates excessive heating. Sliminess and a putrid odor indicate improper fermentation. Both have high nutrient losses	0-15
Total on preservation	
Total score	

EVALUATING CORN AND SORGHUM SILAGE

	Possible points
I. CROP QUALITY (total 50 points)	
A. Grain content	
1. High	46-50
2. Medium	36-45
3. Low	26-35
4. None (either no ears developed or ears removed)	25
Total grain content	
II. PRESERVATION (total 50 points)	
A. Color (total 25 points)	
1. Desirable: Natural green to olive green color	21-25
2. Acceptable: Yellowish green to slight brownish or if frosted, light yellow	11-20
3. Undesirable: Deep brown or black indicating excessive heating or spoilage. Predominantly white or gray indicating excessive mold development	0-10
B. Odor (total 25 points)	
1. Desirable: Clean, pleasant odor with no indication of spoilage	21-25
2. Acceptable: Yeasty, musty, fruity, indicating a slightly improper fermentation. Slight burnt odor. Quite sharply acid, indicating high moisture	11-20
3. Undesirable: Strong burnt odor, indicating excessive heating. Putrid, indicating improper fermentation. Extremely rank indicating very immature high acid silage. Very musty odor, indicating excessive mold which is readily visible throughout silage	0-10
Total on preservation	
Total score	

Extension Service, North Dakota State University of Agriculture and Applied Science, and U. S. Department of Agriculture cooperating. A. H. Schulz, Director, Fargo, North Dakota. Distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914.