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Richard W. Taylor, Ph.D.
Extension Specialist III
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How To Judge Hay Quality Visually

Introduction

Hay varies in quality more than any other harvested feed crop. Hay quality can vary widely, even when composed of one and the same species, when grown in the same vicinity, and when grown and cured under similar conditions. Hay producers differ widely in their expertise at hay making and in their commitment to producing a high-quality crop.

Hay purchasers often find a wide range in hay quality among hay lots and sometimes even within a lot. Before bidding, purchasers must judge hay quality with some accuracy.

Hay Judging

Two principal methods can be used to determine forage quality. The first and, if done properly, best method is to probe the offered hay and have a sample chemically analyzed. Agronomy Facts “Hay Sampling and Grading” discusses hay sampling and hay grading based on chemical analyses.

The second method and, if conscientiously done, a reasonably reliable method, involves a visual inspection of hay and a judgement based on certain forage physical characteristics. This can be done either at the hay-purchasing site and/or the feeding station. Hay is judged visually for relative feeding value and overall desirability as a feed.

Hay purchasers should inspect the lot visually to determine if it is reasonably uniform. If the lot is not uniform, the purchaser should understand that quality may vary too much to reliably judge hay quality, either visually or chemically. For uniform lots where a chemical analysis is not available, the purchaser can judge hay quality visually. To do this, a number of bales should be selected at random, the bales opened, and a visual evaluation made using the Hay Evaluation Form (page 4).

After purchase, workers at the feeding site should be trained to do a rapid visual inspection of each bale fed. Workers should pay partic-ular attention to indicators of possible problems, such as burnt coloration, dustiness, moldiness, the presence of objectionable foreign material, and the presence of toxic or poisonous plants and insects. By establishing general hay quality, the purchaser frees trained feeding-site workers to intercept potential problem bales that may slip through the initial inspection.

Hay should be judged based on those charac-teristics that affect its value as feed. Hay quality translates directly into feed value. Factors known to affect hay quality and animal performance include stage of maturity, leafiness, color, odor and condition, and the presence of foreign material in the hay.

Stage Of Maturity

Stage of maturity refers to the growth stage of a plant at the time of harvest. In the field before harvest, stage of maturity is easily determined in grasses and legumes, but after hay is cut and cured, this determination is more difficult. Also, if hay is weathered or sun-bleached or if certain weather conditions delay normal development of legume flower parts, determination of the stage of maturity becomes more complicated.

For alfalfa hay, stage of maturity can be determined by observing the state of repro-ductive parts and the texture and woodiness of the stems. Alfalfa cut in the bud stage can be recognized by the size of buds at the tips of the stems and by the absence of purple flower petals. Bud-stage alfalfa is usually very leafy, and stems are relatively fine and pliable. Early-bloom stage alfalfa has some purple flower petals and stems that are larger than bud-stage alfalfa. The proportion of stems with visible purple flower petals can be used to estimate how far into the bloom stage the crop was at harvest time. One-tenth bloom would be one stem in ten showing bloom, fifty percent bloom would be five of ten stems showing bloom, and full bloom would be all stems showing bloom. Under certain weather conditions, alfalfa blooms profusely and, under others, sparingly. This does make determin-ation of the exact stage of maturity by the number of blossoms somewhat difficult. Alfalfa hay cut in the late-bloom stages has distinctly larger, woody stems, fewer leaves, and a stemmy appearance. Alfalfa cut after the full-bloom stage is usually indicated by the large stems, by the presence of seed pods (curved, fattened, almost snail-like pods), and by a deficiency of leaves.

Determining the stage of maturity of clover hay is somewhat similar to that for alfalfa hay. Once past the bud stage, the maturity of clover is determined by examining the color and condition of the bloom and the maturity of the seeds, if present. Clover hay cut no later than full-bloom stage will have numerous heads showing flower color (red or purplish-red blossoms of red clover, crimson red for crimson clover, or the pinkish-white or white blossoms of white and subterranean clovers), provided the hay was not weathered while being cured. Clover cut in the full-bloom stage will have no seeds or perhaps only a few shrunken ones. A stage between full bloom and full maturity is indicated by the brown color of all the clover heads and the presence of yellowish-brown seeds. Full maturity is indicated by the dark-brown color of the heads and the presence of plump, mature seeds.

Leafiness

This is an important factor in determining hay quality, but is most critical with legumes and first-cut grass hays. Leafiness (the quantity of leaves in relation to stems) is extremely important since two-thirds of the protein is found in the leaves.

In legume and first-cutting grass hay, stage of maturity affects leafiness. As plants mature, stems increase in diameter, lower leaves yellow and are shed, and the relative proportion of

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leaves decreases. Since leaves are high in protein and low in fiber, highest quality hay is that cut in the late-bud to early-bloom stage when plants have a high proportion of leaves.

Improper handing of leafy hay during raking and baling can result in large losses of leaves and thus quality. Curing method, handling method from field to storage, and weather conditions during curing and baling also influence leafiness.

For alfalfa and some clover hays with a predominance of leaves, stems will be soft and pliable and leaves will cling to the stems. In very stemmy hays, stems will be stiff, large in diameter, and have a very low leaf percentage. Leaf proportion can vary from 65 to 70 percent in very leafy alfalfa hay to only 10 or 15 percent in stemmy hay.

Hay purchasers should be aware that in some hay leaves will be off the stems and loose in the bales. This hay is likely to lose feed value through waste when bales are opened to feed.

Color

Color can be a definitive characteristic of hay. The ideal color is one that most closely approaches the bright green color of an immature grass or legume crop in situ. Hays having this bright green color were most likely cut at an early, desirable stage of maturity and were well and rapidly cured.

Even timely cut hay can lose its bright green color due to the bleaching action of the sun; rain during curing; or fermentation in the bale, stack, or windrow. Sun bleaching reduces hay palatability while rain leaches away a large portion of plant nutrients or causes molding and fermentation. Additionally, poor color can be indicative of hay that was too mature when cut.

Cutting and handling methods are often telegraphed by the appearance of bleached hay.

- Sun-bleached hay will have a *light golden yellow* color. If hay is not seriously reduced in quality, the bleached colored hay is from material from the outside of the windrow or from the sides of the bale exposed to direct sunlight. Other material in the bale will still be bright green. Stems bleached too long in the sun are usually harsh and brittle.
- Hay that has a characteristic *dark brown or black* discolored appearance has been exposed to rain or to heavy fog and dew. Stems in hay that has been discolored by rain are usually harsh and brittle.
- *Brown*-colored hay is usually indicative of hay that has either been through a heat and/or fermentation. This results when the hay is stored at too high a moisture content. Often the proteins in the hay have been chemically altered becoming unavailable to animals. This type of hay usually has a distinctive musty odor and may appear caked.
- *Yellowing*, especially in grass hay, usually indicates that the plants were over-mature when cut. This type hay is distinguished from sun-bleached hay in that all the hay will have the same yellowish color.

Slight discolorations from sun bleaching, dew, or moderate fermentation are not as serious as the loss of green color from maturity, rain damage, or excessive fermentation or heating.

Foreign Matter

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There are two types of foreign matter, the non-injurious and injurious. Non-injurious means those materials in hay that are commonly wasted in feeding operations but, if eaten, are not harmful to livestock. These include non-toxic weeds, overripe grain hay, grain straw, corn stalks, stubble, chaff, sticks, and other objectionable matter. Weeds are the most common non-injurious foreign matter found in hay. They are usually not relished by the livestock and, when eaten, have little or no feed value. Hay containing weeds or other foreign matter is discriminated against on the hay markets.

Injurious matter is material that is poisonous or will harm the animal when eaten. These include sandburs; needlegrasses with needles attached; rough or harsh bearded (awned) grasses like mature foxtail, wild barley, 3-awn grass, ripgut brome, and other grasses that have a sharp point at the base of the seed; wire, nails or other metal or harmful manmade materials; and poisonous plants such as tansy ragwort or bracken fern. Don't buy hay containing injurious foreign material.

Odor And Condition

Generally the smell of new mown hay is used as the standard for comparisons. Off-odors, such as mildew, mustiness or putrefied or rotten odors, indicate lowered quality and acceptance by livestock. These smells are caused when hay is stored at too high moisture or has been weather damaged.

Hay condition is important. Hay should be free from must and mold and from insect and disease damage. It should also be free of dust.

HAY CHARACTERISTICS		POSSIBLE SCORE	GIVEN
I. STAGE OF HARVEST (Total 30)			
First Cut Hay	Mixed Legume: Grass Hays & Grass Hays Second & Subsequent Cuttings		
1. Before heading or bloom	1. 0-5% of leaves are old and brown	27-30	_____
2. Early heading or bloom	2. 6-15% of leaves are old and brown	22-26	_____
3. Mid- to late-heading or bloom	3. 16-30% of leaves are old and brown	17-21	_____
4. Seed stage (stemmy)	4. >30% of leaves are old and brown	11-16	_____
II. LEAFINESS (Total 30)			

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1. Very leafy	27-30	_____
2. Leafy	22-26	_____
3. Not leafy	17-21	_____
4. Few leaves	11-16	_____
III. STEMINESS (Total 30)		
1. None OR only small diameter stems	27-30	_____
2. Few OR medium diameter stems	22-26	_____
3. Many OR large diameter stems	17-21	_____
4. Mostly stems OR very coarse diameter stems	11-16	
IV. COLOR (Total 15)		
1. Natural green color of crop	14-15	_____
2. Light green to slightly brownish	11-13	_____
3. Yellow to straw to brownish	8-10	_____
4. Brown or black	0-7	_____
V.ODOR (Total 15)		
1. Clean	14-15	_____
2. Dusty	11-13	_____
3. Moldy -- musty	8-10	_____
4. Burnt	0-7	_____
VI. SOFTNESS (Total 10)		
1. Very soft and pliable	9-10	_____
2. Soft	7-8	_____
3. Slightly harsh	5-6	_____
4. Harsh and brittle	0-4	_____

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SUBTOTAL		_____
VII. PENALTIES		
1. Trash, weeds, dirt, and other foreign matter	minus 0-35	_____
2.Noxious insects (blister beetles, others)	0 or deduct 50	_____
TOTAL		_____

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