

Evaluating Grain for Livestock Feed

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All livestock producers need to be able to visually evaluate grain for its desirability as a feed. Producers with only a few animals may buy all feedstuffs used in their operation. Large-scale producers, who generally produce much of their own feeds, may have access to grain that was unmarketable in food channels and is offered for sale as feed.

In either case, producers need to develop “a good eye” for grain quality. Our purposes here are to define those grain characteristics that you can visually evaluate and to discuss their importance in determining the feed value of a grain.

There are several factors to consider. They are, in order of relative importance (most important first), plumpness, foreign material, color, mixtures, treated seed, and other considerations.

Plumpness

Most cereal grains are used as an energy source in livestock rations. The energy-supplying portion of a grain kernel is called the *endosperm*, which is made up of high-energy carbohydrates (starch and sugars) and proteins. A plump kernel usually has a well-developed endosperm.

Plumpness normally indicates a lower percentage of hull or bran (or both), and thus a lower percentage of crude fiber, which results in a higher feeding value for livestock. Kernel plumpness is particularly important when evaluating oats or barley—these grains are naturally high in fiber because of their adhering hulls.

Test weight or *bushel weight* is an indirect measure of kernel plumpness. USDA Grade No. 1 test weights for soft

white wheat, feed barley, and oats are 60, 47, and 36 pounds per bushel, respectively. Plump grain will have a test weight near these levels.

Grain that is heavier than the given test weight is likely to be very plump and to have a good feed value. You can estimate test weights from bag size and weight or truck volume and weight.

Foreign material

These are any undesirable substances found in grain, such as stones, cinders, chaff, or straw. Foreign materials add little or nothing to the feed value of a grain and are costly in two ways.

First, a customer pays as much for foreign material as for the grain itself and receives no value in return.

Second, a customer must usually clean the grain to remove the foreign materials before the grain can be used as feed.

Cleaning can be costly. Impurities that cannot be readily separated decrease the value of a grain. Stones, pebbles, and pieces of glass or metal can damage processing equipment and may injure animals that consume them.

Ergots are also a type of foreign material. These are black, hornlike fungal bodies that are poisonous to stock when fed in large quantities or if fed in small quantities over a long period of time. Before buying or feeding ergoty grain, consult a veterinarian, a feed specialist, or your county Extension agent.

Color

Grains can be “off-colored” for a number of reasons. Weathering of seeds can result in bleaching (a lighter color) or in darkening (because of the growth

of decay molds). If molds are not present, weathering causes only a minor deterioration in grain quality.

Sprouted or frosted wheat makes poor quality flour, but it still can be used successfully in livestock rations. Sprouting generally results in higher grain-sugar content.

High temperatures (90 to 160°F), generated in stored grain or caused by mechanical processes, may give grain a brown or mahogany color and a burned taste or odor. Still higher temperatures, near the spontaneous combustion point, result in grain with a charred appearance, taste, and odor.

Heat-damaged grain is generally not used for food purposes; however, it can sometimes be used in livestock feeds. Palatability of heated grain can sometimes be a problem.

Unlike some of the other grains, oats can be found in a broad range of colors. This color is genetic in origin. Gray and red oats are often thought to be inferior in feeding value to white oats. This inferiority may be real; however, inferiority is caused by a lack of plumpness (oats of these colors tend to be less plump), not by color itself. When you buy feed oats, test weight and/or kernel plumpness are the prime factors to consider, regardless of oat color.

Mixtures

Grain sometimes contains unwanted weed or other crop seeds. Certain weed seeds or bulblets (such as wild onion or garlic) can affect the flavor of feeds and

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should be removed. Wild oats are generally low in feed value and are undesirable in feed grains. Common oats and barley have a lower feed value than wheat or corn, and mixed feed grains containing large amounts of oats or barley should have a lower market value.

Weed seeds, unless they're toxic or present in large amounts, generally don't greatly affect the feeding value of grain; however, some seeds can pass through an animal's digestive system, and weed seed introduced through feeds can be spread by the animals eating them.

Cereal rye is sometimes found as a contaminant in other grains. The feeding value of rye is essentially equivalent to that of wheat; however, rye is less palatable and actually should be mixed with other grains to be fed. If you buy rye to blend with other feed grains, look carefully for heavy ergot infestation.

Treated seed

Seed grain is often treated with chemicals to prevent diseases such as seed and seedling rots in planted grain. Some of these substances are quite toxic if livestock consume them. Many seed treatments are red-colored for easy recognition. Bioassay tests to detect seed treatments can also be performed by seed analysis labs. *Treated seed is unacceptable in grain to be used as feed or food.*

Other considerations

Moldy grain is a serious problem. Grain that is moldy is usually unpalatable and may have a disagreeable odor. Many grains, especially corn, can produce dangerous amounts of poisonous fungal toxins called *aflotoxins*. These are formed by the growth of mold fungus, usually *Aspergillus flavus*. Moldy grains are often unfit for feed or food uses.

Cracked grain is unsuitable for certain grain products but has no real impact on grain quality. Cracked grain is primarily an economic rather than a feeding value concern. One disadvantage to cracked grain is that it does not store for long periods of time. Oils in the cracked grain break down, which can cause a rancid taste and odor. Cracked grain is also more susceptible to insect infestation.

Insects, living or dead, are sometimes found in grain. The presence of insects indicates that the grain had been stored at too high a temperature or moisture content. Insect feeding activities can rapidly deteriorate grain. If you feed it promptly, weevilly grain is not necessarily undesirable as a feed.

Rolled or ground grains present special problems in evaluation. Be alert for unusual color or objectionable odors. Look for uniformity in the feed—grain or grain-weed-seed mixes should still be detectable.

These are the major factors to consider when you evaluate grain for feed use. All these factors are considered when a USDA grain grade is assigned to a lot of grain. If possible, have your grain officially sampled and graded before you contract for purchase. Contact your local elevator operator for the address of the nearest USDA grain-grading service.

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