

TIMELY INFORMATION

Agriculture & Natural Resources

USE OF FREEZE-DAMAGED WHEAT FOR FORAGE*

The recent unseasonably cold weather has caused freeze damage to some Alabama agricultural crops, including wheat, especially in north Alabama. This has resulted in numerous producers considering the possibility of using wheat for forage instead of the original purpose of harvesting grain, thus salvaging something from a wheat crop they feel may yield poorly. Here are some points that may be worthy of consideration by people facing this decision.

Assess The Situation Carefully- It is difficult to predict how much damage cold weather may have done to wheat because numerous factors can come into play, including stage of growth, variety, how cold it got, how long it stayed cold, and fertility. Different fields on a farm or even parts of a given field may have been affected differently due to differences in elevation and/or exposure. Thus, careful inspection and evaluation on a field-by-field basis is required.

The growth stage of wheat is a particularly important factor influencing the impact of cold weather on grain yield. An excellent discussion of the usual impact of growth stage and how to assess freeze damage is provided at the following website created by Kansas State University faculty: <http://www.oznet.ksu.edu/library/crpsl2/c646.pdf>.

Don't Rush The Decision- It makes sense to wait at least a week before deciding what to do. This will make the damage easier to detect, because dead, frozen tissue will turn brown, and other indications of damage (as described in the website cited above) will be easier to identify. There is still plenty of time to harvest cold damaged wheat for forage and obtain good forage quality.

Consider All The Options- If it is determined that the grain yield potential of a field has been severely reduced, it makes sense to consider all the options. No doubt a wide variety of situations exist on various farms and in different fields. In some cases, there may be some damage, but perhaps not enough to preclude grain harvest.

There may be some producers who want to graze their freeze-damaged wheat. Given the growth stage of wheat at present, this would need to be done within the next two to four weeks in order to provide good quality pasture forage. Hoof damage may be excessive in fields that are wet. Strip grazing would be the best way to obtain a good level of forage utilization. Continuous grazing, especially at low stocking rates, would be particularly wasteful.

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Some producers will want to harvest wheat for hay, which is certainly an option. However, the long period of time required to cure high moisture hay at this time of year makes rain damage a substantial risk. Wheat hay is porous and needs to be stored inside. For producers who have the option of storing damaged wheat as silage, this is probably a better choice than making hay. Still other producers may decide that they will simply chemically burn down their damaged wheat and plant another crop (i.e. soybeans or cotton) that promises to provide more profit than grain wheat.

Growth Stage At Which To Harvest Wheat For Forage- Wheat may be harvested for forage from the boot stage (just before heading), or the milk stage (when the head releases a milky liquid if sliced open), to the mid-dough stage (when the grain has a “dough-like” consistency inside). As the plant matures, plant moisture content, digestible dry matter, and crude protein levels decline (see table 1). Most beef cattle producers who intentionally grow wheat for forage harvest at the mid-dough stage, as this maximizes dry matter yield while still producing forage suitable for most classes of beef cattle. Producers who have animals with higher nutritional requirements (such as dairy animals) may wish to harvest at the boot or milk stages.

Table 1. Maturity effects on wheat silage¹

Stage	Dry Matter	Crude ² Protein	IVDMD ³
Boot	15.8 percent	15.3 percent	62.9 percent
Milk	29.0 percent	11.0 percent	57.8 percent
Dough	40.0 percent	9.5 percent	56.1 percent

¹ Adapted from Kansas State University Bulletin 613, January 1978.

²DM basis.

³In vitro dry matter digestibility (here in vitro means artificial rumen). For general purposes, IVDMD can be equated with total digestible nutrients (TDN).

Moisture Content For Wheat Silage- If forage harvested for silage is too dry it will not pack easily or well, resulting in poor fermentation. If it is too high in moisture there will be undesirable fermentation and excessive seepage. In bunker silos a moisture content of 65 to 70% (30 to 35% dry matter) is advisable. Oxygen-limiting structures can be used to store lower moisture silage. In addition, some producers may have the option of wrapping low moisture forage in plastic as baleage if they have access to bale wrapping equipment.

The only way to know the moisture content of forage is to sample and test for moisture. The approximate probable moisture content of wheat plants at various growth stages that is provided in Table 1 reveals that direct harvest of wheat at the mid-dough stage of maturity may be possible. However, less mature wheat will likely need to be cut and wilted in order to have a low enough moisture content to be properly ensiled.

Packing Of Silage- A key to making good silage from any forage crop is to exclude air from the silage. Packing of small grain is more difficult than many other types of forage because of the hollow stems. Thus, fine chopping (theoretically ½ inch) and thorough packing are essential.

Probable Yield- Healthy wheat planted for forage and harvested at the mid-dough stage often produces around 2 tons of dry matter per acre, which is the equivalent of around 2 ¼ tons of hay or 7 tons of 65% moisture silage. Wheat harvested at earlier stages of maturity, and/or that has been severely damaged by cold will produce less dry matter and fewer tons of hay or silage.

Feed Value/Animal Performance- As shown in Table 1, stage of growth at harvest has a profound impact on forage quality. The crude protein content of wheat silage harvested at the mid-dough stage is usually in the range of 9 to 11% on a dry matter basis, which is better than corn. However, the energy level of mid-dough stage wheat silage is only around 80% of that of corn silage, so animal performance is correspondingly lower unless an energy supplement is provided along with the silage. The quality of unweathered wheat hay should be close to that of silage harvested at the same stage of growth and exposed to the same environmental conditions.

Nitrates- It is possible for freeze-damaged wheat to contain toxic levels of nitrates, especially before heading. The ensiling process usually results in a substantial (at least 25%) reduction in nitrate levels, which is an added reason to consider harvesting damaged wheat forage for silage rather than hay. However, the only way to know for certain if forage contains potentially toxic nitrate levels is to have it tested. The Auburn University Soil Testing Laboratory will test forage samples for nitrates at a cost of \$6 per sample.

Information pertaining to forage quality, including instructions as to how to properly sample hay, silage, and pasture forage are provided in the publication, “Understanding Forage Quality.” To access this publication, go to the following website: <http://www.aces.edu>. Then click on “publications.” Next click on “Agriculture” and then on “Agronomy and Soils.” Then click on “Forages” and finally on “Understanding Forage Quality.” Instructions for sampling hay, silage, and pasture are provided on pages 8, 9, and 12, respectively. If sampling green wheat that is to be grazed, at least one pound of tissue should be obtained, placed in a paper (not plastic) bag, and sent via overnight mail. It is important to attempt to harvest what the animals will be allowed to consume; nitrate levels are highest in the bases of stems.

Pesticides- Some wheat fields receive treatments with pesticides for which there are grazing or harvest restrictions. Such restrictions should be strictly observed.