



Determining the Extent of Alfalfa Winter Kill

Even during mild winters, alfalfa winter kill still may occur in some areas. Sustained temperatures of just 0 to 15° F can be lethal to the plant. The influence of temperature can be determined by many variables, snow cover, soil type, and of course, the winter hardiness of the variety. If the plant survived the winter temperatures, alternating freezing and thawing in wet soils can cause heaving and expose the root and crown to freezing temperature and may break the crown, and freezing rain or ice covering the plant to the extent that it cannot respire can also result in plant death. Finally, the summer stresses, such as drought and compaction, and not leaving enough residue can also play a role in winter survival. Regardless of the cause of the stand loss, the stand needs to be assessed and a decision must be made if it should be kept or not.



Figure 1. Poor stand (left image) versus an excellent stand of alfalfa (right image)

//When should the stand be examined?

The plants should be actively growing to make the best decision on the stand. The stand should have 3 to 4 inches of growth before it is assessed. Take the assessments across the field, tossing the 1 square foot sampling frame at random throughout the field. How many samples to take is based on the variability in the field; 10 to 20 samples per 10 acres is recommended. In a more variable field, the sample number should be closer to 20 than 10. A good estimate is the goal, so do not skimp on the number.

//What to sample, plants or stems?¹

Plant counts

One method that has been used is to count the number of surviving plants on a square foot basis. In a pure stand of alfalfa, if there are 20 or more plants in the fall

of the seeding year, 12 or more in the spring of the first production year, 8 or more plants in the spring of the second year, and 5 or more plants in the spring of the third production year, the stand is considered adequate. This method does a good job of predicting the survival of young stands, but not more established stands.

Stem counts

A more accurate way to assess established alfalfa stands is to count stems, not plants. Older stands will almost always have fewer plants per square foot, but older plants produce more stems. To use this method requires about six inches of top growth. Count the number of stems in a square foot in four to five different locations in the field. Only count the stems that will be tall enough to mow. Consult Table 1 below to determine yield potential based on the stem count.

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Table 1. Number of stems and yield potential of alfalfa.

Stems per square foot						
54 or more	50	45	40	35	30	25
100% yield potential	90% of yield potential	81% of yield potential	72% of yield potential	62% of yield potential	53% of yield potential	44% of yield potential
Keep in production	Keep in production	Keep in production	Keep in production	Consider replacing	Consider replacing	Consider replacing

Adopted from Undersander, D., Grau, C., Cosgrove, D., Doll, J., and Martin, N. 2011. Alfalfa stand assessment: Is this stand good enough to keep? University of Wisconsin Extension.

If it is an alfalfa/grass mixture, not a pure alfalfa stand, the percent of yield potential would change. For example, for a 75:25 alfalfa:grass mix, about 41 stems per square foot would provide the maximum yield potential. Additional considerations in determining whether to replace a particular field include the current alfalfa inventory on the farm and is there a replacement field that will be adequate for seeding of a new field.

Plant Health Assessment

Plant health should also be assessed. Cut the tap root and assess the color of the root tissue inside. If it is white and firm, the plant is in good health, if it is brown, the plant is already dead, and if it is yellow, the plant is dying. How many samples to take is based on the variability in the field.

//What else should be considered?²

Depending on the spring weather, foliar diseases that may become common include: spring black stem, downy mildew, and Lepto leaf spot. As the stand ages, the incidence of these diseases can increase, and they will all be more common if the spring is wet and cool.

//If the field is rotated out and planted to corn, what would be the nitrogen credit?³

Generally, for good stands the credit would be 150 lb of N, for fair stands it would be 75 lb of N, and for poor stands 50 lb of N. The level of potassium should be determined prior to planting corn as alfalfa can remove a significant amount of it.

//What are some termination methods that can be used?³

Tillage (mold board plow, under cutter chisel plow) can be used to cut the roots, but in no-till systems this may not

be an option. Herbicides can be used to terminate growth, but with spring termination, herbicides in combination with tillage is often more effective. While fall termination may be more effective in eliminating alfalfa, spring termination offers the possible benefit of harvesting a first crop of alfalfa prior to termination. Burndown products can include glyphosate tank-mixed with dicamba and 2,4-D. For Roundup Ready® Alfalfa, a dicamba, 2-4 D, and atrazine tank mix can be effective. Read and understand rotational restrictions prior to planting a subsequent crop. With spring termination, a concern is that the optimal time to control alfalfa (at 4 to 6 inches of growth) with herbicides is usually past the ideal time for planting corn.

Sources

¹Undersander, D., Grau, C., Cosgrove, D., Doll, J., and Martin, N. 2011. Alfalfa stand assessment: Is this stand good enough to keep? University of Wisconsin Extension. <https://fyi.extension.wisc.edu/forage/alfalfa-stand-assessment-is-this-stand-good-enough-to-keep/>

²Lang, B. 2016. A practical look at disease management in alfalfa production. Iowa State University Extension. <https://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=1232&context=icm>

³Yost, M., Coulter, J., and Russelle, M. 2018. Managing the rotation from alfalfa to corn. University of Minnesota Extension. <https://extension.umn.edu/corn-cropping-systems/managing-rotation-alfalfa-corn>

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