

# Alfalfa Winter Injury

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The winter of 2007/08 has provided a lot of discussion at local coffee shops and winter meetings. There has been plenty of moisture but it has been the wet kind rather than the white kind. Depending on your perspective and the amount of snow shoveling you need to do, you may be fairly happy about this.

If you are an alfalfa plant, you might not have the same opinion. Snow helps to insulate alfalfa crowns from fluctuating air temperatures. In addition, a layer of snow moderates growth and initiation of buds when air temperatures move into the mid 40's. With the amount of rain we have experienced this winter, soil conditions are flooded in many areas. High soil moisture levels can lead to root death from lack of oxygen and heaving due to freezing and thawing cycles.

## Injury Factors

In addition to weather conditions, other factors have been identified that have the potential to increase winter injury. Forage researchers note that older stands (>3 years) have greater risk to injury. There are significant variety tolerances as well. Most seed companies will rate varieties for winter hardiness. Varieties with better disease resistance will also be better able to tolerate poorer conditions.

Soil fertility plays a major role in winter survival. Fields with low soil pH and/or low levels of potassium (K) have been shown to have greater winter injury from cold temperatures and heaving. Poorly drained soils also increase the risk of injury.

How does harvest management affect winter survival? More frequent cuts, 5>4>3, increase the risk as does a fall harvest. Harvesting in mid September, which allows some re-growth prior to frosts, has more winter injury risks than an early September or mid October harvest. When cutting in the fall, a 6-inch stubble height is preferred.

## Evaluating Stands

In late March/early April, evaluate your stands. Look for uneven growth from plant crowns, both in location on the crown and in height. The best indicator will be found in the roots. Collect 4 to 6 inch lengths of roots. Healthy roots will be firm and white. Winter injured will be grayish, possibly brown to black and will be soft, stringy and possibly dry. On severely injured crowns, the top-growth can easily be pulled off.

One method to evaluate stands is based on counting stems per square foot at many locations across the field. Most productive alfalfa stands will have 55 stems/ft<sup>2</sup>. When stem counts are between 40–55 stems/ft<sup>2</sup> there will be yield potential losses. At <40 stems/ft<sup>2</sup> significant yield losses will occur and producers should consider replacing the stand.

## **Considerations for Injured Stands**

If you decide to retain stands with significant winter injury, consider the following practices to put some additional vigor back into the stand. First, delay harvest to allow weakened plants to replenish carbohydrates needed for future production. How long to delay will depend on the extent of injury. The less the injury, the less important. First cutting of the most severe stands should be delayed until mid bloom if the stand will be kept in production. With only mild injury, you may need to delay harvest to 10 or 25% bloom on 1 or 2 harvests, perhaps only 2nd or 3rd cut. When delaying harvest be sure to check the crown area for new growth. Removal of these shoots will further weaken the plant.

Be sure to soil test and top-dress. Potassium is a critical alfalfa nutrient that frequently limits production. Removal rates of 60 lbs/ton need to be replenished. Weed and insect control also improve alfalfa survival.

What about inter-seeding alfalfa on the worst stands? Experience and research has shown that this is not a beneficial practice. Established alfalfa plants produce a toxin that greatly inhibits development of smaller plants. Research has found that the risk remains in fields for 12 months. Rotating to corn will be the best alternative to thin stands.