Has Your Alfalfa Stand Been Winter-Killed or Winter-Injured?

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As spring approaches, farmers need to determine the health status of their alfalfa fields to estimate summer forage availability and decide whether to keep or replace stands. Shoots should be growing vigorously and be more than 2˝ before making the assessment. Assessing too early may give false results, as some plants are slow coming out of dormancy.

Figure 1. One-year-old, winter-killed alfalfa plants from 2014-2015 winter in Fargo, ND. Picture taken May 21, 2015.

Walk the entire field looking for healthy, injured, or dead plants. Some areas might have more winter-kill than others. Usually, low areas are more prone to winter-kill and injury. Plants may have weakened from fall waterlogging or died from ice sheeting during the freeze-thaw cycle.

First, look at the top of the plant. Look for the number of greening shoots and the symmetry or distribution in the crown. Healthy plants have many shoots coming from all sides of the crowns. A plant with an asymmetrical distribution of shoots has winter-injury and will be lower yielding. Some shoots will develop later but will remain behind. Also, look for crowns that have been pushed out from the ground 1˝ or more, referred to as heaving. Heaved plants will eventually die.

Figure 2. Two-year-old alfalfa experiment after 2014-2015 winter. Some areas were completely killed, others were spared. In the left upper corner of the flagged plot you can see a plant with winter injury, only a few shoots from one side of the crown are growing. Picture taken May 21, 2015, Fargo, ND.

Second, dig out a few plants, look at the health of the crowns and roots. Split the roots. A healthy root is turgid, firm, has an off-white color, and little or no crown rot symptoms. If the root looks dehydrated or stringy, the plant is injured and will likely die. A less healthy plant will have signs of rot in the crown but also inside the root.

A dark or reddish coloration is indicative of rot. If rot has affected more than 50% of the crown diameter and root, the plant is likely to die later in the year. Brown root rot is often associated with winter injury and winter-kill in northern tier states. Symptoms usually occur in older stands. Diseased plants break dormancy more slowly. Root symptoms have brown, roughly circular lesions that surround the tap and lateral roots. Lesions can sever the root and kill the plant. A winter-killed plant will have no top growth, the crown and root will be soft and can be easily pulled out the ground.

Figure 3. Five-year-old alfalfa field with poor stand, less than 3 plants/ft^2 in 80% of the field. Picture taken May 21, 2015, Fargo, ND.

Count only healthy plants or slightly injured plants; heavily injured plants should be counted as dead. If there are many slightly injured plants (asymmetric shoot growth), the first cut may be delayed 1-2 weeks because a few shoots will develop later in the injured part of the crowns.

Before deciding to keep or replace a stand, consider stand age. For example, less than 7 plants/ft^2 is considered poor in a 1-year-old stand; in a 4-year-old stand, less than 4 plants/ft^2 is considered poor. Research shows that counting stems (shoots) instead of plants is a better predictor of potential yield, especially in older stands. Stem counts greater than 50 stems/ft^2 are adequate for a 1-year-old stand, and greater than 30 stems/ft^2 are adequate for a 4-year-old stand.

Calculate what percentage of the field has been winter-killed or has less than the recommended minimum plant density. Forage options for winter-killed alfalfa vary depending on the calendar date, timing, urgency for feed, economics, and yield. Early identification of the problem will give enough time to the farmer to establish a new pasture or an annual cool-season forage. Alfalfa cannot be seeded into alfalfa. Newly seeded alfalfa will die from an autotoxic compound, medicarpin, released to the soil by alfalfa crown and roots.

Corn, when following alfalfa, will benefit from alfalfa N credits. Nitrogen credits are estimated at 100-120 lbs N/acre. Also, corn yield will increase by 10-15% after alfalfa because of increased soil organic matter, recycled nutrients, improved infiltration, and reduced soil compaction.