Evaluating and Managing Alfalfa Stands for Winter Injury

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Many farmers have reported alfalfa fields that have been slow to green-up this spring. Having had a harsh winter it is highly likely that some forage fields have suffered from winter injury. This article will present some options for managing and enhancing winter injured alfalfa stands.

What causes winter injury? There are many factors that can contribute to winterkill such as deficient snow cover, variety, cutting management, fall soil moisture, stand age, low soil fertility, and low soil pH. Alfalfa prepares itself for the winter months once temperatures drop below 40 degrees F. During this time the plant prepares itself to tolerate freezing temperatures between 5 and 15 degrees F. When temperatures drop below this threshold the water in the plant cells freeze and lead to further cell damage, dehydration and eventually can lead to plant death. Winter injury can also be caused by ice sheeting that prevents air exchange to the alfalfa crowns. One way to reduce damage from ice sheeting is the recommended practice of leaving 6 to 8 inches of stubble in the fall. This will also increase the chances "catching" snow, which acts as an insulator.

How to diagnose winter injury? The most obvious sign of winter injury are stands that are slow to green up. If other fields in your area are starting to grow and yours are still brown those stands should be checked for injury or death. In addition to slow green up, fields with uneven growth patterns may also indicate damage. The best way to diagnose damage is by examining the plant roots in a suspect field. To do this walk diagonally across a field and at regular intervals, dig up a shovel full of plants (4 to 6 inches deep) and examine their roots. The roots of each plant should be firm and the interior color should be white or cream colored. If the roots are soft and the interior yellow to brownish in color it most likely was wintered killed. Try and inspect as many plants as possible to determine the percentage of your stand and/or areas of your field that are injured.

Options for fields moderately affected by winter injury

Winter injured stands will require different management than healthy stands if they are to stay in production. If winter injury is evident consider the following.

1. Allow alfalfa plants to mature longer before cutting. This will help the plants rebuild needed energy for future production. For severely impacted stands, allow plants to go to full bloom before taking a first cut and to early flower for following harvests.
2. Increasing the cutting height may also help stands recover. New shoots will be developing at the base of the injured plants and it is important to not remove these shoots as it will result in further detriment.
3. Lastly do not cut winter injured stands late in the fall this will allow them to build up more reserves before winter.

If a significant loss of alfalfa was seen in a predominantly grass stand, then you could manage it for grass. This will work best if the grass species are predominated by tall

growing species such as reed canarygrass, orchardgrass or timothy. If the grass is less than 10 inches tall, it may still be economical to apply 50 pounds of N per acre to boost yield and protein.

If the alfalfa stand was only partially injured (25 to 50 %) interseeding with quick germinating forage with a no-till drill could provide additional production. Species that could be considered for interseeding include orchardgrass (4-6 lbs/acre) perennial ryegrass (5-6 lbs/acre), or clover (4 lbs/acre). Remember that alfalfa should not be reseeded back into the field unless the stand is only a year old. Autotoxicity issues will keep the newly seeded alfalfa from growing. Perennial ryegrass should be considered a short term option since it does not overwinter well in our climate.

Options for fields severely affected by winter injury

If your stand was over 50 % killed, you may want to consider replanting. Depending on your needs, there are several forage choices. A small grain/field pea mixture will be the best choice if the forage is needed in early/mid summer. Early planted small grains (60 lb/acre) such as oats, barley, or triticale with the addition of field peas (50 lb/acre) will be ready for harvest between late June and mid July. Research from the University of Vermont has reported dry matter yields between 2.5 and 3.0 t/acre.

Corn silage will be the best choice for optimizing full season forage production. If corn silage is planted by the end of June it will normally out yield most other forages however you risk lower quality forage. At these later dates (mid-June to early July) you may want to consider planting a summer annual. A few options include sorghum-sudangrass hybrids and millets. The sorghum-sudangrass hybrids and sudangrass should be seeded at 50 lb/acre, while forage millets are planted at 20 lb/acre. These forages should be harvested when they reach approximately 30 inches. It is important to note that these crops need high temperatures to yield well and may not be the best choice if we are experiencing average to cool temperatures. Studies conducted at the University of Vermont have reported dry matter yields between 4 and 6 t/acre.

Each potential forage option listed above has advantages and disadvantages. How you decide to manage your winter injured fields will depend on the required forage yields and quality for your farm.

For more information on how to manage winter injured alfalfa fields please feel free to contact Dr. Heather Darby at 524-6501 or heather.darby@uvm.edu.