

Hopefully, most alfalfa will come through the winter in good shape. However, there are some areas where alfalfa will show signs of injury or winterkill due to the lack of snow cover over winter. We expect that winterkill will be spotty and likely occur to a greater extent in fields with low soil pH, low potassium and sulfur and in older stands. So it is important to check individual fields for winter injury and kill to make planting decisions early. Identifying injury without kill will also indicate reduced yield for 2015 and allow consideration of any management changes in the future.

#### *How do we identify injured and killed alfalfa early?*

- **Slow or no “green up” in all or portions of the field.** Look for portions of the field that are green while other areas remain brown. In the fall, energy reserves are stored in the roots and crown buds are formed. The reserves provide energy for the plant during winter and for spring growth of shoots from crown buds. Injury can destroy the roots and crowns but often some crown buds survive and slowly regrow; however, this may be limited to only a few per plant and these may be stunted or chlorotic (yellow).
- **Uneven regrowth.** Damage to several of the crown buds during the winter will create uneven regrowth as the surviving buds begin to grow and the plant begins to regenerate new crown buds. Shoots from the regenerated buds will be 3 to 4 inches shorter than shoots from surviving buds. If the plant root has been damaged, some shoots may die.
- **Root damage.** Healthy roots are firm and white. Injured roots are spongy, (yellowish) grey, and dehydrated (ropy). Over time, injured roots will become diseased, rot and turn dark brown. A damaged root cannot sustain crown bud growth.

#### *We recommend the following:*

- 1) First make sure that “dead” spots are actually dead and not just delayed: (Stands can be slow to recover when injured). So don't be in too much of a hurry to till up a stand until you've looked at some roots to determine health)
  - a) Dig up a few plants and check the top four inches of the tap root for color and turgor. Split the root and crown. A healthy tap root should be an off white (like the inside of a potato) and turgid (not ropy) (see pictures).
  - b) Check plants that are putting out small shoots. Sometimes the dying plants will produce shoots one to two inches tall and then die. Again, dig a few plants and look for off-white and turgid taproots.
- 2) Determine the percentage of field affected and manage to meet your goals: there are several alternatives approaches:
  - a) If a small or moderate percentage of the field is affected and you want to harvest forage from the existing stand, go over the affected areas with a drill seeding (10 lb/a) with a 50/50 mix of Italian (annual) ryegrass and perennial ryegrass to a depth of ½ inch.
  - b) If a moderate percentage of the field is affected you can immediately interseed Italian ryegrass (10 lb/a), take the first cutting for forage, then spray and seed corn or soybeans into the killed forage. An alternative to this approach is to take two forage harvests and seed oats for fall forage.
  - c) If a moderate or large amount of the field is affected seed oats (2 bu/a) and peas (20 lb/a) for haylage harvest. In some regions, corn or sorghum-sudangrass can be planted following the oat-pea harvest.
  - d) If a large percentage of the field is affected, seed corn or BMR sorghum-sudangrass before July 1 (20 lb/a). These crops can use the nitrogen credits from alfalfa. Corn will likely produce the most tonnage of any forage. Sorghum-sudangrass is a good choice if you expect dry conditions and/or above average temperatures. Alfalfa can be seeded into a different field at 12 lb/a either alone or in mixture with grass (e.g. 6 lb/a tall fescue and 2 lb/a Italian (annual) ryegrass).

A stand of alfalfa releases auto-toxic compounds into the soil that inhibits alfalfa regrowth. How long these compounds remain is a function of soil type, temperature, amount of rainfall, and time from tillage to reseeding. These compound residues affect only alfalfa and will reduce future yield up to 60% if reseeded within one year of killing the stand and 15 to 20% if reseeded in 1 to 2 years on medium to heavy soils.

Where producers are making decisions for the long term they should use stem counts to estimate future yield potential. Stand yield potential based on stem densities per square foot can be assessed in the following manner:

- **Greater than 55** stems indicates density will not be a limiting factor,
- **Between 40 and 55** stems indicates some yield reduction but fields may be adequate in years of low inventories and high value,
- **Fewer than 40** stems indicate a poor stand and consideration for termination.

A stand can be slow to recover when injured. So don't be in too much of a hurry to tear it up until you've looked at some roots to determine health. If surviving plants are injured, but have adequate stem density (40 to 50 stems/ft<sup>2</sup>), it's probably best to plan to push the stand to get the most out of it this year then to plan to terminate after this growing season. If most surviving plants look reasonably healthy (i.e. losses were spotty across the field) you might consider inter-seeding a mixture of annual forages (i.e. Italian ryegrass or oats) and perennial (grass) forages to stretch the stand beyond this year.



Injured and dying plant on left (yellow taproot below crown) and healthy plant on right



Dead plants with dehydrated, yellow-brown area below crown