

Frost-Seeding:

Low-Tech Wonder or Wishful Thinking?

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Hayfields and pastures don't always have everything we would like them to have. It is common to establish a grass-legume mixture, like timothy and red clover, only to see the clover disappear over a period of two or three years. It might die out because of the weather, soil drainage, fertility, or harvest management. While it is important for you to know why it disappeared, you might want to have it back. The important question is: *do you need to destroy the whole thing to get back the missing piece?*

To add a forage to an existing hayfield or pasture is called *supplementation* (if you tear up everything and start over, it is called *replacement or renovation*). There are a couple of methods for doing this. One is to seed a new forage species into the existing sod using a no-till seeder. This technology has improved quickly over the last ten years, and can be quite successful if you know how to manage competition with the new forage.

Another method is *Frost-Seeding*. The principle behind frost-seeding is quite simple. Seed is broadcast on the soil in mid-spring, when daytime temperatures are above freezing but nighttime temperatures are below freezing. This daily freezing and thawing, which shrinks and swells the soil, works the seed into the soil. When temperatures become warm enough, the seed can germinate in the soil, and begin the process of establishment. This seeding method might be called "low-tech" because all that is needed is something to apply the seed (usually some type of spin spreader). It is relatively inexpensive for the same reason; you pay for the seed and the time on the equipment.

Sound simple? It's not as easy as it sounds.

Foolproof seeding method? Not at all.

What Has to Go Right for Frost-seeding to Work:

1. *The seed has to reach the soil surface.* For the new forage to have a chance at establishment, it must germinate in the soil. If the seed doesn't reach the soil...end of story. For this reason, this method is not recommended for old hayfields which tend to have thick vegetation, or for abandoned fields with a lot of litter.
2. *The seed must work its way into the soil.* This is where the frost (or freezing-thawing) goes to work. **Timeliness is critical.** Seed too early and the seed may die. Seed too late and there is no frost to do the work. In addition, the weather

changes from one year to the next, so we can't predict when the right conditions will end.

3. *The new seedling must be able to compete with the plants already in place.* If the first two steps fall into place, you aren't done yet. Say you frost-seed red clover into a timothy-bluegrass pasture. In mid-May, you can locate the new clover seedlings. Notice that they are much smaller than the established grasses. **Do you have a plan for controlling this competition?** Grazing pressure and clipping are both options, but have an idea beforehand to manage this part of the season.
4. *You must be seeding the right plant into the right field or pasture.* This is why you need to know why something disappeared the first time. For example, if continuous grazing wiped the clover out of the pasture, the same management will wipe it out again. Likewise, clover may have died out because soil pH was dropping; unless you applied lime lately, the frost-seeded clover is not likely to live anyway. For this reason, frost-seeding should be viewed as **one** component of improving a hayfield or pasture. It should not be seen as **the only** practice needed to renovate these fields.

Remember, all of these pieces have to fall into place for this seeding method to be successful. Frost-seeding *is* a low-tech method and a low-cost method of forage improvement. It is also a **high-risk** method of forage improvement, so don't depend just on frost-seeding. Make it part of the system.

What to Frost-Seed:

Most frost-seeding is done using legumes, either clover or alfalfa. Birdsfoot trefoil is used occasionally, but it is a poor competitor as a seedling, reducing the likelihood that the seeding will be successful. Seeding rates are variable for legumes. Some people will seed normal rates (12-14 pounds of alfalfa or clover) as an insurance policy ("more seed equals better chances"). However, if all of the pieces don't fall into place, it doesn't matter how much seed you use. If you are trying to add a little clover, use a lower rate (6-8 pounds).

The frost-seeding method does not appear to work very well for grasses. Grass seed may not be able to tolerate the cold temperatures (freezing to death instead) or it may mold in late spring. If you are interested in adding a grass to a pasture or hayfield, no-till seeding is a more realistic option.