Frost Seed to Renovate Pastures

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Frost seeding is one method that producers can use to renovate pastures and improve pasture quality and/or the species mix within the pasture. Frost seeding involves broadcasting seed over a pasture area and letting the natural freeze/thaw cycles of late winter and early spring help to move the seed into good contact with the soil. A basic requirement for frost seeding success is to make sure that the sod cover has been opened up, that is, that there is not so much growth present that the broadcast seed will not be able to come into contact with bare soil. Generally, a pasture is prepared for frost seeding by grazing it down hard, although some light tillage or a close mowing could also be used.

Another twist to frost seeding that sheep producers can use to their advantage is to combine frost seeding with hoof action. Under this seeding scenario, let your sheep begin to graze the paddock that is to be frost seeded in early March. Let the sheep graze down the forage, scuff up the soil and open up bare areas in the sod. At this point, broadcast the forage seed across the paddock. Keep the sheep in the paddock another couple of days and let them continue to graze and trample or hoof in the seed. This method seems to work well with sheep because they don't trample in the seed too deep as could happen with cattle.

In general, legumes work better for frost seeding as compared to grasses. This might be because legume seeds are typically heavier than grass seed and that may help them get down to the soil level better than grass seed. The advantage to frost seeding a legume such as red or white clover is that legumes "fix" nitrogen typically in excess of their own needs. The existing grass plants use the excess nitrogen, which improves their quality as a feedstuff. Once legumes become established in a stand of pasture grass and compose 25 to 30 % of the stand, there is no need to apply supplemental nitrogen so this portion of fertilizer costs is reduced.

Red clover is probably the most widely used forage species when it comes to frost seeding. Red clover has high seedling vigor, is tolerant of a range of soil pH and fertility conditions, and tolerates drought better than white clover. Red clover produces its heaviest growth during the summer months. Red clover is known as a short-lived perennial, typically persisting in a stand for only a couple of years. Thus, many producers find themselves frost-seeding red clover every couple of years back into the same pasture. However, work is underway to improve red clover longevity and there are a couple of varieties on the market that in OSU trials have high yields and stand percentages of around 60% or greater after 4 years. This seed is higher in cost than some of the more common shorter-lived red clovers, but may be worth it to some producers in some pasture situations.

After red clover, the next most popular legume that I see being used for frost seeding is white clover. White clover is a perennial clover and begins its production in the cooler spring weather. The older varieties of white clover are known as low growing or prostrate type of growth. This means that in order for the white clover to thrive, grass must be grazed down shorter so that light can get down to the white clover. However many seed companies now have newer, improved varieties that are more upright growing and compete better with grasses.

Other legumes that also are used for frost seeding purposes include alfalfa and birdsfoot trefoil. Alfalfa has also been tried as a frost seeded legume with variable results. Alfalfa has higher fertility requirements than clovers or birdsfoot trefoil and it also requires a soil pH above 6.5 for best establishment results. Some producers like a combination of red clover and birdsfoot trefoil in their frost seeding mix. Birdsfoot trefoil is a persistent perennial once established, but can be slow to establish, often not showing up in a stand until the second year after frost seeding. This works well for most common varieties of red clover as they begin to decline after the second year in a stand.

Another legume that is starting to receive more interest for pasture and frost seeding use is annual lespedeza, especially in the southern third of Ohio. Annual lespedeza is a non-bloating legume that is drought tolerant. Although annual lespedeza will tolerate acidic soils (pH 5.0 to 5.5) and low phosphorous level soils, it will also respond to applications of lime, phosphorous and potassium. Applications of nitrogen will decrease lespedeza yields. Lespedeza is a warm season forage that can be used to fill in the “summer slump” period that cool season grasses experience. Expect growth of annual lespedeza to kick in during July and August. Do not graze after early September to allow sufficient seed production for stand regeneration. I know of one beef producer in Athens County who frost seeded lespedeza into his pasture several years ago and he was very pleased with its performance during the summer’s drought. However, I did some frost seeding trials with lespedeza on 4 different farms a few years ago and didn’t have much success. My experience was that the seed was light, more similar to a grass seed, and I don’t think good seed to soil contact was established, even though the pastures had been grazed down tight and there were areas of soil showing. This might be the case where the seed should be broadcast and then let animals continue to graze for a couple days to use some hoof action to get better seed to soil contact.

As a final note, remember that when seeding a legume that has not been grown in the pasture for a number of years, it is a good idea to include the proper bacterial inoculum with the seed to insure that the bacteria responsible for fixing nitrogen becomes associated with the plant roots.

Grasses do not generally work as well as legumes to establish through frost seeding, although in some of those pasture fields that have been trampled and beat down, the possibility for success should be greater than in conditions of a thicker sod. Frost seeding trials have indicated that perennial and annual ryegrass is probably the best choice for frost seeding followed by orchardgrass. My preference, given the increased seed prices we have seen in the past couple of years, would be to stay away from frost seeding grass seed and use a no-till drill as the preferred seeding method.

Once the decision has been made to frost seed and the forage species selected, the producer must think about timing and seeding rate. Generally, from mid-February through the end of March is a good time to frost seed. Of course, if there is a good snow cover on a hillside that you desire to frost seed, you may want to wait until the snow has melted or your seed may all end up being carried down the hill. Recommended frost seeding rates by species is included in the following table:

Forage Species	Seedling Rate (lbs/acre)
Red Clover	4 - 8
Ladino/White Clover	2 - 3
Alsike Clover	2 - 4
Birdsfoot Trefoil	4 - 6
Annual Lespedeza	15 - 20
Ryegrass	10 - 15
Orchardgrass	4 - 6

Researchers have played around with frost seeding rates and found that by doubling these rates plants per square foot can be increased in the stand; however, the number of plants established as a percentage of the seeding rate was actually slightly lower than what resulted from these recommended rates. For the average producer, these rates are probably the most economical, but there may be situations that warrant higher seeding rates. For example, where the existing grass sod has not been grazed down or opened up, higher frost seeding rates may be necessary to insure that at least some of the seed makes it down to soil level.

Frost seeding is a low-cost seeding method that can allow the sheep producer to renovate pastures by increasing the legume content of the pasture and moving some improved genetics into the pasture mix. The end result can be a more productive, higher yielding pasture that requires less synthetic nitrogen inputs.