

Title: Frost Seeding - A Cheaper Alternative

Division: Agriculture and Rural

History:

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Introduction

Frost seeding is an economical method of improving pasture and hay fields by broadcasting the seed on frozen ground. As the ground freezes and thaws, it opens and closes allowing the seed to be incorporated into the soil. This keeps the seed from germinating until there is a good moisture supply early in the spring. Legumes are the most successful for this system as they tend to be rounded, dense and most importantly, they -germinate at lower temperatures so will begin growth early in the spring. Grasses have not been as successful as they are lighter coloured, less dense thus they sit on top of the ground and wait for warmer temperatures to begin growth. This often coincides with drier weather as well.

The ideal candidate for frost seeding is a pasture field that is "run out". If you walk across the field and can see bare soil the size of a loonie, then these spots will be good frost seeding sites. A field can be made ready for frost seeding by overgrazing in the fall to weaken the existing plant growth in the spring. This is not necessary but can be helpful in allowing the seeds to make good soil contact.

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Benefits of Adding a Legume

The addition of legumes to a pasture or hayfield benefits the forage in many ways. The legume is higher in protein and energy at all stages of growth than the existing grasses, so the addition improves the quality of the forage. Legumes are also able to "fix nitrogen" from the air. As their roots rot back naturally they "share" this nitrogen with the surrounding grasses. Nutrient requirements of a legume grass stand are much lower than for a pure grass stand because of this "free" nitrogen.

As we work pasture fields harder, using rotational grazing to keep them vegetative, we are finding that legumes such as trefoil are not long lived perennials but rather live 3 - 4 years and reseed easily. If we do not allow them to go to seed, they will thin out of the pasture. It is more economical to frost seed every 3 - 4 years than to set aside a portion of the pasture to allow it to go to seed unless land costs are extremely low. Frost seeding can help to limit the density of legumes such as clovers if they are frost seeded rather than seeded with the original mix. This along with good grazing management will help with bloat control.

Alfalfa will frost seed as well as any other legume, but alfalfa has an autotoxicity which will not allow new alfalfa seed to grow in the presence of a mature alfalfa plant. You will only have one chance to get a successful stand if you are frost seeding into a pure grass stand. For this reason, alfalfa is usually seeded conventionally or no-tilled to produce more consistent results.

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Equipment Considerations

You have the choices of conventional reseeding no-tilling, fertilizing or frost seeding forage fields to improve their production. Your goals for the field and the condition of the stand will determine which is best. In hay fields, we generally want an alfalfa grass stand so conventional reseeding or no-tilling, after killing the original stand, are the most effective. Alfalfa stands can be patched by frost seeding red clover into the stand to get one more production year, but this is usually done in the spring when winterkill reduces hay supplies. Fertilizing, can double or triple the production from an existing stand, but keep in mind that it could also do this with a more productive species that you have introduced. If you have an adequate grass stand in a pasture field, then adding a legume by frost seeding will not only add a high quality plant to the stand but will also help to provide nitrogen to the grasses, improving their growth as well.

Frost seeding requires very little equipment. It is often done using an all terrain vehicle (ATV), snowmobile, tractor and spreader or with a hand-held broadcaster. Many custom operators provide these services. Cost per acre is low. This makes it a very attractive alternative for someone who wants to improve a pasture with very low input costs. It also has the added advantage that the pasture will be useable the summer following as there is no need to remove the livestock completely.

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Frost Seeding Guidelines

Time of Seeding

The ideal time to frost seed is in the very early spring. The ground should freeze and thaw 2 - 3 times after the seed is broadcast. Another good time is December, after all the growth has stopped for the year. This is an excellent time for areas which normally receive good snow cover and do not experience prolonged January thaws when the seeds could germinate. Too many times fields go from snowbanks to mud in the spring so there is no time to frost seed. Do consider December seeding,. A light skiff of snow will help to show where you have seeded. Tractors with a spinner spreader can often be used at this time, making the job faster and a smoother ride.

Species Selection

Bird's foot trefoil is Generally used for frost seeding as it is a non-bloating legume that established relatively well. A seeding rate of 5 kg/ha is adequate. The clovers are more aggressive in establishment but do introduce a bloat concern. If you manage your grasses to keep them young and vegetative, this can be reduced. Seeding rates of 1-2 kg/ha are adequate for clovers as they have many seeds per kilogram. There has been some success with perennial ryegrass and orchardgrass but this should be considered more as a last resort. Legumes are about 50-60% effective in establishment and grasses about 20-30% effective when frost seeded. This really means one year of excellent catches, one year of no

results, and two years somewhere in between. You will need patience and perseverance when frost seeding. The cost is 25-30% of conventional or no-till seeding so you can afford to frost seed 2 - 3 times to get an acceptable stand. If you do not find this wait acceptable, then you should consider other alternatives. Weather in the spring will determine how successful the frost seeding will be.

Fertilizing

Phosphorus does favour new seedling but in a frost seeding situation, where there is so much existing, competition, fertilizing the field will give the advantage to the existing plants. A late summer application of phosphorus and potash would strengthen the root systems of the legumes for the winter.

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Grazing Management

An early summer grazing can help reduce the competition from existing grasses. If a rotational system is being used, limit the time that the livestock have access to the frost seeded area. Often, in continuous -grazing situations, livestock have overgrazed the area and killed the legume. Watch their habits to see if this is the problem and try to alter their behavior. A minimum of four paddocks will help you to control grazing patterns, which will allow rebuilding of root reserves between grazing periods. The legumes can then establish and be more productive.

Frost seeding is a popular method of improving long term pastures or patching hayfields for one more year of production. It is a cheap but high risk option. Many people will frost seed 25% of their acreage each year so that they are spreading their risk over different years. It takes about two years to see the improvements from trefoil applications so these should be made a year before the existing plants die out. This will continuously maintain a good pasture rather than allowing it to lower its production. Frost seeding is one of the most economical and easy improvements that can be made to a pasture.

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