What Species Work Best for Frost Seeding?

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Surface seed broadcasting in late winter, or frost seeding, is a common practice minimizing equipment expense and erosion concern over tillage practices. While less reliable than drill seeding, frost seeding increases plant diversity and yield, and reduces weed pressure. Species for successful frost seeding into pastures need to have certain characteristics (i.e., rapid germination, superior seedling vigor, aggressive tillering, competitive ability) allowing them to compete with existing vegetation while being established.

Successful frost seeding relies on cycles of freeze/thawing in late winter and early spring to improve soil-to-seed contact. Many grasses and legumes can be seeded using this method.

Table 1. Suggested frost seeding rates into an existing grass or legume sod (*UW-Extension*).

Species	Seed Alone	Part of Seed Mixture	Expected Established Plants (Plants/ft^2)
	----------lbs/ac----------		
Legumes			
Red Clover	4-8	3-4	2-5
Birdsfoot Trefoil	4-6	2-3	6-9 (2nd yr)
Alfalfa	5-8	3-4	4-6
Ladino Clover	2-3	1-2	1-2
Alsike Clover	2-4	1-2	2-3
Grasses			
Ryegrass (perennial/Italian)	8-15	2-3	10-12
Orchardgrass	3-4	1-2	4
Tall Fescue	6-8	3-4	3-4
Smooth Bromegrass	Not recommended for frost seeding		
Reed Canarygrass	Not recommended for frost seeding		
Timothy	Not recommended for frost seeding		

What grass species are good candidates to frost seed?

Research results in Arlington and Lancaster, WI, suggest orchardgrass and perennial ryegrass tend to have early spring growth and dense ground cover resulting in good weed suppression. Bromegrass, timothy, and reed canarygrass were shown to have lower occurrence in the seeding year, resulting in more open space for annual grasses to grow. Orchardgrass showed better suppression of quackgrass than reed canarygrass or smooth bromegrass.

Smooth bromegrass, timothy, and reed canarygrass require energy to develop reserve storage structures of rhizomes and lower stem sections (haplocorms), limiting the ability to produce new tillers and above ground dry matter in the seeding year. However, these structures are advantageous for long-term stand development. The study suggests bromegrass and timothy could be frost-seeded at lower rates than orchardgrass or perennial ryegrass due to increased vegetative reproduction capacity, but results will be seen in the second year so they are not recommended for frost seeding.

What legume species are good candidates to frost seed?

Among legumes, red clover and birdsfoot trefoil have been reported by farmers and Wisconsin researchers as good candidates for frost seeding. Grass sod suppression is critical to effective seeding. Mowing or overgrazing can be done in the fall. Early spring seeding is preferred over fall or winter seeding because of seed lost to wildlife consumption. Additional spring grazing or mowing will be needed after seeding but before clover or trefoil emergence.

Alfalfa, white or ladino clover, and alsike clover have been frost-seeded with varying degrees of success. Midwest research testing different cultivars of alfalfa and frost seeding showed less dormant varieties will tend to germinate early and, if followed by low lethal temperatures, the frost-seeded alfalfa seedling could die. On the contrary, the more dormant varieties tend to germinate later in the season, escaping the risk of winterkill. When choosing alfalfa for frost seeding, consider varieties with a good combination of winter survival, dormancy, and pest resistance.