

IMPROVING PASTURE AND HAYFIELDS BY OVERSEEDING LEGUMES

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Broadcast seeding is a method of scattering seed over a wide area, typically using a spreader with a hopper and spinning discs. **Overseeding** is the practice of broadcasting seed onto an area of existing vegetation. When overseeding is performed early in the spring over frozen ground or light snow, it is known as **frost seeding**. Overseeding is an easy and inexpensive way to help rejuvenate almost any pasture or hayfield. Rejuvenating is a technique used to boost and/or extend the productivity of a forage stand when a complete renovation by tillage and reseeding may not be practical or economical.

Benefits of Overseeding

Studies have shown that by adding legumes, significant improvements in a thin or unproductive forage stand can be achieved. Legumes can increase and more evenly distribute seasonal yields as well as increase plant-available nitrogen (N) through fixation and improve overall feed quality. Compared to seeding with a drill, broadcast seeding is much quicker, requiring fewer passes over a field and less fuel and labour costs. Overseeding can also have numerous environmental benefits. When tillage is not used, the risk of soil erosion is minimized. This can be especially useful if the field has steep slopes or a soil type susceptible to erosion. Frost seeding on frozen soil minimizes the chances of rutting up a field and compacting soil, which can benefit fields with high soil moisture during

the growing season. Soil disturbance by tillage has also been shown to negatively affect soil health in various ways, such as degrading soil structure, disrupting biological activity and increasing compaction. Soil organic matter is conserved and can help maintain soil moisture. In contrast to a complete renovation by tillage and reseeding, a field is not taken out of production and can be grazed immediately after overseeding. As an additional benefit, legumes used in overseeding can attract beneficial insects like wild pollinators as their flowers provide an excellent food source.

IMPORTANT TAKEAWAYS

Overseeding is a fast and inexpensive seeding method that can have environmental benefits

Ideal fields are unproductive (thin grass stands, heavily grazed pastures, areas with bare ground) or could be unsuitable for tillage and conventional seeding methods

Red clover, white clover and birdsfoot trefoil are recommended species

Seeding may not always be successful and is highly dependent on weather conditions

Pastures should be grazed after seeding to reduce competition from the existing stand

Risks of Overseeding

Overseeding is not without some risk and may not always be successful. Because the seed is not incorporated, the seed to soil contact is decreased, and as much as 25% of seeds may not germinate. Frost seeding tends to be unsuccessful when an abnormally dry spring occurs. Moisture conditions can change quickly on the surface, and drought will reduce the establishment of seedlings, so establishment is less certain than for conventional seeding. Seeding at the right time and appropriate pre-and post-seeding grazing are key to the success of this method.

Site Preparation

Unproductive fields with thin grass stands, heavily grazed pastures, or many bare patches are the best places for overseeding because there is less competition for the new seedlings. Sites where tillage is impractical or could cause erosion are also good candidates. When broadcast seeding, the stand should be short to maximize seed to soil contact. This can be done by either grazing the pasture very hard or by clipping the forage very short (about 2-3") in the fall (Figure 1). Weeds reduce stand establishment, so lessen their presence by clipping the pasture or applying herbicide at least a year in advance. If using herbicides, please note the label directions since many products cannot be followed



Figure 1: A Nova Scotia pasture in the fall prepared for spring overseeding.

with grazing for several weeks or months after application, and some pesticide residue may reduce seed germination. Apply amendments as necessary to ensure soil fertility and pH are within the recommended range for forage stands. See the "**Maritime Pasture Manual**" for general fertility recommendations depending on your species composition or a recent soil test (within three years). Legumes need phosphorus (P) and potassium (K), but too much N can reduce N fixation and increase the competitiveness of grasses and weeds. By ensuring that there is sufficient P and K, the potential for the seed to develop a strong root system and have vigorous, early growth is increased. Maintaining soil pH levels is also important to ensure that plant nutrients are in an available form and to encourage nitrogen-fixing bacteria. Pastures should be between pH 6.0 – 7.0 to maximize nutrient availability to plants.

Seed Application

Broadcast seeding can be done at various times throughout the year as long as adequate moisture is present. Usually, spring is preferred due to sufficient moisture and because red and white clover seedlings may have poor winter-hardiness. Moisture is vital for germination to occur, but excessive moisture can inhibit germination and increase the risk of soil compaction. Legume seeds are not generally washed away with snowmelt water, although extreme rainfalls may wash away the seed. Note that grass seeds do not perform as well as legumes when broadcast as their smaller size limits how far they can be thrown, and they tend to become caught in existing vegetation, reducing the number of seeds making contact with the soil. Seed can be applied to the field using a hand-operated cyclone seeder, a seeder mounted on an all-terrain vehicle or truck, or with a 3-point hitch fertilizer spreader (Figure 2). Seed mixtures may be more difficult to spread evenly due to differences in weight and size and



Figure 2: Spinner-type spreader used for overseeding pastures and hayfields.

how far the spreading discs throw them. Early seeding can be done in early spring (March - April) when the ground is still frozen and covered by light snow (frost seeding). The goal is to seed before any growth starts, and the soil freezes and thaws, allowing the seed to be naturally worked into the soil. Spring rainfall and snowmelt further helps with germination. Some producers will broadcast the seed on light snow, allowing the operator to watch the uniformity of seed distribution, or the use of a GPS guidance system (such as a lightbar) can help with uniform coverage. Seeding later in the year, from April to June or from August into early September, can also be done, but the results are much less predictable due to a possible lack of soil-to-seed contact and moisture. August seeding has a benefit because September normally provides moisture, and soil temperature is more appropriate for growth than in early spring. However, there is an increased risk of winterkill of the new seedlings. In pastures, seed-to-soil contact can be improved when livestock trample in the seed.

Recommended Legume Species and Seeding Rates

Purchasing certified varieties well adapted to our climate and soils is less expensive in the long run due to increased establishment and reducing the chance of incorporated weed seeds. See varieties listed in the **2018 Forage Guide to Cultivar Selection for Nova Scotia**, or contact your local seed dealer for suitable cultivars. Note that seeding rates may be more than rates used when applying to a conventional seedbed to compensate for the reduced seed to soil contact. There are three main recommended legume species to add to your pasture: **red clover**, **white clover** and **birdsfoot trefoil** (Figure 3). The choice will depend on site characteristics, grazing or harvest management and individual preference (Table 1). White clover requires a shallow seed depth so it can be broadcast onto a closely grazed sod. Birdsfoot trefoil is slow to establish but is long-lived and does well under many soil conditions; it is also bloat-free. Red clover establishes quickly but produces well for only two years.



Table 1: Recommended legume species characteristics (L = Low, M = Medium, H = High) and seeding rates based on Table 6.3 of the Maritime Pasture Manual 1st edition.

Legume	Establishment	Persistence	Tolerance to:					Seeding Rate ^c
			Low pH ^b	Winter Hardiness	Wet	Drought	Heavy Grazing	
Birdsfoot trefoil	L ^a	H	M	M	H	M	H	9 kg / ha (8 lb / ac)
Red clover	H	M	M	H	M	M	L	11 kg / ha (9.8 lb / ac)
White clover	M	H	M	H	L	L	H	5 kg / ha (4.5 lb / ac)

^a First year slow to establish, but steadily increases over time and is reflected in yields

^b pH less than 6

^c Rates are for single legume; rates for mixtures will be lower.

Post Seeding Pastures: Grazing Management

During the establishment year, make sure to graze the pasture to reduce competition from the existing stand, but not so frequently as to create pressure on the new plants. Rotational grazing best meets the needs of the emerging plants. Remove animals once the forage is grazed to 2 to 3" to provide adequate rest and recovery. During the grazing season, take steps to maintain what you have put in. Provide adequate fertility levels to sustain or increase high productivity (but little or no N). Mow or graze pastures when needed to control weeds and reduce grass competition. Avoid overgrazing, and the greatest chance of success comes by keeping the grass in a vegetative stage throughout the season.

Final Considerations

Unproductive pastures and hayfields can benefit from seeding legumes every year or second year. Rejuvenating a pasture by overseeding may be a good fit for certain situations and is an option to consider when looking to extend the productive life of a hayfield or pasture. Weather variability means that broadcast seeding will work better in some years than others, but since this method is relatively inexpensive, it is usually worth the risk. An alternative method for renovating fields is to use a no-till drill to interseed into an existing stand. This achieves better seed to soil contact, and grasses tend to do better when seeded with this method. Please see the "Improving Pasture and Hayfields by No-Till Interseeding" factsheet for information on this seeding method.

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