

Improving Pastures by Overseeding Legumes

Factsheet 2006

Broadcast seeding is an easy and inexpensive way to rejuvenate almost any pasture. Many studies have shown that by adding some improved species, especially legumes, pastures significantly increase in yield and quality. Adding a legume to a pasture increases yield and available nitrogen (N) through fixation, improves feed quality and more evenly distributes the seasonal yield. Seeding at the right time and appropriate grazing pre- and post-seeding are key in the success of this method.

Broadcasting is not without some risk. 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. Also, because the seed is not incorporated, the seed to soil contact is decreased and as much as 25% of seeds may not germinate.

Site Preparation

Choose a suitable site. Thin grass stands, heavily grazed pastures or areas with bare ground are the best places for overseeding because there is less competition for the new seedlings. Sites where tillage can cause erosion are also candidates.

Make establishment easier. 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. Weeds reduce stand establishment, so lessen their presence either by clipping the pasture or applying herbicide at least a year in advance. If using herbicides, please note the directions, since many products cannot be followed with grazing for several weeks or months after application and some residue may reduce germination.

Soil test and apply amendments as necessary. Before applying seed it is best to test the soil and then apply the proper amount of amendments as required (such as lime, compost, manure or fertilizer). 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. A pH of 6.5 allows soil nutrients to be most available, which increases yields. This pH also helps to increase nitrogen output of legumes by increasing bacterial activity to fix N.

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 amounts are also counter-effective (through soil compaction and reduced germination). Seed can be applied to the pasture using a hand-operated cyclone seeder, a seeder mounted on an all-terrain vehicle or truck, or with a 3-point hitch fertilizer spreader.

Early seeding can be done in early spring (March-April) when the ground is still frozen (also called frost seeding). The goal is to seed before any growth starts and the soil freezes and thaws, allowing the seed to be worked into the soil. The high rainfall and snow melt further helps with germination. Legume seeds tend not to be washed away with snow melt water, though grass seeds may be. Many broadcast the seed on light snow, allowing the operator to watch the uniformity of seed distribution.

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 moisture. August seeding has a benefit because September moisture is not far off and soil temperature is more appropriate for growth than in early spring. Seed to soil contact can be improved when livestock trample in the seed. A better alternative at these times is to use a drill seeder, such as a **no-till seeder**, (grasses tend to do much better with this method). The Soil & Crop Improvement Association of Nova Scotia (SCIANS) has a Tye™ no-till seeder available for rent and price is determined by the acre. For rental information, please contact: Rob Michitsch at (902) 896-7092.

Legume Selection

Use **high-quality seed**. 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. Seed only varieties listed in the [Forage Guide to Variety and Mixture Selection](http://www.agrapoint.ca/publications/FORAGE_GUIDE_2006.pdf) (http://www.agrapoint.ca/publications/FORAGE_GUIDE_2006.pdf) because these varieties are locally adapted and high yielding.

Seeding rates should be equal to or more than rates used when applying to a conventional seedbed to compensate for the reduced seed to soil contact. This is still less expensive than the cost to seed by conventional tillage practices. Only a few grasses are recommended

for broadcast seeding (including timothy, meadow fescue, orchardgrass and perennial ryegrass), but even these are uncertain. Grass seed is lighter so does not easily settle on the soil and the risk of washout is increased.

There are three main choices of legume to add to your pasture: red clover, white clover and birdsfoot trefoil. Choice will depend on site characteristics, grazing management and individual preference.

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 2 years

Legume	Establishment	Persistence	Tolerance to:				Tolerance to heavy grazing	Seeding rate ^c
			Low pH ^b	Winter	Wet	Drought		
Birdsfoot trefoil	L ^a	M	H	H	H	M	H	10 kg ha ⁻¹ (8 lb ac ⁻¹)
Red clover	H	L	M	H	L	M	M	10 kg ha ⁻¹ (8 lb ac ⁻¹)
White clover	M	H	M	H	L	L	H	4 kg ha ⁻¹ (3.5 lb ac ⁻¹)

^aFirst year slow to establish, but steadily increases over time and is reflected in yields; ^bpH less than 6

^cRates are for single legume; rates for mixtures will be lower. Rates are based on traditional seeding methods; they may need to be increased for broadcast seeding.

Post Seeding: Grazing Management

During the establishment year, make sure to graze the pasture for the seedlings. Graze frequently enough 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 5 cm 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).

Mowing or grazing pastures when needed to control weeds and reduce grass competition.

Avoiding overgrazing. Leave a minimum of 5 to 8 cm of growth at all times. The greatest chance of success comes with rotational grazing by keeping the grass in a vegetative stage throughout the season.

Pastures benefit from seeding legumes on a regular basis, so apply seed yearly or every other year to fill in thin areas. Also, weather variability means that broadcast seeding will work better in some years than others. The gain in livestock and stocking density should pay for this regular practice.

For more information, contact the Nova Scotia Pasture Improvement Initiative (NSPII) at (902) 896-0277.

The Nova Scotia Pasture Improvement Initiative (NSPII) is funded by Agriculture and Agri-Food Canada's Greencover Canada Program, an initiative under the federal-provincial-territorial Agricultural Policy Framework. It is delivered by the Soil & Crop Improvement Association of Nova Scotia and is partnered with:

