

Legumes for Your Pasture

Pastures in Nova Scotia are often at least 70% grass. Since grasses require large amounts of nitrogen to be productive, pastures also generally have a high nitrogen demand.

The nitrogen cycle is dynamic and there are many ways nitrogen can be lost from the soil. With the high demand and the many pathways for loss, nitrogen deficiency often limits the productivity of grass pastures.

Get legumes working for you!



Legumes have a unique characteristic. Unlike grasses, they are able to transform nitrogen from the atmosphere into a form that can be used by plants. This process, called nitrogen fixation, is completed by bacteria that form a symbiotic relationship with legumes. The bacteria form nodules at the roots of legumes where nitrogen fixation occurs.

Legumes increase the amount of nitrogen available in the soil.

The nitrogen fixed by legumes is available to the host legume as well as nearby grasses. Nitrogen becomes available to the grasses as the nodules and legume residues decompose.

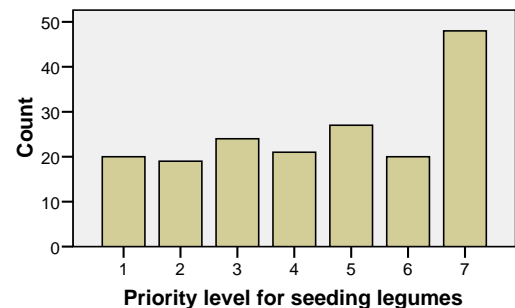
Due to the nitrogen supplying capacity of legumes, the legume content of a pasture determines how much fertilizer nitrogen is required. With significant legume content in a pasture, additional nitrogen fertilizer is not needed. In fact, adding fertilizer would suppress nitrogen fixation and reduce the benefit of the legumes!

Since legume content influences how much nitrogen is required, it is important to estimate the legume content of your pasture, although this can be difficult. Legume content is often overestimated, especially when it comes to white clover content. Establishing 30% legume content is ideal, however it is often difficult to maintain even 20% legume content due to factors such as nutrient deficiency, competition from weeds/grass, and winterkill.

Despite the benefits of legumes, a recent survey indicated that producers are not that likely to seed legumes to improve the nutrient status of their pastures. It also indicated that seeding legumes was generally given the lowest priority.

To improve the nutrient status of your pastures, how likely would you be to seed a legume?

25% not likely
42% somewhat likely
33% very likely



This means that many are missing out on the benefits of legumes in their pastures. It is time to get legumes working for you!

Local seeding success

In 2007, several legume seeding demonstrations were established on farms in Nova Scotia to compare frost seeding and no-till seeding methods to establish red clover (RC) in a pasture. For both methods, RC was seeded at a rate of 10 kg/ha. The frost seeding was done in late March and the no-till seeding was done in early June.

At one farm in particular, both frost seeding and no-till seeding successfully increased the RC content in the pasture relative to a control where RC was not seeded (Table 1).

Table 1: Average red clover content

Site	Control	Frost seeded	No-till seeded
1	2%	38%	45%
2	0.2%	17%	35%

The % RC content was higher at Site 1 because there were more bare soil areas at the time of seeding, which helped with establishment.



Although no-till seeding increased the RC content more than frost seeding, when a no-till seeder is not available, frost seeding appears to be an effective alternative.

The producer who participated in this seeding demonstration was very pleased with the results and plans to try frost seeding again next spring.

It is important to note that RC establishment at this farm was high and should not be considered typical. Establishment will vary between fields and years. Adequate rainfall, bare soil areas, and grass cover that was not very dense all helped RC establishment at the site.

In comparison, at a second farm the amount of RC established was much lower. Natural RC content at the farm was 2-6%. Where RC had been no-till seeded, the content was about 11%. Frost seeding did not greatly increase the amount of RC.

In addition to supplying more available nitrogen, legumes increase pasture yield. Seeding RC increased the yield at both Sites 1 and 2. Legumes in the pasture also increase feed quality by increasing digestibility and crude protein content.

Seeding legumes makes dollars and sense

Legumes are an economical source of nitrogen for a pasture. Establishing and maintaining legume content reduces the need for expensive nitrogen fertilizer. However, until the legumes start fixing nitrogen, a light application of fertilizer N in the spring may still be beneficial.

Nitrogen source	Cost (\$/ha)
34-0-0 fertilizer	174.00*
Red clover	70.00 [§]
White clover	70.00 [§]
Birdsfoot trefoil	96.00 [§]

*150 kg N/ ha application rate

[§]10 kg/ha seeding rate of a certified seed variety

Note that these costs apply to one year only. Fertilizer application is a yearly expense, and it will take more than one year of seeding to successfully establish and maintain legumes in the pasture.

Nutrients for Legumes

The root systems of legumes make them less efficient at extracting soil nutrients than grasses; therefore, legumes require more soil phosphorous, potassium, sulphur, boron, and molybdenum than grasses. Ensuring these nutrients are supplied by the soil is important for establishing and maintaining legume content. For optimal legume productivity, soil pH should be maintained between 6.0-6.5.

Additional Information

Check out “Improving Pastures by Overseeding Legumes”, available at www.scians.org, and the forage crop factsheets available on AgraPoint’s extension website, www.extensioncentral.com.

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For more information, please visit <http://www.scians.org>