



IMPROVING PASTURE AND HAYFIELDS BY NO-TILL INTERSEEDING

Original fact sheet and content by Bill Thomas, Perennia, Revised by the Agri-Environmental Program - 2021

No-till (also known as zero-till or direct seeding) is a seeding method where the planter seeds directly into a layer of uncultivated soil or vegetation. Interseeding is the introduction of a legume or grass into an existing forage stand by no-till seeding. Productivity of low-yielding forage stands can be improved through interseeding. Interseeding a legume into a grass stand can increase yields, improve forage quality and reduce the need for nitrogen fertilizer, while the introduction of a productive grass into a thin unproductive grass stand can also improve yields. When seeded with this method, yields are typically similar to conventionally seeded stands.

Environmental Benefits

No-till seeding is a best management practice that minimizes soil disturbance and can have numerous environmental benefits. One of the greatest benefits is a reduced erosion risk and limited soil loss by wind and water. By not disturbing the surface, soil moisture already present is conserved, and infiltration from additional rainfall is improved. Soil moisture is critical to seedling establishment, especially to small grass seedlings. Tillage practices can induce a layer of compacted soil known as a hardpan, and eliminating tillage can reduce soil

compaction. Since no-till seeding can be accomplished in a single pass over the field, there are reduced fuel and labour inputs required. Fields managed under no-till over the long term tend to have healthier soils with increased organic matter, higher biological activity and improved soil structure.

Important Takeaways

- No-till interseeding is a good method for rejuvenating pastures or hayfields, and yields are typically similar to conventional seeding.
- Environmental benefits include lower energy inputs, reduced erosion risk, soil moisture conservation and increased biological activity and organic matter.
- Recommended species are alfalfa, meadow fescue, orchardgrass, red or white clover and timothy.
- Ensure proper setup and calibration of the seeder so correct seeding rates and depths can be achieved.
- To be successful, competition from existing stands must be reduced by grazing, mowing or herbicide.

Site Preparation

No-till seeding works best on well-drained silty loam soils. Less favourable results are often seen on poorly drained clay soils. A representative soil sample should be taken to determine soil pH and soil nutrient levels. Sites low in pH, potassium and phosphorous are usually not successful. Soil pH should be in the range of 6.0 to 6.5, and potassium and phosphorous levels, as reported on the NS provincial soil test report, should be M+ or higher to help ensure ample nutrients for seedling establishment. Some no-till drills allow for the application of dry fertilizers at the time of seeding. This can help to place the fertilizer in the soil where it is needed by the seedling roots and is better than broadcasting on an untilled pasture where it may be more easily lost to erosion or atmospheric losses. Verify maximum rates are not exceeded, and the drill is properly set up and calibrated to ensure seedings are not burned by excess or improper placement of fertilizers in the seed trench.



Figure 1: Tye no-till drill suitable for no-till interseeding pastures and hayfields

See the “Maritime Pasture Manual” for general fertility recommendations depending on your species composition or a recent soil test (within three years). Sites that are susceptible to soil erosion are good candidates for no-till seeding. In practice, the results of interseeding are somewhat inconsistent and seem to work best when the stand is more open, and there is not a heavy sod. Livestock grazing or mowing before seeding can help open the stand. Herbicides may be necessary to reduce competition

from weeds or suppress existing vegetation. If a herbicide is used, be sure to follow label directions and restrictions for grazing following applications.

Timing and Post-Seeding Management

Interseeding is best done in early spring, just as growth begins. The growth of the existing stand must be controlled by clipping or grazing. Excessive top growth (more than 8-10 cm high) will shade-out the new seedlings. Excessive top growth is the most common reason why new seedlings fail to establish. A late summer seeding done in mid-August in a more open stand may also be successful. Pastures should be grazed closely before seeding to reduce competition from the existing stand.

Seeding Rates and Mixtures

It is important to match the interseeded species to the site conditions and existing vegetation. If the grass component of the stand is good, interseeding with a legume should increase yield, improve forage quality and reduce the need for nitrogen fertilizer. Red clover is the most shade tolerant and easiest to establish, particularly when sown into tall-growing grasses such as orchardgrass, brome grass and timothy. Alfalfa should germinate well when drilled, but the seedling will be shaded-out if the top growth is allowed to grow too high for too long. Alfalfa should not be planted into existing alfalfa stands due to its tendency to produce autotoxic compounds that inhibit germination and growth of the new alfalfa seedlings. White clover works well, but again, grass growth needs to be controlled if the clover is going to have a chance at getting established. When the grass stand is thin, a legume/grass mix is best. Orchardgrass, meadow fescue, tall fescue, perennial ryegrass and timothy are best suited for no-till seeding. Brome grass, reed canary grass and Kentucky bluegrass are less suitable. 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. See Table 1 for recommended mixtures 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 your local seed dealer for suitable cultivars.

Table 1: Recommended mixtures and seeding rates (See Maritime Pasture Manual for individual species characteristics).

Mixture	Mixture tolerance to:			Forage Species	Seeding Rate
	Drought	Low pH	Poor Drainage		
A	Low / Medium	Medium	Medium	Red Clover	6 kg/ha (5.3 lbs/ac)
				Timothy	8 kg/ha (7.1 lbs/ac)
B	Medium	Low/ Medium	High	Alfalfa	8 kg/ha (7.1 lbs/ac)
				Timothy	6 kg/ha (5.3 lbs/ac)
C	High	Low	High	Alfalfa	8 kg/ha (7.1 lbs/ac)
				Orchardgrass	7 kg/ha (6.2 lbs/ac)
D	Low	Medium / High	Low	Meadow fescue	12 kg/ha (10.7 lbs/ac)
				Timothy	5 kg/ha (4.5 lbs/ac)
				White clover	3 kg/ha (2.7 lbs/ac)

No-till Drills

No-till drills work by making a small slit in the soil with an opener and/or coulter discs, dropping the seed into the slit and pressing it in place, then closing the slit over the seed with a closing wheel. No-till drills are significantly heavier than conventional drills and have modified components that allow them to seed directly into tougher conditions such as existing sod or un-tilled soils. The ground engaging components, especially the openers and coulters, are more robust to allow them to cut through hard soil and sod. The additional weight helps keep the openers



Figure 2: Fluted coulter disc found on a no-till drill to help cut through sod and hard soil ahead of the openers.

pressed into the ground in tough conditions, although extra weight may sometimes need to be added if the soil is exceptionally hard. Compared to broadcast seeding, no-till results in better seed to soil contact and more uniform establishment, however it requires more time to complete. Some no-till drills will have separate seedboxes and metering systems for large seeds or small seeds. Seeding depth is critical when seeding into an existing sod. The recommended seeding depth for alfalfa, clovers and grasses is ¼" to ½" (6-12 mm) deep. Seed should never be sown deeper than ¾" (20 mm). Calibrate the drill before you start to ensure a proper seeding rate. Follow the operator's manual for your drill to confirm proper setup and calibration. Perennia has a Tye no-till seed drill (Figure 1) available for producers to rent.

Field Management During the Season

Under favourable weather conditions, the new seedlings should be up and growing in 10 to 14 days. They require ample light to grow and steps should be taken to ensure the existing stand does not shade out the new seedlings. The primary means of providing ample light is by reducing competition in established stands by grazing or by taking an early cut. Do not graze or clip too short (below 2" or 5 cm), as this will reduce the viability of the seedlings. To increase the chances of successful establishment, new seedlings should be allowed to grow to 3 to 5" (8 - 10 cm) before being clipped or grazed.

For more information or to book the Tye no-till drill, please contact Shane Wood, Forage Specialist at Perennia shanewood@perennia.ca