

## Birdsfoot Trefoil As a Grazing or Hay Crop

**Sid Bosworth**, Extension Associate Professor, Department of Plant and Soil Science, University of Vermont [sid.bosworth@uvm.edu](mailto:sid.bosworth@uvm.edu)

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Birdsfoot trefoil is a long-lived perennial legume that can provide excellent nutritional value to pasture and additional summer production when grasses often go into a growth slump. Trefoil's branched, relatively shallow taproot makes it less drought tolerant than alfalfa, but it is tolerant of poorly drained and somewhat acid soils. This factor combined with high forage quality, zero bloat potential, excellent grazing tolerance, natural reseeding capability, and the potential for a long stand life, make it an ideal pasture legume. In addition, birdsfoot trefoil can also be used as a legume companion crop with grasses either for pasture or hay. Regardless of use, it is important to consider variety selection, establishment, fertility needs, grazing management and, of course, costs.



Birdsfoot trefoil varieties can be categorized into three general types: 1) prostrate or low-growing types such as Empire, Leo, or Dawn, 2) erect or hay types such as Viking or Maitland, and 3) semi-erect such as Norcen. Generally, the prostrate or semi-erect types have been recommended for grazing because of their low profile and tolerance to prolonged grazing. However, the erect and semi-erect varieties can tolerate rotational grazing and would be best suited for mixed hay/grazing situation. Seedling vigor is a major consideration when selecting trefoil varieties since trefoil is generally slow to establish.

It is best to purchase certified seed to ensure that you are buying improved varieties. "Common" or non-certified seed may have unpredictable performance. Some varieties such as 'Leo', 'Maitland' or 'Norcen' have been selected for better seedling vigor as compared to older varieties like Empire and Viking. A newer variety, 'Pardee', released by Cornell in 1999, has a higher resistance to Fusarium wilt, a disease that caused a significant decline of trefoil in the Champlain Valley during the 1960's. It is an upright, hay-type variety that matures earlier than other varieties. It has also yielded better in New York variety trials.

Trefoil may be seeded as a pure stand or in a mixture with a grass. Since trefoil seedlings are slow to establish, it is important to select a companion grass that will not dominate the trefoil. Kentucky bluegrass, timothy, and reed canarygrass are good companion grasses because their seedling growth is slower than orchardgrass, smooth brome grass or tall fescue. In pure stand, seed trefoil at a rate of 8 - 10 lbs. per acre. In

a mix, plant trefoil at 6 lbs. per acre with one of the following, Ky. bluegrass at 4 lbs., Timothy at 3.5 lbs, or reed canarygrass at 6 lbs. per acre. You could also plant a three-way mix of trefoil with Ky bluegrass and Timothy. Yes, you could have a mixture of trefoil and orchardgrass, but there is a higher risk of losing the trefoil and, for the high cost of seed, it may not be worth it. Be sure and adjust the seeding rate to account for percent pure live seed (PLS).  $\%PLS = \%germination \times \%purity$ . Both of these figures are found on the seed tag.

The best time to take care of fertility needs is before planting. Apply lime and fertilizer according to soil test recommendations. Trefoil tolerates acid soils but benefits from liming the soil to a pH of 6.0. If possible, apply lime 6 to 12 months before seeding and work it in the soil. Phosphorus and potassium need to be applied according to soil test if trefoil is going to be productive and compete with grasses and weeds. Since trefoil is a legume, it can fix atmospheric nitrogen and, therefore, does not require any additional nitrogen fertilizer. However, trefoil does need a specific strain of Rhizobium inoculum and you should request this when ordering seed. You can often times buy preinoculated seed but make sure it has been recently inoculated and stored in a cool, dark area.

There are three things to keep in mind about planting trefoil. It is expensive seed. It is slow to germinate. Seedling growth is slow. Therefore, everything must be done to give the best opportunity for germination and growth. Plant in the spring as early as possible, no deeper than 1/4 inch, in a well-prepared, firm seedbed. If the seedbed is fluffy, run over it with a cultipacker before planting. If the seed is broadcast planted, be sure and go over the area with the cultipacker after planting as well. This provides good soil-to-seed contact which is important to assure adequate moisture for germination.

To minimize competition in the seeding year, graze or cut trefoil stands whenever companion crops reach a height of 8 to 10 inches. "Going easy on the stand" by not harvesting in the seeding year can actually reduce trefoil in the stand due to competition. Do not graze or clip after mid-August in the seeding year in order to prepare it for overwintering.

In an established stand, grazing of pure trefoil can be delayed until first flowers form. Grazing earlier than this can actually reduce regrowth potential. With a mixed stand, it may be important to begin grazing earlier to maximize forage quality and control competition of the grass. Avoid grazing erect and semi-erect varieties of trefoil below 3 inches because regrowth only comes from buds on the stems. Low-growing, prostrate varieties can be grazed to a shorter height of 2 inches. A fall rest period is important to assure trefoil's ability to overwinter.

To maintain a long-lived stand, allow trefoil to flower and set seed at least once during the growing season. This could be achieved by extending the rest period during the summer until seed pods develop and mature.

## **Stockpiling for Summer Forage**

Past research has shown that birdsfoot trefoil can serve as an excellent spring stockpiled forage. In other words, trefoil can be allowed to accumulate growth in the spring and delayed for grazing until summer. Why? Trefoil is classified as an indeterminately flowering plant. If you observe a trefoil plant in early summer, you will notice that it may have ripe and green seed pods (the pods radiate away from the flower stalk like the toes on a bird's foot; hence the name), flowers and flower buds all at the same time. Unlike other legumes like red clover or alfalfa in which the majority of flowers are formed at once (called a determinant plant), trefoil flowers are formed more gradually. The consequences of this flowering characteristic are twofold: 1) the quality of the forage declines more gradually for trefoil as compared to other legumes, and 2) natural reseeding that helps thicken and maintain stands can be accomplished without compromising too much on forage quality.



For beef operations that do not hay, trefoil could be one way to reduce some of the excessive spring growth found with our grass pastures. The figure below illustrates my point. Let's say your farm has 100 acres of pasture. The figure below shows how the distribution of forage may occur throughout the year. If this farm could incorporate trefoil (40% of the pasture in this example) and spring stockpile it so it will not be grazed until mid-June, then the potential distribution for the year is improved. These patterns will vary depending on soil type, moisture and air temperature and the proportion of grass to trefoil can certainly vary depending on several factors.

Of course there are some drawbacks to this system that you have to consider. First, this system works best if the stand is pure trefoil. If there is much grass mixed with the stand, it will head out and reduce the quality of the stockpiled trefoil. To maintain pure trefoil requires a very clean seedbed at establishment and proper fertility and grazing management that encourages the trefoil for maintenance. This is achievable but challenging. A clean seedbed is best achieved by a combination of glyphosate (Roundup) applied in the fall to kill perennial vegetation followed by primary and secondary tillage that produces a good firm seedbed in the spring. Trefoil seedling vigor is lower than other legumes and should be seeded as early as possible. A companion crop like oats can be included (at less than 1.5 bu/acre) if soil erosion is of concern.

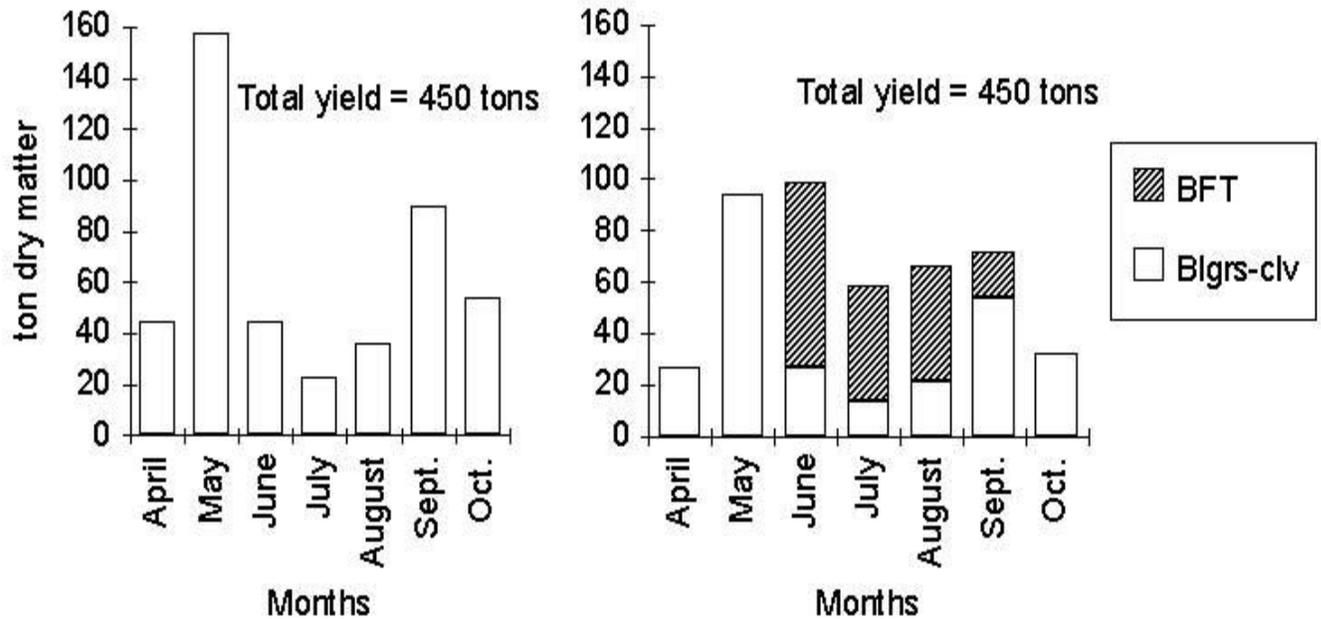


Figure 1. The monthly yield and distribution of a 100 acre pasture in which the total pasture system is bluegrass-clover (on left) or 60% is bluegrass-clover and 40% birdsfoot trefoil (on right). Assumption is that both can yield 4.5 tons per acre with good grazing management.

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