Bulletin #2246

Maine Forage Facts: **Birdsfoot trefoil**

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Birdsfoot trefoil (*Lotus corniculatus* L.) is a low-growing perennial legume with stems 1 to 2 feet long. Each leaf has five linear lanceolate and smooth leaflets. Flowers are colored bright yellow and are composed of 4 to 8 florets per peduncle. They are borne at the top of the plant and are very attractive to pollinators. Seed pods are dark brown and resemble a "bird's foot," each containing 10 to 15 seeds. There are two types of trefoils: a) "decumbant," or low growing, best used in pastures, and b) erect or upright, best suited for hay or silage production.

Site selection

Birdsfoot trefoil will tolerate soil pH between 3.5 and 9, low soil fertility, and poor soil drainage. However, better-drained, highly fertile soils will produce a much higher yield. Under good management and fertility, it can be extremely long-lived and can survive in some pastures for 50 years or more. Moreover, birdsfoot trefoil is very sensitive to drought and has low persistence in well-drained soils.

Soil preparation and establishment

Birdsfoot trefoil requires careful management for successful establishment due to the small seed size and poor seedling vigor. A smooth, firm seedbed will facilitate accurate seed depth placement, with no more than ¼ inch depth. Cultipacking or rolling improves seed-to-soil contact and enhances establishment.

Birdsfoot trefoil may produce 410,000 to 460,000 seeds per pound, which requires a low seeding rate to thrive: 5 to 6 pounds of seed per acre when planted alone, or 5 pounds per acre when seeded in a mixture. It should be seeded in early spring (May) or fall (September). For seedlings delayed to late May or early June, chemicals should be used for weed control. Fall seeding has the advantage of less competition from weeds, but seedling failure is possible due to inadequate moisture and increased insect numbers. Birdsfoot trefoil should be seeded at least 6 weeks before a hard freeze, to allow enough root growth.

Before seeding, birdsfoot trefoil seed should be inoculated with *Rhizobium lupini* bacteria. This

Birdsfoot trefoil mixed with white clover. Trefoil flowers are very attractive to bees and other pollinators.

Photo: UMaine Extension

will ensure sufficient nodulation of the root system and adequate atmospheric N fixation. Certified seed usually is covered with the appropriate inoculant, and it can be also found in organic markets.

Liming and fertilization

Although birdsfoot trefoil adapts to acid soils, liming is recommended on soils with a pH less than 5.5, especially if mixed with grasses. Birdsfood trefoil can grow above 5.5 soil pH, but this condition will benefit grass growth, so it is recommended to plant the legume with soil pH above 6. Fertilization and lime recommendations must be made considering a soil test.

Phosphorus (P) and potassium (K) are very important for a successful establishment. On soils that test low in P, use at least 85 pounds of phosphate (P_2O_5) per acre. Placing it in a band beneath the seed is especially effective. Potash (K_2O) is the best-applied broadcast, with 50 to 70 kg K_2O per acre in soils with low K concentration. Nitrogen application can be harmful to the establishment: it decreases the biological fixation capacity and stimulates competitive grasses and weeds more than trefoil.

Trefoil establishment in soils with a pH less than 5.5 may result in molybdenum (Mo) deficiencies. Molybdenum is an essential nutrient for N fixation. When needed, Mo can be applied as a seed coating. This should provide sufficient Mo levels for the life of the trefoil stand.

Varieties

Bull: This is a semierect, winter-hardy, high-yielding variety with good regrowth after cutting. It is leafy and multi-branched with good seedling vigor and will persist well under either hay or grazing management.

Dawn: This semierect, winter-hardy, late-maturing variety with leafy, multi-branched stems was developed by the U.S. Department of Agriculture and the University of Missouri. It has excellent yield, recovery after cutting, and spring growth.

Empire: This semierect, winter-hardy, late-maturing variety with leafy, multi-branched stems was developed at the New York (Cornell) Agricultural Experiment Station. It is exceptionally long-lived and productive in pastures and may persist under controlled continuous grazing after a good establishment.

Norcen: This late-maturing, winter-hardy variety with an intermediate growth habit. Norcen has better seedling vigor than Empire but less winter hardiness. It ranks high in crude protein and is like other varieties in digestible dry matter.

Productivity

Birdsfoot trefoil yield is considerably less than alfalfa but may equal that of red clover if fertility is high. It is a desirable legume in pastures, especially those that are difficult to seed, because of its long life span and because it does not cause bloat in grazing livestock. Use the decumbant or low-growing type (Empire, for example) for pastures and the erect or upright type (Dawn or Norcen) for hayfields. Yield may reach 4 to 6 tons of hay per acre on drained soils with plenty of moisture (at least 20 inches per year).

Getting trefoil established in a pasture or hayfield can be difficult. It does not compete well with weeds as a seedling (one to four months after seeding). It performs poorly if weeds shade it during this stage. Clear seeding (without small grains) has the greatest chance of success. Trefoil

Birdsfoot trefoil flower. Note the seven florets that compose the same flower.

Photo: Pverdonk, Flickr

should not be cut below 4 to 6 inches, taking the first cutting when the pasture is 30% bloomed. The second cutting may be done in mid to late August.

Birdfoot trefoil responds well to fall stockpiling, holding maturity and quality after a frost. Stockpiling helps increase root reserves at the end of the season.

Grazing Management

A rotational grazing system is useful in managing harvest height. Birdsfoot trefoil is not recommended for continuous grazing. Regrowth originates from buds formed at leaf axils, so avoid intensive stem grazing. Plants should be 8 inches high to graze and provide 28 to 40 days of a rest period. Leave at least 5 inches stubble height. A resting period of 60 days every three years will help to maintain the stand. Grazing management must be very careful during the first year of establishment, especially avoiding overgrazing.

From a nutritional perspective, grazing birdsfoot trefoil supports cattle gains of up to 3.5 pounds per day and may increase 2 pounds of milk per cow per day while improving plant protein use by livestock.

Birdsfoot trefoil is a unique legume that does not cause bloat in ruminants. Several studies have reported 0 incidences of bloat in cows grazing pastures with 100% birdsfoot trefoil. This is probably by the presence of tannins as secondary metabolites in the plant. These molecules impact proteins and could mitigate the foaming that typically causes gas accumulation in the rumen.

References

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