



# BIRDSFOOT TREFOIL

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Birdsfoot trefoil is a perennial legume that is well adapted to the north-central states. Trefoil's high forage quality, excellent grazing tolerance, natural reseeding capability, good stand longevity, and non-bloating characteristics make it a useful pasture legume (Undersander et al. 1993). Birdsfoot trefoil, while difficult to get established, can be maintained as a legume in a grass mixture over a long period of time. Livestock will selectively graze trefoil over grass, but it is less likely than alfalfa to be grubbed out by livestock (Moyer). Kansas is considered outside trefoil's optimum growth region (Posler).

Trefoil withstands grazing pressure better than any other legume except white clover and lespedeza. However, trefoil appears to be more sensitive to fall grazing than alfalfa because it stores fewer carbohydrates for the winter (Undersander et al. 1993). Daily gains for cattle can be up to 30% higher when introducing trefoil into straight grass stands. More suited to continuous grazing than alfalfa, trefoil's prostrate growth habit reduces its risk of total defoliation when grazed. Trefoil's prostrate growth makes it better suited to store energy and root reserves with persistent grazing (Motsinger).

Protein in trefoil is similar to alfalfa. Approaching maturity, trefoil's protein degrades more slowly than alfalfa's. Trefoil is finer stemmed than alfalfa so sheep are able to utilize it more fully. Trefoil has a taproot of 3-5 feet. This relatively shallow root makes it less drought tolerant than alfalfa (Schmid and Klay, 1984).

## Soil Requirements

Birdsfoot trefoil has a tolerance to low fertility conditions and poorly drained soils ("Cover Crops Management for No-till Grain Production," 1986). Trefoil has considerable more tolerance to wet soils than alfalfa (Moyer). Trefoil tolerates acid soils better than red clover or alfalfa, but benefits from liming a soil to at least 6.0 (Undersander et al. 1993). Trefoil performs poorly with a soil pH below 5.5 (Motsinger).

## Variety Selection

Prostrate varieties include Dawn, Empire, Fergus, Leo and AU-Dewey. Erect varieties include Georgia-1, Maitland, and Viking. Semi-erect varieties include Mackinaw and Norcen. All varieties are suited for grazing with the prostrate varieties particularly suited for continuous grazing (Undersander et al. 1993). Norcen preformed well in trials in the northcentral region both in dry matter and crude protein (Carlson et al. 1983).

## Establishment

Trefoil has low seedling emergence and competes poorly with other plants ("Cover Crops Management for No-till Grain Crop Production," 1986). It requires a specific strain of Rhizobium bacteria to fix nitrogen. In spring, trefoil can be planted when soil temperatures reach 50 degrees F at a 4-inch depth. Seed 8 pounds per acre into a conventionally tilled seedbed using a drill or broadcast seeder. Planting depth should be  $\frac{1}{4}$ - $\frac{1}{2}$  inches. Trefoil and trefoil/grass mixtures may be seeded with oats as a companion crop. Select a short oat variety, and seed oats at 1 to 1.5 bushels per acre. Remove the oats by grazing or harvesting by the boot stage. Monitor the stand for late-season weed growth and clip if necessary (Undersander et al. 1993).

Birdsfoot trefoil may be planted with a companion grass. The grass will help fill vacant areas in the stand and utilize the nitrogen fixed by the trefoil. Kentucky bluegrass and timothy are better companion grasses due to their slower growth rate than more aggressive grasses such as orchardgrass, smooth bromegrass, and tall fescue. When planting a trefoil and a single grass mixture, mix two pounds of Kentucky bluegrass, two pounds of orchardgrass, 5 pounds smooth bromegrass, 4 pounds of tall fescue, or 3.5 pounds timothy with 6 pounds of birdsfoot trefoil for each acre of pasture. Do not graze or mow after mid-August the seedling year to allow the new stand time to build up its energy reserves for winter (Undersander et al. 1993).

Another establishment method is overseeding trefoil into an existing pasture. In spring, flashgraze the pasture close to the ground to remove competition. No-till plant 8-10 pounds per acre of trefoil. Graze again until the trefoil forms its first true leaves. Remove livestock for at least 5-6 weeks. Mow or graze again lightly later in the growing season to reduce competition ("The Wood Farm in Wisconsin," 1990).

To establish a trefoil/brome mixture, plant the trefoil in the spring. In September or October broadcast the brome seed. Any light fall tillage will kill the trefoil (Moyer).

Trefoil's slow establishment presents more winter kill problems with fall seedings. If fall seeding is chosen, mix 5-6 pounds of trefoil with 6-8 pounds per acre of brome on a per acre basis. Fall establishment reduces weed competition but rainfall is usually not as favorable compared to a spring planting (Kilgore).

Weed control is important for the first 60 to 90 days to nurture seedling establishment of trefoil (Motsinger). An excellent publication on birdsfoot trefoil that includes herbicide options for weed control and no-till establishment is Northcentral Regional Extension Publication 474.

## Nitrogen Credits

Birdsfoot trefoil in grass provides nitrogen credits equal to 80 pounds per acre ("Performance of Grass-Legume Mixtures in Eastern Kansas," 1986). A three-year total fertilizer nitrogen equivalence naturally fixed by trefoil for succeeding corn crops was estimated to be 131 pounds per acre. Available nitrogen for succeeding corn crops for each year averaged 55% for the first, 30% for the second, and 15% for the third year (Fox and Piekielek, 1988).

## Yield

Trefoil annually produced 1.5-5 tons per acre of dry matter ("Performance of Grass-Legume Mixtures in Eastern Kansas," 1986). A Kansas State University research plot in Harvey County testing the Dawn variety averaged 2.5 tons per acre (Harvey County Experiment Station research). Almost two-thirds of trefoil's growth occurs from June through August. Trefoil/grass pastures averaged 101 animal unit grazing days compared to 109 for alfalfa/grass pastures (Motsinger).

## Reseeding

Birdsfoot trefoil has an aggressive reseeding capacity. Allow trefoil to flower and set seed sometime during the growing season. This will permit natural reseeding (Undersander et al. 1993). Five plants per square foot is considered an adequate distribution (Motsinger). Allow sheep to graze when half of seed pods have split open. The sheep will eat the seeds and then redistribute seeds with manure ("The Wood Farm in Wisconsin," 1990).

## Grazing Management

Birdsfoot trefoil regrows from axillary buds on the stems. It will regrow significantly better from a 3-inch stubble than a 1.5-inch stubble. Proper rotational grazing management with adequate rest periods will help trefoil regrow more quickly, reseed, and store energy reserves over winter for a long stand life (Undersander et al. 1993).

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## CREDITS

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