History of *Lotus corniculatus* L. in Indiana

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Introduction

Broadleaved birdsfoot trefoil, *Lotus corniculatus* L., is a warm-season forage legume which is native to Europe. The introduction of this legume into the United States is unknown. It is generally assumed that birdsfoot trefoil was introduced as a contaminant of other seed or from the emptying of ships' ballasts along the Hudson River in New York. Several Experiment Stations tested seed samples from Europe between 1885 and 1900 (5). In 1934, Prof. D. B. Johnstone-Wallace of Cornell University found a naturalized stand growing in Columbia County, N.Y. (1). During the late 1930's and the 1940's Prof. H. A. McDonald, also of Cornell University, conducted extensive research on birdsfoot trefoil and encouraged the seeding of this long-lived forage legume in northeastern U.S. (2).

First Seeding in Indiana

Dr. G. O. Mott, former professor of Agronomy at Purdue University, made the first seeding of birdsfoot trefoil in Indiana on the Miller-Purdue Agricultural Center (formerly known as the Miller-Purdue Memorial Farm) at Upland in the spring of 1940. Empire birdsfoot trefoil, which tends to be more prostrate than the European type, was seeded. An excellent stand of birdsfoot trefoil resulted from this seeding, with Kentucky bluegrass, *Poa pratensis* L., coming into the stand naturally within two to three years. This seeding of birdsfoot trefoil has persisted since 1940 while being utilized as pasture for beef cattle.

Grazing Trials with Beef Cattle

In 1948, a seven-year grazing trial was initiated on the Miller-Purdue Agricultural Center to determine the influence of lime, fertilizer and birdsfoot trefoil on the amount of beef produced on Kentucky bluegrass pastures (3, 4). Bluegrass pastures were treated in four different ways, and their production in terms of feed units, average daily gain, carrying capacity and beef production per acre was determined. Yearling Hereford steers, wintered on the farm, were used as grazing animals.

Treatments and Description

1. No lime or fertilizer applied. Management—continuous grazing.
2. Lime applied to adjust the pH to 6.5, and 300 pounds per acre of 0-20-10 applied in 1948, 1949, 1950, 1951, and 1952. Grazed under a 3-paddock rotation grazing system with 10- to 14-day grazing period.

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3. Lime and fertilizer the same as 2. In addition, 360 pounds of ammonium nitrate (NH_4NO_3) was applied annually in two applications—the first in the early spring and the second approximately July 1. Three-paddock rotation grazing system.
4. Lime and fertilizer the same as 2. Seeded to a mixture of Empire birdsfoot trefoil and Kentucky bluegrass. Three-paddock rotation grazing system.

The results of the seven-year study presented in Table 1 demonstrate the tremendous benefit that birdsfoot trefoil has in increasing beef production of bluegrass pasture. Beef production per acre is determined by the rate of gain per steer and the carrying capacity of the pasture. In this experiment, very little difference in rate of daily gain resulted from the four treatments. Therefore, the difference in beef production between treatments was due primarily to the carrying capacity of the pasture.

Over the seven-year period, the addition of lime, P and K resulted in a nearly 40 percent increase in beef production. Applying 120 pounds per acre of N along with the lime, P and K doubled beef production. Beef production resulting from pastures where birdsfoot trefoil was grown in association with Kentucky bluegrass exceeded that produced on N fertilized Kentucky bluegrass by 35 pounds per acre.

As a result of the successful establishment of the original seeding of birdsfoot trefoil in Indiana and the productivity of this birdsfoot trefoil-bluegrass pasture over a seven-year period, as well as other successful seedings in the Midwest, the seeding of birdsfoot trefoil pastures has been promoted by forage specialists for nearly 40 years. Despite the many advantages of birdsfoot trefoil as a pasture legume, only a few thousand acres are presently being grown in Indiana. Farmers attempting to seed this legume have experienced many failures. These failures are probably associated with inoculation and grass and/or weed competition. Poor nodulation may be due to the fact that a specific inoculum is required and also that the seed is small and glossy, making it difficult for the inoculum to adhere to the seed. In addition, the trefoil seedlings are quite sensitive to grass and weed competition during establishment. Herbicides have been very beneficial in the successful establishment of birdsfoot trefoil.

TABLE 1. *Pounds of Beef Produced Per Acre on Bluegrass Pastures.*

Grazing Season		Treatment			
Year	No. Days	1	2	3	4
1948	140	160	232	262	307
1949	168	154	181	321	322
1950	154	158	208	274	298
1951	126	134	212	250	308
1952	168	104	188	258	304
1953	140	92	117	219	223
1954	168	115	140	250	319
	Average	131	182	262	297

The persistence of the original seeding of Empire birdsfoot trefoil in 1940 on the Miller-Purdue Agricultural Center demonstrates that under proper management birdsfoot trefoil can be a highly productive and long-lived legume. It is essential, if Empire birdsfoot trefoil is to persist in a permanent pasture, that once birdsfoot trefoil is established the associated cool-season grass be grazed rather closely in early May to allow the legume to compete with the grass. Otherwise, the grass starts its growth in early spring and will out-compete the birdsfoot trefoil which does not make rapid growth until later in the spring and early summer. Also, permitting the birdsfoot trefoil plants to naturally reseed appears to be an important factor contributing to its long-term persistence in Indiana.

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