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Big Trefoil Production and Potential in Southern Indiana

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For many years, big trefoil (*Lotus pedunculatus* Cav.) was thought to be unadapted as a forage legume in Indiana, due primarily to lack of winterhardiness. Then, it was discovered growing well in a tall fescue pasture in Crawford County. This created much optimism among those looking for a pasture legume that would persist with tall fescue on fragipan soils in the sandstone-shale region of southern Indiana.

However, subsequent attempts to establish big trefoil pasture have generally been unsuccessful. The major problems seem to be (1) lack of a locally adapted strain and (2) extremely poor seedling vigor. If these problems were resolved, big trefoil could shortly be a common sight in southern Indiana pastureland.

This publication seeks to provide an update on big trefoil, including its development in the state, characteristics and adaption. Also discussed are some of the problems encountered in stand establishment, how they might be overcome, what varieties to consider and where to get seed.

History of Big Trefoil in Indiana

Big trefoil has long been grown in western Oregon and Washington and in northern California, where it is used primarily as a perennial pasture legume. More recently, it was found adaptable to many of the wet soils of Florida, Georgia and North Carolina.

In the early 1950s, several seedings of big trefoil were made at the Southern Indiana Purdue Agricultural Center (SIPAC) in Dubois County. From those experiments, it was concluded that big trefoil was not winterhardy enough for Indiana's

In the year 1964, however, Purdue Extension agronomist M. E. Heath identified big trefoil plants growing—and very well—in tall fescue pasture on the Clarence Kaiser farm in Crawford County. Mr. Kaiser assumed the plants to be birdsfoot trefoil, since he had seeded that legume in the same field in 1939. Apparently, the big trefoil originated as a 'contaminant' in the birdsfoot seed. It has since been determined that this species can overwinter in southern Indiana if afforded protection of a grass tuft mulch, such as tall fescue.

Eight ecotypes of the big trefoil growing on Kaiser's fescue pasture were planted at SIPAC. Of the eight, three showed excellent forage and seed characteristics. Seed from these three has since been blended together, and limited quantities have been produced for testing purposes in southern Indiana. Name of the resulting blend is Kaiser trefoil.

Characteristics of Big Trefoil

Big trefoil closely resembles birdsfoot trefoil in size and also has five pinnate leaflets per leaf and bright yellow flowers. However, some types tend to have small hairs on the leaves (pubescence). One of the major differences between birdsfoot and big trefoil is that the latter roots and spreads by rhizomes. Big trefoil also produces more flowers per umbel.

The seed of big trefoil is much smaller than birdsfoot trefoil, numbering up to 1 million per pound. It is nearly round and varies in color from yellow to olive green, but does not have speckling like birdsfoot trefoil does.

Adaption of Big Trefoil in Indiana

Big trefoil will grow on acid, poorly drained soils, which describes the fragipans of sandstone-shale origin in southern Indiana. These soils are quite acid with a silt pan 24-30 inches down. They therefore tend to be saturated with water during the winter and early spring, resulting in extensive winter-heaving of taprooted legumes like alfalfa.

This does not occur with big trefoil, however, because it establishes and spreads by rhizomes. By the same token, being shallow rooted, it is not as drought resistant as other legumes.

Big trefoil is more tolerant of acid soils than birdsfoot trefoil, thriving where the soil pH is as low as 4.5, if phosphorus and potash are not limiting. It lacks winterhardiness in pure stands but will survive in southern Indiana when grown in association with a grass such as tall fescue or orchardgrass. The grass, if not overgrazed, modifies the microclimate enough to protect big trefoil through the winter.

Establishing Big Trefoil

Very limited research information is available relative to the establishment of big trefoil in this part of the country. The general recommendation, therefore, is to follow the same practices as for birdsfoot trefoil, except that the seeding rate can be 2-3 pounds per acre rather than 5.

The following suggestions should be beneficial in attempts to establish big trefoil:

Liming and fertilizing. Test the soil at least 6 months before seeding, and lime and fertilize according to the test results. Lime is slow to react with soil; thus, if the soil is very acid, the lime should be applied and incorporated as far ahead of seeding as possible.

Seedbed preparation. Because big trefoil establishment is very slow (even more so than birdsfoot), it is critical that the grass sod be thoroughly disked or 'knocked down' with a herbicide such as paraquat. If erosion is not a

hazard, shallow plowing would be desirable, since a fine-textured, firm seedbed allows only shallow coverage with soil of the very tiny big trefoil seed.

Inoculation. Like birdsfoot, big trefoil requires special inoculum, which at this point must be obtained directly from its manufacturer. Without it, nodulation will be poor, further reducing the chances of establishment.

Seeding. Because big trefoil seed is so small, soil coverage should be only 1/8 to 1/4 inch. If the soil is low in phosphorus, a band seeder is preferred. If soil fertility is high, a cultipacker-seeder does an excellent job of uniformly distributing the seed and providing shallow coverage while firming the seedbed to insure good seed-soil contact. If neither type of seeder is available, an alternative method is to cultipack the seedbed, broadcast the seed, then cultipack again with a corrugated roller.

Weed control. Because big trefoil seedlings grow slowly, weeds can become a serious problem. The best way to minimize the problem is to prepare a weed-free seedbed followed by careful clipping or grazing.

Grazing management. In the first year, graze lightly to eliminate weed competition when the soil is dry. Once established, big trefoil is very tolerant of heavy grazing.

Selecting and Obtaining Seed

At this point, only Kaiser trefoil can be recommended for seeding in southern Indiana; even then, there is no guarantee of successful establishment. Kaiser trefoil seed is available in very limited quantities from the Indiana Crop Improvement Association, 3510 U.S. Hwy 52 South, Lafayette, IN 47905 (phone 317/474-3494).

The two varieties grown in the Pacific Northwest, Beaver and Columbia, are not nearly as winterhardy as Kaiser but might survive in Indiana if protected by grass sod mulch.

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