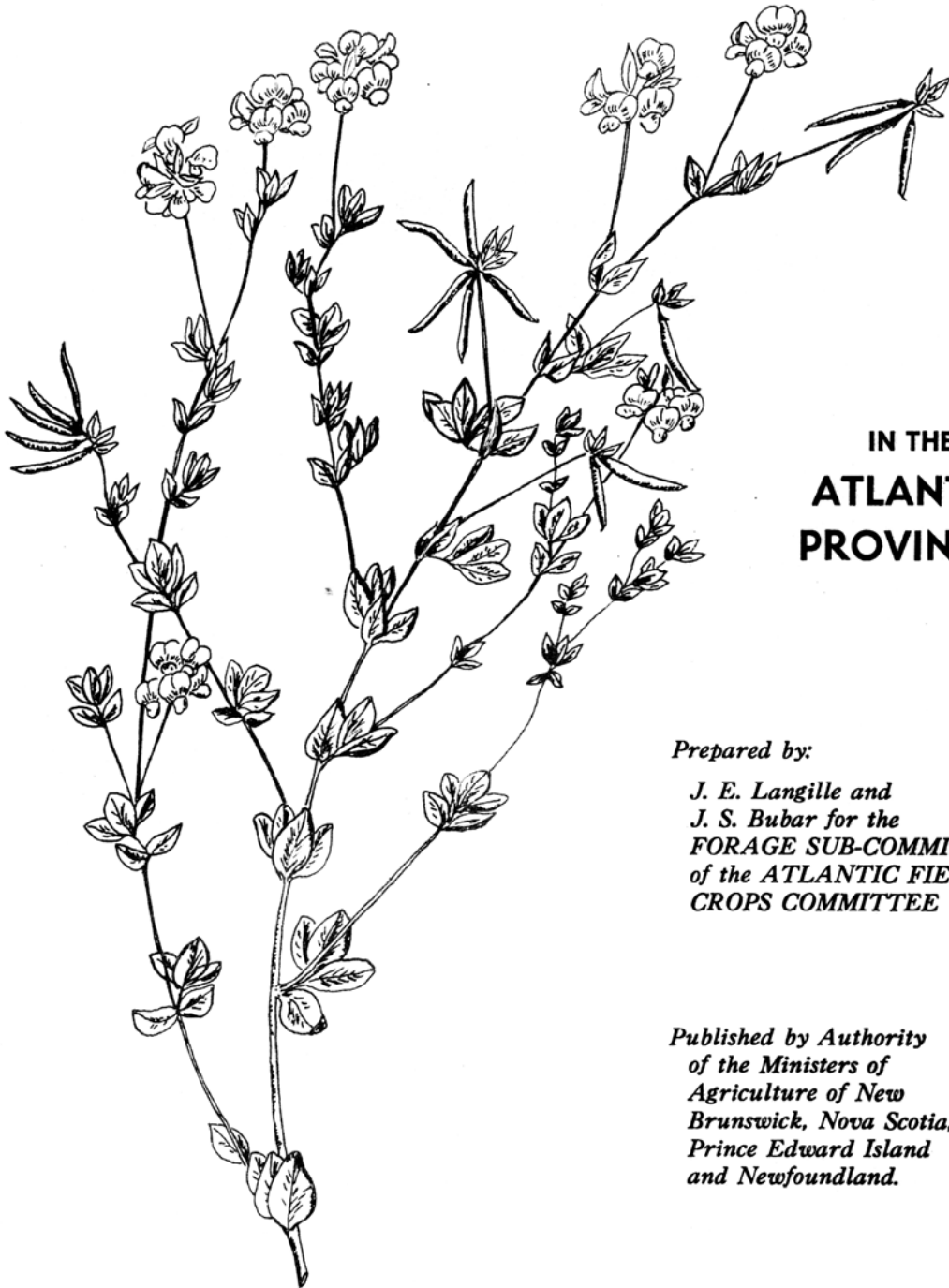


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GROWING BIRDSFOOT TREFOIL



IN THE
**ATLANTIC
PROVINCES**

Prepared by:

*J. E. Langille and
J. S. Bubar for the
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Introduction

Excellent fields of birdsfoot trefoil can now be found on some farms in all four Atlantic Provinces. Much more land could produce high quality trefoil hay, pasture or silage mixtures. Trefoil needs special care to establish and maintain a good stand. The main purpose of this publication is to provide farmers with information needed to provide this care.

Birdsfoot trefoil produces a very digestible forage with high levels of protein. Increasing costs of nitrogen fertilizer and of feed grain are improving the profit margin in favour of keeping animals on legume pasture for as much of the season as possible and on legume hay or silage throughout the rest of the year. Birdsfoot trefoil could be that legume on many acres in the Atlantic Provinces.

Birdsfoot trefoil pasture does not cause bloat in cattle or sheep. Pasture retains good feed quality even after plants start to flower and go to seed, while other pasture plants become coarse and less digestible. Hay or silage quality also equals that made from alfalfa or other legumes. In addition, trefoil is low in the estrogens that cause breeding problems.

Adaptation and field selection

Birdsfoot trefoil is well suited to the cool, humid climate found throughout eastern Canada. The hardiest varieties survive our coldest temperatures. Fields damaged by ice sheets, which completely killed alfalfa or clover, have recovered with a minimum of loss. Trefoil tolerates extremes of flooding and drought with less loss than any other forage legume.

Shading is more damaging to trefoil than to other legumes. More rapid growing crops can smother out the slow-starting trefoil in the seedling year. Vigorous growth of competing grasses or legumes, especially white clover, can also smother a well-established trefoil stand.

Trefoil grows on a wide range of soils from sandy loams to heavy clays, including clays with poor subsoil drainage. This assumes there is sufficient depth for the branched taproots to develop and satisfactory pH and fertility levels. Because trefoil will tolerate a wider range of adverse conditions it frequently performs better than alfalfa in some fields. It also withstands saline soil better than most other forage legumes.

Trefoil is best suited to areas intended for long-term pasture, hay or grass silage. Some fields have maintained good levels of production for more than 10 years.

Varieties

Each recommended variety has specific soil and climatic adaptations and unique management requirements

LEO is the hardiest of the three recommended varieties. It tolerates poor drainage and is well suited for hay, silage and pasture production. It is now being seeded on more land in Canada each year than all other trefoil varieties combined.

CARROLL is a new variety, similar in yield and winter hardiness to Leo. It appears well suited to hay, pasture and silage production. It is more upright and

has larger seeds than Empire.

EMPIRE is the oldest variety. It is a late-maturing, prostrate variety that tolerates close grazing better than other varieties. It is tolerant of poor drainage and ranks second to Leo in winter-hardiness.

VIKING is an earlier flowering variety with a more upright growth habit than alternate varieties. It is suited only to well-drained soils and in areas where there is little risk of winterkill. Because of its upright growth habit, it may persist where Leo or Empire are lost due to competition of other crops in the mixture.

Seed mixtures and rates

The only mixture recommended for use in the Atlantic Provinces is one of timothy with birdsfoot trefoil. Other grasses used in trefoil mixtures, such as brome grass, grow so vigorously under our cool-humid climate that they crowd out the trefoil. A seeding rate of only 2 kg/ha (2 lb/ac) of timothy with 9 kg/ha (8 lb/ac) of trefoil is recommended to reduce the competition that timothy gives trefoil. Late maturing timothy varieties such as Drummond and Bounty are preferred in most trefoil mixtures used for hay or silage. For pasture, Champ timothy is another alternative.

Trefoil may be seeded alone at 9 kg/ha (8 lb/ac). However, volunteer bluegrass or other grasses are likely to come in and provide more competition to the trefoil than if timothy were present. Winter injury of trefoil is more frequent when grass is not in the stand.



A good mixture of birdsfoot trefoil and timothy.

Inoculation

Inoculation of the seed with the correct strain of nitrogen fixing bacteria is **essential** for successful stands of trefoil. For top performance, legumes should be inoculated every time they are seeded. Nitrogen fixing bacteria convert atmospheric nitrogen into fertilizer nitrogen that can meet the needs of the crop for this essential and expensive nutrient. The bacteria can be applied by simply purchasing a package of the powdered culture (a black powder generally in a plastic pouch) and thoroughly mixing with the seed just prior to seeding. Instructions for use appear on the container. **Be sure to check the expiry date on the package. All inoculants should be stored under cool conditions and they should never be left lying in the hot sun.**

Some seed companies use a vacuum treatment to introduce nitrogen fixing bacteria into the seed coat prior to sale (Trade name "nocolated"). Evaluation of this treatment to inoculate birdsfoot trefoil under Atlantic Provinces conditions is not available. Until this method is further evaluated it is recommended that additional inoculant be added prior to seeding.

Failure to get proper nodulation generally leads to unsatisfactory establishment. With proper inoculation, modules should be visible on the roots of seedlings 7 to 10 cm. tall. A symptom of poor nodulation is a pale yellowish green colour on the leaves. Trefoil seedlings that failed to nodulate have occasionally been saved by mixing inoculant with sand and broadcasting on the surface immediately before a soaking rain.

Seedbed preparation

Fall plowing of sod or spring plowing following a cereal crop is a good method of preparing a seedbed for birdsfoot trefoil. It is essential that sod be well rotted and free from couchgrass, other grasses and weeds. It is important that the seedbed be level so that pockets of water or ice sheets do not form and cause winterkilling.

Seeding

Birdsfoot trefoil is best established without a cereal companion crop. If it is necessary to use a companion crop, only 55 kg/ha (50 lb/ac) of seed should be used. The companion crop should be removed as green chop or silage rather than allowing it to mature for grain.

The best machine for seeding trefoil in the Atlantic Region is a cultipacker type of seeder. Less seed is required and it produces a fine, firm, smooth seedbed. The seed is planted at a uniform depth and placed in contact with soil moisture, resulting in better germination. Stones are either pressed into the soil or left visible where they can be removed for easier and safer harvesting of forage.

Lime and Fertilization

Birdsfoot trefoil does best on well limed soil with a pH of 6.2 or higher. It will grow on lower pH soils but is not nearly as productive and does not compete as well with grasses and weeds.

A soil test is essential to determine fertilizer and lime requirements.

Samples from the fields in which trefoil is to be seeded should be tested at a Provincial Soil Testing Laboratory. If this is not done, a general recommendation for fertilizer can be used at some risk of not giving the best treatment for establishment. If a soil test is not possible, apply 5-20-20 + .2B fertilizer at 450 to 560 kg/ha (400 to 500 lb/ac). A higher rate of application may be required if the soil is low in fertility. Maintenance applications of fertilizer are 5-10-30 or 0-10-30 applied at 560 kg/ha (500 lb/ac) early in the spring, depending on the amount of grass in the stand. If grass is heavy, 0-10-30 is desirable to avoid stimulating grass growth. Danger of burning is reduced if applied before growth starts. An application of potash at 225 kg/ha (200 lb/ac) is required after the first cut if harvesting for hay or in early to mid-July if growing for pasture. Top dressings of fertilizer when foliage is wet can cause burning of the foliage.

Annual fertilization is essential for good production.



A pure seeding of birdsfoot trefoil

Weed Control

Perennial weeds (quackgrass, yarrow, dandelions, etc.) should be controlled before the land is seeded. This is best accomplished through tillage operations and/or with assistance of herbicide treatments. Early fall plowing followed by spring-tooth cultivations will bring root systems to the soil surface for better control. This followed by early and thorough cultivations prior to planting is an important step in seedbed preparations.

Once most perennial broadleaf weeds become established they are essentially impossible to control without injury to the crop.

Weed control throughout the first year can be accomplished by repeated mowings or one harvest prior to weed seed production.

For specific herbicide recommendations - See Publication 100.

Uses

Pasture

It is best to rotationally graze trefoil and remove animals before they graze too close to the crowns. Trefoil can be strip grazed when the crop is quite tall. Farmers sometimes leave an area of trefoil ("stockpiled pasture") to use for midsummer grazing after other pastures are short. Trefoil makes good pasture after it is in bloom or even after ripe seed is formed on the plants. Strip grazing of these mature stands reduces wastage by trampling and by animal droppings on the ungrazed crop.

Hay or Silage

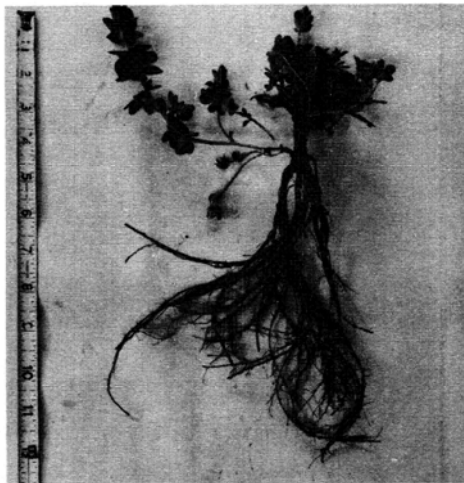
Trefoil makes excellent hay or silage. A dense stand is hard to cut and difficult to field cure for hay. In addition, considerable leaf loss will occur when trefoil is handled as dry hay. Barn finishing of partly cured hay or storing as silage reduces field losses.

Management for Hay and Pasture

Hay-An advantage of birdsfoot trefoil is that it does not lower in its digestibility as fast as other legume crops because it is slower to mature. A trefoil mixture is usually harvested last in the sequence of crops being

harvested for hay. Birdsfoot trefoil mixtures may be harvested twice each season for hay if there are well fertilized. However it is essential not to cut the second crop after the end of August so that sufficient recovery can be made before winter begins. Food storage in the roots is essential for good survival. A field with sufficient regrowth helps to maintain snow cover during the winter and penetrates through ice sheets so that the plants can breathe.

Pasture-Birdsfoot trefoil provides excellent pasture that is very palatable and digestible. Rotational or strip grazing is the best way to handle this species for pasture. Trefoil **should not** be grazed closer than 10 cm (4 inches) as this will damage crowns, reduces the number of auxiliary buds from which regrowth arises and removes leaf area needed to produce carbohydrates for regrowth. Trefoil may be grazed often but not close.



Some leaves are needed to produce carbohydrates for regrowth.

Disease Problems

Birdsfoot trefoil is not affected by many of the diseases found commonly on clovers and alfalfa. However, birdsfoot trefoil can be attacked by **SCLEROTINIA CROWN AND STEM ROT** which results in dead plants in the spring of the year and which may be confused with other causes of failure to survive the winter. First year stands are more susceptible to attack than other stands and attack is more probable during winters with continuous snow cover and no frost penetration of the soil. Birdsfoot trefoil is quite susceptible to damage from the **ROOT LESION NEMATODE**, *Pratylenchus penetrans*, more so than clovers or alfalfa. If birdsfoot trefoil is seeded in soil with a high level of root lesion nematode infestation, establishment may fail, forage yield will be reduced and there will be increased invasion of roots by root rotting fungi.

Seed Production

There are few success stories with birdsfoot trefoil seed production in the Atlantic Region. Seed production trials at the Nova Scotia Agricultural College demonstrated that seed production is more difficult here than in central Canada, due to problems in getting good seed set and to climatic conditions during harvest. Present seed production in central Canada appears more than adequate to supply most recommended varieties required in the Atlantic Region. However, anyone who wants to attempt trefoil seed production should consider pedigreed rather than common seed. Regulations for growing pedigreed seed are contained in Circular No. 6, prepared by the Canadian Seed Growers Association. For further information in this regard contact: "The Plant Products Division, P. O. Box 930, Sackville, New Brunswick".

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