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Factsheet

RED CLOVER IN ONTARIO

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The large acreage of red clover in Ontario is developed from easy establishment, inexpensive seed and excellent first-year production under conditions unsuitable to alfalfa. Lack of long-term persistence is the major disadvantage. Red clover is also adversely affected by high temperatures and low soil moisture. Accounting for 22% of the forage legume seed sold in the province, red clover is most popular in eastern and northern Ontario.

Figure 1. Tolerating a range of soil and moisture conditions, red clover is very popular in eastern and northern Ontario.

Advantages and Usage

Red clover is broadly adapted, tolerating a range of soil moisture conditions and moderately acid soils. While newer cultivars are more persistent, cool temperatures during the growing season and adequate soil moisture are essential to production.

Red clover works best in a silage system. Dry hay is not only difficult to cure, but losses will be much greater if rain is a problem. Storage losses can also be high, unless it is adequately dry when put into storage. A very dark color and mustiness are commonly associated with spoilage of dry hay. On the other hand, the silage will also be a darker color, but this does not necessarily reduce the feeding value.

Red clover is normally pastured without much thought to legume management. Usually the crop is plowed down after one or two years of pasturing because of rapid depletion of the stand. Bloat is a hazard, but it may be reduced by adding a grass component such as timothy.

As a plow down crop, red clover is especially valuable in adding nitrogen and organic matter to the soil. Relatively inexpensive seed and the short-term nature of the crop (one or two years duration) has appealed to cash crop farmers. As a short-term plow down crop, Canada No. 1 seed (graded for purity and germination) is satisfactory since persistence is not essential. Nitrogen requirements for the succeeding crop may be met by fall plowing a full stand of red clover.

Single and Double Cut Types

Single and double cut types are characterized more by their flowering time than by the number of cuts. Double-cut cultivars flower 1 to 2 weeks earlier with the result that their flowering dates match the heading dates of recommended grasses. Double-cut cultivars are also preferred because they produce better aftermath. Both single and double cut types produce excellent yields in the first-cut. The later flowering of single cut types does not permit both forage and seed production in the same year.

Establishment

Red clover is easy to establish. Its excellent competitive ability and shade tolerance provide good results when seeding with a companion crop. Grain seeded with red clover may be pushed for higher yeilds than with other legumes such as alfalfa and trefoil. Follow normal grain crop recommendations for nitrogen and seeding rates. Red clover will suffer from lodged grain and late seeding. Earlier spring seeding allows earlier harvesting of grain resulting in a longer shade-free growth period before winter. This improves winter hardiness and may provide fall pasture. Lodged grain should be harvested

early. Excessive straw should not be left in the field. Red clover may be direct seeded. Kemptville and Thunder Bay data suggest that forage yield in the first full production year is not improved by direct seeding. In addition the loss of grain and straw yield will not be compensated for economically by seedling year forage production. Where direct seeding is undertaken, early planting (before moisture stress) is highly recommended.

Weed Control

Most broadleaf weeds may be controlled with MCPB at the 1- to 3- trifoliate leaf stage of the red clover. Under conditions of drought or stress, damage may result. When mustard is a problem use a mixture of MCPB and MCPA (15:1) which is commercially available as Tropotox Plus.

Annual grasses may be controlled with Hoe-grass when they are at the 1- to 4- leaf stage. Do not use other herbicides within 4 days.

Weed control in direct seeded red clover is essential, either with herbicides or by clipping, since weed competition can exceed the competition from a grain crop.

Cultivars

Considerable progress has been made in cultivar development for persistence. Dollard is no longer recommended and Lakeland has become a poor choice. The cultivar Ottawa has also slipped in performance. The newest ones, Arlington, Florex and Prosper I are especially noted for long-term persistence. In northern Ontario, Bytown is an excellent choice. The poor overall performance of single-cut types has resulted in their limited use throughout the province.

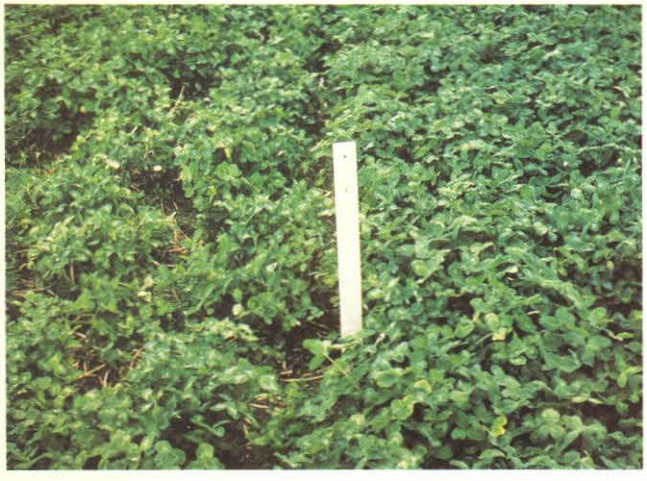

Figure 2. Better persistence in the second production year is demonstrated by newer cultures (Prosper 1 on right) compared to the older standards (Ottawa on left).

Mixtures

The inclusion of grasses will dilute the approximate 18 to 20% protein content expected of red clover. A small amount of timothy is frequently added in a hay or pasture stand to fill in spaces as the red clover dies out. This will give better competition to invading weeds and extends the life of the forage stand.

Alsike is often planted with red clover to add drainage tolerance. Alsike is subject to diseases and is often attacked by potato leafhoppers. Its contribution to yield is variable, while aftermath production is poor. Red clover is not recommended in mixtures with alfalfa since red clover is too competitive.

Fertility

Fertility programs in red clover are generally designed to improve overall yield. Phosphorus and potash should be applied according to soil test recommendations. Nitrogen may be applied to stands of red clover after the legume content has largely disappeared. Be sure the grasses are productive ones; timothy for example, which gives much better response than later invading bluegrasses. Best soil improvement results are obtained by plowing the stand while substantial amounts of red clover are still present. One advantage is free residual nitrogen for a succeeding corn or cereal crop.

While the optimum pH range is 6.0 to 7.5, red clover will produce well down to about 5.5 before showing much limestone response. Thus most of the soils in Ontario will not demonstrate an economic return from liming red clover.

Harvesting

The first-cut should be taken at the early bloom stage, the best compromise between quantity and declining quality. An early first-cut will ensure a better second-cut, either for forage, pasture or seed production.

The second-cut for forage should also be taken at the early bloom stage. While the fall rest period is not as critical as it is for alfalfa, the best quality will result from early cutting. Poor weather for hay drying has caused a large shift to haylage systems. Early cut red clover forage will approach 18 to 20% protein.

Excessive fall growth after a frost should be harvested or grazed to prevent smothering and buildup of diseases under snow and ice cover.

Diseases

Persistence in red clover is largely a question of disease-resistance. Numerous diseases contribute to the problem; the main ones being root rots and fungus diseases attacking the leaves and stems.

Crown rot *Schlerotinia trifoliorium* attacks red clover in the winter and early spring. Damage tends to be most severe when the ground is not frozen under a snow cover. Crown and root rot organisms may enjoy temperatures warm enough under the snow to multiply and cause severe damage. Ideally, a lightly frozen soil, protected from extreme temperature by a snow cover, gives the best protection.

During the later spring and summer months northern anthracnose *Kabatiella caulivora* (Kirch) and powdery mildew *Erysiphe polygoni* may become a problem. These diseases are prevalent in periods of moderate temperature and moist conditions. Powdery mildew is not a problem in northern Ontario. Diseases present major problems for red clover, reducing it to the status of a short-lived perennial. In areas of northern Ontario where diseases present fewer problems, good stands have been known to last 4 years or more. In the

southwest, the stands may be productive only during the first crop year.

Seed Production

Most seed from double-cut types in southern Ontario is harvested from the second cut. First-cut seed yields are higher, but this makes it impossible to obtain a good forage yield in the same year. Taking the first-cut as earlier forage will increase later seed yields. Harvesting the second cut as a seed crop does not appear to have a detrimental effect on the stand.

In northern Ontario, the seed crop should be obtained from the first-cut. Honeybees may be placed in the field to increase essential cross pollination. Swathing should be done when 90% of the heads have turned down. Direct combining is possible when fully ripe, or a chemical desicant has been used (e.g. Reglone).

Cultivar	Persistence	Disease Reaction	Performance and Adaption	Breeder, Year of Canadian license	Seed Supplier
Arlington	Good	Tolerant to northern anthracnose, powdery mildew and bean mosaic virus	Performs well in northern and southern Ontario out-yielding the check cultivar Ottawa	USDA, U. of Winconsin College of Agr. & Life Sciences. 1979	Public
Bytown	Good N. Ont. Fair S. Ont.	Tolerant to *schlero-tinia* root rot	A tetraploid adapted to N. Ontario particularly the N.W.	Canada Agr. 1979	SeCan
Florex	Good	Selected for healthy crowns & resistance to powdery mildew, northern anthracnose & rust	Yield from first production year similar, but substantially better in subsequent years to check Ottawa	Northrup King Co. 1977	National NK Seeds Ltd.
Lakeland	Poor	Resistance to northern anthracnose & powdery mildew	Relative to newer cultivars performance has been declining	Winconsin Agr. Experimental Station with USDA 1964	Public
Ottawa	Fair	Some resistance to *schlerotinia*	Since being released the cultivar has been improved, however recent cultivars are better.	Agr. Canada 1936	Public
Prosper I	Good	Selected for healthy plants & resistance to northern anthracnose, powdery mildew & unidentified viruses.	Yield from first production year similar, but substantially better in subsequent years to the check Ottawa.	Northrup King Co. 1978	King Grain, Chatham