

## RED CLOVER

*Trifolium pratense* L.

Plant Symbol = TRPR2

Contributed by: Idaho Plant Materials



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### Uses

Red clover is the most widely grown of all the true clovers and is the most important legume hay crop in the northeastern United States. Red clover is primarily used for hay, pasture, silage, and soil improvement. It is a quick growing crop, easily established, and produces high quality forage. Red clover is commonly planted with cool season grasses such as orchardgrass, tall fescue, brome grasses and timothy. It can also be grown alone or with some warm season grasses such as dallisgrass and johnsongrass.

Many wildlife species use legumes and are attracted to the early green up to help them recover from the stress of winter. Red clover is not particularly noted for providing wildlife cover or food. Bumblebees are especially important in pollinating red clover but are sometimes inadequate to insure a good seed crop. Honey bees also pollinate red clover but tend to prefer sweetclover, white clover and alsike clover if these species are in the vicinity.

### Status

Consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

### Weediness

This plant may become weedy or invasive in some regions or habitats and may displace other vegetation if not properly managed. Consult your local NRCS Field Office, Cooperative Extension Service Office, or state natural resource or agriculture department regarding its status and use. Weed information is also available from the PLANTS web site at [plants.usda.gov](http://plants.usda.gov)

### Description

*Trifolium pratense* L., red clover, is an introduced biennial or short-lived perennial that grows as one of two types: medium (double-cut) or mammoth (single-cut). Red clover initiates growth from the plant crown. Plants have hollow, hairy stems and branches. Stem lengths of medium and mammoth types average 18 inches and 24-30 inches, respectively. Medium types have about 4 branches per stem; mammoth types have 6 branches per stem. Each leaf consists of a slender stalk bearing 3 leaflets. The taproot of red clover normally disintegrates in the second year and plants that survive have developed secondary, extensively branched roots. Flowers are borne in compact clusters at the tips of the branches and are usually rose-pink in color. The flower shape is similar to pea flowers except is more elongated and much smaller. Flower heads usually consist of up to 125 flowers. Seed pods are small, short, and contain kidney-shaped seeds that vary in color from yellow to deep violet. Plants of the single-cut type form a leafy rosette growth in the first year and produce no flowering stems. Double-cut types produce many flowering plants in the seedling year. Mammoth (single-cut) red clover matures later than medium types; only one crop of mammoth red clover is harvested each season since recovery is slow.

### Adaptation and Distribution

Red clover grows best on well-drained loamy soils, but it will also grow on soil that is not as well-drained. Medium and fine textured soils are preferred by the plant over sandy or gravelly soils. It is best adapted to a pH of 6.0 or higher but will grow on moderately acid soils. It is important to note that Mammoth (single-cut) red clover is generally recommended for areas with a short growing season.

Red clover is distributed throughout the United States and is best adapted where summer temperatures are moderately cool to warm and moisture is sufficient

throughout the growing season (mean annual precipitation 25 inches or more) or if site is irrigated. Data indicate that as much as 10 million acres of red clover were grown in the Northern states in the 1940's. Its prominence has waned because it does not fit well into currently used crop rotations. Red Clover was grown extensively in the northeast and northwest U.S. and used as a winter annual in the southeastern U.S. For a current distribution map, please consult the Plant Profile page for this species on the PLANTS Website.

Red clover originated in Asia Minor and southeastern Europe and was introduced to the British Isles from Germany in the 1600's. English colonists brought red clover to North America.

### **Establishment**

Red clover has approximately 275,000 seeds per pound. The full seeding rate is 6 pounds PLS per acre for a solid stand. The recommended seeding rate for a grass/legume pasture is approximately 25 percent or 1.5 pounds PLS per acre. For pasture establishment, seed should be drilled into a well-prepared seedbed that has been plowed, harrowed, and compacted to produce a very firm seedbed. The seed should be inoculated with the correct *Rhizobium* before seeding. Seeding depth should be 1/8 - 1/4 inch deep. Typically, in grass/legume mixtures, the grass is drill seeded in rows and red clover is over seeded to limit competition from grass. For stabilization use, seed is broadcast on roadside cuts and fills by cyclone seeders, hydroseeders, or blower-type equipment.

For solid stands for hay production, red clover is usually planted with a small grain companion crop such as oats, barley, flax, or winter wheat. The recommended seeding rate for small grain companion crops are typically 50 to 75 % of normal. Red clover has good shade tolerance (approximately 6% of daylight) which makes companion cropping with red clover fairly successful. Its tolerance to shade allows red clover to be used as a cover crop under corn for silage.

The proper time of seeding is determined by seasonal moisture conditions. In most areas, this may vary from early April to mid May. Late summer and fall seedings should only be conducted when site is irrigated and when at least six weeks of growing season remain to assure establishment before freezing conditions.

### **Management**

Graze or cut for hay when the red clover is 1/4- 1/2 bloom. A second cutting or successive grazing should occur when red clover is 1/4 bloom. Leave at least 2 inches of growth after each harvest.

Mammoth red clover does not produce flowers the first year. Typically, 2 hay harvests per year can be made after establishment and because red clover is short-lived will only be productive for about 3 years. Red Clover can cause livestock to bloat, so care should be taken to reduce this condition. Keep pH and fertility (especially phosphorus and potassium) at the proper levels. Control insects and diseases.

If planted with a small grain as a companion crop, the small grain should be removed before it can smother the red clover.

Red clover is normally used as a companion crop with forage grasses (smooth brome, meadow brome, timothy, ryegrass, tall fescue or orchardgrass) to provide a source of nitrogen while also providing high-yielding forage rich in protein.

When seed is properly inoculated at time of planting, red clover can fix nitrogen from N<sub>2</sub> in the atmosphere, requiring little or no additional nitrogen fertilizer. However, it responds to fertilizer and requires relatively large amounts of phosphorus, potassium, and sulphur in some areas. In grass-legume mixtures, it is not possible to supply the ideal combinations of elements for both grass and legume. If nitrogen is applied to a grass-legume mixture, the grass will tend to increase at the expense of the legume. Well-fertilized grass will outgrow clover in fall and winter and could smother the clover.

Red clover cut for hay at 50% bloom stage usually exceeds 14-15 % protein. Unfavorable quality results when harvest is delayed and plants are allowed to mature.

Management for forage is aimed at maintaining 40-50% clover. Close grazing (2 inch stubble height) favors clover, whereas light grazing favors grass. Red clover should be rotationally grazed.

Red clover has nearly the same potential to cause bloat as alfalfa when grazed. It usually is recommended as a mixture with one or more grasses for pasture which will greatly reduce the hazard for bloat. Livestock sometimes slobber excessively when feeding on second cutting red clover hay. This is caused by a fungus, is harmless and rather rare.

There are also reports of reproductive problems in sheep which graze solid stands of red clover. This is caused by the high levels of estrogen in the plant, occurs infrequently, and is rare with grass/red clover mixtures.

Spring applications of nitrogen will stimulate grass and provide early feed, but excessive rates are detrimental to the clover stand. Phosphate applications are broadcast in fall or spring according to soil tests. Sulfur, boron, or magnesium may be needed for maximum production on some soils in the western part of red clover's range.

### **Pests and Potential Problems**

Red Clover is subject to many disease and insect problems. Crown rot, root rot, anthracnose and powdery mildew may be problems in areas with high humidity and rainfall. Viral diseases such as bean yellow mosaic virus, stem blackening diseases and black patch also occur. Choose disease resistant cultivars to reduce the occurrence of these problems.

Red clover is attacked by many insects including the clover root borer, clover root curculio, clover seed chalcid, clover weevils, aphids, midges, and leaf hoppers. Unfortunately, there is no practical overall control of red clover insects especially in seed production fields because of pollination by bumblebees and honey bees. Chemical control of insect pests would also destroy the pollinators.

### **Environmental Concerns**

Red clover may be spread by seed and may be considered weedy in some locations. It can spread into adjoining vegetative communities under ideal climatic and environmental conditions.

### **Seed Production**

Plant red clover at 3-4 pounds PLS per acre in 12 inch rows. Because seed production often follows production for hay, row culture is not as critical as with other plant materials grown for seed production.

Average seed yields are about 350-500 pounds per acre but can easily be doubled by using best production practices. Time and frequency of irrigation is critical as red clover lodges easily. Irrigation should be discontinued when the degree of bloom and seedhead maturity is maximized. Highest yields result from second growth in two year old fields. The first growth is normally cut for hay.

Pollination by bumblebees or honey bees is critical. Bumblebees are usually relied on for pollination but are often low in number. Provide at least one honey

bee hive per two acres of red clover. Place hives in the field when 5-10 percent of the crop is in bloom. If hives are placed too early, bees will tend to orient to other legume fields in the vicinity. The lack of pollinating insects is often the biggest cause of low seed yields.

Seed is harvested when the interior of the heads are brown, the stems show a yellowish tinge and the seeds show color ranging from yellow to purple. Harvesting seed before this stage results in light seed with low germination. If harvest is delayed beyond this stage, heavy seed loss occurs from weathering and harvesting operations.

To obtain highest seed yields, red clover is usually cut and windrowed for drying prior to combining. Occasionally seed is harvested by direct combining but yields and quality are usually low.

### **Cultivars, Improved, and Selected Materials (and area of origin)**

Some of the major cultivars for the western US are 'Pennscott', 'Chesapeake', 'Kenland', 'Cumberland', 'Dollard', 'Midland' and 'Lakeland'. 'Altaswede', 'Norlac', and 'Craig' are mammoth red clovers. In the eastern US, varieties selected should be resistant to anthracnose and powdery mildew. Some cultivars commercially available that are moderate to highly resistant to anthracnose are 'Acclaim', 'Rally', 'Redland II', and 'Renegade'. Those moderate to highly resistant to powdery mildew are 'Arlington', 'Rally', 'Rebel', 'Red Star', and 'Reddy'. Most cultivars and varieties adapted to your area can be found through local seed suppliers.

### **Control**

Contact your local agricultural extension specialist or county weed specialist to determine what works best for control in your area and how to use it safely. Always read label and safety instructions for each control method. Trade names and control measures appear in this document only to provide specific information. USDA, NRCS does not guarantee or warranty the products and control methods named, and other products may be equally effective.

### **References**

Jensen, Kevin et al. 2004 Intermountain Planting Guide. Pg 81.

Ogle, D., L. St. John, M. Stannard, and L. Holzworth. 2008. Grass, grass-like, forb, legume and woody species for the Intermountain West. Natural Resources Conservation Service. Boise, Idaho. Idaho Plant Materials Technical Note 24. 43 p.

Ogle, D., L. St. John, J. Cornwell, M. Stannard, and L. Holzworth. 2008. Pasture and Range Seedings: Planning, Installation, Evaluation, Management. Natural Resources Conservation Service. Boise, Idaho. Idaho Plant Materials Technical Note 10. 36 p.

Oregon Clover Seed Production.  
<http://oregonclover.org/seedproduction.html>  
[2008, November 25].

Shewmaker, Glenn. 2005. Idaho Forage Handbook. University of Idaho. 99 p.

Steiner, J. and S. Alderman. 2003. Red Clover Seed Production – Effect and Economics of Soil pH Adjusted by Lime Application. Crop Science 43:624-630.  
<http://crop.scijournals.org/cgi/content/full/43/2/624>  
[2008, December 4]

Taylor, N.L. 1985. Red Clover. Chapter 12. In: Forages: The Science of Grassland Agriculture. Iowa State University Press. 643 p.

University of Maine Cooperative Extension. Components of a Backyard Wildlife Habitat. Bulletin #7137. 5 p.

Wheaton, H.N. Red Clover. University of Missouri Extension.  
<http://extension.missouri.edu/explore/agguides/crops/g04638.htm>  
[2008, December 1]

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