



RED CLOVER

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FORAGE CROPS --- PRODUCTION TECHNOLOGY

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RED CLOVER (*Trifolium pratense*) is an important forage legume for eastern Oklahoma, and is generally grown with grasses or small grains for pastures. Red clover makes abundant growth from spring through late summer, and produces high-quality forage for stocker and cow-calf operations. It is used as a short-lived perennial (2-3 years) in Oklahoma where alfalfa is not adapted because of shallow or acid soils.

DESCRIPTION: Red clover plants are leafy and grow erect up to 3 feet tall. The leaves are marked with a white "V". Red clover leaves, stems, and petioles are covered with thick hairs, and its pinkish-violet flowers are produced in dense clusters. Red clover exhibits greater seedling vigor than many other forage legumes, making it somewhat easier to establish.

ORIGIN AND HISTORY: Red clover originated in southeast Europe and is an important forage in much of the world where precipitation is well-distributed throughout the year. It has been used in the U.S. since its introduction during the 17th century -- much earlier than most other clovers and alfalfa.

ESTABLISHMENT: Red clover can be grown as a pure hay stand or as a pasture component. It grows well on a wide variety of soils (from sands to clay loams) and can be successfully established by broadcasting or drilling. Red clover should be sown in late September to early October or during February and March. As little as 3-6 lb/acre of seed can be broadcast on an existing sod, but it is more reliable to drill 10-12 lb/acre with a planter that places seed in contact with soil at a depth of 1/4-1/2 inch

Seeds germinate quickly in moist soil. Seed-soil contact is important; therefore, dense thatch should be removed by heavy grazing or haying. Disking before sowing provides a better seedbed and reduces grass competition during germination and emergence. For pure stands sown in prepared seedbeds, field preparation is similar to that of alfalfa (see **Alfalfa Stand Establishment**, OSU Facts No. 2089). In spite of its seedling vigor, red clover does not tolerate drought as well as alfalfa.

Soils should be sampled and tested to determine the pH as well as the level of phosphorus and potassium. Soil fertility and pH are critical for successful red clover establishment. It can be productive if the soil pH is 6-6.5, and agricultural lime should be applied several months before planting if soil pH is lower than 5.8. Proper fertilizer should be applied if phosphorus or potassium is deficient.

Nitrogen levels as low as 15 lb/acre are adequate for rapid seedling development. High levels of nitrogen (more than 30 lb/acre) may stimulate grass growth and increase competition with clover seedlings.

Inoculation of seed with the correct *Rhizobium* bacteria (strain B) is essential in areas where red clover has not been grown. Normally 3-4 oz. of inoculant is adequate for 50 lb. of clover seed. Although it is not essential, a sticker (commercial products, sugar water, cola, or milk) on seeds reduces inoculant waste and ensures quick bacterial action.

Grazing should be deferred after sowing to allow good seedling development and to avoid trampling by animals. Short term grazing can be started after the clover is 6 to 8 inches tall. If animals are left on red clover for several weeks, they will graze and re-graze plants, inhibiting development of vigorous plants.

YIELD POTENTIAL: Red clover can produce yields of high quality forage comparable to alfalfa in favorable environments. Hay yields of 5 ton/acre are common, and 6-8 ton/acre are possible when summer rainfall is well-distributed. About 5 to 7 inches of water is required for well-managed stands to produce one ton of dry. This amount of water must be in the root zone.

In pure clover stands, protein can be in excess of 20%; however, it is more realistic to expect 11-15% protein-hay in mixed stands of red clover and bermudagrass or fescue without nitrogen fertilizer. Stocker gains of 2 lb/day for 90 days is a reasonable expectation from well-managed grass/red clover pastures.

MANAGEMENT: Successful red clover production depends on maintaining adequate levels of phosphorus and potassium with a soil pH of 6-6.5. When these fertilizer elements are low or the soils are excessively acid, clover stands are unproductive and unreliable.

Infertile soils can be built up economically to acceptable levels during 3-5 years with annual surface applications of lime, phosphorus, and potassium. It is more efficient; however, from the stand point of building up the soil's production capacity, to apply and incorporate lime and phosphorus well before sowing.

Irrigation: Red clover can benefit from irrigation even in eastern Oklahoma when mid-summer droughts decrease production and stand life. Irrigation can reduce some of the boom and bust cycles, typical of many clovers.

Renovation: Few herbicides are needed in well-managed red clover pastures. Good soil fertility, along with competitive legume and grass species, grazed or hayed in a timely fashion, reduce the need for special weed control practices. Once established and productive, red clover pastures seldom need special renovation practices other than sowing 2-3 lb of seed/acre every 2 to 4 years as the stands thin. Deferring grazing to allow seed production and the removal of thick thatch by grazing and/or haying in September are also normally helpful in maintaining stands.

Harvesting: Grazing red clover pastures between seedling emergence and early December can be detrimental to the clover. While there is no ideal harvesting height, light grazing should begin when plants are 10-12 inches tall. Red clover maintains its high forage quality until about 40-50% of the stems have blooms and can be harvested for hay or grazed at that time.

Red clover should not be cut or grazed shorter than 3 or 4 inches. Continuous stocking of red clover can be profitable, but requires frequent adjustments in number of animals per acre. With rotational stocking, it is generally easier to maintain long stand life, high forage quality, and produce seed necessary for reseeding.

Ideally red clover should be grazed for 5-7 days early in the growing season (late March or April for fall-sown stands and June for spring-sown stands), followed by 3-5 weeks of regrowth. Later in the season grazing can be extended to 2 weeks with enough animals to remove all but 3 to 4 inches of growth.

When seed production is desired, animals should be removed for 5-6 weeks. Few flowers develop for good seed production with heavy continuous grazing. Pastures can be cut or grazed after seed set, shattering much of the seed onto the soil.

Nitrogen fixation potential of well-managed clover minimizes the need for nitrogen fertilizer. Red clover can produce 5 ton/acre of hay, containing 18% protein (1800 lb/acre protein), requiring fixation of more than 200 lb of nitrogen/acre. Other than small direct transfer of nitrogen to other species, this nitrogen is first available for animal feed, much of which is recycled through urine and manure. As clover roots, stems, and leaves decay, some of the nitrogen becomes available to associated grasses. This underscores the importance of effective inoculation.

Varieties: Many red clover varieties exist, from both public and private breeding programs; however, the choice of variety is seldom the most important management decision in Oklahoma. Producers should use two or three different varieties to decrease the risk associated with single varieties.

TO GUARD AGAINST BLOAT

- ▶ Fill animals with grass or hay before grazing lush clovers. Allow access to dry mature grass when grazing clovers.
- ▶ Provide a bloat preventative (poloxalene) for several days before cattle or sheep begin grazing.
- ▶ Watch cattle closely and remove all animals from legumes at first signs of bloat.
- ▶ Do not begin grazing early in the morning. Fewer problems occur when starting in the afternoon.
- ▶ Do not turn cattle onto legumes wet with dew. Wait until it dries completely.
- ▶ Pay close attention to weather forecasts and remove animals before weather changes.

Bloat is probably the most important deterrent to using clovers in pastures; however, relatively few animals are lost because most producers effectively avoid the problems by using many of the suggestions listed in the box above.

Quality of red clover ranks high among forages, and its high quality is maintained even after the initiation of flowering. Forage quality of red clover/grass mixtures are seldom surpassed for a wide array of livestock.

Pure red clover is, however, difficult to dry quickly for hay production. It is very leafy and does not allow air circulation through windrows as alfalfa does. Mowing flat followed by tedding helps cure red clover hay.

References for additional information.

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