



WHITE CLOVER

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FORAGE CROPS --- PRODUCTION TECHNOLOGY

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WHITE CLOVER (*Trifolium repens*), one of the most useful forage legumes in eastern Oklahoma, is generally used with grasses for pastures and hay. This perennial clover produces abundant growth during spring and early summer and can be stockpiled for winter grazing.

DESCRIPTION: All types of white clover are leafy, with short, almost prostrate stems. They bear white flowers in spherical clusters that are on stems slightly longer than the leaf petioles. New plants develop vegetatively on stolons near the soil surface.

White clovers are classified into 3 fairly distinct types. Small types, normally less than 3 inches tall, are often found in lawns and other areas frequently mowed or grazed short. Large types, sometimes 2 feet tall, are the most productive and sometimes called "ladino" clover. Intermediate type white clovers, sometimes called "common" or "white dutch," have plant heights, leaf size, petiole size, flowering date, and growth habit midway between the others.

ESTABLISHMENT: White clovers are often sod seeded with 3 to 4 lb. of seed per acre but can be sown in fine firm prepared seedbeds. White clover requires good soil moisture and is not productive under droughty conditions. Production is best on fertile, well-drained soils where rainfall is abundant. White clover tolerates wet soils better than many other legumes. In wet sites, white clover survives summer droughts better than legumes that are intolerant of wet soils. Seed should be placed in contact with the soil and covered no more than 1/4 inch of soil.

INOCULATION of seed with correct *Rhizobium* bacteria (strain B) is essential for nitrogen fixation in areas where white clover has not been grown. Normally 3 to 4 oz. of inoculant is adequate for 50 lb. of clover seed. A sticker (commercial products, sugar water, or cola) on seeds avoids wasting inoculant and ensures quick bacterial action.

YIELD POTENTIAL: White clover may produce more than 10 tons of dry matter per acre in favorable environments. White clover/bermudagrass pastures in eastern Oklahoma yield more than 5 tons of hay per acre without nitrogen fertilizer. Forage production during summer is dependent on summer rainfall.

QUALITY: Pure white clover can be more than 20% protein at early bloom; however, pure stands are difficult to cure as hay. Producers, however, can expect hay with 11-15% protein in mixed stands of clover and bermudagrass or fescue without N fertilization. Stocker gains of 2 lb. per day or more during spring is reasonable from well-managed grass/clover pastures. Mother cows with calves can remain in excellent condition on white clover pastures for more than 200 days per year.

MANAGEMENT: Although individual white clover plants live only a few years, stands remain productive for many years because of natural reseeding and spread by stolons. White clover is more tolerant of continuous stocking than many other forage legumes; however, large white clover persists best if hayed or rotationally stocked because repeated harvests before flowering will not produce enough seed for reseeding.

Proper Soil Fertility and pH are critical for successful white clover stand establishment and persistence. Soils should be tested to determine the pH, phosphorus, and potassium levels. Fertilizer and lime should be applied if deficient.

White clover is most productive with a soil pH near 6.5 and adequate phosphorus and potassium. When these fertilizer elements are low or the soils are excessively acid, clover stands are unproductive and unreliable.

Nitrogen levels as low as 15 lb. per acre are adequate for rapid seedling development. High levels of nitrogen (more than 30 lb. per acre) may stimulate grass growth, which competes with clover.

Soil pH, phosphorus, and potassium can be built up to acceptable levels over 3 to 5 years with annual surface applications. 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. Soil amendments should always be applied based on soil test recommendations.

Animals should graze white clover mixed with grass fairly close to prevent competition for light as a limiting factor for white clover. However, frequent very short mowing or grazing reduces reproduction by stolons.

White clovers are susceptible to several diseases; however, individual diseases seldom cause stand losses without simultaneous environmental stress. Likewise, insect pests are seldom severe enough to warrant chemical control. The combination of good soil fertility and competitive legume and grass species, grazed or hayed in a timely fashion, reduces the need for special weed control practices. Consequently, there is little for pesticides in well-managed white clover pastures.

Renovation: Once established and productive, white clover pastures seldom need special renovation practices. Allowing good seed production every 2 or 3 years and reducing canopy height by grazing and/or haying in September help prolong stand life. Broadcasting 1 or 2 lb. of seed per acre in the fall may be necessary if natural reseeding does not effectively extend the life of a stand.

Stand persistence is encouraged primarily by managing pastures for clover rather than associated grasses. Soil pH near neutral and adequate soil fertility contribute to long-lived stands.

Harvesting: Grazing white clover pastures between seedling emergence and early December can be detrimental to the clover. They are normally ready to graze in March or April, depending upon growing conditions during fall and late winter. While no single harvesting height is ideal, light grazing should begin when plants are 4 to 6 inches tall. One problem associated with initiating grazing late is that vigorous cool-season grasses shade white clover and reduce production.

Continuous stocking of white clover can be profitable, but requires stocking rate adjustments. Too few animals leads to spot grazing, and too many animals reduces forage production and animal productivity. Few flowers develop for good seed production if grazing is continuous and heavy.

Rotational stocking provides assurance of efficiently utilizing forage and maintaining good stands year after year. White clover should be grazed with enough animals to remove all but 2 to 3 inches of growth, followed by 2 to 3 weeks of regrowth and regrazing. Sometime before mid summer, producers should defer grazing for 2 or 3 extra weeks to allow seed set. Pastures can be cut or graze after that time, shattering much of the seed onto the soil.

NITROGEN FIXATION: White clover's nitrogen contributions can be equivalent to applying 150 to 180 lb. per acre of nitrogen fertilizer to the associated grasses. White clover production of 5 tons per acre of hay, containing 18% protein (1800 lb. per acre protein), represents more than 200 lb. per acre of nitrogen fixed and used by the clover. This nitrogen is available first as forage, much of which is recycled through urine and manure. Later as clover roots, stems, and leaves decay, some nitrogen becomes available to associated grasses. Some fixed nitrogen is also available to grasses directly from clover.

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

TO GUARD AGAINST BLOAT

- ▶ Do not turn hungry livestock into pastures of lush clovers. Allow animals access to dry mature grass while grazing clovers.
- ▶ Provide a bloat preventative (poloxalene) for several days before cattle or sheep begin grazing lush forages.
- ▶ 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.

ADDITIONAL REFERENCES

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Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Charles B. Browning, Director of Oklahoma Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Dean of the Division of Agricultural Sciences and Natural Resources and has been prepared and distributed at a cost of \$21.39 for 900 copies.