Kansas Rural Center
SUSTAINABLE AGRICULTURE
MANAGEMENT GUIDES

SWEETCLOVER

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Sweetclover has a wide range of adaptation. Sweetclover can obtain phosphorus from relatively unavailable soil phosphates and is able to grow on soils where alfalfa, red clover or white clover often fail. It requires a pH of 6 or higher for proper nodulation to occur and has a higher calcium requirement. Sweetclover is highly sensitive to acid soils. Except for its high lime requirements, it is similar to lespedeza with its ability to tolerate low fertility soils. Sweetclover is a true biennial since it survives only one winter ("Cover Crops Management for No-till Grain Crop Production," 1986).

Sweetclover produces more vegetative growth the first year than most legumes because it grows uninterrupted till freezing weather. Sweetclover resumes growth in the spring later than alfalfa, red clover or alsike clover (Willard, 1927). Sweetclover can grow up to three feet the first year and up to five feet the second year.

Sweetclover is noted best for its ability to improve soil structure through its tremendous root growth. Its roots penetrate 20 to 30 feet deep into the soil. Roots make their greatest depth of growth during the first year. Root growth doesn't increase much till August of the first year. Then the root weight doubles from early October to freezing weather with 60-65% of the growth occurring in the top four inches of soil. In the second year the feeding roots within the top three feet become more abundant. Nodules are found at all depths. The root weight the second year reaches about 900 pounds per acre (Willard, 1927).

The above ground growth during the second year comes from dormant buds on the lower stem. If sweetclover is cut too short in fall of the first year, regrowth will be prevented and the plant will die. Plowing the second year should be done only after a few inches of regrowth to ensure that the plants will not sprout back again. Maximum soil improvement is provided when the sweetclover is allowed to reach the bloom stage during the second season, plowed under, and rotated to a small grain in the fall. The favorable effects of two years of sweetclover upon soil aggregation last for 2-3 years ("Sweetclover in Kansas," 1978). The optimum time for plowdown is late April to early May, achieving 80% of the maximum nitrogen accumulated during the season. However, an earlier plowdown helps reduce soil moisture depletion. Delaying spring plowing merely permits the translocation of dry matter from the easily decomposable roots to the less easily decomposable tops (Willard, 1927).

Crop Rotation Management

Sweetclover often is interseeded into wheat. While a biennial legume, it can be terminated the following spring after planting to quicken the rotation back to a cash crop such as grain sorghum or corn. Terminate the sweetclover only after it has begun to regrow after winter dormancy. Time the termination to optimize the spring growth with the need to conserve moisture for the subsequent crop.

Bill Granzow near Herrington prefers to broadcast sweetclover seed 12 pounds per acre on wheat ground in December with topdressed dry urea using an air spreader. If the field is rotated to grain sorghum the following spring, Granzow will disc the clover in early May and plant grain sorghum later in May. Another option is to summer fallow the clover field in the second year and rotate back to wheat (Granzow, 1998).

Paul Burmeister near Claflin, Kansas interseeds sweetclover with grain sorghum at planting. Fiberglass boxes in every other opening in his drill separate the sweetclover and grain sorghum seed. Burmeister's drill has 10 inch row spacings. The seed rates are typically about four pounds of sorghum seed and six pounds of sweetclover seed per acre (Burmeister, 1993). An on-farm trial in 1991 resulted in comparable yields between the sweetclover/grain sorghum combination without herbicides and a control without sweetclover with herbicide weed control (52 vs. 51 bushels per acre) (On-farm LISA Demonstration, 1991). Weed control options are limited after planting so proper seedbed preparation, later planting, and quick emergence of the sorghum and sweetclover are critical for shading out weeds.

Nitrogen Credits

Sweetclover, when grown for two years, produces the equivalence of 100-120 pounds per acre of nitrogen ("Using Legumes in Crop Rotations," 1988). First year summer seeding severely reduces the amount of organic matter and nitrogen during spring of the second year, but by July the differences narrow significantly. The total nitrogen per acre contained in the second year's growth usually reaches a maximum before the middle of June. The greater the first year's growth, the earlier this peak is reached. Sweetclover continues uninterrupted growth until freezing weather, while alfalfa and red clover usually bloom and form some seed the first year after fair vegetative growth. This difference allows sweetclover to produce more dry matter and nitrogen in the fall of the first year and have a much higher percentage of nitrogen in the dry matter early in the second year than alfalfa and red clover (Willard, 1927).

Livestock Feed

Seeds may be poisonous to horses. Cattle can be poisoned by eating moldy hay. The fungus in moldy hay can result in external and internal hemorrhages (Duke and James, 1981). Poorly preserved silage can also result in this "bleeding disease." Clover should be wilted to 65% moisture before ensiling. Sweetclover grows rapidly in the spring and its palatability decreases as plants grow taller and more woody ("Sweetclover in Kansas," 1978). Cattle tire of the taste of sweetclover and often prefer other forages. Sweetclover fed to cattle has a laxative effect until it blossoms and at this time cattle increase their preference for sweetclover and make better weight gains. In the dry, wheat growing region of Washington, beef gained a third more weight on sweetclover with grass pasture than on alfalfa with grass pasture. Cattle prefer the coarser parts, sheep the finer parts (Goldstein, 1989). Sweetclover can cause bloat but it is less of a risk than with alfalfa ("Sweetclover Production and Management," 1985).

Bill Granzow, a farmer near Herrington, prefers to graze sweetclover the second spring from late April to the third week in May before turning the cattle onto native grass. Granzow uses Bloat Guard to prevent bloat. After grazing, Granzow will let the sweetclover regrow and under favorable conditions will harvest seed. This land would then be rotated back to wheat. Granzow avoids baling second year sweetclover because the coarse stems are more difficult to cure adequately to prevent mold that produces dicoumarol, resulting in a "bleeding disease" in livestock. Granzow also has put up sweetclover as silage during the third week of May. Granzow prefers sweetclover to have a good bloom and more maturity to assist wilting the forage to get a desired 65% moisture content at ensiling. Sweetclover silage has been tested on a 16% protein dry matter basis on the Granzow farm (Granzow).

Soil Moisture

Sweetclover exceeds alfalfa in its ability to withstand drought conditions and high temperatures ("Cover Crops Management for No-till Grain Crop Production," 1986). Under the stress of drought in Kansas in 1989, an on-farm demonstration revealed grain sorghum following fallow yielded more than following sweetclover (Kansas Rural Center On-farm Demonstration, 1989). An early spring plowing of sweetclover will reduce drought stress on the following crop ("Sweetclover in Kansas," 1978).

Establishment

Broadcast 10-15 pounds of sweetclover per acre into fall-planted small grains just before the period of spring freezing and thawing. The natural heaving of the soil will help cover up the broadcasted seeds. Under favorable fall moisture conditions, sweetclover can be drilled at a depth of less than a half inch into a firm seedbed in mid-August at 10 pounds per acre. Fall seeded sweetclover generally yields less than spring seeded sweetclover. Summer seeding exposes the sweetclover to more winter kill from winter heaving (Kansas Ag Experiment Station's Biennial Director's Report, 1942). Sweetclover and red clover seedlings withstand lower spring temperatures than alfalfa seedlings ("Sweetclover in Nebraska," 1943).

Scarification

Sweetclover seed should be scarified since newly threshed seed germinates less than 50% of the seed with 50-80% being hard seed ("Sweetclover in Kansas," 1978).

Varieties

Yellow sweetclover blooms earlier; produces less plant matter but more roots; has shorter, smaller stems; withstands drought conditions better during seeding; is a better hay producer the second year; and is also a better seed producer than white blossom clover (Willard, 1927). Certified Norgold seed will produce a low-

coumarin variety of sweetclover which will help reduce the bitter taste of the clover and the potential risk of sweetclover disease ("Sweetclover Production and Management," 1985).

Publications

Kansas State University Extension has a useful publication entitled "Sweetclover in Kansas," L-510, 1978.

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CREDITS

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