

AGRICULTURAL GUIDE

Published by the University of Missouri-Columbia Extension Division

Clover

White, ladino and sweet clover

Jimmy C. Henning and Howell N. Wheaton
Department of Agronomy
College of Agriculture

AUG 2 5 1987

White and ladino clover

White clover is a stoloniferous plant with a shallow root system. The primary stems of white clover usually die before the second year, and the life of the plant depends upon the stolons and their haphazard roots.

The white clovers *Trifolium repens* L of the United States can be classified in three general groups—small, intermediate and large. The small white clover is probably native to an area and often is referred to as wild white clover. Most of the white clovers sold in this country as common white clover belong to the intermediate group. Dutch white clover, which is a strain of the species, belongs to this group, as does Louisiana Sl.

The varieties Pilgrim, Merit, Regal and Tillman belong to the large group and often are referred to as ladino clovers. Ladino has at different times been designated as a variety (in Italy), as an ecotype of white clover and as a completely different kind of clover. Evidently most of the large white clovers now used in this country derived from the "Ladino Gigante Lodigiano" of Italy, or the original ladino variety.

All of these groups of clovers are difficult to tell apart, except for their differences in size.

Buying certified seed is the only way to be sure the seed lot is not contaminated with wild white clover.

Adaptation

White clover will grow in soils considered too acid for red clover and alfalfa, but it is more productive if the pH_s is 5.5 or higher. White clover needs adequate phosphorus and potassium for establishment, persistence and growth.

White or ladino clover is especially responsive to cool, moist conditions. It grows best between 50° and 85°F. It also responds to irrigation about as much as any other legume. Because of its shallow root system, it is not adapted to shallow, droughty soils.

Ladino clover is widely used for forage, especially

in pasture. It is unexcelled as a pasture for hogs because of its unusually low fiber content. It is high in protein digestibility, a heavy nitrogen fixer, easy to establish and moderately winter hardy.

In grazing trials with beef cattle at the University of Missouri-Columbia, grass-ladino pastures have had as great a carrying capacity as grasses fertilized with 80 lbs. of nitrogen and have produced as much beef as grasses with 100 lbs. of nitrogen.

The two greatest deterrents to greater use of ladino clover are the possibility of its causing bloat and its inability to survive prolonged periods of dry weather.

The bloat problem is extremely difficult to characterize. Some farmers have reported using ladino for many years with little or no bloat problem. Others have reported heavy livestock losses. Because of the infrequency of the problem, there are often reports that a non-bloating variety of white or ladino clover exists. Unfortunately, this is not true.

One of the keys to grazing ladino with reasonable safety is to maintain a uniform grass-clover stand, with the clover not contributing more than 40 percent of the stand. Uneven stands of grass and ladino seem to be particularly dangerous. As a general rule, do not turn hungry cattle onto white clover pastures, especially those pastures wet with dew.

There occasionally have been cases of prussic acid poisoning with white clover. But not all plants of white or ladino clover will cause prussic acid poisoning.

Ladino clover is less sensitive to winter damage by fall usage than is red clover or alfalfa.

Ladino clover can be useful in re-establishment of legumes in predominantly grass sods. On an experimental basis, good stands of clover were established in a heavy fescue sod by overseeding one pound of ladino seed per acre for two consecutive years. No tillage was used, but seed was sown during winter months (Jan.-Feb.) so that freezing and thawing worked the seed into the soil. No nitrogen fertilizer was used during the establishment period.

Grazing management as well as weather factors will influence the amount of ladino in a pasture. Increased intensity of grazing usually increases the proportion of ladino to grass, while less frequent or longer intervals between defoliation tend to increase the proportion of grass in the mixture.

When ladino is seeded in a mixture with other legumes, about ¼ lb. of ladino seed per acre is adequate. When it is the only legume seeded with a grass, about ½-1 lb. is adequate. When used to overseed grass previously established, 1-2 lbs. is the most used rate. (All seeding rates are PLS).

White clover has more than 800,000 seeds per pound. Certified white or ladino clover seed will be at least 99 percent pure with 85 percent or better total germination, including hard seed. All seeding rates assume that seed quality will be equal to or greater than that of certified seed. Certified seed is 84 percent PLS.

Sweet clover

There are both annual and biennial types of sweet clover. In the central United States the biennial types are most important. White blossom sweet clover includes the varieties Denta and Polara, but most white blossom sweet clover used in Missouri is commercial common.

The use of varieties of yellow blossom sweet clover is slightly greater than that of white, but still most seed available is commercial common. Some of the yellow blossom varieties are Madrid, Goldtop and Yukon.

The yellow flowered species is finer stemmed and of higher quality, but it yields less than white blossomed sweet clover. Yellow common sweet clover is from 10 days to two weeks earlier than white.

The annual sweet clovers have had their greatest use in the South as a winter annual legume. The annual variety Hubam was used as a summer annual as well as a winter annual; a more recent annual variety is Israel.

Adaptation

Sweet clover has an extreme range of adaptation. About the only consistent requirement is one of high pH. Sweet clover needs a high pH (pH_s 6.0 or higher) for proper nodulation to occur, and it has a higher calcium requirement as well. Sweet clover is able to obtain phosphorus from relatively unavailable soil phosphates and will grow on soils where alfalfa, red clover or ladino will fail. Except for its high lime requirements, it is similar to lespedeza, which tolerates very low fertility conditions. But like other legumes, it makes its highest yields under less astringent conditions.

Sweet clover has great ability to grow and produce under dry conditions. It exceeds alfalfa in its ability to withstand drought and high temperatures. It also has

more resistance to grasshoppers than most other legumes. Yellow blossomed is considered to be more drought hardy than white blossomed sweet clover. The variety Madrid is especially tolerant of dry conditions.

Sweet clover also grows well on a wide range of soil conditions from claypan to sandy soils and is quite tolerant of wet conditions.

Sweet clover will have 260,000 seeds per pound. Certified seed will be at least 99 percent pure with 85 percent germination (including hard seed). Certified sweet clover seed is at least 84 percent pure line seed (PLS). All seeding rates assume that seed used is equal in quality to certified seed.

Plant characteristics

Sweet clover is a true biennial, surviving only one winter. When seeded in the winter or early spring, it will not usually bloom during the first season, especially if seeded in small grains.

From mid-summer to early fall during the seeding year, buds are formed on the crowns and roots. These buds remain dormant over winter, and early the next season a strong growth of stems is produced from the crown. Close pasturing or mowing during the late summer of the seeding year is detrimental to this growth.

When the second season growth is cut in the spring, new growth does not come from the crown as in alfalfa, but from the dormant buds on the lower portion of the stems. If the plants are cut too low, they die. Too-late cutting is also detrimental to early summer production. Usually the second season spring growth is exceptionally heavy, and stocking rates need to be high so that new shoots are initiated and blooming is delayed. Once blooming occurs, the plant sets seed and dies.

Sweet clover contains a high level of coumarin. When mold occurs during hay or silage making, this can be converted to dicumarol, an anticoagulant that can cause internal bleeding of animals consuming the forage.

If sweet clover hay is being fed and is suspected of containing dicumarol, the danger can be lessened by feeding the sweet clover hay for about two weeks, followed by feeding some other type of hay for three weeks.

Usages and management

Sweet clover may be used for hay or pasture or as a plow-down crop. By far its greatest use and adaptation is as a pasture and soil improving crop.

The amount of grazing it will furnish in its seeding year depends upon its companion crop. If seeded with a small grain that is harvested for grain, little forage production can be expected. If the grain is pastured or it is otherwise seeded with less competition, some first year pasturage can be expected. In

general, it can be pastured once it reaches a height of 12 to 14 inches if close grazing is avoided. It should not be grazed during September and early October, when it is producing winter root reserves.

Sweet clover is not as palatable as most other legumes because of its high coumarin content. Livestock soon get used to its taste and consume sweet clover readily. The coumarin content presents no animal health problem when used as pasture.

There is less danger from bloat with sweet clover than with alfalfa, red clover or alsike, but some possibility does exist.

No other legume will provide as much grazing as sweet clover during the spring and summer of its second year. Animal performance is equal to that of alfalfa, and for a short period its carrying capacity is greater. The biggest problem during this period is to regulate grazing so it is not grazed closely enough to harm new shoots yet close enough to prevent it from flowering.

As a soil improving crop, sweet clover probably has no equal. It has a deep tap root system that penetrates the subsoil, produces a large amount of growth that can be quickly broken down and converted to organic matter, and fixes high levels of nitrogen on heavy clay soils.

Sweet clover is unexcelled as a legume used to improve nitrogen levels, especially at the end of the first growing season. In Iowa tests it produced 146 lbs. of N as compared to 55 from alfalfa, 50 from red clover and 36 from ladino in the fall of the seeding year. Spring-seeded sweet clover may be plowed down during the fall or winter of the seeding year without much decrease in the potential nitrogen level produced during its full lifetime.

Sweet clover is a fine source of nectar and pollen for honeybees. Usually both yellow and white are used by beekeepers because yellow may bloom as much as two weeks before white, and a combination of the two extends the flowering season.

Cultural practices

It is best to seed sweet clover in the winter or early spring. Late summer or fall seedings tend to reach maturity, set seed and die by July of the following summer. This can reduce its total lifetime production by as much as 30 percent.

One of the most common ways to seed sweet

clover is to overseed on fall-seeded small grain or at spring oats seeding time. Eight pounds of scarified seed per acre is usually sufficient to get a good stand of sweet clover. A cool season grass should also be seeded with it. A good mixture is 10 pounds of tall fescue (8 lb. PLS) plus 8 pounds of sweet clover (7 lb. PLS).

Sweet clover contains a high percentage of hard seeds that persist in the soil for many years. This accounts for its consistent volunteering in many areas.

The same strains of bacteria that are used to inoculate alfalfa will inoculate sweet clover.

Diseases and insects

Sweet clover is usually considered to be more resistant to diseases than red clover.

Insects are troublesome to sweet clover, and in particular it is susceptible to the sweet clover weevil. This weevil is probably a major reason that sweet clover is not used more widely. Complete loss of new seedlings due to feeding by adult weevil is not uncommon in areas where much sweet clover is grown. Second-year stands may be damaged, but the stand seldom is destroyed.

About the only control for sweet clover weevil is the use of insecticides.

Summary

- Sweet clover is an excellent legume to provide nitrogen and improve soil tilth.
- It must have a high pH, but phosphorus and potassium levels are seldom critical for survival.
- Because of the way it regrows from buds along its main stem, during its first year of growth sweet clover must not be grazed down to less than 10 to 12 inches in height.
- It is not as palatable as most other legumes.
- Sweet clover is not as consistent as red clover in producing high quality forage over the summer period.
- Sweet clover is very tolerant of dry conditions, heat and grasshoppers.
- It is a true biennial and will survive only one winter.
- It is susceptible to attack by the sweet clover weevil.
- It is not a very good hay crop.
- It is better adapted to short rotation pastures than to long-term permanent pastures.

Faint, illegible text in the left column, likely bleed-through from the reverse side of the page.

Faint, illegible text in the right column, likely bleed-through from the reverse side of the page.