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Growing White Clover in Kentucky

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White clover (*Trifolium repens* L.), a low growing perennial with white flowers, differs from most clovers in that the stems (stolons) grow along the surface of the soil and can form adventitious roots at each node (Figure 1). The adventitious roots help the plants spread and develop new plants, and the low growing habit helps the plants survive in grazing situations because only the leaves and flowers are eaten.

White clover probably originated in the eastern Mediterranean region or in western Asia. It was grown in England in the early 1700s and was introduced into North America by early colonists. Once established in North America, the small, hard seeds, which could quickly pass intact through grazing animals' digestive systems, were spread over a wide range. White clover can be found growing from the Arctic Circle to temperate regions. Volunteer stands often occur after second-growth timber is cleared.

Three types of white clover grow in Kentucky. **Small** white clover, generally called white "Dutch," originated in Holland. The **intermediate** white clovers are larger than white Dutch. Most unnamed varieties of white clover sold in the U.S. are of the intermediate type and are often called "common" white clover. **Large** white clover, or Ladino, is much larger and produces three to five times as much growth as white Dutch clover.

White clover is one of the most important pasture legumes in Kentucky. It is almost always grown with grasses to supply nitrogen and improve the feed value of pastures. It is one of the most nutritious and palatable of all legumes because grazing animals only eat the leaves and flowers. Although white clover is best suited for grazing, it can be used for silage, hay, soil improvement, and reclaiming disturbed land. When harvested as silage or hay, yields will be low compared to red clover.

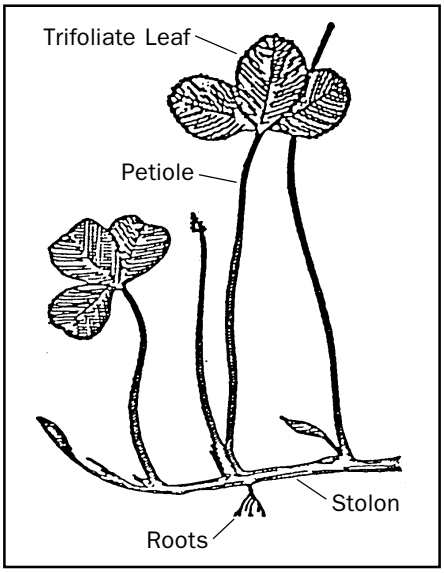

Figure 1. White clover spreads by creeping stems (stolons) that root at the nodes. One leaf per node grows from the stolon.

Varieties

A limited number of white clover varieties are available for sale in Kentucky. Certified Regal Ladino seed is usually available and is a good choice for most situations. Common "white Dutch" seed may also be available, but is usually less productive than Ladino varieties. Mixtures of white clovers (primarily Ladino-varieties) are being packaged and promoted for wildlife plantings. These mixtures are usually more expensive and have not been proven to be any better than single varieties. For best results, plant only certified varieties of white clover.

Soil Selection

White clover grows best in moist, fertile, well drained soils. However, it will grow on most soils used for pasture in Kentucky. Because of its shallow root system it will not do well on some of the drier soils in some years. The shallow roots also limit production during summer. Ladino does well on somewhat poorly drained soils, but it may need to be reseeded more often than on better sites.

Fertility

The two most important soil fertility factors in growing white clover are pH and phosphorus. Soils should be limed to a target pH of 6.4 for seeding white clover. For late winter or spring seedings, perform soil tests in the fall and apply lime at this time, if needed. Applying lime in the fall will give it time to dissolve and increase the pH before the clover is seeded. Phosphorus and potassium could also be applied in the fall. Soil test levels of these nutrients should be maintained at medium or higher for good white clover growth.

Nitrogen should **not** be applied on white clover. White clover is able to "fix" nitrogen from the air with the help of bacteria that live in nodules on the plant roots. Fertilizer nitrogen reduces nitrogen fixation and increases competition from grass and weeds. This becomes even more of a problem when seeding white clover into grass pastures. Increased grass

competition from added nitrogen can cause failure of white clover seedings.

Sowing the Crop

If a tilled seedbed is to be used, disk or plow the land at least a week before sowing. Make sure the seedbed is well pulverized and the surface is smooth and firm. The seed can be broadcast on the surface and covered using a cultipacker. Drills can be used, but do **not** place the seed more than one-fourth inch deep. As a "rule of thumb" you should be able to see some seed on the surface after seeding white clover.

White clover is rarely sown alone. In Kentucky, a cool season grass such as tall fescue or bluegrass is normally used with it. Ladino clover is suggested for seeding with tall fescue. Use ten pounds of fescue per acre with one to two pounds of inoculated Ladino clover seed. Spring seeding (February 1 to April 15) is best for the clover, but late summer (August 1 - September 10) is better for the grasses. A good compromise may be to sow grasses in late summer and then sow clover in late winter or early spring.

Renovation is probably the most common method of establishing white clover in Kentucky. In this method, the grasses such as bluegrass or tall fescue are already established and they are "renovated" by seeding white clover or other legumes (see AGR-26, "Renovating Hay and Pasture Fields"). Basically, the grasses are grazed or mowed very short and white clover is seeded in late February or March. Several methods of seeding will work:

1. A light disking of the grass sod can be used and the seed sown as described for a tilled seedbed.
2. Seed can be broadcast on the soil surface in February or early March; freezing & thawing will cover the seed.
3. A no-till drill can be used to place the seed in the soil.

One of the most important factors in successful establishment of white clover with any of these methods is controlling competition from the grass after seeding. The best way to do this is by grazing the pasture until the clover is two to three inches tall and then removing the animals for three weeks or more. If grazing is not possible, the grass can be kept short by mowing.

Management

White/Ladino clover tolerates grazing very well; however, continuous grazing can deplete a stand. By subdividing pastures into three or more paddocks, rotational grazing increases stand life and improves utilization of the forage. In periods of excess production, some paddocks can be left ungrazed and cut for hay, although yields may be low compared to red clover. Short rest periods of two to three weeks allow the clover to renew its vigor. Rotational grazing also makes it easier to mow for weed control or spread manure piles.

White clover is a short-lived perennial, and thus some effort is required to maintain it in pastures. Ladino does not reseed itself as well as common or white Dutch types of white clover. Therefore, it may be necessary to sow some seed of the Ladino type periodically to maintain good stands.

Cattle may bloat on white clover pastures under certain conditions. However, the problem can be minimized by proper management (see ASC-57, "Forage Related Cattle Disorders"). Bloat is more likely to be a problem when:

1. Clovers make up 50% or more of the pasture forage
2. Cattle are first placed on clover pastures when they are very hungry
3. The pasture is lush and lots of forage is available
4. The forage is wet from dew or rain.

Special precautions should be taken during these times.

Feed Quality

White clover is high in feed value partly because only leaves and flowers are grazed. White clover is higher in crude protein than birdsfoot trefoil, alfalfa, or red clover. It is also very palatable and highly digestible.

In a Virginia study with orchardgrass and tall fescue, Ladino clover was compared with nitrogen fertilizer over a ten-year period. Steers grazing the grass-Ladino clover mixtures gained about 17% more than steers grazing the grasses alone fertilized with 200 pounds of nitrogen per acre per year. The grass-clover mixtures were also more palatable than the grasses fertilized with nitrogen.

Diseases and Insect Pests

White clovers are susceptible to stolon and root rots, both of which can seriously deplete stands. These diseases are more likely to be a problem on less well drained sites. Tolerance to these diseases can be increased by selecting clover varieties that are adapted to the area where they are to be grown. Good management practices that help maintain the vigor of the plant also help increase resistance to these diseases and other stresses.

Potato leafhopper feeding on white clover causes stunting and a reddening-bronzing and browning of the leaves. Spittle bugs can stunt plants and cause a rosetting of the terminal growth. Insects are not likely to cause enough damage to white clover in Kentucky to warrant the use of insecticides.

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