



# White Sweetclover

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**W**hite sweetclover (*Melilotus alba*) is a biennial legume that can be a valuable tool for sustainable farming in the tropics. This plant produces an extensive root system and a deep taproot to scavenge soil nutrients and moisture from deep in the ground. These nutrients are available to subsequent crops when the plant is tilled in as a green manure to add nitrogen and organic matter to the root zone. The farmer can use this crop's taproot for loosening compacted plow layers or heavy subsoils. With a feed value comparable to alfalfa, white sweetclover can be used for rotational grazing or haymaking.

## Characteristics

White sweetclover is actually not a true clover but is more closely related to alfalfa. It is an annual or biennial summer legume that grows to a height of 3–5 ft (0.9–1.5 m) or more. It has trifoliate leaves and a taproot that can extend as deep as 3–5 ft (0.9–1.5 m) into the subsoil. During the second year of growth, white sweetclover will produce bracts of tiny blooms through much of the year.

## Environmental requirements

White sweetclover tolerates heavy clays as well as light, sandy soils. It grows best at a pH range between 6 and 8. Due to its taproot, white sweetclover tolerates drought conditions once it is established. It requires at least 17 inches of rainfall per year. In Hawaii, white sweetclover grows year round at elevations ranging from sea level to 2500 ft, according to the USDA Natural Resources Conservation Service (NRCS).

## Benefits provided by white sweetclover

**EXCELLENT** for increasing soil organic matter and improving soil structure

**VERY GOOD** as a source of organic nitrogen, for protecting soil and controlling erosion, for attracting beneficial insects, for reduced- and non-chemical pest management, for providing lasting crop residues, and for penetrating subsoil and hardpans

**GOOD** forage production, nutritional quality, and palatability

**GOOD** shade tolerance makes it suitable as a living mulch with vegetables or a cover crop in orchards

**TOLERATES** heat and drought conditions, low fertility soils

**USE IN** annual production systems including vegetables, herbs, cut flowers and ornamentals, dryland taro



## Cultivars

The cultivar commonly recommended by the Hawaii NRCS is an annual, 'Hubam'.

## Establishment

Broadcast 15–30 lb pure live seed per acre, or drill 6–10 lb pure live seed per acre. White sweetclover is hard-seeded; if available, purchase scarified seed. Inoculate seeds with an “alfalfa-medic” type rhizobia inoculant. Once inoculated seed has been applied, it is usually unnecessary to inoculate succeeding crops of the legume. Broadcast and cover or drill to a depth of ¼–1 inch (0.6–2.5 cm).

## Uses

### Soil improvement

White sweetclover produces about 2.5 tons/acre dry matter and about 63 lb of nitrogen (N) per ton of dry matter (NRCS). To optimize N fixation, the soil should have adequate phosphorus, sulfur, and micronutrients, especially iron and molybdenum, suitable pH, and good aeration (no compaction or waterlogging). Sweetclover is often recommended for the regeneration of low-fertility, thin soils.

Additional significant benefits such as improved soil structure, drainage, and water-holding capacity result from adding organic matter to the soil. White sweetclover produces lots of biomass and fixes N, making it a good choice as a green manure crop. Taller, stemmy cultivars provide longer lasting organic residues for improving soil quality, but their woody nature makes field incorporation more difficult.

White sweetclover’s root system helps to improve the structure and tilth of the topsoil layer. In addition, it can scavenge nutrients such as phosphorus, potassium, and micronutrients from the subsoil and make them more available for subsequent crops. This attribute allows white sweetclover to grow well on low-fertility soils. This plant is thus a good choice for improving farmed-out fields.

### Hardpan penetration

White sweetclover is valuable as a low-cost tool for breaking up compaction in subsoils, loosening naturally heavy clay subsoils as well as hardpans resulting from conventional machinery traffic. To maximize the ability of its root system to aerate the subsoil, use lighter sowing rates. Most of the root growth occurs during the first year.

### Cover crop and living mulch

Sweetclover has been used on the U.S. mainland as a living mulch with vegetables such as broccoli and winter squash. It can also be used as a nurse crop to help establish slower-growing companion grass cover crops. Sweetclover shows potential as a cover crop, as part of a rotation program, because it seems to be better than most cash crops in extracting phosphorus, potassium, and other nutrients from insoluble materials in the soil, while the deep taproot can obtain minerals from deeper soil horizons. The nutrients that are stored in the sweetclover plant can then become available for the next crop in the rotation program.

### Attract beneficial insects

As an insectary plant, white sweetclover is valuable to promote reduced- or non-chemical management of insect pests. Its blossoms attract honey bees, tachinid flies, and large predatory wasps.

### Feed

Farmers practicing sustainable agriculture have the alternative of using white sweetclover for livestock grazing or as a hay crop. First-year sweetclover is similar to alfalfa in feed value quality, but quality declines in the second year. If animal production is desired, select cultivars with low levels of coumarin, because feeding of typical sweetclover varieties can cause bloat. Coumarin also gives sweetclover an undesirable bitter taste, reducing its appeal to livestock.

### Management cautions

White sweetclover is a poor competitor, and weed management may be required during the establishment year. White sweetclover will exploit soil moisture to the extreme and may depress yields of subsequent crops in drought-prone soils. This plant’s hard seed can remain in the soil for many years and volunteer in future crops.

This cover crop does not tolerate acid soils. Because the canopy has a tough, fibrous growth, it is advisable to turn the crop over early enough to speed up the decomposition process and facilitate field operations during incorporation.

Sweetclover used as a cover crop should be expected to provide relatively poor weed control because the seed

is small and the plant is slow to become established. To overcome this, consider intercropping it with a small grain, such as oats.

### Pest problems

Sweetclover weevil (*Sitonia cylindricollis*) is a major pest in some areas. Other important pests include cutworms and nematodes. Nematodes that have been isolated from white sweetclover roots include *Belonolaimus gracilis*, *Ditylenchus dipsaci*, *Heterodera glycines*, *H. trifolii*, *Meloidogyne hapla*, *M. javanica*, *Pratylenchus projectus*, *P. penetrans*, *P. pratensis*, *P. vulnus*, and *Tylenchorhynchus martini*.

### For assistance:

Contact your nearest Cooperative Extension Service office for additional assistance in selecting appropriate cover crops and green manures for your farm and cropping situation. Help can also be obtained from the USDA Natural Resources Conservation Service field offices located on each island.

Visit CTAHR's Sustainable Agriculture for Hawaii Program Website at <<http://www.ctahr.hawaii.edu/sustainag>> to find additional information about green manure and cover crops. The site also includes references and links to other useful on-line resources.



### Sustainable Agriculture in Hawaii . . .

. . . integrates three main goals—environmental health, economic profitability, and social and economic equity. Sustainable farms differ from conventional ones in that they rely more on management practices such as crop diversification and crop rotation, agroforestry, integrated pest management, rotational grazing, and innovative marketing strategies. For further information on Sustainable Agriculture in Hawaii, contact:

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