SUNN HEMP

Crotalaria juncea L.

Plant Symbol = CRJU

Contributed by: USDA NRCS Soil Quality Institute and the National Plant Data Center

USDA NRCS Hawaii PMC

Uses

Cover Crop & Green Manure: Used as a cover crop, sunn hemp can improve soil properties, reduce soil erosion, conserve soil water, and recycle plant nutrients.

When grown as a summer annual, sunn hemp can produce over 5,000 pounds of biomass and 100 pounds of nitrogen per acre. It can produce this amount within 60 to 90 days, so it has the potential to build organic matter levels and sequester carbon in the soil. It is known to suppress nematodes.

Sunn hemp originated in India where it has been grown since the dawn of agriculture. It has been utilized as a green manure, livestock feed, and as a non-wood fiber crop.

Status

As of 2005, Arkansas considered the genus *Crotalaria* as a noxious weed. Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Weediness

This plant may become weedy or invasive in some regions or habitats and may displace desirable vegetation if not properly managed. Please consult with your local NRCS Field Office, Cooperative Extension Service office, state natural resource, or state agriculture department regarding its status and use. Weed information is also available from the PLANTS Web site at plants.usda.gov. Please consult the Related Web Sites on the Plant Profile for this species for further information.

Description

Legume family (Fabaceae). Branched, erect, herbaceous shrubby annual growing 3 to 9 feet high with bright green simple, elliptical leaves. It has deep yellow terminal flowers (open raceme to 10 inches long) and the light brown pods are small (1 inch long and 1/2 inch wide) and inflated. It has a well-developed root system, with a strong taproot. The number of seeds per pound is 15,000.

Distribution: For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Adaptation

Sunn hemp is a tropical or sub-tropical plant that when grown in the continental United States performs like a summer annual. It can be planted year round in Hawaii below an elevation of 1,000 feet. However, it does not perpetuate itself well and is not found in the wild. Sunn hemp is adapted to a wide range of soils and performs better on poor sandy soils than most crops. It is for such situations that it has attracted attention. It grows best on well-drained soils with a pH from 5.0 to 7.5.

Establishment

To establish a successful stand, seed should be broadcast or drilled and covered ½ to 1 inch deep into a well prepared, weed-free seedbed. If broadcasted, seed at a rate of 40 to 60 pounds of live seed per acre. If drilled, the rate should be 30 to 50 pounds per acre in 6-inch rows. The higher rates should be used if the crop will be terminated in less than 60 days or if severe weed competition is expected. Where weed competition is mild, drilled rates as low as 20 pounds of live seed per acre have been satisfactory. Inoculate with the cowpea-type rhizobia bacteria.

Using a winter cover crop/green manure is a conservation practice that provides soil-improving characteristics. A common problem, however, is that the relatively short period between cash crop harvest in the fall and planting the following spring can result in less than optimum biomass production of the cover crop. Sunn hemp, because of its rapid growth and relatively short growing season requirement, can be an excellent alternative. Where conditions are favorable, it can provide the benefits of a winter

legume prior to a killing frost in the fall and also in the summer after the winter crop has been harvested.

Management
Warm weather (frost-free) is needed for 8 to 12 weeks to provide biomass and nitrogen. Small grains following sunn hemp can utilize the symbiotically produced nitrogen, thus reducing or eliminating the loss of nitrogen. It must be plowed under before reaching the full bloom stage or it becomes too fibrous when using it as a green manure.

Pests and Potential Problems
Some species of *Crotalaria*, including *Crotalaria juncea*, contain toxic alkaloids, particularly the seeds and pods. 'Tropic Sun' is non-toxic and is resistant to root-knot and reniform nematodes. The genus *Crotalaria* has been known for its suppression of plant-parasitic nematodes.

Seed Production
-Drill 3 to 4 live seeds per foot about 1/2 inch deep in 36 to 42 inch rows. This will give a live seeding rate of about 4 lb/acre. Isolate the seed field from other *Crotalaria* plants.
-Test soil and apply fertilizer and amendments per recommendations (broadcast before planting or banded next to seed at planting).
-Irrigate if needed until about 75% of plants are flowering (usually occurs at end of the third month). Stop irrigating after the 75% bloom stage. 'Tropic Sun' is easily threshed when dry. To enable the plants to dry naturally, time the planting so that flowering, seed set, and harvest occur during the dry season.
-Cultivate as needed to control weeds. Fields should be weed free at harvest to prevent contamination of crop. Remove any wild *Crotalaria* before harvest.
-Combine when seeds rattle in the pods, about 5 months from planting. Raise the combine header as high as possible without leaving seed pods on the plants (which prevents excess straw from slowing combine). Initially set the concave clearance at 1/8 to 3/16 inch and the cylinder speed at 1150 to 1200 RPM. Adjust as needed according to crop conditions.
-When seed crop is ready for harvest, the plants should be dry and self-defoliated. If crop is still green, desiccate by spraying with an approved desiccant 1-2 weeks before harvest.
-Clean seed with standard commercial seed-cleaning equipment. Dry the combined material before cleaning.
-If commercial seed-drying and storage facilities are available, dry seed to below 10% moisture and store at low temperature and humidity.
-Seed yields have ranged from 500 of over 2200 lb/ac, varying with environmental conditions and cultural practices.

Cultivars, Improved, and Selected Materials (and area of origin)
'Tropic Sun': This has promise as an alternative to winter legume cover crops as an organic matter builder and as a symbiotic nitrogen producing legume. The USDA NRCS and the University of Hawaii Institute of Tropical Agriculture and Human Resources cooperatively released the cultivar 'Tropic Sun' sunn hemp in 1983. This cultivar is non-toxic to poultry and livestock as shown by laboratory tests and feeding trials. Since sunn hemp is a short-day plant and will not set seed consistently north of 28° N latitude (slightly north of Corpus Christi, TX), it has little potential for becoming a weed in most of the U.S. 'Tropic Sun' sunn hemp should receive a minimum of 1 inch of moisture per week for maximum growth, however it is quite drought tolerant.

The supply of sunn hemp seed is limited due to few growers and the need for the plant to be grown in tropical regions to produce seed. Currently, limited supplies of seed can be obtained from the University of Hawaii and www.groworganic.com. If sufficient demand develops, it may be possible to produce seed in areas like south Texas or south Florida. The NRCS does not endorse any certain company over another.

Control
Please contact your local agricultural extension specialist or county weed specialist to learn what works best in your area and how to use it safely. Always read label and safety instructions for each control method. Trade names and control measures appear in this document only to provide specific information. USDA NRCS does not guarantee or warranty the products and control methods named, and other products may be equally effective.

References
University of Hawaii. 2005. Sustainable agriculture in Hawai'I – green manures – 'Tropic Sun' sunn hemp. Accessed: 050927. <http://www2.ctahr.hawaii.edu/sustainag/GreenManures/tropicsunnhemp.asp>

USDA NRCS. 2003. Sunn hemp: A cover crop for southern and tropical farming systems. Soil Quality – Agronomy Technical Note No. 10. Washington, DC.

Prepared By:
Robert Joy, Plant Materials Center, Hoolehua, Hawai'i and J.S. Peterson, USDA NRCS National Plant Data Center, Baton Rouge, Louisiana.

Species Coordinator:
Robert Joy, USDA NRCS Plant Materials Center, Hoolehua, Hawai'i.

Edited: 23sep05 jsp

For more information about this and other plants, please contact your local NRCS field office or Conservation District, and visit the PLANTS Web site<http://plants.usda.gov> or the Plant Materials Program Web site <http://Plant-Materials.nrcs.usda.gov>