'Tropic Sun' sunn hemp
_Crotalaria juncea_ L.

'Tropic Sun' sunn hemp was released in 1983 by the USDA NRCS Hoolehua Plant Materials Center in cooperation with the University of Hawaii, Hawaii Institute of Tropical Agriculture and Human Resources, Department of Agronomy and Soil Science.

**Description**

'Tropic Sun' is an erect, branching, annual legume. It grows rapidly, achieving a height of 4 to 6 feet in 60 days under favorable conditions. The plants are generally unbranched from the ground to approximately 2 feet. The simple, elliptical leaves are 2 ½ to 5 inches long, and ½ to 1 inch wide. The flowers are bright yellow and, typically, 18 to 20 develop on terminal racemes up to 10 inches long. The papery, inflated seed pods are cylindrical, 1 to 1 ¼ inches long, and ¼ to ½ inch wide. Seeds are dark slate green and about ¼ inch long. There are about 15,000 seeds per pound.

**Source**

The presumptive original seed of Tropic Sun was purchased in 1958 from a farmer on the island of Kauai, who grew it as a cover crop. The Pineapple Research Institute did considerable work with the _Crotalaria_ species and may have brought the strain to Hawaii. No other information is available regarding its origin.

**Conservation Uses**

'Tropic Sun' is an excellent green manure that can be included in rotation with vegetable, ornamental, and other crops to add nitrogen and organic matter to soil, suppress weeds, and reduce root-knot nematodes. In test plots, Tropic Sun added 134 to 147 lbs of nitrogen per acre to the soil when grown for 60 days and incorporated. Where growing conditions are favorable, as much as 3 tons organic matter per acre air-dry basis can be produced within 60 days. Experiments have shown that incorporating a Tropic Sun cover crop into a crop system can significantly reduce root-knot nematodes (Meloidogyne spp.) populations in the soil because is not a suitable host.

**Area of Adaptation and Use**

Sunn hemp is considered native to India, where it is extensively used for soil improvement, bast fiber, and forage. It is probably the most widely grown green manure crop in the tropics. It is found in Indonesia, Zimbabwe, Malaysia, Taiwan, and China. Since sunn hemp is a short-day plant and will not set seed consistently above 28° latitude (e.g., slightly north of Corpus Christi, TX), it has little potential for becoming a weed in much of the U.S. In Hawaii, Tropic Sun grows year-round and grows best below an elevation of 1,000 feet (though is known to grow up to 2,500 feet) and in an annual rainfall range of 20-200 inches. Tropic Sun grows on soil textures ranging from coarse to fine, and on infertile as well as fertile soils. It grows best on well-drained soils with pH levels from 5 to 7.5.

**Establishment and Management for Conservation Plantings**

Before planting, seed should be inoculated with cowpea-type or "EL" inoculant to ensure effective nodulation as some soils may not contain compatible Rhizobium strains. Broadcast seed at a rate of 40-60 pure live seed (PLS) pounds per acre. Good seed to soil contact is essential to establish a uniform stand. It is imperative that broadcast seed be covered with at least ¼ inch of soil. If drilled, seed can be planted at 30-50 PLS pounds per acre in 6 to 7 ½ inch rows at about ½ to 1 inch deep in a well-prepared, weed-free seedbed. Higher seeding rates should be used if the crop is to be terminated in less than 60 days or if severe weed competition is expected. Irrigation may be applied to promote rapid germination and early growth. Although Tropic Sun is drought tolerant, it should receive a minimum of 1 inch of moisture per week for maximum growth.

A sunn hemp green manure crop should be terminated at the bud to early flowering stage, about 60 days after planting. If allowed to grow beyond the early flowering stage, plant stems will become increasingly fibrous and difficult to incorporate.
into the soil. Tropic Sun can be terminated as early as 30-45 days after planting and still add nitrogen and organic matter to the soil, although at reduced levels.

Satisfactory methods have been developed to turn the crop under. They are: (1) mow with a rotary or flail mower, then plow as soon as possible so the material does not dry; the chopped material incorporates easily when green, whereas when dry it becomes light and tends to accumulate in front of the plow blade; (2) plow the erect, standing crop; a single plow will usually do a better job than multiple plows; the crop should not be lightly disked or otherwise laid down before plowing, as the plants will become tangled in the plow; (3) rototill with rear-tine machines when the plant stems are succulent; if the crop is tall (over 4 feet), it should be mowed first; (4) disk with a heavy duty disk when the plant stems are succulent; soil moisture must be at a suitable level for any tillage method to work well.

Ecological Considerations
The Tropic Sun sunn hemp cultivar is non-toxic to poultry and livestock as shown by laboratory tests and feeding trials (Rotar and Joy, 1983). Aphids (Aphis spp.) and the bean butterfly (Lampides boeticus) have been the main insect pests. Powdery mildew (Oidium spp.) may appear on leaves during very humid weather.

Seed Production
Seed yields of over 2,000 pounds per acre can be achieved; however, seed yield will vary according to field conditions, weather, and other factors. Apply fertilizer and other soil amendments according to soil test results and recommendations from your local extension office. Drill seed at 3-4 PLS pounds per acre (about 3-4 seeds per foot) in 30-42 inch rows to promote branching. Isolate the field from other Crotalaria plants. If wild Crotalaria are present, they should be removed before planting and harvesting. Most weeds can be controlled mechanically to ensure purity of the seed harvest. An approved preemergence herbicide can also be used for weed control. Irrigation may be applied at a minimum of 1 inch per week for maximum production but should be halted when about 75% of the plants are flowering.

Time plantings so that harvest occurs during the dry season to enable the plants to dry-down naturally. Tropic Sun is easily threshed when dry. Harvest when 50-75% of the pods have seed “rattling” (about 5 months from planting). When the seed crop is ready for harvest, the plants should be dry and leaves senesced. Moisture from the green plants can create a sticky mess in the combine and make seed harvest very difficult, if not impossible. To dry the plants sufficiently for harvesting with a combine, spray with an approved desiccant, or similar materials 1-2 weeks before harvest. Final seed cleaning is easily accomplished with standard commercial seed-cleaning equipment if the fields are kept free of weeds. Dry seed to below 10% moisture and store at low temperature and humidity.

Availability
For conservation use: Tropic sun is not available from the commercial market at the time of publishing.

For seed or plant increase: Tropic Sun breeder and foundation seed is maintained by the USDA-NRCS Hoolehua Plant Materials Center on Molokai and is available to interested commercial growers.

Citation

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

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