The use of sunn hemp as cover crop and forage in Florida

Joao 'Joe' Vendramini, Professor – Forage Management
Range Cattle Research and Education Center, Ona, Florida

Published in *The Florida Cattleman and Livestock Journal*, March 2021

Warm-season perennial grasses are the predominant forages in Florida; however, the use of warm-season legumes as pure stands or overseeded into warm-season perennial grass pastures may provide benefits such as increased forage nutritive value and biological nitrogen fixation.

Sunn hemp (*Crotalaria juncea*) is a warm-season annual legume that has been used primarily as a cover crop due to its rapid growth and relatively affordable price of seed. Sunn hemp can fix nitrogen from the atmosphere and its decomposition in the soil may supply nutrients for the companion or subsequent crop. In addition, sunn hemp may suppress root not nematodes in the soil. For those reasons, several vegetable and row crop producers are using sunn hemp to decrease erosion and improve soil health.

The University of Hawaii and USDA released a variety named 'Tropic Sun' in 1982. This genotype has limited seed production and greater seed cost. Auburn University released 'AU Golden' and 'AU Darbin' cultivars, that can produce seeds in temperate climate. In addition, other cultivars available in Florida are 'Crescent Sunn' or 'Ubon', both developed in Ubon Ratchathani (Thailand), and 'Blue Leaf' from India.

However, there is limited information regarding the agronomic performance and adaptability of these cultivars in Florida.

Sunn hemp seeds and pods may contain pyrrolizidine alkaloids, a class of chemical compounds typically found in the *Crotaria* genus that can negatively impact animal performance. However, several studies have shown safe animal intake of this legume without adverse effects when consumed in the vegetative growth stages with no inflorescence (flowers or seed pods).

A series of studies were conducted in Florida to test different cultivars and the potential to use sunn hemp as forage for beef cattle. At Ona, four cultivars (Tropic Sun, Crescent Sunn, AU Golden, and Blue Leaf) were tested. Note, there have been some changes in the cultivar names and the commercial sunn hemp referred to as 'Crescent Sunn,' may be referred to as 'Ubon' in the literature. Plots were seeded with a drill in a prepared seedbed in April 2016 and 2017 with seeding rate of 20 lb/acre,and fertilized with 300 lb/acre of 10-10-10 approximately 7 days after seeding. It was observed that the cultivars have different herbage accumulation and nutritive value when harvested at 60 days after seeding. Tropic Sun had the greatest forage production, followed by Crescent Sunn and AU Golden; Blue Leaf had the least forage production. The differences were primarily due to the distinct time to flower among cultivars. The cultivars Tropic Sun and Blue Leaf did not flower at Ona and were harvested at the end of the growing season.

Table 1. Forage production and time to flowering/growing season end of sunn hemp cultivars.

Cultivar	Herbage accumulation (lb DM/acre)	Time to flowering or growing season end (d)
AU Golden	1,780b	83b
Blue Leaf	1,340c	174a
Tropic Sun	2,950a	159a
Crescent Sunn	1,740b	92b

Means followed by different lowercase letters are statistically different

The cultivar AU Golden had greater crude protein concentration than the other cultivars, while AU Golden and Tropic Sun had the greatest digestibility (Table 2). The average crude protein and digestibility of all cultivars would be sufficient to meet the requirements of mature lactating beef cows.

Table 2. Crude protein and digestibility of different sunn hemp cultivars.

Cultivar	Crude protein (%)	Digestibility (%)
AU Golden	15.5a	58a
Blue Leaf	13.2b	53b
Tropic Sun	11.0c	60a
Crescent Sunn	13.9b	52b

Means followed by different lowercase letters are statistically different

The biological nitrogen fixation is certainly one of the main desirable characteristics of legumes. The Tropic Sun fixed 72 lb nitrogen /acre, while AU Golden, Blue leaf and Crescent Sunn fixed, on average, 58 lb/acre. Greater biological nitrogen fixation of Tropic Sun occurred because of the greater forage production.

An additional trial was conducted at Ona to evaluate the forage intake and digestibility of Crescent Sunn fed to beef heifers. An area of 5 acres were seeded with Crescent Sunn and harvested 60 days after seeding. The forage was dried on the field for 7 days and baled in round bales. The treatments were heifers receiving 100% sunn hemp, 50% sunn hemp and 50% bermudagrass, or 100% bermudagrass. The forage was ground with a hay chopper and fed to the heifers daily. It is important to mention that the nutritive value of the sunn hemp and bermudagrass hay were similar with 12% crude protein and 53% digestibility.

Increasing the proportion of sunn hemp in the diet decreased total forage intake (1.6, 1.4 and 1.2% bodyweight with 0, 50 and 100% sunn hemp) and digestibility (52, 52 and 48 % digestibility with 0, 50 and 100% sunn hemp). It is possible that low concentrations of alkaloids in sunn hemp leaves affected the digestibility and forage intake. Samples of the sunn hemp hay were tested and there was a presence of different types of

pyrrolizidine alkaloids. However, further research will be necessary to evaluate the effects of those alkaloids on animal performance.

In conclusion, the commercially available sunn hemp cultivars in Florida have significant forage production and adequate nutritive value when harvested 60 days after seeding. The nitrogen fixation characteristics of sunn hemp is very attractive to decrease use and cost of fertilizer in forage systems. Tropic Sun had the greatest forage production; however, the seed price is greater than Crescent Sunn. AU Golden showed the greatest nutritive value but additional feeding studies are needed to evaluate the potential impacts of greater nutritive value on animal performance. Despite the lesser intake and digestibility of sunn hemp than bermudagrass, sunn hemp harvested during the vegetative growth stage (no seeds present) might be a viable feedstock for cattle production in Florida.

If you have any questions about sunn hemp management, please contact Joe Vendramini at jv@ufl.edu.

***

Upcoming Events

March 9, 11:00 to 11:45 a.m., Ona Agronomy Program Highlight with Dr. Joao Vendramini presenting " The use of sunn hemp as cover crop and forage in Florida."

March TBD, 1:00 to 2:00 p.m., Become a Bluebird Watcher**!** Session 5: Nest box check / bluebird diet in the field. Please contact Hance Ellington e.ellington@ufl.edu for more information.

Visit our calendar online to view all our upcoming events and their registration links:

***

UF/IFAS Range Cattle REC - 3401 Experiment Station Rd., Ona - http://rcrec-ona.ifas.ufl.edu/