

TECHNICAL NOTES

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PLANT MATERIALS TECHNICAL NOTE NO. 20

'Tropic Sun' sunn hemp for cover crop use during the sugarcane fallow period

Introduction

'Tropic Sun' sunn hemp is a tropical or sub-tropical plant that acts like a summer annual when grown in the continental United States. Released in 1982 from the NRCS Plant Materials Center in Hawaii, 'Tropic Sun' was developed for use as a summer green manure crop in rotation with vegetables, ornamentals, and other ag crops to add nitrogen and organic matter, to suppress weeds, control erosion, and to reduce root-knot nematodes. When grown as a cover crop in southern climates, sunn hemp can produce 5,000-6,000 pounds of biomass per acre in 60-90 days, and potentially fix 51 pounds of nitrogen per ton of dry matter produced (Rotar and Joy, 1983).

Cultural practices historically used with sugarcane production in southern Louisiana have been associated with low soil organic matter content and high nutrient (N) usage. Sunn hemp's adaptation to a wide range of soils and its ability to produce high amounts of biomass and fix nitrogen within a relatively short period of time has attracted attention from sugarcane producers in Louisiana. To demonstrate the use and benefit of using 'Tropic Sun' during the summer sugarcane fallow period, multiple sites in southern Louisiana (Donaldsonville, Thibodaux, and Galliano) were established in 2007 and 2009.

2007 Field Trial

On May 14, 2007 at the Sweet Home Plantation near Donaldsonville, LA, 'Tropic Sun' was established on a 3 acres fallow field used for sugarcane production. Seeds were inoculated with a cow pea type *Bradyrhizobium* sp. bacteria and planted on raised cane beds at a rate of approximately 30 PLS lb/ac using a broadcast spreader. Cane beds were flattened following planting with a drum roller to help incorporate seeds. Plants were allowed to grow for a maximum of 60 days and terminated by mowing. Fields were later disked and beds reshaped to incorporate residues into the soil to speedup breakdown before new cane was planted in August/September.



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At 30 and 60 days after planting biomass samples were clipped from 8 random plots within the field. Samples were dried in a forced air forage oven and dry weights were converted to lb/ac production estimates. Projected potential nitrogen contribution was figured based on literature formula (N contribution = 51 lb N/ton dry matter). Table 1

Table 1 - 2007 Sweet Home Plantation 30 and 60 days after planting (DAP) average biomass yield and average estimated N contribution of ‘Tropic Sun’ sunn hemp grown on sugar cane fallow field.

	Biomass lb/ac	Projected N Contribution lb/ac
30 DAP	1031.48	26.30
60 DAP	11370.50	289.95

2009 Field Trial

In April 2009 ‘Tropic Sun’ was establish on 3 sites in south central Louisiana including the Sweet Home Plantation near Donaldsonville, Nicholls State University Farm near Thibodaux and the USDA-NRCS Plant Materials Center near Galliano.

Seeds were inoculated with a cow pea type *Bradyrhizobium* sp. bacteria and planted on flat clean tilled sites using a Tye No-Till® drill. The drill was calibrated to plant approximately 30 PLS lb/ac. Plants were allowed to grow the entire season to evaluate the potential for seed production and to get an estimate of full season biomass yield potential. Replicated plots were clipped at 30, 60, and 90 days, and one sample taken after a frost or when plants showed limited growth. Samples were dried in a forced air forage oven and dry weights were converted to lb/ac production estimates. Projected potential nitrogen contribution for the 30, 60, and 90 DAP was figured based on literature formula (N contribution = 51 lb N/ton dry matter). Table 2

Table 2 - 2009 average biomass yield and average estimated N contribution of ‘Tropic Sun’ sunn hemp grown on fallow fields at Donaldsonville, Thibodaux, and Galliano, 30, 60, and 90

	Donaldsonville Biomass lb/ac	Donaldsonville Projected N Contribution lb/ac	Thibodaux Biomass lb/ac	Thibodaux Projected N Contribution lb/ac	Galliano Biomass lb/ac	Galliano Projected N Contribution lb/ac
30 DAP	1809	46	1934	49	909	23
60 DAP	10813	276	7464	190	2817	72
90 DAP	21379	545	18412	470	4521	115
After Frost	14163	N/A	19538	N/A	3685	N/A

Conclusion

When using ‘Tropic Sun’ sunn hemp as a cover crop, it is recommended that seed be broadcast or drilled at 30 PLS lb/ac. Planting on raised beds is recommended for best performance in southern Louisiana. ‘Tropic Sun’ is very sensitive to wet soil conditions the first 10 days following germination of seed. Seeds that germinate will not survive or show poor performance where excessively wet conditions exist. In 2009, at Galliano, where wet soils were a problem at the 60 DAP harvest ‘Tropic Sun’ produced on average

2817 lbs of dry biomass per acre compared to 7464 lbs and 10813 lbs of dry biomass per acre at Thibodaux and Donaldsonville (Table 2).

For cover crop use on sugarcane fallow fields in Louisiana, it is recommended that 'Tropic Sun' be terminated at 60 days after planting in April or May. At 60 days of growth, plants are easily destroyed by mowing and the plant residue is easily incorporated back into the soil by disking. Plants left to grow after 60 days will start to turn woody and could potentially cause problems with termination, incorporation and residue breakdown. Although biomass yields taken at 90 DAP and at the end of the growth cycle showed a high increase in overall lbs of dry biomass per acre, the tuff woody plant residues would be difficult to manage as a cover crop practice.

Using a cover crop/green manure crop is a conservation practice that provides soil-improving characteristics. 'Tropic Sun' sunn hemp, because of its rapid growth and relatively short growing season requirement, can be an excellent cover crop/green manure alternative for sugarcane growers. Where conditions are favorable, it can provide the benefits of increasing soil organic matter content and potentially offsetting commercial nitrogen fertilizer needs.

References

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