

COVER CROPS FOR LOUISIANA SUGARCANE PRODUCTION



BENEFITS OF COVER CROPS

Sugarcane in Louisiana is grown on about 500,000 acres and is the state’s highest valued row crop. Successful sugarcane production has occurred since the 1750s. Sustainable production is critical as the Louisiana sugar industry continues to have a positive impact on rural economies. Taking advantage of the benefits of cover crops contributes to sustainable sugarcane production.

Fields where sugarcane is planted are fallow following plow out after the last harvest of the crop cycle. Sugarcane is a perennial crop where three to five annual harvests can be made from an initial planting. To start a new sugarcane crop, stalks or billets of sugarcane are planted in an open furrow on bedded rows in these fallow fields. Research has shown the greatest potential for soil losses in sugarcane production occur during these two distinct periods within the production cycle: the fallow period and during the fall and spring in newly planted fields.

Cover crops are grown throughout the United States in many annual row crops to stimulate soil microorganism growth (particularly nitrogen fixing bacteria), control weeds, regulate soil temperature, translocate nutrients and reduce soil erosion. Long-term effects include increasing soil organic matter, which improves overall soil fertility.

FALLOW PERIOD

The fallow period spans several months between final harvest (October or November in the previous year) and planting of new sugarcane (August to September of the planting year). Soil left bare is highly erodible due to intensive tillage necessary to terminate the previous crop and the desire to keep the ground as weed-free as possible by periodic tillage operations.

Cool Season Cover Crops

Several cover crop options are available to Louisiana farmers that can minimize erosion, provide additional income and improve soil health during the fallow period. The first option is to plant a cool season cover crop (Figure 1) immediately after harvesting the final crop in the fall. Some growers may plow out old stubble, reform the row and make a broadcast planting of a mix of cover crops, such as Austrian winter pea (*Pisum sativum* L.), hairy vetch (*Vicia villosa* Roth) and cereal rye grass (*Secale cereale* L.). The optimum time to plant these cover crops is during October. In addition to decreasing soil erosion, these cover crops contribute to soil organic matter and add important nutrients back into the soil (Table 1).

The benefit of nutrients from a cover crop is long term. Consistent use of cover crops mines the soil and atmosphere for valuable crop nutrients that become more available as the organic matter builds and breaks down in the soil over time. If a soybean (*Glycine max* L. Merr) crop will be planted in the spring, the winter cover crop should be terminated six weeks before planting.



Table 1. Analyses of nutrient content in cover crops from a fallow field of sugarcane, Iberia Parish 2021.

Cover Crop	Dry Biomass (tons/acre)	Nitrogen (%)	Nitrogen (lbs./acre)	Phosphorus (%)	Phosphorus lbs./acre	Potassium (%)	Potassium (lbs./acre)	Sulfur (%)	Sulfur (lbs./acre)
Winter Pea	1.37	2.831	77.8	0.201	5.5	2.870	78.9	0.104	2.9
Vetch	0.67	3.161	42.6	0.230	3.1	2.592	34.9	0.116	1.6
Total	2.04		120.4		8.6		113.8		4.4

Warm Season Cover Crops

If the field is to remain fallow, then consider a second warm season cover crop. A warm season cover crop can be planted in late March through May to allow for sufficient growth prior to terminating. Soybean is the most common cover crop and can provide an additional source of revenue. Soybean production using glyphosate-resistant soybean seed also provides an opportunity to control yield-robbing grasses, such as itchgrass and bermudagrass, using glyphosate.

Iron clay cowpea (*Vigna unguiculata* L. Walp.) or sunn hemp (*Crotalaria juncea* L.) (Figure 2) can also be planted as cover crops during the fallow period. These cover crops are seeded at rates between 10 and 50 pounds per acre, respectively, onto beds drawn following fallow tillage operations. They are terminated after 90 to 100 days by mowing and incorporated into the soil by tillage. When grown as green manures, these cover crops contribute 2 to 5 tons of organic matter per acre, which improves soil health. These crops are also legumes that fix their own nitrogen from the atmosphere, which improves soil nitrogen status. It is necessary to terminate cover crops four to six weeks prior to planting sugarcane to allow for biomass decomposition, which could harm newly planted seed cane. Shredding the cover crop allows for quicker breakdown in the soil. Laboratory research demonstrated that soybean, cowpea and sunn hemp decomposed most rapidly between 77 and 90 degrees Fahrenheit. In multiple field trials, sugarcane grown following soybean, cowpea or sunn hemp cover crops produced plant cane yields that were similar or better than cane grown on land kept without a cover crop.



NEWLY PLANTED SUGARCANE

Sugarcane is typically planted in August through September. Unlike grain crops that are often planted into stale seedbeds with minimum soil disturbance, the planting of sugarcane (Figure 3) requires large amounts of soil to be moved to plant vegetative stalks or billets. In Louisiana, sugarcane is planted into raised beds that facilitate adequate drainage. The large amount of soil disturbance associated with planting and the slow rate of establishment of newly planted sugarcane in the fall create an ideal situation for soil loss.

The goal is to simultaneously grow a winter cover crop as the newly planted sugarcane establishes. The challenge is to provide weed control for the newly planted sugarcane while maintaining cover crop growth.

Measured in early January, the winter cover crops Florida broadleaf mustard (*Brassica juncea*), Cherry Belle radish (*Raphanus raphanistrum* subsp. *sativus* L. Domin), and Austrian winter pea had ground cover that averaged less than 16%, whereas ground cover for hairy vetch and Persian clover averaged over 72% (Table 2). These were planted in early August.



Table 2. Winter cover crop ground cover following early and mid-August planting dates at the Sugar Research Station, St. Gabriel, Louisiana.

	% ground cover provided by cover crop on January 5, 2018	% ground cover provided by cover crop on January 5, 2018
Cover Crop	Cover Crop Planting Date	Cover Crop Planting Date
	August 2, 2017	August 15, 2017
Florida Broadleaf Mustard	16	52
Cherry Belle Radish	5	7
Hairy Vetch	72	75
Persian Clover	92	100
Austrian Winter Pea	0	1

Biomass reductions for the mustard and radish were due to feeding from crossed-striped cabbageworms, whereas disease prematurely killed the Austrian winter pea.

Herbicides are applied to newly planted sugarcane to provide preemergent weed control; however, many of these herbicides will prevent the establishment of winter cover crops. Florida broadleaf mustard, Cherry Belle radish, and Persian clover poorly tolerate metribuzin (Tricor), clomazone (Command) and hexazinone (Velpar, Velossa) (Table 3). Moreover, metribuzin caused moderate reductions to Austrian winter pea biomass. Conversely, Austrian winter pea tolerated clomazone, hexazinone and pendimethalin (Prowl).

Table 3. Winter cover crop biomass reduction by herbicide applications after cover crops were planted at the Sugar Research Station, St. Gabriel, Louisiana, in 2017.

Herbicide ¹	Florida Broadleaf Mustard	Cherry Belle Radish	Hairy Vetch	Persian Clover	Austrian Winter Pea
	----- % reduction in biomass compared to nontreated check -----				
Prowl	25	45	40	95	10
Command	100	99	40	95	10
Velossa	100	100	40	100	0
Tricor	100	100	90	100	60

¹Prowl = Pendimethalin applied at 2.4 qts./acre; Command = Clomazone applied at 3.3 pts./acre; Velossa = Hexazinone applied at 1.6 pts./acre; Tricor = Metribuzin applied at 2 lbs./acre.

To reduce the risk of herbicide injury to winter cover crops, establishment of the cover crop should be a minimum of six weeks following the planting of sugarcane. Cover crops should be planted in the wheel furrow and sides of the row and not on the row top (outside the off-bar) (Figure 4). Cover crops planted on the row top of newly planted sugarcane compete with and significantly reduce sugarcane yield and limit nonherbicidal termination options. On-farm testing showed improved sugar yield in sugarcane when these recommendations were followed (Table 4).

Table 4. Effect of a mixture of drill-seeded cover crops on plant cane yield of HoCP 96-540 at Blanchard Brothers Inc. in Glencoe, Louisiana, in 2018.

Treatment	Cane yield (tons/acre)	Sugar content (lbs./ton)	Sugar Yield (lbs./acre)
Cover Crop ¹	55.9 a	232 a	12,985 a
No Cover Crop	48.8 b	236 a	11,548 b

¹ A mixture of sunn hemp, bullseye radish and rapeseed (*Brassica napus* subspecies *napus*) were drill seeded on the sugarcane row shoulders at 28, 9, and 9 lbs./acre, respectively, on Oct. 13, 2017.

The U.S. Department of Agriculture National Resources Conservation Service (NRCS) has programs that encourage Louisiana sugarcane growers to plant cover crops. Visit the nearest NRCS office for more information.

Research documented that cover crops can be used in the sugarcane fallow period and after planting as a cultural practice to improve soil health for Louisiana sugarcane production. Some Louisiana sugarcane producers have begun to utilize these practices.



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