Registration of 'L 97-128' Sugarcane

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ABSTRACT

'L 97-128' (Reg. No. CV-129, PI 650858) sugarcane (a complex hybrid of *Saccharum officinarum* L., *S. barberi* Jeswiet, *S. spontaneum* L., and *S. sinense* Roxb. amend. Jeswiet) was released on 5 May 2004 by the Louisiana State University Agricultural Center in cooperation with the USDA-ARS and the American Sugarcane League, Inc. L 97-128 has early high sucrose content, high cane yield potential, and resistance to common brown rust disease (*Puccinia melanocephala* H. and P. Syd.). Both the cross and the early stage clonal selection were made at Louisiana State University Agricultural Center's Sugar Research Station, St. Gabriel; permanent cultivar assignment was done in 1997. The cross was made on 25 Sept. 1992. Early stage clonal selection was done as single stools in 1994 followed by first clonal line trial selection in 1995 and second clonal line trial stage selection in 1996. Testing in replicated yield trials was conducted through the sugarcane growing area in south Louisiana from 1998 through 2003. Plant patent 17,636 was issued on 24 Apr. 2007.

The modern *Saccharum* spp. (cultivated sugarcane) is believed to have originated from complex hybridization events (termed *nobilization*) between *Saccharum officinarum*, *S. barberi*, *S. sinense*, and the wild related species *S. spontaneum* (Sreenivasan et al., 1987). Cultivated sugarcane is predominantly outcrossing, highly heterozygous, and maintained by vegetative propagation. 'L 97-128' (Reg. No. CV-129, PI 650858) sugarcane, a complex hybrid of *Saccharum officinarum* L., *S. barberi* Jeswiet, *S. spontaneum* L., and *S. sinense* Roxb. amend. Jeswiet. was released on 5 May 2004 by the Louisiana State University Agricultural Center in cooperation with the USDA-ARS and the American sugarcane League, Inc. It was released because of its early high sucrose content, high cane yield potential, and resistance to common brown rust disease (*Puccinia melanocephala* H. And P. Syd.). The "L" indicates that both the cross and the early stage clonal selection were made at the LSU AgCenter's Sugar Research Station, St. Gabriel, LA; the "97" indicates that permanent cultivar assignment occurred in 1997; the "128" is an identification number unique to LSU AgCenter sugarcane breeding programs, which has number designations 1–499.

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Abbreviations: LSU AgCenter, Louisiana State University Agricultural Center.

Published in the Journal of Plant Registrations 2:24–28 (2008).
doi: 10.3198/jpr2007.08.0489crc

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Methods

Crossing and Early Stage Selection

A summary of the release of L 97-128 is shown in Table 1; a comprehensive summary of the LSU AgCenter sugarcane breeding program is provided in Bischoff and Gravois (2003). Cultivated sugarcane rarely flowers in Louisiana's temperate climate due to

Table 1. Summary of the release of commercial sugarcane cultivar L 97-128.

Year	Stage
1992	Cross made on 25 Sept. at the Sugar Research Station, LA
1993	True seed germinated and seedlings planted into the field
1994	Selection in first-ratoon seedling crop (advanced to first line trials)
1995	Selection in plant-cane first line trials (advanced to second line trials)
1996	Selection in plant-cane second line trials (advanced to increase plots)
1997	Assignment in first-ratoon second line trials On-station nursery trials planted (St. Gabriel, Ardoyne, New Iberia, LA)
1998	Plant-cane on-station nursery trials harvested; off-station nursery trials planted (Landry Farm, D & N, Gonsoulin farms, LA)
1999	First ratoon on-station nursery trials harvested; plant-cane off-station nursery trials harvested
2000	Second-ratoon on-station nursery trials harvested; first-ratoon off-station nursery trials harvested; outfield trials planted
2001	Third-ratoon on-station nursery trials harvested; second-ratoon off-station nursery trials harvested; plant-cane outfield trials harvested
2002	Third-ratoon off-station nursery trials harvested; first-ratoon outfield trials harvested
2003	Second-ratoon outfield trials harvested
2004	Cultivar release

cool fall temperatures. To induce sugarcane to flower in Louisiana, breeding clones are subjected to artificial photoperiod treatments. Photoperiod treatments in the LSU AgCenter sugarcane breeding program begin in early June by subjecting plants to a constant photoperiod of 12.5 hours for 35 d. Afterward, daylengths are decreased by one min per day until 10 September. Breeding clones are propagated in 38-L buckets and placed on rail carts that can be pushed in and out of totally dark chambers inside of a photoperiod facility. Typically, the carts are pushed into the photoperiod facility after sunset and rolled out after sunrise based on a predetermined photoperiod schedule.

The cross (XL92-42) for L 97-128 was made on 25 Sept. 1992. The female parent was LCP 81-10, and the male parent was LCP 85-384 (Milligan et al., 1994). LCP 81-10 was a near commercial experimental clone with substandard sucrose content but excellent cane yield potential and disease resistance. LCP 85-384 was released as a commercial cultivar in 1993 and has been the most widely grown sugarcane cultivar in Louisiana from 1998 through 2007. The acreage of LCP 85-384 peaked in 2005, when it occupied 91% of the state's acreage (Legendre and Gravois, 2006). The seedling of L 97-128 was germinated from "true" seed in January 1993 and transplanted to the field in April 1993. Selection occurred in the first-ratoon crop in 1994 from a single stool of sugarcane. Two stalks were cut and vegetatively propagated into a 1.8-m-long plot within the first clonal line trial stage. Selection within the first clonal line trial stage occurred in 1995 where six stalks were cut and planted into a 4.9-m-long plot within the second clonal line trial stage. Clones were selected and advanced in the plant-cane crop of the second clonal line trial stage in 1996. Permanent cultivar assignment was done in the first-ratoon crop of the second clonal line trial stage in 1997. Selection criteria in the early clonal selection stages include adequate stalk diameter, stalk height, stalk number, commercially acceptable Brix, and visual observation for disease and insect pest resistance.

Replicated Yield Trials

Replicated on-station nursery trials were conducted at the Sugar Research Station in St. Gabriel, LA, the Iberia Research Station in Jeanerette, LA, and the USDA-ARS Ardoyne Farm in Schriever, LA. Single-row (1.8-m-wide) plots were planted at a rate of two running stalks placed side by side, with a total of six stalks used to plant an entire plot. The plot length was 4.9 m, and each trial was replicated twice. The experimental design at each location was a randomized complete block. Data were collected in the plant-cane, first-ratoon, second-ratoon, and third-ratoon crops. These data include sugar yield (Mg ha^{-1}), cane yield (Mg ha^{-1}), sucrose content (% of cane yield), stalk weight (kg), and stalk population (stalks ha^{-1}).

Each year, millable stalk counts of the entire plot were made in early August. Stalk population was calculated as the number of millable stalks per hectare. At harvest, a random 10-stalk hand-harvested sample was taken from each plot, stripped of the immature tops and leaves, and weighed for an estimate of stalk weight (kg). Afterward, a sucrose analysis was done on each sample at the Sugar Research Station sucrose laboratory. Brix and pol readings were used to determine sucrose content (g kg^{-1}) (Gravois and Milligan, 1992). Cane yield was estimated as the product of stalk population and stalk weight and dividing by 1000. Sucrose content was determined as described by Gravois and Milligan (1992). Sugar yield was estimated as the product of cane yield and sucrose content and dividing by 100.

Replicated off-station nursery trials were conducted at the D & N Farm in Cecilia, LA; Ulysee Gonsoulin & Sons, Inc. Farm in New Iberia, LA; and Landry Farms in Paincourtville, LA. Single-row (1.8-m-wide) plots were planted at a rate of two running stalks placed side by side, with a total of eight stalks used to plant an entire plot. The plots for off-station nursery trials are 6.1 m long with a 1.5-m alley between plots. Stalk population, stalk weight, sugar yield, cane yield, and sucrose content were estimated as described above.

Infield trials were planted in the same year as off-station nursery trials and were conducted at the Sugar Research Station in St. Gabriel, the USDA-ARS Ardoyne Farm in Schriever, and Blackberry Farms in Vacherie, LA. Two-row plots were planted at a rate of two running stalks placed side by side, with a total of 20 stalks used to plant an entire plot. The plots for infield trials are two rows 7.6 m long with a 1.5-m alley between plots. Cane yield data were obtained using a combine harvester and a three-ton, single-axle, high-dump weigh wagon equipped with electronic load cells to record cane weight. Plot weights were used to calculate cane yield. The experimental design for each trial is a randomized complete block design with two replications.

The final yield testing stage of the LSU AgCenter sugarcane breeding program is the outfield trials. Outfield trials were conducted in cooperation with the USDA-ARS and the American sugarcane League. Fifty-one mechanically harvested outfield trials were conducted across 10 south Louisiana locations from 2001 through 2003. The commercial sugarcane cultivars included for comparison were LCP 85-384, HoCP 85-845 (Legendre et al., 1994), HoCP 91-555 (Legendre et al., 2000), and HoCP 96-540 (Tew et al., 2005). A 15-stalk sample was collected before harvest to determine stalk weight and for a sucrose analysis. Plots were harvested in a manner similar to the infield trials. No burning was done before harvest.

Sugarcane maturity is an important aspect of sugarcane harvesting. Sugarcane maturity was assessed by measuring sucrose content at regular intervals throughout the harvest. Maturity tests were conducted by personnel of the USDA-ARS Sugarcane Research Unit in Houma, Louisiana. Ten-stalk samples were taken monthly from plant-cane tests and biweekly from first ratoon tests to monitor the accumulation of sucrose. Each test was replicated four times and planted as a randomized complete block design.

Statistical Analyses

Data were analyzed by year (crop) across locations for multilocation yield trials. The PROC MIXED procedure was used to analyze the linear model (SAS v. 9.0; SAS Institute, Cary, NC). Least square means were generated for each cultivar and were separated using the PDIFF option ($P = 0.05$).

Characteristics

Field Performance

On-station nursery trials were conducted from 1998 through 2001 for the 1997 assignment series of which L 97-128 was a part (Table 2). L 97-128 was compared with the commercial standard at the time, LCP 85-384. For the plant-cane crop and the first- through

Table 2. Summary of on-station nursery trials planted at the Sugar Research Station in St. Gabriel, LA, USDA-ARS Ardoyne Farm in Schriever, LA, and the Iberia Research Station in Jeanerette, LA, from 1998 through 2001.

Cultivar	Sugar yield	Cane yield	Sucrose content	Stalk weight	Stalk no.
	Mg ha^{-1}	Mg ha^{-1}	mg kg^{-1}	kg	stalks ha^{-1}
Plant-cane crop: 1998					
CP70-321	11.84	88.70	134	1.34+[†]	64,815–
LCP 85-384	14.05	100.58	140	1.00	101,426
HoCP 85-845	11.56	88.48	130–	1.26	76,395
L 97-128	*13.56*	*96.10*	*140*	*1.12*	*86,482*
First-ratoon crop: 1999					
CP70-321	18.93–	131.49–	146	1.35+	96,387–
LCP 85-384	23.39	168.67	140	1.07	156,161
HoCP 85-845	17.29–	129.70–	135	1.18	108,900–
L 97-128	*21.26*	*149.86*	*144*	*1.20*	*124,404–*
Second-ratoon crop: 2000					
CP70-321	13.77	115.14	119	1.05+	109,836–
LCP 85-384	15.24	140.22	109	0.82	172,038
HoCP 85-845	11.83	98.34–	119	0.92	106,193–
L 97-128	*15.91*	*128.80*	*124*	*0.96*	*135,052*
Third-ratoon crop: 2001					
CP70-321	7.90	78.62	101	0.91	86,860
LCP 85-384	9.21	95.20	99	0.73	128,887
HoCP 85-845	7.71	74.14	104	0.80	92,462
L 97-128	*10.50*	*87.36*	*121*	*0.76*	*115,438*

[†]Cultivars that are significantly higher or lower than LCP 85–384 are denoted by a plus (+) or minus (–), respectively, next to the value for each trait in each of the following tables. Values for L 97-128 are highlighted in italic type.

Table 3. Summary of outfield trials for 51 combine-harvested trials on light- and heavy-textured soils from 2001 to 2003 at 10 southern Louisiana locations.

Cultivar	Sugar yield	Cane yield	Sucrose content	Stalk weight	Stalk no.
	Mg ha^{-1}	Mg ha^{-1}	mg kg^{-1}	kg	stalks ha^{-1}
Plant-cane crop: 2001–2003 (28)[†]					
LCP 85-384	8.64	65.86	131	0.98	68,525
HoCP 85-845	8.11–[‡]	65.63	124–	1.08+	61,179–
HoCP 91-555	8.56	64.96	132	0.98	67,466
HoCP 96-540	10.48+	73.70+	133	1.22+	61,622–
L 97-128	*10.37+*	*72.35+*	*134*	*1.21+*	*60,293–*
First-ratoon crop: 2002–2003 (16)					
LCP 85-384	8.52	62.72	136	0.82	78,477
HoCP 85-845	7.95–	61.15	131–	0.93+	67,471–
HoCP 91-555	7.97	57.79–	138	0.83	71,168–
HoCP 96-540	8.69	64.74	135	1.00+	65,645–
L 97-128	*8.65*	*62.27*	*140+*	*1.00+*	*62,187–*
Second-ratoon crop: 2003 (7)					
LCP 85-384	7.05	53.76	132	0.72	74,634
HoCP 85-845	6.53	53.76	122–	0.86+	63,029–
HoCP 91-555	7.30	53.31	138+	0.74	72,939
HoCP 96-540	7.10	54.88	130	0.84+	65,010–
L 97-128	*7.58*	*54.66*	*140+*	*0.87+*	*64,390–*

[†]Number in parentheses represents the total number of trials.

[‡]Cultivars that are significantly higher or lower than LCP 85-384 are denoted by a plus (+) or minus (–), respectively. The analysis was done with SAS (v. 9.0; SAS Institute, Cary, NC) using the PROC MIXED procedure which estimated least square means that were separated by the PDIFF option. Values for L 97–128 are highlighted in italic type.

third-ratoon crops, L 97-128 was not significantly different from LCP 85-384 for sugar yield, cane yield, and sucrose content. In the ratoon crops, the sucrose content of L 97-128 was numerically higher than LCP 85-384. The new cultivar was also characterized as having larger stalk weight with a lower stalk number than LCP 85-384. L 97-128 was replanted in off-station nursery and infield trials during 1999 through 2002 with similar results (data not shown).

L 97-128 was included in outfield trials that were conducted from 2001 through 2003 (Table 3). In the plant-cane crop, L 97-128 produced significantly higher sugar yield and cane yield than LCP 85-384. A similar numeric increase was observed in both the first- and second-ratoon crops. In the plant-cane crop, the sucrose content of L 97-128 was numerically similar to LCP 85-384, whereas sucrose content was numerically higher for L 97-128 in the ratoon crops. Experimental clones are typically released after second-ratoon data is collected from outfield cultivar trials. The ratoon crop data indicate L 97-128 to be an excellent ratooning cultivar.

L 97-128 produced an average fiber content of 122 g kg^{-1} based on 20 trials, which was slightly higher than the 111 g kg^{-1} average fiber content produced by LCP 85-384. Fiber content is important for sugarcane cultivars as it affects the throughput in factories for processing. Experimental clones with fiber content higher than 140 g kg^{-1} are discarded from the commercial breeding program.

After planting in the fall, L 97-128 emerges quickly. During Louisiana's cool wet winters, sugarcane becomes dormant and then regrows each spring from underground buds. Compared with most other cultivars, L 97-128 emerges quickly in the spring and grows vigorously through early summer. Growth tapers off in the late summer. It has an erect growth habit and is well suited for mechanical harvesting.

Maturity Trials

L 97-128 demonstrated early maturity and continued to accumulate sucrose throughout the harvest. It exhibited an 11.1% higher recoverable sucrose content in the plant-cane crop than LCP 85-384, when harvested in mid-September 2003 (Table 4). L 97-128 exhibited 32.4% higher recoverable sucrose content than LCP 85-384 when the first-ratoon crop was harvested in August 2003 (Table 5). Earlier sugarcane harvest start dates are the trend in Louisiana. Sugarcane cultivars with early and high sucrose content are important for the Louisiana sugar industry.

Agronomic and Botanical Description

Plants described here were characterized on 23 and 24 Aug. 2004 at approximately 150 to 165 d in age from spring emergence (Table 6). The stalks characterized were from inner rows unexposed to direct sunlight. Colors were determined from a Munsell color chart. However, it is understood that both color and other phenotypic expressions described may vary from plant to plant with differences in growth, environment, and cultural conditions, without any change in the genotype of the cultivar L 97-128. Stalk characteristics were based on measurements from 10 stalks.

A white wax bloom covers the stalk of L 97-128 and is typically more abundant than the wax bloom of LCP 85-384. L 97-128 exhibits a greenish-brown stalk that becomes more red or purple when exposed to sunlight. For comparison, the stalk of LCP 85-384 gradually changes from yellow to green, and LCP 81-10 has a green stalk color.

L 97-128 exhibits an average, mature stalk height (ground level to the top visible dewlap) of 270 cm, compared with LCP 85-384 (222 cm) and LCP81-10 (217 cm). The average stalk diameter of L 97-128 is 26 mm, compared with LCP 85-384 (22 mm) and LCP 81-10 (27 mm). L 97-128 exhibits a cylindrically shaped internode (fourth internode from ground level) and a glabrous growth ring having a width of 0.3 mm. The root band of L 97-128 is 0.7 mm wide, glabrous with straight sides, and exhibits unequally distributed rows of irregularly shaped root primordia having a diameter of between ~0.25 and ~0.50 mm. The root band of L 97-128 exhibits an extensive wax layer compared with that of LCP 85-384 (light wax layer) and LCP 81-10 (moderate wax layer). The internodes of L 97-128 are smooth and glabrous, with few, if any, corky patches or cracks, and exhibit an average length at the mid-culm of 18.2 cm. The internodes of L 97-128 and LCP 81-10 exhibit a moderate bud furrow compared with internodes of LCP 85-384, which exhibit no bud furrow. The buds of each cultivar are located just above the leaf scar and are raised above the surface of the root band. L 97-128 and LCP 81-10 similarly exhibit a round bud shape (at the fourth node) with a central germ pore, as compared to that of LCP 85–384, which is pentagonal. The bud diameter of both L 97–128 and LCP 81–10 is 7–9 mm, which is larger than that of LCP 85–384. The buds of L 97–128 are 6–7 mm long and yellow, without any wax surfaces. All three clones exhibit no setaceous or pilose hairs on the buds.

The canopy of L 97-128 and LCP 81-10 droops, while that of LCP 85-384 is more erect. The average leaf blade length and width of L 97-128, LCP 81-10, and LCP 85-384, at the third leaf below the top most visible dewlap, are 160 cm and 34.1 mm, 158 cm and 44.5 mm, and 137 cm and 35.9 mm, respectively. LCP 81-10 and L 97-128 similarly exhibit green leaf blades at the second visible dewlap, compared with LCP 85-384, which exhibits a lighter green leaf blade color. Each of these clones exhibit acuminate leaf blades. L 97-128 and LCP 81-10 similarly exhibit a 4- to 8-mm-wide midrib distinctly raised on its abaxial side, compared with that of LCP 85-384, which is 3 to 7 cm wide. The midrib of L 97-128 is the same color as the leaf blade on the abaxial side. On the adaxial side, the midrib of L 97-128 has a smooth to concave surface and a whitish color that is lighter than its leaf blade. Both the leaf blade and midrib of L 97-128 are linear, glabrous with a smooth surface, and relatively thin. The dewlaps of LCP 81-10, L 97-128, and LCP 85-384 are narrow and square shaped, with a brownish color. LCP 85-384 exhibits a distinct, necrotic leaf sheath margin, which is more prominent than that of L 97-128 and LCP 81-10. The average auricle shape for both L 97-128 and LCP 81-10 is short lanceolate, compared with that of LCP 85-384, which is slightly shorter. (Auricles were measured on the fourth leaf from the top most visible dewlap.) L 97-128 and LCP 81-10 exhibit a linear crescent-shaped ligule, while that of LCP 85-384 is broad crescent. L 97-128 exhibits a tan-color ligule having a length of 1.5 to 2.0 mm and a width of 13 to 15 mm, with a torn, darker brown edge. The ligule region of L 97-128 exhibits no pubescence.

On the abaxial side of the leaf sheath, L 97-128 exhibits a moderate amount of setaceous hair, when compared with LCP 85-384, which is extensive. The leaf sheath pubescence of L 97-128 is predominately opposite of the dewlap of the next lower leaf. LCP 81-10 exhibits a more glabrous leaf sheath than L 97-128.

Table 4. Sucrose content for a plant-cane crop as affected by harvest date for a maturity trial conducted in 2003 at the USDA-ARS Sugarcane Research Unit in Houma, LA.

Cultivar	2003 harvest dates			
	9/23	10/21	11/18	Avg. by cultivar
	Sucrose content			
	mg kg^{-1}			
LCP 85-384	90	123	144	119
HoCP 85-845	90	123	137–[†]	117
HoCP 91-555	98	127	148	124+
HoCP 96-540	90	125	138–	118
L 97-128	*100+*	*128*	*148*	*125+*
Avg. by date	94	125	143	121

[†]Cultivars that are significantly higher or lower than LCP 85-384 are denoted by a plus (+) or minus (–), respectively, next to the value for each trait. Values for L 97-128 are highlighted in italic type.

Under normal growing conditions in Louisiana, L 97-128 does not exhibit any flowering. The following flower description was obtained from a 38-L can culture of L 97-128 grown at the Sugar Research Station in St. Gabriel on 4 Oct. 2004 (approximately 130–145 d in age from spring emergence). L 97-128 exhibited a cylindrical-shaped inflorescence peduncle, degenerating from the base, having a width and length of approximately 6 mm and 40 to 50 mm, respectively, and pubescence throughout, with short, appressed, silvery pilose hairs. L 97-128 has a 600- to 610-mm-long inflorescence main axis with some pilose hairs. Primary branches of L 97-128 are 295 to 320 mm long and exhibit appressed racemose branches. Rachis internodes of L 97-128 are glabrous from the bottom of the main axis and exhibit a few setaceous hairs toward the apex of the main axis. The apex of L 97-128 is predominantly grooved. Sessile spikelets of L 97-128 are 2.5 to 3.0 mm long, with callus hairs having a length of 9 to 13 mm and a white color. The sessile spikelets of L 97-128 are lanceolate, acuminate, and have membranous glumes, lemma with a hyaline scale, and yellow stamens that are 1.5 to 2.0 mm long. Pedicellate spikelets of L 97-128 are ovate, acute, rounded at the base, and 2.5 to 3.0 mm long. The glumes of the pedicillate spikelets of L 97-128 are membranous; the lemma is hyaline; and the stamens are yellow.

Table 5. Sucrose content for a first-ratoon crop as affected by harvest date for a maturity trial conducted in 2003 at the USDA-ARS Sugarcane Research Unit in Houma, LA.

Cultivar	2003 harvest dates								
	8/25	9/8	9/23	10/6	10/21	11/3	11/18	12/1	Avg. by cultivar
	Sucrose content								
	mg kg^{-1}								
LCP 85-384	74	93	104	117	128	134	151	154	119
HoCP 85-845	84	102	111	116	136+	140	150	151	124+
HoCP 91-555	86 +	99	111	123	140+	144+	157+	155	127+
HoCP 96-540	80	90	103	113	128	136	152	152	119
L 97-128	*98 +*	*113+*	*121+*	*133+*	*149+*	*153+*	*164+*	*160 +*	*136+*
Avg. by date	85	99	110	120	136	142	155	154	128

Cultivars that are significantly higher or lower than LCP 85-384 are denoted by a plus (+) or minus (–), respectively, next to the value for each trait. Values for L 97-128 are highlighted in italic type.

Table 6. Botanical descriptions of L 97-128 and its parental clones, LCP 85-384 and LCP 81-10, as determined at the Sugar Research Station in St. Gabriel, LA, in 2004.

Trait	L 97-128	LCP 85-384	LCP 81-10
Stalk height (cm) (avg. 10 stalks)	270	222	217
Stalk diam. (mm) (avg. of 10 stalks)	26	22	27
Leaf shape	Drooping	Erect	Drooping
Leaf length (cm) (avg. of 10 leaves)	160	137	158
Leaf width (mm) (avg. 10 leaves)	34.1	35.9	44.5
Stalk buds shape (fourth node)	Round bud with central germ pore	Pentagonal bud	Round bud with central germ pore
Auricle (avg. of 5 auricles)			
Shape	Short lanceolate	Short lanceolate	Short lanceolate
Length (mm)	7	6	7
Internode			
Waxiness	Extensive	Light	Moderate
Bud furrow	Moderate	None	Moderate
Growth ring width	0.3 mm	0.3 mm	0.3 mm
Root band width	0.7 mm	0.7 mm	0.7 mm
Internode shape (fourth internode from ground level)	Cylindrical	Cylindrical	Cylindrical
Dewlap (leaf collar)	Narrow, square shaped	Narrow, square shaped	Narrow, square shaped
Ligule shape	Linear crescent	Broad crescent	Linear crescent
Leaf sheath	Moderate pubescence (on green leaves)	Extensive pubescence (on green leaves)	Light pubescence (on green leaves)

Table 7. Disease and insect reactions of L 97-128, its parental clones, and other commercial cultivars.

Cultivar	Mosaic	Smut	Rust	Leaf scald	Ratoon stunting disease	Sugarcane borer
L 97-128	R†	MS	MR	R	S	S
LCP 81-10	R	R	MR	R	S	U
LCP 85-384	R	R	S	R	S	S
HoCP 85-845	R	R	R	MS	S	R
HoCP 91-555	R	MR	MR	MR	S	S

†R, resistant; MR, moderately resistant; S, susceptible; MS, moderately susceptible; U, unknown.

Disease and Insect Reactions

Sugarcane disease and sugarcane borer ratings important to Louisiana sugarcane production are shown in Table 7. Diseases and insect ratings were obtained either in controlled tests or observed in yield trials or seed increases. Like most commercial sugarcane cultivars, L 97-128 is resistant to *Sugarcane mosaic* and *Sorghum mosaic* viruses. L 97-128 exhibited moderate susceptibility to smut (caused by *Ustilago scitaminea* Sydow & P. Sydow), unlike LCP 81-10, LCP 85-384, and HoCP 85-845, which exhibited resistance to smut. L 97-128 and LCP 81-10 similarly exhibited moderate resistance to rust (caused by *Puccinia melanocephala* H. and P. Sydow), unlike LCP 85-384, which exhibited susceptibility to this disease. Rust resistance is extremely important. LCP 85-384 was resistant to sugarcane brown rust on its release in 1993 but is now extremely susceptible to the new races that have formed (Hoy et al., 2000). LCP 81-10, LCP 85-384, and L 97-128 similarly exhibited resistance to leaf scald (caused by *Xanthomonas albilineans* Ashby, Dowson), under natural field infection conditions. The effect of yellow leaf on the yield of L 97-128 is unknown. Similar to most commercial cultivars grown in Louisiana, L 97-128 exhibited significant yield loss in ratoon crops from ratoon stunting disease (caused by *Clavibacter xyli* subsp. *xyli* Davis).

L 97-128 and LCP 85-384 are both susceptible to the sugarcane borer (caused by *Diatraea saccharalis* Fabricius) insect pest of sugarcane. Early season borer infestations are more common for L 97-128 than later season borer infestations. This reflects summer growth rates as L 97-128 grows vigorously in early summer. L 97-128 should not be grown where insecticides cannot be applied.

Field observations indicated that L 97-128 is no more susceptible to herbicides commonly used for weed control than LCP 85-384.

Availability

L 97-128 has received a plant patent (17,636). The Louisiana Agricultural Experiment Station will make available small quantities of seed for research purposes and may be obtained from the corresponding author for at least 5 yr from the date of this publication via a Material Transfer Agreement. Seed of L 97-128 has been deposited in the USDA-ARS National Center for Genetic Resources Preservation, where it will become freely available for distribution after the expiration of the plant patent.

Acknowledgments

L 97-128 was developed with financial support of the Louisiana State University, Agricultural Center, Louisiana Agricultural Experiment Station under Projects LAB03742 and LAB03747, and the American Sugar Cane League.

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