AN OVERVIEW OF 2012 ACTIVITIES IN THE LOUISIANA STATE UNIVERSITY AGRICULTURAL CENTER SUGARCANE VARIETY DEVELOPMENT PROGRAM

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A key objective of the Louisiana State University Agricultural Center's (LSU AgCenter) Sugarcane Variety Development Program is to develop genetically improved varieties of sugarcane for the Louisiana sugarcane industry. This is accomplished through multidisciplinary research among a team of scientists drawn from a diversity of disciplines within the LSU AgCenter (Table 1) as well as from other organizations such as the United States Department of Agriculture (USDA) and the American Sugar Cane League. The LSU AgCenter and the United States Department of Agriculture (USDA) sugarcane variety development teams work independently as well as cooperatively to produce "L" and HoCP or Ho varieties, respectively. The best varieties from each program are brought together for evaluation at the nursery, infield, and outfield testing stages of the program (Table 2). Outfield testing is conducted by personnel from the LSU AgCenter, the USDA, and the American Sugar Cane League. Upon recommending a variety for commercial release, seed increase is carried out by the American Sugar Cane League and generally commences when varieties are introduced to the outfield testing stage. The cooperative effort under which the three entities (the LSU AgCenter, the USDA, and the American Sugar Cane League) participate to develop improved sugarcane varieties for the Louisiana sugarcane industry is outlined in the "Three-Way Agreement of 2007".

Table 1. Members of the LSU AgCenter Sugarcane Variety Development Team in 2012.

Team Member	**Budgetary Unit**	**Responsibility**
Collins Kimbeng	Sugar Res. Station	Program Leader
Michael Pontif	Sugar Res. Station	Crossing, Selection and Variety Testing
Sonny Viator	Iberia Research Station	Variety Testing
Niranjan Baisakh	School of Plant, Soil and Environmental Sciences	Molecular Breeding
Gene Reagan	Entomology	Insect Resistance
Jeff Hoy	Plant Pathology	Disease Resistance
Jim Griffin	Plant, Env. & Soil Sci.	Herbicide Tolerance
Brenda Tubana	Plant, Env. & Soil Sci.	Agronomy
Todd Robert	Sugar Res. Station	Variety Testing/ Farm Crew
Gert Hawkins	Sugar Res. Station	Sucrose Laboratory
Dexter Fontenot	Sugar Res. Station	Photoperiod & Crossing
David Sexton	Sugar Res. Station	Outfield
Joel Hebert	Sugar Res. Station	Farm Manager

Success in developing improved sugarcane varieties is heavily dependent on the availability of novel genetic variation created through targeted cross hybridization. Cultivated sugarcane does not flower naturally in Louisiana because of the cool fall temperatures hence, the

breeding program must rely on artificial photoperiod treatment to induce and synchronize flowering of sugarcane parents for crossing. Photoperiod treatment to induce flowering began on May 30 and continued until September 10, 2012. Crossing lasted from September 2 to October 26, 2012. A total of 776 tassels of 102 clones were used to make 531 crosses. The number of viable seeds per cross was estimated by counting the number of shoots produced per 0.5 g of seed (fuzz). Seed production was down in 2012 (258,305 viable seeds) compared to last year (338,269 viable seeds) with 149,840 seeds coming from bi-parental crosses, and 65,066 from polycrosses.

Seeds were germinated in the green house in 25lx15wx4h inches metal trays filled with 2 inches of potting mix in January of 2012. Individual seedlings were transplanted into styrofoam trays with 128 (1.5lx1.5wx1.5h inches per cell) cells in early March of 2012. A total of 75,703 seedlings from 166 crosses most of them from the 2011 crossing campaign were eventually transplanted to the field in April of 2012. Many of these seedlings were progeny of crosses among commercial as well as superior experimental varieties. In addition, seedlings were planted in a cross appraisal trial. Individual seedling selection will be carried out in 2013 when these seedlings are in the first stubble crop.

Individual seedling selection in the 2012 season was practiced on 61,704 first stubble single stools of the 2010 crossing series that survived the winter. Because the seedlings were severely lodged following Hurricane Isaac, seedling selection was delayed from September to October when the mills opened and were ready to process cane. Each row was selected and then harvested using a combined harvester to expose the next row. Family selection, based on accumulated data from family appraisal studies and visual assessment of seedling populations, was used to discard about ten percent of families prior to selection. The selection criteria included visual appraisal of individual seedlings for disease and insect damage, lodging, pith and yield (stalk number, stalk diameter and height). This was followed by evaluation of the visually selected clones for Brix using a hand held refractometer. A total of 2,692 clones (4 % selection rate) were selected and planted in 10-foot, first-line trial plots.

Well established procedures were used to advance superior clones of the 2009 crossing series from the first-line to 16-foot, second-line trials (393 clones; 21% selection rate) and of the 2008 crossing series from second-line to 2-row, un-replicated, 16-foot increase plots (150 clones; 28% selection rate). Preliminary visual ratings for cane yield and plant type were done in August on the 522 second line clones from the 2007 crossing series. Clones with acceptable ratings were further evaluated for lodging and/or broken tops, borer damage, disease symptoms, pith, and Brix/sugar per ton. A total of 40 experimental varieties judged to be superior to the checks were assigned permanent variety designations (“L”) in the fall of 2012 (Table 2). These newly assigned experimental varieties were entered into replicated nursery trials (2 replicates, 16-foot plots) at three locations (Sugar Research Station, Iberia Research Station and USDA-ARS Ardoyne Farm).

Experimental varieties were replanted in Infield and Off Station nursery tests (10 varieties assigned L numbers in 2011 (2011 assignment series)), introduced to the outfield tests (3 varieties of the 2010 assignment series), and planted in outfield tests (3 experimental varieties of the 2009 assignment series, L 09-099, L 09-131 and L 09-112) (Table 2).

In general, the 2012 season was characterized by two major events. The incidence of brown rust, caused by *Puccinia melanocephalacan*, which occurred earlier in the spring, and Hurricane Isaac which came ashore in late August. There was a high incidence of rust infection at the station. All trials at the station were rated for rust resistance. Several clones were dropped for rust as rust became a primary trait of selection. The incidence of smut was generally low among experimental varieties in the program. About 1.5% and 5.2% of clones were dropped in the first and second line trials, respectively, because of smut during a second round of selection. Very few incidences of leaf scald were recorded among experimental varieties. About 9.8 % and 13.6% of clones were dropped in the first and second line trials, respectively, because of pith during a second round of selection. For lodging, about 4.5% and 15.2 % were dropped in the first and second line trials, respectively because of lodging. Breeding personnel also assisted Dr. Jeff Hoy (Plant Pathologist) and Dr. Gene Reagan (Entomologist) to enter new experimental varieties in the sugarcane smut and Leaf Scald and sugarcane borer resistance tests, respectively.

The decision regarding further testing and seed increase of candidate varieties in the program was determined at the Variety Advancement Committee meeting. The 2012 meeting was held on August 9th at the American Sugar Cane League office in Thibodaux, Louisiana.

Progress in the LSU AgCenter Sugarcane Variety Development Program would not be possible without the financial support of state funds from the LSU AgCenter and the Louisiana sugar industry through the American Sugar Cane League and the cooperation of the USDA-ARS Sugarcane Research Unit.

Table 2. Number of "L" varieties by assignment series for each stage of testing in 2011.

Assignment Series	Stage of Testing	Number of experimental varieties
L 2006	Outfield – Replanted and harvested as plantcane, first stubble, and second stubble	0
L 2007	Outfield – Replanted and harvested as plantcane and first stubble Off-station nurseries and infield – 3rd stubble harvested	0
L 2008	Outfield – Replanted and harvested as plantcane On-station nurseries - 3rd stubble harvested Off-station nurseries and infield – 2nd stubble harvested.	0
L 2009	Outfield – Planted On-station nurseries - 2nd stubble harvested Off-station nurseries and infield - 1st stubble harvested	3
L 2010	Outfield – Introduced On-station nurseries - 1st stubble harvested Off-station nurseries and infield - plantcane harvested.	3
L 2011	On-station nurseries - plantcane harvested Off-station nurseries and infield planted	10
L 2012	Assignment On-station nurseries planted	40

2012 PHOTOPERIOD AND CROSSING IN THE LSU AGCENTER SUGARCANE VARIETY DEVELOPMENT PROGRAM

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Photoperiod and crossing are the first stages in the LSU Agcenter's Sugarcane Variety Development Program. For the release of new varieties to be productive, success must first be achieved at photoperiod and crossing. Proper photoperiod induction in addition to proper hybridization techniques are key factors for the production of viable seed belonging to viable crosses. Viable crosses are the optimum and most desirable combinations that will be advanced to the seedling stage of the Sugarcane Variety Development Program. In order to accomplish viable crosses, the seed must be viable or alive to produce adequate germination. This seed will then be advanced to the seedling stage of the Sugarcane Variety Development Program.

Cuttings of potential parent varieties used for the 2012 crossing season were planted in the fall of 2011. After establishing the plants from the cuttings, the plants were fertilized biweekly with a 400 ppm solution of Peter's 20-20-20. In late January 2012, the cuttings were then transferred to can culture. In April, the cans were moved from the greenhouse to the photoperiod rail carts. Soluble fertilizer applications were continued on a biweekly basis. Fertilization was discontinued in early- to mid-May to condition the plants for floral induction. Two additional applications of dry granular fertilizer (8-24-24, one Tbs/can) were applied to the cans during July and August. A reduced nitrogen ratio makes a higher C:N ratio, which is more desirable for the ease of flowering.

Natural lighting and six light-tight chambers were used for photoperiod treatments. To prevent overwhelming the crossing facilities, two flowering peaks were planned for September 23 and October 8 although these two flowering peaks can be advanced or delayed because of certain climatic factors. Records of varietal flowering, past photoperiod response, and pollen production were used to determine the most appropriate photoperiod treatment for each variety. The first photoperiod treatments began on May 30. All photoperiod treatments (time from artificial sunrise to natural sunset) were initiated with a minimum of 34 consecutive days of 12 ½ hours of constant day length. After the initial constant photoperiod days, day length was shortened by one minute per day. Treatments differed by the number of days with constant day length and the date on which the decline of photoperiod was initiated. All photoperiod treatments were discontinued on September 10, 2012, when natural day length was 12 ½ hours and decreasing.

Photoperiod treatments require pulling the carts out of the photoperiod bays at their appropriate time each morning to receive full sunlight. On certain days when the weather was severe, the carts were pushed back into the photoperiod chambers to protect the parental varieties from wind damage. The doors were partially opened to allow natural light to enter the chambers.

Flowering percentage of total stalks were average on the photoperiod carts in 2012 (Tables 1-2). Total flowering percentage for the six bays was 49%, which was comprised from 1,578 stalks of

which 776 produce tassels. Although the flowering percentage was average in 2012, successful seed production is comprised of a multitude of factors. An adequate germination rate provided the Variety Development Program with sufficient seed production. In 2012 as in previous years, seedlings were produced from hybridization techniques that used sugarcane yield components, borer resistance, and disease resistance as some of the criteria to determine which breeding clones were most compatible.

Close attention was made once again to maintain high relative humidity within the crossing greenhouse; high relative humidity has been proven in past studies to increase seed set. High relative humidity is maintained with the use of a misting system that has been installed inside of the crossing greenhouse. High temperatures in the crossing house can also result in poor seed set as temperatures in excess of 95°F have adverse effects on pollen viability. Temperatures between 85-95°F were maintained in the greenhouse along with 85-98% relative humidity.

The flowering season in 2012 began during the first week of September. The normal time frame for first flowering can be as early as the last week of August or as late as the third week of September. There can be a slight deviation for first flower due to temperature during the photoperiod induction phase, varietal characteristics, and the photoperiod treatments. Crossing began on September 2 and ended on October 26, 2012. A total of 776 tassels of 102 clones were used to produce 531 crosses. Germination rate was estimated based on the germination of 0.5 g of seed that was germinated under greenhouse conditions in early December. A total of 258,305 viable seed were produced in 2012. A total of 149,840 seed were produced from bi-parental crosses, and 65,066 seed were produced from polycrosses (Table 3).

Table 1. Summary of the 2012 photoperiod treatments for the LSU AgCenter's sugarcane variety development program.

Bay	Cart	Treatment Start Date	Days of Constant Photoperiod	Date Photoperiod Decline Started	Days of Declining Photoperiod		Mean Flowering Date	Total Stalks	Percent Flowered
					Peak 1	Peak 2			
1	A	14-Jun	44	28-Jul	72	87	297±1	90	78
1	B	14-Jun	44	28-Jul	72	87	297±2	88	48
1	C	14-Jun	44	28-Jul	72	87	300±2	86	40
2	A	14-Jun	44	28-Jul	72	87	299±1	90	72
2	B	14-Jun	44	28-Jul	72	87	299±2	89	43
2	C	14-Jun	44	28-Jul	72	87	297±2	87	46
3	A	30-May	37	6-Jul	87	102	288±1	98	86
3	B	30-May	37	6-Jul	87	102	290±2	84	35
3	C	30-May	37	6-Jul	87	102	293±2	77	38
4	A	30-May	37	6-Jul	87	102	293±1	86	69
4	B	30-May	37	6-Jul	87	102	280±3	86	30
4	C	30-May	37	6-Jul	87	102	291±3	77	30
5	A	30-May	41	10-Jul	82	97	294±2	92	54
5	B	30-May	41	10-Jul	82	97	291±2	94	35
5	C	30-May	41	10-Jul	82	97	292±4	83	19
6	A	30-May	41	10-Jul	82	97	294±2	86	70
6	B	30-May	41	10-Jul	82	97	290±2	93	59
6	C	30-May	41	10-Jul	82	97	280±3	92	25

Table 2. Summary of can, variety, and flower information on bays 1-6 subjected to photoperiod treatments.

Varieties used in crossing	Cans with stalks	Cans with tassels	Total stalks	Total tassels	Mean stalks per can	Mean tassels per can†	Mean pollen rating‡	Mean days to flower§
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102	324	236	1578	776	4.87±0.97	3.29±1.51	5.33±2.08	72.84±12.33

† Based upon cans with tassels.
‡ Rating of 1 to 4 being male and 5 to 9 being female.
§ Days from decline date to flowering.

Table 3. Summary of 2012 crossing and seed production.

Type of Cross	Crosses	Sum of Seed Production	Mean Seed Production Per Cross	Mean Seed Production Per Female Tassel	Mean Germination Per Gram Seed
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Biparental	346	149840	433±619	433±619	38±50
Polycross	92	65066	707±1077	707±1077	51±56
Self	93	43399	466±852	466±852	42±67
Total	531	258305	486±765	486±765	41±55

Table 4. Varietal flowering summary in 2012 in the photoperiod bays.

Variety	Days of Constant Photoperiod	First Flower Date	Mean Days to Flower	Pollen Rating	Total Stalk Number	Total Flowers	Percent Flowering Stalks
CP83-644	40	277	100±2	6±1	28	8	29
HO05-961	41	282	95	7	34	1	3
HO06-530	42±1	296	86±1	7	17	2	12
HO06-563	42±1	254	72±3	5	20	13	65
HO07-613	41±1	284	76±3	7±1	32	2	6
HO07-617	40±1	256	73±8	8±1	23	2	9
HO08-709	43	277	77±2	8	18	14	78
HO08-711	38±1	.	.	.	14	.	.
HO08-717	42±1	268	94±8	5±1	22	6	27
HO09-832	44	282	77±6	8	5	2	40
HO09-840	41	249	63±2	5±1	5	5	100
HO10-908	44	.	.	.	5	.	.
HO10-912	37	279	92	3	4	1	25
HO10-927	37	.	.	.	5	.	.
HO10-937	44	272	61	8	5	2	40
HO95-988	41±1	296	109	8	21	1	5
HOCP00-950	41	256	73±1	8	38	27	71
HOCP01-517	40±1	263	82±3	5	13	8	62
HOCP01-523	40	268	92±7	4±1	18	6	33
HOCP02-618	40±1	254	76±2	7	20	6	30
HOCP04-838	42	249	68±3	4	26	18	69
HOCP04-847	39	256	71±2	5±1	23	13	57
HOCP05-902	38±1	.	.	.	14	.	.
HOCP09-800	44	300	89	4	5	1	20
HOCP09-804	37	268	88±4	7±1	6	4	67
HOCP09-814	40±1	275	95±4	7±1	17	4	24
HOCP09-846	41	.	.	.	4	.	.
HOCP10-900	44	277	66	8	6	1	17
HOCP10-901	44	272	73±8	7±1	4	3	75
HOCP10-917	44	.	.	.	6	.	.
HOCP85-845	41	258	80±2	6	43	28	65
HOCP91-552	42±1	247	59±1	5	20	17	85
HOCP92-618	39±1	256	74±4	6±1	15	7	47
HOCP92-624	41±1	247	62±1	8	33	31	94
HOCP95-951	39±1	254	74±2	5	10	9	90
HOCP96-540	40	261	83±2	4	41	25	61
HOCP96-561	42±1	268	81±2	4	20	13	65
HOCP97-609	39±1	258	73	4	9	7	78
L01-283	40±1	270	91±5	3	31	6	19
L01-299	40	254	72±1	3	70	45	64
L01-315	39±1	261	74	.	9	1	11
L05-448	41±1	251	71±3	4	15	11	73
L05-457	42	251	61±1	8	17	17	100
L06-001	42	256	76±1	3	34	24	71
L06-038	39±1	256	73±4	5±1	10	3	30
L06-040	41±1	256	74±3	8	20	12	60

Table 4. Continue.

Variety	Days of Constant Photoperiod	First Flower Date	Mean Days to Flower	Pollen Rating	Total Stalk Number	Total Flowers	Percent Flowering Stalks
L07-057	40±1	247	62±2	4	22	17	77
L07-068	41±1	.	.	.	11	.	.
L08-088	39	261	83±4	6±1	18	6	33
L08-090	41±1	249	61±1	3	35	19	54
L09-099	40±1	251	73±3	5	26	19	73
L09-112	40±1	.	.	.	17	.	.
L09-117	40±1	.	.	.	14	.	.
L09-123	40±1	254	69±4	6±1	11	9	82
L09-125	42±1	282	71	8	15	1	7
L09-131	42±1	247	57±1	8	22	20	91
L10-138	41	249	59±1	4±1	6	5	83
L10-141	37	258	74±1	3	6	6	100
L10-142	37	.	.	.	5	.	.
L10-145	44	306	95	.	5	1	20
L10-146	41	.	.	.	5	.	.
L10-147	44	270	64±5	3	6	4	67
L10-148	44	284	79±2	8	6	6	100
L10-156	42±1	256	71±3	5±1	14	11	79
L10-163	37	258	72±1	3	6	6	100
L11-167	44	289	84±6	6±1	3	2	67
L11-168	44	279	79±11	7	5	2	40
L11-169	44	279	69±1	8	6	5	83
L11-170	44	268	58±1	8	6	6	100
L11-171	37	289	102	4	4	2	50
L11-172	37	263	85±3	4	5	5	100
L11-173	44	272	64±3	7	3	2	67
L11-174	43	261	73±2	6±1	10	6	60
L11-175	41	249	62±1	6	5	5	100
L11-176	44	275	71±7	8	5	2	40
L11-178	37	263	76	6	4	1	25
L11-179	41	.	.	.	6	.	.
L11-180	44	279	78±10	8	4	2	50
L11-181	37	.	.	.	4	.	.
L11-182	44	292	83±1	3	5	4	80
L11-183	41	251	68±3	8	6	5	83
L11-184	44	306	95	.	4	2	50
L11-185	41	275	88±4	8	3	2	67
L11-186	37	.	.	.	5	.	.
L11-187	44	277	72±4	6	7	6	86
L11-188	44	279	68	8	5	3	60
L11-189	37	292	105	4	5	1	20
L11-190	37	279	96±2	3	5	5	100
L11-191	44	.	.	.	6	.	.
L94-426	39	263	84±10	7	19	4	21
L94-428	39	265	87±3	4	17	7	41
L94-433	41	.	.	.	20	.	.
L97-128	40	254	73±2	8	43	28	65

Table 4. Continue

Variety	Days of Constant Photoperiod	First Flower Date	Mean Days to Flower	Pollen Rating	Total Stalk Number	Total Flowers	Percent Flowering Stalks
L98-207	40	258	73±5	5±1	36	10	28
L98-209	41±1	254	67±1	8	17	9	53
L99-226	41	256	70±1	3	61	40	66
L99-233	42	249	65±2	3	50	29	58
LCP81-010	41±1	254	65±1	7	10	10	100
LCP85-384	41±1	257	75±3	4	38	17	45
LCP86-454	41	257	79±2	5±2	8	2	25
N-27	40	255	78±4	8	27	13	48
US01-040	39	276	101±6	8	6	3	50

Table 5. Crosses and seed made in 2012 sorted by cross number.

Cross	Female	Male	Seed
XL12-001	L09-131	L07-057	522
XL12-002	HOCP92-624	L07-057	1856
XL12-003	L07-057	L07-057	110
XL12-004	L09-131	HOCP91-552	49
XL12-005	HOCP92-624	HOCP91-552	1882
XL12-006	HOCP91-552	HOCP91-552	1285
XL12-007	HO09-840	L08-090	352
XL12-008	L11-175	L08-090	225
XL12-009	HOCP92-624	L08-090	720
XL12-010	L99-233	L08-090	0
XL12-011	L08-090	L08-090	2251
XL12-012	HOCP04-838	12P1	725
XL12-013	L07-057	12P1	868
XL12-014	L10-138	12P1	572
XL12-015	L99-233	12P1	1705
XL12-016	HOCP92-624	12P1	1340
XL12-017	L08-090	12P1	2601
XL12-018	L05-457	L99-233	608
XL12-019	HOCP92-624	L99-233	4232
XL12-020	L10-138	L99-233	52
XL12-021	N27	L99-233	1216
XL12-022	L99-233	L99-233	1192
XL12-023	HOCP04-838	L08-090	312
XL12-024	L09-131	L08-090	8
XL12-025	L05-448	L08-090	1631
XL12-026	L08-090	L08-090	279
XL12-027	HOCP04-838	L09-099	342
XL12-028	L11-183	L09-099	488
XL12-029	HOCP92-624	L09-099	339
XL12-030	L09-099	L09-099	715
XL12-031	L05-457	L99-233	147
XL12-032	N27	L99-233	2538
XL12-033	L05-448	L99-233	760
XL12-034	L05-457	12P2	374
XL12-035	L99-233	12P2	1450
XL12-036	N27	12P2	110
XL12-037	L05-457	L01-299	658
XL12-038	L11-175	L01-299	150
XL12-039	LCP81-010	L01-299	233
XL12-040	L11-183	L01-299	783
XL12-041	L01-299	L01-299	55
XL12-042	L05-457	HO09-840	22
XL12-043	L11-175	HO09-840	8
XL12-044	L97-128	HO09-840	0
XL12-045	LCP85-384	HO09-840	214
XL12-046	HO09-840	HO09-840	0
XL12-047	HOCP02-618	L07-057	16
XL12-048	L05-457	L07-057	0
XL12-049	L98-128	L07-057	0
XL12-050	L98-209	L07-057	8
XL12-051	L07-057	L07-057	0
XL12-052	LCP81-010	L10-138	95
XL12-053	L05-457	L10-138	0
XL12-054	HOCP04-838	L10-138	140
XL12-055	L10-138	L10-138	167
XL12-056	HO09-840	12P3	883
XL12-057	L99-233	12P3	2097
XL12-058	L09-123	12P3	340
XL12-059	L11-175	12P3	0
XL12-060	L97-128	12P3	165
XL12-061	HO07-617	L06-001	39
XL12-062	L09-123	L06-001	642
XL12-063	L11-175	L06-001	158
XL12-064	HOCP00-950	L06-001	40
XL12-065	L06-001	L06-001	29
XL12-066	HOCP00-950	L01-299	0

Table 5. Continue.

Cross	Female	Male	Seed
XL12-067	HOCP92-618	L01-299	770
XL12-068	L09-123	L01-299	0
XL12-069	L01-299	L01-299	95
XL12-070	HOCP00-950	HOCP04-847	50
XL12-071	L06-040	HOCP04-847	145
XL12-072	L97-128	HOCP04-847	41
XL12-073	L01-299	HOCP04-847	86
XL12-074	HOCP02-618	HOCP04-847	180
XL12-075	HOCP04-847	HOCP04-847	48
XL12-076	L01-299	HOCP04-838	375
XL12-077	HOCP00-950	HOCP04-838	183
XL12-078	L97-128	HOCP04-838	86
XL12-079	HOCP04-838	HOCP04-838	711
XL12-080	HOCP04-838	12P4	95
XL12-081	HOCP04-847	12P4	104
XL12-082	L99-226	12P4	13
XL12-083	L01-299	12P4	650
XL12-084	L06-038	12P4	0
XL12-085	HOCP04-847	12P5	50
XL12-086	HOCP91-552	12P5	894
XL12-087	HOCP92-618	12P5	131
XL12-088	L10-156	12P5	31
XL12-089	L06-040	L99-226	25
XL12-090	L09-123	L99-226	0
XL12-091	L97-128	L99-226	93
XL12-092	L98-209	L99-226	269
XL12-093	L99-226	L99-226	111
XL12-094	HOCP00-950	HOCP04-838	3007
XL12-095	LCP81-010	HOCP04-838	412
XL12-096	L01-299	HOCP04-838	39
XL12-097	HOCP04-838	HOCP04-838	526
XL12-098	HOCP00-950	L09-099	31
XL12-099	L97-128	L09-099	144
XL12-100	LCP81-010	L09-099	16
XL12-101	L06-038	L09-099	0
XL12-102	L09-099	L09-099	1340
XL12-103	HOCP00-950	HOCP04-847	10
XL12-104	HOCP92-624	HOCP04-847	535
XL12-105	L97-128	HOCP04-847	138
XL12-106	L01-299	HOCP04-847	5
XL12-107	HOCP04-847	HOCP04-847	5
XL12-108	HOCP00-950	L99-233	84
XL12-109	L97-128	L99-233	300
XL12-110	HO95-951	L99-233	816
XL12-111	L99-233	L99-233	566
XL12-112	HOCP97-609	12P6	593
XL12-113	L06-001	12P6	74
XL12-114	L10-141	12P6	605
XL12-115	L10-156	12P6	1148
XL12-116	L99-226	12P6	14
XL12-117	L99-233	12P6	1074
XL12-118	L99-226	12P7	383
XL12-119	L11-175	12P7	30
XL12-120	L10-163	12P7	355
XL12-121	L10-141	12P7	629
XL12-122	L06-038	12P7	61
XL12-123	L10-163	L99-226	622
XL12-124	HOCP00-950	L10-141	0
XL12-125	L97-128	L10-141	21
XL12-126	L09-099	L10-141	398
XL12-127	L10-141	L10-141	539
XL12-128	L07-057	HOCP96-540	135
XL12-129	L08-088	HOCP96-540	61
XL12-130	L09-099	HOCP96-540	795
XL12-131	HOCP96-540	HOCP96-540	2789
XL12-132	L11-174	L99-226	281
XL12-133	L11-183	L99-226	316
XL12-134	L01-299	L99-226	98
XL12-135	L99-226	L99-226	351
XL12-136	HOCP00-950	L99-226	31
XL12-137	N27	L99-226	2116
XL12-138	L06-040	L99-226	30
XL12-139	L99-226	L99-226	0
XL12-140	L06-040	L06-001	212
XL12-141	L97-128	L06-001	48
XL12-142	L01-299	L06-001	259
XL12-143	L06-001	L06-001	49
XL12-144	HO09-840	12P8	0
XL12-145	HOCP04-847	12P8	245
XL12-146	HOCP85-845	12P8	850
XL12-147	HOCP97-609	12P8	625
XL12-148	L01-299	12P8	350
XL12-149	L99-226	12P8	38
XL12-150	L01-299	12P9	153
XL12-151	HOCP85-845	12P9	165
XL12-152	HOCP97-609	12P9	1045
XL12-153	L99-226	12P9	19
XL12-154	L11-174	L06-001	1029
XL12-155	L11-178	L06-001	9
XL12-156	L11-183	L06-001	427
XL12-157	N27	L06-001	4996
XL12-158	L06-001	L06-001	0

Table 5. Continue.

Cross	Female	Male	Seed
XL12-159	HOCP95-951	L01-299	886
XL12-160	L08-088	L01-299	36
XL12-161	L94-426	L01-299	0
XL12-162	HOCP01-517	L01-299	602
XL12-163	L01-299	L01-299	15
XL12-164	HOCP92-618	L09-099	37
XL12-165	HOCP95-951	L09-099	1028
XL12-166	L08-088	L09-099	22
XL12-167	L98-207	L09-099	493
XL12-168	L09-099	L09-099	593
XL12-169	HOCP00-950	L11-172	114
XL12-170	L06-040	L11-172	9
XL12-171	L97-128	L11-172	7
XL12-172	L11-172	L11-172	633
XL12-173	HOCP92-618	HOCP96-540	1472
XL12-174	HOCP95-951	HOCP96-540	1675
XL12-175	HOCP00-950	HOCP96-540	288
XL12-176	L01-299	HOCP96-540	65
XL12-177	HOCP00-950	12P10	0
XL12-178	HOCP85-845	12P10	18
XL12-179	HO06-563	12P10	78
XL12-180	HOCP97-609	12P10	202
XL12-181	L01-299	12P10	9
XL12-182	L10-163	12P10	461
XL12-183	L09-131	L99-226	964
XL12-184	L94-428	L99-226	79
XL12-185	HOCP01-517	L99-226	87
XL12-186	L99-226	L99-226	85
XL12-187	HOCP04-847	L08-090	420
XL12-188	HOCP85-845	L08-090	504
XL12-189	L09-131	L08-090	69
XL12-190	L11-183	L08-090	263
XL12-191	L97-128	L08-090	90
XL12-192	L08-090	L08-090	381
XL12-193	L09-131	L07-057	225
XL12-194	L97-128	L07-057	8
XL12-195	N27	L07-057	601
XL12-196	HOCP01-517	L07-057	1588
XL12-197	L07-057	L07-057	11
XL12-198	HOCP92-618	L01-299	36
XL12-199	HOCP02-618	L01-299	18
XL12-200	L94-426	L01-299	17
XL12-201	N27	L01-299	258
XL12-202	L09-131	L01-299	448
XL12-203	L01-299	L01-299	46
XL12-204	HOCP02-618	HOCP96-540	367

Cross	Female	Male	Seed
XL12-205	L09-131	HOCP96-540	988
XL12-206	L94-426	HOCP96-540	85
XL12-207	HOCP04-838	HOCP96-540	484
XL12-208	HOCP85-845	12P11	1482
XL12-209	HOCP91-552	12P11	8190
XL12-210	HOCP97-609	12P11	183
XL12-211	L09-131	12P11	2642
XL12-212	L10-141	12P11	704
XL12-213	L97-128	12P11	57
XL12-214	L99-233	12P11	1258
XL12-215	N27	LCP86-454	73
XL12-216	L94-428	LCP86-454	20
XL12-217	L11-170	LCP86-454	0
XL12-218	LCP86-454	LCP86-454	0
XL12-219	HO08-717	L06-001	1051
XL12-220	HOCP01-517	L06-001	1763
XL12-221	L09-099	L06-001	928
XL12-222	L11-189	L06-001	73
XL12-223	L06-001	L06-001	13
XL12-224	HOCP04-847	HOCP96-561	17
XL12-225	HOCP09-804	HOCP96-561	0
XL12-226	L05-457	HOCP96-561	36
XL12-227	L11-170	HOCP96-561	0
XL12-228	L09-131	HOCP96-561	442
XL12-229	HOCP96-561	HOCP96-561	75
XL12-230	L11-170	L11-172	7
XL12-231	L09-131	L11-172	21
XL12-232	L09-099	L11-172	442
XL12-233	HOCP85-845	L11-172	1028
XL12-234	L11-172	L11-172	545
XL12-235	HOCP02-618	HOCP01-523	0
XL12-236	HOCP92-624	HOCP01-523	770
XL12-237	HOCP91-552	HOCP01-523	1602
XL12-238	HOCP04-838	HOCP01-523	876
XL12-239	HOCP01-523	HOCP01-523	111
XL12-240	L11-170	HOCP96-540	12
XL12-241	L09-131	HOCP96-540	693
XL12-242	L07-057	HOCP96-540	189
XL12-243	HOCP92-624	HOCP96-540	729
XL12-244	HOCP96-540	HOCP96-540	2204
XL12-245	L09-131	L11-174	41
XL12-246	LCP85-384	L11-174	64
XL12-247	L07-057	L11-174	74
XL12-248	L11-174	L11-174	155
XL12-249	L09-131	L99-233	476
XL12-250	L07-057	L99-233	109

Table 5. Continue.

Cross	Female	Male	Seed
XL12-251	L05-457	L99-233	1911
XL12-252	HOCP09-804	L99-233	450
XL12-253	L99-233	L99-233	354
XL12-254	HOCP02-618	12P12	16
XL12-255	HOCP85-845	12P12	474
XL12-256	HOCP91-552	12P12	3273
XL12-257	L09-131	12P12	1227
XL12-258	L09-131	L10-147	127
XL12-259	HOCP92-624	L10-147	83
XL12-260	L98-207	L10-147	104
XL12-261	L09-123	L10-147	20
XL12-262	HOCP04-838	L10-147	454
XL12-263	L10-147	L10-147	9
XL12-264	L06-040	HOCP85-845	0
XL12-265	L09-099	HOCP85-845	89
XL12-266	HOCP92-618	HOCP85-845	74
XL12-267	L99-226	HOCP85-845	106
XL12-268	HOCP85-845	HOCP85-845	34
XL12-269	HOCP91-552	L01-283	773
XL12-270	L05-457	L01-283	213
XL12-271	L11-170	L01-283	0
XL12-272	N27	L01-283	62
XL12-273	L01-283	L01-283	0
XL12-274	HOCP91-552	L01-299	463
XL12-275	HOCP92-624	L01-299	118
XL12-276	L99-226	L01-299	172
XL12-277	L05-457	HOCP96-540	40
XL12-278	L09-131	HOCP96-540	119
XL12-279	LCP81-010	HOCP96-540	336
XL12-280	HOCP00-950	L94-428	360
XL12-281	HO10-937	L94-428	11
XL12-282	HOCP85-845	L94-428	27
XL12-283	HOCP95-951	L94-428	159
XL12-284	L94-428	L94-428	20
XL12-285	HO10-937	HOCP04-847	24
XL12-286	L11-170	HOCP04-847	8
XL12-287	N27	HOCP04-847	540
XL12-288	HOCP04-847	HOCP04-847	0
XL12-289	HOCP00-950	L08-090	0
XL12-290	HOCP85-845	L08-090	29
XL12-291	HOCP91-552	L08-090	1644
XL12-292	L10-156	L08-090	0
XL12-293	LCP81-010	L08-090	194
XL12-294	L08-090	L08-090	43
XL12-295	HO07-617	L01-299	0
XL12-296	HOCP85-845	L01-299	34
XL12-297	L06-038	L01-299	0
XL12-298	L11-173	L01-299	43
XL12-299	L01-299	L01-299	58
XL12-300	HOCP01-517	HOCP04-838	43
XL12-301	N27	HOCP04-838	416
XL12-302	L10-156	HOCP04-838	14
XL12-303	HOCP04-838	HOCP04-838	148
XL12-304	LCP81-010	L99-233	65
XL12-305	HOCP92-624	L99-233	463
XL12-306	L98-207	L99-233	899
XL12-307	L98-209	L99-233	28
XL12-308	LCP85-384	L99-233	707
XL12-309	L99-233	L99-233	224
XL12-310	HOCP00-950	12P13	0
XL12-311	HOCP10-901	12P13	550
XL12-312	HOCP96-561	12P13	254
XL12-313	L09-099	12P13	109
XL12-314	L09-123	12P13	73
XL12-315	L09-131	12P13	14
XL12-316	L99-233	12P13	25
XL12-317	HOCP09-814	L01-299	249
XL12-318	L10-156	L01-299	22
XL12-319	L98-209	L01-299	34
XL12-320	L11-185	L01-299	31
XL12-321	L01-299	L01-299	0
XL12-322	HOCP01-517	L01-283	344
XL12-323	L09-099	L01-283	93
XL12-324	LCP81-010	L01-283	211
XL12-325	L11-176	L01-283	10
XL12-326	L01-283	L01-283	0
XL12-327	L06-040	L99-226	0
XL12-328	L01-299	L99-226	525
XL12-329	L98-209	L99-226	0
XL12-330	L99-226	L99-226	51
XL12-331	HOCP91-552	LCP85-384	524
XL12-332	LCP81-010	LCP85-384	810
XL12-333	L97-128	LCP85-384	32
XL12-334	L98-207	LCP85-384	467
XL12-335	LCP85-384	LCP85-384	85
XL12-336	L97-128	HOCP96-540	1000
XL12-337	L98-207	HOCP96-540	818
XL12-338	L98-209	HOCP96-540	306
XL12-339	LCP81-010	HOCP96-540	1774
XL12-340	HOCP96-540	HOCP96-540	1552
XL12-341	HO06-563	L07-057	334
XL12-342	HOCP09-804	L07-057	220

Table 5. Continue.

Cross	Female	Male	Seed
XL12-343	HOCP10-900	L07-057	46
XL12-344	L07-057	L07-057	112
XL12-345	HOCP92-624	L11-172	441
XL12-346	N27	L11-172	9
XL12-347	US01-040	L11-172	213
XL12-348	L01-299	L11-172	144
XL12-349	L11-172	L11-172	431
XL12-350	HOCP95-951	L94-428	150
XL12-351	L11-173	L94-428	392
XL12-352	L11-187	L94-428	10
XL12-353	L01-299	L94-428	47
XL12-354	L94-428	L94-428	306
XL12-355	HO06-563	L99-226	132
XL12-356	HO08-709	L99-226	402
XL12-357	HOCP85-845	L99-226	813
XL12-358	L01-315	L99-226	94
XL12-359	L05-448	L99-226	339
XL12-360	L99-226	L99-226	505
XL12-361	HOCP00-950	LCP85-384	0
XL12-362	HOCP09-814	LCP85-384	1552
XL12-363	LCP85-384	LCP85-384	703
XL12-364	HOCP85-845	HOCP96-540	406
XL12-365	HOCP92-624	HOCP96-540	1072
XL12-366	L05-448	HOCP96-540	108
XL12-367	L06-040	HOCP96-540	0
XL12-368	L97-128	HOCP96-540	759
XL12-369	HOCP96-540	HOCP96-540	5163
XL12-370	HO06-563	L01-299	232
XL12-371	L06-040	L01-299	436
XL12-372	L98-207	L01-299	620
XL12-373	L97-128	L01-299	675
XL12-374	L01-299	L01-299	88
XL12-375	HOCP00-950	HO10-912	26
XL12-376	L97-128	HO10-912	51
XL12-377	HO08-709	HO10-912	348
XL12-378	HO10-912	HO10-912	974
XL12-379	HO06-563	L11-190	460
XL12-380	L97-128	L11-190	58
XL12-381	L09-099	L11-190	1066
XL12-382	HOCP92-618	L11-190	83
XL12-383	L10-156	L11-190	290
XL12-384	HOCP92-624	L11-190	571
XL12-385	L11-190	L11-190	98
XL12-386	HO06-563	L05-448	230
XL12-387	HO08-709	L05-448	126
XL12-388	L11-169	L05-448	825

Cross	Female	Male	Seed
XL12-389	L11-187	L05-448	76
XL12-390	L05-448	L05-448	246
XL12-391	HO08-709	L08-090	345
XL12-392	HOCP10-901	L08-090	46
XL12-393	L11-188	L08-090	0
XL12-394	L08-090	L08-090	286
XL12-395	L11-188	L08-088	0
XL12-396	L11-187	L08-088	12
XL12-397	L11-169	L08-088	70
XL12-398	L08-088	L08-088	10
XL12-399	L11-168	L99-226	710
XL12-400	L11-174	L99-226	381
XL12-401	L11-188	L99-226	7
XL12-402	L10-156	L99-226	2012
XL12-403	L98-207	L99-226	396
XL12-404	L01-299	L99-226	219
XL12-405	HOCP85-845	L06-001	413
XL12-406	L11-180	L06-001	184
XL12-407	L11-187	L06-001	27
XL12-408			0
XL12-409	HOCP04-838	12P14	134
XL12-410	HOCP85-845	12P14	145
XL12-411	L01-283	12P14	445
XL12-412	L06-040	12P14	37
XL12-413	L97-128	12P14	101
XL12-414	L99-226	12P14	319
XL12-415	L05-457	12P14	496
XL12-416	HO05-961	L01-299	997
XL12-417	L11-187	L01-299	23
XL12-418	L11-169	L01-299	99
XL12-419	HOCP01-523	L01-299	395
XL12-420	L98-128	L01-299	0
XL12-421	HO09-832	L99-226	286
XL12-422	L11-169	L99-226	257
XL12-423	L11-185	L99-226	99
XL12-424	LCP85-384	L99-226	332
XL12-425	L99-226	L99-226	273
XL12-426	HOCP85-845	L11-172	1028
XL12-427	L97-128	L11-172	55
XL12-428	L05-448	L11-172	396
XL12-429	L11-172	L11-172	60
XL12-430	HOCP00-950	L05-448	156
XL12-431	N27	L05-448	2177
XL12-432	L10-148	L05-448	1737
XL12-433	L11-174	L05-448	852
XL12-434	HOCP09-814	L05-448	0

Table 5. Continue.

Cross	Female	Male	Seed
XL12-435	L05-448	L05-448	901
XL12-436	HO07-613	LCP85-384	1390
XL12-437	L10-148	LCP85-384	2245
XL12-438	HO08-709	LCP85-384	1687
XL12-439	LCP85-384	LCP85-384	182
XL12-440	HO06-563	L99-226	694
XL12-441	HO08-709	L99-226	1535
XL12-442	HOCP85-845	L99-226	617
XL12-443	L99-226	L99-226	499
XL12-444	L06-040	HOCP09-804	30
XL12-445	HOCP00-950	HOCP09-804	6
XL12-446	HO08-709	HOCP09-804	183
XL12-447	HOCP09-804	HOCP09-804	100
XL12-448	HO08-709	L06-001	858
XL12-449	HOCP85-845	L06-001	1850
XL12-450	HOCP00-950	L06-001	95
XL12-451	L06-001	L06-001	72
XL12-452	HO08-709	HOCP96-540	1228
XL12-453	HOCP96-561	HOCP96-540	1408
XL12-454	HOCP96-540	HOCP96-540	3224
XL12-455	CP83-644	HOCP04-838	1605
XL12-456	L98-209	HOCP04-838	983
XL12-457	HOCP04-838	HOCP04-838	1240
XL12-458	HO08-709	L08-090	561
XL12-459	HO07-613	L08-090	1077
XL12-460	HO06-563	L08-090	270
XL12-461	L06-001	L08-090	120
XL12-462	L08-090	L08-090	607
XL12-463	L11-176	HOCP96-540	148
XL12-464	L09-099	HOCP96-540	1056
XL12-465	HOCP85-845	HOCP96-540	627
XL12-466	HOCP00-950	HOCP96-540	232
XL12-467	L06-001	HOCP96-540	281
XL12-468	HOCP96-540	HOCP96-540	3811
XL12-469	CP83-644	HOCP96-561	252
XL12-470	HO08-709	HOCP96-561	60
XL12-471	L11-167	HOCP96-561	739
XL12-472	HOCP00-950	HOCP96-561	13
XL12-473	L06-001	HOCP96-561	34
XL12-474	HOCP96-561	HOCP96-561	0
XL12-475	L06-001	L10-147	26
XL12-476			0
XL12-477	HO08-709	L10-147	327
XL12-478	L10-147	L10-147	34
XL12-479	CP83-644	L06-001	2816
XL12-480	HOCP00-950	L06-001	811
XL12-481	HOCP96-561	L06-001	810
XL12-482	L09-099	L06-001	908
XL12-483	L06-001	L06-001	16
XL12-484	HOCP00-950	L01-283	91
XL12-485	L06-001	L01-283	13
XL12-486	LCP85-384	L01-283	458
XL12-487	L01-283	L01-283	489
XL12-488	HOCP96-561	12P15	469
XL12-489	L11-171	12P15	1471
XL12-490	L11-190	12P15	383
XL12-491	HOCP85-845	12P15	279
XL12-492	L06-001	12P16	463
XL12-493	CP83-644	12P16	1564
XL12-494	L10-148	12P16	849
XL12-495	HOCP96-561	12P16	632
XL12-496	L11-182	12P16	2885
XL12-497	L11-189	12P16	795
XL12-498	CP83-644	12P17	434
XL12-499	HO08-709	12P17	1490
XL12-500	HO08-717	12P17	1628
XL12-501	HOCP09-814	12P17	578
XL12-502	HOCP96-540	12P17	1204
XL12-503	HOCP96-561	12P17	297
XL12-504	L10-148	12P17	3016
XL12-505	L10-156	HO08-717	24
XL12-506	HO08-717	HO08-717	39
XL12-507	HO08-709	L94-428	224
XL12-508	L08-088	HOCP01-523	60
XL12-509	HOCP01-523	HOCP01-523	57
XL12-510	HOCP01-517	L11-182	72
XL12-511	HO09-832	L11-182	872
XL12-512	L11-182	L11-182	1065
XL12-513	HOCP85-845	US01-040	210
XL12-514	US01-040	US01-040	204
XL12-515	HO06-530	L11-182	1308
XL12-516	HO06-563	L11-182	518
XL12-517	HO95-988	L11-182	322
XL12-518	L11-182	L11-182	349
XL12-519	L99-233	L99-233	137
XL12-520	HO06-530	HOCP96-540	1222
XL12-521	HOCP85-845	HOCP96-540	1151
XL12-522	L11-180	HOCP96-540	589
XL12-523	L99-233	L99-233	396
XL12-524	L94-426	HO08-717	20
XL12-525	L11-187	HO08-717	45
XL12-526	HO08-717	HO08-717	0

Table 5. Continue.

Cross	Female	Male	Seed
XL12-527	L11-168	HOCP09-800	1196
XL12-528	HOCP09-800	HOCP09-800	7
XL12-529	L97-128	HOCP10-901	107
XL12-530	HOCP10-901	HOCP10-901	59
XL12-531	L11-167	L99-226	458

SELECTIONS, ADVANCEMENTS, AND ASSIGNMENTS OF THE LSU AGCENTER'S SUGARCANE VARIETY DEVELOPMENT PROGRAM FOR 2012

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SUMMARY

In the selection phase of the LSU AgCenter's Sugarcane Variety Development Program, superior clones are advanced through the single stool, first line, second line, and increase stages of the breeding program. In the first stubble crop of the second-line trials, those clones with acceptable breeding or commercial value are assigned a permanent variety number. A total of 75,703 seedlings from 166 crosses were planted in the field in the spring of 2012. The majority of these seedlings are progeny of poly crosses among commercial and elite experimental varieties. In the fall of 2012, family selection was practiced on the 61,704 stubble seedlings surviving the winter. This selection resulted in the planting of 2,692 first-line trial plots. At the same time, superior clones were also selected and advanced through subsequent stages (393 to second line trials, 150 to the increase stage). Assignments of permanent "L12" numbers were given to the 40 best clones of the 2007 crossing series.

PROCEDURES

In the selection stage of the LSU AgCenter's Sugarcane Variety Development Program, single stools are established from seed generated in the crossing stage. After evaluating and selecting the families for cane yield potential in the cross appraisal studies, clones with desirable phenotypes are selected and advanced through single stool, first line, second line, and increase stages. In the first stubble crop of the second-line trials, clones judged to have breeding or commercial value are assigned a permanent variety number and advanced to the nursery stage of testing.

RESULTS AND DISCUSSION

A total of 75,703 seedlings from 166 crosses of the 2011 crossing series were planted to the field in the spring of 2012 (Table 1). Many of these seedlings were progeny of crosses among commercial and superior experimental varieties. In the fall of 2012, individual selection was practiced on the 61,704 stubble single stools of the 2010 crossing series that survived the winter. The 2,692 clones selected and advanced from the single stools were planted in 10-foot first-line trial plots. Dates of planting and harvesting of all plots in the selection phase of the program can be found in Table 2.

The 1,888 first-line trial plots of the 2009 crossing series were rated for cane yield and pest resistance in August of 2012 (Table 3). After screening for cane yield rating, acceptable clones were further evaluated for pest resistance (diseases and borer injury) stalk quality, and Brix (Table 3). This second stage of advancement was concluded with the planting of 393 clones in single row 16-foot second line trials plots.

Stalk counts were made on the 522 plant-cane second line trial plots of the 2008 crossing series

in August 2012. Based on these counts and sucrose lab data collected in 2011, 150 clones were planted in two single row 16-foot plots representing the increase stage of the program (Table 4). One replication was planted in light soil and the other in heavy soil. These clones will be candidates for assignment in 2013. Of the 151 candidates from the first stubble crop of the second line trial plots, the best 40 clones from the 2007 crossing series were assigned permanent “L12" numbers (Table 5). These newly assigned “L12" varieties were then planted in replicated nursery trials at three on station locations (Sugar Research Station, Iberia Research Station, USDA-ARS Ardoyne Farm).

The advancement summary of clones from crosses made in 2007 through 2011 is shown in Table 6. Crosses are sorted by female parent in ascending order, with the percentile ranking given for each cross in each stage of the program.

Table 1. Summary of selections, advancements and assignments made during 2012 by the Louisiana, “L” Sugarcane Variety Development Program’s personnel.

	Crosses				Advanced to			
Crossing series	Progeny test	Selection program	Plants transplanted	Over-wintered plants	1st line	2nd line	Increase	On-station Nurseries (L12 Assignments)
			----------------------- number of clones	----------------------------				
X07	70	132	81474	70878	1836	388	150	40
X08	--	153	76213	39329	1730	522	150	
X09	60	215	76095	41581	1888	393		
X10	50	211	90294	61704				
X11	58	166	75703					

Table 2. Dates of seedling and line trials planted or harvested in 2012.

Crossing Series	Test	Crop	Date Planted	Date Harvested
X11	Seedlings	Planted	4/9 – 4/20	
X11	Progeny Test	Planted	4/19	
X10	Seedlings	First Stubble	4/11 – 4/18	9/17 – 10/5
X10	Progeny Test	Planted	4/18/11	Did not harvest
X10	First Line Trials	Planted	9/21/12	
X09	First Line Trials	Plant-cane	9/30/11	
X08	First Line Trials	First Stubble	9/17/10	11/26/12
X09	Second Line Trials	Planted	10/12/12	
X08	Second Line Trials	Plant-cane	09/14/11	10/31/12
X07	Second Line Trials	First Stubble	9/23/10	10/17/12
X06	Second Line Trials	Second Stubble	10/1/09	12/10/12
X08	Light Soil Increase	Planted	10/30/12	
X07	Light Soil Increase	Plant-cane	10/25/11	12/14/12
X06	Light Soil Increase	First Stubble	9/23/10	12/12/12
X05	Light Soil Increase	Second Stubble	10/21/09	11/20/12
X08	Heavy Soil Increase	Planted	10/30/12	
X07	Heavy Soil Increase	Plant-cane	10/25/11	12/12/12
X06	Heavy Soil Increase	First Stubble	9/23/10	12/7/12

Table 3. Numbers of experimental clones dropped for identified faults in the 2009 crossing series first-line trials.

Trait	Fault	
	Frequency	Percent
------------------------- 1888 clones enter first round of evaluation ------------------------------		
Initial Selection (Rating)	551	29.2
------------------------ 1337 clones enter second round of evaluation ----------------------------		
Pith	185	9.8
Smut	29	1.5
Tube	37	1.9
Lodge	84	4.5
Broken Tops	35	1.8
Other	19	1.1
--------------------------------------- 389 clones dropped ---------------------------------------		
----------------------------948 clones enter third round of evaluation ---------------------------		
Brix	555	29.4
Clones advanced	393	20.8

Table 4. Number of experimental clones dropped for identified faults in the 2008 crossing series of the plant-cane second line trial prior to advancement to the increase stage.

Trait	Fault	
	Frequency	Percent
--------------------------- 522 clones enter first round of evaluation ----------------------------		
Stalk count <75 per plot & observations	175	33.5
Lodged	79	15.2
Pith / Tube	71	13.6
Smut	27	5.2
Other	20	3.8
--- 372 clones dropped -------------------------------------		
Clones advanced to Increase stage	150	28.7

Table 5. Yield data of the 2012 "L" assignments made in the first-stubble second line trials.

Variety	Female	Male	Sugar Per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
HOCP96-540	LCP86-454	LCP85-384	7053	39.2	181	2.11	36981	11.3
L99-226	CP89-846	LCP81-030	7317	40.2	181	1.94	42426	11.5
L01-283	L93-365	LCP85-384	8847	48.4	183	1.87	51728	11.8
L01-299	L93-365	LCP85-384	6231	33.6	186	1.86	35846	13.5
L12-192	HOCP96-561	L06-001	9379	51.6	182	2.23	46283	11.9
L12-193	L04-408	HOCP04-803	6845	33.7	203	1.52	44468	11.7
L12-194	HOCP92-624	LCP85-384	8469	43.3	196	1.55	55811	10.9
L12-195	CP79-348	HOCP02-610	7125	37.2	192	2.19	34031	10.9
L12-196	L97-128	HOCP96-540	5078	28	181	1.93	29040	11.5
L12-197	HOCP02-610	HOCP96-540	7385	40.5	182	1.58	51274	11.6
L12-198	HOCP92-624	L04-425	9000	51.2	176	1.85	55358	11.3
L12-199	L06-040	HOCP96-540	8246	41.1	201	1.83	44921	13.4
L12-200	HOCP92-624	L01-299	6669	40.2	166	1.81	44468	11
L12-201	L97-128	HOCP96-540	8283	48.7	170	2.19	44468	10.6
L12-202	LCP81-010	HOCP02-620	9858	50.9	194	1.86	54904	12.4
L12-203	LCP81-010	HOCP00-950	6333	40.2	157	2.57	31309	11.3
L12-204	HOCP96-540	L02-325	6588	39.4	167	2.26	34939	11.9
L12-205	L05-457	L99-226	6805	35.1	194	1.8	39023	13
L12-206	L06-040	HOCP96-540	7413	40.9	181	1.56	52635	13.9
L12-207	L97-128	HOCP96-540	6479	33.9	191	1.63	41745	12
L12-208	HOCP92-624	L01-299	8222	46.7	176	1.64	57173	13.1
L12-209	L05-457	L04-425	7492	42.8	175	1.56	54904	11.6
L12-210	N27	L99-226	13937	75	186	2.35	63979	11.7
L12-211	HOCP05-902	L99-226	7509	37.3	201	1.51	49459	12.5
L12-212	HO91-572	HOCP96-540	9952	53	188	1.83	58080	12.8
L12-213	HOCP89-831	HOCP96-540	9791	51.8	189	1.87	55358	10.7
L12-214	L97-128	HOCP96-540	5670	31.6	180	1.21	52181	14
L12-215	HOCP00-950	L06-001	7153	42.5	168	1.5	56719	11.2
L12-216	HOCP92-624	L99-226	10424	59.4	175	2.17	54904	14.3
L12-217	HOCP92-624	LCP85-384	9105	52.5	174	2.07	50820	13.6
L12-218	N27	L01-299	6886	43.7	158	1.69	51728	13.6
L12-219	HO95-988	L99-233	5635	31.3	180	1.63	38569	11.9
L12-220	HOCP89-831	HOCP96-540	7668	42.3	181	1.15	73961	12.3
L12-221	L05-457	L99-233	9680	56.7	171	1.37	83036	13.5
L12-222	HOCP95-951	L01-299	5730	32.6	176	1.03	63525	13.5
L12-223	LCP81-010	LCP85-384	9531	49.4	193	1.63	60803	14
L12-224	L97-128	HOCP96-540	9040	54.9	165	1.89	58080	10.6
L12-225	HOCP00-930	L00-266	7154	36.9	194	1.57	47190	14.8
L12-227	L01-283	L99-226	8474	50.6	167	2.57	39476	12.7
L12-228	HOCP89-831	LCP85-384	7175	38.2	188	1.2	63979	13.8

Table 5. Continue.

Variety	Female	Male	Sugar Per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
L12-229	HOCP89-831	LCP85-384	7814	39.1	200	1.46	53543	12.6
L12-230	HO95-988	HOCP96-540	8095	42.1	192	1.9	44468	11.1
L12-231	L04-425	L99-226	8217	47.9	172	2.3	41745	10.4
L12-232	HOCP00-930	L99-233	6678	35.8	187	1.66	43106	12.3

Table 6. Advancement summary of the crosses in the 2007 through 2010 crossing series.

			1 st Line		2 nd Line		Increases		Assignments	
Female	Male	Survive	No	Rank Percentile	No	Rank Percentile	No	Rank Percentile	No	Rank Percentile
2007 Crossing Series										
CP79-348	HOCP02-610	950	9	23	2	33	2	66	1	84
CP79-348	L99-226	691	5	19	2	42	1	59	0	38
HO91-572	07P2	214	6	61	0	15	0	25	0	38
HO91-572	HOCP96-540	247	8	67	1	50	1	79	1	95
HO95-988	HOCP96-540	1210	24	50	7	62	6	88	1	79
HO95-988	L99-233	235	3	30	0	15	0	25	0	38
HO95-988	L99-233	699	16	54	2	42	2	74	1	88
HO95-988	L99-233	466	7	36	2	53	0	25	0	38
HOCP00-930	07P2	246	5	50	2	73	2	94	0	38
HOCP00-930	HOCP02-618	250	16	94	4	93	2	93	0	38
HOCP00-930	L00-266	1052	35	70	6	61	3	73	1	82
HOCP00-930	L99-233	410	7	43	6	91	3	91	1	93
HOCP00-950	HOCP96-540	457	6	30	0	15	0	25	0	38
HOCP00-950	L06-001	485	34	97	7	90	3	90	1	90
HOCP00-950	L99-233	575	13	54	3	60	2	78	0	38
HOCP01-523	LCP85-384	836	0	7	0	15	0	25	0	38
HOCP02-610	HOCP96-540	948	28	65	6	68	3	75	1	84
HOCP02-618	L05-450	248	12	85	2	73	0	25	0	38
HOCP02-618	L06-001	707	23	70	7	85	2	73	0	38
HOCP02-618	L99-226	214	13	94	4	94	3	98	0	38
HOCP02-620	HOCP02-623	220	3	33	0	15	0	25	0	38
HOCP02-620	L99-226	480	3	17	0	15	0	25	0	38
HOCP02-620	L99-226	229	6	57	2	80	0	25	0	38
HOCP02-623	HOCP04-803	201	3	36	1	58	1	88	0	38
HOCP02-623	L99-226	252	0	7	0	15	0	25	0	38
HOCP04-809	L99-226	243	14	91	1	51	0	25	0	38
HOCP04-809	L99-233	430	8	48	3	71	1	67	0	38
HOCP04-810	TUC95-25	265	9	74	5	95	0	25	0	38
HOCP04-838	TUC95-25	132	6	82	0	15	0	25	0	38
HOCP05-902	L99-226	481	14	63	3	66	1	65	1	92
HOCP85-845	HOCP96-540	226	4	46	1	54	0	25	0	38
HOCP89-831	HOCP96-540	454	8	46	2	54	2	86	2	97
HOCP89-831	LCP85-384	713	42	92	15	96	9	97	2	94
HOCP89-846	L99-233	450	5	26	1	36	0	25	0	38
HOCP91-552	L99-226	930	4	15	2	36	0	25	0	38
HOCP92-624	HOCP02-623	1011	10	24	1	31	1	54	0	38
HOCP92-624	HOCP91-552	1043	32	66	3	42	1	52	0	38
HOCP92-624	HOCP96-561	970	11	26	2	33	0	25	0	38
HOCP92-624	L01-299	237	9	77	2	79	1	83	0	38
HOCP92-624	L01-299	1102	49	81	9	76	3	70	2	89
HOCP92-624	L04-425	955	78	98	21	97	4	82	1	84
HOCP92-624	L99-226	481	16	70	5	86	1	65	1	92
HOCP92-624	L99-233	1281	24	48	8	66	3	68	0	38
HOCP92-624	LCP85-384	1429	69	85	7	57	4	72	2	88
HOCP93-746	L99-233	249	0	7	0	15	0	25	0	38
HOCP95-951	HOCP05-923	210	9	80	1	56	0	25	0	38
HOCP95-951	HOCP96-540	1160	75	95	6	60	1	51	0	38
HOCP95-951	L01-299	858	58	96	15	94	7	95	1	85

Table 6. Continue.

Female	Male	Survive	1 st Line		2 nd Line		Increases		Assignments	
			No	Rank Percentile	No	Rank Percentile	No	Rank Percentile	No	Rank Percentile
HOCP96-540	HOCP00-950	897	0	7	0	15	0	25	0	38
HOCP96-540	HOCP00-950	642	11	43	1	32	1	60	0	38
HOCP96-540	HOCP89-831	448	0	7	0	15	0	25	0	38
HOCP96-540	L02-325	215	8	76	2	84	1	87	1	98
HOCP96-561	L06-001	735	16	52	2	39	1	55	1	86
HOCP96-561	L06-016	239	7	63	0	15	0	25	0	38
HOCP96-561	L99-226	246	10	79	2	73	2	94	0	38
HOCP96-561	LCP85-384	460	7	36	1	36	0	25	0	38
HOCP99-825	L99-233	434	6	33	1	38	0	25	0	38
HoCP00-950	Poly	183	10	89	0	15	0	25	0	38
L01-283	L99-226	1199	12	24	1	30	1	50	1	79
L01-283	L99-226	246	21	99	0	15	0	25	0	38
L01-283	LCP85-384	741	0	7	0	15	0	25	0	38
L01-299	HOCP96-540	165	8	85	1	65	0	25	0	38
L01-299	L99-233	244	8	70	2	76	0	25	0	38
L01-299	Poly	240	8	70	2	77	1	80	0	38
L02-325	L99-226	1405	23	40	4	40	2	57	0	38
L04-408	HOCP04-803	236	13	89	3	89	1	84	1	96
L04-408	HOCP96-540	1800	48	59	0	15	0	25	0	38
L04-408	TUC95-25	267	12	82	1	48	0	25	0	38
L04-425	L99-226	1172	34	63	7	64	4	77	1	81
L04-434	L01-299	221	17	97	1	55	0	25	0	38
L05-445	L05-450	490	4	21	0	15	0	25	0	38
L05-450	07P2	183	0	7	0	15	0	25	0	38
L05-451	07P1	407	0	7	0	15	0	25	0	38
L05-457	HOCP02-610	245	1	15	0	15	0	25	0	38
L05-457	HOCP91-552	852	11	30	3	47	0	25	0	38
L05-457	HOCP96-540	426	7	40	3	71	1	69	0	38
L05-457	HOCP96-561	245	6	55	2	76	0	25	0	38
L05-457	L01-299	695	12	43	2	42	1	58	0	38
L05-457	L04-425	1096	36	70	10	83	3	71	1	82
L05-457	L04-425	240	8	70	2	77	1	80	0	38
L05-457	L99-226	717	19	57	7	85	3	81	1	87
L05-457	L99-233	240	5	51	0	15	0	25	0	38
L05-457	L99-233	482	13	59	2	51	1	64	1	91
L05-457	L99-233	1036	17	40	3	42	1	53	0	38
L05-457	LCP81-010	248	12	85	6	97	3	97	0	38
L05-459	L99-226	475	24	87	3	68	1	66	0	38
L06-003	L99-233	743	19	57	9	88	1	55	0	38
L06-010	07P2	682	8	27	0	15	0	25	0	38
L06-010	HOCP96-540	1189	57	85	6	58	1	50	0	38
L06-010	L99-226	1053	0	7	0	15	0	25	0	38
L06-010	LCP85-384	251	0	7	0	15	0	25	0	38
L06-010	LCP85-384	655	20	66	0	15	0	25	0	38
L06-025	LCP81-010	236	4	43	0	15	0	25	0	38
L06-026	L99-226	230	10	80	2	80	1	85	0	38
L06-040	HOCP96-540	251	14	91	9	98	4	99	2	99
L91-281	HOCP02-620	199	0	7	0	15	0	25	0	38
L91-281	L06-001	936	14	36	3	45	0	25	0	38
L91-281	LCP85-384	220	13	92	10	99	2	96	0	38

Table 6. Continue.

Female	Male	Survive	1 st Line No	1 st Line Rank Percentile	2 nd Line No	2 nd Line Rank Percentile	Increases No	Increases Rank Percentile	Assignments No	Assignments Rank Percentile
L91-281	LCP85-384	183	3	40	0	15	0	25	0	38
L94-428	L06-023	478	13	59	6	88	2	81	0	38
L97-128	HOCP05-923	220	4	46	2	83	0	25	0	38
L97-128	HOCP96-540	1130	60	88	17	91	8	91	5	97
L97-128	HOCP96-540	436	17	78	3	70	0	25	0	38
L97-128	L01-299	247	7	61	1	50	0	25	0	38
L97-128	L04-425	251	0	7	0	15	0	25	0	38
L97-128	L99-233	624	10	40	5	72	2	76	0	38
L97-128	L99-233	1163	8	19	4	47	1	51	0	38
L97-128	L99-233	250	2	21	0	15	0	25	0	38
L98-197	07P2	890	0	7	0	15	0	25	0	38
L98-197	HOCP85-845	244	0	7	0	15	0	25	0	38
L98-197	L99-226	675	0	7	0	15	0	25	0	38
L98-207	L94-428	449	0	7	0	15	0	25	0	38
L98-207	Poly	710	8	26	3	52	1	56	0	38
L98-209	L99-226	596	0	7	0	15	0	25	0	38
L99-233	L99-226	227	3	30	2	82	0	25	0	38
LCP81-010	HOCP00-950	263	14	88	4	92	2	92	1	94
LCP81-010	HOCP02-620	1191	21	46	7	63	3	70	1	80
LCP81-010	HOCP96-540	970	8	21	3	44	2	63	0	38
LCP81-010	L06-016	193	0	7	0	15	0	25	0	38
LCP81-010	L99-233	1120	6	17	0	15	0	25	0	38
LCP81-010	L99-233	1356	11	21	2	32	0	25	0	38
LCP81-010	LCP85-384	1524	22	33	6	49	3	62	1	77
LCP85-384	HOCP00-950	218	3	33	0	15	0	25	0	38
N27	L01-299	1395	32	54	3	36	2	58	1	78
N27	L99-226	928	1	14	0	15	0	25	0	38
N27	L99-226	1544	59	77	10	69	5	76	1	76
N27	LCP85-384	1209	18	36	3	38	2	61	0	38
TUC89-28	HOCP01-517	141	5	75	0	15	0	25	0	38
TUCCP77-042	Poly	382	11	63	4	87	2	89	0	38
US79-010	HOCP96-540	1220	5	15	4	46	2	61	0	38
US79-010	L01-299	693	15	52	4	62	0	25	0	38
US79-010	LCP85-384	494	6	27	3	65	0	25	0	38
US99-004	LCP85-384	235	8	74	2	79	1	85	0	38
2008 Crossing Series										
CB79-318	LCP85-384	191	3	32	0	14	0	24	.	.
CP79-318	LCP85-384	445	17	76	4	64	0	24	.	.
CP83-644	HOCP04-836	938	11	23	4	37	1	53	.	.
HO95-988	L99-233	247	7	60	2	58	0	24	.	.
HOCP00-930	HOCP91-552	866	21	52	1	29	1	54	.	.
HOCP00-930	L00-266	419	8	41	6	87	3	95	.	.
HOCP00-930	L02-353	465	17	74	6	80	1	62	.	.
HOCP00-930	L04-408	874	10	21	7	58	3	74	.	.
HOCP00-950	08P2	648	34	90	9	86	1	58	.	.
HOCP00-950	08P4	756	15	44	8	72	5	92	.	.
HOCP00-950	08P6	1070	19	36	5	40	1	50	.	.
HOCP00-950	HOCP96-540	98	5	89	2	93	0	24	.	.

Table 6. Continue.

Female	Male	Survive	1 st Line No	1 st Line Rank Percentile	2 nd Line No	2 nd Line Rank Percentile	Increases No	Increases Rank Percentile	Assignments No	Assignments Rank Percentile
HOCP01-517	L98-207	1261	36	62	23	92	9	94	.	.
HOCP01-523	L98-209	546	17	66	5	66	2	77	.	.
HOCP01-523	L99-233	570	22	77	9	89	4	93	.	.
HOCP01-544	L99-233	540	24	81	6	76	1	59	.	.
HOCP01-558	HOCP92-618	419	10	52	2	41	1	65	.	.
HOCP02-610	08P13	465	16	71	4	63	1	62	.	.
HOCP02-610	08P14	1213	17	26	0	14	0	24	.	.
HOCP02-610	08P15	206	14	95	2	69	0	24	.	.
HOCP02-623	08P13	155	3	41	1	55	1	91	.	.
HOCP02-623	08P28	239	7	62	2	60	2	96	.	.
HOCP02-623	HOCP01-523	451	29	93	15	97	2	82	.	.
HOCP02-623	HOCP91-552	226	4	36	0	14	0	24	.	.
HOCP02-623	HOCP96-540	378	3	19	0	14	0	24	.	.
HOCP03-757	L04-425	210	0	8	0	14	0	24	.	.
HOCP04-827	HO95-988	439	21	86	2	39	1	64	.	.
HOCP04-843	HOCP04-809	233	10	80	4	91	2	97	.	.
HOCP85-845	08P13	575	27	84	23	99	7	99	.	.
HOCP85-845	08P20	709	16	49	6	61	2	71	.	.
HOCP85-845	HOCP96-540	200	6	64	0	14	0	24	.	.
HOCP89-846	08P14	613	21	71	5	59	2	73	.	.
HOCP89-846	08P15	456	5	21	0	14	0	24	.	.
HOCP89-846	HOCP96-540	704	16	49	4	48	0	24	.	.
HOCP91-552	05P2	227	4	36	0	14	0	24	.	.
HOCP92-618	HOCP89-846	207	4	41	0	14	0	24	.	.
HOCP92-618	LCP85-384	657	10	28	0	14	0	24	.	.
HOCP92-624	08P8	1543	19	23	7	39	3	61	.	.
HOCP92-624	08P9	1793	27	28	9	43	1	48	.	.
HOCP92-624	HOCP02-623	245	7	62	1	35	0	24	.	.
HOCP92-624	HOCP04-836	225	6	58	1	38	0	24	.	.
HOCP92-624	HOCP89-846	471	7	28	3	53	0	24	.	.
HOCP92-624	HOCP91-552	195	3	28	1	44	0	24	.	.
HOCP92-624	HOCP96-540	460	7	28	5	74	2	81	.	.
HOCP92-624	HOCP96-561	216	6	60	0	14	0	24	.	.
HOCP92-624	L00-266	379	19	88	4	72	1	69	.	.
HOCP92-624	L01-299	203	6	64	1	42	0	24	.	.
HOCP92-624	L02-316	248	0	8	0	14	0	24	.	.
HOCP92-624	L98-207	395	5	25	0	14	0	24	.	.
HOCP92-624	L99-233	1068	14	25	6	47	2	60	.	.
HOCP92-624	LCP85-384	962	17	36	4	36	1	52	.	.
HOCP92-648	HOCP04-836	617	25	78	4	55	1	58	.	.
HOCP92-648	L00-266	857	19	46	3	32	1	55	.	.
HOCP92-648	L04-410	734	18	55	10	84	4	86	.	.
HOCP92-648	L92-312	149	7	84	0	14	0	24	.	.
HOCP92-648	L97-137	224	5	46	3	83	0	24	.	.
HOCP92-648	L99-233	205	15	98	5	96	1	84	.	.
HOCP92-648	LCP85-384	484	23	86	10	93	4	95	.	.
HOCP95-951	08P14	566	6	21	1	30	0	24	.	.
HOCP95-951	08P8	1039	32	66	4	34	1	51	.	.
HOCP95-951	HOCP04-824	199	4	44	0	14	0	24	.	.
HOCP95-951	HOCP96-522	213	0	8	0	14	0	24	.	.

Table 6. Continue.

Female	Male	Survive	1 st Line No	1 st Line Rank Percentile	2 nd Line No	2 nd Line Rank Percentile	Increases No	Increases Rank Percentile	Assignments No	Assignments Rank Percentile
HOCP95-951	HOCP96-540	103	0	8	0	14	0	24	.	.
HOCP96-540	08P1	394	0	8	0	14	0	24	.	.
HOCP96-540	08P4	819	0	8	0	14	0	24	.	.
HOCP96-540	08P6	1356	0	8	0	14	0	24	.	.
HOCP96-540	HOCP02-618	477	0	8	0	14	0	24	.	.
HOCP96-540	HOCP91-552	1379	41	64	8	50	1	50	.	.
HOCP96-540	L02-325	418	0	8	0	14	0	24	.	.
HOCP96-540	L99-226	438	16	74	6	85	1	64	.	.
HOCP96-540	L99-233	1579	40	55	15	68	4	66	.	.
L01-283	08P22	1136	0	8	0	14	0	24	.	.
L01-283	08P25	154	3	41	2	81	0	24	.	.
L01-283	08P28	439	7	32	0	14	0	24	.	.
L01-299	08P1	508	23	82	9	91	3	89	.	.
L01-299	08P29	350	24	95	8	95	2	88	.	.
L01-299	08P6	416	29	96	5	77	2	83	.	.
L01-299	08P8	329	8	52	3	65	1	72	.	.
L01-299	HOCP96-561	148	4	58	1	56	0	24	.	.
L01-315	08P13	226	7	66	3	82	0	24	.	.
L01-315	L05-445	212	13	92	5	95	1	82	.	.
L02-316	08P20	238	21	99	4	90	1	79	.	.
L02-316	08P22	236	15	93	2	61	0	24	.	.
L02-316	HOCP96-540	61	2	69	0	14	0	24	.	.
L02-320	HO95-988	322	7	46	2	52	0	24	.	.
L03-396	HOCP91-552	185	6	67	2	73	0	24	.	.
L03-396	L04-410	245	8	69	2	59	0	24	.	.
L03-396	LCP85-384	231	4	34	3	81	1	80	.	.
L04-407	L99-233	305	16	90	3	69	1	73	.	.
L04-408	HOCP04-807	596	13	46	8	83	4	93	.	.
L04-408	HOCP96-540	28	2	97	1	98	0	24	.	.
L04-425	L99-233	276	10	73	3	74	1	76	.	.
L05-445	L05-450	203	9	81	6	97	1	84	.	.
L05-457	L99-233	407	3	18	2	42	1	65	.	.
L06-010	08P23	599	0	8	0	14	0	24	.	.
L06-010	08P24	311	15	86	7	94	2	91	.	.
L07-057	08P22	618	44	97	10	89	7	98	.	.
L07-059	08P28	374	6	32	2	45	1	69	.	.
L93-399	HOCP04-836	134	6	82	1	57	0	24	.	.
L94-426	08P23	399	16	78	5	78	2	85	.	.
L94-426	HO95-988	77	0	8	0	14	0	24	.	.
L94-426	L99-233	212	0	8	0	14	0	24	.	.
L94-428	L05-448	791	21	58	5	52	0	24	.	.
L94-428	LCP85-384	646	2	17	2	32	0	24	.	.
L94-432	L99-233	756	12	32	7	67	1	56	.	.
L97-128	08P8	780	29	74	5	53	1	56	.	.
L97-128	08P9	382	10	56	4	71	1	68	.	.
L97-137	L99-233	777	18	49	1	30	0	24	.	.
L98-197	08P24	351	0	8	0	14	0	24	.	.
L98-197	HOCP96-540	216	0	8	0	14	0	24	.	.
L98-197	L99-226	748	0	8	0	14	0	24	.	.
L98-197	L99-226	889	2	17	1	28	1	54	.	.

Table 6. Continue.

Female	Male	Survive	1 st Line No	1 st Line Rank Percentile	2 nd Line No	2 nd Line Rank Percentile	Increases No	Increases Rank Percentile	Assignments No	Assignments Rank Percentile
L98-197	LCP82-089	342	0	8	0	14	0	24	.	.
L98-207	08P1	879	22	55	8	65	5	87	.	.
L98-207	08P19	380	0	8	0	14	0	24	.	.
L98-207	08P4	985	25	55	6	51	1	52	.	.
L98-207	08P5	332	0	8	0	14	0	24	.	.
L98-207	08P6	199	0	8	0	14	0	24	.	.
L98-207	LCP81-010	540	13	52	4	56	2	78	.	.
L99-233	HOCP96-540	336	9	58	3	63	1	71	.	.
LCP81-010	08P1	737	29	77	7	68	1	57	.	.
LCP81-010	08P4	358	23	93	5	86	2	86	.	.
LCP81-010	HOCP89-846	275	13	84	0	14	0	24	.	.
LCP81-010	HOCP91-552	183	4	46	2	74	2	97	.	.
LCP81-010	HOCP96-561	226	0	8	0	14	0	24	.	.
LCP81-010	L02-316	758	0	8	0	14	0	24	.	.
LCP81-010	L02-316	328	0	8	0	14	0	24	.	.
LCP81-010	L04-410	843	11	25	3	33	3	76	.	.
LCP81-010	L98-207	739	37	88	11	88	3	78	.	.
LCP81-010	L99-233	370	20	91	2	46	1	70	.	.
LCP81-010	L99-233	395	13	69	5	79	0	24	.	.
LCP81-010	L99-233	1251	20	32	5	34	0	24	.	.
LCP81-010	LCP82-089	388	4	19	2	45	1	67	.	.
LCP81-010	LCP85-384	213	0	8	0	14	0	24	.	.
LCP85-384	04P4	687	23	69	8	76	0	24	.	.
LCP85-384	08P2	288	12	79	3	70	1	75	.	.
LCP85-384	08P22	390	7	36	2	44	1	67	.	.
LCP85-384	08P33	158	3	41	2	79	1	90	.	.
LCP85-384	08P5	255	4	32	0	14	0	24	.	.
LCP85-384	HOCP96-540	1541	30	41	9	50	0	24	.	.
N27	L01-299	836	19	49	11	82	5	89	.	.
N27	L99-226	181	11	92	1	47	0	24	.	.
N27	LCP85-384	1055	12	21	3	31	2	60	.	.
US79-010	L99-226	233	8	71	1	37	1	80	.	.
US99-004	L99-226	1392	26	41	8	48	1	49	.	.
2009 Crossing Series										
CP83-644	HO05-961	418	11	60	8	96	.	.	.	.
CP83-644	L01-283	118	0	23	0	29	.	.	.	.
CP83-644	L01-283	477	58	99	.	.	.	.	.	.
CP83-644	L99-226	399	29	92	9	97	.	.	.	.
HO01-564	HOCP01-517	213	0	23	0	29	.	.	.	.
HO01-564	L01-299	196	13	91	1	72	.	.	.	.
HO01-564	TUCCP77-042	442	7	52	0	29	.	.	.	.
HO05-961	HOCP02-618	139	4	63	0	29	.	.	.	.
HO05-961	HOCP85-845	270	8	64	5	94	.	.	.	.
HO05-961	L01-299	184	1	48	1	72	.	.	.	.
HO05-961	L99-226	177	0	23	0	29	.	.	.	.
HO05-961	L99-226	429	0	23	.	.	.	.	.	.
HO06-523	L99-233	545	25	76	6	82	.	.	.	.
HO06-523	LCP85-384	131	0	23	0	29	.	.	.	.

Table 6. Continue.

Female	Male	Survive	1 st Line No	1 st Line Rank Percentile	2 nd Line No	2 nd Line Rank Percentile	Increases No	Increases Rank Percentile	Assignments No	Assignments Rank Percentile
HO06-530	HO05-961	184	6	66	0	29	.	.	.	.
HO06-530	HO06-523	162	0	23	0	29	.	.	.	.
HO06-530	L06-038	386	0	23	0	29	.	.	.	.
HO06-537	L99-226	349	17	79	5	88	.	.	.	.
HO06-537	L99-233	388	20	80	5	86	.	.	.	.
HO06-562	L01-283	208	0	23	0	29	.	.	.	.
HO06-562	L01-283	410	17	73	0	29	.	.	.	.
HO06-562	L99-226	302	9	64	3	81	.	.	.	.
HO06-562	L99-226	286	16	82	7	99	.	.	.	.
HO06-562	L99-233	212	0	23	0	29	.	.	.	.
HO06-562	L99-233	369	0	23	0	29	.	.	.	.
HO06-562	LCP85-384	333	10	64	5	90	.	.	.	.
HO06-562	TUCCP77-042	389	2	48	0	29	.	.	.	.
HO06-563	HOCP96-540	173	0	23	0	29	.	.	.	.
HO06-563	HOCP96-540	146	0	23	0	29	.	.	.	.
HO06-563	HOCP96-540	363	0	23	0	29	.	.	.	.
HO06-563	L01-299	262	0	23	0	29	.	.	.	.
HO07-613	L99-226	465	21	75	11	98	.	.	.	.
HO07-617	HO06-523	214	4	54	1	69	.	.	.	.
HO95-988	09P21	343	0	23	0	29	.	.	.	.
HO95-988	09P24	122	0	23	0	29	.	.	.	.
HO95-988	HOCP01-523	131	0	23	0	29	.	.	.	.
HO95-988	HOCP96-540	294	0	23	0	29	.	.	.	.
HO95-988	L01-283	445	15	67	1	59	.	.	.	.
HOCP00-930	HOCP96-540	132	0	23	0	29	.	.	.	.
HOCP00-930	HOCP96-540	441	9	55	5	82	.	.	.	.
HOCP00-930	HOCP96-540	235	20	93	.	.	.	.	.	.
HOCP00-930	US01-040	170	0	23	0	29	.	.	.	.
HOCP00-950	HO06-562	514	9	53	0	29	.	.	.	.
HOCP00-950	HOCP96-540	1668	41	59	11	75	.	.	.	.
HOCP00-950	HOCP96-540	307	10	66	1	65	.	.	.	.
HOCP00-950	HOCP96-540	392	13	66	1	61	.	.	.	.
HOCP00-950	HOCP97-609	417	16	71	4	80	.	.	.	.
HOCP00-950	L01-283	854	47	82	16	95	.	.	.	.
HOCP00-950	L01-299	1232	34	62	3	60	.	.	.	.
HOCP00-950	L01-299	637	74	97	.	.	.	.	.	.
HOCP00-950	L06-001	807	27	66	6	76	.	.	.	.
HOCP00-950	L06-001	247	0	23	.	.	.	.	.	.
HOCP00-950	L06-038	396	1	47	0	29	.	.	.	.
HOCP00-950	L06-038	218	9	73	3	87	.	.	.	.
HOCP00-950	L08-076	196	0	23	0	29	.	.	.	.
HOCP00-950	L94-428	218	4	53	1	68	.	.	.	.
HOCP00-950	L94-432	360	0	23	0	29	.	.	.	.
HOCP00-950	L99-226	361	8	56	1	63	.	.	.	.
HOCP00-950	L99-226	132	8	86	2	90	.	.	.	.
HOCP00-950	L99-233	206	2	50	0	29	.	.	.	.
HOCP00-950	L99-233	199	5	59	.	.	.	.	.	.
HOCP00-950	LCP85-384	145	0	23	0	29	.	.	.	.
HOCP00-950	LCP85-384	201	0	23	0	29	.	.	.	.
HOCP00-950	LCP86-454	375	18	78	7	95	.	.	.	.

Table 6. Continue.

Female	Male	Survive	1 st Line No	1 st Line Rank Percentile	2 nd Line No	2 nd Line Rank Percentile	Increases No	Increases Rank Percentile	Assignments No	Assignments Rank Percentile
HOCP00-950	US01-040	240	15	89	.	.	.	.	.	.
HOCP01-523	LCP85-384	174	0	23	0	29	.	.	.	.
HOCP02-610	L01-299	424	24	83	6	87	.	.	.	.
HOCP02-610	HO06-562	173	0	23	0	29	.	.	.	.
HOCP02-610	HOCP01-523	163	0	23	0	29	.	.	.	.
HOCP02-610	HOCP96-540	337	0	23	0	29	.	.	.	.
HOCP02-610	HOCP96-540	244	0	23	0	29	.	.	.	.
HOCP02-610	HOCP97-609	166	0	23	0	29	.	.	.	.
HOCP02-610	L06-001	217	0	23	0	29	.	.	.	.
HOCP02-610	L06-001	218	0	23	0	29	.	.	.	.
HOCP02-610	L94-432	139	9	90	2	89	.	.	.	.
HOCP02-610	L99-233	573	0	23	0	29	.	.	.	.
HOCP02-618	HOCP92-618	132	0	23	0	29	.	.	.	.
HOCP02-623	HOCP96-540	639	0	23	0	29	.	.	.	.
HOCP02-623	L01-299	320	0	23	0	29	.	.	.	.
HOCP02-623	L08-089	194	0	23	0	29	.	.	.	.
HOCP02-623	L94-428	152	0	23	0	29	.	.	.	.
HOCP04-838	HOCP05-904	206	0	23	0	29	.	.	.	.
HOCP04-838	HOCP07-615	382	3	50	0	29	.	.	.	.
HOCP04-838	HOCP91-552	221	0	23	0	29	.	.	.	.
HOCP04-838	HOCP96-540	500	3	49	1	59	.	.	.	.
HOCP04-838	L01-283	678	42	88	9	86	.	.	.	.
HOCP04-838	L01-299	508	11	56	3	73	.	.	.	.
HOCP04-838	L06-001	202	0	23	0	29	.	.	.	.
HOCP04-838	L06-038	182	0	23	0	29	.	.	.	.
HOCP04-838	L06-038	160	0	23	0	29	.	.	.	.
HOCP04-838	L94-428	164	6	70	1	74	.	.	.	.
HOCP04-838	L94-428	201	0	23	0	29	.	.	.	.
HOCP04-838	L99-226	980	0	23	0	29	.	.	.	.
HOCP04-838	L99-233	107	0	23	0	29	.	.	.	.
HOCP04-838	L99-233	152	0	23	0	29	.	.	.	.
HOCP04-838	L99-233	207	0	23	0	29	.	.	.	.
HOCP04-847	HOCP96-540	222	10	75	7	99	.	.	.	.
HOCP04-847	L08-089	454	0	23	0	29	.	.	.	.
HOCP05-902	L01-299	380	0	23	0	29	.	.	.	.
HOCP05-918	L01-283	644	16	59	3	69	.	.	.	.
HOCP05-918	L01-299	369	7	54	1	62	.	.	.	.
HOCP85-845	HO95-988	523	33	89	6	83	.	.	.	.
HOCP85-845	HOCP97-609	182	0	23	0	29	.	.	.	.
HOCP92-618	09P24	131	0	23	0	29	.	.	.	.
HOCP92-618	HOCP96-540	102	6	85	1	81	.	.	.	.
HOCP92-618	L01-299	638	60	95	12	96	.	.	.	.
HOCP92-618	L05-448	142	0	23	0	29	.	.	.	.
HOCP92-624	HO01-564	332	0	23	0	29	.	.	.	.
HOCP92-624	HOCP01-523	164	0	23	0	29	.	.	.	.
HOCP92-624	HOCP91-552	172	0	23	0	29	.	.	.	.
HOCP92-624	HOCP96-540	447	0	23	0	29	.	.	.	.
HOCP92-624	L01-283	1178	31	60	2	58	.	.	.	.
HOCP92-624	L01-283	1152	140	99	.	.	.	.	.	.
HOCP92-624	L01-299	419	0	23	0	29	.	.	.	.

Table 6. Continue.

Female	Male	Survive	1 st Line No	1 st Line Rank Percentile	2 nd Line No	2 nd Line Rank Percentile	Increases No	Increases Rank Percentile	Assignments No	Assignments Rank Percentile
HOCP92-624	L01-299	424	34	93	6	87	.	.	.	.
HOCP92-624	L01-299	436	0	23	.	.	.	.	.	.
HOCP92-624	L06-001	131	0	23	0	29	.	.	.	.
HOCP92-624	L06-038	397	0	23	0	29	.	.	.	.
HOCP92-624	L08-089	1118	0	23	.	.	.	.	.	.
HOCP92-624	L98-207	202	0	23	0	29	.	.	.	.
HOCP92-624	L99-226	814	75	94	10	84	.	.	.	.
HOCP92-624	L99-233	552	27	79	4	76	.	.	.	.
HOCP92-648	HOCP96-540	544	33	86	4	76	.	.	.	.
HOCP92-648	L01-283	218	26	98	2	80	.	.	.	.
HOCP92-648	L01-299	436	25	83	7	93	.	.	.	.
HOCP92-648	L94-428	175	4	58	0	29	.	.	.	.
HOCP96-540	09P14	155	0	23	0	29	.	.	.	.
HOCP96-540	L99-233	310	0	23	0	29	.	.	.	.
HOCP96-561	HO05-961	145	0	23	0	29	.	.	.	.
HOCP96-561	HOCP96-540	226	0	23	0	29	.	.	.	.
HOCP96-561	L99-226	629	34	81	2	64	.	.	.	.
HOCP96-561	TUCCP77-042	365	2	48	0	29	.	.	.	.
HOCP97-606	L94-426	159	9	83	2	85	.	.	.	.
L01-283	09P13	435	0	23	0	29	.	.	.	.
L01-283	HO06-562	432	0	23	0	29	.	.	.	.
L01-283	HOCP02-610	1106	50	75	13	84	.	.	.	.
L01-283	HOCP02-610	237	27	96	.	.	.	.	.	.
L01-283	HOCP06-523	156	0	23	0	29	.	.	.	.
L01-283	L08-076	405	25	88	2	71	.	.	.	.
L01-283	L94-426	602	16	62	3	71	.	.	.	.
L01-283	L94-428	670	28	74	4	74	.	.	.	.
L01-283	L94-428	472	23	79	.	.	.	.	.	.
L01-283	L99-226	313	5	52	1	64	.	.	.	.
L01-283	L99-233	788	48	86	18	98	.	.	.	.
L01-283	L99-233	693	32	76	11	92	.	.	.	.
L01-283	L99-233	435	27	88	.	.	.	.	.	.
L01-299	09P1	603	0	23	.	.	.	.	.	.
L01-299	09P3	718	69	95	.	.	.	.	.	.
L01-299	09P4	578	41	92	.	.	.	.	.	.
L01-299	09P7	331	9	62	6	94	.	.	.	.
L01-299	TUCCP77-042	192	12	89	3	91	.	.	.	.
L01-315	HOCP96-540	416	12	63	0	29	.	.	.	.
L05-448	L01-283	386	20	80	3	78	.	.	.	.
L05-457	HO01-564	301	0	23	0	29	.	.	.	.
L05-457	HOCP02-623	158	0	23	0	29	.	.	.	.
L05-457	HOCP91-552	154	0	23	0	29	.	.	.	.
L05-457	HOCP96-540	635	7	51	3	69	.	.	.	.
L05-457	L01-283	521	8	52	2	65	.	.	.	.
L05-457	L01-283	401	9	56	3	77	.	.	.	.
L05-457	L01-283	1206	137	96	.	.	.	.	.	.
L05-457	L01-299	188	0	23	0	29	.	.	.	.
L05-457	L06-038	194	0	23	0	29	.	.	.	.
L05-457	L99-226	236	0	23	0	29	.	.	.	.
L05-457	L99-226	239	14	85	3	85	.	.	.	.

Table 6. Continue.

Female	Male	Survive	1 st Line No	1 st Line Rank Percentile	2 nd Line No	2 nd Line Rank Percentile	Increases No	Increases Rank Percentile	Assignments No	Assignments Rank Percentile
L05-457	L99-233	197	0	23	0	29	.	.	.	.
L06-001	L01-299	74	3	73	0	29	.	.	.	.
L08-078	HO05-961	229	0	23	0	29	.	.	.	.
L08-082	HOCP00-610	188	0	23	0	29	.	.	.	.
L08-082	HOCP96-540	352	12	67	3	79	.	.	.	.
L08-082	HOCP96-540	394	0	23	0	29	.	.	.	.
L08-082	LCP86-454	106	0	23	0	29	.	.	.	.
L08-090	L01-299	413	0	23	0	29	.	.	.	.
L08-094	L01-299	472	6	51	2	66	.	.	.	.
L08-094	L01-299	217	0	23	0	29	.	.	.	.
L08-095	HOCP00-930	215	0	23	0	29	.	.	.	.
L94-426	L06-001	192	0	23	0	29	.	.	.	.
L94-426	L06-001	1156	79	92	.	.	.	.	.	.
L94-426	L99-226	380	0	23	0	29	.	.	.	.
L94-426	L99-226	229	0	23	.	.	.	.	.	.
L94-428	L01-299	173	10	84	1	73	.	.	.	.
L94-432	L01-299	358	7	55	1	63	.	.	.	.
L94-433	HO05-961	184	0	23	0	29	.	.	.	.
L94-433	HOCP05-918	303	14	76	2	75	.	.	.	.
L94-433	L01-283	304	7	58	1	65	.	.	.	.
L94-433	L01-283	419	0	23	.	.	.	.	.	.
L94-433	L99-226	396	14	68	1	60	.	.	.	.
L97-128	09P17	197	7	69	3	90	.	.	.	.
L97-128	09P3	144	0	23	0	29	.	.	.	.
L97-128	HO01-564	220	8	69	1	67	.	.	.	.
L97-128	HOCP01-517	205	13	89	1	71	.	.	.	.
L97-128	L01-283	182	11	85	4	97	.	.	.	.
L97-128	L01-299	165	0	23	0	29	.	.	.	.
L97-128	L06-038	247	0	23	0	29	.	.	.	.
L97-128	L98-207	227	6	60	0	29	.	.	.	.
L97-128	L98-207	249	27	96	.	.	.	.	.	.
L97-128	L99-226	91	3	66	0	29	.	.	.	.
L97-128	L99-233	501	0	23	0	29	.	.	.	.
L98-207	HO05-961	334	12	69	0	29	.	.	.	.
L98-207	HOCP01-517	344	12	68	0	29	.	.	.	.
L98-207	L01-299	121	0	23	0	29	.	.	.	.
L98-207	TUCCP77-042	434	11	59	2	68	.	.	.	.
L98-209	L99-226	912	44	78	7	78	.	.	.	.
L98-209	L99-226	485	42	94	.	.	.	.	.	.
L99-226	09P4	392	0	23	.	.	.	.	.	.
L99-233	09P2	409	0	23	0	29	.	.	.	.
L99-233	HOCP96-540	506	59	97	8	92	.	.	.	.
L99-233	L08-093	180	1	49	0	29	.	.	.	.
L99-233	L99-226	944	35	70	11	83	.	.	.	.
LCP81-010	HOCP96-540	386	7	53	0	29	.	.	.	.
LCP81-010	L01-299	325	0	23	0	29	.	.	.	.
LCP81-010	L06-001	310	0	23	0	29	.	.	.	.
LCP81-010	L06-038	341	13	71	3	79	.	.	.	.
LCP81-010	L99-226	344	19	82	5	89	.	.	.	.
LCP81-010	L99-226	229	15	91	1	66	.	.	.	.

Table 6. Continue.

Female	Male	Survive	1 st Line No	1 st Line Rank Percentile	2 nd Line No	2 nd Line Rank Percentile	Increases No	Increases Rank Percentile	Assignments No	Assignments Rank Percentile
LCP81-010	L99-233	239	0	23	0	29	.	.	.	.
LCP85-384	HOCP96-540	634	26	73	1	58	.	.	.	.
LCP85-384	HOCP96-540	324	0	23	0	29	.	.	.	.
LCP85-384	L01-299	1253	0	23	0	29	.	.	.	.
N-27	L94-428	204	0	23	0	29	.	.	.	.
N-27	L94-432	211	0	23	0	29	.	.	.	.
N-27	L99-226	213	0	23	0	29	.	.	.	.
N-27	L99-226	392	18	76	1	61	.	.	.	.
TUCCP77-042	L01-283	169	9	80	3	93	.	.	.	.
US01-040	HOCP97-609	216	26	98	1	68	.	.	.	.
2010 Crossing Series										
CP83-644	HOCP85-845	328	6	38	.	.	.	.	.	.
CP83-644	L94-428	521	7	33	.	.	.	.	.	.
CP83-644	L99-233	304	13	68	.	.	.	.	.	.
HO06-530	10P26	212	6	48	.	.	.	.	.	.
HO06-563	10P24	240	0	10	.	.	.	.	.	.
HO07-613	10P21	149	0	10	.	.	.	.	.	.
HO08-709	10P6	495	15	50	.	.	.	.	.	.
HO95-988	10P7	484	30	80	.	.	.	.	.	.
HO95-988	10P9	443	8	38	.	.	.	.	.	.
HOCP00-930	10P18	928	26	48	.	.	.	.	.	.
HOCP00-930	HO95-988	166	0	10	.	.	.	.	.	.
HOCP00-930	L06-001	214	8	60	.	.	.	.	.	.
HOCP00-930	L06-038	189	27	98	.	.	.	.	.	.
HOCP00-930	L94-428	250	18	85	.	.	.	.	.	.
HOCP00-930	L98-207	228	3	33	.	.	.	.	.	.
HOCP00-930	L99-226	131	4	51	.	.	.	.	.	.
HOCP00-930	L99-226	172	0	10	.	.	.	.	.	.
HOCP00-950	L99-226	2127	33	35	.	.	.	.	.	.
HOCP01-517	10P12	242	7	49	.	.	.	.	.	.
HOCP01-523	L99-226	89	4	70	.	.	.	.	.	.
HOCP02-618	10P12	178	16	91	.	.	.	.	.	.
HOCP02-623	10P24	324	12	60	.	.	.	.	.	.
HOCP02-623	10P29	674	3	21	.	.	.	.	.	.
HOCP02-623	10P5	180	5	48	.	.	.	.	.	.
HOCP04-838	10P2	117	2	36	.	.	.	.	.	.
HOCP04-838	HOCP02-623	170	6	55	.	.	.	.	.	.
HOCP04-838	L06-001	170	6	55	.	.	.	.	.	.
HOCP05-902	10P34	440	15	54	.	.	.	.	.	.
HOCP85-845	10P10	488	39	88	.	.	.	.	.	.
HOCP85-845	10P11	650	6	28	.	.	.	.	.	.
HOCP85-845	10P13	129	9	83	.	.	.	.	.	.
HOCP85-845	10P28	415	18	68	.	.	.	.	.	.
HOCP85-845	L99-233	136	0	10	.	.	.	.	.	.
HOCP91-552	10P12	421	5	31	.	.	.	.	.	.
HOCP91-552	10P13	348	0	10	.	.	.	.	.	.
HOCP91-552	10P14	210	5	43	.	.	.	.	.	.
HOCP91-552	10P2	64	0	10	.	.	.	.	.	.

Table 6. Continue.

Female	Male	Survive	1 st Line No	1 st Line Rank Percentile	2 nd Line No	2 nd Line Rank Percentile	Increases No	Increases Rank Percentile	Assignments No	Assignments Rank Percentile
HOCP91-552	HOCP02-623	396	0	10	.	.	.	.	.	.
HOCP91-552	L05-448	181	9	74	.	.	.	.	.	.
HOCP91-552	L07-057	232	7	50	.	.	.	.	.	.
HOCP91-552	L09-107	694	0	10	.	.	.	.	.	.
HOCP92-618	10P12	173	6	55	.	.	.	.	.	.
HOCP92-624	10P1	244	10	66	.	.	.	.	.	.
HOCP92-624	10P11	1095	20	38	.	.	.	.	.	.
HOCP92-624	10P21	304	13	68	.	.	.	.	.	.
HOCP92-624	10P3	385	14	57	.	.	.	.	.	.
HOCP92-624	HO08-706	166	6	57	.	.	.	.	.	.
HOCP92-624	HO95-988	701	26	60	.	.	.	.	.	.
HOCP92-624	HOCP04-838	950	0	10	.	.	.	.	.	.
HOCP92-624	L01-299	153	0	10	.	.	.	.	.	.
HOCP92-624	L05-448	220	12	78	.	.	.	.	.	.
HOCP92-624	L05-448	489	20	66	.	.	.	.	.	.
HOCP92-624	L07-057	216	23	95	.	.	.	.	.	.
HOCP92-624	L07-057	385	18	71	.	.	.	.	.	.
HOCP92-624	L08-090	229	22	92	.	.	.	.	.	.
HOCP92-624	L09-106	205	24	97	.	.	.	.	.	.
HOCP92-624	L99-226	1199	87	86	.	.	.	.	.	.
HOCP92-624	L99-226	892	23	46	.	.	.	.	.	.
HOCP92-624	L99-233	369	19	75	.	.	.	.	.	.
HOCP92-624	L99-233	551	23	67	.	.	.	.	.	.
HOCP92-624	LCP86-454	182	0	10	.	.	.	.	.	.
HOCP92-648	L99-233	212	20	91	.	.	.	.	.	.
HOCP95-951	10P5	413	5	31	.	.	.	.	.	.
HOCP95-951	10P6	606	14	42	.	.	.	.	.	.
HOCP96-540	10P10	893	12	33	.	.	.	.	.	.
HOCP96-540	10P11	1117	0	10	.	.	.	.	.	.
HOCP96-540	10P12	188	10	77	.	.	.	.	.	.
HOCP96-540	10P15	1217	0	10	.	.	.	.	.	.
HOCP96-540	10P17	206	8	63	.	.	.	.	.	.
HOCP96-540	10P18	225	0	10	.	.	.	.	.	.
HOCP96-540	10P19	446	0	10	.	.	.	.	.	.
HOL08-720	L99-233	87	0	10	.	.	.	.	.	.
L01-283	10P29	478	4	26	.	.	.	.	.	.
L01-283	10P30	635	0	10	.	.	.	.	.	.
L01-283	10P32	1114	0	10	.	.	.	.	.	.
L01-283	10P34	194	19	93	.	.	.	.	.	.
L01-299	10P10	242	15	80	.	.	.	.	.	.
L01-299	10P11	383	10	46	.	.	.	.	.	.
L01-299	10P17	234	0	10	.	.	.	.	.	.
L01-299	10P9	157	13	89	.	.	.	.	.	.
L01-315	10P12	238	3	33	.	.	.	.	.	.
L01-315	L99-233	226	9	64	.	.	.	.	.	.
L05-457	10P13	187	0	10	.	.	.	.	.	.
L05-457	10P3	206	10	73	.	.	.	.	.	.
L05-457	HO95-988	192	10	76	.	.	.	.	.	.
L05-457	HOCP04-838	248	5	40	.	.	.	.	.	.
L05-457	L07-057	135	5	60	.	.	.	.	.	.

Table 6. Continue.

Female	Male	Survive	1 st Line No	1 st Line Rank Percentile	2 nd Line No	2 nd Line Rank Percentile	Increases No	Increases Rank Percentile	Assignments No	Assignments Rank Percentile
L05-457	L08-090	243	14	79	.	.	.	.	.	.
L05-457	L09-106	230	25	96	.	.	.	.	.	.
L05-457	L99-226	516	27	76	.	.	.	.	.	.
L05-457	L99-233	210	9	68	.	.	.	.	.	.
L06-001	10P17	138	7	75	.	.	.	.	.	.
L06-001	L99-226	123	4	52	.	.	.	.	.	.
L07-057	10P1	193	9	71	.	.	.	.	.	.
L08-090	10P11	955	24	45	.	.	.	.	.	.
L08-090	10P16	163	8	73	.	.	.	.	.	.
L09-099	10P17	304	11	57	.	.	.	.	.	.
L09-118	10P31	383	0	10	.	.	.	.	.	.
L09-123	10P12	219	3	35	.	.	.	.	.	.
L09-123	10P6	122	3	45	.	.	.	.	.	.
L09-123	10P9	225	16	84	.	.	.	.	.	.
L09-125	L01-299	209	8	62	.	.	.	.	.	.
L09-130	10P9	231	16	83	.	.	.	.	.	.
L94-428	LCP85-384	243	26	96	.	.	.	.	.	.
L94-432	10P11	238	29	98	.	.	.	.	.	.
L94-432	10P13	188	10	77	.	.	.	.	.	.
L94-432	10P15	143	0	10	.	.	.	.	.	.
L94-432	10P27	203	17	89	.	.	.	.	.	.
L94-432	10P28	1004	105	94	.	.	.	.	.	.
L94-432	10P31	226	0	10	.	.	.	.	.	.
L97-128	10P6	225	9	64	.	.	.	.	.	.
L97-128	HOCP95-951	219	15	82	.	.	.	.	.	.
L97-128	L06-001	164	25	99	.	.	.	.	.	.
L97-128	L99-226	137	1	24	.	.	.	.	.	.
L98-207	10P27	198	0	10	.	.	.	.	.	.
L98-207	10P6	365	2	22	.	.	.	.	.	.
L98-207	10P9	235	9	62	.	.	.	.	.	.
L98-207	LCP81-010	172	4	42	.	.	.	.	.	.
L98-209	10P5	236	13	78	.	.	.	.	.	.
L98-209	HOCP95-951	403	4	30	.	.	.	.	.	.
L99-226	HO08-706	245	9	60	.	.	.	.	.	.
L99-226	L01-299	116	4	54	.	.	.	.	.	.
L99-226	L06-038	152	12	88	.	.	.	.	.	.
L99-226	L06-038	613	5	26	.	.	.	.	.	.
L99-226	L99-233	557	18	52	.	.	.	.	.	.
L99-233	10P11	797	7	28	.	.	.	.	.	.
L99-233	10P12	597	0	10	.	.	.	.	.	.
L99-233	10P2	146	0	10	.	.	.	.	.	.
L99-233	10P3	143	11	86	.	.	.	.	.	.
L99-233	HOCP04-838	224	23	94	.	.	.	.	.	.
LCP81-010	10P12	334	2	23	.	.	.	.	.	.
LCP81-010	10P14	287	7	43	.	.	.	.	.	.
LCP81-010	10P4	132	1	26	.	.	.	.	.	.
LCP81-010	HO06-530	222	4	38	.	.	.	.	.	.
LCP81-010	HO07-613	213	0	10	.	.	.	.	.	.
LCP81-010	HO08-706	287	0	10	.	.	.	.	.	.
LCP81-010	HO08-706	389	4	30	.	.	.	.	.	.

Table 6. Continue.

			1 st Line		2 nd Line		Increases		Assignments	
				Rank		Rank		Rank		Rank
Female	Male	Survive	No	Percentile	No	Percentile	No	Percentile	No	Percentile
LCP81-010	HOCP01-523	127	13	93	.	.	.	.	.	.
LCP81-010	L01-299	937	5	22	.	.	.	.	.	.
LCP85-384	10P17	295	6	40	.	.	.	.	.	.
LCP85-384	10P18	197	8	66	.	.	.	.	.	.
LCP85-384	10P19	208	7	54	.	.	.	.	.	.
LCP85-384	10P20	858	9	30	.	.	.	.	.	.
LCP85-384	10P24	443	28	81	.	.	.	.	.	.
LCP85-384	10P28	146	7	72	.	.	.	.	.	.
LCP85-384	10P31	604	0	10	.	.	.	.	.	.
LCP85-384	10P32	425	0	10	.	.	.	.	.	.
LCP85-384	10P4	252	22	90	.	.	.	.	.	.
LCP85-384	10P7	232	18	87	.	.	.	.	.	.
LCP85-384	10P8	159	4	45	.	.	.	.	.	.
LCP86-454	10P9	844	7	26	.	.	.	.	.	.
N27	10P7	932	5	22	.	.	.	.	.	.
N27	10P8	1614	0	10	.	.	.	.	.	.
N27	HO08-706	876	19	41	.	.	.	.	.	.
N27	HOCP96-540	1635	12	24	.	.	.	.	.	.
N27	L06-001	225	16	84	.	.	.	.	.	.
N27	L94-426	368	0	10	.	.	.	.	.	.
N27	L99-226	829	16	39	.	.	.	.	.	.

2012 LOUISIANA SUGARCANE VARIETY DEVELOPMENT PROGRAM NURSERY AND INFIELD VARIETY TRIALS

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Five years after the initial hybridization of parents, clones that have met or exceeded criteria for desired characteristics at previous selection stages are assigned permanent numbers by each of the Louisiana Sugarcane Variety Development Programs. The LSU program assigns variety designations of “L,” and the USDA program assigns variety designations of “Ho” and “HoCP.” These varieties are planted in replicated nursery and infield tests at locations across the southern Louisiana sugarcane-growing areas.

One objective of the nursery and infield stages is to identify and select varieties that will perform well across the range of environments a commercial variety will encounter in Louisiana. Nursery tests are initially planted at three on-station locations (USDA-ARS - Ardoyne Farm, Iberia Research Station, and Sugar Research Station) during the year of assignment, and four to five additional and different off-station locations are planted the year after assignment. The off-station nurseries are Newton Cane, Inc. (Bunkie), Michael Melancon (Cecilia), and Landry Farms (Paincourtville), along with the two infield trial locations at Blackberry Farms (Vacherie), Sugarland Acres, Inc. (Youngsville) and Donnie Vallot (Erath). Both the LSU and USDA varieties were planted at each location. The locations, soil types, dates of planting and dates of harvest are listed in Table 1.

The on-station nursery trials were planted in single row (6-foot centers), 16-foot-long plots with 4-foot alleys. The off-station nurseries were planted in single row, 20-foot plots with 4-foot alleys. The infield tests were planted in two-row, 25-foot plots with 5-foot alleys. The experimental design for both nursery and infield tests was a randomized complete block with two replications per location. Five commercial check varieties, HoCP96-540, L99-226, L01-299, and L03-371 were planted in all nursery and infield tests for comparison.

Millable stalk counts for both nursery and infield tests were made in late July and August. A combine harvester and weigh wagon system was used to cut and weigh plots, respectively, for the infield tests. At harvest, 10-stalk samples were harvested by hand and stripped of leaves. A bundle weight was recorded to obtain a stalk weight (lb) estimate. Samples were then analyzed for sucrose content and fiber content. At the USDA-ARS laboratory, the pre-breaker press method was used to estimate fiber content. A juice sample was sent to the laboratory to obtain Brix and pol readings, which were used to estimate theoretical recoverable sugar per ton as estimated by the Winter-Carp formula as reported by Gravois and Milligan (1992). Samples sent to the Sugar Research Station sucrose laboratory were analyzed with a NIR Spectra Cane system to estimate sucrose and fiber content. Cane yield for the nursery tests was estimated as the product of stalk weight and stalk number. Cane yield for the infield tests was determined from

the plot weights and reduced 14 percent to account for extraneous trash. Sugar per acre was calculated as the product of sugar per ton and cane yield.

The 2012 sugarcane crop experienced a normal range of growing conditions. Many parts of the sugarcane growing area in Louisiana experienced a summer drought then average rainfall through mid-December, with increasing rainfall from late December to early January. The planting season had average rainfall and all experiments were planted in a timely manner. The majority of the Louisiana crop was harvested by the end of December. Recommended cultural practices were followed at all test locations.

The leading variety grown in Louisiana in 2012 was HoCP96-540, which occupied 42% of the state's sugarcane acreage. Therefore, HoCP96-540 was used as a standard for comparison and is highlighted in the tables. To adjust for missing data, the statistical analysis calculated least square means (SAS 9 Proc Mixed). Mean separation used least square means probability differences where P=0.05. Varieties that are significantly higher or lower than HoCP96-540 are denoted by a plus (+) or minus (-), respectively, next to the value for each trait.

References:

Gravois, K.A. and S.B. Milligan. 1992. Genetic relationships between fiber and sugarcane yield components. Crop Sci. 32: 62-66.

Table 1. 2012 Location, soil texture, and planting and harvest dates for the nursery and infield tests.

					Harvest Date	Varieties	
Series	Location†	Stage	Soil Texture	Planting Date	2012	No. Planted	No. Harvested
2007	Landry Farms	Nursery	Commerce silt loam	09/29/08	11/08/12	19	1
2008	Sugar Research Station	Nursery	Commerce silt loam	10/10/08	11/09/12	21	1
2008	Iberia Research Station	Nursery	Baldwin silty clay	10/17/08	10/16/12	21	1
2008	Blackberry Farms	Infield	Commerce silt loam	08/10/09	10/12/12	11	2
2008	Newton Cane, Inc.	Nursery	Norwood silt loam	08/18/09	10/16/12	25	2
2008	Michael Melancon	Nursery	Loreauville silt loam	08/12/09	10/22/12	25	2
2008	Landry Farms	Nursery	Commerce silt loam	08/19/09	11/07/12	25	2
2009	Sugar Research Station	Nursery	Commerce silt loam	10/26/09	11/09/12	35	3
2009	Ardoyne Farm– U.S.D.A.	Nursery	Commerce silt loam	11/05/09	12/18/12	35	3
2009	Blackberry Farms	Infield	Commerce silt loam	09/10/10	12/13/12	21	3
2009	Sugarland Acres, Inc.	Infield	Coteau silt loam	08/25/10	11/30/12	21	3
2009	Newton Cane, Inc.	Nursery	Norwood silt loam	08/26/10	12/11/12	43	7
2009	Michael Melancon	Nursery	Loreauville silt loam	08/27/10	11/05/12	43	7
2009	Landry Farms	Nursery	Commerce silt loam	09/15/10	12/04/12	43	7
2010	Sugar Research Station	Nursery	Commerce silt loam	10/14/10	12/12/12	34	3
2010	Ardoyne Farm – U.S.D.A	Nursery	Commerce silt loam	10/13/10	12/18/12	34	3
2010	Iberia Research Station	Nursery	Baldwin silty clay	10/21/10	11/15/12	34	3
2010	Blackberry Farms	Infield	Commerce silt loam	08/26/11	12/13/12	21	7
2010	Donnie Vallot Farm	Infield	Patoutville silt loam	09/22/11	12/12/12	21	7
2010	Newton Cane, Inc.	Nursery	Norwood silt loam	08/24/11	12/11/12	28	6
2010	Michael Melancon	Nursery	Loreauville silt loam	08/18/11	11/05/12	28	6
2010	Landry Farms	Nursery	Commerce silt loam	08/29/11	11/07/12	28	6
2011	Sugar Research Station	Nursery	Commerce silt loam	10/13/11	12/14/12	25	10
2011	Ardoyne Farm – U.S.D.A	Nursery	Commerce silt loam	10/17/11	12/17/12	25	10
2011	Iberia Research Station	Nursery	Baldwin silty clay	10/21/11	11/15/12	25	10
2011	Donnie Vallot Farms	Infield	Patoutville silt loam	09/10/12		13	
2011	Newton Cane, Inc.	Nursery	Norwood silt loam	08/22/12		54	
2011	Blackberry Farms	Infield	Commerce silt loam	08/17/12		13	
2011	Michael Melancon	Nursery	Loreauville silt loam	09/11/12		54	
2011	Landry Farms	Nursery	Sharkey silty clay loam	09/27/12		54	
2012	Sugar Research Station	Nursery	Commerce silt loam	10/25/12		40	
2012	Ardoyne Farm – U.S.D.A.	Nursery	Commerce silt loam	11/02/12		40	
2012	Iberia Research Station	Nursery	Baldwin silty clay	10/23/12		40	

† Ardoyne-U.S.D.A. Ardoyne Farm (Chacahoula), Blackberry Farms (Vacherie), Iberia Research Station (Jeanerette), Newton Cane, Inc. (Bunkie), Sugar Research Station (St. Gabriel), Michael Melancon (Cecilia), Sugarland Acres Inc. (Youngsville), Donnie Vallot Farm (Erath), Landry Farms (Paincourtville).

Table 2. Nursery third-stubble means of the 2007 "Ho" assignment series on a, Commerce silt loam soil at Landry Farms in Paincourtville, Louisiana in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	5770	26.3	219	1.77	29948	12.4
L 99-226	8729	39.1 +	223	2.07	38297	13.7
L 01-283	6260	27.9	222	1.32	43197	12.5
Ho 07-613	8000	36.2 +	221	1.62	44831	12.4

Table 3. Infield second-stubble means of the 2007 "Ho" and 2008 "L" assignment series on a Commerce silt loam soil at Blackberry Farms in Vacherie, Louisiana in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	5666	24.5	235	1.69	29232	11.5
L 99-226	7490 +	31.0	241	1.96	33083	12.0
L 99-233	6332	26.9	235	1.79	30108	13.2 +
HoCP 00-950	10327 +	36.5	283	1.67	44417	11.3
L 01-283	7334	30.9	233	1.50	41451	11.4
Ho 07-613	6479	27.0	240	2.08	26014	10.7
L 08-090	8449 +	30.8	274	1.68	36751	10.5 -

Table 4. Nursery second-stubble means of the 2008 "Ho" and "L" assignment series on a, Baldwin silty clay soil at Melancon Farms in Henderson, Louisiana in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	3654	17.8	205	1.33	26862	13.3
L 99-226	5091	23.5	217	1.35	34848	13.5
L 99-233	3637	20.1	181	0.98	41382	15.6 +
HoCP 00-950	2941	13.8	214	0.91	30674	12.8
L 01-283	7135	33.2	215	1.35	47735	12.5 -
L 08-090	4324	20.2	213	1.08	37934	12.5 -
Ho 08-730	6429	32.0	201	1.22	52998	13.1

Table 5. Nursery second-stubble means of the 2008 “Ho” and “L” assignment series on a Moreland silt loam soil at Newton Cane, Inc. in Bunkie, Louisiana in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	-	39.0	192	1.85	-	11.4
L 99-226	-	34.3	215	1.91	-	11.1
L 99-233	-	23.4	183	1.33	-	12.8 +
HoCP 00-950	-	26.3	200	1.54	-	12.2 +
L 01-283	-	36.0	207	1.42	-	11.8 +
L 08-090	-	68.8	185	2.07	-	12.3 +
Ho 08-730	-	34.1	188	1.66	-	11.2

Table 6. Nursery second-stubble means of the 2008 “Ho” and “L” assignment series on a, Commerce silt loam soil at Landry Farms in Paincourtville, Louisiana in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	9448	43.5	217	2.13	40838	12.8
L 99-226	11567	54.2	213	2.36	46101	11.1
L 99-233	10447	49.3	212	2.00	49368	13.3
HoCP 00-950	13106	57.7	227	2.01	56991	11.9
L 01-283	9167	41.3	222	1.35 -	61347	11.8
L 08-090	11683	53.9	216	1.94	54995	11.0
Ho 08-730	15081	75.5	200	2.22	67881	12.1

Table 7. Infield first-stubble means of the 2009 “L” assignment series on a Commerce silt loam soil at Blackberry Farms in Vacherie, Louisiana in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	11149	42.01	265	2.45	34328	11.2
L 99-226	12331	42.8	288 +	2.58	33407	11.9
L 99-233	14550	57.6 +	253	2.00 -	57724 +	14.9 +
L 01-283	13013	46.5	279	1.72 --	54713 +	11.3
L 01-299	16832	63.1 +	267	1.94 -	63476 +	11.8
L 09-099	11737	49.2	238 -	1.97 -	50176	14.5 +
L 09-112	15131	58.8 +	257	2.95 +	39859	13.9 +
L 09-131	13200	48.9	270	1.73 -	57140 +	13.0 +

Table 8. Infield first-stubble means of the 2009 "L" assignment series on a Coteau silt loam soil at Sugarland Acres, Inc. in Youngsville, Louisiana in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	7746	31.0	249	2.18	28537	11.5
L 99-226	12148	41.7	291 +	2.61	32032	13.2 +
L 99-233	10594	41.1	258	2.12	38807	14.1 +
L 01-283	10032	36.5	276 +	1.58 -	45838	12.5
L 01-299	10391	40.9	254	1.94	42310	12.2
L 09-099	7020	29.8	236	1.79	33347	13.5 +
L 09-112	9008	35.9	250	2.51	28644	14.6 +
L 09-131	9096	33.4	272 +	2.06	33204	14.0 +

Table 9. Infield plantcane means of the 2009 "Ho", "HoCP" and 2010 "L" assignment series on a Commerce silt loam soil at Blackberry Farms in Vacherie, Louisiana in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	11633	45.0	259	2.93	30767	12.7
L 99-226	9948	36.1 -	276	2.97	24342	12.1
L 01-299	8460 -	31.5 -	268	2.36	26627	12.4
L 03-371	9273	33.0 -	282 +	2.46	26971	11.4
HoCP 04-838	11928	46.7	255	2.12 -	43969 +	13.2
HoCP 09-800	8791 -	31.3 -	281 +	2.39	26249	11.1 -
HoCP 09-804	10808	41.5	260	2.04 -	40663 +	13.5
HoCP 09-814	16223 +	58.3 +	278 +	3.32	35903	11.8
Ho 09-840	11249	43.6	258	1.50 -	58789 +	13.2
L 10-146	13709	48.7	281 +	2.17 -	45053 +	11.1
L 10-147	13418	53.3 +	252	2.49	42838 +	10.8 -
L 10-156	12918	52.3 +	247	2.46	42547 +	12.8

Table 10. Infield plantcane means of the 2009 “Ho”, “HoCP” and 2010 “L” assignment series on a Coteau silt loam soil at Donnie Vallot Farms in Erath, Louisiana in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	8195	31.4	262	2.21	28393	13.4
L 99-226	6250	21.4	291 +	2.44	17523	11.7 -
L 01-299	10172	36.6	277	1.83	39130	12.9
L 03-371	8730	29.4	297 +	1.78	33524	11.6 -
HoCP 04-838	5881	21.9	268	1.66 -	26787	13.9
HoCP 09-800	5765	20.4	283 +	2.12	19277	11.4 -
HoCP 09-804	5787	20.9	277 +	1.61 -	26346	13.4
HoCP 09-814	14243 +	52.1 +	274	2.54	42018	11.0 -
Ho 09-840	8145	29.5	276	1.33 -	44047	11.8 -
L 10-146	4588	17.0	270	1.85	18730	11.4 -
L 10-147	10357	38.9	266	1.89	41501	10.7 -
L 10-156	7737	31.9	242 -	1.88	34185	11.9 -

Table 11. Nursery first-stubble means of the 2009 “Ho”, “HoCP” and “L” assignment series on a, Baldwin silty clay soil at Melancon Farms in Henderson, Louisiana in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	7728	39.4	195	1.98	40112	10.9
L 99-226	9037	41.9	215 +	2.42	34304	11.3
L 99-233	7560	38.3	198	2.09	36845	13.7 +
L 01-283	7076	32.4	219 +	1.65	39023	11.5
L 01-299	8163	38.5	210	1.68	45557	12.8 +
L 09-099	12508	62.2 +	201	2.18	57717	13.7 +
L 09-112	14650	68.9 +	213	3.52 +	38841	12.9 +
L 09-131	7731	34.0	227 +	1.66	40656	13.0 +
HoCP 09-800	7819	38.7	199	2.17	35393	11.1
HoCP 09-804	11477	51.4	223 +	1.72	60258	13.4 +
HoCP 09-814	9660	45.8	212	2.28	40293	10.2
Ho 09-840	8590	42.1	204	1.59	53361	12.5 +

Table 12. Nursery first-stubble means of the 2009 "Ho", "HoCP", and "L" assignment series on a Moreland silt loam soil at Newton Cane, Inc. in Bunkie, Louisiana in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	9304	33.8	275	1.76	38478	--
L 99-226	15226	56.9 +	267	2.64 +	43016	--
L 99-233	13426	54.9 +	245	1.92	57354 -	--
L 01-283	12674	51.6 +	247	1.97	52272	--
L 01-299	14869	60.1 +	241	1.95	61166 +	--
L 09-099	11824	51.4 +	230	1.95	52817	--
L 09-112	17703	69.2 +	255	2.74 +	50457	--
L 09-131	6062	24.8	243	1.44	34667	--
HoCP 09-800	12547	48.8 +	258	1.98	49731	--
HoCP 09-804	14829	56.1 +	260	1.99	57173 +	--
HoCP 09-814	14890	60.7 +	246	2.55 +	47553	--
Ho 09-840	13945	53.3 +	261	1.38 -	77501 +	--

Table 13. Nursery first-stubble means of the 2009 "Ho", HoCP", and "L" assignment series on a Commerce silt loam soil at Landry Farms in Paincourtville, Louisiana in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	10666	40.0	267	2.34	34304	12.4
L 99-226	13544	50.9	266	2.78 +	37026	12.4
L 99-233	10931	43.5	250	1.89 -	45557	13.3
L 01-283	15593 +	57.2 +	273	1.96	58443 +	12.8
L 01-299	13864	52.9	263	1.87 -	57717 +	13.4
L 09-099	10227	46.6	218 -	1.77 -	52454	12.9
L 09-112	17281 +	66.9 +	258	2.81 +	47735	13.5
L 09-131	8485	32.6	261	1.77 -	37389	12.7
HoCP 09-800	12199	48.0	252	2.19	43923	11.8
HoCP 09-804	15709 +	57.4 +	273	1.89 -	61166 +	15.5 +
HoCP 09-814	14544	57.4 +	254	2.30	50457	11.1
Ho 09-840	12466	47.0	265	1.43 -	65703 +	13.5

Table 14. Nursery plantcane means of the 2010 "Ho", "HoCP" and "L" assignment series on a, Baldwin silty clay soil at Melancon Farms in Henderson, Louisiana in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	7702	38.9	195	1.98	39386	12.0
L 99-226	13095	59.9	219	3.11	39023	13.1
L 01-299	5589	27.1	201	1.85	28133	11.1
L 03-371	8181	40.5	203	1.85	44105	9.7 -
HoCP 04-838	9172	44.9	204	1.94	46464	12.2
Ho 08-730	13623	65.2	209	2.57	51002	12.1
L 10-146	9641	45.5	212	2.21	41382	10.7
L 10-147	8862	43.7	203	1.78	49550	9.8 -
L 10-156	9630	48.3	201	2.15	45194	12.3
HoCP 10-917	7727	37.8	205	1.65	45920	11.4
Ho 10-937	9283	45.0	206	2.25	40112	12.4

Table 15. Nursery plantcane means of the 2010 "Ho", "HoCP", and "L" assignment series on a Moreland silt loam soil at Newton Cane, Inc. in Bunkie, Louisiana in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	9947	39.4	252	2.44	32852	--
L 99-226	11713	44.4	265	2.47	36119	--
L 01-299	9732	37.7	258	2.23	33759	--
L 03-371	12369	49.2	253	2.23	43197	--
HoCP 04-838	9974	38.8	257 +	1.82 -	42653	--
Ho 08-730	10708	45.0	238	1.85 -	49005	--
L 10-146	11954	46.7	256	2.12	44286	--
L 10-147	13030	52.7	245	2.21	48098	--
L 10-156	13189	56.5	233	2.64	42834	--
HoCP 10-917	12742	46.4	274	2.23	41745	--
Ho 10-937	15164	58.7	258	2.94	39930	--

Table 16. Nursery plantcane means of the 2010 “Ho”, HoCP”, and “L” assignment series on a Commerce silt loam soil at Landry Farms in Paincourtville, Louisiana in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	8035	39.8	200	2.08	38115 +	10.0
L 99-226	10446	50.3	207	2.70 +	37389	11.3 +
L 01-299	5807	29.7	195	2.00	29948	11.9 +
L 03-371	8984	42.9	210	1.73	49005	9.9
HoCP 04-838	12945	63.3	205	2.00	63344 +	12.1 +
Ho 08-730	10627	56.2	189	2.34	48098	11.0 +
L 10-146	9119	40.3	227 +	1.83	44105	10.3
L 10-147	11085	54.9	203	2.29	48279	9.7
L 10-156	10912	56.7	193	2.45	45920	12.7 +
HoCP 10-917	9274	46.6	198	1.74	53724 +	11.2 +
Ho 10-937	10841	51.0	213	2.13	47372	12.0 +

Table 17. Nursery third-stubble means of the 2008 “L” assignment series on a Commerce silt loam soil at Sugar Research Station in St. Gabriel, Louisiana in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	10243	38.3	268	2.20	35166	11.3
L 99-226	14399 +	51.7 +	280	2.55	40157	11.8
L 01-283	13075	47.4	275	1.85	51274 +	10.9
L 01-299	13672	53.7 +	249	1.89	56265 +	12.7 +
L 08-090	11063	39.9	277	1.80	44241	11.9 +

Table 18. Nursery second-stubble means of the 2009 “L” assignment series on a Commerce silt loam soil at U.S.D.A-Ardoyne Farm in Chacahoula, Louisiana in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	11510	38.1	301	2.21	35619	--
L 99-226	14400	46.9	307	2.74	34258	--
L 99-233	16952	58.8	289	1.99	58988	--
HoCP 00-950	14362	46.4	309	2.19	44241	--
L 01-283	14780	49.4	299	1.89	51501	--
L 09-099	10172	37.5	271 -	1.86	40384	--
L 09-112	18664	61.8	303	2.84 +	42879	--
L 09-131	9929	34.1	292	1.64	41518	--

Table 19. Nursery second-stubble means of the 2009 “L” assignment series on a Commerce silt loam soil at Sugar Research Station in St. Gabriel, Louisiana in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	15227	57.6	267	2.73	42653	10.1
L 99-226	14435	53.1	269	2.52	41972	12.0 +
L 99-233	13005	49.5	263	1.79	56038	13.4 +
HoCP 00-950	11361	42.0	270	2.07	40611	11.8
L 01-283	16889	61.0	277	1.81	67155	11.8
L 09-099	13142	53.5	245	2.37	44921	12.5 +
L 09-112	16627	63.7	260	2.83	44921	13.5 +
L 09-131	12900	46.6	277	1.83	49913	13.1 +

Table 20. Nursery first-stubble means of the 2010 “L” assignment series on a Commerce silt loam soil at U.S.D.A-Ardoyne Farm in Chacahoula, Louisiana in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	13194	45.3	289	2.35	37888	--
L 99-226	16278	56.0	294	2.91 +	38115	--
L 99-233	21713	80.0	272	2.45	65340 +	--
L 01-283	21686	71.8	302	2.19	65567 +	--
L 01-299	17530	59.6	294	1.98	60122 +	--
L 10-146	14375	50.4	285	2.79	36300	--
L 10-147	15350	55.7	278	2.49	44241	--
L 10-156	12936	48.7	266	2.60	37434	--

Table 21. Nursery first-stubble means of the 2010 “L” assignment series on a Baldwin silty clay soil at Iberia Research Station in Jeanerette, Louisiana in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	15088	54.5	276	2.44	44694	10.2
L 99-226	14654	57.0	257	2.62	43560	12.2
L 99-233	10055 -	39.6	256	1.80	44241	10.1
L 01-283	14325	54.4	264	2.05	53316	9.2
L 01-299	11344 -	41.7	272	2.20	37888	11.5
L 10-146	11237 -	43.2	262	2.15	40157	10.3
L 10-147	12431	49.0	254	1.93	51274	9.9
L 10-156	10181 -	45.6	224	2.53	36300	2.4

Table 22. Nursery first-stubble means of the 2010 "L" assignment series on a Commerce silt loam soil at Sugar Research Station in St. Gabriel, Louisiana in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	20659	73.5	282	2.44	59668	--
L 99-226	20252	71.1	283	3.18 +	44014	--
L 99-233	17514	64.7	271	2.29	56492	--
L 01-283	13121	48.2	273	2.24	43787	--
L 01-299	18910	65.5	289	2.15	61029	--
L 10-146	15483	56.1	276	2.48	45375	--
L 10-147	18954	74.7	254	2.73	54677	--
L 10-156	17164	64.9	264	2.94	44241	--

Table 23. Nursery plantcane means of the 2011 "L" assignment series on a Commerce silt loam soil at Sugar Research Station in St. Gabriel, Louisiana in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	11000	40.0	276	2.20	36527	12.0
L 99-226	15001	50.0	300 +	3.24 +	30855	13.7 +
L 01-299	12138	42.3	288	2.52	33351	12.8
L 03-371	12860	45.2	284	2.00	45148	10.9
HoCP 04-838	13634	47.7	285	2.27	42653	14.8 +
L 11-168	9748	33.7	289	1.83	36754	13.8 +
L 11-172	14708	53.4	276	2.51	42653	12.6
L 11-173	12609	42.8	295 +	2.15	40157	14.4 +
L 11-178	11737	42.9	274	2.52	34031	11.2
L 11-180	10028	36.4	276	1.80	41064	10.0 -
L 11-183	11008	41.1	268	2.35	34939	13.0
L 11-185	10092	34.3	294 +	1.83	37888	13.3
L 11-187	11753	40.0	294 +	1.89	42426	14.3 +
L 11-190	10007	36.4	276	1.86	39476	12.5
L 11-191	11979	45.7	261	1.87	49686	10.6 -

Table 24. Nursery plantcane means of the 2011 "L" assignment series on a Commerce silt loam soil at U.S.D.A-Ardoyne Farm in Chacahoula, Louisiana in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	11333	40.7	279	2.69	30174	12.0
L 99-226	15190	50.8	299	3.14	32443	12.7
L 01-299	11933	42.6	280	2.13 -	39249	12.4
L 03-371	13910	51.3	271	2.11 -	48778	11.1
HoCP 04-838	13026	45.5	286	2.39	38115	13.6 +
L 11-168	14284	49.8	285	2.29	42879	12.2
L 11-172	18632	65.9	283	2.96	45148	12.9
L 11-173	13496	47.6	284	2.35	40610	12.6
L 11-178	11036	38.5	287	2.51	30628	11.4
L 11-180	10570	37.5	283	1.99 -	38115	10.0 -
L 11-183	12886	46.0	280	2.64	35619	13.7 +
L 11-185	10937	37.5	292	1.91 -	39249	13.7 +
L 11-187	14516	52.3	278	2.20	47870	12.3
L 11-190	10009	34.1	293	1.87 -	36753	13.2 +
L 11-191	12969	47.9	271	2.13 -	44921	10.5 -

Table 25. Nursery plantcane means of the 2011 "L" assignment series on a Baldwin silty clay soil at Iberia Research Station in Jeanerette, Louisiana in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	11184	41.8	268	2.62	31763	--
L 99-226	14119	48.0	294	2.57	37434	--
L 01-299	9797	36.7	268	1.84 -	39930	--
L 03-371	9827	37.4	262	1.94 -	38569	--
HoCP 04-838	11864	42.9	276	2.09 -	41291	--
L 11-168	12865	45.9	282	2.08 -	44013	--
L 11-172	9845	38.2	258	2.51	30628	--
L 11-173	7048	24.4	289	1.41 -	34939	--
L 11-178	10122	39.4	257	2.23 -	35619	--
L 11-180	8687	31.1	280	1.67 -	37208	--
L 11-183	9993	37.1	269	2.01 -	36754	--
L 11-185	7299	27.2	263	1.42 -	38115	--
L 11-187	11510	41.3	276	1.86 -	44014	--
L 11-190	7634	28.9	263	1.75 -	33124	--
L 11-191	12348	46.6	266	2.05 -	46056	--

Table 26. Infield first-stubble means of the 2009 "L" assignment series across 2 locations (Blackberry and Sugarland Acres) in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP96-540	9448	36.5	257	2.32	31432	11.3
L99-226	12240	42.3	289 +	2.59	32719	12.6
L 99-233	12572	49.3	255	2.06	48266 +	14.5 +
L 01-283	11522	41.5	278 +	1.65 -	50276 +	11.9
L 01-299	13611	52.0	260	1.97	52893 +	12.0
L 09-099	9378	39.5	237 -	1.88 -	41762	14.0 +
L 09-112	12070	47.4	254	2.73 +	34252	14.3 +
L 09-131	11148	41.4	271 +	1.89 -	45172 +	13.5 +

Table 27. Infield plantcane means of the 2009 "Ho", "HoCP" and 2010 "L" assignment series across 2 locations (Blackberry and Donnie Vallot Farms) in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	9914	38.2	260	2.57	29580	13.0
L 99-226	8099	28.7	284 +	2.70	20932	11.9 -
L 01-299	9316	34.0	272	2.09 -	32879	12.6
L 03-371	9001	31.2	289 +	2.12 -	30113	11.5 -
HoCP 04-838	8905	34.3	262	1.89 -	35378	13.5
HoCP 09-800	7278	25.9	282 +	2.25	22763	11.2 -
HoCP 09-804	8298	31.2	269	1.82 -	33504	13.5
HoCP 09-814	15234	55.2 +	276 +	2.93 +	38960	11.4 -
Ho 09-840	9697	36.5	267	1.41 -	51418	12.5
L 10-146	9148	32.8	276 +	2.01 -	31891	11.3 -
L 10-147	11888	46.1	259	2.19 -	42169	10.8 -
L 10-156	10328	42.1	244 -	2.17 -	38366	12.4

Table 28. Infield and nursery plantcane means of the 2008 “Ho”, 2009 “Ho”and “HoCP” and 2010 “L”, “Ho”, and “HoCP” assignment series across 5 locations (Blackberry, Melancon, Newton, Westfield, and Donnie Vallot Farms) in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	9103	38.9	234	2.33	33903	12.0
L 99-226	10290	42.4	252 +	2.74 +	30879	12.0
L 01-299	7952	32.5	240	2.05	31519	12.1
L 03-371	9507	39.0	249 +	2.01 -	39306	10.7 -
HoCP 04-838	9980	43.1	238	1.91 -	44643 +	12.8
Ho 08-730	11493	52.1 +	231	2.27	46036 +	11.9
HoCP 09-800	7518	30.9	254 +	2.23	27761	10.8 -
HoCP 09-804	8538	36.2	240	1.80 -	38502	13.0
HoCP 09-814	15474 +	60.2 +	248	2.90 +	43958	11.0
Ho 09-840	9937	41.5	239	1.39 -	56415 +	12.1
L 10-146	9802	39.6	249 +	2.03	38711	10.9 -
L 10-147	11351	48.7 +	234	2.13	46053 +	10.3 -
L 10-156	10877	49.2 +	223	2.31	42136 +	12.4
HoCP 10-917	9754	40.2	245	1.89 -	43798 +	11.7
Ho 10-937	11603	48.2	245	2.45	39139	12.6

Table 29. Infield and nursery first-stubble means of the 2009 “Ho”, “HoCP”, and “L” assignment series across 5 locations (Blackberry, Melancon, Newton, Sugarland Acres, and Westfield) in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	9319	37.3	250	2.14	35151	11.5
L 99-226	12457 +	46.8	265 +	2.61 +	35957	12.2
L 99-233	11412	47.1 +	241	2.00	47257 +	14.0 +
L 01-283	11678	44.8	259	1.77 -	50058 +	12.0 +
L 01-299	12824 +	51.1 +	247	1.89	54045 +	12.5 +
L 09-099	10663	47.8 +	225 -	1.93	49302 +	13.7 +
L 09-112	14755 +	59.9 +	247	2.91 +	41107	13.7 +
L 09-131	8915	34.7	254	1.73 -	40611	13.2 +
HoCP 09-800	10853	43.8	246	2.11	41805	11.5
HoCP 09-804	14002 +	53.6 +	261	1.86	58321 +	14.5 +
HoCP 09-814	13029 +	53.3 +	246	2.38	44890 +	10.7
Ho 09-840	11665	46.1	253	1.47 -	64311 +	13.1 +

Table 30. Infield and nursery second-stubble means of the 2007 “Ho” and 2008 “L” and “Ho” assignment series across 4 locations (Blackberry, Melancon, Sugarland Acres, and Westfield) in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	6522	30.6	214	1.74	33803	12.2
L 99-226	7870	35.8	222	1.90	37447	11.9
L 99-233	6360	30.5	205	1.54	39608	13.7 +
HoCP 00-950	8167	34.2	234 +	1.53	42645	11.9
L 01-283	7847	35.4	223	1.41	50709 +	11.7
Ho 07-613	6511	31.2	210	2.00	31209	11.2
L 08-090	9085	41.4	226	1.66	46674 +	11.4
Ho 08-730	9699	47.2	209	1.74	54499 +	11.9

Table 31. Nursery plantcane means of the 2008 “Ho”, 2010 “HoCP”, and “L” assignment series across 3 locations (Newton, Melancon, Westfield) in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP96-540	8561	39.4	216	2.16	36784	11.0
L99-226	11751 +	51.5 +	231 +	2.76 +	37510	12.2
L 01-299	7043	31.5	218	2.03	30613	11.5
L 03-371	9845	44.2	222	1.94	45436 +	9.8
HoCP 04-838	10697	49.0	222	1.92	50820 +	12.1
Ho 08-730	11653 +	55.5 +	212	2.25	49368 +	11.5
L 10-146	10238	44.2	232 +	2.05	43258	10.5
L 10-147	10992	50.4	217	2.09	48642 +	9.8
L 10-156	11244	53.8 +	209	2.41	44649 +	12.5 +
HoCP 10-917	9914	43.6	226	1.87	47130 +	11.3
Ho 10-937	11763 +	51.6 +	226	2.44	42471	12.2

Table 32. Nursery first-stubble means of the 2009 “Ho”, “HoCP” and “L” assignment series across 3 locations (Newton, Melancon, Westfield) in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	9233	37.7	246	2.02	37631	11.6
L99-226	12602 +	49.9 +	249	2.62 +	38115	11.9
L 99-233	10639	45.6	231	1.97	46585	13.5 +
L 01-283	11781	47.1	246	1.86	49913 +	12.1
L 01-299	12299 +	50.5 +	238	1.83	54813 +	13.1 +
L 09-099	11519	53.4 +	216 -	1.97	54329 +	13.3 +
L 09-112	16545 +	68.3 +	242	3.02 +	45678	13.2 +
L 09-131	7426	30.5	244	1.62 -	37571	12.9
HoCP 09-800	10855	45.2	237	2.11	43016	11.4
HoCP 09-804	14005 +	55.0 +	252	1.86	59532 +	14.4 +
HoCP 09-814	13031 +	54.6 +	237	2.38 +	46101	10.6
Ho 09-840	11667	47.5 +	244	1.47 -	65522 +	13.0 +

Table 33. Nursery second-stubble means of the 2008 “Ho” and “L” assignment series across 3 locations (Newton, Melancon, Westfield) in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	6831	32.8	208	1.76	35380	12.5
L 99-226	7997	37.3	215	1.87	38902	11.9
L 99-233	6378	31.7	195	1.45	43027	13.8 +
HoCP 00-950	7365	33.2	218	1.48	41580	12.1
L 01-283	8018	36.9	217	1.37	53549 +	11.9
L 08-090	9292	45.3	210	1.66	50459 +	11.7
Ho 08-730	9725	48.6	200	1.70	56142 +	12.1

Table 34. Nursery plantcane means of the 2011 “L” assignment series across 3 locations (St. Gabriel, Iberia and U.S.D.A.- Ardoyne Farms) in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP96-540	11172	40.8	274	2.50	32821	12.0
L99-226	14770 +	49.6 +	298 +	2.98 +	33578	13.2
L01-299	11289	40.5	278	2.16 -	37510	12.6
L 03-371	12199	44.7	272	2.02	44165 +	11.0
HoCP 04-838	12838	45.4	282	2.25	40686 +	14.2 +
L 11-168	12299	43.1	285	2.07 -	41216 +	13.0 +
L 11-172	14395 +	52.5 +	272	2.66	39476	12.7 +
L 11-173	11051	38.3	289 +	1.97 -	38569	13.5 +
L 11-178	10965	40.3	273	2.42	33426	11.3
L 11-180	9762	35.0	279	1.82 -	38796	10.0 -
L 11-183	11295	41.4	272	2.34	35771	13.4
L 11-185	9443	33.0	283	1.72 -	38418	13.5 +
L 11-187	12593	44.5	283	1.98 -	44770 +	13.3
L 11-190	9217	33.2	278	1.82 -	36451	12.8
L 11-191	12432	46.7	266	2.01 -	46888 +	10.5 -

Table 35. Nursery first-stubble means of the 2010 “L” assignment series across 3 locations (St. Gabriel, Iberia and U.S.D.A.- Ardoyne Farms) in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	16314	57.8	282	2.41	47417	--
L 99-226	17062	61.4	278	2.90 +	41896	--
L 99-233	16427	61.4	266 -	2.18	55358	--
L 01-283	16377	58.2	280	2.16	54223	--
L 01-299	15928	55.6	285	2.11	53013	--
L 10-146	13699	49.9	274	2.47	40611	--
L 10-147	15578	59.8	262 -	2.39	50064	--
L 10-156	13427	53.1	251 -	2.69	39325	--

Table 36. Nursery second-stubble means of the 2009 “L” assignment series across 2 locations (St. Gabriel, and U.S.D.A.- Ardoyne Farms) in 2012.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
		(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	13369	47.9	284	2.47	39136	--
L 99-226	14418	50.0	288	2.63	38115	--
L 99-233	14978	54.1	276	1.89 -	57513 +	--
HoCP 00-950	12861	44.2	290	2.13	42426	--
L 01-283	15834	55.2	288	1.85 -	59328 +	--
L 09-099	11657	45.5	258 -	2.12	42653	--
L 09-112	17645	62.7	282	2.83	43900	--
L 09-131	11414	40.3	284	1.74 -	45715	--

2012 LOUISIANA "Ho" NURSERY AND INFIELD VARIETY TRIALS

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LSU AgCenter Sugar Research Station
St. Gabriel, LA

Three years after selection in the seedling stage of the USDA variety program, superior experimental varieties are assigned permanent "HoCP" or "Ho" numbers. These varieties are then planted in replicated yield trials at SRU's Ardoyne Farm in Schriever and at the LSU AgCenter's Iberia Research Station in Jeanerette and Sugar Research Station in St. Gabriel. The following year, experimental varieties advanced for further testing are pooled with varieties from the "L" series and planted in replicated nursery yield trials on commercial farms (Paincourtville, Cecilia, and Bunkie) representing different regions of the sugarcane belt. From this stage on, varieties from the SRU and LSU AgCenter are combined in all yield tests. These tests (infield and outfield trials) are weighed yield tests. Two years after assignment, infield trials are planted at three locations (Ardoyne Farm in Schriever and commercial farms located in Vacherie and Abbeville), and varieties are introduced to primary stations and outfield locations for testing by the SRU, LSU AgCenter, and the American Sugar Cane League.

The SRU's nursery test plots planted during the year of assignment use a randomized complete block design with two replications. Plots are 16 feet long by six feet (one row) wide with a four-foot alley between plots. A minimum of three commercial varieties are planted in each test for comparison purposes. In addition to experimental commercial varieties, clones from the SRU Recurrent Selection for Borers (RSB) program are included in nursery trials. Yield data collected on RSB clones give breeders agronomic information for selecting what parents to use in the breeding program. The year after assignment, varieties from SRU'S program are combined with varieties from the LSU program and planted in nurseries on commercial farms. The plot length in these tests is increased to 20 feet.

Nursery test plots are rated for agronomic traits such as population, height, etc. in the spring and summer. Counts of mature, millable stalks are made in late July or August. A 10-stalk sample is hand-cut from plots of active varieties during the harvest season. Samples from USDA nurseries are taken to the Juice and Milling Quality Laboratory at the USDA Ardoyne Farm, where they are weighed to determine stalk weight and processed for sucrose analysis. Brix and pol values are used to estimate the yield of theoretical recoverable sugar (TRS) per ton of cane. Estimated yields of cane and sugar per acre, and number of stalks per acre are calculated based on results from juice analyses, mature millable stalk counts, and mean stalk weight. Varieties with acceptable yields (both cane tonnage and sugar per ton) and disease and insect resistance are advanced for further testing.

Infield evaluations on commercial farms are conducted cooperatively with LSU AgCenter sugarcane variety personnel. Infield tests are established in a randomized complete block design with two replications and at least three commercial varieties as controls. The plot size in infield tests are two rows wide by 24 feet long. A 10-stalk sample is hand-cut from each plot just prior to combine harvesting and sent to the lab at the Ardoyne Farm, where it is weighed and processed through the pre-breaker/press for sucrose and fiber analysis. Brix and pol values are then used to estimate the yield of theoretical recoverable sugar (TRS) per ton of cane. Plots are weighed with a tractor-pulled weigh-wagon equipped with electronic load cells mounted in the axles and hitch. The weight of harvested cane in each plot, stalk weight, and sucrose content are used to estimate sugar per acre, tons of cane per acre, sugar per ton of cane, and number of stalks per acre.

Table 1 lists planting and harvest dates of USDA nursery and infield evaluations. Results of infield and nursery trials are found in Tables 2 to 23. Statistical analyses were conducted for each test and for each series combined across locations using PROC MIXED procedures in SAS (version 9.1). For purposes of comparison, the check variety, HoCP 96-540, which is currently the leading variety in acreage in the state, is highlighted in each table. Yield values which are significantly higher or lower (P=0.05) than values for HoCP 96-540 are noted with a '+' or '-', respectively.

Table 1. Planting and harvest dates of "Ho" nursery & infield tests in 2012.

					Harvest Dates		
Series	Location[1/]	Soil Series [2/]	Test type	Planting Date	2010	2011	2012
2007	AFH	Sc	Infield	8/27/09	11/22	11/02	11/13
2007	BLK	Csl	Infield	8/10/09	12/09	12/12	10/11
2009	AFL	Csl	Nursery	10/22/09	12/09	11/08	10/15
2009	STG	Csl	Nursery	11/06/09	12/10	11/22	11/20
2008	AFH	Sc	Infield	9/29/10		11/07	11/13
2008	BLK	Csl	Infield	9/10/10		12/12	12/13
2008	SUG	Cosl	Infield	8/25/10		12/09	11/30
2010	AFL	Csl	Nursery	10/15/10		12/13	11/28
2010	IRS	Bsc	Nursery	10/21/10		11/17	11/14
2010	STG	Cscl	Nursery	10/19/10		12/02	11/20
2009	AFH	Sc	Infield	9/28/11			11/13
2009	BLK	Csl	Infield	8/26/11			12/13
2009	VAL	Pasl	Infield	9/22/11			12/12
2011	AFH	Csl	Nursery	10/20/11			12/10
2011	IRS	Bsc	Nursery	10/21/11			11/14
2011	STG	Sc	Nursery	10/25/11			12/06
2010	AFH	Sc	Infield	10/30/12			
2010	BLK	Csl	Infield	8/17/12			
2010	VAL	Pasl	Infield	9/10/12			
2012	AFH	Csl	Nursery	10/17/12			
2012	IRS	Bsc	Nursery	10/29/12			
2012	STG	Sc	Nursery	10/19/12			

[1/] AFH = Ardoyne Farm heavy soil and AFL = Ardoyne Farm Light soil in Schriever, BLK = Blackberry Farms in Vacherie, , IRS = Iberia Research Station in Jeanerette, STG = St. Gabriel Research Station in St. Gabriel, SUG = Sugarland Acres in Youngsville, VAL = Vallot Farm in Abbeville.

[2/] Bsc = Baldwin silty clay, Cosl = Coteau silt loam, Cscl = Commerce silty clay loam, Csl = Commerce silt loam, Pasl = Patoutville silt loam, Sc = Sharkey clay

Table 2. Infield second-stubble means of the 2007 “Ho” assignment series on a Sharkey clay soil at Ardoyne Farm in Schriever, LA in 2012.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
HoCP 96-540	8423	30.5	276	1.63	37437	11.9
L 99-226	6499	23.1	282	2.03	22848 −	12.0
L 99-233	7382	29.7	249 −	1.64	36448	15.3 +
HoCP 00-950	7546	25.0	302 +	1.69	29684 −	11.7
L 01-283	7753	26.7	291	1.48	36354	12.5
Ho 07-613	6700	24.1	278	1.73	27927 −	11.1 −

Table 3. Infield second-stubble means of the 2007 “Ho” and 2008 “L” assignment series on a Commerce silt loam soil at Blackberry Farms in Vacherie, LA in 2012.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
HoCP 96-540	5666	24.5	235	1.69	29232	11.5
L 99-226	7490 +	31.0	241	1.96	33083	12.0
L 99-233	6332	26.9	235	1.79	30108	13.2 +
HoCP 00-950	10327 +	36.5	283	1.67	44417	11.3
L 01-283	7169	30.9	232	1.54	40154	11.5
Ho 07-613	6479	27.0	240	2.08	26014	10.7
L 08-090	8449 +	30.9	274	1.68	36751	10.5 −

Table 4. Infield second-stubble means of the 2007 “Ho” assignment series across two locations (Ardoyne Farm in Schriever & Blackberry Farms in Vacherie, LA) in 2012.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
HoCP 96-540	7045	27.5	255	1.66	33335	11.7
L 99-226	6994	27.1	262	1.99	27966	12.0
L 99-233	6857	28.3	242	1.71	33278	14.2 +
HoCP 00-950	8937	30.8	292	1.68	37050	11.5
L 01-283	7476	28.7	266	1.49	38000	12.0
Ho 07-613	6590	25.6	259	1.90	26970	10.9

Table 5. Infield first-stubble means of the 2008 "L" assignment series on a Sharkey clay soil at Ardoyne Farm in Schriever, LA in 2012.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
HoCP 96-540	8960	31.3	286	1.81	34532
L 99-226	9410	30.0	314	1.61	37523
L 99-233	7404	25.5	292	1.66	30583
L 01-283	8432	27.4	308	1.59	34466
L 01-299	10521	34.9	303	1.83	37854
L 08-090	9764	31.1	313	2.12	29941

Table 6. Infield first-stubble means of the 2009 "L" assignment series on a Commerce silt loam soil at Blackberry Farms in Vacherie, LA in 2012.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
HoCP 96-540	11149	42.1	265	2.45	34328	11.2
L 99-226	12331	42.8	288 +	2.58	33407	11.9
L 99-233	14550	57.6 +	253	2.00 −	57724 +	14.9 +
L 01-283	13013	46.5	279	1.72 −	54713 +	11.3
L 01-299	16832	63.1 +	267	2.00 −	63476 +	11.8
L 09-099	11737	49.2	238 −	1.97 −	50176 +	14.5 +
L 09-112	15131	58.8 +	257	2.95 +	39859	14.0 +
L 09-131	13200	48.9	270	1.73 −	57140 +	13.0 +

Table 7. Infield first-stubble means of the 2009 "L" assignment series on a Coteau silt loam soil at Sugarland Acres in Youngsville, LA in 2012.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
HoCP 96-540	7746	31.0	249	2.18	28537	11.5
L 99-226	12148	41.7	291 +	2.61	32032	13.2 +
L 99-233	10594	41.1	258	2.12	38807	14.1 +
L 01-283	10032	36.5	276 +	1.58 −	45838	12.5
L 01-299	10391	40.9	254	1.94	42310	12.2
L 09-099	7020	29.8	236	1.79	33347	13.5 +
L 09-112	9008	35.9	251	2.51	28644	14.6 +
L 09-131	9096	33.4	272 +	2.06	33204	14.0 +

Table 8. Infield first-stubble means of the 2009 "L" assignment series across two locations (Blackberry Farms and Sugarland Acres) in 2012.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
HoCP 96-540	9448	36.5	257	2.32	31432	11.3
L 99-226	12240	42.3	289 +	2.59	32719	12.6
L 99-233	12572	49.3	255	2.06	48266 +	14.5 +
L 01-283	11522	41.5	278 +	1.65 −	50276 +	11.9
L 01-299	13611	52.0	260	1.97	52893 +	12.0
L 09-099	9378	39.5	237 −	1.88 −	41762	14.0 +
L 09-112	12070	47.4	254	2.73 +	34252	14.3 +
L 09-131	11148	41.2	271 +	1.89 −	45172 +	13.5 +

Table 9. Infield plant-cane means of the 2009 "Ho", "HoCP", and "L" assignment series on a Sharkey clay soil at Ardoyne Farm in Schriever, LA in 2012.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
HoCP 96-540	9592	39.8	242	2.44	32613	12.2
L 99-226	10356	37.3	278 +	2.59	29227	11.1 −
L 01-299	9812	36.4	270 +	1.49 −	48706 +	13.1
L 03-371	11117	37.1	300 +	2.00	37369	11.0 −
HoCP 04-838	9995	35.5	281 +	1.56 −	45330 +	12.7
L 09-099	7842	31.9	246	2.04	31728	13.2 +
L 09-112	10296	38.5	266 +	2.27	34578	11.8
L 09-131	8920	31.0	288 +	2.15	29033	12.7
HoCP 09-800	7491	26.5	282 +	2.03	26175	10.5 −
HoCP 09-804	7942	29.0	273 +	2.10	27847	12.5
HoCP 09-814	9087	30.8	294 +	2.42	25573	10.7 −
Ho 09-840	9380	34.0	276 +	1.51 −	45739 +	12.7

Table 10. Infield plant-cane means of the 2009 “Ho” and “HoCP” and 2010 “L” assignment series on a Commerce silt loam soil at Blackberry Farms in Vacherie, LA in 2012.

Variety	Sugar/ acre		Tons/ acre		Sugar/ ton		Weight/ stalk		Stalks/ acre		Fiber	
	(lbs.)		(tons)		(lbs.)		(lbs.)		(no.)		(%)	
HoCP 96-540	11634		45.0		259		2.93		30767		12.7	
L 99-226	9948		36.1	−	276		2.97		24342		12.1	
L 01-299	8460	−	31.5	−	268		2.36		26627		12.4	
L 03-371	9273		33.0	−	282	+	2.46		26971		11.4	−
HoCP 04-838	11929		46.7		255		2.12	−	43969	+	13.2	
HoCP 09-800	8791	−	31.3	−	281	+	2.39		26249		11.1	−
HoCP 09-804	10808		41.5		260		2.04	−	40663	+	13.6	
HoCP 09-814	16224	+	58.3	+	278	+	3.32		35903		11.8	
Ho 09-840	11249		43.6		258		1.50	−	58789	+	13.2	
L 10-146	13709		48.7		281	+	2.17	−	45053	+	11.1	−
L 10-147	13419		53.3	+	252		2.49		42838	+	10.9	−
L 10-156	12919		52.3		247		2.46		42547	+	12.8	

Table 11. Infield plant-cane means of the 2009 “Ho” and “HoCP” and 2010 “L” assignment series on a Patoutville silt loam soil at Vallot Farms in Abbeville, LA in 2012.

Variety	Sugar/ acre		Tons/ acre		Sugar/ ton		Weight/ stalk		Stalks/ acre		Fiber	
	(lbs.)		(tons)		(lbs.)		(lbs.)		(no.)		(%)	
HoCP 96-540	8195		31.4		262		2.21		28393		13.4	
L 99-226	6250		21.4		291	+	2.44		17523		11.7	−
L 01-299	10173		36.6		277		1.83		39130		12.9	
L 03-371	8730		29.5		297	+	1.78		33254		11.6	−
HoCP 04-838	5881		21.9		268		1.66	−	26787		13.9	
HoCP 09-800	5765		20.4		283	+	2.12		19277		11.4	−
HoCP 09-804	5787		20.9		277	+	1.61	−	26346		13.4	
HoCP 09-814	14243	+	52.1	+	274		2.54		42018		11.0	−
Ho 09-840	8145		29.5		276		1.33	−	44047		11.8	−
L 10-146	4588		17.0		270		1.85		18730		11.4	−
L 10-147	10358		39.0		266		1.89		41501		10.7	−
L 10-156	7737		32.0		242	−	1.88		34185		11.9	−

Table 12. Infield plant-cane means of the 2009 “Ho” and “HoCP” and 2010 “L” assignment series across two locations (Blackberry Farms and Vallot Farm) in 2012.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
HoCP 96-540	9914	38.2	260	2.57	29580	13.0
L 99-226	8099	28.8	284 +	2.70	20932	11.9 −
L 01-299	9316	34.0	272	2.09 −	32879	12.7
L 03-371	9001	31.2	289 +	2.12 −	30113	11.5 −
HoCP 04-838	8905	34.3	262	1.89 −	35378	13.5
HoCP 09-800	7278	25.9	282 +	2.25	22763	11.2 −
HoCP 09-804	8298	31.2	269	1.82 −	33504	13.5
HoCP 09-814	15234	55.2	276 +	2.93 +	38960	11.4 −
Ho 09-840	9697	36.5	267	1.41 −	51418	12.5
L 10-146	9148	32.9	276 +	2.01 −	31891	11.3 −
L 10-147	11888	46.1	259	2.19 −	42169	10.8 −
L 10-156	10328	42.1	244	2.17 −	38366	12.4

Table 13. Nursery second-stubble means of the 2009 “Ho” and “HoCP” assignment series on a Commerce silt loam soil at the Ardoyne Farm in Schriever, LA in 2012.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
HoCP 96-540	11197	42.3	257	1.82	45829
L 99-226	15130	58.5	259	2.76 +	42426
L 99-233	16551	64.4	249	2.28	55358
L 01-283	14856	54.9	270	1.77	61937
HoCP 09-800	15175	58.3	260	2.28	51047
HoCP 09-804	15169	57.4	265	1.85	62164
HoCP 09-814	19496 +	73.2 +	267	2.68 +	54450
Ho 09-840	14543	54.9	265	1.61	68743 +
Ho 09-9619 [3/]	11498	57.5	200 -	2.29	49913
Ho 09-9620 [3/]	8787	48.0	183 -	1.69	56946
Ho 09-9621 [3/]	6446	26.4	241	1.78	30174
Ho 09-9622 [3/]	5908	39.2	150 -	1.69	46283
Ho 09-9623 [3/]	11295	46.0	249	1.82	50139

[3/] Varieties from the SRU’S Recurrent Selection for Borers (RSB) program.

Table 14. Nursery second-stubble means of the 2009 "Ho" and "HoCP" assignment series on a Commerce silt loam soil at the Sugar Research Station in St. Gabriel, LA in 2012.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
HoCP 96-540	18250	57.6	317	2.50	45829
L 99-226	13435	45.4	298 -	2.21	40611
L 99-233	15070	52.2	288 -	1.97	52862
L 01-283	14133	46.0	307	1.75 -	51954
HoCP 09-800	18433	60.8	303	2.61	46963
HoCP 09-804	17368	58.7	297 -	1.89 -	62391
HoCP 09-814	20126	68.0	296 -	2.65	51047
Ho 09-840	12105	41.3	293 -	1.54 -	53769
Ho 09-9619 [3/]	13159	47.9	274 -	2.04	46963
Ho 09-9620 [3/]	18364	71.6	256 -	1.90 -	74869 +
Ho 09-9621 [3/]	7954 -	29.5 -	269 -	1.90 -	30855
Ho 09-9622 [3/]	6813 -	28.5 -	239 -	2.03	28133
Ho 09-9623 [3/]	11837	41.5	286 -	1.53 -	54450

[3/] Varieties from the SRU'S Recurrent Selection for Borers (RSB) program.

Table 15. Nursery second-stubble means of the 2009 "Ho" and "HoCP" assignment series across locations (Ardoyne Farm and Sugar Research Station) in 2012.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
HoCP 96-540	14723	49.9	287	2.16	45829
L 99-226	14283	51.9	278	2.48	41518
L 99-233	15811	58.3	269	2.12	54110
L 01-283	14494	50.4	288	1.76	56946
HoCP 09-800	16804	59.6	281	2.44	49005
HoCP 09-804	16269	58.1	281	1.87	62277 +
HoCP 09-814	19811	70.6 +	281	2.66 +	52748
Ho 09-840	13324	48.1	279	1.57 -	61256 +
Ho 09-9619 [3/]	12328	52.7	237 -	2.16	48438
Ho 09-9620 [3/]	13575	59.8	220 -	1.79	65907 +
Ho 09-9621 [3/]	7200 -	28.0 -	255 -	1.84	30515 -
Ho 09-9622 [3/]	6360 -	33.8	195 -	1.86	37208
Ho 09-9623 [3/]	11566	43.8	268	1.67 -	52295

[3/] Varieties from the SRU'S Recurrent Selection for Borers (RSB) program.

Table 16. Nursery first-stubble means of the 2010 "Ho" and "HoCP" assignment series on a Commerce silt loam soil at the Ardoyne Farm in Schriever, LA in 2012.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
HoCP 96-540	18285	62.1	295	2.91	42653
L 99-226	14792	49.2	302	2.60	36754
L 99-233	17435	61.5	284	2.16 -	56719 +
L 01-283	19615	62.4	314 +	2.18 -	57173 +
L 01-299	17491	60.6	290	2.40	50593
HoCP 10-917	20105	65.3	309 +	2.38	54904 +
Ho 10-937	17331	56.8	306	2.96	38342
Ho 10-9624 [3/]	13634	47.0	289	2.06 -	46056
Ho 10-9625 [3/]	13327	45.2	295	2.38	37888
Ho 10-9626 [3/]	13133	43.1	304	1.90 -	45375

[3/] Varieties from the SRU'S Recurrent Selection for Borers (RSB) program.

Table 17. Nursery first-stubble means of the 2010 "Ho" and "HoCP" assignment series on a Baldwin silty clay soil at the Iberia Research Station in Jeanerette, LA in 2012.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
HoCP 96-540	18698	64.5	290	2.65	48551
L 99-226	15688	56.6	276	2.89	39476
L 99-233	16887	61.1	274	2.25	54904
L 01-283	16095	59.8	269	2.26	54677
L 01-299	19272	71.1	271	2.86	49913
HoCP 10-917	14807	51.8	286	1.97 -	52862
Ho 10-937	12482 -	45.3 -	273	2.42	37434
Ho 10-9624 [3/]	9782 -	38.5 -	253	1.66 -	46736
Ho 10-9625 [3/]	9933 -	39.8 -	252	2.33	34485
Ho 10-9626 [3/]	11500 -	40.1 -	288	1.77 -	45375

[3/] Varieties from the SRU'S Recurrent Selection for Borers (RSB) program.

Table 18. Nursery first-stubble means of the 2010 “Ho” and “HoCP” assignment series on a Commerce silty clay loam soil at the Sugar Research Station in St. Gabriel, LA in 2012.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
HoCP 96-540	16718	59.4	281	2.52	47190
L 99-226	20647	69.7	296	2.95	47644
L 99-233	16715	66.0	253 -	1.96 -	67382 +
L 01-283	17266	61.3	282	2.11	58080
L 01-299	18714	65.6	287	2.11	61483 +
HoCP 10-917	15476	54.6	285	2.02	53996
Ho 10-937	18351	63.8	287	2.99	42426
Ho 10-9624 [3/]	10609 -	39.2	271	1.81 -	43333
Ho 10-9625 [3/]	16392	59.1	280	2.20	53089
Ho 10-9626 [3/]	14930	52.2	286	1.83 -	57173

[3/] Varieties from the SRU’S Recurrent Selection for Borers (RSB) program.

Table 19. Nursery first-stubble means of the 2010 “Ho” and “HoCP” assignment series across locations (Ardoyne Farm, Iberia Research Station, and Sugar Research) in 2012.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
HoCP 96-540	17900	62.0	288	2.69	46131
L 99-226	17042	58.5	292	2.81	41291
L 99-233	17013	62.9	270 -	2.12 -	59668 +
L 01-283	17659	61.1	288	2.18 -	56643 +
L 01-299	18492	65.8	283	2.45	53996 +
HoCP 10-917	16796	57.2	293	2.12 -	53921 +
Ho 10-937	16055	55.3	289	2.79	39401
Ho 10-9624	11342 -	41.6 -	271 -	1.84 -	45375
Ho 10-9625	13217 -	48.0 -	276	2.30 -	41821
Ho 10-9626	13188 -	45.1 -	293	1.83 -	49308

[3/] Varieties from the SRU’S Recurrent Selection for Borers (RSB) program.

Table 20. Nursery plant cane means of the 2011 "Ho" and "HoCP" assignment series on a Commerce silt loam soil at the Ardoyne Farm in Schriever, LA in 2012.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
HoCP 96-540	13427	44.8	299	2.17	41291
L 99-226	18615 +	59.4 +	314	3.32 +	35846
L 01-299	15256	51.3	298	2.41	42426
L 03-371	13862	44.1	315	2.25	39249
HoCP 04-838	12410	38.3	324 +	2.33	32897 -
Ho 11-501	12270	46.1	266 -	2.45	37434
HoCP 11-504	13743	47.9	287	2.31	41518
Ho 11-505	10921	36.5	299	1.67 -	43787
Ho 11-506	11399	35.7	319 +	2.08	34485
Ho 11-508	10951	36.2	303	1.92	37661
Ho 11-509	10511	35.1	298	2.09	33578 -
Ho 11-510	11068	35.1	315	1.70 -	41291
Ho 11-511	15181	46.8	325 +	2.78 +	33804 -
Ho 11-512	14886	46.3	321 +	2.67 +	34712
Ho 11-515	14233	49.7	286	2.47	40384
HoCP 11-516	12633	39.4	321 +	2.12	37208
Ho 11-517	11121	36.5	304	2.07	35393
Ho 11-518	11463	36.4	314	1.89	38569
Ho 11-519	10367	35.3	294	2.21	31989 -
Ho 11-520	8693 -	29.0 -	300	1.91	30401 -
Ho 11-521	11502	42.2	272 -	2.33	36300
Ho 11-524	14479	46.6	310	2.47	37661
Ho 11-526	12430	42.1	295	2.42	34939
Ho 11-528	12090	38.6	314	1.96	39476
Ho 11-529	15102	48.1	314	2.13	45148
Ho 11-532	14039	46.5	302	1.99	46736
HoCP 11-533	14981	48.8	307	2.07	47190
HoCP 11-534	12275	38.9	315	2.03	38569
HoCP 11-536	12630	40.7	310	2.11	38569
HoCP 11-537	12322	45.5	270 -	2.53	35393
HoCP 11-539	12523	39.5	317	1.84	43106
HoCP 11-542	11999	41.1	292	2.39	34485
HoCP 11-544	14127	46.0	307	2.70 +	34485
HoCP 11-546	14923	49.4	302	2.56	38796
HoCP 11-548	12893	40.5	318	2.36	34258
HoCP 11-550	12176	38.2	319	1.85	41291
HoCP 11-551	12310	40.3	305	1.86	43333
Ho 11-556	13514	43.6	310	2.02	42653
HoCP 11-557	9744 -	35.2	277 -	1.73 -	40838

Table 20. continued.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
Ho 11-559	10746	33.0 -	325 +	2.11	31536 -
Ho 11-561	10542	36.4	290	1.87	39023
Ho 11-562	10246	34.4	299	1.92	35619
Ho 11-563	11978	40.7	294	2.06	39476
HoCP 11-565	12537	40.5	309	1.94	41972
HoCP 11-567	9966	32.9 -	303	1.57 -	41972
Ho 11-571	12943	45.1	288	2.80 +	32216 -
Ho 11-572	11421	37.4	305	2.17	34258
Ho 11-573	17162 +	57.9 +	297	2.89 +	40157
HoCP 11-576	11245	33.4	336 +	1.88	35619
Ho 11-9627 [3/]	10937	38.3	283	1.53 -	50139 +
Ho 11-9628 [3/]	9080 -	40.3	226 -	1.77	45375
Ho 11-9629 [3/]	12279	45.9	268 -	1.65 -	55584 +
Ho 11-9630 [3/]	13443	44.8	301	1.91	46963

[3/] Varieties from the SRU'S Recurrent Selection for Borers (RSB) program.

Table 21. Nursery plant-cane means of the 2011 "Ho" and "HoCP" assignment series on a Baldwin silty clay soil at the Iberia Research Station in Jeanerette, LA in 2012.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
HoCP 96-540	12385	49.6	250	2.35	42199
L 99-226	11393	43.6	260	2.76	31763 -
L 01-299	12509	45.0	278	2.17	41518
L 03-371	13403	44.3	302 +	2.16	41064
HoCP 04-838	14928	51.2	291 +	2.26	45375
Ho 11-501	10541	47.5	226	2.10	45375
HoCP 11-504	11247	45.2	247	2.13	42199
Ho 11-505	11654	43.6	267	1.72 -	50820 +
Ho 11-506	12254	42.9	285	1.91	44921
Ho 11-508	12906	46.4	278	2.07	44921
Ho 11-509	11082	39.8	278	2.11	37888
Ho 11-510	7222 -	27.0 -	268	1.64 -	33124 -
Ho 11-511	11650	42.3	276	2.14	39476
Ho 11-512	13967	55.5	250	2.43	45602
Ho 11-515	11741	43.1	272	2.18	39703
HoCP 11-516	12047	39.3	306 +	2.21	35619
Ho 11-517	11811	47.7	247	1.95	49232

Table 21. continued.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
Ho 11-518	10312	36.7	281	1.89	39023
Ho 11-519	14953	56.3	277	2.41	40838
Ho 11-520	10286	37.1	276	2.02	36981
Ho 11-521	9871	37.5	263	2.23	34031 -
Ho 11-524	10930	40.3	272	2.09	38569
Ho 11-526	14417	57.8	249	2.85	40611
Ho 11-528	14496	48.6	299 +	2.04	47644
Ho 11-529	18094 +	60.7	297 +	2.47	49005
Ho 11-532	15778	56.2	282	2.35	47871
HoCP 11-533	11578	41.2	281	1.96	41972
HoCP 11-534	10466	37.6	282	2.07	36300
HoCP 11-536	11049	36.6	302 +	2.07	35619
HoCP 11-537	7784	31.8 -	228	2.46	25637 -
HoCP 11-539	12593	43.8	287 +	1.89	46283
HoCP 11-542	12440	52.0	237	2.54	41064
HoCP 11-544	14633	55.6	262	2.95 +	37661
HoCP 11-546	13897	49.1	283	2.06	47644
HoCP 11-548	14396	54.3	268	2.91 +	37208
HoCP 11-550	12563	42.3	297 +	1.94	43787
HoCP 11-551	11318	40.5	281	1.93	41972
Ho 11-556	11716	40.1	293 +	2.19	37208
HoCP 11-557	10557	41.8	253	1.68 -	49913
Ho 11-559	11490	37.9	305 +	1.89	39249
Ho 11-561	13208	49.0	269	2.39	41064
Ho 11-562	6457 -	25.3 -	254	2.04	24729 -
Ho 11-563	10159	37.8	269	2.39	31989 -
HoCP 11-565	12590	50.5	249	2.31	44014
HoCP 11-567	10283	36.1 -	285	1.55 -	46736
Ho 11-571	12790	46.3	277	2.75	33804 -
Ho 11-572	14584	54.0	271	2.26	48098
Ho 11-573	16983 +	61.3	277	3.13 +	39249
HoCP 11-576	17135 +	63.9 +	267	2.44	52181 +
Ho 11-9627 [3/]	8767	38.4	230	1.18 -	64659 +
Ho 11-9628 [3/]	9365	43.4	216	1.76 -	49459
Ho 11-9629 [3/]	11299	48.3	234	1.50 -	64659 +
Ho 11-9630 [3/]	14772	55.7	262	2.28	48778

[3/] Varieties from the SRU'S Recurrent Selection for Borers (RSB) program.

Table 22. Nursery plant cane means of the 2011 “Ho” and “HoCP” assignment series on a Commerce silt loam soil at the Sugar Research Station in St. Gabriel, LA in 2012.

Variety	Sugar/ acre		Tons/ acre		Sugar/ ton		Weight/ stalk		Stalks/ acre	
	(lbs.)		(tons)		(lbs.)		(lbs.)		(no.)	
HoCP 96-540	15626		54.7		286		2.80		39023	
L 99-226	17413		60.2		290		3.29		37208	
L 01-299	14352		50.2		287		2.47		40384	
L 03-371	12933		43.1		300		2.07	-	41745	
HoCP 04-838	15243		52.0		293		2.49		41518	
Ho 11-501	14881		57.3		260	-	2.87		39930	
HoCP 11-504	17505		64.8		271		2.85		45602	
Ho 11-505	10977		39.7	-	277		1.77	-	45602	
Ho 11-506	13894		47.3		293		2.05	-	46509	
Ho 11-508	11845		39.5	-	300		2.74		29040	-
Ho 11-509	13625		45.8		297		2.67		34258	
Ho 11-510	13041		44.7		292		2.12	-	42199	
Ho 11-511	16181		55.8		288		2.95		37888	
Ho 11-512	17150		52.6		327	+	2.74		38569	
Ho 11-515	11975		44.9		267		2.36		38115	
HoCP 11-516	12609		40.2		313	+	2.39		33578	
Ho 11-517	11372		39.0	-	292		2.34		33351	
Ho 11-518	11578		43.0		269		2.18	-	39476	
Ho 11-519	11232		38.3	-	293		2.67		28586	-
Ho 11-520	10637		38.8	-	274		2.16	-	36300	
Ho 11-521	11966		44.1		272		2.47		35846	
Ho 11-524	13743		48.0		285		2.69		36073	
Ho 11-526	18494		71.5	+	259	-	3.47	+	41291	
Ho 11-528	15050		50.8		297		2.62		38342	
Ho 11-529	22217	+	76.2	+	292		2.95		51501	+
Ho 11-532	9295		35.1	-	265		2.69		26318	-
HoCP 11-533	12234		42.7		286		2.23	-	38342	
HoCP 11-534	8289		30.1	-	275		2.27	-	26544	-
HoCP 11-536	12607		43.6		289		2.39		36527	
HoCP 11-537	11566		45.4		254	-	3.08		29494	-
HoCP 11-539	13920		45.7		304		2.12	-	43106	
HoCP 11-542	15594		60.1		259	-	3.06		39249	
HoCP 11-544	17965		59.6		302		3.06		39249	
HoCP 11-546	12319		43.5		284		2.32		37434	
HoCP 11-548	17422		56.9		306		3.20		35619	
HoCP 11-550	13872		47.0		295		2.31		40611	
HoCP 11-551	15345		55.4		277		2.61		42199	
Ho 11-556	16398		57.0		289		2.39		47644	
HoCP 11-557	7363		27.5	-	268		1.75	-	31309	

Table 22. continued.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
Ho 11-559	15163	47.8	317 +	2.51	38342
Ho 11-561	13583	50.1	271	2.47	40611
Ho 11-562	11633	41.2	282	2.19 -	37661
Ho 11-563	13059	46.5	282	2.50	36754
HoCP 11-565	13137	45.8	287	2.61	35619
HoCP 11-567	12576	44.1	285	2.05 -	43106
Ho 11-571	14560	54.1	269	3.14	34485
Ho 11-572	15203	53.7	284	2.61	41064
Ho 11-573	18858	67.9	277	3.40 +	39930
HoCP 11-576	15147	49.1	308 +	2.82	34939
Ho 11-9627 [3/]	16804	60.9	276	3.09	39249
Ho 11-9628 [3/]	9078	45.1	201 -	1.97 -	45829
Ho 11-9629 [3/]	12347	51.1	241 -	1.74 -	58761 +
Ho 11-9630 [3/]	13839	46.6	297	2.19 -	42426

[3/] Varieties from the SRU'S Recurrent Selection for Borers (RSB) program.

Table 23. Nursery plant cane means of the 2011 "Ho" and "HoCP" assignment series across locations (Ardoyne Farm, Iberia Research Station, and Sugar Research Station) in 2012.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
HoCP 96-540	13813	49.7	278	2.44	40838
L 99-226	15807	54.4	288	3.12 +	34939
L 01-299	14039	48.8	288	2.35	41443
L 03-371	13399	43.8	306 +	2.16	40686
HoCP 04-838	14194	47.2	303 +	2.36	39930
Ho 11-501	12564	50.3	251 -	2.47	40913
HoCP 11-504	14165	52.6	269	2.43	43106
Ho 11-505	11184	39.9	281	1.72 -	46736
Ho 11-506	12516	42.0	299 +	2.01 -	41972
Ho 11-508	11901	40.7	294	2.24	37208
Ho 11-509	11740	40.2	291	2.29	35241
Ho 11-510	10444 -	35.6 -	292	1.82 -	38871
Ho 11-511	14337	48.3	296 +	2.62	37056
Ho 11-512	15334	51.5	299 +	2.61	39628
Ho 11-515	12650	45.9	275	2.33	39401
HoCP 11-516	12429	39.6	313 +	2.24	35468

Table 23. continued.

Variety	Sugar/ acre (lbs.)	Tons/ acre (tons)	Sugar/ ton (lbs.)	Weight/ stalk (lbs.)	Stalks/ acre (no.)
Ho 11-517	11435	41.1	281	2.12	39325
Ho 11-518	11118	38.7 -	288	1.98 -	39023
Ho 11-519	11630	40.7	288	2.43	33804
Ho 11-520	9872 -	35.0 -	284	2.03 -	34561
Ho 11-521	11113	41.2	269	2.34	35393
Ho 11-524	13051	45.0	289	2.41	37434
Ho 11-526	15114	57.2	268	2.91 +	38947
Ho 11-528	13878	46.0	303 +	2.21	41821
Ho 11-529	18471 +	61.7 +	301 +	2.52	48551 +
Ho 11-532	13037	46.0	283	2.34	40308
HoCP 11-533	12931	44.3	291	2.09 -	42501
HoCP 11-534	10343 -	35.5 -	291	2.12	33804
HoCP 11-536	12095	40.3	301 +	2.19	36905
HoCP 11-537	11112	42.7	251 -	2.74	30174 -
HoCP 11-539	13012	43.0	303 +	1.95 -	44165
HoCP 11-542	13344	51.0	263	2.66	38266
HoCP 11-544	15575	53.7	290	2.90 +	37132
HoCP 11-546	13713	47.3	290	2.31	41291
HoCP 11-548	14904	50.5	297 +	2.82 +	35695
HoCP 11-550	12871	42.5	304 +	2.03 -	41896
HoCP 11-551	12991	45.4	288	2.13	42501
Ho 11-556	13876	46.9	297 +	2.20	42501
HoCP 11-557	9222 -	34.8 -	266	1.72 -	40686
Ho 11-559	12466	39.6 -	316 +	2.17	36376
Ho 11-561	12444	45.2	277	2.24	40233
Ho 11-562	9445 -	33.6 -	278	2.05 -	32670 -
Ho 11-563	11732	41.7	282	2.32	36073
HoCP 11-565	12755	45.6	282	2.28	40535
HoCP 11-567	10942 -	37.7 -	291	1.72 -	43938
Ho 11-571	13431	48.5	278	2.89 +	33502
Ho 11-572	13736	48.4	287	2.35	41140
Ho 11-573	17668 +	62.4 +	284	3.14 +	39779
HoCP 11-576	14509	48.8	304 +	2.38	40913
Ho 11-9627 [3/]	12169	45.9	263	1.93 -	51349 +
Ho 11-9628 [3/]	9174 -	42.9	214 -	1.83 -	46888
Ho 11-9629 [3/]	11975	48.5	248 -	1.63 -	59668 +
Ho 11-9630 [3/]	14018	49.0	287	2.12	46056

[3/] Varieties from the SRU'S Recurrent Selection for Borers (RSB) program.

2012 LOUISIANA SUGARCANE VARIETY DEVELOPMENT PROGRAM OUTFIELD VARIETY TRIALS

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The outfield variety trials are the final stage of testing experimental varieties for their potential commercial production in Louisiana. Results from these trials are used in both variety advancement and crossing decisions. The outfield variety trials are cooperatively conducted at 12 locations throughout the Louisiana sugarcane belt by the LSU AgCenter, the USDA-ARS, and the American Sugar Cane League.

To be considered for release, an experimental variety must equal or exceed the performance of commercial varieties with regard to yield and harvestability across locations, crops, and years. Accurate varietal evaluation requires overall yield performance information in addition to performance under adverse harvest conditions. The objective of this report is to provide overall and specific location yield data by crop for the 2012 outfield tests. Included are multi-year yield analyses for appropriate test varieties.

The experimental design used at each outfield location was a randomized complete block design with three replications per location. Test plots were two rows wide and 50 feet long with a 5-foot alley between plots. All locations were harvested with a combine harvester and each plot was weighed with a weigh wagon fitted with load cells mounted on each axle and hitch. A 10-stalk, whole-stalk sample, not stripped of leaves, was taken from each plot and sent to the USDA-ARS sucrose laboratory. Samples were hand cut for all tests. The samples were weighed, milled, and the juice analyzed for Brix and pol. Pounds of theoretical recoverable sugar per ton of cane were reported.

Cane yield for each plot was estimated by plot weight, less 14% to adjust for leaf-trash weight and 10% for harvester efficiency. Stalk number was calculated by dividing adjusted cane yield by stalk weight. Adjustments made to cane yield resulted in lower estimated stalk numbers than those achieved by growers.

Interpreting one year of yield data can be misleading because varieties may differ in relative performance from year to year. Across location means can likewise be misleading since a variety, experimental or commercial, may not perform consistently at all locations. Multi-year and multi–location testing solves these problems by averaging the inconsistent performances.

The most widely grown variety in Louisiana in 2012 was HoCP96-540, occupying 43% of the state’s acreage. Accordingly for comparison, HoCP96-540 is used as the check variety in all comparisons and is highlighted in the tables. To adjust for missing data, the SAS analysis

calculated least square means (v 9.2, Proc Mixed). Mean separation used least square mean probability differences (P=0.05). Varieties that are significantly higher or lower than HoCP96-540 are denoted by a plus (+) or minus (-), respectively, next to the value for each trait.

Five experimental varieties representing the 2010 assignment series were introduced to outfield locations for seed increase in 2011 (Table 1). Eight experimental and seven commercial varieties were planted at 12 outfield locations. Forty tests were harvested in 2012 including twelve plantcane, eleven first-stubble, eleven second-stubble, and six third-stubble crops (Table 2).

Variety yield traits are reported by crop and trait with overall means and individual location data in the same table and in summary tables by crop. A combined analysis of plantcane, first-stubble, second-stubble, and third-stubble crops averaged over several years is also provided.

The Louisiana sugar industry experienced tropical activity in 2012 when Hurricane Isaac made landfall on August 28. The harvest of 2012 was marked by below average rainfall in October and November and above average rainfall in December and January, which contributed to muddy conditions at the end of the harvest. All tests were harvested by the second week of December 2012. The Louisiana sugar industry did not experience any severe freezes during harvest. The last raw sugar factory ended its processing season on January 16, 2012.

The experimental variety Ho 07-613 was harvested in plantcane through first stubble crops in 2012 and will be considered for release in the spring of 2014.

Data were obtained through a cooperative effort of personnel from the LSU AgCenter, USDA-ARS, Sugarcane Research Laboratory, and the American Sugar Cane League in accordance to the provisions of the “Three-way Agreement of 2007.” Outfield testing would not be possible without the full cooperation of the growers at each outfield location.

Table 1. Commercial and experimental varieties planted in the outfield in 20120.

Commercial Varieties		Experimental Varieties		Experimental Varieties Introduced to the Outfield	
HoCP96-540	L01-299	Ho07-613	HoCP09-840	L10-146	Ho08-730
L99-226	L03-371	HoCP09-800	L09-099	L10-147	Ho10-917
HoCP00-950	HoCP04-838	HoCP09-804	L09-112	L10-156	HoCP10-937
L01-283		HoCP09-814	L09-131		

Table 2. Harvest and planting dates for all outfield locations harvested in 20121.

			Plantcane		First-stubble		Second-stubble		Third-stubble	
Location	Parish	2012 Planting Date	2012 Harvest Date	2011 Planting Date	2012 Harvest Date	2010 Planting Date	2012 Harvest Date	2009 Planting Date	2012 Harvest Date	2008 Planting Date
A. Landry	Iberville	09/25	11/07	08/11	**	08/16	**	*	**	10/07
Allains	St. Mary	09/27	11/14	08/31	11/14	09/17	11/15	11/19	11/14	10/15
Alma	Pointe Coupee	08/17	11/19	09/14	11/19	09/13	10/09	08/31	10/09	09/29
Bon Secour	St. James	09/07	12/03	09/13	12/03	09/15	10/31	09/03	10/31	09/24
Brunswick	Pointe Coupee	09/05	11/16	09/09	11/16	09/02	10/10	08/27	10/10	09/22
F. Martin	St. Mary	09/26	10/30	09/15	11/13	09/10	10/24	09/04	**	10/13
Glenwood	Assumption	09/24	11/26	09/01	11/26	09/20	11/06	09/02	11/06	10/02
Lanaux	St. John	08/23	11/30	08/31	11/30	09/23	10/22	09/01	10/22	09/24
Levert-St. John	St. Martin	09/06	12/11	09/02	12/11	09/09	10/23	08/20	**	09/23
Magnolia	Terrebonne	09/11	11/20	09/21	11/20	09/16	11/20	09/03	**	10/17
Mary	Lafourche	09/12	11/01	10/11	11/01	09/24	10/03	10/21	**	10/09
R. Hebert	Iberia	09/25	12/04	09/16	11/08	09/01	11/08	09/22	**	10/13

* No test planted at this location.
** No test harvested at this location.

Table 3. Plantcane sugar per acre for eight commercial and two experimental varieties at twelve outfield locations in 2012.

	Heavy						Light						
Variety	Allains	Alma	F.Martin	Landry	Magnolia	Mary	Bon Secour	Brunswick	Glenwood	Lanaux	R.Hebert	St. John	Mean
							(lbs./A)						
HoCP96-540	8348	9421	10264	11654	10411	8949	8384	10253	8785	10000	11694	7117	9609
L99-226	9768 +	10174	9978	10932	9522	9146	9088	10042	11262	11337	10464	8416	10011
L99-233	8702	7507	8084 -	8755	10595	8022	9973 +	10493	9190	11494	9214 -	8445	9208
HoCP00-950	8050	10527	10357	10916	9360 -	8104	8440	8817	10715	9335	12228	8489	9611
L01-299	9138	10137	10906	10741	8988 -	9622	9041	10832	9404	10776	11620	8272	9956
L03-371	7068 -	9364	9597	9277	9332 -	8285	9305	9750	9747	11193	9152 -	7064	9095
HoCP04-838	7811	8922	9893	10362	9365 -	9636	10012 +	11040	11130	11769 +	11545	8562	10004
Ho05-961	8912 +	8754	10616	9936	8274 -	8817	9620	10459	11714	10941	10766	9798 +	9884
Ho07-613	10235 +	9251	9524	10711	10283	8729	10059 +	8830	11784	11354	10985	9474 +	10102
L08-090	8336	7420	8894	10337	8853 -	8478	7112	9806	9128	9450	9916 -	8659 +	8866 -

Table 4. Plantcane cane yield for eight commercial and two experimental varieties at twelve outfield locations in 2012.

	Heavy						Light						
Variety	Allains	Alma	F.Martin	Landry	Magnolia	Mary	Bon Secour	Brunswick	Glenwood	Lanaux	R.Hebert	St. John	Mean
							(tons/A)						
HoCP96-540	28.5	36.9	35.3	42.9	34.3	35.5	29.9	35.1	33.5	38.5	41.1	23.8	34.6
L99-226	30.5	38.9	32.1	38.7	29.4 -	34.3	27.8	31.2	39.0 +	37.6	34.0 -	27.9	33.5
L99-233	30.3	34.0	31.5	38.1	36.0	31.8	34.3 +	37.7	43.1 +	44.4 +	35.1 -	31.8 +	35.7
HoCP00-950	24.3 -	38.4	33.9	36.2	28.5 -	29.7 -	27.5 -	27.9	39.3 +	35.0	41.8	28.6	32.6
L01-299	31.4	38.5	36.8	40.6	30.7 -	37.2	29.5	36.7	39.6 +	37.6	40.0	28.5	35.6
L03-371	21.7 -	33.7	32.2	31.2 -	30.1 -	29.0 -	29.3	31.9	35.9	34.8	30.6 -	24.0	30.4 -
HoCP04-838	25.1	36.7	32.0	35.7 -	30.4 -	34.7	33.2	37.7	41.3 +	39.7	43.3	28.5	34.9
Ho05-961	28.2	34.4	34.7	33.4 -	26.3 -	32.5	31.7	34.2	41.6 +	35.7	38.2	33.9 +	33.7
Ho07-613	33.1 +	35.7	32.7	38.1	32.8	31.5	33.8	29.2	43.6 +	37.9	38.2	32.1 +	34.9
L08-090	27.7	29.5 -	30.6	35.6 -	27.4 -	30.5 -	24.8 -	32.7	35.4	29.8 -	32.9 -	28.7	30.4 -

Table 5. Plantcane sugar per ton for eight commercial and two experimental varieties at twelve outfield locations in 2012.

	Heavy						Light						
Variety	Allains	Alma	F.Martin	Landry	Magnolia	Mary	Bon Secour	Brunswick	Glenwood	Lanaux	R.Hebert	St. John	Mean
							(lbs./tons)						
HoCP96-540	294	256	291	272	304	252	280	288	262	260	285	299	279
L99-226	322 +	261	311	283	323 +	267	327 +	321 +	288	301 +	308	301	301 +
L99-233	288	220	258 -	229 -	294	252	291	279	216	259	265	266	260 -
HoCP00-950	332 +	273	305	303 +	328 +	273	308 +	315 +	272	266	293	297	297 +
L01-299	291	263	297	265	293 -	259	306 +	294	238	287	291	290	281
L03-371	325 +	278	298	298	310	283	318 +	306	271	322 +	298	296	300 +
HoCP04-838	313	243	309	290	308	277	301	294	270	297 +	267	301	289 +
Ho05-961	316 +	257	306	298	315 +	271	303 +	307	281	306 +	283	288	294 +
Ho07-613	309	259	292	281	313	277	298	303	270	300 +	288	296	290 +
L08-090	302	250	291	290	323 +	278	287	299	259	318 +	302	302	292 +

Table 6. Plantcane stalk weight for eight commercial and two experimental varieties at twelve outfield locations in 2012.

	Heavy						Light						
Variety	Allains	Alma	F.Martin	Landry	Magnolia	Mary	Bon Secour	Brunswick	Glenwood	Lanaux	R.Hebert	St. John	Mean
							(lbs.)						
HoCP96-540	2.43	2.89	2.31	2.41	2.17	2.33	2.38	2.48	2.86	2.47	2.63	2.66	2.50
L99-226	2.82 +	3.34	2.72	2.77	2.88 +	2.59	3.01 +	3.32 +	2.95	2.95	3.01	2.97	2.94 +
L99-233	1.80 -	1.82 -	1.96	1.90 -	2.52	1.88	1.96	1.82 -	1.95 -	2.00	1.83 -	2.04 -	1.96 -
HoCP00-950	1.71 -	2.42	2.00	1.85 -	2.07	2.25	2.15	1.94 -	2.24 -	2.08	2.34	2.10 -	2.09 -
L01-299	2.16	2.63	2.17	2.35	2.42	1.94	2.06	2.14 -	2.53	2.19	2.17 -	2.32	2.26 -
L03-371	2.11	2.18 -	2.59	2.18	2.33	2.15	2.18	1.95 -	2.10 -	2.35	1.99 -	1.75 -	2.15 -
HoCP04-838	2.17	2.51	2.15	2.15	2.20	2.27	2.28	2.27	2.39	2.44	2.19 -	2.04 -	2.26 -
Ho05-961	2.02 -	2.38	2.16	2.49	2.07	2.19	2.52	2.24	2.92	2.32	2.93	1.99 -	2.35
Ho07-613	1.95 -	2.62	2.54	2.29	2.24	2.19	2.46	2.10 -	2.79	2.58	2.61	2.69	2.42
L08-090	2.10 -	2.86	2.35	2.28	2.41	2.45	2.34	2.11 -	2.59	2.10	2.61	2.62	2.40

Table 7. Plantcane stalk number for eight commercial and two experimental varieties at twelve outfield locations in 2012.

	Heavy						Light						
Variety	Allains	Alma	F.Martin	Landry	Magnolia	Mary	Bon Secour	Brunswick	Glenwood	Lanaux	R.Hebert	St. John	Mean
							(stalks/A)						
HoCP96-540	24299	25536	30501	35535	31944	30787	25849	29312	24891	31468	32163	18003	28346
L99-226	21582	23438	23766 -	29144	20490 -	27120	18488 -	18900 -	26611	25691	22620 -	18988	23070 -
L99-233	33745 +	39932 +	32197	40208	28551	33805	35240 +	41560 +	45039 +	44892 +	38765	31281 +	37090 +
HoCP00-950	29262	31867	34101	39247	27628	26579	26454	28884	35325 +	33764	36211	27350 +	31389 +
L01-299	29047	29291	34026	34888	25969 -	39280 +	28732	34436	31412	35748	37479	24860 +	32097 +
L03-371	20656	31267	24964 -	28736 -	25869 -	26868	27002	32868	34977	29828	30987	27726 +	28479
HoCP04-838	23412	29376	29950	33213	27958	30872	29697	33470	34832	32558	39609 +	27846 +	31066 +
Ho05-961	27980	29714	32225	27030 -	25528 -	29646	25226	30580	28658	31128	26154	34073 +	28995
Ho07-613	33958 +	27435	26046	33482	29347	29200	27431	27877	31550	30014	29284	23880 +	29125
L08-090	26396	20714	26393	31261	23180 -	24993	21995	31277	27252	29058	25161 -	21958	25803

Table 8. First-stubble sugar per acre for one experimental and nine commercial varieties at eleven outfield locations in 2012.

	Heavy					Light						
Variety	Allains	Alma	F. Martin	Magnolia	Mary	Bon Secour	Brunswick	Glenwood	Lanaux	R.Hebert	St. John	Mean
						(lbs./A)						
HoCP96-540	7241	1048	8335	9081	8698	9391	10046	11686	9580	12412	10280	9749
L99-226	7745	9539	8530	7310 -	9236	9138	10072	10063 -	8674	10568	9856	9157
L99-233	5695	8453	8152	7088 -	9563	8066 -	8964	8709 -	9573	9681 -	10017	8540 -
HoCP00-950	6423	9329	8466	6119 -	9252	8940	10272	10273	1014	12018	10540	9253
L01-283	8846	9547	8951	7476 -	10050 +	9394	10552	11077	9532	11540	10249	9747
L01-299	7407	9936	9430	8153	11430 +	10482 +	10875	11400	1122 +	13598	13704 +	10694 +
L03-371	6541	8832	8863	6801 -	7748	8092 -	8133	10323	7150 -	8744 -	7061 -	8029 -
HoCP04-838	7861	8969	8734	8169	9734 +	9946	10286	11586	9169	12925	10889	9854
Ho05-961	6608	8270	7141	6839 -	9403 +	9029	9267	10778	9341	11792	11222	9063 -
Ho07-613	7615	9669	9015	5518 -	9787 +	10763 +	8790	10983	9023	9644 -	9095	9082

Table 9. First-stubble cane yield for one experimental and nine commercial varieties at eleven outfield locations in 2012.

	Heavy					Light						
Variety	Allains	Alma	F. Martin	Magnolia	Mary	Bon Secour	Brunswick	Glenwood	Lanaux	R.Hebert	St. John	Mean
						(tons/A)						
HoCP96-540	22.8	38.7	26.2	28.4	33.3	30.4	33.3	39.9	31.3	43.3	34.4	32.9
L99-226	24.3	35.9	24.7	22.0 -	32.7	28.4	33.5	36.0	27.7	33.6 -	32.8	30.2 -
L99-233	19.1	32.3 -	25.3	23.1 -	35.3	28.2	32.0	34.9	32.8	34.4 -	35.8	30.3 -
HoCP00-950	19.0	32.2 -	24.2	17.7 -	29.7 -	28.4	32.8	36.2	30.5	42.3	35.5	29.9 -
L01-283	26.9	32.7 -	27.4	23.0 -	33.5	30.5	34.6	39.0	30.8	43.6	38.5	32.8
L01-299	23.5	37.8	28.2	25.9	42.2 +	34.4 +	39.3 +	40.8	36.6 +	47.1	46.2 +	36.6 +
L03-371	20.0	30.0 -	26.2	21.4 -	29.4 -	27.3 -	26.5 -	34.9	22.7 -	29.6 -	27.3 -	26.8 -
HoCP04-838	25.5	32.2 -	27.0	26.0	33.7	33.3 +	34.4	41.0	30.8	44.6	38.4	33.4
Ho05-961	20.2	29.0 -	22.0	21.2 -	31.2	29.0	31.6	36.2	30.7	38.2	38.9	29.8 -
Ho07-613	23.9	34.6 -	27.8	17.0 -	33.8	34.6 +	28.4 -	39.4	31.0	34.5 -	30.5	30.5 -

Table 10. First-stubble sugar per ton for one experimental and nine commercial varieties at eleven outfield locations in 2012.

	Heavy					Light						
Variety	Allains	Alma	F. Martin	Magnolia	Mary	Bon Secour	Brunswick	Glenwood	Lanaux	R.Hebert	St. John	Mean
						(lbs./tons)						
HoCP96-540	319	270	321	320	261	310	302	293	305	286	299	299
L99-226	318	264	346	331	281	322	303	280	313	315	300	307
L99-233	298	262	322	307	270	285	280	249	292	282	279	284 -
HoCP00-950	338	290	349	345 +	311 +	316	313	284	333 +	283	297	315 +
L01-283	329	292	327	325	300 +	309	305	285	309	267	267	301
L01-299	315	263	335	314	271	305	277	279	307	290	297	296
L03-371	326	294	337	319	265	297	310	297	315	295	260	301
HoCP04-838	308	280	323	316	289	299	300	285	298	291	284	297
Ho05-961	327	285	326	322	302 +	311	292	298	305	307	288	306
Ho07-613	320	279	326	325	290	311	309	278	291	280	298	301

Table 11. First-stubble stalk weight for one experimental and nine commercial varieties at eleven outfield locations in 2012.

	Heavy					Light						
Variety	Allains	Alma	F. Martin	Magnolia	Mary	Bon Secour	Brunswick	Glenwood	Lanaux	R.Hebert	St. John	Mean
						(lbs.)						
HoCP96-540	1.86	2.89	2.08	2.01	2.57	2.78	2.17	2.67	2.81	2.47	2.69	2.46
L99-226	2.44 +	2.64	2.39	2.47 +	2.39	2.66	2.87 +	3.47 +	2.59	2.92	2.91	2.71 +
L99-233	1.42 -	1.67 -	1.75	1.55 -	1.83 -	1.92 -	1.68 -	1.78 -	1.98 -	1.73 -	2.14	1.77 -
HoCP00-950	1.54	1.80 -	1.64 -	1.62 -	1.85 -	2.18 -	1.86	2.03 -	1.67 -	1.96 -	2.06 -	1.84 -
L01-283	1.69	1.92 -	1.86	1.56 -	1.73 -	2.01 -	1.97	2.19 -	1.74 -	1.91 -	2.03 -	1.88 -
L01-299	1.76	1.95 -	2.06	1.69	2.01 -	1.91 -	2.43	2.24 -	2.33	2.18	2.38	2.08 -
L03-371	1.92	1.94 -	1.82	1.26 -	2.22	1.94 -	1.40 -	2.19 -	1.90 -	1.99 -	1.87 -	1.86 -
HoCP04-838	1.98	1.88 -	1.66 -	1.54 -	1.96 -	2.23 -	1.89	1.90 -	2.04 -	2.03	1.74 -	1.90 -
Ho05-961	2.05	2.31 -	1.76	1.65	2.02 -	2.30	1.51 -	2.37	2.31	2.28	2.13	2.06 -
Ho07-613	1.67	2.25 -	1.96	1.56 -	1.96 -	2.65	1.90	2.27 -	2.66	1.97 -	2.27	2.10 -

Table 12. First-stubble stalk number for one experimental and nine commercial varieties at eleven outfield locations in 2012.

	Heavy					Light						
Variety	Allains	Alma	F. Martin	Magnolia	Mary	Bon Secour	Brunswick	Glenwood	Lanaux	R.Hebert	St. John	Mean
						(stalks/A)						
HoCP96-540	25939	27521	25823	28648	25924	22509	30862	30036	22795	35117	25678	27350
L99-226	20011	27369	20968	18106 -	27503	21725	23279 -	20714 -	21796	23158 -	22744	22488 -
L99-233	27354	38716 +	28970	29976	38809 +	29531 +	37945 +	39716 +	34440 +	40111	34538	34543 +
HoCP00-950	24714	35788	30007	21851	32162	26134	35566	35700	36428 +	43687 +	35501	32504 +
L01-283	31963	34121	30747	29744	39616 +	30725 +	35089	35553	36257 +	45732 +	37895 +	35155 +
L01-299	27028	40668 +	27408	30490	42912 +	36188 +	32571	36622	32108 +	43558 +	39419 +	35361 +
L03-371	21184	32094	29503	33853	26570	28340	38219 +	32507	23926	30698	29911	29719
HoCP04-838	25884	34804	32779	36560 +	35410 +	29861 +	36630	43042 +	30242	44182 +	44571 +	35775 +
Ho05-961	19866	25103	25543	25585	31620	25948	41905 +	30625	26853	33542	37483 +	29461
Ho07-613	28766	30853	28299	21879	36515 +	26184	30353	34900	23335	35407	27250	29431

Table 13. Second-stubble sugar per acre for eight commercial varieties at eleven outfield locations in 2012.

	Heavy					Light						
Variety	Allains	Alma	F. Martin	Magnolia	Mary	Bon Secour	Brunswick	Glenwood	Lanaux	R.Hebert	St. John	Mean
						(lbs./A)						
HoCP96-540	12025	5789	7062	8749	6441	7014	6710	9165	9207	9517	7991	8152
L99-226	9124 -	-------	6347	7150	6290	8863	7233	9059	7955	10269	7607	7812
L99-233	8045 -	5629	6079	7226	7365	8377	6875	7776	8736	7886 -	6704	7336
HoCP00-950	6785 -	5826	6157	7725	6581	9096	6782	7735	9468	11808 +	7110	7734
L01-283	10010 -	6377	7062	7775	8195	8371	7537	10068	9145	11005	7952	8500
L03-371	--------	-------	6758	6523	-------	8440	---------	9606	9050	7935 -	-------	7576
HoCP04-838	8364 -	5983	5736 -	8064	6642	8548	6992	8716	9524	10947	6450	7814
Ho05-961	9039 -	6140	5212 -	5964	7187	7346	7064	8991	10011	10523	6942	7674

Table 14. Second-stubble cane yield for eight commercial varieties at eleven outfield locations in 2012.

	Heavy					Light						
Variety	Allains	Alma	F. Martin	Magnolia	Mary	Bon Secour	Brunswick	Glenwood	Lanaux	R.Hebert	St. John	Mean
						(tons/A)						
HoCP96-540	37.8	29.0	24.1	27.6	21.8	23.8	28.5	32.2	33.3	32.2	26.9	28.8
L99-226	27.4 -	-------	19.2 -	22.1 -	22.8	27.9 +	27.7	30.6	27.9	33.1	24.2	26.3 -
L99-233	26.2 -	27.9	19.5 -	24.0	27.9	29.1 +	31.5	27.7	34.2	28.5	22.3	27.2
HoCP00-950	20.3 -	23.0	18.7 -	22.9	21.2	29.7 +	25.2	24.4	32.0	36.8	22.0	25.1 -
L01-283	31.1 -	28.4	23.0	24.5	27.9	27.1	30.1	31.5	32.0	37.1 +	26.3	29.0
L03-371	--------	-------	20.7	20.0 -	-------	27.1	---------	31.0	31.0	24.8 -	-------	25.1 -
HoCP04-838	27.1 -	26.3	17.7 -	25.2	23.6	29.9 +	28.2	30.4	32.1	35.7	22.4	27.1
Ho05-961	28.4 -	27.0	18.3 -	18.7 -	24.5	26.2 +	26.3	28.6	33.1	33.3	22.3	26.1 -

Table 15.Second-stubble sugar per ton for eight commercial varieties at eleven outfield locations in 2012.

	Heavy					Light						
Variety	Allains	Alma	F. Martin	Magnolia	Mary	Bon Secour	Brunswick	Glenwood	Lanaux	R.Hebert	St. John	Mean
						(lbs./tons)						
HoCP96-540	319	202	293	317	296	294	234	284	277	296	298	283
L99-226	333	-------	331 +	322	279	317	261	296	286	310	314	298 +
L99-233	306	201	316 +	301 -	264 -	288	218	280	255	278 -	301	273 -
HoCP00-950	334	253 +	328 +	337 +	311	306	269	317 +	295	321 +	323	309 +
L01-283	321	224	309	317	292	309	251	319 +	286	296	302	293 +
L03-371	--------	-------	326 +	326	-------	311	---------	311 +	292	321 +	-------	303 +
HoCP04-838	307	228	325 +	320	280	286	245	287	296	307	289	288
Ho05-961	318	228	285	319	293	281	269	316 +	301	315 +	311	294 +

Table 16. Second-stubble stalk weight for eight commercial varieties at eleven outfield locations in 2012.

	Heavy					Light						
Variety	Allains	Alma	F. Martin	Magnolia	Mary	Bon Secour	Brunswick	Glenwood	Lanaux	R.Hebert	St. John	Mean
						(lbs.)						
HoCP96-540	2.19	1.86	1.47	1.71	1.59	2.12	2.00	2.18	2.79	2.19	2.29	2.04
L99-226	2.53	-------	1.67	1.86	1.83	2.56 +	2.25	2.06	2.30	2.74	2.25	2.20 +
L99-233	1.64	1.42	1.35	1.52	1.32	1.87	1.67 -	1.75	1.84	1.88	1.71	1.63 -
HoCP00-950	1.70	1.54	1.16	1.51	1.41	2.06	1.75	1.99	1.89	2.00	1.48	1.68 -
L01-283	1.84	1.51	1.41	1.71	1.29	1.69 -	1.82	1.71	2.08	1.90	1.91	1.72 -
L03-371	--------	-------	1.33	1.87	-------	2.09	---------	2.11	2.17	1.97	-------	1.89
HoCP04-838	1.93	1.75	1.22	1.71	1.49	1.92	1.64 -	1.91	1.89	2.21	1.78	1.77 -
Ho05-961	2.01	2.02	1.33	1.69	1.56	2.08	1.94	2.20	2.10	1.81	1.81	1.87 -

Table 17. Second-stubble stalk number for eight commercial varieties at eleven outfield locations in 2012.

	Heavy						Light					
Variety	Allains	Alma	F. Martin	Magnolia	Mary	Bon Secour	Brunswick	Glenwood	Lanaux	R.Hebert	St. John	Mean
						(stalks/A)						
HoCP96-540	35343	31340	33227	32884	28976	22394	28618	31611	23823	30175	24107	29318
L99-226	21741 -	-------	23986 -	23579 -	25248	21754	24799	30505	24598	24521	22632	24449 -
L99-233	32145	40058	28433	32615	43401	31097 +	37909	32116	37077	31780	26138	34016 +
HoCP00-950	23926 -	30871	33440	30304	31526	28879 +	28874	24823	34030	36715	30061	30313
L01-283	34695	38268	32786	28788	44105	32140 +	33542	36821	33399	39332	27842	34702 +
L03-371	--------	-------	32009	21367 -	-------	26477	---------	30046	29281	25611	-------	27494
HoCP04-838	28088	30184	29104	30052	31815	31662 +	35704	32231	35091	33480	25196	31146
Ho05-961	28384	27359	27572	22057 -	31970	25932	27290	26103	31654	37329	24978	28239

Table 18. Third-stubble sugar per acre for eight commercial varieties at six outfield locations in 2012.

	Heavy		Light				
Variety	Allains	Alma	Bon Secour	Brunswick	Glenwood	Lanaux	Mean
			(lbs./A)				
HoCP96-540	6155	7380	5957	8050	9503	9445	7748
L99-226	6579	6699	6631	8052	7867	7620	7241
L99-233	3975 -	7042	7107 +	6001	7678	7535 -	6556 -
HoCP00-950	5011	8519	6741	7052	10550	8353	7704
L01-283	6080	9077 +	8948 +	7348	10142	8772	8395
L03-371	6952	8091	7854 +	--------	9763	8037	8045
HoCP04-838	5571	8000	6532	5693	9476	8690	7327
Ho05-961	5482	7084	7892 +	6614	9716	7244 -	7339

Table 19. Third-stubble cane yield for eight commercial varieties at six outfield locations in 2012.

Variety	Heavy Allains		Heavy Alma		Light Bon Secour		Light Brunswick		Light Glenwood		Light Lanaux		Mean	
					(tons/A)									
HoCP96-540	18.7		32.1		21.2		31.5		34.8		35.0		28.9	
L99-226	19.2		28.1	-	21.4		30.8		27.9		25.7	-	25.5	-
L99-233	13.6	-	30.1		25.5	+	27.3		29.3		28.8	-	25.8	-
HoCP00-950	14.5	-	33.0		21.2		26.8		33.9		27.2	-	26.1	
L01-283	19.1		34.4		28.2	+	27.5		35.3		30.8		29.2	
L03-371	21.4		32.1		25.3	+	--------		33.9		27.1	-	28.1	
HoCP04-838	17.1		29.7		22.2		24.3		34.1		32.2		26.6	
Ho05-961	16.5		26.9	-	25.8	+	24.1		32.0		24.3	-	24.9	-

Table 20. Third-stubble sugar per ton for eight commercial varieties at six outfield locations in 2012.

Variety	Heavy Allains		Heavy Alma		Light Bon Secour		Light Brunswick		Light Glenwood		Light Lanaux		Mean	
					(lbs./tons)									
HoCP96-540	329		228		280		256		272		269		272	
L99-226	341		239		309	+	261		284		297	+	288	+
L99-233	292	-	234		279		217	-	262		260		257	-
HoCP00-950	347		261		319	+	264		311		307	+	301	+
L01-283	318		264		317	+	267		286		285		290	+
L03-371	324		252		311	+	--------		288		296	+	288	+
HoCP04-838	327		269		295	+	238		277		270		279	
Ho05-961	331		263		306	+	275		302		298	+	296	+

Table 21. Third-stubble stalk weight for eight commercial varieties at six outfield locations in 2012.

	Heavy				Light								
Variety	Allains		Alma		Bon Secour		Brunswick		Glenwood		Lanaux		Mean	
					(lbs.)									
HoCP96-540	1.07		2.05		1.84		2.17		2.28		2.01		1.90	
L99-226	1.79	+	2.12		2.13	+	2.33		2.32		2.12		2.13	+
L99-233	1.22		1.72		1.37	-	1.43	-	1.62	-	1.55	-	1.49	-
HoCP00-950	1.25		1.82		1.48	-	1.70	-	2.00		1.73		1.66	-
L01-283	1.22		1.81		1.54	-	1.74	-	1.85	-	1.56	-	1.62	-
L03-371	1.40	+	1.86		1.42	-	--------		1.78	-	1.98		1.70	-
HoCP04-838	1.26		1.58		1.38	-	1.42	-	1.80	-	1.82		1.54	-
Ho05-961	1.46	+	1.68		1.71		1.66	-	1.82	-	1.64	-	1.66	-

Table 22. Third-stubble stalk number for eight commercial varieties at six outfield locations in 2012.

	Heavy				Light								
Variety	Allains		Alma		Bon Secour		Brunswick		Glenwood		Lanaux		Mean	
					(stalks/A)									
HoCP96-540	35392		31317		23111		29309		30759		34725		30769	
L99-226	21498	-	26966		20356		26982		24372		24428	-	24100	-
L99-233	22251	-	35165		37356	+	38135		36578		37683		34528	
HoCP00-950	23167	-	36733		29659		32391		34710		31950		31435	
L01-283	31265		40342		36743	+	31619		38597		39478		36340	+
L03-371	30963		35164		35500	+	--------		38354		27377	-	33489	
HoCP04-838	27110	-	37728		32127	+	33945		37799		35439		34025	
Ho05-961	22832	-	32522		30210	+	29539		35140		29661		29984	

Table 23. Plantcane means from twelve outfield locations in 2012: Allains, Alma, Bon Secour, Brunswick, F. Martin, Glenwood, Lanaux, Landry, Magnolia, Mary, R. Hebert and St. John.

Variety	Sugar per Acre	Cane Yield	Sugar per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
HoCP96-540	9609	34.6	279	2.50	28346
L99-226	10011	33.5	301 +	2.94 +	23070 -
L99-233	9208	35.7	260 -	1.96 -	37090 +
HoCP00-950	9611	32.6	297 +	2.09 -	31389 +
L01-299	9956	35.6	281	2.26 -	32097 +
L03-371	9095	30.4 -	300 +	2.15 -	28479
HoCP04-838	10004	34.9	289 +	2.26 -	31066 +
Ho05-961	9884	33.7	294 +	2.35	28995
Ho07-613	10102	34.9	290 +	2.42	29125
L08-090	8866 -	30.4 -	292 +	2.40	25803

Table 24. First-stubble means from eleven outfield locations in 2012: Allains, Alma, Bon Secour, Brunswick, F. Martin, Glenwood, Lanaux, Magnolia, Mary, R. Hebert and St. John.

Variety	Sugar per Acre	Cane Yield	Sugar per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
HoCP96-540	9749	32.9	299	2.46	27350
L99-226	9157	30.2 -	307	2.71 +	22488 -
L99-233	8540 -	30.3 -	284 -	1.77 -	34543 +
HoCP00-950	9253	29.9 -	315 +	1.84 -	32504 +
L01-283	9747	32.8	301	1.88 -	35155 +
L01-299	10694 +	36.6 +	296	2.08 -	35361 +
L03-371	8029 -	26.8 -	301	1.86 -	29719
HoCP04-838	9854	33.4	297	1.90 -	35775 +
Ho05-961	9063 -	29.8 -	306	2.06 -	29461
Ho07-613	9082	30.5 -	301	2.10 -	29431

Table 25. Second-stubble means from eleven outfield locations in 2012: Allains, Alma, Bon Secour, Brunswick, F. Martin, Glenwood, Lanaux, Magnolia, Mary, R. Hebert and St. John.

Variety	Sugar per Acre	Cane Yield	Sugar per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
HoCP96-540	8152	28.8	283	2.04	29318
L99-226	7812	26.3 -	298 +	2.20 +	24449 -
L99-233	7336	27.2	273 -	1.63 -	34016 +
HoCP00-950	7734	25.1 -	309 +	1.68 -	30313
L01-283	8500	29.0	293 +	1.72 -	34702 +
L03-371	7576	25.1 -	303 +	1.89	27494
HoCP04-838	7814	27.1	288 +	1.77 -	31146
Ho05-961	7674	26.1 -	294 +	1.87 -	28239

Table 26. Third-stubble means from six outfield locations in 2012: Allains, Alma, Bon Secour, Brunswick, Glenwood and Lanaux.

Variety	Sugar per Acre	Cane Yield	Sugar per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
HoCP96-540	7748	28.9	272	1.90	30769
L99-226	7241	25.5 -	288 +	2.13 +	24100 -
L99-233	6556 -	25.8 -	257 -	1.49 -	34528
HoCP00-950	7704	26.1	301 +	1.66 -	31435
L01-283	8395	29.2	290 +	1.62 -	36340 +
L03-371	8045	28.1	288 +	1.70 -	33489
HoCP04-838	7327	26.6	279	1.54 -	34025
Ho05-961	7339	24.9 -	296 +	1.66 -	29984

Table 27. Combined plantcane means across outfield locations from 2008 to 2012.

Variety	Sugar per Acre	Cane Yield	Sugar per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
HoCP96-540	9609	34.6	279	2.50	28353
L99-226	10011	33.5	301 +	2.94 +	23070 -
L99-233	9209	35.7	260 -	1.96 -	37097 +
HoCP00-950	9611	32.6	297 +	2.09 -	31389 +
L01-299	9956	35.6	281	2.26 -	32097 +
L03-371	9095	30.4 -	300 +	2.15 -	28479
HoCP04-838	10004	34.9	289 +	2.26 -	31066 +
Ho05-961	9884	33.7	294 +	2.35	28995
Ho07-613	10102	34.9	290 +	2.42	29125
L08-090	8866	30.4 -	292 +	2.40	25803

Table 28. Combined first-stubble means across outfield locations from 2009 to 2012.

Variety	Sugar per Acre	Cane Yield	Sugar per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
HoCP96-540	9749	32.9	299	2.46	27350
L99-226	9157	30.2 -	307	2.71 +	22488 -
L99-233	8540 -	30.3 -	284 -	1.77 -	34543 +
HoCP00-950	9253	29.9 -	315 +	1.84 -	32504 +
L01-283	9747	32.8	301	1.88 -	35155 +
L01-299	10694 +	36.6 +	296	2.08 -	35361 +
L03-371	8029 -	26.8 -	301	1.86 -	29719
HoCP04-838	9854	33.4	297	1.90 -	35775 +
Ho05-961	9063 -	29.8 -	306	2.06 -	29461
Ho07-613	9082	30.5 -	301	2.10 -	29431

Table 29. Combined second-stubble means across outfield locations from 2010 to 2012.

Variety	Sugar per Acre	Cane Yield	Sugar per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
HoCP96-540	8152	28.8	283	2.04	29318
L99-226	7812	26.3 -	298 +	2.20 +	24449 -
L99-233	7336	27.2	273 -	1.63 -	34016 +
HoCP00-950	7734	25.1 -	309 +	1.68 -	30313
L01-283	8500	29.0	293 +	1.72 -	34702 +
L03-371	7576	25.1 -	303 +	1.89	27494 -
HoCP04-838	7814	27.1	288	1.77 -	31146
Ho05-961	7674	26.1 -	294 +	1.87 -	28239

Table 30. Combined third-stubble means across outfield locations from 2011 to 2012.

Variety	Sugar per Acre	Cane Yield	Sugar per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
HoCP96-540	7748	28.9	272	1.90	30769
L99-226	7241	25.5 -	288 +	2.13 +	24100 -
L99-233	6556 -	25.8 -	257 -	1.49 -	34528
HoCP00-950	7704	26.1	301 +	1.66 -	31435
L01-283	8395	29.2	290 +	1.62 -	36340 +
L03-371	8045	28.1	288 +	1.70 -	33489
HoCP04-838	7327	26.6	279	1.54 -	34025
Ho-05-961	7339	24.9 -	296 +	1.66 -	29984

SUCROSE LABORATORY AT THE SUGAR RESEARCH STATION

Gert Hawkins, Michael Pontif and Collins Kimbeng
Sugar Research Station

The Sugar Research Station sucrose laboratory processed 2,578 samples during the 2012 harvest season (Table 1). Standard laboratory procedures were used to analyze 863 samples of which 340 were also processed through the Spectracane FT-NIR instrument. The juice was extracted via a Honiron sugarcane hydraulic press. Procedures included the use of Octapol® for clarification, with Brix being measured by refractometer and pol measured by saccharimeter (Autopol 880). The juice was extracted via a three-roller mill for 543 samples. Sucrose percent and theoretical recoverable sugar (lbs/ton of cane) was calculated based on the Brix and pol values. In addition 360 samples including 260 sweet sorghum samples and 100 energy cane samples were analyzed for brix only. The juice was extracted via a three-roller mill. The sucrose laboratory processed samples from August 2012 to March 2013.

A total of 1,335 samples were analyzed using the Spectracane FT-NIR instrument of which 209 where sweet sorghum and 173 energy cane samples. The sample was prepared using a Dedini shredder then fed into the Spectracane unit containing NIR technology to analyze the sample for Brix, pol, fiber, moisture, purity, and theoretical recoverable sugar. Samples that were spectral outliers were automatically sent into a bin and reanalyzed using wet chemistry procedures.

Table 1. Number of sugarcane samples processed at the Sugar Research Station sucrose laboratory during the 2012 harvest season.

Unit/Project Area	Leader	Number of Samples
School of Plant, Environmental, and Soil Sciences	James Griffin	35
	Brenda Tubana	191
	Jim Wang	12
Biological and Agricultural Engineering Dept.	Richard Bengston	6
Iberia Research Station	Sonny Viator	42
Plant Pathology and Crop Physiology	Jeff Hoy	257
Entomology	Gene Reagan	156
LCES	Albert Orgeron	37
LCES (Energy Cane)	Kenneth Gravois	140
LCES (Sugarcane)	Kenneth Gravois	57
Sugar Research Station/Variety Development	Line Trials	454
	Increase	131
	Nursery	370
Contract Services		68
Audubon Sugar Institute (Energy Cane)	Shyue Lu	153
Southeast Research Station (Sweet Sorghum)	Kun-Jun Han	117
Rice Research Station (Sweet Sorghum)	Dustin Harrell	68
Iberia Research Station (Sweet Sorghum)	Sonny Viator	152
Entomology (Sweet Sorghum)	Gene Reagan	132
TOTAL		2578

LAES SUGARCANE TISSUE CULTURE LABORATORY

Q.J.Xie[1], J.L Flynn[1], and K.A.Gravois[2]
[1]Certis USA, LLC and [2]Sugar Research Station

During the 2012-2013 production season, about 18,865 sugarcane plantlets regenerated in the Louisiana Agricultural Experiment Station Sugarcane Tissue Culture Laboratory, were turned over to Certis USA, LLC, Kleentek Div., for transplanting into the greenhouse at Houma. The number of plantlets transplanted for each cultivar are listed in Table one.

Table 1. The number of tissue-culture-derived plantlets of different cultivars transplanted in the greenhouse.

Cultivar	Number of plantlets
HoCP 96-540	2,938
HoCP 04-838	6,120
L 99-226	5,184
L 01-299	3,600
HoCP 07-613	1,023
TOTAL	18,865

THE 2012 LOUISIANA SUGARCANE VARIETY SURVEY

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Each year a sugarcane variety survey is conducted by the county agents in the 22 sugarcane-growing parishes of Louisiana to determine the variety makeup and distribution across the state. There were no parish survey reports from Acadia, Calcasieu, Evangeline, Jeff Davis, or St. Charles parishes. The information presented in this survey was summarized from 17 individual parish reports. According to USDA Farm Service Agency (FSA), there were 427,044 acres planted to sugarcane in Louisiana in 2012. This survey was based on 99.2 percent of the acres reported by USDA-FSA.

Agents in each sugarcane-producing parish collected acreage according to variety and crop. Twelve sugarcane varieties, LCP 85-384, HoCP 85-845, HoCP 96-540, L 97-128, L 99-226, L 99-233, HoCP 00-950, L 01-283, L 01-299, L 03-371, HoCP 04-838, and Ho 05-961 were listed along with “Others” in the survey. The category of others included, but was not limited to, small acreages of CP 89-2143, HoCP 91-555, Ho 95-988 and small increase acreages devoted to the experimental variety Ho 07-613, which was grown on primary seed-cane increase stations. The crop was divided into four categories, which included plant-cane, first-stubble, second-stubble and third-stubble and older crops. Additional information regarding parish acreage was collected as needed from the local and state FSA offices.

Total State Acreage. Actual area surveyed for each parish, region and the statewide total are shown in Table 1. Statewide, the area planted to sugarcane in 2012 was 427,044 acres according to state FSA records. A total of 423,334 acres comprised the sample for the 2012 variety survey. An estimated 399,286 acres were available for harvest for sugar, assuming 6.5% of the total acres were used for seed-cane.

Sugarcane Distribution by Variety. Statewide sugarcane acreage in percent by variety and crop is shown in Table 2. The leading variety for 2012 was HoCP 96-540, which occupied 39% of the Louisiana sugarcane acreage. This was four percentage points less than HoCP 96-540’s acreage in 2011 (Gravois and Legendre, 2012). L 99-226 was next in total acreage as it was planted on 21% of the state’s acreage. The varieties planted in the next largest areas were L 01-283, L 99-233, L 01-299, HoCP 00-950, L 97-128, and L 03-371 with 11%, 9%, 7%, 6%, 2%, and 2%, respectively. All other varieties in the survey had each 1% or less of the planted area for 2012.

Sugarcane Distribution by Region and Crop. The total sugarcane acreage was highest for Teche region (173,377 acres); followed by the River-Bayou Lafourche region (165,022 acres); then the Northern region at 84,935 acres (Table 3). It is interesting to note the increase in sugarcane acreage in Pointe Coupee parish. In 2000, the parish produced sugarcane on 25,479 acres. In 2012, sugarcane was grown on 41,501 acres, making Pointe Coupee the third largest sugarcane producing parish in Louisiana.

In 2012, 10.6% of the state's acreage was grown as third and older stubble crops, which was 3.1 percentage points lower than 2011. The years 2010 and 2011 had successful plantings, and growers kept some acreage devoted to older stubble cane in an effort to take advantage of higher than normal sugar prices; the trend for 2012 was different than the previous two years. In 2012, 32.3% of the state's acreage was in the plant-cane crop, with lower percentages in the first- and second-stubble crops, 30.5 and 26.7%, respectively. In the era of LCP 85-384, the acreage in second- and older-stubble was typically over 50% of the total acreage; now it is only 37.3%.

For the current survey, the Teche region had the greatest percentage of plant-cane (34.2%), with the northern region at 29.2%. The trend in first stubble was just the opposite between these two regions. Second-stubble percentages were similar between the three areas, ranging from 26.3 to 26.9 in 2012. The lower plant-cane percentage in the Northern area could indicate that expansion of sugarcane acres in this area is slowing.

Sugarcane Distribution by Variety and Crop for the Three Regions. HoCP 96-540 continued as the leading variety in all crops (plant-cane through second-stubble crops) for all regions in 2012 (Tables 4-6). For third-stubble and older crops, the northern area had a higher percentage of L 99-226; the other areas were led by HoCP 96-540. HoCP 96-540 led the way in planted acreage with 42%, 35%, and 34% of the plant-cane crop in the Bayou Teche, River-Bayou Lafourche and Northern regions, respectively. The percentages for L 99-226 increased in the plant-cane crop for the three regions as it was planted at 25, 18, and 11%, respectively, in the three regions. The acreage devoted to L 97-128 and L 99-233 decreased as growers discontinued planting these varieties. Although there is some renewed interest in HoCP 85-845 and LCP 85-384 because of excellent stubbling ability, both varieties were planted on less than 1% of the Louisiana acreage.

L 99-233 was planted more widely by growers in the River-Bayou Lafourche region, mainly for its ability to stubble in heavy clay soils. This variety was only planted on 7% and 3% of the Teche and Northern growing regions, respectively, but occupied 14% of the River-Bayou Lafourche region. Growers in the Bayou Teche region increased the planting of L 99-226 more so than its expansion in other growing regions. HoCP 00-950 and L 01-283 were more widely planted in the Northern region compared to the more southerly growing regions. These two varieties are more suited to the better drained sandier soils that provide a less stressful growing environment, plus growers like the early maturity of these varieties.

Variety Trends. HoCP 96-540, released for commercial planting in 2003, now occupies 39% of the state's acreage, which is a decrease of 4 percentage points between 2011 and 2012. This variety performed well in 2012, despite the high levels of brown rust. Rust infections were high HoCP 96-540 in early 2012, primarily in early planted and seed-cane fields. Later the rust moved into stubble fields. A majority of the acres of HoCP 96-540 were treated with fungicide, which provided excellent control and allowed the variety to yield well at harvest.

L 97-128 has served its purpose and acreage devoted to the variety has decreased to 2% of the Louisiana acreage in 2012. This variety is no longer recommended for planting.

L 99-226 increased in acreage by 2 percentage points, with the largest acreage in the Tech growing region. The stubbling ability of L 99-226 allows the variety withstand tough harvesting conditions and some of the more recent cold winters and springs. Its good field yields and excellent sugar recoveries in the factories continued in 2012. L 99-226 is susceptible to brown rust, but had less rust than HoCP 96-540 in 2012. L 99-226 exhibits some resistance to the sugarcane borer and its growth habit makes it competitive with most problem weeds.

L 99-233 decreased in acreage in 2012. Field yields of L 99-233 were not good and the variety does not perform well in drought. Also, the variety does not respond to ripeners, and as expected, its sugar recoveries were not as high as other varieties. L 99-233 is resistant to brown rust, susceptible to smut, and rapidly deteriorates after subfreezing conditions. This variety is no longer recommended for planting.

HoCP 00-950 was released for commercial planting in 2007, and it occupied the same acreage as in 2011 (6% of the acreage). This variety has high sugar per ton of cane and is considered one of the earliest maturing varieties released for commercial planting in Louisiana. HoCP 00-950 does not grow as well in poorly drained areas and seems better suited to the sandier soils in the sugar belt. Some growers have been very pleased with the performance of HoCP 00-950, while others have discontinued its planting.

L 01-283 was released for commercial planting in 2008 with great expectations and it was the variety with the second largest increase in acreage from the previous year (+3 percentage point increase from 2011). It has good yield of tons cane per acre and sugar per ton of cane. L 01-283 is early maturing and is generally erect and well suited to both whole-stalk and combine harvesting systems. Naturally occurring, environmentally induced off-types have been increasing in L 01-283. Growers are cautioned to watch the variety closely before making too rapid of an expansion.

L 01-299 was grown on 7% of the state's acreage. This variety was released in 2009 after superior sugar yields were obtained in all stubble outfield tests. The variety erected itself well

after Hurricane Isaac in 2012 and larger acreages were planted. L 01-299 can have difficulty establishing after planting in sandier soils. The variety can pick up smut and growers are encouraged to monitor seed-cane sources. This variety will likely be widely planted again in 2013.

L 03-371, released in 2010, was modestly expanded in the industry during the 2012 planting season. Outfield testing indicated the variety to have good sugar and cane yields (Dufrene et al., 2012). The variety is moderately susceptible to brown rust. L 03-371 is very susceptible to the sugarcane borer and should not be planted where insecticides cannot be applied.

HoCP 04-838 was released in 2011. This new variety has very good sugar and cane yield potential, with its most notable attribute being cold tolerance. Field yields on limited acreage in 2012 were encouraging. HoCP 04-838 will continue to be expanded more widely in 2013.

Ho 05-961 was released to the Louisiana sugar industry in 2012. Soon after its release, two diseases were found in the variety: s*ugarcane mosaic virus* and orange rust. It was decided that Ho 05-961 would not be distributed to growers from the secondary seed increase farms. Ho 05-961 is not recommended for planting until the disease situation becomes more clear.

The dominance of a single variety can lead to disease and insect shifts as was the case with brown rust and LCP 85-384 and HoCP 96-540 (Hoy, 2005). It has been fortunate that HoCP 96-540 was grown on less than 50% of the state's acreage each year that it has been planted. This has likely extended the life span of HoCP 96-540. With the release of 11 new sugarcane varieties since 2003, growers are encouraged to continue to plant a more balanced mix of varieties.

ACKNOWLEDGMENTS
We acknowledge the assistance of the county agents for conducting the sugarcane variety survey in their parishes. We also thank the sugarcane growers and/or their consultants who took the time and effort to respond to the survey. We also acknowledge the assistance of the USDA-FSA offices in the sugarcane parishes for certified acreage figures.

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Table 1. Total area planted to sugarcane in Louisiana by region and parish, 2012.[1,2]

Bayou Teche		River-Bayou Lafourche		Northern	
Parish	**Acres**	**Parish**	**Acres**	**Parish**	**Acres**
Acadia	NAR	Ascension	19,110	Avoyelles	9,544
Calcasieu	NAR	Assumption	35,366	Evangeline	NAR
Iberia	52,219	Iberville	36,446	Pointe Coupee	41,501
Jeff Davis	NAR	Lafourche	29,133	Rapides	12,396
Lafayette	12,688	St. Charles	NAR	St. Landry	7,175
St. Martin	29,851	St. James	28,554	West Baton Rouge	14,319
St. Mary	47,461	St. John	7,162		
Vermilion	31,158	Terrebonne	9,481		
Total	173,377	Total	165,252	Total	84,935
Total all regions: 423,564					

[1]Acreage based on information obtained in variety surveys from 17 parishes by the county agents in 2012

[2] NAR = No acres reported

Table 2. Estimated statewide sugarcane acreage percentage by variety and crop, all regions, 2012.[1]

Variety	Plant-cane	First-stubble	Second-stubble	Third-stubble and older	Total
	---------------------------------------	-------	-------%	-------	---------------------------------------
LCP 85-384	<1	<1	<1	2	<1
HoCP 85-845	1	<1	1	<1	<1
HoCP 96-540	38	39	41	42	39
L 97-128	1	3	2	6	2
L 99-226	20	17	22	29	21
L 99-233	5	10	13	10	9
HoCP 00-950	4	6	7	6	6
L 01-283	7	16	12	4	11
L 01-299	16	6	1	<1	7
L 03-371	4	1	<1	<1	2
HoCP 04-838	2	1	<1		1
Ho 05-961	<1	<1			<1
Other	1	1	1	2	1
Total acres Percent of total crop	136,593 32.3	128,918 30.5	112,986 26.7	44,838 10.6	423,335

[1] Based on information obtained in variety surveys from 17 parishes by county agents in 2012.

Table 3. Estimated sugarcane distribution by region and crop, 2012.[1]

Crop	Bayou Teche	River-Bayou Lafourche	Northern	State Total
Plant-cane Area (acres) Percent (%)	59,269 34.2	52,528 31.8	24,796 29.2	136,593 32.3
First-stubble Area (acres) Percent (%)	50,284 29.0	50,323 30.5	28,311 33.3	128,918 30.5
Second-stubble Area (acres) Percent (%)	45,646 26.3	44,461 26.9	22,878 26.9	112,986 26.7
Third-stubble and older Area (acres) Percent (%)	18,178 10.5	17,710 10.7	8,950 10.5	44,838 10.6
Total area (acres) Percent (%)	173,377 41.0	165,022 39.0	84,935 20.1	423,334

[1] Based on information obtained in variety surveys from 17 parishes by county agents in 2012.

Table 4. Estimated area planted to sugarcane in percent by variety and crop for the Bayou Teche region, 2012.[1]

Variety	Plant-cane crop (%)	First-stubble crop (%)	Second-stubble crop (%)	Third-stubble crop & older (%)	Total (%)
LCP 85-384	<1	0	0	<1	<1
HoCP 85-845	1	<1	2	0	1
HoCP 96-540	42	39	37	44	40
L 97-128	<1	5	2	4	2
L 99-226	25	25	27	35	27
L 99-233	4	6	12	10	7
HoCP 00-950	6	6	8	2	6
L 01-283	2	7	10	2	5
L 01-299	12	6	8	<1	6
L 03-371	4	2	<1	0	2
HoCP 04-838	4	1	<1	0	2
Ho 05-961	<1	<1	0	0	<1
Others	1	1	1	<1	1
Totals	100	100	100	100	100

[1] Based on information obtained in variety surveys from 5 parishes by county agents in 2012.

Table 5. Estimated area planted to sugarcane in percent by variety and crop for the River/Bayou Lafourche region, 2012.[1]

Variety	Plant-cane crop (%)	First-stubble crop (%)	Second-stubble crop (%)	Third-stubble crop & older (%)	Total (%)
LCP 85-384	<1	<1	<1	<1	<1
HoCP 85-845	1	<1	<1	<1	<1
HoCP 96-540	35	37	43	45	39
L 97-128	2	3	4	11	4
L 99-226	18	14	18	20	17
L 99-233	8	17	18	13	14
HoCP 00-950	2	3	4	4	3
L 01-283	11	19	9	3	12
L 01-299	16	5	1	<1	7
L 03-371	3	1	<1	<1	1
HoCP 04-838	1	<1	<1	0	1
Ho 05-961	<1	<1	0	0	<1
Others	1	1	1	3	2
Totals	100	100	100	100	100

[1] Based on information obtained in variety surveys from 7 parishes by county agents in 2012.

Table 6. Estimated area planted to sugarcane in percent by variety and crop for the Northern region, 2012[1]

Variety	Plant-cane crop (%)	First-stubble crop (%)	Second-stubble crop (%)	Third-stubble crop & older (%)	Total (%)
LCP 85-384	0	1	1	0	<1
HoCP 85-845	0	0	0	0	0
HoCP 96-540	34	39	44	33	38
L 97-128	<1	<1	<1	1	<1
L 99-226	11	7	19	37	14
L 99-233	2	5	3	2	3
HoCP 00-950	5	13	10	19	10
L 01-283	12	27	21	8	19
L 01-299	28	6	1	<1	10
L 03-371	7	1	<1	0	2
HoCP 04-838	1	<1	0	0	<1
Ho 05-961	<1	<1	0	0	<1
Others	<1	<1	1	<1	<1
Totals	100	100	100	100	100

[1] Based on information obtained in variety surveys from 5 parishes by county agents in 2012.

Table 7. Louisiana sugarcane variety trends, by variety and years, all regions, 2008-2012[1]

	Area planted to sugarcane by variety and years (%)					
Variety	**2008**	**2009**	**2010**	**2011**	**2012**	**1 yr. Change**
LCP 85-384	22	6	1	<1	<1	0
HoCP 85-845	1	<1	1	1	<1	-1
HoCP 96-540	44	50	48	43	39	-4
L 97-128	17	17	11	6	2	-4
L 99-226	5	11	17	19	21	+2
L 99-233	2	6	10	11	9	-2
HoCP 00-950	1	2	4	6	6	0
L 01-283	<1	<1	4	8	11	+3
L 01-299		<1	1	3	7	+4
L 03-371			<1	1	2	+1
HoCP 04-838				<1	1	+1
Ho 05-961					<1	+1
Others	1	2	1	<1	1	-1
Totals	100	100	100	100	100	

[1] Based on annual variety surveys from 17 parishes by county agents, 2008-2012.

YIELD AND FIBER CONTENT OF HIGH-FIBER SUGARCANE CLONES

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In 2008, the LSU AgCenter partnered with Mississippi State University to evaluate high-fiber sugarcane clones (energycane). Dr. Brian Baldwin of Mississippi State University is the coordinator of the Sun Grant proposal: "Regional Biomass Feedstock – Herbaceous Bioenergy Crop Field Trial". These trials are located across the southeastern U.S. with one located at the LSU AgCenter's Sugar Research Station at St. Gabriel, LA.

A yield trial was planted on September 18, 2008 at the Sugar Research Station in St. Gabriel, Louisiana. Seed-cane of five varieties was obtained at the USDA-ARS Sugarcane Research Unit's Ardoyne Farm, and a randomized complete block (four replications) experiment was planted.

Standard cultural practices were followed during the 2009, 2010, 2011, and 2012 growing seasons. The field trial was harvested on December 16, 2009 for the plant-cane crop; December 2, 2010 for the first stubble crop; December 15, 2011 for the second stubble crop; December 19, 2012 for the third stubble crop. Plots were combine-harvested and weighed to determine cane yield (tons/acre). A 10-stalk sample was hand-cut out of each plot for a quality analysis. Each sample was then sent to the laboratory to determine Brix by refractometer and pol (Z°) by saccharimeter. Fiber content was determined by the pre-breaker press method (Gravois and Milligan, 1992).

Data were analyzed with SAS (v9.3) software. Replication was considered a random effect; variety was considered a fixed effect. Least square means were estimated and tested for statistical significance (P=0.05) with the PDIFF option of PROC MIXED.

Gravois, K.A. and S.B. Milligan. 1992. Genetic relationships between fiber and sugarcane yield components. Crop Sci. 32:62-67.

Table 1. Plant-cane data obtained from an energycane field trial conducted at the Sugar Research Station in St. Gabriel, Louisiana in 2009.

Variety	Cane Yield		Brix		Fiber Content		Insoluble Solids (Fiber) Weight		Brix Weight	
	tons/ac		%		%		tons/ac		tons/ac	
Ho 02-144	30.5	B	12.5	A	20.6	B	6.27	C	3.86	AB
Ho 02-147	44.2	A	10.7	B	17.8	C	7.87	AB	4.72	A
Ho 06-9001	28.9	B	10.7	B	26.4	A	7.58	ABC	3.10	BC
Ho 06-9002	25.5	B	10.1	BC	25.3	A	6.44	BC	2.56	C
HoCP 72-114	42.8	A	9.2	C	20.7	B	8.84	A	3.96	AB

Table 2. First-stubble data obtained from an energycane field trial conducted at the Sugar Research Station in St. Gabriel, Louisiana in 2010.

Variety	Cane Yield		Brix		Fiber Content		Insoluble Solids (Fiber) Weight		Brix Weight		Moisture Content	
	tons/ac		%		%		tons/ac		tons/ac		%	
Ho 02-144	25.0	C	16.6	A	25.9	B	6.49	D	4.16	C	61.8	C
Ho 02-147	47.0	A	16.9	A	19.5	D	9.15	A	7.94	A	66.9	A
Ho 06-9001	26.0	C	14.1	C	29.7	A	7.70	BC	3.67	C	60.4	D
Ho 06-9002	24.4	C	14.5	BC	29.6	A	7.22	CD	3.54	C	60.2	D
HoCP 72-114	35.8	B	15.1	B	24.0	C	8.58	AB	5.40	B	64.5	B

Table 3. Second-stubble data obtained from an energycane field trial conducted at the Sugar Research Station in St. Gabriel, Louisiana in 2011.

Variety	Cane Yield		Brix		Fiber Content		Insoluble Solids (Fiber) Weight		Brix Weight		Moisture Content	
	tons/ac		%		%		tons/ac		tons/ac		%	
Ho 02-144	55.3	A	15.6	A	23.6	B	12.95	B	8.62	B	64.5	BC
Ho 02-147	72.4	B	16.0	A	18.4	D	13.21	AB	11.47	A	68.6	A
Ho 06-9001	57.2	A	13.5	BC	28.7	A	16.41	A	7.71	B	61.7	C
Ho 06-9002	50.7	A	12.8	C	28.3	A	14.41	AB	6.50	B	62.6	C
HoCP 72-114	57.1	A	14.4	B	22.6	C	12.39	B	8.22	B	66.2	AB

Table 4. Third-stubble data obtained from an energycane field trial conducted at the Sugar Research Station in St. Gabriel, Louisiana in 2012.

Variety	Cane Yield		Brix		Fiber Content		Insoluble Solids (Fiber) Weight		Brix Weight		Moisture Content	
	tons/ac		%		%		tons/ac		tons/ac		%	
Ho 02-144	34.6	B	17.1	AB	23.2	AB	7.99	AB	5.90	B	63.7	B
Ho 02-147	49.7	A	17.9	A	19.6	C	9.74	A	8.89	A	66.0	AB
Ho 06-9001	27.3	C	15.4	BC	24.8	A	6.85	B	4.13	C	63.6	B
Ho 06-9002	28.0	C	14.7	C	25.7	A	7.24	B	4.13	C	63.3	B
HoCP 72-114	39.4	B	13.7	C	21.5	BC	8.46	AB	5.40	B	67.8	A

IDENTIFICATION OF COLD-RESPONSIVE GENES TOWARD DEVELOPMENT OF FUNCTIONAL MARKERS FOR BREEDING COLD TOLERANCE IN SUGARCANE

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Abstract
Breeding for cold tolerance in sugarcane will allow its cultivation as a dedicated biomass crop in cold environments. Development of functional markers to facilitate marker-assisted breeding requires identification of cold stress tolerance genes. Using suppression subtractive hybridization, 465 cold-responsive genes were isolated from the cold-tolerant energycane Ho02-144. Predicted gene interactions network indicated several associated pathways that may coordinately regulate cold tolerance responses in energycane. Expression analysis of a select set of genes, representing signaling and transcription factors, genes involved in polyamine and antioxidant biosynthesis, protein degradation and in the repair of damaged proteins in the cytosol, showed their time-dependent regulation under cold-stress. Comparative expression profiles of these genes between Ho02-144 and a cold-sensitive clone (L79-1002) showed that almost all genes were induced immediately upon imposition of cold stress and maintained their expression in Ho02-144 whereas they were either downregulated or their upregulation was very low in L79-1002. Simple sequence repeat markers derived from 260 cold-responsive genes showed allelic diversity among the cold-sensitive commercial hybrids that were distinct from the *Saccharum spontaneum* clones. Future efforts will target sequence polymorphism information of these genes in our ongoing QTL and association mapping studies to identify functional markers associated with cold tolerance in sugar/energycane.

Introduction

Sugarcane, a significant component of the economy in many countries in the tropics and subtropics as a sugar source, is also considered as a promising source of ligno-cellulose for ethanol production because of its high biomass production per unit area. Sugarcane grows well in the tropics or in subtropical areas where the climate is moderated by surrounding water masses; the optimum temperature for its growth is about 35 °C. Any temperature near freezing (chilling temperature) is cold enough to produce crop injury or to suppress growth and yield by affecting the developmental and physiological processes. There is little plant growth at temperatures as high as 20 °C and there may be tissue injury at temperatures below 15 °C [1]. This is because most sugarcane clones have not developed strategies to avoid the devastating consequences of cold, and because selection of commercial germplasm is being maximized for sucrose genes, which are mostly derived from the cold-sensitive *S. officinarum* genome. Nevertheless, sugarcane clones vary in their sensitivity to cold with a few hybrids, such as HoCP04-838 possesses increased tolerance to cold stress. For example, unselected F_1 populations of cultivar x

S. spontaneum crosses had adequate levels of freeze tolerance, but in the subsequent backcross breeding, the cold tolerance trait disappeared [6] due to heavy selection on sugar content. Because *S. spontaneum* is well adapted to harsh climatic conditions, its germplasm is being increasingly introgressed recently into breeding lines of Louisiana and elsewhere with an aim to transfer genes for cold-tolerance into sugarcane [2].

Identification of the genes/alleles for cold tolerance will have a great potential in sugarcane breeding programs. Several molecular approaches, such as suppression subtractive hybridization, SSH, cDNA microarrays, qRT-PCR and SUCEST data mining have been used to identify and study the expression of the genes in response to cold and water deficit stress. Nogueira et al. [3], using a high-density filter arrays containing sugarcane ESTs, identified 33 genes that were induced by low temperature (4 °C) stress. RNA gel-blot analysis identified SsNAC23, out of 26 non-redundant genes encoding NAC domain proteins, to be strongly induced by chilling stress in sugarcane, in addition to water stress and herbivory [4]. All of these studies used commercial sugarcanes that were bred for sugar. The present investigation is a first report where a cold-tolerant energycane clone was used to mine cold-regulated genes with a long term goal of developing functional markers to facilitate breeding of cold tolerant sugarcane cultivars that would extend their growing period and allow their cultivation in northern Louisiana.

Material and methods

Plant material, cold treatment, and physiological analysis

Two early generation clones, L79-1002 (cold sensitive; released by USDA-ARS, Houma, LA) and Ho02-144 (a cold tolerant energycane candidate), were used in this study. One month-old greenhouse maintained first-stubble plants were exposed to a temperature of 0 °C for a week at inside a growth chamber (Shel Lab, Cornelius, OR) maintained at 14 h day/10 h night cycle. Young fully expanded leaf samples were harvested in liquid nitrogen from both clones at different time intervals 0 h (control), 24 h, 48 h, 72 h, and 1 wk after cold stress and stored at -80 °C for RNA isolation.

Chlorophyll and cell membrane stability analysis

Total chlorophyll content was extracted from one fully expanded leaf per plant (three plants each of control and cold-stressed plants) of L79-1002 and Ho02-144 with 80 % acetone twice. The chlorophyll a and b content were measured spectrophotometrically following the method described by Baisakh et al. [5] to determine the extent of bleaching and chlorophyll loss.

The membrane stability index (MSI) was determined from leaf samples (100 mg) of control and cold-stressed plants according to Sairam et al. [6].

RNA isolation and cDNA subtraction

Seven µg of RNA extracted at four different time points of the cold stressed Ho02-144 were pooled for cDNA synthesis. cDNA subtraction was performed using the PCR-select cDNA subtraction kit (Clontech, Palo Alto, CA) following manufacturer's instructions except that double strand cDNA was synthesized from 20 µg of control and cold stressed RNA using the Superscript™ double-strand cDNA synthesis kit (Invitrogen, Carlsbad, CA).

Annealing control primer (ACP)-based cDNA synthesis and gene fishing

First-strand cDNA was synthesized from 3 µg of the RNA of cold-stressed (pooled over 24 h, 48 h, 72 h, and 1 wk) and control leaf tissue of tolerant (Ho02-144) and sensitive (L79-1002) clones using a Gene Fishing DEG premix kit (Seegene, Rockville, MD) according to the manufacturer's instructions with minor modification as described earlier [7,8].

Cloning and sequencing of differentially expressed genes

The subtracted cDNA and the ACP-generated DEGs were cloned into pGEM-T Easy Vector (Promega, Madison, WI) and transformed into *Escherichia coli* DH5α cells following the method described by Ramanarao et al. [7].

Sequence processing and bioinformatics analysis

The vector sequences and the poly(A) tail were cleaned from the sequences using an in-house PERL script. The clean sequences, after excluding the exactly duplicated sequences, were assembled using the CAP3 program with default parameter settings [9]. The resulting unigenes (contigs and singlets) were functionally annotated through BLASTx and BLASTn-based [10] homology search against NCBI protein and nucleotide database (http://www.ncbi.nlm.nih.gov/). The sequences were also BLASTn-searched against sugarcane EST database (SoGI). Sequence match results with significant hits, i.e. exceeding 50 nucleotides and more than 90 % identity, were considered significant, extracted and parsed using in-house PERL script and MySQL database for subsequent analysis. The sugarcane unigenes were mapped against the sorghum genome based on BLASTn output at 1e-05 and 60 % sequence identity. The syntenic regions were depicted in the sorghum circular karyotype map.

The metabolic functions of the unigenes were determined and the gene ontology (GO) IDs of the unigenes were retrieved from the amigo database for biological process, molecular function, and cellular component associated with significant BLASTx hits. An interaction network among the cold responsive sugarcane unigenes was predicted with the homologous rice genes.

Transcript profiling of differentially expressed genes

The expression pattern of 23 expressed sequence tags (ESTs), identified by cDNA subtraction and ACP, was validated by semi-quantitative and quantitative reverse transcription polymerase chain reaction (sq/qRT-PCR) following the method described earlier [5]. Gene-specific primers (Supplementary Table 1) were designed using Primer3Plus web resource (http://www.bioinformatics.nl/cgi-bin/primer3plus/primer3plus.cgi) and were synthesized by Integrated DNA technologies (IDT Inc, Coralville, IA).

The relative abundance of the genes was determined using qRT-PCR in a MyiQ real-time PCR analysis system (Bio-Rad, Hercules, CA) as per Baisakh et al. [5]. The mRNA expression was normalized against the *S. officinarum* elongation factor (*SoEF1α*; GenBank Acc. # EF581011) and calculated as ratio using the $2^{-\Delta\Delta Ct}$ method [11]. The absolute fold-change values of the relative mRNA abundance of the genes were used for heat map analysis and visualization using MayDay 2.13 (http://www-ps.informatik.uni-tuebingen.de/mayday/wp).

Mining cold-responsive ESTs for microsatellite markers

The 465 cold-responsive unigenes and their matches from SoGI were searched for the

presence of simple sequence repeat (SSR) motifs and primers flanking the SSR motifs were designed as described earlier [12].

Genetic diversity of Louisiana sugarcane cultivars using cold responsive gene-derived SSR markers

Seventy clones (Table 1) comprising of 48 Louisiana sugarcane commercial hybrids, five energycane clones, two *Saccharum officinarum* and 15 *S. spontaneum* clones were genotyped with 12 cold responsive gene-derived SSR primers derived from cold responsive ESTs. Two ng of genomic DNA was used as the template in PCR reactions in a final volume of 10 µl containing 1x PCR buffer, 2.5 mM $MgCl_2$, 0.2 µM dNTP mix, 0.4 unit of *Taq* DNA polymerase (Promega, Madison, WI) and 0.75 µM of each primer. PCR products were resolved in a 6.5% polyacrylamide gel at 1500 V for 3 hours and detected using a Li-COR Model 4300 DNA analyzer (Li-COR Biosciences, Lincoln, NE). The M13-tailed forward primers were fluorescence labeled (IRDye700 or IRDye800; IDT Inc, Coralville, IA) for multiplexing as described earlier [13]. The scoring of the gels and data analysis was done following the method described by Suman et al. [13].

Table 1. List of the *Saccharum* spp. used for genetic diversity with EST-SSRs.

Clone #	Clone ID	Species
1	CP52-068	*Saccharum* hybrids
2	CP72-0370	*Saccharum* hybrids
3	CP74-0383	*Saccharum* hybrids
4	CP77-0405	*Saccharum* hybrids
5	CP77-0407	*Saccharum* hybrids
6	CP79-0318	*Saccharum* hybrids
7	CP79-0348	*Saccharum* hybrids
8	CP83-0644	*Saccharum* hybrids
9	CP85-0830	*Saccharum* hybrids
10	Ho89-889	*Saccharum* hybrids
11	Ho95-988	*Saccharum* hybrids
12	HoCP00-930	*Saccharum* hybrids
13	HoCP00-950	*Saccharum* hybrids
14	HoCP02-610	*Saccharum* hybrids
15	HoCP02-618	*Saccharum* hybrids
16	HoCP04-838	*Saccharum* hybrids
17	HoCP05-961	*Saccharum* hybrids
18	HoCP85-845	*Saccharum* hybrids
19	HoCP89-846	*Saccharum* hybrids
20	HoCP96-540	*Saccharum* hybrids
21	L01-281	*Saccharum* hybrids
22	L01-283	*Saccharum* hybrids
23	L01-299	*Saccharum* hybrids
24	L03-371	*Saccharum* hybrids
25	L05-466	*Saccharum* hybrids
26	L06-001	*Saccharum* hybrids

Table 1. Continue

Clone #	Clone ID	Species
27	L07-057	*Saccharum* hybrids
28	L07-068	*Saccharum* hybrids
29	L09-105	*Saccharum* hybrids
30	L09-118	*Saccharum* hybrids
31	L94-426	*Saccharum* hybrids
32	L94-432	*Saccharum* hybrids
33	L97-128	*Saccharum* hybrids
34	L98-207	*Saccharum* hybrids
35	L98-209	*Saccharum* hybrids
36	L99-226	*Saccharum* hybrids
37	L99-233	*Saccharum* hybrids
38	LCP81-010	*Saccharum* hybrids
39	LCP81-030	*Saccharum* hybrids
40	LCP82-089	*Saccharum* hybrids
41	LCP85-376	*Saccharum* hybrids
42	LCP85-384	*Saccharum* hybrids
43	LCP86-454	*Saccharum* hybrids
44	N27	*Saccharum* hybrids
45	NCo310	*Saccharum* hybrids
46	TucCP77-042	*Saccharum* hybrids
47	US01-040	*Saccharum* hybrids
48	US79-010	*Saccharum* hybrids
49	LA Stripe	*S. officinarum*
50	Badila	*S. officinarum*
51	S6684A	*S. spontaneum*
52	MPTH97-107	*S. spontaneum*
53	MPTH97-213	*S. spontaneum*
54	MOL1032	*S. spontaneum*
55	MPTH97-204	*S. spontaneum*
56	IMP9068	*S. spontaneum*
57	Coimbatore	*S. spontaneum*
58	US56-15-8	*S. spontaneum*
59	SH249	*S. spontaneum*
60	SES323A	*S. spontaneum*
61	SES205A	*S. spontaneum*
62	SES147B	*S. spontaneum*
63	IND81-161	*S. spontaneum*
64	Guangxi8721	*S. spontaneum*
65	H002-113	*Saccharum* hybrids (Energycane)
66	Ho02-144	*Saccharum* hybrids (Energycane)
67	Ho02-147	*Saccharum* hybrids (Energycane)

Table 1. Continue

Clone #	Clone ID	Species
68	SES234BF1	*Saccharum* hybrids
69	L79-1002	*Saccharum* hybrids (Energycane)
70	Tainan	*S. spontaneum*

Results and Discussion

The effect of cold stress was apparent in the cold sensitive (L79-1002) clone with respect to the loss of chlorophyll. After one week under 0 °C the chlorophyll in the sensitive clone was reduced by 37% while there was only 11% reduction in the tolerant clone Ho02-144. The membrane stability index (MSI) of Ho02-144 was reduced by 30% (60 to 42), whereas it was 63% (56 to 21) in L79-1002 after a week of exposure to cold stress. Upon transfer of the plants after a week of cold stress to the greenhouse, Ho02-144 produced new tillers after two weeks and grew normally but the sensitive clone did not produce any new tillers and showed stunted growth inside the greenhouse. The leaves and stems of the sensitive clone withered with time leading to the death of the plant.

Annotation of cold-responsive unigenes

A total of 650 clones with insert size >200 bp were selected for plasmid extraction and sequencing. Six hundred and eighteen ESTs produced quality sequences from which twelve ESTs with insert length <50 bp were excluded. Further, six of the 606 ESTs were exact duplicates, which were also excluded from further analysis. Assembly of these 600 with insert size ranging from 56 to 848 bp (mean length = 595 bp) resulted in 58 contigs and 407 singlets, which translated to 465 unigenes. The longest unigene was 1546 nt. Blast search with NCBI protein and nucleotide database assigned putative functions to 426 unigenes and 39 did not have any hit, which represent sequences in the untranslated regions, non-coding RNAs or sequences specific to sugarcane. Confirmation of sugarcane sequence similarity to sorghum was established by significant similarity of 341 unigenes to sorghum gene indices distributed over the 10 sorghum chromosomes.

Pathway analysis of the cold-responsive unigenes revealed that 145 ESTs were involved in diverse metabolic pathways. Most of the pathways were involved in the metabolism and biosynthetic processes; maximum numbers of ESTs were involved in amino acid metabolism. Twenty four and 23 ESTs were involved in arginine and proline, and cysteine and methionine metabolism, respectively. GO analysis of the ESTs showed that the GOslim terms for biological process, molecular function and cellular component were assigned to 39.3 %, 36 % and 24.69 % of the ESTs, respectively. GO enrichment analysis indicated that most ESTs had catalytic activity under cellular and biosynthetic processes and were represented mostly in the plastid. Maximum number of ESTs belonged to transcription factor category involved in nucleotide binding activity. The results obtained with pathway analysis and GOslim terms assignments were concurrent to each other and represent the diversity of the expressed genes of sugarcane under cold stress.

Network analysis

Two hundred sixteen cold-responsive unigenes were used for construction of a gene network.

The gene interaction network established with 70 genes after removing ribosomal genes and elongation factors, uncovered several associated pathways that may regulate and coordinate complex genomic responses and control cold tolerance in energycane. Further, genes were clustered into 11 classes within the resulting network based on their biological function: kinases regulating cell signaling, protein/nucleic acid binding regulatory transcription factors, genes involved in abiotic stress response, carbohydrate and protein metabolism, plant development, photosynthetic reactions, transport functions and vitamin biosynthesis, in addition to proteins of unknown functions. Different clusters of genes with specific functions interacting with each other suggested their role in diverse biological processes in energycane.

Temporal expression of cold-responsive genes in tolerant and sensitive cultivars under cold stress

Expression pattern of twenty four ESTs representing members of different biosynthetic pathways, transcription factors and signaling genes (Fig. 1) were analyzed at different time points in the cold tolerant cv. Ho02-144 and sensitive cv. L79-1002 by (semi)quantitative RT-PCR. A general trend was observed with respect to the expression of all the selected genes under cold stress in the tolerant clone Ho02-144 (Fig. 1a, b).

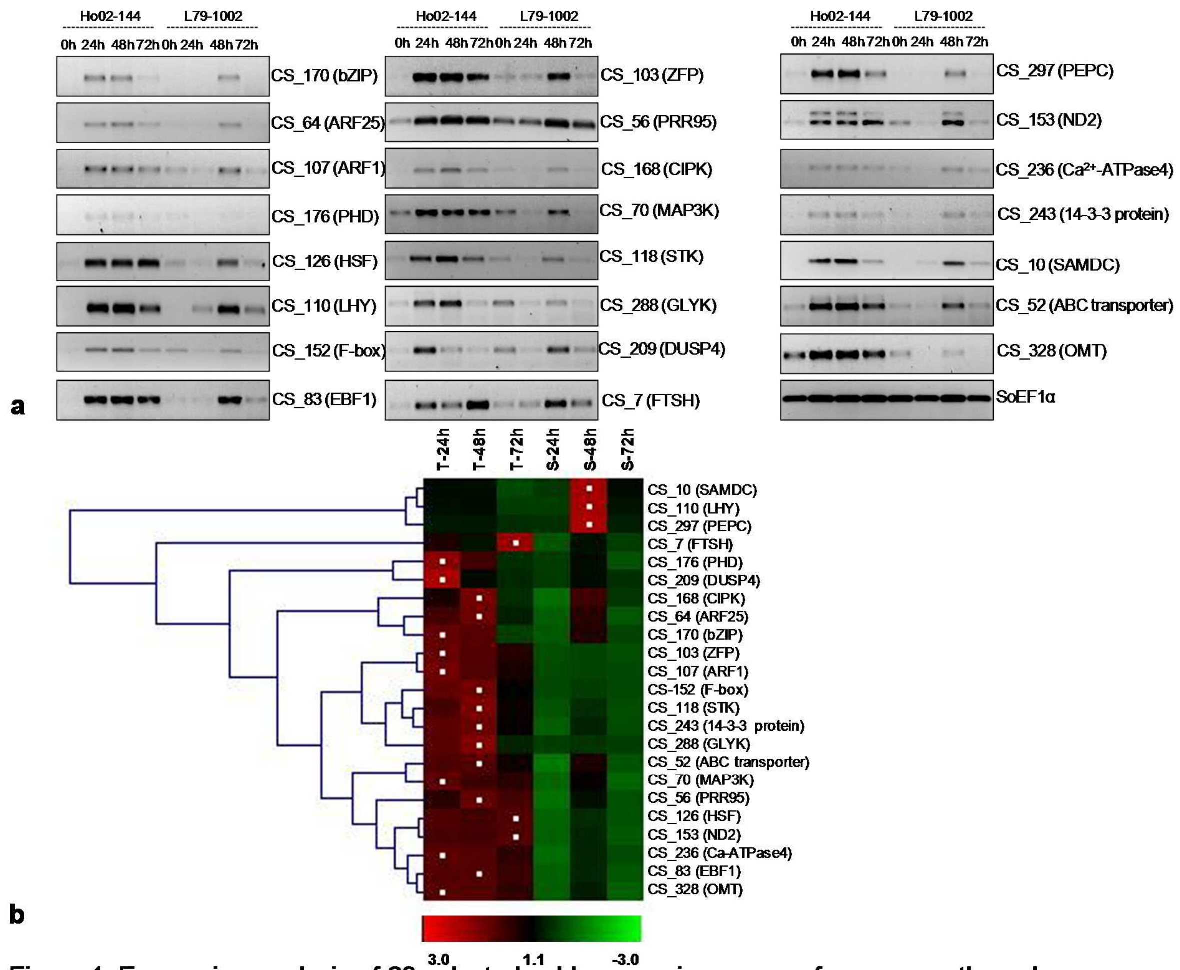

Figure 1. Expression analysis of 23 selected cold-responsive genes of sugarcane through semiquantitative (a) and quantitative (b) reverse-transcription PCR.

Genes in the tolerant clone responded early to cold stress with higher accumulation of their transcripts within 24 h of stress compared to the control. High expression level was maintained through 72 h in most of the genes except for a few transcription factors such as PHD (plant homeodomain transcription factor,CS_176) and DUSP4 (dual specificity phosphatase 4,CS_209). The highest expression of majority of the genes was observed either after 24 h or 72 h of exposure to 0 °C in tolerant clone whereas it was at 48 h in the sensitive clone. Interestingly, three ESTs, CS_83, CS_103, and CS_107 representing transcription factor genes, ethylene binding factor (EBF), zinc finger protein (ZFP), and auxin responsive factor (ARF), respectively showed the highest accumulation of their transcript under cold in the tolerant clone, especially after 24 h. All of the transcription factors selected for the expression analysis showed upregulation under cold stress in the tolerant clone. Abiotic stress affects cellular activities by damaging important proteins. Protein degrading machinery was also activated in the tolerant clone of energycane as a survival to cold stress. The upregulation of EIN3-binding F-box protein under cold stress, as observed in the present study, suggested that it was targeting the proteins involved in ethylene response pathways for degradation by 26S proteasome. Up-regulation of EIN3-F box protein (Ore9) promoted degradation of EIN3 and thus delayed senescence under cold stress [14]. Similarly, diverse classes of kinases and phosphatases, which played important role from sensing the stress to initiation of the responses, were found to be activated under cold stress.

The ESTs, CS_7, CS_126, and CS_153 coding for ATP-dependent zinc metalloprotease (FTSH), heat shock factor (HSF), and NADH subunit 2 (ND2), respectively showed gradual increase in their transcript accumulation with highest level at 72 h of cold stress (Fig. 1). Cold stress is known to reduce the photosynthesis efficacy of plants [15], which was also evident from the loss of chlorophyll in the leaves of the sensitive clone. Increased protein degradation and misfolding during cold stress may have increased the demand of FtSH protease in the tolerant clone to enable it to maintain the protease activity to protect the photosystem and chloroplast biogenesis from stress-induced damage [16]. The expression of HSF was consistently high at all time points in Ho02-144. On the other hand, the transcripts of almost all these genes were detectable to a varying degree in the sensitive clone under control condition, but were downregulated at 24 h after cold stress. However, a majority of the genes showed upregulation in their expression after 48 h of cold stress; however, the fold change in their transcript accumulation was much lower than those of the tolerant clone.

A transcript coding for S-adenosylmethionine decarboxylase (SAMDC) was highly accumulated under cold stress, which indicated that polyamines play pivotal roles in cold stress response of sugarcane. Although the exact molecular mechanism of their role in cold stress tolerance is still elusive, it is suggested that polyamines add stability to cellular function under stress by binding to membrane, cellular compartments, and other proteins. Similarly, proteins involved in Krebs cycle and glucose and fructose metabolism were also highly induced under cold stress. These included phosphoenolpyruvate carboxylase (PEPC), NADP dehydrogenase subunit 2 (ND2) and D-glycerate 3-kinase (GLYK). Increased expression of PEPC and other photosynthesis genes was observed *Miscanthus giganteus* in comparison to maize under low temperature conditions [17]. An ABC transporter gene (TUR2) and OMT genes were induced by cold stress in an aquatic plant *Spirodela polyrriza* [18] and rice [19], respectively. Similarly,

Ca^{2+}-ATPase that acts as an antiporter catalyzing the active transport of Ca^{2+} from cytosol to intracellular organelle or apoplast has been implicated in cold stress response in the plants [20].

Differential expression patterns of the genes, representing different levels of stress cascade i.e., perception, relay and response, between the tolerant and sensitive clones indicated their possible role in cold stress tolerance mechanism.

Molecular markers development based on sugarcane ESTs

One hundred seventy nine cold responsive ESTs were identified to contain SSR motifs; 124 ESTs were with perfect SSRs (with single motif repeats) and eight were complex with two or more SSRs separated by ≤ 100 bp). Among the SSR motifs, trinucelotide repeats were the highest (164) followed by tetra (15), di (7), hexa (4) and penta (1). Among the trinucleotide motifs, TGC/GCA type was with highest occurrence followed by AGA/TCT and AAG/CTT in that order (Fig. 2). The eSSRs derived from eleven unigenes were used to genotype 48 sugarcane clones along with their progenitors.

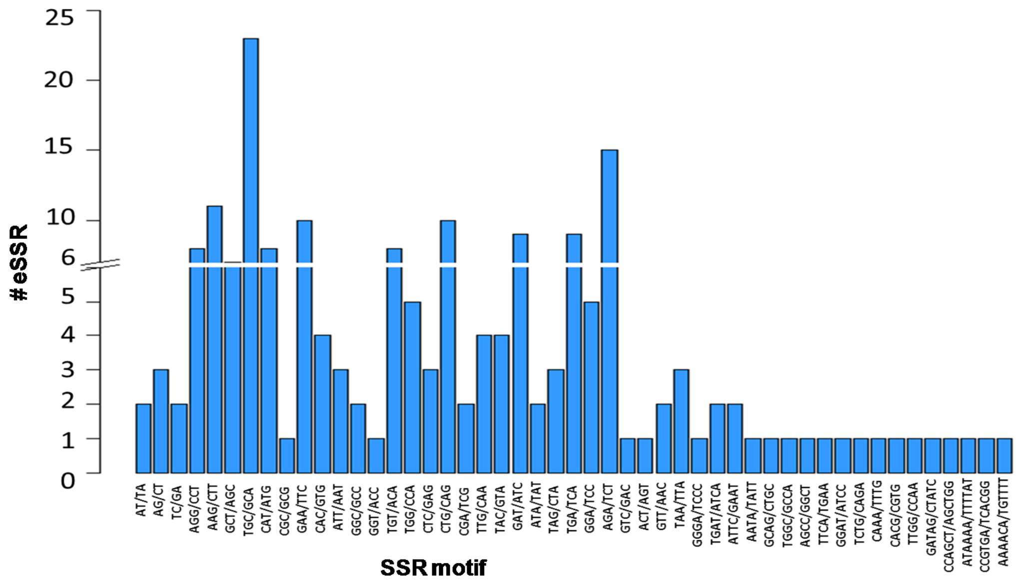

Figure 2. Distribution of SSR motifs in the cold-responsive genes of Ho02-144

eSSR-based genetic diversity among sugarcane clones

Twelve eSSRs generated 170 polymorphic alleles among 70 clones used for genotyping. The average genetic similarity (GS) based on Jaccard's coefficient among the 70 clones was 0.40, with the lowest pairwise genetic similarity value of 0.07 {between Spont57 (*S. spontaneum, Coimbatore*) and hybrid clone 25 (L05-466), Spon57 and Offi50 (*S. officinarum, Badila*)} and the highest value of 0.74, between hybrid clones 34 (L98-207) and 42 (LCP85-384). High GS values were observed among commercial sugarcane clones (Fig. 3).

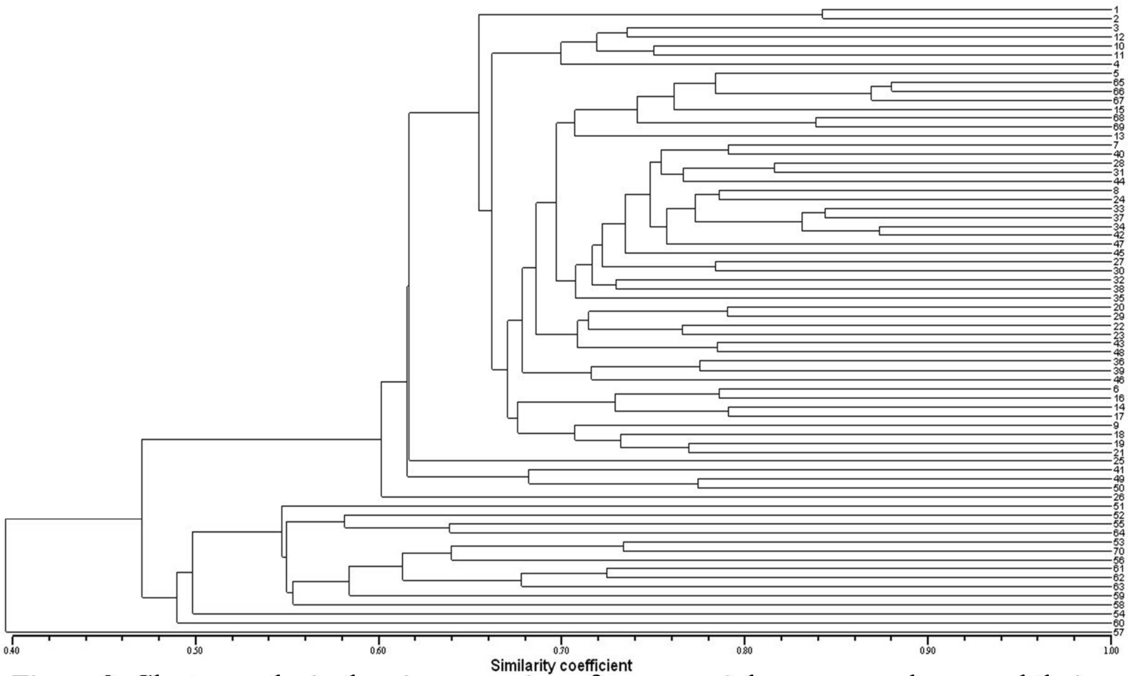

Figure 3. Cluster analysis showing grouping of commercial sugarcane clones and their progenitors *Saccharum officinarum* and *S. spontaneum* clones (see Table 1 for the clone ID) discriminated by the SSR markers derived from cold-responsive genes

Genetic diversity among the sugarcane genotypes were analyzed by both cluster analysis-based on UPGMA and principal coordinate analysis (PCoA). At 0.23 GS coefficient, the 70 clones were grouped into two main clusters: Cluster I included the 53 sugarcane hybrids and two *S. officinarum* genotypes; and Cluster II comprised of the 15 wild *S. spontaneum* genotypes (Fig. 6). A large genetic diversity existed between the cultivated clones and their ancestral parents. In general, the *S. spontaneum* clones were the most divergent in comparison to the commercial hybrids. For example, at 0.74 similarity coefficient, all the sugarcane clones can be distinguished from each other except clone 34 (L98-207) and clone 42 (LCP85-384) whereas the *S. spontaneum* clones could be distinguished from each other at ~0.50 GS. Principal coordinate analysis (PCoA) also supported the UPGMA cluster analysis where the polymorphic ESSR markers could clearly separate all the ancestral *S. spontaneum* clones from the cultivated sugarcane clones that also included the two clones of *S. officinarum* (Fig. 3). Three coordinates cumulatively explained 27.8 % of the total variation (coordinate 1, 2, 3 explaining 23.7 %, 1.4 % and 2.7 %, respectively), which further validated the robustness of the clustering pattern.

Because eSSRs are derived from the transcripts with a putative function, they are useful for functional diversity assay in natural populations or germplasm collections. The eSSRs derived from the sugarcane genes also had high sequence similarity with sorghum, so these can be used as anchor markers for comparative mapping and could prove useful for marker-assisted selection. Moreover, their cross transferability across different species have facilitated us tracking of the ancestral *Saccharum* species-specific alleles in the commercial sugarcane hybrids. In the present study, ninety-two percent of the eSSRs showed higher polymorphism among the

sugarcane clones than previously reported studies with the genic SSR markers of sugarcane [21], which could be due to high rate of replication slippage by large allelic diversity among and within the parental clones used to produce the commercial hybrids. *S. spontaneum* showed the most diversity, which further conformed to our earlier reported results [13]. On the other hand, genetic similarity value was higher among sugarcane hybrids, which indicated that only a few parental clones were involved in the development of the foundation clones through nobilization in breeding programs [22]. The eSSRs from cold-responsive genes differentiated *S. officinarum* and *S. spontaneum* with only 7 % similarity to each other, which was clearly evident from the cluster analysis results. Grouping of the commercial hybrids with *S. officinarum* in Cluster I was expected because most of the modern cultivars inherited the major part of the genome of *S. officinarum* during nobilization events. Similar results were also reported earlier from our lab with the use of gene-based TRAP markers [13]. Thus genic markers seem to be useful to assess genetic diversity and discriminate between different species of sugarcane. However, the conserved sequences of the transcribed regions within the same genus accounted to low (0.20) average polymorphic information content (PIC) of the eSSR markers in the present study. Another reason for the low PIC could be due to the low frequency of transmission of the diverged sequence differences between *S. officinarum* versus *S. spontaneum* and cultivated sugarcane varieties [23]. Nevertheless, the eSSRs could be used with gSSR and other marker systems for mapping in sugarcane.

In summary, we were able to identify genes involved in diverse biological/cellular/molecular mechanisms in sugarcane in response to cold stress by selectively enlarging its transcriptome through SSH and ACP-based library. Cold stress induced phosphatases and kinases involved in signal transduction and post-translational modification; activated different regulons through respective transcription factors, retrotransposons; upregulated biosynthesis of polyamines, and positively controlled protein degradation and ubiquitination pathways; and induced genes involved in the repair of damaged cellular proteins in the cytosol and chloroplast and genes involved in antioxidant biosynthesis for ROS scavenging in the cold-tolerant energycane clone. Early accumulation and subsequent maintenance of high messages in Ho02-144 could be the determining factor for its ability to tolerate cold for a prolong time period. A much comprehensive coexpression network established through next generation sequencing and validation through protein-protein interaction and transgenic overexpression/knock down will provide better clues to the cold stress response of sugar/energycane. Further, the interaction network with the coregulated connections between genes of interest need further validation based on experimental evidence, which will help decipher the specific biological inference among the interacting genes in sugarcane and other grasses, because many processes are conserved among different monocotyledonous species [20]. These genes would have a great potential in the engineering of sugarcane plants with higher cold tolerance that would allow the cultivation of this plant in more temperate climates. Additionally, the differentially expressing cold responsive genes will be very useful to mine for SNPs/indels for QTL and association mapping to identify functional markers associated with cold tolerance in sugar/energycane.

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