AN OVERVIEW OF 2016 ACTIVITIES IN THE LOUISIANA STATE UNIVERSITY AGRICULTURAL CENTER SUGARCANE VARIETY DEVELOPMENT PROGRAM

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New, genetically improved, varieties of sugarcane has contributed immensely to the long-term sustainability of the Louisiana sugar industry. Research to develop new varieties of sugarcane in Louisiana is accomplished through a multidisciplinary approach drawing from the expertise of scientists and allied professionals from a diversity of disciplines within the LSU AgCenter (Table 1). The LSU AgCenter research team also works in collaboration with other institutions such as the United States Department of Agriculture (USDA) and the American Sugar Cane League. The best varieties from the LSU AgCenter ('L' varieties) and USDA ('Ho' and 'HoCP') programs are brought together for evaluation at the off-station, 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 (Table 2). 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.

Team Member	**Budgetary Unit**	**Responsibility**
Collins Kimbeng	Sugar Res. Station	Program Leader
Michael Pontif	Sugar Res. Station	Selection and Variety Testing
Sonny Viator	Iberia Research Station	On-station Nursery
Niranjan Baisakh	School of Plant, Environmental and Soil Sciences	Molecular Breeding
Blake Wilson	Sugar Res. Station	Insect Resistance
Jeff Hoy	Plant Pathology	Disease Resistance
Albert Orgeron	St. James Parish, Lutcher	Herbicide Tolerance
Gertrude Hawkins	Sugar Res. Station	Sucrose Laboratory
Mavis Daigle	Sugar Res. Station	Photoperiod & Crossing
David Sexton	Sugar Res. Station	Outfield Variety Testing
Srinivasan Pinnamaneni	Sugar Res. Station	Bioenergy Research
Todd Robert	Sugar Res. Station	Farm Crew
Alphonse Coco	Sugar Res. Station	Farm Manager

Success in developing new sugarcane varieties is heavily dependent on the availability of novel genetic variability made available for selection via targeted cross hybridization among desirable sugarcane genotypes. Cultivated sugarcane does not flower naturally in Louisiana because of the cool fall temperatures hence, the breeding program must resort to artificial photoperiod treatment to induce and synchronize flowering of sugarcane for crossing. Photoperiod treatment to induce flowering began on May 30, 2016 and continued until September 11, 2016. The first crosses were made in the first week of September and lasted till November 7, 2016. A total of 553 tassels of 117 clones were used to make 333 crosses with a total of 176,644 viable seeds produced. The number of viable seeds per cross was estimated by counting the number of shoots produced per 0.5 g of seed (fuzz). A total of 152,573 seeds were produced from bi-parental crosses, and 22,734 seeds were produced from polycrosses. The 2016 crossing campaign was an improvement over the 2015 campaign with more viable seeds produced. Details about the 2016 crossing campaign along with factors that are thought to have contributed to the improvement in seed set are found in the section titled '**2016 PHOTOPERIOD AND CROSSING IN THE LSU AGCENTER SUGARCANE VARIETY DEVELOPMENT PROGRAM**'.

Seeds (fuzz) were germinated in the green house in 25 l x 15 w x 4 h inches metal trays filled with 2 inches of potting mix in January of 2016. Individual seedlings were transplanted into styrofoam trays with 128 (1.5 l x 1.5 w x 1.5 h inches per cell) cells in late February to early March. A total of 81,783 seedlings from 157 crosses, most of them from the 2015 crossing campaign, were transplanted to the field in April, 2016. Many of these seedlings were progeny of biparental crosses among commercial varieties as well as superior experimental clones. In addition, seedlings were planted in a cross appraisal trial. Individual seedling selection will be carried out next year when these seedlings are in the first stubble crop.

Individual seedling selection was practiced on 77,448 first stubble single stools in the fall of 2016. These seedlings were mostly from the 2014 crossing series that were planted to the field in 2015, allowed to overwinter and were in the first ratoon cane crop in 2016. Selection was conducted in September. 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, yield (stalk number, stalk diameter and height) and then lastly for the absence of pith. This was followed by evaluation of the visually selected clones for Brix using a hand held refractometer. A total of 2,128 clones (2.7 % selection rate) were selected and planted in 10-foot, first line trial plots.

The first line trial plots established last year (2013 crossing series) were evaluated and superior clones selected and planted into a second line trial. Breeders walked through the plots and dropped clones based on visual appraisal for diseases, insect damage and, if the stand was poor or weak. Clones that were not dropped the first time around were evaluated for pith, and Brix. A total of 551 clones (33 % selection rate) were eventually selected and planted into single row, 16-foot second line trial. From the second line trial established the year before (2012 crossing series) 348 clones were selected and planted into 2-row, unreplicated, 16-foot increase plots. These are tentative selections with the 'seed cane' being increased pending data from the ratoon crop. By the time clones are assigned a permanent 'L' variety number using both the plant and first ratoon cane crop data there will be enough material to plant replicated trials in three on-station nurseries.

Preliminary visual ratings for cane yield and plant type were done in August on the 209 clones from the 2011 crossing series that remained active in the second line trial. Clones with acceptable ratings were further evaluated for lodging and/or broken tops, borer damage, disease symptoms, pith, cane yield, sucrose content and sugar yield. A total of 38 experimental varieties judged to be superior to the checks were assigned permanent variety designations ("L") in the fall of 2016. These newly assigned experimental varieties were entered into replicated on-station nursery trials (2 replicates, 16-foot plots) at three locations (Sugar Research Station, Iberia Research Station and USDA-ARS Ardoyne Farm). Details about selection in the seedling and early clonal stages can be found in the section titled '**SELECTIONS, ADVANCEMENTS, AND ASSIGNMENTS OF THE LSU AGCENTER'S SUGARCANE VARIETY DEVELOPMENT PROGRAM FOR 2016**'.

The section titled **'2016 LOUISIANA SUGARCANE VARIETY DEVELOPMENT PROGRAM NURSERY AND INFIELD VARIETY TRIALS'** describes experiments that were conducted outside of the experiment station in several locations scattered across the Louisiana sugarcane industry. The objective is to identify and select varieties that will perform well across the range of environments a commercial variety will encounter in Louisiana. Nineteen experimental varieties from the 2015 assignment series (2010 Crossing series) that performed well in the plant cane crop on-station nursery trials were replanted into infield and off station nursery tests. Eight experimental varieties from the 2014 assignment series that performed well in the infield, off-station and on-station nurseries tests were introduced to outfield locations as increase plots. Those that continue to perform well in these tests will subsequently be planted into the outfield testing stage of the program in 2017. One experimental varieties (L12-201) introduced to outfield locations last year that continued to perform well was entered into the outfield tests and introduced on primary increase stations. One experimental variety, L11-183, continues to be tested in the outfield stage and is being increased in primary and secondary stations to ensure there is enough 'seed-cane' for growers if the variety is recommended for release. The outfield stage of the program is described in the section titled '**2016 LOUISIANA SUGARCANE VARIETY DEVELOPMENT PROGRAM OUTFIELD VARIETY TRIALS'.**

Rust caused by the fungus *Puccinia melanocephalacan* occurred early in the 2016 season probably due to the mild 2015 winter season. Clones in the breeding nursery from which parents are taken for crossing were rated for rust and this information will be useful during crossing. Mosaic virus was noticed on a newly released variety, HoCP09-804, mostly around the River-Bayou Lafourche region of the industry. This prompted us to screen the clones in the breeding nursery for the presence of mosaic virus infection. Again this information will be useful in the crossing program. Special attention will be made during crossing to avoid the pairing of two susceptible genotypes in a cross.

Promising experimental varieties that made it to the more advanced stages of the program were entered into several tests to screen for resistance to prominent diseases (Dr. Jeff Hoy, Plant Pathologist) and insect pests (Dr. Blake Wilson, Entomologist) found in Louisiana. Results gathered from these screening tests will be influential in determining which varieties to recommend for commercial release and how best to manage these varieties during commercial production. The data will also be useful in the crossing program in determining what parents to pair in order to avoid making susceptible by susceptible crosses. Also informative were data from the molecular breeding program (Dr. Niranjan Baisakh) in deciding, which crosses to make based on genetic diversity among parents at the molecular level and, which parents harbor the Bru 1 gene that confers rust resistance.

The decision regarding further testing and seed increase of candidate varieties in the program was determined at the Variety Advancement Committee meeting. The 2016 meeting was held on Friday August 12, 2016.

In general, all the goals set out for the 2016 season were accomplished. All trials were planted and harvested as planned despite the slow start to the season. The uncharacteristically wet conditions brought about by the great flood of 2016 delayed the planting, selection and harvesting operations. However, below normal rainfall occurred in the months of October and November meaning that the cane experienced drought conditions during part of the harvest season which affected stalk weight during selection.

Progress in the LSU AgCenter Sugarcane Variety Development Program would not be possible without the collaboration of many growers on whose farm several of the trials are conducted. Financial support from the state of Louisiana disburse through the LSU AgCenter and from the Louisiana sugar industry disbursed through the American Sugar Cane League is also gratefully acknowledged. So too is the collaboration of personnel from the American Sugarcane League and the USDA-ARS Sugarcane Research Unit.

Table 2. Chronological activities within the LSU AgCenter sugarcane variety ('L' varieties) development program.

Year	Stage and activity
1	Crossing
2	Seedlings planted
3	Seedlings selected in 1R to plant first line trial
4	First line trial selected in PC to plant second line trial
5	Second line trial selected in PC to plant increase plots
6	Second line trial selected in 1R Assign permanent 'L' variety numbers On-station nurseries planted (at St. Gabriel, Houma, New Iberia) from increase plots
7	On-station nurseries PC harvested Off-station (3) and infield (2) nurseries planted
8	On-station nurseries 1R harvested Off-station and infield nurseries PC harvested Increase experimental clones at 12 outfield test sites Introduce experimental clones to 3 ASCL primary increase stations
9	On-station nurseries 2R harvested Off-station and infield 1R nurseries harvested Outfield tests planted at 12 locations Increase experimental clones on 3 ASCL primary increase stations
10	On-station nurseries 3R harvested Off-station and infield nurseries 2R harvested Outfield tests PC harvested Continue to increase experimental clones on primary increase stations
11	Off-station and infield nurseries 3R harvested Outfield tests 1R harvested Introduce experimental clones to 44 ASCL secondary increase stations
12	Outfield tests 2R harvested Increase experimental clones on 44 ASCL secondary increase stations
13	Variety release meeting New variety distributed by ASCL from secondary increase stations

1R, First ratoon cane crop; PC, Plant cane crop; 2R, Second ratoon cane crop; ASCL, American Sugar Cane League.

2016 PHOTOPERIOD AND CROSSING IN THE LSU AGCENTER SUGARCANE VARIETY DEVELOPMENT PROGRAM

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The longstanding and continued goal of the LSU AgCenter's Sugarcane Variety Development Program is the development of genetically improved sugarcane varieties which will positively impact the sugar industry. The variety development program begins with the photoperiod and crossing stages. Photoperiod treatments are managed as to encourage flowering of genotypes that would otherwise not naturally flower in Louisiana's climatic conditions. Crosses are made through hybridization techniques that use sugarcane yield components, borer resistance characteristics, and disease resistance characteristics as criteria. The breeding program strives to produce crosses that will yield superior progeny.

Eyepiece cuttings of breeding genotypes to be used for the 2016 crossing season were planted in October of 2015. The cuttings were planted in Styrofoam cell trays and maintained in the greenhouse. In late January of 2016, the cuttings were transferred to can culture. The transplants were planted in large cans (38 liters) containing equal parts of field soil, washed sand, and peat moss and maintained in the greenhouse. On April 25, 2016, after the danger of frost, the cans were moved from the greenhouse to the photoperiod rail carts. Natural lighting and six light-tight chambers were used for photoperiod treatments. The cans were placed on photoperiod carts and assigned to a specific photoperiod regime based on flowering type. Genotypes that are difficult to flower were given a longer induction treatment and longer decline period. Fertilization was adjusted to condition plants for floral induction as a high C:N ratio has been shown to promote flowering in sugarcane.

The first photoperiod treatment began on May 30, 2016. All photoperiod treatments were initiated with a minimum of 37 consecutive days of 12 ½ hours of constant day length (Table 1). After the initial constant photoperiod days, artificial day length was shortened by one minute per day. Tassel (flower) initiation begins when day length begins to decrease. Treatments differed by the number of days with constant day length and the date on which the decline of photoperiod was initiated (Table 1). All photoperiod treatments were discontinued on September 11, 2016, when natural day length was less than 12 ½ hours and decreasing at a rate conducive to sugarcane flowering.

The flowering season began in the first week of September in 2016, similar to the previous year. 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 may be a slight deviation in the appearance of the first flower due to temperature during the photoperiod induction phase, varietal characteristics, and the photoperiod treatments. Fewer flowers were present in 2016 than in 2015. There were also fewer total sugarcane stalks in 2016 than as compared to 2015. As such, flowering percentages of stalks on photoperiod carts decreased in 2016 as compared with the 2015 flowering season. The largest decrease in flowering percentages was observed in photoperiod carts located in position "C" (Table 1). Flowering percentages of stalks in all position "C" locations did not exceed 29% in 2016, whereas, in 2015, flowering percentages were as high as 53% in a particular position "C" location (Table 1). The total flowering percentage for the six photoperiod bays decreased from 42% in 2015 to 37% in 2016. Of a total of 1,553 stalks, 553 tassels were produced (Table 2). The peak of the 2016 flowering season was observed during mid-September (Fig. 1). The peak occurrence in 2016 was similar in timing to the flowering peak observed in 2015.

Crossing began on September 2, 2016 and ended on November 7, 2016. A total of 553 tassels comprising 117 genotypes (Table 4) were used to make 333 crosses (Table 3, Table 5). A total of 176,644 viable seed were produced in 2016 (Table 3). A total of 152,573 seed were produced from bi-parental crosses and a total of 22,734 seed were produced from polycrosses (Table 3). Germination rate was estimated based on the germination of 0.5 g of seed under greenhouse conditions in late December of 2015. Germination rates improved significantly from a mean germination of 34 plants per gram of seed in 2015 to 41 plants per gram of seed in 2016 (Table 3).

Rust made an early appearance during the spring of 2016 due to an exceptionally warm winter. A survey of parental stock located in the breeding nursery in St. Gabriel, LA was completed. Most parental genotypes exhibited at least moderate susceptibility to rust (Fig. 3). Also, with the release of a mosaic susceptible variety in 2015, renewed focus was made to identify parental genotypes in the breeding nursery exhibiting symptoms of mosaic virus. Of the 193 unique genotypes present in the breeding nursery, 40, or 21%, of the genotypes exhibited symptoms of mosaic virus. Special attention will be made in future crossing seasons to avoid the pairing of two susceptible genotypes in a cross. In addition to an unseasonably warm winter of 2015, record rainfalls were observed in the summer of 2016. Thankfully, plants on the rail carts were seemingly unaffected by the dramatic weather conditions. Insect pressure remained minimal during the 2016 crossing season. Although the West Indian Cane Fly reappeared in some commercial fields in 2016, no observances were made on the plants on the crossing carts. Intensive scouting further reduced any potential insect related issues. As in 2015, there were few days of unfavorable weather conditions and rail carts were allowed to receive maximum sun exposure. However, fewer total stalks and flowers were observed in 2016. The reduction in stalks and flowers may be due to the late removal of plants from the greenhouse to the rail carts in 2016. Ideally, plants should be transferred onto the rail carts soon after the danger of frost has diminished. In 2016, plants were transferred to rail carts in late April. The increased exposure to high greenhouse temperatures during April may have resulted in fewer stalks. Even with fewer stalks and flowers, germination rates improved significantly in 2016. Specific focus was made to improve air-circulation inside the seed drying box in 2016. The improved air flow may have favorably impacted seed germination rates. Terra-Sorb®, a soil wetting agent, was again added to marcotts in 2016. The available moisture may have prevented marcotts from drying and also may have contributed to the increase in seed germination rates. The data-logging system installed in 2014 was again used to monitor temperature and relative humidity in the crossing greenhouse but a system failure prevented the system from being used in the latter half of the crossing season.

Table 1. Summary of the 2016 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 Peak 1	Days of Declining Photoperiod Peak 2	Mean Flowering Date	Total Stalks	Percent Flowered
1	A	14-Jun	44	28-Jul	72	87	285±2	96	54
1	B	14-Jun	44	28-Jul	72	87	282±2	86	37
1	C	14-Jun	44	28-Jul	72	87	288±2	79	29
2	A	14-Jun	44	28-Jul	72	87	284±1	91	53
2	B	14-Jun	44	28-Jul	72	87	286±2	90	30
2	C	14-Jun	44	28-Jul	72	87	283±3	93	26
3	A	30-May	37	6-Jul	87	102	269±1	88	69
3	B	30-May	37	6-Jul	87	102	262±2	84	31
3	C	30-May	37	6-Jul	87	102	270±3	83	24
4	A	30-May	37	6-Jul	87	102	268±2	83	58
4	B	30-May	37	6-Jul	87	102	271±3	85	35
4	C	30-May	37	6-Jul	87	102	269±4	88	20
5	A	30-May	41	10-Jul	82	97	277±3	89	36
5	B	30-May	41	10-Jul	82	97	266±2	86	20
5	C	30-May	41	10-Jul	82	97	264±4	87	8
6	A	30-May	41	10-Jul	82	97	270±2	79	57
6	B	30-May	41	10-Jul	82	97	271±2	80	26
6	C	30-May	41	10-Jul	82	97	267±3	86	26

Table 2. Summary of can, variety, and flower information in 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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82	324	188	1553	553	4.79 ± 0.89	2.94 ± 1.47	5.44 ± 1.67	77.95 ± 13.24

† Based upon cans with tassels.
‡ Pollen rating of 1 through 4 indicates male tassel; pollen rating of 5 through 9 indicates female tassel.
§ Days from photoperiod decline start date to flowering.

Table 3. Summary of 2016 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	288	152573	530±715	530±715	41±46
Polycross	39	22734	583±823	583±823	45±57
Self	6	1337	223±188	35±28	35±28
Total	333	176644	530±723	530±723	41±47

Table 4. Varietal flowering summary in 2016 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
CP1983-644	41	298	108±3	4	31	4	13
CPCL2002-6848	44	.	.	.	5	.	.
CPCL2005-1201	44	.	.	.	6	.	.
HO1995-988	41	.	.	.	5	.	.
HO2006-530	41	295	103	7	9	1	11
HO2006-563	37	260	83±5	4	9	7	78
HO2007-613	40±1	.	.	.	10	.	.
HO2007-617	41	270	78	8	11	1	9
HO2008-717	37	.	.	.	11	.	.
HO2008-730	44	.	.	.	5	.	.
HO2009-827	43±1	263	80±3	7	8	6	75
HO2009-832	44	284	75	6	5	1	20
HO2009-840	41±1	252	67±2	7	20	14	70
HO2009-9401	37	253	67±2	8	3	2	67
HO2009-9402	37	260	96±24	8±1	6	2	33
HO2011-532	43	263	82±3	4	19	6	32
HO2011-573	43	.	.	.	14	.	.
HO2011-9405	41	.	.	.	6	.	.
HO2011-9406	44	272	71±8	5±1	4	4	100
HO2012-615	44	295	86	7	6	2	33
HO2012-9410	37	.	.	.	4	.	.
HO2013-705	37	256	86±9	4±1	4	3	75
HO2013-720	37	.	.	.	5	.	.
HOCP1985-845	41	281	98±5	7	10	4	40
HOCP1991-552	40±1	252	68±2	4	32	25	78
HOCP1992-618	41±1	267	83±2	7	33	13	39
HOCP1992-624	41±1	260	82±3	7	33	15	45
HOCP1995-951	38	265	84±4	7	20	6	30
HOCP1996-540	41±1	270	82±7	3	27	7	26
HOCP1996-561	42±1	279	87±2	4	16	9	56
HOCP1997-609	41±1	263	80±3	4	12	9	75
HOCP2000-950	41±1	258	77±2	8	30	14	47
HOCP2001-517	41±1	284	97±1	5±1	22	3	14
HOCP2001-523	41	298	106	7	21	1	5
HOCP2002-618	39±1	267	85±2	4	11	6	55
HOCP2004-838	41±1	250	66±4	3	24	11	46
HOCP2004-847	40	274	96±6	7	16	4	25
HOCP2009-804	38	281	109±9	4	26	4	15
HOCP2009-846	41	.	.	.	11	.	.
HOCP2012-647	37	263	79±2	3	6	5	83
HOCP2013-723	37	.	.	.	6	.	.
HOCP2013-726	41	263	77±2	4	6	6	100
HOCP2013-738	44	.	.	.	4	.	.
L1994-426	38±1	265	96±7	5	14	6	43
L1994-428	37	258	78±3	4	4	4	100
L1994-433	38±1	288	110±10	7	15	2	13
L1997-128	41±1	256	70±1	7	18	10	56
L1998-207	43	265	82±6	7	32	5	16

Table 4. Continued

Variety	Days of Constant Photoperiod	First Flower Date	Mean Days to Flower	Pollen Rating	Total Stalk Number	Total Flowers	Percent Flowering Stalks
L1998-209	41±1	260	75±1	7	14	8	57
L1999-226	41	250	79±1	4	43	27	63
L1999-233	40±1	246	67±2	4	26	19	73
L2001-283	41	279	93±3	7	27	3	11
L2001-299	40	256	75±2	4	54	20	37
L2001-315	39±1	263	76±1	7	9	3	33
L2003-371	41	253	68±4	4	28	5	18
L2005-448	37	258	74±1	4	9	8	89
L2005-457	41	253	71±1	8	39	34	87
L2006-001	40	270	82±2	4	33	4	12
L2006-038	40±1	256	73±2	4	14	11	79
L2006-040	40±1	291	89±5	7	13	3	23
L2007-057	40±1	246	60±1	7	20	14	70
L2008-088	41	.	.	.	12	.	.
L2008-090	40±1	253	76±2	4	25	18	72
L2009-099	42	267	85±4	4	27	10	37
L2009-112	37	284	96	7	19	1	5
L2009-123	37	252	67±1	7	11	11	100
L2009-131	41±1	.	.	.	10	.	.
L2010-146	41	288	96	6	17	1	6
L2010-147	40±1	.	.	.	15	.	.
L2011-183	41±1	260	79±2	7	16	8	50
L2011-187	42±1	258	76±2	7	15	10	67
L2012-201	42	.	.	.	12	.	.
L2012-202	39±1	260	80±2	4	17	13	76
L2012-218	41±1	281	98±5	6±2	12	2	17
L2012-227	43	263	80±2	5	11	8	73
L2013-234	41	.	.	.	8	.	.
L2013-242	41	253	63±2	7	9	3	33
L2013-243	39±1	258	69±1	5±1	8	4	50
L2013-251	39±1	288	96	3	12	1	8
L2013-257	41±1	293	89±5	6	14	2	14
L2013-260	41±1	265	60±2	7	13	9	69
L2013-263	41±1	.	.	.	10	.	.
L2014-264	41±1	270	79±4	5±1	8	6	75
L2014-265	37	281	95±1	6	4	3	75
L2014-266	44	.	.	.	10	.	.
L2014-267	43±1	.	.	.	10	.	.
L2014-269	44	291	87±2	7	5	5	100
L2014-270	42±1	.	.	.	9	.	.
L2014-271	43±1	281	78±3	7	9	5	56
L2014-273	44	270	71±5	7	11	4	36
L2014-274	41±1	281	76±4	7±1	11	2	18
L2014-275	41±1	274	85±9	6±1	9	3	33
L2014-276	42	305	96	7	11	1	9
L2014-282	44	307	98	7	10	1	10
L2014-285	43±1	312	103	4	8	1	13
L2014-288	39±1	312	124	6	9	1	11

Table 4. Continued

Variety	Days of Constant Photoperiod	First Flower Date	Mean Days to Flower	Pollen Rating	Total Stalk Number	Total Flowers	Percent Flowering Stalks
L2014-289	41±1	.	.	.	9	.	.
L2014-290	41	.	.	.	5	.	.
L2014-295	39±1	274	93±4	7±1	10	4	40
L2014-296	44	.	.	.	6	.	.
L2014-297	41	.	.	.	4	.	.
L2015-298	44	.	.	.	5	.	.
L2015-300	37	298	114±4	5±2	5	2	40
L2015-301	44	293	91±7	3	5	2	40
L2015-302	44	.	.	.	5	.	.
L2015-303	37	.	.	.	4	.	.
L2015-304	37	265	82±5	8	3	3	100
L2015-305	44	.	.	.	6	.	.
LCP1981-010	41±1	267	72±6	4	18	6	33
LCP1985-384	41±1	263	85±4	4	33	13	39
LCP1986-454	40±1	.	.	.	8	.	.
N27	42	263	88±8	7	15	5	33
US2001-040	40±1	277	90±4	8±1	11	4	36
L2014-276	42	305	96	7	11	1	9

Table 5. Crosses and seed made in 2016

Cross	Female	Male	Seed
XL16-001	L07-057	L99-233	760
XL16-002	L07-057	L99-233	985
XL16-003	L99-233*	HOCP04-838	188
XL16-004	HOCP91-552*	HOCP04-838	63
XL16-005	L09-123	HOCP91-552	210
XL16-006	L07-057	HOCP91-552	69
XL16-007	HO09-840	HOCP04-838	697
XL16-008	L09-123	HOCP04-838	148
XL16-009	L07-057	HOCP04-838	23
XL16-010	HO09-9401	L99-233	14
XL16-011	HO09-840	L99-233	1165
XL16-012	L05-457	L99-233	1234
XL16-013	L13-242	HOCP91-552	1538
XL16-014	L05-457	L03-371	160
XL16-015	L09-123	L03-371	32
XL16-016	L13-242	L08-090	95
XL16-017	L09-123	L08-090	58
XL16-018	HO13-705*	L99-233	64
XL16-019	L97-128	L99-233	222
XL16-020	L05-457	L99-233	2152
XL16-021	HO09-9401	L01-299	0
XL16-022	L09-123	L01-299	863
XL16-023	HO09-840	L01-299	267
XL16-024	HO09-840	HOCP04-838	80
XL16-025	L06-038*	HOCP04-838	0

Cross	Female	Male	Seed
XL16-026	L09-123	L03-371	19
XL16-027	L05-457	HOCP91-552	697
XL16-028	L11-187	L99-233	11
XL16-029	HOCP00-950	L03-371	128
XL16-030	HO09-840	L03-371	0
XL16-031	L13-243	L03-371	57
XL16-032	HO09-840	L01-299	721
XL16-033	L05-457	L01-299	642
XL16-034	L97-128	L05-448	0
XL16-035	L13-242	L94-428	23
XL16-036	L05-457	L08-090	27
XL16-037	HOCP00-950	L01-299	199
XL16-038	HOCP92-624	L01-299	718
XL16-039	L05-457	L01-299	472
XL16-040	HOCP00-950	L05-448	76
XL16-041	L11-183	L05-448	68
XL16-042	L97-128	L05-448	21
XL16-043	L98-209	L05-448	493
XL16-044	HOCP92-624	HOCP04-838	32
XL16-045	L07-057	HOCP04-838	0
XL16-046	L05-457	HOCP04-838	26
XL16-047	L13-243	L13-243	64
XL16-048	L09-123	L13-243	202
XL16-049	L05-457	L13-243	125
XL16-050	L12-202	L12-202	28

Table 5. Continued

Cross	Female	Male	Seed
XL16-051	HOCP00-950	L12-202	7
XL16-052	HO09-9402	L12-202	118
XL16-053	HOCP92-624	HOCP91-552	219
XL16-054	L09-123	HOCP91-552	1557
XL16-055	L05-457	HOCP91-552	123
XL16-056	HOCP91-552	16P1	2534
XL16-057	HOCP91-552	16P1	3253
XL16-058	L08-090	16P1	188
XL16-059	L08-090	16P1	19
XL16-060	L06-038	16P1	0
XL16-061	L06-038	16P1	371
XL16-062	L06-038	16P1	488
XL16-063	L06-038	16P1	298
XL16-064	HO06-563	16P1	458
XL16-065	HO06-563	16P1	551
XL16-066	HOCP13-726*	HOCP12-647	1541
XL16-067	HOCP91-552*	HOCP12-647	957
XL16-068	L05-448*	HOCP12-647	123
XL16-069	L13-243*	HOCP12-647	633
XL16-070	HOCP12-647	HOCP12-647	469
XL16-071	HOCP00-950	L01-299	36
XL16-072	L12-227	L01-299	480
XL16-073	L05-457	L01-299	527
XL16-074	L07-057	L01-299	182
XL16-075	N27	L99-226	4128
XL16-076	L97-128	L99-226	31
XL16-077	N27	LCP85-384	3835
XL16-078	L07-057	LCP85-384	483
XL16-079	L01-315	L08-090	122
XL16-080	L05-457	L08-090	637
XL16-081	HO09-827	L08-090	438
XL16-082	L97-128	HOCP11-532	104
XL16-083	L98-209	HOCP11-532	846
XL16-084	HOCP04-838	16P2	1327
XL16-085	HOCP91-552	16P2	2812
XL16-086	HOCP91-552	16P2	2136
XL16-087	HOCP97-609	16P2	1205
XL16-088	HOCP97-609	16P2	1467
XL16-089	L06-038	16P2	0
XL16-090	L06-038	16P2	83
XL16-091	L94-426	L99-226	210
XL16-092	L97-128	L99-226	97
XL16-093	L11-183	L99-226	184
XL16-094	L15-304	L99-226	163
XL16-095	L13-260	L99-233	0
XL16-096	L15-304	L99-233	0
XL16-097	L07-057	HOCP91-552	1046
XL16-098	HO06-563*	HOCP91-552	336
XL16-099	HOCP97-609*	HOCP91-552	1201

Cross	Female	Male	Seed
XL16-100	L94-428*	HOCP91-552	1549
XL16-101	HOCP95-951	L08-090	2592
XL16-102	L98-209	L08-090	1219
XL16-103	L07-057	L08-090	330
XL16-104	HOCP00-950	L12-202	57
XL16-105	L98-207	L12-202	537
XL16-106	L11-187	LCP85-384	0
XL16-107	L13-260	LCP85-384	901
XL16-108	HOCP95-951	LCP85-384	422
XL16-109	L12-227*	LCP85-384	204
XL16-110	HOCP91-552*	LCP85-384	1578
XL16-111	HOCP00-950	LCP81-010	148
XL16-112	L13-260	LCP81-010	0
XL16-113	HO09-827	LCP81-010	827
XL16-114	HOCP91-552*	LCP81-010	926
XL16-115	L13-260	HOCP13-726	80
XL16-116	HOCP92-618	HOCP13-726	1573
XL16-117	L05-457	HOCP13-726	568
XL16-118	L11-183	L08-090	81
XL16-119	L13-260	L08-090	421
XL16-120	HOCP92-618	L08-090	143
XL16-121	L98-207	L08-090	375
XL16-122	L11-183	L09-099	209
XL16-123	HOCP92-624	L09-099	1370
XL16-124	L13-260	L09-099	0
XL16-125	L01-315	L09-099	120
XL16-126	L13-260	L99-233	603
XL16-127	HO09-840	L99-233	955
XL16-128	HOCP91-552	16P3	552
XL16-129	HOCP91-552	16P3	920
XL16-130	HOCP02-618	16P3	226
XL16-131	HOCP02-618	16P3	374
XL16-132	L05-448	16P3	440
XL16-133	L94-428	16P3	808
XL16-134	HOCP95-951	16P3	552
XL16-135	L13-260	16P3	146
XL16-136	L98-209	16P3	0
XL16-137	HO09-840	L99-226	1174
XL16-138	L14-273	L99-226	466
XL16-139	L11-183	L99-226	332
XL16-140	L98-209	L99-226	1348
XL16-141	L05-457	L99-226	2349
XL16-142	L11-183	L12-202	470
XL16-143	HOCP92-618	L12-202	962
XL16-144	LCP81-010	L12-202	4425
XL16-145	HO09-840	HO06-563	2166
XL16-146	HOCP92-618	HO06-563	2271
XL16-147	HO09-827	HO06-563	2656
XL16-148	HOCP92-618	HOCP96-540	2152

Table 5. Continued

Cross	Female	Male	Seed
XL16-149	HOCP09-840	LCP85-384	1161
XL16-150	HO07-617	LCP85-384	245
XL16-151	HOCP00-950	HOCP91-552	617
XL16-152	L13-260	HOCP91-552	249
XL16-153	L14-264	HOCP91-552	74
XL16-154	HO11-532*	HOCP12-647	1925
XL16-155	L05-448*	HOCP12-647	170
XL16-156	HOCP13-726*	HOCP12-647	20
XL16-157	L06-001*	HOCP12-647	1150
XL16-158	L01-299*	HOCP12-647	355
XL16-159	HOCP12-647	HOCP12-647	169
XL16-160	HO11-9406*	L99-233	2330
XL16-161	L05-457	L99-233	980
XL16-162	HOCP02-618*	L99-233	583
XL16-163	HOCP92-618	HOCP04-838	430
XL16-164	L05-457	L99-226	1740
XL16-165	LCP85-384*	L99-226	719
XL16-166	L99-233*	HO11-9406	1528
XL16-167	L05-457	16P4	182
XL16-168	L12-227	16P4	46
XL16-169	L14-264	16P4	54
XL16-170	L06-038	16P4	126
XL16-171	HOCP02-618	16P4	48
XL16-172	HOCP92-624	L99-226	460
XL16-173	L05-457	L99-226	1098
XL16-174	HOCP04-847	L06-001	167
XL16-175	L05-457	L06-001	999
XL16-176	L14-295	L06-001	2039
XL16-177	L05-457	HOCP13-726	54
XL16-178	L14-273	HOCP13-726	191
XL16-179	L14-275	HOCP13-726	66
XL16-180	HOCP13-726	HOCP13-726	440
XL16-181	HOCP95-951	L09-099	235
XL16-182	L05-457	L09-099	230
XL16-183	L14-295	HOCP91-552	61
XL16-184	L94-426	LCP85-384	28
XL16-185	L94-428	16P5	75
XL16-186	L08-090	16P5	7
XL16-187	L06-038*	16P5	0
XL16-188	L05-457	HOCP96-540	1088
XL16-189	L14-275	HOCP96-540	1995
XL16-190	L05-457	HOCP91-552	119
XL16-191	L05-457	L12-202	782
XL16-192	US01-040	L12-202	57
XL16-193	L05-457	L99-226	489
XL16-194	US01-040	L99-226	611
XL16-195	L97-128	HOCP96-540	19
XL16-196	HOCP92-618	HOCP96-540	1513
XL16-197	L05-457	L01-299	176
XL16-198	US01-040	L01-299	0
XL16-199	HOCP92-624	HOCP96-561	157
XL16-200	HOCP04-847	L99-226	21
XL16-201	HOCP97-609*	L99-226	137
XL16-202	L14-264*	L12-202	5
XL16-203	L98-207	L12-202	148
XL16-204	L07-057	L09-099	0
XL16-205	HO09-827	L08-090	61
XL16-206	HOCP92-624	LCP85-384	805
XL16-207	L01-283	HO06-563	623
XL16-208	L97-128	HOCP02-618	0
XL16-209	L11-187	L99-226	10
XL16-210	L15-304	L99-226	14
XL16-211	L14-265	L99-226	790
XL16-212	L14-274	L99-226	84
XL16-213	L11-187	L99-226	0
XL16-214	L12-218	L99-226	298
XL16-215	L14-271	L99-226	18
XL16-216	L05-457	L08-090	36
XL16-217	HOCP85-845	L08-090	48
XL16-218	HOCP00-950	LCP81-010	0
XL16-219	L11-187	LCP81-010	21
XL16-220	L14-264	LCP81-010	0
XL16-221	HOCP95-951	L01-299	226
XL16-222	HOCP85-845	L01-299	488
XL16-223	L05-457	L01-299	116
XL16-224	L11-187	L01-299	12
XL16-225	HO09-840	HO13-705	241
XL16-226	L14-273	L12-202	166
XL16-227	L05-457	HOCP09-804	420
XL16-228	L11-183	HOCP09-804	169
XL16-229	HOCP09-804	HOCP09-804	167
XL16-230	L97-128	16P6	0
XL16-231	L94-426	16P6	92
XL16-232	L14-264	16P6	38
XL16-233	HOCP97-609	16P6	153
XL16-234	LCP85-384	16P6	708
XL16-235	L05-457	L01-299	1174
XL16-236	L14-271	L01-299	0
XL16-237	L99-233*	L01-299	179
XL16-238	L97-128	L01-299	242
XL16-239	HO09-827	L99-226	171
XL16-240	L11-187	L99-226	169
XL16-241	L14-265	L99-226	894
XL16-242	L98-209	L99-226	923
XL16-243	L09-112	L08-090	0
XL16-244	L14-265	L08-090	927
XL16-245	HO09-832	L06-001	1271
XL16-246	HOCP92-618	L06-001	2286

Table 5. Continued

Cross	Female	Male	Seed
XL16-247	L01-283	HOCP01-517	395
XL16-248	HOCP96-561*	HOCP01-517	351
XL16-249	L11-187	HOCP09-804	151
XL16-250	HOCP97-609*	HOCP09-804	682
XL16-251	HOCP00-950	HOCP96-540	39
XL16-252	HOCP92-624	HOCP96-540	0
XL16-253	L98-209	L12-202	0
XL16-254	HOCP92-624	L12-202	72
XL16-255	L98-207	L12-202	0
XL16-256	L05-457	HO11-532	707
XL16-257	HOCP00-950	HO13-705	793
XL16-258	LCP85-384*	HO13-705	202
XL16-259	HOCP95-951	L08-090	0
XL16-260	L14-295	HOCP96-561	34
XL16-261	N27	HOCP96-540	1151
XL16-262	L10-146	HOCP96-540	81
XL16-263	L14-274	L08-090	4
XL16-264	HO09-840	L12-227	1870
XL16-265	HOCP92-618	L12-227	1422
XL16-266	HOCP00-950	L13-251	856
XL16-267	HOCP92-618	L13-251	1575
XL16-268	HOCP92-624	L99-226	810
XL16-269	L94-433	L99-226	1050
XL16-270	L06-038*	LCP85-384	122
XL16-271	L98-209	HOCP91-552	191
XL16-272	HOCP92-624	HOCP91-552	656
XL16-273	L11-187	HOCP96-561	17
XL16-274	L12-227	HOCP96-561	32
XL16-275	L14-269	HOCP96-561	132
XL16-276	L14-295	HOCP96-561	13
XL16-277	HOCP00-950	L09-099	157
XL16-278	L01-283	L09-099	560
XL16-279	HOCP92-618	L09-099	385
XL16-280	HOCP04-847	L12-218	157
XL16-281	L94-426	L12-218	48
XL16-282	L06-040	L12-218	57
XL16-283	L12-227*	HOCP91-552	32
XL16-284	HOCP00-950	L08-090	0
XL16-285	HOCP92-618	L08-090	0
XL16-286	L14-271	L12-227	44
XL16-287	US01-040	L12-227	0
XL16-288	L14-269	L15-301	84
XL16-289	L4-273	L15-301	80
XL16-290	L13-257	L99-226	0
XL16-291	L14-269	L99-226	54
XL16-292	HO12-615	L99-226	157
XL16-293	L11-183	L99-226	356
XL16-294	L06-038*	HO06-563	52
XL16-295	HO12-615	HO11-532	0
XL16-291	L14-269	L99-226	54
XL16-296	L94-426	HO11-532	55
XL16-297	HO06-530	L06-001	108
XL16-298	HOCP85-845	L06-001	1008
XL16-299	L06-040	HOCP96-561	113
XL16-300	US01-040	HOCP96-561	55
XL16-301	HOCP96-561*	HOCP04-838	21
XL16-302	HO11-532*	HOCP04-838	94
XL16-303	L14-271	CP83-644	51
XL16-304	L11-187	CP83-644	0
XL16-305	HO09-840	CP83-644	0
XL16-306	HOCP01-523	CP83-644	697
XL16-307	L15-300	LCP81-010	131
XL16-308	HOCP02-624	LCP81-010	48
XL16-309	HOCP04-847	HOCP97-609	802
XL16-310	HOCP-618	HOCP97-609	0
XL16-311	L14-269	HOCP97-609	1608
XL16-312	N27	L09-099	51
XL16-313	L13-257	L09-099	221
XL16-314	HO09-827	L09-099	71
XL16-315	HOCP85-845	L09-099	558
XL16-316	L14-269	L09-099	102
XL16-317	L14-276	L15-300	177
XL16-318	HOCP92-624	L14-264	147
XL16-319	N27	L09-099	1802
XL16-320	HO11-9406	HOCP01-517	186
XL16-321	L98-207	HOCP01-517	323
XL16-322	HOCP92-618	CP83-644	1908
XL16-323	L14-282	CP83-644	818
XL16-324	L06-040	LCP85-384	19
XL16-325	HO09-9402	L15-301	586
XL16-326	HOCP01-517	HOCP96-540	2614
XL16-327	L14-275	HOCP96-540	1221
XL16-328	L05-457	LCP85-384	1082
XL16-329	HOCP92-624	HOCP09-804	2401
XL16-330	L14-288	HOCP09-804	314
XL16-331	L94-433	HOCP09-804	1355
XL16-332	HOCP92-624	CP83-644	1279
XL16-333	L14-285*	L94-426	54

* Indicates emasculated flower

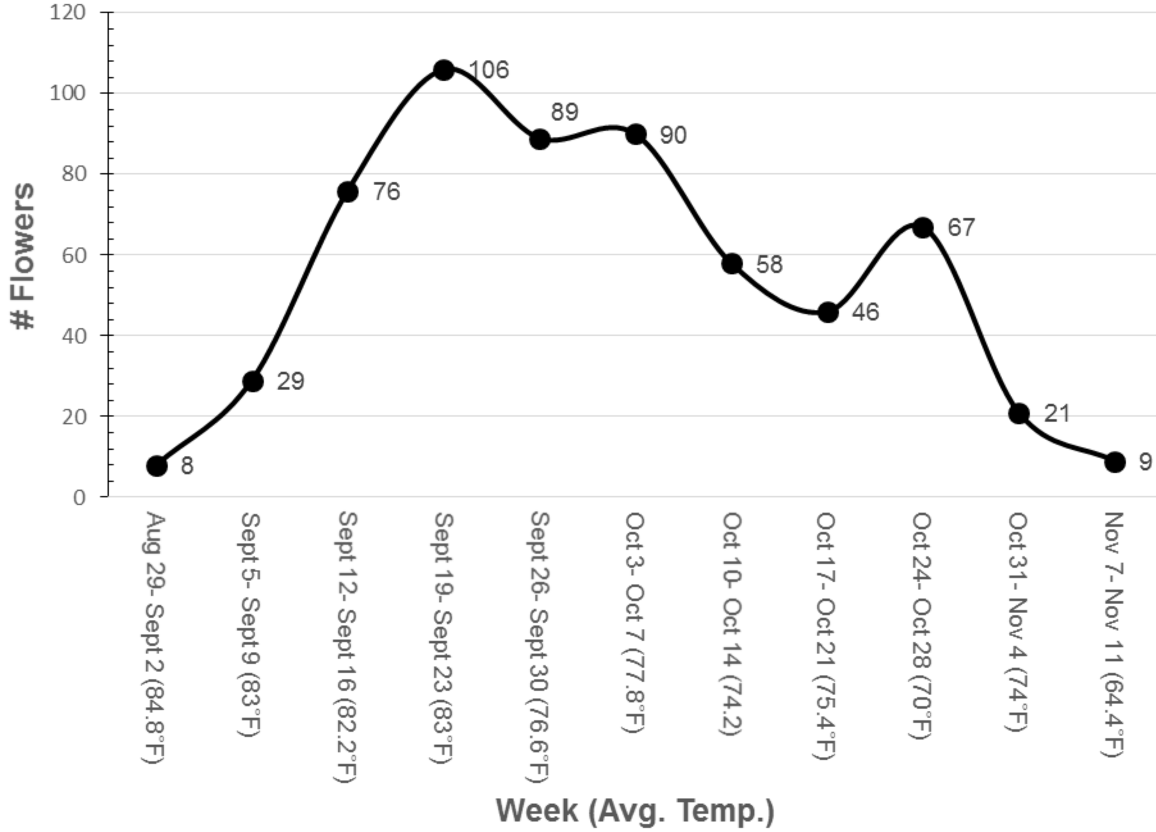

Fig. 1. Number of flowers produced during the 2016 crossing season. The average ambient high temperature is reported for each week.

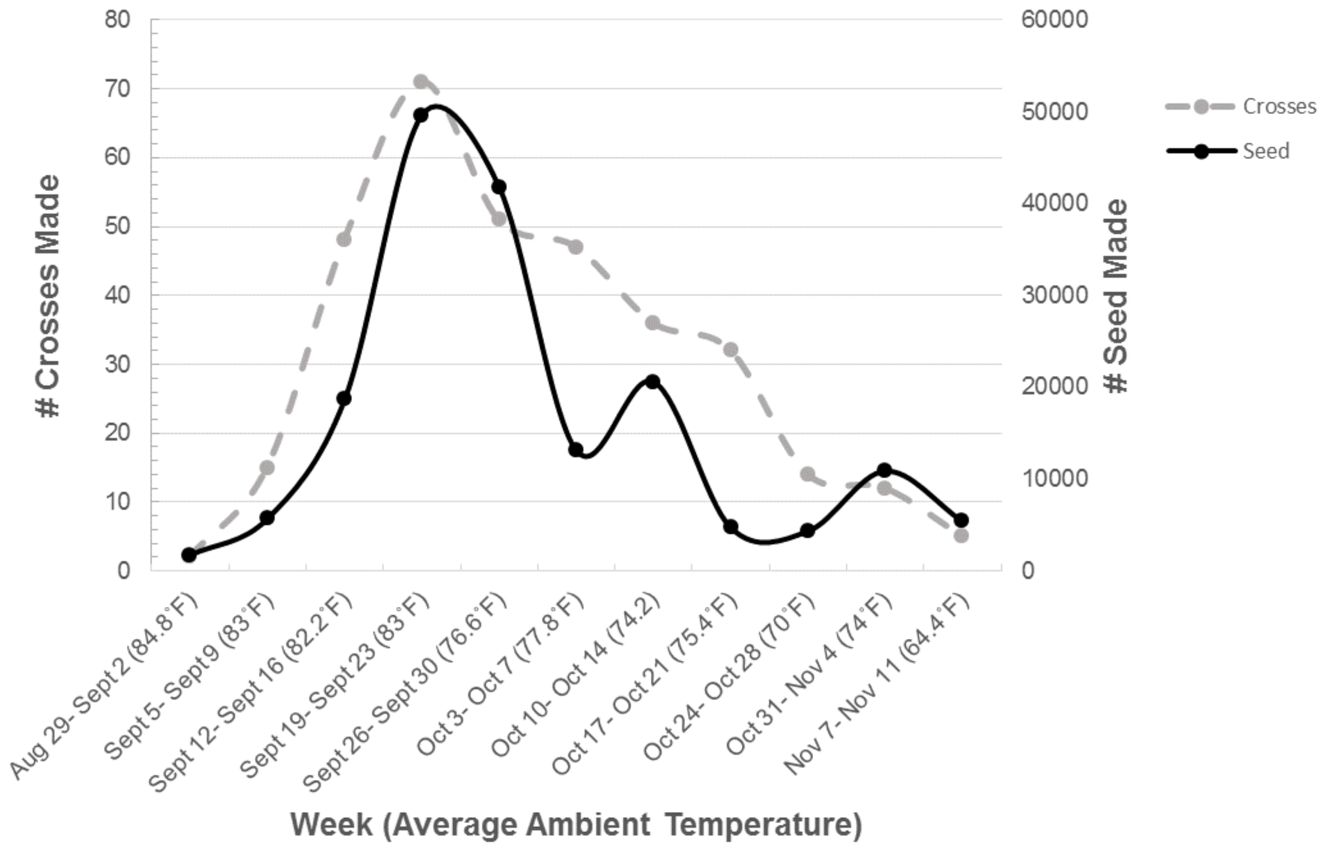

Fig. 2. Number of crosses made and number of seed made from those corresponding crosses in 2016.

Average weekly ambient high temperatures in St. Gabriel, LA are reported due to malfunction of the crossing greenhouse data collection device.

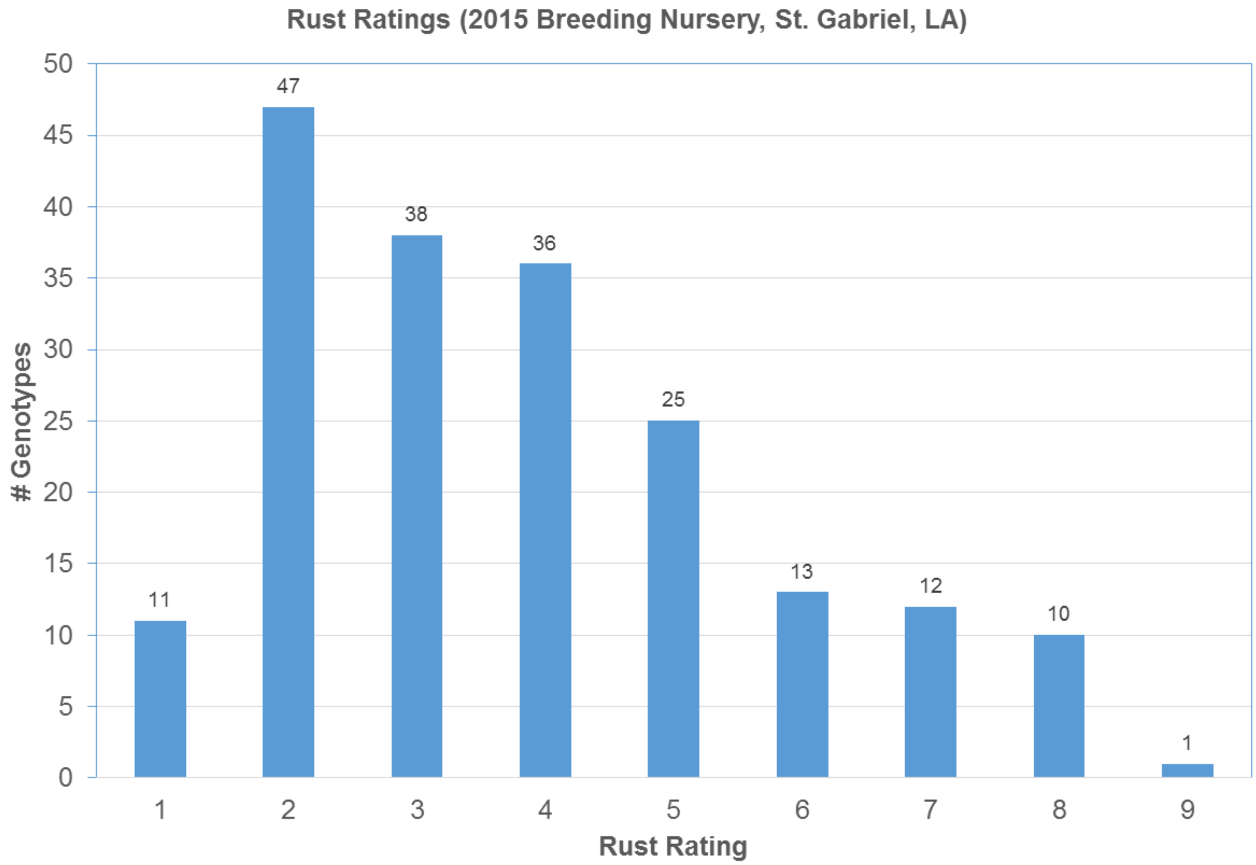

Fig 3. Rust ratings of genotypes present in a breeding nursery located in St. Gabriel, LA. The nursery was planted in 8/25/15. Rust ratings were taken on 5/6/16. Ratings scale as follows: 1 = little or no symptoms, 2 = few to moderate lesions on older leaves, 3 = few lesions on young leaves with moderate lesions on older leaves, 4 = moderate lesions on some young leaves and moderate lesions on older leaves with necrosis, 5 = moderate lesions on young leaves and moderate to extensive lesions and necrosis on older leaves; 6 = moderate lesions with tip necrosis on young leaves and extensive lesions and necrosis on older leaves, 7 = moderate to extensive lesions with tip necrosis on young leaves and extensive necrosis on older leaves; 8 = moderate to extensive lesions with tip necrosis on youngest leaves and extensive necrosis on older leaves, 9 = moderate to extensive lesions on young leaves with extensive necrosis and total senescence of older leaves

SELECTIONS, ADVANCEMENTS, AND ASSIGNMENTS OF THE LSU AGCENTER'S SUGARCANE VARIETY DEVELOPMENT PROGRAM FOR 2016

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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 81,783 seedlings from 157 crosses were planted in the field in the spring of 2016. The majority of these seedlings are progeny of bi-parental crosses among commercial and elite experimental varieties. In the fall of 2016, family selection was practiced on the 64,206 stubble seedlings surviving the winter. This selection resulted in the planting of 2,128 first-line trial plots. At the same time, superior clones were also selected and advanced through subsequent stages (551 to second line trials, 348 to the increase stage). Assignments of permanent "L16" numbers were given to the 38 best clones of the 2011 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 81,783 seedlings from 157 crosses of the 2015 crossing series were planted to the field in the spring of 2016 (Table 1). Many of these seedlings were progeny of crosses among commercial and superior experimental varieties. In the fall of 2016, individual selection was practiced on the 64,206 stubble single stools of the 2014 crossing series that survived the winter. The 2,128 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 1,663 first-line trial plots of the 2013 crossing series were rated for cane yield and pest resistance in August of 2016 (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 551 clones in single row 16-foot second line trials plots.

The 473 plant-cane second line trial plots of the 2012 crossing series were evaluated for disease and population in August 2016. Based on the field evaluation, comments and sucrose lab data collected in 2015, 348 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 2017. Of the 155 candidates from the first stubble crop of the second line trial plots, the best 38 clones from the 2011 crossing series were assigned permanent "L16" numbers (Table 5). These newly assigned "L16" 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 2011 through 2015 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 2016 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 (L16 Assignments)
			----------------------- number of clones	-----------------------------				
X11	58	166	75,703	45,543	1,985	461	209	38
X12	40	170	78,747	38,616	1,414	473	348	
X13	--	155	76,217	51,399	1,663	551		
X14	24	194	85,659	77,448	2,128			
X15	20	157	81,783					

Table 2. Dates of seedling and line trials planted or harvested in 2016.

Crossing Series	Test	Crop	Date Planted	Date Harvested
X15	Seedlings	Planted	4/11/16-4/22/16	
X15	Progeny Test	Planted	4/22/16	
X14	Seedlings	First Stubble	4/21/15–5/01/15	10/5 – 10/24/16
X14	Progeny Test	First Stubble	5/01/15	11/18/16
X13	First Line Trials	Plantcane	9/24 – 9/29/15	9/26/16
X12	First Line Trials	First Stubble	9/11/15	12/2/16
X13	Second Line Trials	Planted	10/4/16	
X12	Second Line Trials	Plantcane	9/16/15	11/28/16
X11	Second Line Trials	First Stubble	9/24/14	10/27/16
X10	Second Line Trials	Second Stubble	9/27/13	11/10/16
X12	Light Soil Increase	Planted	9/15/16	
X11	Light Soil Increase	Plantcane	11/6/15	12/7/16
X10	Light Soil Increase	First Stubble	10/23/14	11/11/16
X09	Light Soil Increase	Second Stubble	10/17/13	10/26/16
X12	Heavy Soil Increase	Planted	9/28/16	
X10	Heavy Soil Increase	First Stubble	10/23/14	11/10/16
X09	Heavy Soil Increase	Second Stubble	10/17/13	10/26/16

Table 3. Numbers of experimental clones dropped for identified faults in the 2013 crossing series first-line trials.

	Fault	
Trait	Frequency	Percent
------------------------ 1663 clones enter first round of evaluation ------------------------------		
Initial Selection (Rating)	725	43.6
----------------------- 815 clones enter second round of evaluation ----------------------------		
Pith	132	7.94
Smut	2	0.12
Open	2	0.12
Tube	39	2.35
Other	5	0.3
--------------------------------------- 180 clones dropped ---------------------------------------		
----------------------------758 clones enter third round of evaluation ---------------------------		
Brix	207	12.45
Clones advanced	551	33.13

Table 4. Number of experimental clones dropped for identified faults in the 2012 crossing series of the plantcane second line trial prior to advancement to the increase stage.

	Fault	
Trait	Frequency	Percent
-------------------------- 473 clones enter first round of evaluation ----------------------------		
Lodged	18	3.81
Diameter	5	1.06
Pith	43	9.09
Tube	19	4.02
Smut	18	3.81
Population	13	2.75
Other	9	1.90
-- 125 clones dropped -------------------------------------		
Clones advanced to Increase stage	348	73.57

Table 5. First stubble second line trial yield data for the 2016 "L" assignments. Assignments were made at the first stubble stage and included data accumulated from preceding stages. The mean, minimum and maximum values reported are for the assigned clones only.

Variety	Female	Male	Sugar Per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
HoCP96-540	LCP86-454	LCP85-384	6075	24.5	247	1.64	29948	10.8
L99-226	CP89-846	LCP81-030	4720	19.3	248	1.25	30628	13
HoCP00-950	HOCP93-750	HOCP92-676	4172	16.2	252	1.28	24956	11.7
L01-283	L93-365	LCP85-384	6389	26.9	237	1.33	40384	12.2
L01-299	L93-365	LCP85-384	9363	37.9	245	1.49	51047	13.1
L03-371	CP83-644	LCP82-089	9746	38.5	252	1.68	45829	11.2
HoCP04-838	HOCP85-845	LCP85-384	8083	32.3	249	1.62	39023	13.1
L16-348	HOCP97-609	11P10	12246	44.4	276	2.13	41745	12.8
L16-349	HOCP02-623	L06-001	6816	25	273	1.28	39023	12
L16-350	L99-233	11P2	8085	30.8	262	1.58	39023	12
L16-352	LCP85-384	11P22	7449	28.1	265	1.94	29040	13.5
L16-353	HOCP02-623	11P19	6730	25.6	262	1.27	40384	11.1
L16-354	HOCP08-726	L99-233	4906	18.4	267	1.21	30401	12.4
L16-355	LCP81-010	L99-226	7128	28.9	247	1.72	33578	9.5
L16-358	L09-099	L06-001	7915	29.2	271	1.28	45829	12.6
L16-359	HOCP04-847	11P19	1820	6.5	280	1.37	9529	13.3
L16-360	HOCP08-726	11P24	7890	29.6	267	1.19	49913	12.3
L16-361	HOCP01-517	11P22	7901	26.9	293	1.18	45829	14
L16-362	HOCP97-609	11P15	10918	38.4	284	1.44	53543	14.1
L16-363	L01-299	11P26	9687	35.6	272	1.53	46736	11.3
L16-364	HOCP04-838	L07-057	8982	34.2	262	1.41	48551	15.7
L16-365	L09-121	L99-226	4937	17.6	280	0.92	38569	11.7
L16-366	HOCP02-618	11P22	7666	27.4	280	1.42	38569	13.9
L16-367	HO06-563	11P28	6280	24.4	257	1.17	41745	13.3
L16-368	HOCP04-838	L08-090	5523	21.3	259	0.98	43560	11
L16-369	L09-099	L10-163	11292	43.4	260	1.77	49005	9.7
L16-372	LCP85-384	11P16	4428	18.1	245	1.09	33124	10.8
L16-373	L07-057	11P20	6392	25.1	254	1.34	37661	12.8
L16-374	HO95-988	L09-125	3040	11.3	269	1.22	18604	12.6
L16-375	HOCP97-609	11P10	5855	22	267	1.29	34031	13.8
L16-376	HOCP97-609	11P10	9180	36.8	249	1.75	42199	11.1
L16-377	HOCP92-624	HOCP01-523	8812	33.8	261	1.18	57173	13.4
L16-378	MISC	MISC	13343	50.1	266	1.91	52635	12.7
L16-379	HOCP00-930	L99-226	8800	34.1	258	1.84	37208	13
L16-380	HOCP97-609	11P15	9363	39.8	235	1.58	50366	11.7
L16-381	L08-090	11P2	11137	40.9	272	1.54	53089	11.9
L16-382	HOCP01-523	HOCP96-540	4417	16.2	273	0.92	35393	14.4
L16-385	HOCP04-838	L08-090	3708	15.2	244	1.56	19511	10.7
L16-386	HOCP00-930	L10-147	6481	26.8	242	2.19	24503	12.2
L16-387	HOCP04-838	L08-090	6785	24.8	273	1.71	29040	13.5
L16-388	HO09-827	L07-057	13996	52.3	267	1.85	56719	11.9
L16-389	HOCP04-838	11P18	9319	34.9	267	1.41	49459	11.6

Table 5. Continue.

Variety	Female	Male	Sugar Per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
L16-390	L01-299	11P27	9150	33.9	270	1.45	46736	13.1
L16-391	L09-099	L10-163	12192	46.1	264	2.61	35393	12.7
L16-392	L09-099	L10-163	8063	30.4	265	1.97	30855	10
Mean			7715	29	262	1.50	39335	12.3
Min.			3040	11	235	0.92	9529	9.5
Max.			13996	52	293	2.61	57173	15.7

Table 6. Advancement summary of the crosses in the 2009 through 2014 series.

			1 st Line		2 nd Line		Increases		Assignments	
				Rank		Rank		Rank		Rank
Female	Male	Survive	No	Percentile	No	Percentile	No	Percentile	No	Percentile
2009 Crossing Series										
CP83-644	HO06-562	457	1	13	1	29	.	.	.	.
CP83-644	HOCP01-517	2094	13	18	5	35	.	.	.	.
CP83-644	L08-093	1422	51	71	15	75	.	.	.	.
CP83-644	LCP85-384	842	23	64	13	90	.	.	.	.
HO05-961	HOCP96-540	436	10	55	6	84	.	.	.	.
HO06-537	HOCP02-610	222	0	5	0	10	.	.	.	.
HO06-563	HOCP96-540	217	10	84	2	70	.	.	.	.
HO06-563	L06-001	386	23	95	3	60	.	.	.	.
HO06-563	L99-226	208	10	90	0	10	.	.	.	.
HOCP00-930	US01-040	234	0	5	0	10	.	.	.	.
HOCP02-610	HO06-562	1136	35	67	11	71	.	.	.	.
HOCP02-610	HOCP01-523	1137	46	76	9	61	.	.	.	.
HOCP02-610	L06-001	233	10	80	1	42	.	.	.	.
HOCP02-610	L06-038	703	16	55	8	79	.	.	.	.
HOCP02-610	L94-428	390	8	47	0	10	.	.	.	.
HOCP02-610	L94-432	620	7	30	5	63	.	.	.	.
HOCP02-623	HO06-562	441	7	43	4	68	.	.	.	.
HOCP02-623	HOCP01-517	162	2	34	1	50	.	.	.	.
HOCP04-838	HOCP92-618	871	12	40	2	32	.	.	.	.
HOCP04-838	L08-089	413	0	5	0	10	.	.	.	.
HOCP05-902	L01-299	199	0	5	0	10	.	.	.	.
HOCP05-902	LCP86-454	142	3	47	0	10	.	.	.	.
HOCP05-918	L01-299	648	6	25	4	50	.	.	.	.
HOCP92-624	HOCP01-517	1013	23	55	3	40	.	.	.	.
HOCP92-624	HOCP06-523	1237	13	30	6	48	.	.	.	.
HOCP92-624	HOCP91-552	1078	75	96	7	53	.	.	.	.
HOCP92-624	L01-299	634	25	75	3	45	.	.	.	.
HOCP92-624	L06-001	204	10	93	5	96	.	.	.	.
HOCP92-624	L98-207	689	6	25	2	38	.	.	.	.
HOCP92-624	L99-226	823	14	45	1	21	.	.	.	.
HOCP96-561	L94-426	646	14	50	5	58	.	.	.	.
HOCP96-561	LCP85-384	453	5	30	1	29	.	.	.	.
L01-283	HOCP06-523	394	5	37	1	36	.	.	.	.
L01-315	HO06-523	694	5	20	1	23	.	.	.	.
L01-315	L01-283	477	1	13	1	25	.	.	.	.
L01-315	L06-038	432	2	16	0	10	.	.	.	.
L05-448	L06-001	384	18	86	10	98	.	.	.	.
L05-448	L06-038	542	22	78	7	81	.	.	.	.
L05-448	LCP85-384	833	7	23	4	46	.	.	.	.
L05-457	HOCP01-517	429	6	40	1	32	.	.	.	.

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	HOCP01-517	1662	3	13	1	20	.	.	.	.
L05-457	HOCP06-523	946	7	20	2	25	.	.	.	.
L05-457	HOCP91-552	145	12	98	2	84	.	.	.	.
L05-457	L01-299	458	22	90	4	66	.	.	.	.
L05-457	L99-226	346	11	70	5	86	.	.	.	.
L94-432	L08-076	1277	35	64	13	73	.	.	.	.
L98-207	HOCP01-517	668	9	37	5	56	.	.	.	.
L99-233	L99-226	590	0	5	0	10	.	.	.	.
LCP81-010	HO06-523	1056	51	90	22	93	.	.	.	.
LCP81-010	HOCP02-618	1488	46	67	17	79	.	.	.	.
LCP81-010	HOCP05-918	630	24	73	7	76	.	.	.	.
LCP81-010	L06-001	916	11	34	6	55	.	.	.	.
LCP81-010	L06-038	1527	70	84	36	95	.	.	.	.
LCP81-010	L99-226	242	6	59	2	65	.	.	.	.
LCP81-010	L99-226	1674	0	5	0	10	.	.	.	.
LCP86-454	L06-001	632	27	80	12	91	.	.	.	.
N27	L94-428	238	6	59	0	10	.	.	.	.
N27	L94-432	1848	41	50	8	42	.	.	.	.
US01-040	HOCP97-609	468	12	61	7	88	.	.	.	.
2010 Crossing Series										
HOCP04-838	L06-001	221	0	6	0	10	.	.	.	.
HOCP91-552	HOCP02-623	485	4	20	2	40	.	.	.	.
HOCP92-624	HO08-706	476	12	33	1	20	.	.	.	.
HOCP92-624	L09-106	206	8	60	3	66	.	.	.	.
HOCP92-624	L99-233	864	29	50	23	93	.	.	.	.
L01-283	10P29	462	23	80	6	53	.	.	.	.
L99-226	L06-038	401	3	13	0	10	.	.	.	.
LCP81-010	HO07-613	469	12	40	10	86	.	.	.	.
LCP81-010	HO08-706	581	20	50	9	73	.	.	.	.
LCP81-010	HO08-706	408	8	26	1	26	.	.	.	.
N27	HOCP96-540	732	29	66	10	60	.	.	.	.
N27	L06-001	811	43	86	6	46	.	.	.	.
N27	L94-426	696	29	73	11	80	.	.	.	.
N27	L99-226	494	35	93	2	33	.	.	.	.
2011 Crossing Series										
CP83-644	11P35	273	0	9	0	15	0	22	0	40
CP83-644	11P36	198	1	27	1	51	0	22	0	40
CP83-644	L01-283	186	7	68	1	54	0	22	0	40
HO06-563	11P11	385	16	72	2	52	0	22	0	40
HO06-563	11P28	495	3	28	1	34	1	50	1	88

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
HO06-563	11P29	484	20	72	1	35	1	54	0	40
HO07-613	L99-226	164	0	9	0	15	0	22	0	40
HO08-709	LCP86-454	700	46	89	10	86	7	94	0	40
HO08-717	11P22	223	6	55	2	71	1	75	0	40
HO08-717	11P23	381	11	58	3	67	1	58	0	40
HO08-717	11P26	222	3	38	3	84	1	76	0	40
HO08-717	11P32	488	0	9	0	15	0	22	0	40
HO08-717	L09-131	219	16	94	4	91	1	77	0	40
HO09-824	11P33	234	23	97	10	98	6	98	0	40
HO09-827	L07-057	738	27	66	7	74	5	88	1	83
HO09-827	LCP85-384	170	4	52	1	56	1	85	0	40
HO09-841	11P7	162	21	99	1	60	1	86	0	40
HO09-841	11P9	227	5	50	3	83	0	22	0	40
HO95-988	11P15	715	21	58	2	39	0	22	0	40
HO95-988	11P16	653	19	58	2	42	1	49	0	40
HO95-988	11P17	477	2	23	0	15	0	22	0	40
HO95-988	L09-125	251	14	83	3	80	1	66	1	94
HOCP00-930	11P26	813	50	87	6	65	2	57	0	40
HOCP00-930	HOCP96-561	485	0	9	0	15	0	22	0	40
HOCP00-930	L10-147	241	5	48	2	68	2	93	1	96
HOCP00-930	L99-226	692	13	47	2	41	2	61	1	83
HOCP00-930	L99-226	220	6	55	3	84	.	.	.	.
HOCP00-950	11P13	535	7	36	0	15	0	22	0	40
HOCP00-950	11P33	251	10	70	2	68	1	66	0	40
HOCP01-517	11P22	648	24	66	6	73	1	49	1	85
HOCP01-517	L01-283	244	2	30	0	15	0	22	0	40
HOCP01-523	HOCP96-540	250	10	70	4	89	4	98	1	95
HOCP01-523	HOCP96-561	360	22	86	1	39	1	59	0	40
HOCP01-523	LCP85-384	1185	43	65	11	73	6	81	0	40
HOCP02-618	11P13	478	0	9	0	15	0	22	0	40
HOCP02-618	11P22	439	47	98	11	95	6	96	1	91
HOCP02-618	11P29	221	8	65	0	15	0	22	0	40
HOCP02-623	11P17	192	6	60	0	15	0	22	0	40
HOCP02-623	11P18	251	2	30	0	15	0	22	0	40
HOCP02-623	11P19	949	15	41	6	61	4	69	1	81
HOCP02-623	L06-001	476	15	61	6	81	2	68	1	89
HOCP04-838	11P10	429	0	9	0	15	0	22	0	40
HOCP04-838	11P18	933	4	23	3	43	3	65	1	82
HOCP04-838	11P20	440	29	89	3	63	1	55	0	40
HOCP04-838	HOCP95-951	220	3	38	1	49	0	22	0	40
HOCP04-838	L07-057	548	9	41	4	65	3	83	1	86
HOCP04-838	L08-090	926	62	90	23	95	7	91	3	94

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
HOCP04-838	L08-090	396	10	53	3	66	2	81	0	40
HOCP04-847	11P19	250	4	41	3	80	2	91	1	95
HOCP08-726	11P24	686	34	80	8	79	5	90	1	84
HOCP08-726	L06-001	131	0	9	0	15	0	22	0	40
HOCP08-726	L08-090	145	4	56	4	96	1	88	0	40
HOCP08-726	L99-233	501	23	77	11	94	7	96	1	87
HOCP09-803	HOCP96-540	168	1	28	1	57	0	22	0	40
HOCP09-810	11P22	686	17	53	1	32	0	22	0	40
HOCP09-846	11P23	245	15	86	1	44	1	67	0	40
HOCP09-846	11P9	206	9	74	0	15	0	22	0	40
HOCP85-845	11P10	492	34	92	3	58	1	51	0	40
HOCP85-845	11P16	677	9	36	4	56	1	47	0	40
HOCP85-845	11P17	818	3	23	0	15	0	22	0	40
HOCP85-845	11P18	667	8	33	2	42	2	63	0	40
HOCP85-845	11P19	263	4	40	4	88	0	22	0	40
HOCP85-845	11P24	255	0	9	0	15	0	22	0	40
HOCP85-845	11P33	710	34	78	10	85	5	89	0	40
HOCP85-845	L01-283	57	1	44	0	15	0	22	0	40
HOCP85-845	L10-160	378	2	27	2	53	0	22	0	40
HOCP91-552	11P5	442	6	38	3	63	.	.	.	.
HOCP91-552	HOCP04-838	210	0	9	0	15	0	22	0	40
HOCP91-552	HOCP04-838	379	4	32	2	53	.	.	.	.
HOCP91-552	L01-299	881	0	9	0	15	0	22	0	40
HOCP92-618	11P33	225	4	44	1	47	0	22	0	40
HOCP92-618	L06-001	702	1	18	0	15	0	22	0	40
HOCP92-624	11P3	372	18	78	8	93	3	92	0	40
HOCP92-624	HOCP01-523	433	30	92	5	78	2	77	1	92
HOCP92-624	L05-457	448	15	62	3	62	2	73	0	40
HOCP92-624	L08-090	411	19	77	1	37	1	56	0	40
HOCP92-624	L09-125	1173	53	75	9	67	3	57	0	40
HOCP95-951	L01-299	116	0	9	0	15	.	.	.	.
HOCP95-951	L09-099	234	9	68	3	82	0	22	0	40
HOCP97-609	11P10	488	39	95	16	97	6	94	3	98
HOCP97-609	11P15	699	38	81	13	91	6	93	2	93
HOCP97-609	11P18	212	12	84	3	85	1	79	0	40
HOCP97-609	11P19	547	7	36	5	72	3	83	0	40
HOL08-723	11P25	419	14	62	5	80	2	79	0	40
HOL08-723	L01-283	215	8	66	0	15	0	22	0	40
L01-283	11P33	231	1	23	1	45	0	22	0	40
L01-299	11P26	475	32	90	9	92	6	95	1	90
L01-299	11P27	500	23	77	1	34	1	50	1	87
L01-315	11P7	223	6	55	1	49	1	75	0	40

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
L01-315	HOCP95-951	265	0	9	0	15	.	.	.	.
L01-315	L99-233	754	0	9	0	15	0	22	0	40
L05-448	11P28	235	3	36	1	45	1	70	0	40
L05-448	11P5	215	1	27	0	15	0	22	0	40
L06-001	11P17	231	13	83	4	90	1	71	0	40
L06-040	11P25	475	1	19	1	35	0	22	0	40
L06-040	L05-448	151	6	70	0	15	0	22	0	40
L06-040	L99-233	208	8	68	2	75	1	80	0	40
L07-057	11P20	486	14	58	7	87	1	53	1	89
L07-057	HOCP91-552	226	1	23	1	47	.	.	.	.
L08-088	11P28	230	1	23	0	15	0	22	0	40
L08-090	11P2	583	40	92	6	77	2	66	1	86
L08-090	11P2	625	2	20	0	15	.	.	.	.
L08-090	11P3	642	32	80	6	73	2	64	0	40
L09-099	11P16	612	0	9	0	15	0	22	0	40
L09-099	L01-283	445	36	96	3	62	2	76	0	40
L09-099	L06-001	685	33	78	9	82	2	62	1	84
L09-099	L10-163	228	18	95	11	99	7	99	3	99
L09-099	L99-233	235	0	9	0	15	0	22	0	40
L09-107	11P27	116	0	9	0	15	0	22	0	40
L09-107	L09-125	485	8	41	5	77	1	53	0	40
L09-108	HOCP01-523	728	13	44	2	37	0	22	0	40
L09-108	HOCP92-618	452	0	9	0	15	0	22	0	40
L09-121	L98-207	762	0	9	0	15	0	22	0	40
L09-121	L99-226	138	4	58	3	94	1	89	1	98
L09-123	HOCP96-540	225	4	44	0	15	0	22	0	40
L09-123	L99-233	137	3	50	2	87	2	97	0	40
L10-132	11P2	195	5	54	1	51	1	82	0	40
L10-132	11P3	203	0	9	0	15	0	22	0	40
L10-147	HOCP96-540	680	5	29	1	32	0	22	0	40
L94-426	11P14	233	3	36	2	70	1	71	0	40
L94-426	11P15	386	0	9	0	15	0	22	0	40
L94-426	HOCP96-561	180	13	93	3	90	1	84	0	40
L94-426	L06-001	202	14	92	6	97	0	22	0	40
L94-426	L99-226	185	0	9	0	15	0	22	0	40
L94-428	11P11	684	20	58	7	76	4	84	0	40
L94-433	11P11	498	6	33	0	15	0	22	0	40
L94-433	11P14	485	16	62	3	60	0	22	0	40
L94-433	HOCP96-540	699	3	23	1	31	1	47	0	40
L98-207	11P15	543	0	9	0	15	0	22	0	40
L98-207	11P19	669	12	44	3	49	1	48	0	40
L99-223	11P22	705	15	48	7	75	3	70	0	40

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
L99-226	11P13	514	0	9	0	15	0	22	0	40
L99-226	11P14	160	10	88	3	92	1	87	0	40
L99-226	11P15	239	1	23	0	15	0	22	0	40
L99-226	11P16	1292	16	33	11	69	6	78	0	40
L99-226	11P17	971	18	47	4	44	2	53	0	40
L99-233	11P2	334	7	48	3	71	1	62	1	93
L99-233	11P3	419	0	9	0	15	0	22	0	40
L99-233	11P4	634	0	9	0	15	0	22	0	40
LCP81-010	11P17	490	22	75	3	58	1	52	0	40
LCP81-010	11P28	700	0	9	0	15	0	22	0	40
LCP81-010	L09-125	776	19	52	4	52	.	.	.	.
LCP81-010	L10-132	952	72	94	2	35	1	45	0	40
LCP81-010	L10-132	166	15	97	8	99	.	.	.	.
LCP81-010	L99-226	1046	45	73	6	55	3	60	1	81
LCP81-010	L99-226	133	13	97	2	88	.	.	.	.
LCP85-384	11P10	691	5	29	1	31	0	22	0	40
LCP85-384	11P12	586	0	9	0	15	0	22	0	40
LCP85-384	11P15	575	0	9	0	15	0	22	0	40
LCP85-384	11P16	164	2	33	1	58	1	86	1	97
LCP85-384	11P17	696	40	84	4	55	0	22	0	40
LCP85-384	11P22	453	18	70	4	70	2	72	1	91
LCP85-384	11P25	224	10	75	1	49	1	73	0	40
LCP85-384	11P28	688	40	85	5	65	3	72	0	40
LCP85-384	11P31	850	8	31	0	15	0	22	0	40
LCP85-384	11P33	434	24	82	5	78	1	55	0	40
LCP85-384	L10-160	228	8	64	0	15	0	22	0	40
LCP85-384	L99-226	334	0	9	0	15	0	22	0	40
N27	L10-144	115	0	9	0	15	0	22	0	40
N27	L10-157	696	42	85	2	41	.	.	.	.
N27	L10-163	158	6	68	1	61	0	22	0	40
N27	L99-226	695	22	61	2	41	2	61	0	40
N27	L99-233	632	10	41	3	50	2	64	0	40
US79-010	11P14	549	0	9	0	15	0	22	0	40
US79-010	11P17	230	5	50	1	45	0	22	0	40
US79-010	11P30	192	10	81	0	15	0	22	0	40
US79-010	11P31	976	4	23	2	34	1	45	0	40
US79-010	L05-448	717	2	20	2	39	1	46	0	40
US79-010	L99-226	1126	21	47	3	37	3	59	0	40
2012 Crossing Series										
CP83-644	12P16	948	18	64	13	86	9	84	.	.
CP83-644	HOCP04-838	444	11	72	7	90	6	93	.	.

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
CP83-644	L06-001	1414	42	77	13	75	9	72	.	.
CP83-644	L06-001	220	1	40	1	57	.	.	.	.
HO05-961	L01-299	410	0	16	0	21	0	25	.	.
HO06-530	HOCP96-540	504	0	16	0	21	0	25	.	.
HO06-530	L11-182	451	2	36	0	21	0	25	.	.
HO06-563	L11-182	448	0	16	0	21	0	25	.	.
HO06-563	L99-226	399	6	57	3	69	3	75	.	.
HO07-613	L08-090	227	0	16	0	21	0	25	.	.
HO07-613	LCP85-384	972	7	45	2	45	2	51	.	.
HO08-709	12P17	389	7	62	3	69	3	77	.	.
HO08-709	HOCP96-540	419	8	64	1	48	1	55	.	.
HO08-709	L08-090	224	2	47	0	21	0	25	.	.
HO08-709	L99-226	229	0	16	0	21	0	25	.	.
HO08-709	L99-226	1182	14	52	2	43	0	25	.	.
HO08-709	LCP85-384	866	0	16	0	21	0	25	.	.
HO08-717	12P17	587	0	16	0	21	0	25	.	.
HO08-717	L06-001	434	16	85	4	75	4	83	.	.
HO09-832	L11-182	250	0	16	0	21	0	25	.	.
HO09-840	12P3	388	2	40	0	21	0	25	.	.
HO95-951	L99-233	657	21	79	10	89	5	76	.	.
HOCP00-950	HOCP04-838	959	14	57	4	56	4	63	.	.
HOCP00-950	L06-001	243	3	52	1	54	0	25	.	.
HOCP00-950	L94-428	235	2	47	0	21	0	25	.	.
HOCP01-517	L01-299	376	7	64	1	50	1	56	.	.
HOCP01-517	L06-001	781	53	94	14	92	12	94	.	.
HOCP01-517	L07-057	693	34	91	15	95	7	86	.	.
HOCP01-523	L01-299	227	0	16	0	21	0	25	.	.
HOCP02-618	HOCP96-540	206	7	82	5	96	4	96	.	.
HOCP04-838	HOCP01-523	478	38	97	14	98	11	98	.	.
HOCP04-838	L10-147	200	1	40	1	60	1	68	.	.
HOCP09-804	L99-233	234	9	86	0	21	0	25	.	.
HOCP09-814	12P17	411	17	89	6	87	5	91	.	.
HOCP09-814	LCP85-384	437	8	62	4	75	5	89	.	.
HOCP85-845	12P11	546	17	78	3	64	2	61	.	.
HOCP85-845	HOCP96-540	225	0	16	0	21	0	25	.	.
HOCP85-845	HOCP96-540	372	4	50	1	50	1	57	.	.
HOCP85-845	HOCP96-540	243	0	16	0	21	0	25	.	.
HOCP85-845	L06-001	236	1	36	0	21	0	25	.	.
HOCP85-845	L06-001	748	6	46	4	62	4	70	.	.
HOCP85-845	L08-090	209	0	16	0	21	0	25	.	.
HOCP85-845	L11-172	139	0	16	0	21	0	25	.	.
HOCP85-845	L11-172	497	0	16	0	21	0	25	.	.

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
HOCP85-845	L99-226	499	0	16	0	21	0	25	.	.
HOCP85-845	L99-226	467	0	16	0	21	0	25	.	.
HOCP91-552	12P11	373	0	16	0	21	0	25	.	.
HOCP91-552	12P11	1054	0	16	0	21	.	.	.	.
HOCP91-552	12P12	839	3	36	0	21	0	25	.	.
HOCP91-552	12P12	118	0	16	0	21	.	.	.	.
HOCP91-552	12P5	168	0	16	0	21	0	25	.	.
HOCP91-552	HOCP01-523	257	10	87	3	80	1	62	.	.
HOCP91-552	L01-283	473	3	43	1	45	1	52	.	.
HOCP91-552	L01-299	127	0	16	0	21	0	25	.	.
HOCP91-552	L08-090	295	0	16	0	21	0	25	.	.
HOCP91-552	LCP85-384	193	0	16	0	21	0	25	.	.
HOCP92-618	HOCP96-540	473	0	16	0	21	0	25	.	.
HOCP92-618	L01-299	220	0	16	0	21	0	25	.	.
HOCP92-624	12P1	152	5	80	2	84	0	25	.	.
HOCP92-624	HOCP01-523	459	11	70	5	78	5	87	.	.
HOCP92-624	HOCP04-847	381	8	66	4	78	3	77	.	.
HOCP92-624	HOCP91-552	812	30	85	10	81	5	70	.	.
HOCP92-624	HOCP96-540	217	10	90	2	75	2	83	.	.
HOCP92-624	HOCP96-540	497	12	70	4	70	1	51	.	.
HOCP92-624	L07-057	871	30	82	10	80	7	78	.	.
HOCP92-624	L08-090	448	36	98	6	84	5	89	.	.
HOCP92-624	L11-172	246	12	91	2	71	2	79	.	.
HOCP92-624	L11-190	248	3	52	1	53	0	25	.	.
HOCP92-624	L99-233	765	53	95	13	92	8	87	.	.
HOCP92-624	L99-233	197	8	89	1	61	1	69	.	.
HOCP95-951	HOCP96-540	948	19	65	7	68	3	60	.	.
HOCP95-951	L01-299	450	3	45	0	21	0	25	.	.
HOCP95-951	L09-099	395	6	57	2	61	0	25	.	.
HOCP95-951	L09-099	105	0	16	0	21	.	.	.	.
HOCP96-540	12P17	410	1	33	1	48	1	56	.	.
HOCP96-561	12P15	238	8	82	0	21	0	25	.	.
HOCP96-561	12P16	484	19	87	4	72	3	71	.	.
HOCP96-561	HOCP96-540	466	3	43	0	21	0	25	.	.
HOCP96-561	L06-001	432	6	56	0	21	0	25	.	.
HOCP97-609	12P6	674	24	84	11	90	8	91	.	.
HOCP97-609	12P8	387	0	16	0	21	0	25	.	.
HOCP97-609	12P9	200	8	88	3	88	1	68	.	.
L01-283	12P14	247	0	16	0	21	0	25	.	.
L01-299	12P8	244	8	80	1	54	0	25	.	.
L01-299	HOCP04-838	117	0	16	0	21	0	25	.	.
L01-299	L99-226	187	0	16	0	21	0	25	.	.

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
L05-448	L08-090	617	4	43	1	43	0	25	.	.
L05-448	L99-233	310	0	16	0	21	0	25	.	.
L05-457	12P14	222	6	73	3	85	2	81	.	.
L05-457	L01-299	440	2	40	1	47	1	53	.	.
L05-457	L99-233	686	37	92	13	94	8	90	.	.
L05-457	L99-233	467	27	93	6	83	4	80	.	.
L07-057	12P1	428	1	33	1	47	1	54	.	.
L08-090	12P1	1420	7	40	4	50	4	58	.	.
L09-099	HOCP96-540	626	8	54	4	66	4	73	.	.
L09-099	HOCP96-540	459	8	60	4	73	4	81	.	.
L09-099	L06-001	210	2	49	1	59	1	67	.	.
L09-099	L06-001	430	7	59	3	67	2	65	.	.
L09-099	L10-141	204	3	57	1	60	1	67	.	.
L09-099	L11-172	185	2	50	1	63	0	25	.	.
L09-099	L11-190	231	0	16	0	21	0	25	.	.
L09-123	L06-001	408	1	33	0	21	0	25	.	.
L09-131	12P11	1312	39	77	6	58	4	59	.	.
L09-131	12P12	476	26	92	4	72	4	79	.	.
L09-131	HOCP96-540	433	9	66	6	86	6	93	.	.
L09-131	HOCP96-540	328	6	62	2	66	1	59	.	.
L09-131	HOCP96-561	192	14	95	3	89	2	86	.	.
L09-131	L01-299	213	5	68	1	58	1	66	.	.
L09-131	L07-057	413	14	82	4	76	1	55	.	.
L09-131	L99-233	222	0	16	0	21	0	25	.	.
L10-138	12P1	434	12	75	4	75	4	83	.	.
L10-141	12P11	481	2	36	1	45	0	25	.	.
L10-141	12P6	444	1	33	0	21	0	25	.	.
L10-141	12P7	440	0	16	0	21	0	25	.	.
L10-148	12P16	175	0	16	0	21	0	25	.	.
L10-148	L05-448	1107	0	16	0	21	0	25	.	.
L10-148	LCP85-384	818	0	16	0	21	0	25	.	.
L10-156	12P6	391	0	16	0	21	0	25	.	.
L10-156	L99-226	855	48	93	24	97	19	97	.	.
L10-163	12P10	223	0	16	0	21	0	25	.	.
L10-163	L99-226	350	1	34	0	21	0	25	.	.
L11-167	HOCP96-561	417	12	76	5	81	3	74	.	.
L11-168	HOCP09-800	90	0	16	0	21	0	25	.	.
L11-168	L99-226	447	2	36	2	57	2	65	.	.
L11-169	L05-448	251	20	98	1	53	0	25	.	.
L11-171	12P15	437	0	16	0	21	0	25	.	.
L11-173	L94-428	234	0	16	0	21	0	25	.	.
L11-174	L05-448	483	3	43	2	54	2	62	.	.

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
L11-174	L06-001	313	3	49	1	51	1	60	.	.
L11-180	HOCP96-540	391	0	16	0	21	0	25	.	.
L11-182	12P16	207	0	16	0	21	0	25	.	.
L11-182	12P16	238	7	76	3	82	.	.	.	.
L11-183	L01-299	225	8	84	5	96	3	92	.	.
L11-183	L06-001	195	17	99	8	99	5	99	.	.
L11-183	L09-099	182	2	50	2	79	2	88	.	.
L11-183	L99-226	215	2	47	0	21	0	25	.	.
L11-189	12P16	357	10	75	6	91	6	95	.	.
L97-128	HOCP96-540	499	5	49	1	44	1	50	.	.
L97-128	L01-299	463	0	16	0	21	0	25	.	.
L98-207	HOCP96-540	426	2	40	0	21	0	25	.	.
L98-207	L01-299	385	1	34	0	21	0	25	.	.
L98-207	L09-099	217	4	62	4	93	2	83	.	.
L98-207	L99-226	229	0	16	0	21	0	25	.	.
L98-207	L99-233	698	9	54	4	65	3	64	.	.
L98-207	LCP85-384	192	0	16	0	21	0	25	.	.
L98-209	HOCP04-838	325	9	75	7	95	7	96	.	.
L99-233	12P1	698	16	68	9	83	7	85	.	.
L99-233	12P11	181	3	60	1	64	0	25	.	.
L99-233	12P2	273	0	16	0	21	0	25	.	.
L99-233	12P3	200	0	16	0	21	0	25	.	.
L99-233	12P6	355	27	96	14	98	9	98	.	.
LCP81-010	HOCP04-838	143	0	16	0	21	0	25	.	.
LCP81-010	HOCP96-540	921	18	65	9	77	6	74	.	.
LCP85-384	L01-283	166	0	16	0	21	0	25	.	.
LCP85-384	L99-233	411	9	67	3	67	3	75	.	.
N27	HOCP04-847	232	3	54	0	21	0	25	.	.
N27	L05-448	933	22	70	5	63	4	63	.	.
N27	L05-448	238	6	72	1	56	.	.	.	.
N27	L06-001	1764	42	70	14	70	11	72	.	.
N27	L06-001	343	26	96	5	87	.	.	.	.
N27	L07-057	439	6	56	1	47	1	53	.	.
N27	L99-226	1444	50	83	26	93	21	94	.	.
N27	L99-233	474	0	16	0	21	0	25	.	.
N27	L99-233	827	21	72	3	52	1	50	.	.
L97-128	L99-226	.	0	.	2	.	1	.	.	.
LCP81-010	L99-226	.	0	.	5	.	3	.	.	.
LCP85-384	11P22	.	0	.	6	.	4	.	.	.
N27	L99-233	.	0	.	2	.	1	.	.	.

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
2013 Crossing Series										
HO07-613	13P21	234	0	15	0	22	.	.	.	.
HO08-709	CP06-2897	109	5	83	0	22	.	.	.	.
HO08-730	HOCP04-852	206	5	64	1	56	.	.	.	.
HO089-711	CP03-2390	223	2	39	1	53	.	.	.	.
HO09-824	POLY12-26	106	0	15	0	22	.	.	.	.
HO09-840	HOCP04-838	241	7	70	4	81	.	.	.	.
HO10-937	13P10	172	9	87	8	95	.	.	.	.
HO91-552	HOCP04-838	1138	18	55	3	45	.	.	.	.
HOCP01-517	13P12	886	28	75	4	53	.	.	.	.
HOCP01-517	HOCP96-540	227	8	79	7	93	.	.	.	.
HOCP01-517	L99-226	205	4	59	3	70	.	.	.	.
HOCP01-552	L01-299	361	3	34	0	22	.	.	.	.
HOCP09-808	CP95-1039	234	7	72	1	50	.	.	.	.
HOCP09-814	POLY12-30	109	3	68	1	64	.	.	.	.
HOCP09-846	HOCP09-814	220	0	15	0	22	.	.	.	.
HOCP11-544	13P3	185	10	91	5	91	.	.	.	.
HOCP85-845	L99-226	157	4	66	3	85	.	.	.	.
HOCP85-845	L99-233	162	2	45	1	58	.	.	.	.
HOCP91-552	13P10	185	0	15	0	22	.	.	.	.
HOCP91-552	L01-299	158	0	15	0	22	.	.	.	.
HOCP91-552	L08-090	131	0	15	0	22	.	.	.	.
HOCP91-552	L99-226	164	2	45	0	22	.	.	.	.
HOCP91-552	L99-233	918	2	31	0	22	.	.	.	.
HOCP92-624	13P19	127	12	95	2	75	.	.	.	.
HOCP92-624	13P20	134	2	52	2	72	.	.	.	.
HOCP92-624	13P3	454	18	81	4	62	.	.	.	.
HOCP92-624	HO11-556	432	6	50	0	22	.	.	.	.
HOCP92-624	L01-299	110	1	39	0	22	.	.	.	.
HOCP92-624	L07-057	2883	67	62	31	68	.	.	.	.
HOCP95-951	L11-172	247	2	34	1	47	.	.	.	.
HOCP96-540	13P12	249	5	59	4	77	.	.	.	.
HOCP96-540	L99-226	475	0	15	0	22	.	.	.	.
HOCP96-540	L99-233	1908	22	45	13	60	.	.	.	.
HOCP96-540	LCP81-010	354	0	15	0	22	.	.	.	.
HOCP96-540	LCP85-384	184	0	15	0	22	.	.	.	.
L06-040	L99-226	116	0	15	0	22	.	.	.	.
L07-057	13P12	238	12	85	6	89	.	.	.	.
L09-123	HOCP91-552	106	9	93	2	83	.	.	.	.
L10-138	L07-057	126	0	15	0	22	.	.	.	.
L12-197	L01-299	245	4	55	4	79	.	.	.	.

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
L12-197	L08-090	204	22	97	15	97	.	.	.	.
L12-205	HOCP04-838	118	0	15	0	22	.	.	.	.
L99-226	L01-299	246	13	89	6	87	.	.	.	.
L99-233	HOCP04-838	152	0	15	0	22	.	.	.	.
LCP81-010	13P5	205	7	77	2	66	.	.	.	.
MISC	MISC	230	2	39	0	22	.	.	.	.
US01-040	13P12	233	0	15	0	22	.	.	.	.
2014 Crossing Series										
HO05-961	HOCP01-517	85	0	15	.	.	.	.	.	.
HO05-961	HOCP09-814	198	0	15	.	.	.	.	.	.
HO06-530	10P26	419	6	43	.	.	.	.	.	.
HO06-563	L199-226	162	0	15	.	.	.	.	.	.
HO07-613	HOCP09-814	287	0	15	.	.	.	.	.	.
HO07-613	HOCP09-814	203	0	15	.	.	.	.	.	.
HO07-613	L06-001	476	15	67	.	.	.	.	.	.
HO08-709	L99-226	242	6	60	.	.	.	.	.	.
HO08-717	L09-099	210	0	15	.	.	.	.	.	.
HO08-730	HOCP10-917	257	3	39	.	.	.	.	.	.
HO08-730	L11-172	388	4	36	.	.	.	.	.	.
HO09-827	HOCP01-523	154	2	41	.	.	.	.	.	.
HO09-840	HOCP11-504	105	0	15	.	.	.	.	.	.
HO09-840	HOCP11-542	136	6	80	.	.	.	.	.	.
HO09-840	L06-001	1078	48	82	.	.	.	.	.	.
HO09-840	L08-090	375	8	54	.	.	.	.	.	.
HO09-9401	HOCP04-838	464	8	46	.	.	.	.	.	.
HO09-9401	HOCP91-552	441	24	89	.	.	.	.	.	.
HO09-9401	L99-233	171	5	64	.	.	.	.	.	.
HO09-9402	L11-191	618	22	71	.	.	.	.	.	.
HO10-908	L09-099	218	12	89	.	.	.	.	.	.
HO10-937	HOCP96-540	178	7	75	.	.	.	.	.	.
HO10-937	L06-001	375	20	88	.	.	.	.	.	.
HO10-937	L06-001	479	9	50	.	.	.	.	.	.
HO11-511	HO07-613	348	0	15	.	.	.	.	.	.
HO11-512	HO07-613	138	0	15	.	.	.	.	.	.
HO11-512	HOCP05-920	227	0	15	.	.	.	.	.	.
HO11-512	HOCP09-814	186	0	15	.	.	.	.	.	.
HO11-528	HOCP01-517	246	14	90	.	.	.	.	.	.
HO11-531	HOCP96-540	131	5	74	.	.	.	.	.	.
HO11-532	L11-172	349	15	80	.	.	.	.	.	.
HO11-556	HO10-937	143	0	15	.	.	.	.	.	.
HO11-556	HO11-529	235	0	15	.	.	.	.	.	.

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
HO11-556	HOCP01-517	125	5	77	.	.	.	.	.	.
HO11-556	HOCP04-838	132	5	74	.	.	.	.	.	.
HO11-563	HO10-937	121	0	15	.	.	.	.	.	.
HO11-573	HOCP96-540	242	11	82	.	.	.	.	.	.
HO12-512	L81-010	479	19	77	.	.	.	.	.	.
HO12-621	LCP85-384	341	13	74	.	.	.	.	.	.
HO12-9411	14P2	247	8	67	.	.	.	.	.	.
HOCP00-930	11P24	1224	52	79	.	.	.	.	.	.
HOCP00-950	HOCP96-540	237	0	15	.	.	.	.	.	.
HOCP00-950	L06-001	228	23	97	.	.	.	.	.	.
HOCP01-517	HOCP04-838	222	0	15	.	.	.	.	.	.
HOCP01-517	HOCP05-918	410	0	15	.	.	.	.	.	.
HOCP01-517	HOCP96-540	134	8	92	.	.	.	.	.	.
HOCP01-517	L01-299	961	18	50	.	.	.	.	.	.
HOCP01-517	L06-001	212	3	43	.	.	.	.	.	.
HOCP02-618	L99-233	476	40	96	.	.	.	.	.	.
HOCP03-743	HO11-529	243	0	15	.	.	.	.	.	.
HOCP04-838	L07-057	178	2	37	.	.	.	.	.	.
HOCP05-920	HO05-961	133	0	15	.	.	.	.	.	.
HOCP08-726	HOCP10-900	262	3	37	.	.	.	.	.	.
HOCP08-726	L99-226	232	1	32	.	.	.	.	.	.
HOCP09-804	HO11-556	202	0	15	.	.	.	.	.	.
HOCP09-804	HOCP96-540	458	0	15	.	.	.	.	.	.
HOCP11-504	L09-099	172	4	56	.	.	.	.	.	.
HOCP11-516	14P4	241	19	95	.	.	.	.	.	.
HOCP12-674	L99-226	107	0	15	.	.	.	.	.	.
HOCP85-845	L06-001	1500	56	72	.	.	.	.	.	.
HOCP91-552	10P12	666	5	34	.	.	.	.	.	.
HOCP91-552	10P13	127	3	58	.	.	.	.	.	.
HOCP91-552	12P11	618	0	15	.	.	.	.	.	.
HOCP91-552	14P3	217	3	43	.	.	.	.	.	.
HOCP91-552	L199-226	224	11	85	.	.	.	.	.	.
HOCP91-552	L99-233	135	0	15	.	.	.	.	.	.
HOCP91-552	L99-233	169	3	48	.	.	.	.	.	.
HOCP92-618	HOCP04-838	239	5	54	.	.	.	.	.	.
HOCP92-624	HOCP04-838	133	0	15	.	.	.	.	.	.
HOCP92-624	HOCP91-552	227	7	66	.	.	.	.	.	.
HOCP92-624	HOCP92-618	112	11	97	.	.	.	.	.	.
HOCP92-624	HOCP96-540	1631	48	64	.	.	.	.	.	.
HOCP92-624	L04-425	509	18	70	.	.	.	.	.	.
HOCP92-624	L06-001	1535	55	71	.	.	.	.	.	.
HOCP92-624	L07-057	896	20	55	.	.	.	.	.	.

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	L13-248	183	30	99	.	.	.	.	.	.
HOCP92-624	L99-233	359	4	37	.	.	.	.	.	.
HOCP92-624	L99-233	138	0	15	.	.	.	.	.	.
HOCP92-624	L99-233	1338	56	79	.	.	.	.	.	.
HOCP92-624	LCP85-384	1789	84	84	.	.	.	.	.	.
HOCP95-951	HOCP92-618	184	6	68	.	.	.	.	.	.
HOCP95-951	HOCP96-540	224	4	48	.	.	.	.	.	.
HOCP95-951	L01-299	242	12	86	.	.	.	.	.	.
HOCP96-540	10P22	706	9	41	.	.	.	.	.	.
HOCP96-540	10P27	244	12	85	.	.	.	.	.	.
HOCP96-540	11P27	557	11	52	.	.	.	.	.	.
HOCP96-540	11P30	602	0	15	.	.	.	.	.	.
HOCP96-561	HO09-832	235	5	54	.	.	.	.	.	.
HOCP97-609	HO06-563	392	9	56	.	.	.	.	.	.
HOL08-723	11P27	882	36	78	.	.	.	.	.	.
L01-283	HO12-615	222	6	63	.	.	.	.	.	.
L01-283	L99-226	254	0	15	.	.	.	.	.	.
L01-299	HO11-529	257	3	39	.	.	.	.	.	.
L01-299	HOCP01-517	243	1	32	.	.	.	.	.	.
L01-299	L06-001	146	9	92	.	.	.	.	.	.
L01-299	L09-112	451	11	58	.	.	.	.	.	.
L01-299	L99-226	232	11	84	.	.	.	.	.	.
L01-315	10P12	466	2	32	.	.	.	.	.	.
L01-315	11P7	172	0	15	.	.	.	.	.	.
L03-371	HOCP04-852	147	0	15	.	.	.	.	.	.
L03-371	HOCP05-918	165	0	15	.	.	.	.	.	.
L05-448	13P10	170	0	15	.	.	.	.	.	.
L05-448	HOCP11-548	368	25	94	.	.	.	.	.	.
L05-457	HOCP11-504	1376	53	75	.	.	.	.	.	.
L05-457	L04-425	259	7	63	.	.	.	.	.	.
L05-457	L09-099	437	30	94	.	.	.	.	.	.
L05-457	L99-226	447	7	45	.	.	.	.	.	.
L05-457	L99-226	415	22	88	.	.	.	.	.	.
L05-457	L99-226	477	16	69	.	.	.	.	.	.
L05-457	L99-233	375	22	91	.	.	.	.	.	.
L05-457	L99-233	1806	37	52	.	.	.	.	.	.
L07-057	L99-233	374	40	98	.	.	.	.	.	.
L08-90	HOCP04-838	228	0	15	.	.	.	.	.	.
L08-90	HOCP04-838	467	1	30	.	.	.	.	.	.
L08-90	HOCP11-504	245	0	15	.	.	.	.	.	.
L08-90	HOCP96-540	186	19	98	.	.	.	.	.	.
L09-099	14P18	112	2	48	.	.	.	.	.	.

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
L09-099	HOCP04-838	474	17	71	.	.	.	.	.	.
L09-099	HOCP09-804	111	0	15	.	.	.	.	.	.
L09-099	HOCP11-504	118	6	87	.	.	.	.	.	.
L09-112	HO05-961	374	0	15	.	.	.	.	.	.
L09-112	HO07-613	171	0	15	.	.	.	.	.	.
L09-112	HO11-529	105	0	15	.	.	.	.	.	.
L09-112	HOCP04-838	256	13	87	.	.	.	.	.	.
L09-112	HOCP96-540	235	0	15	.	.	.	.	.	.
L09-112	L09-112	264	18	94	.	.	.	.	.	.
L09-118	10P31	458	23	86	.	.	.	.	.	.
L09-121	11P24	1012	12	39	.	.	.	.	.	.
L09-121	11P25	1135	4	32	.	.	.	.	.	.
L09-123	HOCP04-838	1057	37	70	.	.	.	.	.	.
L09-123	HOCP11-548	434	8	48	.	.	.	.	.	.
L09-123	HOCP96-540	591	44	95	.	.	.	.	.	.
L09-123	L05-448	1230	25	52	.	.	.	.	.	.
L10-148	12P17	186	0	15	.	.	.	.	.	.
L10-156	HO06-530	103	0	15	.	.	.	.	.	.
L10-156	HO07-613	182	0	15	.	.	.	.	.	.
L10-156	HOCP09-804	193	0	15	.	.	.	.	.	.
L11-172	HOCP96-540	687	6	35	.	.	.	.	.	.
L11-172	L11-187	133	4	65	.	.	.	.	.	.
L11-174	L99-226	134	6	82	.	.	.	.	.	.
L11-183	HO11-532	340	7	54	.	.	.	.	.	.
L11-183	HOCP10-917	154	0	15	.	.	.	.	.	.
L11-183	L13-261	236	5	54	.	.	.	.	.	.
L11-183	L99-226	207	0	15	.	.	.	.	.	.
L11-187	HOCP96-540	244	0	15	.	.	.	.	.	.
L11-191	14P18	134	6	82	.	.	.	.	.	.
L11-191	HOCP11-504	141	2	43	.	.	.	.	.	.
L11-191	HOCP12-666	199	0	15	.	.	.	.	.	.
L12-197	L99-226	438	18	78	.	.	.	.	.	.
L12-197	L99-226	243	14	91	.	.	.	.	.	.
L12-201	HO10-937	181	0	15	.	.	.	.	.	.
L12-201	HO11-529	271	2	33	.	.	.	.	.	.
L12-201	HO11-532	248	0	15	.	.	.	.	.	.
L12-201	HOCP01-517	127	2	45	.	.	.	.	.	.
L12-202	HO10-937	249	0	15	.	.	.	.	.	.
L12-202	L09-112	239	16	93	.	.	.	.	.	.
L12-218	L99-226	228	7	66	.	.	.	.	.	.
L12-232	HOCP04-838	370	12	67	.	.	.	.	.	.
L13-234	L98-209	460	8	46	.	.	.	.	.	.

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
L13-237	L01-299	244	4	45	.	.	.	.	.	.
L13-239	HO11-532	199	6	65	.	.	.	.	.	.
L13-239	L01-299	230	13	90	.	.	.	.	.	.
L13-239	L07-057	443	4	35	.	.	.	.	.	.
L13-241	LCP85-384	964	44	83	.	.	.	.	.	.
L13-246	HO12-9411	242	6	60	.	.	.	.	.	.
L13-246	HOCP92-624	140	0	15	.	.	.	.	.	.
L13-251	HOCP92-624	172	16	96	.	.	.	.	.	.
L13-254	HOCP96-540	116	3	62	.	.	.	.	.	.
L13-261	14P2	1249	5	32	.	.	.	.	.	.
L94-428	11P11	708	8	37	.	.	.	.	.	.
L94-432	10P31	112	0	15	.	.	.	.	.	.
L94-433	11P27	241	0	15	.	.	.	.	.	.
L94-433	HOCP04-838	162	3	50	.	.	.	.	.	.
L94-433	HOCP96-540	241	6	60	.	.	.	.	.	.
L98-207	L99-226	875	8	35	.	.	.	.	.	.
L98-209	HO11-556	190	0	15	.	.	.	.	.	.
L99-233	L01-299	199	0	15	.	.	.	.	.	.
LCP81-010	11P25	919	22	58	.	.	.	.	.	.
LCP81-010	L09-125	2063	78	74	.	.	.	.	.	.
LCP81-010	L99-233	381	15	75	.	.	.	.	.	.
LCP81-010	LCP85-384	767	10	41	.	.	.	.	.	.
LCP85-384	11P15	1103	27	58	.	.	.	.	.	.
LCP85-384	11P22	704	10	43	.	.	.	.	.	.
LCP85-384	11P30	685	23	69	.	.	.	.	.	.
LCP85-384	14P2	664	29	80	.	.	.	.	.	.
LCP85-384	HO11-528	117	0	15	.	.	.	.	.	.
LCP85-384	HOCP00-950	187	5	63	.	.	.	.	.	.
LCP85-384	L06-001	204	5	60	.	.	.	.	.	.
LCP85-384	L10-141	162	0	15	.	.	.	.	.	.
N27	L99-226	214	5	56	.	.	.	.	.	.
N27	L99-233	1636	29	48	.	.	.	.	.	.
N27	L99-233	369	0	15	.	.	.	.	.	.
N27	L99-233	252	3	39	.	.	.	.	.	.
N27	L99-233	691	2	30	.	.	.	.	.	.

2016 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 (Abbeville). 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, L01-299, L01-283, HoCP04-838 and HoCP09-804 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 2016 season was marked by higher than average rainfall, much of this amount occurred in August during the great flood of 2016. Rainfall was above normal for all months of 2016 except for October and November where rainfall was below normal. Temperatures throughout the year were normal to above normal. The Louisiana industry was spared of any tropical activity during the 2016 season. The industry received rainfall in late November, which helped to alleviate dry conditions. The majority of the Louisiana crop was harvested by the end of December. Recommended cultural practices were followed at all test locations.

The most widely grown varieties in Louisiana in 2016 were HoCP96-540 and L01-299, occupying 30% and 36% of the state's acreage, respectively. L01-299 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 L01-299 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. 2016 Location, soil texture, and planting and harvest dates for the nursery and infield tests.

					Harvest Date	Varieties	
Series	Location†	Stage	Soil Texture	Planting Date	2016	No. Planted	No. Harvested
2011	Donnie Vallot Farms	Infield	Patoutville silt loam	09/10/12	10/25/16	13	1
2011	Blackberry Farms	Infield	Commerce silt loam	08/17/12	10/13/16	13	1
2011	Newton Cane, Inc.	Nursery	Norwood silt loam	08/22/12	10/10/16	54	1
2012	Blackberry Farms	Infield	Commerce silt loam	08/30/13	10/13/16	21	1
2012	Donnie Vallot Farms	Infield	Patoutville silt loam	09/03/13	10/25/16	21	1
2012	Newton Cane, Inc	Nursery	Norwood silt loam	08/27/13	10/10/16	58	3
2012	Michael Melancon	Nursery	Loreauville silt loam	08/20/13	10/10/16	58	3
2012	Landry Farms	Nursery	Sharkey silty clay loam	08/22/13	11/14/16	58	3
2013	Sugar Research Station	Nursery	Commerce silt loam	10/29/13	11/11/16	30	3
2013	Ardoyne Farm – U.S.D.A.	Nursery	Commerce silt loam	10/31/13	11/14/16	30	3
2013	Iberia Research Station	Nursery	Baldwin silty clay	11/06/13	11/09/16	30	3
2013	Blackberry Farms	Infield	Commerce silt loam	08/26/14	10/13/16	34	5
2013	Donnie Vallot Farms	Infield	Patoutville silt loam	09/11/14	12/07/16	34	5
2013	Newton Cane, Inc.	Nursery	Norwood silt loam	08/20/14	10/10/16	67	12
2013	Michael Melancon	Nursery	Loreauville silt loam	08/22/14	11/17/16	67	12
2013	Landry Farms	Nursery	Sharkey silty clay loam	08/19/14	10/28/16	67	12
2014	Sugar Research Station	Nursery	Commerce silt loam	10/27/14	11/11/16	33	8
2014	Ardoyne Farm – U.S.D.A	Nursery	Commerce silt loam	10/30/14	11/14/16	33	8
2014	Iberia Research Station	Nursery	Baldwin silty clay	10/28/14	11/09/16	33	8
2014	Blackberry Farms	Infield	Commerce silt loam	08/25/15	12/07/16	36	18
2014	Donnie Vallot Farms	Infield	Patoutville silt loam	09/10/15	12/07/16	36	18
2014	Newton Cane, Inc.	Nursery	Norwood silt loam	08/11/15	11/14/16	77	26
2014	Michael Melancon	Nursery	Loreauville silt loam	09/01/15	11/17/16	77	26
2014	Landry Farms	Nursery	Sharkey silty clay loam	08/28/15	11/23/16	77	26
2015	Sugar Research Station	Nursery	Commerce silt loam	10/12/15	11/29/16	38	19
2015	Ardoyne Farm – U.S.D.A.	Nursery	Commerce silt loam	10/22/15	12/13/16	38	19
2015	Iberia Research Station	Nursery	Baldwin silty clay	10/15/15	11/30/16	38	19
2015	Blackberry Farms	Infield	Commerce silt loam	09/21/16		37	
2015	Sugar Research Station	Infield	Commerce Silty Clay loam	09/30/16		37	
2015	Newton Cane, Inc.	Nursery	Norwood silt loam	09/12/16		75	
2015	Michael Melancon	Nursery	Loreauville silt loam	09/23/16		75	
2015	Landry Farms	Nursery	Sharkey silty clay loam	08/25/16		75	
2016	Sugar Research Station	Nursery	Commerce silt loam	11/07/16		34	
2016	Ardoyne Farm – U.S.D.A.	Nursery	Commerce silt loam	11/14/16		34	
2016	Iberia Research Station	Nursery	Baldwin silty clay	11/09/16		33	

† 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. Off-station nursery third-stubble means of the 2011 “L” and “Ho” assignment series on a Moreland silt loam soil at Newton Cane, Inc. in Bunkie, Louisiana in 2016.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs./A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP96-540	8096	38.2	212	1.98	38660	11.2
L99-226	8720	37.0	236 +	1.92	38660	11.8
L01-299	9191	43.4 +	212	1.76	49368	12.6
L03-371	10542 +	44.3 +	238 +	1.89	47009	10.4
L11-183	9517 +	39.2	243 +	1.63	48279	11.6

Table 3. Off-station nursery second-stubble means of the 2012 “L”, “Ho”, and “HoCP” assignment series on a Moreland silt loam soil at Newton Cane, Inc. in Bunkie, Louisiana in 2016.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs./A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	6713	25.5	261	2.08	25047	12.0
L 99-226	8306	31.0	268	2.04	30492	11.7
L 01-283	7299	28.2	259	1.33	42290	12.2
L 01-299	8046	36.0	227	1.65	43560	11.9
HoCP 04-838	6286	26.8	237	1.56	33759	12.5
L 12-201	6885	25.3	272	1.88	27044	11.4
Ho 12-615	6705	29.2	230	1.37	42653	13.0
Ho 12-630	8346	33.7	248	2.21	31037	12.0

Table 4. Off-station nursery second-stubble means of the 2012 “L”, “Ho”, and “HoCP” assignment series on a Baldwin silty clay soil at Melancon Farms in Henderson, Louisiana in 2016.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs./A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	3843	12.8	302	0.98	25955 -	14.8
L 99-226	6357	21.0	299	1.37	30855 -	14.1
L 01-283	6202	21.5	286	1.12	38297	14.3
L 01-299	6997	24.1	283	1.04	45920	14.1
HoCP 04-838	5866	18.3	316	0.92	39204	15.3
L 12-201	6056	19.8	303	1.52	25955 -	12.3
Ho 12-615	9002	30.4	294	1.01	59714 +	13.8
Ho 12-630	8595	29.0	303	1.21	47735	13.8

Table 5. Off-station nursery second-stubble means of the 2012 “L”, “Ho”, and “HoCP” assignment series on a Commerce silt loam soil at Landry Farms in Paincourtville, Louisiana in 2016.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs./A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	5940 -	22.4 -	265	1.49	31581 -	14.0
L 99-226	10868	37.1 -	292 +	1.95	37934 -	13.6
L 01-283	9238 -	33.4 -	277	1.32	50639	13.7
L 01-299	12651	46.5	273	1.86	49913	13.6
HoCP 04-838	7450 -	29.1 -	256	1.50	39023 -	15.0
L 12-201	9698 -	34.7 -	279	2.03	34304 -	12.7
Ho 12-615	9565 -	36.4 -	263	1.37	53180	13.9
Ho 12-630	8309 -	29.7 -	280	1.57	37934 -	13.4

Table 6. Off-station nursery second-stubble means of the 2012 “L”, “Ho”, and “HoCP” assignment series across 3 locations (Newton, Melancon and Westfield) in 2016.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs./A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	5499 -	20.2 -	276	1.52	27528 -	13.6
L 99-226	8510	29.7	286	1.79	33094 -	13.2
L 01-283	7579	27.7 -	274	1.26	43742	13.4
L 01-299	9231	35.6	261	1.52	46464	13.2
HoCP 04-838	6534 -	24.7 -	269	1.33	37329 -	14.3 +
L 12-201	7546	26.6 -	285	1.81	29101 -	12.2 -
Ho 12-615	8424	32.0	262	1.25	51849	13.6 -
Ho 12-630	8417	30.8	277	1.66	38902	13.1

Table 7. Off-station nursery first-stubble means of the 2013 "L", "Ho", and "HoCP", assignment series on a Moreland silt loam soil at Newton Cane, Inc. in Bunkie, Louisiana in 2016.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs./A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	9100	40.2	224	2.43 +	32942	11.5 -
L 01-283	7795	37.5	209	1.63	46736	11.3 -
L 01-299	8146	37.7	216	1.88	40293	12.8
HoCP 04-838	9525	43.7	220	2.04	42653	12.1
L 13-234	4694	25.4	185 -	1.45	35120	11.8
L 13-251	8719	42.4	206	2.28	37389	10.9 -
L 13-257	7981	36.8	215	2.65 +	27770	10.0 -
Ho 13-708	9256	38.9	239	2.26	34394	13.2
HoCP 13-726	8730	36.6	238	1.51	48551	10.7 -
HoCP 13-737	9980	40.3	248 +	2.15	37389	10.3 -
HoCP 13-738	8028	36.5	219	2.08	35120	10.8 -
Ho 13-739	10634	46.4	229	2.04	46101	11.2 -
HoCP 13-740	9220	38.0	245 +	1.70	44558	12.4
HoCP 13-755	8791	38.1	232	1.71	44649	11.8
HoCP 13-758	10373	47.0	221	2.19	42834	8.9 -
HoCP 13-775	8571	36.7	233	1.80	41564	9.9 -

Table 8. Off-station nursery first-stubble means of the 2013 "L", "Ho", and "HoCP" assignment series on a Baldwin silty clay soil at Melancon Farms in Henderson, Louisiana in 2016.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs./A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	4929 -	15.5 -	318	1.44	21417 -	12.3
L 01-283	9656	30.0	321	1.57	38297	13.2
L 01-299	9227	28.0	328	1.74	31944	13.5
HoCP 04-838	7279	22.0	330	1.43	30855	13.3
L 13-234	4931 -	16.0 -	308 -	0.97 -	33033	14.7
L 13-251	6499	22.6	288 -	1.74	25229	13.6
L 13-257	5206 -	18.7	280 -	1.61 -	23051 -	11.9 -
Ho 13-708	8722	26.8	326	1.70	31400	13.6
HoCP 13-726	7163	21.5	334	1.52	28314	12.3
HoCP 13-737	4959 -	15.3 -	324	1.45	21054 -	11.1 -
HoCP 13-738	4270 -	14.3 -	301 -	1.21 -	23414 -	11.9 -
Ho 13-739	8087	25.0	323	1.55	32126	12.6
HoCP 13-740	6838	21.5	318	1.37	31400	12.3
HoCP 13-755	7825	24.0	324	1.50	31400	11.7 -
HoCP 13-758	9660	31.1	310 -	1.92	32670	10.5 -
HoCP 13-775	4761 -	15.4 -	310 -	1.17 -	26136	11.7 -

Table 9. Off-station nursery first-stubble means of the 2013 “L”, “Ho”, and “HoCP” assignment series on a Commerce silt loam soil at Landry Farms in Paincourtville, Louisiana in 2016.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs./A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	9566	43.3	220	2.31 -	38115	-----
L 01-283	9372	38.8	241 +	1.68 -	46373	-----
L 01-299	11121	51.5	216	2.09	49277	-----
HoCP 04-838	7330 -	33.0 -	222	1.69 -	38932	-----
L 13-234	9307	44.2	211	1.96	45012	-----
L 13-251	11490	50.7	227	2.51 +	40475	-----
L 13-257	10203	43.5	235 +	2.14	40747	-----
Ho 13-708	12200	52.2	234 +	2.51 +	41564	-----
HoCP 13-726	9360	40.5	231	1.68 -	48188	-----
HoCP 13-737	9134	38.6	236 +	1.70 -	45466	-----
HoCP 13-738	8536	36.6 -	234 +	1.94	37389	-----
Ho 13-739	10607	44.1	240 +	2.08	42562	-----
HoCP 13-740	14394 +	59.7	241 +	2.25	53089	-----
HoCP 13-755	10944	43.6	251 +	1.94	45012	-----
HoCP 13-758	9511	39.8	239 +	1.73 -	45920	-----
HoCP 13-775	9141	39.0	234 +	1.61 -	48733	-----

Table 10. Off-station nursery first-stubble means of the 2013 “L”, “Ho”, and “HoCP” assignment series across 3 locations (Newton, Melancon and Westfield) in 2016.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs./A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	7865	33.0	254	2.06	30825 -	11.9
L 01-283	8941	35.5	257	1.63 -	43802	12.2
L 01-299	9498	39.1	254	1.90	40505	13.1
HoCP 04-838	8045	32.9	257	1.72	37480	12.7
L 13-234	6311	28.5	235 -	1.46 -	37722	13.3
L 13-251	8902	38.6	240	2.18	34364 -	12.2
L 13-257	7797	33.0	243	2.13	30522 -	11.0 -
Ho 13-708	10060	39.3	267	2.15	35786	13.4
HoCP 13-726	8418	32.9	268	1.57	41685	11.5 -
HoCP 13-737	8024	31.4	270	1.77	34636 -	10.7 -
HoCP 13-738	6945	29.1	251	1.74	31974 -	11.3 -
Ho 13-739	9776	38.5	264	1.89	40263 -	11.9
HoCP 13-740	10151	39.7	268	1.77	43016	12.3
HoCP 13-755	9186	35.2	269	1.71	40354	11.7 -
HoCP 13-758	9848	39.3	256	1.94	40475	9.7 -
HoCP 13-775	7491	30.4	259	1.53 -	38811	10.8 -

Table 11. Off-station nursery plantcane means of the 2014 "L", "Ho", "HoCP" and "HoL", assignment series on a Moreland silt loam soil at Newton Cane, Inc. in Bunkie, Louisiana in 2016.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs./A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	11738	47.1	249	2.52	37480	10.5
L 01-283	10223	42.3	241	2.23	38115	10.8
L 01-299	11427	46.9	245	2.01	46464	11.4
HoCP 04-838	12007	47.9	250	2.22	42743	12.4
L 14-265	13373	55.3	242	2.69 +	41624	10.4
L 14-267	13392	51.2	262	2.61 +	39204	10.7
L 14-271	9362	35.8	261	2.16	33941 -	12.2
L 14-273	10935	40.5	269 +	1.84	44377	12.9 +
L 14-274	11046	45.3	244	2.19	41685	10.2 -
L 14-282	14923	61.6 +	242	2.67 +	46555	10.8
L 14-285	8186	34.5	237	2.43	28496 -	10.2
L 14-288	11837	46.1	256	2.43	37934	12.1
HoCP 14-802	14547	54.4	267 +	2.45	44195	11.6
HoCP 14-826	12634	46.2	273 +	2.02	45557	11.5
Ho 14-827	10954	45.5	241	2.47	36754 -	11.2
HoCP 14-829	12575	50.3	250	2.24	44831	12.5
HoCP 14-830	13885	52.6	264	2.67 +	39386	10.5
HoCP 14-831	9567	38.4	249	1.90	40928	10.3
HoL 14-834	10854	41.5	263	2.33	35665 -	11.3
Ho 14-835	10941	45.2	242	2.22	41110	10.9
Ho 14-836	10753	41.7	258	2.17	38478	9.7 -
HoL 14-841	14400	53.3	269 +	2.27	46918	10.8
HoCP 14-843	14606	63.4 +	230	2.87 +	44286	10.4
Ho 14-863	12238	52.3	234	2.48	42290	12.0
Ho 14-864	15771 +	61.1 +	258	2.51	48914	12.2
HoCP 14-867	16202 +	61.1	265	2.82 +	43742	11.2
HoCP 14-878	13888	57.6	241	2.73 +	42108	10.2 -
HoCP 14-885	17308 +	63.5 +	273 +	2.59	49096	9.7 -
HoCP 14-897	8653	35.0	244	1.75	39839	9.5 -
HoCP 14-902	11453	46.9	244	2.95 +	31944 -	11.9

Table 12. Off-station nursery plantcane means of the 2014 “L”, “Ho”, “HoCP” and “HoL”, assignment series on a Baldwin silty clay soil at Melancon Farms in Henderson, Louisiana in 2016.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs./A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	6534	20.4	321	2.36	17424 -	-----
L 01-283	10084	30.4	333 +	1.65	36935	-----
L 01-299	8613	27.9	310	1.91	29494	-----
HoCP 04-838	8675	26.6	325	1.69	32307	-----
L 14-265	9425	29.8	315	2.12	28223	-----
L 14-267	11923 +	37.5	318	2.74 +	28223	-----
L 14-271	6044	18.7	324	1.53	24230	-----
L 14-273	9738	29.0	337 +	1.67	34576	-----
L 14-274	10125	31.1	326	2.17	29040	-----
L 14-282	13986 +	44.6 +	313	2.53 +	35302	-----
L 14-285	5671	17.1 -	332 +	1.63	20963	-----
L 14-288	8771	26.8	329	2.02	26408	-----
HoCP 14-802	8709	27.9	313	1.89	29585	-----
HoCP 14-826	10659	32.8	325	2.41	27316	-----
Ho 14-827	10102	33.0	307	2.21	29494	-----
HoCP 14-829	11892 +	38.6 +	308	1.86	41564 +	-----
HoCP 14-830	9787	29.7	329	2.60 +	22869	-----
HoCP 14-831	11180	35.2	319	1.72	40656 +	-----
HoL 14-834	9132	28.4	322	1.95	29131	-----
Ho 14-835	9224	28.9	319	1.58	36663	-----
Ho 14-836	11518	34.9	330	1.86	37480	-----
HoL 14-841	9041	28.5	316	1.66	35120	-----
HoCP 14-843	8356	28.6	292	2.01	29040	-----
Ho 14-863	8763	28.4	309	2.01	28223	-----
Ho 14-864	11291	36.8	307	2.00	36935	-----
HoCP 14-867	10021	31.8	315	1.81	34939	-----
HoCP 14-878	6486	20.9	310	1.62	25773	-----
HoCP 14-885	14298 +	43.6 +	327	2.18	40021 +	-----
HoCP 14-897	9602	27.4	350 +	1.81	30401	-----
HoCP 14-902	8759	25.4	345 +	2.50 +	20328 -	-----

Table 13. Off-station nursery plantcane means of the 2014 “L”, “Ho”, “HoCP” and “HoL”, assignment series on a Commerce silt loam soil at Landry Farms in Paincourtville, Louisiana in 2016.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs./A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	12528	45.0	279	2.15	41654 -	11.2 -
L 01-283	14108	48.6	291	2.04	47735 -	11.8
L 01-299	11346	40.4	280	1.76	45738 -	12.8
HoCP 04-838	19177 +	72.0 +	268	2.27	63071	12.1
L 14-265	12021	43.0	280	2.02	42562 -	10.5 -
L 14-267	14842	52.4	284	2.62 +	39930 -	11.5 -
L 14-271	14569	51.9	280	2.39 +	43469 -	12.7
L 14-273	12914	45.1	287	1.67	54359	14.1 +
L 14-274	12494	45.2	277	1.96	46162 -	11.0 -
L 14-282	16155 +	59.0 +	272	2.34 +	49640 -	11.7
L 14-285	10149	35.9	286	2.21	32942 -	11.3 -
L 14-288	10203	37.5	273	2.14	35574 -	10.7 -
HoCP 14-802	17820 +	61.9 +	288	2.06	60167	12.7
HoCP 14-826	16441 +	55.3	296	2.55 +	43106 -	13.1
Ho 14-827	13443	51.1	263	2.30	44377 -	12.6
HoCP 14-829	14156	54.3	263	2.02	53452	11.6 -
HoCP 14-830	14092	51.8	273	2.65 +	38841 -	10.2 -
HoCP 14-831	10389	38.8	268	1.56	49913 -	11.0 -
HoL 14-834	11081	39.0	284	1.96	39930 -	12.0
Ho 14-835	13863	49.8	280	1.85	53724	11.2 -
Ho 14-836	13608	48.1	285	2.06	46736 -	10.1 -
HoL 14-841	8887	33.8 -	263	1.35	50185 -	10.3 -
HoCP 14-843	11443	42.6	268	2.08	40747	10.6 -
Ho 14-863	13654	52.0	263	2.09	49731 -	11.8
Ho 14-864	13695	52.1	264	2.12	48733 -	12.3
HoCP 14-867	14341	55.5	259 -	2.41 +	46010 -	11.3 -
HoCP 14-878	11917	43.8	272	1.99	44377 -	11.7
HoCP 14-885	16042 +	57.0	281	2.28	50548 -	9.7 -
HoCP 14-897	10915	39.7	275	1.86	42653 -	10.5 -
HoCP 14-902	10034	36.5	275	2.01	37843 -	10.2 -

Table 14. Off-station nursery plantcane means of the 2014 “L”, “Ho”, “HoCP” and “HoL”, assignment series across 3 locations (Newton, Melancon and Westfield) in 2016.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs./A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	10267	37.5	283	2.34 +	32186 -	10.8 -
L 01-283	11472	40.4	288	1.97	40928	11.3
L 01-299	10462	38.4	278	1.90	40565	12.1
HoCP 04-838	13286	48.8 +	281	2.06	46041	12.3
L 14-265	11701	43.2	279	2.30 -	37783	10.5 -
L 14-267	13345 +	46.8	288	2.63 +	36023	11.0
L 14-271	9992	35.5	288	2.03	33880 -	12.5 +
L 14-273	11196	38.2	297 +	1.72	44437	13.5 +
L 14-274	11149	40.3	282	2.08	38938	10.6 -
L 14-282	15021 +	55.1 +	276	2.51 +	43832	11.2 -
L 14-285	8002	29.1	285	2.09	27467 -	10.8 -
L 14-288	10270	36.8	286	2.20	33305 -	11.4
HoCP 14-802	13692 +	48.1	289	2.13	44649	12.2
HoCP 14-826	13245	44.8	298 +	2.32 +	38660	12.3
Ho 14-827	11500	43.2	271	2.33 +	36875	11.9
HoCP 14-829	12874	47.7	273	2.04	46615 -	12.1
HoCP 14-830	12588	44.7	289	2.64 +	33699 -	10.4 -
HoCP 14-831	10379	37.5	279	1.73	43832	10.7 -
HoL 14-834	10356	36.3	289	2.08	34909	11.6
Ho 14-835	11343	41.3	280	1.88	43832	11.0
Ho 14-836	11959	41.6	291	2.03	40898	9.9 -
HoL 14-841	10776	38.6	283	1.76	44074	10.5 -
HoCP 14-843	11468	44.9	263	2.32 +	38024	10.5 -
Ho 14-863	11551	44.2	269	2.19	40081	11.9
Ho 14-864	13585 +	50.0 +	276	2.21	44861	12.2
HoCP 14-867	13216	48.7	277	2.30 +	41380	11.2
HoCP 14-878	10764	40.7	274	2.11	37419	10.9
HoCP 14-885	15883 +	54.7 +	294 +	2.35 +	46555	9.7 -
HoCP 14-897	9723	34.0	290	1.81	37631	10.0 -
HoCP 14-902	10082	36.3	288	2.49 +	30038 -	11.0

Table 15. On-station nursery second-stubble means of the 2013 "L" assignment series on a Commerce silt loam soil at U.S.D.A-Ardoyne Farm in Chacahoula, Louisiana in 2016.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs./A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	6873	25.8	263 -	1.99	25637 -	12.2
L 99-226	13416	45.2	297 +	2.19 +	41518	13.0
L 01-299	13608	48.7	279	1.68	57626	13.7
HoCP 04-838	11658	41.5	280	1.99	41518	14.2
L 13-234	9562	34.5	277	1.69	40838	13.7
L 13-251	12413	47.5	261 -	2.40 +	39930 -	14.1
L 13-257	10521	37.8	279	2.31 +	32670 -	12.8

Table 16. On-station nursery second-stubble means of the 2013 "L" assignment series on a Baldwin silty clay soil at Iberia Research Station in Jeanerette, Louisiana in 2016.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs./A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	6810 -	26.6 -	255	1.66	31989 -	11.8
L 99-226	8508	30.0 -	284	1.54	39023 -	12.2
L 01-299	10391	39.3	265	1.69	46509	13.3
HoCP 04-838	8848	34.7	255	1.60	43333	12.6
L 13-234	8664	30.8 -	280	1.78	34712 -	12.5
L 13-251	7329 -	28.3	260	1.81	31536 -	13.2
L 13-257	7888 -	30.7	257	1.71	36073 -	12.3

Table 17. On-station nursery second-stubble means of the 2013 "L" assignment series on a Commerce silt loam soil at Sugar Research Station in St. Gabriel, Louisiana in 2016.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs./A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	7569	29.6	256 -	1.89	31536	12.8
L 99-226	15464	54.5	284	2.45 +	44468	14.9
L 01-299	11457	41.3	278	1.64	49686	14.3
HoCP 04-838	10484	37.5	279	1.82	41291	14.6
L 13-234	7717	30.3	256 -	1.41	42879	13.7
L 13-251	11846	43.5	272	2.24 +	39023	14.5
L 13-257	12477	44.9	278	2.37 +	37888	13.3

Table 19. On-station nursery second-stubble means of the 2013 "L" assignment series across 3 locations (St. Gabriel, Iberia and U.S.D.A.- Ardoyne Farms) in 2016.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs./A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	7084 -	27.3 -	258	1.85	29721 -	12.2 -
L 99-226	12463	43.2	288	2.06	41669 -	13.4
L 01-299	11819	43.1	274	1.67	51274	13.7
HoCP 04-838	10330	37.9	272	1.80	42048 -	13.8
L 13-234	8648 -	31.9 -	271	1.63	39476 -	13.3
L 13-251	10529	39.8 -	265	2.15	36829 -	13.9
L 13-257	10295	37.8 -	271	2.13	35544 -	12.8 -

Table 20. On-station nursery first-stubble means of the 2014 "L" assignment series on a Commerce silt loam soil at U.S.D.A-Ardoyne Farm in Chacahoula, Louisiana in 2016.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs./A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	10699	39.9	268	2.16	36754 -	11.7 -
L 99-226	14238	49.8	286	1.73	57853	12.2
L 01-299	13901	51.4	271	1.94	53089	13.1
HoCP 04-838	14555	52.3	279	2.07	50593	13.9
L 14-265	11891	43.2	275	1.54	56719	12.5
L 14-267	16439	56.1	291 +	2.19	51047	11.5 -
L 14-271	11809	41.7	283	1.81	46509	14.5 +
L 14-273	11589	41.1	282	1.49	55131	13.1
L 14-274	9541 -	33.3 -	286	1.77	37661 -	11.7 -
L 14-282	14739	52.2	282	1.96	53316	12.3
L 14-285	10454	34.2 -	306 +	1.73	39930 -	11.7 -
L 14-288	9647 -	34.1 -	285	2.46 +	27452 -	12.5

Table 21. On-station nursery first-stubble means of the 2014 “L” assignment series on a Baldwin silty clay soil at Iberia Research Station in Jeanerette, Louisiana in 2016.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs./A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	7266	28.5	256	1.93	29494	12.0 -
L 99-226	7542	28.7	263	1.69	34031	11.9 -
L 01-299	7675	29.0	265	1.57	36754	12.8
HoCP 04-838	9533	35.3	269	1.73	41064	13.7 +
L 14-265	5548	21.2	262	1.29	34031	12.0 -
L 14-267	10875	40.8	267	2.14	39023	11.1 -
L 14-271	6861	25.0	275	1.52	33351	13.1 -
L 14-273	9337	33.6	279 +	1.43	46509	12.8
L 14-274	9568	33.1	289 +	1.74	37661	12.5
L 14-282	8901	34.0	262	1.84	36754	12.1
L 14-285	5596	19.0	295 +	1.40	27225	12.4
L 14-288	7081	26.6	266	1.98	26771	12.1 -

Table 22. On-station nursery first-stubble means of the 2014 “L” assignment series on a Commerce silt loam soil at Sugar Research Station in St. Gabriel, Louisiana in 2016.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs./A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	9715 -	36.7 -	266	1.95	37661 -	12.0 -
L 99-226	12095	44.3	273	1.78	49686	11.9 -
L 01-299	13515	49.9	270	2.00	49913	13.4
HoCP 04-838	11411 -	43.5	263	1.84	47417	12.6
L 14-265	8592 -	33.0 -	260	1.94	34485 -	11.4 -
L 14-267	14132	51.6	274	2.37 +	43560	11.1 -
L 14-271	8849 -	31.1 -	285	1.61 -	38569 -	13.6
L 14-273	10768 -	40.3 -	268	1.72	46963	13.1
L 14-274	8127 -	28.7 -	282	1.75	33578 -	11.9 -
L 14-282	11848	41.5 -	285	1.81	46283	11.9 -
L 14-285	9411 -	31.2 -	301 +	1.79	34939 -	11.5 -
L 14-288	9421 -	34.9 -	270	2.15	32443 -	11.7 -

Table 23. On-station nursery first-stubble means of the 2014 "L" assignment series across 3 locations (St. Gabriel, Iberia and U.S.D.A. - Ardoyne Farms) in 2016.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs./A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	9227 -	35.0 -	263	2.01	34636 -	11.9 -
L 99-226	11291	40.9	274	1.73	47190 +	12.0
L 01-299	11697	43.5	269	1.84	46585	13.1
HoCP 04-838	11833	43.7	270	1.88	46358 +	13.4 -
L 14-265	8677 -	32.5 -	266	1.59 -	41745	12.0 -
L 14-267	13815 +	49.5	277 +	2.23 +	44543	11.2
L 14-271	9173 -	32.6 -	281 +	1.64	39476	13.7
L 14-273	10565	38.3	276	1.55 -	49534	13.0 -
L 14-274	9079 -	31.7 -	286 +	1.75	36300 -	12.0 -
L 14-282	11829	42.6	276	1.87	45451	12.1 -
L 14-285	8487 -	28.1 -	301 +	1.64	34031 -	11.9 -
L 14-288	8716 -	31.9 -	274	2.20 +	28889 -	12.1 -

Table 24. On-station nursery Nursery plantcane means of the 2015 "L" assignment series on a Commerce silt loam soil at U.S.D.A-Ardoyne Farm in Chacahoula, Louisiana in 2016.

Variety	Sugar Per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs./A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	11067	42.0	264	3.01 +	27679	12.3 -
L 01-283	10614	37.6	280	2.16	34485	10.8 -
L 01-299	11676	42.8	273	2.15	39476	14.7
HoCP 04-838	15917	59.6	267	2.50	47644	15.0
L 15-306	15722	57.8	272	2.58 +	44694	11.4 -
L 15-309	9822	37.0	266	2.76 +	26771	14.8
L 15-311	13437	46.7	288	2.41	39249	12.6 -
L 15-312	11507	41.1	280	3.48 +	23595	13.5
L 15-317	15533	57.0	272	3.52 +	32670	13.3
L 15-319	10280	37.5	272	2.23	33578	13.3
L 15-320	13974	51.0	274	2.66 +	38342	10.4 -
L 15-324	10535	42.0	251 -	2.27	37208	15.9
L 15-325	8902	32.5	273	2.48	26544	13.5
L 15-327	7818	27.6	283	2.75 +	19738	10.8 -
L 15-328	12057	44.7	270	1.96	45602	9.9 -
L 15-329	12117	45.3	268	2.78 +	32443	13.3 -
L 15-334	14494	49.6	292 +	2.70 +	36981	11.6
L 15-336	8597	29.8	291 +	1.84	32216	12.9 -
L 15-337	7395	25.6	288	1.76	29267	12.3 -
L 15-338	13464	47.0	286	2.24	41518	11.3 -

Table 24. Continue.

Variety	Sugar Per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
L 15-343	12919	45.6	283	2.49	36527	12.3 -
L 15-344	6966	26.2	263	2.65 +	19738	13.0 -
L 15-346	13739	50.7	271	2.66 +	38115	14.9

Table 25. On-station nursery plantcane means of the 2015 "L" assignment series on a Baldwin silty clay soil at Iberia Research Station in Jeanerette, Louisiana in 2016.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs./A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	6079	21.8	277	2.56	17016 -	12.2
L 01-283	5818	21.8	267	1.76 -	24729	11.0 -
L 01-299	8722	31.5	276	2.32	27225	12.7
HoCP 04-838	7120	25.1	282	1.82 -	27452	13.8
L 15-306	9547	33.1	290	2.05	31989	12.1
L 15-309	4944	18.5	267	2.39	15201 -	13.9
L 15-311	8562	28.1	304 +	1.75 -	31989	12.5
L 15-312	9587	32.4	295 +	2.28	27906	13.9
L 15-317	10707	37.1	289	2.32	31989	13.9
L 15-319	8803	30.0	294 +	2.41	24956	10.6 -
L 15-320	7743	27.6	281	2.38	23141	13.0
L 15-324	10170	34.7	293 +	2.40	29040	14.0
L 15-325	6006	21.7	275	1.81 -	24049	12.9
L 15-327	6996	23.6	296 +	1.48 -	31763	10.5 -
L 15-328	8088	28.3	289	2.40	23141	13.1
L 15-329	5556	18.2	304 +	2.22	16108 -	10.9 -
L 15-334	8734	28.6	306 +	1.50 -	35166	13.1
L 15-336	10542	35.4	298 +	1.83	37888 +	12.7
L 15-337	7152	25.0	287	1.85 +	26771	10.5 -
L 15-338	9055	30.9	293	1.97	30401	12.2
L 15-343	6879	23.8	288	2.15	22007	12.3
L 15-344	6504	22.5	289	2.47	18377 -	13.1
L 15-346	6079	21.8	277	2.56	17016 -	12.2

Table 26. On-station nursery plantcane means of the 2015 “L” assignment series on a Commerce silt loam soil at Sugar Research Station in St. Gabriel, Louisiana in 2016.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs./A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	9535	36.6	259	2.60	28133	11.8 -
L 01-283	8954	35.1	257	2.10	33351	11.0 -
L 01-299	9074	33.7	269	2.39	28359	14.2
HoCP 04-838	15235 +	59.2 +	257	3.09 +	38569 +	12.9
L 15-306	17568 +	65.7 -	267	2.89	45375 +	11.7 -
L 15-309	10061	38.8	260	2.80	27679	13.9
L 15-311	10137	38.5	263	2.20	34939	11.7 -
L 15-312	14408 +	51.7 +	279	3.89 +	26544	13.5
L 15-317	8543	35.1	243	2.04	34485	11.9 -
L 15-319	7897	29.8	265	2.09	28586	12.7 -
L 15-320	12749	44.5	287	2.66	33578	11.0 -
L 15-324	8364	34.5	242	2.40	28813	12.3 -
L 15-325	13657	50.7	268	2.85	29494	13.2
L 15-327	6244	28.3 -	221 -	1.88	30401	12.8
L 15-328	7608	29.3 -	262	1.98	28813	10.2 -
L 15-329	8690	37.0	234 -	2.39	30628	12.6 -
L 15-334	13642	44.7	304	2.51	34258	12.2 -
L 15-336	8946	32.3	277	1.77	36527	13.2
L 15-337	8090	30.6	264	1.52 -	40384 +	11.1 -
L 15-338	11080	44.3	249	2.39	37434	11.0 -
L 15-343	10669	41.5	257	2.46	34031	11.1 -
L 15-344	12243	49.2 +	249	2.51	39023 +	13.5
L 15-346	10400	38.7	268	2.31	33804	13.7

Table 27. On-station nursery plantcane means of the 2015 “L” assignment series across 3 locations (St.Gabriel, Iberia and U.S.D.A. - Ardoyne Farms) in 2016.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs./A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
HoCP 96-540	8893	33.4	267	2.72	24276	12.1 -
L 01-283	8462	31.5	268	2.01	30855	11.0 -
L 01-299	9824	36.0	273	2.29	31687	13.9
HoCP 04-838	12757	48.0 +	269	2.47	37888 +	13.9
L 15-306	14279 +	52.2 +	276	2.51	40686 +	11.7 -
L 15-309	8276	31.4	264	2.65	23217	14.2
L 15-311	10712	37.7	285	2.12	35393	12.2 -
L 15-312	11907	41.7	286	3.59 +	22652	13.5
L 15-317	11221	41.5	270	2.61	31687	13.1
L 15-319	9628	34.8	276	2.21	31384	13.3
L 15-320	11842	41.8	285	2.58	32292	10.7 -
L 15-324	8881	34.7	258	2.35	29721	13.7
L 15-325	10537	38.1	278	2.54	28359	13.6
L 15-327	6689	25.8	260	2.15	24729	12.2 -
L 15-328	8887	32.5	276	1.81 -	35393	10.2 -
L 15-329	9631	36.9	263	2.52	28738	13.0
L 15-334	10909	36.9	298 +	2.47	29116	11.5 -
L 15-336	8320	28.7	291 +	1.70 -	34636	13.1
L 15-337	7948	28.0	283	1.66 -	35846	12.0 -
L 15-338	10566	38.7	274	2.16	35241	10.9 -
L 15-343	10717	38.8	277	2.31	33653	11.8 -
L 15-344	8696	33.1	267	2.44	26923	12.9
L 15-346	10214	37.3	276	2.48	30099	13.9

2016 LOUISIANA "Ho" NURSERY VARIETY TRIALS

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In the Sugarcane Research Unit's sugarcane variety program, promising experimental varieties are assigned permanent "HoCP" or "Ho" numbers three years after selection in the seedling stage. These varieties are then planted in replicated yield trials at USDA's Ardoyne Farm in Schriever and at the LSU AgCenter's Iberia Research Station in Jeanerette and Sugar Research Station in St. Gabriel.

The USDA nursery test plots established during the year of assignment are planted in 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. The following year, experimental varieties advanced for further testing are combined with varieties from the LSU AgCenter program ("L" series) and planted in replicated nursery yield trials on commercial farms that collectively represent the different regions of the sugarcane belt.

In the spring and summer, researchers rate nursery test plots for yield traits such as population, height, diameter, erectness, etc. Mature, millable stalks are counted in each plot 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, 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 yields equal or higher than the control varieties (both cane tonnage and sugar per ton) and not appearing to be very susceptible to diseases are advanced for further testing.

Table 1 lists planting and harvest dates of USDA nursery evaluations. Results of these evaluations are presented in Tables 2 to 12. Because of standing water in the field and a long delay in fertilization, data from the 1st stubble test at Ardoyne Farm is not included. Statistical analyses were done for each test and for each series combined across locations using PROC MIXED procedures in SAS (version 9.4). For purposes of comparison, the check variety L 01-299 is highlighted in each table. Yield values that are significantly higher or lower (P=0.05) than values for L 01-299 are noted with a '+' or '-', respectively.

Table 1. Planting and harvest dates of "Ho" nursery tests in 2015.

Series	Location[1/]	Soil Series [2/]	Planting Date	Harvest Dates 2014	2015	2016
2013	AFH	Sc	11/06/13	12/11	11/05	10/20
2013	IRS	Bsc	11/13/13	11/24	11/04	10/26
2013	STG	Csl	11/08/13	12/10	12/15	10/27
2014	AFH	Sc	10/21/14		12/21	10/06
2014	IRS	Bsc	10/23/14		12/09	11/03
2014	STG	Csl	10/24/14		12/15	11/09
2015	AFH	Sc	10/21/15			11/21
2015	IRS	Bsc	10/23/15			11/29
2015	STG	Csl	11/13/15			12/09
2016	AFH	Sc	10/20/16			
2016	IRS	Bsc	10/26/16			
2016	STG	Csl	10/27/16			

[1/] AFH = Ardoyne Farm heavy soil in Schriever, IRS = Iberia Research Station in Jeanerette, STG = Sugar Research Station in St. Gabriel

[2/] Bsc = Baldwin silty clay, Csl = Commerce silt loam, Sc = Sharkey clay

Table 2. Nursery second-stubble means of the 2013 "Ho" and "HoCP" assignment series on a Sharkey clay soil at the Ardoyne Farm in Schriever, LA in 2016.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
L 01-299	7489	29.0	260	1.41	41745
HoCP 96-540	10668	40.9	257	1.63	50593
L 99-226	9254	36.4	255	1.75	41972
L 01-283	8266	30.9	265	1.21	51274
HoCP 04-838	9077	32.1	281	1.50	42879
Ho 13-708	10848	41.6	261	1.82	46056
HoCP 13-726	7584	30.4	251	1.22	49913
HoCP 13-737	10273	36.8	280	1.50	48778
HoCP 13-738	7841	29.3	266	1.38	42653
Ho 13-739	9169	33.0	274	1.40	46963
HoCP 13-740	9590	35.6	266	1.36	50366
HoCP 13-755	8236	29.1	282	1.26	46283
HoCP 13-758	8961	34.6	259	1.36	51274
HoCP 13-775	8053	30.3	266	1.10	55358

Table 3. Nursery second-stubble means of the 2013 “Ho” and “HoCP” assignment series on a Baldwin silty clay soil at the Iberia Research Station in Jeanerette, LA in 2016.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
L 01-299	7216	25.3	286	1.35	37888
HoCP 96-540	8486	29.8	285	1.42	41745
L 99-226	6834	23.6	291	1.64	28813
L 01-283	8569	31.9	270	1.59	41291
HoCP 04-838	7009	24.7	285	1.39	35166
Ho 13-708	7441	25.9	287	1.62	31989
HoCP 13-726	6846	23.1	295	1.14	40611
HoCP 13-737	9014	31.2	286	1.56	39023
HoCP 13-738	6116	22.1	276	1.12	39703
Ho 13-739	9954	32.8	304	1.72	38115
HoCP 13-740	6421	22.6	284	1.05	43560
HoCP 13-755	6624	23.6	281	1.34	35166
HoCP 13-758	7691	28.4	273	1.35	42199
HoCP 13-775	7115	25.4	280	1.20	42426

Table 4. Nursery second-stubble means of the 2013 “Ho” and “HoCP” assignment series on a Commerce silt loam soil at the Sugar Research Station in St. Gabriel, LA in 2016.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
L 01-299	11288	39.9	280	1.51	52181
HoCP 96-540	9529	35.1	271	1.61	43787
L 99-226	13109	45.1	291	2.03	44468
L 01-283	10396	35.3	294	1.73	40384 -
HoCP 04-838	10002	35.4	283	1.42	51047
Ho 13-708	10949	37.1	296	2.11 +	35166 -
HoCP 13-726	8475	30.7	275	1.20	51047
HoCP 13-737	10863	35.5	306	1.61	44014
HoCP 13-738	10134	36.0	281	1.52	47417
Ho 13-739	12363	41.0	301	1.86	44014
HoCP 13-740	12801	45.9	279	1.53	59895
HoCP 13-755	9368	34.2	272	1.33	52635
HoCP 13-758	12884	44.5	289	1.70	52408
HoCP 13-775	7574	26.6	284	1.10	48778

Table 5. Nursery second-stubble means of the 2013 "Ho" and "HoCP" assignment series across locations (Ardoyne Farm, Iberia Research Station, & Sugar Research Station) in 2016.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
L 01-299	8664	31.4	275	1.42	43938
HoCP 96-540	9561	35.3	271	1.55	45375
L 99-226	9732	35.0	279	1.80 +	38418
L 01-283	9077	32.7	276	1.51	44316
HoCP 04-838	8696	30.7	283	1.44	43031
Ho 13-708	9746	34.9	281	1.85 +	37737
HoCP 13-726	7635	28.1	273	1.18	47190
HoCP 13-737	10050	34.5	291	1.56	43938
HoCP 13-738	8030	29.1	274	1.34	43258
Ho 13-739	10495	35.6	293	1.66	43031
HoCP 13-740	9604	34.7	276	1.31	51274 +
HoCP 13-755	8076	29.0	278	1.31	44694
HoCP 13-758	9845	35.8	274	1.47	48627
HoCP 13-775	7580	27.4	277	1.13 -	48854

Table 6. Nursery first-stubble means of the 2014 “Ho” and “HoCP” assignment series on a Baldwin silty clay soil at the Iberia Research Station in Jeanerette, LA in 2016.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
L 01-299	5054	18.2	278	1.37	26771
HoCP 96-540	5208	23.3	238 -	1.77 +	29040
L 01-283	4385	15.1	291	1.77 +	17016
HoCP 04-838	4937	18.5	267	1.54	24049
HoCP 14-802	7738 +	27.8 +	281	1.82 +	30401
HoCP 14-826	4650	16.5	283	1.72 +	19284
Ho 14-827	6106	21.5	284	1.59 +	26998
HoCP 14-829	3916	14.0	280	1.04 -	26998
HoCP 14-830	7500 +	26.3 +	286	2.30 +	22914
HoCP 14-831	5837	20.6	285	1.55	26544
HoL 14-834	4994	17.2	291	1.29	27679
Ho 14-835	6467	22.2	292	1.67	26544
Ho 14-836	7181 +	23.8	301 +	1.66	29040
HoL 14-841	6580	23.4	279	1.78 +	26317
HoCP 14-843	6705	25.0	268	1.83 +	27452
Ho 14-863	6470	24.2	267	1.51	32216
Ho 14-864	9067 +	31.7 +	287	1.83 +	34939
HoCP 14-867	7418 +	27.4 +	271	2.07 +	26544
HoCP 14-878	8216 +	28.8 +	286	1.96 +	29494
HoCP 14-885	5507	21.0	264	2.01 +	21099
HoCP 14-897	5989	19.6	306 +	1.51	25864
HoCP 14-902	5518	20.0	277	2.02 +	19738
Ho 14-9638 [3/]	13787 +	50.2 +	274	2.24 +	44921 +

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

Table 7. Nursery first-stubble means of the 2014 "Ho" and "HoCP" assignment series on a Commerce silt loam soil at the Sugar Research Station in St. Gabriel, LA in 2016.

Variety	Sugar/ acre (lbs.)	Tons/ acre (tons)	Sugar/ ton (lbs.)	Weight/ stalk (lbs.)	Stalks/ acre (no.)
L 01-299	12318	42.7	289	1.81	47871
HoCP 96-540	12574	50.5	250 -	2.45 +	41518 -
L 01-283	10545	33.6	310	1.52	44014
HoCP 04-838	11996	40.0	300	1.68	47644
HoCP 14-802	15776	51.3	307	2.14	48098
HoCP 14-826	13777	45.0	306	2.22	40611 -
Ho 14-827	11055	36.8	300	1.86	39249 -
HoCP 14-829	12297	41.0	300	1.76	46736
HoCP 14-830	11876	38.1	311 +	1.76	43333
HoCP 14-831	11546	39.2	295	1.57	49913
HoL 14-834	10717	36.3	296	1.77	40838 -
Ho 14-835	11007	35.6	312 +	1.53	46509
Ho 14-836	9544	28.8 -	331 +	1.59	36300 -
HoL 14-841	12826	41.2	311 +	1.58	52181
HoCP 14-843	10480	38.8	272	1.88	41518 -
Ho 14-863	11782	42.4	277	1.73	48778
Ho 14-864	16624	57.0 +	292	2.20	51583
HoCP 14-867	13675	45.7	299	2.21	41518 -
HoCP 14-878	14753	48.4	305	2.25 +	43106
HoCP 14-885	19271 +	64.2	300	2.35 +	54450 +
HoCP 14-897	10603	32.2 -	330 +	1.45	44468
HoCP 14-902	10375	33.9	306	2.27 +	29948 -
Ho 14-9638 [3/]	13152	47.0	280	2.25 +	41745 -

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

Table 8. Nursery first-stubble means of the 2014 "Ho" and "HoCP" assignment series across locations (Iberia Research Station & Sugar Research Station) in 2016.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
L 01-299	8686	30.4	284	1.59	37321
HoCP 96-540	10119	37.2	244 -	2.15 +	35279
L 01-283	7465	24.4	300 +	1.65	30515
HoCP 04-838	8467	29.3	283	1.61	35846
HoCP 14-802	11757	39.5	294	1.98	39249
HoCP 14-826	9214	30.7	294	1.97	29948
Ho 14-827	8580	29.2	292	1.73	33124
HoCP 14-829	8106	27.5	290	1.40	36867
HoCP 14-830	9688	32.2	298 +	2.03 +	33124
HoCP 14-831	8691	29.9	290	1.56	38228
HoL 14-834	7855	26.8	294	1.53	34258
Ho 14-835	8737	28.9	302 +	1.60	36527
Ho 14-836	8362	26.3	316 +	1.63	32670
HoL 14-841	9746	32.5	297	1.65	41518
HoCP 14-843	8593	31.9	270 -	1.85	34485
Ho 14-863	9126	33.3	272	1.62	40497
Ho 14-864	12759	44.0	292	2.00	40686
HoCP 14-867	10546	36.5	285	2.14 +	34031
HoCP 14-878	11484	38.6	296	2.10 +	36300
HoCP 14-885	12389	42.6	282	2.18 +	37775
HoCP 14-897	8296	25.9	318 +	1.48	35166
HoCP 14-902	7947	27.0	291	2.14 +	24843
Ho 14-9638 [3/]	13469	48.6	277	2.24 +	43333

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

Table 9. Nursery plant cane means of the 2015 "Ho" and "HoCP" assignment series on a Sharkey clay soil at the Ardoyne Farm in Schriever, LA in 2016.

Variety	Sugar/ acre (lbs.)	Tons/ acre (tons)	Sugar/ ton (lbs.)	Weight/ stalk (lbs.)	Stalks/ acre (no.)
L 01-299	10670	34.8	306	1.96	35733
HoCP 96-540	11185	38.1	294	2.30	33124
L 01-283	9999	32.1	312	1.98	33124
HoCP 04-838	10946	34.0	322 +	2.09	32783
HoL 15-501	13052	38.9	335 +	2.01	38569
HoL 15-502	14202 +	44.6	318	2.48 +	36073
HoCP 15-503	10136	33.2	305	1.57	42426 +
HoCP 15-504	13503	43.7	310	2.87 +	30515
HoCP 15-506	11138	36.8	302	1.93	38228
HoL 15-508	14387 +	44.3	325 +	2.44 +	36300
HoCP 15-510	10294	31.7	324 +	2.31	27679 -
HoL 15-511	13081	41.2	317	2.53 +	32443
HoL 15-513	9907	35.2	282 -	2.24	31422
HoCP 15-519	10575	33.5	316	1.99	33691
HoCP 15-525	13572	47.9 +	283 -	2.79 +	34372
Ho 15-531	13032	43.2	301	2.61 +	33124
HoL 15-534	10338	31.8	326 +	1.93	33124
HoCP 15-537	12179	40.8	298	2.52 +	32330
Ho 15-538	10714	33.3	322 +	1.93	34598
HoL 15-539	12346	39.5	314	2.05	38455
HoCP 15-543	15638 +	52.1 +	300	2.92 +	35619
HoL 15-547	11229	34.5	326 +	2.11	33351
HoCP 15-548	16775 +	52.6 +	318	2.89 +	36073
HoCP 15-915	15435 +	46.6 +	332 +	2.85 +	32670
Ho 15-916	15802 +	49.7 +	318	2.68 +	37094
Ho 15-918	11777	36.7	321 +	2.47 +	29721
Ho 15-921	14175 +	45.9 +	309	2.23	41291
HoH 15-926	13088	40.2	326 +	1.98	40724
HoH 15-927	13241	42.6	311	1.91	44694 +
Ho 15-930	14815 +	45.9	323 +	3.31 +	27792 -
Ho 15-936	11316	36.9	306	1.82	40270
Ho 15-938	13391	42.6	313	1.96	43333 +
Ho 15-943	13304	41.5	321 +	1.86	44694 +
Ho 15-944	11359	34.6	328 +	2.06	33578
Ho 15-945	12321	41.8	294	2.63 +	31649
Ho 15-954	10768	33.5	321 +	2.10	31989
Ho 15-957	15287 +	51.1 +	299	2.46 +	41632
Ho 15-958	12195	43.0	283 -	2.90 +	29721
Ho 15-959	9795	33.1	296	1.98	33464

Table 9. Continued.

Variety	Sugar/ acre		Tons/ acre		Sugar/ ton		Weight/ stalk		Stalks/ acre	
	(lbs.)		(tons)		(lbs.)		(lbs.)		(no.)	
Ho 15-960	14746	+	48.9	+	302		2.87	+	34031	
Ho 15-962	14462	+	46.8	+	309		2.36	+	39930	
Ho 15-963	16680	+	55.5	+	301		2.83	+	39249	
Ho 15-964	13157		43.2		305		2.37	+	36527	
Ho 15-965	18016	+	57.1	+	316		3.13	+	36300	
Ho 15-970	10413		31.9		326	+	1.84		34712	
Ho 15-971	13192		40.0		329	+	2.39	+	33918	
Ho 15-972	13733		43.8		314		1.85		47757	+
Ho 15-975	9081		30.1		301		2.16		27906	-
Ho 15-979	14473	+	45.7	+	317		2.15		42539	+
Ho 15-984	13506		46.1	+	293	-	2.48	+	37208	
Ho 15-985	11349		36.5		311		2.22		32897	
HoCP 15-986	13533		42.9		316		2.49	+	34372	
HoCP 15-987	10529		33.7		312		2.14		31876	
HoCP 15-990	13710		44.1		311		2.72	+	32557	
HoCP 15-991	12832		42.9		300		2.49	+	34372	
Ho 15-993	11758		36.5		322	+	1.96		37321	
Ho 15-994	11651		35.0		334	+	2.13		32670	
HoCP 15-996	11948		39.9		300		2.69	+	29721	
Ho 15-997	10221		33.2		308		1.68		39590	
HoCP 15-999	12735		44.4		287	-	2.52	+	35279	

Table 10. Nursery plant-cane means of the 2015 "Ho" and "HoCP" assignment series on a Baldwin silty clay soil at the Iberia Research Station in Jeanerette, LA in 2016.

Variety	Sugar/ acre (lbs.)		Tons/ acre (tons)		Sugar/ ton (lbs.)		Weight/ stalk (lbs.)		Stalks/ acre (no.)	
L 01-299	8701		28.7		303		1.96		29380	
HoCP 96-540	11195		38.2		293		2.88	+	26544	
L 01-283	9754		31.2		313		1.88		33237	
HoCP 04-838	7403		23.8		310		1.77		26998	
HoL 15-501	11367		34.7		329	+	2.78	+	24956	
HoL 15-502	9640		32.2		299		2.48	+	25977	
HoCP 15-503	8892		27.7		321	+	1.67		33124	
HoCP 15-504	10759		35.9		299		2.68	+	27112	
HoCP 15-506	10098		33.2		304		1.93		34372	
HoL 15-508	9832		30.9		317		2.15		28700	
HoCP 15-510	10614		32.4		327	+	2.45		26658	
HoL 15-511	10139		32.1		316		2.41		26885	
HoL 15-513	6894		23.9		289		2.13		22120	-
HoCP 15-519	8545		26.2		326	+	1.81		29040	
HoCP 15-525	10599		36.7		289		2.77	+	26544	
Ho 15-531	9416		31.7		296		2.40		26431	
HoL 15-534	7863		25.4		310		2.02		25183	
HoCP 15-537	8301		28.3		293		2.50	+	22688	-
Ho 15-538	9919		32.4		306		2.32		28133	
HoL 15-539	9499		29.9		318		1.85		32443	
HoCP 15-543	13001	+	46.4	+	280	-	3.35	+	27792	
HoL 15-547	8491		26.3		322	+	2.06		25637	
HoCP 15-548	14389	+	44.3	+	326	+	3.33	+	26771	
HoCP 15-915	14497	+	45.6	+	318		3.16	+	28927	
Ho 15-916	14099	+	45.1	+	312		2.92	+	31082	
Ho 15-918	9044		29.0		312		2.68	+	21667	-
Ho 15-921	9986		31.4		318		2.01		31536	
HoH 15-926	8506		25.9		329	+	1.83		28359	
HoH 15-927	10792		34.6		311		1.98		35052	
Ho 15-930	13448	+	41.0	+	328	+	3.21	+	25523	
Ho 15-936	6898		22.1		313		1.87		23708	
Ho 15-938	12367	+	38.3		323	+	2.37		32443	
Ho 15-943	11363		34.4		330	+	1.88		36640	+
Ho 15-944	9374		28.7		325	+	2.03		28700	
Ho 15-945	10654		33.7		316		2.77	+	24389	
Ho 15-954	9535		30.0		318		2.16		27906	
Ho 15-957	12656	+	41.6	+	304		2.35		35393	
Ho 15-958	12244	+	43.7	+	280	-	3.51	+	24956	
Ho 15-959	11953	+	38.6	+	310		2.52	+	30628	

Table 10. Continued.

Variety	Sugar/ acre (lbs.)		Tons/ acre (tons)		Sugar/ ton (lbs.)		Weight/ stalk (lbs.)		Stalks/ acre (no.)	
Ho 15-960	15425	+	50.1	+	307		3.07	+	32670	
Ho 15-962	17508	+	56.3	+	311		3.26	+	34485	
Ho 15-963	13698	+	45.8	+	298		2.65	+	35052	
Ho 15-964	7985		25.5		312		2.45		20873	-
Ho 15-965	13164	+	42.1	+	311		2.80	+	29494	
Ho 15-970	7935		24.3		327	+	2.24		21553	-
Ho 15-971	15836	+	49.1	+	323	+	2.68	+	36640	+
Ho 15-972	13834	+	45.0	+	308		2.18		41405	+
Ho 15-975	10311		31.9		324	+	2.50	+	25637	
Ho 15-979	8904		28.4		313		2.16		26658	
Ho 15-984	11425		37.5		305		2.57	+	29267	
Ho 15-985	10342		32.5		318		2.29		28473	
HoCP 15-986	13832	+	44.3	+	313		2.96	+	29948	
HoCP 15-987	12398	+	38.1		325	+	2.85	+	26771	
HoCP 15-990	9250		30.7		302		2.38		25523	
HoCP 15-991	9931		33.2		299		2.48	+	26658	
Ho 15-993	11866		36.1		329	+	2.20		32783	
Ho 15-994	7182		21.8		329	+	2.15		20305	-
HoCP 15-996	11567		38.5		300		2.89	+	26658	
Ho 15-997	9704		30.9		314		1.84		33691	
HoCP 15-999	9063		30.0		302		2.11		28473	

Table 11. Nursery plant cane means of the 2015 “Ho” and “HoCP” assignment series on a Commerce silt loam soil at the Sugar Research Station in St. Gabriel, LA in 2016.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
L 01-299	12242	40.7	299	2.08	38569
HoCP 96-540	9616	33.8	284	2.40	28359 -
L 01-283	11204	37.4	299	1.90	39476
HoCP 04-838	13472	44.9	300	2.20	40838
HoL 15-501	17589	56.1	313	2.89 +	39023
HoL 15-502	11632	45.8	253 -	2.26	40838
HoCP 15-503	7273	24.6	295	1.49	34031
HoCP 15-504	16952	57.3	297	3.40 +	33804
HoCP 15-506	11924	41.4	287	2.18	38115
HoL 15-508	20708 +	66.7 +	311	2.80	47644 +
HoCP 15-510	12389	42.4	292	2.65	32216
HoL 15-511	17328	58.6	295	3.44 +	34485
HoL 15-513	13676	46.0	297	2.36	39023
HoCP 15-519	13743	46.5	296	2.54	36754
HoCP 15-525	13160	50.6	253 -	2.28	44921
Ho 15-531	12789	42.4	300	2.49	33124
HoL 15-534	11359	39.0	291	2.08	37208
HoCP 15-537	13698	45.6	301	2.70	33804
Ho 15-538	11829	39.4	300	2.17	36300
HoL 15-539	12275	43.3	284	2.22	39023
HoCP 15-543	17374	67.9 +	255 -	3.62 +	38115
HoL 15-547	18507 +	59.7	310	3.05 +	39249
HoCP 15-548	15403	53.8	286	2.96 +	36300
HoCP 15-915	18090	59.5	307	3.54 +	32897
Ho 15-916	6951	22.2	304	1.11 -	37208
Ho 15-918	14481	49.7	292	3.27 +	30401
Ho 15-921	13350	45.6	294	2.24	39703
HoH 15-926	13040	43.1	305	2.31	36981
HoH 15-927	14988	51.3	293	2.23	46056
Ho 15-930	16772	54.3	309	3.63 +	29948
Ho 15-936	10945	36.3	301	2.12	34258
Ho 15-938	15207	48.0	317	2.07	46509
Ho 15-943	12349	38.8	318	2.12	36527
Ho 15-944	12405	39.4	316	2.01	39249
Ho 15-945	16613	57.8	288	3.19 +	36300
Ho 15-954	11985	40.3	299	2.15	36754
Ho 15-957	14353	48.6	295	2.55	38115
Ho 15-958	14031	52.1	269 -	3.90 +	27452 -
Ho 15-959	14744	52.0	284	2.53	41291

Table 11. Continued.

Variety	Sugar/ acre		Tons/ acre		Sugar/ ton		Weight/ stalk		Stalks/ acre	
	(lbs.)		(tons)		(lbs.)		(lbs.)		(no.)	
Ho 15-960	19486	+	66.3	+	295		3.13	+	42426	
Ho 15-962	14549		49.5		294		2.56		38569	
Ho 15-963	18167		61.5	+	295		3.07	+	40157	
Ho 15-964	15127		49.4		306		2.29		43106	
Ho 15-965	12466		47.3		267	-	2.32		40838	
Ho 15-970	13188		42.7		310		1.84		46056	
Ho 15-971	18015		60.3	+	298		2.98	+	40157	
Ho 15-972	16189		53.6		303		2.28		46963	
Ho 15-975	10146		34.2		296		2.37		29040	-
Ho 15-979	11929		40.1		298		2.08		38569	
Ho 15-984	16003		55.5		288		2.53		43787	
Ho 15-985	13943		45.4		307		2.25		40611	
HoCP 15-986	14799		53.0		279		2.77		38342	
HoCP 15-987	14966		52.2		286		2.68		39023	
HoCP 15-990	12617		44.6		285		2.77		32216	
HoCP 15-991	14689		50.6		291		2.42		41745	
Ho 15-993	13310		42.7		313		2.33		36300	
Ho 15-994	13131		43.7		298		2.78		31536	
HoCP 15-996	16416		56.7		289		3.68	+	30855	
Ho 15-997	17933		61.0	+	294		2.39		51047	+
HoCP 15-999	19193	+	66.1	+	291		2.89	+	45829	

Table 12. Nursery plant cane means of the 2015 “Ho” and “HoCP” assignment series across locations (Ardoyne Farm, Iberia Research Station, & Sugar Research Station) in 2016.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
L 01-299	10538	34.8	303	2.00	34561
HoCP 96-540	10666	36.7	290	2.52 +	29343
L 01-283	10319	33.6	308	1.92	35279
HoCP 04-838	10607	34.3	311	2.02	33540
HoL 15-501	14003 +	43.2	326 +	2.56 +	34183
HoL 15-502	11825	40.9	290	2.40	34296
HoCP 15-503	8767	28.5	307	1.57	36527
HoCP 15-504	13738 +	45.6 +	302	2.98 +	30477
HoCP 15-506	11053	37.1	298	2.01	36905
HoL 15-508	14975 +	47.3 +	318 +	2.46 +	37548
HoCP 15-510	11099	35.5	315	2.47 +	28851 -
HoL 15-511	13516	44.0	309	2.79 +	31271
HoL 15-513	10159	35.0	289	2.24	30855
HoCP 15-519	10954	35.4	313	2.11	33162
HoCP 15-525	12444	45.1 +	275 -	2.61 +	35279
Ho 15-531	11746	39.1	299	2.50 +	30893
HoL 15-534	9853	32.0	309	2.01	31838
HoCP 15-537	11393	38.3	297	2.57 +	29607
Ho 15-538	10820	35.0	309	2.14	33010
HoL 15-539	11374	37.5	305	2.04	36640
HoCP 15-543	15338 +	55.5 +	278 -	3.29 +	33842
HoL 15-547	12742	40.2	319 +	2.41	32746
HoCP 15-548	15523 +	50.2 +	310	3.06 +	33048
HoCP 15-915	16007 +	50.6 +	319 +	3.18 +	31498
Ho 15-916	12284	39.0	311	2.24	35128
Ho 15-918	11767	38.4	309	2.80 +	27263 -
Ho 15-921	12504	41.0	307	2.16	37510
HoH 15-926	11545	36.4	320 +	2.04	35355
HoH 15-927	13007	42.8	305	2.04	41934 +
Ho 15-930	15012 +	47.1 +	320 +	3.38 +	27754 -
Ho 15-936	9720	31.8	306	1.94	32746
Ho 15-938	13655 +	43.0	318 +	2.13	40762 +
Ho 15-943	12339	38.2	323 +	1.95	39287
Ho 15-944	11046	34.2	323 +	2.03	33842
Ho 15-945	13196	44.4	300	2.86 +	30779
Ho 15-954	10763	34.6	313	2.13	32216
Ho 15-957	14099 +	47.1 +	300	2.45 +	38380
Ho 15-958	12823	46.3 +	277 -	3.43 +	27376 -
Ho 15-959	12164	41.2	297	2.34	35128

Table 12. Continued.

Variety	Sugar/ acre (lbs.)		Tons/ acre (tons)		Sugar/ ton (lbs.)		Weight/ stalk (lbs.)		Stalks/ acre (no.)	
Ho 15-960	16552	+	55.1	+	301		3.02	+	36376	
Ho 15-962	15507	+	50.9	+	305		2.72	+	37661	
Ho 15-963	16182	+	54.3	+	298		2.85	+	38153	
Ho 15-964	12090		39.4		308		2.37		33502	
Ho 15-965	14549	+	48.8	+	298		2.75	+	35544	
Ho 15-970	10512		32.9		321	+	1.97		34107	
Ho 15-971	15681	+	49.8	+	317	+	2.68	+	36905	
Ho 15-972	14586	+	47.5	+	308		2.10		45375	+
Ho 15-975	9846		32.1		307		2.34		27528	-
Ho 15-979	11768		38.1		309		2.13		35922	
Ho 15-984	13645	+	46.4	+	295		2.52	+	36754	
Ho 15-985	11878		38.2		312		2.25		33993	
HoCP 15-986	14055	+	46.7	+	302		2.74	+	34220	
HoCP 15-987	12631		41.4		308		2.55	+	32557	
HoCP 15-990	11859		39.8		300		2.62	+	30099	
HoCP 15-991	12484		42.2		297		2.46	+	34258	
Ho 15-993	12311		38.5		321	+	2.16		35468	
Ho 15-994	10655		33.5		320	+	2.35		28170	-
HoCP 15-996	13310		45.0	+	296		3.08	+	29078	-
Ho 15-997	12619		41.7		305		1.97		41443	+
HoCP 15-999	13664	+	46.8	+	293		2.50	+	36527	

2016 LOUISIANA VARIETY DEVELOPMENT PROGRAM INFIELD TRIALS

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The infield stage of variety development is the first stage in which yield estimates are based on plot weights instead of stalk counts. Varieties from the LSU AgCenter program (L' s) are planted in infield tests the year after assignment while varieties from the USDA program (Ho's) are included two years after assignment. Infield trials are generally planted at three locations (USDA's Ardoyne Farm in Schriever and commercial farms located in Vacherie and Erath) representing three distinct regions and soil types of the Louisiana sugarcane industry. In 2016, an infield test was planted on a mixed soil type at the Sugar Station in St. Gabriel instead of Erath.

Infield evaluations on commercial farms are conducted cooperatively with LSU AgCenter sugarcane variety personnel. Infield tests are planted 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 calculate the yield of theoretical recoverable sugar (TRS) per ton of cane. Plots are weighed with a tractor-pulled weigh-wagon fitted with electronic load cells mounted in the axle 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 infield evaluations. Results of infield trials are presented in Tables 2 to 17. Statistical analyses were done for each test and for each series combined across locations using PROC MIXED procedures in SAS (version 9.4). For purposes of comparison, the check variety L 01-299 is highlighted in each table. Yield values that are significantly higher or lower (P=0.05) than values for L 01-299 are noted with a '+' or '-', respectively.

Table 1. Planting and harvest dates of infield tests in 2016.

'Ho' Series	'L' Series	Location[1/]	Soil Series [2/]	Planting Date	Harvest Dates			
					2013	2014	2015	2016
2010	2011	BLK	Csl	8/17/12	11/12	11/19	10/19	10/13
2010	2011	VAL	Pasl	9/10/12	12/09	12/04	-	10/25
2011	2012	BLK	Csl	8/30/13		11/19	10/19	10/13
2011	2012	VAL	Pasl	9/03/13		12/04	12/29	10/25
2012	2013	AFH	Sc	9/25/14			11/24	10/21
2012	2013	BLK	Csl	8/26/14			12/16	10/13
2012	2013	VAL	Pasl	9/11/14			12/29	12/07
2013	2014	AFH	Sc	9/25/15				11/16
2013	2014	BLK	Csl	8/25/15				12/07
2013	2014	VAL	Pasl	9/10/15				12/07
2014	2013	AFH	Sc	10/06/16				
2014	2013	BLK	Csl	9/21/16				
2014	2013	STG	Cm	9/30/16				

[1/] AFH = Ardoyne Farm heavy soil in Schriever, BLK = Blackberry Farms in Vacherie, VAL = Vallot Farm in Erath, STG = St. Gabriel Research Station.

[2/] Cm = Commerce silty clay loam, Csl = Commerce silt loam, Pasl = Patoutville silt loam, Sc = Sharkey clay.

Table 2. Infield third-stubble means of the 2011 "L" assignment series on a Commerce silt loam soil at Blackberry Farms in Vacherie, LA in 2016.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
L 01-299	7189	35.5	202	1.40	51057	13.1
HoCP 96-540	6491	31.3	207	1.39	45559	12.5
L 99-226	5663	25.6 -	221	1.81	29795 -	14.3
L 03-371	6475	29.8	217	1.59	37789	11.3
L 11-183	7655	32.4	236 +	1.86	34971	13.1

Table 3. Infield third-stubble means of the 2011 “L” assignment series on a Patoutville silt loam soil at Vallot Farm in Erath, LA in 2016.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
L 01-299	10370	41.7	248	1.37	60712	13.4
HoCP 96-540	6880 -	27.1 -	254	1.47	37399 -	15.1
L 99-226	7900	28.3 -	279	2.07	27730 -	13.8
L 03-371	8600	29.5 -	293 +	1.41	42044 -	11.6
L 11-183	7898	29.5 -	266	2.09 +	28628 -	13.6

Table 4. Infield third -stubble means of the 2011 “L” assignment series across two locations (Blackberry Farms and Vallot Farm) in 2016.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
L 01-299	8779	38.6	225	1.38	55885	13.3
HoCP 96-540	6686	29.2 -	231	1.43	41479 -	13.8
L 99-226	6782	27.0 -	250	1.94 +	28763 -	14.0
L 03-371	7537	29.7 -	255	1.50	39916 -	11.4
L 11-183	7777	31.0 -	251	1.97 +	31800 -	13.4

Table 5. Infield second-stubble means of the 2012 “L” assignment series on a Commerce silt loam soil at Blackberry Farms in Vacherie, LA in 2016.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
L 01-299	6996	34.8	203	1.47	47134	13.7
HoCP 96-540	5461	28.0	195	1.80	31151 -	12.8
L 99-226	5704	24.3	235 +	1.66	29412 -	14.7
L 01-283	7102	31.1	228 +	1.36	45775	13.5
HoCP 04-838	7007	30.5	230 +	1.37	44768	14.1
L 12-201	7890	32.7	241 +	1.97 +	33183 -	11.3 -

Table 6. Infield second-stubble means of the 2012 "L" assignment series on a Patoutville silt loam soil at Vallot Farm in Erath, LA in 2016

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
L 01-299	9579	36.8	261	1.62	45588	13.9
HoCP 96-540	7626	32.4	236	1.86	35078	15.0
L 99-226	9623	36.0	268	2.36 +	30785 -	12.1 -
L 01-283	8352	33.0	252	1.70	39278	12.6
HoCP 04-838	8023	30.4	262	1.56	39199	13.4
L 12-201	8937	31.0	288	1.99	31303 -	10.6 -

Table 7. Infield second -stubble means of the 2012 "L" assignment series across two locations (Blackberry Farms and Vallot Farm) in 2016.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
L 01-299	8288	35.8	232	1.54	46361	13.8
HoCP 96-540	6544	30.2	216	1.83	33115 -	13.9
L 99-226	7663	30.2	252	2.01 +	30099 -	13.4
L 01-283	7727	32.1	240	1.53	42526	13.1
HoCP 04-838	7515	30.5	246	1.46	41983	13.8
L 12-201	8413	31.9	265 +	1.98	32243 -	10.9 -

Table 8. Infield first-stubble means of the 2012 "Ho" assignment series on a Sharkey clay soil at Ardoyne Farm in Schriever, LA in 2016.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
L 01-299	6846	28.4	241	1.37	41622	13.8
HoCP 96-540	6823	28.4	241	2.10 +	27008 -	12.8
L 01-283	6139	25.6	241	1.58	32610	12.5 -
HoCP 04-838	8540	34.3	248	1.31	52397	13.3
Ho 12-615	5713	23.0	249	1.14	40895	12.8
Ho 12-630	6223	24.5	254	1.71	28865	12.1 -

Table 9. Infield first-stubble means of the 2012 “Ho” and 2013 “L” assignment series on a Commerce silt loam soil at Blackberry Farms in Vacherie, LA in 2016.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
L 01-299	5900	31.6	190	1.49	44372	12.7
HoCP 96-540	6231	30.9	200	2.20 +	28561	12.4
L 01-283	6956	28.6	243 +	1.68	33969	12.8
HoCP 04-838	7679	32.4	237 +	1.56	42739	13.5
Ho 12-615	7625	34.0	224 +	1.58	43229	14.0 +
Ho 12-630	7933	32.1	248 +	1.86	34463	12.1
L 13-234	5167	22.8	227 +	1.33	34145	13.6
L 13-251	8148	33.9	240 +	2.40 +	28410	12.5
L 13-257	6130	26.6	229 +	2.22 +	24174 -	11.3 -

Table 10. Infield first-stubble means of the 2012 “Ho” and 2013 “L” assignment series on a Patoutville silt loam soil at Vallot Farm in Erath, LA in 2016.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
L 01-299	11001	39.3	279	1.74	45246	12.8
HoCP 96-540	8092 -	29.4 -	274	1.98	29675 -	12.1
L 01-283	9304	33.4	278	1.55	44420	11.4 -
HoCP 04-838	8172 -	29.8 -	274	1.77	33652	12.6
Ho 12-615	8812	33.5	263	1.75	38485	14.1 +
Ho 12-630	8815	29.4 -	300	1.98	30237 -	11.1 -
L 13-234	5651 -	22.6 -	251	1.45	32157	13.5
L 13-251	7335 -	28.6 -	257	2.30 +	24830 -	12.1
L 13-257	8203 -	30.6 -	268	2.58 +	23718 -	11.9

Table 11. Infield first-stubble means of the 2012 “Ho” assignment series across three locations (Ardoyne Farm, Blackberry Farms, and Vallot Farm) in 2016.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
L 01-299	8263	33.8	240	1.55	43639	13.2
HoCP 96-540	7049	29.5	238	2.09 +	28415 -	12.5
L 01-283	7466	29.2	254	1.60	37000	12.2
HoCP 04-838	8130	32.2	253	1.55	42929	13.2
Ho 12-615	7383	30.2	245	1.49	40870	13.6
Ho 12-630	7657	28.7	267 +	1.85 +	31188 -	11.8 -

Table 12. Infield first-stubble means of the 2012 "Ho" and 2013 "L" assignment series across two locations (Blackberry Farms and Vallot Farm) in 2016.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
L 01-299	9043	36.9	238	1.66	44955	12.8
HoCP 96-540	7161	30.1 -	237	2.09 +	29118 -	12.3
L 01-283	8130	31.0	260	1.61	39194	12.1
HoCP 04-838	7926	31.1	256	1.67	38195	13.1
Ho 12-615	8218	33.8	243	1.67	40857	14.1 +
Ho 12-630	8374	30.8	274	1.92	32350 -	11.6 -
L 13-234	5409 -	22.7 -	239	1.39	33151 -	13.5
L 13-251	7742	31.3	249	2.35 +	26620 -	12.3
L 13-257	7166	28.6 -	249	2.40 +	23946 -	11.6 -

Table 13. Infield plant-cane means of the 2013 "Ho" assignment series on a Sharkey clay soil at Ardoyne Farm in Schriever, LA in 2016.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
L 01-299	10063	38.1	264	2.16	35426	12.5
HoCP 96-540	10358	43.0	241 -	2.33	37308	12.9
L 01-283	9594	34.3	279	2.05	33609	12.4
HoCP 04-838	10362	38.7	268	2.20	35242	13.3
Ho 11-573	10729	38.4	279	3.00 +	26140	12.2
Ho 13-708	12992 +	47.4 +	274	3.09 +	30844	12.5
HoCP 13-726	12213	42.1	290 +	2.03	41170	11.6
HoCP 13-737	9706	32.3	301 +	2.18	30317	10.9 -
HoCP 13-738	10203	34.9	293 +	2.60	27060	10.7 -
Ho 13-739	10957	37.6	292 +	2.02	37218	11.3 -
HoCP 13-740	12610 +	45.7 +	276	2.04	44854	12.0
HoCP 13-755	11014	36.8	298 +	2.15	34313	11.8
HoCP 13-758	13123 +	45.3	290 +	2.64	34508	10.6 -
HoCP 13-775	9789	34.6	283 +	2.19	32074	11.6

Table 14. Infield plant-cane means of the 2013 "Ho" and 2014 "L" assignment series on a Commerce silt loam soil at Blackberry Farms in Vacherie, LA in 2016.

Variety	Sugar/ acre (lbs.)	Tons/ acre (tons)	Sugar/ ton (lbs.)	Weight/ stalk (lbs.)	Stalks/ acre (no.)	Fiber (%)
L 01-299	11262	41.0	274	2.00	40937	13.9
HoCP 96-540	13014	48.1	270	2.89 +	33244	14.2
L 01-283	9831	34.5	285	1.77	39386	12.3
HoCP 04-838	13377	48.7 +	275	1.88	52084	13.8
Ho 11-573	14983 +	52.2 +	287	3.44 +	30457	12.6
Ho 13-708	14185 +	52.5 +	271	2.72 +	39304	14.7
HoCP 13-726	14000 +	47.1	297 +	2.12	44507	12.4
HoCP 13-737	12108	40.4	299 +	2.32	35706	11.5 -
HoCP 13-738	10652	37.5	283	2.20	35810	12.8
Ho 13-739	12498	41.0	305 +	2.56 +	32201	10.7 -
HoCP 13-740	14601 +	49.7 +	294	2.20	45671	11.6 -
HoCP 13-755	12059	41.4	292	1.85	44906	12.3
HoCP 13-758	18236 +	61.5 +	297 +	2.59 +	47515	11.1 -
HoCP 13-775	13209	46.2	285	2.05	45284	11.3 -
L 14-265	11826	44.2	269	2.68 +	33037	11.8 -
L 14-267	11624	39.8	292	3.02 +	26573 -	11.7 -
L 14-271	10621	38.2	278	2.03	37762	14.7
L 14-273	11912	46.9	254	1.65	56913 +	16.1 +
L 14-274	9042	30.8 -	293	2.09	29656 -	12.0 -
L 14-282	13161	46.8	281	2.49	37673	12.5
L 14-285	10870	36.5	298 +	2.65 +	27444 -	11.9 -
L 14-288	9627	34.6	279	2.45	28219 -	12.9

Table 15. Infield plant-cane means of the 2013 "Ho" and 2014 "L" assignment series on a Patoutville silt loam soil at Vallot Farms in Erath, LA in 2016.

Variety	Sugar/ acre (lbs.)		Tons/ acre (tons)		Sugar/ ton (lbs.)		Weight/ stalk (lbs.)		Stalks/ acre (no.)		Fiber (%)	
L 01-299	11107		41.1		272		2.19		37971		13.1	
HoCP 96-540	9728		37.4		260		2.93	+	25497	-	14.2	
L 01-283	10024		35.5		282		2.14		33325		12.4	
HoCP 04-838	12276		41.1		299	+	2.37		34644		11.7	
Ho 11-573	11946		45.3		264		3.64	+	25092	-	13.0	
Ho 13-708	11260		40.6		278		2.86	+	28427	-	13.4	
HoCP 13-726	7069	-	24.4	-	288		2.33		21008	-	12.8	
HoCP 13-737	8687	-	33.1	-	262		2.95	+	22510	-	13.5	
HoCP 13-738	8835	-	33.2	-	266		2.56		26091	-	13.1	
Ho 13-739	9274		33.8	-	274		2.20		30772		12.4	
HoCP 13-740	8048	-	30.6	-	263		2.05		30361		14.2	
HoCP 13-755	8358	-	29.9	-	279		2.24		26832	-	13.0	
HoCP 13-758	12676		43.2		293		2.93	+	29532		10.9	
HoCP 13-775	7032	-	27.3	-	258		1.93		28341	-	13.6	
L 14-265	9873		36.6		268		2.96	+	24746	-	12.3	
L 14-267	10373		36.7		283		2.91	+	25255	-	12.4	
L 14-271	7247	-	27.9	-	258		2.09		27221	-	15.8	+
L 14-273	9050		36.0		251		2.10		34401		16.6	+
L 14-274	7045	-	27.2	-	259		2.30		23885	-	12.3	
L 14-282	10185		38.9		262		2.27		35102		13.2	
L 14-285	8436	-	30.8	-	274		2.34		26782	-	14.1	
L 14-288	9204		34.4		268		2.88	+	24187	-	13.3	

Table 16. Infield plant-cane means of the 2013 "Ho" assignment series across three locations (Ardoyne Farm, Blackberry Farms, and Vallot Farm) in 2016.

Variety	Sugar/ acre (lbs.)	Tons/ acre (tons)	Sugar/ ton (lbs.)	Weight/ stalk (lbs.)	Stalks/ acre (no.)	Fiber (%)
L 01-299	10810	40.1	270	2.11	38111	13.2
HoCP 96-540	11033	42.8	257	2.72 +	32016	13.8
L 01-283	9816	34.8	282	1.98	35440	12.4
HoCP 04-838	12005	42.8	281	2.15	40657	12.9
Ho 11-573	12553	45.3	277	3.36 +	27230 -	12.6
Ho 13-708	12812	46.8	274	2.89 +	32858	13.5
HoCP 13-726	11094	37.9	292 +	2.16	35562	12.3
HoCP 13-737	10167	35.3	287	2.48 +	29511 -	11.9
HoCP 13-738	9897	35.2	281	2.45	29653 -	12.2
Ho 13-739	10909	37.5	290 +	2.26	33397	11.4 -
HoCP 13-740	11753	42.0	277	2.10	40295	12.6
HoCP 13-755	10477	36.0	290 +	2.08	35351	12.4
HoCP 13-758	14678 +	50.0 +	293 +	2.72 +	37185	10.9 -
HoCP 13-775	10010	36.0	275	2.06	35233	12.2

Table 17. Infield plant-cane means of the 2013 "Ho" and 2014 "L" assignment series across two locations (Blackberry Farms and Vallot Farm) in 2016.

Variety	Sugar/ acre (lbs.)	Tons/ acre (tons)	Sugar/ ton (lbs.)	Weight/ stalk (lbs.)	Stalks/ acre (no.)	Fiber (%)
L 01-299	11184	41.0	273	2.09	39454	13.5
HoCP 96-540	11371	42.7	265	2.91 +	29370	14.2
L 01-283	9928	35.0	283	1.95	36355	12.4
HoCP 04-838	12827	44.9	287	2.13	43364	12.8
Ho 11-573	13465	48.7	276	3.54 +	27774 -	12.8
Ho 13-708	12723	46.5	274	2.79 +	33865	14.0
HoCP 13-726	10534	35.8	292	2.22	32758	12.6
HoCP 13-737	10398	36.8	281	2.63 +	29108	12.5
HoCP 13-738	9743	35.4	275	2.38	30950	13.0
Ho 13-739	10886	37.4	290	2.38	31487	11.5 -
HoCP 13-740	11324	40.2	278	2.13	38016	12.9
HoCP 13-755	10209	35.6	286	2.05	35869	12.7
HoCP 13-758	15456 +	52.4 +	295 +	2.76 +	38523	11.0 -
HoCP 13-775	10121	36.7	272	1.99	36813	12.5
L 14-265	10849	40.4	268	2.82 +	28892 -	12.0
L 14-267	10998	38.3	287	2.96 +	25914 -	12.1
L 14-271	8934	33.0	268	2.06	32491	15.3 +
L 14-273	10481	41.5	253	1.87	45657	16.3 +
L 14-274	8044 -	29.0 -	276	2.20	26770 -	12.2
L 14-282	11673	42.8	271	2.38	36388	12.9
L 14-285	9653	33.7	286	2.49	27113 -	13.0
L 14-288	9415	34.5	273	2.66 +	26203 -	13.1

2016 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 2016 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, topped but 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 varieties in Louisiana in 2016 were HoCP96-540 and L01-299, occupying 30% and 36% of the state’s acreage, respectively. For comparison, L01-299 was used as the check variety 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 was done with the Student's t test by using PDIFF option (P=0.05). Varieties that are significantly higher or lower than L01-299 are denoted by a plus (+) or minus (-), respectively, next to the value for each trait.

Twenty-four experimental varieties representing the 2014 assignment series were introduced to outfield locations for seed increase in 2016 (Table 1). Seventeen experimental and five commercial varieties were planted at 12 outfield locations. Forty-one tests were harvested in 2016 including eleven plantcane, twelve first-stubble, twelve 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 2016 season was marked by higher than average rainfall; much of this amount occurred in August during the great flood of 2016. Rainfall was above normal for all months of 2016 except for October and November where rainfall was below normal. Temperatures throughout the year were normal to above normal. The Louisiana industry was spared of any tropical activity during the 2016 season. The industry received rainfall in late November, which helped to alleviate dry conditions.

The commercial variety HoCP 09-804 and was released in 2016, and seed-cane was distributed by League secondary seed increase stations. The new variety was harvested in plant cane through third stubble in 2016 outfield variety trials. Experimental variety L 11-183 was harvested in plant cane and 1st stubble tests and is eligible for release in 2018.

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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 2016.

Commercial Varieties	Experimental Varieties			Experimental Varieties Introduced to the Outfield			
HoCP96-540	L11-183	L13-257	HoCP13-755	L14-265	L14-288	HoL14-841	HoCP14-897
L01-283	Ho11-573	Ho13-708	HoCP13-758	L14-267	HoCP14-802	HoCP14-843	HoCP14-902
L01-299	L12-201	Ho13-726	HoCP13-775	L14-271	HoCP14-826	Ho14-863	
HoCP04-838	Ho12-615	HoCP13-737		L14-273	Ho14-827	Ho14-864	
HoCP09-804	Ho12-630	HoCP13-738		L14-274	HoCP14-829	HoCP14-867	
	L13-234	Ho13-739		L14-282	HoCP14-830	HoCP14-878	
	L13-251	HoCP13-740		L14-285	HoCP14-831	HoCP14-885	

Table 2. Harvest and planting dates for all outfield locations harvested in 2016.

			Plantcane		First-stubble		Second-stubble		Third-stubble	
Location	Parish	2016 Planting Date	2016 Harvest Date	2015 Planting Date	2016 Harvest Date	2014 Planting Date	2016 Harvest Date	2013 Planting Date	2016 Harvest Date	2012 Planting Date
Al Landry	Iberville	09/28	12/14	09/02	10/31	08/27	10/31	09/06	**	09/25
Allains	St. Mary	10/11	12/01	09/23	12/02	10/13	12/02	09/19	12/01	09/27
Alma	Pointe Coupee	10/04	11/21	09/08	11/21	10/09	10/19	08/28	10/19	08/17
Bon Secour	St. James	*	**	*	11/28	09/09	10/26	08/29	10/26	09/07
Brunswick	Pointe Coupee	09/19	11/22	09/09	11/22	09/17	10/17	09/04	10/17	09/05
Frank Martin	St. Mary	09/27	10/21	08/14	11/18	10/08	10/21	10/05	**	09/26
Glenwood	Assumption	09/21	12/01	09/16	11/02	10/07	11/02	08/23	**	09/24
Harper Farms	Rapides	09/16	**	*	**	*	**	*	**	*
Lanaux	St. John	08/31	11/28	08/19	11/28	08/25	10/27	09/10	10/27	08/23
Levert-St. John	St. Martin	09/20	12/09	09/15	11/04	09/10	11/04	09/03	**	09/06
Magnolia	Terrebonne	10/01	11/15	09/17	11/15	10/27	10/14	11/05	**	09/11
Mary	Lafourche	10/10	10/12	10/08	12/21	10/28	10/12	09/17	**	09/12
Ronald Hebert	Iberia	08/25	12/12	09/01	12/12	09/29	10/20	09/05	10/20	09/25

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

Table 3. Plantcane sugar per acre for six commercial and four experimental varieties at eleven outfield locations in 2016.

	Heavy						Light					
Variety	Allains	Alma	Frank Martin	Landry	Magnolia	Mary	Brunswick	Glenwood	Lanaux	Ronald Hebert	Levert St. John	Overall Mean
	(lbs./A)											
HoCP96-540	6549	9575	6182	7550 -	9840	6613	7863 -	10374	10201	10732 -	10222	8700 -
L01-283	8081 +	10763	6522	9860	9644	5945	8819	9395	11921	9816 -	11219	9271
L01-299	6005	10827	6943	9265	9878	5811	10238	9441	12170	12591	11724	9536
HoCP04-838	5344	11815	6655	9521	9132	6005 +	12194 +	10701	11635	11200 -	14025 +	9839
Ho07-613	9131 +	12248	7866	11609 +	11224	7970 +	12275 +	12631 +	11586	8698 -	10818	10551 +
HoCP09-804	8121 +	10610	7602	10809 +	8550	6703	9356	10930	11088	10281 -	12567	9693
L11-183	7870 +	11072	7304	10322	10695	7397 +	10536	11481 +	12560	12421	11863	10320
L12-201	6183	9885	7219	9300	11682 +	7686 +	9793	12374 +	11706	10745 -	10728	9755
Ho12-615	8197 +	12732	7797	10538 +	10420	6584	11844 +	11494 +	11766	11212	13054	10513 +
Ho12-630	7028	9938	7163	10125	11386 +	7274 +	10293	11748 +	11101	10667 -	11312	9821

Table 4. Plantcane cane yield for six commercial and four experimental varieties at eleven outfield locations in 2016.

	Heavy						Light					
Variety	Allains	Alma	Frank Martin	Landry	Magnolia	Mary	Brunswick	Glenwood	Lanaux	Ronald Hebert	Levert St. John	Overall Mean
	(tons/A)											
HoCP96-540	22.1	33.1	27.6	26.9 -	35.5	28.2	26.9 -	35.0	35.2	35.8 -	32.5 -	30.8
L01-283	24.6	34.3	24.9	31.6	31.3	21.6	29.0 -	31.0	37.8	33.0 -	36.0	30.5
L01-299	19.2	37.5	27.4	32.2	33.6	24.4	34.3	30.1	40.6	41.9	37.6	32.6
HoCP04-838	17.1	37.1	24.6	34.1	30.7	23.5	40.1 +	37.2 +	37.5	37.5	45.0 +	33.1
Ho07-613	29.0 +	39.0	30.4	37.0 +	37.1 +	29.7 +	37.6	40.3 +	36.7	28.1 -	34.9	34.5
HoCP09-804	25.6 +	34.5	28.2	37.3 +	27.9 -	24.5	30.9	35.9 +	35.9	34.4 -	40.7	32.4
L11-183	24.5	34.5	30.6	34.7	36.5	28.4 +	32.6	36.2 +	39.5	39.6	37.3	34.0
L12-201	19.4	31.2 -	29.1	31.1	38.1 +	27.2	32.0	39.1 +	37.5	34.5 -	34.0	32.1
Ho12-615	26.6 +	40.6	31.3 +	36.0	35.6	25.7	40.1 +	38.9 +	38.2	38.9	44.3 +	36.0 +
Ho12-630	22.3	31.5 -	29.1	33.0	37.8 +	26.0	33.6	37.1 +	35.9	34.4 -	35.6	32.4

Table 5. Plantcane sugar per ton for six commercial and four experimental varieties at eleven outfield locations in 2016.

	Heavy						Light					
Variety	Allains	Alma	Frank Martin	Landry	Magnolia	Mary	Brunswick	Glenwood	Lanaux	Ronald Hebert	Levert St. John	Overall Mean
	(lbs./tons)											
HoCP96-540	297 -	289	224 -	281	277	235	293	297 -	290 -	300	314	282 -
L01-283	329 +	314 +	262	312 +	308	274 +	304	303	316 +	297	312	303 +
L01-299	314	288	254	288	294	238	299	313	301	300	312	291
HoCP04-838	314	318 +	270	280	298	255	304	288 -	310 +	299	312	295
Ho07-613	314	314 +	259	314 +	303	268 +	327 +	313	315 +	309	310	304 +
HoCP09-804	318	308 +	270	289	307	272 +	302	304	309	298	309	299 +
L11-183	321	321 +	239	297	293	261 +	323 +	317	318 +	314	316	302 +
L12-201	319	317 +	248	299	307	283 +	306	316	311 +	311	315	303 +
Ho12-615	309	314 +	249	292	292	255	296	296 -	309	289	294	290
Ho12-630	315	316 +	246	307 +	301	278 +	306	317	309	310	317	302 +

Table 6. Plantcane stalk weight for six commercial and four experimental varieties at eleven outfield locations in 2016.

	Heavy						Light					
Variety	Allains	Alma	Frank Martin	Landry	Magnolia	Mary	Brunswick	Glenwood	Lanaux	Ronald Hebert	Levert St. John	Overall Mean
	(lbs)											
HoCP96-540	2.88 +	2.46	2.13	2.99	2.86 +	2.25	2.80	2.33 +	2.48	2.81 +	2.65	2.60 +
L01-283	2.00	1.91	1.73	2.59	1.90	1.74	2.09	1.67	2.22	2.22	1.85 -	1.99 -
L01-299	1.96	2.29	1.90	2.83	2.17	1.87	2.54	1.87	2.00	2.05	2.36	2.17
HoCP04-838	1.68	2.00	1.55	2.56	1.99	1.69	2.23	2.07	2.23	2.67 +	2.40	2.10
Ho07-613	2.15	2.45	2.07	2.83	2.64 +	2.06	2.58	2.12	2.14	2.48	2.63	2.38 +
HoCP09-804	1.70	1.76	1.61	2.24 -	1.80	1.64	1.86 -	1.59 -	1.94	1.79	1.78 -	1.79 -
L11-183	2.42 +	2.11	2.11	2.62	2.82 +	1.99	2.32	2.48 +	2.65 +	2.91 +	2.48	2.45 +
L12-201	2.64 +	2.55	2.13	3.31	3.08 +	2.20	2.91	3.02 +	3.48 +	3.45 +	2.71	2.86 +
Ho12-615	1.72	1.66	1.99	2.27 -	1.97	1.64	2.04 -	1.81	2.10	1.98 -	1.87 -	1.91 -
Ho12-630	2.32	2.71	2.43 +	2.82	2.77 +	2.11	2.50	2.39 +	2.50 +	2.77 +	2.43	2.52 +

Table 7. Plantcane stalk number for six commercial and four experimental varieties at eleven outfield locations in 2016.

	Heavy						Light					
Variety	Allains	Alma	Frank Martin	Landry	Magnolia	Mary	Brunswick	Glenwood	Lanaux	Ronald Hebert	Levert St. John	Overall Mean
						(stalks/A)						
HoCP96-540	15395	27517	25988	18004	25025 -	25395	19252 -	30031	28654 -	25626 -	24685 -	24143 -
L01-283	24581	36257	28977	24384	33121	24834	28078	37511	33984	29842 -	39198 +	30979
L01-299	19633	33495	29034	22813	30896	26307	27593	32497	41320	41207	31914	30610
HoCP04-838	20152	39787	32178	27107	30839	28189	36094 +	36129	34217	28084 -	37509	31844
Ho07-613	28846 +	32845	29469	26208	28407	28915	29147	38316	34261	23489 -	26716	29693
HoCP09-804	30144 +	40480	35373	34246 +	30897	29763	33706	45973 +	36955	38437	46274 +	36568 +
L11-183	20969	32792	28970	26824	25971 -	28604	28338	29456	32130	27442 -	30406	28355
L12-201	14600	24697	28207	19069	24939 -	25363	22120	25934 -	21726 -	20071 -	25321	22913 -
Ho12-615	30777 +	49560 +	32100	31825 +	36129 +	31841	39485 +	43122 +	39167	39435	47998 +	38313 +
Ho12-630	19315	23575	24195	23660	27726	24506	27034	30995	28772 -	26018 -	29312	25919 -

Table 8. First-stubble sugar per acre for one experimental and eight commercial varieties at twelve outfield locations in 2016.

	Heavy						Light						
Variety	Allains	Alma	Frank Martin	Landry	Magnolia	Mary	Bon Secour	Brunswick	Glenwood	Lanaux	Ronald Hebert	Levert St. John	Overall Mean
							(lbs./A)						
HoCP96-540	3653	7413 -	7199	6655	3824	7565	10385	5525	5258 -	7779 -	10010 -	5977 -	6770 -
L99-226	5403	10233	7781	8080	3471	6834	10162	6718	6705	8550 -	9364 -	8646	7662
HoCP00-950	2129	7834 -	6006 -	7321	2497	6152	8204 -	5624	5179 -	10184	9403 -	8250	6565 -
L01-283	4305	9772	8230	8310	4245	6361	9351 -	6686	6816	10249	10020 -	8589	7745
L01-299	4224	10753	8153	7413	3502	6439	10697	6994	7318	10125	11666	8402	7977
HoCP04-838	2376	8333 -	6130 -	6299	3433	6763	9384 -	5361	6895	10905	9143 -	8656	6973 -
Ho07-613	3314	9544	6820	8265	3152	6560	10028	6412	7199	9091	9410 -	7950	7312 -
HoCP09-804	3861	10763	8111	6851	3820	8039	10359	7427	7967	10344	10866	9528 +	8161
L11-183	3307	9752	6800	6995	4611	7522	10558	6523	6740	9960	10239 -	8408	7618

Table 9. First-stubble cane yield for one experimental and eight commercial varieties at twelve outfield locations in 2016.

	Heavy						Light						
Variety	Allains	Alma	Frank Martin	Landry	Magnolia	Mary	Bon Secour	Brunswick	Glenwood	Lanaux	Ronald Hebert	Levert St. John	Overall Mean
							(tons/A)						
HoCP96-540	11.5	24.7 -	21.4	22.3	12.5	23.4	33.4	18.3	19.6 -	26.4 -	32.5 -	21.0 -	22.3 -
L99-226	16.5	32.1	21.3	26.5	11.0	20.9	29.9 -	19.9	22.6 -	25.7 -	28.8 -	26.0	23.4 -
HoCP00-950	6.2	23.6 -	16.8 -	21.8 -	7.5	18.1	24.3 -	17.0	16.1 -	29.2	28.7 -	25.9	19.6 -
L01-283	13.4	30.7	23.5	25.9	13.5	19.7	28.4 -	21.0	25.0	32.1	32.0 -	28.2	24.4
L01-299	13.8	34.7	22.8	25.3	11.1	20.8	33.8	23.0	26.8	31.7	37.1	28.7	25.8
HoCP04-838	7.7	26.8 -	18.6	23.0	11.3	22.6	30.3	16.7	25.5	35.8	29.4 -	28.8	23.0 -
Ho07-613	10.4	30.0	19.2	25.9	9.9	21.0	31.9	19.6	24.5	28.4	29.6 -	25.8	23.0 -
HoCP09-804	12.2	33.8	24.8	21.8 -	12.1	26.5	33.0	23.4	26.0	32.2	35.2	30.5	26.0
L11-183	10.0	29.7 -	19.8	23.3	14.2	23.4	33.3	20.9	24.2	31.1	32.1 -	27.9	24.2

Table 10. First-stubble sugar per ton for one experimental and eight commercial varieties at twelve outfield locations in 2016.

	Heavy						Light						
Variety	Allains	Alma	Frank Martin	Landry	Magnolia	Mary	Bon Secour	Brunswick	Glenwood	Lanaux	Ronald Hebert	Levert St. John	Overall Mean
							(lbs./tons)						
HoCP96-540	317	300 -	334 -	299	308	323 +	310	302	268	295 -	308	285	304
L99-226	328 +	318	365	305	310	327 +	340 +	337 +	297 +	332	325 +	332 +	326 +
HoCP00-950	334 +	332 +	359	336 +	327	340 +	337 +	332 +	323 +	349 +	328 +	318 +	335 +
L01-283	322 +	319	349	320 +	314	322 +	330 +	319	273	320	314	305	317 +
L01-299	305	310	358	292	316	309	317	307	273	319	314	293	310
HoCP04-838	309	310	330 -	275	302	299	310	321	270	305	311	301	304
Ho07-613	317	318	355	319 +	318	312	315	327 +	293	320	317	308 +	318 +
HoCP09-804	317	318	327 -	314 +	312	303	315	318	307 +	321	309	313 +	314
L11-183	330 +	329 +	344	299	324	321	318	313	278	321	319	301	316

Table 11. First-stubble stalk weight for one experimental and eight commercial varieties at twelve outfield locations in 2016.

	Heavy						Light						
Variety	Allains	Alma	Frank Martin	Landry	Magnolia	Mary	Bon Secour	Brunswick	Glenwood	Lanaux	Ronald .Hebert	Levert St. John	Overall Mean
							(lbs.)						
HoCP96-540	1.60 +	2.02	1.74 +	1.51	1.00	1.71	2.31 +	1.74	1.64	2.11	2.52 +	2.31 +	1.85 +
L99-226	2.14 +	2.68	1.89 +	1.66	1.10	1.75	2.18	2.13 +	2.17 +	2.58 +	2.82 +	2.43 +	2.13 +
HoCP00-950	0.99	1.79 -	1.23	1.52	0.88	1.38	1.87	1.52	1.53	1.82	1.89	1.84	1.52
L01-283	1.20	1.80 -	1.21	1.41	1.11	1.29	1.77	1.58	1.71	1.94	1.81	1.72	1.54
L01-299	1.07	2.37	1.40	1.60	1.03	1.53	1.81	1.71	1.58	1.92	1.77	1.67	1.62
HoCP04-838	1.12	1.75 -	1.20	1.27	1.15	1.73	2.04	1.44	1.42	1.93	2.04	1.82	1.58
Ho07-613	1.14	2.31	1.61	1.51	1.07	1.57	2.52 +	1.70	1.62	2.28	2.42 +	2.09 +	1.82 +
HoCP09-804	1.03	1.60 -	1.22	1.26	0.94	1.33	1.62	1.43	1.35	1.58	1.80	1.60	1.40 -
L11-183	1.56 +	2.00	1.77 +	1.55	1.00	2.05 +	1.88	2.25 +	1.67	2.15	2.25 +	1.95	1.84 +

Table 12. First-stubble stalk number for one experimental and eight commercial varieties at twelve outfield locations in 2016.

	Heavy						Light						
Variety	Allains	Alma	Frank Martin	Landry	Magnolia	Mary	Bon Secour	Brunswick	Glenwood	Lanaux	Ronald Hebert	Levert St. John	Overall Mean
							(stalks/A)						
HoCP96-540	14302 -	24909	25275	29867	24756	27620	29585 -	21154 -	24371 -	25891	26281 -	18632 -	24387 -
L99-226	15308 -	24084 -	22768 -	32028	20319	24032	27456 -	18702 -	21312 -	20077 -	20452 -	21761 -	22358 -
HoCP00-950	12250 -	26303	27732	28781	16778	27342	26180 -	22540	21078 -	32198	30566 -	28375 -	25010 -
L01-283	21422	34088 +	39400	39086	24487	30774	32151	26708	29333	33138	35518 -	32953	31588
L01-299	26403	29194	32999	31651	21516	27536	37463	26891	34231	33793	42394	34563	31543
HoCP04-838	13243 -	30851 +	31554	37091	20038	26217	29846	23112	35990	36968	29058 -	31611	28798
Ho07-613	17249 -	26183	23860	34262	18707	26872	25428 -	23111	30248	24936	24712 -	24641 -	25018 -
HoCP09-804	23627	42149 +	41356	34641	25751	40188 +	41065	32730 +	39647	41759	38966	38280	36680 +
L11-183	12413 -	29930	22427 -	30163	28925	22922	35983	18668 -	29130	30460	28788 -	28968 -	26565 -

Table 13. Second-stubble sugar per acre for nine commercial and one experimental varieties at twelve outfield locations in 2016.

	Heavy						Light						
Variety	Allains	Alma	Frank Martin	Landry	Magnolia	Mary	Bon Secour	Brunswick	Glenwood	Lanaux	Ronald Hebert	Levert St. John	Overall Mean
							(lbs./A)						
HoCP96-540	4496 -	5251 -	5753	6291	2760	5332	6366	4391	5827 -	5158	8349	6639	5551 -
L99-226	6416	6341	5461	6580	2535	3866	7146	5356	5397 -	7643	7588 -	9453 +	6148
HoCP00-950	4694 -	5304 -	3817 -	6432	1860	4461	6668	4902	5905 -	7972	6931 -	7960	5575 -
L01-283	6092	7261	6905	7338	2648	5149	6023	4972	7456	7183	8354	8308	6474
L01-299	6917	7222	6829	7401	2877	4683	6386	5248	7411	7960	9085	7712	6644
L03-371	4393 -	5690 -	5452	6640	3369	4636	7042	6080	5313 -	7475	8540	9251 +	6157
HoCP04-838	5362 -	6590	5394	6507	2725	3744	6221	3732 -	5878 -	7946	7677 -	7924	5809 -
Ho07-613	4453 -	6204	5707	6706	3147	5289	7042	3219 -	5900 -	6709	6998 -	7074	5704 -
L09-112	5865	6259	5366	7241	2379	5889	7155	5144	5485 -	7343	7032 -	8071	6102 -
HoCP09-804	5939	7489	6674	6558	2641	4825	7101	5762	7190	8195	8796	9237 +	6701

Table 14. Second-stubble cane yield for nine commercial and one experimental varieties at twelve outfield locations in 2016.

	Heavy						Light						
Variety	Allains	Alma	Frank Martin	Landry	Magnolia	Mary	Bon Secour	Brunswick	Glenwood	Lanaux	Ronald Hebert	Levert St. John	Overall Mean
							(lbs./A)						
HoCP96-540	12.9 -	20.5 -	21.1	21.6	12.2	18.4	23.7	17.5	21.6	19.9 -	33.3	20.0	20.2 -
L99-226	17.9	22.5 -	18.7 -	21.6	10.7	14.2	25.0 +	20.1	17.4 -	25.5	26.2 -	26.5	20.5 -
HoCP00-950	13.0 -	17.0 -	12.2 -	18.9	7.1	13.8	21.5	16.8	18.3 -	24.8	25.2 -	22.9	17.6 -
L01-283	17.6	23.9	23.4	23.0	10.2	16.9	20.3	17.8	23.7	23.5	30.0 -	25.7	21.3 -
L01-299	20.0	27.0	24.6	25.0	12.4	15.1	22.0	20.9	25.5	28.5	35.0	22.9	23.2
L03-371	12.4 -	18.1 -	19.7 -	22.7	13.8	14.9	23.9	21.4	17.1 -	25.6	29.1 -	27.2 +	20.5 -
HoCP04-838	15.7 -	23.2	19.1 -	21.1	11.5	13.2	21.5	14.8 -	19.5 -	28.3	27.9 -	24.4	20.0 -
Ho07-613	12.8 -	21.4 -	20.3	21.5	12.0	18.0	23.5	11.8 -	19.4 -	22.3 -	25.6 -	21.0	19.1 -
L09-112	17.8	24.1	21.0	26.5	10.4	21.1	27.2 +	21.1	20.4 -	28.1	29.0 -	26.7	22.8
HoCP09-804	17.5	25.4	22.5	20.8	10.5	16.8	24.3	21.7	23.8	29.4	31.5 -	27.6 +	22.7

Table 15. Second-stubble sugar per ton for nine commercial and one experimental varieties at twelve outfield locations in 2016.

	Heavy						Light						
Variety	Allains	Alma	Frank Martin	Landry	Magnolia	Mary	Bon Secour	Brunswick	Glenwood	Lanaux	Ronald Hebert	Levert St. John	Overall Mean
							(tons/A)						
HoCP96-540	348	256	272	291	220	289	268 -	250	268 -	261	251	331	276 -
L99-226	357 +	282	290	305	223	275	286	267	311 +	301	290 +	357 +	295 +
HoCP00-950	360 +	314 +	309	340 +	252 +	324	311 +	291	322 +	321 +	275	348	314 +
L01-283	346	304 +	295	319 +	244	302	297	279	315 +	306 +	278	324	301 +
L01-299	345	268	277	297	223	311	289	256	291	280	259	336	286
L03-371	354 +	314 +	272	293	237	312	295	285	310 +	292	293 +	340	300 +
HoCP04-838	341	284	279	308	230	280	289	253	302	281	275	325	287
Ho07-613	347	292	282	313	256 +	297	299	275	305	299	273	337	298 +
L09-112	329 -	260	256	276 -	219	278	263 -	246	269 -	262	242	302 -	267 -
HoCP09-804	339	294 +	296	316	246	290	292	267	302	277	279 +	334	294 +

Table 16. Second-stubble stalk weight nine commercial and one experimental varieties at twelve outfield locations in 2016.

	Heavy						Light						
Variety	Allains	Alma	Frank Martin	Landry	Magnolia	Mary	Bon Secour	Brunswick	Glenwood	Lanaux	Ronald Hebert	Levert St. John	Overall Mean
							(lbs./tons)						
HoCP96-540	1.28	1.57	1.48	1.34	1.03	1.08	1.40	1.32	1.55	2.05	1.83	1.85	1.48
L99-226	1.90 +	2.42 +	1.89 +	1.69	0.96	1.30 +	1.95 +	1.88 +	1.97 +	2.07	2.49 +	2.44 +	1.91 +
HoCP00-950	1.13	1.57	1.30	1.46	0.86	1.07	1.45	1.20	1.43	1.77	1.85	1.58	1.39
L01-283	1.30	1.54	1.58	1.29	0.93	1.00	1.31	1.35	1.26	1.66	1.94 +	1.55	1.39
L01-299	1.29	1.72	1.47	1.48	0.87	1.05	1.45	1.33	1.43	1.58	1.51	1.66	1.40
L03-371	1.30	1.61	1.31	1.38	0.87	1.09	1.43	1.57 +	1.25	1.77	1.75	1.66	1.42
HoCP04-838	1.30	1.41	1.13 -	1.33	0.81	0.92	1.47	1.11 -	1.42	1.80	1.58	1.41	1.31
Ho07-613	1.34	1.81	1.45	1.44	0.94	1.10	1.59	1.10 -	1.37	1.61	1.98 +	2.12	1.49
L09-112	1.56 +	2.22 +	1.83 +	1.78	1.33	1.43 +	1.95 +	1.92 +	2.16 +	2.55 +	1.95 +	2.13	1.90 +
HoCP09-804	1.12	1.18 -	1.10 -	1.33	0.90	0.93	1.30	1.22	1.33	1.6	1.51	1.37	1.24 -

Table 17. Second-stubble stalk number for nine commercial and one experimental varieties at twelve outfield locations in 2016.

	Heavy						Light						
Variety	Allains	Alma	Frank Martin	Landry	Magnolia	Mary	Bon Secour	Brunswick	Glenwood	Lanaux	Ronald Hebert	Levert St. John	Overall Mean
							(lbs.)						
HoCP96-540	20299 -	27066	28180	32922	23178	34207	34337	26858 -	27972 -	20204 -	37871 -	21616	27893 -
L99-226	18826 -	18618 -	19908 -	26143	23517	21969	25554	21575 -	18433 -	24499 -	21093 -	21830	21830 -
HoCP00-950	23095	21655 -	18892 -	26164	16364 -	26119	31295	28545	26469 -	28395 -	27359 -	29533	25324 -
L01-283	28033	31511	30027	35836	20860	34078	31071	26616 -	38965	28693 -	31075 -	33112	30823
L01-299	31375	32024	34022	34595	27420	28909	30566	31246	36506	36602	46831	28606	33225
L03-371	19615 -	22646 -	30146	33155	31770	27326	33580	27385	28117	28850 -	33633 -	32825	29087 -
HoCP04-838	24340	33193	33883	32168	28333	28751	29691	26911 -	27700 -	31285	35976 -	35624	30655
Ho07-613	19255 -	23638 -	28137	30043	25269	32482	29654	22782 -	28202	27547 -	25891 -	20881	26148 -
L09-112	24372	21765 -	23056 -	29715	14845 -	29545	27894	22257 -	19079 -	22050 -	30228 -	26464	24272 -
HoCP09-804	31375	43861 +	40916	31710	23424	36033	37612	35965 +	36594	38059	42166	40766 +	36540 +

Table 18. Third-stubble sugar per acre for nine commercial and one experimental varieties at six outfield locations in 2016.

	Heavy		Light				
Variety	Allains	Alma	Bon Secour	Brunswick	Lanaux	Ronald Hebert	Overall Mean
			(lbs./A)				
HoCP96-540	4755	4564 -	6609	2942 -	7281 -	6830 -	5497 -
L99-226	6609	6990	6957	6509	7710 -	8398 -	7196
HoCP00-950	4478 -	4756 -	6099 -	5898	9242	8446 -	6487 -
L01-283	5483	7579	6632	4765	9051	9283	7132
L01-299	5686	7984	7485	6663	9558	10746	8020
L03-371	5219	6337 -	7768	6823	8833	7906 -	7148
HoCP04-838	4478 -	6647	6864	7460	9765	8278 -	7249
Ho07-613	4582 -	6469 -	7353	3158 -	6656 -	4710 -	5488 -
L09-112	3897 -	6067 -	7272	5550	9053	8599 -	6752 -
HoCP09-804	5198	7651	7814	7184	9124	8397 -	7561

Table 19. Third-stubble cane yield for nine commercial and one experimental varieties at six outfield locations in 2016.

	Heavy		Light				
Variety	Allains	Alma	Bon Secour	Brunswick	Lanaux	Ronald Hebert	Overall Mean
			(tons/A)				
HoCP96-540	15.1	20.7 -	24.1	12.7 -	27.1 -	27.6 -	21.2 -
L99-226	19.5	26.3	23.3	23.4	27.4 -	29.1 -	24.8
HoCP00-950	13.4 -	16.9 -	20.4 -	21.6	29.3	29.0 -	21.8 -
L01-283	16.3	26.8	21.4 -	18.2 -	31.2	32.8	24.5 -
L01-299	17.7	30.5	24.9	26.7	33.1	38.7	28.6
L03-371	15.6	23.7 -	24.7	26.3	30.6	29.4 -	25.1
HoCP04-838	14.1 -	26.1	23.2	30.6	32.8	29.5 -	26.1
Ho07-613	14.1 -	24.2 -	25.9	11.7 -	23.1 -	16.7 -	19.3 -
L09-112	13.2 -	24.6 -	26.9	25.9	32.9	31.6 -	25.9
HoCP09-804	16.5	27.9	27.0	26.0	30.7	30.1 -	26.4

Table 20. Third-stubble sugar per ton for nine commercial and one experimental varieties at six outfield locations in 2016.

	Heavy		Light				
Variety	Allains	Alma	Bon Secour	Brunswick	Lanaux	Ronald Hebert	Overall Mean
			(lbs./tons)				
HoCP96-540	315	220 -	274 -	231	268 -	248	259 -
L99-226	338 +	264	299	279	281	289	292
HoCP00-950	333	282	298	272	316 +	291	299 +
L01-283	336 +	283	309	259	290	283	293
L01-299	321	262	301	251	289	278	283
L03-371	334 +	267	314	256	289	265	287
HoCP04-838	318	255	296	243	298	281	282
Ho07-613	325	267	283	269	289	282	286
L09-112	295 -	247	270 -	215 -	275	271	262 -
HoCP09-804	315	273	289	277	298	279	289

Table 21. Third-stubble stalk weight for nine commercial and one experimental varieties at six outfield locations in 2016.

	Heavy		Light				
Variety	Allains	Alma	Bon Secour	Brunswick	Lanaux	Ronald Hebert	Overall Mean
			(lbs.)				
HoCP96-540	1.45 +	1.52	1.59	1.71	2.24 +	2.32 +	1.80 +
L99-226	1.96 +	2.21 +	1.80 +	2.05 +	2.18 +	2.73 +	2.16 +
HoCP00-950	1.32	1.39	1.47	1.76 +	1.78	1.62	1.56
L01-283	1.24	1.26	1.28	1.38	1.74	1.59	1.41
L01-299	1.19	1.34	1.33	1.53	1.63	1.71	1.46
L03-371	1.19	1.68 +	1.34	1.51	1.98	2.11	1.63
HoCP04-838	0.98	1.13	1.36	1.60	1.80	1.48	1.39
Ho07-613	1.17	1.54	1.77 +	1.37	2.18 +	1.61	1.61
L09-112	1.59 +	1.83 +	1.81 +	2.27 +	2.46 +	2.25 +	2.03 +

Table 22. Third-stubble stalk number for nine commercial and one experimental varieties at six outfield locations in 2016.

	Heavy		Light				
Variety	Allains	Alma	Bon Secour	Brunswick	Lanaux	Ronald Hebert	Overall Mean
			(stalks/A)				
HoCP96-540	21036 -	27951 -	30305	15190 -	24481 -	24993 -	23993 -
L99-226	19983 -	23913 -	25952	22737 -	25157 -	21384 -	23188 -
HoCP00-950	20303 -	24421 -	30066	24490 -	33428	35796	28084 -
L01-283	26599	43163	34062	26403 -	36063	42027	34720
L01-299	29706	46072	38350	35047	42554	45955	39614
L03-371	27000	27901 -	37755	34697	31368 -	27822 -	31090 -
HoCP04-838	29412	46878	34540	38378	37621	39769	37766
Ho07-613	24322 -	31492 -	30220	17199 -	21678 -	21210 -	24353 -
L09-112	17048 -	27016 -	31696	22857 -	27354 -	28720 -	25550 -
HoCP09-804	29551	52067	44131	34540	43966	38583	40473

Table 23. Plantcane means from eleven outfield locations in 2016: Allains, Alma, 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	8700 -	30.8	282 -	2.60 +	24143 -
L01-283	9271	30.5	303 +	1.99 -	30979
L01-299	9536	32.6	291	2.17	30610
HoCP04-838	9839	33.1	295	2.10	31844
Ho07-613	10551 +	34.5	304 +	2.38 +	29693
HoCP09-804	9693	32.4	299 +	1.79 -	36568 +
L11-183	10320	34.0	302 +	2.45 +	28355
L12-201	9755	32.1	303 +	2.86 +	22913 -
Ho12-615	10513 +	36.0 +	290	1.91 -	38313 +
Ho12-630	9821	32.4	302 +	2.52 +	25919 -

Table 24. First-stubble means from twelve outfield locations in 2016: 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	6770 -	22.3 -	304	1.85 +	24387 -
L99-226	7662	23.4 -	326 +	2.13 +	22358 -
HoCP00-950	6565 -	19.6 -	335 +	1.52	25010 -
L01-283	7745	24.4	317 +	1.54	31588
L01-299	7977	25.8	310	1.62	31543
HoCP04-838	6973 -	23.0 -	304	1.58	28798
Ho07-613	7312 -	23.0 -	318 +	1.82 +	25018 -
HoCP09-804	8161	26.0	314	1.40 -	36680 +
L11-183	7618	24.2	316	1.84 +	26565 -

Table 25. Second-stubble means from twelve outfield locations in 2016: 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	5551 -	20.2 -	276 -	1.48	27893 -
L99-226	6148	20.5 -	295 +	1.91 +	21830 -
HoCP00-950	5575 -	17.6 -	314 +	1.39	25324 -
L01-283	6474	21.3 -	301 +	1.39	30823
L01-299	6644	23.2	286	1.40	33225
L03-371	6157	20.5 -	300 +	1.42	29087 -
HoCP04-838	5809 -	20.0 -	287	1.31	30655
Ho07-613	5704 -	19.1 -	298 +	1.49	26148 -
L09-112	6102 -	22.8	267 -	1.90 +	24272 -
HoCP09-804	6701	22.7	294 +	1.24 -	36540 +

Table 26. Third-stubble means from six outfield locations in 2016: Allains, Alma, Bon Secour Brunswick, Lanaux and R.Hebert

Variety	Sugar per Acre	Cane Yield	Sugar per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
HoCP96-540	5497 -	21.2 -	259 -	1.80 +	23993 -
L99-226	7196	24.8	292	2.16 +	23188 -
HoCP00-950	6487 -	21.8 -	299 +	1.56	28084 -
L01-283	7132	24.5 -	293	1.41	34720
L01-299	8020	28.6	283	1.46	39614
L03-371	7148	25.1	287	1.63	31090 -
HoCP04-838	7249	26.1	282	1.39	37766
Ho07-613	5488 -	19.3 -	286	1.61	24353 -
L09-112	6752 -	25.9	262 -	2.03 +	25550 -
HoCP09-804	7561	26.4	289	1.33	40473

Table 27. Combined plantcane means across outfield locations from 2014 to 2016.

Variety	Sugar per Acre	Cane Yield	Sugar per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
HoCP96-540	8700	30.8	282 -	2.60 +	24143 -
L01-283	9271	30.5	303 +	1.99 -	30979
L01-299	9536	32.6	291	2.17	30610
HoCP04-838	9839	33.1	295	2.10	31844
Ho07-613	10551 +	34.5	304 +	2.38 +	29693
HoCP09-804	9693	32.4	299 +	1.79 -	36568 +

Table 28. Combined first-stubble means across outfield locations from 2014 to 2016.

Variety	Sugar per Acre (lbs/A)	Cane Yield (tons/A)	Sugar per Ton (lbs/ton)	Stalk Weight (lbs)	Stalk Number (stalks/A)
HoCP96-540	6770 -	22.3 -	304	1.85 +	24387 -
L99-226	7662	23.4 -	326 +	2.13 +	22358 -
HoCP00-950	6565 -	19.6 -	335 +	1.52	25010 -
L01-283	7745	24.4	317 +	1.54	31588
L01-299	7979	25.8	310	1.62	31550
HoCP04-838	6973 -	23.0 -	304	1.58	28798
Ho07-613	7312 -	23.0 -	318 +	1.82 +	25018 -
HoCP09-804	8161	26.0	314	1.40 -	36680 +

Table 29. Combined second-stubble means across outfield locations from 2014 to 2016.

Variety	Sugar per Acre (lbs/A)	Cane Yield (tons/A)	Sugar per Ton (lbs/ton)	Stalk Weight (lbs)	Stalk Number (stalks/A)
HoCP96-540	5551 -	20.2 -	276 -	1.48	27893 -
L99-226	6148	20.5 -	295 +	1.91 +	21830 -
HoCP00-950	5575 -	17.6 -	314 +	1.39	25324 -
L01-283	6474	21.3 -	301 +	1.39	30823
L01-299	6644	23.2	286	1.40	33225
L03-371	6157	20.5 -	300 +	1.42	29087 -
HoCP04-838	5809 -	20.0 -	287	1.31	30655
Ho07-613	5704 -	19.1 -	298 +	1.49	26148 -
HoCP09-804	6701	22.7	294 +	1.24 -	36540 +

Table 30. Combined third-stubble means across outfield locations from 2014 to 2016.

Variety	Sugar per Acre (lbs/A)	Cane Yield (tons/A)	Sugar per Ton (lbs/ton)	Stalk Weight (lbs)	Stalk Number (stalks/A)
HoCP96-540	5497 -	21.2 -	259 -	1.80 +	23993 -
L99-226	7196	24.8	292	2.16 +	23188 -
HoCP00-950	6487 -	21.8 -	299 +	1.56	28084 -
L01-283	7132	24.5 -	293	1.41	34720
L01-299	8020	28.6	283	1.46	39614
L03-371	7148	25.1	287	1.63	31090 -
HoCP04-838	7249	26.1	282	1.39	37766
Ho07-613	5488 -	19.3 -	286	1.61	24353 -
HoCP09-804	7561	26.4	289	1.33	40473

SUCROSE LABORATORY AT THE SUGAR RESEARCH STATION

Gert Hawkins, Michael Pontif and Collins Kimbeng
Sugar Research Station

The Sugar Research Station sucrose laboratory processed 3,017 samples during the 2016 harvest season (Table 1). Standard laboratory procedures were used to analyze 159 samples of which 111 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 44 samples. Sucrose percent and theoretical recoverable sugar (lbs/ton of cane) was calculated based on the Brix and pol values. In addition 29 samples of sweet sorghum were analyzed for brix only. The juice was extracted via a Honiron sugarcane hydraulic press. The sucrose laboratory processed samples from July 2016 to December 2016.

A total of 2,858 samples were analyzed using the Spectracane FT-NIR instrument of which 80 were 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 2016 harvest season.

Unit/Project Area	Leader	Number of Samples
School of Plant, Environmental, and Soil Sciences	Magdi Selim	12
	Brenda Tubana	390
Energy Cane	Brenda Tubana	80
	Jim Wang	48
Iberia Research Station	Sonny Viator	37
Plant Pathology and Crop Physiology	Jeff Hoy	291
LCES	Albert Orgeron	212
LCES	Kenneth Gravois	83
Sugar Research Station/Variety Development	Line Trials	904
	Increase	116
	Nursery	490
	Energy Cane	265
Contract Services		60
Iberia Research Station (Sweet Sorghum)	Sonny Viator	29
TOTAL		3,017

LAES SUGARCANE TISSUE CULTURE LABORATORY

Q.J. Xie[1], D.P. Fontenot[1], and K.A. Gravois[2]
[1]Certis USA and [2]Sugar Research Station

During the 2016-2017 production season, about 18,956 sugarcane plantlets regenerated in the Louisiana Agricultural Experiment Station Sugarcane Tissue Culture Laboratory, were turned over to Certis USA, LLC Kleentek Division, 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	2,016
L 99-299	6,601
L 99-283	7,315
HoCP09-804	3,024
Total	18,956

THE 2016 LOUISIANA SUGARCANE VARIETY SURVEY

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Each year a sugarcane variety survey is conducted by the county agents in the sugarcane-growing parishes of Louisiana to determine the variety makeup and distribution across the state. Surveys were obtained from 19 of the 24 parishes; no parish survey reports were obtained from Calcasieu, Cameron, Concordia, Evangeline, and St. Charles parishes. According to USDA Farm Service Agency (FSA), there were 431,377 acres planted to sugarcane in Louisiana in 2016. This survey was based on 98.5 percent of the acres reported by USDA-FSA.

Agents collected acreage according to variety and crop. A total of 10 sugarcane varieties, HoCP 96-540, L 99-226, L 99-233, HoCP 00-950, L 01-283, L 01-299, L 03-371, HoCP 04-838, Ho 07-613, and HoCP 09-804 were listed along with "Others" in the survey. The category of "Others" included, but was not limited to, small acreages of LCP 85-384, HoCP 85-845, CP 89-2143, and Ho 05-961. The crop was divided into four categories that 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 2016 was 431,377 acres according to the state FSA office. A total of 416,816 acres comprised the sample for the 2016 variety survey.

Sugarcane Distribution by Variety. Statewide sugarcane acreage in percent by variety and crop is shown in Table 2. The leading variety for 2016 was L 01-299, which occupied 36% of the Louisiana sugarcane acreage. This percentage was six points higher than L 01-299's acreage in 2015 (Gravois and Legendre, 2016). HoCP 96-540, the leading sugarcane variety grown in Louisiana from 2008-2015, was next in total acreage as it was planted on 30% of the state's acreage. The varieties planted in the next largest areas were L 01-283, HoCP 04-838, L 99-226, and HoCP 00-950, occupying 12%, 10%, 6%, and 4% of the state's acreage, respectively. All other varieties in the survey had each 2% or less of the planted area for the 2016 crop.

Sugarcane Distribution by Region and Crop. The total sugarcane acreage was highest for Teche region (181,073 acres); followed by the River-Bayou Lafourche region (160,651 acres); then the Northern region at 89,654 acres (Table 3). Total FSA reported sugarcane acreage for

Louisiana was approximately 21,000 acres higher than in 2015. The northern area showed the greatest increase in acreage, with Pointe Coupee, Avoyelles, and Rapides parishes showing the largest percentage increases compared to 2015. A new sugarcane growing parish was added to the census in 2016 when Concordia parish reported 35.0 acres of sugarcane.

In 2016, 13.6% of the state's acreage was grown as third and older stubble crops, which was slightly lower than the acreage of the same category for 2015. In 2016, 30.25%, 31.0%, and 25.1% of the state's acreage was in a plant-cane, first stubble, and second stubble crops, respectively.

For the current survey, plant-cane percentages was similar for all three regions, at about 30%. For the third and older stubble crops, the Bayou Teche region had the lowest percentage at 12.6%, whereas the northern region had the highest percentage at 15.2%.

Sugarcane Distribution by Variety and Crop for the Three Regions. HoCP 96-540 was the most widely grown variety for the Bayou Teche region in 2016; L 01-299 was the most widely grown variety in the River-Bayou Lafourche and Northern regions (Tables 4-6). Plant-cane acreage was dominated by L 01-299 for all three growing areas of Louisiana. The largest variety trend in sugarcane acreage was the increased planting of L 01-299 and increased older stubble crops devoted to L 01-299. The River-Bayou Lafourche and Northern growing areas planted more L 01-283 than the Bayou Teche region. HoCP 04-838 was more widely grown in the River-Bayou Lafourche region than the other two sugarcane growing areas of the state.

Variety Trends. HoCP 96-540, released for commercial planting in 2003, now occupies 30% of the state's 2016 acreage, which is a decrease of three percentage points from the previous year. The variety continues to perform well, but HoCP 96-540 is better adapted to sandier soils. The variety has average stubbling ability, which is one reason for the general shift to L 01-299. Rust infections were common in the variety in 2016. Fungicides were successfully applied to limit yield loss due to brown rust. HoCP 96-540 is an important variety for Louisiana was widely planted by growers in 2016.

L 99-226 decreased in acreage by five percentage points. The variety is difficult to plant due to lodging and the amount of shucks (long leaves) on the variety. L 99-226 is moderately susceptible to brown rust. L 99-226 exhibits resistance to the sugarcane borer, competitive with most problem weeds, and stubbles well. Sucrose content is very good in the variety, but cane yield at times has been disappointing. L 99-226 will likely continue to decrease in acreage.

L 99-233 was planted on less than one percent of the state's acreage in 2016. This variety is no longer recommended for planting.

HoCP 00-950 was released for commercial planting in 2007 and occupied four percent of the state's acreage in 2016. This variety has high sugar per ton of cane and is considered early maturing. HoCP 00-950 does not grow as well in poorly drained soils and is better suited to the sandier soils in the sugar belt. In some fields, HoCP 00-950 was severely affected by the disease red stripe (*Acidovorax avenai* subsp. Avenae).

L 01-283 was released for commercial planting in 2008 and occupied 12 percent of the state's acreage in 2016. The variety has excellent stubbling ability, good sugar yield and erectness. Naturally occurring, environmentally induced off-types have been increasing in L 01-283. The variety has performed best in well drained sandier soils along with good fertility programs, all of which reduce stress. The variety is especially susceptible to late season sugarcane borer infestations when off-types are present.

L 01-299 was grown on 36% of the state's acreage in 2016. This variety was released in 2009 after superior sugar yields were obtained in the outfield variety trials. The variety is known for outstanding stubbling ability and is also well suited for heavy land. The variety has an erect growth habit. L 01-299 can have difficulty establishing after planting in sandier soils, especially when planted just prior to high rainfall. L 01-299 is susceptible to the disease brown stripe and smut. Growers are encouraged to closely monitor seed-cane sources. L 01-299 performed well in all crops for the 2016 grinding season. Because of its superior stubbling ability, L 01-299 will likely be widely planted again in 2017.

L 03-371, released in 2010, was grown on one percent of the state's acreage in 2016. L 03-371 is no longer recommended for planting in Louisiana.

HoCP 04-838 was released in 2011. This variety has good sugar and cane yield potential, with its most notable attribute being cold tolerance. Cane yield in stubble crops can be erratic; the variety does not appear to take the drought well. The fiber content of HoCP 04-838 is about 13.6%. Harvesting trials have been conducted with HoCP 04-838, and fiber content can be managed by careful operation of combines.

Ho 07-613 was released to Louisiana sugarcane growers in 2014. The new variety has good sucrose content, but after the winter of 2014-15, Ho 07-613 did not establish well in the stubble cane crops. Therefore, the small acreage of Ho 07-613 was not widely increased in the 2016 planting season.

A new sugarcane variety was released to growers in 2016 – HoCP 09-804 (Anon., 2016). This variety has a high population of small diameter stalks. Sucrose content is similar to L 01-283, and early yield trials suggest that the variety will stubble well. The variety did have some mosaic disease, primarily in the River-Bayou Lafourche region. Seed-cane of HoCP 09-804 for distribution was more limited because of rouging, but growers are encouraged to plant the variety and maintain healthy seed-cane sources for future plantings.

The dominance of a single variety can lead to disease and insect shifts as was the case with brown rust and LCP 85-384 (Hoy, 2005) and HoCP 96-540. 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. The same strategy needs to happen with the new leading sugarcane variety L 01-299. With the release of many new sugarcane varieties in recent years, growers are encouraged to continue to plant a 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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Hoy, Jeff. 2005. Impact of rust on LCP 85-384. Sugar Bulletin 84(1):12-13.

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Table 1. Total area planted to sugarcane in Louisiana by region and parish, 2016.[1]

Bayou Teche		River Bayou Lafourche		Northern	
Parish	**Acres**	**Parish**	**Acres**	**Parish**	**Acres**
Acadia[2]	4,192.6	Ascension	17,536.1	Avoyelles	9,317.1
Calcasieu[2]	398.6	Assumption	34,188.8	Concordia	35.0
Cameron[2]	33.6	Iberville	37,062.3	Evangeline[2]	287.7
Iberia	56,441.1	Lafourche	26,323.7	Pointe Coupee	46,292.9
Jeff Davis	622.2	St. Charles[2]	1,368.2	Rapides	12,057.5
Lafayette	8,739.7	St. James	28,849.5	St. Landry	6,609.7
St. Martin	28,759.5	St. John	6,080.7	West Baton Rouge	15,054.2
St. Mary	45,144.2	Terrebonne	9,241.7		
Vermilion	36,741.5				
Total	181,073	Total	160,651	Total	89,654.1

Total acres all regions: **431,377.4**

[1]Acreage based on information obtained in variety surveys from 19 of 24 sugarcane producing parishes by the county agents in 2016

[2] No variety survey

Table 2. Estimated statewide sugarcane percentage by variety and crop, all regions, 2016.[1]

Variety	Plant-cane	First-stubble	Second-stubble	Third-stubble and older	Total
	---------------------------- percentage	--------------------------------------			
HoCP96-540	26.2	29.7	37.5	28.5	30.4
L99-226	2.9	2.8	9.1	11.3	5.6
L99-233	0.1	0.2	0.3	1.1	0.3
HoCP00-950	3.9	3.2	2.5	6.1	3.6
L01-283	13.5	10.9	9.1	13.0	11.5
L01-299	42.8	38.2	29.5	29.7	36.3
L03-371	0.7	0.7	0.6	2.6	0.9
HoCP04-838	8.4	11.1	10.7	6.1	9.5
Ho07-613	0.8	0.8	0.3	0.0	0.6
HoCP09-804	0.3	0.0	0.0	0.0	0.1
Others	0.3	2.4	0.5	1.6	1.2
% Crop	30.4	30.9	25.1	13.6	100

[1] Based on information obtained in variety surveys by county agents in 2016.

Table 3. Estimated sugarcane distribution by region and crop, 2016.[1]

Crop	Bayou Teche	River-Bayou Lafourche	Northern	State Total
Plant-cane Area (acres) Percent (%)	52,823.2 30.3	48,950.1 30.8	25,103.5 30.0	126,876.8 30.4
First-stubble Area (acres) Percent (%)	51,460.1 29.5	51,176.5 32.2	26,083.4 31.2	128,720.0 30.9
Second-stubble Area (acres) Percent (%)	47,927.4 27.5	36,878.6 23.2	19,699.9 23.6	104,505.9 25.1
Third-stubble and older Area (acres) Percent (%)	21,941.8 12.6	22,034.0 13.9	12,738.0 15.2	56,713.8 13.6
Total area (acres) Percent (%)	174,152.4 41.8	159,039.2 38.2	83,624.9 20.1	416,816.5

[1] Based on surveyed acres; information obtained in variety surveys by county agents in 2016.

Table 4. Estimated area planted to sugarcane in percent by variety and crop for the Bayou Teche region, 2015.[1]

Variety	Plant-cane crop (%)	First-stubble crop (%)	Second-stubble crop (%)	Third-stubble crop & older (%)	Total (%)
HoCP96-540	36.8	40.8	46.4	28.9	39.6
L99-226	2.0	2.3	8.3	17.6	5.8
L99-233	0.1	0.1	0.0	0.0	0.1
HoCP00-950	2.8	3.9	2.7	8.1	3.8
L01-283	4.5	1.5	1.4	4.4	2.8
L01-299	44.7	38.5	27.3	26.6	35.8
L03-371	1.0	0.4	0.7	2.8	1.0
HoCP04-838	6.4	11.1	12.6	11.7	10.2
Ho07-613	1.1	1.3	0.5	0.0	0.8
HoCP09-804	0.5	0.1	0.0	0.0	0.2
Others	0.0	0.0	46.4	0.0	0.0
Total acres	52,823.2	51,460.08	47,927.39	21,941.8	

[1] Based on information obtained in variety surveys by county agents in 2016.

Table 5. Estimated area planted to sugarcane in percent by variety and crop for the River/Bayou Lafourche region, 2016.[1]

Variety	Plant-cane crop (%)	First-stubble crop (%)	Second-stubble crop (%)	Third-stubble crop & older (%)	Total (%)
HoCP96-540	16.7	18.8	26.8	26.6	21.1
L99-226	2.5	2.4	6.1	8.1	4.1
L99-233	0.2	0.2	0.9	2.9	0.7
HoCP00-950	3.0	2.1	2.0	7.3	3.1
L01-283	18.7	15.2	13.8	20.1	16.6
L01-299	45.3	40.6	36.6	26.0	39.1
L03-371	0.8	0.7	0.6	1.9	0.9
HoCP04-838	11.3	13.5	11.5	2.9	10.9
Ho07-613	0.6	0.6	0.1	0.0	0.4
HoCP09-804	0.1	0.0	0.0	0.0	0.0
Others	0.7	6.0	1.5	4.1	3.1
Total acres	48,950.1	51,176.5	36,878.6	22,034.0	

[1] Based on information obtained in variety surveys by county agents in 2016.

Table 6. Estimated area planted to sugarcane in percent by variety and crop for the Northern region, 2016[1]

Variety	Plant-cane crop (%)	First-stubble crop (%)	Second-stubble crop (%)	Third-stubble crop & older (%)	Total (%)
HoCP96-540	22.4	29.2	35.9	30.8	29.0
L99-226	5.6	4.6	16.6	5.9	7.9
L99-233	0.0	0.5	0.0	0.1	0.2
HoCP00-950	8.1	3.8	2.9	0.6	4.4
L01-283	22.3	21.1	18.9	15.7	20.1
L01-299	34.0	32.8	21.3	41.5	31.8
L03-371	0.0	1.0	0.3	3.4	0.9
HoCP04-838	6.9	6.6	4.2	1.9	5.4
Ho07-613	0.6	0.3	0.0	0.0	0.3
HoCP09-804	0.2	0.0	0.0	0.0	0.1
Others	0.0	0.0	0.0	0	0.0
Total acres	25,103.5	26,083.4	19,699.9	12,738.0	

[1] Based on information obtained in variety surveys by county agents in 2016.

Table 7. Louisiana sugarcane variety trends, by variety and years, all regions, 2012-2016[1].

	Area planted to sugarcane by variety and years (%)					
Variety	**2012**	**2013**	**2014**	**2015**	**2016**	**1 yr. Change**
HoCP96-540	39	39	37	33	30	-3
L99-226	21	17	13	11	6	-5
L99-233	9	6	2	1	<1	-1
HoCP00-950	6	4	4	3	4	+1
L01-283	11	10	10	9	12	+3
L01-299	7	15	22	30	36	+6
L03-371	2	3	3	4	1	-3
HoCP04-838	1	3	6	9	10	+1
Ho07-613	1	2	1	<1	1	+1
HoCP09-804	-	-	-	<1	<1	0

[1] Based on annual variety surveys by county agents, 2012-2016.

PERFORMANCE OF FLORIDA SUGARCANE VARIETIES IN LOUISIANA

Kenneth Gravois, Michael Pontif, Gert Hawkins, and Collins Kimbeng
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Sugarcane brown rust is becoming an increasingly larger problem for sugarcane growers in Louisiana. The primary means of combatting this disease has been to breed resistant varieties. Previous work has identified a QTL (quantitative trait loci) referred to as *Bru1* that is associated with resistance to brown rust disease in sugarcane. Unfortunately, the prevalence of *Bru1* is low in the clones used for breeding sugarcane in Louisiana. In fact, the only commercial Louisiana variety that has *Bru1* is L 01-299. The prevalence of *Bru1* in Florida sugarcane varieties is much higher. Table 1 lists some of the newer sugarcane varieties being planted in Florida and whether or not *Bru1* is present.

In 2013, a few stalks of each sugarcane variety were obtained from the Kleentek quarantine greenhouse and used to plant a small seed-cane increase. Yield trials were planted on August 28, 2014; August 18, 2015; August 25, 2016 at the Sugar Research Station in St. Gabriel, Louisiana. Each test was planted as a randomized complete block (two replications) design. Plots were paired rows that were 25 feet in length and a four foot alley separated plots. The soil type was a Commerce silt loam.

Standard cultural practices were followed during each growing season. The field trial that was planted in 2014, the harvest dates were on December 8, 2015 for the plant-cane crop and October 25, 2016 for the first stubble crop. The field trial that was planted in 2015, the harvest date was on November 29, 2016 for the plant-cane crop. Plots were combine-harvested and weighed to determine cane yield (tons/acre). A 6-stalk sample was hand-cut out of each plot for a quality analysis. Each sample was then sent to the laboratory to determine juice Brix by refractometer and pol (Zº) by saccharimeter. Sucrose content (lbs/ton of cane) and fiber content were determined by the pre-breaker press method (Gravois and Milligan, 1992).

Data were analyzed with SAS (v 9.4) 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 Student's t test using 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. A listing of Florida sugarcane varieties, rating for the presence of *Bru1*, and year of introduction for seed-cane increase.

Variety	Bru1 Positive	Year Introduced
CP 03-1912	Yes	2013
CPCL 97-2730	Yes	2013
CPCL 00-4111	No	2013
CP 01-1372	Yes	2013
CP 00-1101	Yes	2013
CP 96-1252	No	2013
CP 04-1844	Yes	2013
CP 04-1935	Yes	2013
CPCL 02-1295	Yes	2013
CP 04-1566	No	2013
CPCL 95-2287	No	2013
CPCL 02-0926	Yes	2013
CPCL 99-4455	Yes	2013
CP 89-2143	Yes	2013
CPCL 02-6848	Yes	2014
CPCL 05-1102	No	2014
CP 05-1791	No	2014
CP 05-1526	No	2014
CPCL 05-1201	Yes	2014
CP 06-2400	Yes	2015
CP 06-2042	Yes	2016
CP 07-2137	No	2016

Table 2. Plant-cane data obtained from a yield trial conducted at the Sugar Research Station, St. Gabriel, LA and harvested on December 8, 2015. The test was planted on August 27, 2014, and the soil type was a Commerce silt loam.

Variety	Sugar Yield[1]		Cane Yield		Sugar Content		Fiber		Purity	
	lbs/ac		tons/ac		lbs/ton		%		%	
HoCP 96-540	13407		48.1		278		10.8	-	86.0	
L 01-299	11422		42.5		269		12.2		85.8	
HoCP 04-838	13048		45.8		285		13.7	+	85.2	
CP 89-2143	12182		43.9		277		9.1	-	86.7	
CPCL 95-2287	14335		50.8		282		11.8		85.2	
CP 96-1252	12256		49.9		245		9.9	-	84.4	
CPCL 97-2730	12446		46.5		268		11.6		84.9	
CPCL 99-4455	9088		31.2	-	291		10.5	-	86.1	
CP 00-1101	12040		43.6		276		10.2	-	85.3	
CPCL 00-4111	11397		44.9		250		9.2	-	83.9	
CP 01-1372	14587		50.8		287		9.0	-	85.7	
CPCL 02-0926	11371		41.7		272		10.5	-	85.9	
CPCL 02-1295	11163		41.5		269		13.1		86.0	
CP 03-1912	14722		55.9	+	263		10.0	-	86.9	
CP 04-1566	9953		39.8		250		14.0	+	84.5	
CP 04-1844	14402		55.9		258		12.3		85.6	
CP 04-1935	11456		42.2		272		12.4		84.8	
Pr > F	0.084		0.003		0.142		<0.001		0.261	

[1]Values that are significantly higher or lower than L 01-299 are denoted by a '+' or '-', respectively.

Table 3. First stubble data obtained from a yield trial conducted at the Sugar Research Station, St. Gabriel, LA and harvested on October 25, 2016. The test was planted on August 27, 2014, and the soil type was a Commerce silt loam.

Variety	Sugar Yield[1]		Cane Yield		Sugar Content		Fiber		Purity	
	lbs/ac		tons/ac		lbs/ton		%		%	
CP 89-2143	6765		29.6		229		11.6	-	85.6	
CPCL 95-2287	10053	+	42.7	+	235		12.1	-	85.1	
CP 96-1252	7577		34.9		217		11.2	-	83.1	
HoCP 96-540	7651		33.8		227		10.9	-	84.3	
CPCL 97-2730	8636		38.1		227		11.8	-	81.8	-
CPCL 99-4455	6269	-	24.3	-	258		11.7	-	84.9	
CP 00-1101	7363		29.8		247		11.3	-	85.9	
CPCL 00-4111	6741		28.8		235		11.1	-	83.5	
CP 01-1372	9972	+	38.3		260		10.4	-	85.8	
L 01-299	8017		33.1		242		13.3		86.1	
CPCL 02-0926	9104		39.9	+	228		10.6	-	83.3	-
CPCL 02-1295	6421		31.6		203	-	12.7		80.9	-
CP 03-1912	8313		42.4	+	196	-	11.1	-	80.9	-
CP 04-1566	7065		33.5		213	-	14.9	+	80.5	-
CP 04-1844	8184		40.9	+	200	-	11.5	-	81.8	
CP 04-1935	8495		36.0		236		12.0	-	83.4	
HoCP 04-838	8642		36.1		239		13.0		84.4	
Pr > F	0.0022		0.0003		0.0316		0.0001		0.0279	

[1]Values that are significantly higher or lower than L 01-299 are denoted by a '+' or '-', respectively.

Table 4. Plant-cane data obtained from a yield trial conducted at the Sugar Research Station, St. Gabriel, LA and harvested on November 29, 2016. The test was planted on August 18, 2015, and the soil type was a Commerce silt loam.

Variety	Sugar Yield[1]		Cane Yield		Sugar Content		Fiber		Purity	
	lbs/ac		tons/ac		lbs/ton		%		%	
CP 89-2143	7172	-	28.5	-	250		10.4	-	85.5	
HOCP 96-540	9742		36.5	-	265		12.1		87.6	
CPCL 97-2730	11575		46.5		249		12.6		85.1	
CP 00-1101	9777		36.5	-	270		11.0		86.7	
CP 00-1372	10636		37.0	-	289		11.1		87.6	
L 01-299	12880		50.8		255		12.8		86.1	
CPCL 02-1295	8647	-	36.1	-	239		15.3	+	84.8	
CPCL 02-6848	10859		38.2	-	284		15.7	+	87.6	
CPCL 02-0926	10791		39.3	-	274		11.8		87.6	
CP 03-1912	8987	-	41.3		218	-	12.2		83.2	
CP 04-1844	14122		56.7		249		14.1		86.2	
CP 04-1935	11339		40.8		278		12.3		85.5	
HOCP 04-838	13638		47.7		286		15.0		88.6	
CPCL 05-1102	16139		56.7		284		11.4		88.0	
CPCL 05-1201	10958		41.4		263		12.3		86.4	
CP 04-1566	12163		50.4		240		12.1		85.2	
CP 05-1791	7517	-	28.6	-	263		14.1		85.7	
Pr > F	0.0016		0.0004		0.0012		0.0031		0.7513	

[1]Values that are significantly higher or lower than L 01-299 are denoted by a '+' or '-', respectively.

2016 ENERGY CANE FEEDSTOCK DEVELOPMENT ACTIVITIES

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The LSU AgCenter along with several partners received funding from the Agriculture and Food Research Initiative (AFRI) program in 2010. The project titled 'A Regional Program for Production of Multiple Agricultural Feedstocks and Processing to Biofuels and Biobased Chemicals' is being led by the LSU AgCenter. Energy cane feedstock development is one of the Tasks in this multifaceted project. The objective of the Feedstock Development Task as spelt out in the call for proposals was to develop new, genetically improved varieties of energy cane that 'Optimize yields, expand feedstock diversity and range of cultivation and allow for reduced inputs**'.**

Energy cane clones bred by the USDA-ARS Sugarcane Research Unit at Houma, LA were evaluated at the LSU AgCenter Macon Ridge Research Station in Winnsboro (32°09'48"N) in north Louisiana. About 1,000 clones were evaluated in small plots (3 meters) in 2012 from which about 200 clones were selected in 2013, based on visual appraisal for biomass yield, cold tolerance, and ratooning ability, and replanted into larger plots (5 meters). A random sample of 42 clones was taken from Winnsboro and planted at the Sugar Research Station in St. Gabriel, LA (30°15'13"N) in south Louisiana in 2014. Each clone, along with two energy canes, Ho 02-113 and HoCP 72-114, and one sugarcane, L01-299, check varieties were planted into 3m plots and replicated 3 times each in two blocks. The objective was to evaluate the effect of treating energy cane with the popular sugarcane ripener, glyphosate (Roundup PowerMAX® II), on energy cane traits of economic importance.

The experiment was planted on 09/08/14 and no ripener was applied in the 2015 plant cane crop. Date from the 2015 plant cane crop was reported last year. The ripener (Roundup PowerMAX® II) was applied in block 1 at 385 g ai ac^{-1} (24 Oz/acre) on 09/09/16 and harvested on 10/13/16. A 10-stalk sample was hand-cut from each plot, topped, stripped of leaves, weighed, shredded and the shredded material fed through the Near-infrared spectroscopy (NIRS) machine (SpectraCane, New Zealand) to analyze for Brix, Pol (Z^o), fiber, moisture, and sucrose contents, and for theoretical recoverable sugars (TRS). Also, about 1000 grams of shredded material from each sample was weighed out and dried in an oven till a constant weight was achieved. The oven-dried samples were ground through a 1mm sieve (IKA® 2939200MF1.0) and the residue was analyzed for fiber components, namely, extractives, cellulose, hemicellulose and lignin using a near infrared reflectance spectrophotometer. The data were analyzed using the Genes software (http://www.ufv.br/dbg/genes/gdown2.htm) assuming all variables as random in the model.

Spraying of glyphosate reduced significantly (*P*>0.05) (glyphosate vs control) the moisture (68.03 vs. 69.16 %) and fiber (16.74 vs. 17.22 %) contents, while the differences observed for biomass yield expressed on a fresh (21.81 t/acre vs 19.94 t/acre) and dry (7.13 vs. 6.07 t/acre) weight basis were non-significant (Table 1). However, significant increases were observed for Brix (19.3 vs. 16.8 %), purity (67.5 vs. 62.4%), Pol (57.37 vs. 45.63 %). Sucrose (13.31 vs. 10.72 %) contents, total recoverable sugars (165.81 vs 125.80 Ibs/ton), and sugar yield (3627 vs 2525 lb/acre) following glyphosate application. Cellulose (31.14 % vs 31.43 %), hemicellulose (19.44 vs. 19.83%), and lignin (14.11 vs. 17.42 %) contents decreased significantly. Extractives, estimated as the total of water soluble carbohydrates, inorganic and ethanol soluble materials, increased significantly (10.26 vs 8.88 %) with glyphosate application while ash content was unaffected (3.85 vs. 3.89 %). Only three clones (14, 522 and 542) met the Environmental Protection Agency (EPA) mandated adjusted cellulosic fiber content of ≥ 75 %, indicating the need for breeding energy canes with high fiber content to benefit the cellulosic biofuel industry. This study demonstrated that, much like in sugarcane, glyphosate can be used as a tool to alter biomass characteristics of energy cane which could serve to enhance its economic value.

Table 1. First ratoon crop data showing biomass and juice characteristics of energy cane clones that were sprayed with Roundup PowerMAX® II @ 385 g ai ac^{-1} (24 Oz/acre). Experiment sprayed on 09/09/2016 and sampled on 10/13/2016.

Mean	Moisture (%)	Fiber (%)	Brix (%)	Purity (%)	Pol. reading (%)	Sucrose (%)	Total recoverable sugars (lb/ton)	Sugar yield (Ibs/acre)
Control	69.16	17.22	16.8	62.4	45.63	13.31	125.80	2525
Roundup PowerMAX ® II applied	68.03	16.74	19.3	67.5	57.37	10.72	165.81	3627

Mean	Biomass yield (ton/ac)		Cellulose (%)	Hemicellulose (%)	Lignin (%)	Extractives (%)	Ash (%)
	Fresh wt.	Dry wt.					
Control	19.84	6.07	31.43	19.83	17.42	8.88	3.89
Roundup PowerMAX® II applied	21.81	7.13	31.14	19.44	14.11	10.26	3.85

IDENTIFICATION OF GENOMIC REGIONS CONTROLLING LEAF SCALD RESISTANCE IN SUGARCANE USING A BI-PARENTAL MAPPING POPULATION DENSELY ENRICHED WITH SNP MARKERS

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INTRODUCTION

Diseases are one of the most important problems that affect sugarcane productivity (Rott et al. 2000). Leaf scald, caused by *Xanthomonas albilineans* (Ashby) Dowson, is one of the major diseases worldwide (Rott et al. 1997; Wang et al. 1999; Rott and Davis 2000). The disease is characterized by chronic and acute phases varying in severity from a white, sharply defined longitudinal leaf stripe to death of shoots or entire plants (Ricaud and Ryan 1989; Rott et al. 1997; Wang et al. 1999). Latent infection can occur, making visual diagnosis problematic (Ricaud and Ryan 1989; Rott et al. 1997). Leaf scald causes high losses in tons of cane per hectare and reduction in juice quality (Ricaud and Ryan 1989; Rott and Davis 2000). The use of hot water treatment and tissue culture to produce healthy seed-cane, disinfection of cutting and harvesting tools with bactericides, and quarantine measures during germplasm exchanges are methods used to prevent and control the disease (Ricaud and Ryan 1989; Rott and Davis 2000).

The development of resistant varieties is considered the best strategy to manage leaf scald in sugarcane. The troublesome aspect of resistance evaluation is that symptom expression is affected by environmental conditions, and some sugarcane cultivars can tolerate the pathogen without exhibiting symptoms (Rott et al. 1997). The erratic symptom expression results in the failure to accurately detect susceptibility and thus multiple inoculations are needed. In addition, inoculation can result in systemic infection of resistant clones (Gutierrez et al. 2016). Under this scenario, the development of molecular markers was considered as a major breakthrough promising to overcome the limitations with phenotypic evaluation (Ruane and Sonnino 2007). The use of DNA markers for genetic analysis and manipulation of agronomic traits has become a useful tool in plant breeding (Zhang et al. 2004). Marker-assisted selection (MAS) technique, which uses marker(s) linked to useful trait(s), is extensively used in improving crop yields and in breeding for resistance against pests and diseases (Manigbas and Villegas 2007).

Cultivated sugarcane is derived from inter-specific hybridizations between two polyploid species *Saccharum officinarum* and *S. spontaneum* with different basic chromosome numbers (Aitken et al. 2014). Thus, the modern cultivars are complex aneu-polyploids with chromosome numbers of 2n=100-120 (D’Hont et al. 1998; Aitken et al. 2014), and they contain approximately 80% of *S. officinarum*, 10-15% of *S. spontaneum* and 5-10% recombinant chromosomes (D’Hont et al. 1996). The large (10 Gb) and complex genome, the absence of a reference genome draft, and the coexistence of single and multi-dose alleles have hindered the progress in the development and application of genetic/genomic tools in sugarcane (Wang et al. 2010).

Currently, all sugarcane genetic maps constructed appear incomplete due to the large number of chromosomes and the limited sequence information available for marker development (Wang et al. 2010). However, with the decrease in the cost of DNA sequencing technologies, it will be possible to produce a higher number of DNA markers that will help saturate the available molecular maps, and the information can be used in gene tagging, QTL mapping and map-based cloning (Le Cunff et al. 2008).

Genetic tools for sugarcane have only recently become adequate to quantify the effect of many genomic regions on a trait (Aljanabi et al. 2007). Earlier studies in sugarcane genetics have reported the association of DNA markers with disease resistance, for example, brown rust (Daugrois et al. 1996) and yellow spot (Aljanabi et al. 2007). For brown rust resistance, the studies conducted by Daugrois et al. (1996) were confirmed in a larger population (Asnaghi et al. 2004) that led to the development of two molecular markers linked to the QTL region associated with brown rust resistance (*Bru*1) (Le Cunff et al. 2008). *Bru*1 provides an example that marker-assisted selection is feasible in sugarcane, and the use of *Sorghum bicolor* genome information is an important tool in the map saturation process and the identification of possible gene candidates in the QTL regions (Le Cunff et al. 2008).

For the identification of QTLs associated with resistance to leaf scald, a bi-parental population was developed from the cross between two parents with contrasting disease response-resistant cultivar LCP 85-384 (female) and susceptible cultivar L 99-226 (male). Two different kinds of markers were selected for the map construction, SSRs (including those from the leaf scald responsive ESTs) and SNPs (obtained through genotyping by sequencing). With the use of SNP markers and the synteny between sorghum and sugarcane, a comparative genomic analysis was conducted to elucidate the nature of the resistance to leaf scald and pinpoint regions associated with disease resistance.

MATERIALS AND METHODS

Plant materials

The progeny derived from the cross between a leaf scald resistant clone LCP 85-384 (female) and a susceptible clone L 99-226 (male) was used to develop a linkage map. The seedling progeny of the mapping population was germinated in the greenhouse. The seedlings were transplanted to seedling trays after three weeks and the survivor clones in the process went to the field. A random sample of 186 individuals was taken from the population and used in the linkage mapping study. The population was maintained as clones in field plots. The parents and grandparents were also included to track the origin of markers segregating in the population.

Leaf scald susceptibility evaluation

The population was evaluated in two growing seasons (summer 2014 and 2015) in field trials planted at the LSU AgCenter Sugar Research Station, Saint Gabriel, LA. Phenotypic evaluations were performed in plant cane crops. Bacteria isolation and quantification, and plant inoculation were performed following the protocols previously described (Garces et al. 2014). For inoculation, a bacterial suspension with a concentration of 3.5×10^8 CFU/µL (0.18 OD at 590 nm) was kept at 4°C in the dark prior to inoculation. Plants were inoculated using the decapitation method by placing the bacterial suspension with a sprayer on the surface of the shoot cut above the apical meristem with scissors dipped in the inoculum suspension (Koike 1965). The inoculations were performed at sunset on approximately 15-20 plants per clone.

Each trial evaluated 188 different clones (186 F_1 clones and parents). The trials followed a completely randomized layout where each clone represented a single plot of 2.1 - 2.4 m long. Disease severity was evaluated on plant cane according to the type of symptoms observed 8 weeks after inoculation in intact leaves that emerged after the inoculation in 6 to 14 stalks. Visual symptoms were assessed for systemically infected leaves and rated using a 1 to 9 scale where 1-3 was considered to be resistant, 4-6 as moderately susceptible, and 7-9 as highly susceptible. The assessment was performed using the TVD -2 (Top Visible Dewlap) leaf, and disease severity was evaluated for each clone using the formula: $DS = [(1 \times NS) + (3 \times PL) + (5 \times ML) + (7 \times N) + (9 \times D)] / T$, where NS = number of stalks without symptoms; PL= number of stalks with the TVD -2 leaf exhibiting one or two narrow, white, pencil-line streaks; ML = number of stalks with more than two pencil-line streaks in leaves; N = number of stalks with leaf necrosis or bleaching; D = number of dead stalks or stalks with side shooting; and T = total number of stalks per clone.

In addition to visual symptom evaluation, the bacterial populations were quantified at 8 weeks after inoculation in the TVD -2 leaves using three composite samples (each sample consisted of three leaves of different stalks) per clone. The quantification was performed using a TaqMan qPCR using the protocol as previously described (Garces et al. 2014; Gutierrez et al. 2016).

Phenotypic data analysis

For the QTL analysis, two different sets of phenotypic data were collected: visual rating and bacterial population titer at 8 weeks after inoculation. Both data sets were transformed in order to meet the normal distribution requirement of the analysis. The visual ratings (scale 1-9) were transformed using the Box-Cox transformation with λ values of -1.2 (2014 data), -0.2 (first set of 2015) and 0.1 (second set 2015) using the formula $(y^{\lambda} - 1)/\lambda$ (if $\lambda \neq 0$). The Box-Cox coefficients (λ) were obtained using SAS software v. 9.3 (SAS Institute Inc., Cary, NC). The data after transformation were evaluated using the Shapiro and Wilk test for normality in SAS software v. 9.3 (SAS Institute Inc., Cary, NC). For the bacterial population titer (scale 0 to 10^9) a LOG_{10} transformation was used. Although the transformed data did not meet the normality requirement, the histogram shapes and the Box-Cox normality plots showed a better shape as compared with the non-transformed data. Using the transformed data, the VARCOMP procedure of SAS software v. 9.3 (SAS Institute Inc., Cary, NC) was used to calculate the broad-sense heritability of the visual evaluation of the leaf scald symptoms.

DNA extraction and SSR genotyping

Young leaf tissue was collected on ice from the clones growing in field plots and stored at -80°C until DNA extraction. Genomic DNA was isolated using the potassium acetate protocol (Dellaporta et al. 1983). DNA concentrations were estimated using Nanodrop 1000 spectrophotometer (Nanodrop, Bethesda, MD) at 260 nm wavelength and the quality was checked using the 260 nm / 280 nm ratio information.

A total of 121 SSR primers from the Sugarcane Microsatellite Consortium (Cordeiro et al. 2000; Pan 2006) and 31 eSSRs developed from the leaf scald suppressive subtractive hybridization cDNA library (described in Chapter II) were used in this study. Fifty 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 amplification reactions were conducted on C1000 Touch Thermal Cycler equipped with 384 well block (Bio-Rad, Hercules, CA) with a thermal profile of initial denaturation of 95°C for 5 min, 35 cycles of 95°C for 15 sec, 58°C for 15 sec and 72°C for 1 min, and a final extension of 72°C for 10 min. PCR products were resolved in 13% polyacrylamide gels and run at 350 V for 4 h using 1X Tris-Glycine as running buffer in a HEGS electrophoresis apparatus (Nihon Eido, Tokyo, Japan). The gels were stained using ethidium bromide and visualized and documented in a Kodak GelLogic200 gel documentation system (Carestream, Rochester, NY). The SSRs and eSSRs amplified fragments were manually scored as '1' for presence and '0' for absence.

Genotyping by sequencing and SNP markers development

The DNA samples of parents, grandparents and 89 F_1 clones selected based on the disease symptom evaluation in 2014 (36 resistant, 28 moderate resistant, 16 moderate susceptible and 9 susceptible clones; the samples in each disease reaction groups were represented in similar proportions in the original population of 186 progeny) were used for genotyping by sequencing on a Illumina HiSeq2500 platform at the Institute of Biotechnology of Cornell University, BRC Genomics Facility (Ithaca, NY). In the absence of the sugarcane reference genome, *Sorghum bicolor* genome was used for SNP calling using the Tassel GBS pipeline. After filtering out the SNP markers with more than 10% of missing data and/or without parent information, a χ^2 test was performed to select the bi-allelic SNPs that segregated in a single dose (SD) manner.

Linkage map construction

Mono- and polymorphic fragments were produced by all the marker systems. Each marker was tested against expected segregation ratio using a χ^2 test (df = 1) at 5% error level (type I) for SD or bi-parental SD segregation ratios. Mapping of the SD markers onto linkage groups was done using OneMap v. 2.0-4 package of the R software v.3.1.3 (Margarido et al. 2007). The SSR and eSSR markers were mapped as a dominant marker (presence versus absence). The linkage map construction was performed in two steps following method suggested for genetic mapping in polyploid species (Wu et al. 1992). Only SD markers were used to build the framework map with LOD score threshold of 4.0 and a recombination fraction value of 0.40. Genetic distances between markers were computed using the Kosambi mapping function. Linkage groups with significant QTLs with high LOD scores and percentage of phenotypic variance explained (PVE) were selected for saturation. In the saturation process, the markers that were previously discarded but flanking the QTL regions (based on the genome information of the *Sorghum bicolor*) were selected with a less stringent selection (Bonferroni correction was applied in the χ^2 test) for integration into the map. The graphic representation of the linkage groups was performed using the software MapChart v.2.3 (Voorrips 2002) and/or Windows QTL Cartographer Software v.2.5 (Wang et al. 2012).

QTL mapping

QTL mapping was carried out using single marker analysis (SMA), interval mapping (IM) and composite interval mapping (CIM). QTL analysis was performed on the transformed phenotypic data from the three field trials over two crop years, using the Windows QTL Cartographer Software v.2.5 (Wang et al. 2012) and QTL ICIM Mapping Software v.4.1(Wang et al. 2016). To confirm the location of the QTLs, CIM was undertaken with all default settings in Windows QTL Cartographer Software v.2.5 (Wang et al. 2012). A permutation (1,000 iterations) based LOD threshold of 2.5 and a 5% PVE threshold were used as the criteria to declare a QTL significant (Churchill and Doerge 1994).

RESULTS

Leaf scald screening of the F_1 progeny in the field

Leaf scald reaction of the F_1 population was evaluated 8 weeks after artificial inoculation on plant cane in three different trials (one in 2014 and two in 2015). In both cases, the phenotypic distributions were not normal and skewed to the left. The left skewed distribution was due to the high number of resistant clones present in the F_1 population. For the visual symptom evaluation, the use of the Box-Cox transformation showed low to intermediate correlation among the three field trials (Table 1). In contrast, the correlation among the different trials evaluated with the average of the visual symptom evaluation was high (Table 1). For H^2 calculation, the transformed data appeared to be normally distributed (Shapiro-Wilk test; p-value = 0.4157, W = 0.9943). In addition, the skewness value was near to zero (0.0860), a good indicator of the transformation effect in the elimination of the left skewness. The heritability in broad sense of the leaf scald reaction (H^2=0.2757), based on the symptom expression, showed a low to medium genetic variance component and a high effect of the environment on the leaf scald symptom expression.

Table 1. Pearson correlation among different measures of leaf scald reaction in the field of the progeny of the bi-parental F_1 population of LCP 85-384 x L 99-226.

	Visual symptom rating				Bacterial population titer			
Trials	**2014**	**2015a**	**2015b**	**Average**	**2014**	**2015a**	**2015b**	**Average**
2014	1	0.3486 (0.0009)a	0.2558 (0.0162)	0.6665 (<.0001)	1	0.2911 (0.0059)	0.0012 (0.9911)	0.7163 (<.0001)
2015a		1	0.3865 (0.0002)	0.7808 (<.0001)		1	0.1461 (0.1696)	0.6719 (<.0001)
2015b			1	0.7133 (<.0001)			1	0.5828 (<.0001)

a. Values in the parenthesis represent p-values for Pearson correlation.

For the bacterial population titer measured through qPCR, the use of LOG_{10} transformation showed low correlation among the three field trials (Table 1). However, the correlation among the trials with the average of the bacterial population was medium to high (Table 1). The heritability calculation was not possible because the data after transformation did not show a near-normal distribution (Shapiro-Wilk test; p-value <0.0001, W = 0.9667). In addition, the skewness value was not close to zero (0.2339), an indicator that the data transformation could not eliminate the left skewness. Other kinds of data transformations were also tested, but the results were similar (data not shown). The low to medium correlation among the data sets with both methods of disease reaction evaluation led to the use of all the data sets in the QTL analysis. The QTLs reported in this study were found with at least two of the three field evaluations. The medium (bacterial population titer) to high (visual symptom rating) correlations of the average data with the trials allowed using the average information for the initial QTL mapping with both methods.

SSRs, eSSRs and SNP markers

A total of 332 unambiguous alleles were obtained with genotyping of the F_1 progeny using 121 polymorphic SSR markers. Genotyping using 31 polymorphic eSSR markers resulted in 24 alleles. Of these, 202 SSR (60.8%) and 20 eSSR (83.3%) alleles that segregated as SD markers by χ^2 test were included for linkage mapping. From the genotyping by sequencing of 95 individuals (89 F_1 individuals plus parents and grandparents), a total of 27,260 SNP markers were called using *Sorghum bicolor* genome as the reference. Of the 5,835 selected markers tested for allelic dosage using a $\chi 2$ test, 1,726 (29.6%) were SD markers that were used along with the SD SSR and eSSR markers for linkage mapping.

Linkage map construction

A total of 1,948 SD (SSR, eSSR, and SNP) markers were obtained from the genotyping of the 89 F_1 progeny of the cross between LCP 85-384 x L 99-226. One thousand seven hundred and twenty six (88.6%) of the SD markers were SNP markers generated by the genotyping by sequencing strategy. A simplex framework map was built using 1,146 SD markers, which were assigned to 205 linkage groups (LGs) with the genome coverage of 19,230 cM. Of the 205 linkage groups, 95 LGs were assigned to LCP 85-384 (31 LGs with bi-parental 3:1 SD markers exclusively) with a genome length of 2,793 cM by 272 SD markers, and109 LGs were assigned to L 99-226 (31 LGs with bi-parental SD markers exclusively) with a genome length of 4,121 cM by 348 markers. Also, 32 LGs characterized with SD markers from both parents were obtained with a genome length of 12,880 cM by 593 SD markers. The length of the LGs varied from 0.0001 cM (LG-90) to 5,217 cM (LG-3) with an average of 93.80 cM per LG and an average distance of 16.78 cM between two adjacent markers. The number of mapped markers per LG varied from 2 to 163.

QTL mapping

The phenotypic data of leaf scald reaction obtained through visual symptom evaluation and bacterial population titer were considered as quantitative traits for QTL mapping. QTL mapping was performed using three different strategies: single marker analysis (SMA), interval mapping (IM) and composite interval mapping (CIM). In all the strategies, a putative QTL was called positive when the LOD score (Log_{10} of odds) was higher than 2.5 and the percentage of the phenotypic variance explained (PVE) was higher than 5%. Table 2 (for SMA) and Table 3 (for IM and CIM) summarize the QTLs found in the initial QTL mapping.

Table 2. Summary of the single marker analysis (SMA) for the detection of single dose (SD) markers associated with the leaf scald resistance in LCP 85-384 x L 99-226 F_1 population.

Trait[a]	LG[b]	Position	Marker	LOD[c]	PVE (%)[d]	Add[e]	Dom[f]
Visual	20	0.00	c1_586b	2.5964	12.61	-0.1881	-0.2601
Visual	6	110.88	c3_579	2.4837	11.99	-0.1287	-0.2753
Bacteria	6	110.88	c3_579	3.8923	18.31	-0.2755	-0.8111

a. Trait, Two different methods were used for the disease assessment in the F_1 population used for QTL analysis. "Visual" refers to visual symptom evaluation and "Bacteria" refers to bacterial population titer measured through qPCR.
b. LG, Linkage group.
c. LOD, Logarithm -base 10- of odds score (threshold=2.5, to call a SMA QTL positive).
d. PVE (%), Percentage of phenotypic variance explained by the marker.
e. Add, Estimated additive effect of QTL (of the marker).
f. Dom, Estimated dominant effect of QTL (of the marker).

Saturation of QTL regions

After the initial QTL mapping, nine LGs (3, 6, 20, 21, 35, 42, 44, 130, and 167) showed the presence of QTL regions with high PVE % and high LOD scores. These QTL regions were saturated with the SNPs that were previously not included in the linkage mapping but were found flanking the QTL regions based on the *Sorghum bicolor* genome information. For the integration of the additional SNPs, the Bonferroni correction was applied in the χ^2 test of these markers. Also, the markers that could not be mapped to the *S. bicolor* genome and were located in super contigs were analyzed with the Bonferroni correction for their integration into the map. The Bonferroni correction was not applied previously, during the construction of the framework linkage map, due to the addition of markers with different dosage in the analysis (especially double dose markers). That strategy was followed for the small population size used in the present study for linkage mapping.

The nine LGs with QTLs selected for saturation initially covered a genome length of 6,123 cM with 217 SD markers. The saturation process resulted in 16 LGs that covered a genome length of 15,570 cM with 657 markers (Table 4, Figure 1), taking into account the LGs with previously mapped SD markers and/or LGs with QTLs.

Table 3. Summary of interval mapping and composite interval mapping QTL analysis for the detection of regions associated with the leaf scald resistance in the LCP 85-384 x L 99-226 F_1 population.

Trait[a]	LG[b]	Pos[c]	Left Marker	Right Marker	LOD[d]	PVE (%)[e]	Add[f]	Dom[g]	Left CI[h]	Right CI[h]
Interval Mapping										
Visual	21	291.5	6_4830d	c6_548b	4.9011	11.68	0.1224	-0.4763	288.25	298.25
Visual	35	109.5	10_192a	10_165	4.9808	9.07	0.0393	0.3276	101.25	109.75
Visual	42	8.5	c10_38	10_321a	2.627	10.62	0.0296	0.3997	0	16.75
Visual	44	54.5	5_1527g	5_1527e	8.2299	19.03	-0.7295	-0.2655	53.75	61
Bacteria	3	74.5	CA1172c	1_7232	4.5392	5.27	1.7829	-1.7525	62.75	82.75
Bacteria	3	2151	1_1515d	1_1745a	4.5424	7.85	-1.3817	-1.7751	2143.75	2159.75
Bacteria	6	109.5	2_7637b	c3_579	6.7471	12.56	-0.3441	-1.0454	105.75	110.5
Bacteria	130	86.5	c10_19b	6_6359a	4.5663	10.20	-1.0768	-1.5135	82.25	90.25
Bacteria	167	3.5	3_5544	c4_659a	5.1195	8.88	1.4266	-0.9752	0	12.25
Composite Interval Mapping										
Visual	2	763	3_6381	2_7699a	3.3943	10.61	-0.5841	-0.0355	752.75	766.25
Visual	3	1860.5	CA1602b	SR8-1	2.7549	8.10	0.0749	-0.7322	1824.25	1872.25
Visual	3	3169.5	ci1_713	c1_525a	2.5067	8.14	-0.0608	-0.7263	3156.75	3177.75
Visual	44	54.5	5_1527g	5_1527e	3.9824	2.78	-0.3285	0.0994	47.75	61
Visual	119	321	c6_540a	6_5843a	4.8421	7.84	0.1064	0.7942	312.25	328.25

a. Trait, Two different methods were used for the disease assessment in the F_1 population used for QTL analysis. “Visual” refers to visual symptom evaluation and “Bacteria” refers to bacterial population titer measured through qPCR.
b. LG, Linkage group
c. Pos, The scanning position in cM on the linkage group.
d. LOD, Logarithm -base 10- of odds score (threshold=2.5, to call an IM QTL positive).
e. PVE (%), Percentage of the phenotypic variation explained by QTL at the current scanning position.
f. Add, Estimated additive effect of QTL at the current scanning position.
g. Dom, Estimated dominance effect of QTL at the current scanning position.
h. Left CI and Right CI, Confidence intervals calculated by one-LOD drop from the estimated QTL position.

Final QTL mapping

A second round of QTL analysis was performed after the saturation process using SMA (Table 5), IM and CIM (Table 6). The results showed the location of new markers by SMA analysis and the QTLs flanked with markers added in the saturation process. However, some of the QTLs, such as the QTL region located in the LG 44 (IM, Table 6) and LG 35 (CIM, Table 6) could not be fine resolved after the saturation attempt.

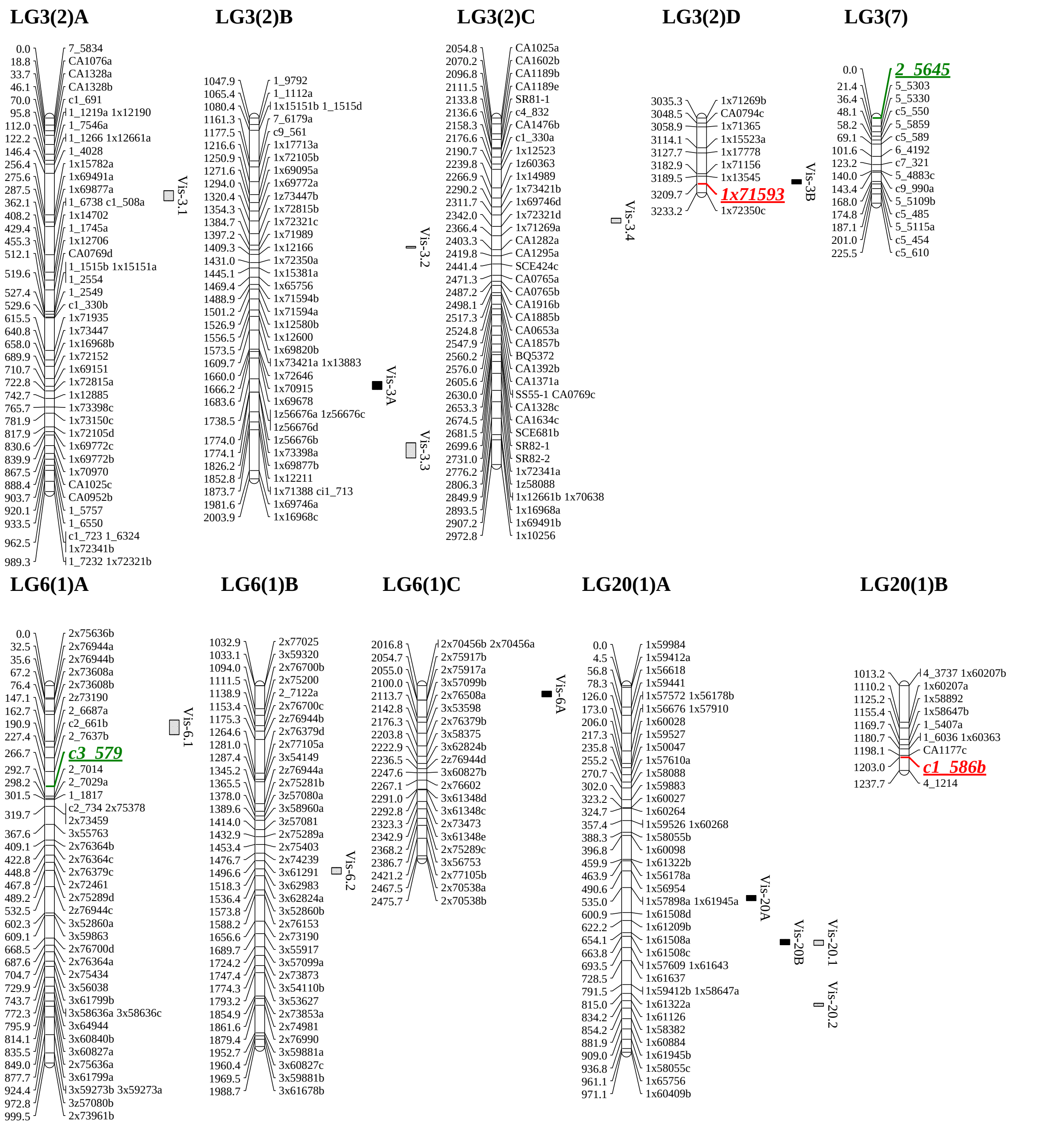
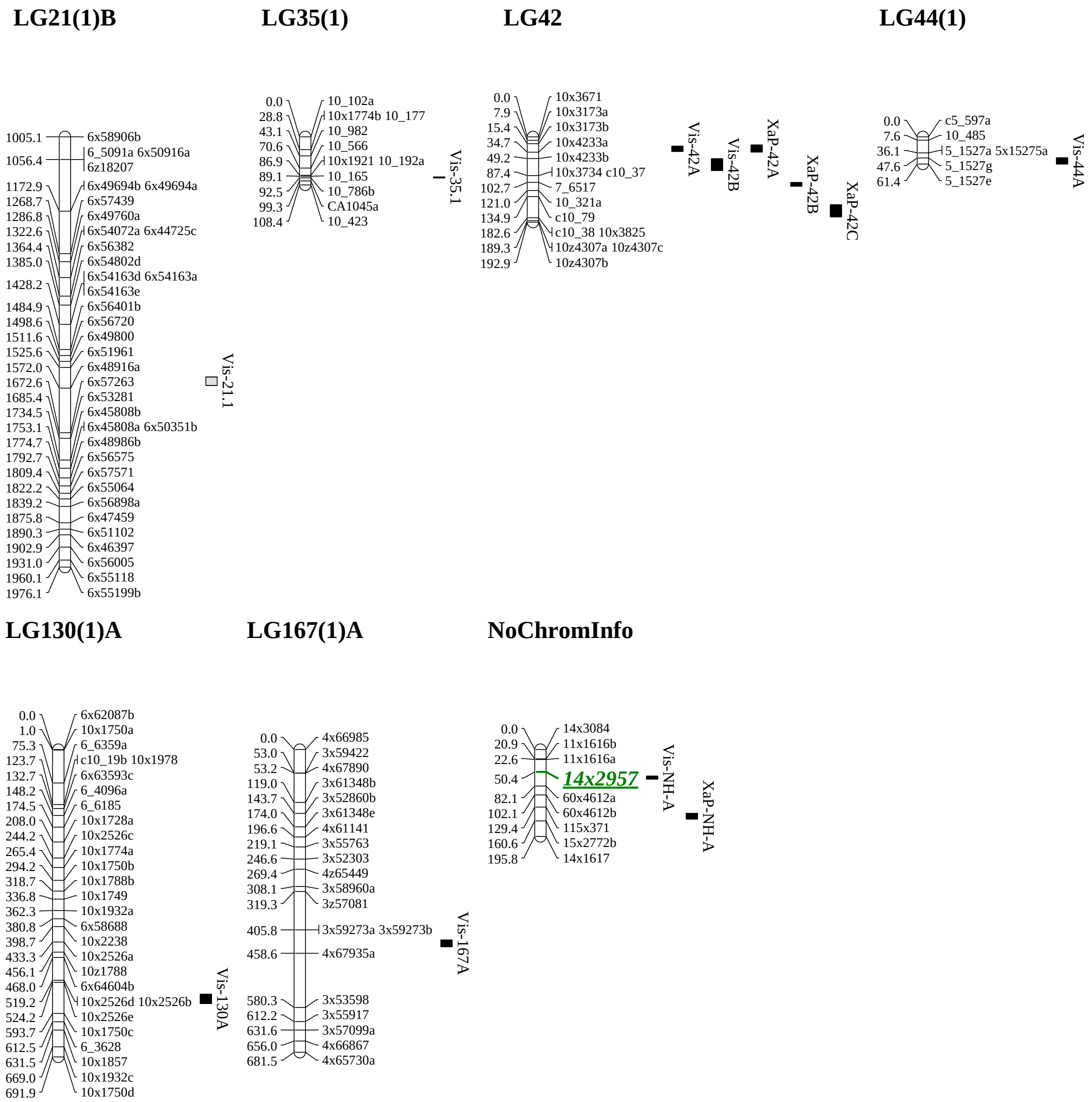


Figure 1 Genetic map of sugarcane cultivars LCP 85-384 and L 99-226 after the saturation process of the QTL regions detected in the initial screening. Bonferroni correction was used in the χ^2 test for the detection of single dose markers flanking the QTL regions. For the detection of markers and regions associated with leaf scald resistance were used three different QTL strategies. Markers associated with leaf scald resistance using the visual evaluation as phenotypic trait (red) and the bacterial populations (green) were detected using single marker analysis. Multiple regions were found using interval mapping (solid black bars on the right side of each linkage group (LG) and composite interval mapping (hatched bars on the right side of each LG) QTL analysis. The QTL names show if they were detected using the visual evaluation (Vis) or the bacterial population (Xa) data.



(Figure 1 Continued)

Table 4. Linkage groups obtained after the saturation of the QTL regions.

LG[a] final	Length (cM)	Markers final[b]	Markers added[c]	3:1 (both parents)	1:1 (LCP 85-384)	1:1 (L99-226)	1:1:1:1	Chrom in sorghum[d]
3.1	302.40	25	5	12	6	7	0	1
3.2	3233.17	136	71	50	44	41	1	1, 7, 9
3.4	246.69	21	5	2	10	9	0	1
3.7	225.47	15	0	9	4	2	0	5, 2, 6, 7
3.8	140.07	11	0	2	4	5	0	3
3.11	82.37	6	0	2	1	3	0	7
6.1	2475.71	99	90	45	34	19	1	2, 3
20.1	1237.67	53	47	17	18	18	0	1, 4
21.1	3071.46	120	112	43	31	46	0	6, 2
21.2	12.83	2	0	1	0	1	0	3
35.1	108.35	11	2	0	0	11	0	10
42.1	192.89	15	10	0	0	0	0	10, 7
44.1	61.40	6	1	1	5	0	0	5, 10
130.1	1215.14	37	31	16	8	12	0	6, 10
167.2	2768.89	91	90	37	29	23	2	3, 4
NM[e]	195.82	9	9	6	2	0	1	ND[f]
Total	15570.34	657	473	243	196	197	5	All except 8

a. LG, Linkage group. The name of the linkage group was based on the original LG prior ro the saturation and a consecutive number.
b. Markers final, Number of markers present in the linkage group.
c. Markers added, Markers added in the saturation process after the Bonferroni correction in the χ^2 test
d. Chrom in sorghum, Based on the SNP information (*Sorghum bicolor* genome was used for the SNP calling), the linkage groups were discriminated using the SNPs contained in each LG.
e. NM, Not mapped on the *Sorghum bicolor* genome
f. ND, No data. No SNPs markers on the LG, so it was not possible to assign a chromosome in sorghum to the LG.

Table 5. Summary of the single marker analysis after the saturation process for the detection of single dose markers associated with leaf scald resistance in the LCP 85-384 x L 99-226 F_1 population.

Trait[a]	LG[b]	Position	Marker	LOD[c]	PVE (%)[d]	Add[e]	Dom[f]
Visual	3.2	3209.69	1x71593	3.0453	14.65	-0.0738	-0.3497
Bacteria	3.7	0	2_5645	2.0375	10.03	-0.0682	0.6505
Bacteria	6.1	266.72	c3_579	3.7189	17.56	-0.5928	-0.4387
Visual	20.1	1203.01	c1_586b	3.013	14.48	-0.0342	-0.3921
Bacteria	NM	50.44	14x2957	2.8566	13.80	-1.303	-1.1466

a. Trait, Two different methods were used for the disease assessment in the F_1 population used for QTL analysis. “Visual” refers to visual symptom evaluation and “Bacteria” refers to bacterial populations measured through qPCR.
b. LG, Linkage group
c. LOD, Logarithm -base 10- of odds score.
d. PVE (%), Percentage of phenotypic variance explained by the marker.
e. Add, Estimated additive effect of QTL of the marker.
f. Dom, Estimated dominant effect of QTL of the marker.

Table 6. Summary of the interval mapping and composite interval mapping QTL analysis after the saturation process for the detection of regions associated with the leaf scald resistance in the LCP 85-384 x L 99-226 F_1 population.

Trait[a]	LG[b]	Pos[c]	Left Marker	Right Marker	LOD[d]	PVE (%)[e]	Add[f]	Dom[g]	Left CI[h]	Right CI[h]
Interval Mapping										
Visual	3.2	1755	1z56676d	1z56676b	2.5677	11.58	-0.2179	0.385	1745.75	1766.75
Visual	3.2	3204.5	1x13545	1x71593	3.4202	13.29	-0.0886	-0.4915	3198.25	3209.75
Visual	6.1	2039.5	2x70456a	2x75917b	3.5764	6.65	-0.111	0.7975	2031.75	2046.25
Visual	20.1	562.4	1x61945a	1x61508d	3.6602	10.86	-0.5282	-0.0348	555.661	569.458
Visual	20.1	679.7	1x61508c	1x57609	3.6713	8.00	-0.1009	0.6745	672.433	686.529
Visual	42.1	26.6	10x3173b	10x4233a	3.2177	6.27	-0.44	0.13	21.45	32.9501
Visual	42.1	66.3	10x4233b	10x3734	2.5377	7.59	0.1137	0.7485	49.7498	76.0494
Bacteria	42.1	31.5	10x3173b	10x4233a	2.7955	2.46	-1.8086	-1.4754	18.85	34.35
Bacteria	42.1	106.3	7_6517	10_321a	3.1217	3.19	-1.4305	-1.4772	103.349	111.349
Bacteria	42.1	168.5	c10_79	c10_38	4.85	4.21	1.4692	-1.1141	153.35	180.352
Visual	44.1	54.8	5_1527g	5_1527e	3.9372	18.62	0.2784	0.117	47.5498	61.2996
Visual	130.1	558.5	10x2526e	10x1750c	2.8359	5.24	-0.5821	-0.0551	550.75	571.75
Visual	167.2	436.3	3x59273b	4x67935a	3.3905	5.90	0.24	0.8485	428.667	443.668
Visual	NM	65.9	14x2957	60x4612a	2.8708	11.27	-0.134	-0.7936	60.0497	66.4496
Bacteria	NM	58.2	14x2957	60x4612a	5.9117	4.44	-1.3874	-1.5255	51.8498	75.7494
Composite Interval Mapping										
Visual	3.2	210	1_4028	1x15782a	3.1258	7.80	-0.5752	-0.0396	192.25	219.25
Visual	3.2	1390	1x72321c	1x71989	2.6335	6.40	-0.5455	0.0035	1388.25	1392.25
Visual	3.2	1929	ci1_713	1x69746a	2.8246	7.36	-0.5552	-0.0196	1908.25	1948.25
Visual	3.2	2327	1x69746d	1x72321d	2.5526	6.01	-0.1079	-0.7307	2320.25	2332.75
Visual	6.1	107.5	2x73608b	2z73190	2.5936	9.78	-0.1109	0.7879	91.25	129.75
Visual	6.1	1527.5	3x62983	3x62824a	2.5716	7.34	-0.0611	0.6357	1514.75	1531.75
Visual	6.1	2039.5	2x70456a	2x75917b	3.5764	9.22	-0.111	0.7975	2031.75	2046.25
Visual	20.1	681.9	1x61508c	1x57609	2.8295	10.91	-0.0084	0.7048	674.332	687.929
Visual	20.1	845.1	1x61126	1x58382	2.5681	11.77	-0.1559	-0.6542	840.992	849.19
Visual	21.1	1558.2	6x51961	6x48916a	3.0903	8.70	-0.0063	-0.7202	1546.92	1565.91
Visual	35.1	90.5	10-165	10-786b	2.6475	12.58	-0.4651	-0.1224	90.4492	92.4492

a. Trait, Two different methods were used for the disease assessment in the F_1 population used for QTL analysis. “Visual” refers to visual symptom evaluation and “Bacteria” refers to bacterial populations measured through qPCR.
b. LG, Linkage group
c. Pos, The scanning position in cM on the Linkage Group.
d. LOD, Logarithm -base 10- of odds score (threshold=2.5, to call an IM QTL positive).
e. PVE (%), Percentage of the phenotypic variation explained by QTL at the current scanning position.
f. Add, Estimated additive effect of QTL at the current scanning position.
g. Dom, Estimated dominance effect of QTL at the current scanning position.
h. Left CI and Right CI: Confidence interval calculated by one-LOD drop from the estimated QTL position.

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