AN OVERVIEW OF 2018 ACTIVITIES IN THE LOUISIANA STATE UNIVERSITY AGRICULTURAL CENTER SUGARCANE VARIETY DEVELOPMENT PROGRAM

Collins Kimbeng
Sugar Research Station

The primary objective of the Louisiana State University Agricultural Center (LSU AgCenter) Sugarcane Variety Development Program is to develop new, genetically improved varieties of sugarcane for the Louisiana sugar industry. The LSU AgCenter Sugarcane Variety Development Program is accomplished through a multidisciplinary effort 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, 'seedcane' 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 Research Station	Program Leader
Michael Pontif	Sugar Research Station	Selection and Variety Testing
Blake Wilson	Sugar Research Station	Insect Resistance
Kenneth Gravois	Sugar Research Station	Extension
Jeffrey Hoy	Plant Pathology and Crop Physiology	Disease Resistance
Niranjan Baisakh	School of Plant, Environmental and Soil Sciences	Molecular Breeding
Albert Orgeron	St. James Parish, Lutcher	Herbicide Tolerance
Carlton Baucum	Sugar Research Station	Infield Variety Testing
Gertrude Hawkins	Sugar Research Station	Sucrose Laboratory
Mavis Daigle	Sugar Research Station	Photoperiod & Crossing
David Sexton	Sugar Research Station	Outfield Variety Testing
Todd Robert	Sugar Research Station	Farm Crew
Alphonse Coco	Sugar Research 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/parents (Table 2). 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 June 1, 2018 and continued until September 10, 2018. The first crosses were made in the first week of September and lasted till November 9, 2018. A total of 419 tassels from 65 genotypes or parents were used to make 268

crosses with a total of 108,719 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 70,730 seeds were produced from bi-parental crosses, and 37,259 seeds were produced from polycrosses.

The 2018 crossing campaign was at par with the 2017 campaign in terms of number of, tassels that flowered (419 vs. 417), crosses made (268 vs. 228) and viable seed produced (108719 vs. 92,549). The germination rate was 36 seedlings per gram of seed. More details about the 2018 crossing campaign can be found in the section titled '**2018 PHOTOPERIOD AND CROSSING IN THE LSU AGCENTER SUGARCANE VARIETY DEVELOPMENT PROGRAM**'.

Seeds (fuzz), most of them from the 2017 crossing campaign, 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 2018. 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 71,116 seedlings from 230 crosses were transplanted to the field in the spring of 2018. Many of these seedlings were progeny of biparental crosses among commercial varieties as well as superior experimental clones. Individual seedling selection will be carried out next year when these seedlings are in the first stubble crop.

Individual seedling selection was practiced on 34,599 first stubble single stools in the fall of 2018. These seedlings were mostly from the 2016 crossing series that were planted to the field in 2017 allowed to overwinter and were in the first ratoon cane crop in 2018. Family selection, based on accumulated data from family appraisal studies and visual assessment of seedling populations, was used to discard some 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 776 clones were selected and planted in 10-foot, first line trial plots.

The first line trial plots established last year (from the 2015 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, poor stand including lodging. Clones that were not dropped the first time around were evaluated for pith, and Brix. A total of 381 clones were eventually selected and planted into single row, 16-foot second line trial. From the second line trial established the year before (2014 crossing series) 301 clones were selected and planted into 2-row, unreplicated, 16-foot increase plots. These are tentative selections with the 'seedcane' being increased pending additional data from the first and second line ratoon crops. 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 197 clones from the 2013 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, estimated cane yield, sucrose content and sugar yield. A total of 41 experimental varieties judged to be superior to the checks were assigned permanent variety designations ("L") in the fall of 2018. 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 2018**'.

The section titled **'2018 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 is likely to encounter in Louisiana. Some of these tests are planted in grower's farms by the breeding crew but are managed by the growers. Twenty-seven experimental varieties from the 2017 assignment series (2012 Crossing series) that performed well in the plant cane crop on-station nursery trials were replanted into infield and off station nursery tests. 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 the off-station nursery and infield tests was a randomized complete block with two replications per location. The infield test is the first time experimental varieties are harvested and weighed using weigh wagons to estimate cane yield. Up until this point, cane yield was estimated using stalk counts multiplied by the weight of 10 random stalks in a plot.

Five experimental varieties from the 2016 assignment series that performed well in the infield, off-station and on-station nurseries tests were introduced to outfield locations and planted into increase plots. Those that continue to perform well in these tests will subsequently be planted into the outfield testing stage of the program in 2019. Two experimental varieties (L 15-306 and L 15-317) introduced to outfield locations last year that continued to perform well in off-station nurseries and infield tests were entered into the outfield tests and introduced on primary increase stations. One experimental varieties, L 14-267 continue to be tested in the outfield stage and are being increased in primary. A variety release meeting was held in April of 2019 and a new variety, L 12-201 was voted for release to the industry. The outfield stage of the program is described in the section titled '**2018 LOUISIANA SUGARCANE VARIETY DEVELOPMENT PROGRAM OUTFIELD VARIETY TRIALS'.**

The section titled **'SUCROSE LABORATORY AT THE SUGAR RESEARCH STATION'** describes activities in the sucrose ('juice lab') laboratory for 2018. Less samples were processed in the 'juice lab' in 2018 (3,094) compared with 2017 (3,590). Of the 3,094 samples processed, 48% were from research programs other than breeding. Most of the samples were processed using the Spectracane FT-NIR instrument. A subset of samples were processed using the standard wet chemistry method and the data were used to validate data obtained from the Spectracane FT-NIR instrument.

Promising experimental varieties that made it to the 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 instructive 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 2018 meeting was held on Thursday August 9, 2018.

Because of the excessive wet weather, not all the goals set out for the 2018 season were accomplished. The industry received higher than normal rainfall amounts throughout the 2018 season. Baton Rouge recorded 65.39" of rainfall in 2018, which is about 5 inches above normal. Spring temperatures were cooler than average, and the crop was short throughout the summer. Planting was delayed for most growers by 7 – 10 days. All trials were planted but not all trials were harvested as planned. Warmer than average temperatures in September and October improved the crop tremendously. The Louisiana industry was spared of any tropical activity during the 2018 season. All mills in the Louisiana industry completed grinding by January 19, 2019.

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 disbursed through the LSU AgCenter and from the Louisiana sugar industry disbursed through the American Sugar Cane League is 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 to assign permanent 'L' variety numbers On-station nurseries planted (at St. Gabriel, Houma, New Iberia) using 'seedcane' 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 Experimental clones introduced to 12 outfield test sites and planted as 'seedcane' increase plots Experimental clones introduced to 3 primary increase stations
9	On-station nurseries 2R harvested Off-station and infield 1R harvested Outfield tests planted at 12 locations Experimental clones increased on 3 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 secondary increase stations
12	Outfield tests 2R harvested Increase experimental clones on 44 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.

The 2018 Louisiana sugarcane crop experienced a cold start in January, with the industry experiencing temperatures in the mid-teens at both the beginning and middle of January. February proved to be the warmest winter month in weather record history since 1893. Spring temperatures were cooler than average, and the crop was short throughout the summer. Planting was delayed for most growers by 7 – 10 days. The Louisiana sugar industry was affected by tropical activity during 2018. Warmer than average temperatures in September and October improved the crop tremendously. The industry received higher than normal rainfall amounts throughout

the 2018 season. Baton Rouge recorded 65.39” of rainfall in 2018, which is about 5 inches above normal. Because of the wet weather during the planting season, only nine of the twelve outfield trials were able to be planted. Harvesting of the trials began on October 16, 2018. The industry experienced sub-freezing temperatures in mid-November, which affected the northern area more than the areas further south. The outfield harvest was completed on January 10, 2019. All mills in the Louisiana industry completed grinding by January 19, 2019.

2018 PHOTOPERIOD AND CROSSING IN THE LSU AGCENTER SUGARCANE VARIETY DEVELOPMENT PROGRAM

Mavis Daigle and Collins Kimbeng
LSU AgCenter Sugar Research Station
St. Gabriel, LA

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 to select parents and to decide what crosses to make. The breeding program strives to produce crosses that will yield superior progeny.

Eyepiece cuttings of breeding genotypes to be used for the 2018 crossing season were planted on October 18, 2017. The cuttings were planted in Styrofoam cell trays and maintained in the greenhouse. On January 31, 2018, 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 26, 2018, when all danger of frost had passed, 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 previous knowledge of their flowering behavior. Genotypes that are difficult to flower were given a longer induction treatment of 41 consecutive days of 12 ½ hours of constant day length and longer decline period which began on July 12, 2018. In comparison, genotypes considered to be easy to flower were given a shorter induction treatment of 37 consecutive days of 12 ½ hours of constant day length and a decline period which began on July 8, 2018. New genotypes for which flowering behavior was not known were placed throughout the photoperiod carts. The new genotypes will be moved to more favorable photoperiod conditions in the following crossing season if they do not flower in a specific photoperiod regime. 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 June 1, 2018. 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 in day length was initiated (Table 1). All photoperiod treatments were discontinued on September 10, 2018, 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 2018, similar to the previous two years. 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. Stalk numbers increased in 2018 to 1,459 stalks (Table 2) as compared to 1,371 stalks in 2017. On average, there were 4.5 stalks per can with 171 cans producing tassels (Table 2). Although an increase in stalk number was observed in 2018, the number of tassels observed during the 2018 crossing season (419) (Table 2) was similar to the number of tassels

observed during the 2017 crossing season (417). This marks the third consecutive year that flowering was reduced in comparison to the 2015 crossing season. Typically, flowering percentages are highest in stalks located in cart position "A" (Table 1). However, during the 2018 crossing season, large decreases in flowering percentages were observed in cart position "A". Most notably, the percent of stalks flowered decreased in position "Bay 4, Cart A" from 45% in 2017 to 24% in 2018 (Table 1). The total flowering percentage for the six photoperiod bays decreased from 30% in 2017 to 29% in 2018. Of a total of 1,459 stalks, 419 tassels were produced (Table 2). An unusually low number of tassels were observed during the second week of crossing with 9 tassels being present as compared to 42 tassels during the same week in 2017 (Fig. 1). The flowering peak of 66 tassels was observed on the week of Oct 1 – Oct 5 (Fig. 1). Flowering then gradually decreased until crossing was discontinued on November 9, 2018 (Fig. 1).

Crossing began on September 7, 2018 and ended on November 9, 2018. A total of 419 tassels comprising 65 genotypes (Table 4) were used to produce 268 crosses (Table 3, Table 5). A total of 108,719 viable seed were produced in 2018 (Table 3). A total of 70,730 seed were produced from bi-parental crosses, a total of 37,259 seed were produced from polycrosses, and a total of 730 seed were produced from self crosses (Table 3). Germination rate was estimated based on the germination of 0.5 g of seed under greenhouse conditions in late December of 2018. Germination rates decreased slightly in 2018 with an average of 36 plants per gram of seed compared to 38 plants per gram of seed in 2017 (Table 3). Poor seed production of crosses made during the week of Nov 5 – Nov 9 was observed in 2018 (Fig. 2).

The 2018 crossing season began under less than ideal conditions. Unseasonably warm weather persisted during a two week period following the transplanting of parental stock eyepieces into can culture. This abnormality in weather patterns may have contributed, in part, to a reduction in potential stalks. A number of stalks and tassels were broken as a result of roosting birds in 2018. Roosting birds also caused stalk and tassel destruction in the prior crossing season. The use of a scarecrow and other tactics to make the photoperiod area less desirable for birds will be implemented in future crossing seasons. Insect pressure remained light during the 2018 crossing season. Poor seed set of seed collected from crosses made during the final week (Nov 5 – Nov 9) was due in large part to an error made in the drying process of seed made from these crosses. The seed maturation process was not complete before the seed from these crosses was dried; therefore, poor seed germination was observed. Special attention will be made to determine what factors are contributing to the reduction in flowering observed in the last 3 crossing seasons.

Table 1. Summary of the 2018 photoperiod treatments for the LSU AgCenter's sugarcane variety development program

Bay	Cart	Treatment Start Date	Days of Constant Photoperiod	Date Photoperiod Decline Started	Days of Declining Photoperiod		Mean Flowering Date	Total Stalks	Percent Flowered
					Peak 1	Peak 2			
1	A	16-Jun	44	30-Jul	72	87	291±2	87	46
1	B	16-Jun	44	27-Jul	72	87	286±2	84	50
1	C	16-Jun	44	27-Jul	72	87	287±3	82	22
2	A	16-Jun	44	27-Jul	72	87	292±2	85	51
2	B	16-Jun	44	27-Jul	72	87	293±3	79	35
2	C	16-Jun	44	27-Jul	72	87	288±3	77	27
3	A	1-Jun	37	8-Jul	87	102	271±3	80	38
3	B	1-Jun	37	8-Jul	87	102	264±3	87	20
3	C	1-Jun	37	8-Jul	87	102	274±4	84	25
4	A	1-Jun	37	8-Jul	87	102	267±3	76	24
4	B	1-Jun	37	8-Jul	87	102	268±4	84	19
4	C	1-Jun	37	8-Jul	87	102	273±3	75	15
5	A	1-Jun	41	12-Jul	82	97	277±4	83	24
5	B	1-Jun	41	12-Jul	82	97	275±5	73	25
5	C	1-Jun	41	12-Jul	82	97	271±8	75	9
6	A	1-Jun	41	12-Jul	82	97	281±3	80	41
6	B	1-Jun	41	12-Jul	82	97	276±3	88	19
6	C	1-Jun	41	12-Jul	82	97	278±5	80	24

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§
---Number---								
65	324	171	1459	419	4.50 ± 1.04	2.45 ± 1.27	5.49 ± 1.76	80.57 ± 19.97

† 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 2018 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
---Number---					
Biparental	179	70730	395±555	395±555	35±39
Polycross	86	37259	433±518	433±518	37±39
Self	3	730	243±361	243±361	19±27
Total	268	108719	406±541	406±541	36±39

Table 4. Varietal flowering summary in 2018 in the photoperiod bays

Variety	Days of Constant Photoperiod	First Flower Date	Mean Days to Flower	Pollen Rating	Total Stalk Number	Total Flowers	Percent Flowering Stalks
CP83-644	43	.	.	.	23	.	.
HO06-530	41	.	.	.	2	.	.
HO06-537	40±1	.	.	.	9	.	.
HO06-563	37	260	78±5	3	6	3	50
HO07-613	41	.	.	.	6	.	.
HO07-617	41	.	.	.	5	.	.
HO08-711	40±1	.	.	.	9	.	.
HO08-717	40±1	.	.	.	14	.	.
HO08-730	39±1	267	94±9	7	15	4	27
HO09-827	43	269	91±3	7	14	8	57
HO09-832	44	.	.	.	6	.	.
HO09-840	42±1	250	65±2	7	18	7	39
HO09-9401	37	250	61±0	7	5	3	60
HO11-532	41±1	274	91±4	4	28	12	43
HO11-9406	44	276	73±3	4	11	9	82
HO12-615	44	284	79±1	6	17	9	53
HO13-705	44	284	80±4	4	6	6	100
HO13-708	40±1	.	.	.	14	.	.
HO13-720	37	.	.	.	4	.	.
HO14-835	40±1	271	92±3	3	9	7	78
HO14-836	44	.	.	.	4	.	.
HO15-960	41	.	.	.	4	.	.
HO15-962	41	260	67	4	4	1	25
HO15-964	41	250	57±0	4	3	2	67
HO15-985	41	.	.	.	2	.	.
HO95-988	41	.	.	.	9	.	.
HOCP00-950	40	262	84±2	8	49	10	20
HOCP01-523	39±1	.	.	.	11	.	.
HOCP02-618	39±1	.	.	.	12	.	.
HOCP04-838	41±1	250	72±4	3	24	14	58
HOCP04-847	39	278	104±15	8	23	2	9
HOCP05-902	42	.	.	.	10	.	.
HOCP09-804	37	.	.	.	9	.	.
HOCP09-814	41	.	.	.	13	.	.
HOCP09-846	41±1	.	.	.	10	.	.
HOCP13-723	44	.	.	.	8	.	.
HOCP14-802	41±1	267	80±2	3	10	2	20
HOCP14-826	40±1	.	.	.	9	.	.
HOCP14-830	40±1	.	.	.	7	.	.
HOCP14-867	41	285	95±3	8	3	2	67
HOCP14-885	41	.	.	.	5	.	.
HOCP15-510	41	264	81±6	4	5	3	60
HOCP15-987	41	.	.	.	3	.	.
HOCP85-845	41	.	.	.	5	.	.
HOCP91-552	44	269	65±3	4	10	8	80
HOCP92-618	42±1	290	101±4	3	20	2	10
HOCP92-624	41±1	264	66±20	7	32	14	44
HOCP95-951	39	267	92±6	6	17	5	29

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
HOCP96-540	41±1	274	89±2	3	24	7	29
HOCP96-561	40±1	284	92±2	6	11	7	64
HOCP97-609	41±1	267	89±6	4	23	3	13
HOL14-841	41±1	311	115	6	10	2	20
HOL15-508	41	.	.	.	6	.	.
HOL15-511	41	267	74	8	3	1	33
HOL15-993	41	278	95±6	7	5	4	80
HOL15-997	41	260	72±2	8±1	5	4	80
L01-283	41	311	101±1	7	31	3	10
L01-299	40	262	88±5	4	45	10	22
L01-315	37	.	.	.	3	.	.
L03-371	42	.	.	.	22	.	.
L05-448	37	262	75±1	4	6	4	67
L05-457	42	250	66±2	8	34	20	59
L06-001	41	269	89±2	4	41	12	29
L06-038	41±2	250	66±2	4	6	4	67
L06-040	42±1	.	.	.	7	.	.
L07-057	40±1	260	73±3	7	17	7	41
L08-088	41	281	88	7	4	1	25
L08-090	40±1	260	79±2	6	32	20	63
L09-099	41	262	83±4	3	33	12	36
L09-112	39±1	.	.	.	18	.	.
L09-123	37	250	70±4	7	14	9	64
L09-131	41	.	.	.	9	.	.
L10-146	41	.	.	.	17	.	.
L10-147	39	281	99±11	4	21	2	10
L11-168	41±1	276	79±4	7	8	3	38
L11-183	41	260	82±5	6	37	11	30
L11-187	40±1	250	81±3	5	33	19	58
L12-201	44	.	.	.	7	.	.
L12-202	41±1	260	74±2	4	15	13	87
L12-218	39±1	281	95±5	8	12	4	33
L12-227	42±1	262	70	3	5	5	100
L13-242	44	.	.	.	10	.	.
L13-243	44	278	74±4	7	4	4	100
L13-251	37	260	81±6	4	9	6	67
L13-257	37	.	.	.	14	.	.
L14-264	44	.	.	.	1	.	.
L14-265	41±2	.	.	.	6	.	.
L14-267	40±1	.	.	.	14	.	.
L14-270	37	.	.	.	4	.	.
L14-273	42±1	264	83±3	8	15	10	67
L14-275	44	285	87±13	7	5	2	40
L14-276	44	297	92±6	8	6	2	33
L14-282	42±1	267	94±8	8	9	5	56
L15-298	44	.	.	.	4	.	.
L15-300	37	.	.	.	6	.	.
L15-302	37	.	.	.	2	.	.

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
L15-303	37	.	.	.	9	5	56
L15-304	44	306	110	8	4	.	.
L15-305	41	.	.	.	6	.	.
L15-306	39±1	.	.	.	2	.	.
L15-311	39±1	.	.	.	6	.	.
L15-312	38±1	311	118	4	4	1	25
L15-317	37	.	.	.	5	.	.
L15-319	41	290	97	8	8	.	.
L15-320	37	.	.	.	10	.	.
L15-328	41	.	.	.	6	2	33
L15-337	41	278	90±5	7	3	.	.
L94-426	39±1	.	.	.	4	1	25
L94-428	37	.	.	.	4	.	.
L94-433	41	305	112	8	6	.	.
L97-128	41±1	260	85±5	7	5	2	40
L98-209	43	284	82±9	7	9	.	.
L99-226	41	269	95±4	4	4	.	.
L99-233	41	250	71±3	4	3	1	33
LCP81-010	41±1	264	78±4	6	16	10	63
LCP81-030	37	.	.	.	11	2	18
LCP85-384	40±1	267	78	4	46	12	26
LCP86-454	41	.	.	.	37	23	62
N27	43	.	.	.	17	12	71
US01-040	41	271	92±13	8	5	.	.

Table 5. Crosses and seed made in 2018

Cross	Female	Male	Seed
XL18-001	L99-233	18P1	799.80
XL18-002	L99-233	18P1	1041.04
XL18-003	L09-123	18P1	402.84
XL18-004	L07-057	18P1	407.22
XL18-005	L06-038	18P1	73.44
XL18-006	HO09-9401	18P1	213.12
XL18-007	L99-233	18P2	560.48
XL18-008	L99-233	18P2	0
XL18-009	L09-123	18P2	535.80
XL18-010	L05-457	18P2	571.90
XL18-011	HO09-9401	18P2	345.56
XL18-012	L99-233	18P3	95.26
XL18-013	L99-233	18P3	743.68
XL18-014	L07-057	18P3	660.60
XL18-015	HO09-9401	18P3	178.06
XL18-016	HO09-840	18P3	561.10
XL18-018	L09-123	HO15-964	263.70
XL18-018	HO09-840	HO15-964	467.50
XL18-019	HO09-840	HOCP04-838	467.48
XL18-020	L09-123	HOCP04-838	710.50
XL18-021	L09-123	L99-233	965
XL18-022	L05-457	L99-233	657.60
XL18-023	HO09-840	L99-233	870.10
XL18-024	HO09-9401	L99-233	157.76
XL18-025	L05-457	L99-233	545.30
XL18-026	L99-233	18P4	0
XL18-027	L09-123	18P4	318.68
XL18-028	L99-233	18P4	0
XL18-029	HOCP04-838	18P4	197.20
XL18-030	L05-457	18P4	131.56
XL18-031	L05-457	18P4	181.72
XL18-032	L05-457	18P4	151.68
XL18-033	L05-457	18P4	7.86
XL18-034	L09-123	18P4	55.56
XL18-035	L09-123	HO15-962	9.10
XL18-036	HOL15-511	HO15-962	0
XL18-037	HO15-962	HO15-962	12.66
XL18-038	L11-168	HOCP04-838	454.14
XL18-039	HO09-840	HOCP04-838	70.16
XL18-040	L05-457	L01-299	0

Table 5. Continued

Cross	Female	Male	Seed
XL18-043	L05-457	L99-233	94.32
XL18-044	L97-128	HO06-563	14
XL18-045	L07-057	L12-202	294
XL18-046	HOL15-997	L13-251	64.62
XL18-047	L11-183	L13-251	140.66
XL18-048	L08-090	HO15-962	35.20
XL18-049	HOCP00-950	L01-299	181.08
XL18-050	L11-183	L13-251	46.68
XL18-051	HO09-840	18P5	5.86
XL18-052	HOCP04-838	18P5	79.36
XL18-053	L09-099	18P5	243.60
XL18-054	L08-090	18P5	10.80
XL18-055	L05-448	18P5	123.30
XL18-056	L11-187	18P6	126.14
XL18-057	L05-457	18P6	55.38
XL18-058	L12-227	18P6	1483.20
XL18-059	L12-202	18P6	277.92
XL18-060	L12-202	18P6	344.88
XL18-061	L12-202	18P6	660.08
XL18-062	L14-273	L12-227	89.04
XL18-063	LCP81-010	L12-227	268.28
XL18-064	HOCP92-624	L05-448	117.36
XL18-065	LCP81-010	L05-448	87.40
XL18-066	HOCP92-624	HOCP15-510	691.84
XL18-067	HOCP00-950	L09-099	7
XL18-068	L11-183	L09-099	108.68
XL18-069	L08-090	L11-187	15.52
XL18-070	HOCP92-624	HO06-563	300.80
XL18-071	L01-123	HO06-563	168.96
XL18-072	HOCP95-951	L01-299	46.80
XL18-073	HOCP00-950	L01-299	17.44
XL18-074	L14-282	L01-299	68
XL18-075	HO08-730	HOCP04-838	31.84
XL18-076	HOL15-511	HOCP04-838	15.08
XL18-077	LCP81-010	LCP85-384	220.48
XL18-078	L11-187	LCP85-384	86.22
XL18-079	L05-457	L11-187	21.20
XL18-080	L97-128	L11-187	0
XL18-081	HOL15-997	HOCP14-802	8.58
XL18-082	HOCP14-802	HOCP14-802	659
XL18-083	HOL15-997	HOCP97-609	181.42
XL18-084	L11-187	HOCP97-609	785.46
XL18-085	HOL15-997	L05-448	53.82
XL18-086	L11-187	L05-448	79.52
XL18-087	L05-457	L99-233	1773.78
XL18-088	HOCP92-624	L99-226	23.52
XL18-089	L05-457	L99-226	77.84
XL18-090	HOCP00-950	L06-001	41.60
XL18-091	L07-057	HOCP91-552	0
XL18-092	L11-183	HOCP91-552	527.28
XL18-093	HO09-827	HOCP04-838	1463.28
XL18-094	L05-457	HOCP04-838	2743.16
XL18-095	L08-090	HOCP04-838	127.16
XL18-096	US01-040	HO14-835	507.30
XL18-097	L07-057	HO14-835	298.48
XL18-098	L09-123	HO14-835	57.96
XL18-099	L11-187	HO14-835	332.80
XL18-100	HO14-835	HO14-835	58.52
XL18-101	L08-090	HOCP14-802	110.40
XL18-102	L05-457	HOCP14-802	717.36
XL18-103	L14-282	HOCP14-802	262.98
XL18-104	HOCP92-624	L99-233	1033.76
XL18-105	L05-457	L99-226	163.90
XL18-106	HOCP15-510	18P7	39.36
XL18-107	HOCP96-540	18P7	142.74
XL18-108	US01-040	18P7	388.48
XL18-109	L14-273	HO11-532	15.24
XL18-110	HO09-840	L01-299	68.04
XL18-111	L08-090	L01-299	26.30
XL18-112	L08-090	18P8	8.40
XL18-113	L11-187	18P8	45.36
XL18-114	L11-187	18P8	0
XL18-115	L07-057	18P8	39.90
XL18-116	HO11-9406	18P8	586.80
XL18-117	HO11-9406	18P8	1061.64
XL18-118	L05-457	HOCP04-838	492.80
XL18-119	L11-168	HOCP04-838	0
XL18-120	L08-090	HOCP91-552	57.60
XL18-121	HOCP00-950	L09-099	64.40
XL18-122	HOCP95-951	HOCP96-540	343.04
XL18-123	L08-090	HOCP96-540	159.88
XL18-124	L11-183	L99-233	255.84
XL18-125	L05-457	L99-233	401.80
XL18-126	HOCP04-847	HOCP04-838	209.52
XL18-127	L13-243	HOCP04-838	774
XL18-128	HO09-840	L12-202	5.02
XL18-129	HOL15-993	L12-202	27.68
XL18-130	LCP81-010	L06-038	2248.40
XL18-131	HO09-840	HOCP91-552	80
XL18-132	HO09-827	L06-001	1151.28
XL18-133	HO06-563	18P9	18.40
XL18-134	HO14-835	18P9	0
XL18-135	L11-187	18P9	13.16
XL18-136	HOL15-993	18P9	1626.20
XL18-137	L14-275	18P9	875.70
XL18-138	L15-337	18P9	412.16
XL18-139	L14-275	18P9	949.62
XL18-140	HOCP00-950	L06-001	178.20

Table 5. Continued

Cross	Female	Male	Seed
XL18-141	L12-218	L09-099	341.36
XL18-142	L97-128	L09-099	66.80
XL18-143	L08-090	L10-147	50.70
XL18-144	L08-090	L11-187	61.10
XL18-145	L12-218	L12-202	30.72
XL18-146	L05-457	L12-227	456
XL18-147	L97-128	L12-227	128.80
XL18-148	L97-128	18P10	31.92
XL18-149	HO14-835	18P10	118.16
XL18-150	LCP81-010	18P10	1068.10
XL18-151	L08-088	18P10	314.64
XL18-152	HOCP04-838	18P10	393.90
XL18-153	HO12-615	HO13-705	22.48
XL18-154	L12-218	HO13-705	917.70
XL18-155	L14-273	HO13-705	287.10
XL18-156	L05-457	L99-233	301.04
XL18-157	HOCP96-561	L99-233	1051.38
XL18-158	L98-209	18P11	135.84
XL18-159	L14-273	18P11	94.12
XL18-160	HOCP15-510	18P11	263.12
XL18-161	L12-202	18P11	19.14
XL18-162	L13-251	18P11	2819.36
XL18-163	HO08-730	HOCP96-540	64.40
XL18-164	L11-168	L09-099	896.50
XL18-165	L14-273	L09-099	114.56
XL18-166	HOCP14-867	HO13-705	3378.08
XL18-167	HO11-9406	L01-299	263.12
XL18-168	L14-282	L01-299	1331.68
XL18-169	L14-275	L12-202	748.88
XL18-170	LCP81-010	HOCP91-552	3159.06
XL18-171	HO08-730	HO11-532	1361.60
XL18-172	HO09-827	HO11-532	1291.16
XL18-173	HO12-615	HO11-532	176.40
XL18-174	HO12-615	L09-099	204.96
XL18-175	L09-123	L09-099	594.30
XL18-176	L11-168	L09-099	737.10
XL18-177	L15-337	L09-099	346.80
XL18-178	HOCP00-950	L06-001	250.20
XL18-179	HOCP92-624	L06-001	388.70
XL18-180	LCP81-010	HO11-9406	752.70
XL18-181	HOCP92-624	HO11-9406	1039.04
XL18-182	L97-128	HO11-9406	16.48
XL18-183	HO12-615	L12-202	16.88
XL18-184	HOCP95-951	L06-001	276.92
XL18-185	HOCP92-624	L99-226	446.26
XL18-186	L15-319	L99-226	303.92
XL18-187	L97-128	L99-233	15.36
XL18-188	HO12-615	L99-233	89.82
XL18-189	HOCP14-867	HO11-532	1081.80
XL18-190	L13-243	18P12	1320
XL18-191	HO11-9406	18P12	342.50
XL18-192	HOCP91-552	18P12	1016.50
XL18-193	HOCP92-618	18P12	20.26
XL18-194	L97-128	L99-226	11.04
XL18-195	L08-090	L99-226	135.54
XL18-196	L14-273	L99-226	452.92
XL18-197	HOL15-993	L09-099	278.88
XL18-198	L07-057	L09-099	90.40
XL18-199	HOCP00-950	HO11-532	424.62
XL18-200	L08-090	HO11-532	174.24
XL18-201	L13-243	HO11-532	656.56
XL18-202	L14-273	HO11-532	388.80
XL18-203	LCP81-010	HO11-532	1794.24
XL18-204	HO12-615	L13-251	95.80
XL18-205	HOCP92-624	L13-251	78.32
XL18-206	L07-057	L13-251	50.38
XL18-207	L08-090	HOCP96-540	110.70
XL18-208	HOCP92-618	18P13	1099.80
XL18-209	L06-001	18P13	120
XL18-210	L13-243	18P13	203.28
XL18-211	L14-276	18P13	338.04
XL18-212	L99-233	18P13	758.52
XL18-213	HOCP95-951	L01-299	534.06
XL18-214	HO09-827	L01-299	712.50
XL18-215	L11-187	L01-299	535.70
XL18-216	L11-187	L06-001	198.24
XL18-217	L12-218	L06-001	239
XL18-218	L97-128	L06-001	137.64
XL18-219	L CP81-010	L06-001	531.48
XL18-220	HO09-827	L09-099	322.56
XL18-221	HO12-615	L09-099	18.20
XL18-222	HO09-827	HO11-532	1284.36
XL18-223	HOCP96-561	HO11-532	1270.92
XL18-224	HOCP96-561	HO13-705	1076.16
XL18-225	L98-209	L99-226	343.98
XL18-226	HOCP96-561	L99-226	247
XL18-227	HOL15-993	L99-226	851
XL18-228	L14-282	L99-226	812.52
XL18-229	L99-233	18P14	483.74
XL18-230	HOCP04-838	18P14	1602.90
XL18-231	L09-099	18P14	1159.28
XL18-232	HO11-9406	18P14	595.92
XL18-233	L10-147	18P14	1824.90
XL18-234	HOCP97-609	18P14	422.28
XL18-235	L11-187	L01-299	47.18
XL18-236	L14-273	L01-299	381.68
XL18-237	HOCP92-624	L99-226	893.04
XL18-238	LCP81-010	L99-226	1769.58

Table 5. Continued

Cross	Female	Male	Seed
XL18-239	L11-183	HOCP04-838	400
XL18-240	L14-273	HOCP96-540	88.40
XL18-241	L94-433	18P15	1528.02
XL18-242	HO11-532	18P15	22.88
XL18-243	L01-299	18P15	138.60
XL18-244	L99-233	18P15	179.34
XL18-245	L99-233	18P15	142.20
XL18-246	HOCP92-624	HO13-705	201.12
XL18-247	L11-183	L06-001	1014.60
XL18-248	HO09-827	L11-187	187.72
XL18-249	HO09-827	L99-226	1452.60
XL18-250	L15-304	L99-226	136.40
XL18-251	L14-276	L99-226	328.32
XL18-252	HO08-730	18P16	659.64
XL18-253	HO11-532	18P16	0
XL18-254	HO14-835	18P16	59.88
XL18-255	HOCP97-609	18P16	109.20
XL18-256	HOCP92-624	HO14-835	0
XL18-257	L14-282	HOCP96-540	19.44
XL18-258	HOL14-841	HOCP96-540	0
XL18-259	HOCP04-847	L11-187	0
XL18-260	HOL14-841	L11-187	0
XL18-261	HOCP96-561	L15-312	6.32
XL18-262	L14-275	L15-312	0
XL18-263	US01-040	L15-312	7.28
XL18-264	L01-283	L99-226	0
XL18-265	L11-183	HO11-532	0
XL18-266	L97-128	HO11-532	0
XL18-267	HO09-827	L01-299	0
XL18-268	L01-283	L06-001	0

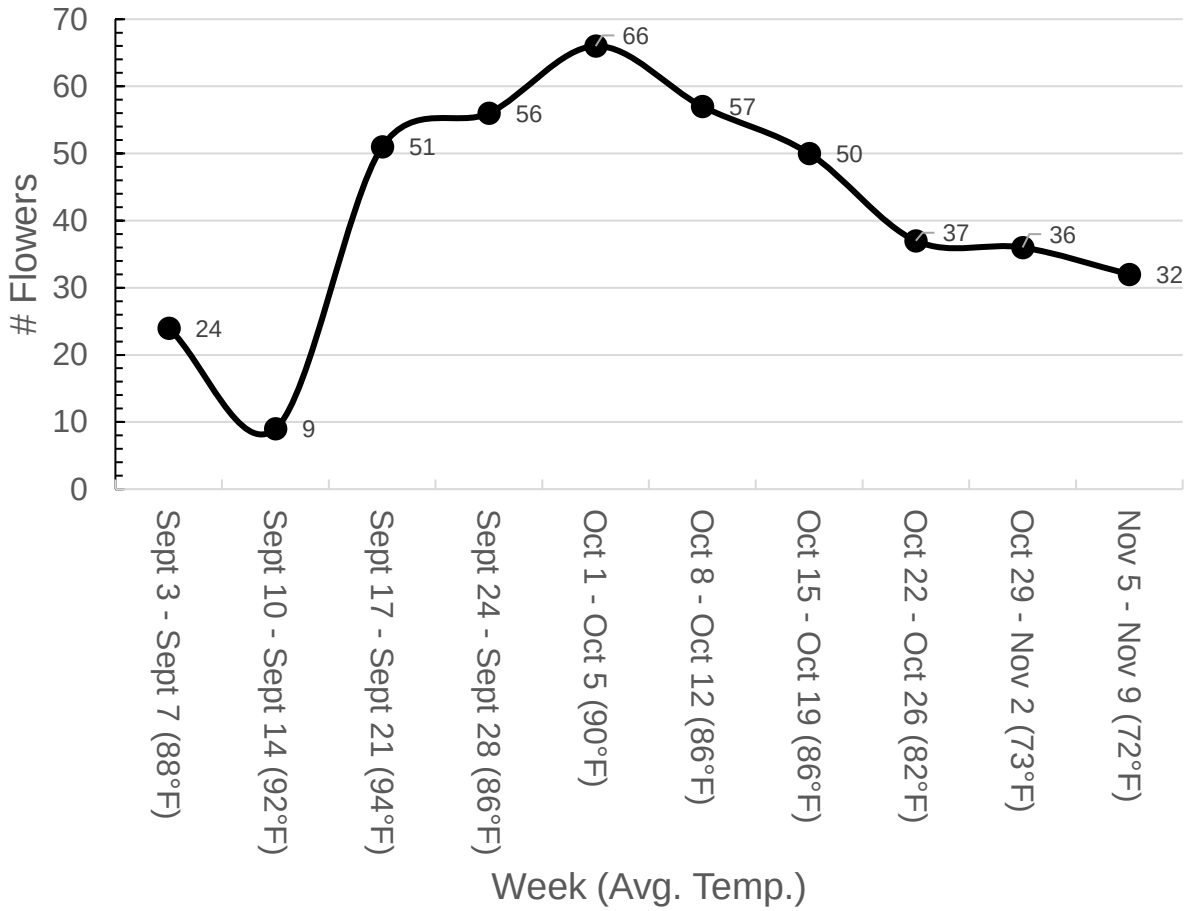

Fig. 1. Number of flowers produced during the 2018 crossing season. The average ambient high temperature is reported for each week.

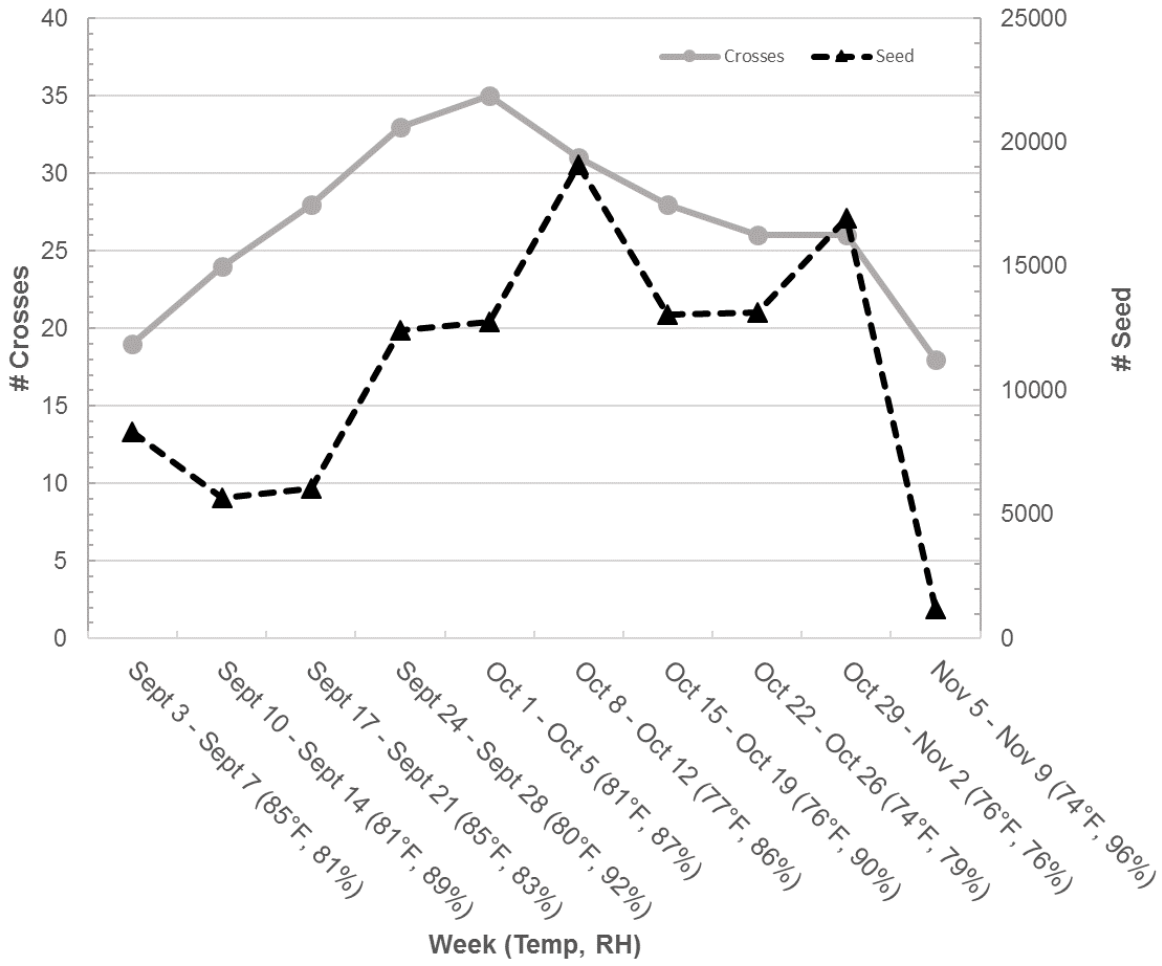

Fig. 2. Number of crosses made and number of seed made from those corresponding crosses in 2018. Average weekly high temperature and average weekly relative humidity readings were recorded inside the crossing greenhouse located in St. Gabriel, LA.

SELECTIONS, ADVANCEMENTS, AND ASSIGNMENTS OF THE LSU AGCENTER'S SUGARCANE VARIETY DEVELOPMENT PROGRAM FOR 2018

Michael J. Pontif, Collins Kimbeng, Gert Hawkins, David Sexton,
Mavis Daigle, and Alphonse Coco
Sugar Research Station

In the selection phase of the LSU AgCenter's Sugarcane Variety Development Program, superior clones are advanced through the seedling (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 71,116 seedlings from 230 crosses were planted in the field in the spring of 2018. The majority of these seedlings are progeny of bi-parental crosses among commercial and elite experimental varieties. In the fall of 2018, family selection was practiced on the 34,599 stubble seedlings, planted in 2017, surviving the winter. This selection resulted in the planting of 776 first-line trial plots. At the same time, superior clones were selected and advanced through subsequent stages (381 to second line trials, 301 to the increase stage). Assignments of permanent "L18" numbers were given to the 41 best clones of the 2013 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 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 71,116 seedlings from 230 crosses of the 2017 crossing series were planted to the field in the spring of 2018 (Table 1). Many of these seedlings were progeny of crosses among commercial and superior experimental varieties. In the fall of 2018, individual selection was practiced on the 34,599 stubble single stools of the 2016 crossing series, planted in 2017, that survived the winter. The 776 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 776 first-line trial plots of the 2015 crossing series were visually appraised for cane yield potential in August of 2018 (Table 3). After screening for cane yield potential, acceptable clones were further evaluated for pest resistance (diseases and borer injury), stalk quality, and Brix (Table 3). This second stage of advancement concluded with the planting of 381 clones in single row, 16-foot, second line trials plots.

The 381 plant-cane, second line trial plots of the 2014 crossing series were visually appraised for yield potential August 2018. Based on the field evaluation, comments and sucrose lab data collected in 2017, 301 clones were planted in one single row, 25-foot plots representing the increase stage of the program (Table 4). (Only one increase test was planted, in light soil.) These clones will be candidates for assignment in 2019. Of the 197 candidates from the first stubble crop of the second line trial plots, the best 41 clones from the 2013 crossing series were assigned permanent "L18" numbers (Table 5). These newly assigned "L18" varieties were then planted in replicated nursery trials at two on station locations (Sugar Research Station and Iberia Research Station). (The on station nursery at USDA-ARS Ardoyne Farm was not planted.)

The advancement summary of clones from crosses made in 2013 through 2017 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 2018 by the Louisiana, "L" Sugarcane Variety Development Program's personnel.

Crossing series	Crosses		Plants transplanted	Over-wintered plants	Advanced to			
	Progeny test	Selection program			1st line	2nd line	Increase	On-station Nurseries (L18 Assignments)
			number of clones					
X13	--	155	76,217	51,399	1,663	551	270	41
X14	24	194	85,659	64,206	2,128	557	301	
X15	20	157	81,783	49,088	1,395	381		
X16	20	333	83,214	34,599	776			
X17	20	230	71,116					

Table 2. Dates of seedling and line trials planted or harvested in 2018.

Crossing Series	Test	Crop	Date Planted	Date Harvested
X17	Seedlings	Planted	4/12 – 4/19/18	
X17	Progeny Test	Planted	4/19/18	
X16	Seedlings	First Stubble	4/11/17-4/20/17	10/1 – 10/4/18
X16	Progeny Test	First Stubble	4/20/17	Not harvested
X15	First Line Trials	Plant-cane	10/3 – 10/6/17	10/12/18
X14	First Line Trials	First Stubble	10/10-10/25/16	12/10/18
X15	Second Line Trials	Planted	10/15/18	
X14	Second Line Trials	Plant-cane	9/27/17	10/23 & 10/31/18
X13	Second Line Trials	First Stubble	10/4/16	10/18/18
X12	Second Line Trials	Second Stubble	9/16/15	12/12/18
X14	Light Soil Increase	Planted	10/31/18	
X13	Light Soil Increase	Plant-cane	10/19/17	Not harvested
X12	Light Soil Increase	First Stubble	9/15/16	12/6/18
X11	Light Soil Increase	Second Stubble	11/06/15	11/15/18
X13	Heavy Soil Increase	Plant-cane	10/19/17	12/13/18
X12	Heavy Soil Increase	First Stubble	9/28/16	12/6/18

Table 3. Numbers of experimental clones dropped for identified faults in the 2015 crossing series first-line trials.

	Fault	
Trait	Frequency	Percent
---------- 1395 clones enter first round of evaluation ----------		
Initial Selection (Rating)	680	48.75
---------- 715 clones enter second round of evaluation ----------		
Pith	126	9.03
Smut	2	0.14
Lodge / Broken	15	1.08
Tube	2	0.14
Rating	12	0.86
Other	6	0.43
---------- 163 clones dropped ----------		
----------552 clones enter third round of evaluation ----------		
Brix	171	12.26
Clones advanced	381	27.31

Table 4. Number of experimental clones dropped for identified faults in the 2014 crossing series of the plant-cane second line trial prior to advancement to the increase stage.

	Fault	
Trait	Frequency	Percent
---------- 557 clones enter first round of evaluation ----------		
Lodged	65	11.67
Rating	61	10.95
Pith	115	20.65
Tube	4	0.72
Smut	6	0.54
Leaf Scald	3	1.08
Other	2	0.36
---------- 256 clones dropped ----------		
Clones advanced to Increase stage	301	54.04

Table 5. First stubble second line trial yield data for the 2017 "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	Sugar Per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
HoCP1996540	5220	29.2	177	2.00	29343	11.5
L2001283	5990	32.3	186	1.61	41140	11.3
L2001299	5272	30.5	165	1.47	42501	14.6
HoCP2004838	6978	36.6	188	1.76	43106	12.6
L2018438	5790	24.7	234	1.40	35393	11.4
L2018439	10521	46.4	227	1.90	49005	13.1
L2018440	5415	23.5	231	1.88	24956	10.8
L2018441	6574	30.9	213	1.70	36300	12.3
L2018442	7529	34.9	216	1.41	49459	13.2
L2018443	7325	35.0	209	1.56	44921	10.5
L2018444	6597	31.2	211	1.70	36754	11.3
L2018445	6393	30.8	207	1.55	39930	11.1
L2018446	7191	37.8	190	1.25	60803	11.9
L2018447	7039	34.7	203	1.42	49005	14.5
L2018448	5272	25.6	206	1.57	32670	12.8
L2018449	8475	42.1	201	2.24	37661	10.7
L2018450	5608	28.6	196	1.34	42653	11.0
L2018451	5760	29.7	194	2.08	28586	11.0
L2018452	7377	38.6	191	1.93	39930	12.5
L2018453	5749	29.4	195	1.97	29948	11.2
L2018455	7731	40.0	193	1.96	40838	10.6
L2018456	5288	27.7	191	1.34	41291	11.7
L2018457	6384	32.9	194	1.42	46283	14.0
L2018458	7516	36.8	204	2.08	35393	13.6
L2018459	6533	33.2	197	1.26	52635	13.6
L2018460	5303	26.6	199	1.50	35393	11.5
L2018461	10697	53.5	200	2.59	41291	14.2
L2018462	6271	32.9	190	2.14	30855	12.7
L2018463	6133	30.5	201	1.27	48098	13.6
L2018464	4991	26.4	189	2.01	26318	13.6
L2018465	6885	35.5	194	1.74	40838	12.0
L2018466	6511	36.2	180	2.02	35846	14.3
L2018467	4959	28.4	175	2.12	26771	12.7
L2018468	7112	39.9	178	2.23	35846	12.6
L2018469	9279	50.8	183	1.88	53996	13.3
L2018470	8505	45.0	189	2.39	37661	9.1
L2018471	7991	41.4	193	2.15	38569	9.6
L2018472	7467	41.3	181	1.88	44014	10.0
L2018473	5123	27.6	186	1.65	33578	12.2

Table 5. Continue.

Variety	Sugar Per Acre	Cane Yield	Sugar Per ton	Stalk Weight	Stalk Number	Fiber
L2018474	4754	26.3	181	1.93	27225	11.7
L2018475	9213	52.8	174	2.45	43106	11.8
L2018476	4166	24.1	173	1.43	33578	11.8
L2018477	8119	44.0	185	2.34	37661	12.9
L2018478	7764	44.9	173	2.54	35393	11.9
L2018479	.	.	146	1.85	.	12.0

Table 6. Advancement summary of the crosses in 2013 through 2016 series.

			1 st Line		2 nd Line		Increases		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
2016 Crossing Series										
HO06-530	L99-233	225	0	7	.	.	.	.	.	.
N27	L06-001	248	0	7	.	.	.	.	.	.
L07-057	L99-233	369	1	22	.	.	.	.	.	.
HO09-840	HOCP04-838	314	1	23	.	.	.	.	.	.
HO09-840	L99-233	824	6	51	.	.	.	.	.	.
L05-457	L99-233	637	11	84	.	.	.	.	.	.
L13-242	HOCP91-552	558	4	50	.	.	.	.	.	.
L05-457	L99-233	937	6	45	.	.	.	.	.	.
L09-123	L01-299	220	3	76	.	.	.	.	.	.
HO09-840	L01-299	167	2	70	.	.	.	.	.	.
L05-457	HOCP91-552	197	1	37	.	.	.	.	.	.
HO09-840	L01-299	395	18	98	.	.	.	.	.	.
L05-457	L01-299	380	5	72	.	.	.	.	.	.
HOCP92-624	L01-299	612	6	64	.	.	.	.	.	.
L05-457	L01-299	240	3	71	.	.	.	.	.	.
L98-209	L05-448	182	1	42	.	.	.	.	.	.
L09-123	HOCP91-552	921	3	24	.	.	.	.	.	.
HOCP91-552	16P1	831	4	31	.	.	.	.	.	.
L06-038	16P1	212	0	7	.	.	.	.	.	.
HO06-563	16P1	232	6	91	.	.	.	.	.	.
HO06-563	16P1	438	5	68	.	.	.	.	.	.
HOCP13-726	HOCP12-647	601	3	36	.	.	.	.	.	.
HOCP91-552	HOCP12-647	284	6	86	.	.	.	.	.	.
L13-243	HOCP12-647	410	0	7	.	.	.	.	.	.
HOCP12-647	HOCP12-647	.	0	.	.	.	.	.	.	.
L12-227	L01-299	209	3	79	.	.	.	.	.	.
L05-457	L01-299	417	9	87	.	.	.	.	.	.
N27	L99-226	2426	59	89	.	.	.	.	.	.
N27	LCP85-384	2110	58	92	.	.	.	.	.	.
L07-057	LCP85-384	420	1	20	.	.	.	.	.	.
L05-457	L08-090	406	12	95	.	.	.	.	.	.
HO09-827	L08-090	280	1	27	.	.	.	.	.	.
L98-209	HOCP11-532	452	0	7	.	.	.	.	.	.
HOCP04-838	16P2	405	9	87	.	.	.	.	.	.
HOCP91-552	16P2	1495	9	44	.	.	.	.	.	.
HOCP91-552	16P2	596	8	74	.	.	.	.	.	.
HOCP97-609	16P2	227	2	56	.	.	.	.	.	.
HOCP97-609	16P2	619	0	7	.	.	.	.	.	.
L07-057	HOCP91-552	382	2	39	.	.	.	.	.	.
HO06-563	HOCP91-552	188	3	82	.	.	.	.	.	.
HOCP97-609	HOCP91-552	764	14	85	.	.	.	.	.	.

Table 6. Continue

			1 st Line		2 nd Line		Increases		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
L94-428	HOCP91-552	594	5	54	.	.	.	.	.	.
HOCP95-951	L08-090	1169	8	48	.	.	.	.	.	.
L98-209	L08-090	785	12	81	.	.	.	.	.	.
L07-057	L08-090	179	2	67	.	.	.	.	.	.
L98-207	L12-202	376	0	7	.	.	.	.	.	.
L13-260	LCP85-384	289	1	25	.	.	.	.	.	.
HOCP91-552	LCP85-384	376	2	40	.	.	.	.	.	.
HO09-827	LCP81-010	203	0	7	.	.	.	.	.	.
HOCP91-552	LCP81-010	441	1	18	.	.	.	.	.	.
HOCP92-618	HOCP13-726	569	1	16	.	.	.	.	.	.
L05-457	HOCP13-726	340	2	43	.	.	.	.	.	.
L13-260	L08-090	179	2	67	.	.	.	.	.	.
L98-207	L08-090	301	4	73	.	.	.	.	.	.
HOCP92-624	L09-099	591	8	74	.	.	.	.	.	.
L13-260	L99-233	207	2	62	.	.	.	.	.	.
HO09-840	L99-233	550	6	66	.	.	.	.	.	.
HOCP91-552	16P3	179	0	7	.	.	.	.	.	.
HOCP91-552	16P3	229	0	7	.	.	.	.	.	.
L94-428	16P3	219	14	99	.	.	.	.	.	.
HOCP95-951	16P3	411	3	52	.	.	.	.	.	.
HO09-840	L99-226	476	4	53	.	.	.	.	.	.
L14-273	L99-226	251	1	28	.	.	.	.	.	.
L11-183	L99-226	137	2	80	.	.	.	.	.	.
L98-209	L99-226	637	1	15	.	.	.	.	.	.
L05-457	L99-226	1326	12	58	.	.	.	.	.	.
L11-183	L12-202	218	0	7	.	.	.	.	.	.
HOCP92-618	L12-202	461	4	56	.	.	.	.	.	.
LCP81-010	L12-202	2683	15	43	.	.	.	.	.	.
HO09-840	HO06-563	1047	7	47	.	.	.	.	.	.
HOCP92-618	HO06-563	1198	19	82	.	.	.	.	.	.
HO09-827	HO06-563	1248	17	76	.	.	.	.	.	.
HOCP92-618	HOCP96-540	1122	8	49	.	.	.	.	.	.
HOCP09-840	LCP85-384	387	1	21	.	.	.	.	.	.
HOCP00-950	HOCP91-552	333	1	23	.	.	.	.	.	.
HO11-532	HOCP12-647	501	2	29	.	.	.	.	.	.
L06-001	HOCP12-647	213	2	61	.	.	.	.	.	.
L01-299	HOCP12-647	223	0	7	.	.	.	.	.	.
HO11-9406	L99-233	547	1	17	.	.	.	.	.	.
L05-457	L99-233	617	10	83	.	.	.	.	.	.
HOCP02-618	L99-233	369	5	75	.	.	.	.	.	.
HOCP92-618	HOCP04-838	136	0	7	.	.	.	.	.	.

Table 6. Continue

			1 st Line		2 nd Line		Increases		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
L05-457	L99-226	1128	13	69	.	.	.	.	.	.
LCP85-384	L99-226	418	3	51	.	.	.	.	.	.
L99-233	HO11-9406	386	2	38	.	.	.	.	.	.
HOCP92-624	L99-226	232	2	55	.	.	.	.	.	.
L05-457	L99-226	228	3	72	.	.	.	.	.	.
L05-457	L06-001	453	13	94	.	.	.	.	.	.
L14-295	L06-001	1111	25	88	.	.	.	.	.	.
L05-457	HOCP96-540	364	3	53	.	.	.	.	.	.
L14-275	HOCP96-540	782	7	58	.	.	.	.	.	.
L05-457	L12-202	614	3	35	.	.	.	.	.	.
L05-457	L99-226	387	4	65	.	.	.	.	.	.
US01-040	L99-226	207	1	33	.	.	.	.	.	.
HOCP92-618	HOCP96-540	216	1	30	.	.	.	.	.	.
HOCP92-624	LCP85-384	607	2	25	.	.	.	.	.	.
L01-283	HO06-563	419	6	79	.	.	.	.	.	.
L14-265	L99-226	586	6	64	.	.	.	.	.	.
L12-218	L99-226	213	2	61	.	.	.	.	.	.
HOCP85-845	L01-299	365	2	41	.	.	.	.	.	.
L05-457	HOCP09-804	222	0	7	.	.	.	.	.	.
LCP85-384	16P6	404	1	20	.	.	.	.	.	.
L05-457	L01-299	723	5	48	.	.	.	.	.	.
L97-128	L01-299	214	8	97	.	.	.	.	.	.
L14-265	L99-226	657	17	92	.	.	.	.	.	.
L98-209	L99-226	413	4	63	.	.	.	.	.	.
L14-265	L08-090	587	14	89	.	.	.	.	.	.
HO09-832	L06-001	570	18	97	.	.	.	.	.	.
HOCP92-618	L06-001	1478	17	69	.	.	.	.	.	.
L01-283	HOCP01-517	218	2	60	.	.	.	.	.	.
HOCP96-561	HOCP01-517	207	1	33	.	.	.	.	.	.
HOCP97-609	HOCP09-804	213	1	30	.	.	.	.	.	.
L05-457	HO11-532	438	6	77	.	.	.	.	.	.
HOCP00-950	HO13-705	388	0	7	.	.	.	.	.	.
N27	HOCP96-540	458	3	46	.	.	.	.	.	.
HO09-840	L12-227	983	9	59	.	.	.	.	.	.
HOCP92-618	L12-227	892	0	7	.	.	.	.	.	.
HOCP00-950	L13-251	589	0	7	.	.	.	.	.	.
HOCP92-618	L13-251	755	5	46	.	.	.	.	.	.
HOCP92-624	L99-226	565	5	57	.	.	.	.	.	.
L94-433	L99-226	180	0	7	.	.	.	.	.	.
HOCP92-624	HOCP91-552	530	1	17	.	.	.	.	.	.
L01-283	L09-099	414	2	33	.	.	.	.	.	.

Table 6. Continue

			1 st Line		2 nd Line		Increases		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
L11-183	L99-226	136	4	94	.	.	.	.	.	.
HOCP85-845	L06-001	184	1	41	.	.	.	.	.	.
HOCP01-523	CP83-644	239	6	90	.	.	.	.	.	.
HOCP04-847	HOCP97-609	218	0	7	.	.	.	.	.	.
L14-269	HOCP97-609	850	3	26	.	.	.	.	.	.
HOCP85-845	L09-099	212	0	7	.	.	.	.	.	.
N27	L09-099	866	26	96	.	.	.	.	.	.
HOCP92-618	CP83-644	611	3	35	.	.	.	.	.	.
L14-282	CP83-644	214	3	78	.	.	.	.	.	.
HO09-9402	L15-301	254	7	93	.	.	.	.	.	.
HOCP01-517	HOCP96-540	830	14	84	.	.	.	.	.	.
L14-275	HOCP96-540	388	2	38	.	.	.	.	.	.
L05-457	LCP85-384	178	0	7	.	.	.	.	.	.
HOCP92-624	HOCP09-804	824	4	34	.	.	.	.	.	.
L94-433	HOCP09-804	263	1	28	.	.	.	.	.	.
HOCP92-624	CP83-644	435	1	19	.	.	.	.	.	.
2015 Crossing Series										
HO14-9243	HO14-824	177	0	9	0	22	.	.	.	.
HOCP11-544	L99-233	637	11	61	2	58	.	.	.	.
HOCP11-541	HOCP04-838	680	6	38	0	22	.	.	.	.
HOCP00-950	HOCP04-838	469	5	45	0	22	.	.	.	.
HO12-629	HOCP12-676	195	2	43	0	22	.	.	.	.
HOCP11-541	HOCP12-674	848	5	29	0	22	.	.	.	.
HO14-811	HO11-508	475	16	87	0	22	.	.	.	.
HO11-517	HOCP04-838	219	4	63	1	68	.	.	.	.
HO12-628	HO14-852	699	15	72	7	87	.	.	.	.
HO11-517	HO13-705	165	0	9	0	22	.	.	.	.
HOCP13-749	HO13-705	277	2	31	0	22	.	.	.	.
HOCP13-764	HOCP10-900	706	27	89	14	97	.	.	.	.
HOCP13-726	HO14-807	497	4	35	1	53	.	.	.	.
HO14-805	L99-233	328	9	80	1	57	.	.	.	.
HO13-731	L99-233	199	0	9	0	22	.	.	.	.
HO11-508	HOCP13-749	735	19	78	1	48	.	.	.	.
HO12-628	HO13-705	425	1	19	0	22	.	.	.	.
HO11-508	L99-233	478	2	23	0	22	.	.	.	.
HO11-536	L99-233	428	4	40	1	55	.	.	.	.
HO14-913	L99-233	472	2	24	0	22	.	.	.	.
HOCP11-541	HO13-702	514	6	48	0	22	.	.	.	.

Table 6. Continue

			1 st Line		2 nd Line		Increases		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
HOCP11-565	HO13-702	431	0	9	0	22	.	.	.	.
HO10-937	HOCP05-918	266	2	32	2	81	.	.	.	.
HOCP11-545	HOCP05-918	549	9	58	1	51	.	.	.	.
HOCP12-676	HOCP14-892	388	0	9	0	22	.	.	.	.
HOCP00-950	HOCP11-536	273	3	46	1	62	.	.	.	.
HOCP04-814	HO07-613	688	17	75	5	80	.	.	.	.
HOCP12-643	HOCP13-767	709	4	28	1	48	.	.	.	.
HOCP12-654	HOCP13-767	478	3	30	1	53	.	.	.	.
HOCP14-892	HO14-9219	198	1	27	0	22	.	.	.	.
HO13-713	HOCP96-540	.	0	.	2	.	.	.	.	.
HO11-556	HOCP14-865	434	0	9	0	22	.	.	.	.
HOCP12-654	HOCP14-865	501	8	57	5	87	.	.	.	.
HO12-633	HOCP14-865	204	6	83	0	22	.	.	.	.
HOCP14-815	HOCP13-726	135	2	56	0	22	.	.	.	.
HOCP13-751	HOCP13-726	261	2	34	0	22	.	.	.	.
HO12-626	HO13-704	372	3	36	0	22	.	.	.	.
HO13-718	HO13-704	715	15	70	6	82	.	.	.	.
HOCP05-918	HOCP96-540	710	28	90	3	65	.	.	.	.
L05-457	HO11-556	902	12	52	1	46	.	.	.	.
L14-265	HOCP91-552	795	2	20	1	47	.	.	.	.
L05-457	HOCP91-552	615	31	94	3	70	.	.	.	.
L14-265	HOCP91-552	853	35	91	11	92	.	.	.	.
L14-275	HOCP91-552	191	0	9	0	22	.	.	.	.
L14-265	HOCP91-552	301	1	22	1	61	.	.	.	.
HO12-9401	HOCP91-552	158	0	9	0	22	.	.	.	.
L14-275	L07-057	748	6	34	5	78	.	.	.	.
L07-057	15P1	426	4	41	4	86	.	.	.	.
L09-099	15P1	1552	4	21	0	22	.	.	.	.
L99-233	15P1	396	3	33	0	22	.	.	.	.
L11-168	L09-099	490	27	94	12	98	.	.	.	.
HO09-9401	L09-099	189	11	96	0	22	.	.	.	.
L14-272	L09-099	217	1	25	0	22	.	.	.	.
HO12-9410	L09-099	162	0	9	0	22	.	.	.	.
L14-272	L99-233	203	4	68	1	71	.	.	.	.
L07-057	L01-299	365	4	46	0	22	.	.	.	.
L14-275	HOCP04-838	293	0	9	0	22	.	.	.	.
L99-233	L01-299	168	5	84	1	74	.	.	.	.
L13-251	L13-234	157	0	9	0	22	.	.	.	.
L01-299	L99-233	169	5	84	0	22	.	.	.	.
L09-123	L99-233	381	0	9	0	22	.	.	.	.

Table 6. Continue

			1 st Line		2 nd Line		Increases		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
L98-207	HOCP04-838	241	4	58	0	22	.	.	.	.
L13-234	HOCP04-838	357	5	53	3	82	.	.	.	.
HO12-9410	HOCP96-540	286	8	82	5	96	.	.	.	.
L11-178	HOCP91-552	175	0	9	0	22	.	.	.	.
L01-315	LCP85-384	191	0	9	0	22	.	.	.	.
HO12-9410	L08-090	190	0	9	0	22	.	.	.	.
HOCP92-624	L01-299	605	9	56	4	77	.	.	.	.
L14-275	L06-038	142	0	9	0	22	.	.	.	.
L11-178	L14-291	119	1	36	0	22	.	.	.	.
L11-178	L09-099	352	5	53	1	56	.	.	.	.
L13-251	L09-099	703	10	54	8	91	.	.	.	.
L07-057	15P2	121	0	9	0	22	.	.	.	.
L11-178	15P2	216	1	25	0	22	.	.	.	.
HOCP95-951	LCP85-384	158	0	9	0	22	.	.	.	.
L99-233	L01-299	385	7	63	2	72	.	.	.	.
L13-241	L11-172	330	3	39	1	56	.	.	.	.
L13-243	15P3	158	0	9	0	22	.	.	.	.
L14-268	15P3	137	2	55	0	22	.	.	.	.
L09-099	15P3	108	0	9	0	22	.	.	.	.
HO11-556	15P3	594	26	93	4	79	.	.	.	.
L11-172	15P4	571	7	49	2	62	.	.	.	.
L11-187	15P4	197	5	77	2	88	.	.	.	.
N27	L99-226	720	12	59	0	22	.	.	.	.
HOCP92-624	L99-226	254	3	48	0	22	.	.	.	.
L13-234	15P5	281	17	96	4	93	.	.	.	.
L99-233	L01-299	143	6	92	1	79	.	.	.	.
L01-283	L99-226	377	5	51	1	55	.	.	.	.
L05-457	L99-226	1453	35	74	7	69	.	.	.	.
HO08-709	L99-226	1147	24	69	18	94	.	.	.	.
L11-168	L99-226	226	1	24	1	66	.	.	.	.
L14-282	HO11-532	249	9	89	4	95	.	.	.	.
L14-285	HO11-532	226	5	74	1	66	.	.	.	.
L12-202	L08-090	127	0	9	0	22	.	.	.	.
L14-282	HOCP97-609	223	10	93	9	99	.	.	.	.
L14-276	HOCP97-609	153	3	67	2	93	.	.	.	.
N27	L99-226	1067	20	65	7	77	.	.	.	.
L13-246	L99-226	235	8	87	2	83	.	.	.	.
L05-457	15P6	1830	11	29	2	45	.	.	.	.
HOCP85-845	15P6	631	9	55	2	59	.	.	.	.
HOCP95-951	15P6	230	5	73	0	22	.	.	.	.

Table 6. Continue

			1 st Line		2 nd Line		Increases		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
HOCP96-540	15P6	958	1	18	1	44	.	.	.	.
L05-457	L99-226	342	7	68	0	22	.	.	.	.
HO06-530	L99-226	671	2	22	0	22	.	.	.	.
L98-209	L99-226	1904	25	51	12	76	.	.	.	.
L01-283	L99-233	1117	13	47	2	51	.	.	.	.
HO06-530	L99-233	222	4	62	0	22	.	.	.	.
L13-246	L06-038	992	21	71	6	75	.	.	.	.
L14-282	L06-038	222	8	88	2	85	.	.	.	.
L14-286	HOCP97-609	431	1	18	0	22	.	.	.	.
HOCP00-950	L06-001	413	1	20	0	22	.	.	.	.
HO08-709	HO06-563	594	5	37	3	72	.	.	.	.
L05-457	L99-226	1035	9	37	5	70	.	.	.	.
L06-040	L99-226	184	0	9	0	22	.	.	.	.
L01-283	L08-090	238	5	70	1	64	.	.	.	.
HO08-709	L08-090	521	5	42	1	52	.	.	.	.
L05-457	L99-233	189	2	44	0	22	.	.	.	.
L15-302	HOCP04-838	250	22	99	4	94	.	.	.	.
HOCP92-624	L01-283	1163	6	27	1	44	.	.	.	.
HO08-717	L99-226	132	1	33	0	22	.	.	.	.
HOCP97-609	L99-226	140	0	9	0	22	.	.	.	.
L15-298	L99-226	345	22	97	0	22	.	.	.	.
L15-298	L99-233	619	17	81	2	60	.	.	.	.
L12-218	L06-001	1939	63	86	35	96	.	.	.	.
HO07-613	L06-001	998	25	76	8	81	.	.	.	.
N27	L06-001	3221	80	75	10	58	.	.	.	.
L06-040	L06-001	360	10	81	2	73	.	.	.	.
L99-233	HOCP96-540	1405	26	64	12	84	.	.	.	.
L15-302	HOCP96-540	429	0	9	0	22	.	.	.	.
L14-286	HOCP96-540	796	17	72	5	75	.	.	.	.
L15-302	LCP81-010	235	4	60	0	22	.	.	.	.
HO12-641	L14-268	167	3	62	0	22	.	.	.	.
L14-269	HOCP04-838	383	10	79	4	89	.	.	.	.
HO09-840	HOCP96-561	229	3	50	1	65	.	.	.	.
L06-040	L06-001	1011	33	86	12	91	.	.	.	.
L15-302	LCP81-010	451	12	79	2	67	.	.	.	.
L14-269	HOCP96-540	235	20	98	2	83	.	.	.	.
L11-183	L99-226	175	0	9	0	22	.	.	.	.
HO11-515	L99-226	178	3	60	1	74	.	.	.	.
HOCP96-561	L99-226	955	9	41	2	54	.	.	.	.
L98-209	L14-294	807	4	26	1	46	.	.	.	.

Table 6. Continue

			1 st Line		2 nd Line		Increases		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
L14-269	L09-099	692	39	95	18	98	.	.	.	.
L14-286	HOCP96-540	388	5	50	0	22	.	.	.	.
HOCP00-950	L01-283	212	4	66	0	22	.	.	.	.
HOCP11-516	L01-283	437	11	77	2	68	.	.	.	.
L94-433	L01-283	180	15	98	2	90	.	.	.	.
L15-298	L99-226	533	10	65	2	63	.	.	.	.
HOCP01-517	L99-226	938	37	91	9	86	.	.	.	.
N27	L01-299	248	8	85	1	63	.	.	.	.
L14-286	L99-233	773	7	39	0	22	.	.	.	.
L94-433	L99-233	1400	41	82	15	89	.	.	.	.
L01-283	L99-226	173	0	9	0	22	.	.	.	.
HOCP92-624	L99-226	672	13	67	1	50	.	.	.	.
HOCP85-845	HOCP04-838	223	0	9	0	22	.	.	.	.
LCP81-010	HOCP96-540	704	7	43	1	49	.	.	.	.
L94-433	L99-226	568	6	44	1	50	.	.	.	.
HO07-613	L99-226	910	6	31	3	60	.	.	.	.
L14-282	LCP85-384	134	0	9	0	22	.	.	.	.
2014 Crossing Series										
HOCP09-804	HOCP96-540	458	0	15	0	23	0	27	.	.
HOCP01-517	HOCP96-540	134	8	92	1	66	0	27	.	.
L08-90	HOCP96-540	186	19	98	2	73	0	27	.	.
L03-371	HOCP04-852	147	0	15	0	23	0	27	.	.
HOCP01-517	HOCP05-918	410	0	15	0	23	0	27	.	.
L03-371	HOCP05-918	165	0	15	0	23	0	27	.	.
L11-183	L99-226	207	0	15	0	23	0	27	.	.
HO11-512	HOCP05-920	227	0	15	0	23	0	27	.	.
HO05-961	HOCP09-814	198	0	15	0	23	0	27	.	.
HOCP05-920	HO05-961	133	0	15	0	23	0	27	.	.
L09-112	HO05-961	374	0	15	0	23	0	27	.	.
L09-112	HO07-613	171	0	15	0	23	0	27	.	.
HO11-512	HOCP09-814	186	0	15	0	23	0	27	.	.
L10-156	HO06-530	103	0	15	0	23	0	27	.	.
L10-156	HO07-613	182	0	15	0	23	0	27	.	.
LCP85-384	L10-141	162	0	15	0	23	0	27	.	.
HO11-511	HO07-613	348	0	15	0	23	0	27	.	.
HO11-512	HO07-613	138	0	15	0	23	0	27	.	.
HO07-613	HOCP09-814	287	0	15	0	23	0	27	.	.
HO07-613	HOCP09-814	203	0	15	0	23	0	27	.	.
HO10-925	HO09-832	.	0	.	1	.	1	.	.	.

Table 6. Continue

			1 st Line		2 nd Line		Increases		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
HO09-840	HOCP11-542	136	6	81	2	82	1	77	.	.
HO09-840	HOCP11-504	105	0	15	0	23	0	27	.	.
L11-191	HOCP11-504	141	2	43	1	65	1	75	.	.
HO10-908	L09-099	218	12	89	3	80	3	93	.	.
HOCP11-504	L09-099	172	4	56	0	23	0	27	.	.
HO08-717	L09-099	210	0	15	0	23	0	27	.	.
L09-099	14P18	112	2	48	2	89	1	86	.	.
L11-191	14P18	134	6	82	2	83	1	78	.	.
HOCP09-804	HO11-556	202	0	15	0	23	0	27	.	.
HO11-563	HO10-937	121	0	15	0	23	0	27	.	.
L09-099	HOCP09-804	111	0	15	0	23	0	27	.	.
L10-156	HOCP09-804	193	0	15	0	23	0	27	.	.
L11-191	HOCP12-666	199	0	15	0	23	0	27	.	.
L08-90	HOCP11-504	245	0	15	0	23	0	27	.	.
L09-099	HOCP11-504	118	6	87	5	97	3	96	.	.
HO11-556	HOCP04-838	132	5	73	4	95	3	95	.	.
L08-90	HOCP04-838	228	0	15	0	23	0	27	.	.
HO11-556	HO11-529	235	0	15	0	23	0	27	.	.
HO11-556	HO10-937	143	0	15	0	23	0	27	.	.
L12-201	HO10-937	181	0	15	0	23	0	27	.	.
L12-202	HO10-937	249	0	15	0	23	0	27	.	.
HOCP01-517	HOCP04-838	222	0	15	0	23	0	27	.	.
L08-90	HOCP04-838	467	1	30	0	23	0	27	.	.
L09-112	HOCP04-838	256	13	87	4	84	2	80	.	.
L12-201	HO11-529	271	2	33	0	23	0	27	.	.
L01-299	HO11-529	257	3	39	2	67	1	66	.	.
L09-112	HO11-529	105	0	15	0	23	0	27	.	.
HOCP03-743	HO11-529	243	0	15	0	23	0	27	.	.
L01-299	L09-112	451	11	58	5	74	2	69	.	.
L12-202	L09-112	239	16	93	11	98	8	98	.	.
HO11-556	HOCP01-517	125	5	77	2	87	1	81	.	.
L12-201	HOCP01-517	127	2	45	2	85	2	94	.	.
L01-299	HOCP01-517	243	1	32	0	23	0	27	.	.
L11-183	HOCP10-917	154	0	15	0	23	0	27	.	.
L11-183	HO11-532	340	7	53	2	63	1	65	.	.
HO08-730	L11-172	388	4	36	1	53	1	63	.	.
HO08-730	HOCP10-917	257	3	39	1	58	1	66	.	.
L09-112	L09-112	264	18	94	10	96	3	90	.	.
L12-201	HO11-532	248	0	15	0	23	0	27	.	.
L11-172	L11-187	133	4	65	4	94	4	98	.	.

Table 6. Continue

			1 st Line		2 nd Line		Increases		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
HO10-937	HO11-556	.	0	.	2	.	0	.	.	.
L12-202	HO10-937	.	0	.	2	.	0	.	.	.
HO11-556	HO11-529	.	0	.	2	.	0	.	.	.
L08-090	HOCP04-838	.	0	.	1	.	0	.	.	.
HOCP03-743	HO11-529	.	0	.	1	.	1	.	.	.
HOCP08-726	HOCP10-900	262	3	38	0	23	0	27	.	.
HOCP08-726	L99-226	232	1	33	0	23	0	27	.	.
HOCP12-674	L99-226	107	0	15	0	23	0	27	.	.
HO12-621	LCP85-384	341	13	74	6	88	4	91	.	.
LCP85-384	HO11-528	117	0	15	0	23	0	27	.	.
HO11-573	HOCP96-540	242	11	83	0	23	0	27	.	.
L11-187	HOCP96-540	244	0	15	0	23	0	27	.	.
HO11-528	HOCP01-517	246	14	90	11	97	7	97	.	.
HO11-531	HOCP96-540	131	5	74	1	67	1	79	.	.
HO05-961	HOCP01-517	85	0	15	0	23	0	27	.	.
		.	0	.	5	.	4	.	.	.
		.	0	.	4	.	1	.	.	.
HOCP92-624	L99-233	359	4	36	0	23	0	27	.	.
HOCP92-624	L04-425	509	18	70	8	85	3	71	.	.
L05-457	L99-233	375	22	91	9	91	3	81	.	.
L05-457	L04-425	259	7	63	3	77	1	66	.	.
HOCP92-624	L99-233	138	0	15	0	23	0	27	.	.
LCP81-010	L99-233	381	15	76	4	72	3	80	.	.
LCP81-010	LCP85-384	767	10	42	2	54	1	56	.	.
LCP85-384	HOCP00-950	187	5	62	0	23	0	27	.	.
L01-315	10P12	466	2	32	0	23	0	27	.	.
HOCP91-552	10P12	666	5	34	1	49	0	27	.	.
HOCP91-552	10P13	127	3	57	0	23	0	27	.	.
HOCP96-540	10P22	706	9	41	1	48	0	27	.	.
HO06-530	10P26	419	6	44	1	52	0	27	.	.
HOCP96-540	10P27	244	12	85	0	23	0	27	.	.
L94-432	10P31	112	0	15	0	23	0	27	.	.
L09-118	10P31	458	23	86	12	93	5	90	.	.
HOCP92-624	HOCP04-838	133	0	15	0	23	0	27	.	.
HOCP91-552	L99-233	135	0	15	0	23	0	27	.	.
N27	L99-233	1636	29	47	5	55	3	60	.	.
N27	L99-233	369	0	15	0	23	0	27	.	.
L01-315	11P7	172	0	15	0	23	0	27	.	.
L94-428	11P11	708	8	37	3	60	1	57	.	.
LCP85-384	11P15	1103	27	59	4	57	2	60	.	.

Table 6. Continue

			1 st Line		2 nd Line		Increases		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
L09-112	HOCP96-540	235	0	15	0	23	0	27	.	.
HO09-827	HOCP01-523	154	2	41	0	23	0	27	.	.
LCP85-384	11P22	704	10	44	1	48	1	57	.	.
HOCP00-930	11P24	1224	52	79	17	81	8	73	.	.
L09-121	11P24	1012	12	40	3	55	2	61	.	.
L09-121	11P25	1135	4	31	2	50	2	59	.	.
LCP81-010	11P25	919	22	58	3	56	2	61	.	.
LCP81-010	L09-125	2063	78	73	2	46	1	54	.	.
HOCP96-540	11P27	557	11	51	0	23	0	27	.	.
HOL08-723	11P27	882	36	77	14	86	6	74	.	.
L94-433	11P27	241	0	15	0	23	0	27	.	.
HOCP96-540	11P30	602	0	15	0	23	0	27	.	.
LCP85-384	11P30	685	23	69	2	54	2	64	.	.
HO09-840	L08-090	375	8	55	0	23	0	27	.	.
N27	L99-233	252	3	40	0	23	0	27	.	.
N27	L99-233	691	2	30	0	23	0	27	.	.
L11-174	L99-226	134	6	82	1	66	1	78	.	.
HOCP91-552	12P11	618	0	15	0	23	0	27	.	.
L10-148	12P17	186	0	15	0	23	0	27	.	.
HOCP91-552	L99-233	169	3	48	0	23	0	27	.	.
L05-448	13P10	170	0	15	0	23	0	27	.	.
HOCP92-624	HOCP92-618	112	11	97	0	23	0	27	.	.
HOCP95-951	HOCP92-618	184	6	68	1	62	1	70	.	.
L13-239	L07-057	443	4	35	0	23	0	27	.	.
HO09-9401	L99-233	171	5	64	1	63	0	27	.	.
L07-057	L99-233	374	40	98	3	68	3	82	.	.
HO09-9401	HOCP04-838	464	8	46	1	50	0	27	.	.
L12-232	HOCP04-838	370	12	68	4	74	3	82	.	.
HO09-9402	L11-191	618	22	71	11	89	6	88	.	.
HOCP04-838	L07-057	178	2	37	0	23	0	27	.	.
L05-457	HOCP11-504	1376	53	75	16	78	4	64	.	.
L05-457	L99-233	1806	37	52	6	56	1	54	.	.
HOCP92-624	HOCP91-552	227	7	66	0	23	0	27	.	.
HO09-9401	HOCP91-552	441	24	89	5	76	3	74	.	.
L13-234	L98-209	460	8	47	1	51	0	27	.	.
HOCP92-624	L07-057	896	20	55	2	51	1	55	.	.
L09-123	L05-448	1230	25	52	3	53	1	55	.	.
HOCP92-624	L99-233	1338	56	78	15	75	6	69	.	.
L09-123	HOCP11-548	434	8	49	3	65	3	75	.	.
L05-448	HOCP11-548	368	25	93	12	95	10	96	.	.

Table 6. Continue

			1 st Line		2 nd Line		Increases		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
L05-457	L99-226	447	7	45	1	52	1	62	.	.
HOCP95-951	L01-299	242	12	86	1	59	1	68	.	.
L09-123	HOCP04-838	1057	37	70	12	77	8	78	.	.
HOCP97-609	HO06-563	392	9	56	0	23	0	27	.	.
L13-239	HO11-532	199	6	65	1	62	1	70	.	.
HOCP91-552	L199-226	224	11	85	6	93	5	95	.	.
HO06-563	L199-226	162	0	15	0	23	0	27	.	.
L99-233	L01-299	199	0	15	0	23	0	27	.	.
N27	L99-226	214	5	57	2	72	2	87	.	.
L05-457	L99-226	415	22	88	6	81	3	76	.	.
L13-251	HOCP92-624	172	16	96	13	99	5	97	.	.
L09-123	HOCP96-540	591	44	95	13	91	6	88	.	.
L11-172	HOCP96-540	687	6	34	3	61	1	58	.	.
HO10-937	L06-001	375	20	88	6	87	4	89	.	.
HO11-532	L11-172	349	15	80	3	71	3	85	.	.
L13-241	LCP85-384	964	44	83	9	71	3	65	.	.
L05-457	L09-099	437	30	94	2	61	1	62	.	.
L11-183	L13-261	236	5	54	0	23	0	27	.	.
HOCP02-618	L99-233	476	40	96	12	92	7	93	.	.
L05-457	L99-226	477	16	69	3	64	3	71	.	.
L12-197	L99-226	438	18	78	7	86	3	74	.	.
HO10-937	HOCP96-540	178	7	75	2	76	0	27	.	.
HOCP92-624	L13-248	183	30	99	12	98	7	99	.	.
L13-261	14P2	1249	5	31	2	49	2	58	.	.
LCP85-384	14P2	664	29	80	10	83	8	91	.	.
HO12-9411	14P2	247	8	67	0	23	0	27	.	.
HOCP01-517	L06-001	212	3	43	0	23	0	27	.	.
HOCP01-517	L01-299	961	18	50	1	47	0	27	.	.
L13-239	L01-299	230	13	90	1	60	0	27	.	.
L13-237	L01-299	244	4	46	0	23	0	27	.	.
L01-283	L99-226	254	0	15	0	23	0	27	.	.
L12-218	L99-226	228	7	66	0	23	0	27	.	.
L12-197	L99-226	243	14	91	0	23	0	27	.	.
L98-209	HO11-556	190	0	15	0	23	0	27	.	.
L09-099	HOCP04-838	474	17	72	4	70	3	72	.	.
HOCP91-552	14P3	217	3	42	0	23	0	27	.	.
HOCP92-624	LCP85-384	1789	84	84	15	69	7	67	.	.
L01-283	HO12-615	222	6	63	4	90	2	86	.	.
HO08-709	L99-226	242	6	60	2	68	2	83	.	.
HO12-512	L81-010	479	19	76	6	78	4	84	.	.

Table 6. Continue

			1 st Line		2 nd Line		Increases		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
HOCP96-561	HO09-832	235	5	54	2	70	0	27	.	.
HOCP95-951	HOCP96-540	224	4	48	3	80	3	92	.	.
L13-246	HOCP92-624	140	0	15	0	23	0	27	.	.
L01-299	L99-226	232	11	84	7	94	3	92	.	.
L98-207	L99-226	875	8	35	1	47	1	56	.	.
HOCP92-618	HOCP04-838	239	5	53	3	79	2	84	.	.
L01-299	L06-001	146	9	92	1	64	0	27	.	.
LCP85-384	L06-001	204	5	60	3	82	0	27	.	.
HOCP00-950	HOCP96-540	237	0	15	0	23	0	27	.	.
HOCP00-950	L06-001	228	23	97	8	96	4	94	.	.
HOCP85-845	L06-001	1500	56	72	27	90	16	89	.	.
HOCP92-624	L06-001	1535	55	71	24	84	11	76	.	.
HO07-613	L06-001	476	15	67	5	73	3	72	.	.
HO09-840	L06-001	1078	48	81	12	75	10	87	.	.
HO10-937	L06-001	479	9	51	4	69	2	68	.	.
HOCP92-624	HOCP96-540	1631	48	64	6	57	4	63	.	.
HOCP11-516	14P4	241	19	95	4	88	2	83	.	.
L13-246	HO12-9411	242	6	60	1	59	0	27	.	.
L94-433	HOCP04-838	162	3	50	0	23	0	27	.	.
L13-254	HOCP96-540	116	3	62	3	92	1	85	.	.
L94-433	HOCP96-540	241	6	61	0	23	0	27	.	.
2013 Crossing Series										
HO09-824	POLY12-26	106	0	9	0	14	0	22	0	39
HO08-730	HOCP04-852	206	5	56	1	51	0	22	0	39
HO08-709	CP06-2897	109	5	82	0	14	0	22	0	39
HOCP09-846	HOCP09-814	220	0	9	0	14	0	22	0	39
HOCP09-808	CP95-1039	234	7	67	1	44	0	22	0	39
HO089-711	CP03-2390	223	2	32	1	47	0	22	0	39
HOCP09-814	POLY12-30	109	3	65	1	66	0	22	0	39
HOCP92-624	HOCP91-552	1078	75	93	7	56	1	46	0	39
L05-457	HOCP91-552	145	12	95	2	77	0	22	0	39
HOCP92-624	L98-207	689	6	31	2	40	0	22	0	39
LCP81-010	L99-226	242	6	58	2	63	2	81	0	39
HOCP92-624	L01-299	634	25	76	3	49	1	50	0	39
L05-457	L01-299	458	22	84	4	64	4	82	0	39
L05-457	L99-226	346	11	70	5	78	4	89	1	92
HO06-563	HOCP96-540	217	10	83	2	66	2	83	1	93
LCP81-010	L06-001	916	11	38	6	56	0	22	0	39
N27	L94-428	238	6	59	0	14	0	22	0	39

Table 6. Continue

			1 st Line		2 nd Line		Increases		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
LCP81-010	L99-226	1674	0	9	0	14	0	22	0	39
L05-448	L06-001	384	18	84	10	94	3	79	0	39
HOCP02-610	L06-001	233	10	81	1	45	1	71	0	39
HO06-563	L06-001	386	23	92	3	61	1	58	1	89
HOCP02-610	HOCP01-523	1137	46	78	9	61	3	59	0	39
HO06-563	L99-226	208	10	85	0	14	0	22	0	39
LCP86-454	L06-001	632	27	80	12	89	5	80	2	92
HOCP92-624	L06-001	204	10	87	5	93	4	94	2	97
HOCP02-610	L94-428	390	8	51	0	14	0	22	0	39
HOCP02-610	L94-432	620	7	36	5	62	1	51	0	39
N27	L94-432	1848	41	53	8	46	3	51	0	39
HOCP00-930	US01-040	234	0	9	0	14	0	22	0	39
HOCP02-610	HO06-562	1136	35	68	11	67	4	64	2	86
HOCP02-623	HO06-562	441	7	46	4	65	1	56	1	87
HOCP05-902	L01-299	199	0	9	0	14	0	22	0	39
HOCP05-918	L01-299	648	6	33	4	54	3	73	0	39
HOCP04-838	HOCP92-618	871	12	43	2	35	0	22	0	39
HOCP02-623	HOCP01-517	162	2	39	1	54	1	76	1	97
L05-457	HOCP01-517	429	6	44	1	35	1	56	0	39
HOCP04-838	L08-089	413	0	9	0	14	0	22	0	39
L01-315	L01-283	477	1	20	1	31	0	22	0	39
HOCP92-624	HOCP01-517	1013	23	53	3	41	0	22	0	39
L05-457	HOCP01-517	1662	3	19	1	29	0	22	0	39
L98-207	HOCP01-517	668	9	41	5	59	4	75	1	83
HOCP92-624	L99-226	823	14	48	1	30	1	48	0	39
HOCP92-624	HOCP06-523	1237	13	34	6	51	4	63	2	85
L05-457	HOCP06-523	946	7	26	2	33	1	46	0	39
L01-283	HOCP06-523	394	5	41	1	38	1	57	0	39
LCP81-010	HOCP05-918	630	24	74	7	71	2	62	0	39
LCP81-010	L06-038	1527	70	82	36	92	16	87	1	79
L01-315	HO06-523	694	5	25	1	30	0	22	0	39
HOCP05-902	LCP86-454	142	3	51	0	14	0	22	0	39
HOCP02-610	L06-038	703	16	54	8	71	5	77	0	39
L01-315	L06-038	432	2	24	0	14	0	22	0	39
L05-448	L06-038	542	22	79	7	74	2	66	0	39
HO06-537	HOCP02-610	222	0	9	0	14	0	22	0	39
L94-432	L08-076	1277	35	64	13	69	10	79	0	39
HO05-961	HOCP96-540	436	10	55	6	76	2	72	1	88
CP83-644	HOCP01-517	2094	13	25	5	36	3	48	0	39
LCP81-010	HO06-523	1056	51	86	22	90	16	92	3	91

Table 6. Continue

			1 st Line		2 nd Line		Increases		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
CP83-644	HO06-562	457	1	21	1	33	1	53	0	39
HOCP96-561	L94-426	646	14	52	5	60	2	61	1	84
L05-448	LCP85-384	833	7	30	4	50	3	65	0	39
CP83-644	LCP85-384	842	23	64	13	83	8	84	2	89
HOCP96-561	LCP85-384	453	5	35	1	34	1	54	0	39
US01-040	HOCP97-609	468	12	62	7	82	5	88	0	39
LCP81-010	HOCP02-618	1488	46	69	17	72	4	60	0	39
L99-233	L99-226	590	0	9	0	14	0	22	0	39
CP83-644	L08-093	1422	51	74	15	69	6	70	1	80
HOCP92-624	L09-106	206	8	75	3	79	2	85	0	39
HOCP92-624	L99-233	864	29	71	23	95	10	90	1	82
LCP81-010	HO08-706	581	20	72	9	84	2	64	0	39
HOCP92-624	HO08-706	476	12	59	1	32	0	22	0	39
HOCP04-838	L06-001	221	0	9	0	14	0	22	0	39
N27	L06-001	811	43	90	6	58	3	66	0	39
L99-226	L06-038	401	3	27	0	14	0	22	0	39
N27	L99-226	494	35	94	2	42	0	22	0	39
N27	L94-426	696	29	79	11	85	7	87	0	39
N27	HOCP96-540	732	29	76	10	76	7	84	0	39
HOCP91-552	HOCP02-623	485	4	28	2	43	1	52	0	39
LCP81-010	HO07-613	469	12	61	10	91	1	53	1	87
LCP81-010	HO08-706	408	8	49	1	37	0	22	0	39
L01-283	10P29	462	23	87	6	74	4	82	0	39
L07-057	HOCP91-552	226	1	23	1	46	0	22	0	39
L08-090	11P2	625	2	22	0	14	0	22	0	39
HOCP91-552	HOCP04-838	379	4	35	2	53	1	59	1	90
LCP81-010	L10-132	166	15	97	8	98	5	97	1	96
L01-315	HOCP95-951	265	0	9	0	14	0	22	0	39
HOCP91-552	11P5	442	6	42	3	57	1	55	0	39
LCP81-010	L99-226	133	13	98	2	82	2	92	0	39
HOCP95-951	L01-299	116	0	9	0	14	0	22	0	39
HOCP00-930	L99-226	220	6	63	3	75	3	91	0	39
N27	L10-157	696	42	92	2	39	1	49	0	39
LCP81-010	L09-125	776	19	57	4	52	3	67	1	82
N27	L06-001	343	26	94	5	79	1	61	0	39
HOCP95-951	L09-099	105	0	9	0	14	0	22	0	39
HOCP91-552	12P11	1054	0	9	0	14	0	22	0	39
HOCP91-552	12P12	118	0	9	0	14	0	22	0	39
N27	L05-448	238	6	59	1	43	0	22	0	39
CP83-644	L06-001	220	1	23	1	48	0	22	0	39

Table 6. Continue

			1 st Line		2 nd Line		Increases		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
L11-182	12P16	238	7	66	3	73	1	69	0	39
HOCP92-624	L07-057	2883	67	56	31	70	13	71	0	39
L10-138	L07-057	126	0	9	0	14	0	22	0	39
HOCP92-624	HO11-556	432	6	43	0	14	0	22	0	39
L99-233	HOCP04-838	152	0	9	0	14	0	22	0	39
HO91-552	HOCP04-838	1138	18	46	3	38	1	45	0	39
HOCP91-552	L99-233	918	2	20	0	14	0	22	0	39
HO09-840	HOCP04-838	241	7	66	4	87	1	69	0	39
L12-205	HOCP04-838	118	0	9	0	14	0	22	0	39
HOCP11-544	13P3	185	10	91	5	96	2	89	1	95
HOCP92-624	13P3	454	18	77	4	64	3	76	0	39
LCP81-010	13P5	205	7	71	2	68	1	74	0	39
HOCP85-845	L99-226	157	4	61	3	89	3	94	0	39
HOCP91-552	L99-226	164	2	38	0	14	0	22	0	39
HOCP01-517	L99-226	205	4	48	3	80	2	86	1	94
HOCP01-517	HOCP96-540	227	8	73	7	97	6	97	0	39
HOCP95-951	L11-172	247	2	28	1	42	0	22	0	39
HOCP91-552	13P10	185	0	9	0	14	0	22	0	39
HO10-937	13P10	172	9	89	8	97	6	99	3	99
L09-123	HOCP91-552	106	9	96	2	88	0	22	0	39
HOCP96-540	L99-233	1908	22	37	13	58	9	74	3	84
HOCP96-540	LCP81-010	354	0	9	0	14	0	22	0	39
L07-057	13P12	238	12	88	6	94	6	96	0	39
US01-040	13P12	233	0	9	0	14	0	22	0	39
HOCP01-552	L01-299	361	3	29	0	14	0	22	0	39
HOCP92-624	L01-299	110	1	33	0	14	0	22	0	39
L12-197	L01-299	245	4	47	4	87	1	68	0	39
L12-197	L08-090	204	22	99	15	99	7	98	1	94
HOCP96-540	13P12	249	5	50	4	86	4	93	3	98
HOCP01-517	13P12	886	28	69	4	48	1	47	1	81
HOCP91-552	L08-090	131	0	9	0	14	0	22	0	39
L06-040	L99-226	116	0	9	0	14	0	22	0	39
HOCP96-540	L99-226	475	0	9	0	14	0	22	0	39
HOCP85-845	L99-233	162	2	39	1	54	0	22	0	39
HOCP96-540	LCP85-384	184	0	9	0	14	0	22	0	39
L99-226	L01-299	246	13	89	6	92	5	95	0	39
HOCP91-552	L01-299	158	0	9	0	14	0	22	0	39
HOCP92-624	13P19	127	12	97	2	84	0	22	0	39
HOCP92-624	13P20	134	2	45	2	81	1	78	0	39
HO07-613	13P21	234	0	9	0	14	0	22	0	39

Table 6. Continue

			1 st Line		2 nd Line		Increases		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
MISC	MISC	230	2	30	0	14	0	22	0	39

2018 LOUISIANA SUGARCANE VARIETY DEVELOPMENT PROGRAM NURSERY AND INFIELD VARIETY TRIALS

Michael J. Pontif[1], Collins Kimbeng[1],
Gert Hawkins[1], David Sexton[1], Mavis Daigle[1], Alphonse Coco[1], and Sonny Viator[2]
[1]Sugar Research Station and [2]Iberia Research Station

Edwis Dufrene, Michael J. Duet, and Francis J. Adams
USDA-ARS Sugarcane Research Unit

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), and Circle A Farms (Maurice). 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-long 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, HoCP04-838, HoCP09-804 and L11-183 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 industry received higher than normal rainfall amounts throughout the 2018 season. Baton Rouge recorded 65.39" of rainfall in 2018, which is about 5 inches above normal. Spring temperatures were cooler than average, and the crop was short throughout the summer. Planting was delayed for most growers by 7 – 10 days. Warmer than average temperatures in September and October improved the crop tremendously. The Louisiana industry was spared of any tropical activity during the 2018 season. All mills in the Louisiana industry completed grinding by January 19, 2019. Recommended cultural practices were followed at all test locations. The most widely grown varieties in Louisiana in 2018 were L01-299 and HoCP96-540 and, occupying 51% and 20% 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. 2018 Location, soil texture, and planting and harvest dates for the nursery and infield tests.

					Harvest Date	Varieties	
Series	Location†	Stage	Soil Texture	Planting Date	2018	No. Planted	No. Harvested
2013	Blackberry Farms	Infield	Commerce silt loam	08/26/14	10/3/18	34	2
2013	Landry Farms	Nursery	Sharkey silty clay loam	08/19/14	10/7/18	67	2
2014	Sugar Research Station	Nursery	Commerce silt loam	10/27/14	11/7/18	33	1
2014	Ardoyne Farm – U.S.D.A	Nursery	Commerce silt loam	10/30/14	12/6/18	33	1
2014	Iberia Research Station	Nursery	Baldwin silty clay	10/28/14	11/6/18	33	1
2014	Blackberry Farms	Infield	Commerce silt loam	08/25/15	10/3/18	36	4
2014	Newton Cane, Inc.	Nursery	Norwood silt loam	08/11/15	9/24/18	77	3
2014	Michael Melancon	Nursery	Loreauville silt loam	09/01/15	11/14/18	77	3
2014	Landry Farms	Nursery	Sharkey silty clay loam	08/28/15	10/7/18	77	3
2015	Sugar Research Station	Nursery	Commerce silt loam	10/12/15	11/7/18	38	2
2015	Ardoyne Farm – U.S.D.A.	Nursery	Commerce silt loam	10/22/15	12/6/18	38	2
2015	Iberia Research Station	Nursery	Baldwin silty clay	10/15/15	11/6/18	38	2
2015	Blackberry Farms	Infield	Commerce silt loam	09/21/16	10/3/18	37	4
2015	Sugar Research Station	Infield	Commerce Silty Clay loam	09/30/16	12/13/18	37	4
2015	Newton Cane, Inc.	Nursery	Norwood silt loam	09/12/16	11/27/18	75	10
2015	Michael Melancon	Nursery	Loreauville silt loam	09/23/16	11/14/18	75	10
2015	Landry Farms	Nursery	Sharkey silty clay loam	08/25/16	11/29/18	75	10
2016	Sugar Research Station	Nursery	Commerce silt loam	11/07/16	11/13/18	34	6
2016	Ardoyne Farm – U.S.D.A.	Nursery	Commerce silt loam	11/14/16	12/6/18	34	6
2016	Iberia Research Station	Nursery	Baldwin silty clay	11/09/16	11/6/18	33	6
2016	Blackberry Farms	Infield	Commerce silt loam	09/06/17	12/5/18	47	14
2016	Circle A Farm	Infield	Coteau-Patoutville-Frost silt loam	08/24/17	11/28/18	47	14
2016	Newton Cane, Inc.	Nursery	Norwood silt loam	08/16/17	11/27/18	64	23
2016	Michael Melancon	Nursery	Loreauville silt loam	08/18/17	11/14/18	64	23
2016	Landry Farms	Nursery	Sharkey silty clay loam	09/08/17	11/29/18	64	23
2017	Sugar Research Station	Nursery	Commerce silt loam	11/18/17	Did Not Harvest	42	Did Not Harvest
2017	Ardoyne Farm – U.S.D.A	Nursery	Commerce silt loam	11/13/17	12/6/18	42	22
2017	Iberia Research Station	Nursery	Baldwin silty clay	11/7/17	11/21/18	42	22
2017	Blackberry Farms	Infield	Commerce silt loam	09/17/18		39	
2017	Circle A Farm	Infield	Coteau-Patoutville-Frost silt loam	08/15/18		39	
2017	Newton Cane, Inc	Nursery	Norwood silt loam	08/16/18		60	
2017	Michael Melancon	Nursery	Loreauville silt loam	09/18/18		60	
2017	Landry Farms	Nursery	Sharkey silty clay loam	09/19/18		60	
2018	Sugar Research Station	Nursery	Commerce silt loam	11/16/18		28	
2018	Iberia Research Station	Nursery	Baldwin silty clay	11/19/18		28	

† 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), Landry Farms (Paincourtville), and Circle A Farm (Maurice).

Table 2. Off-station nursery third-stubble means of the 2013 “Ho” and “HoCP” assignment series on a Commerce silt loam soil at Landry Farms in Paincourtville, Louisiana in 2018.

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	5818	26.7	216	1.86	28133 -	10.7-
L01-283	7621	36.0	213	1.65	43923	11.1
L01-299	7814	38.2	207	1.51	50457	12.0
HoCP04-838	5365	26.7	199	1.54	35030	12.0
Ho13-739	7645	37.0	207	1.79	41745	11.1
HoCP13-758	6784	33.7	198	1.80	37026	9.9-

Table 3. Off-station nursery second-stubble means of the 2014 “L” and “HoCP” assignment series on a Commerce silt loam soil at Landry Farms in Paincourtville, Louisiana in 2018.

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	7803	46.5	168	2.11	44014	11.0
L01-283	8691	49.2	176	1.78	55176	11.0
L01-299	8058	47.0	170	1.95	48551	11.7
HoCP04-838	7474	45.7	160	1.83	50366	11.7
L 14-267	10670	49.9	215	2.37	42380	10.3
HoCP 14-802	7181	44.5	156	1.72	51183	11.3
HoCP 14-885	6011	33.0	182	1.95	34757	10.5

Table 4. Off-station nursery second-stubble means of the 2014 “L” and “HoCP”, assignment series on a Moreland silt loam soil at Newton Cane, Inc. in Bunkie, Louisiana in 2018.

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	4453	17.7	251	1.96	17878 -	10.5-
L01-283	9188	40.5	227 -	1.68	47735	11.2
L01-299	10101	40.5	249	1.62	49822	11.5
HoCP04-838	8738	35.1	248	1.73	40293	12.2
L 14-267	10330	41.7	248	2.16	38478	10.6
HoCP 14-802	8379	37.0	227 -	1.53	48188	11.1
HoCP 14-885	11524	45.6	253	1.99	46101	9.2-

Table 5. Off-station nursery second-stubble means of the 2014 “L” and “HoCP” assignment series on a Baldwin silty clay soil at Melancon Farms in Henderson, Louisiana in 2018.

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	3870	18.8	205	1.66	22688 -	10.3-
L01-283	6928	32.2	215	1.40	45920	10.8-
L01-299	8656	38.7	223	1.80	43197	12.1
HoCP04-838	6790	30.6	221	1.67	36663	11.8
L 14-267	8593	37.5	229	2.24	33578	10.5-
HoCP 14-802	10560	44.7	235	1.75	49459	11.0-
HoCP 14-885	10177	43.3	235	2.26	38387	9.9-

Table 6. Off-station nursery second-stubble means of the 2014 “L” and “HoCP” assignment series across 3 locations (Newton, Melancon and Westfield) in 2018.

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	5375	27.7	208	1.91	28193 -	10.6-
L01-283	8269	40.6	206	1.62	49610	11.0-
L01-299	8938	42.1	214	1.79	47190	11.8
HoCP04-838	7667	37.2	210	1.74	42441	11.9
L 14-267	9864	43.0	231	2.26 +	38145	10.5-
HoCP 14-802	8707	42.0	206	1.67	49610	11.1
HoCP 14-885	9238	40.6	223	2.06 +	39749	9.9-

Table 7. Off-station nursery first-stubble means of the 2015 “L”, “Ho”, “HoCP” and “HoL”, assignment series on a Baldwin silty clay soil at Melancon Farms in Henderson, Louisiana in 2018.

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	5705	28.3	201	2.66	21236 -	10.5-
L01-283	9861	42.5	232	2.03	41927	11.2-
L01-299	11331	50.3	225	2.47	40384	12.7
HoCP04-838	10756	47.8	230	2.19	42925	13.0
HoCP 09-804	9999	41.3	242	1.85 -	44740	12.7
L 15-306	8200	34.7	237	1.94	35937	10.3-
L 15- 317	10866	44.0	248	2.62	33487	12.5
HoL 15-508	10748	47.2	228	2.14	44286	9.2-
Ho 15-918	10609	43.5	244	2.38	36572	10.5-
Ho 15-930	11688	48.9	238	3.08	31944	12.3
Ho 15-960	10182	45.1	224	2.29	39295	12.0
Ho 15-971	10682	48.1	223	2.36	40565	11.6
Ho 15-972	10480	43.5	242	1.86 -	46646	12.1
HoCP 15-987	8839	38.9	227	2.28	34213	11.9
Ho 15-993	10873	43.7	248	1.97	44195	12.8

Table 8. Off-station nursery first-stubble means of the 2015 “L”, “Ho”, “HoCP”, and “HoL” assignment series on a Moreland silt loam soil at Newton Cane, Inc. in Bunkie, Louisiana in 2018.

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	9354	43.0	219	2.56	33578 -	10.2
L01-283	10421	46.5	225	2.02	45829	10.4
L01-299	12638	55.6	227	2.19	50820	11.4
HoCP04-838	10417	49.3	213	1.89	52272	10.6
HoCP 09-804	13133	56.5	233	1.89	59714	14.0+
L 15-306	10162	46.8	216	2.34	39930 -	10.1
L 15- 317	9969	43.0	232	2.47	34848 -	12.0
HoL 15-508	11994	51.1	234	2.25	45194	9.4-
Ho 15-918	12276	55.7	220	3.00 +	37117 -	9.8-
Ho 15-930	9061	42.4	215	2.84 +	29857 -	10.0-
Ho 15-960	11767	53.7	218	2.55	41564	11.4
Ho 15-971	8937	40.5	221	2.49	32489 -	10.1
Ho 15-972	10169	45.6	221	2.20	41291	11.6
HoCP 15-987	9107	40.7	224	2.25	36572 -	11.2
Ho 15-993	10058	40.8	247	1.97	41382	10.6

Table 9. Off-station nursery first-stubble means of the 2015 “L”, “Ho”, “HoCP”, and “HoL” assignment series on a Commerce silt loam soil at Landry Farms in Paincourtville, Louisiana in 2018.

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	10492	48.3	217	2.52 +	38478 -	10.4
L01-283	11927	51.3	233	2.00	52091	11.5
L01-299	8780	40.4	215	1.64	49187	11.2
HoCP04-838	12832 +	52.8	241	2.07	51092	12.5 +
HoCP 09-804	17268 +	69.8 +	248	2.04	68335 +	13.1 +
L 15-306	13499 +	54.0	251	2.13	50729	10.6
L 15- 317	12568 +	52.4	239	2.46 +	42743	12.2
HoL 15-508	16108 +	64.7 +	249	2.29 +	57263	9.0 -
Ho 15-918	14074 +	57.9 +	245	2.90 +	39749 -	10.7
Ho 15-930	14351 +	63.8 +	224	3.02 +	42290	11.1
Ho 15-960	15016 +	65.2 +	232	2.72 +	47644	12.1
Ho 15-971	12715 +	55.6	230	2.57 +	43379	11.2
Ho 15-972	12813 +	52.7	243	2.04	51637	12.3
HoCP 15-987	17613 +	76.9 +	229	3.20 +	48007	12.2
Ho 15-993	12299 +	50.3	250	2.32 +	43288	12.1

Table 10. Off-station nursery first-stubble means of the 2015 “L”, “Ho”, “HoCP”, and “HoL” assignment series across 3 locations (Newton, Melancon and Westfield) in 2018.

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	8517	39.9	212	2.58 +	31097 -	10.4 -
L01-283	10736	46.8	230	2.02	46615	11.1
L01-299	10917	48.8	223	2.10	46797	11.8
HoCP04-838	11335	49.9	228	2.05	48763	12.0
HoCP 09-804	13467	55.9	241	1.93	57596 +	13.3 +
L 15-306	10620	45.2	235	2.14	42199	10.3 -
L 15- 317	11134	46.4	240	2.51 +	37026 -	12.2
HoL 15-508	12950	54.3	237	2.23	48914	9.2 -
Ho 15-918	12320	52.4	237	2.76 +	37813 -	10.3
Ho 15-930	11700	51.7	226	2.98 +	34697 -	11.1
Ho 15-960	12321	54.6	225	2.52 +	42834	11.8
Ho 15-971	10778	48.1	225	2.47	38811 -	11.0
Ho 15-972	11154	47.3	235	2.03	46525	12.0
HoCP 15-987	11853	52.2	227	2.58 +	39597 -	11.8
Ho 15-993	11077	44.9	248 +	2.09	42955	11.8

Table 11. Off-station nursery plantcane means of the 2016 “L”, “Ho” and “HoCP”, assignment series on a Baldwin silty clay soil at Melancon Farms in Henderson, Louisiana in 2018.

Variety	Sugar per Acre (lbs./A)	Cane Yield (tons/A)	Sugar Per Ton (lbs/ton)	Stalk Weight (lbs)	Stalk Number (stalks/A)	Fiber (%)
HoCP96-540	9099	46.2	197	2.87 +	32398	9.8 -
L01-283	8350	39.4	209	1.76	44286	11.1
L01-299	8121	40.3	202	2.11	38297	11.9
HoCP04-838	8387	37.7	222	1.85	40928	12.4
HoCP 09-804	11596	50.7	229	2.00	50639 +	11.4
L 16-353	10813	46.5	233	2.09	44558	10.4 -
L 16-360	7244	36.6	199	1.88	37752	10.0 -
L 16-372	9397	41.5	226	1.89	43923	9.1 -
L 16-375	6103	31.7	193	2.02	31309	10.6 -
L 16-386	12544 +	56.8 +	221	2.98 +	38206	11.8
L 16-391	6352	35.3	180	1.65	43016	10.8
Ho 16-600	12396 +	53.5	233	2.90 +	36754	8.1 -
Ho 16-606	7660	37.7	207	1.96	38115	9.2 -
Ho 16-608	12047 +	58.2 +	207	2.59 +	45194	11.4
Ho 16-609	5937	27.5	214	1.54 -	35393	11.6
Ho 16-610	8347	38.2	219	1.83	41654	11.3
Ho 16-624	9464	46.7	202	2.24	41745	11.2
Ho 16-626	9372	45.6	207	2.45	37208	9.2 -
Ho 16-627	9173	42.1	218	2.77 +	30220	9.9 -
Ho 16-646	11738 +	57.1 +	206	2.52	45375	9.8 -
Ho 16-647	7105	35.5	199	2.13	34213	8.5 -
Ho 16-648	6174	29.7	210	1.60 -	37298	10.4 -
Ho 16-649	9741	50.0	192	2.17	46192	10.5
Ho 16-666	10678	50.7	211	2.53	40202	10.1 -
Hocp 16-672	6640	34.2	190	1.82	36572	10.8
Hocp 16-675	9091	43.8	206	1.79	48914 +	10.3 -
Ho 16-678	8430	42.4	198	2.02	42108	10.7
Ho 16-680	10239	48.3	212	2.51	38569	10.7

Table 12. Off-station nursery plantcane means of the 2016 “L”, “Ho” and “HoCP”, assignment series on a Moreland silt loam soil at Newton Cane, Inc. in Bunkie, Louisiana in 2018.

Variety	Sugar per Acre (lbs./A)	Cane Yield (tons/A)	Sugar Per Ton (lbs/ton)	Stalk Weight (lbs)	Stalk Number (stalks/A)	Fiber (%)
HoCP96-540	11753	50.7	233	2.80 +	36028	10.4
L01-283	11190	49.0	229	2.04	47916	11.3
L01-299	10108	43.5	233	2.08	41836	11.0
HoCP04-838	12093	50.6	239	2.27	44740	11.5
HoCP 09-804	9276	38.2	243	1.59	48098	10.9
L 16-353	8914	35.5	251 +	1.67	42562	10.7
L 16-360	11280	51.5	221	2.17	46918	10.9
L 16-372	10274	41.5	247	2.05	40021	8.5 -
L 16-375	8135	35.1	232	2.12	33033 -	11.1
L 16-386	13157	54.0	244	2.95 +	36754	11.3
L 16-391	10182	43.9	231	2.24	39113	11.6
Ho 16-600	12969	50.5	257 +	2.96 +	34122	9.2 -
Ho 16-606	12594	53.1	236	2.72 +	38841	10.0
Ho 16-608	11355	50.0	226	2.46	40475	10.9
Ho 16-609	7494	30.9	242	1.62	38297	10.9
Ho 16-610	9907	40.5	245	1.76	46010	12.0
Ho 16-624	9160	42.1	219	2.16	38841	10.9
Ho 16-626	14313 +	55.8	256 +	2.65 +	42290	9.7 -
Ho 16-627	10883	46.8	233	2.60	36028	10.2
Ho 16-646	12982	56.5	229	2.42	46827	10.1
Ho 16-647	10901	46.9	232	2.69 +	35030	8.7 -
Ho 16-648	9739	42.5	228	2.04	41564	10.7
Ho 16-649	10447	46.0	227	2.10	43742	10.2
Ho 16-666	12977	54.4	239	2.49	43560	11.0
Hocp 16-672	11131	43.5	254 +	2.06	42199	11.3
Hocp 16-675	11391	47.4	240	1.90	51092 +	11.3
Ho 16-678	9671	41.5	233	1.80	46283	12.1
Ho 16-680	13152	52.6	250 +	2.45	43379	10.9

Table 13. Off-station nursery plantcane means of the 2016 “L”, “Ho” and “HoCP”, assignment series on a Commerce silt loam soil at Landry Farms in Paincourtville, Louisiana in 2018.

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	10989		59.2		186		2.84		41654	-	10.6	-
L01-283	11025		50.6		220		1.88		53452		11.6	-
L01-299	12797		63.7		202		2.46		51818		13.4	
HoCP04-838	11871		55.8		214		2.26		49187		12.6	
HoCP 09-804	12067		50.7		238	+	1.97		51455		12.3	
L 16-353	12447		55.2		225		2.18		50729		11.1	-
L 16-360	11223		49.9		223		1.78	-	56084		11.5	-
L 16-372	11654		53.9		217		2.47		43288	-	9.1	-
L 16-375	12300		63.0		196		2.31		54269		11.6	-
L 16-386	14959		65.7		228	+	3.12	+	42562	-	12.6	
L 16-391	9158		42.6	-	215		1.93		44014		11.4	-
Ho 16-600	22244	+	88.3	+	252	+	3.50	+	50457		9.7	-
Ho 16-606	12798		64.7		198		2.56		50548		11.5	-
Ho 16-608	13464		68.6		196		2.53		54269		11.0	-
Ho 16-609	9706		50.0		194		2.05		48914		11.4	-
Ho 16-610	11560		56.4		205		1.89		59714		12.1	
Ho 16-624	10259		52.2		196		2.16		48279		12.9	
Ho 16-626	13451		59.2		227	+	2.36		50276		11.1	-
Ho 16-627	10137		47.2		215		2.13		44195		10.6	-
Ho 16-646	10202		51.6		197		2.07		49550		11.5	-
Ho 16-647	11789		62.4		188		2.76		45284		8.7	-
Ho 16-648	10452		50.9		206		2.08		48824		11.6	-
Ho 16-649	13212		69.0		191		2.86		48188		10.7	-
Ho 16-666	9262		54.9		166	-	2.28		47825		10.8	-
Hocp 16-672	12764		59.0		216		2.31		50820		12.0	
Hocp 16-675	8978		47.3		190		1.96		48279		10.8	-
Ho 16-678	12348		58.3		211		2.04		57354		11.3	-
Ho 16-680	9142		46.1		198		2.29		40384	-	11.9	

Table 14. Off-station nursery plantcane means of the 2016 “L”, “Ho” and “HoCP”, assignment series across 3 locations (Newton, Melancon and Westfield) in 2018.

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	10614	52.0	205	2.84 +	36693 -	10.2 -
L01-283	10188	46.3	219	1.89	48551	11.4
L01-299	10342	49.2	212	2.21	43984	12.1
HoCP04-838	10784	48.0	225	2.13	44952	12.2
HoCP 09-804	10980	46.5	237 +	1.85	50064 +	11.5
L 16-353	10725	45.7	236 +	1.98	45950	10.7 -
L 16-360	9916	46.0	214	1.94	46918	10.8 -
L 16-372	10441	45.6	230 +	2.14	42411	8.9 -
L 16-375	8846	43.2	207	2.15	39537	11.1 -
L 16-386	13554 +	58.8	231 +	3.01 +	39174	11.9
L 16-391	8564	40.6	209	1.94	42048	11.3 -
Ho 16-600	15870 +	64.1 +	247 +	3.12 +	40444	9.0 -
Ho 16-606	11017	51.8	214	2.41	42501	10.3 -
Ho 16-608	12289	59.0	210	2.53	46646	11.1 -
Ho 16-609	7712	36.2 -	217	1.73 -	40868	11.3
Ho 16-610	9938	45.0	223	1.82 -	49126	11.8
Ho 16-624	9628	47.0	206	2.19	42955	11.7
Ho 16-626	12379	53.6	230	2.48	43258	10.0 -
Ho 16-627	10064	45.3	222	2.50	36814 -	10.2 -
Ho 16-646	11641	55.1	211	2.33	47251	10.5 -
Ho 16-647	9932	48.3	206	2.53	38176	8.6 -
Ho 16-648	8788	41.0	214	1.91	42562	10.9 -
Ho 16-649	11134	55.0	203	2.38	46041	10.5 -
Ho 16-666	10972	53.3	205	2.43	43863	10.6 -
Hocp 16-672	10178	45.6	220	2.06	43197	11.4
Hocp 16-675	9820	46.2	212	1.88	49429	10.8 -
Ho 16-678	10150	47.4	214	1.95	48582	11.4
Ho 16-680	10844	49.0	220	2.42	40777	11.2 -

Table 15. On-station nursery third-stubble means of the 2014 "L" assignment series on a Baldwin silty clay soil at Iberia Research Station in Jeanerette, Louisiana in 2018.

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	3051 -	14.5 -	208	1.82 +	26091 -	10.9 -
L 01-283	5667	25.2 -	225 +	1.43	46056 -	11.6 -
L 01-299	8294	39.2	211	1.73	74415	12.1
HoCP 04-838	7557	33.9	223	1.69	59895	12.7 +
L 14-267	8842	37.6	235 +	2.12 +	40157 -	10.7 -

Table 16. On-station nursery third-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 2018.

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	9433 -	42.5	223	2.79	30401 -	11.2 -
L 01-283	17074 +	66.7	257	2.27 -	58534	11.7 -
L 01-299	14356	60.3	238	2.38	50820	13.0
HoCP 04-838	12760	55.4	231	2.33	47417	13.2
L 14-267	19017 +	75.5	252	2.95 +	51274	11.2 -

Table 17. On-station nursery third-stubble means of the 2014 "L" assignment series on a Commerce silt loam soil at Sugar Research Station in St. Gabriel, Louisiana in 2018.

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	6724	33.0	205	2.60 +	26091 -	10.3 -
L 01-283	8552	38.3	219	1.65	46056 -	10.8
L 01-299	15153	70.0	216	1.88	74415	12.4
HoCP 04-838	13540	59.2	229	1.97	59895	13.2
L 14-267	12611	53.1	237	2.66 +	40157 -	10.6

Table 18. On-station nursery third-stubble means of the 2014 "L" assignment series across 3 locations (St. Gabriel, Iberia and U.S.D.A- Ardoyne Farms) in 2018.

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	6403	-	30.0	-	212	-	2.40		24276	-	10.8	
L 01-283	10431		43.4		234		1.78	-	46585		11.4	
L 01-299	12601		56.5		222	-	1.99	-	56870		12.5	+
HoCP 04-838	11286		49.5		228	-	2.00	-	49156		13.0	+
L 14-267	13490		55.4		242		2.58		42350		10.8	

Table 19. On-station nursery second-stubble means of the 2015 "L" assignment series on a Commerce silt loam soil at Sugar Research Station in St. Gabriel, Louisiana in 2018.

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	10869		47.1		231		2.64	+	35619	-	11.5	
L 01-283	12420		56.5		220		2.00	-	56719		10.6	-
L 01-299	15154		67.7		224		2.28		59441		12.5	
HoCP 04-838	11930		51.5		231		2.02	-	51047		13.1	
L 15-306	14109		57.0		247		2.29		49913		11.3	
L 15-317	13201		54.8		242		2.82	+	38796	-	12.5	

Table 20. On-station nursery second-stubble means of the 2015 "L" assignment series on a Commerce silt loam soil at U.S.D.A-Ardoyne Farm in Chacahoula, Louisiana in 2018.

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	8668	-	38.8	-	223	-	2.68		29040	-	11.8	
L 01-283	16103		63.7		253		2.36		53996		10.8	-
L 01-299	15450		63.9		242		2.47		51728		12.5	
HoCP 04-838	17113		71.8		239		2.78		51728		12.8	
L 15-306	12122		47.3	-	257	+	2.61		36300	-	10.8	-
L 15-317	17032		67.5		252		2.91		46509		13.1	

Table 21. On-station nursery second-stubble means of the 2015 "L" assignment series on a Baldwin silty clay soil at Iberia Research Station in Jeanerette, Louisiana in 2018.

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	5334 -	25.4 -	207	2.14	23822 -	11.4 -
L 01-283	7594	34.4	222	1.66	41291	11.4 -
L 01-299	9599	44.6	215	1.76	51954	13.0
HoCP 04-838	9756	48.6	203	2.24	43106	12.6
L 15-306	9653	41.5	233	2.12	39249	11.4 -
L 15-317	6883 -	31.0 -	222	2.38	26091 -	12.2

Table 22. On-station nursery second-stubble means of the 2015 "L" assignment series across 3 locations (St. Gabriel, Iberia and U.S.D.A- Ardoyne Farms) in 2018.

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	8290	37.1	220	2.48 +	29494 -	11.5 -
L 01-283	12039	51.5	231	2.01	50669	10.9 -
L 01-299	13401	58.7	227	2.17	54374	12.7
HoCP 04-838	12933	57.3	224	2.35	48627	12.8
L 15-306	11961	48.6	246 +	2.34	41821 -	11.2 -
L 15-317	12372	51.1	239	2.70 +	37132 -	12.6

Table 23. On-station nursery first-stubble means of the 2016 "L" assignment series on a Commerce silt loam soil at U.S.D.A-Ardoyne Farm in Chacahoula, Louisiana in 2018.

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	11353	48.9	232	3.21 +	31536	11.4
L 01-283	13377	52.2	256	2.51	41518	11.2 -
L 01-299	14786	59.7	248	2.31	51728	12.6
HoCP 04-838	12187	51.2	238	2.36	43106	13.1
HoCP 09-804	12285	46.3	265 +	2.32	40157	13.0
L 16-353	10479	42.3	249	2.50	33578	10.9 -
L 16-360	10925	42.6	255	2.05	41291	11.5
L 16-372	13187	53.0	249	2.50	42426	8.9 -
L 16-375	13420	54.4	246	2.54	42879	12.0
L 16-386	13942	53.5	260	3.44 +	31082	12.6
L 16-391	11263	46.5	242	2.19	42426	11.7

Table 24. On-station nursery first-stubble means of the 2016 "L" assignment series on a Baldwin silty clay soil at Iberia Research Station in Jeanerette, Louisiana in 2018.

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	7773	35.1	223	2.64	26544 -	10.8
L 01-283	9363	38.7	242	2.06	37434	12.1
L 01-299	10869	49.8	217	2.21	44921	12.6
HoCP 04-838	9655	42.7	227	2.19	39023	12.1
HoCP 09-804	9920	38.3	258	1.54 -	50366	12.5
L 16-353	5910	23.9	248	2.01	23595 -	11.1
L 16-360	8301	34.9	238	1.92	36527	11.4
L 16-372	9673	42.1	230	2.23	37888	11.4
L 16-375	8032	34.4	234	1.91	36073	10.6
L 16-386	10226	43.9	233	2.88 +	30855 -	12.4
L 16-391	7914	32.7	242	1.83	35846 -	13.0

Table 25. On-station nursery first-stubble means of the 2016 "L" assignment series on a Commerce silt loam soil at Sugar Research Station in St. Gabriel, Louisiana in 2018.

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	12915	55.7	233	2.94 +	37661	12.1
L 01-283	13903	54.7	255 +	2.19	50139	11.6
L 01-299	11538	48.0	240	2.34	41291	13.2
HoCP 04-838	13242	54.1	245	2.58	41972	13.5
HoCP 09-804	12466	48.0	259 +	2.13	45148	13.9
L 16-353	14538	60.0	242	2.58	46509	11.8
L 16-360	12965	52.2	250	1.95	53089	12.3
L 16-372	11112	45.1	247	2.37	38115	9.8 -
L 16-375	14826	62.6	237	2.42	51954	11.8
L 16-386	14889	61.6	242	3.13 +	39930	12.7
L 16-391	11418	48.0	238	2.39	40157	12.3

Table 26. On-station nursery first-stubble means of the 2016 “L” assignment series across 3 locations (St. Gabriel, Iberia and U.S.D.A. - Ardoyne Farms) in 2018.

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	10680	46.6	229	2.93 +	31914 -	11.4 -
L 01-283	12214	48.5	251 +	2.25	43031	11.6 -
L 01-299	12398	52.5	235	2.29	45980	12.8
HoCP 04-838	11695	49.3	237	2.37	41367	12.9
HoCP 09-804	11557	44.2	261 +	2.00 -	45224	13.1
L 16-353	10309	42.1	246 +	2.36	34561 -	11.2 -
L 16-360	10730	43.2	248 +	1.97 -	43636	11.7
L 16-372	11324	46.7	242	2.36	39476	10.0 -
L 16-375	12093	50.5	239	2.29	43636	11.5
L 16-386	13019	53.0	245	3.15 +	33956 -	12.6
L 16-391	10199	42.4	241	2.14	39476	12.3

Table 27. On-station nursery plantcane means of the 2017 "L" assignment series on a Commerce silt loam soil at U.S.D.A-Ardoyne Farm in Chacahoula, Louisiana in 2018.

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	6537	30.7	213	3.30 +	18604 -	10.3 -
L 01-283	7332	30.2 -	243	2.64	22914	11.3 -
L 01-299	10249	45.9	224	2.71	34031	12.2
HoCP 04-838	13289	56.9	234	2.79	40838	12.5
HoCP 09-804	10046	40.4	248 +	2.57	31309	11.8
L 17-392	8844	38.4	230	2.53	30628	11.3 -
L 17-394	11721	48.2	243	3.52 +	27225	12.2
L 17-395	10074	40.8	247 +	3.16	25864	11.2 -
L 17-396	8391	35.7	235	2.62	27679	11.8
L 17-398	10857	43.6	249 +	2.73	31989	10.7 -
L 17-400	8516	35.4	240	2.88	24503	11.0 -
L 17-401	8245	34.6	238	2.01 -	34485	11.3 -
L 17-405	10856	44.8	242	2.87	32670	12.5
L 17-406	9118	40.3	226	2.84	28359	11.3 -
L 17-407	8734	40.0	219	2.63	30401	10.0 -
L 17-410	11205	45.5	245 +	3.34 +	27225	10.3 -
L 17-413	10617	41.9	251 +	2.49	33804	12.0
L 17-415	10338	43.7	236	2.72	32216	11.6
L 17-419	6470	26.0 -	250 +	2.37	21780 -	11.8
L 17-424	12287	50.1	246 +	3.16	31763	11.8
L 17-426	10761	42.8	252 +	2.47	34939	11.4 -
L 17-428	10987	47.1	234	3.41 +	27679	10.4 -
L 17-429	13210	54.3	243 +	2.97	36527	13.5 +
L 17-432	7533	31.0	243 +	2.73	22234 -	13.2 +
L 17-433	14575 +	61.1	238	4.60 +	26771	11.5
L 17-434	7110	31.6	221	2.49	25410	12.1
L 17-435	13055	54.4	240	2.39	45602	10.3 -

Table 28. On-station nursery plantcane means of the 2017 "L" assignment series on a Baldwin silty clay soil at Iberia Research Station in Jeanerette, Louisiana in 2018.

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	4433	23.2	193	2.47	19058	10.9
L 01-283	4945	24.6	200	2.14	22914	10.4 -
L 01-299	4730	23.9	198	2.15	22234	11.8
HoCP 04-838	5847	32.2	181	2.33	27906	11.0
HoCP 09-804	7662	33.8	227	2.08	32443 +	12.9
L 17-392	5799	29.8	195	1.91	31309 +	10.9
L 17-394	10489	52.4	202	3.59 +	27906	11.6
L 17-395	8426	37.0	228	2.86 +	25864	10.4 -
L 17-396	7104	36.0	196	1.74	41064 +	11.5
L 17-398	6552	28.6	229	2.09	27225	11.4
L 17-400	9520	40.3	236 +	2.74	29494	11.8
L 17-401	5155	23.9	216	1.90	25183	10.5 -
L 17-405	8053	34.3	235 +	2.55	27452	11.9
L 17-406	7031	33.3	212	2.16	30855	11.4 -
L 17-407	8935	45.2	198	2.76 +	32897 +	9.8 -
L 17-410	6935	31.9	218	2.38	26771	9.6 -
L 17-413	8478	39.9	213	2.14	37208 +	11.9
L 17-415	5197	25.2	207	1.86	25864	10.1 -
L 17-419	8242	35.5	232 +	2.16	32897 +	11.8
L 17-424	8610	36.7	235 +	2.43	29948	12.0
L 17-426	7686	36.3	211	2.32	31309 +	11.2
L 17-428	7367	34.3	214	2.61	26318	10.0 -
L 17-429	8108	39.3	203	2.57	30174	11.2
L 17-432	8363	39.3	213	2.41	32670 +	12.6
L 17-433	7883	35.6	222	3.49 +	20419	9.8 -
L 17-434	5994	31.4	193	2.12	29494	12.6
L 17-435	7094	37.0	192	2.02	36754 +	9.7 -

Table 29. On-station nursery plantcane means of the 2017 “L” assignment series on a Commerce silt loam soil at Sugar Research Station in St. Gabriel, Louisiana in 2018.

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	7226	31.5	232 +	2.58	24503	12.1
L 01-283	4805	24.3	199	2.40	20192	10.2 -
L 01-299	7097	34.4	206	2.61	27452	12.9
HoCP 04-838	10749 +	49.8 +	215	2.88	34712	12.1
HoCP 09-804	11133	47.5 +	235 +	2.38	39930 +	12.7
L 17-392	7880	36.5	216	2.22	32897	11.7
L 17-394	14294 +	61.5 +	233 +	3.37 +	36527	12.1
L 17-395	8024	34.1	235 +	2.63	25864	11.0 -
L 17-396	8217	35.6	231 +	1.93 -	36981	11.7
L 17-398	9958 +	40.3	247 +	2.55	31763	12.0
L 17-400	9809	40.1	245 +	2.86	28133	11.4 -
L 17-401	7253	34.1	212	2.03	33578	11.2 -
L 17-405	11625 +	49.1 +	236 +	2.72	36073	12.0
L 17-406	7682	36.7	209	2.94	24956	11.9
L 17-407	8900	40.6	219	3.02	26998	10.5 -
L 17-410	12004 +	50.1 +	240 +	2.65	37888 +	10.5 -
L 17-413	9984 +	41.4	244 +	2.52	32443	12.5
L 17-415	9640	43.1	225	2.65	32443	12.0
L 17-419	9205	36.0	256 +	2.46	29267	12.5
L 17-424	10068 +	43.5	232 +	2.76	31536	11.2 -
L 17-426	10830 +	48.3 +	224	2.52	38342 +	11.5 -
L 17-428	9694	43.1	224	3.09 +	27906	10.6 -
L 17-429	8617	38.5	223	2.41	32443	14.1
L 17-432	9890	42.5	233 +	2.38	36073	13.1
L 17-433	10653 +	48.0 +	221	3.47 +	27679	10.7 -
L 17-434	8226	37.2	221	2.26	33804	11.9
L 17-435	9607	40.5	237 +	1.98 -	41064 +	10.4 -

Table 30. On-station nursery plantcane means of the 2017 "L" assignment series across 3 locations (St.Gabriel, Iberia and U.S.D.A. - Ardoyne Farms) in 2018.

Variety	Sugar Per Acre (lbs./A)	Cane Yield (tons/A)	Sugar Per Ton (lbs/ton)	Stalk Weight (lbs)	Stalk Number (stalks/A)	Fiber (%)
HoCP 96-540	6135	28.6	214	2.76	20928 -	11.2 -
L 01-283	5694	26.4	214	2.40	22007	10.7 -
L 01-299	7359	34.7	209	2.49	27906	12.3
HoCP 04-838	9962 +	46.3 +	210	2.67	34485	11.9
HoCP 09-804	9613	40.6	237 +	2.34	34561 +	12.5
L 17-392	7508	34.9	214 -	2.22	31611	11.3 -
L 17-394	12168 +	54.0 +	226 +	3.49 +	30553	12.0
L 17-395	8841	37.3	237 +	2.88 +	25864	10.9 -
L 17-396	7904	35.8	221	2.10 -	35241 +	11.7
L 17-398	9123	37.5	242 +	2.45	30326	11.3 -
L 17-400	9282	38.6	240 +	2.82	27376	11.4 -
L 17-401	6884	30.9	222	1.98 -	31082	11.0 -
L 17-405	10178 +	42.7	237 +	2.71	32065	12.1
L 17-406	7944	36.8	216	2.65	28057	11.5
L 17-407	8856	41.9	212	2.80	30099	10.1 -
L 17-410	10048 +	42.5	234 +	2.79	30628	10.1 -
L 17-413	9693 +	41.1	236	2.39	34485	12.1
L 17-415	8392	37.3	223 +	2.41	30174	11.2 -
L 17-419	7972	32.5	246 +	2.33	27981	12.0
L 17-424	10321 +	43.4	238 +	2.78	31082	11.7
L 17-426	9759 +	42.5	229 +	2.44	34863 +	11.4 -
L 17-428	9349	41.5	224	3.04 +	27301	10.3 -
L 17-429	9978 +	44.0	223	2.65	33048	12.9
L 17-432	8596	37.6	230 +	2.51	30326	13.0
L 17-433	11037 +	48.2 +	227 +	3.85 +	24956	10.7 -
L 17-434	7110	33.4	212	2.29	29569	12.2
L 17-435	9919 +	44.0	223	2.13 -	41140 +	10.1 -

2018 LOUISIANA "Ho" NURSERY VARIETY TRIALS

E. O. Dufrene, M. J. Duet, F. J. Adams, L. Lovell, and J.R. Todd
USDA-ARS, Sugarcane Research Unit (SRU)
Houma, LA

In the USDA Sugarcane Research Unit's sugarcane variety program, promising experimental varieties are assigned permanent numbers three years after selection in the seedling stage. These varieties are 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. These trials are normally established in the same year permanent variety numbers are assigned and use a randomized complete block design with two replications. Plots are 16 feet long by six feet (one row) wide with a four-foot alley between plots. A minimum of three commercial varieties are planted in each test for comparison purposes. 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 represent the different regions of the sugarcane belt.

In the spring and summer, team members rate nursery test plots for yield traits such as population, stalk height, stalk diameter, erectness, etc. Mature, millable stalks are counted in each plot in late July or early August. A 10-stalk sample is hand-cut from plots of active varieties during the harvest season. Samples from USDA nurseries are analyzed at the Juice and Milling Quality Laboratory at the USDA Ardoyne Farm, where they are weighed to determine stalk weight and processed for sucrose analysis. Estimates of theoretical recoverable sugar (TRS) per ton of cane are calculated based on Brix (% w/w) and pol reading (Z°) values, while estimated yields of cane per acre, 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 and not susceptible to diseases are advanced for further testing.

Table 1 lists planting and harvest dates of USDA nursery evaluations. Results of these trials are presented in Tables 2 to 17. Varieties where both the cross and selection were done in Houma were assigned a prefix of "Ho". Varieties where a cross was made at the USDA facility in Canal Point, FL and selection was done in Houma have a "HoCP" prefix. Two varieties have a "HoL" prefix and are derived from a cross made at the LSU Sugar Research Station in St. Gabriel and selected from the USDA farm. Statistical analyses were run for each test and for each crop combined across locations using PROC MIXED procedures in SAS (version 9.4). For 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 2018.

Series	Location[1/]	Soil Series [2/]	Planting Date	Harvest Dates 2015	2016	2017	2018
2014	AFH	Sc	10/21/14	12/21	10/06	10/11	10/17
2014	IRS	Bsc	10/23/14	12/09	11/03	10/13	10/17
2014	STG	Csl	10/24/14	12/15	11/09	10/27	11/15
2015	AFH	Sc	10/21/15		11/21	10/24	10/17
2015	IRS	Bsc	10/23/15		11/29	11/08	10/17
2015	STG	Csl	11/13/15		12/09	12/12	11/15
2016	AFH	Sc	10/20/16			11/20	10/24
2016	IRS	Bsc	10/26/16			11/16	10/19
2016	STG	Csl	10/27/16			11/28	11/15
2017	AFH	Sc	10/20/17				12/12
2017	IRS	Bsc	11/02/17				12/11
2017	STG	Csl	10/27/17				12/17
2018	AFL	Sc	11/21/18				
2018	IRS	Bsc	10/19/18				

[1/] AFH = Ardoyne Farm heavy soil in Schriever, AFL = Ardoyne Farm light 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 third-stubble means of the 2014 "Ho" and "HoCP" assignment series on a Sharkey clay soil at the Ardoyne Farm in Schriever, LA in 2018.

Variety	Sugar/ acre (lbs.)		Tons/ acre (tons)		Sugar/ ton (lbs.)	Weight/ stalk (lbs.)	Stalks/ acre (no.)	
L 01-299	9042		36.6		249	1.52	48665	
HoCP 96-540	7729		38.4		201	1.83	42312	
L 01-283	6261	-	25.0	-	251	1.57	32103	
HoCP 04-838	7612		28.3		269	1.65	34825	
HoCP 14-802	14241	+	62.2	+	229	1.83	68176	+
HoCP 14-885	14824	+	56.9	+	260	2.02	56492	
Means	9952		41.2		243	1.73	47095	

Table 3. Nursery third-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 2018.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
L 01-299	7010	35.2	200	1.45	48324
HoCP 96-540	1981	13.9	141 -	1.86 +	15314
L 01-283	4801	22.2	218	1.56	28246
HoCP 04-838	4071	21.2	195	1.48	28586
HoCP 14-802	9782	45.5	214	1.63	55698
HoCP 14-885	5021	22.1	225	1.42	31422
Means	5444	26.7	199	1.57	34598

Table 4. Nursery third-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 2018.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
L 01-299	15184	53.8	283	1.87	57513
HoCP 96-540	15186	61.4	247 -	2.37 +	51841
L 01-283	15160	49.2	309 +	1.65	59555
HoCP 04-838	13085	45.8	286	1.50	61597
HoCP 14-802	13909	49.1	283	1.71	57399
HoCP 14-885	18023	59.9	300	1.97	61029
Means	15091	53.2	284	1.84	58156

Table 5. Nursery third-stubble means of the 2014 “Ho” and “HoCP” assignment series across locations (Ardoyne Farm, Iberia Research Station, & Sugar Research Station) in 2018.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
L 01-299	10412	41.8	244	1.61	51501
HoCP 96-540	8299	37.9	196 -	2.02	36489
L 01-283	8741	32.1	259	1.59	39968
HoCP 04-838	8256	31.8	250	1.55	41669
HoCP 14-802	12644	52.3	242	1.72	60424
HoCP 14-885	12623	46.3	262	1.80	49648
Means	10162	40.4	242	1.71	46617

Table 6. Nursery second-stubble means of the 2015 “Ho” and “HoCP” assignment series on a Sharkey clay soil at the Ardoyne Farm in Schriever, LA in 2018.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
L 01-299	11148	44.8	249	1.58	56719
HoCP 96-540	5360	26.1	208 -	1.96	25523
L 01-283	7885	29.9	265 +	1.57	37434
HoCP 04-838	7194	28.2	257	1.53	37208
HoL 15-508	13201	48.5	272 +	2.01 +	48211
Ho 15-918	11321	41.8	271 +	2.24 +	37434
Ho 15-930	11953	47.7	251	3.24 +	29494
Ho 15-960	9164	35.7	256	1.75	40838
Ho 15-971	9405	40.2	239	2.07 +	38342
Ho 15-972	9695	39.5	247	1.64	47871
HoCP 15-987	9376	38.4	245	2.03 +	38002
HoL 15-993	8020	28.9	276 +	1.85	31195
Means	9477	37.5	253	1.95	39023

Table 7. Nursery second-stubble means of the 2015 "Ho" and "HoCP" assignment series on a Baldwin silty clay soil at the Iberia Research Station in Jeanerette, LA in 2018.

Variety	Sugar/ acre		Tons/ acre	Sugar/ ton		Weight/ stalk		Stalks/ acre	
	(lbs.)		(tons)	(lbs.)		(lbs.)		(no.)	
L 01-299	10063		47.7	210		1.46		65113	
HoCP 96-540	5199	-	30.6	170	-	1.92		31989	-
L 01-283	6715		32.5	208		1.44		44694	-
HoCP 04-838	8641		39.3	219		1.89	+	41518	-
HoL 15-508	12562		53.3	238		1.95	+	54563	
Ho 15-918	9659		39.4	243		2.38	+	33351	-
Ho 15-930	10139		47.9	211		3.01	+	31876	-
Ho 15-960	8099		39.3	206		1.74		45148	-
Ho 15-971	10902		49.2	222		2.12	+	46623	-
Ho 15-972	7138		33.7	210		1.65		41291	-
HoCP 15-987	11513		54.1	213		2.35	+	46056	-
HoL 15-993	10256		42.0	245		1.71		49232	-
Means	9240		42.4	216		1.97		44288	

Table 8. Nursery second-stubble 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 2018.

Variety	Sugar/ acre		Tons/ acre	Sugar/ ton		Weight/ stalk		Stalks/ acre	
	(lbs.)		(tons)	(lbs.)		(lbs.)		(no.)	
L 01-299	17585		64.5	273		2.03		64092	
HoCP 96-540	11321		48.9	232		2.53		38909	-
L 01-283	14988		54.5	274		2.01		54563	
HoCP 04-838	16357		60.1	272		2.40		49913	-
HoL 15-508	17419		60.2	289		2.39		50366	-
Ho 15-918	15925		58.6	271		2.84		41518	-
Ho 15-930	19760		73.9	266		3.30		44921	-
Ho 15-960	18635		72.0	259		2.76		52522	-
Ho 15-971	20206		71.6	282		2.35		61029	
Ho 15-972	13786		50.6	272		2.02		50480	-
HoCP 15-987	12713		50.6	251		2.21		45829	-
HoL 15-993	15032		53.7	276		2.18		49232	-
Means	16144		59.9	268		2.42		50281	

Table 9. Nursery second-stubble means of the 2015"Ho" and "HoCP" assignment series across locations (Ardoyne Farm, Iberia Research Station, & Sugar Research Station) in 2018.

Variety	Sugar/ acre (lbs.)	Tons/ acre (tons)	Sugar/ ton (lbs.)	Weight/ stalk (lbs.)	Stalks/ acre (no.)
L 01-299	12932	52.3	244	1.69	61975
HoCP 96-540	7293 -	35.2 -	203 -	2.13 +	32141 -
L 01-283	9863 -	39.0 -	249	1.67	45564 -
HoCP 04-838	10731	42.6	249	1.94	42879 -
HoL 15-508	14394	54.0	266 +	2.12 +	51047 -
Ho 15-918	12302	46.6	262 +	2.48 +	37434 -
Ho 15-930	13951	56.5	243	3.18 +	35430 -
Ho 15-960	11966	49.0	240	2.08 +	46169 -
Ho 15-971	13504	53.7	248	2.18 +	48665 -
Ho 15-972	10207 -	41.3 -	243	1.77	46547 -
HoCP 15-987	11201	47.7	237	2.20 +	43295 -
HoL 15-993	11102	41.5 -	266 +	1.91	43220 -
Means	11620	46.6	246	2.11	44531

Table 10. Nursery first-stubble means of the 2016 “Ho” and “HoCP” assignment series on a Sharkey clay soil at the Ardoyne Farm in Schriever, LA in 2018.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
L 01-299	12141	48.0	253	2.10	45602
HoCP 96-540	9871	43.6	225 -	2.52	34712
L 01-283	13065	47.3	274	2.10	44921
HoCP 04-838	9174	35.1	259	2.41	31649
HoCP 09-804	11687	42.5	277	1.76	47757
Ho 16-600	16164	59.4	272	3.17 +	37775
Ho 16-606	13245	47.5	277	2.50	37548
Ho 16-608	12668	46.2	275	2.20	42085
Ho 16-609	11025	41.0	270	1.62	50593
Ho 16-610	10935	43.0	254	1.84	46736
Ho 16-624	11191	44.3	253	2.05	43333
Ho 16-626	12597	48.7	259	2.51	38909
Ho 16-627	13206	50.1	264	2.53	39590
Ho 16-646	12567	50.2	248	2.36	42539
Ho 16-647	10845	40.1	270	2.68 +	30174
Ho 16-648	12868	49.0	263	2.07	47303
Ho 16-649	12628	53.5	236	2.40	44581
Ho 16-666	11269	46.1	245	2.28	40497
HoCP 16-672	11235	50.4	224 -	2.47	40951
HoCP 16-675	13240	47.2	281 +	2.13	44241
Ho 16-678	12213	45.9	266	2.05	44808
Ho 16-680	11946	46.3	258	2.57	36300
Means	12108	46.7	259	2.29	41360

Table 11. Nursery first-stubble means of the 2016 “Ho” and “HoCP” assignment series on a Baldwin silty clay soil at the Iberia Research Station in Jeanerette, LA in 2018.

Variety	Sugar/ acre (lbs.)	Tons/ acre (tons)	Sugar/ ton (lbs.)	Weight/ stalk (lbs.)	Stalks/ acre (no.)
L 01-299	8845	40.3	217	1.90	42426
HoCP 96-540	5392	28.2	191 -	2.50	22801 -
L 01-283	9218	42.1	219	1.97	42766
HoCP 04-838	6787	31.9	213	1.67	38228
HoCP 09-804	10703	44.0	244 +	1.87	46736
Ho 16-600	7878	36.3	217	2.24	32557
Ho 16-606	9592	40.5	238	1.94	41518
Ho 16-608	10526	46.8	224	2.02	45035
Ho 16-609	10588	45.6	234	1.95	46623
Ho 16-610	8149	37.8	217	1.62	46283
Ho 16-624	8807	44.1	199	2.03	43560
Ho 16-626	7690	34.8	221	1.89	36640
Ho 16-627	9876	48.6	204	2.42	40270
Ho 16-646	8555	43.3	198	1.91	45602
Ho 16-647	11219	45.2	248 +	2.73	33351
Ho 16-648	7043	37.3	189 -	1.72	43560
Ho 16-649	13109	61.4	212	2.49	50139
Ho 16-666	8364	44.2	188 -	2.46	35960
HoCP 16-672	5518	29.8	185 -	1.98	30288 -
HoCP 16-675	13276	56.1	236	2.16	51954
Ho 16-678	10305	49.6	210	2.22	44241
Ho 16-680	7380	37.7	194 -	2.37	31536
Means	8945	41.7	214	2.08	40326

Table 12. Nursery first-stubble means of the 2016 “Ho” and “HoCP” assignment series on a Commerce silt loam soil at the Sugar Research Station in St. Gabriel, LA in 2018.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
L 01-299	11153	41.1	271	2.21	37208
HoCP 96-540	15925	65.4	243 -	2.94 +	44921
L 01-283	9803	37.0	268	1.73	43106
HoCP 04-838	10122	38.5	263	2.17	35846
HoCP 09-804	12656	43.8	289	2.14	41064
Ho 16-600	15510	51.9	300 +	2.53	41064
Ho 16-606	12243	46.6	263	2.15	43333
Ho 16-608	15593	58.6	266	2.69	43787
Ho 16-609	9460	32.5	291	1.84	35393
Ho 16-610	9773	37.0	265	2.11	35166
Ho 16-624	12779	48.8	259	2.62	36754
Ho 16-626	14098	52.1	271	2.68	38342
Ho 16-627	9968	38.2	263	2.81 +	26771
Ho 16-646	10373	41.5	247	1.85	46736
Ho 16-647	15837	57.0	277	2.72	41745
Ho 16-648	8245	33.4	254	1.79	36754
Ho 16-649	9885	39.3	252	2.63	29948
Ho 16-666	14339	57.5	250	2.50	46056
HoCP 16-672	12609	48.3	261	2.52	38342
HoCP 16-675	12965	45.8	282	2.18	41745
Ho 16-678	12242	44.4	276	2.27	39023
Ho 16-680	11621	43.3	268	2.47	35393
Means	12189	45.7	268	2.35	38843

Table 13. Nursery first-stubble means of the 2016 “Ho” and “HoCP” assignment series across locations (Ardoyne Farm, Iberia Research Station, & Sugar Research Station) in 2018.

Variety	Sugar/ acre (lbs.)	Tons/ acre (tons)	Sugar/ ton (lbs.)	Weight/ stalk (lbs.)	Stalks/ acre (no.)
L 01-299	10713	43.1	247	2.07	41745
HoCP 96-540	10396	45.8	220 -	2.65 +	34145
L 01-283	10695	42.1	254	1.93	43598
HoCP 04-838	8694	35.2	245	2.08	35241
HoCP 09-804	11682	43.4	270 +	1.92	45186
Ho 16-600	13184	49.2	263 +	2.64 +	37132
Ho 16-606	11694	44.8	259	2.20	40800
Ho 16-608	12929	50.5	255	2.30	43636
Ho 16-609	10358	39.7	265 +	1.80	44203
Ho 16-610	9356	38.5	244	1.86	41927
Ho 16-624	10926	45.7	237	2.23	41216
Ho 16-626	11462	45.2	250	2.36	37964
Ho 16-627	11017	45.7	244	2.59 +	35544
Ho 16-646	10541	46.1	227	2.07	44604
Ho 16-647	12634	47.4	265 +	2.71	35090
Ho 16-648	9385	39.9	235	1.86	42539
Ho 16-649	11651	49.6	237	2.51 +	39839
Ho 16-666	11324	49.3	228 -	2.41	40838
HoCP 16-672	9787	42.8	223 -	2.32	36527
HoCP 16-675	13160	49.7	266 +	2.15	45980
Ho 16-678	11587	46.6	251	2.18	42690
Ho 16-680	10316	42.5	240	2.47 +	34409
Means	11081	44.7	247	2.24	40176

Table 14. Nursery plant cane means of the 2017 “Ho” and “HoCP” assignment series on a Sharkey clay soil at the Ardoyne Farm in Schriever, LA in 2018.

Variety	Sugar/ acre (lbs.)	Tons/ acre (tons)	Sugar/ ton (lbs.)	Weight/ stalk (lbs.)	Stalks/ acre (no.)
L 01-299	17123	63.7	269	2.59	49572
HoCP 96-540	18030	67.4	267	3.13	43106
L 01-283	16357	58.5	280	2.27	51614
HoCP 04-838	17424	67.4	258	3.06	43900
HoCP 09-804	19022	65.6	290 +	2.43	54450
HoCP 17-700	14879	60.1	247 -	3.12	38569 -
HoCP 17-701	20600	70.2	294 +	2.95	47530
HoCP 17-702	20492	74.6	275	2.92	51047
HoCP 17-703	20596	74.8	275	3.24 +	46169
HoCP 17-705	16662	57.7	289 +	2.05	56152
HoCP 17-707	17975	69.6	258	3.18	43673
HoCP 17-710	19139	66.4	289 +	3.16	41858 -
HoCP 17-711	11998 -	47.7	250	2.66	35846 -
HoCP 17-713	15661	61.7	254	3.08	39817 -
HoCP 17-714	15681	60.6	252	2.43	49913
HoCP 17-716	15114	58.1	260	3.38 +	34598 -
Ho 17-719	18542	66.6	278	3.15	42539
Ho 17-721	17764	66.1	269	2.82	46736
Ho 17-722	20653	96.7 +	214	3.75 +	51614
Ho 17-724	22670 +	81.3 +	279	3.03	53656
Ho 17-725	19150	66.7	287	2.68	50139
Ho 17-726	16667	64.5	259	3.32 +	38796 -
HoCP 17-728	18172	71.8	253	3.47 +	41064 -
HoCP 17-730	13732	62.4	220	2.55	49118
Ho 17-731	14283	52.0	275	2.36	44127
Ho 17-732	17411	60.2	289 +	2.60	46396
Ho 17-734	19526	72.3	270	3.66 +	39476 -
Ho 17-735	16662	63.9	261	3.50 +	36527 -
Ho 17-736	15520	58.1	268	2.42	48098
Ho 17-738	18700	68.1	275	2.89	47303
Ho 17-745	16358	58.5	279	2.50	46736
Ho 17-749	15338	59.7	257	2.93	40724 -
HoCP 17-750	9763 -	40.6 -	241 -	1.68 -	48438
Ho 17-753	16898	64.1	263	3.17	40611 -
Ho 17-754	14702	61.1	241 -	2.76	44468
Ho 17-755	21123	76.1	278	3.17	48438
Ho 17-756	17215	60.8	283	2.95	41291 -
Ho 17-760	14522	61.4	233 -	2.76	44694
HoCP 17-761	16164	62.1	261	3.27 +	38002 -
Ho 17-768	17197	57.7	298 +	2.22	51841
Means	17156	64.5	266	2.89	45157

Table 15. Nursery plant-cane means of the 2017 “Ho” and “HoCP” assignment series on a Baldwin silty clay soil at the Iberia Research Station in Jeanerette, LA in 2018.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
L 01-299	8211	31.9	257	2.42	26431
HoCP 96-540	5037	21.1	239	2.89 +	14633
L 01-283	7162	28.0	257	1.92 -	29267
HoCP 04-838	11994	45.7	262	2.79	32557
HoCP 09-804	11724	41.3	282 +	2.48	33237
HoCP 17-700	5332	22.1	241	2.46	18037
HoCP 17-701	9847	34.2	288 +	2.43	27906
HoCP 17-702	8196	31.4	258	2.65	23595
HoCP 17-703	12007	45.5	261	3.01 +	30515
HoCP 17-705	10382	37.5	277	1.71 -	43900 +
HoCP 17-707	9429	41.3	228 -	3.13 +	26544
HoCP 17-710	14055 +	50.4 +	279	2.73	36867
HoCP 17-711	8938	35.9	252	2.51	27906
HoCP 17-713	10618	41.6	255	2.92 +	28700
HoCP 17-714	10863	43.1	252	2.43	35506
HoCP 17-716	9026	33.0	273	2.23	29948
Ho 17-719	5944	25.0	241	3.00 +	17129
Ho 17-721	10106	38.4	264	2.78	27679
Ho 17-722	12177	62.8 +	193 -	3.22 +	38909 +
Ho 17-724	12259	46.5	264	2.51	37208
Ho 17-725	11101	40.6	274	2.32	34939
Ho 17-726	13664 +	53.4 +	256	2.99 +	35733
HoCP 17-728	10529	42.4	249	3.35 +	25297
HoCP 17-730	7759	33.0	237	2.58	25410
Ho 17-731	8571	34.2	250	2.20	31082
Ho 17-732	11791	45.7	257	2.43	36867
Ho 17-734	10804	45.2	237	3.19 +	28246
Ho 17-735	9829	40.1	244	3.35 +	24049
Ho 17-736	8484	32.4	262	2.11	30742
Ho 17-738	12228	46.4	264	2.58	36300
Ho 17-745	4563	17.7	258	1.92 -	18490
Ho 17-749	7805	33.7	231 -	2.82	24049
HoCP 17-750	8920	34.5	259	2.22	31082
Ho 17-753	7305	29.3	249	3.11 +	18831
Ho 17-754	8618	32.6	264	2.47	26658
Ho 17-755	13981 +	54.6 +	252	2.97 +	36640
Ho 17-756	12885	48.1	269	3.10 +	31082
Ho 17-760	8141	33.1	246	2.97 +	22347
HoCP 17-761	8689	34.0	256	2.54	26658
Ho 17-768	8458	33.4	253	2.34	28927
Means	9699	38.1	255	2.65	29020

Table 16. Nursery plant cane means of the 2017 “Ho” and “HoCP” assignment series on a Commerce silt loam soil at the Sugar Research Station in St. Gabriel, LA in 2018.

Variety	Sugar/ acre (lbs.)	Tons/ acre (tons)	Sugar/ ton (lbs.)	Weight/ stalk (lbs.)	Stalks/ acre (no.)
L 01-299	11823	43.3	270	2.41	35619
HoCP 96-540	6440	25.9	247	2.89	18037 -
L 01-283	9837	39.1	253	2.01	39023
HoCP 04-838	14676	53.2	276	2.65	40497
HoCP 09-804	16535	57.4	287	2.37	47984 +
HoCP 17-700	14598	58.4	250	2.78	42085
HoCP 17-701	19048	65.3 +	291	3.24 +	40611
HoCP 17-702	13544	51.4	264	2.73	37661
HoCP 17-703	18529	67.1 +	277	3.05 +	43787
HoCP 17-705	14170	47.5	298 +	2.14	44808
HoCP 17-707	15677	64.7 +	242 -	3.26 +	39703
HoCP 17-710	15466	52.8	293	2.67	39590
HoCP 17-711	13053	49.5	263	2.39	41405
HoCP 17-713	12925	48.7	264	2.65	36754
HoCP 17-714	14935	54.3	275	2.64	41064
HoCP 17-716	13571	48.5	280	2.64	35733
Ho 17-719	15175	56.0	270	3.05 +	36867
Ho 17-721	12463	44.8	279	2.56	35279
Ho 17-722	15526	69.9 +	222 -	3.39 +	41972
Ho 17-724	13468	49.0	275	2.70	36300
Ho 17-725	14168	52.3	271	2.45	42879
Ho 17-726	12048	47.2	255	2.64	35733
HoCP 17-728	13891	56.4	246	3.03 +	36981
HoCP 17-730	12308	47.5	259	2.19	43560
Ho 17-731	11805	46.3	254	2.32	40157
Ho 17-732	14939	53.4	280	2.51	42426
Ho 17-734	14039	53.9	260	3.83 +	28359
Ho 17-735	14028	53.5	262	3.09 +	34485
Ho 17-736	10793	39.5	273	2.33	34031
Ho 17-738	12661	49.2	258	2.30	42766
Ho 17-745	14850	53.1	281	2.76	38455
Ho 17-749	14064	55.8	251	2.82	39590
HoCP 17-750	12550	49.7	252	2.60	38228
Ho 17-753	13739	50.8	272	2.79	36413
Ho 17-754	11308	47.4	235 -	2.62	36300
Ho 17-755	18050	65.0 +	278	3.24 +	39590
Ho 17-756	16421	56.7	290	2.84	39930
Ho 17-760	14166	56.4	249	3.05 +	36867
HoCP 17-761	12472	45.2	276	2.82	32103
Ho 17-768	10260	39.1	262	2.29	34258
Means	13756	51.7	266	2.72	38221

Table 17. Nursery plant cane means of the 2017 “Ho” and “HoCP” assignment series across locations (Ardoyne Farm, Iberia Research Station, & Sugar Research Station) in 2018.

Variety	Sugar/ acre (lbs.)	Tons/ acre (tons)	Sugar/ ton (lbs.)	Weight/ stalk (lbs.)	Stalks/ acre (no.)
L 01-299	12386	46.3	265	2.47	37208
HoCP 96-540	9836	38.2	251	2.97 +	25259 -
L 01-283	11119	41.8	263	2.06 -	39968
HoCP 04-838	14698	55.4	265	2.83 +	38985
HoCP 09-804	15760 +	54.8	286 +	2.43	45224 +
HoCP 17-700	11603	46.9	246 -	2.78	32897
HoCP 17-701	16498 +	56.6	291 +	2.88 +	38682
HoCP 17-702	14077	52.5	266	2.77	37434
HoCP 17-703	17044 +	62.5 +	271	3.10 +	40157
HoCP 17-705	13738	47.5	288 +	1.97 -	48287 +
HoCP 17-707	14360	58.5 +	243 -	3.19 +	36640
HoCP 17-710	16220 +	56.5	287 +	2.85 +	39438
HoCP 17-711	11329	44.4	255	2.52	35052
HoCP 17-713	13068	50.7	258	2.88 +	35090
HoCP 17-714	13458	51.1	263	2.51	40611
HoCP 17-716	12370	46.2	269	2.77	33426
Ho 17-719	13220	49.2	263	3.07 +	32178
Ho 17-721	13444	49.8	271	2.72	36565
Ho 17-722	16119 +	76.5 +	209 -	3.45 +	44165
Ho 17-724	16665 +	60.9 +	272	2.75	43605
Ho 17-725	14806	53.2	277	2.48	42653
Ho 17-726	14126	55.0	257	2.98 +	36754
HoCP 17-728	14198	56.8 +	249 -	3.28 +	34447
HoCP 17-730	11266	47.6	239 -	2.44	39363
Ho 17-731	11553	44.2	260	2.29	38455
Ho 17-732	14714	53.1	275	2.51	41896
Ho 17-734	14790	57.1 +	256	3.56 +	32027
Ho 17-735	13506	52.5	256	3.31 +	31687
Ho 17-736	11599	43.3	268	2.29	37623
Ho 17-738	14530	54.6	266	2.59	42123
Ho 17-745	11924	43.1	273	2.39	34561
Ho 17-749	12402	49.7	247 -	2.85 +	34788
HoCP 17-750	10411	41.6	251	2.17	39249
Ho 17-753	12647	48.1	261	3.02 +	31952
Ho 17-754	11543	47.0	247 -	2.62	35808
Ho 17-755	17718 +	65.2 +	270	3.13 +	41556
Ho 17-756	15507 +	55.2	280	2.96 +	37434
Ho 17-760	12276	50.3	243 -	2.92 +	34636
HoCP 17-761	12442	47.1	264	2.87 +	32254
Ho 17-768	11972	43.4	271	2.28	38342
Means	13536	51.4	262	2.75	37466

2018 LOUISIANA VARIETY DEVELOPMENT PROGRAM INFIELD TRIALS

E. O. Dufrene, M. J. Duet, F. J. Adams, L. Lovell, and J. R. Todd
USDA-ARS, Sugarcane Research Unit (SRU)
Houma, LA

M. J. Pontiff and G. L. Hawkins
LSU AgCenter Sugar Research Station
St. Gabriel, LA

The infield stage of variety development is the first stage in which yield estimates are based on plot weights instead of estimated yields derived from stalk population and stalk weight. 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. In 2018, tests were planted at USDA's Ardoyne Farm in Schriever and commercial farms located in Vacherie and Maurice, LA representing three distinct regions and soil types of the Louisiana sugarcane industry.

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 with a four-foot alley between plots. 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 to estimate stalk weight and processed through the pre-breaker/press for an estimation of sucrose content and fiber content. Brix (% w/w) and pol reading (Z°) 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 TRS 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 19. Statistical analyses were done for each test and for each series across locations using PROC MIXED procedures in SAS (version 9.4). For 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 2018.

'Ho' Series	'L' Series	Location[1/]	Soil Series [2/]	Planting Date	Harvest Dates			
					2015	2016	2017	2018
2012		AFH	Sc	9/25/14	11/24	10/21	10/18	10/24
2012	2013	BLK	Csl	8/26/14	12/16	10/13	10/16	10/03
2012	2013	VAL	Pasl	9/11/14	12/29	12/07	-	-
2013		AFH	Sc	9/25/15		11/16	10/18	10/24
2013	2014	BLK	Csl	8/25/15		12/07	10/16	10/03
2013	2014	VAL	Pasl	9/10/15		12/07	-	11/02
2014		AFH	Sc	10/06/16			11/22	10/24
2014	2015	BLK	Csl	9/21/16			12/04	10/03
2014	2015	STG	Sc	9/30/16			11/16	12/13
2015		AFH	Sc	8/23/17				12/14
2015	2016	BLK	Csl	9/06/17				12/05
2015	2016	CAF	Co	8/24/17				11/28
2016		AFH	Sc	8/23/18				
2016	2017	BLK	Csl	9/17/18				
2016	2017	CAF	Co	8/15/18				

[1/] AFH = Ardoyne Farm heavy soil in Schriever, BLK = Blackberry Farm in Vacherie, CA = Circle A Farm in Maurice, VAL = Vallot Farm in Erath.

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

Table 2. Infield third-stubble means of the 2012 "Ho" assignment series on a Sharkey clay soil at Ardoyne Farm in Schriever, LA in 2018.

Variety	Sugar/ acre (lbs.)		Tons/ acre (tons)		Sugar/ ton (lbs.)		Weight/ stalk (lbs.)	Stalks/ acre (no.)	Fiber (%)	
L 01-299	6890		36.1		192		1.95	37076	12.5	
HoCP 96-540	5490	-	29.9	-	184		1.94	30893	11.5	-
L 01-283	6680		32.1		209		1.61	39624	12.0	-
HoCP 04-838	5837		28.4	-	206		1.86	31146	12.4	
Ho 12-615	7445		36.0		207		1.83	39831	12.4	
Ho 12-630	8793	+	41.3		213	+	2.17	37990	10.9	-
Means	6856		33.9		202		1.89	36093	11.9	

Table 3. Infield third-stubble means of the 2012 “Ho” assignment series on a Commerce silt loam soil at Blackberry Farm in Vacherie, LA in 2018.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
L 01-299	7324	44.0	167	1.36	66580	12.7
HoCP 96-540	3933 -	24.8 -	159	1.65	30066 -	12.5
L 01-283	6681	32.2 -	207	1.51	42587 -	12.5
HoCP 04-838	6359	30.3 -	208	1.59	38248 -	13.2
Ho 12-615	7336	41.7	176	1.33	64524	13.4
Ho 12-630	6637	33.0 -	200	1.66	39619 -	12.0
Means	6378	34.3	186	1.52	46937	12.7

Table 4. Infield third-stubble means of the 2012 “Ho” assignment series across two locations (Ardoyne Farm and Blackberry Farm) in 2018.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
L 01-299	7107	40.0	179	1.65	51828	12.6
HoCP 96-540	4711	27.3	172	1.79	30479	12.0
L 01-283	6681	32.2	208 +	1.56	41106	12.2
HoCP 04-838	6098	29.3	207 +	1.72	34697	12.8
Ho 12-615	7390	38.8	191	1.58	52177	12.9
Ho 12-630	7715	37.1	207 +	1.92	38805	11.5 -
Means	6617	34.1	194	1.70	41515	12.3

Table 5. Infield second-stubble means of the 2013 "Ho" assignment series on a Sharkey clay soil at Ardoyne Farm in Schriever, LA in 2018.

Variety	Sugar/ acre (lbs.)		Tons/ acre (tons)	Sugar/ ton (lbs.)		Weight/ stalk (lbs.)	Stalks/ acre (no.)		Fiber (%)	
L 01-299	7119		36.1	198		1.78	41605		12.1	
HoCP 96-540	6791		33.7	202		2.04	33824		11.1	
L 01-283	7573		34.4	219		1.46	47551		11.5	
HoCP 04-838	5981		27.9	214		1.97	28377		12.7	
Ho 11-573	6192		29.8	208		2.10	28427		11.7	
Ho 13-739	9524	+	40.8	234	+	1.95	41786		11.6	
HoCP 13-758	6739		32.2	210		2.22	29329		9.8	-
Means	7131		33.6	212		1.93	35843		11.5	

Table 6. Infield second-stubble means of the 2013 "Ho" and 2014 "L" assignment series on a Commerce silt loam soil at Blackberry Farm in Vacherie, LA in 2018.

Variety	Sugar/ acre (lbs.)		Tons/ acre (tons)	Sugar/ ton (lbs.)		Weight/ stalk (lbs.)	Stalks/ acre (no.)		Fiber (%)	
L 01-299	8351		46.5	180		1.70	55071		13.2	
HoCP 96-540	7715		39.2	192		2.03	39428		11.9	
L 01-283	8032		41.7	192		1.43	59086		11.7	
HoCP 04-838	8376		38.7	216	+	1.68	46095		11.6	
Ho 11-573	6593		35.1	188		2.01	34952	-	11.0	
Ho 13-739	8564		39.1	219	+	1.90	41179		11.9	
HoCP 13-758	8115		39.0	208		1.74	45094		10.5	-
L 14-267	8048		38.3	211		1.86	41696		12.3	
Means	7974		39.7	201		1.79	45325		11.8	

Table 7. Infield second-stubble means of the 2013 “Ho” and 2014 “L” assignment series on a Patoutville silt loam soil at Vallot Farm in Erath, LA in 2018.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
L 01-299	8333	38.3	218	2.11	36518	13.0
HoCP 96-540	7756	33.0	235	2.30	28639	11.1 -
L 01-283	9829	38.3	257 +	1.83	42205	11.4 -
HoCP 04-838	8997	39.7	227	2.00	39696	13.0
Ho 11-573	8534	36.3	236	2.75 +	26682 -	11.8 -
Ho 13-739	8674	34.3	252 +	2.41	28478	11.7 -
HoCP 13-758	8151	31.5	260 +	2.44	25838 -	10.3 -
L 14-267	9217	38.9	237	2.57 +	30421	11.0 -
Means	8686	36.3	240	2.30	32310	11.7

Table 8. Infield second-stubble means of the 2013 “Ho” and 2014 “L” assignment series across two locations (Blackberry Farm and Vallot Farm) in 2018.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
L 01-299	8342	42.4	199	1.90	45795	13.1
HoCP 96-540	7735	36.1	213	2.16	34033 -	11.5 -
L 01-283	8930	40.0	225	1.63	50646	11.5 -
HoCP 04-838	8687	39.2	222	1.84	42896	12.3
Ho 11-573	7563	35.7	212	2.38 +	30817 -	11.4 -
Ho 13-739	8619	36.7	236	2.15	34829 -	11.8 -
HoCP 13-758	8133	35.3	234	2.09	35466 -	10.4 -
L 14-267	8632	38.6	224	2.21	36058 -	11.6 -
Means	8330	38.0	220	2.04	38817	11.7

Table 9. Infield second-stubble means of the 2013 "Ho" assignment series across three locations (Ardoyne Farm, Blackberry Farm and Vallot Farm) in 2018.

Variety	Sugar/ acre (lbs.)	Tons/ acre (tons)	Sugar/ ton (lbs.)	Weight/ stalk (lbs.)	Stalks/ acre (no.)	Fiber (%)
L 01-299	7934	40.3	198	1.86	44398	12.8
HoCP 96-540	7420	35.3	210	2.12 +	33964 -	11.4 -
L 01-283	8478	38.2	223 +	1.57 -	49614	11.5 -
HoCP 04-838	7785	35.4	219 +	1.88	38056	12.4
Ho 11-573	7106	33.7	210	2.28 +	30021 -	11.5 -
Ho 13-739	8920	38.1	235 +	2.09 +	37148 -	11.7 -
HoCP 13-758	7669	34.2	226 +	2.13 +	33420 -	10.2 -
Means	7902	36.5	217	1.99	38089	11.7

Table 10. Infield first-stubble means of the 2014 "Ho" assignment series on a Sharkey clay soil at Ardoyne Farm in Schriever, LA in 2018.

Variety	Sugar/ acre (lbs.)	Tons/ acre (tons)	Sugar/ ton (lbs.)	Weight/ stalk (lbs.)	Stalks/ acre (no.)	Fiber (%)
L 01-299	8274	36.9	224	2.01	36758	13.5
HoCP 96-540	7624	37.8	202	2.65 +	28440	12.1 -
L 01-283	7766	34.1	228	1.68	40760	12.0 -
HoCP 04-838	7723	38.8	199	1.85	42762	12.6
HoCP 09-804	9404	39.6	238	1.71	46381	12.2 -
HoCP 14-802	7901	37.6	211	2.05	37120	13.2
HoCP 14-885	11177	45.5	246	2.40	37895	11.1 -
Means	8552	38.6	221	2.05	38588	12.4

Table 11. Infield first-stubble means of the 2014 "Ho" and 2015 "L" assignment series on a Commerce silt loam soil at Blackberry Farm in Vacherie, LA in 2018.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
L 01-299	8535	44.0	194	1.65	53626	12.7
HoCP 96-540	7915	44.8	176	1.81	49544	10.8
L 01-283	8522	40.7	209	1.58	51585	11.6
HoCP 04-838	6761	37.4	180	1.70	44210 -	11.5
HoCP 09-804	8738	42.0	208	1.62	51949	12.1
HoCP 14-802	9411	51.3 +	184	1.83	56302	14.6
HoCP 14-885	11912 +	49.7	240 +	1.89	52604	10.4 -
L 15-306	9361	43.1	217	1.58	54723	10.1 -
L 15-317	8527	36.8 -	232	2.11 +	34952 -	13.0
Means	8853	43.3	204	1.75	49944	11.9

Table 12. Infield first-stubble means of the 2014 "Ho" and 2015 "L" assignment series on a Sharkey clay soil at St. Gabriel Research Station[3/] in St. Gabriel, LA in 2018.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
L 01-299	12496	50.8	246	2.53	40118	13.0
HoCP 96-540	12766	55.6	230	2.97	37494	14.2
L 01-283	10685	45.0	237	2.25	40120	11.5
HoCP 04-838	9164	38.2	240	1.78	42954	13.4
HoCP 09-804	12787	46.9	273	2.14	43849	13.7
HoCP 14-802	11104	48.6	229	2.21	43972	14.4
HoCP 14-885	14218	54.2	262	2.88	37659	11.3
L 15-306	12135	45.6	266	2.15	42441	12.6
L 15-317	8927	30.4	293	2.78	21888	14.0
Means	11587	46.2	253	2.41	38944	13.1

[3/] Only one rep harvested at this location.

Table 13. Infield first-stubble means of the 2014 "Ho" and 2015 "L" assignment series across two locations (Blackberry Farm and St. Gabriel Research Station[3/]) in 2018.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
L 01-299	10376	46.9	219	2.08	47325	12.9
HoCP 96-540	10130	49.4	202	2.37	43729	12.2
L 01-283	9609	42.5	226	1.91	45964	11.7
HoCP 04-838	7948 -	37.6 -	208	1.76	41993	12.3
HoCP 09-804	10616	44.1	237	1.88	47450	12.8
HoCP 14-802	10300	50.0	206	2.03	50394	14.7
HoCP 14-885	13058 +	51.6	255 +	2.37	45823	10.8
L 15-306	10704	44.1	241	1.87	48830	11.1
L 15-317	8874	33.9 -	260 +	2.44	28799 -	13.5
Means	10179	44.5	228	2.08	44479	12.4

[3/] Only one rep harvested at this location.

Table 14. Infield first-stubble means of the 2014 "Ho" assignment series across three locations (Ardoyne Farm, Blackberry Farm and St. Gabriel Research Station[3/]) in 2018.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
L 01-299	9565	43.2	221	2.04	43702	13.1
HoCP 96-540	9110	44.8	201 -	2.45 +	38330	12.3
L 01-283	8994	39.6	226	1.82	44455	11.7 -
HoCP 04-838	7968 -	38.8	204 -	1.81	43048	12.5
HoCP 09-804	10156	42.7	237 +	1.82	47619	12.6
HoCP 14-802	9487	46.0	208	2.04	45762	14.1
HoCP 14-885	12421 +	49.6 +	251 +	2.37	43175	10.9 -
Means	9672	43.5	221	2.05	43727	12.4

[3/] Only one rep harvested at this location.

Table 15. Infield plant-cane means of the 2015 “Ho” assignment series on a Sharkey clay soil at Ardoyne Farm in Schriever, LA in 2018.

Variety	Sugar/ acre		Tons/ acre		Sugar/ ton		Weight/ stalk		Stalks/ acre		Fiber	
	(lbs.)		(tons)		(lbs.)		(lbs.)		(no.)		(%)	
L 01-299	15428		65.7		235		2.33		59081		12.4	
HoCP 96-540	13069		54.7		240		2.78		39572	-	12.8	
L 01-283	13037		48.4	-	269	+	2.65		37363	-	11.1	
HoCP 04-838	13157		55.9	-	236		2.64		42622		12.8	
HoCP 09-804	13671		49.1	-	278	+	1.97		50239		12.0	
HoL 15-508	11433	-	39.4	-	290	+	2.86		27857	-	9.2	-
Ho 15-918	12497	-	44.8	-	279	+	3.32	+	27007	-	10.9	
Ho 15-930	11441	-	42.9	-	267	+	4.16	+	20930	-	11.8	
Ho 15-960	11805	-	47.9	-	247		2.88		33346	-	12.7	
Ho 15-971	12825		49.5	-	259	+	3.42	+	29091	-	11.2	
Ho 15-972	11377	-	47.3	-	240		2.77		34277	-	12.9	
HoCP 15-987	13127		53.4	-	245		3.84	+	28002	-	12.6	
HoL 15-993	12898		47.0	-	274	+	2.70		34888	-	12.7	
Means	12751		49.7		258		2.95		35713		11.9	

Table 16. Infield plant-cane means of the 2015 “Ho” and 2016 “L” assignment series on a Commerce silt loam soil at Blackberry Farm in Vacherie, LA in 2017.

Variety	Sugar/ acre (lbs.)		Tons/ acre (tons)		Sugar/ ton (lbs.)		Weight/ stalk (lbs.)		Stalks/ acre (no.)		Fiber (%)	
L 01-299	10451		44.7		234		2.20		40739		12.7	
HoCP 96-540	9902		44.9		220		2.60		34821		11.2	
L 01-283	12399		44.2		280	+	2.13		41688		12.5	
HoCP 04-838	9387		38.7		243		2.46		31445		14.2	
HoCP 09-804	10154		39.3		258		1.85		42506		13.1	
HoL 15-508	14080	+	48.5		290	+	2.29		42359		10.1	-
Ho 15-918	12775		48.7		263	+	3.13	+	31254		12.2	
Ho 15-930	11005		43.4		254		3.55	+	24798	-	11.5	
Ho 15-960	11378		47.8		238		2.53		39009		11.1	
Ho 15-971	10959		40.5		271	+	2.56		31494		12.1	
Ho 15-972	12112		47.0		258		2.28		41534		12.5	
HoCP 15-987	12414		49.7		250		2.37		41958		11.9	
HoL 15-993	11840		43.9		269	+	2.06		42842		12.6	
L 16-353	11058		42.0		263	+	2.00		42351		11.2	
L 16-360	10853		42.0		259		2.03		41457		13.1	
L 16-372	8086		29.5	-	274	+	2.32		25409	-	10.7	-
L 16-375	9932		38.7		257		2.21		35070		12.5	
L 16-386	12501		45.4		275	+	3.02	+	31664		12.8	
L 16-391	9407		37.3		253		2.04		37528		12.3	
Means	11089		42.9		258		2.40		36838		12.1	

Table 17. Infield plant-cane means of the 2015 “Ho” and 2016 “L” assignment series on a Coteau-Patoutville-Frost silt loam soil at Circle A Farm in Maurice, LA in 2018.

Variety	Sugar/ acre (lbs.)		Tons/ acre (tons)	Sugar/ ton (lbs.)		Weight/ stalk (lbs.)		Stalks/ acre (no.)	Fiber (%)	
L 01-299	9301		40.8	228		2.55		32098	12.9	
HoCP 96-540	7720		34.1	225		2.92		23291	11.2	-
L 01-283	7254		31.2	232		2.54		24331	11.1	-
HoCP 04-838	8416		35.3	239		2.23		32495	12.6	
HoCP 09-804	8445		34.7	243		2.16		32445	13.5	
HoL 15-508	.		.	274	+	2.43		.	9.5	-
Ho 15-918	10992		45.8	240		3.12		29631	12.2	
Ho 15-930	12090	+	49.1	247		3.43	+	28449	11.8	
Ho 15-960	10520		46.5	226		3.32	+	28508	12.2	
Ho 15-971	10423		41.9	249	+	2.88		29123	11.3	-
Ho 15-972	9769		43.1	226		2.22		39028	12.2	
HoCP 15-987	9110		39.2	231		2.76		28614	10.9	-
HoL 15-993	9709		37.0	262	+	2.38		31149	11.9	
L 16-353	9194		35.4	259	+	2.21		32030	10.5	-
L 16-360	8907		38.8	229		2.72		28726	12.1	
L 16-372	10168		41.4	245		2.44		34254	9.8	-
L 16-375	8695		35.6	245		2.68		27618	12.0	
L 16-386	9651		40.2	240		3.36	+	23965	12.0	
L 16-391	7355		32.4	227		2.33		27818	12.4	
Means	9318		39.0	240		2.66		29643	11.7	

Table 18. Infield plant-cane means of the 2015 “Ho” and 2016 “L” assignment series across two locations (Circle A Farm & Blackberry Farm) in 2018.

Variety	Sugar/ acre (lbs.)	Tons/ acre (tons)	Sugar/ ton (lbs.)	Weight/ stalk (lbs.)	Stalks/ acre (no.)	Fiber (%)
L 01-299	9876	42.8	231	2.37	36419	12.8
HoCP 96-540	8811	39.5	223	2.76	29056	11.2 -
L 01-283	9826	37.7	256 +	2.34	33009	11.8
HoCP 04-838	8902	37.0	241	2.34	31970	13.4
HoCP 09-804	9299	37.0	250	2.00	37475	13.3
HoL 15-508	14080	48.5	282 +	2.36	42359	9.8 -
Ho 15-918	11883	47.3	251 +	3.12 +	30442	12.2
Ho 15-930	11548	46.3	250	3.49 +	26623	11.7 -
Ho 15-960	10949	47.2	232	2.92 +	33759	11.6 -
Ho 15-971	10691	41.2	260 +	2.72	30309	11.7 -
Ho 15-972	10941	45.0	242	2.25	40281	12.4
HoCP 15-987	10762	44.4	241	2.57	35286	11.4 -
HoL 15-993	10775	40.5	266 +	2.22	36995	12.3
L 16-353	10126	38.7	261 +	2.10	37191	10.8 -
L 16-360	9880	40.4	244	2.37	35092	12.6
L 16-372	9127	35.5	260 +	2.38	29831	10.2 -
L 16-375	9313	37.1	251 +	2.44	31344	12.2
L 16-386	11076	42.8	258 +	3.19 +	27815	12.4
L 16-391	8381	34.8	240	2.18	32673	12.3
Means	10227	41.0	249	2.53	33338	11.9

Table 19. Infield plant-cane means of the 2015 “Ho” assignment series across three locations (Ardoyne Farm, Blackberry Farm & Circle A Farm) in 2018.

Variety	Sugar/ acre (lbs.)	Tons/ acre (tons)	Sugar/ ton (lbs.)	Weight/ stalk (lbs.)	Stalks/ acre (no.)	Fiber (%)
L 01-299	11726	50.4	232	2.36	43973	12.7
HoCP 96-540	10230	44.6	228	2.77	32562	11.7
L 01-283	10897	41.3	261 +	2.44	34460	11.6
HoCP 04-838	10320	43.3	239	2.44	35521	13.2
HoCP 09-804	10757	41.0	260 +	1.99	41730	12.9
HoL 15-508	12756	44.0	285 +	2.53	35108	9.6 -
Ho 15-918	12088	46.4	261 +	3.19 +	29297	11.7
Ho 15-930	11512	45.1	256 +	3.71 +	24726	11.7
Ho 15-960	11234	47.4	237	2.91 +	33621	12.0
Ho 15-971	11402	44.0	260 +	2.95 +	29903	11.5 -
Ho 15-972	11086	45.8	242	2.42	38280	12.5
HoCP 15-987	11550	47.4	242	2.99 +	32858	11.8
HoL 15-993	11482	42.6	269 +	2.38	36293	12.4
Means	11273	44.9	252	2.70	34471	12.0

2018 LOUISIANA SUGARCANE VARIETY DEVELOPMENT PROGRAM OUTFIELD VARIETY TRIALS

David Sexton and Collins Kimbeng
Sugar Research Station

Edwis Dufrene and Mike Duet
USDA-ARS, Sugarcane Research Laboratory

Herman Waguespack, Jr., Atticus Finger and Wilson Judice
American Sugar Cane League

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 2018 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 2018 were HoCP96-540, L01-283, and L01-299 occupying 20%, 14%, and 51% 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-three experimental varieties representing the 2016 assignment series were introduced to outfield locations for seed increase in 2018 (Table 1). Nineteen experimental and five commercial varieties were planted at 9 outfield locations. Thirty-three tests were harvested in 2018 including ten plantcane, ten first-stubble, eight second-stubble, and five 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 2018 Louisiana sugarcane crop experienced a cold start in January, with the industry experiencing temperatures in the mid-teens at both the beginning and middle of January. February proved to be the warmest winter month in weather record history since 1893. Spring temperatures were cooler than average, and the crop was short throughout the summer. Planting was delayed for most growers by 7 – 10 days. The Louisiana sugar industry was not affected by tropical activity during 2018. Warmer than average temperatures in September and October improved the crop tremendously. The industry received higher than normal rainfall amounts throughout the 2018 season. Baton Rouge recorded 65.39" of rainfall in 2018, which is about 5 inches above normal. Because of the wet weather during the planting season, only nine of the twelve outfield trials were able to be planted. Harvesting of the trials began on October 16, 2018. The industry experienced sub-freezing temperatures in mid-November, which affected the northern area more than the areas further south. The outfield harvest was completed on January 10, 2019. All mills in the Louisiana industry completed grinding by January 19, 2019.

Experimental varieties L 12-201, Ho 12-615 and Ho 12-630 were harvested in plant cane and second stubble and are eligible for release in 2019.

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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 2018.

Commercial Varieties	Experimental Varieties			Experimental Varieties Introduced to the Outfield			
HoCP96-540	Ho11-573	HoCP14-802	Ho15-960	L16–353	Ho 16-600	Ho 16-626	Ho 16-666
L01-299	L12-201	HoCP14-885	Ho15-971	L16–360	Ho 16-606	Ho 16-627	HoCP 16-672
HoCP04-838	Ho12-615	L15-306	Ho15-972	L16–372	Ho 16-608	Ho 16-646	HoCP 16-675
HoCP09-804	Ho12-630	L15-317	HoCP15-987	L16–375	Ho 16-609	Ho 16-647	HoCP 16-678
L11-183	Ho13-739	HoL15-508	HoL15-993	L16–386	Ho 16-610	Ho 16-648	HoCP16-680
	HoCP13-758	Ho15-918		L16–391	Ho 16-624	Ho 16-649	
	L14-267	Ho15-930					

Table 2. Harvest and planting dates for all outfield locations harvested in 2018.

Location	Parish	Plantcane			First-stubble		Second-stubble		Third-stubble	
		2018 Planting Date	2018 Harvest Date	2017 Planting Date	2018 Harvest Date	2016 Planting Date	2018 Harvest Date	2015 Planting Date	2018 Harvest Date	2014 Planting Date
Al Landry	Iberville	08/28	12/10	09/13	**	09/28	12/10	09/02	**	08/27
Allains	St. Mary	*	**	09/21	01/10/19	10/11	01/10/19	09/23	**	10/13
Alma	Pointe Coupee	09/21	10/23	09/20	10/23	10/04	10/24	09/26	10/23	10/09
Brunswick	Pointe Coupee	09/24	11/26	09/22	11/26	09/19	10/30	09/09	10/30	09/17
Domingue	Vermilion	10/12	**	*	**	*	**	*	**	*
Frank Martin	St. Mary	*	**	*	**	09/27	**	08/14	**	10/08
Glenwood	Assumption	*	01/07/19	08/24	11/19	09/21	10/16	09/16	10/16	10/07
Harper Farms	Rapides	09/14	11/08	09/18	11/08	09/16	**	*	**	*
Lanaux	St. John	08/15	12/11	09/07	11/30	08/31	11/02	08/19	11/02	08/25
Levert-St. John	St. Martin	09/18	12/12	09/08	12/12	09/20	11/07	09/15	**	09/10
Magnolia	Terrebonne	10/15	11/16	09/11	11/16	10/01	**	09/17	**	10/27
Mary	Lafourche	*	12/24	09/28	12/24	10/10	**	10/08	**	10/28
Ronald Hebert	Iberia	09/19	12/04	09/14	12/04	08/25	11/06	09/01	11/06	09/29

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

Table 3. Plantcane sugar per acre for six commercial and nine experimental varieties at ten outfield locations in 2018.

	HEAVY				LIGHT						
Variety	Alma	Landry	Magnolia	Mary	Brunswick	Glenwood	Harper	Lanaux	Ronald Hebert	Levert St. John	Overall Mean
						(lbs./A)					
HoCP96-540	5055 -	10209	9544	10520	5292	7907	5809	9508	7268 -	7119	7823 -
L01-283	8383	12016	9840	11185	7448	9470	7968	10181	9744	7842	9408
L01-299	8845	11848	9371	10528	7792	9460	6330	9626	10432	7742	9197
HoCP04-838	11224 +	12203	8188	11155	7214	10804	9540 +	9290	7941 -	8112	9567
HoCP09-804	8672	11445	10253	12678	6804	9505	8540 +	10967	10892	8360	9812
L11-183	5932 -	11562	10913	11730	6855	10052	8376 +	9981	8911	8284	9260
Ho11-573	10054	11002	9541	13377	6179	11219 +	7444	10221	11267	7883	9819
L12-201	8361	11686	10588	11344	8144	11924 +	8361 +	10730	9267	7899	9830
Ho12-615	8913	12243	10487	13069	7715	10819	9857 +	12700 +	11159	8629	10559 +
Ho12-630	9902	-------	9844	11688	6496	11190	8943 +	10927	7591 -	8237	9635
Ho13-739	8783	10550	9407	11543	7316	10885	8840 +	10341	11104	8480	9725
HoCP13-758	11771 +	12936	10797	12972	8328	11118	8731 +	10669	9466	7738	10452 +
L14-267	8402	11085	10590	12114	7203	10472	8218 +	10397	9353	8675	9651
HoCP14-802	8069	11701	10058	12484	7063	9204	9503 +	10645	9171	8054	9595
HoCP14-885	10929	11979	10864	12982	8147	11415 +	8319 +	11425 +	11500	9114	10667 +

Table 4. Plantcane cane yield for six commercial and nine experimental varieties at ten outfield locations in 2018.

	HEAVY				LIGHT						
Variety	Alma	Landry	Magnolia	Mary	Brunswick	Glenwood	Harper	Lanaux	Ronald Hebert	Levert St. John	Overall Mean
						(tons/A)					
HoCP96-540	26.7 -	31.3	38.9	40.9	23.4	36.3	26.7	34.1	30.5 -	30.5	31.9 -
L01-283	39.3	38.1	34.7	39.8	31.5	38.9	32.6	32.0	36.7	32.6	35.6
L01-299	40.5	38.8	34.3	38.6	34.4	38.8	29.8	32.9	38.8	31.6	35.9
HoCP04-838	43.8	39.6	29.3	41.0	29.3	40.3	38.1 +	31.7	30.8 -	31.5	35.5
HoCP09-804	37.4	35.8	34.9	42.9	27.4	34.0	32.3	35.2	39.5	31.9	35.1
L11-183	31.2 -	35.5	38.8	43.0	30.4	39.6	34.5	36.7	40.2	34.1	36.4
Ho11-573	44.8	38.4	36.5	50.7	29.5	45.9	31.9	34.2	42.2	32.7	38.7 +
L12-201	41.0	35.9	39.3	42.2	33.5	44.8	34.2	35.5	37.5	29.9	37.4
Ho12-615	44.1	38.6	36.8	48.1	34.6	43.3	41.9 +	43.4 +	43.1	36.6	41.1 +
Ho12-630	42.6	-------	34.3	41.8	30.0	43.4	33.5	35.9	31.0 -	31.8	36.1
Ho13-739	37.9	33.5	31.0	41.7	31.0	41.6	37.9 +	33.1	39.4	32.3	35.9
HoCP13-758	47.8 +	41.1	38.2	46.0	32.3	44.1	35.3	35.7	34.3	29.4	38.4
L14-267	38.5	34.7	37.3	43.0	28.8	42.4	35.9 +	33.2	38.2	33.3	36.5
HoCP14-802	37.7	40.0	40.0	48.0	34.0	38.2	40.7 +	36.8	39.0	34.6	38.9 +
HoCP14-885	43.9	37.7	38.3	42.5	32.9	43.5	34.2	36.0	40.4	33.6	38.3

Table 5. Plantcane sugar per ton for six commercial and nine experimental varieties at ten outfield locations in 2018.

	HEAVY				LIGHT						
Variety	Alma	Landry	Magnolia	Mary	Brunswick	Glenwood	Harper	Lanaux	Ronald Hebert	Levert St. John	Overall Mean
						(lbs./tons)					
HoCP96-540	189	326 +	246 -	257	227	219	218	279	238 -	233	243 -
L01-283	215	317	285	281	233	243	244 +	318 +	266	241	265
L01-299	218	306	274	273	226	243	210	293	269	245	256
HoCP04-838	257 +	308	279	273	246	268	251 +	293	257	257	269 +
HoCP09-804	232	320	294	296 +	247	280	265 +	311 +	276	262	278 +
L11-183	189	327 +	281	273	228	254	243 +	270 -	222 -	244	253
Ho11-573	225	286 -	264	264	209	244	233	299	267	241	253
L12-201	203	326 +	269	270	242	266	244 +	302	247	262	263
Ho12-615	201	317	285	272	223	250	235	292	259	235	257
Ho12-630	232	-------	287	280	217	258	267 +	305	244	259	267 +
Ho13-739	233	315	302 +	277	239	262	235	313 +	282	263	272 +
HoCP13-758	246	315	282	282	258	251	247 +	299	276	263	272 +
L14-267	217	319	283	282	251	247	229	313 +	242 -	261	265
HoCP14-802	213	293	252	260	207	241	232	290	235 -	233	246 -
HoCP14-885	248	318	282	306 +	248	261	242 +	317 +	285	271 +	278 +

Table 6. Plantcane stalk weight for six commercial and nine experimental varieties at ten outfield locations in 2018.

	HEAVY				LIGHT						
Variety	Alma	Landry	Magnolia	Mary	Brunswick	Glenwood	Harper	Lanaux	Ronald Hebert	Levert St. John	Overall Mean
						(lbs.)					
HoCP96-540	3.79 +	2.84	2.95	3.11	2.28	3.16 +	3.46 +	2.75 +	3.30 +	2.42	3.01 +
L01-283	2.47	2.19 -	2.14	2.49	2.25	2.32	2.02	2.41	2.32	2.47	2.31 -
L01-299	2.35	3.04	2.61	2.74	2.47	2.51	2.24	2.18	2.43	2.75	2.53
HoCP04-838	2.61	2.64	2.82	2.37	2.15	2.42	2.54	2.42	2.69	2.31	2.50
HoCP09-804	2.11	2.15 -	2.23	2.29	1.92	1.87 -	1.94	2.12	2.16	1.98 -	2.08 -
L11-183	2.61	2.56	2.57	3.13	2.22	2.58	2.68	2.49	2.50	2.58	2.59
Ho11-573	3.20 +	3.46	3.44 +	3.82 +	2.46	3.49 +	2.93 +	3.13 +	3.25 +	3.01	3.22 +
L12-201	3.37 +	2.68	3.56 +	3.36 +	2.97	3.35 +	3.30 +	3.08 +	2.93	2.83	3.14 +
Ho12-615	2.49	1.99 -	2.12	2.19 -	2.17	2.39	2.30	2.55	2.40	2.38	2.30 -
Ho12-630	2.97	-------	3.15 +	3.67 +	2.31	2.76	2.51	2.71 +	2.69	2.68	2.83 +
Ho13-739	3.10	2.95	3.03	3.27 +	2.67	3.00	2.93 +	2.84 +	3.34 +	3.01	3.01 +
HoCP13-758	2.88	2.96	2.93	3.07	2.07	2.63	2.45	2.69 +	2.55	2.27 -	2.65
L14-267	3.25 +	3.08	3.03	3.26 +	2.98	3.28 +	2.86 +	3.03 +	2.98	3.17	3.09 +
HoCP14-802	2.72	2.27 -	2.42	2.58	2.08	2.28	2.48	2.66 +	2.34	2.56	2.44
HoCP14-885	2.70	2.78	2.96	2.89	2.26	2.89	2.88 +	2.90 +	2.88	2.66	2.78 +

Table 7. Plantcane stalk number for six commercial and nine experimental varieties at ten outfield locations in 2018.

	HEAVY				LIGHT						
Variety	Alma	Landry	Magnolia	Mary	Brunswick	Glenwood	Harper	Lanaux	Ronald Hebert	Levert St. John	Overall Mean
						(stalks/A)					
HoCP96-540	14169 -	22938	26843	26432	20499	23776 -	15545 -	24880 -	18951 -	25619	21965 -
L01-283	31783	34810 +	32484	32528	29162	34917	32392 +	26458	31612	26702	31285
L01-299	36026	25679	26439	28960	28148	31615	27057	30213	32094	23188	28942
HoCP04-838	34491	30125	20840	34325	27246	33336	29905	26338	22996 -	27336	28694
HoCP09-804	35525	33374 +	31378	38059 +	29000	36914	33434 +	33558	36946	32656 +	34084 +
L11-183	24087 -	27581	30893	27644	28495	30681	25907	29739	32443	26570	28404
Ho11-573	27983 -	22293	21244	26469	24370	26652	21887 -	22144 -	26063	21938	24104 -
L12-201	24534 -	27007	22194	25215	22566	26924	20790 -	23072 -	25590 -	21016	23891 -
Ho12-615	35591	38775 +	34609 +	43978 +	32744	36360	36881 +	34390	36081	31145 +	36055 +
Ho12-630	28924 -	-------	21821	22959	25977	31869	26715	26507	22948 -	23882	25768 -
Ho13-739	24501 -	22751	20630	25534	23535	27789	25919	23700 -	23637 -	21546	23954 -
HoCP13-758	33409	28337	26249	30079	31455	33648	28866	26533	27215	26178	29197
L14-267	23650 -	22466	24698	26436	19598	26044	25334	22066 -	26643	21408	23834 -
HoCP14-802	27868 -	36402 +	33680 +	37512 +	32910	33462	32796 +	27874	33344	26986	32283 +
HoCP14-885	32709	27174	25907	29503	30127	30175	24020	24847 -	28062	25494	27802

Table 8. First-stubble sugar per acre for six experimental and six commercial varieties at ten outfield locations in 2018.

Variety	HEAVY				LIGHT						Overall Mean
	Allains	Alma	Magnolia	Mary	Brunswick	Glenwood	Harper	Lanaux	Ronald Hebert	Levert St. John	
						(lbs./A)					
HoCP96-540	8583	6337 -	11558	9922	6137 -	8636	5013 -	8177 -	9501 -	7641 -	8151 -
L01-283	8850	8288	10638	11634	8342	11478	8212	10703	12736	8979	9986
L01-299	10566	7946	9850	11388	9400	11991	8895	12280	12329	9831	10448
HoCP04-838	8227	7162	9412	10588	7704 -	11647	8004	9745 -	9415 -	8661	9057 -
HoCP09-804	9057	9856 +	10666	12053	9074	10797	9492	11596	11112	10256	10396
L11-183	7742	6306 -	8843	12126	7439 -	11196	8844	10660	9158 -	8988	9130 -
Ho11-573	8328	7635	10508	11240	8034	10734	7946	11255	11425	9489	9659
L12-201	8490	7802	10345	10651	8632	11237	6391 -	9999 -	8692 -	9819	9206 -
Ho12-615	9190	7563	10432	11848	8206	13829	9882	11619	11998	9774	10434
Ho12-630	9276	7332	11111	10862	5833 -	10350	7175 -	9887 -	10483	8012 -	9024 -
Ho13-739	10111	8026	10988	10167	9175	12570	8583	10239 -	11529	8509	9990
HoCP13-758	6391	8005	7923	9233	7524 -	12097	8008	12167	11192	9559	9210 -

Table 9. First-stubble cane yield for six experimental and six commercial varieties at ten outfield locations in 2018.

Variety	HEAVY				LIGHT						Overall Mean
	Allains	Alma	Magnolia	Mary	Brunswick	Glenwood	Harper	Lanaux	Ronald Hebert	Levert St. John	
						(tons/A)					
HoCP96-540	32.8	32.7	42.2 +	37.2	26.3 -	31.9	25.5 -	30.5 -	41.5 -	32.4	33.3 -
L01-283	30.9	35.2	34.4	37.3	33.1	40.1	35.9	35.4	46.8	35.2	36.4 -
L01-299	37.1	38.7	34.5	39.5	38.3	41.9	38.2	40.5	48.0	37.6	39.4
HoCP04-838	30.6	34.6	32.1	37.1	31.7 -	41.0	36.4	33.7 -	35.9 -	36.4	34.9 -
HoCP09-804	31.1	40.8	35.2	38.5	34.9	38.0	37.8	37.1	40.1 -	38.9	37.2
L11-183	28.5	32.4	31.7	43.5	30.5 -	40.5	36.5	41.3	39.6 -	35.8	36.0 -
Ho11-573	32.5	37.5	36.8	40.1	34.2	39.9	35.0	38.6	43.1	37.0	37.5
L12-201	29.5	37.7	36.6	37.5	35.4	39.5	27.8 -	36.2	37.8 -	37.7	35.6 -
Ho12-615	34.1	38.9	36.3	40.8	37.0	49.6	43.4	39.5	45.7	38.6	40.4
Ho12-630	33.6	35.4	38.3	36.0	25.2 -	35.3	30.3 -	34.8	40.0 -	32.6	34.1 -
Ho13-739	34.3	34.6	35.9	33.9	35.4	42.1	36.4	33.8	40.5 -	32.7	36.0 -
HoCP13-758	23.2	34.8	27.9	32.2	29.4 -	44.3	33.5	40.6	41.3 -	35.1	34.2 -

Table 10. First-stubble sugar per ton for six experimental and six commercial varieties at ten outfield locations in 2018.

Variety	HEAVY				LIGHT						Overall Mean
	Allains	Alma	Magnolia	Mary	Brunswick	Glenwood	Harper	Lanaux	Ronald Hebert	Levert St. John	
	(lbs./tons)										
HoCP96-540	263 -	195	275	268 -	232	270	197 -	268 -	229	236	243 -
L01-283	286	235	309 +	312 +	251	287	230	303	273	256	274 +
L01-299	285	205	285	288	245	286	235	303	256	262	265
HoCP04-838	270	208	293	286	239	284	221	289	262	238	259 -
HoCP09-804	290	242 +	303 +	313 +	260	284	250	313	277	264	280 +
L11-183	271	194	279	279	245	276	242	257 -	230	251	252 -
Ho11-573	256 -	203	286	280	236	270	226	291	265	257	257
L12-201	288	206	283	284 -	244	284	229	277	229	261	259
Ho12-615	269	194	288	290	222	277	227	295	263	253	258
Ho12-630	275	207	289	304 +	232	294	237	285	263	245	263
Ho13-739	295	232	306 +	301	257	298	236	303	285 +	260	277 +
HoCP13-758	275	230	280	287	256	274	239	299	271	271	268

Table 11. First-stubble stalk weight for six experimental and six commercial varieties at ten outfield locations in 2018.

Variety	HEAVY				LIGHT						Overall Mean
	Allains	Alma	Magnolia	Mary	Brunswick	Glenwood	Harper	Lanaux	Ronald Hebert	Levert St. John	
						(lbs.)					
HoCP96-540	2.69 +	2.44	3.15 +	2.75 +	2.31	3.06 +	2.91 +	2.51	2.64	2.77	2.72 +
L01-283	2.32	2.10	2.33	2.10	2.45	2.08	2.44	1.88	1.94	1.97	2.16 -
L01-299	2.15	2.16	2.11	2.25	2.52	2.43	2.27	2.13	2.30	2.18	2.25
HoCP04-838	2.43	1.99	2.23	2.43	2.47	2.69	2.68	1.68 -	2.53	2.50	2.36
HoCP09-804	2.07	1.90	2.08	1.85	1.81	2.10	1.91	1.88	1.74 -	1.92	1.93 -
L11-183	2.41	2.17	2.36	2.64	2.96	2.31	2.68	2.08	2.55	2.26	2.44 +
Ho11-573	2.87 +	2.57 +	3.17 +	3.36 +	2.89	2.75	3.15 +	2.82 +	2.95 +	2.71	2.92 +
L12-201	2.64 +	2.84 +	3.34 +	3.15 +	2.78	3.36 +	2.95 +	2.36	2.97 +	2.86 +	2.93 +
Ho12-615	2.24	2.08	1.95	2.15	1.97	2.07	2.06	1.99	2.08	1.96	2.05 -
Ho12-630	2.87 +	2.69 +	2.91 +	3.21 +	2.04	2.74	2.49	2.15	2.84 +	2.29	2.61 +
Ho13-739	2.53	2.45	2.83 +	2.48	2.54	2.87	3.07 +	2.58 +	2.79 +	2.39	2.66 +
HoCP13-758	2.41	2.45	2.44	2.71	2.15	2.95	2.13	2.50	2.43	2.79	2.49 +

Table 12. First-stubble stalk number for six experimental and six commercial varieties at ten outfield locations in 2018.

Variety	HEAVY				LIGHT						Overall Mean
	Allains	Alma	Magnolia	Mary	Brunswick	Glenwood	Harper	Lanaux	Ronald Hebert	Levert St. John	
						(stalks/A)					
HoCP96-540	24462 -	27060 -	26784	27372	22579	21505 -	17785 -	24392 -	31816 -	24072 -	24783 -
L01-283	26915	33669	29649	36064	27994	38446	30090	37876	49549	35778	34603
L01-299	34477	35903	33205	35178	30731	35225	34089	38679	43434	34943	35586
HoCP04-838	25070 -	35101	28685	30663	26098	30531	28085	41423	28592 -	30116	30437 -
HoCP09-804	30416	43211 +	33979	41944	39753 +	37202	40008	39611	46207	40703	39303 +
L11-183	24364 -	30708	26940	33592	21499 -	35929	27356	40216	31102 -	32209	30391 -
Ho11-573	22739 -	29233 -	23292 -	23920 -	23631	29601	22278 -	27545 -	29269 -	28011	25952 -
L12-201	22338 -	26511 -	22430 -	23919 -	26592	23672 -	18969 -	30922	25894 -	27385	24863 -
Ho12-615	30726	37772	37497	38280	38460	48826 +	42463 +	39640	44081	39788	39753 +
Ho12-630	23573 -	26337 -	26423	22566 -	24686	25966	24391	32630	28395 -	29958	26610 -
Ho13-739	27286	28198 -	25499 -	29305	28293	29275	23768 -	26733 -	29222 -	27527	27453 -
HoCP13-758	19476 -	28458 -	23648 -	23859 -	28015	30143	31585	32653	34131	25295 -	27726 -

Table 13. Second-stubble sugar per acre for seven commercial and three experimental varieties at eight outfield locations in 2018.

Variety	HEAVY				LIGHT				Overall Mean
	Allains	Alma	Landry	Brunswick	Glenwood	Lanaux	Ronald Hebert	Levert St. John	
					(lbs./A)				
HoCP96-540	8598	5397 -	6849 -	3936 -	4185 -	6467 -	9387 -	6358 -	6402 -
L01-283	8852	8616	12063	5249 -	8823 +	10936	9686 -	10414	9316
L01-299	10890	8260	13507	9040	7217	10658	12254	9292	10159
HoCP04-838	7947	9864	11196 -	6287 -	8856 +	10393	9170 -	8757	9059 -
Ho07-613	9236	7154	9102 -	5912 -	7058	9286	8870 -	8463	8127 -
HoCP09-804	10370	9410	13316	7568	9878 +	8712 -	12739	9082	10140
L11-183	9418	5758 -	11018 -	5557 -	6312	9113	9706 -	8324	8176 -
L12-201	8517	7487	12359	5347 -	8922 +	10110	10626	9119	9082 -
Ho12-615	10837	8729	12753	6886 -	7227	9419	12041	7949	9467
Ho12-630	9682	5638 -	8515 -	5572 -	7612	8939 -	10343 -	8925	8172 -

Table 14. Second-stubble cane yield for seven commercial and three experimental varieties at eight outfield locations in 2018.

Variety	HEAVY				LIGHT				Overall Mean
	Allains	Alma	Landry	Brunswick	Glenwood	Lanaux	Ronald Hebert	Levert St. John	
					(tons/A)				
HoCP96-540	33.5	25.4 -	23.4 -	20.6 -	27.1	26.0 -	40.6 -	29.9 -	28.4 -
L01-283	30.3	36.1	37.7	23.4 -	39.3	36.6 -	39.1 -	41.6	35.5 -
L01-299	37.3	39.1	43.0	41.0	41.6	41.9	50.5	42.0	42.1
HoCP04-838	28.3	40.5	35.8 -	28.8 -	42.0	35.5 -	37.2 -	36.5 -	35.6 -
Ho07-613	31.8	30.6 -	29.2 -	26.4 -	32.9 -	31.5 -	32.4 -	32.5 -	30.9 -
HoCP09-804	34.3	38.4	43.7	31.7 -	40.6	28.8 -	46.8	36.1 -	37.6 -
L11-183	33.5	25.5 -	35.7 -	26.9 -	34.6 -	35.3 -	43.8 -	33.4 -	33.7 -
L12-201	29.6	35.2	39.5	27.3 -	44.5	35.8 -	42.0 -	37.0	36.5 -
Ho12-615	37.9	44.1	42.2	33.5	43.7	33.2 -	50.3	36.6 -	40.2
Ho12-630	32.3	29.2 -	29.2 -	26.8 -	37.3	32.3 -	40.5 -	36.8	33.1 -

Table 15. Second-stubble sugar per ton for seven commercial and three experimental varieties at eight outfield locations in 2018.

Variety	HEAVY			LIGHT					Overall Mean
	Allains	Alma	Landry	Brunswick	Glenwood	Lanaux	Ronald Hebert	Levert St. John	
					(lbs./tons)				
HoCP96-540	257 -	210	293	189 -	155 -	248	231	213	224 -
L01-283	292	241	320	225	224 +	299 +	249	250 +	262 +
L01-299	293	210	314	219	173	255	243	221	241
HoCP04-838	282	244 +	312	219	210 +	292 +	246	240	256 +
Ho07-613	291	233	312	225	215 +	295 +	274 +	261 +	263 +
HoCP09-804	306	247 +	305	239	244 +	303 +	272 +	252 +	271 +
L11-183	281	223	308	207	182	259	220	249 +	241
L12-201	286	213	313	196 -	200 +	282 +	253	245 +	248
Ho12-615	281	199	302	206	165	284 +	240	217	237
Ho12-630	300	196	296	206	204 +	278	255	242 +	248

Table 16. Second-stubble stalk weight seven commercial and three experimental varieties at eight outfield locations in 2018.

Variety	HEAVY			LIGHT					Overall Mean
	Allains	Alma	Landry	Brunswick	Glenwood	Lanaux	Ronald Hebert	Levert St. John	
					(lbs.)				
HoCP96-540	2.46 +	1.50 -	2.31	1.84	2.41 +	2.07	3.14 +	2.42 +	2.30 +
L01-283	2.22	1.70	2.07	1.47	1.88	2.24	2.12	1.92	1.95
L01-299	1.78	2.00	2.23	1.87	1.85	2.17	2.14	1.82	1.97
HoCP04-838	2.13	1.75	2.56 +	1.77	1.86	2.22	2.39	2.40 +	2.13
Ho07-613	2.19	2.19	2.32	1.99	2.18 +	2.25	2.56	2.65 +	2.29 +
HoCP09-804	1.86	1.41 -	2.13	1.44	1.69	1.80	1.91	1.55	1.73 -
L11-183	2.42 +	1.68	2.52	1.76	2.18 +	2.40	2.00	2.47 +	2.19 +
L12-201	2.72 +	2.29	2.84 +	1.72	2.47 +	2.75 +	2.83 +	2.55 +	2.52 +
Ho12-615	2.23	1.65 -	1.71 -	1.48	1.96	1.80	2.24	2.01	1.89
Ho12-630	2.67 +	2.40 +	2.39	1.90	2.70 +	2.40	2.35	2.78 +	2.45 +

Table 17. Second-stubble stalk number for seven commercial and three experimental varieties at eight outfield locations in 2018.

Variety	HEAVY			LIGHT					Overall Mean
	Allains	Alma	Landry	Brunswick	Glenwood	Lanaux	Ronald Hebert	Levert St. John	
	(stalks/A)								
HoCP96-540	27301 -	34849	20278 -	22801 -	22314 -	25485	25900 -	24673 -	25050 -
L01-283	27591 -	42165	36633	31865 -	41949	32772	38335 -	44049	36863 -
L01-299	41902	39746	38647	47327	45222	38852	47592	47381	43512
HoCP04-838	27383 -	46402	28058 -	32525 -	45789	32065	31323 -	30380 -	34241 -
Ho07-613	31564 -	28103 -	25240 -	27120 -	30299 -	28400	25468 -	24962 -	27460 -
HoCP09-804	36679	53805 +	41257	44849	48136	32293	49353	47025	44311
L11-183	27972 -	31437	28385 -	30662 -	31984 -	29887	44148	27112 -	31520 -
L12-201	23358 -	30779	27863 -	31489 -	36153 -	26424	29781 -	29571 -	29499 -
Ho12-615	36254	53512 +	50002 +	45630	45039	37175	45183	36912	43820
Ho12-630	24342 -	24747 -	24547 -	28157 -	27781 -	28188	34752 -	26573 -	27524 -

Table 18. Third-stubble sugar per acre for nine commercial varieties at five outfield locations in 2018.

	HEAVY	LIGHT				
Variety	Alma	Brunswick	Glenwood	Lanaux	Ronald Hebert	Overall Mean
			(lbs./A)			
HoCP96-540	3275 -	2829 -	4896 -	3551 -	8327 -	4576 -
L99-226	7389	4618	7461 -	6481 -	9624 -	7115 -
HoCP00-950	5883 -	4680	7319 -	10561	10609	7811 -
L01-283	7349	5405	8912	7163 -	9925 -	7751 -
L01-299	8551	6181	10493	10654	12408	9657
HoCP04-838	8790	4255 -	9855	7878 -	9940 -	8144 -
Ho07-613	4898 -	4012 -	7801 -	4117 -	5949 -	5334 -
HoCP09-804	8354	6670	10534	9131	10367 -	9011
L11-183	5310 -	4876	8308	6264 -	8083 -	6568 -

Table 19. Third-stubble cane yield for nine commercial varieties at five outfield locations in 2018.

	HEAVY	LIGHT				
Variety	Alma	Brunswick	Glenwood	Lanaux	Ronald Hebert	Overall Mean
			(tons/A)			
HoCP96-540	19.8 -	15.2 -	17.1 -	11.4 -	37.3 -	20.2 -
L99-226	37.2	25.0	24.5 -	18.6 -	36.8 -	28.4 -
HoCP00-950	24.5 -	21.4 -	23.3 -	30.4	38.5 -	27.6 -
L01-283	33.4 -	24.0 -	28.8	21.8 -	40.0 -	29.6 -
L01-299	40.2	31.6	33.6	32.3	50.1	37.6
HoCP04-838	37.8	22.9 -	31.1	24.0	37.7 -	30.7 -
Ho07-613	20.8 -	19.9 -	24.6 -	12.4 -	22.6 -	20.0 -
HoCP09-804	36.7	29.8	34.8	27.9	39.7 -	33.8
L11-183	27.8 -	26.7	29.6	18.9 -	34.3 -	27.5 -

Table 20. Third-stubble sugar per ton for nine commercial varieties at five outfield locations in 2018.

	HEAVY		LIGHT			
Variety	Alma	Brunswick	Glenwood	Lanaux	Ronald Hebert	Overall Mean
			(lbs./tons)			
HoCP96-540	166 -	184	287 -	319	222 -	236 -
L99-226	198	184	305	347	261	259
HoCP00-950	240 +	217	314	347	276 +	279 +
L01-283	221	225	310	331	249	267
L01-299	212	196	311	331	248	259
HoCP04-838	231	185	317	328	263	265
Ho07-613	231	206	318	330	262	269
HoCP09-804	228	223	303	327	261	268
L11-183	191	183	279 -	329	235	244 -

Table 21. Third-stubble stalk weight for nine commercial varieties at five outfield locations in 2018.

	HEAVY		LIGHT			
Variety	Alma	Brunswick	Glenwood	Lanaux	Ronald Hebert	Overall Mean
			(lbs.)			
HoCP96-540	1.99	2.20 +	1.88	2.12	3.01 +	2.24 +
L99-226	2.53 +	2.26 +	2.36 +	2.71 +	3.09 +	2.59 +
HoCP00-950	1.79	1.73	1.93	1.94	2.10	1.90
L01-283	1.79	1.73	1.74	1.55 -	2.45 +	1.85
L01-299	1.91	1.54	1.66	1.93	1.81	1.77
HoCP04-838	1.89	1.45	2.02 +	2.02	2.49 +	1.98
Ho07-613	1.89	1.87	1.70	1.92	2.77 +	2.03 +
HoCP09-804	1.82	1.45	1.39	1.36 -	1.96	1.60
L11-183	1.91	1.87	1.77	2.22	2.43 +	2.04 +

Table 22. Third-stubble stalk number for nine commercial varieties at five outfield locations in 2018.

	HEAVY	LIGHT				
Variety	Alma	Brunswick	Glenwood	Lanaux	Ronald Hebert	Overall Mean
			(stalks/A)			
HoCP96-540	20266 -	15190 -	18386 -	11127 -	24791 -	17952 -
L99-226	30074 -	22157 -	20882 -	13726 -	24623 -	22292 -
HoCP00-950	27939 -	26089 -	24359 -	31333	36918 -	29328 -
L01-283	37522	28160 -	33318	28500	32759 -	32052 -
L01-299	42432	41779	41069	34084	56280	43129
HoCP04-838	39975	31631 -	30860	23759	30209 -	31287 -
Ho07-613	21844 -	21227 -	29038	13045 -	16539 -	20258 -
HoCP09-804	40525	41725	51021	41442	40771 -	43097
L11-183	29105 -	28312 -	34033	17570 -	28319 -	27468 -

Table 23. Plantcane means from ten outfield locations in 2018: Alma, Brunswick, Glenwood, Harper, 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	7823 -	31.9 -	243 -	3.01 +	21965 -
L01-283	9408	35.6	265	2.31 -	31285
L01-299	9197	35.9	256	2.53	28942
HoCP04-838	9567	35.5	269 +	2.50	28694
HoCP09-804	9812	35.1	278 +	2.08 -	34084 +
L11-183	9260	36.4	253	2.59	28404
Ho11-573	9819	38.7 +	253	3.22 +	24104 -
L12-201	9830	37.4	263	3.14 +	23891 -
Ho12-615	10559 +	41.1 +	257	2.30 -	36055 +
Ho12-630	9635	36.1	267 +	2.83 +	25768 -
Ho13-739	9725	35.9	272 +	3.01 +	23954 -
HoCP13-758	10452 +	38.4	272 +	2.65	29197
L14-267	9651	36.5	265	3.09 +	23834 -
HoCP14-802	9595	38.9 +	246 -	2.44	32283 +
HoCP14-885	10667 +	38.3	278 +	2.78 +	27802

Table 24. First-stubble means from ten outfield locations in 2018: Allains, Alma, Brunswick, Glenwood, Harper, Lanaux, Magnolia, Mary, R. Hebert and St. John.

Variety	Sugar per Acre	Cane Yield	Sugar per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
HoCP96-540	8151 -	33.3 -	243 -	2.72 +	24783 -
L01-283	9986	36.4 -	274 +	2.16 -	34603
L01-299	10448	39.4	265	2.25	35586
HoCP04-838	9057 -	34.9 -	259	2.36	30437 -
HoCP09-804	10396	37.2	280 +	1.93 -	39303 +
L11-183	9130 -	36.0 -	252 -	2.44 +	30391 -
Ho11-573	9659	37.5	257	2.92 +	25952 -
L12-201	9206 -	35.6 -	259	2.93 +	24863 -
Ho12-615	10434	40.4	258	2.05 -	39753 +
Ho12-630	9024 -	34.1 -	263	2.61 +	26610 -
Ho13-739	9990	36.0 -	277 +	2.66 +	27453 -
HoCP13-758	9210 -	34.2 -	268	2.49 +	27726 -

Table 25. Second-stubble means from eight outfield locations in 2018: Allains, Alma, Brunswick, Glenwood, Lanaux, Landry, 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	6402 -	28.4 -	224 -	2.30 +	25050 -
L01-283	9316	35.5 -	262 +	1.95	36863 -
L01-299	10159	42.1	241	1.97	43512
HoCP04-838	9059 -	35.6 -	256 +	2.13	34241 -
Ho07-613	8127 -	30.9 -	263 +	2.29 +	27460 -
HoCP09-804	10140	37.6 -	271 +	1.73 -	44311
L11-183	8176 -	33.7 -	241	2.19 +	31520 -
L12-201	9082 -	36.5 -	248	2.52 +	29499 -
Ho12-615	9467	40.2	237	1.89	43820
Ho12-630	8172 -	33.1 -	248	2.45 +	27524 -

Table 26. Third-stubble means from five outfield locations in 2018: Alma, Brunswick, Glenwood, 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	4576 -	20.2 -	236 -	2.24 +	17952 -
L99-226	7115 -	28.4 -	259	2.59 +	22292 -
HoCP00-950	7811 -	27.6 -	279 +	1.90	29328 -
L01-283	7751 -	29.6 -	267	1.85	32052 -
L01-299	9657	37.6	259	1.77	43129
HoCP04-838	8144 -	30.7 -	265	1.98	31287 -
Ho07-613	5334 -	20.0 -	269	2.03 +	20258 -
HoCP09-804	9011	33.8	268	1.60	43097
L11-183	6568 -	27.5 -	244 -	2.04 +	27468 -

Table 27. Combined plantcane means across outfield locations from 2016 to 2018.

Variety	Sugar per Acre (lbs/A)	Cane Yield (tons/A)	Sugar per Ton (lbs/ton)	Stalk Weight (lbs)	Stalk Number (stalks/A)
HoCP96-540	8813	32.7	268 -	2.81 +	23933 -
L01-283	9320	32.2	291 +	2.12 -	30635 +
L01-299	9207	33.0	279	2.34	28792
HoCP04-838	9701 +	34.1	285 +	2.30	29934
Ho07-613	10489 +	35.9 +	291 +	2.52 +	28917
HoCP09-804	9624	33.1 +	290 +	1.96 -	34428 +
L11-183	9836 +	34.9 +	282	2.50 +	28378
L12-201	9883 +	34.6 +	286 +	3.06 +	23047 -
Ho12-615	10635 +	38.2 +	279	2.11 -	36736 +
Ho12-630	9854 +	34.1	289 +	2.65 +	26035 -

Table 28. Combined first-stubble means across outfield locations from 2017 to 2018.

Variety	Sugar per Acre (lbs/A)	Cane Yield (tons/A)	Sugar per Ton (lbs/ton)	Stalk Weight (lbs)	Stalk Number (stalks/A)
HoCP96-540	8709 -	32.6 -	268 -	2.54 +	25898 -
L01-283	9776 -	33.7 -	292 +	2.05	33535
L01-299	10458	37.1	283	2.15	34868
HoCP04-838	9436 -	33.8 -	281	2.24	30713 -
Ho07-613	10022	34.4 -	292 +	2.54 +	27022 -
HoCP09-804	10154	34.9 -	293 +	1.83 -	38571 +
L11-183	9578 -	34.8 -	277 -	2.32 +	30645 -
L12-201	9632 -	34.5 -	281	2.89 +	24293 -
Ho12-615	10408	37.8	278	1.91 -	40072 +
Ho12-630	9869	34.7 -	284	2.43 +	29293 -

Table 29. Second-stubble means across outfield locations in 2018.

Variety	Sugar per Acre (lbs/A)	Cane Yield (tons/A)	Sugar per Ton (lbs/ton)	Stalk Weight (lbs)	Stalk Number (stalks/A)
HoCP96-540	6402 -	28.4 -	224 -	2.30 +	25050 -
L01-283	9316	35.5 -	262 +	1.95	36863 -
L01-299	10159	42.1	241	1.97	43512
HoCP04-838	9059 -	35.6 -	256 +	2.13	34241 -
Ho07-613	8127 -	30.9 -	263 +	2.29 +	27460 -
HoCP09-804	10140	37.6 -	271 +	1.73 -	44311
L11-183	8176 -	33.7 -	241	2.19 +	31520 -
L12-201	9082 -	36.5 -	248	2.52 +	29499 -
Ho12-615	9467	40.2	237	1.89	43820
Ho12-630	8172 -	33.1 -	248	2.45 +	27524 -

SUCROSE LABORATORY AT THE SUGAR RESEARCH STATION

Gert Hawkins, Michael Pontif and Collins Kimbeng
Sugar Research Station

The Sugar Research Station sucrose laboratory processed 3,094 samples during the 2018 harvest season (Table 1). Standard laboratory (wet chemistry) procedures were used to analyze 114 samples that were also processed through the Spectracane FT-NIR instrument. The cane was shredded using a Dedini shredder and the juice 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). Sucrose percent and theoretical recoverable sugar (lbs/ton of cane) was calculated based on the Brix and pol values. The sucrose laboratory processed samples from September 2018 to February 2019.

A total of 2,980 samples were analyzed using the Spectracane FT-NIR instrument of which 32 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, sucrose percent, 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 2018 harvest season.

Unit/Project Area	Leader	Number of Samples
School of Plant, Environmental, and Soil Sciences	Niranjan Baisakh	301
	Brenda Tubana	408
	Energy Cane	32
	Sonny Viator	17
Iberia Research Station	Jeff Hoy	319
Plant Pathology and Crop Physiology	Albert Orgeron	260
LCES	Kenneth Gravois	118
LCES		
Sugar Research Station/Variety Development	Line Trials	874
	Increase	119
	Nursery	607
	Infield	9
	Introductions	6
Contract Services		24
TOTAL		3,094

LAES SUGARCANE TISSUE CULTURE LABORATORY

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

During the 2018-2019 production season, more than 28,000 plantlets regenerated in the Louisiana Agricultural Experiment Station Tissue Culture Laboratory, were turned over to Certis USA, LLC, Kleentek Div., for transplanting into the greenhouse at Houma. The number of plantlets transplanted for each cultivar are listed in Table one.

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

Cultivar	Number of plantlets
HoCP96-540	1,080
L01-299	6,120
HoCP05-961	4,248
HoCP09-804	2,448
L11-183	2,808
L12-201	1,512
Ho12-615	3,744
HoCP12-630	4,248
Ho13-758	2,160
Total	28,368

THE 2018 LOUISIANA SUGARCANE VARIETY SURVEY

Kenneth A. Gravois
LSU Agricultural Center, Sugar Research Station, St. Gabriel, LA 70776

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 24 parishes. According to USDA Farm Service Agency (FSA), there were 459,217.1 acres planted to sugarcane in Louisiana in 2018.

Agents collected acreage according to variety and crop. A total of eight sugarcane varieties, HoCP 96-540, L 99-226, HoCP 00-950, L 01-283, L 01-299, 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, L 99-233, L 03-371, 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. Total parish acreage was obtained from the state FSA office.

Total State Acreage. Total sugarcane acreage for each parish, region and the statewide total is shown in Table 1. Statewide, the area planted to sugarcane in 2018 was 460,343.8 acres according to the state FSA office. There were 1,126.7 failed acres, which resulted in a total of 459,217.1 acres comprising the 2018 variety survey.

Sugarcane Distribution by Variety. Statewide sugarcane acreage in percent by variety and crop is shown in Table 2. The leading variety for 2018 was L 01-299, which occupied 51% of the Louisiana sugarcane acreage. This percentage was six points higher than the acreage of L 01-299 in 2017 (Gravois and Legendre, 2018). HoCP 96-540, the leading sugarcane variety grown in Louisiana from 2008-2015, was next in total acreage as it was planted on 20% 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 14%, 5%, 3%, and 2% of the state's acreage, respectively. All other varieties in the survey had less than 2% of the planted area for the 2018 crop.

Sugarcane Distribution by Region and Crop. The total sugarcane acreage was highest for Teche region (190,913.3 acres); followed by the River-Bayou Lafourche region (160,653.4 acres); then the Northern region (108,669.3 acres). Total FSA reported sugarcane acreage for Louisiana in 2018 was just over 20,000 acres higher than in 2017. The northern area showed the greatest increase in acreage, with Pointe Coupee, St. Landry, Avoyelles, and Rapides parishes showing the largest percentage increases compared to 2017. A new sugarcane-growing parish, Concordia, reported 190.0 acres of sugarcane.

In 2018, 16.7% of the state's acreage was grown as third and older stubble crops, which was higher than the acreage of the same category for 2017. In 2018, 29.2%, 26.1%, and 28.1% of the state's acreage was in a plant-cane, first stubble, and second stubble crops, respectively.

For the current survey, plant-cane percentage was highest in the northern region (35.0%) where most new expansion is occurring (Table 3). For the third and older stubble crops, the Bayou Teche region had the highest percentage at 17.6%, whereas the River-Bayou Lafourche and Northern regions had 16.1% and 16.0%, respectively.

Sugarcane Distribution by Variety and Crop for the Three Regions. L 01-299 was the most widely grown variety in all three regions (Tables 4-6). L 01-299 was the most widely represented variety in all crops of each region. The most notable variety trend in sugarcane acreage was the continued 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 96-540 was more widely grown (25.5%) in the Bayou Teche region, followed by the northern region and the River-Bayou Lafourche region, each at 15.3%. The survey picked up more HoCP 09-804 in the Bayou Teche regions, an area where mosaic is not present in the variety.

Variety Trends. HoCP 96-540, released for commercial planting in 2003, now occupies 20% of the state's 2018 acreage, which is a decrease of five percentage points from the previous year. The variety continues to perform well, but HoCP 96-540 is better adapted to sandier soils because of average stubbling ability. Rust infections can be a problem in its plantcane crop. HoCP 96-540 is an important variety for Louisiana was re-planted by many growers in 2018.

L 99-226 decreased in acreage by one percentage point from 2017. 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 is no longer recommended for planting.

HoCP 00-950 was released for commercial planting in 2007 and occupied two percent of the state's acreage in 2018. This variety has high sugar per ton of cane and is 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). The variety has a fit for early harvest on better-drained land.

L 01-283, released for commercial planting in 2008, occupied 14 percent of the Louisiana acreage in 2017. The variety is more popular on the River-Bayou Lafourche and Northern

regions, has excellent stubbling ability, good sugar yield, erectness, and cold tolerance. 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 51% of the state's acreage in 2018. This variety was released in 2009 after superior sugar yields were obtained in outfield variety trials. The variety has outstanding stubbling ability and is well suited for both light and heavy soils. 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 monitor seed-cane and plant from healthy sources. L 01-299 performed well in all crops for the 2018 grinding season, and it is important to note its excellent response to ripening with glyphosate. Because of its superior stubbling ability, L 01-299 will likely be widely planted again in 2019.

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 colder than average winters, Ho 07-613 did not establish well in the stubble cane crops. The small acreage of Ho 07-613 was not widely increased in the 2018 planting season. Ho 07-613 is no longer recommended for planting.

HoCP 09-804 was released to growers in 2016. This variety has a high population of small diameter stalks. Sucrose content is similar to L 01-283, and information from 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 for mosaic. Growers are encouraged to plant the variety with healthy seed-cane sources.

L 11-183 was released to growers in 2018 (Anon. 2017). The new variety was derived from the cross HoCP 92-624 and LCP 85-384. Stalks of L 11-183 are larger and the population is lower than L 01-299. The variety has good sugar yield and is considered a mid- to late-maturing variety. L 11-183 has a good disease package, but it tends to lodge. Growers are encourage to expand acreage of this variety and see where it might fit in their operation.

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 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 acreages.

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Table 1. Total area planted to sugarcane in Louisiana by region and parish, 2018.[1]

Region	Parish	Total Acres	% Change from 2017
Bayou Teche	Acadia	4,504.6	+ 18.7
River- Bayou Lafourche	Ascension	18,120.0	+ 0.2
River- Bayou Lafourche	Assumption	34,064.0	- 0.3
Northern	Avoyelles	11,203.1	+ 6.6
Bayou Teche	Calcasieu	150.7	- 22.0
Bayou Teche	Cameron	33.1	-
Northern	Concordia	190.0	-
Northern	Evangeline	524.5	+57.0
Bayou Teche	Iberia	56,464.1	+ 0.5
River- Bayou Lafourche	Iberville	37,497.6	+ 2.0
Bayou Teche	Jefferson Davis	737.1	- 18.2
Bayou Teche	Lafayette	9,632.2	+ 10.3
River- Bayou Lafourche	Lafourche	25,649.6	- 1.5
Northern	Pointe Coupee	53,590.7	+14.5
Northern	Rapides	12,885.9	+ 5.9
River- Bayou Lafourche	St. Charles	1,450.9	+ 4.6
River- Bayou Lafourche	St. James	28,193.7	- 1.1
River- Bayou Lafourche	St. John the Baptist	6,455.1	+ 1.6
Northern	St. Landry	15,781.1	+ 48.6
Bayou Teche	St. Martin	30,988.2	+ 3.8
Bayou Teche	St. Mary	47,415.0	+ 2.1
River-Bayou Lafourche	Terrebonne	9,243.1	+ 0.1
Bayou Teche	Vermilion	40,570.9	+ 7.0
Northern	West Baton Rouge	14,998.8	- 0.1
	State Total	**460,343.8**	
	Failed Acres	**1,126.7**	
	State Total (Less Failed)	**459,217.1**	

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

Table 2. Estimated statewide sugarcane percentage by variety and crop, all regions, 2018.[1]

Variety	Plant-cane	First-stubble	Second-stubble	Third-stubble and older	Total
	---------- percentage ----------				
HoCP96-540	13.9	19.2	23.6	22.8	**19.5**
L99-226	0.7	2.4	3.5	4.9	**2.6**
HoCP00-950	1.2	1.4	2.0	2.6	**1.7**
L01-283	14.5	14.7	14.0	10.2	**13.7**
L01-299	57.0	52.4	46.9	45.7	**51.1**
HoCP04-838	3.6	4.1	5.8	10.0	**5.4**
Ho07-613	0.2	0.3	0.6	0.4	**0.4**
HoCP09-804	6.0	3.7	1.4	0.7	**3.2**
Others	2.9	1.9	2.3	2.7	**2.4**
% Crop	29.2	26.1	28.1	16.7	

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

Table 3. Estimated sugarcane distribution by region and crop, 2018.[1]

Crop	Bayou Teche	River-Bayou Lafourche	Northern	State Total
Plant-cane Area (acres) Percent (%)	52,055.4 27.3	44,301.6 27.6	38,024.0 35.0	134,380.9 29.2
First-stubble Area (acres) Percent (%)	53,060.5 27.8	42,564.3 26.5	24,282.6 22.3	119,907.4 26.1
Second-stubble Area (acres) Percent (%)	52,237.4 27.4	47975.1 29.9	29,022.4 26.7	129,234.9 28.1
Third-stubble and older Area (acres) Percent (%)	33,560.0 17.6	25,812.4 16.1	17340.3 16.0	76,712.7 16.7
Total area (acres) Percent (%)	190,913.3 41.5	160,653.4 34.9	108,669.3 23.6	

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

Table 4. Estimated area planted to sugarcane in percent by variety and crop for the Bayou Teche region, 2018.[1]

Variety	Plant-cane crop (%)	First-stubble crop (%)	Second-stubble crop (%)	Third-stubble crop & older (%)	Total (%)
HoCP96-540	18.6	23.5	30.0	32.2	25.5
L99-226	1.0	2.7	3.2	4.2	2.6
HoCP00-950	2.1	1.7	2.6	3.4	2.4
L01-283	5.7	6.4	4.9	1.8	5.0
L01-299	53.9	53.3	48.8	44.6	50.7
HoCP04-838	5.6	4.4	5.6	11.4	6.3
Ho07-613	0.2	0.2	0.9	0.6	0.4
HoCP09-804	10.1	6.4	2.4	0.5	5.3
Others	2.8	1.4	1.6	1.2	1.8

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

Table 5. Estimated area planted to sugarcane in percent by variety and crop for the River/Bayou Lafourche region, 2018.[1]

Variety	Plant-cane crop (%)	First-stubble crop (%)	Second-stubble crop (%)	Third-stubble crop & older (%)	Total (%)
HoCP96-540	10.7	15.6	19.0	15.9	15.3
L99-226	0.1	2.7	4.4	7.4	3.2
HoCP00-950	0.4	1.3	1.8	2.7	1.4
L01-283	15.8	18.8	17.9	13.7	16.9
L01-299	66.3	54.7	47.7	46.5	54.5
HoCP04-838	2.1	4.7	7.4	10.9	5.8
Ho07-613	0.0	0.3	0.3	0.2	0.2
HoCP09-804	3.7	1.4	0.2	0.2	1.5
Others	0.8	0.4	1.4	2.6	1.2

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

Table 6. Estimated area planted to sugarcane in percent by variety and crop for the Northern region, 2018[1]

Variety	Plant-cane crop (%)	First-stubble crop (%)	Second-stubble crop (%)	Third-stubble crop & older (%)	Total (%)
HoCP96-540	11.4	16.2	19.9	14.9	15.3
L99-226	1.0	1.1	2.4	2.7	1.7
HoCP00-950	0.8	0.9	1.3	1.0	1.0
L01-283	25.0	25.6	23.9	21.0	24.2
L01-299	50.4	46.2	42.1	46.4	46.6
HoCP04-838	2.6	2.2	3.4	6.0	3.3
Ho07-613	0.4	0.5	0.4	0.4	0.4
HoCP09-804	2.9	2.0	1.6	2.0	2.2
Others	5.5	5.3	5.0	5.5	5.3

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

Table 7. Louisiana sugarcane variety trends, by variety and years, all regions, 2014-2018[1].

	Area planted to sugarcane by variety and year (%)						
Variety	**2014**	**2015**	**2016**	**2016**	**2017**	**2018**	**1 yr. Change**
HoCP96-540	37	33	30	30	25	20	-5
L99-226	13	11	6	6	4	3	-1
HoCP00-950	4	3	4	4	3	2	-1
L01-283	10	9	12	12	12	14	+2
L01-299	22	30	36	36	45	51	+6
HoCP04-838	6	9	10	10	8	5	-3
Ho07-613	1	<1	1	1	1	<1	-1
HoCP09-804	-	-	<1	<1	1	3	+2

[1] Based on annual variety surveys by county agents, 2014-2018.

PERFORMANCE OF FLORIDA SUGARCANE VARIETIES IN LOUISIANA

Kenneth Gravois, Michael Pontif, Gert Hawkins, and, Collins Kimbeng

LSU AgCenter, Sugar Research Station

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) *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.

Each year a few stalks of each sugarcane variety were obtained from the Kleentek quarantine greenhouse and used to plant a small seedcane increase. Yield trials were planted each subsequent year during August 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. In 2018, a new trial was planted on August 23.

In 2018, all seed-cane increase of the Florida varieties were tested for Ratoon Stunt Disease (RSD) and yellow leaf. All varieties tested negative for these two diseases.

Standard cultural practices were followed during each growing season. The second and third stubble trials were harvested on October 8, 2018; the first stubble trial was harvested on October 30, 2018; the plantcane trial was harvested on November 28, 2018. 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 (% w/w) by refractometer and pol reading (Z°) by saccharimeter. Sucrose content (lbs/ton of cane) and fiber content were determined by the pre-breaker press method.

Table 1. Plantcane Florida variety yield trials harvested in 2018 at the Sugar Research Station in St. Gabriel, LA.

Plantcane	Sugar Yield	Cane Yield	TRS	Fiber
	Lbs/acre	Tons/acre	Lbs/ton of cane	%
CPCL 95-2287	8389	36.9	229	10.7
HoCP 96-540	7729	35.1	221	12.0
CP 01-1372	10271	46.2	222	10.6
L 01-299	12332	58.1	211	12.1
CPCL 02-0926	7058	34.4	205	10.2
CP 04-1935	5156	25.3	200	12.2
HoCP 04-838	11588	49.1	236	14.1
CPCL 05-1102	9889	40.8	241	10.4
CP 06-2042	10995	46.7	235	14.8
CP 07-2137	6877	30.0	229	9.8
HoCP 09-804	11097	46.5	240	14.0

Table 2. First stubble Florida variety yield trials harvested in 2018 at the Sugar Research Station in St. Gabriel, LA.

Variety	Sugar Yield	Cane Yield	TRS	Fiber
First Stubble	Lbs/acre	Tons/acre	Lbs/ton of cane	%
CPCL 95-2287	10141	44.4	229	12.5
CP 96-1252	10604	49.2	215	11.5
HoCP 96540	11772	55.2	214	11.9
CP 01-1372	10174	46.1	221	10.9
L 01-299	12184	57.3	213	13.4
CPCL 02-6848	10508	44.9	234	15.4
CP 03-1912	8734	48.4	181	12.1
CP 04-1844	10178	52.9	192	11.4
HoCP 04-838	10507	50.6	208	12.4
CPCL 05-1102	11966	51.0	234	10.3
CPCL 05-1201	12906	57.8	223	12.0
CP 05-1526	10470	51.1	205	12.1
CP 05-1791	7375	29.8	247	13.2
CP 06-2400	7470	37.6	199	15.0

Table 3. Second stubble Florida variety yield trials harvested in 2018 at the Sugar Research Station in St. Gabriel, LA.

Second Stubble	Sugar Yield	Cane Yield	TRS	Fiber
	Lbs/acre	Tons/acre	Lbs/ton of cane	%
CP 89-2143	6031	32.3	188	10.8
HoCP 96-540	7646	42.8	177	10.4
CPCL 97-2730	4305	33.6	128	10.8
CP 00-1101	5029	28.5	176	10.5
CP 01-1372	8615	51.7	166	9.9
L 01-299	10114	62.0	163	11.3
CPCL 02-0926	7067	46.0	153	10.6
CPCL 02-1295	9098	60.5	147	12.0
CPCL 02-6848	6157	44.5	139	11.1
CP 03-1912	5433	43.4	112	9.5
CP 04-1566	10667	53.4	199	11.8
CP 04-1844	6179	41.5	150	11.4
CP 04-1935	7621	43.2	177	12.1
HoCP 04-838	8008	45.2	178	13.1
CPCL 05-1102	8630	47.9	180	10.2
CPCL 05-1201	7974	52.6	152	11.0
CP 05-1791	6018	32.1	187	12.0

Table 4. Third stubble Florida variety yield trial harvested in 2018 at the Sugar Research Station in St. Gabriel, LA.

Third Stubble	Sugar Yield	Cane Yield	TRS	Fiber
	Lbs/acre	Tons/acre	Lbs/ton of cane	%
CP 89-2143	4110	23.5	175	11.4
CPCL 95-2287	7921	38.3	206	12.2
CP 96-1252	4992	31.3	159	11.0
HoCP 96-540	4041	24.8	160	10.5
CPCL 97-2730	2823	21.8	130	11.5
CPCL 99-4455	1997	11.7	166	10.8
CP 00-1101	4390	26.4	166	11.0
CPCL 00-4111	3144	22.0	141	10.7
CP 01-1372	8973	54.7	164	10.2
L 01-299	8772	52.2	168	12.3
CPCL 02-0926	6620	43.7	151	10.7
CPCL 02-1295	6280	43.0	146	13.1
CP 03-1912	4365	30.4	147	10.2
CP 04-1566	2328	16.9	147	13.0
CP 04-1844	5639	43.1	132	11.4
CP 04-1935	5109	31.9	161	12.3
HoCP 04-838	7796	41.8	186	13.1

CANDIDATE MARKERS ASSOCIATED WITH CANE YIELD COMPONENTS AND SUCROSE TRAITS IN THE LOUISIANA SUGARCANE CORE COLLECTION

Nathanael Fickett[1], Andres Gutierrez[1], Mohit Verma[1], Michael Pontif[2], Anna Hale[3], Collins Kimbeng[2], and Niranjan Baisakh[1*]

[1] School of Plant, Environmental and Soil Sciences, Louisiana State University Agricultural Center, Baton Rouge, LA

[2] Sugar Research Station, Louisiana State University Agricultural Center, St. Gabriel, LA

[3] Sugarcane Research Unit, USDA-ARS, Houma, LA

Introduction

Sugarcane breeding efforts are currently focused on enhancing sucrose yield, disease and insect resistance, ratooning ability, cold tolerance, and biomass yield for bioenergy. From seedling stage to commercial variety release, sugarcane variety development takes an estimated 12-15 years; with an average of one commercial variety being released for every 250,000 seedlings. High numbers at early stages reduce selection efficiency due to space and time constraints, such as lack of replications, seedling competition effects, and the high cost of individual clone selection. Early stage selection efficiency may be enhanced by the use of molecular markers, which may also increase the selection response of traits that are difficult to select phenotypically.

The high amount of linkage disequilibrium (LD) in sugarcane provides genome wide association studies (GWAS) an advantage over traditional biparental mapping for the identification of molecular markers governing traits of economic importance. The high LD can be attributed to the limited number of progenitor clones used during the nobilization process and to the relatively few generations between modern cultivars. A limited number of recombination events are present in a biparental population, potentially increasing the size of linkage blocks, which may render difficult to detect quantitative trait locus (QTL) without a very large trait effect. An association panel, on the other hand, has more genetic variation and smaller linkage blocks.

Marker-trait associations (MTA) from GWAS have been reported in sugarcane to potential markers for resistance to smut, Pachymetra root rot, red rot, leaf scald, sugarcane yellow leaf virus and Fiji leaf gall, and cane yield, bagasse content, sugar content and pol. However, all of these studies used low-to-medium throughput marker systems, such as SSRs, EST-derived SSRs, AFLPs, and DArTs, leading to low coverage and saturation of the large (10 Gb) and complex genome of sugarcane. On the other hand, decreasing costs of next generation sequencing (NGS) technology make genotyping by sequencing (GBS) ideal for improving marker density and coverage by generating thousands of single nucleotide polymorphisms (SNPs) and insertions/deletions (InDels). The present study reports on the use of GBS-derived SNP and InDel markers to identify MTA in 11 cane yield-component (CYC) and sucrose-related traits.

Materials and Methods

Plant materials and phenotypic data

This study consisted of 97 elite and historic sugarcane clones from the Louisiana sugarcane breeding program (Parco et al. 2013). Ninety-two were Louisiana sugarcane clones which included elite breeding lines and released varieties. These were produced at the Louisiana State University Agricultural Center ("L" or "LCP") and at the USDA-Agricultural Research Station (ARS) in Houma, Louisiana ("Ho" or "HoCP"). Designations with "CP" indicate the crosses were made at the USDA-ARS in Canal Point, Florida. The hybrids US 01-040 and US 79-010 are experimental clones, and N27, NCo310, and POJ 234 are foreign commercial cultivars used in sugarcane breeding in Louisiana.

The 97 sugarcane clones were planted in 2015 and 2016 in both heavy soil (Commerce silty clay loam and Sharkey clay) and light soil (Commerce silt loam). The clones were planted in 3 m long plots with 1.8 m row spacing. Five plots each of HoCP 96-540 and L 01-299 were planted as checks to account for in-field variation.

Data were collected in 2016 for plant cane in both soil types, and in 2017 from plant cane and first ratoon crops in both soil types. Stalk count per plot, and height and diameter of six stalks (biological replicates) were measured in field prior to harvesting. Six stalks were harvested from each plot to obtain stalk weight and sucrose data. Data on sucrose traits, such as theoretical recoverable sugars (TRS), total soluble solids (Brix), percent sucrose, fiber, purity and Pol were collected using a Spectracane near infrared spectroscopic system (Bruker Corporation, Billerica, MA).

Phenotypic data analysis

In-field variation was modeled by linear regression on the data of the checks HoCP 96-540 and L 01-299 along the rows. The regression line was used to adjust observed values proportionate to their location along the rows when the checks were significant in the model. Both modeling by nearest-neighbor and modeling variation between rows were not used due to the size of random error in proportion to the in-field variation, and to the study dimensions (two to three rows with 30 to 50 plots in each).

Phenotypic data were modeled using a mixed linear model (MLM) using JMP Pro version 14.0.0 (SAS Institute, Cary, NC) as follows:

$$t_{ijkl} = \mu + g_i + p_{j(i)} + s_k + y_l + \varepsilon_{ijkl},$$

where t_{ijkl} = phenotypic trait, μ = overall mean, $g_i = i^{th}$ genotypic effect, $p_j = j^{th}$ cane-crop (plant cane or first ratoon crop) of the i^{th} genotypic effect, $s_k = k^{th}$ soil type, $y_l = l^{th}$ year, and ε_{ijkl} = residual error for t_{ijkl}. For estimating means, g and p were considered to be fixed effects, and s and y as random effects. This model was also evaluated for types of cane-crop independently (i.e. for plant cane and first ratoon crop estimates), and for soil type in plant cane independently (i.e. heavy soil and light soil estimates). Soil type models were within plant cane only to avoid weighting estimates by a single year of ratoon crop and for ease of interpretation.

Broad-sense heritability (H^2) and the coefficient of genotypic variation (CV_g) were measured in plant cane with g, s, and y being considered as random effects as genotypes are considered to be a random representation of Louisiana breeding clones, and mean estimates of the clones are not of interest for H^2. Broad-sense heritability was estimated with the equation:

$$H^2 = \frac{\sigma_g^2}{\sigma_g^2 + \frac{\sigma_\varepsilon^2}{n_{kl}}},$$

where σ_g^2 = genetic variance, σ_ε^2 = residual error variance, and n_{kl} = number of soil types by the number of years.

Genotyping

Genomic DNA was isolated from ~100 mg leaf tissues of the sugarcane clones and library preparation for GBS was done as described earlier (Gutierrez et al. 2018). The libraries were sequenced (96-plex 100-bp single-end) on an in-house Illumina HiSeq2500 platform.

The sequence reads were cleaned by removing the adapter and restriction enzyme remnants and then filtered to those with a Phred quality score ≥ 20. SNP calls were made as described earlier (Gutierrez et al. 2018). The *Sorghum bicolor* genome (v. 3.1) was used as the reference. Uniquely mapped reads were used for variant calling. SNP and InDel loci common to both software were filtered further by removing those loci not occurring in at least 50% of the clones.

Population structure analysis

Population structure was evaluated using STRUCTURE and JMP Genomics 9.0. In STRUCTURE, the number of populations, *K,* was expected to be at least 2. Models were run for $K = 2$ through 10, and $K = 3$ was selected as per documentation. The Markov chain Monte Carlo was run for 25,000 iterations of burn-in (the model converged around 10,000 iterations), and 25,000 subsequent iterations were used for model parameter estimation. Ten model runs were used to check for non-symmetric modes, and none were found. An average of the ten runs was used for the final result. JMP Genomics was used to build an identity by state (IBS) matrix and dendrogram and for principal coordinate analysis (PCoA). PCoA calculations used single-value decomposition, i.e., the wide estimation method in JMP.

Association mapping

The association between markers and traits was evaluated using a Q-K analysis in JMP Genomics, which was used also to impute missing SNPs. The IBS distance matrix from JMP Genomics was used as the K-matrix, and the matrix from STRUCTURE was used as the Q-matrix. The MLM from the phenotypic analysis using JMP Pro was used to calculate estimates of the phenotypic traits for use as the dependent variables. Analysis was run on five models of the phenotypic traits: the full model, plant cane, first ratoon, plant cane in heavy soil, and plant cane in light soil. The P-value cut-off was set at 0.05, i.e., -*log*(P) of 3 to call a marker-trait association (MTA) significant.

Results

Phenotypic variation for cane yield components and sucrose traits

The phenotypic data were evaluated using an MLM to obtain estimates for association mapping (Table 1). All traits were found to be normally distributed with significant genetic variance ($P < 0.001$). Sucrose yield averaged 8.84 t/ha ranging from 1.96 to 19.00, with a coefficient of genetic variation (CV_g) of 21.7% and an H^2 of 0.72.

The average values for CYC traits, such as stalk count, height, diameter and weight were 6.75 stalks/m^2, 266 cm, 24.20 mm and 1.08 kg, respectively, with significant yet broad range of genetic variance ($P < 0.001$). Broad-sense heritability for these traits ranged from 0.52 for stalk height to 0.82 for stalk weight with CV_g ranging from 4.3% for stalk height to 17.9% for stalk count. The average values for the sucrose traits TRS, Brix, percent sucrose, fiber, Pol, and purity were 124.62 Kg/t, and 20.02, 17.41, 12.35, 75.20, and 85.30%, respectively, with significant genetic variance ($P < 0.001$). Broad-sense heritability ranged from 0.73 for purity to 0.88 for fiber. Coefficients of genetic variation of sucrose traits ranged from 1.9% for purity to 7.3% for fiber, which were less than the values for the CYC traits.

For CYC traits, correlations between stalk count and height, height and weight, and diameter and weight were significant ($P < 0.0001$) with values of 0.388, 0.439, and 0.802, respectively (Table 2). Stalk count and diameter were negatively correlated (-0.328; $P < 0.05$). All sucrose traits, except fiber, were highly correlated ranging from 0.732 to 0.999. Fiber was positively correlated with stalk count (0.317) and height (0.373), but negatively correlated with stalk diameter (-0.273).

Population structure

The Louisiana core collection consisting of 97 clones showed a non-translatable structure. The heat map and dendrogram generated from the IBS K-matrix showed strong differentiation between ten clones and the rest of the collection that was divided into two main groups. The STRUCTURE analysis and PCoA both produced results similar to the IBS K-matrix, where the same ten clones separated from the majority of the population. In the PCoA, this separation corresponded with the variation explained by coordinate 1. However, the separation between the two main groups was not discrete from the STRUCTURE analysis where the groups were composed of different clones than in the K-matrix. In the PCoA, there was no clear differentiation of the remaining clones into subgroups. Coordinate 2 separated out three clones accounting for 2.23% of the variation, which did not have any corollaries in the other two analyses.

Marker-trait association

For each phenotypic trait, five models were run: a full model and four sub-models: plant cane, first ratoon, plant cane in heavy soil, and plant cane in light soil. These models together identified 570, 460, 697, and 656 makers significantly ($P < 0.05$) associated with stalk count, stalk height, stalk diameter, and stalk weight, respectively. The number of markers common to all models was 39, 26, 57, and 32 for stalk count, stalk height, stalk diameter, and stalk weight, respectively.

For sucrose traits, the same five models together identified 541, 520, 528, 562, 517, and 687 MTAs for TRS, Brix, percent sucrose, fiber, Pol, and purity, respectively. The number of markers common across all models was 39, 42, 39, 45, 37, and 9 for TRS, Brix, percent sucrose, fiber, Pol, and purity, respectively.

Markers that explained more than 5% phenotypic variation (R^2 >0.05) at a *-log(P)* >3 were considered significant. Only two markers, one each for Brix and percent sucrose, had an R^2 <0.05. The top markers with significant (*-log(P)*>3) association with stalk count, stalk height, stalk diameter, and stalk weight were SNP5806, SNP5501, SNP0938, and SNP2578 with R^2 values of 0.143, 0.122, 1.39, and 0.139, respectively. The markers SNP1190, SNP3258, SNP4204, SNP1571, SNP1190, and SNP5851 showed highest association with TRS, Brix, percent sucrose, fiber, Pol, and purity explaining 15.0, 13.7, 14.9, 12.4, 14.7, and 14.2 % of the phenotypic variance, respectively.

Altogether, there were 154 MTAs for CYC traits and 209 MTAs for sucrose traits. These associations had 142 distinct markers for CYC traits, and 101 distinct markers for sucrose traits, with a total of 238 distinct makers. Fifty-six of these markers were associated with more than one trait, with 12, 39, and five markers associating with only CYC traits, only sucrose traits, or traits from either, respectively. Twenty-seven markers were found to be very highly significantly (P <0.01) associated with six traits, with five for stalk count, 2 each for height and diameter, nine for Brix, five for Pol, and 4 for fiber (Table 3). Six markers were common for Brix and Pol. Highly significant SNPs associated with the CYC and sucrose traits were located on genes with different biological functions (Table 3). The non-synonymous SNPs associated with the traits, especially on the genes with hypothetical function, transferase (height), auxin-responsive gene (Brix) and POT family protein (Fiber) signify biological relevance of the genes contributing to cane and sucrose yield.

The markers showing significantly high associations with CYC and sucrose traits, especially those found across different crop types and crop edapho-climatic environments will be of immediate interest. These markers will be validated in the future using biparental mapping populations and more diverse clones. In addition, the future study will aim at analyzing the functional relevance of the non-synonymous SNPs, such as SNP5822, SNP3647, SNP0321 (Table 3) through gene expression and functional assays. The validated SNPs can be converted to allele-specific markers for use in marker-assisted selection of desirable clones, which will ultimately pay dividends to the sugarcane industry in Louisiana and elsewhere.

Acknowledgements

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Table 1. Descriptive statistics and broad-sense heritability (plant cane) for the phenotypic traits in sugarcane.

Trait		Range		Mean ± standard	σ_g^2	H^2	CV_g
		min	max	error			
Sucrose yield	t/ha	1.96	19.00	8.84 ± 1.39	3.67**	0.72	21.7
Stalk count	stalk/m^2	1.21	16.03	6.75 ± 1.13	1.39**	0.67	17.9
Stalk height	cm	158	345	265.93 ± 24.31	132.97**	0.52	4.3
Stalk diameter	mm	18	33	24.20 ± 1.18	2.62**	0.77	6.7
Stalk weight	Kg	0.43	1.92	1.08 ± 0.097	0.033**	0.82	16.8
Brix	%	14.97	22.75	20.02 ± 1.04	0.52**	0.78	3.6
Pol	%	46.94	89.63	75.20 ± 5.30	16.85**	0.77	5.5
Fiber	%	9.00	15.92	12.35 ± 0.47	0.82**	0.88	7.3

** Significant at P-value < 0.001

σ_g^2, Genotypic variance

H^2, The degree of genetic determination

CV_g, % coefficient of genetic variation

Table 2. Pearson's product moment correlations between cane yield-component and sucrose traits in Louisiana sugarcane core collection.

	Count	Height	Diameter	Weight	Brix	Pol	Fiber
Count	1.000						
Height	0.388**	1.000					
	[0.20 – 0.55][a]						
Diameter	-0.328*	0.047	1.000				
	[-0.49 – -0.14]	[-0.15 – 024]					
Weight	-0.161	0.439**	0.802**	1.000			
	[-0.35 – 0.04]	[0.26 – 0.59]	[0.72 – 0.86]				
Brix	-0.019	-0.068	0.013	0.015	1.000		
	[-0.22 – 0.18]	[-0.26 – 0.13]	[-0.19 – 0.21]	[-0.19 – 0.21]			
Pol	0.008	-0.043	0.010	0.005	0.975**	1.000	
	[-0.19 – 0.21]	[-0.24 – 0.16]	[-0.19 – 0.21]	[-0.19 – 0.20]	[0.96 – 0.98]		
Fiber	0.317*	0.373*	-0.273*	-0.015	-0.016	-0.038	1.000
	[0.13 – 0.49]	[0.19 – 0.53]	[-0.45 – -0.08]	[-0.21 – 0.19]	[-0.21 – 0.18]	[-0.24 – 0.16]	

* P <0.05

** P <0.0001

[a] 95% confidence interval

Table 3. Markers associated with cane yield components and sucrose traits of Louisiana sugarcane core collection with P <0.01 i.e., ($-log_{10}$(P) >2) in all field-years, plant cane, first ratoon, plant cane in heavy soil, and in plant cane in light soil (i.e., P <0.01 in all five models)

Trait	Marker	Chr.[a]	Position	$-log_{10}$(P)	R^2	Gene location	Gene Annoatation	Position
Count	SNP5822	10	357653	3.29	0.122	Sobic.010G004100	expressed protein	Exon[ns]
Count	SNP0120	1	4578504	3.22	0.119	Sobic.001G057200	pyruvate kinase	Exon
Count	SNP0102	1	4169583	2.98	0.11	Sobic.001G052700	vacuolar protein sorting-associated protein 35	intron
Count	SNP0122	1	4578513	2.78	0.101	Sobic.001G057200	pyruvate kinase	Exon
Count	SNP0123	1	4578518	2.78	0.101	Sobic.001G057200	pyruvate kinase	Exon
Height	SNP3647	4	63808780	2.72	0.099	Sobic.004G328800	transferase family protein	Exon[ns]
Height	SNP1948	2	89376489	2.39	0.085	Sobic.002G426800	C3HC4 type zinc finger	intron
Diameter	SNP3385	4	55911251	2.84	0.133	Sobic.004G099400	expressed protein	intergenic
Diameter	SNP3148	4	9312997	3.02	0.111	Sobic.004G099400	expressed protein	Exon
Brix	SNP3258*	4	49689987	2.95	0.137	Sobic.004G176100	expressed protein	Exon[ns]
Brix	SNP0321*	1	12278001	2.91	0.107	Sobic.001G146400	Auxin-responsive SAUR16	Exon[ns]
Brix	SNP0323*	1	12278041	2.91	0.107	Sobic.001G146400	Auxin-responsive SAUR16	Exon[ns]
Brix	SNP1435*	2	67352987	2.91	0.107	Sobic.002G178700	ubiquitin fusion protein	5’UTR
Brix	SNP1662*	2	77691298	2.91	0.107	Sobic.002G272600	TBC domain containing protein	Exon
Brix	SNP5167*	8	57562266	2.82	0.103	Sobic.008G107000	expressed protein	Exon
Brix	SNP4203	6	53965509	2.81	0.103	Sobic.006G096600	DUF623 domain containing protein	Exon
Brix	SNP2609	3	65363324	2.74	0.100	Sobic.003G311100	DUF260 domain containing protein	Exon
Brix	SNP5168	8	57562275	2.51	0.090	Sobic.008G107000	expressed protein	Exon
Pol	SNP3258*	4	49689987	3.28	0.143	Sobic.004G176100	expressed protein	Exon[ns]
Pol	SNP0321*	1	12278001	2.68	0.108	Sobic.001G146400	Auxin-responsive SAUR16	Exon[ns]
Pol	SNP0323*	1	12278041	2.58	0.108	Sobic.001G146400	Auxin-responsive SAUR16	Exon[ns]
Pol	SNP1435*	2	67352987	2.22	0.108	Sobic.002G178700	ubiquitin fusion protein	5’UTR

Pol	SNP1662*	2	77691298	3.09	0.108	Sobic.002G272600	TBC domain containing protein	Exon
Pol	SNP5167*	8	57562266	2.94	0.103	Sobic.008G107000	expressed protein	Exon
Fiber	SNP2376	3	54388761	2.94	0.122	Sobic.003G205200	expressed protein	Exon
Fiber	SNP2760	3	70172418	2.94	0.097	Sobic.003G371100	POT family protein	Exon[ns]
Fiber	SNP0034	1	1961803	2.94	0.093	Sobic.001G020000	metallo-beta-lactamase	5'UTR
Fiber	SNP2685	3	67910237	2.82	0.078	Sobic.003G341400	Phox domain-containing protein	Exon

* Markers significant for more than one trait

[a] Sorghum reference chromosome number

[ns] non-synonymous