AN OVERVIEW OF 2006 ACTIVITIES IN THE LSU AGCENTER SUGARCANE VARIETY DEVELOPMENT PROGRAM

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The primary objective of the LSU AgCenter Sugarcane Variety Development Program is to contribute to the profitability of the Louisiana sugarcane industry by developing improved sugarcane varieties.

Sugarcane variety development in the LSU AgCenter is carried out by a team of scientists (Table 1). The LSU AgCenter sugarcane breeding team and the United States Department of Agriculture (USDA) sugarcane breeding team work independently yet cooperatively to produce "L" and "HoCP or Ho" varieties, respectively. The best varieties from each program are brought together for evaluation at the nursery, infield, and outfield test locations. Outfield testing is conducted by personnel of the LSU AgCenter, the USDA, and the American Sugar Cane League. Seed increase is carried out by the American Sugar Cane League and begins when varieties are introduced to the outfield testing stage. The cooperative efforts of sugarcane breeding are done in accordance with the provisions of the "Three-Way Agreement of 2007." After yield data for one crop cycle (plant-cane, first stubble, and second stubble) are collected in the outfield testing stage, those varieties that show promise are released for commercial production.

Table 1. Members of the LSU AgCenter Sugarcane Variety Development Team in 2006.

Team Member	**Budgetary Unit**	**Responsibility**
Kenneth Gravois	Sugar Research Station	Program Leader
Keith Bischoff	Sugar Research Station	Selection
Collins Kimbeng	Plant, Environmental & Soil Sciences	Molecular Breeding
Gene Reagan	Entomology	Insect Resistance
Jeff Hoy	Plant Pathology & Crop Physiology	Disease Resistance
Jim Griffin	Plant, Environmental & Soil Sciences	Herbicide Tolerance
Sonny Viator	Iberia Research Station	Variety Testing
Terry Bacon	Sugar Research Station	Variety Testing
Gert Hawkins	Sugar Research Station	Sucrose Laboratory
Chris LaBorde	Sugar Research Station	Photoperiod and Crossing
Mike Duet	Sugar Research Station	Outfield Testing
Todd Robert	Sugar Research Station	Variety Testing
Joel Hebert	Sugar Research Station	Farm Manager

A total of 79,395 seedlings from 72 crosses from the 2004 and 2005 crossing series were planted in the field in the spring of 2006. A total of 73,137 seedlings survived transplanting. In addition, 3,710 seedlings were planted in a cross appraisal trial. The majority of the seedlings

were from crosses of commercial varieties and elite experimental varieties. Selection will be carried out in 2007 when the seedlings are in the first stubble crop.

Photoperiod treatments to induce flowering began on May 31 and continued until September 10. Flowering in 2006 was excellent, with 401 crosses being made. Relatively low August and September temperatures were conducive to flowering. Germination tests were conducted in December and January. Seed production for 2006 was more than adequate based on germination test results, with 279,777 true seed produced during 2006.

In the fall of 2006, individual selection was practiced on first stubble seedlings that represented the 2004 crossing series. The cross appraisal was evaluated and rated prior to selection. Family selection (top 60% in 2006) was utilized based on information from the cross appraisal results. Selection was done during the first through third weeks of September. The seedling populations were only slightly lodged. From this initial population, 2,296 clones were selected and planted to establish the first-line trials.

Established procedures were used to advance superior clones of the 2003 crossing series from first-line trials to second-line trials (256 clones) and of the 2002 crossing series from second-line trials to increase trials (240 clones). Preliminary ratings for cane yield and plant type were done in August. Clones with acceptable ratings were further evaluated for lodging, broken tops, borer damage, diseases, pith/tube, and Brix/sugar per ton.

The best 40 experimental varieties from the 2001 crossing series were assigned permanent variety designations in the fall of 2006. Newly assigned varieties were entered in replicated nursery trials at three locations (Sugar Research Station, USDA-ARS Ardoyne Farm, and Iberia Research Station). "L", "HoCP, or Ho" varieties of the 2006 assignment series were exchanged in the fall of 2006 to plant cooperative infield and off-station nursery tests the following year.

Experimental varieties were replanted in infield and off-station nursery tests (15 varieties of the 2005 series), introduced to the outfield tests (three varieties of the 2004 series), and planted in outfield tests (two experimental varieties of the 2001 assignment series; one experimental variety of the 2003 assignment series). Breeding personnel assisted Dr. Jeff Hoy and Dr. Gene Reagan in entering experimental varieties in the sugarcane smut and sugarcane borer resistance trials, respectively.

The Variety Release Committee met at the American Sugar Cane League Office on April 25, 2006 to consider the release of L 99-226 and L 99-233. The vote for release was unanimous. Seed was made available to growers by the American Sugar Cane League

The decision regarding the further testing and seed increase of candidate experimental varieties was determined at the Variety Advancement Committee meeting. The 2006 meeting was held on August 11, 2006, at the American Sugar Cane League office in Thibodaux, Louisiana. The distribution of "L" experimental clones through stages of testing in 2006 is presented in Table 2.

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

Table 2. Number of "L" varieties by assignment series at the most advanced stage of testing in 2006.

Series	Stage of Testing	Number of experimental varieties
L 2001	Outfield – Replanted and harvested as plantcane and first stubble Off-station nurseries and infield – 3rd stubble harvested	2
L 2002	Outfield – Replanted and harvested as plantcane On-station nurseries - 3rd stubble harvested Off-station nurseries and infield – 2nd stubble harvested.	0
L 2003	Outfield – Planted On-station nurseries - 2nd stubble harvested Off-station nurseries and infield - 1st stubble harvested	1
L 2004	Outfield - Introduced On-station nurseries - 1st stubble harvested Off-station nurseries and infield - plantcane harvested.	3
L 2005	On-station nurseries - plantcane harvested Off-station nurseries and infield planted	15
L 2006	Assignment - On-station nurseries planted	40

In 2006, rust continued to be seen in high levels in LCP85-384 throughout the growing season, especially in the plant-cane crop. Smut disease was prevalent in 2006, whereas levels of pith and leaf scald in experimental varieties were somewhat below average compared to other years. Sugarcane borer infestations were extremely light at the Sugar Research Station. The weather in 2006 was good, although some of the western and northern portions of the sugarcane growing areas experienced drought.

2006 PHOTOPERIOD AND CROSSING IN THE LSU AGCENTER SUGARCANE VARIETY DEVELOPMENT PROGRAM

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The LSU AgCenter's Sugarcane Variety Development Program is a complex program that encompasses many entities to develop new commercial sugarcane varieties for the Louisiana sugarcane industry. The duration of the program spans a 13 year period. The first stage of the program is the photoperiod induction and crossing stage. For subsequent stages to be successful, success must first be achieved at both photoperiod induction and crossing. Photoperiod induction is essential for the transition or phase change from the vegetative to the reproductive stage of the sugarcane life cycle. In addition to photoperiod induction, proper hybridization techniques are the other key for the production of viable seed. Viable "true" seed is seed that has a sufficient germination count. The objective of crossing is to produce viable "true" seed from the most desirable crosses. This seed will then be advanced to the seedling stage of the Sugarcane Variety Development Program.

Cuttings of potential parent varieties used for the 2006 crossing season were planted in the fall of 2005. After establishing the plants from the cuttings, the plants were fertilized biweekly with a 200 ppm solution of Peter's 20-20-20. In late January 2006, the cuttings were then transferred to can culture. In April, the cans were moved from the greenhouse to the photoperiod rail carts. Soluble fertilizer applications were continued on a biweekly basis. Fertilization was discontinued in early- to mid-May to condition the plants for floral induction. Three additional applications of dry granular fertilizer (8-24-24, one Tbs/can) were applied to the cans during July, August, and September. A reduced nitrogen ratio makes a higher C:N ratio, which is more desirable for the ease of flowering.

Natural lighting and six light-tight chambers were used for photoperiod treatments. To prevent overwhelming the crossing facilities, two flowering peaks were planned for September 23 and October 8 although these two flowering peaks can be advanced or delayed because of certain climatic factors. Records of varietal flowering, past photoperiod response, and pollen production were used to determine the most appropriate photoperiod treatment for each variety. The first photoperiod treatments began on May 30. All photoperiod treatments (time from artificial sunrise to natural sunset) were initiated with a minimum of 34 consecutive days of 12 ½ hours of constant day length. After the initial constant photoperiod days, day length was shortened by one minute per day. Treatments differed by the number of days with constant day length and the date on which the decline of photoperiod was initiated. All photoperiod treatments were discontinued on September 10, 2005, when natural day length was 12 ½ hours and decreasing.

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

Flowering percentage of total stalks was average on the photoperiod carts in 2006 (Tables 1-2). Total flowering percentage for the six bays was 45%, which was comprised from 1,585 stalks. Although the flowering percentage was average in 2006, successful seed production is comprised of a multitude of factors. An adequate germination rate provided the Variety Development Program with sufficient seed production. In 2006 as in previous years, seedlings were produced from hybridization techniques that used sugarcane yield components, borer resistance, and disease resistance as some of the criteria to determine which breeding stocks were most compatible.

The flowering season in 2006 began during the second week of September. The normal time frame for first flowering can be as early as the last week of August or as late as the second week of September. There can be a slight deviation on when the first flower does appear due to temperature during the photoperiod induction phase, varietal characteristics, and the photoperiod treatments. Crossing began on September 8 and ended on October 23, 2006. The end date was a true end date; there were no more flowers to be used for hybridization. This was an unusual year because of the early influx of flowers that were produced. Crossing usually extends well into November. A total of 712 tassels of 139 varieties were used to produce 401 crosses producing 279,777 viable seed with 236,065 seed produced from biparental crosses (Table 3). The germination rate is one of two components that measure the success of this stage in the crossing program. The other component is photoperiod induction. Close attention was made once again in maintaining high relative humidity within the crossing greenhouse; high relative humidity has been proven in past studies to increase seed set. High relative humidity is maintained with the use of a misting system that has been installed inside of the crossing greenhouse. High temperatures throughout the summer months can result in poor production of sugarcane flowering as is being speculated in 2006. Along with the hot summer months, high temperatures in September can also result in poor seed set. Although outside temperatures may be in the 90 degree range, greenhouse temperatures can be anywhere from 10 to 30 degrees hotter. To manage high temperatures the crossing greenhouse is white-washed at the beginning of the crossing season (late August). Along with the shading effect of the white-washed greenhouse, the misting system also has a cooling effect on the greenhouse environment.

Table 1. Summary of the 2006 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	277±21	88	55
1	B	16-Jun	44	30-Jul	72	87	287±6	94	41
1	C	16-Jun	44	30-Jul	72	87	282±12	95	23
2	A	16-Jun	34	20-Jul	72	87	279±13	84	55
2	B	16-Jun	34	20-Jul	72	87	278±8	91	51
2	C	16-Jun	34	20-Jul	72	87	273±15	88	22
3	A	30-May	37	6-Jul	87	102	270±9	93	56
3	B	30-May	37	6-Jul	87	102	272±11	89	47
3	C	30-May	37	6-Jul	87	102	265±12	90	33
4	A	30-May	37	6-Jul	87	102	274±11	84	44
4	B	30-May	37	6-Jul	87	102	272±9	94	27
4	C	30-May	37	6-Jul	87	102	271±14	83	28
5	A	30-May	36	10-Jul	82	97	271±8	89	73
5	B	30-May	36	10-Jul	82	97	271±6	78	28
5	C	30-May	36	10-Jul	82	97	269±11	81	23
6	A	30-May	41	10-Jul	82	97	271±9	80	68
6	B	30-May	41	10-Jul	82	97	274±9	92	62
6	C	30-May	41	10-Jul	82	97	269±9	92	72

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

Varieties used in crossing	Cans with stalks	Cans with tassels	Total stalks	Total tassels	Mean stalks per can	Mean tassels per can†	Mean pollen rating‡	Mean days to flower§
----------Number----------								
139	324	198	1585	712	4.97±1.08	3.60±1.68	4.91±1.76	78.96±12.00

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

Table 3. Summary of 2005 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	345	236,065	684±971	684±971	103±123
Polycross	26	25,194	969±1068	969±1068	151±149
Self	30	18,517	617±1251	617±1251	79±131
Total	401	279,777	698±1001	698±1001	104±126

Table 4. Varietal flowering summary in 2006 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
CP79-348	38±1	.	.	.	14	.	.
CP83-644	41	282	98±3	6	22	4	18
Ho89-889	41	270	82±3	6±1	3	3	100
Ho91-572	38±2	.		.	5	.	.
Ho95-988	39	261	88±2	5	18	18	100
HoCP00-905	41	268	81±4	5±2	15	2	13
HoCP00-927	44	235	25±1	5±1	13	3	23
HoCP00-930	40±2	282	77±2	4	9	5	56
HoCP00-931	34	289	88	3	1	1	100
HoCP00-933	36±2	237	68±12	5±1	11	5	45
HoCP00-950	37±1	261	83±2	7	22	17	77
HoCP00-951	41	270	79	7	1	1	100
HoCP01-517	39±1	.	.	.	9	.	.
HoCP01-523	37	275	94±2	5	15	4	27
HoCP01-561	37	275	93±5	6±2	4	2	50
HoCP02-610	38±1	265	78±1	4	18	15	83
HoCP02-618	42	268	80±1	3	16	8	50
HoCP02-620	41±1	268	81±2	6	10	8	80
HoCP02-623	40	272	86±1	5	17	14	82
HoCP02-652	34	272	77±2	4	6	6	100
HoCP03-704	37	263	79±2	7	6	6	100
HoCP03-708	40±1	275	88±3	4±1	8	5	63
HoCP03-716	39±1	.	.	.	8	.	.
HoCP03-720	44	296	85	5	4	1	25
HoCP03-743	37	.	.	.	11	.	.
HoCP03-744	34	.	.	.	4	.	.
HoCP04-803	41	258	70±1	4±1	10	5	50
HoCP04-807	41	270	85±2	3	6	6	100
HoCP04-809	41	251	63±1	5	5	5	100
HoCP04-810	41	263	75±1	5±1	5	5	100
HoCP04-814	37	.	.	.	6	.	.
HoCP04-821	37	.	.	.	5	.	.
HoCP04-823	37±1	.	.	.	8	.	.
HoCP04-824	41	263	76±1	4	12	11	92
HoCP04-827	36±2	272	84±1	6	7	4	57
HoCP04-829	37	256	73±1	5±1	5	5	100
HoCP04-836	41±2	275	83±3	3	7	5	71
HoCP04-837	37	.	.	.	3	.	.
HoCP04-838	34	237	36	3	12	2	17
HoCP04-843	37	251	71±2	6	6	6	100
HoCP04-847	44	.	.	.	6	.	.
HoCP04-853	44	291	83±3	5±2	4	2	50
HoCP04-854	44	.	.	.	6	.	.
HoCP04-855	44	235	24	3	7	1	14
HoCP04-856	44	.	.	.	5	.	.
HoCP85-845	41	268	85±4	3	36	6	17

Table 4. Continue.

Variety	Days of Constant Photoperiod	First Flower Date	Mean Days to Flower	Pollen Rating	Total Stalk Number	Total Flowers	Percent Flowering Stalks
HoCP88-739	41	277	90±4	6±1	9	2	22
HoCP89-831	39±2	286	100±5	5±2	6	2	33
HoCP89-846	41±1	254	75±2	6	15	11	73
HoCP91-552	40±1	251	66±1	4	13	12	92
HoCP91-555	39±1	.	.	.	12	.	.
HoCP91-572	44	277	67±1	3	3	3	100
HoCP92-618	37	286	99	4	17	1	6
HoCP92-624	39±1	256	74±1	7	32	28	88
HoCP92-648	37±1	265	86±2	7	18	15	83
HoCP93-746	44	.	.	.	6	.	.
HoCP93-749	41	279	95±7	5±2	5	2	40
HoCP95-951	37	265	82±2	5	11	10	91
HoCP96-509	38±1	.	.	.	18	.	.
HoCP96-522	40±1	254	74±4	5±1	12	6	50
HoCP96-540	38±1	261	83±1	3	43	38	88
HoCP96-561	39±1	263	81±1	4	11	10	91
HoCP97-606	34	.	.	.	5	.	.
HoCP97-609	38±2	279	82±2	5±1	15	5	33
HoCP99-815	41	284	93	7	4	2	50
HoCP99-825	41	265	78±2	4	6	6	100
HoCP99-866	39±2	.	.	.	10	.	.
Ho01-001	44	.	.	.	4	.	.
Ho89-889	41	.	.	.	5	.	.
Ho94-856	40±1	.	.	.	11	.	.
Ho95-988	39±1	.	.	.	28	.	.
L00-266	41	.	.	.	5	.	.
L01-283	41	284	98±2	4±1	13	5	38
L01-292	41	.	.	.	6	.	.
L01-299	40	263	77±2	5±1	24	13	54
L01-315	39±1	256	74±4	7	11	9	82
L02-316	41	270	81±1	3	5	5	100
L02-320	41	268	83±4	5±1	5	5	100
L02-325	41	272	84±1	3	4	4	100
L03-371	36±1	.	.	.	10	.	.
L03-374	37	.	.	.	5	.	.
L03-378	41±1	.	.	.	10	.	.
L03-390	34	275	74	7	5	1	20
L03-392	34	272	77±4	7	6	3	50
L03-396	40±2	277	77±1	7	9	9	100
L04-403	44	.	.	.	6	.	.
L04-404	34	.	.	.	3	.	.
L04-407	37	272	90±5	7±1	5	2	40
L04-408	41	268	84±2	6±1	6	6	100
L04-410	39±1	268	89±4	3	12	9	75
L04-423	37	.	.	.	3	.	.
L04-425	35	251	69±1	5	11	11	100
L04-431	38±1	.	.	.	10	.	.

Table 4. Continue.

Variety	Days of Constant Photoperiod	First Flower Date	Mean Days to Flower	Pollen Rating	Total Stalk Number	Total Flowers	Percent Flowering Stalks
L05-442	37	.	.	.	6	.	.
L05-445	41	256	73±6	7±1	9	4	44
L05-447	37	.	.	.	6	.	.
L05-448	38±1	263	73±1	3	10	10	100
L05-450	41	272	81	3	5	5	100
L05-451	41	258	75±5	5±1	6	6	100
L05-453	41	.	.	.	4	.	.
L05-460	37±1	258	72±1	6	12	11	92
L05-462	41	.	.	.	6	.	.
L05-471	44	.	.	.	5	.	.
L89-113	37	296	109	5	10	1	10
L91-255	39±1	.	.	.	16	.	.
L91-281	44	279	71±1	3	10	10	100
L92-312	41	272	84±2	3±1	4	4	100
L93-399	37	275	90±2	6	10	2	20
L94-424	40±1	.	.	.	13	.	.
L94-426	36	268	87±2	6	23	8	35
L94-428	39±1	263	82±3	6±1	21	10	48
L94-432	41	270	90±8	4±1	20	3	15
L94-433	40±1	282	99±3	6	24	9	38
L96-092	41	.	.	.	9	.	.
L97-128	40	258	76±1	7	49	36	73
L97-137	41	.	.	.	10	.	.
L98-197	37±2	237	74±6	5±1	9	8	89
L98-207	44	282	74±2	5	32	4	13
L98-209	41±4	265	83±5	7	19	2	11
L99-226	39	265	82±1	3	44	36	82
L99-233	38±1	254	70±1	4	41	26	63
LCP81-010	41±1	235	72±4	5	26	19	73
LCP82-089	41	275	90±3	5±1	11	5	45
LCP85-384	39±1	265	85±1	4	54	24	44
LCP86-454	41	258	71±3	6	24	3	13
LCP87-492	40±1	254	75±5	6	13	8	62
N27	37	.	.	.	12	.	.
TucCP77-042	38±1	237	86±6	6	23	15	65
US01-039	37	.	.	.	6	.	.
US01-040	37	275	93±4	4±1	6	3	50
US02-095	34	.	.	.	4	.	.
US05-9604	44	.	.	.	6	.	.
US79-010	34	277	76	3	10	1	10
US80-004	39±1	.	.	.	8	.	.
US90-018	41	.	.	.	5	.	.
US93-015	37	279	92	5	5	1	20
US96-002	34	279	83±5	7	5	3	60
US99-002	44	235	47±10	5±1	6	6	100
US99-004	44	286	78±2	5±1	4	3	75

Table 5. Crosses and seed made in 2006 sorted by cross number.

Cross	Female	Male	Seed
XL06-001	L04-425	HoCP91-552	740
XL06-002	HoCP91-552	HoCP91-552	4682
XL06-003	HoCP91-552	HoCP04-809	4682
XL06-004	HoCP04-843	HoCP04-809	866
XL06-005	HoCP04-809	HoCP04-809	601
XL06-006	HoCP04-843	L99-233	1017
XL06-007	HoCP89-846	L99-233	821
XL06-008	HoCP96-522	L99-233	427
XL06-009	L04-425	L99-233	682
XL06-010	LCP87-492	L99-233	142
XL06-011	HoCP04-809	L99-233	1067
XL06-012	L99-233	L99-233	675
XL06-013	HoCP04-809	L04-425	188
XL06-014	LCP87-492	L04-425	0
XL06-015	L04-425	L04-425	354
XL06-016	HoCP04-809	HoCP04-829	427
XL06-017	HoCP92-624	HoCP04-829	31
XL06-018	L01-315	HoCP04-829	20
XL06-019	HoCP04-829	HoCP04-829	150
XL06-020	HoCP89-846	LCP81-010	125
XL06-021	HoCP92-624	LCP81-010	370
XL06-022	L01-315	LCP81-010	569
XL06-023	LCP81-010	LCP81-010	106
XL06-024	HoCP92-624	L99-233	1303
XL06-025	L05-445	L99-233	635
XL06-026	L04-425	L99-233	228
XL06-027	HoCP89-846	LCP87-492	89
XL06-028	HoCP92-624	LCP87-492	182
XL06-029	L01-315	LCP87-492	40
XL06-030	LCP87-492	LCP87-492	0
XL06-031	HoCP92-624	L99-233	425
XL06-032	L05-451	L99-233	510
XL06-033	L05-460	L99-233	0
XL06-034	L97-128	L99-233	0
XL06-035	L01-315	L05-445	262
XL06-036	HoCP92-624	L05-445	313
XL06-037	HoCP04-803	L05-445	18
XL06-038	HoCP04-843	L05-445	37
XL06-039	L05-445	L05-445	451
XL06-040	Ho95-988	L99-233	239
XL06-041	HoCP92-624	L99-233	150
XL06-042	L97-128	L99-233	292
XL06-043	LCP86-454	L99-233	262
XL06-044	HoCP04-843	L99-233	815
XL06-045	HoCP00-950	HoCP96-540	0
XL06-046	L97-128	HoCP96-540	569
XL06-047	HoCP96-540	HoCP96-540	597
XL06-048	L97-128	HoCP96-522	118
XL06-049	L05-445	HoCP96-522	486
XL06-050	L05-460	HoCP96-522	376
XL06-051	HoCP96-522	HoCP96-522	55
XL06-052	L97-128	HoCP04-803	49
XL06-053	L05-460	HoCP04-803	20
XL06-054	HoCP04-829	HoCP04-803	46
XL06-055	LCP87-492	HoCP04-803	0
XL06-056	HoCP04-803	HoCP04-803	0
XL06-057	HoCP04-843	L05-451	49
XL06-058	LCP87-492	L05-451	0
XL06-059	L05-451	L05-451	464
XL06-060	HoCP03-704	L01-299	17
XL06-061	HoCP92-624	L01-299	718
XL06-062	L94-428	L01-299	660
XL06-063	HoCP04-824	L01-299	30
XL06-064	L01-315	L01-299	286
XL06-065	L97-128	L01-299	469
XL06-066	L01--299	L01-299	59
XL06-067	L05-451	HoCP96-522	584
XL06-068	L97-128	HoCP96-522	6
XL06-069	LCP87-492	HoCP96-522	0
XL06-070	HoCP96-522	HoCP96-522	149
XL06-071	HoCP92-624	HoCP96-540	1622
XL06-072	LCP81-010	HoCP96-540	1835
XL06-073	HoCP04-824	HoCP96-540	1223
XL06-074	HoCP96-540	HoCP96-540	5198
XL06-075	HoCP92-624	L05-448	1648
XL06-076	L94-428	L05-448	3246
XL06-077	HoCP04-829	L05-448	423
XL06-078	L05-448	L05-448	237
XL06-079	HoCP92-624	HoCP96-561	842
XL06-080	LCP81-010	HoCP96-561	1975
XL06-081	HoCP04-810	HoCP96-561	377
XL06-082	HoCP96-561	HoCP96-561	149
XL06-083	HoCP03-704	HoCP04-803	0
XL06-084	L97-128	HoCP04-810	87
XL06-085	HoCP95-951	HoCP04-810	794
XL06-086	HoCP96-522	HoCP04-810	197
XL06-087	HoCP04-810	HoCP04-810	72
XL06-088	HoCP03-704	L99-226	15
XL06-089	HoCP99-825	L99-226	61
XL06-090	LCP81-010	L99-226	1305
XL06-091	L01-299	L99-226	261
XL06-092	L99-226	L99-226	333
XL06-093	L05-451	L05-448	1726
XL06-094	HoCP03-704	L05-448	0
XL06-095	L01-299	L05-448	321
XL06-096	L01-299	HoCP02-610	571
XL06-097	HoCP02-610	HoCP02-610	2065
XL06-098	LCP85-384	HoCP00-950	0
XL06-099	Ho95-988	HoCP04-824	50
XL06-100	HoCP92-624	HoCP04-824	280

Table 5. Continue

Cross	Female	Male	Seed
XL06-101	HoCP92-648	HoCP04-824	702
XL06-102	HoCP95-951	HoCP04-824	1085
XL06-103	L94-428	HoCP04-824	2931
XL06-104	L97-128	HoCP04-824	175
XL06-105	L98-209	HoCP04-824	156
XL06-106	L01-299	HoCP04-824	295
XL06-107	HoCP92-624	HoCP91-552	277
XL06-108	L97-128	HoCP91-552	4
XL06-109	HoCP99-825	HoCP91-552	46
XL06-110	HoCP95-951	HoCP96-540	1056
XL06-111	L99-233	HoCP96-540	2575
XL06-112	HoCP03-704	HoCP96-540	0
XL06-113	L01-299	HoCP96-540	793
XL06-114	HoCP00-950	L99-226	75
XL06-115	L99-226	HoCP00-950	0
XL06-116	L99-226	HoCP85-845	0
XL06-117	HoCP85-845	L99-226	102
XL06-118	Ho95-988	HoCP89-846	0
XL06-119	HoCP92-624	HoCP89-846	69
XL06-120	L94-426	HoCP89-846	0
XL06-121	HoCP89-846	HoCP89-846	28
XL06-122	HoCP92-624	LCP85-384	600
XL06-123	L94-426	LCP85-384	124
XL06-124	LCP85-384	LCP85-384	109
XL06-125	L05-448	06P1	394
XL06-126	HoCP02-610	06P1	238
XL06-127	HoCP91-552	06P1	325
XL06-128	HoCP96-540	06P1	1717
XL06-129	HoCP96-561	06P1	1073
XL06-130	HoCP99-825	06P1	77
XL06-131	L04-425	06P1	443
XL06-132	LCP86-454	L99-226	195
XL06-133	L01-315	L99-226	191
XL06-134	LCP87-492	L99-226	3
XL06-135	HoCP04-810	HoCP02-610	529
XL06-136	L97-128	HoCP96-522	151
XL06-137	L02-320	HoCP96-522	231
XL06-138	HoCP95-951	HoCP96-522	1132
XL06-139	HoCP04-824	L04-425	191
XL06-140	HoCP04-810	HoCP00-905	125
XL06-141	HoCP95-951	HoCP00-905	987
XL06-142	HoCP00-905	HoCP00-905	83
XL06-143	HoCP02-620	L94-428	34
XL06-144	L05-460	L94-428	51
XL06-145	L94-428	L94-428	50
XL06-146	L94-428	L99-233	95
XL06-147	LCP81-010	L99-233	921
XL06-148	L99-233	L99-233	655
XL06-149	HoCP00-933	L04-410	743
XL06-150	HoCP95-951	L04-410	409
XL06-151	L04-410	L04-410	1103
XL06-152	L94-428	HoCP04-824	0
XL06-153	HoCP00-950	HoCP04-824	67
XL06-154	HoCP04-824	HoCP04-824	0
XL06-155	HoCP02-618	HoCP99-825	277
XL06-156	HoCP99-825	HoCP99-825	0
XL06-157	LCP81-010	L01-299	861
XL06-158	HoCP95-951	L01-299	264
XL06-159	HoCP00-950	L01-299	18
XL06-160	HoCP96-561	L05-448	333
XL06-161	L04-408	L05-448	731
XL06-162	Ho89-889	Ho95-988	216
XL06-163	LCP85-384	Ho95-988	1000
XL06-164	HoCP02-618	Ho95-988	150
XL06-165	Ho89-889	L99-226	0
XL06-166	HoCP02-618	L99-226	318
XL06-167	L02-320	L99-226	735
XL06-168	HoCP00-950	HoCP91-552	124
XL06-169	HoCP95-951	HoCP91-552	676
XL06-170	HoCP00-950	LCP85-384	396
XL06-171	L97-128	LCP85-384	17
XL06-172	HoCP96-561	L04-425	327
XL06-173	HoCP95-951	L04-425	233
XL06-174	L04-425	L04-425	37
XL06-175	HoCP96-561	L04-410	383
XL06-176	L94-432	L04-410	1479
XL06-177	L04-410	L04-410	0
XL06-178	HoCP04-807	06P2	17
XL06-179	HoCP96-540	06P2	4597
XL06-180	L02-316	06P2	472
XL06-181	L02-320	06P2	382
XL06-182	L05-448	06P2	254
XL06-183	L99-226	06P2	15
XL06-184	HoCP92-624	L04-410	1698
XL06-185	LCP81-010	L04-410	7984
XL06-186	L05-460	L04-410	362
XL06-187	L04-408	HoCP85-845	563
XL06-188	L05-460	HoCP85-845	913
XL06-189	L97-128	HoCP02-623	441
XL06-190	LCP81-010	HoCP02-623	552
XL06-191	HoCP04-827	HoCP02-623	526
XL06-192	L94-426	HoCP02-623	0
XL06-193	L05-408	HoCP02-623	590
XL06-194	L97-128	L99-233	57
XL06-195	LCP81-010	L99-233	3441
XL06-196	L04-408	L99-233	1254

Table 5. Continue

Cross	Female	Male	Seed
XL06-197	L03-392	HoCP96-540	8
XL06-198	L04-407	HoCP96-540	1628
XL06-199	L05-460	HoCP96-540	988
XL06-200	L05-460	L99-226	715
XL06-201	L05-450	06P3	891
XL06-202	L92-312	06P3	118
XL06-203	LCP85-384	06P3	1250
XL06-204	L04-425	06P3	1228
XL06-205	HoCP02-652	06P3	194
XL06-206	HoCP00-933	06P3	1294
XL06-207	L94-428	HoCP96-540	519
XL06-208	L98-197	HoCP96-540	98
XL06-209	HoCP02-620	HoCP96-540	52
XL06-210	HoCP02-623	HoCP96-540	1590
XL06-211	L03-390	HoCP96-540	32
XL06-212	L05-460	L99-233	328
XL06-213	L94-428	L99-233	157
XL06-214	HoCP02-620	L99-233	25
XL06-215	HoCP02-623	L99-233	187
XL06-216	HoCP03-704	L99-233	0
XL06-217	L04-425	L99-233	1431
XL06-218	HoCP00-950	HoCP01-523	668
XL06-219	HoCP02-623	HoCP01-523	1711
XL06-220	HoCP00-950	HoCP91-552	195
XL06-221	HoCP92-624	HoCP91-552	1437
XL06-222	HoCP02-623	HoCP91-552	1156
XL06-223	US01-040	HoCP91-552	962
XL06-224	HoCP96-561	HoCP04-824	59
XL06-225	L02-320	HoCP04-824	602
XL06-226	Ho91-572	HoCP03-708	192
XL06-227	Ho95-988	L02-316	195
XL06-228	HoCP92-624	L02-316	967
XL06-229	HoCP92-648	L02-316	62
XL06-230	L94-426	L02-316	135
XL06-231	L04-425	L02-316	286
XL06-232	HoCP92-648	L04-410	2935
XL06-233	HoCP02-610	L04-410	1761
XL06-234	HoCP02-623	HoCP04-836	826
XL06-235	HoCP92-624	HoCP04-836	1422
XL06-236	HoCP92-648	HoCP04-836	3566
XL06-237	L94-426	HoCP04-836	274
XL06-238	L93-399	HoCP04-836	1161
XL06-239	HoCP00-950	HoCP04-836	347
XL06-240	HoCP00-905	HoCP04-836	1281
XL06-241	L97-128	TucCP77-042	130
XL06-242	HoCP92-648	TucCP77-042	0
XL06-243	HoCP02-623	TucCP77-042	94
XL06-244	HoCP92-648	L92-312	1062
XL06-245	LCP82-089	L92-312	2780
XL06-246	LCP85-384	L92-312	1881
XL06-247	Ho95-988	L04-410	397
XL06-248	L97-128	L04-410	1044
XL06-249	L03-396	L04-410	1220
XL06-250	Ho95-988	L99-233	1421
XL06-251	L94-426	L99-233	1434
XL06-252	L94-432	L99-233	2849
XL06-253	L97-128	L99-233	24
XL06-254	HoCP88-739	L99-233	197
XL06-255	HoCP89-846	L99-233	0
XL06-256	HoCP00-950	HoCP04-807	99
XL06-257	L98-197	HoCP04-807	653
XL06-258	L03-392	HoCP04-807	6
XL06-259	HoCP00-950	HoCP91-552	664
XL06-260	L03-396	HoCP91-552	1300
XL06-261	LCP82-089	HoCP91-552	5901
XL06-262	HoCP96-522	HoCP96-561	476
XL06-263	LCP82-089	HoCP96-561	4982
XL06-264	TucCP77-042	HoCP96-561	10
XL06-265	LCP85-384	L02-325	1735
XL06-266	TucCP77-042	L02-325	13
XL06-267	US01-040	L02-325	381
XL06-268	LCP85-384	HoCP96-540	4212
XL06-269	US99-002	HoCP96-540	4767
XL06-270	TucCP77-042	L99-226	0
XL06-271	US79-010	L99-226	2227
XL06-272	Ho95-988	Ho89-889	0
XL06-273	HoCP00-950	Ho89-889	119
XL06-274	L01-299	Ho89-889	73
XL06-275	Ho95-988	HoCP02-623	0
XL06-276	HoCP92-648	HoCP02-623	538
XL06-277	L94-428	HoCP02-623	49
XL06-278	HoCP01-523	HoCP02-623	0
XL06-279	HoCP97-609	HoCP02-623	122
XL06-280	L97-128	HoCP02-623	53
XL06-281	HoCP92-648	LCP85-384	1911
XL06-282	Ho95-988	LCP85-384	684
XL06-283	L05-460	HoCP04-807	493
XL06-284	HoCP97-609	HoCP04-807	2088
XL06-285	L04-408	HoCP04-807	2181
XL06-286	Ho95-988	HoCP04-807	0
XL06-287	L98-197	HoCP96-540	1640
XL06-288	US96-002	HoCP96-540	1962
XL06-289	L97-128	HoCP96-540	996
XL06-290	TucCP77-042	HoCP83-749	0
XL06-291	US96-002	HoCP83-749	63
XL06-292	HoCP92-648	HoCP83-749	87

Table 5. Continue

Cross	Female	Male	Seed
XL06-293	L93-399	HoCP91-552	161
XL06-294	L01-299	HoCP91-552	212
XL06-295	US93-015	HoCP91-552	1314
XL06-296	CP83-644	LCP81-010	388
XL06-297	HoCP89-846	LCP81-010	449
XL06-298	HoCP00-950	LCP81-010	94
XL06-299	L97-128	LCP81-010	170
XL06-300	L98-207	LCP81-010	844
XL06-301	HoCP92-624	HoCP00-930	188
XL06-302	HoCP00-950	HoCP00-930	1297
XL06-303	HoCP02-623	HoCP00-930	134
XL06-304	L98-197	HoCP00-930	1285
XL06-305	L94-433	HoCP00-930	532
XL06-306	HoCP92-624	LCP85-384	913
XL06-307	HoCP92-648	LCP85-384	2165
XL06-308	L03-396	LCP85-384	979
XL06-309	L05-445	LCP85-384	832
XL06-310	US99-002	LCP85-384	3034
XL06-311	HoCP92-648	L99-233	1490
XL06-312	HoCP01-523	L99-233	2626
XL06-313	L04-407	L99-233	1376
XL06-314	HoCP00-933	L92-312	1645
XL06-315	L97-128	L92-312	366
XL06-316	HoCP02-652	HoCP96-540	664
XL06-317	L94-433	HoCP96-540	1339
XL06-318	HoCP85-845	HoCP96-540	1281
XL06-319	L97-128	TucCP77-042	28
XL06-320	L01-315	TucCP77-042	33
XL06-321	L94-433	TucCP77-042	205
XL06-322	Ho95-988	LCP85-384	62
XL06-323	HoCP92-624	LCP85-384	481
XL06-324	TucCP77-042	LCP85-384	22
XL06-325	HoCP04-827	LCP85-384	44
XL06-326	HoCP99-815	LCP85-384	0
XL06-327	L03-396	LCP85-384	75
XL06-328	HoCP88-739	L99-233	0
XL06-329	HoCP00-930	L99-233	1865
XL06-330	HoCP01-561	L99-233	278
XL06-331	HoCP89-846	HoCP96-540	1114
XL06-332	HoCP92-624	HoCP96-540	1196
XL06-333	HoCP92-624	L04-408	292
XL06-334	LCP82-089	L04-408	1703
XL06-335	HoCP00-930	L04-408	2590
XL06-336	HoCP95-951	L01-283	50
XL06-337	HoCP99-815	L01-283	0
XL06-338	L03-396	L01-283	137
XL06-339	L97-128	L01-283	207
XL06-340	L03-396	L01-283	95
XL06-341	L97-128	L01-283	11
XL06-342	L97-128	LCP81-010	147
XL06-343	L98-207	LCP81-010	1084
XL06-344	CP83-644	HoCP04-836	1142
XL06-345	HoCP92-624	HoCP04-836	978
XL06-346	L97-128	HoCP04-836	121
XL06-347	HoCP89-846	Ho95-988	137
XL06-348	TucCP77-042	Ho95-988	0
XL06-349	HoCP02-620	Ho95-988	102
XL06-350	L03-392	Ho95-988	10
XL06-351	L97-128	Ho95-988	32
XL06-352	TucCP77-042	LCP85-384	61
XL06-353	HoCP01-827	LCP85-384	410
XL06-354	HoCP02-620	L99-226	149
XL06-355	HoCP03-708	L99-226	76
XL06-356	L03-396	L99-226	0
XL06-357	L94-433	L04-410	1255
XL06-358	HoCP96-540	06P4	2300
XL06-359	US99-004	06P4	3014
XL06-360	HoCP92-618	06P4	870
XL06-361	HoCP89-831	06P4	651
XL06-362	HoCP92-620	HoCP00-930	66
XL06-363	L94-433	HoCP00-930	136
XL06-364	HoCP04-827	Ho95-988	1110
XL06-365	L02-320	Ho95-988	937
XL06-366	US99-004	Ho95-988	748
XL06-367	L94-426	L04-410	0
XL06-368	L94-433	L04-410	1576
XL06-369	L99-226	L04-410	659
XL06-370	HoCP97-609	L01-283	239
XL06-371	L03-396	L01-283	148
XL06-372	US01-040	L01-283	303
XL06-373	L01-283	L01-283	115
XL06-374	HoCP96-540	06P5	2154
XL06-375	L05-451	06P6	278
XL06-376	L98-197	06P7	948
XL06-377	CP83-644	HoCP04-836	3052
XL06-378	HoCP04-853	HoCP04-836	139
XL06-379	HoCP89-831	HoCP04-836	450
XL06-380	HoCP92-648	HoCP89-846	192
XL06-381	L03-396	HoCP89-847	57
XL06-382	L91-281	HoCP89-848	312
XL06-383	L98-207	L94-428	575
XL06-384	TucCP77-042	L99-226	0
XL06-385	HoCP02-618	L99-226	1245
XL06-386	HoCP89-846	LCP82-089	1196
XL06-387	HoCP02-620	LCP82-089	1087
XL06-388	L98-197	LCP82-089	1337

Table 5. Continue

Cross	Female	Male	Seed
XL06-389	HoCP93-749	HoCP02-618	433
XL06-390	HoCP96-540	HoCP02-618	3344
XL06-391	LCP81-010	L01-283	1151
XL06-392	HoCP00-950	L01-283	50
XL06-393	LCP87-492	L01-283	96
XL06-394	US99-004	LCP85-384	1665
XL06-395	CP83-644	HoCP89-846	305
XL06-396	Ho95-988	HoCP89-846	13
XL06-397	HoCP92-648	HoCP89-846	76
XL06-398	HoCP92-624	LCP85-384	452
XL06-399	HoCP00-950	LCP85-384	249
XL06-400	L94-426	HoCP04-836	36
XL06-401	L97-128	HoCP04-836	278
Total			279777

SELECTIONS, ADVANCEMENTS, AND ASSIGNMENTS OF THE LSU AGCENTER'S SUGARCANE VARIETY DEVELOPMENT PROGRAM FOR 2006

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SUMMARY

In the selection phase of the LSU AgCenter's Sugarcane Variety Development Program, superior clones are advanced through the single stool, first line, second line, and increase stages of the breeding program. In the first stubble crop of the second-line trials, those clones with acceptable breeding or commercial value are assigned a permanent variety number. A total of 79,395 seedlings from 128 crosses were planted in the field in the spring of 2006. The majority of these seedlings are progeny of crosses among commercial and elite experimental varieties. In the fall of 2006, family selection was practiced on the 76,377 stubble seedlings surviving the winter. This selection resulted in the planting of 2,334 first-line trial plots. At the same time, superior clones were also selected and advanced through subsequent stages (248 to second line trials, 232 to the increase stage). Assignments of permanent "L06" numbers were given to the 40 best clones of the 2001 crossing series.

PROCEDURES

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

RESULTS AND DISCUSSION

A total of 79,395 seedlings from 128 crosses of the 2005 crossing series were planted to the field in the spring of 2006 (Table 1). Many of these seedlings were progeny of crosses among commercial and superior experimental varieties. In the fall of 2006, individual selection was practiced on the 76,377 stubble single stools of the 2004 crossing series that survived the winter. The 2,334 clones selected and advanced from the single stools were planted in 8-foot first-line trial plots. Dates of planting and harvesting of all plots in the selection phase of the program can be found in Table 2.

The 1,548 first-line trial plots of the 2003 crossing series were rated for cane yield and pest resistance in August of 2006 (Table 3). After screening for cane yield rating, acceptable clones were further evaluated for pest resistance (diseases and borer injury) stalk quality, and Brix (Table 3). This second stage of advancement was concluded with the planting of 248 clones in single row 16-foot second line trials plots.

Stalk counts were made on the 601 plant-cane second line trial plots of the 2002 crossing series in August 2006. Based on these counts and sucrose lab data collected in 2005, 232 clones were planted in two single row 16-foot plots representing the increase stage of the program

(Table 4). One replication was planted in light soil and the other in heavy soil. These clones will be candidates for assignment in 2007. Of the 287 candidates from the first stubble crop of the second line trial plots, the best 40 clones from the 2001 crossing series were assigned permanent "L06" numbers (Table 5). These newly assigned "L06" varieties were then planted in replicated nursery trials at three on station locations (Sugar Research Station, Iberia Research Station, USDA-ARS Ardoyne Farm).

The advancement summary of clones from crosses made in 2001 through 2005 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. The results of the 2004 crossing series cross appraisal in 2006 are presented in Table 7.

Table 1. Summary of selections, advancements and assignments made during 2006 by the Louisiana, "L," Sugarcane Variety Development Program's personnel.

Crossing series	Crosses		Plants surviving transplanting	Over-wintered plants	Advanced to			
	Progeny test	Selection program			1st line	2nd line	Increase	On-station Nurseries (L06 Assignments)
			number of clones					
X01	218	247	93019	46325	2902	773	287	40
X02	200	192	72061	50951	2742	601	232	
X03	134	211	92598	70910	1548	248		
X04	67	194	93490	76377	2334			
X05	60	128	79395					

Table 2. Dates of seedling and line trials planted or harvested in 2006.

Crossing Series	Test	Crop	Date Planted	Date Harvested
X05	Seedlings	Planted	4/17 – 4/21/06	
X05	Progeny Test	Planted	4/21/06	
X04	Seedlings	First Stubble	4/08 -4/18/05	
X04	Progeny Test	First Stubble	4/18/05	12/11/06
X04	First Line Trials	Planted	9/08 – 9/22/06	
X03	First Line Trials	Plant-cane	9/30/05	
X02	First Line Trials	First Stubble	9/10/04	10/30/06
X03	Second Line Trials	Planted	9/26/06	
X02	Second Line Trials	Plant-cane	10/10/05	11/27/06
X01	Second Line Trials	First Stubble	9/22/04	10/08/06
X00	Second Line Trials	Second Stubble	10/01/03	10/10/06
X02	Light Soil Increase	Planted	10/03/06	
X01	Light Soil Increase	Plant-cane	10/19/05	10/15/06
X00	Light Soil Increase	First Stubble	9/28/04	11/07/06
X99	Light Soil Increase	Second Stubble	10/02/03	10/10/06
X02	Heavy Soil Increase	Planted	10/03/06	
X01	Heavy Soil Increase	Plant-cane	10/19/05	11/01/06
X00	Heavy Soil Increase	First Stubble	9/28/04	11/30/06
X99	Heavy Soil Increase	Second Stubble	10/02/03	10/10/06

Table 3. Numbers of experimental clones dropped for identified faults in the 2003 crossing series first-line trials.

	Fault	
Trait	Frequency	Percent
---------- 1548 clones enter first round of evaluation ----------		
Initial Selection (Rating)	931	60.1
---------- 617 clones enter second round of evaluation ----------		
Lodged	27	1.7
Pith / Tube	86	5.6
Short	39	2.5
Diameter	3	0.2
Smut	9	0.6
Other	8	0.5
---------- 1103 clones dropped ----------		
----------445 clones enter third round of evaluation ----------		
Brix	197	12.7
Clones advanced	248	16.1

Table 4. Number of experimental clones dropped for identified faults in the 2002 crossing series of the plant-cane second line trial prior to advancement to the increase stage.

	Fault	
Trait	Frequency	Percent
---------- 601 clones enter first round of evaluation ----------		
Stalk count <75 per plot	230	38.3
Lodged	96	16.0
Pith / Tube	14	2.3
Diameter	2	0.3
Smut	18	3.0
Rust	2	0.3
Short	5	0.8
Other	2	0.3
---------- 369 clones dropped ----------		
Clones advanced to Increase stage	232	38.7

Table 5. Mean yield data of the 2006 "L" assignments made in first-stubble second line trial plots.

Variety	Female	Male	Sugar Per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number
			Lbs/A	Tons/A	Lbs/Ton	Lbs	Stalks/A
LCP85-384	CP77-310	CP77-407	10225	50.9	199	1.88	53996
HoCP96-540	LCP86-454	LCP85-384	12032	60.3	198	2.25	53543
L97-128	LCP81-010	LCP85-384	11771	52.3	225	2.12	49459
L2006-001	HoCP92-618	HoCP96-540	18687	74.6	250	2.59	57626
L2006-002	HoCP92-618	HoCP96-540	13140	51.2	257	1.41	72600
L2006-003	L97-128	LCP82-089	12353	56.6	218	2.17	52181
L2006-004	L97-128	LCP82-089	13317	55.7	239	1.95	57173
L2006-005	L97-128	LCP82-089	13364	62.0	215	2.01	61710
L2006-006	HoCP92-624	L98-207	10888	50.5	216	1.78	56719
L2006-007	CP65-357	L92-312	14033	57.7	243	1.64	70331
L2006-008	HoCP89-846	TucCP77-042	13628	51.5	265	1.62	63525
L2006-009	Ho95-988	L98-207	11009	46.7	236	1.79	52181
L2006-010	L00-268	HoCP96-540	14801	55.4	267	2.26	49005
L2006-011	LCP81-010	LCP85-384	13401	52.7	254	2.30	45829
L2006-012	Ho95-988	L98-207	11438	46.7	245	1.89	49459
L2006-013	Ho95-988	HoCP96-540	11262	49.2	229	1.75	56265
L2006-014	HoCP92-624	L98-207	11771	56.0	210	2.09	53543
L2006-015	HoCP92-618	HoCP96-540	17890	80.5	222	1.83	88028
L2006-016	CP83-644	L98-209	13041	61.7	211	1.89	65340
L2006-017	HoCP92-624	L00-257	14257	63.1	226	1.42	88935
L2006-018	HoCP95-951	HoCP96-540	11133	48.8	228	1.72	56719
L2006-019	Ho95-988	L89-113	11409	45.4	251	2.00	45375
L2006-020	L98-209	01P4	14557	60.6	240	2.19	55358
L2006-021	LCP81-010	LCP85-384	17797	77.8	229	2.35	66248
L2006-022	LHo83-153	L99-233	15419	63.6	243	2.26	56265
L2006-023	LHo83-153	L99-233	11448	44.4	258	1.43	62164
L2006-024	L97-128	L99-233	14314	65.6	218	1.71	76684
L2006-025	L91-281	HoCP96-561	13047	55.9	233	1.56	71693
L2006-026	LCP86-454	LCP85-384	13142	60.6	217	1.69	71693
L2006-027	L99-226	01P4	13280	59.8	222	1.91	62618
L2006-028	HoCP92-624	L99-233	10927	50.3	217	1.72	58534
L2006-029	HoCP85-845	LCP85-384	11311	52.8	214	2.28	46283
L2006-030	MISC	MISC	11728	53.0	221	1.84	57626
L2006-031	L97-137	L94-428	12267	52.4	234	1.65	63525
L2006-032	HoCP96-509	LCP85-384	14532	55.6	261	1.96	56719
L2006-033	HoCP92-624	L94-428	11038	49.1	225	1.79	54904
L2006-034	L99-226	LCP85-384	12069	55.0	219	1.94	56719
L2006-035	TucCP77-042	L99-238	13960	56.9	245	1.90	59895

Table 5. Continue.

Variety	Female	Male	Sugar Per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number
			Lbs/A	Tons/A	Lbs/Ton	Lbs	Stalks/A
L2006-036	LCP85-313	HoCP96-509	13159	55.9	235	2.44	45829
L2006-037	LCP86-454	L99-233	10867	53.6	203	1.75	61256
L2006-038	HoCP92-624	L99-233	16881	74.6	226	2.63	56719
L2006-039	L99-226	LCP85-384	12450	47.6	261	1.81	52635
L2006-040	LCP81-010	LCP85-384	12175	48.4	252	1.87	51728

Table 6. Advancement summary of crosses in the 2001 through 2004 crossing series.

			1st Line		2nd Line		Increase		Assignment	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
2001 Crossing Series										
CP65-357	L92-312	240	10	61	3	72	2	84	1	95
CP77-405	L98-207	187	0	21	0	22	0	29	0	43
CP77-405	LCP85-384	394	0	21	0	22	0	29	0	43
CP78-317	HoCP91-552	191	0	21	0	22	0	29	0	43
CP79-318	L98-209	229	0	21	0	22	0	29	0	43
CP79-318	L98-209	225	0	21	0	22	0	29	0	43
CP83-644	HoCP96-540	430	15	57	9	86	3	80	0	43
CP83-644	HoCP96-561	210	7	54	1	51	0	29	0	43
CP83-644	HoCP97-621	218	0	21	0	22	0	29	0	43
CP83-644	HoCP98-778	212	0	21	0	22	0	29	0	43
CP83-644	L98-209	402	24	77	8	85	1	64	1	93
CP83-644	L99-226	398	0	21	0	22	0	29	0	43
CP83-644	L99-238	175	0	21	0	22	0	29	0	43
CP89-846	HoCP97-621	229	0	21	0	22	0	29	0	43
CP89-846	L98-209	385	0	21	0	22	0	29	0	43
Ho89-889	HoCP85-845	219	11	68	1	50	0	29	0	43
Ho89-889	HoCP96-561	69	0	21	0	22	0	29	0	43
Ho89-889	L99-233	235	0	21	0	22	0	29	0	43
Ho95-988	HoCP96-540	930	45	64	11	70	5	76	1	88
Ho95-988	HoCP96-561	237	12	69	3	73	1	68	0	43
Ho95-988	HoCP97-609	419	17	60	7	79	2	72	0	43
Ho95-988	L89-113	452	19	61	7	77	2	69	1	90
Ho95-988	L98-207	625	65	95	28	98	10	96	2	94
Ho95-988	L99-226	464	0	21	0	22	0	29	0	43
Ho95-988	L99-238	197	11	74	3	76	1	74	0	43
Ho95-988	LCP85-384	432	49	96	20	98	8	98	0	43
Ho95-988	TucCP77-42	424	9	47	4	64	2	71	0	43
HoCP85-845	Ho95-988	197	10	69	4	85	0	29	0	43
HoCP85-845	HoCP96-540	955	31	53	6	55	1	58	0	43
HoCP85-845	HoCP97-609	228	12	71	4	81	0	29	0	43
HoCP85-845	L96-092	215	0	21	0	22	0	29	0	43
HoCP85-845	L98-207	1325	41	51	16	70	8	78	0	43
HoCP85-845	L99-233	208	11	71	2	65	2	89	0	43
HoCP85-845	LCP85-384	656	39	76	6	63	4	78	1	89
HoCP88-739	LCP85-384	208	15	85	8	95	2	89	0	43
HoCP89-846	HoCP98-741	167	17	95	1	55	1	77	0	43
HoCP89-846	LCP85-384	203	2	44	1	52	0	29	0	43
HoCP89-846	LCP85-384	178	4	48	0	22	0	29	0	43
HoCP90-941	L97-137	226	7	51	4	81	1	69	0	43
HoCP90-941	LCP85-384	223	0	21	0	22	0	29	0	43

Table 6. Continue.

			1st Line		2nd Line		Increase		Assignment	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
HoCP91-552	01P1	456	15	54	1	46	0	29	0	43
HoCP91-552	HoCP96-540	543	12	48	4	58	0	29	0	43
HoCP91-552	HoCP97-609	90	0	21	0	22	0	29	0	43
HoCP91-555	HoCP00-955	200	0	21	0	22	0	29	0	43
HoCP91-555	HoCP96-509	210	10	64	0	22	0	29	0	43
HoCP91-555	HoCP96-540	198	0	21	0	22	0	29	0	43
HoCP91-555	HoCP96-540	723	22	50	4	54	2	65	0	43
HoCP91-555	HoCP98-776	149	9	77	1	56	0	29	0	43
HoCP91-555	L99-226	429	38	91	6	74	1	63	0	43
HoCP91-555	LCP85-384	203	0	21	0	22	0	29	0	43
HoCP91-555	LCP86-454	195	0	21	0	22	0	29	0	43
HoCP92-618	HoCP96-540	709	32	63	13	82	6	84	3	95
HoCP92-618	LCP85-384	429	0	21	0	22	0	29	0	43
HoCP92-618	TucCP77-42	430	0	21	0	22	0	29	0	43
HoCP92-624	HoCP00-961	232	19	88	2	61	0	29	0	43
HoCP92-624	HoCP91-552	219	0	21	2	63	0	29	0	43
HoCP92-624	HoCP96-540	242	12	68	2	60	1	67	0	43
HoCP92-624	HoCP96-561	373	24	80	3	58	2	75	0	43
HoCP92-624	L00-257	442	21	64	7	78	4	86	1	91
HoCP92-624	L89-113	231	14	78	5	87	3	94	0	43
HoCP92-624	L94-426	181	0	21	0	22	0	29	0	43
HoCP92-624	L94-428	218	4	46	2	64	1	71	1	97
HoCP92-624	L98-207	560	18	53	9	78	3	75	2	94
HoCP92-624	L98-209	468	35	86	1	45	1	61	0	43
HoCP92-624	L99-226	232	0	21	0	22	0	29	0	43
HoCP92-624	L99-233	401	37	92	13	95	9	99	2	98
HoCP92-624	LCP85-384	144	12	88	3	86	2	94	0	43
HoCP92-648	HoCP96-540	369	18	66	7	83	3	83	0	43
HoCP92-648	HoCP96-561	210	12	75	1	51	0	29	0	43
HoCP92-648	HoCP97-609	222	0	21	0	22	0	29	0	43
HoCP92-648	HoCP97-621	196	0	21	0	22	0	29	0	43
HoCP92-648	L99-226	345	0	21	0	22	0	29	0	43
HoCP92-648	L99-226	175	6	56	0	22	0	29	0	43
HoCP92-648	L99-234	238	0	21	0	22	0	29	0	43
HoCP92-648	LCP85-384	455	60	98	13	92	7	96	0	43
HoCP92-648	LCP85-384	198	20	94	8	97	3	95	0	43
HoCP94-806	HoCP97-621	72	0	21	0	22	0	29	0	43
HoCP94-806	L99-226	245	0	21	0	22	0	29	0	43
HoCP94-806	L99-233	236	14	76	4	80	1	68	0	43
HoCP95-951	CP79-348	420	54	98	18	97	4	87	0	43
HoCP95-951	HoCP96-540	422	22	70	10	88	3	81	0	43

Table 6. Continue.

			1st Line		2nd Line		Increase		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
HoCP95-951	HoCP96-540	232	10	62	6	91	4	97	1	96
HoCP95-951	L97-137	465	33	84	8	80	1	61	0	43
HoCP95-951	LCP82-089	450	28	79	7	77	5	92	0	43
HoCP96-509	HoCP96-561	368	25	82	3	59	0	29	0	43
HoCP96-509	L92-312	243	0	21	0	22	0	29	0	43
HoCP96-509	L99-226	226	0	21	0	22	0	29	0	43
HoCP96-509	LCP85-384	184	17	92	6	95	3	97	1	98
HoCP96-522	HoCP89-846	225	12	71	3	73	2	85	0	43
HoCP96-522	HoCP96-561	184	6	54	2	67	0	29	0	43
HoCP96-522	L91-255	207	11	71	1	51	0	29	0	43
HoCP96-522	L98-209	410	20	66	3	57	1	63	0	43
HoCP96-522	LCP85-384	203	7	56	1	52	0	29	0	43
HoCP96-540	HoCP89-846	623	0	21	0	22	0	29	0	43
HoCP96-540	HoCP96-561	237	0	21	0	22	0	29	0	43
HoCP96-540	L89-113	190	0	21	0	22	0	29	0	43
HoCP96-540	L91-255	371	0	21	0	22	0	29	0	43
HoCP96-540	L99-226	449	0	21	0	22	0	29	0	43
HoCP96-540	LCP85-384	392	0	21	0	22	0	29	0	43
HoCP96-561	HoCP85-845	452	14	51	5	68	0	29	0	43
HoCP97-606	L96-092	237	7	50	3	73	0	29	0	43
HoCP97-609	Ho91-572	207	0	21	0	22	0	29	0	43
HoCP97-609	HoCP97-621	167	0	21	0	22	0	29	0	43
HoCP97-609	HoCP98-741	231	0	21	0	22	0	29	0	43
HoCP97-609	L89-113	250	0	21	0	22	0	29	0	43
HoCP97-609	L99-226	417	0	21	0	22	0	29	0	43
HoCP97-609	L99-233	142	4	49	2	75	0	29	0	43
HoCP97-609	LCP82-089	448	31	82	8	82	1	63	0	43
HoCP97-621	L98-207	452	0	21	0	22	0	29	0	43
HoCP98-741	HoCP92-618	236	0	21	0	22	0	29	0	43
HoCP98-741	L94-432	239	0	21	0	22	0	29	0	43
HoCP98-741	LCP85-384	413	43	95	8	84	3	82	0	43
HoCP98-776	CP79-348	210	2	44	0	22	0	29	0	43
HoCP98-776	HoCP96-540	177	0	21	0	22	0	29	0	43
HoCP98-776	L91-255	203	9	62	6	93	2	90	0	43
HoCP98-776	L99-226	236	0	21	0	22	0	29	0	43
HoCP98-776	L99-233	218	6	49	1	50	0	29	0	43
HoCP98-778	CP79-318	219	0	21	0	22	0	29	0	43
HoCP98-778	HoCP97-621	93	0	21	0	22	0	29	0	43
HoCP98-781	HoCP96-540	442	38	90	5	69	0	29	0	43
HoCP99-825	L91-281	217	0	21	0	22	0	29	0	43
HoCP99-833	L98-209	180	13	85	2	68	0	29	0	43

Table 6. Continue.

			1st Line		2nd Line		Increase		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
L00-249	L94-432	236	0	21	0	22	0	29	0	43
L00-254	HoCP97-609	430	0	21	0	22	0	29	0	43
L00-254	L98-209	244	0	21	0	22	0	29	0	43
L00-254	LCP85-384	416	0	21	0	22	0	29	0	43
L00-260	HoCP97-621	232	0	21	0	22	0	29	0	43
L00-260	L99-233	400	0	21	0	22	0	29	0	43
L00-264	L94-432	145	0	21	0	22	0	29	0	43
L00-264	LCP85-384	226	7	51	2	62	0	29	0	43
L00-264	LCP85-384	202	7	57	0	22	0	29	0	43
L00-268	HoCP96-540	971	63	81	25	91	11	92	1	87
L00-271	HoCP96-540	194	11	75	1	53	1	75	0	43
L00-273	LCP82-089	198	0	21	0	22	0	29	0	43
L91-255	HoCP96-509	141	0	21	0	22	0	29	0	43
L91-255	L98-207	427	0	21	0	22	0	29	0	43
L91-255	LCP85-384	386	18	63	1	46	0	29	0	43
L91-281	HoCP96-540	240	21	90	3	72	2	84	0	43
L91-281	HoCP96-561	442	53	97	12	92	4	86	1	91
L91-281	L97-137	246	12	66	4	79	3	93	0	43
L91-281	L99-234	218	12	73	5	88	1	71	0	43
L91-281	LCP85-384	226	0	21	0	22	0	29	0	43
L93-386	HoCP96-540	363	0	21	0	22	0	29	0	43
L93-391	L98-209	215	0	21	0	22	0	29	0	43
L93-391	L99-226	206	0	21	0	22	0	29	0	43
L93-391	LCP85-384	97	0	21	0	22	0	29	0	43
L93-399	HoCP85-845	176	0	21	0	22	0	29	0	43
L93-399	HoCP85-845	326	12	58	0	22	0	29	0	43
L93-399	LCP85-384	171	0	21	0	22	0	29	0	43
L94-426	HoCP97-621	174	0	21	0	22	0	29	0	43
L94-426	L99-233	185	7	58	1	53	0	29	0	43
L94-426	LCP85-384	224	11	66	1	49	1	70	0	43
L94-426	LCP85-384	184	22	97	9	99	2	91	0	43
L94-426	LHo92-314	234	0	21	0	22	0	29	0	43
L94-428	HoCP96-540	354	32	91	11	94	6	97	0	43
L94-428	MISC	178	8	63	2	69	0	29	0	43
L94-432	HoCP96-540	209	36	99	4	83	2	88	0	43
L94-432	L89-113	208	0	21	0	22	0	29	0	43
L94-432	L91-281	195	0	21	0	22	0	29	0	43
L94-432	L98-207	337	0	21	0	22	0	29	0	43
L94-432	LCP85-384	194	0	21	0	22	0	29	0	43
L94-432	TucCP77-42	383	13	56	3	58	0	29	0	43
L96-040	HoCP92-618	228	22	93	9	96	0	29	0	43

Table 6. Continue.

			1st Line		2nd Line		Increase		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
L96-040	HoCP96-540	227	13	75	1	49	0	29	0	43
L96-040	L99-233	211	0	21	0	22	0	29	0	43
L96-040	L99-233	393	26	81	6	76	1	64	0	43
L97-128	HoCP85-845	224	14	80	2	63	0	29	0	43
L97-128	L91-281	174	15	90	1	54	1	77	0	43
L97-128	L99-233	228	25	96	12	99	5	99	1	97
L97-128	LCP82-089	416	29	83	10	89	6	95	3	99
L97-128	LHo92-314	205	0	21	0	22	0	29	0	43
L97-128	TucCP77-42	191	32	99	8	97	4	98	0	43
L97-137	HoCP94-806	219	13	76	4	82	2	87	0	43
L97-137	L94-428	406	20	66	7	80	5	93	1	92
L98-197	HoCP00-961	227	0	21	0	22	0	29	0	43
L98-207	01P5	473	2	43	0	22	0	29	0	43
L98-207	CP79-318	388	0	21	0	22	0	29	0	43
L98-207	HoCP85-845	736	45	78	18	90	5	80	0	43
L98-209	01P4	416	38	92	4	65	3	82	1	92
L98-209	HoCP97-621	474	17	58	3	55	1	60	0	43
L98-209	HoCP98-741	205	0	21	0	22	0	29	0	43
L98-209	L92-312	182	0	21	0	22	0	29	0	43
L98-209	LHo92-314	457	18	59	3	56	0	29	0	43
L98-209	TucCP77-42	427	24	74	9	87	3	80	0	43
L99-214	HoCP97-621	235	0	21	0	22	0	29	0	43
L99-214	L99-233	207	17	88	4	84	2	89	0	43
L99-221	HoCP96-540	433	0	21	0	22	0	29	0	43
L99-226	01P4	676	12	46	2	47	1	59	1	88
L99-226	HoCP92-618	436	0	21	0	22	0	29	0	43
L99-226	HoCP96-540	757	0	21	0	22	0	29	0	43
L99-226	L89-113	204	0	21	0	22	0	29	0	43
L99-226	L99-233	754	5	43	3	48	2	65	0	43
L99-226	LCP82-089	464	19	60	4	61	1	62	0	43
L99-226	LCP85-384	843	42	68	10	70	6	81	2	91
L99-226	TucCP77-42	621	11	46	2	47	1	60	0	43
L99-231	HoCP85-845	195	3	45	1	53	1	74	0	43
L99-231	HoCP97-621	194	0	21	0	22	0	29	0	43
L99-231	L92-312	147	0	21	0	22	0	29	0	43
L99-233	HoCP97-621	173	0	21	0	22	0	29	0	43
L99-233	L94-428	205	16	86	5	90	2	90	0	43
L99-234	HoCP96-540	216	0	21	0	22	0	29	0	43
L99-234	L98-207	365	0	21	0	22	0	29	0	43
L99-238	L94-432	220	0	21	0	22	0	29	0	43
LCP81-010	L89-113	208	0	21	0	22	0	29	0	43

Table 6. Continue.

			1st Line		2nd Line		Increase		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
LCP81-010	L91-281	209	11	71	5	89	3	95	0	43
LCP81-010	L92-312	143	0	21	0	22	0	29	0	43
LCP81-010	L92-312	124	0	21	0	22	0	29	0	43
LCP81-010	L94-428	460	6	44	2	48	1	62	0	43
LCP81-010	L98-207	617	39	80	15	90	5	82	0	43
LCP81-010	L98-207	1095	35	53	12	68	6	76	0	43
LCP81-010	L98-209	605	24	59	5	60	3	73	0	43
LCP81-010	L99-233	898	28	51	12	74	3	66	0	43
LCP81-010	LCP82-089	384	0	21	0	22	0	29	0	43
LCP81-010	LCP85-384	844	85	94	25	93	8	87	2	91
LCP81-010	LCP85-384	937	17	46	4	48	1	59	1	87
LCP82-089	LCP85-384	381	20	70	1	46	1	65	0	43
LCP83-137	HoCP96-561	404	34	89	9	87	4	90	0	43
LCP85-313	HoCP96-509	342	24	83	10	92	3	85	1	93
LCP85-313	HoCP97-609	415	29	83	3	57	2	72	0	43
LCP85-384	01P4	597	0	21	0	22	0	29	0	43
LCP85-384	HoCP89-846	240	19	87	3	72	1	67	0	43
LCP85-384	HoCP92-618	230	0	21	0	22	0	29	0	43
LCP85-384	HoCP97-621	471	53	96	5	67	3	79	0	43
LCP85-384	L91-281	378	0	21	0	22	0	29	0	43
LCP85-384	L99-233	609	13	47	6	66	2	66	0	43
LCP86-454	L99-233	591	32	73	6	66	3	74	1	90
LCP86-454	LCP85-384	636	45	84	10	78	4	78	1	89
LCP86-454	LCP85-384	1475	64	62	18	71	3	60	0	43
LCP86-454	TucCP77-42	335	0	21	0	22	0	29	0	43
LHo83-153	L99-233	180	14	86	7	96	2	92	2	99
LHo83-153	LCP85-384	213	5	48	2	64	0	29	0	43
LHo92-314	L99-226	207	0	21	0	22	0	29	0	43
LHo92-314	LCP85-384	229	0	21	0	22	0	29	0	43
MISC	MISC	240	15	80	2	60	1	67	1	95
TucCP77-42	L98-209	162	14	90	5	94	0	29	0	43
TucCP77-42	L99-238	232	12	70	2	61	2	85	1	96
TucCP77-42	LCP85-384	476	25	71	7	75	3	79	0	43
US96-002	LCP85-384	229	22	93	2	62	1	69	0	43
2002 Crossing Series										
CP70-321	LCP85-384	185	2	28	0	21	0	26	.	.
CP77-405	HoCP96-540	454	0	12	0	21	0	26	.	.
CP77-405	L99-233	172	3	31	0	21	0	26	.	.
CP77-405	LCP85-384	234	8	48	0	21	0	26	.	.

Table 6. Continue.

			1st Line		2nd Line		Increase		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
CP78-317	L92-312	80	9	95	2	91	0	26	.	.
CP79-318	L91-255	243	10	55	0	21	0	26	.	.
CP79-318	L92-312	222	7	45	0	21	0	26	.	.
CP79-348	HoCP92-618	239	16	77	3	74	2	87	.	.
CP79-348	L98-207	703	89	96	15	87	12	97	.	.
CP83-644	02P9	196	4	33	1	52	1	79	.	.
CP83-644	L99-233	465	19	55	6	77	2	69	.	.
CP89-831	HoCP89-846	485	22	62	3	54	0	26	.	.
Ho01-566	02P9	481	17	49	3	54	1	57	.	.
Ho89-889	HoCP89-846	714	18	37	2	44	0	26	.	.
Ho95-988	02P13	239	0	12	0	21	0	26	.	.
Ho95-988	HoCP93-767	443	10	35	0	21	0	26	.	.
Ho95-988	HoCP96-540	236	0	12	0	21	0	26	.	.
Ho95-988	L00-266	249	23	88	2	60	1	66	.	.
Ho95-988	L94-432	58	4	80	0	21	0	26	.	.
Ho95-988	L98-207	664	41	74	10	81	6	90	.	.
Ho95-988	LCP82-089	404	40	93	2	51	1	60	.	.
Ho95-988	LCP85-384	464	45	90	8	83	1	58	.	.
Ho95-988	LCP85-384	1203	118	91	46	97	17	95	.	.
HoCP00-905	02P3	245	26	94	13	99	5	99	.	.
HoCP00-905	02P4	477	42	87	17	97	7	96	.	.
HoCP00-920	HoCP92-618	138	3	34	0	21	0	26	.	.
HoCP00-920	L99-226	411	0	12	0	21	0	26	.	.
HoCP01-517	02P10	164	5	42	2	72	1	80	.	.
HoCP85-845	02P11	1831	6	24	1	42	1	52	.	.
HoCP85-845	02P15	226	10	61	1	48	0	26	.	.
HoCP85-845	02P3	336	14	58	0	21	0	26	.	.
HoCP85-845	HoCP89-846	234	4	31	1	47	0	26	.	.
HoCP85-845	L98-207	1343	51	52	14	70	4	63	.	.
HoCP91-552	HoCP97-609	466	0	12	0	21	0	26	.	.
HoCP91-552	L98-209	851	26	43	4	50	1	54	.	.
HoCP92-624	02P10	233	2	27	0	21	0	26	.	.
HoCP92-624	02P16	216	17	83	4	84	1	75	.	.
HoCP92-624	HoCP98-741	202	15	81	5	91	2	92	.	.
HoCP92-624	L00-259	1435	140	91	32	88	11	85	.	.
HoCP92-624	L00-266	711	35	65	9	75	2	61	.	.
HoCP92-624	L91-255	868	76	87	11	75	4	74	.	.
HoCP92-624	L98-209	1149	59	67	9	58	4	64	.	.
HoCP92-624	L99-226	1171	46	53	9	58	4	63	.	.
HoCP92-624	LCP85-384	1396	81	73	21	80	5	65	.	.
HoCP92-624	US01-040	230	41	98	9	98	4	97	.	.

Table 6. Continue.

			1st Line		2nd Line		Increase		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
HoCP93-746	L91-255	217	5	35	0	21	0	26	.	.
HoCP93-746	L99-233	463	20	59	3	55	1	58	.	.
HoCP93-749	L00-247	131	2	29	0	21	0	26	.	.
HoCP93-749	L00-266	481	0	12	0	21	0	26	.	.
HoCP93-749	LCP85-384	68	0	12	0	21	0	26	.	.
HoCP93-749	LCP85-384	239	9	52	3	74	0	26	.	.
HoCP93-767	HoCP97-609	213	0	12	0	21	0	26	.	.
HoCP93-767	L99-226	234	33	97	6	92	1	68	.	.
HoCP94-806	HoCP91-552	212	11	68	2	67	1	77	.	.
HoCP94-806	HoCP93-767	240	11	63	3	73	0	26	.	.
HoCP94-806	HoCP96-540	209	12	72	4	85	0	26	.	.
HoCP95-951	02P2	670	56	86	20	95	9	95	.	.
HoCP96-509	L98-207	1205	76	75	16	79	10	86	.	.
HoCP96-561	HoCP00-905	118	0	12	0	21	0	26	.	.
HoCP96-561	L99-226	466	16	48	6	77	4	89	.	.
HoCP98-741	HoCP85-845	249	7	40	2	60	0	26	.	.
HoCP98-741	L00-249	236	16	78	1	46	1	67	.	.
HoCP98-741	L00-268	214	22	94	2	67	1	76	.	.
HoCP98-741	L91-255	236	10	58	2	62	2	88	.	.
HoCP98-741	L94-432	225	7	43	2	65	0	26	.	.
HoCP98-741	L98-207	178	0	12	0	21	0	26	.	.
HoCP98-741	L98-209	151	0	12	0	21	0	26	.	.
HoCP98-741	L99-226	244	23	89	1	45	0	26	.	.
HoCP98-781	HoCP85-845	423	3	25	0	21	0	26	.	.
HoCP98-781	LCP85-384	684	38	70	4	52	1	54	.	.
HoCP99-866	L01-291	473	0	12	0	21	0	26	.	.
L00-247	02P4	230	13	72	3	79	3	94	.	.
L00-247	HoCP97-609	35	0	12	0	21	0	26	.	.
L00-247	L98-209	80	0	12	0	21	0	26	.	.
L00-247	L99-226	204	4	33	2	68	1	78	.	.
L00-264	L94-432	232	21	88	2	63	1	70	.	.
L00-266	LCP86-454	413	0	12	0	21	0	26	.	.
L00-268	HoCP92-618	435	21	63	3	56	0	26	.	.
L00-268	HoCP96-540	1070	0	12	0	21	0	26	.	.
L00-268	L92-321	217	0	12	0	21	0	26	.	.
L00-270	02P2	426	19	62	3	57	2	76	.	.
L00-270	HoCP96-540	521	3	25	1	43	1	56	.	.
L00-270	HoCP97-609	793	0	12	0	21	0	26	.	.
L00-270	L00-247	228	10	61	2	64	1	72	.	.
L00-270	L99-226	1089	0	12	0	21	0	26	.	.
L01-315	HoCP96-540	465	23	65	5	71	3	83	.	.

Table 6. Continue.

			1st Line		2nd Line		Increase		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
L01-315	HoCP96-561	232	4	31	0	21	0	26	.	.
L01-315	HoCP98-741	487	20	55	5	69	3	81	.	.
L01-315	HoCP99-825	78	2	38	0	21	0	26	.	.
L01-315	L94-428	188	0	12	0	21	0	26	.	.
L01-315	LCP86-454	240	8	46	1	46	0	26	.	.
L01-315	US01-040	244	0	12	0	21	0	26	.	.
L89-113	LCP85-384	250	20	84	6	89	2	85	.	.
L91-255	HoCP00-905	82	2	36	0	21	0	26	.	.
L91-281	L99-226	761	45	73	6	59	2	60	.	.
L92-312	02P2	442	0	12	0	21	0	26	.	.
L92-312	US80-004	101	0	12	0	21	0	26	.	.
L93-363	L00-259	579	15	38	4	56	2	64	.	.
L93-363	L91-255	208	31	98	4	86	1	77	.	.
L93-363	L99-226	144	12	85	3	86	0	26	.	.
L93-365	L99-233	242	7	41	0	21	0	26	.	.
L93-365	LCP85-384	236	8	48	0	21	0	26	.	.
L93-399	L98-209	229	8	49	2	63	1	71	.	.
L93-399	L98-209	394	17	59	0	21	0	26	.	.
L94-426	HoCP96-540	122	0	12	0	21	0	26	.	.
L94-426	HoCP97-609	225	15	77	1	48	0	26	.	.
L94-426	L98-207	117	2	31	1	62	1	89	.	.
L94-428	02P12	214	2	27	1	50	0	26	.	.
L94-428	HoCP96-540	482	31	76	11	88	3	82	.	.
L94-428	HoCP97-609	41	0	12	0	21	0	26	.	.
L94-428	L00-259	442	21	63	4	66	2	73	.	.
L94-428	L98-207	943	48	67	18	85	4	67	.	.
L94-433	HoCP92-618	174	11	75	0	21	0	26	.	.
L94-433	L94-428	189	0	12	0	21	0	26	.	.
L94-433	L99-226	1280	41	45	6	50	2	55	.	.
L96-040	HoCP97-609	490	0	12	0	21	0	26	.	.
L96-040	L00-268	240	8	46	0	21	0	26	.	.
L96-040	L99-226	664	0	12	0	21	0	26	.	.
L96-092	LCP85-384	463	13	40	5	71	1	58	.	.
L97-128	HoCP91-951	186	5	39	0	21	0	26	.	.
L97-128	HoCP96-540	246	18	80	8	96	3	92	.	.
L97-128	L94-428	146	6	55	0	21	0	26	.	.
L97-128	L98-207	133	7	69	0	21	0	26	.	.
L97-128	L99-233	87	6	80	1	72	0	26	.	.
L97-128	LCP85-384	69	0	12	0	21	0	26	.	.
L98-197	HoCP99-866	226	0	12	0	21	0	26	.	.
L98-207	02P10	1009	96	89	24	89	13	94	.	.

Table 6. Continue.

			1st Line		2nd Line		Increase		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
L98-207	02P7	244	0	12	0	21	0	26	.	.
L98-207	02P9	920	0	12	0	21	0	26	.	.
L98-207	L92-321	225	17	82	2	65	1	73	.	.
L98-207	L99-226	461	17	51	8	83	3	83	.	.
L98-209	HoCP97-609	213	0	12	0	21	0	26	.	.
L98-209	L01-299	326	0	12	0	21	0	26	.	.
L99-233	02P18	232	10	59	6	92	1	70	.	.
L99-233	HoCP98-741	216	0	12	0	21	0	26	.	.
L99-233	L99-226	248	9	50	2	61	1	66	.	.
LCP81-010	HoCP96-540	673	54	84	11	82	2	62	.	.
LCP81-010	L92-312	462	14	42	1	44	1	58	.	.
LCP81-010	L99-233	162	11	78	4	90	2	93	.	.
LCP81-010	LCP85-384	226	12	69	1	48	1	72	.	.
LCP81-010	02P19	223	9	54	0	21	0	26	.	.
LCP82-089	02P3	445	0	12	0	21	0	26	.	.
LCP82-089	02P4	410	0	12	0	21	0	26	.	.
LCP85-313	HoCP92-618	137	2	29	0	21	0	26	.	.
LCP85-313	HoCP97-609	159	9	72	0	21	0	26	.	.
LCP85-313	L98-209	623	31	66	8	76	4	82	.	.
LCP85-313	LCP82-089	109	4	51	1	66	1	91	.	.
LCP85-384	02P11	1105	22	33	7	55	3	61	.	.
LCP85-384	02P17	145	14	90	0	21	0	26	.	.
LCP85-384	02P3	200	0	12	0	21	0	26	.	.
LCP85-384	02P4	244	18	81	7	94	2	86	.	.
LCP85-384	HoCP01-517	444	49	95	20	98	9	98	.	.
LCP86-454	02P11	1033	0	12	0	21	0	26	.	.
LCP86-454	02P14	233	12	68	3	77	1	69	.	.
LCP86-454	L98-207	374	3	26	0	21	0	26	.	.
LCP86-454	LCP85-384	1366	34	37	7	52	1	53	.	.
LH083-153	HoCP92-618	92	0	12	0	21	0	26	.	.
N-27	HoCP96-540	383	38	93	11	94	2	79	.	.
N-27	L94-428	185	6	45	3	82	1	80	.	.
N-27	L98-209	657	18	39	4	53	1	55	.	.
N-27	LCP85-384	252	16	75	7	93	5	98	.	.
TucCP77-42	LCP85-384	476	24	66	6	74	4	88	.	.
US79-010	HoCP96-540	131	17	97	4	95	1	84	.	.
US79-010	L01-299	216	17	83	3	80	1	75	.	.
US79-010	L98-207	245	10	55	0	21	0	26	.	.
US79-010	LCP85-384	102	19	99	1	68	1	91	.	.
US96-002	L01-299	185	2	28	0	21	0	26	.	.

Table 6. Continue.

Female	Male	Survive	1st Line No.	1st Line Rank Percentile	2nd Line No.	2nd Line Rank Percentile	Increase No.	Increase Rank Percentile	Assignments No.	Assignments Rank Percentile
2003 Crossing Series										
CP65-357	Ho95-988	238	0	39	0	39	.	.	.	.
CP65-357	LCP85-384	1235	0	39	0	39	.	.	.	.
CP65-357	LCP85-384	964	0	39	0	39	.	.	.	.
CP73-351	HoCP96-540	457	0	39	0	39	.	.	.	.
CP77-310	HoCP91-552	231	0	39	0	39	.	.	.	.
CP83-644	HoCP97-606	244	0	39	0	39	.	.	.	.
Ho01-564	L99-226	425	29	84	5	87	.	.	.	.
Ho01-564	LCP85-384	238	0	39	0	39	.	.	.	.
Ho89-889	L98-209	209	0	39	0	39	.	.	.	.
Ho95-988	L99-226	182	0	39	0	39	.	.	.	.
Ho95-988	L99-233	274	0	39	0	39	.	.	.	.
Ho95-988	LCP85-384	243	27	91	3	87	.	.	.	.
HoCP00-905	HoCP00-930	154	28	99	11	99	.	.	.	.
HoCP00-905	HoCP92-618	175	0	39	0	39	.	.	.	.
HoCP00-905	HoCP96-540	222	0	39	0	39	.	.	.	.
HoCP00-905	HoCP97-609	248	0	39	0	39	.	.	.	.
HoCP00-905	L91-281	500	0	39	0	39	.	.	.	.
HoCP00-905	L94-432	377	56	97	18	98	.	.	.	.
HoCP00-905	LCP85-384	251	0	39	0	39	.	.	.	.
HoCP00-905	LCP85-384	452	0	39	0	39	.	.	.	.
HoCP00-930	HoCP91-552	478	36	86	10	94	.	.	.	.
HoCP00-930	HoCP96-540	490	0	39	0	39	.	.	.	.
HoCP00-942	L00-266	242	0	39	0	39	.	.	.	.
HoCP00-946	LCP85-384	236	0	39	0	39	.	.	.	.
HoCP00-950	HoCP01-506	212	24	92	6	96	.	.	.	.
HoCP00-950	HoCP01-506	228	0	39	0	39	.	.	.	.
HoCP00-950	HoCP91-552	668	6	79	1	80	.	.	.	.
HoCP00-950	HoCP91-552	446	0	39	0	39	.	.	.	.
HoCP00-950	HoCP96-540	934	71	87	12	89	.	.	.	.
HoCP00-950	L00-266	249	0	39	0	39	.	.	.	.
HoCP00-950	L99-226	240	23	89	2	85	.	.	.	.
HoCP01-523	Ho91-572	240	0	39	0	39	.	.	.	.
HoCP01-523	LCP85-384	234	0	39	0	39	.	.	.	.
HoCP01-523	LCP85-384	243	16	84	2	84	.	.	.	.
HoCP01-525	03P12	235	0	39	0	39	.	.	.	.
HoCP01-525	HoCP01-506	244	26	90	4	91	.	.	.	.
HoCP01-525	LCP85-384	213	31	96	5	95	.	.	.	.
HoCP01-528	03P15	175	0	39	0	39	.	.	.	.
HoCP01-541	HoCP96-540	153	0	39	0	39	.	.	.	.
HoCP01-544	L98-197	244	0	39	0	39	.	.	.	.

Table 6. Continue.

			1st Line		2nd Line		Increase		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
HoCP01-558	HoCP00-905	241	0	39	0	39	.	.	.	.
HoCP01-561	03P12	490	64	94	10	93	.	.	.	.
HoCP01-561	03P13	256	0	39	0	39	.	.	.	.
HoCP01-561	LCP85-384	172	0	39	0	39	.	.	.	.
HoCP85-845	03P22	232	32	95	4	92	.	.	.	.
HoCP85-845	HoCP01-506	483	0	39	0	39	.	.	.	.
HoCP85-845	L02-328	247	25	89	7	96	.	.	.	.
HoCP85-845	L98-207	727	68	88	9	88	.	.	.	.
HoCP85-845	L98-209	741	0	39	0	39	.	.	.	.
HoCP85-845	LCP85-384	467	0	39	0	39	.	.	.	.
HoCP88-739	LCP85-384	683	0	39	0	39	.	.	.	.
HoCP89-831	03P12	489	0	39	0	39	.	.	.	.
HoCP89-831	LCP85-384	491	0	39	0	39	.	.	.	.
HoCP89-846	HoCP96-540	796	0	39	0	39	.	.	.	.
HoCP89-846	HoCP96-540	245	0	39	0	39	.	.	.	.
HoCP89-846	L02-328	241	0	39	0	39	.	.	.	.
HoCP89-846	L98-209	442	0	39	0	39	.	.	.	.
HoCP89-846	LCP85-384	244	0	39	0	39	.	.	.	.
HoCP91-552	03P16	183	0	39	0	39	.	.	.	.
HoCP91-552	L99-226	393	44	92	19	99	.	.	.	.
HoCP92-618	L02-333	231	0	39	0	39	.	.	.	.
HoCP92-624	03P1	641	0	39	0	39	.	.	.	.
HoCP92-624	03P2	247	0	39	0	39	.	.	.	.
HoCP92-624	HoCP00-905	235	0	39	0	39	.	.	.	.
HoCP92-624	HoCP85-845	239	0	39	0	39	.	.	.	.
HoCP92-624	HoCP91-552	355	0	39	0	39	.	.	.	.
HoCP92-624	HoCP91-552	228	33	96	3	89	.	.	.	.
HoCP92-624	HoCP96-540	497	0	39	0	39	.	.	.	.
HoCP92-624	L02-320	234	0	39	0	39	.	.	.	.
HoCP92-624	L02-323	208	31	97	6	97	.	.	.	.
HoCP92-624	L91-281	502	0	39	0	39	.	.	.	.
HoCP92-624	L96-092	494	0	39	0	39	.	.	.	.
HoCP92-624	L98-209	1114	0	39	0	39	.	.	.	.
HoCP92-624	L98-209	501	0	39	0	39	.	.	.	.
HoCP92-624	L99-226	250	0	39	0	39	.	.	.	.
HoCP92-624	LCP85-384	222	0	39	0	39	.	.	.	.
HoCP92-624	LCP85-384	473	0	39	0	39	.	.	.	.
HoCP92-624	LCP85-384	498	26	82	2	81	.	.	.	.
HoCP92-624	LCP85-384	315	0	39	0	39	.	.	.	.
HoCP92-648	HoCP96-540	215	0	39	0	39	.	.	.	.
HoCP92-648	L98-209	482	0	39	0	39	.	.	.	.

Table 6. Continue.

			1st Line		2nd Line		Increase		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
HoCP92-648	L98-209	487	0	39	0	39	.	.	.	.
HoCP92-648	L99-233	437	49	92	10	94	.	.	.	.
HoCP92-648	LCP85-384	1199	0	39	0	39	.	.	.	.
HoCP92-648	LCP85-384	256	0	39	0	39	.	.	.	.
HoCP92-648	LCP85-384	247	0	39	0	39	.	.	.	.
HoCP93-746	HoCP85-845	438	0	39	0	39	.	.	.	.
HoCP93-746	LCP85-384	437	0	39	0	39	.	.	.	.
HoCP93-749	L99-226	246	0	39	0	39	.	.	.	.
HoCP95-951	03P1	254	21	87	2	84	.	.	.	.
HoCP96-540	03P11	1587	0	39	0	39	.	.	.	.
HoCP96-540	03P12	474	0	39	0	39	.	.	.	.
HoCP96-540	03P18	195	0	39	0	39	.	.	.	.
HoCP96-540	03P19	200	0	39	0	39	.	.	.	.
HoCP96-540	03P6	251	0	39	0	39	.	.	.	.
HoCP96-540	03P8	249	0	39	0	39	.	.	.	.
HoCP96-540	03P9	1376	0	39	0	39	.	.	.	.
HoCP96-540	HoCP01-506	674	0	39	0	39	.	.	.	.
HoCP96-540	L02-316	1218	0	39	0	39	.	.	.	.
HoCP96-540	L98-209	435	0	39	0	39	.	.	.	.
HoCP96-540	L99-226	1435	0	39	0	39	.	.	.	.
HoCP96-561	03P19	247	43	98	4	91	.	.	.	.
HoCP96-561	L02-341	306	0	39	0	39	.	.	.	.
HoCP97-606	HoCP96-540	592	0	39	0	39	.	.	.	.
HoCP97-606	L98-209	239	0	39	0	39	.	.	.	.
HoCP97-609	03P13	365	0	39	0	39	.	.	.	.
HoCP97-609	03P15	247	0	39	0	39	.	.	.	.
HoCP97-609	HoCP96-540	805	0	39	0	39	.	.	.	.
HoCP98-741	L02-320	383	0	39	0	39	.	.	.	.
HoCP98-781	03P9	438	0	39	0	39	.	.	.	.
HoCP98-781	L98-207	481	0	39	0	39	.	.	.	.
HoCP98-781	LCP85-384	208	0	39	0	39	.	.	.	.
L01-281	03P9	428	0	39	0	39	.	.	.	.
L01-283	HoCP91-552	476	15	79	3	83	.	.	.	.
L01-283	LCP85-384	160	0	39	0	39	.	.	.	.
L01-299	LCP85-384	646	0	39	0	39	.	.	.	.
L01-299	LCP85-384	677	0	39	0	39	.	.	.	.
L02-233	L96-092	241	23	88	3	88	.	.	.	.
L02-319	HoCP96-540	407	0	39	0	39	.	.	.	.
L02-320	HoCP85-845	229	0	39	0	39	.	.	.	.
L02-320	HoCP96-540	487	0	39	0	39	.	.	.	.
L02-320	L99-226	243	12	81	4	92	.	.	.	.

Table 6. Continue.

			1st Line		2nd Line		Increase		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
L02-322	HoCP85-845	240	0	39	0	39	.	.	.	.
L02-322	HoCP96-540	132	0	39	0	39	.	.	.	.
L02-322	L99-226	211	0	39	0	39	.	.	.	.
L02-328	Ho91-572	223	0	39	0	39	.	.	.	.
L02-328	HoCP91-552	224	0	39	0	39	.	.	.	.
L02-328	HoCP91-552	204	0	39	0	39	.	.	.	.
L02-328	L99-226	896	53	83	8	86	.	.	.	.
L02-328	L99-233	711	0	39	0	39	.	.	.	.
L02-333	HoCP96-540	748	0	39	0	39	.	.	.	.
L02-336	POLY	227	0	39	0	39	.	.	.	.
L02-341	HoCP91-552	381	42	90	12	97	.	.	.	.
L02-341	HoCP91-552	208	10	80	3	90	.	.	.	.
L02-341	HoCP96-540	428	0	39	0	39	.	.	.	.
L02-351	LCP85-384	242	0	39	0	39	.	.	.	.
L91-255	HoCP96-540	471	0	39	0	39	.	.	.	.
L91-255	L00-266	437	0	39	0	39	.	.	.	.
L91-255	LCP85-384	245	0	39	0	39	.	.	.	.
L94-426	HoCP91-552	356	0	39	0	39	.	.	.	.
L94-428	HoCP96-540	246	0	39	0	39	.	.	.	.
L94-432	03P24	458	0	39	0	39	.	.	.	.
L94-432	LCP85-384	419	0	39	0	39	.	.	.	.
L94-433	Ho91-572	460	0	39	0	39	.	.	.	.
L94-433	LCP85-384	1087	54	81	6	83	.	.	.	.
L96-040	HoCP00-905	241	0	39	0	39	.	.	.	.
L96-040	L94-432	477	0	39	0	39	.	.	.	.
L96-040	L99-226	1105	0	39	0	39	.	.	.	.
L96-040	LCP85-384	212	0	39	0	39	.	.	.	.
L97-128	Ho91-572	186	0	39	0	39	.	.	.	.
L97-128	HoCP91-552	207	0	39	0	39	.	.	.	.
L97-128	HoCP91-552	166	0	39	0	39	.	.	.	.
L97-128	L98-197	166	0	39	0	39	.	.	.	.
L97-128	L98-207	435	31	85	7	90	.	.	.	.
L97-128	L98-209	153	23	98	5	98	.	.	.	.
L97-128	L99-226	74	0	39	0	39	.	.	.	.
L97-128	LCP85-384	188	0	39	0	39	.	.	.	.
L97-128	POLY	371	0	39	0	39	.	.	.	.
L97-137	L94-432	440	0	39	0	39	.	.	.	.
L97-137	L96-092	486	0	39	0	39	.	.	.	.
L98-207	HoCP01-553	721	0	39	0	39	.	.	.	.
L98-209	HoCP91-552	362	0	39	0	39	.	.	.	.
L98-209	HoCP96-540	229	0	39	0	39	.	.	.	.

Table 6. Continue.

			1st Line		2nd Line		Increase		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
L98-209	L98-207	1190	0	39	0	39	.	.	.	.
L99-226	03P10	233	0	39	0	39	.	.	.	.
L99-226	03P13	238	0	39	0	39	.	.	.	.
L99-226	HoCP92-618	850	44	82	7	84	.	.	.	.
L99-226	HoCP96-540	764	64	87	8	87	.	.	.	.
L99-226	L98-197	1172	0	39	0	39	.	.	.	.
L99-226	L99-233	920	0	39	0	39	.	.	.	.
L99-233	L96-092	396	0	39	0	39	.	.	.	.
LCP02-337	03P14	243	0	39	0	39	.	.	.	.
LCP02-337	03P18	342	0	39	0	39	.	.	.	.
LCP02-337	HoCP96-540	440	0	39	0	39	.	.	.	.
LCP02-337	L99-226	1160	0	39	0	39	.	.	.	.
LCP02-344	HoCP96-540	395	0	39	0	39	.	.	.	.
LCP02-345	HoCP96-540	450	0	39	0	39	.	.	.	.
LCP02-345	L99-226	190	0	39	0	39	.	.	.	.
LCP81-010	03P15	1323	0	39	0	39	.	.	.	.
LCP81-010	Ho91-572	487	0	39	0	39	.	.	.	.
LCP81-010	HoCP91-552	242	13	83	1	82	.	.	.	.
LCP81-010	L02-320	226	0	39	0	39	.	.	.	.
LCP81-010	L98-197	786	0	39	0	39	.	.	.	.
LCP81-010	L98-207	238	0	39	0	39	.	.	.	.
LCP81-010	L98-207	694	0	39	0	39	.	.	.	.
LCP81-010	L98-207	1152	83	85	4	81	.	.	.	.
LCP81-010	LCP85-384	908	0	39	0	39	.	.	.	.
LCP81-010	LCP85-384	956	0	39	0	39	.	.	.	.
LCP82-089	LCP85-384	708	0	39	0	39	.	.	.	.
LCP85-384	03P10	866	37	80	1	79	.	.	.	.
LCP85-384	03P22	95	0	39	0	39	.	.	.	.
LCP85-384	03P24	248	0	39	0	39	.	.	.	.
LCP85-384	03P8	666	0	39	0	39	.	.	.	.
LCP86-454	03P8	246	0	39	0	39	.	.	.	.
MISC	MISC	489	0	39	0	39	.	.	.	.
N-27	Ho95-988	233	30	94	1	82	.	.	.	.
N27	03P22	466	66	95	12	95	.	.	.	.
TucCP77-42	POLY	245	0	39	0	39	.	.	.	.
US01-039	Ho91-572	481	0	39	0	39	.	.	.	.
US01-039	HoCP96-540	444	0	39	0	39	.	.	.	.
US01-039	LCP85-384	489	58	93	1	80	.	.	.	.
US01-039	LCP85-384	150	11	86	0	39	.	.	.	.
US01-040	Ho91-572	172	0	39	0	39	.	.	.	.
US02-096	HoCP01-553	230	42	99	2	86	.	.	.	.

Table 6. Continue.

			1st Line		2nd Line		Increase		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
US02-096	LCP85-384	210	0	39	0	39	.	.	.	.
US99-002	LCP85-384	242	28	93	5	93	.	.	.	.
US99-004	LCP85-384	222	0	39	0	39	.	.	.	.
2004 Crossing Series										
CP65-357	Ho95-988	238	8	69	.	.	.	.	.	.
CP65-357	L02-316	488	29	87	.	.	.	.	.	.
CP65-357	L98-207	693	0	21	.	.	.	.	.	.
CP65-357	L99-233	684	18	60	.	.	.	.	.	.
CP73-351	L98-207	956	0	21	.	.	.	.	.	.
CP79-318	L02-316	247	0	21	.	.	.	.	.	.
CP79-318	LCP85-384	724	16	54	.	.	.	.	.	.
Ho01-564	HoCP91-552	238	11	81	.	.	.	.	.	.
Ho01-564	L99-226	444	0	21	.	.	.	.	.	.
Ho01-564	TucCP77-42	743	47	88	.	.	.	.	.	.
Ho91-572	04P1	234	0	21	.	.	.	.	.	.
Ho95-988	HoCP89-846	251	6	57	.	.	.	.	.	.
Ho95-988	HoCP91-552	941	17	51	.	.	.	.	.	.
Ho95-988	HoCP91-552	498	0	21	.	.	.	.	.	.
Ho95-988	L98-207	1126	27	57	.	.	.	.	.	.
Ho95-988	LCP85-384	732	0	21	.	.	.	.	.	.
HoCP00-930	Ho95-988	480	2	42	.	.	.	.	.	.
HoCP00-930	HoCP89-846	706	0	21	.	.	.	.	.	.
HoCP00-930	HoCP91-552	243	0	21	.	.	.	.	.	.
HoCP00-930	HoCP91-552	455	16	71	.	.	.	.	.	.
HoCP00-930	L00-266	496	46	97	.	.	.	.	.	.
HoCP00-930	L02-353	450	13	63	.	.	.	.	.	.
HoCP00-930	L99-233	834	85	98	.	.	.	.	.	.
HoCP00-930	TucCP77-42	188	15	96	.	.	.	.	.	.
HoCP00-950	HoCP89-846	249	0	21	.	.	.	.	.	.
HoCP00-950	L98-209	244	0	21	.	.	.	.	.	.
HoCP00-950	LCP85-384	360	0	21	.	.	.	.	.	.
HoCP01-517	L98-207	985	43	79	.	.	.	.	.	.
HoCP01-523	L02-316	248	17	93	.	.	.	.	.	.
HoCP01-523	L98-209	491	0	21	.	.	.	.	.	.
HoCP01-523	LCP85-384	470	43	97	.	.	.	.	.	.
HoCP01-529	L99-226	243	0	21	.	.	.	.	.	.
HoCP01-541	HoCP92-618	239	0	21	.	.	.	.	.	.
HoCP01-544	L99-233	202	0	21	.	.	.	.	.	.

Table 6. Continue.

			1st Line		2nd Line		Increase		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
HoCP01-553	L99-233	825	41	84	.	.	.	.	.	.
HoCP01-558	HoCP92-618	152	0	21	.	.	.	.	.	.
HoCP01-558	HoCP97-609	252	0	21	.	.	.	.	.	.
HoCP01-558	LCP82-089	225	5	54	.	.	.	.	.	.
HoCP01-561	L97-137	248	10	76	.	.	.	.	.	.
HoCP01-561	L99-226	738	15	52	.	.	.	.	.	.
HoCP01-588	TucCP77-42	244	0	21	.	.	.	.	.	.
HoCP85-384	Ho95-988	221	6	61	.	.	.	.	.	.
HoCP85-845	Ho95-988	479	16	67	.	.	.	.	.	.
HoCP85-845	HoCP89-846	239	0	21	.	.	.	.	.	.
HoCP85-845	HoCP92-618	251	0	21	.	.	.	.	.	.
HoCP85-845	LCP82-089	423	18	78	.	.	.	.	.	.
HoCP85-845	LCP85-384	1383	35	59	.	.	.	.	.	.
HoCP89-831	LCP85-384	464	53	99	.	.	.	.	.	.
HoCP89-846	Ho95-988	462	0	21	.	.	.	.	.	.
HoCP89-846	Ho95-988	233	4	49	.	.	.	.	.	.
HoCP89-846	HoCP85-845	247	0	21	.	.	.	.	.	.
HoCP89-846	HoCP85-845	250	0	21	.	.	.	.	.	.
HoCP89-846	HoCP97-609	252	0	21	.	.	.	.	.	.
HoCP89-846	L02-316	428	4	44	.	.	.	.	.	.
HoCP89-846	LCP81-010	482	18	73	.	.	.	.	.	.
HoCP91-552	04P2	240	0	21	.	.	.	.	.	.
HoCP91-555	L98-209	245	0	21	.	.	.	.	.	.
HoCP91-555	LCP85-384	487	0	21	.	.	.	.	.	.
HoCP92-618	Ho95-988	1455	0	21	.	.	.	.	.	.
HoCP92-618	HoCP89-846	122	2	48	.	.	.	.	.	.
HoCP92-618	HoCP97-609	502	0	21	.	.	.	.	.	.
HoCP92-618	LCP85-384	500	0	21	.	.	.	.	.	.
HoCP92-618	LCP85-384	252	0	21	.	.	.	.	.	.
HoCP92-624	04P16	247	10	76	.	.	.	.	.	.
HoCP92-624	HoCP85-845	502	10	52	.	.	.	.	.	.
HoCP92-624	HoCP89-846	126	1	43	.	.	.	.	.	.
HoCP92-624	HoCP91-552	473	18	74	.	.	.	.	.	.
HoCP92-624	HoCP91-552	205	5	57	.	.	.	.	.	.
HoCP92-624	HoCP96-540	1119	30	61	.	.	.	.	.	.
HoCP92-624	HoCP96-561	498	17	69	.	.	.	.	.	.
HoCP92-624	L00-266	479	0	21	.	.	.	.	.	.
HoCP92-624	L02-316	905	0	21	.	.	.	.	.	.
HoCP92-624	L02-353	253	8	66	.	.	.	.	.	.
HoCP92-624	L92-312	501	12	57	.	.	.	.	.	.
HoCP92-624	L94-428	496	8	48	.	.	.	.	.	.

Table 6. Continue.

			1st Line		2nd Line		Increase		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
HoCP92-624	L97-128	218	0	21	.	.	.	.	.	.
HoCP92-624	L98-207	1462	70	82	.	.	.	.	.	.
HoCP92-624	L98-209	842	43	85	.	.	.	.	.	.
HoCP92-624	L99-226	1184	67	87	.	.	.	.	.	.
HoCP92-624	L99-226	482	18	73	.	.	.	.	.	.
HoCP92-624	L99-233	1206	38	66	.	.	.	.	.	.
HoCP92-624	L99-233	1196	57	82	.	.	.	.	.	.
HoCP92-624	LCP82-089	876	20	55	.	.	.	.	.	.
HoCP92-624	LCP85-384	1294	98	95	.	.	.	.	.	.
HoCP92-648	HoCP89-846	447	0	21	.	.	.	.	.	.
HoCP92-648	HoCP91-552	243	7	63	.	.	.	.	.	.
HoCP92-648	L00-266	480	31	90	.	.	.	.	.	.
HoCP92-648	L02-316	503	8	48	.	.	.	.	.	.
HoCP92-648	L97-137	117	0	21	.	.	.	.	.	.
HoCP92-648	L99-233	457	13	62	.	.	.	.	.	.
HoCP92-648	LCP85-384	174	7	76	.	.	.	.	.	.
HoCP92-648	LCP85-384	256	19	94	.	.	.	.	.	.
HoCP95-951	L02-325	463	11	57	.	.	.	.	.	.
HoCP95-951	L99-233	433	0	21	.	.	.	.	.	.
HoCP96-509	CP77-310	244	3	46	.	.	.	.	.	.
HoCP96-509	L00-266	229	15	91	.	.	.	.	.	.
HoCP96-509	L02-316	245	0	21	.	.	.	.	.	.
HoCP96-509	LCP85-384	471	0	21	.	.	.	.	.	.
HoCP96-540	04P3	679	7	45	.	.	.	.	.	.
HoCP96-540	04P5	966	0	21	.	.	.	.	.	.
HoCP96-540	04P7	1078	0	21	.	.	.	.	.	.
HoCP96-540	HoCP91-552	224	0	21	.	.	.	.	.	.
HoCP96-540	L02-325	471	0	21	.	.	.	.	.	.
HoCP96-540	L99-233	469	0	21	.	.	.	.	.	.
HoCP96-549	HoCP01-517	232	0	21	.	.	.	.	.	.
HoCP96-561	L99-226	242	0	21	.	.	.	.	.	.
HoCP97-609	Ho95-988	206	0	21	.	.	.	.	.	.
HoCP97-609	HoCP91-552	343	10	63	.	.	.	.	.	.
HoCP97-609	HoCP92-618	241	6	59	.	.	.	.	.	.
HoCP97-609	LCP85-384	239	0	21	.	.	.	.	.	.
HoCP85-845	HoCP91-552	254	0	21	.	.	.	.	.	.
HoCP96-540	OP13	221	0	21	.	.	.	.	.	.
L01-281	04P3	484	20	77	.	.	.	.	.	.
L01-283	LCP81-010	415	8	51	.	.	.	.	.	.
L01-299	04P3	233	17	94	.	.	.	.	.	.
L01-299	HoCP91-552	247	11	80	.	.	.	.	.	.

Table 6. Continue.

			1st Line		2nd Line		Increase		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
L01-299	L97-128	227	8	71	.	.	.	.	.	.
L01-299	LCP85-384	248	0	21	.	.	.	.	.	.
L02-316	Ho95-988	465	0	21	.	.	.	.	.	.
L02-316	HoCP91-552	243	5	53	.	.	.	.	.	.
L02-320	LCP85-384	370	0	21	.	.	.	.	.	.
L02-325	Ho95-988	689	0	21	.	.	.	.	.	.
L02-325	HoCP91-552	804	0	21	.	.	.	.	.	.
L02-325	HoCP92-618	468	0	21	.	.	.	.	.	.
L02-325	LCP81-010	221	0	21	.	.	.	.	.	.
L02-336	TucCP77-42	241	26	98	.	.	.	.	.	.
L02-342	Ho95-988	234	12	85	.	.	.	.	.	.
L02-342	HoCP92-618	252	0	21	.	.	.	.	.	.
L02-342	L98-209	237	0	21	.	.	.	.	.	.
L02-353	HoCP91-552	233	16	93	.	.	.	.	.	.
L02-353	HoCP92-618	244	0	21	.	.	.	.	.	.
L02-353	L98-209	236	15	89	.	.	.	.	.	.
L02-353	LCP85-384	195	13	91	.	.	.	.	.	.
L89-113	LCP85-384	249	0	21	.	.	.	.	.	.
L91-281	HoCP85-845	499	0	21	.	.	.	.	.	.
L91-281	L02-325	495	35	93	.	.	.	.	.	.
L91-281	L99-226	404	9	54	.	.	.	.	.	.
L94-426	HoCP89-846	243	10	77	.	.	.	.	.	.
L94-426	L99-233	453	8	51	.	.	.	.	.	.
L94-426	LCP85-384	233	8	69	.	.	.	.	.	.
L94-428	HoCP89-846	464	0	21	.	.	.	.	.	.
L94-428	LCP85-384	249	0	21	.	.	.	.	.	.
L94-432	04P16	225	0	21	.	.	.	.	.	.
L94-432	L02-316	246	9	73	.	.	.	.	.	.
L94-433	TucCP77-42	474	40	96	.	.	.	.	.	.
L97-128	04P10	466	24	86	.	.	.	.	.	.
L97-128	HoCP85-845	228	2	44	.	.	.	.	.	.
L97-128	HoCP89-846	443	22	84	.	.	.	.	.	.
L97-128	L01-299	242	0	21	.	.	.	.	.	.
L97-128	L91-255	236	0	21	.	.	.	.	.	.
L97-128	L98-209	475	30	88	.	.	.	.	.	.
L97-128	L99-226	231	14	88	.	.	.	.	.	.
L97-128	L99-226	927	34	73	.	.	.	.	.	.
L97-128	L99-233	1356	46	69	.	.	.	.	.	.
L97-128	LCP81-010	453	12	60	.	.	.	.	.	.
L97-128	LCP85-384	941	45	82	.	.	.	.	.	.
L97-128	LCP85-384	367	24	90	.	.	.	.	.	.

Table 6. Continue.

			1st Line		2nd Line		Increase		Assignments	
Female	Male	Survive	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile	No.	Rank Percentile
L97-137	L99-233	485	24	83	.	.	.	.	.	.
L98-197	L99-226	957	0	21	.	.	.	.	.	.
L98-207	HoCP85-845	246	0	21	.	.	.	.	.	.
L98-209	Ho95-988	242	0	21	.	.	.	.	.	.
L98-209	HoCP89-846	242	0	21	.	.	.	.	.	.
L99-226	04P3	223	3	46	.	.	.	.	.	.
L99-226	HoCP85-845	453	18	76	.	.	.	.	.	.
L99-226	HoCP89-846	495	0	21	.	.	.	.	.	.
L99-226	LCP85-384	435	0	21	.	.	.	.	.	.
L99-226	LCP85-384	676	21	65	.	.	.	.	.	.
L99-226	LCP85-384	234	16	92	.	.	.	.	.	.
L99-233	HoCP85-845	468	22	81	.	.	.	.	.	.
L99-233	HoCP91-552	417	14	69	.	.	.	.	.	.
L99-233	LCP85-384	226	5	54	.	.	.	.	.	.
LCP81-010	Ho95-988	1206	21	49	.	.	.	.	.	.
LCP81-010	Ho95-988	241	0	21	.	.	.	.	.	.
LCP81-010	HoCP89-846	760	30	74	.	.	.	.	.	.
LCP81-010	L02-316	225	6	61	.	.	.	.	.	.
LCP81-010	L02-316	218	0	21	.	.	.	.	.	.
LCP81-010	L97-128	244	0	21	.	.	.	.	.	.
LCP81-010	L98-207	793	23	63	.	.	.	.	.	.
LCP81-010	L98-209	241	8	67	.	.	.	.	.	.
LCP81-010	L99-226	468	0	21	.	.	.	.	.	.
LCP81-010	L99-233	320	17	86	.	.	.	.	.	.
LCP81-010	LCP82-089	117	2	49	.	.	.	.	.	.
LCP81-010	LCP85-384	960	5	43	.	.	.	.	.	.
LCP82-089	HoCP85-845	240	0	21	.	.	.	.	.	.
LCP85-384	04P4	676	28	77	.	.	.	.	.	.
LCP86-454	04P7	1132	86	95	.	.	.	.	.	.
N27	LCP85-384	1240	19	47	.	.	.	.	.	.
TucCP77-42	04P16	226	7	65	.	.	.	.	.	.
US79-010	Ho95-988	240	0	21	.	.	.	.	.	.
US79-010	L02-316	235	8	69	.	.	.	.	.	.
US79-010	LCP85-384	248	2	43	.	.	.	.	.	.
US96-002	04P1	202	0	21	.	.	.	.	.	.
US99-002	CP77-310	216	0	21	.	.	.	.	.	.
US99-002	LCP85-384	242	11	80	.	.	.	.	.	.

Table 7. Plant weight and rank summary statistics from the 2004 crossing series first stubble cross appraisal test at the Sugar Research Station in 2006.

Cross	Female	Male	Plant Weight	
			kg/Plant	Pcnt'l
XL04-141	LCP81-010	L02-316	9.88	98
XL04-371	US79-010	04P16	8.94	97
ST99-233			8.75	96
XL04-319	L01-283	LCP81-010	8.62	95
XL04-181	Ho01-564	HoCP91-552	8.62	93
XL04-160	HoCP92-624	L99-226	8.56	92
XL04-026	L01-299	L02-353	8.52	91
XL04-150	HoCP01-544	L99-233	8.48	90
XL04-161	HoCP01-523	LCP85-384	8.31	89
XL04-108	HoCP00-930	L99-233	8.27	87
XL04-377	Ho01-564	TucCP77-042	8.26	86
XL04-327	HoCP89-846	L02-316	8.22	85
XL04-307	HoCP00-950	LCP85-384	8.16	84
XL04-116	LCP81-010	L99-226	8.14	83
XL04-304	L02-353	L98-209	8.09	81
XL04-239	L94-432	L02-316	7.93	80
XL04-391	HoCP01-529	L98-209	7.85	79
XL04-188	HoCP92-648	L00-266	7.74	78
XL04-187	HoCP92-624	L00-266	7.72	77
XL04-182	HoCP00-930	HoCP91-552	7.70	75
XL04-061	L01-299	04P3	7.69	74
XL04-236	HoCP00-930	HoCP91-552	7.66	73
XL04-194	US79-010	Ho95-988	7.65	72
XL04-139	CP65-357	L02-316	7.62	71
XL04-244	HoCP00-950	LCP85-384	7.60	69
XL04-396	L97-128	L99-226	7.56	68
XL04-221	HoCP01-558	L97-128	7.53	67
XL04-173	CP79-318	L02-316	7.50	66
XL04-262	L01-299	LCP81-010	7.47	65
XL04-394	HoCP01-561	L99-226	7.41	63
XL04-117	Ho01-564	L99-226	7.41	62
XL04-249	US79-010	LCP85-384	7.41	61
XL04-157	L02-325	HoCP91-552	7.39	60
XL04-315	US99-002	LCP85-384	7.39	59
XL04-231	L02-353	HoCP92-618	7.32	57
XL04-144	HoCP01-523	L02-316	7.30	56
XL04-024	HoCP00-930	L02-353	7.25	55
XL04-167	L97-128	HoCP95-951	7.22	54
XL04-235	L02-353	HoCP91-552	7.22	53
XL04-140	HoCP92-624	L02-316	7.22	51
XL04-149	HoCP01-553	L99-233	7.18	50
XL04-217	L91-281	L02-325	7.14	49

Table 7. Continue.

Cross	Female	Male	Plant Weight	
			kg/Plant	Pcnt'l
XL04-180	LCP81-010	L02-316	7.13	48
XL04-106	HoCP01-517	L98-207	7.09	46
XL04-002	US96-002	04P1	7.06	45
XL04-276	HoCP01-523	L98-209	7.03	44
XL04-234	L02-325	HoCP92-618	7.01	43
XL04-258	HoCP92-648	L02-316	7.01	42
XL04-242	HoCP89-846	Ho95-988	6.84	40
XL04-353	HoCP96-509	L00-266	6.81	39
ST99-226			6.80	38
XL04-291	L99-226	HoCP89-846	6.74	37
XL04-392	HoCP85-845	Ho95-988	6.72	36
XL04-215	HoCP95-951	L02-325	6.65	34
XL04-381	L94-433	TucCP77-042	6.62	33
XL04-099	Ho95-988	L92-312	6.60	32
XL04-200	HoCP01-558	LCP82-089	6.54	31
XL04-045	HoCP92-624	L02-353	6.47	30
XL04-302	HoCP01-558	L98-209	6.46	28
XL04-196	L02-316	Ho95-988	6.46	27
XL04-277	L02-342	L98-209	6.45	26
XL04-238	HoCP01-558	L02-316	6.30	25
XL04-174	HoCP96-509	L02-316	6.27	24
XL04-057	L01-281	04P3	6.07	22
XL04-232	HoCP01-541	HoCP92-618	6.07	21
XL04-240	HoCP00-930	Ho95-988	5.95	20
XL04-346	L02-342	HoCP92-618	5.91	19
XL04-115	L02-316	HoCP91-552	5.86	18
XL04-374	HoCP92-618	HoCP91-552	5.63	16
XL04-359	L99-226	04P15	5.58	15
XL04-330	HoCP96-549	HoCP01-517	5.27	14
XL04-230	HoCP01-558	HoCP92-618	5.07	13
XL04-028	HoCP91-552	04P2	4.97	12
XL04-263	L02-325	LCP81-010	4.77	10
XL04-216	HoCP96-540	L02-325	4.75	9
XL04-388	HoCP96-549	TucCP77-042	4.60	8
XL04-384	HoCP01-529	L99-226	4.51	7
XL04-356	HoCP96-540	04P15	4.50	6
XL04-403	L97-128	L02-320	4.30	4
XL04-191	L02-325	Ho95-988	4.23	3
XL04-092	L02-320	LCP85-384	4.11	2
XL04-159	L98-197	L99-226	4.05	1

2006 LOUISIANA SUGARCANE VARIETY DEVELOPMENT PROGRAM NURSERY AND INFIELD VARIETY TRIALS

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

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

The on-station nursery trials were planted in single row (6-foot centers), 16-foot-long plots with 4-foot alleys. The off-station nurseries were planted in single row, 20-foot plots with 4-foot alleys. The infield tests were planted in two-row, 25-foot plots with 5-foot alleys. The experimental design for both nursery and infield tests was a randomized complete block with two replications per location. Four commercial check varieties, LCP85-384, HoCP96-540, L97-128, and L99-226 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. During the harvest season, 10-stalk samples were harvested by hand and stripped of leaves for the nursery tests. For the two infield tests, a 10-stalk sample was taken to the USDA Ardoyne Farm and analyzed for fiber content using the pre-breaker press method. Samples were weighed and milled at the sucrose laboratory to obtain a juice sample for analysis. Brix and pol readings were used to estimate theoretical recoverable sugar per ton as estimated by the Winter-Carp formula as reported by Gravois and Milligan (1992). 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 2006 sugarcane crop experienced a wide range of growing conditions. Many parts of the northern and western sugarcane growing areas in Louisiana experienced a summer drought. The planting season had fairly normal rainfall with all experiments planted in a timely manner. The harvest was relatively wet, which contributed to average maturity. The crop was lodged, but cane tonnage was higher than the 2004 and 2005 crops. The sugarcane crop experienced below freezing temperatures from December 5 through December 9. The majority of the Louisiana crop was harvested before the deleterious effects of the freeze were experienced. All experimental locations were harvested before any freezing temperatures occurred. Recommended cultural practices were followed at all test locations.

LCP85-384 has been the leading variety in Louisiana since 1998. Approximately 73% of Louisiana's harvested sugarcane acreage was in LCP85-384 for 2006. The second leading variety grown in Louisiana in 2006 was HoCP96-540. Because of its increasing popularity, HoCP96-540 was used as a standard for comparison and is highlighted in the tables. To adjust for missing data, the statistical analysis calculated least square means (SAS 9 Proc Mixed). Mean separation used least square means probability differences where P=0.05. Varieties that are significantly higher or lower than HoCP96-540 are denoted by a plus (+) or minus (-), respectively, next to the value for each trait.

References:

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

Table 1. 2006 Location, soil texture, and planting and harvest dates for the nursery and infield tests.

					Harvest Date	Varieties	
Series	Location†	Stage	Soil Texture	Planting Date	2006	No. Planted	No. Harvested
2001	Blackberry Farms	Infield	Commerce silt loam	08/27/02	11/03/06	38	2
2001	Newton Cane, Inc.	Nursery	Moreland silt loam	08/21/02	10/05/06	38	2
2001	D & N Farm	Nursery	Baldwin silty clay	08/22/02	10/05/06	12	2
2001	Sugarland Acres, Inc.	Infield	Coteau silt loam	08/09/02	10/05/06	38	2
2002	Blackberry Farms	Infield	Commerce silt loam	08/20/03	11/03/06	41	1
2002	Newton Cane, Inc.	Nursery	Moreland silt loam	08/15/03	10/05/06	41	1
2002	Sugarland Acres, Inc.	Infield	Coteau silt loam	08/19/03	11/16/06	41	1
2002	Landry Farms	Nursery	Commerce silt loam	08/21/03	10/10/06	41	1
2003	Ardoyne Farm-U.S.D.A	Nursery	Commerce silt loam	10/16/03	10/25/06	35	1
2003	Iberia Research Station	Nursery	Baldwin silty clay	10/21/03	11/02/06	35	1
2003	Sugar Research Station	Nursery	Sharkey clay	10/09/03	10/12/06	35	1
2003	Blackberry Farms	Infield	Commerce silt loam	08/17/04	12/04/06	40	2
2003	Newton Cane, Inc.	Nursery	Moreland silt loam	08/31/04	10/11/06	40	2
2003	D & N Farm	Nursery	Baldwin silty clay	08/26/04	10/05/06	14	1
2003	Sugarland Acres, Inc.	Infield	Coteau silt loam	08/19/04	11/16/06	40	2
2003	Landry Farms	Nursery	Commerce silt loam	08/18/04	11/14/06	40	2
2004	Ardoyne Farm-U.S.D.A	Nursery	Commerce silt loam	10/19/04	11/30/06	37	3
2004	Iberia Research Station	Nursery	Baldwin silty clay	10/27/04	12/04/06	37	3
2004	Sugar Research Station	Nursery	Commerce silt loam	10/18/04	11/06/06	37	3
2004	Blackberry Farms	Infield	Commerce silt loam	08/12/05	12/07/06	50	13
2004	Landry Farms	Nursery	Commerce silt loam	08/18/05	12/07/06	50	13
2004	Sugarland Acres, Inc.	Infield	Coteau silt loam	08/19/05	12/04/06	50	13
2004	Newton Cane, Inc.	Nursery	Moreland silt loam	08/25/05	12/11/06	50	13
2005	Sugar Research Station	Nursery	Commerce silt loam	10/25/05	12/05/06	35	15
2005	Ardoyne Farm-U.S.D.A	Nursery	Commerce silt loam	10/26/05	12/13/06	35	15
2005	Iberia Research Station	Nursery	Baldwin silty clay	10/28/05	12/04/06	35	15
2006	Sugarland Acres, Inc.	Infield	Coteau silt loam	08/15/06			
2006	Blackberry Farms	Infield	Commerce silt loam	08/16/06			
2006	Newton Cane, Inc.	Nursery	Moreland silt loam	08/22/06			
2006	Justin Frederick Farms	Nursery	Baldwin silty clay	08/24/06			
2006	Landry Farms	Nursery	Commerce silt loam	09/29/06			
2006	Sugar Research Station	Nursery	Sharkey clay	10/10/06			
2006	Ardoyne Farm-U.S.D.A	Nursery	Commerce silt loam	10/25/06			
2006	Iberia Research Station	Nursery	Baldwin silty clay	11/01/06			

† Ardoyne-U.S.D.A. Ardoyne Farm (Chacahoula), Blackberry Farms (Vacherie), Iberia Research Station (Jeanerette), Newton Cane, Inc. (Bunkie), Sugar Research Station (St. Gabriel), D & N Farm (Cecelia), Sugarland Acres Inc. (Youngsville), Landry Farms (Paincourtville).

Table 2. Infield third-stubble means of the 2001 "HoCP" and "L" assignment series on a Commerce silt loam soil at Blackberry Farms in Vacherie, Louisiana in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
LCP85-384	7712	29.3	265	1.57	38230	11.6
HoCP85-845			245	1.94		14.4 +
HoCP91-555	9295 +	35.2	264	1.42	50368	12.7
L01-283	12419 +	45.7 +	272	1.55	59432	11.3
L01-299	13610 +	47.8 +	285	1.94	49488	11.7

Table 3. Nursery third-stubble means of the 2001 "HoCP" and "L" assignment series on a Moreland silt loam soil at Newton Cane, Inc. in Bunkie, Louisiana in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	5835	29.1	202	1.30	44286
HoCP85-845	9315	44.8 +	206	1.83	48824
HoCP91-555	7205	34.9	201	1.51	45738
L01-283	11675	53.6 +	217	1.75	60984 +
L01-299	10907	52.8 +	206	1.56	67881 +

Table 4. Nursery third-stubble means of the 2001 "L" assignment series on a Baldwin silty clay soil at D& N Farm in Cecilia, Louisiana in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	3933	24.7	160	1.06	46464
HoCP85-845	2796	16.3 -	170	0.91	35756
HoCP91-555	3666	21.3	171	1.10	38841
L01-283	4973	25.0	199	1.09	46101
L01-299	3846	22.9	167	0.91	50639

Table 5. Infield third-stubble means of the 2001 "HoCP" and "L" assignment series on a Coteau silt loam soil at Sugarland Acres, Inc. in Youngsville, Louisiana in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
LCP85-384	5549	30.6	182	1.31	47410	11.3
HoCP85-845	6267	32.0	196	1.47	43609	12.5 +
HoCP91-555	5366	28.4	189	1.37	42269	11.9 +
L01-283	8602 +	41.6 +	207	1.53	54559	11.4
L01-299	9198 +	46.2 +	201	1.99	46524	12.2 +

Table 6. Infield second-stubble means of the 2002 "HoCP" and "L" assignment series on a Commerce silt loam soil at Blackberry Farms in Vacherie, Louisiana in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
LCP85-384	8179	35.1	234	1.41 -	50187 +	11.7
HoCP91-555	6998	30.0	233	1.35 -	45082 +	11.7
HoCP96-540	7273	30.8	237	2.31	26677	11.6
HoCP02-623	8759	36.3	241	1.60 -	45587 +	13.5 +

Table 7. Nursery second-stubble means of the 2002 "HoCP" and "L" assignment series on a Moreland silt loam soil at Newton Cane, Inc. in Bunkie, Louisiana in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	5188 -	26.4 -	199	1.10 -	48098
HoCP91-555	9466	42.5	223	1.50	56447
HoCP96-540	7769	39.2	197	1.74	44831
HoCP02-623	6755	29.2	231	1.24 -	47372

Table 8. Infield second-stubble means of the 2002 "HoCP" and "L" assignment series on a Coteau silt loam soil at Sugarland Acres, Inc. in Youngsville, Louisiana in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
LCP85-384	7464	28.1	266	1.47	38488	11.3
HoCP91-555	8439	31.3	270	1.64	39801	12.2
HoCP96-540	9427	33.2	283	1.83	36319	9.9
HoCP02-623	8684	32.8	265	1.48	45523	12.3

Table 9. Nursery second-stubble means of the 2002 "HoCP" and "L" assignment series on a Commerce silt loam soil at Landry Farms in Paincourtville, Louisiana in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	8729	38.2	228	1.42	53361
HoCP91-555	11519	50.6	227	1.57	65159
HoCP96-540	12101	53.6	226	1.60	66974
HoCP02-623	11838	45.3	262 +	1.60	56447

Table 10. Infield first-stubble means of the 2003 "HoCP" and "L" assignment series on a Commerce silt loam soil at Blackberry Farms in Vacherie, Louisiana in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
LCP85-384	9366	37.2	250	1.88	39589	11.0
HoCP91-555	8851	33.9	261	1.94	34983	12.7 +
Ho95-988	10064	40.0	252	2.31	34940	12.1 +
HoCP96-540	11095	44.1	252	2.54	34694	10.9
L97-128	10251	39.6	259	2.32	34318	12.1 +
L03-371	10114	38.3	263	2.21	34873	10.0 -
HoCP03-743	8202	29.1	281	2.28	25473	10.6

Table 11. Nursery first-stubble means of the 2003 "HoCP" and "L" assignment series on a Moreland silt loam soil at Newton Cane, Inc. in Bunkie, Louisiana in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	5225	19.2	273	1.35	28496
HoCP91-555	9227	36.7	251	1.64	45012
Ho95-988	9548	36.6	262	1.65	44286
HoCP96-540	9200	36.6	251	1.57	46646
L97-128	8023	29.5	272	1.70	35211
L03-371	9208	32.0	288	1.78	35393
HoCP03-743	7286	27.5	262	1.57	34667

Table 12. Nursery first-stubble means of the 2003 "L" assignment series on a Baldwin silty clay soil at D & N Farm in Cecilia, Louisiana in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	3207	16.5	194	1.21	27407
HoCP91-555	4122	19.9	202	1.13	34848
Ho95-988	4708	24.2	194	1.33	36300
HoCP96-540	5893	30.4	195	1.60	37752
L97-128	5437	24.0	226	1.40	34304
L03-371	5621	29.0	196	1.79	32307

Table 13. Infield first-stubble means of the 2003 "HoCP" and "L" assignment series on a Coteau silt loam soil at Sugarland Acres, Inc. in Youngsville, Louisiana in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
LCP85-384	7982	28.9	276	1.89 -	30776	11.8 +
HoCP91-555	9414	33.9	278	1.63 -	41673 +	11.5
Ho95-988	9894	36.6	271	2.25	32430	10.6
HoCP96-540	9294	33.5	277	2.31	29136	11.2
L97-128	9722	38.0	256	2.23	34127	12.9 +
L03-371	9293	33.3	279	2.23	29931	10.4 -
HoCP03-743	9773	34.6	283	2.13	32415	10.6

Table 14. Nursery first-stubble means of the 2003 "HoCP" and "L" assignment series on a Commerce silt loam soil at Landry Farms in Paincourtville, Louisiana in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	11390	44.5	252	1.54	57173
HoCP91-555	11803	42.9	275	1.71	49913
Ho95-988	16230	60.5	267	2.09	57717
HoCP96-540	18820	72.5	259	2.49	57173
L97-128	17122	65.9	258	2.40	54995
L03-371	17849	66.0	269	2.52	52091
HoCP03-743	16283	60.7	268	1.91	63525

Table 15. Nursery second-stubble means of the 2003 "L" assignment series on a Commerce silt loam soil at U.S.D.A-Ardoyne Farm in Chacahoula, Louisiana in 2005.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	16109	63.9	252	2.05	62391
HoCP91-555	14841	56.9	261	2.04	55811
HoCP96-540	15005	60.3	249	2.53	48324
L03-371	16658	65.6	254	2.66	49232

Table 16. Nursery second-stubble means of the 2003 "L" assignment series on a Baldwin silty clay soil at Iberia Research Station in Jeanerette, Louisiana in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	12961	49.8	259	1.91	52181
HoCP91-555	12591	44.1	286	1.79	49686
HoCP96-540	16949	61.7	275	2.34	52862
L03-371	19994	70.9	282	2.53	56038

Table 17. Nursery second-stubble means of the 2003 "L" assignment series on a Sharkey clay soil at Sugar Research Station in St. Gabriel, Louisiana in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	6241	32.3	193	1.43	45148
HoCP91-555	7896	36.2	214	1.38	51728
HoCP96-540	7288	33.8	216	1.50	45375
L03-371	8698	42.6	206	1.54	55131

Table 18. Infield plantcane means of the 2004 "HoCP" and "L" assignment series on a Commerce silt loam soil at Blackberry Farms in Vacherie, Louisiana in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
LCP85-384	6342 -	27.0 -	234	1.54 -	35157	11.4
Ho95-988	10571	42.8	247	2.99	29069	11.5
HoCP96-540	9801	43.4	240	2.67	31441	11.4
L97-128	10705	45.1	237	2.85	31850	13.0 +
L04-408	8482	37.8	225	1.65 -	46446 +	10.9
L04-425	10194	38.4	265 +	2.31	33324	9.7 -
L04-434	9139	38.2	239	2.43	31564	11.1
HoCP04-803	10340	44.5	233	3.10	28711	12.5 +
HoCP04-809	8638	37.0	233	1.95 -	38926	11.6
HoCP04-810	9163	39.7	230	2.27	35015	13.7 +
HoCP04-814	9353	39.5	237	2.95	26969	10.5
HoCP04-821	10133	42.9	236	1.91 -	45331 +	11.5
HoCP04-824	8221	39.5	208 -	2.45	32364	12.9 +
HoCP04-836	9724	38.0	256	2.42	31393	8.5 -
HoCP04-838	12591 +	52.5 +	240	2.54	41687	12.7 +
HoCP04-847	11881 +	48.2	247	3.12	31619	11.6
HoCP04-856	9437	39.0	243	2.00 -	39231	11.5

Table 19. Nursery plantcane means of the 2004 "HoCP" and "L" assignment series on a Moreland silt loam soil at Newton Cane, Inc. in Bunkie, Louisiana in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	7391	32.5 -	227	1.60 -	42108
Ho95-988	12309	52.6	234	2.76	38478
HoCP96-540	10746	48.9	220	2.31	42653
L97-128	12351	54.6	226	2.40	45557
L04-408	8117	33.5 -	240	1.64 -	40656
L04-425	10228	46.8	219	2.01	46827
L04-434	9753	44.2	219	2.30	38297
HoCP04-803	12075	54.4	222	2.79	39023
HoCP04-809	10917	45.2	241	1.96	46283
HoCP04-810	15091 +	61.4	246 +	2.37	52091
HoCP04-814	15948 +	72.5 +	221	2.85 +	50639
HoCP04-821	12995	51.3	254 +	2.17	47372
HoCP04-824	7519	41.9	176 -	1.90	44286
HoCP04-836	10897	47.5	229	1.85	51546
HoCP04-838	15205 +	60.8	250 +	2.25	54087
HoCP04-847	11524	53.3	217	3.00 +	35574
HoCP04-856	10358	47.1	221	1.90	49549

Table 20. Infield plantcane means of the 2004 "HoCP" and "L" assignment series on a Coteau silt loam soil at Sugarland Acres, Inc. in Youngsville, Louisiana in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
LCP85-384	6995	31.8	220	1.70 -	37536	11.7
Ho95-988	9864	40.2	245	2.86	28291	11.8
HoCP96-540	9963	39.7	251	2.50	31902	11.7
L97-128	10170	43.4	234	2.71	31976	13.0
L04-408	7850	31.9	246	1.75 -	36503	10.9
L04-425	7629	32.8	231	2.17	30451	9.7
L04-434	9310	37.6	249	2.29	32887	11.5
HoCP04-803	9128	36.8	248	3.14 +	23930	12.6
HoCP04-809	9275	36.5	253	1.91 -	38421	11.8
HoCP04-810	10199	42.4	240	2.47	34190	14.2 +
HoCP04-814	9585	36.5	264	2.60	28595	10.4
HoCP04-821	8139	32.7	249	2.02 -	33420	11.5
HoCP04-824	9560	40.2	237	2.05 -	39618	12.9
HoCP04-836	9359	36.3	257	2.12	34504	8.8 -
HoCP04-838	10350	44.5	233	2.43	36539	13.5
HoCP04-847	9459	38.6	245	2.56	30527	11.2
HoCP04-856	9948	41.0	241	2.11	39794	12.4

Table 21. Nursery plantcane means of the 2004 "HoCP" and "L" assignment series on a Commerce silt loam soil at Landry Farms in Paincourtville, Louisiana in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	12477 -	50.3	248	2.12 -	47735
Ho95-988	14332	54.9	261	2.18 -	50276 +
HoCP96-540	15969	60.5	264	2.88	42108
L97-128	17425	69.4	251	3.03	45738
L04-408	10082 -	38.4 -	262	1.76 -	43560
L04-425	13364	55.2	244	2.54	43379
L04-434	10947 -	43.0 -	255	2.15 -	40112
HoCP04-803	17104	66.0	259	3.26	40475
HoCP04-809	13393	49.0	274	1.92 -	51002 +
HoCP04-810	11674 -	46.5 -	251	1.87 -	49913 +
HoCP04-814	14467	61.1	238	2.99	41564
HoCP04-821	12237 -	45.5 -	274	1.77 -	51002 +
HoCP04-824	16153	60.7	266	2.14 -	57354 +
HoCP04-836	10385 -	47.7 -	217	2.04 -	47190
HoCP04-838	16253	61.6	263	2.27	54632 +
HoCP04-847	17003	67.6	252	3.06	44105
HoCP04-856	12649	47.1 -	268	1.81 -	52090 +

Table 22. Nursery first-stubble means of the 2004 "L" assignment series on a Commerce silt loam soil at U.S.D.A-Ardoyne Farm in Chacahoula, Louisiana in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	16456	65.1	252	2.03	64659
Ho95-988	21369	81.9	260	2.68	61256
HoCP96-540	23787	90.2	264	3.04	59441
L97-128	20175	74.4	271	3.21	46283
L04-408	15377	58.0	264	1.83	63071
L04-425	16570	67.2	245	2.54	53089
L04-434	15124	57.1	257	2.38	46283

Table 23. Nursery first-stubble means of the 2004 "L" assignment series on a Baldwin silty clay soil at Iberia Research Station in Jeanerette, Louisiana in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	15073	57.0	264	2.02	55811
Ho95-988	16401	57.5	285	2.24	51274
HoCP96-540	18223	67.3	270	2.97	45375
L97-128	15961	60.6	263	2.53	47871
L04-408	11838	44.8	265	1.86	48098
L04-425	16318	62.6	259	2.75	45375
L04-434	14176	51.6	275	2.41	42879

Table 24. Nursery first-stubble means of the 2004 "L" assignment series on a Commerce silt loam soil at Sugar Research Station in St. Gabriel, Louisiana in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	7226 -	29.3 -	247	1.48 -	39930 -
Ho95-988	10023 -	40.8 -	245	1.67 -	48778
HoCP96-540	14169	57.3	247	2.37	48324
L97-128	10509 -	43.7 -	239	1.96	44467
L04-408	12148	48.4	251	1.67 -	58080 +
L04-425	11202	46.7	239	1.97	47190
L04-434	8868 -	35.1 -	253	1.70 -	41291 -

Table 25. Nursery plantcane means of the 2005 "L" assignment series on a Commerce silt loam soil at U.S.D.A-Ardoyne Farm in Chacahoula, Louisiana in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
LCP85-384	15333	60.9	252	2.50	48551	12.4
Ho95-988	15406	66.2	233	2.65	50366	10.7
HoCP96-540	15162	65.2	232	3.16	41291	11.8
L97-128	16095	67.5	237	3.10	43560	13.2
L05-441	12838	51.7	249	2.13	49232	12.9
L05-442	12501	46.7	268 +	2.25	41518	12.0
L05-445	14034	54.5	257 +	2.47	44241	12.7
L05-447	13057	54.8	238	2.33	46963	14.1 +
L05-448	16172	69.3	233	3.05	45829	13.5 +
L05-450	16418	73.9	222	3.27	45148	13.8 +
L05-451	14699	60.0	245	2.69	44694	11.3
L05-453	14232	58.8	244	2.78	42199	11.7
L05-456	13809	58.8	235	2.32	50593	12.7
L05-457	14360	60.8	237	2.49	48778	14.2 +
L05-459	13991	59.9	233	2.28	52635	11.7
L05-460	14863	54.8	271 +	2.27	48324	10.9
L05-466	13159	53.6	245	2.57	41745	13.3
L05-470	11055	45.7	241	2.22	41291	12.2
L05-474	10779	52.5	204 -	2.40	43787	11.7

Table 26. Nursery plantcane means of the 2005 "L" assignment series on a Baldwin silty clay soil at Iberia Research Station in Jeanerette, Louisiana in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	10222	38.8	264	1.86	41518
Ho95-988	12674	47.5	268	2.22	43106
HoCP96-540	11271	42.7	264	2.26	37888
L97-128	11593	43.0	270	2.20	39023
L05-441	9262	34.9	266	1.75	39930
L05-442	10765	38.7	279	1.93	40157
L05-445	8944	33.8	265	1.90	35619
L05-447	9099	33.6	269	1.52	44241
L05-448	11551	45.5	254	2.38	38342
L05-450	12062	48.6	248	2.70	36300
L05-451	10493	38.9	270	2.01	39023
L05-453	7832	33.1	234	1.60	41291
L05-456	8245	32.3	257	1.60	40384
L05-457	14148	57.1	251	1.89	59895 +
L05-459	10859	43.3	251	1.89	45829
L05-460	9461	31.8	298	1.65	38569
L05-466	10849	42.0	260	1.88	44241
L05-470	8863	32.8	270	1.46	45148
L05-474	11054	47.4	234	2.32	41064

Table 27. Nursery plantcane means of the 2005 "L" assignment series on a Commerce silt loam soil at Sugar Research Station in St. Gabriel, Louisiana in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
LCP85-384	10927 -	46.0 -	237	2.09	44014	11.7
Ho95-988	10786 -	46.8 -	231	2.21	42426	10.5
HoCP96-540	15515	64.1	242	3.03	42199	11.0
L97-128	16336	74.3	219 -	3.16	46736	12.3
L05-441	11827	47.9 -	248	1.96	48551	12.9 +
L05-442	12577	45.3 -	276 +	2.07	43787	11.0
L05-445	10730 -	46.2 -	234	2.36	39249	11.8
L05-447	13356	55.0	243	2.24	48778	13.6 +
L05-448	16889	82.3 +	205 -	3.56	46283	12.0
L05-450	11762	56.7	208 -	2.78	40611	11.5
L05-451	14325	59.7	240	2.91	41064	11.0
L05-453	13173	55.6	237	2.38	46736	12.0
L05-456	10380 -	43.5 -	238	2.05	42426	11.7
L05-457	15657	69.8	224 -	2.78	50366	13.5 +
L05-459	12130	51.6	235	2.07	49913	11.6
L05-460	13143	50.2	261 +	2.06	48778	11.4
L05-466	9831 -	40.4 -	243	2.15	38115	14.3 +
L05-470	8652 -	36.3 -	238	1.80	40611	11.5
L05-474	11816	55.8	212 -	2.64	42426	12.6

Table 28. Infield and nursery third-stubble means of the 2001 "HoCP" and "L" assignment series across locations in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
LCP85-384	5757	28.4	202	1.31	44097	11.5
HoCP85-845	7092	32.2	204	1.54	42740	13.5
HoCP91-555	6383	29.9	206	1.35	44304	12.3
L01-283	9417 +	41.5 +	224	1.48	55269 +	11.4
L01-299	9390 +	42.4 +	215	1.60	53633 +	11.9

Table 29. Infield and nursery second-stubble means of the 2002 "HoCP" and "L" assignment series across locations in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
LCP85-384	7390	31.9	232	1.35	47533	11.5
HoCP91-555	9106	38.6	238	1.51	51622	12.0
HoCP96-540	9143	39.2	236	1.87 +	43700	10.8
HoCP02-623	9009	35.9	250	1.48	48732	12.9

Table 30. Nursery second-stubble means of the 2003 "L" assignment series across locations in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	11771	48.7	234	1.80	53240
HoCP91-555	11776	45.7	254	1.74 -	52408
HoCP96-540	13081	51.9	247	2.12	48854
L03-371	15117	59.7	247	2.24	53467

Table 31. Infield and nursery first-stubble means of the 2003 "HoCP" and "L" assignment series across locations in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
LCP85-384	7434 -	29.2 -	249	1.57 -	36688	11.4
HoCP91-555	8683 -	33.5 -	253	1.61 -	41286	12.1
Ho95-988	10089	39.6	249	1.92	41135	11.3
HoCP96-540	10860	43.4	247	2.10	41080	11.0
L97-128	10111	39.4	254	2.01	38591	12.5
L03-371	10417	39.7	259	2.10	36919	10.2
HoCP03-743	9228	34.7 -	261	1.86 -	37710	10.6

Table 32. Nursery first-stubble means of the 2004 "L" assignment series across locations in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	12918	50.5 -	254	1.84 -	53467
Ho95-988	15931	60.1	264	2.20 -	53769
HoCP96-540	18726	71.6	260	2.79	51047
L97-128	15548	59.5	258	2.56	46207
L04-408	13121	50.4 -	260	1.78 -	56416
L04-425	14697	58.8	248	2.42 -	48551
L04-434	12723	47.9 -	262	2.16 -	43484

Table 33. Infield and nursery plantcane means of the 2004 "HoCP" and "L" assignment series across locations in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
LCP85-384	8301 -	35.4 -	232	1.74 -	40634	11.6
Ho95-988	11769	47.6	247	2.70	36529	11.6
HoCP96-540	11642	48.1	244	2.59	37064	11.5
L97-128	12663	53.1	237	2.75	38780	13.0 +
L04-408	8633 -	35.4 -	243	1.70 -	41791	10.9
L04-425	10354	43.3	240	2.25 -	38495	9.7 -
L04-434	9787	40.7	240	2.29 -	35715	11.3
HoCP04-803	12162	50.4	240	3.07 +	33035	12.6 +
HoCP04-809	10556	41.9	250	1.93 -	43658 +	11.7
HoCP04-810	11532	47.5	242	2.24 -	42802 +	13.9 +
HoCP04-814	12338	52.4	240	2.85	36941	10.5 -
HoCP04-821	10876	43.1	253	1.96 -	44281 +	11.5
HoCP04-824	10363	45.6	222	2.13 -	43405 +	12.9 +
HoCP04-836	10091	42.4	240	2.11 -	41158	8.6 -
HoCP04-838	13600	54.9	246	2.37	46736 +	13.1 +
HoCP04-847	12467	51.9	240	2.94 +	35456	11.4
HoCP04-856	10598	43.6	243	1.96 -	45166 +	12.0

Table 34. Nursery plantcane means of the 2005 "L" assignment series across locations in 2006.

Variety	Sugar per Acre	Cane Yield	Sugar Per Ton	Stalk Weight	Stalk Number	Fiber
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)	(%)
LCP85-384	12161	48.6	251	2.15 -	44694	12.1
Ho95-988	12955	53.5	244	2.36 -	45299	10.6
HoCP96-540	13983	57.3	246	2.82	40459	11.4
L97-128	14675	61.6	242	2.82	43106	12.7 +
L05-441	11309 -	44.8 -	254 +	1.95 -	45904	12.9 +
L05-442	11948	43.5 -	274	2.08 -	41821	11.5
L05-445	11236 -	44.9 -	252	2.24 -	39703	12.3
L05-447	11837	47.8	250	2.03 -	46661 +	13.9 +
L05-448	14871	65.7	231 -	2.99	43484	12.8 +
L05-450	13414	59.7	226 -	2.92	40686	12.6 +
L05-451	13172	52.9	252	2.54	41594	11.1
L05-453	11746	49.1	238	2.25 -	43409	11.9
L05-456	10811 -	44.9 -	243	1.99 -	44468	12.2
L05-457	14722	62.6	237	2.38 -	53013 +	13.8 +
L05-459	12327	51.6	240	2.08 -	49459 +	11.6
L05-460	12489	45.6 -	277 +	1.99 -	45224	11.1
L05-466	11279 -	45.3 -	250	2.20 -	41367	13.8 +
L05-470	9523 -	38.3 -	249	1.82 -	42350	11.8
L05-474	11217 -	51.9	216 -	2.45 -	42426	12.1

2006 LOUISIANA "HoCP" NURSERY & INFIELD VARIETY TRIALS

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Three years after selection from single stools in the seedling stages, experimental varieties advanced for further testing are assigned permanent "HoCP" or "Ho" numbers. These newly assigned varieties are routinely planted in replicated nursery trials at three locations (Ardoyne Farm in Schriever, Iberia Research Station in Jeanerette, and Sugar Research Station in St. Gabriel). During the year after assignment, varieties advanced for further testing are replanted in nursery trials located on three commercial sugarcane farms representing various regions of the sugarcane belt. Two years after assignment, active varieties are replanted in three infield tests (Ardoyne Farm and two additional farms). In addition, two years after assignment, varieties are introduced to outfield locations and primary stations.

USDA nursery test plots are planted during the year of assignment and consist of two replications with sixteen-foot, single-row plots. There is a four-foot alleyway between plots. A minimum of three commercial varieties (LCP 85-384, HoCP 96-540, Ho 95-988, L 97-128 or L 99-226) are planted in each test for comparison purposes. Besides experimental commercial varieties, clones from the USDA Recurrent Selection for Borers (RSB) program are included in nursery trials. Yield data collected on RSB clones give breeders needed agronomic information to aid in deciding what crosses should be made with these borer-resistant clones. The year after assignment, varieties from the USDA program are combined with varieties from the LSU program and planted in nurseries on commercial farms. Plot length in these tests is 20 ft.

Nursery test plots are routinely rated for agronomic traits in the spring and summer each year. Stalk counts of mature, millable stalks are made in July or August. A 10-stalk sample is hand-cut from each plot during the harvest season. Samples from USDA nurseries are taken to the Juice and Milling Quality Laboratory at the USDA Ardoyne Farm, where they are weighed and processed for sucrose analysis. Brix and pol are used to estimate the yield of theoretical recoverable sugar (TRS) per ton of cane. Results from these analyses, combined with mature millable stalk counts and mean stalk weight, are used to calculate yield of sugar per acre, yield of cane per acre, and number of stalks per acre. Varieties with acceptable yields (both tonnage and sugar per ton) and disease and insect resistance are advanced for further testing.

Infield variety tests are planted at three locations (Ardoyne Farm & two commercial farms) two years after assignment. Tests on commercial farms are conducted cooperatively with the LSU AgCenter sugarcane variety program. Infield tests are planted in a randomized complete block design with two replications, and include a minimum of four commercial varieties (LCP 85-384, Ho 95-988, HoCP 96-540, L 97-128, or L 99-226) for use as checks. Plot size in infield tests are two rows wide (twelve feet) by twenty-five feet long. A 10-stalk sample is hand-cut from each plot just prior to harvesting and sent to the sucrose lab at Ardoyne Farm for processing for sucrose and fiber analysis. Plots are weighed with a tractor-pulled weigh-wagon equipped with electronic load cells mounted in the axles and hitch. Plot weights and sucrose analysis are used

to estimate sugar per acre, tons of cane per acre, sugar per ton of cane, mean stalk weight, and number of stalks per acre. An estimate of fiber percentage is also obtained.

Planting and harvest dates of USDA infield and nursery tests can be found in Table 1. Results from infield and nursery trials can be found in Tables 2 to 15. Statistical analyses were conducted for each test and for each series using PROC MIXED procedures in SAS (version 9.1). For purposes of comparison, HoCP 96-540 is highlighted in each table. Yield values which are significantly higher or lower (P=0.05) than values for HoCP 96-540 are noted with a "+" or "-" respectively.

Table 1. 2006 Planting and harvest dates of "HoCP" nursery & infield tests.

					Harvest Dates		
Series	Location[2/]	Soil Texture [3/]	Test type	Planting Date	2004	2005	2006
2002	AFH	Sc	Infield	8/24/04		11/16	10/18
2003	AFL	Csl	Nursery	10/20/03	12/06	11/10	10/17
2003	IRS	Bsc	Nursery	10/21/03	11/19	11/18	11/01
2003	STG	Sc	Nursery	10/17/03	12/13	11/17	11/29
2003	AFH	Sc	Infield	9/14/05			11/07
2004	AFL	Csl	Nursery	10/20/04		11/22	10/26
2004	IRS	Bsc	Nursery	10/27/04		11/28	11/28
2004	STG	Sc	Nursery	10/21/04		12/01	11/29
2004	AFH	Sc	Infield	10/05/06			
2005	AFL	Csl	Nursery	10/26/05			12/01
2005	IRS	Bsc	Nursery	10/28/05			12/08
2005	STG	Sc	Nursery	10/27/05			12/12
2006	AFL	Csl	Nursery	10/25/06			
2006	IRS	Bsc	Nursery	11/01/06			
2006	STG	Sc	Nursery	11/14/06			

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

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

Table 2. Infield first-stubble means of the 2002 "HoCP" assignment series on a Sharkey clay soil at Ardoyne Farm in Schriever, Louisiana in 2006.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
LCP 85-384	8328 +	39.2 +	213	1.72	46346	11.2
HoCP 91-555	6988	31.8	220	1.45 -	44419	11.3
Ho 95-988	9433 +	41.7 +	226	2.13	39306	11.5
HoCP 96-540	7021	33.7	208	1.86	36246	11.0
L 97-128	7947 +	32.1	247 +	1.92	33508	12.1
HoCP 02-623	8139 +	35.5	229 +	1.66	42879	12.4

Table 3. Nursery second-stubble means of the 2003 "HoCP" assignment series on a Commerce silt loam soil at Ardoyne Farm in Schriever, Louisiana in 2006.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
LCP 85-384	13872	59.2	234	1.98	59895 +
HoCP 91-555	16931 +	61.5	275 +	1.87 -	65794+
HoCP 96-540	11947	55.0	217	2.20	50139
HoCP 03-743	14667 +	55.5	264 +	1.92 -	57853 +
US 90-18	7453 -	32.3 -	232	1.81 -	35846 -
US 01-40	9221 -	54.3	170 -	2.37	45829
US 02-98	9775	39.9 -	245	2.10	38115 -

Table 4. Nursery second-stubble means of the 2003 "HoCP" assignment series on a Baldwin silty clay soil at Iberia Research Station in Jeanerette, Louisiana in 2006.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
LCP 85-384	15002	52.9	283	1.87	56719
HoCP 91-555	17042	56.8	300	1.79	63752 +
HoCP 96-540	16512	57.2	288	2.14	53543
HoCP 03-743	18837	62.4	303	2.10	59214
US 90-18	7241 -	27.7 -	262	1.29 -	43106 -
US 01-40	13286	60.9	220 -	2.46	49459
US 02-98	7738 -	29.8 -	258-	1.60 -	37434 -

Table 5. Nursery second-stubble means of the 2003 "HoCP" assignment series on a Sharkey clay soil at Sugar Research Station in St. Gabriel, Louisiana in 2006.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
LCP 85-384	12728	48.0	265 -	1.54	64206
HoCP 91-555	14760	53.9	273	1.78	60349
HoCP 96-540	16310	57.9	282	2.24	51728
HoCP 03-743	20594 +	71.4	289	2.27	63071
US 90-18	12560	47.1	267	1.69	56265
US 01-40	10183 -	53.3	191 -	2.12	50366
US 02-98	9558 -	38.8 -	245 -	2.04	38115

Table 6. Nursery second-stubble means of the 2003 "HoCP" assignment series across locations in 2006.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
LCP 85-384	13867	53.4	261	1.79 -	60273 +
HoCP 91-555	16244	57.4	283	1.81 -	63298 +
HoCP 96-540	14923	56.7	263	2.19	51803
HoCP 03-743	18033	63.1	285	2.10	60046 +
US 90-18	9085 -	35.7 -	253	1.59 -	45073
US 01-40	10897 -	56.2	194 -	2.31	48551
US 02-98	9024 -	36.2 -	250	1.91	37888 -

Table 7. Infield plant-cane means of the 2003 "HoCP" assignment series on a Sharkey clay soil at Ardoyne Farm in Schriever, Louisiana in 2006.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre	Fiber
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)	(%)
LCP 85-384	11866	49.1	242	2.01 -	49133 +	11.0
Ho 95-988	9943	41.1 -	242	2.46	33490	11.1
HoCP 96-540	11084	47.9	231	2.72	35545	10.0
L 97-128	12284	48.0	256 +	2.50	38423	12.8 +
L 03-371	10786	41.6 -	259 +	2.27 -	36711	9.9
HoCP 03-743	9581 -	35.8 -	268 +	2.55	28312	10.6

Table 8. Nursery first-stubble means of the 2004 "HoCP" assignment series on a Commerce silt loam soil at Ardoyne Farm in Schriever, Louisiana in 2006.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
LCP 85-384	13747	55.7	246	2.21 -	50366
HoCP 91-555	15902	61.8	258 +	2.35 -	52635
Ho 95-988	16861	63.6	266 +	2.57	49459
HoCP 96-540	15551	69.0	226	2.95	47190
L 97-128	16431	63.9	257 +	2.64	48551
HoCP 04-803	17812	70.7	252 +	3.06	46283
HoCP 04-809	19389	69.5	279 +	2.48 -	56038
HoCP 04-810	16704	66.4	252 +	2.40 -	55584
HoCP 04-814	16666	67.9	245	3.14	43333
HoCP 04-821	16137	58.2	277 +	1.89 -	61710 +
HoCP 04-824	12906	56.2	228	2.37 -	47417
HoCP 04-836	11771	56.6	210	2.22 -	50820
HoCP 04-838	18968	67.2	282 +	2.34 -	56946 +
HoCP 04-847	17100	65.4	262 +	2.71	48324
HoCP 04-856	16304	59.3	275 +	2.08 -	57173 +

Table 9. Nursery first-stubble means of the 2004 "HoCP" assignment series on a Baldwin silty clay soil at Iberia Research Station in Jeanerette, Louisiana in 2006.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
LCP 85-384	13648	48.0	281	1.84 -	51274
HoCP 91-555	16902	57.8	292	1.93 -	60122 +
Ho 95-988	21183 +	71.4	297	2.52	56492 +
HoCP 96-540	15820	56.0	283	2.61	42879
L 97-128	17387	64.2	271	2.80	45602
HoCP 04-803	11536	41.1	280	2.47	33351
HoCP 04-809	12827	45.1	284	1.78 -	51274
HoCP 04-810	19803	68.2	290	2.39	57173 +
HoCP 04-814	16762	59.5	281	2.82	42199
HoCP 04-821	16616	56.4	295	2.13 -	52862
HoCP 04-824	13544	50.7	267 -	1.99 -	51047
HoCP 04-836	13447	50.2	268	2.22	45148
HoCP 04-838	15713	55.1	284	2.20	50593
HoCP 04-847	12842	46.9	274	2.46	38342
HoCP 04-856	13474	46.9	287	1.74 -	53996
US 04-9601	10028 -	45.4	221 -	1.91 -	47644
US 04-9602	12304	49.6	250 -	2.12 -	46509
US 04-9603	14451	56.4	256 -	1.95 -	57853 +

Table 10. Nursery first-stubble means of the 2004 "HoCP" assignment series on a Sharkey clay soil at Sugar Research Station in St. Gabriel, Louisiana in 2006.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
LCP 85-384	14539	52.1	279	2.06 -	50820
HoCP 91-555	15064	54.6	276	1.98 -	55358
Ho 95-988	11438	41.3	277	2.01 -	41291
HoCP 96-540	18526	66.3	278	2.51	52862
L 97-128	15439	55.3	279	2.52	44014
HoCP 04-803	14047	53.1	263	2.69	39249
HoCP 04-809	14758	50.0	295 +	1.68 -	59441
HoCP 04-810	14263	51.4	276	1.88 -	53316
HoCP 04-814	14805	52.5	281	2.36	44921
HoCP 04-821	12014	42.0	278	1.83 -	44241
HoCP 04-824	11503	45.9	251 -	1.98 -	46736
HoCP 04-836	10703	38.9	275	2.02 -	39023
HoCP 04-838	15509	53.1	291	2.05 -	50820
HoCP 04-847	13768	48.8	282	2.21	44241
HoCP 04-856	13294	47.7	279	1.69 -	56492
US 04-9601	12528	62.0	202 -	1.99 -	62391
US 04-9602	16015	64.7	248 -	2.32	55811
US 04-9603	16685	67.5	248 -	2.12 -	63752

Table 11. Nursery first-stubble means of the 2004 "HoCP" assignment series across locations in 2006.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
LCP 85-384	13978	51.9	269	2.04 -	50820
HoCP 91-555	15956	58.1	276	2.08 -	56038 +
Ho 95-988	16494	58.8	280 +	2.37 -	49081
HoCP 96-540	16632	63.8	262	2.69	47644
L 97-128	16419	61.2	269	2.65	46056
HoCP 04-803	14465	55.0	265	2.74	39628
HoCP 04-809	15658	54.9	286 +	1.98 -	55584
HoCP 04-810	16923	62.0	273	2.22 -	55358
HoCP 04-814	16078	60.0	269	2.77	43484
HoCP 04-821	14922	52.2	284 +	1.95 -	52938
HoCP 04-824	12651	50.9	249	2.11 -	48400
HoCP 04-836	11974	48.6	251	2.15 -	44997
HoCP 04-838	16730	58.5	286 +	2.20 -	52786
HoCP 04-847	14570	53.7	272	2.46	43636
HoCP 04-856	14357	51.3	280 +	1.83 -	55887 +
US 04-9601	11278	53.7	211 -	1.95 -	55017
US 04-9602	14160	57.2	249 -	2.22 -	51160
US 04-9603	15568	62.0	252	2.03 -	60803 +

Table 12. Nursery plantcane means of the 2005 "HoCP" assignment series on a Commerce silt loam soil at Ardoyne Farm in Schriever, Louisiana in 2006.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
LCP 85-384	12610	50.2	249	2.47	40611
Ho 95-988	18975	66.6	285	3.25	41064
HoCP 96-540	14193	53.0	266	2.75	38342
L 97-128	17988	63.4	284	3.08	41064
HoCP 05-902	17469	71.4 +	246	3.31	44468
HoCP 05-903	18372	70.4	261	3.26	43333
HoCP 05-904	21913 +	82.2 +	266	3.50 +	46963
HoCP 05-905	15050	61.5	247	2.38	51728 +
HoCP 05-906	15767	62.3	253	2.45	51274 +
HoCP 05-909	16857	65.4	258	2.47	53316 +
HoCP 05-911	17268	69.5	247	3.07	45375
HoCP 05-912	14176	59.8	236	2.85	41745
HoCP 05-915	11876	60.7	198 -	2.65	45829
HoCP 05-917	13822	50.7	273	2.45	41518
HoCP 05-918	15563	63.6	242	2.73	46963
HoCP 05-919	11232	49.1	228	2.46	39930
HoCP 05-920	16291	61.7	262	2.40	51728 +
HoCP 05-922	15988	63.6	251	2.87	44241
HoCP 05-923	18883	69.9	269	3.10	44921
HoCP 05-927	16948	65.2	260	2.74	47871
HoCP 05-930	16733	65.4	256	2.82	46509
HoCP 05-931	19165	70.0	272	2.88	48778 +
HoCP 05-933	10238	42.7	240	1.83 -	46736
HoCP 05-935	9899	43.6	229	1.92 -	45602
HoCP 05-936	12924	67.5	189 -	2.62	51501 +
HoCP 05-937	19399	70.2	276	2.55	55131 +
HoCP 05-939	14978	59.7	250	2.92	41291
HoCP 05-948	18320	73.6 +	248	3.40	43333
HoCP 05-953	17361	65.5	265	2.29	57626 +
HoCP 05-957	14204	51.0	279	2.44	41972
HoCP 05-958	12363	54.5	229	2.69	40384
HoCP 05-961	19424	69.6	279	2.91	47871
US 05-9300	15795	64.0	245	2.20	57853 +
US 05-9604	11029	53.2	207 -	1.89 -	56492 +
US 05-9605	9989	50.4	199 -	2.57	39249
US 05-9606	11968	58.7	204 -	1.63 -	72373 +

Table 13. Nursery plantcane means of the 2005 "HoCP" assignment series on a Baldwin silty clay soil at Iberia Research Station in Jeanerette, Louisiana in 2006.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
LCP 85-384	8716 -	33.4 -	261	1.79 -	37434
Ho 95-988	14872	54.5	273	2.24	48551 +
HoCP 96-540	12280	44.9	274	2.46	36754
L 97-128	11849	44.1	268	2.26	39023
HoCP 05-902	12707	51.4	249 -	1.99 -	51501 +
HoCP 05-903	13682	49.3	278	2.54	38796
HoCP 05-904	14381	53.4	269	2.56	41972
HoCP 05-905	8063 -	30.2 -	267	1.69 -	35619
HoCP 05-906	9584	40.6	236 -	1.90 -	42879
HoCP 05-909	10848	40.5	268	1.89 -	42879
HoCP 05-911	12209	48.7	250 -	2.48	39249
HoCP 05-912	12576	48.5	259	2.48	39249
HoCP 05-915	14555	52.2	279	2.51	41972
HoCP 05-917	8005 -	29.4 -	269	2.04	28813 -
HoCP 05-918	13945	50.9	274	2.32	44014
HoCP 05-919	11727	46.5	250 -	2.55	36300
HoCP 05-920	13993	53.2	264	2.32	45829 +
HoCP 05-922	11060	43.1	257	2.33	36981
HoCP 05-923	11594	45.4	255	2.35	39023
HoCP 05-927	11255	44.4	255	2.00	44241
HoCP 05-930	9970	38.2	262	2.00	38115
HoCP 05-931	10104	37.1	273	2.27	32670
HoCP 05-933	11964	42.0	285	2.04	41291
HoCP 05-935	11732	43.9	267	1.72 -	51274 +
HoCP 05-936	5995 -	25.7 -	230 -	2.02	24276 -
HoCP 05-937	12876	47.5	272	2.16	44014
HoCP 05-939	10082	40.4	249 -	2.10	38342
HoCP 05-948	11879	45.5	262	2.38	38342
HoCP 05-953	13452	49.2	274	1.90 -	52181 +
HoCP 05-957	10766	39.1	275	1.99 -	39249
HoCP 05-958	13265	49.9	266	2.46	41064
HoCP 05-961	13594	49.3	276	2.22	44468 +
US 05-9300	10538	40.1	263	1.78 -	44921 +
US 05-9604	9966	38.8	256	1.49 -	51954 +
US 05-9605	8709 -	37.5	233 -	2.21	34031
US 05-9606	7303 -	32.0 -	229 -	1.12 -	57173 +

Table 14. Nursery plantcane means of the 2005 "HoCP" assignment series on a Sharkey clay soil at Sugar Research Station in St. Gabriel, Louisiana in 2006.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
LCP 85-384	12819	51.6	248	2.05	50366 +
Ho 95-988	10368	45.2	231	2.29	39476
HoCP 96-540	11718	48.5	242	2.33	41518
L 97-128	14379	60.5	237	2.64	45602
HoCP 05-902	11028	57.0	197 -	2.08	54450 +
HoCP 05-903	12940	55.5	233	2.66	41745
HoCP 05-904	11412	53.2	214 -	2.45	43787
HoCP 05-905	12148	51.3	237	2.02	50820 +
HoCP 05-906	10620	55.5	191 -	2.01	55358 +
HoCP 05-909	7961	38.5	207 -	1.80	42879
HoCP 05-911	12525	58.0	216	2.67	43560
HoCP 05-912	10895	54.0	203 -	2.55	42199
HoCP 05-915	9813	43.7	224	2.04	42879
HoCP 05-917	10132	41.8	243	1.88	44241
HoCP 05-918	9639	43.4	222	2.00	43333
HoCP 05-919	10471	49.5	211 -	2.20	45148
HoCP 05-920	10613	47.4	224	2.40	39249
HoCP 05-922	11122	48.8	227	2.56	38115
HoCP 05-923	12641	55.5	228	2.52	44241
HoCP 05-927	12131	53.5	225	2.17	49005 +
HoCP 05-930	6183 -	28.0	219	1.32 -	42426
HoCP 05-931	11727	48.1	244	2.07	46509
HoCP 05-933	11858	52.1	228	2.24	46509
HoCP 05-935	6720 -	36.9	178 -	1.71	43333
HoCP 05-936	10787	50.2	216 -	2.25	44694
HoCP 05-937	12979	57.1	227	2.53	45148
HoCP 05-939	13059	59.5	219	2.28	52181 +
HoCP 05-948	12598	57.3	220	2.57	44694
HoCP 05-953	12606	59.3	213 -	1.89	62618 +
HoCP 05-957	9633	43.6	221	2.28	38569
HoCP 05-958	10629	50.0	215 -	2.40	41518
HoCP 05-961	15105	60.2	251	2.45	49232 +
US 05-9300	8072	44.9	181 -	1.88	47644
US 05-9604	7091 -	41.3	171 -	1.52 -	54223 +
US 05-9605	7680 -	42.1	182 -	2.16	39476
US 05-9606	7949	48.4	164 -	1.38 -	70331 +

Table 15. Nursery plantcane means of the 2005 "HoCP" assignment series across locations in 2006.

Variety	Sugar/ acre	Tons/ acre	Sugar/ ton	Weight/ stalk	Stalks/ acre
	(lbs.)	(tons)	(lbs.)	(lbs.)	(no.)
LCP 85-384	11382	45.1	253	2.10	42804
Ho 95-988	14739	55.4	263	2.59	43031
HoCP 96-540	12730	48.8	261	2.51	38871
L 97-128	14739	56.0	263	2.66	41896
HoCP 05-902	13735	59.9 +	230 -	2.46	50139 +
HoCP 05-903	14998	58.4	257	2.82	41291
HoCP 05-904	15902	63.0 +	250	2.84	44241
HoCP 05-905	11754	47.7	250	2.03	46056
HoCP 05-906	11990	52.8	227 -	2.12	49837 +
HoCP 05-909	11889	48.1	244	2.05	46358 +
HoCP 05-911	14001	58.8	238	2.74	42728
HoCP 05-912	12549	54.1	232 -	2.62	41064
HoCP 05-915	12081	52.2	234 -	2.40	43560
HoCP 05-917	10653	40.6	262	2.12	38191
HoCP 05-918	13049	52.6	246	2.35	44770
HoCP 05-919	11144	48.4	230 -	2.40	40459
HoCP 05-920	13632	54.1	250	2.37	45602
HoCP 05-922	12723	51.8	245	2.59	39779
HoCP 05-923	14373	56.9	251	2.65	42728
HoCP 05-927	13445	54.3	247	2.30	47039 +
HoCP 05-930	10962	43.9	245	2.05	42350
HoCP 05-931	13666	51.7	263	2.41	42653
HoCP 05-933	11354	45.6	251	2.04	44846
HoCP 05-935	9450 -	41.5	225 -	1.78	46736 +
HoCP 05-936	9902	47.8	211 -	2.29	40157
HoCP 05-937	15084	58.2	258	2.41	48098 +
HoCP 05-939	12706	53.2	239	2.43	43938
HoCP 05-948	14266	58.8	243	2.78	42123
HoCP 05-953	14473	58.0	251	2.02	57475 +
HoCP 05-957	11534	44.6	259	2.24	39930
HoCP 05-958	12086	51.5	236 -	2.52	40989
HoCP 05-961	16041 +	59.7 +	269	2.53	47190 +
US 05-9300	11468	49.6	230 -	1.95	50139 +
US 05-9604	9362 -	44.4	211 -	1.63	54223 +
US 05-9605	8793 -	43.4	205 -	2.31	37586
US 05-9606	9073 -	46.3	199 -	1.37	66626 +

2006 LOUISIANA SUGARCANE VARIETY DEVELOPMENT PROGRAM OUTFIELD VARIETY TRIALS

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The outfield variety trials are the final stage of testing experimental varieties for their potential commercial production in Louisiana. Results from these trials are used in both variety advancement and crossing decisions. The outfield variety trials are cooperatively conducted at 10 commercial 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 2006 outfield tests. Included are multi-year yield analyses for appropriate test varieties (tables 3-33).

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. To reflect industry practices, all locations were harvested with a combine harvester. Each plot was weighed with a weigh wagon fitted with load cells mounted on each axle and hitch. A 15-stalk, whole-stalk sample, not stripped of leaves, was taken from each plot and sent to the USDA-ARS sucrose laboratory. Samples were hand cut for all tests. The samples were weighed, milled, and the juice analyzed for Brix and pol. Pounds of theoretical recoverable sugar per ton of cane are 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.

LCP85-384 has been the leading variety in Louisiana since 1998 with 73% of the sugarcane acreage in 2006 grown to this variety. The second leading variety grown in Louisiana in 2006 was HoCP96-540. It comprised 35% of the sugarcane planted in 2006, which is the largest increase for any of the new varieties. Accordingly for comparison, HoCP96-540 is now

used as the check variety in all comparisons and is highlighted in the tables. To adjust for missing data, the SAS analysis calculated least square means (v 9.0, Proc Mixed). Mean separation used least square mean probability differences (P=0.05). Varieties that are significantly higher or lower than HoCP96-540 are denoted by a plus (+) or minus (-), respectively, next to the value for each trait.

Twelve experimental varieties representing the 2004 assignment series were introduced to outfield locations for seed increase in 2006 (Table 1). Seven experimental and six commercial varieties were planted at nine outfield locations. Three new locations were added to the outfield testing stage in 2006. Only seed increases of both commercial and experimental varieties were planted at these locations. Twenty-one tests were harvested in 2006 including seven plantcane, six first-stubble, five second-stubble, and three third-stubble crops (Table 2).

Variety yields are reported by crop and trait with overall means and individual location data in the same table (Table 3-22) and in summary tables by crop (Tables 23-26). Tables 27-33 provide combined analysis of plantcane, first-stubble, second-stubble, and third-stubble crops averaged over several years that is used to evaluate commercial and experimental varieties.

Better growing conditions were experienced in 2006, although the northern and western areas of the sugar belt experienced drought during the summer growing season. In contrast to 2005, tropical storm activity was minimal in 2006. The weather during planting was near optimal with good conditions experienced at all sites. The harvest of 2006 was marked by higher than average rainfall. Some outfield test sites were not harvested due to extended wet conditions.

L99-226 and L99-233 continued to perform well in outfield testing in 2006 based on plantcane, first-stubble, second-stubble, and third-stubble data. On April 25, 2006, L99-226 and L99-233 were released to growers. Seed was made available by the American Sugar Cane League from the secondary seed increase stations.

HoCP00-950 was included in plantcane, first stubble, and second stubble tests in 2006 and produced high levels of sugar per acre and sugar per ton of cane in each crop. Seed of HoCP00-950 was expanded again on secondary increase stations in 2006. This variety will be eligible for release in 2007.

Two experimental varieties of the 2001 assignment series were tested in the plantcane trials: L01-283 and L01-299. Each of these varieties performed well in the plantcane and first-stubble outfield tests. L01-283 was sent from the primary seed increase stations to the secondary seed increase stations. L01-299 was replanted on the primary seed increase stations. L01-283 and L01-299 will be eligible for release in 2008 and 2009, respectively.

HoCP02-623 was harvested in plantcane tests in 2006. The variety produced significantly less sugar per acre and cane yield than HoCP96-540.

CP89-2143 is a commercial variety from Florida. The variety is being made available by the Kleentek Co. and many growers have planted the variety on sandy ridges and have harvested

it late so as to allow for sufficient maturity. Many growers have been well pleased with CP89-2143 managed under these conditions. In the outfield trials, CP89-2143 had significantly lower sugar per acre, cane yield, and sugar per ton of cane than HoCP96-540.

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 2006.

Commercial Varieties		Experimental Varieties		Experimental Varieties Introduced to the Outfield		
LCP85-384	L97-128	HoCP00-950	CP89-2143	L04-408	HoCP04-809	HoCP04-824
Ho95-988	L99-226	L01-283	L03-371	L04-425	HoCP04-810	HoCP04-838
HoCP96-540	L99-233	L01-299	HoCP03-743	L04-434	HoCP04-814	HoCP04-847
		HoCP02-623		HoCP04-803	HoCP04-821	HoCP04-856

Table 2. Harvest and planting dates for all outfield locations harvested in 2006.

Location	Parish		Plantcane		First-stubble		Second-stubble		Third-stubble	
		2006 Planting Date	2006 Harvest Date	2005 Planting Date	2006 Harvest Date	2004 Planting Date	2006 Harvest Date	2003 Planting Date	2006 Harvest Date	2002 Planting Date
A. Landry	Iberville	09/07	***	09/15	***	09/09	***	09/17	***	****
Allains	St. Mary	10/04	11/27	09/21	11/27	09/01	***	09/12**		****
Alma	Pointe-Coupee	09/21	12/07	09/16	***	09/20	***	09/11	***	09/04
Bon Secour	St. James	09/26	12/06	09/08	***	09/08	11/14	09/05	11/14	09/03
Brunswick*	Pointe-Coupee	08/31**								
F. Martin*	St. Mary	10/03**								
Glenwood	Assumption	08/16	12/18	09/13	12/18	09/10	11/09	08/27	11/08	08/29
Lanaux	St. John	08/29	11/28	09/14	11/22	08/25	11/01	09/03	11/01	09/11
Levert-St. John	St. Martin	08/30	***	09/09	11/06	08/26	11/06	08/26	***	09/11
Magnolia	Terrebonne	10/10	11/21	10/06	11/21	09/10	***	10/09	***	08/16
Mary*	Lafourche	09/27**								
R. Hebert	Iberia	09/12	12/14	09/12	11/29	09/13	10/30	09/12	***	09/18

* New location; **Introductions only; *** No test harvested at this location; **** No test planted.

Table 3. Plantcane sugar per acre for six commercial and five experimental varieties at seven outfield locations in 2006.

	Heavy				Light			
Variety	Allains	Magnolia	Alma	Bon Secour	Glenwood	Lanaux	R. Hebert	Mean
				(lbs/A)				
CP85-384	8659	9493	4621 -	7712 -	9803 -	8862	7697	8121 -
CP89-2143	8697	8482	7028 -	9674 -	9529 -	8855	7656	8560 -
Ho95-988	8887	10155	7624	11503	11325	10286	8884	9809
HoCP96-540	11241	10390	8475	11860	11774	12194	7978	10559
L97-128	9688	8845	7880	11287	11209	11468	9685	10009
L99-226	10969	11162	9249	13455	11942	11481	9776	11148
L99-233	10526	11970	6504 -	10946	11280	11325	9827	10340
HoCP00-950	9572	9280	9366	14279 +	12603	11686	8579	10767
L01-283	8866	9112	8092	12846	11543	9974	9384	9974
L01-299	9975	9805	8226	11800	12475	10109	8447	10119
HoCP02-623	8445	10597	7846	11031	10445	9716	9391	9639 -

Table 4. Plantcane cane yield for six commercial and five experimental varieties at seven outfield locations in 2006.

	Heavy				Light			
Variety	Allains	Magnolia	Alma	Bon Secour	Glenwood	Lanaux	R. Hebert	Mean
				(tons/A)				
LCP85-384	31.7	34.8	18.2 -	29.3 -	33.2	34.2	29.9	30.2 -
CP89-2143	34.5	31.3	27.7 -	44.1	37.1	33.6	31.7	34.3 -
Ho95-988	33.5	37.1	29.3	41.9	39.5	39.7	35.7	36.7
HoCP96-540	42.2	33.8	32.3	45.0	40.0	45.7	32.5	38.8
L97-128	37.1	34.5	33.6	43.9	38.0	44.4	38.0 +	38.5
L99-226	40.3	38.2	32.4	44.9	38.5	40.5	37.9 +	39.0
L99-233	38.8	39.9	28.7 -	41.7	40.8	43.1	39.4 +	38.9
HoCP00-950	31.1	34.4	33.6	49.0	41.5	39.0	30.2	37.0
L01-283	30.8	36.5	30.5	46.7	40.9	35.4	36.4	36.7
L01-299	36.2	34.4	32.6	43.7	40.2	37.7	31.2	36.6
HoCP02-623	30.6	34.7	31.6	40.0 -	35.5	38.5	37.0	35.4 -

Table 5. Plantcane sugar per ton for six commercial and five experimental varieties at seven outfield locations in 2006.

	Heavy				Light			
Variety	Allains	Magnolia	Alma	Bon Secour	Glenwood	Lanaux	R. Hebert	Mean
				(lbs/tons)				
LCP85-384	274	275	255	263	296	259	257	268
CP89-2143	251	272	254	219 -	257 -	264	242	251 -
Ho95-988	266	274	260	274	285	259	249	267
HoCP96-540	268	307	262	264	295	269	245	273
L97-128	262	256	235 -	258	295	261	255	260
L99-226	274	292	285	300 +	310	282	258	286
L99-233	271	300	225 -	263	277	262	249	264
HoCP00-950	308 +	269	278	291	304	300	284	291 +
L01-283	288 +	250	266	275	282	280	257	271
L01-299	276	284	252	270	310	268	270	276
HoCP02-623	276	305	249	276	298	254	253	273

Table 6. Plantcane stalk weight for six commercial and five experimental varieties at seven outfield locations in 2006.

	Heavy				Light			
Variety	Allains	Magnolia	Alma	Bon Secour	Glenwood	Lanaux	R. Hebert	Mean
				(lbs)				
LCP85-384	1.87	1.97	1.63 -	1.83-	1.85-	1.97-	2.40-	1.93-
CP89-2143	2.70+	1.93	2.47	2.67	2.07	3.13+	2.63-	2.51
Ho95-988	1.83	1.83	2.20	3.07	1.98	2.50	2.63-	2.29
HoCP96-540	2.17	2.07	2.33	2.83	2.27	2.67	3.13	2.50
L97-128	2.13	1.70	2.47	2.77	2.72+	2.73	2.77	2.47
L99-226	2.17	2.00	2.97 +	3.37	2.42	2.90	3.07	2.70
L99-233	2.00	2.10	1.77 -	1.73-	1.64-	2.03-	2.23-	1.93-
HoCP00-950	1.73 -	1.83	2.43	2.40	1.93	2.53	2.37-	2.18-
L01-283	1.70 -	1.70	2.00	2.23-	2.03	2.30	2.63-	2.09-
L01-299	2.20	2.00	1.93	2.60	2.10	2.23	2.67	2.25
HoCP02-623	1.83	2.10	1.90 -	2.30	1.98	1.97-	2.33-	2.06-

Table 7. Plantcane stalk number for six commercial and five experimental varieties at seven outfield locations in 2006.

	Heavy				Light			
Variety	Allains	Magnolia	Alma	Bon Secour	Glenwood	Lanaux	R. Hebert	Mean
				(stalks/A)				
LCP85-384	34583	35772	22360-	32110	35678	34976	25251	31533
CP89-2143	25558	32806	22584-	34238	37039	21537-	24964	28389
Ho95-988	36409	40511	26622	27334	40173	32030	27246+	32904
HoCP96-540	39184	33596	27688	32110	35787	35242	20883	32070
L97-128	34905	41124	27256	32158	28182-	32472	27537+	31948
L99-226	36800	39866	22049-	26804	32200	27874	24950	30077
L99-233	38816	38317	33569+	49306+	50203+	42014	35291+	41074+
HoCP00-950	36345	37904	27725	40873	43283+	31110	25569	34687
L01-283	36659	43316	30793	43045+	40594	30526	27794+	36104
L01-299	33239	34576	33848+	33909	38445	33899	23516	33062
HoCP02-623	33347	34285	33238+	36153	36749	39134	31676+	34933

Table 8. First-stubble sugar per acre for seven commercial and three experimental varieties at six outfield locations in 2006.

	Heavy		Light				
Variety	Allains	Magnolia	Glenwood	Lanaux	R. Hebert	St. John	Mean
			(lbs/A)				
LCP85-384	8312	5614 -	6311	10751	7415 -	5885	7381 -
HoCP91-555	8578	5405 -	7365	10098	10589	6520	8092
Ho95-988	8605	6657	8473	10093	10745	7429	8667
HoCP96-540	8977	7165	7775	9984	11732	6693	8721
L97-128	8399	5262 -	7567	10686	9723 -	7855 +	8249
L99-226	10943+	9181 +	9913 +	11598	12317	8314 +	10378+
L99-233	8485	7332	7409	11573	10924	6800	8754
HoCP00-950	8365	5814	8586	9922	11202	8585 +	8746
L01-283	8515	7013	10827+	12817	13584+	8489 +	10207+
L01-299	9323	5797	10953+	11877	13718+	8626 +	10049+

Table 9. First-stubble cane yield for seven commercial and three experimental varieties at six outfield locations in 2006.

	Heavy		Light				
Variety	Allains	Magnolia	Glenwood	Lanaux	R. Hebert	St. John	Mean
			(tons/A)				
LCP85-384	30.1	19.8	24.6	37.5	27.1-	24.2	27.2-
HoCP91-555	30.4	18.5-	28.1	36.2	37.9-	24.8	29.3
Ho95-988	31.3	24.5	33.4+	35.1	38.5	28.2	31.8
HoCP96-540	33.0	23.3	27.5	35.0	44.8	26.6	31.7
L97-128	28.7	20.5	28.5	38.8	35.9-	29.2	30.3
L99-226	37.3	28.9+	32.4+	37.7	41.1	30.0	34.6
L99-233	31.2	25.3	29.2	43.2	37.8-	26.7	32.2
HoCP00-950	28.1-	19.5	31.8	32.0	38.0-	30.5+	30.0
L01-283	28.6	24.4	37.3+	44.7	47.2	32.0+	35.7+
L01-299	34.9	23.7	41.6+	42.6	48.2	34.4+	37.6+

Table 10. First-stubble sugar per ton for seven commercial and three experimental varieties at six outfield locations in 2006.

	Heavy		Light				
Variety	Allains	Magnolia	Glenwood	Lanaux	R. Hebert	St. John	Mean
			(lbs/ton)				
LCP85-384	276	283	256 -	286	273 +	243	270
HoCP91-555	282	292	261	279	280 +	263	276
Ho95-988	275	272	254 -	287	279 +	264	272
HoCP96-540	272	305	282	285	262	252	276
L97-128	293 +	258 -	266	276	272	269	272
L99-226	293 +	317	305	307 +	299 +	277 +	300 +
L99-233	271	291	253 -	268 -	289 +	255	271
HoCP00-950	298 +	297	269	310 +	295 +	281 +	291 +
L01-283	298 +	289	290	287	288 +	265	286
L01-299	267	244 -	263	279	285 +	251	265

Table 11. First-stubble stalk weight for seven commercial and three experimental varieties at six outfield locations in 2006.

	Heavy		Light				
Variety	Allains	Magnolia	Glenwood	Lanaux	R. Hebert	St. John	Mean
			(lbs)				
LCP85-384	1.83	1.53-	1.57	1.77-	2.13-	1.53-	1.73-
HoCP91-555	1.87	1.73-	1.67	1.97	2.07-	1.60-	1.82-
Ho95-988	2.10	1.80-	2.27	2.40	2.47-	1.97	2.17
HoCP96-540	2.07	2.10	1.90	2.30	2.90	1.97	2.21
L97-128	2.03	1.77-	2.57+	2.60	2.57	2.03	2.26
L99-226	2.47+	2.60+	2.30+	2.80+	3.00	2.33+	2.58+
L99-233	2.07	1.83	1.70	1.70-	1.87-	1.47-	1.77-
HoCP00-950	1.70-	1.83	1.70	2.07	2.20-	1.97	1.91-
L01-283	1.80	1.97	1.93	2.13	2.33-	1.63-	1.97-
L01-299	1.87	1.97	1.87	1.77-	2.10-	1.90	1.91-

Table 12. First-stubble stalk number for seven commercial and three experimental varieties at six outfield locations in 2006.

	Heavy		Light				
Variety	Allains	Magnolia	Glenwood	Lanaux	R. Hebert	St. John	Mean
			(stalks/A)				
LCP85-384	33137	25908	31402	42618+	25781	31460	31717
HoCP91-555	33331	21356	34040	37479	36476+	31065	32291
Ho95-988	29793	27266	29759	29963	31189	28729	29450
HoCP96-540	31981	22495	30039	30612	30762	27100	28831
L97-128	28317	23621	22206	29927	28268	29084	26904
L99-226	30559	22258	28201	27059	27531	25941	26925
L99-233	30266	27906	34817	51537+	41120+	37020+	37111+
HoCP00-950	33467	21142	37386	31207	35000	31043	31541
L01-283	31738	24826	39505+	41871+	40528+	39268+	36289+
L01-299	37527	24284	44710+	48427+	45919+	36276+	39524+

Table 13. Second-stubble sugar per acre for six commercial and one experimental variety at five outfield locations in 2006.

	Light					
Variety	Bon Secour	Glenwood	Lanaux	R. Hebert	St. John	Mean
			(lbs/A)			
LCP85-384	6671 -	8079 -	7581 +	8599	6213 -	7429-
HoCP91-555	8634	8690 -	6983	8460	7433	8040
HoCP96-540	10170	11309	6221	9303	8368	9074
L97-128	9122	10049	10180+	8491	7912	9151
L99-226	9576	10694	9639 +	8763	8414	9417
L99-233	8861	9173 -	9480 +	10389	7303 -	9041
HoCP00-950	10287	10182	9522 +	9734	10067+	9959

Table 14. Second-stubble cane yield for six commercial and one experimental variety at five outfield locations in 2006.

	Light					
Variety	Bon Secour	Glenwood	Lanaux	R. Hebert	St. John	Mean
			(tons/A)			
LCP85-384	30.0	26.4-	30.2+	30.8	24.3-	28.3
HoCP91-555	33.7	28.8-	25.7	34.6	29.1	30.4
HoCP96-540	39.2	36.0	25.5	34.1	30.4	33.0
L97-128	34.1	33.0	36.8+	28.7	29.1	32.3
L99-226	33.0	31.2	31.7+	33.7	29.7	31.9
L99-233	33.8	30.4-	35.5+	36.0	28.0	32.7
HoCP00-950	35.6	32.4	32.8+	35.5	33.3	33.9

Table 15. Second-stubble sugar per ton for six commercial and one experimental variety at five outfield locations in 2006.

			Light			
Variety	Bon Secour	Glenwood	Lanaux	R. Hebert	St. John	Mean
			(lbs/ton)			
LCP85-384	221 -	306	251	279	256 -	263
HoCP91-555	256	302	272 +	245	256 -	266
HoCP96-540	259	314	244	272	276	273
L97-128	268	305	277 +	296	272	284
L99-226	291 +	342 +	304 +	263	284	297 +
L99-233	262	302	268 +	289	261	276
HoCP00-950	289	315	290 +	273	302 +	294 +

Table 16. Second-stubble stalk weight for six commercial and one experimental variety at five outfield locations in 2006.

			Light			
Variety	Bon Secour	Glenwood	Lanaux	R. Hebert	St. John	Mean
			(lbs)			
LCP85-384	1.78-	1.49	1.71	1.53	1.70	1.64 -
HoCP91-555	1.53-	1.56	1.84	1.60	1.80	1.67 -
HoCP96-540	2.41	1.83	2.07	2.03	1.97	2.06
L97-128	2.30	1.86	2.24	1.97	2.30+	2.13
L99-226	2.30	2.07	2.29	1.60	2.50+	2.15
L99-233	1.71-	1.52	1.87	1.83	1.83	1.75 -
HoCP00-950	2.06	1.73	2.11	1.87	1.90	1.93

Table 17. Second-stubble stalk number for six commercial and one experimental variety at five outfield locations in 2006.

	Light					
Variety	Bon Secour	Glenwood	Lanaux	R. Hebert	St. John	Mean
			(stalks/A)			
LCP85-384	33887	35473	36647	45073	28688	35954
HoCP91-555	45468+	37060	28632	43308	32597	37413
HoCP96-540	32927	39822	24842	35432	31153	32835
L97-128	29574	35484	33070	29150	25302	30516
L99-226	28588	30745	29077	44138	23775-	31265
L99-233	40269	40106	38311	39711	30553	37790
HoCP00-950	34951	38646	31774	38730	35553	35931

Table 18. Third-stubble sugar per acre for seven commercial varieties at three outfield locations in 2006.

	Light			
Variety	Bon Secour	Glenwood	Lanaux	Mean
		(tons/A)		
LCP85-384	7471	7393	8419	7761
HoCP85-845	8449	10333	7113	8632
HoCP91-555	7924	8245	7926	8031
HoCP96-540	9286	8093	8013	8464
L97-128	9178	9676	10108	9654
L99-226	8903	8434	8888	8741
L99-233	10221	8682	9997	9634

Table 19. Third-stubble cane yield for seven commercial varieties at three outfield locations in 2006.

	Light			
Variety	Bon Secour	Glenwood	Lanaux	Mean
		(tons/A)		
LCP85-384	30.6-	30.2	32.4	31.1
HoCP85-845	33.2-	40.0	29.6	34.3
HoCP91-555	29.1-	32.1	29.6	30.3
HoCP96-540	37.8	32.1	33.0	34.3
L97-128	35.2	40.0	38.3	37.8
L99-226	32.8-	30.8	30.9	31.5
L99-233	38.5	37.4	38.5	38.2

Table 20. Third-stubble sugar per ton for seven commercial varieties at three outfield locations in 2006.

	Light			
Variety	Bon Secour	Glenwood	Lanaux	Mean
		(tons/A)		
LCP85-384	244	245	260	249
HoCP85-845	254	255	241	250
HoCP91-555	271	257	267	265 +
HoCP96-540	246	252	241	247
L97-128	261	242	264	256
L99-226	271	272	288+	277 +
L99-233	265	233	260	253

Table 21. Third-stubble stalk weight for seven commercial varieties at three outfield locations in 2006.

	Light			
Variety	Bon Secour	Glenwood	Lanaux	Mean
		(tons/A)		
LCP85-384	1.63-	1.50-	1.53-	1.55-
HoCP85-845	2.36	1.80-	1.52-	1.89-
HoCP91-555	1.65	1.77-	1.75-	1.72-
HoCP96-540	2.18	2.27	2.33	2.26
L97-128	2.59	2.19	2.10	2.29
L99-226	2.45	2.31	2.43	2.39
L99-233	1.89	1.48-	1.92-	1.76-

Table 22. Third-stubble stalk number for seven commercial varieties at three outfield locations in 2006.

	Light			
Variety	Bon Secour	Glenwood	Lanaux	Mean
		(tons/A)		
LCP85-384	37615	40616	42573	40268+
HoCP85-845	29261	44546	39231	37679
HoCP91-555	35993	36395	34421	35603
HoCP96-540	35104	28391	28665	30720
L97-128	27189	37038	36512	33580
L99-226	27062	26771	25624	26485
L99-233	41019	53115	40236	44790+

Table 23. Plantcane means from seven outfield locations in 2006: Allains, Alma, Bon Secour, Glenwood, Lanaux, Magnolia, and R. Hebert farms.

Variety	Sugar per Acre	Cane Yield	Sugar per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	8121 -	30.2-	268	1.93-	31533
CP89-2143	8560 -	34.3-	251-	2.51	28389
Ho95-988	9809	36.7	267	2.29	32904
HoCP96-540	10559	38.8	273	2.50	32070
L97-128	10009	38.5	260	2.47	31948
L99-226	11148	39.0	286	2.70	30077
L99-233	10340	38.9	264	1.93-	41074+
HoCP00-950	10767	37.0	291+	2.18-	34687
L01-283	9974	36.7	271	2.09-	36104
L01-299	10119	36.6	276	2.25	33062
HoCP02-623	9639 -	35.4-	273	2.06-	34933

Table 24. First-stubble means from six outfield locations in 2006: Allains, Glenwood, Lanaux, Magnolia, R. Hebert and St. John farms.

Variety	Sugar per Acre	Cane Yield	Sugar per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	7381 -	27.2-	270	1.73-	31717
HoCP91-555	8092	29.3	276	1.82-	32291
Ho95-988	8667	31.8	272	2.17	29450
HoCP96-540	8721	31.7	276	2.21	28831
L97-128	8249	30.3	272	2.26	26904
L99-226	10378+	34.6	300+	2.58+	26925
L99-233	8754	32.2	271	1.77-	37111+
HoCP00-950	8746	30.0	291+	1.91-	31541
L01-283	10207+	35.7+	286	1.97-	36289+
L01-299	10049+	37.6+	265	1.91-	39524+

Table 25. Second-stubble means from five outfield locations in 2006: Bon Secour, Glenwood, Lanaux, R. Hebert and St. John farms.

Variety	Sugar per Acre	Cane Yield	Sugar per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	7429-	28.3	263	1.64-	35954
HoCP91-555	8040	30.4	266	1.67-	37413
HoCP96-540	9074	33.0	273	2.06	32835
L97-128	9151	32.3	284	2.13	30516
L99-226	9417	31.9	297+	2.15	31265
L99-233	9041	32.7	276	1.75-	37790
HoCP00-950	9959	33.9	294+	1.93	35931

Table 26. Third-stubble means from three outfield locations in 2006: Bon Secour, Glenwood and Lanaux farms.

Variety	Sugar per Acre	Cane Yield	Sugar per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	7761	31.1	249	1.55-	40268+
HoCP85-845	8632	34.3	250	1.89-	37679
HoCP91-555	8031	30.3	265+	1.72-	35603
HoCP96-540	8464	34.3	247	2.26	30720
L97-128	9654	37.8	256	2.29	33580
L99-226	8741	31.5	277+	2.39	26485
L99-233	9634	38.2	253	1.76-	44790+

Table 27. Combined plantcane means across outfield locations from 2003 to 2006.

Variety	Sugar per Acre	Cane Yield	Sugar per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	7490 -	27.6 -	271 -	1.89 -	29841
HoCP96-540	9217	33.2	278	2.43	28297
L97-128	8591 -	31.3 -	276	2.38	26583
L99-226	9844 +	33.6	293 +	2.74 +	25292 -
L99-233	9010	33.2	271 -	1.90 -	35949 +

Table 28. Combined plantcane means across outfield locations from 2004 to 2006.

Variety	Sugar per Acre	Cane Yield	Sugar per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	7396 -	27.3 -	271 -	1.80 -	30665
HoCP96-540	9456	33.8	280	2.33	29533
L97-128	8651 -	31.4 -	276	2.35	26987 -
L99-226	10065 +	34.3	294 +	2.69 +	26076 -
L99-233	9204	33.7	272 -	1.86 -	36840 +
HoCP00-950	9567	32.1 -	298 +	2.07 -	31344

Table 29. Combined plantcane means across outfield locations from 2005 to 2006.

Variety	Sugar per Acre	Cane Yield	Sugar per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	7507 -	27.7 -	270 -	1.77 -	31506
Ho95-988	9005 -	33.5	269 -	2.22	30559
HoCP96-540	9712	34.8	280	2.26	31273
L97-128	8720 -	33.0	264 -	2.32	28729 -
L99-226	10362 +	35.3	293 +	2.59 +	27821 -
L99-233	9423	35.3	266 -	1.83 -	39025 +
HoCP00-950	9615	32.8	293 +	2.03 -	32581
L01-283	9473	33.9	279	2.00 -	34354 +
L01-299	8866 -	32.8	268 -	2.07 -	32036

Table 30. Combined first-stubble means across outfield locations from 2004 to 2006.

Variety	Sugar per Acre	Cane Yield	Sugar per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	6903 -	25.4 -	272 -	1.57 -	32733 +
HoCP91-555	7890	27.8	283	1.75 -	32099 +
HoCP96-540	8152	29.2	280	2.00	29502
L97-128	7760	27.8 -	279	2.05	27407 -
L99-226	9120 +	30.5	299 +	2.35 +	26154 -
L99-233	8073	29.3	276	1.64 -	36488 +

Table 31. Combined first-stubble means across outfield locations from 2005 to 2006.

Variety	Sugar per Acre	Cane Yield	Sugar per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	7075 -	26.2 -	270 -	1.56 -	34209 +
HoCP91-555	8046	28.7	280	1.74 -	33286 +
HoCP96-540	8461	30.0	282	2.01	30522
L97-128	7906 -	28.9	273 -	2.07	28351
L99-226	9506 +	32.0 +	296 +	2.39 +	27199 -
L99-233	8184	30.2	271 -	1.64 -	37829 +
HoCP00-950	8588	28.9	297 +	1.79 -	32706

Table 32. Combined second-stubble means across outfield locations from 2005 to 2006.

Variety	Sugar per Acre	Cane Yield	Sugar per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	6635 -	24.8 -	268	1.49 -	33935
HoCP91-555	6832 -	25.4 -	270	1.50 -	33657
HoCP96-540	7639	28.0	272	1.84	30420
L97-128	7834	28.2	276	1.87	30105
L99-226	8577 +	28.6	299 +	2.05 +	28571
L99-233	8108	29.9	270	1.54 -	38947 +

Table 33. Combined third-stubble means across outfield locations from 2006.

Variety	Sugar per Acre	Cane Yield	Sugar per Ton	Stalk Weight	Stalk Number
	(lbs/A)	(tons/A)	(lbs/ton)	(lbs)	(stalks/A)
LCP85-384	7761	31.1	249	1.55-	40268+
HoCP85-845	8632	34.3	250	1.89-	37679
HoCP91-555	8031	30.3	265+	1.72-	35603
HoCP96-540	8464	34.3	247	2.26	30720
L97-128	9654	37.8	256	2.29	33580
L99-226	8741	31.5	277+	2.39	26485
L99-233	9634	38.2	253	1.76-	44790+

SUGAR RESEARCH STATION SUCROSE LABORATORY

Gert Hawkins and Kenneth Gravois
Sugar Research Station

More than 3,500 samples were processed at the Sugar Research Station Sucrose Laboratory during the 2006 harvest season (Table 1). Standard laboratory procedures, which include use of Octapol® clarifier, were used to measure the Brix and pol of the juice. The pol was analyzed using an autopol 880 model that could read dark samples. The juice was extracted via a three-roller mill for 3,404 samples. Fiber analysis was done on 124 samples using a pre-breaker to shred the sample. The computer program used for the sucrose laboratory assigns a sample identification number to each set processed; in addition, it indicated the number of samples analyzed in that set. The program was designed to automatically calculate sucrose and theoretical recoverable sugar based on the Brix and pol numbers. The laboratory numbers were recorded on the sample tags and returned to the researchers, along with the computer file that contains Brix, pol and theoretical recoverable sugar per ton of cane. The sucrose laboratory processed samples from September 2006 to December 2006.

Table 1. Number of sugarcane samples processed at the Sugar Sucrose Laboratory during the 2006 harvest season.

Project Area	Leader	Number of Samples
Agronomy	James Griffin	12
	Chuck Kennedy	554
	Collins Kimbeng	351
	Magdi Selim	12
	Jim Wang	32
Iberia Research Station	Howard Viator	240
Plant Pathology and Crop Physiology	Jeff Hoy	412
	Clayton Hollier	35
LCES	Ben Legendre	504
Variety Development	Line Trials	584
	Increase	158
	Nursery	248
	Nursery (fiber)	76
	Genetics (fiber)	48
Other		42
Contract Services		220
TOTAL		3528

LAES SUGARCANE TISSUE CULTURE LABORATORY

Q.J.Xie[1], Jeff Flynn[1], and Kenneth Gravois[2]
Certis USA, LLC[1] and Sugar Research Station[2]

During the 2006-2007 production season, about 50,000 sugarcane plantlets were regenerated in the Louisiana Agricultural Experiment Station Sugarcane Tissue Culture Laboratory. A total of 47,200 plantlets 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
L99-233	2,520
Ho98-988	360
HoCP96-540	7,632
L97-128	4,392
HoCP00-950	900
L99-226	9,648
L01-283	1,872
L01-299	1,152
Ho00-961	7,200
L79-1002	11,538
TOTAL	47,214

THE 2006 LOUISIANA SUGARCANE VARIETY SURVEY

Benjamin L. Legendre and Kenneth A. Gravois
Sugar Research Station

INTRODUCTION

A sugarcane variety survey was conducted during the summer of 2006 by the county agents in the 24 sugarcane-growing parishes of Louisiana to determine the variety makeup and distribution across the industry in the state. The information presented in this report was summarized from those individual parish surveys.

Agents in each sugarcane-producing parish collected acreage figures by variety and crop from growers in their respective parishes. Seven varieties, CP 70-321, LCP 85-384, HoCP 85-845, HoCP 91-555, Ho 95-988, HoCP 96-540 and L 97-128, were listed along with "Others" in the survey. The category of others included, but was not limited to, small acreages of CP 65-357, CP 72-370, LCP 82-89, LHo 83-153 and the two newly released varieties, L 99-226 and L 99-233. The crop was divided into four categories, which included plant-cane, first-stubble, second-stubble and third-stubble and older crops. Additional information regarding parish acreage was collected as needed from the local Farm Service Agency (FSA) offices.

Total State and Regional Acreage. Actual area planted to sugarcane included in this survey for each parish, region and the statewide total are shown in Table 1. Statewide, the area planted to sugarcane in 2006 was 433,509 acres, a reduction of 28,933 acres from 2005 (Legendre & Gravois 2006). This is only 68 acres less that the total acres as reported by the Farm Service Agency of the United States Department of Agriculture and used in "Louisiana Summary: Agriculture and Natural Resources 2005" (Anonymous 2005). Figure 1 shows the parishes where sugarcane is grown in the state. Total area planted to sugarcane for the three regions, Bayou Teche, River-Bayou Lafourche and Northern, and parishes (counties) are also shown in Table 1. The Bayou Teche region has the largest area planted to sugarcane, with 187,636 acres reported (43.2% of the total acreage), followed by the River-Bayou Lafourche region with 160,961 acres (37.1%) and the Northern area with 85,719 acres (19.7%). The total area planted to sugarcane for each of the regions declined in 2006 with the Northern area showing the greatest reduction. Further, statewide area planted to sugarcane has declined in recent years because of the threat of acreage reductions brought about by allotments and proportionate shares as written in the current Farm Bill, urban encroachment into farm land and the lower prices received for sugar. At the same time the industry experienced lower production due to hurricanes, drought and the precipitous drop in production of the leading variety, LCP 85-384.

Sugarcane Distribution by Variety and Crop. The estimated statewide sugarcane acreage in percent by variety and crop is shown in Table 2. The leading variety for 2006 continued to be LCP 85-384, with 73% of the total acreage followed by HoCP 96-540 (14%), HoCP 91-555 (5%), L 97-128 (4%) and Ho 95-988 (2%). All other varieties in the survey were planted on 1% or less of the area. LCP 85-384 and HoCP 91-555 are listed as two of the older varieties being released to the industry in 1993 and 1999, respectively (Legendre 2001). The acreage of LCP 85-384 continues to decrease with only 45% of the plantcane area while the acreage of HoCP 96-540 and L 97-128 continue to increase with 36% and 11% of the plantcane area, respectively.

Growers, concerned with the decline in yield of LCP 85-384, are switching to the newer varieties, especially HoCP 96-540 until other varieties are developed and released to the industry. The two remaining new varieties, Ho 95-988 and L 97-128, occupied most of the remaining plantcane area in 2006. Of the older varieties, other than LCP 85-384, HoCP 91-555 was planted on only 3% of the planted area. HoCP 85-845 continued to decline across crop years with 3% in third-and older stubble crops and only 1% in the plant-cane crop. CP 70-321, the leading variety prior to the release of LCP 85-384 in 1993, occupied less than 1% of the total acreage in 2006. Two new varieties, L 99-226 and L 99-233, were released to the industry in the fall of 2006 with only limited acreage on the secondary increase stations. Most of the seed cane on the secondary stations was distributed to the industry for planting. There are four additional varieties on the secondary increase stations that will be candidates for commercial release during the next several years. They are HoCP 00-950, L 01-283 and L 01-299 and CP 89-2143, a commercial variety in Florida being tested for adaptability in Louisiana.

The majority of the Louisiana sugarcane crop has been harvested by cane combine since 2000 when over 70% of the crop was planted to LCP 85-384 (Legendre & Gravois 2006), presumably to take advantage of the superior yield potential of the variety. However, with the lower yields experienced since 2003, especially in the older stubble crops, approximately 20% of the State's growers have switched back to the whole-stalk "soldier" system for harvesting their crops because of lower costs of operating the equipment. The yield of LCP 85-384 rebounded somewhat in 2006; however, the superior yield potential of the newer varieties, especially HoCP 96-540, gave growers optimism for the future.

Sugarcane Distribution by Region and Crop. With the prominence of LCP 85-384, there had been a trend to plant less cane each year and keep more acres in older stubble crops; however, because of the poor performance of LCP 85-384, especially in the older stubble crops, that trend changed in 2004 and continued into 2006 when more acres were replanted in all regions than had been seen in previous years (Table 3). In 2006, there was an increase in plantcane acreage to 29.8% while the acreage of third and older stubble decreased to only 16.7%. As recently as 2003, the acreage in second and older stubble was over 50% of the total acreage; now it is only 41.8%.

For the current survey, the Northern region, which has routinely kept older stubble, had only 22.0 % in third and older stubble in 2006 (Table 3). On the other hand, the percentage in plantcane was 27.6%. The River-Bayou Lafourche region tends to plant more cane each year, with less of its area devoted to stubble crops. In this region, there was only 15.2% of the acreage in third- and older stubble crops and 30.9% in the plant-cane crop in 2006. The trend for less stubble and more plantcane was also evident for the Bayou Teche region. With increased planting, the amount of older stubble decreased from 20.6% in 2005 to 15.6% in 2006 while plantcane increased from 29.2% in 2005 to 29.7% in 2006.

Sugarcane Distribution by Variety and Crop for the Three Regions. With regards to crop from plant-cane through third- and older stubble crops, LCP 85-384 was still the leading variety in all regions in 2006 (Tables 4, 5 and 6). Although still the dominant variety, its preference in plantcane diminished significantly with the new variety, HoCP 96-540, occupying 44, 26 and 33% of the plantcane area in the Bayou Teche, River/Bayou Lafourche and Northern regions, respectively. The percentage of LCP 85-384 in the plant-cane crop for the three regions dropped to 33, 50 and 54%, respectively. There was also a significant increase in the planting of L 97-128 in all regions. The popularity of the older varieties, namely CP 70-321 and HoCP 85-845, continued to loose favor by growers in all regions. CP 70-321, the predominant variety prior to LCP 85-384, comprised less than 1% of the planted area in all regions in 2005. HoCP 85-845 was grown on only 2% or less of the planted area, regardless of regions. The acreage planted to HoCP 91-555 remained virtually unchanged across crop year and regions. The area planted to the new variety, Ho 95-988, was still limited in 2006 but it is anticipated that acreage will increase in ensuing years as growers continue to seek a replacement for LCP 85-384.

Variety Trends. For the second consecutive year the acreage planted to LCP 85-384 decreased from the previous year by 16 percentage points (Table 7). LCP 85-384 reached its maximum utilization in 2004 when 91% of the State's acreage was planted to this variety. CP 70-321 which occupied 49% of the planted acreage as late as 1995 is now planted on only 1% of the State's sugarcane area. Only one other variety, CP 65-357, released in 1973, reached more than 70% of the total acreage in the state with a high of 71% in 1980. HoCP 96-540, released for commercial planting in 2003, and Ho 95-988 and L 97-128, released for commercial planting in 2004, have all gained in popularity with increases in acreage of 11, 2 and 3 percentage points, respectively. According to Garrison et al. (2006), the three new varieties, Ho 95-988, HoCP 96-540 and L 97-128, are generally superior to LCP 85-384 in yield of sugar per acre throughout the crop cycle. Ho 95-988 has good stubbling ability; HoCP 96-540 has excellent yield of cane per acre; and, L 97-128 has early, high sucrose content to go along with its early maturity classification. Ho 95-988 is classified as resistant to mosaic and leaf scald and moderately susceptible to smut and rust and susceptible to the sugarcane borer. HoCP 96-540 is classified as resistant to smut and mosaic, moderately resistant to rust and leaf scald and moderately susceptible to the sugarcane borer. L 97-128 is classified as resistant to mosaic, moderately resistant to leaf scald and rust, moderately susceptible to smut and susceptible to the sugarcane borer. All three varieties are more erect than LCP 85-384; hence, losses associated with mechanical harvesting should be less when compared to LCP 85-384. There were two additional new varieties released to the industry in 2006, L 99-226 and L 99-233, with superior yield of both cane and sugar per acre. Both varieties have adequate resistance to the major disease complexes with L 99-226 exhibiting an added attribute of having resistance to the sugarcane borer. It is anticipated that LCP 85-384 will be the predominant variety for at least one more year; after which, it is believed that the Louisiana sugarcane industry should have a more balanced mix of varieties.

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Concern over the Dependence of a Single Variety (Monoculture). Occasionally, expectations outweigh potential risk considerations to the planting of a single variety (Tew 1987). Hoy (2005) reported that LCP 85-384 was susceptible to common brown rust, and this disease can have a significant negative impact on both cane and sugar yield in areas of severe rust infection. He reported that rust can be controlled by fungicides; however, the best control option at this point is to plant the new varieties which have shown a greater degree of resistance and it appears that growers are following this recommendation.

Another disease was found in LCP 85-384 in recent years, *sugarcane yellow leaf* disease (Grisham et al. 2001); it appears that the variety is tolerant to this disease at least for the moment. However, it is entirely possible that this new virus is also taking its toll on yield of this variety. In a continuing effort to lessen the dependence of the industry on one variety, the Louisiana variety development program has developed three new high yielding varieties in recent years, namely, Ho 95-988, HoCP 96-540 and L 97-128. The two newest varieties, L 99-226 and L 99-233, should further reduce the future prospect of a monoculture again.

Millhollon and Legendre (1996) found that the annual use of glyphosate as a ripener will usually increase the yield of sugar per ton of cane and per acre; however, the magnitude of the increase depended on the tolerance of the variety to the treatment. They found that LCP 85-384 is very sensitive to glyphosate, especially at rates higher than generally recommended and the treatment was shown to cause a significant reduction in cane yield in the subsequent stubble crops. Glyphosate is now used on approximately 75% of the total area planted to sugarcane for enhancing maturity of the crop and increasing yield of sugar per ton of cane and per acre. With LCP 85-384 as the major variety, there is the possibility that part of the yield decline experienced in the older stubble crops was caused, in part, by the sensitivity of LCP 85-384 to glyphosate brought on because of the earlier factory starts in the month of September. This is another reason why the industry might want to consider diversifying into other varieties. The older varieties, namely HoCP 85-845 and HoCP 91-555, are not as sensitive to annual applications of glyphosate as LCP 85-384. In 2006, HoCP 96-540 was found to be very sensitive to residue carryover following green cane harvesting where the cane was treated with glyphosate (Ryan Viator, unpublished data). In these studies, the yield of sugar per acre for HoCP 96-540 was significantly reduced where the cane had been treated with glyphosate and the residue was allowed to remain in the fields. However, with the removal of the residue, it did not appear that glyphosate reduced yield in the subsequent stubble crop.

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Table 1. Total area planted to sugarcane in Louisiana by region and parish (county), 2006[1].

Bayou Teche region		River-Bayou Lafourche region		Northern region	
Parish	Acres	Parish	Acres	Parish	Acres
Acadia	1,872	Ascension	14,666	Avoyelles	15,400
Calcasieu	3,551	Assumption	39,727	East Baton Rouge	280
Cameron	326	Iberville	34,970	Pointe Coupee	29,540
Evangeline	810	Lafourche	29,031	Rapides	12,630
Iberia	57,419	St. Charles	1,865	St. Landry	13,680
Jeff Davis	3,935	St. James	24,634	West Baton Rouge	14,190
Lafayette	12,475	St. John	6,564		
St. Martin	33,544	Terrebonne	9,504		
St. Mary	42,745				
Vermilion	30,958				
Total	187,635	Total	160,961	Total	85,720
Total all regions: 434,316					

[1] Acreage based on information obtained in variety surveys from 24 parishes by the county agents in 2006.

Table 2. Estimated statewide sugarcane acreage percentage by variety and crop, all regions, 2006[1].

Variety	Plant-cane	First-stubble	Second-stubble	Third-stubble and older	Total
	----------%----------				
CP 70-321	<1	<1	<1	2	<1
LCP 85-384	43	80	88	87	73
HoCP 85-845	1	1	2	3	1
HoCP 91-555	3	5	7	7	5
Ho 95-988	4	<1	<1	0	2
HoCP 96-540	36	10	2	<1	14
L 97-128	11	2	<1	<1	4
Other	2	<1	<1	<1	<1
Total acres Percent of total crop	129,231 29.8	123,302 28.4	109,115 25.1	72,668 16.7	434,316

[1] Based on information obtained in variety surveys from 24 parishes by county agents in 2006.

Table 3. Estimated sugarcane distribution by region and crop, 2006[1].

Crop	Bayou Teche	River-Bayou Lafourche	Northern	State Total
Plant-cane Area (acres) Percent (%)	55,771 29.7	49,809 30.9	23,652 27.6	129,231 29.8
First-stubble Area (acres) Percent (%)	55,055 29.3	45,877 28.5	22,371 26.1	123,301 28.4
Second-stubble Area (acres) Percent (%)	47,508 25.3	40,778 25.3	20,829 24.3	109,115 25.1
Third-stubble and older Area (acres) Percent (%)	29,303 15.7	24,499 15.3	18,868 22.0	72,669 16.7
Total area (acres) Percent (%)	187,636 43.2	160,961 37.1	85,719 19.7	434,316

[1] Based on information obtained in variety surveys from 24 parishes by county agents in 2006.

Table 4. Estimated area planted to sugarcane in percent by variety and crop for the Bayou Teche region, 2006[1].

Variety	Plant-cane crop (%)	First-stubble crop (%)	Second-stubble crop (%)	Third-stubble crop & older (%)	Total (%)
CP 70-321	0	<1	2	3	1
LCP 85-384	33	75	83	79	65
HoCP 85-845	1	1	1	4	2
HoCP 91-555	4	8	11	12	8
Ho 95-988	3	<1	0	0	1
HoCP 96-540	44	11	2	<1	17
L 97-128	12	2	<1	<1	4
Others	2	<1	<1	2	1
Totals	100	100	100	100	100

[1] Based on information obtained in variety surveys from 24 parishes by county agents in 2006.

Table 5. Estimated area planted to sugarcane in percent by variety and crop for the River/Bayou Lafourche region, 2006[1].

Variety	Plant-cane crop (%)	First-stubble crop (%)	Second-stubble crop (%)	Third-stubble crop & older (%)	Total (%)
CP 70-321	<1	<1	<1	1	<1
LCP 85-384	50	84	93	92	77
HoCP 85-845	2	2	2	3	2
HoCP 91-555	2	2	2	3	2
Ho 95-988	6	1	<1	0	2
HoCP 96-540	26	9	2	<1	11
L 97-128	11	2	<1	0	4
Others	2	<1	<1	<1	1
Totals	100	100	100	100	100

[1] Based on information obtained in variety surveys from 24 parishes by county agents in 2006.

Table 6. Estimated area planted to sugarcane in percent by variety and crop for the Northern region, 2006[1].

Variety	Plant-cane crop (%)	First-stubble crop (%)	Second-stubble crop (%)	Third-stubble crop & older (%)	Total (%)
CP 70-321	0	0	1	<1	<1
LCP 85-384	54	87	91	94	80
HoCP 85-845	0	<1	<1	<1	<1
HoCP 91-555	<1	3	7	6	4
Ho 95-988	4	<1	0	0	1
HoCP 96-540	33	9	<1	0	12
L 97-128	8	<1	0	0	2
Others	<1	<1	0	0	<1
Totals	100	100	100	100	100

[1] Based on information obtained in variety surveys from 24 parishes by county agents in 2006.

Table 7. Louisiana sugarcane variety trends, by variety and years, all regions, 2002-2006[1].

	Area planted to sugarcane by variety and years (%)					
Variety	2002	2003	2004	2005	2006	1 yr. Change
CP 70-321	5	3	2	1	<1	-1
LCP 85-384	85	88	91	89	73	-16
HoCP 85-845	6	4	3	2	1	-1
HoCP 91-555	3	4	3	4	5	+1
Ho 95-988	0	0	<1	<1	2	+2
HoCP 96-540	0	<1	1	3	14	+11
L 97- 128	0	0	<1	1	4	+3
Others	<1	<1	<1	<1	<1	0
Totals	100	100	100	100	100	

[1] Based on annual variety surveys from 24 parishes by county agents, 2002-2006.

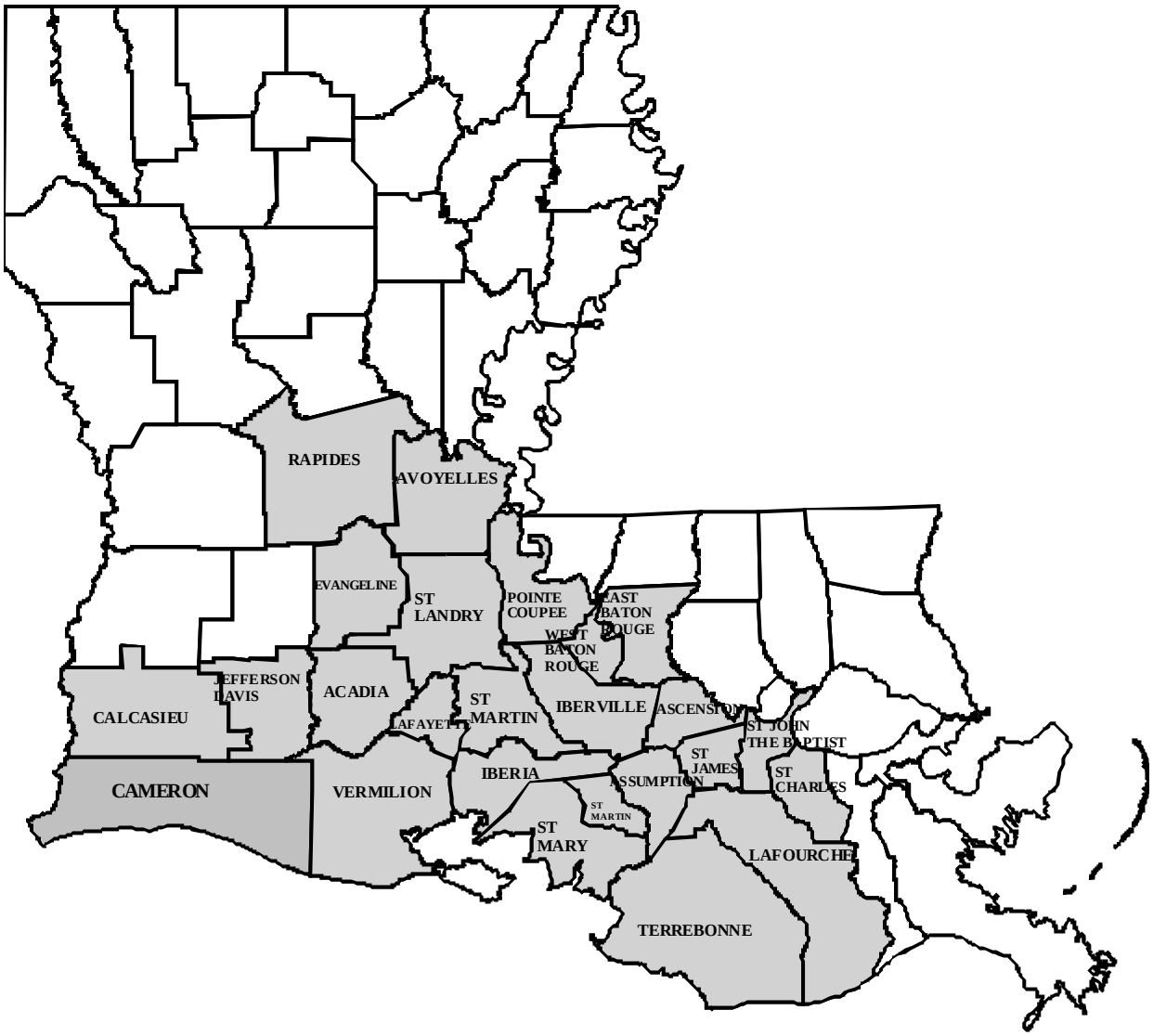

Figure 1. Parishes (counties) in Louisiana where sugarcane is grown.

LINKAGE MAPPING AND GENOME ANALYSIS IN A *SACCHARUM* INTERSPECIFIC CROSS USING AFLP, SRAP AND TRAP MARKERS

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Abstract: Framework genetic linkage maps of two progenitor species of cultivated sugarcane, *Saccharum officinarum* 'La Striped' (2n=80) and *S. spontaneum* 'SES 147B' (*2n*=64) were constructed using amplified fragment length polymorphism (AFLP), sequence related amplified polymorphism (SRAP) and target region amplification polymorphism (TRAP) markers. The mapping population comprised of 100 F_1 progeny derived from the *Saccharum* interspecific cross. A total of 344 polymorphic markers were generated from the female (*S. officinarum*) parent out of which 247 (72%) were single dose (segregating in a 1:1 ratio) and 33 (10%) were double dose (segregating in a 3.3:1 ratio) markers. Sixty-four (18%) markers deviated from Mendelian segregation ratios. Likewise, in the *S. spontaneum* genome, out of a total of 306 markers, 221 (72%) were single dose and 43 (14%) were double dose markers whereas 42 markers (14%) deviated from Mendelian segregation ratios. Linkage maps with Kosambi map distances were constructed using a LOD score of > 5.0 and a recombination threshold of 0.45. In *Saccharum officinarum*, 146 markers were linked to form 49 linkage groups (LG) spanning 1732 cM whereas in *S. spontaneum,* 121 markers were linked to form 45 LG spanning 1491 cM. The estimated genome size of *S. officinarum* 'La Striped' was 2487 cM whereas that of *S. spontaneum* 'SES 147B' was 3232 cM. The genome covered was found to be 69% in *S. officinarum* and 46% in *S. spontaneum*. The *S. officinarum* parent 'La Striped' behaved like an auto-allopolyploid whereas *S. spontaneum* 'SES 147B' behaved like a true autopolyploid. Although a huge amount of disparity appear to exist between the two genomes, the existence of simple duplex markers, which are heterozygous in both parents and segregate 3:1 in the progeny, in the population tends to affirm that pairing and recombination can occur between the two genomes. The study also revealed that, compared to AFLP, the SRAP and TRAP markers appear less effective as tools for rapidly generating a large number of genome-wide markers for linkage mapping. However, SRAP and TRAP markers can be useful for QTL mapping because of their ability to target gene rich regions of the genome and that is the focus of our subsequent study.

Keywords: *Saccharum* – AFLP – SRAP – TRAP markers – linkage map – segregation distortion

INTRODUCTION

Sugarcane belongs to the genus *Saccharum* of the grass family Poaceae. Modern sugarcane cultivars (2*n*=100 -140) are highly heterozygous and complex aneuploids. They were derived from interspecific crosses between the domesticated species *S. officinarum* and it wild relative *S. spontaneum.* The initial interspecific hybrids were repeatedly backcrossed to *S. officinarum.* This process, termed as 'nobilization', retained the high sugar producing ability of *S. officinarum* and minimized the negative effects of *S. spontaneum* (Roach, 1972; Sreenivasan et al., 1987). The nobilization process also resulted in improved cane yields, ratooning ability and increased resistance to biotic and abiotic stresses. During nobilization the progeny inherited *2n* gametes from the *S. officinarum* parent (Bhat and Gill, 1985; Bremer, 1961). Consequently, the genome composition of current sugarcane cultivars is approximately 80 % *S. officinarum*, 15 % *S. spontaneum* with 5% recombinant chromosomes (D'Hont et al., 1996).

S. officinarum clones are characterized by their thick stalks, high sucrose and low fiber content. Chromosome numbers have consistently been reported as $2n = 80$ with $x = 10$ as the basic chromosome number (Sreenivasan et al., 1987; Daniels and Roach, 1987; D'Hont et al., 1998). *S. spontaneum* clones, on the other hand, are characterized by thin stalks, low sucrose, high fiber, profuse flowering, good ratooning ability, and high levels of disease and insect resistance. Chromosome numbers have been reported to range from $2n = 40$ to 128 (Panje and Babu, 1960) with $x = 8$ as the basic chromosome number (Al-Janabi et al., 1993; da Silva et al., 1993; D'Hont et al., 1998).

Limited progress has been made in improving sugar content in most sugarcane breeding programs especially in the last decade (Jackson, 2005). One reason that has been proposed for the lack of progress is the narrow genetic base of sugarcane cultivars. Most of the present day cultivars around the world can be traced back to a few progenitors used in the initial interspecific hybridizations during nobilization (Berding and Roach, 1987; Deren, 1995). In most sugarcane breeding programs, crosses are made among existing improved clones followed by clonal selections. Following the success of nobilization, only sporadic efforts were made by a few breeding programs to utilize new sources of wild germplasm for sugarcane improvement (Berding and Roach, 1987). There is renewed interest among sugarcane breeders to explore wild germplasm for novel sources of genes that could be useful in sugarcane breeding programs.

Molecular markers can play a pivotal role in tracking favorable alleles from wild species as well as ascertaining their introgression into the cultivated background (Edmé et al., 2006). Genetic linkage maps generated from molecular markers have facilitated gene tagging, map based cloning and QTL mapping in many crops. They have also been useful for studying genome architecture and evolution, especially in interspecific crosses (deVicente and Tanksley, 1993).

The earliest molecular genetic linkage maps of the progenitors of modern sugarcane were developed in *S. spontaneum* using RFLP (da Silva et al., 1993; Ming et al., 1998) and RAPD markers (Al-Janabi et al., 1993) and in S. *officinarum* using RAPD (Mudge et al., 1996), and RFLP markers (Ming et al., 1998). Recently, Edmé et al. (2006) developed a *S. spontaneum* and S. *officinarum* map using SSR markers. AFLP markers have so far been used to construct genetic linkage maps of commercial sugarcane (Hoarau et al., 2001; Aitken et al., 2005; Reffay et al., 2005).

Molecular markers such as RFLP, RAPD, AFLP and SSR are ideal for genetic fingerprinting and construction of linkage maps. However, they do not use prior gene sequence information and produce polymorphisms randomly across the genome. Two new PCR-based markers namely, SRAP (sequence related amplified polymorphism) and TRAP (target region amplification polymorphism) which amplify intragenic polymorphism have been reported. SRAP markers are arbitrarily designed with an AT- and GC-rich motif to anneal to intron and exons, respectively (Li and Quiros, 2001). Sequenced SRAP amplicons from *Brassica* (Li and Quiros, 2001) and *Cucurbita* (Ferriol et al., 2003) when used in BLAST searches revealed significant similarities to reported gene sequences found in Genebank databases. With TRAP markers, a forward or fixed primer is designed using gene/EST sequence information, whereas the reverse primer is similar to a SRAP primer (Hu and Vick, 2003). Using TRAP primers designed from resistance gene analogs, Miklas et al. (2006) reported that some of the polymorphisms produced on a preexisting common bean (*Phaseolus vulgaris* L.) mapping population mapped to the vicinity of resistance gene QTLs. In sugarcane, BLAST searches using sequenced TRAP amplicons from a *S. spontaneum* clone revealed high homology with known gene sequences from other grass species. Remarkably, the search also pulled up the *S. officinarum* GenBank accession from which the fixed TRAP primer was designed (Alwala et al., 2006a). SRAP markers have been integrated into genetic linkage maps of brassica (Li and Quiros, 2001) and TRAP markers have been integrated into maps of wheat (Liu et al., 2005) and common bean (Miklas et al., 2006). In sugarcane, SRAP and TRAP markers are being used to characterize parental and wild germplasm collections (Alwala et al., 2006a, 2006b; Suman and Kimbeng, 2007) but their potential for linkage and QTL mapping is yet to be ascertained.

The objective in this study was to construct molecular linkage maps of sugarcane using AFLP in conjunction with SRAP and TRAP markers. The maps were based on an F_1 cross between two progenitor species of modern sugarcane namely, *S. officinarum* 'La Striped' and *S. spontaneum* 'SES 147B'. These framework linkage maps would foster our understanding of genome architecture and organization in the two species and lay the ground work for subsequent QTL studies.

MATERIAL AND METHoDS

Plant Material and DNA extraction

The mapping population consisted of 100 clones derived from a *S. officinarum* (La Striped, 2*n*=80) X *S. spontaneum* (SES 147B, 2*n*=64) cross made at the Sugarcane Research Unit, USDA-ARS, Houma, Louisiana. Leaf tissue from F_1 seedlings was collected, immediately frozen and later ground to powder in liquid nitrogen. Genomic DNA was extracted using Plant DNeasy Mini Kit (Qiagen, Valencia, CA) following the manufacturer's protocol. The concentration of DNA was estimated using known concentration of Lambda DNA in 1% (w/v) agarose gel.

AFLP protocol

Genomic DNA (50 ng) was digested with *EcoR* I (6bp cutter) and *Mse* I (4bp cutter) restriction enzymes. Following the protocol of Vos et al. (1995), the digested DNA was ligated to *EcoR* I and *Mse* I adapters. Pre-amplifications were done using *EcoR* I + A and *Mse* I + C primers followed by selective amplifications using two selective nucleotides. Following a similar protocol, the AFLP procedure was also carried out using *Pst* I (6 bp cutter) and *Mse* I restriction

enzymes. *EcoR* I and *Pst* I are methylation insensitive and sensitive, respectively. The PCR was carried out in a reaction volume of 10 µL consisting of 1 µL of 10X reaction buffer, 1.5 µL of 25 mM MgCl2, 1 µL of 10 mM dNTPs, 1 µL of 1 µM of E-ANN (IR-Dye labeled) and 1 µL of 10 µM forward primer and 0.2 µL of 5U *Taq* polymerase (Promega, Madison, WI). The reactions were run on an *i*-cycler (BioRad Labs, Hercules, CA). The PCR conditions for selective amplifications were as follows: initial denaturing step at 94 ^{o}C for 3 min followed by initial 12 cycles at 94 ^{o}C for 30 s, 65 ^{o}C for 30 s (with 1 ^{o}C decrement every cycle) and 72 ^{o}C for 1 min, then followed by 23 cycles at 94 ^{o}C for 30 s, 56 ^{o}C for 30 s, and 72 ^{o}C for 1 min with a final extension step at 72 ^{o}C for 7 min. A total of 20 *EcoR* I-*Mse* I and 15 *Pst* I-*Mse* I selective amplification primer combinations were used.

SRAP protocol

The sequences of the forward and reverse SRAP primers used in this study are given in Table 1. The forward primers were unlabeled whereas the reverse primers were labeled with either IR-700 or IR-800 dyes. PCR amplifications were carried out in a 10 µL reaction volume containing 1.5 µL of 10X PCR buffer, 1.0 µL of 25 mM MgCl2, 1.0 µL each of 10 mM forward and IR-700 and IR-800 dye labeled reverse primers, 1.0 µL of 10 mM dNTPs (Promega, Madison, WI), 0.2 µL of 5U *Taq* polymerase (Promega, Madison, WI) and 1.0 µL of 50 to 80 ng genomic DNA. The conditions for PCR were as follows: an initial denaturing step was performed at 94 ^{o}C for 4 min followed by 5 cycles at 94 ^{o}C for 45 s, 35 ^{o}C for 45 s and 72 ^{o}C for 1 min, followed by 35 cycles at 94 ^{o}C for 45 s, 53 ^{o}C for 45 s, and 72 ^{o}C for 1 min with a final extension step at 72 ^{o}C for 7 min. All the PCR reactions were performed on an *i*-cycler (BioRad Labs, Hercules, CA). A total of 32 SRAP primer combinations were used.

TRAP protocol

The TRAP, like SRAP, is also a two primer PCR marker technique. The design of fixed/forward primers used in this study was previously described in Alwala et al. (2006a). In brief, three forward primers were designed using the gene/EST sequences of sucrose synthase (SuSy), soluble acid invertase (SAI) and calcium dependent protein kinase (CDPK). The genes SuSy and SAI are associated with sucrose metabolism whereas CDPK is believed to be associated with cold tolerance. The forward primer sequences are listed in Table 2. The reverse primers employed were the same as the labeled SRAP primers (Table 1). PCR amplifications were performed as described by Alwala et al. (2006a). A total of 17 TRAP primer combinations were used.

Marker scoring

The PCR amplified products were run on a LI-COR 4300 sequencer (LI-COR Inc., Lincoln, NE). The gels were saved onto a computer and scored manually and independently by two people. Ambiguous data that could not be resolved between the two scorers were discarded. A pseudo test cross strategy was followed to score the polymorphisms (Grattapaglia and Sederoff, 1994). The bands were scored for presence or absence when heterozygous in one parent, null in the other and segregating in the F_1 population. The bands were divided into two groups, as *S. officinarum* and *S. spontaneum* bands, based on their parental origin. The polymorphic bands were then tested for 1:1 (single dose, SD) and 3.3:1 (double dose, DD) segregation ratios using χ^2- analysis. If *Saccharum* were a disomic polyploid, the double dose segregation would be 3:1. On the other hand, if it were a polysomic polyploid, the double dose ratio would be 7:2 for *Saccharum officinarum* (x=10) and 11:3 for *S. spontaneum* (x=8). To overcome this complexity, we used a segregation ratio of ≤3.3:1 (√3x3.6:1) as it gives equal χ^2

value for 3:1, 7:2 and 11:3 ratios (Mather, 1957). The markers which did not fit into either single or double dose ratios were treated as segregation distorted markers. In addition, bands present in both parents and segregating in a 3:1 fashion (simple duplex) in the F_1 population were retained for consensus linkage map construction.

Linkage map construction

The mapping software JoinMap ver 3.0 (van Ooijen and Voorrips, 2001) was used for map construction. Two genetic linkage maps, one for *S. officinarum* and one for *S. spontaneum*, were constructed at a LOD score of > 5.0. The Kosambi mapping function was employed with a recombination fraction of 0.45 to form LG. First the maps were constructed using SD and DD markers. Then, markers showing segregation distortion were included in the final map. None of the distorted markers altered the final order of markers on the linkage group.

Tests for type of ploidy

Two tests, detection of repulsion phase linkages and χ^2 segregation ratios, were used in an attempt to infer ploidy type (polysomic *vs* disomic polyploid) in the *S. officinarum* and *S. spontaneum* parents.

To detect repulsion phase linkages, SD markers were inverted and combined with the original set of SD markers. Linkage maps were re-constructed using the new set of doubled SD markers. Presence of repulsion phase linkage is indicated by co-localization of the original SD marker with its corresponding inverted marker. The χ^2 tests were performed using single dose and double dose markers to further confirm the ploidy behavior in the two parents as described by da Silva et al. (1993).

Estimation of Genome size and Genome coverage

For each parental species, the genome size was estimated based on Hulbert et al. (1987) and the genome coverage was estimated based on Bishop et al. (1983) methods.

RESULTS

Comparison among marker systems

Combined across the two parental species, 35 AFLP primer combinations produced a total of 409 polymorphic bands out of which 318 (77%) were SD markers and 50 (17%) were DD and 41 (6%) deviated from Mendelian ratios (i. e., distorted markers). The polymorphic AFLP bands varied from 4 to 29 with an average of 11.68 bands per primer combination (Table 3). Among the AFLP primers, 20 *EcoR* I-*Mse* I primer combinations produced a total of 249 polymorphic bands out of which 198 (79%) were SD, 13 (5%) were DD and 38 (16%) were distorted markers. The 15 *Pst* I - *Mse* I primer combinations produced a total of 160 polymorphic bands out of which 120 (75%) were SD, 37 (23%) were DD markers and 3 (2%) were distorted markers (Table 4).

Combined across the two parents, the 32 SRAP primer combinations produced a total of 160 polymorphic bands out of which 92 (58%) were SD, 21 (13%) were DD and 47 (29%) were distorted markers. The total number of polymorphic SRAP bands varied from 1 to 10 with an average of 5 bands per primer combination (Table 3).

Likewise, the 17 TRAP primer combinations produced a total of 81 polymorphic bands out of which 59 (71%) were SD and 5 (7%) were DD markers. Seventeen (22%) markers deviated from Mendelian segregation ratios. The total number of polymorphic TRAP bands ranged from 1 to 12 with an average of 4.76 bands per primer combination (Table 3).

Marker segregation

Combined across the AFLP, SRAP and TRAP techniques, a total of 344 markers were heterozygous in *S. officinarum* 'La Striped' of which 247 (72%) were SD and 33 (10%) were DD markers. Sixty four (18%) markers deviated from Mendelian segregation ratios. In *S. spontaneum* 'SES 147B', 306 markers were heterozygous of which 221 (72%) were SD, 43 (14%) were DD and 42 (14%) were distorted markers. In both parental species, segregation distortion was highest in the SRAP markers followed by the TRAP and lowest in the AFLP markers (Table 4).

Map construction

The female parent *S. officinarum* 'La Striped' map comprised of 146 linked markers spread over 49 linkage groups (LG) (Fig 1). The cumulative genome length covered was found to be 1732 cM. The LG length varied from 13 to 108 cM with an average of 12 cM between any two adjacent markers. The number of loci forming LGs varied from 2-13 with the more dense LGs (L1, L3, L15) being formed almost exclusively by AFLP markers. A majority of the 146 linked markers were AFLP (74%) with only 20% of SRAP and 6% of TRAP markers. Among the 108 AFLP markers, 92 were *EcoR* I –*Mse* I and 16 were *Pst* I- *Mse* I based markers.

The male parent *S. spontaneum* 'SES147B' linkage map comprised of 121 linked markers spanning 45 LGs with a cumulative genome length of 1491 cM (Fig 2). The length of the LGs varied from 2 to 85 cM with an average of 12 cM between any two adjacent markers. The number of loci forming LGs varied from 2-12 with the densest LGs (S1) being formed almost exclusively by AFLP markers. Of the 121 linked markers, 65% were AFLP, 25% were SRAP and 10% were TRAP markers. Among the AFLP markers, 55 were generated by the *EcoR* I –*Mse* I and 24 by the *Pst* I- *Mse* I primer combinations.

Ploidy type

No repulsion phase linkages were detected in *S. officinarum* 'La Striped', suggesting that it could be an autopolyploid. However, the χ^2- test results could not confirm the autoploidy behavior as significant estimates were observed in both the autoploidy and alloploidy tests suggesting it is not a strict autopolyploid (Table 5).

On the other hand, for the *S. spontaneum* 'SES 147B', the non detection of repulsion phase linkages and the non significant χ^2 estimates for autoploidy strongly suggest it to be an autopolyploid (Table 5).

Genome size and genome coverage

Three estimates of genome size were calculated at 10, 20 and 30 cM intervals (Hulbert et al., 1987). For *S. officinarum*, using 32 (10 cM), 97 (20 cM) and 161 (30 cM) paired markers, the weighted genome size estimate was found to be 4897 cM . Likewise, for *S. spontaneum*, using 16, 53 and 90 paired markers, the weighted genome size estimate was found to be 6464 cM. However, as no repulsion phase linkages were observed, the estimates were divided by 2 (da

Silva et al., 1993) giving rise to 2487 cM and 3232 cM genome size for *S. officinarum* and *S. spontaneum*, respectively. The computations indicated that approximately 69 % (1732 / 2487) of the *S. officinarum* genome and 46% (1491 / 3232) of the *S. spontaneum* has been covered.

From the Bishop et al. (1983) estimation, it was observed that there is 76% probability in *S. officinarum* and 63% in *S. spontaneum* to place a new marker (onto the constructed map) within a distance of 30 cM.

DISCUSSION

Comparison among markers

Two relatively new marker techniques, TRAP and SRAP, were used in conjunction with the AFLP marker technique for linkage mapping and analysis of an F_1 population derived from a cross between two progenitor species, *S. officinarum* (La Striped, 2*n*=80) and *S. spontaneum* (SES 147B, 2*n*=64)), of modern sugarcane. The polymorphic fragments amplified by all three techniques were scored as dominant markers although Li and Quiros (2003) detected 20 % of codominant SRAP markers in a diploid brassica cross and Miklas et al. (2006) found 10 % of TRAP markers in a diploid common bean cross to be co-dominant. Due to the possibility of *2n + n* transmission, F_1 hybrids from a *S. officinarum* x *S. spontaneum* cross can harbor double the copy of homologous chromosomes from *S. officinarum* and variable copies of homeologous chromosomes from *S. spontaneum* (Bremer, 1961; D'Hont et al., 1996; Edmé et al., 2006). The difficulty of distinguishing multiple alleles from homologous and homoeologous chromosomes impedes the ability to determine homozygosity or heterozygosity and to designate co-dominant markers at any one locus. Therefore, methods for mapping in polyploid crops, such as sugarcane, have been developed which employ SD markers that are present in the simplex condition and segregate 1:1 irrespective of the ploidy level (Wu et al., 1992).

Single dose markers usually make up about 70 % of polymorphic loci detected in sugarcane mapping studies (Wu et al., 1992; da Silva et al., 1993; Hoarau et al., 2001; Aitken et al., 2005; Edmé et al., 2006; Garcia et al., 2006). These results are corroborated in this study by the frequency of SD markers reported for AFLP and TRAP but not for SRAP markers, which amplified only 58 % SD markers. Mapping in a complex polyploid, with large genome size such as sugarcane, requires substantially more markers and progeny than it would for a diploid. This makes SD markers the more important. Because of their relative abundance, SD markers facilitate mapping in polyploids by allowing the identification of alleles even in relatively small populations (Wu et al., 1992). Deviations from the expected frequency of SD markers, especially in a small population, could seriously bias the outcome of linkage analysis. However, as pointed out by da Silva et al. (1993), the proportion of SD polymorphism detected is not a function of the source of DNA used to detect the locus but rather that of the segregation at each locus according to the dosage of alleles at the locus. Therefore, it is less likely that SRAP markers possess an innate inability to amplify SD markers and rather coincidental that some of the SRAP primers used in this study did not align with SD loci in the population.

The TRAP and SRAP techniques target coding regions of the genome (Li and Quiros, 2003; Hu and Vick, 2003; Miklas et al., 2006) whereas, the AFLP technique was conceived to amplify a large number of random loci in a single assay (Vos et al., 1995). Therefore, as expected, the AFLP was by far the most superior marker technique for linkage mapping and analysis in a genome as large and complicated as that of sugarcane. The AFLP technique

produced the most number of polymorphic bands and linked markers on the map and the least number of distorted markers. Similar to reports in other crop species (van Heusden et al., 2000; Young et al., 2004; Mignouna et al., 2005a, b), the methylation sensitive *Pst* I – *Mse* I proved to be less robust compared to its methylation insensitive counterpart, *EcoR* I – *Mse* I, in generating data for linkage mapping. It has been suggested that DNA sequences are transcribed more readily from methylation sensitive regions of the genome (Cedar, 1988). The TRAP, SRAP and *Pst*-I – *Mse* I markers were included in this study for their potential to be associated with gene rich regions of the genome (Li and Quiros, 2003; Hu and Vick, 2003; Miklas et al., 2006; Cedar, 1988) as a prelude to our future goal of mapping QTLs associated with agronomic traits in these progenitor species. However, these markers have proved to be less efficient as tools for rapidly generating a large number of markers for linkage mapping, especially in genomes as large as that of sugarcane, because of the high throughput tools that would be needed to amplify numerous loci that are uniformly distributed across the genome. Miklas et al. (2006) and Li and Quiros (2003) utilized TRAP and SRAP markers, respectively, for QTL mapping by placing them onto pre-existing core maps. Most of the TRAP markers for disease resistance placed on the core map by Miklas et al. (2006) mapped to the exact same location. Liu et al. (2005) successfully used TRAP markers for linkage mapping in wheat only after lowering the initial annealing temperature. The authors conceded that the reverse primer, acting as a random primer, may have amplified fragments from various other regions in conjunction with itself. In preliminary trials, we found no tendency for TRAP primers to behave like RAPDs for the annealing temperature used in this study.

Map construction

The pseudo-test cross strategy, based on an F_1 mapping population derived from crossing between two heterozygous parents, has been proposed for mapping outcrossing diploid and polyploid species for which inbred lines cannot be readily developed (Grattapaglia and Sederoff, 1994). This strategy has been widely used along with SD markers for mapping in polyploid species including sugarcane (Wu et al., 1992; da Silva et al., 1993; Mudge et al., 1996; Hoarau et al., 2001; Garcia et al., 2006; Edmé et al., 2006). Single dose markers, as earlier mentioned, can be detected in high frequencies even in relatively small populations. For example, irrespective of the ploidy level (i.e., $2n = 4X, 6X, 8X$ and $10X$), a population size of 75 individuals is considered large enough to detect SD loci at high confidence levels (Wu et al., 1992). The appropriate frequency (> 70%) of SD markers was detected in this study using a progeny size of 100 individuals. Appropriate levels of SD markers have been reported in other sugarcane mapping studies using a progeny sizes of 84 (Mudge et al., 1996), 88 (da Silva et al., 1993) and 100 (Guimaraes et al., 1999; Garcia et al., 2006) individuals.

The pseudo-test cross strategy allows two sets of SD markers, each set specific only to one parent, to be identified resulting in two parental maps (Grattapaglia and Sederoof, 1994; Maliepaard et al., 1998). Using this strategy, several female and male linkage maps have been constructed in *Saccharum* interspecific crosses. Using RAPD markers, Mudge et al. (1996) published a map of *S.* o*fficinarum* with 51 LG spanning 1152 cM, that of Ming et al. (1998) using RFLPs included 72 LG spanning 2304 cM, whereas the map of Edmé et al. (2006) using SSRs had 25 LG covering 1180 cM. All these studies involved interspecific crosses in which *S.* o*fficinarum* was used as the female parent. Used as the male parent, the *S. spontaneum* maps from a *S.* o*fficinarum* 'Green German' x *S. spontaneum* 'IND81-146'cross published by Ming et al. (1998) and Edmé et al. (2006) contained 69 LG spanning 1303 cM and 11 LG spanning 614 cM, respectively. Comparable number of LG and map length were found in the female

(*S..officinarum* ' La Striped'; 49 LG with 1732 cM) and male (*S. spontaneum* 'SES 147B'; 45 LG with 1491 cM) maps in our study. In addition, to our knowledge, this is only the first attempt to use either or combination of AFLP, SRAP and TRAP markers for constructing linkage maps in these progenitor species of sugarcane.

The two framework maps in this study are unsaturated and cover only about 69 % and 46 % of the female and male genomes, respectively. This was quite evident from the size of some LG (2 markers) and the substantial amount (60 %) of unlinked markers. Similar percentage of unlinked markers were reported by Garcia et al., (2005) in a sugarcane mapping population containing 100 individuals in contrast to the maps of Hoarau et al. (2001), Aitken et al. (2005) and Reffay et al. (2005) who reported about 15 % of unlinked markers using populations exceeding 200 individuals. The relatively small population size and stringent LOD score (> 5.0) used in our study were probably exacerbated by the complex genetic system inherent with interspecific crosses of sugarcane, leading to the high number of unlinked markers. However, although unsaturated, the stringent LOD score (> 5.0) employed and the relatively high proportion of SD compared to non-SD markers we used in building the maps provide two levels of confidence about the robustness of the maps, leaving little opportunity for spurious linkages. In fact, some of the small LG may actually be parts of larger groups which remained unconnected (Garcia et al., 2006). Our mapping population is being reconstituted to include more individuals and markers in an effort to saturate these framework maps for future use in QTL discovery.

Segregation analyses

Although the two framework maps are far from saturated, marker segregation in the mapping population can be useful to unravel the genomic constitution and chromosomal behavior following hybridization of these two important progenitor species of modern sugarcane. For example, although not used for map construction, about 10 % of markers were simple duplex markers which are heterozygous in both parents and segregate 3:1 in the progeny. Although less informative for mapping, this class of markers may actually represent the degree of relatedness between the two mapping parents (Fig 3) and could be useful as a locus bridge to form homology groups (Grattapaglia and Sederoff, 1994; Malliepaard et al., 1998). This class of markers also portends the possibility that pairing and recombination can occur between chromosomes of the two species. In fact, *S. spontaneum* has been implicated in the ancestry of *S. officinarum* (Daniels *et al*., 1975) and *S. officinarum* genomes have been observed to contain *S. spontaneum* segments (Jannoo et al., 1998; D'Hont et al., 1989). Furthermore, using genomic *in situ* hybridization (GISH), Piperidis and D'Hont (2001) observed that between 5 to 17 % of the chromosomes in modern sugarcane cultivars had undergone recombination between the two progenitor species.

However, disparities exist between the two genomes and this can be inferred from the high proportion of distorted markers (18 % in *S. officinarum* and 14% in *S. spontaneum*) observed in this study since segregation distortion is a reflection of species relatedness or divergence (Tanksley and Nelson, 1996). Disparities exist between these two progenitor species in ploidy levels, chromosome numbers and genome size (Edmé et al., 2006; D'Hont et al., 1989). The possibility of *2n + n* transmission in the progeny only serves as an added layer of complication. All of these factors can act independently or together to effect segregation distortion. In our study, the level of distortion was similar for both parents whereas using a similar type of population, Edmé et al. (2006) reported twice as much distortion (22%) with the

female parent (*S. officinarum* 'Green German') and Ming et al. (1998) reported twice as much distortion (26%) with the male parent (*S. spontaneum* 'IND81-146').

Distorted markers may have biological significance if they are linked to lethal genes or loci with high genetic load causing inbreeding depression (Kuramoto et al., 1997; Barreneche et al., 1998). Maping may help unravel genomic regions which have high propensity for segregation distortion in sugarcane (Edmé et al., 2006). In pine (Kubisiak et al., 1995) and oak (Barreneche et al., 1998) tree maps, distorted markers tended to cluster in particular LG. In sugarcane, Edmé et al. (2006) found evidence of clustering only for one linkage group and since the distorted markers were mostly in high dosage (non-SD), they postulated a possible role for double reduction in influencing distortion in that region of the genome. In this study, adding distorted markers onto the frame work maps, acquired one (L2) and two (S18 and S34) new LG in the *S. officinarum* and *S. spontaneum* maps, respectively, which were formed exclusively from distorted markers. Distorted markers also formed new LG with previously unlinked markers (L8, L 48, S2, S42, and S45) and a few of them mapped onto two preexisting LG (L1 and L3). However, non-biological factors such as small population size and fragment-complexes consisting of non-allelic co-migrating fragments can also effect segregation distortion. At least 30 % of the distorted AFLP alleles in a conifer cross was said to have resulted from fragment-complexes (Nikaido et al., 2000). More markers and possibly a larger population size would be necessary to accurately pin point, if present, loci harboring distorted markers and ascertain if such loci have biological significance in sugarcane.

The results from segregation and linkage analyses strongly suggest that the male parent *S. spontaneum* 'SES 147B' is an autopolyploid with chromosomes undergoing random pairing (polysomic segregation). This hypothesis has held true in all the studies attempted with *S. spontaneum* so far (da Silva et al., 1993; Al-Janabi et. al., 1993; Edmé et al., 2006). For the female parent, *S. officinarum* 'La Striped', linkage analysis failed to detect markers linked in repulsion phase but segregation analysis concluded that the genome was neither undergoing strict polysomic nor disomic segregation, thereby, concurring with previous evidence that *S. officinarum* could be an autoalloploid. Several authors (Mudge et al., 1996; Al-Janabi et al., 1994; Guimaraes et al., 1999; Edmé et al., 2006) have found evidence of repulsion phase linkages in *S officinarum*, some using populations smaller than that used in this study.

In summary, framework linkage maps of the two main progenitor species (*S. officinarum* and *S. spontaneum*) of modern sugarcane were constructed using AFLP with SRAP and TRAP markers. This is only the first report using either one or a combination of AFLP, SRAP and TRAP markers to construct linkage maps in these species. SRAP and TRAP markers appear to be less effective, as compared to AFLP, as tools for rapidly generating a large number of markers for linkage mapping because of the high number of PCRs and high-throughput tools that would be required to amplify numerous loci genome-wide. However, SRAP and TRAP markers are attractive because of their potential for candidate gene analysis of QTLs, although that remains to be seen in sugarcane and is the subject of our subsequent study. Although the maps were incomplete, allele segregation in the mapping population allowed us to decipher genomic constitution and chromosomal behavior following hybridization of these two gene rich progenitor species upon which genetic improvement in sugarcane depends. Although the results revealed huge disparities in the two genomes, there seem to be enough similarity to support some level of pairing and recombination between chromosomes of the two species. Future studies are

planned to include more individuals and markers to ensure better coverage of the genome in preparation for marker-assisted selection.

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Table 1. The primer sequences (5'→3') used in the SRAP PCR amplifications.

Primer sequences	Primer labeling †
Reverse primers	
GAC TGC GTA CGA ATT AAT	IR-700 dye
GAC TGC GTA CGA ATT TGC	IR-700 dye
GAC TGC GTA CGA ATT GAC	IR-800 dye
GAC TGC GTA CGA ATT TGA	IR-800 dye
GAC TGC GTA CGA ATT AAC	IR-700 dye
GAC TGC GTA CGA ATT GCA	IR-700 dye
GAC TGC GTA CGA ATT CAA	IR-800 dye
GAC TGC GTA CGA ATT CAC	IR-800 dye
CGT AGC GCG TCA ATT ATG	IR-700 dye
GGA ACC AAA CAC ATG AAG A	IR-800 dye
Forward Primers	
TGA GTC CAA ACC GGA TA	-
TGA GTC CTT TCC GGT AA	-
TGA GTC CTT TCC GGT CC	-
TGA GTC CAA ACC GGA CC	-
TGA GTC CAA ACC GGA AG	-
TGA GTC CTT TCC GGT TAA	-

† Only the reverse primers were labeled with either the IR-700 or IR-800 dye to enable detection of amplified bands on the LI-COR DNA analyzer.

Table 2. The fixed/forward primer sequences (5'→ 3') used in the TRAP PCR amplifications.

Gene/EST	Fixed primer sequence	NCBI GenBank accession number†
Sucrose Synthase (SuSy)	GGAGGAGCTGAGTGTTTC	AF263384
Soluble Acid Invertase (SAI)	AGGACGAGACCACACTCT	AF062735
Calcium Dependent Protein Kinase (CDPK)	ACAGAACCACCAAAGGAG	CF572977

† The fixed primers were designed from gene/EST sequences obtained from the NCBI GeneBank. The reverse primers were similar to SRAP reverse primers listed in Table 1.

Table 3. Summary statistics of AFLP, SRAP and TRAP polymorphic markers segregating in the single dose (1:1) and double dose (3.3:1) ratios, and that deviated from these ratios (distorted markers) in the mapping population.†

	Polymorphic markers	Single dose markers	Double dose markers	Distorted markers
		35 AFLP primer combinations		
Total	409	318(78)	50(12)	41(10)
Range	4-29	3-15	0-6	0-7
Average	11.68	9.05	1.42	1.17
		32 SRAP primer combinations		
Total	160	92(58)	21(13)	47(29)
Range	1-10	0-8	0-2	0-4
Average	5	2.87	0.65	1.46
		17 TRAP primer combinations		
Total	81	59(73)	5(6)	17(21)
Range	1-12	0-8	0-1	0-3
Average	4.76	3.47	0.29	1.00

† Values in parenthesis indicate percentages

Table 4. Summary of AFLP, SRAP and TRAP polymorphic markers segregating in the single dose (1:1) and double dose (3.3:1) ratios, and that deviated from these ratios (distorted markers) in the two *Saccharum* parental species. †

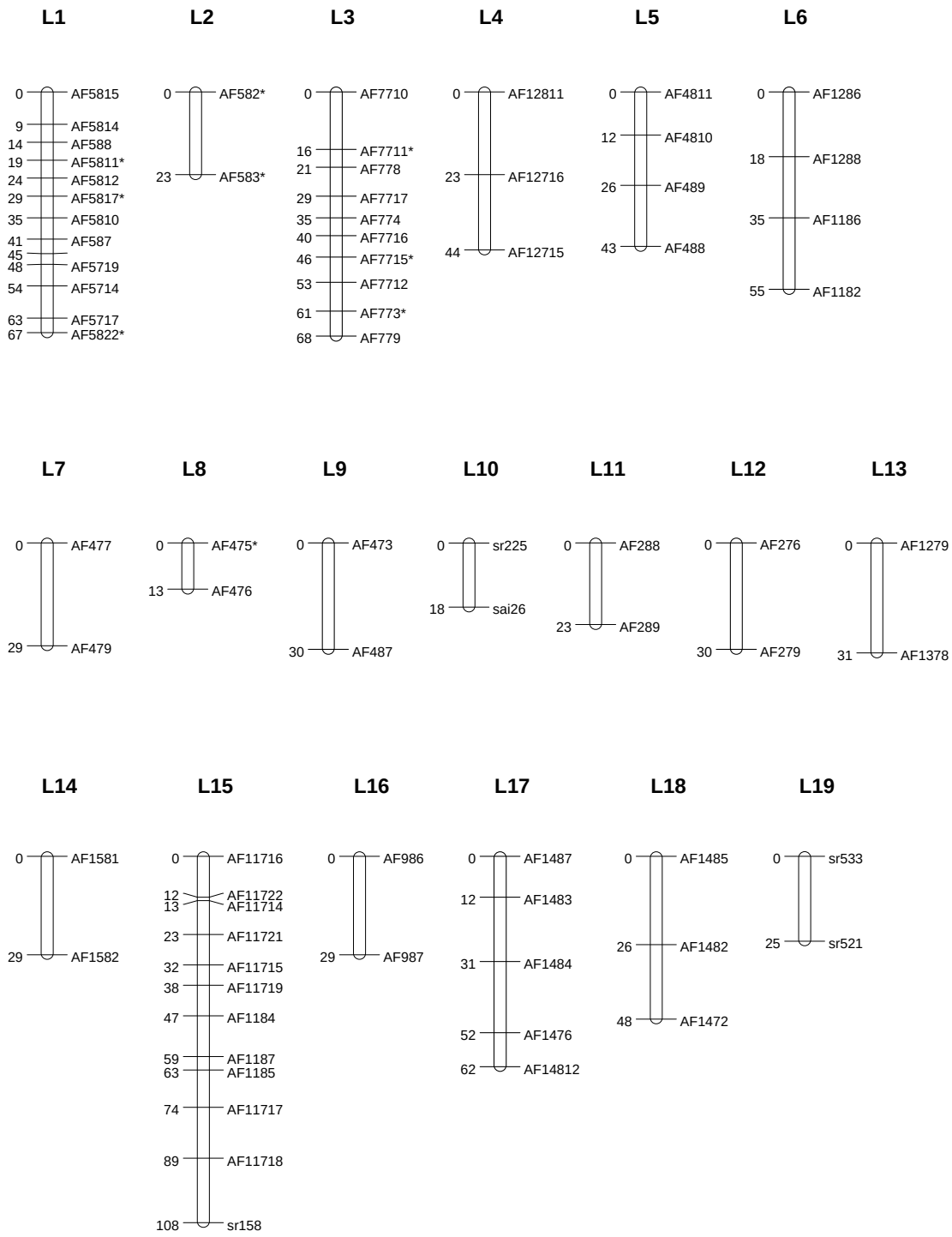
Marker type	Polymorphic markers	Single dose markers	Double dose markers	Distorted markers
		S. officinarum		
AFLP	233	183 (78)	20 (9)	30 (13)
EcoR I-*Mse* I	155	122 (79)	5 (3)	28 (18)
Pst I-*Mse* I	78	61 (78)	15 (19)	2 (3)
SRAP	75	37 (49)	11 (15)	27 (36)
TRAP	36	27 (74)	2 (6)	7 (20)
Total	344	247 (72)	33 (9)	64 (19)
		S. spontaneum		
AFLP	176	135 (77)	30 (17)	11 (6)
EcoR I-*Mse* I	94	76 (81)	8 (9)	10 (10)
Pst I-*Mse* I	82	59 (72)	22 (27)	1 (1)
SRAP	85	54 (64)	10 (12)	21 (25)
TRAP	45	32 (71)	3 (7)	10 (22)
Total	306	221 (72)	43 (14)	42 (14)

† Values in parenthesis indicate percentages

Table 5. Results from χ^2 tests to detect the type of ploidy in *S. officinarum and S. spontaneum* parents used in the study.

Marker class	Observed	Expected	
		Autoploid	Alloploid
		S. officinarum	
Single dose markers	247	218 (0.78)	210 (0.75)
Double dose markers	33	62 (0.22)	70 (0.25)
Total	280	0.00001*	0.000001*
		S. spontaneum	
Single dose markers	221	209 (0.79)	198 (0.75)
Double dose markers	43	55 (0.21)	66 (0.25)
Total	264	0.068^{NS}	0.001*

*, NS Indicates significance and non-significance at P = 0.05, respectively.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19 AF5811*
24 AF5812
29 AF5817*
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41 AF587
45
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54 AF5714
63 AF5717
67 AF5822*
L2
0 AF582*
23 AF583*
L3
0 AF7710
16 AF7711*
21 AF778
29 AF7717
35 AF774
40 AF7716
46 AF7715*
53 AF7712
61 AF773*
68 AF779
L4
0 AF12811
23 AF12716
44 AF12715
L5
0 AF4811
12 AF4810
26 AF489
43 AF488
L6
0 AF1286
18 AF1288
35 AF1186
55 AF1182
L7
0 AF477
29 AF479
L8
0 AF475*
13 AF476
L9
0 AF473
30 AF487
L10
0 sr225
18 sai26
L11
0 AF288
23 AF289
L12
0 AF276
30 AF279
L13
0 AF1279
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L14
0 AF1581
29 AF1582
L15
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12 AF11722
13 AF11714
23 AF11721
32 AF11715
38 AF11719
47 AF1184
59 AF1187
63 AF1185
74 AF11717
89 AF11718
108 sr158
L16
0 AF986
29 AF987
L17
0 AF1487
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L19
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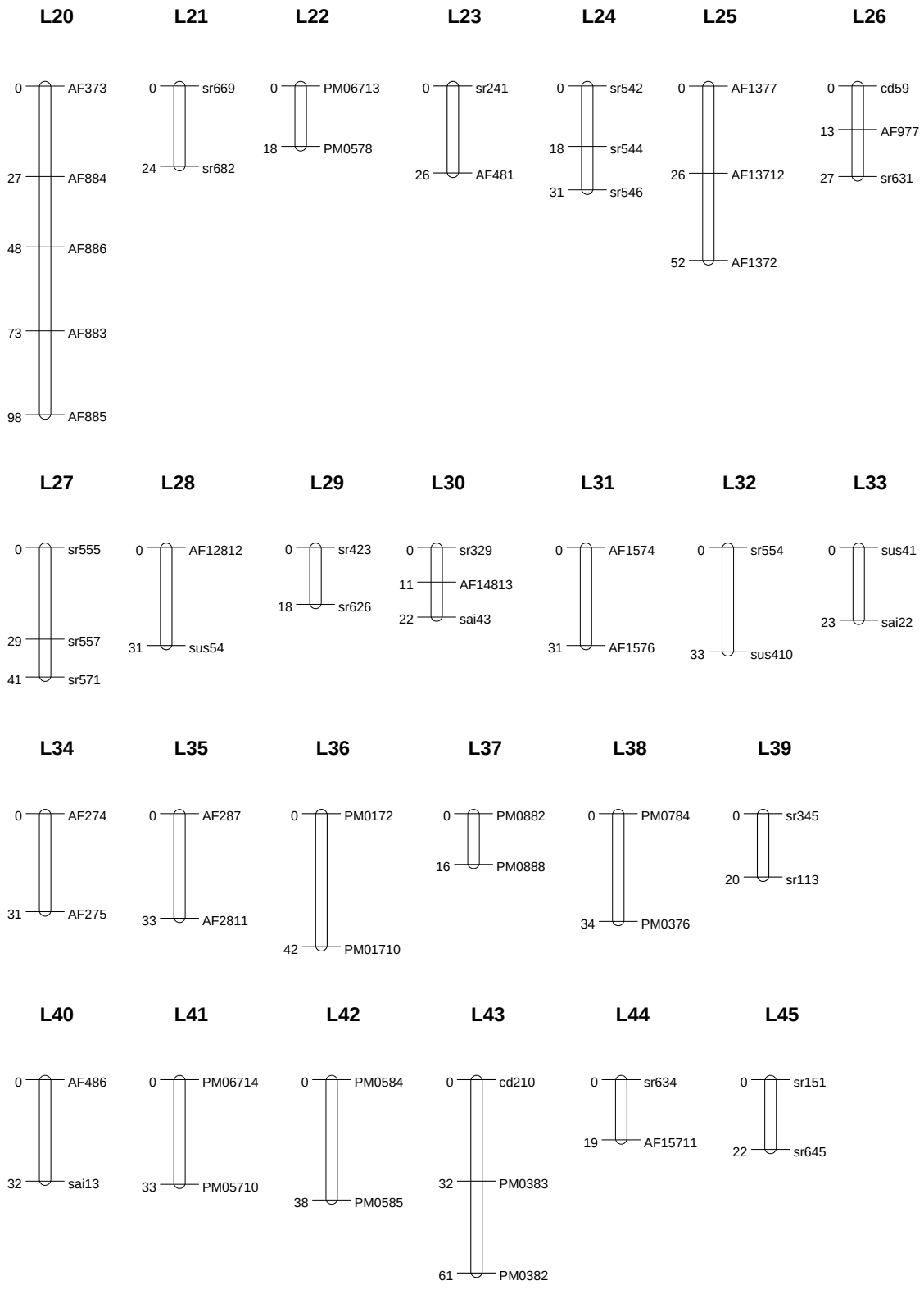
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26 AF481
L24
0 sr542
18 sr544
31 sr546
L25
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26 AF13712
52 AF1372
L26
0 cd59
13 AF977
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29 sr557
41 sr571
L28
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31 sus54
L29
0 sr423
18 sr626
L30
0 sr329
11 AF14813
22 sai43
L31
0 AF1574
31 AF1576
L32
0 sr554
33 sus410
L33
0 sus41
23 sai22
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31 AF275
L35
0 AF287
33 AF2811
L36
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L37
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L38
0 PM0784
34 PM0376
L39
0 sr345
20 sr113
L40
0 AF486
32 sai13
L41
0 PM06714
33 PM05710
L42
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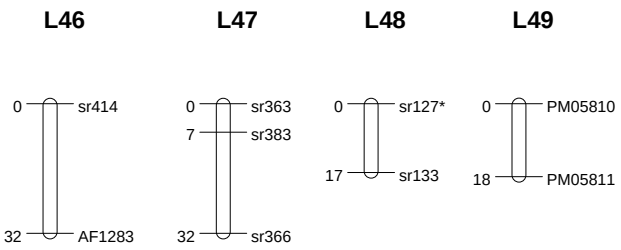
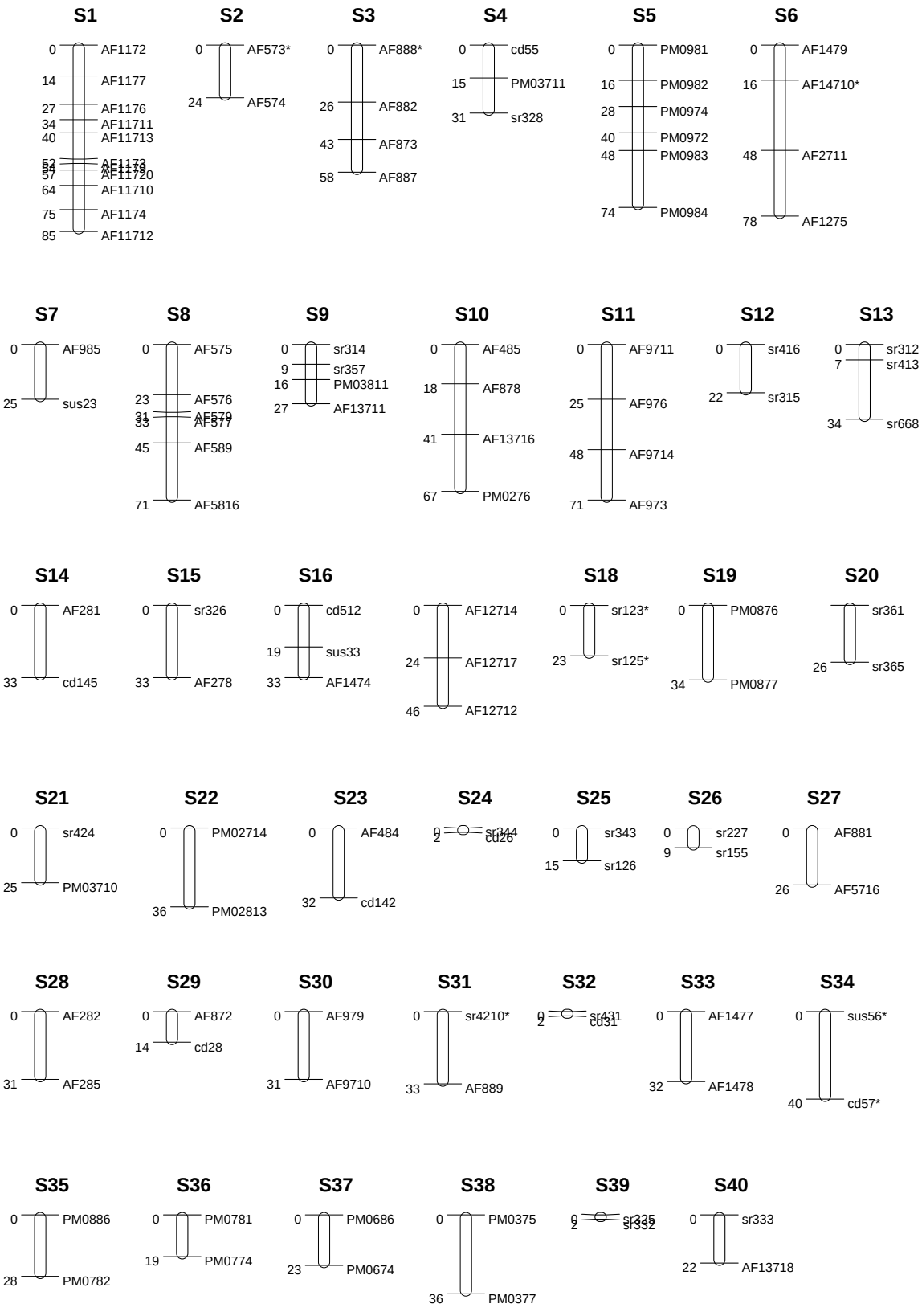


Fig. 1. Molecular marker linkage map of *S. officinarum* 'La Striped'. The map was constructed with a LOD score of > 5.0 and a recombination fraction of 0.45 using AFLP, SRAP and TRAP markers. Only single dose (1:1), double dose (3.3:1) and distorted markers were used to construct the linkage map. The Kosambi map distances (cM) and marker names are indicated on the left and right sides, respectively, of each linkage group. AFLP markers are denoted by 'AF' or 'PM', SRAP markers are denoted by 'sr' and the rest of the markers are TRAP markers. The numbers in each marker name represent the code used in our lab for primer combination along with the size of the band. The marker names with an asterix (*) represent distorted markers.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54 AF1179
57 AF11720
64 AF11710
75 AF1174
85 AF11712
S2
0 AF573*
24 AF574
S3
0 AF888*
26 AF882
43 AF873
58 AF887
S4
0 cd55
15 PM03711
31 sr328
S5
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16 PM0982
28 PM0974
40 PM0972
48 PM0983
74 PM0984
S6
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16 AF14710*
48 AF2711
78 AF1275
S7
0 AF985
25 sus23
S8
0 AF575
23 AF576
31 AF579
33 AF577
45 AF589
71 AF5816
S9
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9 sr357
16 PM03811
27 AF13711
S10
0 AF485
18 AF878
41 AF13716
67 PM0276
S11
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25 AF976
48 AF9714
71 AF973
S12
0 sr416
22 sr315
S13
0 sr312
7 sr413
34 sr668
S14
0 AF281
33 cd145
S15
0 sr326
33 AF278
S16
0 cd512
19 sus33
33 AF1474
0 AF12714
24 AF12717
46 AF12712
S18
0 sr123*
23 sr125*
S19
0 PM0876
34 PM0877
S20
sr361
26 sr365
S21
0 sr424
25 PM03710
S22
0 PM02714
36 PM02813
S23
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32 cd142
S24
0 sr344
2 cd26
S25
0 sr343
15 sr126
S26
0 sr227
9 sr155
S27
0 AF881
26 AF5716
S28
0 AF282
31 AF285
S29
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S30
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S36
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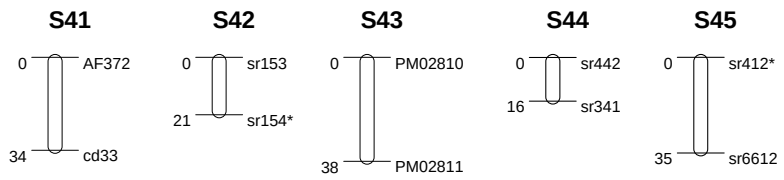

Fig. 2. Molecular marker linkage map of *S. spontaneum* 'SES 147B'. The map was constructed with a LOD score of > 0.5 and a recombination fraction of 0.45 using AFLP, SRAP and TRAP markers. Only single dose (1:1), double dose (3.3:1) and distorted markers were used to construct the linkage map. The Kosambi map distances (cM) and marker names are indicated on left and right sides, respectively of each linkage group. AFLP markers are denoted by 'AF' or 'PM', SRAP markers are denoted by 'sr' and the rest of the markers are TRAP markers. The numbers in each marker name represent the code used in our lab for primer combination along with size of the band. The marker names with an asterix (*) represent distorted markers.

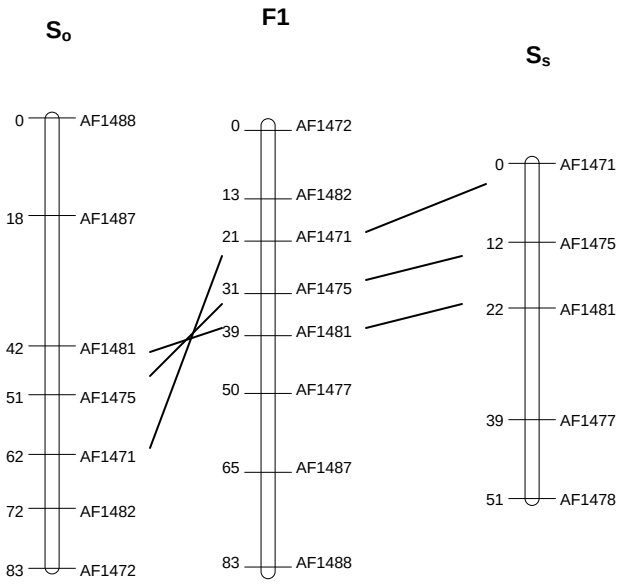

Fig. 3. An example of simple duplex markers mapping in *Saccharum* species. Simple duplex markers (common to both parents and segregate in 3:1 ratio in progeny) along with single dose (1:1), double dose (3.3:1) and distorted markers were used to construct the F_1 consensus linkage map and parental maps. S_o and S_s are linkage groups from the *Saccharum officinarum* and *S. spontaneum* maps, respectively, whereas F_1 is a linkage group from a consensus map of the two parents. The black lines represent the simple duplex markers common to both parents.