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Evaluation of New Canal Point Sugarcane Clones

2005–2006 Harvest Season

Abstract

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Thirty-three replicated experiments were conducted on 15 farms (representing 5 organic and 4 sand soils) to evaluate 55 new Canal Point (CP) and 19 new Canal Point and Clewiston (CPCL) clones of sugarcane from the CP 01, CP 00, CP 99, CP 98, CPCL 98, CPCL 97, CPCL 96, and CPCL 95 series. Experiments compared the cane and sugar yields of the new clones, complex hybrids of Saccharum spp., primarily with yields of CP 72-2086, CP 89-2143, and CP 78-1628, all major sugarcane cultivars in Florida. Each clone was rated for its susceptibility to diseases. Based on results of these and previous years' tests, no new clones were released for commercial production in Florida. The audience for this publication includes growers, geneticists and other researchers, extension agents, and individuals who are interested in sugarcane cultivar development.

Keywords: Histosol, muck soil, organic soil, *Puccinia melanocephala, Saccharum* spp., *Sporisorium scitaminea,* stability, sugarcane cultivars, sugarcane rust, sugarcane smut, sugarcane yields, sugar yields.

While supplies last, single copies of this publication can be obtained at no cost from Barry Glaz, USDA-ARS-SAA, U.S. Sugarcane Field Station, 12990 U.S. Highway 441 N, Canal Point, FL 33438; or by e-mail at Barry.Glaz@ars.usda.gov.

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Contents

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2005–2006 Harvest Season

B. Glaz, R.W. Davidson, S.B. Milligan, J.C. Comstock, S.J. Edmé, and R.A. Gilbert

Breeding and selection for clones that can be used for commercial production of sugarcane, complex hybrids of *Saccharum* spp., support the continued success of this crop in Florida. Though production of sugar per unit area is a principal selection characteristic, it is not the only factor on which sugarcane is evaluated. In addition, analyses are made on the concentration of sugar and on the fiber content of the cane. The economic value of each clone integrates its harvesting, transportation, and milling costs with its expected returns from sugar production. Deren et al. (1995) developed an economic index for clonal evaluation in Florida. Evaluation of clonal suitability also includes its reactions to endemic pathogens.

This report summarizes the cane production and sugar yields of the clones in the plant-cane, first-ratoon, and second-ratoon stage IV experiments sampled in Florida's 2005–2006 sugarcane harvest season. This information is used to identify commercial cultivars in Florida and identify clones with useful characteristics for the Canal Point and other sugarcane breeding programs. The information is also used by representatives of other sugar industries to request Canal Point clones.

The time of year and the duration that a clone yields its highest amount of sugar per unit area is important because the Florida sugarcane harvest season extends from October to April. Because sugarcane is commercially grown in plant and ratoon crops, clones are evaluated accordingly. Adaptability to mechanical harvesters is an important trait in Florida. All sugarcane sent to Florida mills and much of the sugarcane used for planting are mechanically harvested. Before a new clone is released, Florida growers judge its acceptability for mechanical operations.

Clones with desired agronomic characteristics also must be productive in the presence of harmful diseases, insects, and weeds. Some pathogens rapidly develop new, virulent races or strains. Because of these changes in pathogen populations, clonal resistance is not considered permanent. The selection team must try not to discard clones that have sufficient resistance or tolerance to pests, but it also must discard clones that are too susceptible to pests to be grown commercially.

The disease that has caused the most difficulty in Florida in selecting resistant sugarcane cultivars has been sugarcane rust, caused by *Puccinia melanocephala* Syd & P. Syd. Florida sugarcane growers and scientists have had the most success in selecting resistant cultivars for sugarcane smut, caused by *Sporisorium scitaminea* Syd & P. Syd. Other diseases they must contend with are leaf scald, caused by *Xanthomonas albilineans* (Ashby) Dow; sugarcane yellow leaf virus, a disease caused by a luteovirus (Lockhart et al. 1996); sugarcane mosaic strain E.; and ratoon stunting, caused by *Leifsonia xyli* subsp. *xyli* Evtsuhenko et al., which has probably been the most damaging, though the least visible, sugarcane disease in Florida. A program to improve resistance of CP clones to ratoon stunting is underway (Comstock et al. 2001).

Scientists at Canal Point also screen clones in their selection program for resistance to rust, smut, leaf scald, sugarcane yellow leaf virus, mosaic, ratoon stunting, and eye spot caused by *Bipolaris sacchari* (E.J. Butler) Shoemaker. Eye spot is not currently a commercial problem in Florida.

Glaz is a research agronomist; Milligan and Edmé are research geneticists; and Comstock is a research plant pathologist, U.S. Department of Agriculture, Agricultural Research Service, U.S. Sugarcane Field Station, Canal Point, FL. Davidson is a research assistant, Florida Sugar Cane League, Inc., Clewiston, FL. Gilbert is an associate professor in agronomy, Everglades Research and Education Center, Institute of Food and Agricultural Sciences, University of Florida, Belle Glade, FL.

Sugarcane growers in Florida rely much more on tolerance to sugarcane diseases than on resistance. In the 2005 growing season, 8 cultivars comprised 90.4 percent of Florida's sugarcane (Glaz 2006). Seven of these eight cultivars—CP 72-2086, CP 73-1547, CP 78-1628, CP 80-1743, CP 84-1198, CP 88-1762, and CP 89-2143—were at least moderately susceptible to one or more of the following sugarcane diseases: rust, mosaic, leaf scald, smut, and ratoon stunting. Only CL 77-797 (2.1 percent of Florida's sugarcane) was not susceptible to any of these diseases. Glaz et al. (1986) presented a formula and procedure to help growers distribute their available sugarcane cultivars while considering possible attacks of new pests.

Some growers minimize losses by planting stalks that do not contain the bacteria that cause ratoon stunting. This can be accomplished by planting with stalks that have been treated with hot-water therapy that kills the ratoon stunting bacteria or by using disease-free stalks derived from meristem tissue culture.

Damaging insects in Florida are the sugarcane borer, *Diatraea saccharalis* (F.); the sugarcane lace bug, *Leptodictya tabida*; the sugarcane wireworm, *Melanotus communis*; the sugarcane grub, *Ligyrus subtropicus*; and the West Indian cane weevil, *Metamasius hemipterus* (L.).

Winter freezes are common in the region of Florida where much of the sugarcane is produced. The severity and duration of a freeze and the tolerance of specific sugarcane cultivars are the major factors that determine how much damage occurs. The damage caused by such freezes ranges from no damage to death of the mature sugarcane plant. The rate of deterioration of juice quality after a freeze depends on the ambient air temperature: Warmer post-freeze temperatures result in more rapid deterioration of juice quality. Freezes also damage young sugarcane plants. Stalk populations may decline after severe freezes kill aboveground parts of recently emerged plants. The most severe damage occurs when the growing point is frozen, which is more likely if the plant has emerged from the soil. Tai and Miller (1996) reported that resistance to a light freeze (-1.7 ^{o}C to -2.8 ^{o}C) was not significantly correlated to fiber content, but resistance to a moderate freeze (-5.0 ^{o}C) was.

Each year at Canal Point, 50,000 to 100,000 seedlings are evaluated from crosses derived from a diverse germplasm collection. However, Deren (1995) suggested that the genetic base of U.S. sugarcane breeding programs was too narrow. About 85 percent of the cytoplasm in commercial sugarcane was *Saccharum officinarum*. This year, about half of the parental clones in our program originated from Canal Point, while the other half were developed by the United States Sugar Corporation (USSC) (CL clones). Additional parents originate from Louisiana or Texas breeding programs.

The USSC, based in Clewiston, Florida, recently discontinued its breeding program. Approximately the top 25 percent of clones in all selection stages from the USSC program were donated to the Canal Point program. Clones from the USSC program have traditionally been designated with a CL (Clewiston) prefix. Donated clones included in at least one CP evaluation trial will have a CPCL (Canal Point and Clewiston) designation and retain their USSC numbers.

The seedling stage planted in 2006 contained approximately 51,000 new clones that were planted from seeds. Once selected as seedlings, clones are vegetatively propagated. Because of this vegetative propagation, from this stage (seedling stage) on in the selection program, each plant (clone) is genetically identical to its precursor, assuming no mutations. The stage I trial selected from approximately 66,000 seedlings and planted in the winter of 2006 contained 10,722 new clones. Of these clones, 9,058 (84.5%) were CP clones and 1,664 (15.5%) were CPCL clones. The clones in the stage II trial, planted in 2006, were selected from this stage I trial and had 1,567 new clones: 1,151 (73.5%) were CP clones and 416 (26.5%) were CPCL clones. The 2006 plant-cane stage

III trial had 135 new clones (28 CP clones and 107 CPCL clones) that were tested in replicated experiments on 4 grower farms. Each of the first three stages (seedling, stage I, and stage II) was evaluated for 1 year in the plant-cane crop at Canal Point. Selection is visual in the seedling phase. In stage I, the first selection process is visual. The clones that are selected visually are then analyzed with a hand-punch Brix, and heavy emphasis is placed on Brix results. The primary selection criteria for stage II and all subsequent stages are sugar yield (in metric tons of sugar per hectare), theoretical recoverable sucrose, cane tonnage, and disease resistance.

The 135 stage III clones are evaluated for 2 years, in the plant-cane and first-ratoon crops, in commercial sugarcane fields at four locations—three with organic soils and one with a sand soil. The 13 to 14 most promising clones identified in stage III receive continued testing for 4 more years in the stage IV experiments where they are planted in successive years and evaluated in the plant-cane, first-ratoon, and second-ratoon crops. Clones that successfully complete these experimental phases undergo 2 to 4 years of evaluation and expansion by the Florida Sugar Cane League, Inc., before commercial release. Some of the League's evaluation occurs concurrently with the stage IV evaluations. The Canal Point selection program is summarized in appendix 1.

Clones with characteristics that may be valuable for sugarcane breeding programs are identified throughout the selection process. Even though the Canal Point program breeds and selects sugarcane in Florida, some CP clones have been productive commercial cultivars in Texas and outside of the United States. Sugarcane geneticists in other programs often request clones from Canal Point. From May 2005 to April 2006, CP clones or seeds were requested from and sent to the People's Republic of China, Costa Rica, Guatemala, Nicaragua, and Panama.

Test Procedures

In 28 experiments, 55 new CP clones were evaluated. Thirteen clones of the CP 01 series were evaluated at eight farms in the plant-cane crop. Fourteen clones of the CP 00 series were evaluated at two farms in the plant-cane crop and at eight farms in the first-ratoon crop. Fourteen clones of the CP 99 series were evaluated at one farm in the first-ratoon crop and at eight farms in the second-ratoon crop. Fourteen clones of the CP 98 series were evaluated at one farm in the second-ratoon crop. In 5 first-ratoon experiments, 19 new CPCL clones of the 98, 97, 96, and 95 series were evaluated; 1 was evaluated at 5 locations, 1 was evaluated at 3 locations, 1 was evaluated at 1 location, and 16 were evaluated at 2 locations.

CP 89-2143 was the primary reference clone for yields of TS/H and TC/H in all plant-cane experiments and for yields of TC/H, KS/T, and TS/H in all experiments involving new CPCL clones. For experiments of new CP and CPCL clones on sand soils, CP 78-1628 was an important secondary reference clone. CP 89-2143 was the second most widely grown cultivar on organic soils and CP 78-1628 the most widely grown cultivar on sand soils in Florida in 2005 (Glaz 2006). CL 77-797 was also a secondary reference clone in some CPCL experiments. CP 72-2086 and CP 89-2143 were used as reference clones in the first- and second-ratoon experiments of the CP 00, CP 99, and CP 98 series. CP 72-2086 was used as the primary reference clone for KS/T in all experiments of CP clones. CP 72-2086 and CL 77-797 were the fifth and seventh most widely grown cultivars, respectively, in Florida in 2005 (Glaz 2006). In the first- and second-ratoon CP 00 and CP 99 experiments, CP 89-2143 on organic soils and CP 78-1628 on sand soils were secondary reference clones.

Agronomic practices, such as fertilization, pest and water control, and cultivation were conducted by the farmer or farm manager responsible for the field in which each experiment was planted.

All five experiments at Okeelanta Corporation (Okeelanta) south of South Bay were conducted on Dania muck soil. Also, the first-ratoon experiment at Knight Management, Inc., (Knight) southwest of 20-Mile Bend was conducted on Dania muck. As described by Rice et al. (2002), Dania muck is the shallowest of the organic soils comprised primarily of decomposed sawgrass (*Cladium jamaicense* Crantz) in the Everglades Agricultural Area. The maximum depth to the bedrock of Dania muck is 51 cm. The other organic soils similar to Dania muck are Lauderhill muck (51 to 91 cm depth to bedrock), Pahokee muck (91 to 130 cm to bedrock), and Terra Ceia muck (more than 130 cm to bedrock).

All experiments at Wedgworth Farms, Inc. (Wedgworth) east of Belle Glade and at Sugar Farms Cooperative North—SFI Region S05 (SFI) near 20-Mile Bend in Palm Beach County were conducted on Lauderhill muck. In addition, the plant-cane and first-ratoon experiments at A. Duda and Sons', Inc. (Duda) southeast of Belle Glade and Sugar Farms Cooperative North—Osceola Region S03 (Osceola) east of Canal Point were conducted on Lauderhill muck as were the plant-cane and second-ratoon experiments at Knight.

The second-ratoon experiments at Duda and Osceola were conducted on Pahokee muck. The first-ratoon experiment at United States Sugar Corporation—Ritta (Ritta) east of Clewiston was conducted on Terra Ceia muck.

The two experiments at Eastgate Farms, Inc. (Eastgate) north of Belle Glade, and the first-ratoon experiments at United States Sugar Corporation—Bryant (Bryant) southeast of Canal Point, and at United States Sugar Corporation—Prewitt (Prewitt) north of Belle Glade were conducted on Torry muck. The three experiments at Hilliard Brothers of Florida, Ltd. (Hilliard) west of Clewiston were on Malabar sand. The three experiments at Lykes Brothers, Inc. (Lykes) near Moore Haven in Glades County were on Pompano fine sand. The first-ratoon experiment at United States Sugar Corporation—Benbow (Benbow) was on Margate/Oldsmar sand and the two first-ratoon experiments at United States Sugar Corporation—Townsite (Townsite) were on Margate sand.

The CP 00 series plant-cane and the CP 98 series second-ratoon experiments at Okeelanta were planted on fields in successive sugarcane rotations. In this rotation in Florida, a new crop of sugarcane is planted within about 2 months of the previous sugarcane harvest. All other experiments were planted in fields that had not been cropped to sugarcane for approximately 1 year. In all experiments, clones were planted with two lines of stalks per furrow in plots arranged in randomized-complete-block designs. All experiments of the CP clones had six replications. All experiments of the CPCL clones had three replications.

Each plot of new CP clones had three rows, a border row, and two inside rows used for yield determination. These two rows were 10.7 m long and 3.0 m wide (0.0032 ha). The distance between rows was l.5 m, and 1.5-m alleys separated the front and back ends of the plots. The outside row of each plot was a border row and was usually planted with the same clone as the inside two rows. An extra 1.5 m of sugarcane protected each row at the front and back of each test.

Each plot of new CPCL clones had four rows, two border rows, and two inside rows used for yield determination. These rows were 10.7 m long and 3.0 m wide. The distance between rows was l.5 m, and 4.5-m alleys separated all four sides of all plots. There was no sugarcane planted at the front or back of CPCL tests.

Samples of 10 stalks were cut from unburned cane from a middle row of each plot in each experiment between October 11, 2005, and February 22, 2006. In addition, preharvest samples were cut from two replications of nine CP plant-cane experiments and one CPCL first-ratoon experiment between October 11 and November 28, 2005. Once a stool of sugarcane was chosen for cutting, the next 10 stalks in the row were cut as the 10-stalk sample. The range of sample dates for each crop was as follows:

Plant-cane crop...........Dec. 15, 2005 to Feb. 16, 2006

First-ratoon crop ....Dec. 6, 2005 to Feb. 22, 2006

Second-ratoon crop....Oct. 11, 2005 to Dec. 7, 2005

After each stalk sample was transported to the Agricultural Research Service's Sugarcane Field Station at Canal Point, FL, for weighing and milling, crusher juice from the milled stalks was analyzed for Brix and pol, and theoretical recoverable yield of 96° sugar (in kg per metric ton of cane: KS/T) was determined as a measure of sugar content. The fiber percentage of each clone was also used to calculate theoretical recoverable yield (Legendre 1992). Brix and pol were usually estimated by near infrared reflectance spectroscopy (NIRS); actual Brix and pol were measured for samples with unacceptable NIRS calibrations.

A fiber percentage of 10 was assigned to 10 CPCL clones because fiber percentages were not previously determined for these clones. Using 5-stalk samples collected from border rows, an average of 4 fiber samples were calculated for the remaining CPCL clones and an average of 14, 10, 14, and 6 fiber samples were calculated for the clones of the CP 98, CP 99, CP 00, and CP 01 series, respectively. Leaves were stripped from these stalks, which were then cut into three approximately even sections (bottom, middle, and top stalk sections). Two randomly selected bottom, middle, and top sections were processed through a Jeffco1 cutter-grinder (Jeffries Brothers, Ltd., Brisbane Queensland, Australia). About 400 g of material (bagasse) processed through the cutter-grinder was collected and weighed. Juice was extracted from the bagasse by pressing it at 69 MPa for 30 seconds. The pressed bagasse was then weighed, crumbled, placed in cloth bags, washed twice in a washing machine, and dried at 105 °C for about 1 week. The percentage of the pressed bagasse to the total material pressed was labeled as "bagasse percent cane." The percentage of the dried bagasse to the pressed bagasse was labeled as "fiber percent bagasse." The fiber percentage of a clone was its bagasse percent cane × its fiber percent bagasse. Samples of a reference clone were processed on all dates that fiber samples of new clones were processed. All fiber percentages calculated on a given day were corrected to the historical fiber percentage of the reference clone.

Total millable stalks per plot were counted between June 14 and September 30, 2005. Cane yields (in metric tons per hectare: TC/H) were calculated by multiplying stalk weights by number of stalks. Theoretical yields of sugar (in metric tons per hectare: TS/H) were calculated by multiplying TC/H by KS/T and dividing by 1,000.

Prior to their advancement to stage IV, CP clones were evaluated in separate tests by artificial inoculation for susceptibility to sugarcane smut, sugarcane mosaic virus, leaf scald, and ratoon stunt. CP clones were inoculated in stage II plots to determine eye spot susceptibility. Since being advanced to stage IV, separate artificial-inoculation tests were repeated on CP clones for smut, ratoon stunting, mosaic, and leaf scald and on CPCL clones for mosaic and leaf scald. Each clone was also field rated for its emergence, early plant height, tillering, and shading, as well as for its reactions to natural infection by sugarcane smut, sugarcane rust, sugarcane mosaic virus, and leaf scald in stage IV.

Statistical analyses of the stage IV experiments were based on a mixed model using SAS software (SAS version 9.1, 2003; SAS Institute, Cary, NC) with clones as fixed effects and locations and replications as random effects. Least squares means were calculated for clones. Means of locations were estimated by empirical best linear unbiased predictors. Significant differences were sought at the 10 percent probability level. Differences among clones were tested by the least significant difference (*LSD),* which was used regardless of significance of F-ratios to protect against high type-II error rates (Glaz and Dean 1988). The mean square error of the clone

× location interaction was the error term used to calculate this *LSD*. Clones that had significantly higher yields than the reference clone were also identified by individual t tests calculated by SAS. Values of *LSD* were also calculated to approximate significant differences among locations using the mean square error of replications within locations as the error term.

Results and Discussion

Table 1 lists the parentage, percentage of fiber, and reactions to smut, rust, leaf scald, mosaic, and ratoon stunting for each clone included in these experiments. Tables 2–5 contain the results of the CP 01 plant-cane experiments, and tables 6–7 contain the results of the CP 00 plant-cane experiments. Tables 8–10 contain the results of the CP 00 first-ratoon experiments, and table 11 contains the results of the CP 99 first-ratoon experiments. Tables 12–14 contain the results of the CP 99 second-ratoon experiments, and table 15 contains the results of the CP 98 second-ratoon experiments. Tables 16–18 contain the results of the CPCL first-ratoon experiments. Table 19 gives the dates that stalks were counted in each experiment.

Plant-Cane Crop, CP 01 Series

When averaged across all eight locations, seven new clones—CP 01-2390, CP 01-1378, CP 01-1372, CP 01-1178, CP 01-2459, CP 01-1957, and CP 01-1338—yielded significantly more TS/H (metric tons of sugar per hectare) and TC/H (metric tons of cane per hectare) than CP 89-2143 (tables 2 and 5). However, none of these clones had significantly higher preharvest or harvest KS/T (theoretical recoverable yield of 96^{o} sugar in kg per metric ton of cane) than CP 89-2143 (tables 3–4). CP 01-1378 had significantly higher TS/H yields than all clones except CP 01-2390 and CP 01-1372. CP 01-1338 and CP 01-1957 had significantly lower preharvest and harvest KS/T than CP 72-2086, and CP 01-2390 had significantly lower harvest KS/T than CP 72-2086. At Hilliard and Lykes, the locations with sand soils, CP 01-2390 and CP 01-1372 had significantly higher yields of TC/H and TS/H than those of CP 78-1628 (tables 2 and 5). Preharvest and harvest KS/T yields were similar at Hilliard and Lykes among CP 01-2390, CP 01-1372, and CP 78-1628 (tables 3–4).

The Florida Sugar Cane League, Inc., has begun increasing vegetative planting material at all nine locations of CP 01-1178, CP 01-1372, and CP 01-2459 for potential release (table 1). The Florida Sugar Cane League, Inc., has also begun increasing vegetative planting material of CP 01-1378 at the locations with organic soils. CP 01-1378 is not being increased at locations with sand soils due to concerns that its susceptibility to leaf scald is not acceptable for those soils (table 1). In addition to low KS/T yields, CP 01-1338 and CP 01-1957 were not increased due to disease concerns (table 1). CP 01-2390 was not increased due to its susceptibility to smut. In addition, there are concerns regarding rust for CP 01-1178 and CP 01-2459 and leaf scald for CP 01-1372 and CP 01-2459.

Plant-Cane Crop, CP 00 Series

Last year's report contained the results from nine locations of the CP 00 series plant-cane crop. This year, plant-cane results are available from two additional locations (tables 6–7). CP 00-1748 was the only new clone that yielded significantly more TS/H than CP 89-2143 (table 7). CP 00-1748 also yielded significantly more TC/H and preharvest KS/T than CP 89-2143, and its harvest KS/T yield was similar to the harvest KS/T yields of CP 72-2086 and CP 89-2143 (tables 6–7). CP 00-1101 was the only new clone that had a significantly higher harvest KS/T than CP 89-2143 and CP 72-2086 (table 6). In addition, the preharvest KS/T of CP 00-1101 was significantly higher than that of CP 89-2143 and similar to that of CP 72-2086. Yields of TC/H and TS/H of CP 00-1101 were similar to those of CP 00-1748, but not significantly different from those of CP 89-2143 (table 7).

Based on yields previously reported, plantings of CP 00-1748 and CP 00-1101 were expanded for potential commercial release at all nine locations last year (Glaz et al. 2007). However, due to worsening susceptibilities to both rust and mosaic since that time, CP 00-1748 is no longer considered a candidate for commercial release (table 1). CP 00-1101 has no disease concerns and a fiber percentage of 9.71.

First-Ratoon Crop, CP 00 Series

When averaged across all nine farms, two new clones—CP 00-1101 and CP 00-1748—yielded significantly more TC/H, KS/T, and TS/H than CP 72-2086 (tables 8–10). In addition, CP 00-1446, CP 00-1100, CP 00-2180, and CP 00-1074, yielded significantly more TC/H and TS/H than CP 72-2086 (tables 8–9); and CP 00-1630 yielded significantly more KS/T and TS/H than CP 72-2086 (tables 9–10). CP 00-1301 and CP 72-2086 had similar TC/H and KS/T yields, but the TS/H yield of CP 00-1301 was significantly higher than that of CP 72-2086 (tables 8–10). CP 00-1751, CP 00-1252, and CP 72-2086 had similar TC/H and TS/H yields, but the KS/T yields of the two new clones were significantly higher than the KS/T yield of CP 72-2086 (tables 9–10). High yields were reported for all of these new clones last year, and all were identified as potential commercial cultivars (Glaz et al. 2007).

Last year, planting material of CP 00-2188 was also being increased for potential commercial release due to high yields at the locations with sand soils. However, this year, CP 00-2188 had high TS/H yields at Townsite but only mediocre yields at Hilliard and Lykes (table 10). Due to these lower ratoon yields, CP 00-2188 is no longer considered as a candidate for release. CP 00-1748 had high yields on sand soils last year as plant cane and again this year as first-ratoon cane.

Based on disease concerns and yields reported this year, CP 00-1074, CP 00-1252, CP 00-1748, CP 00-1751, and CP 00-2188 are no longer considered as commercial release candidates (table 1). Planting material of CP 00-1101 and CP 00-1301 is being increased for potential commercial release at all nine locations. Of these two, there are concerns regarding susceptibility to rust and mosaic for CP 00-1301. Planting material of CP 00-1630 is being increased at all muck locations except SFI where it is infected with mosaic. In addition to mosaic, there is also concern regarding the susceptibility of CP 00-1630 to leaf scald. Concerns regarding mosaic are more serious for CP 00-1100, therefore it is only being increased at locations where mosaic has not been a commercial problem—Okeelanta, Hilliard, and Lykes. CP 00-1446 and CP 00-2180 are being increased for potential commercial use on sand soils. There are no disease concerns for CP 00-2180, but rust and mosaic are concerns for CP 00-1446.

First-Ratoon Crop, CP 99 Series

No new clone yielded significantly more TS/H or KS/T than CP 89-2143 at Eastgate (table 11). CP 99-1896 yielded significantly more TC/H, but significantly less KS/T than any clone in the group.

Second-Ratoon Crop, CP 99 Series

When averaged across all eight locations, CP 99-1889 yielded significantly more TC/H and TS/H than CP 89-2143 and CP 72-2086 (tables 12 and 14). The KS/T yield of CP 99-1889 was similar to the KS/T yields of CP 89-2143 and CP 72-2086 (table 13). CP 99-1899 also had high TC/H, KS/T, and TS/H yields on the sand soil at Lykes (tables 12–14). However, CP 99-1889 is not being considered for commercial release due to its susceptibilities to rust and smut (table 1).

Second-Ratoon Crop, CP 98 Series

Two new clones—CP 98-1335 and CP 98-1029—had significantly higher yields of TC/H and TS/H than CP 89-2143 in the successively planted experiment at Okeelanta (table 15). Both new clones and CP 72-2086 had similar KS/T yields. CP 98-1029 has been released for commercial use in Florida (Edmé et al. 2006). Yields in previous tests for CP 98-1335 were not considered acceptable for commercial release.

First-Ratoon Crop, Sand Soils, CPCL 95–97 Series

No new CPCL clone at the three locations with sand soils had significantly higher mean yields of TC/H, KS/T, or TS/H than CP 78-1628 or CP 89-2143 (table 16). However, vegetative planting material of three clones from this group—CPCL 97-0393, CPCL 97-2730, and CPCL 96-0860—is being increased at locations with sand soils for potential release (table 1). All of these clones had mean KS/T, TC/H, and TS/H yields similar to those of CP 78-1628. There are no disease concerns for CPCL 97-0393, but leaf scald is a concern for CPCL 97-2730 and CPCL 96-0860 (table 1).

First-Ratoon Crop, Organic Soils, CPCL 96 Series

CPCL 96-2061 and CP 89-2143 had similar yields of TC/H and TS/H across the three locations with organic soils (table 17). However, CP 89-2143 had significantly higher preharvest and harvest KS/T yields than CPCL 96-2061 (table 18). Planting material of CPCL 96-2061 is being increased at locations with organic soils for potential release (table 1). There were no disease concerns for CPCL 96-2061 (table 1).

Summary

The CP 01 series was tested for the first time this year at eight locations in stage IV. CP 01-2390, CP 01-1378, CP 01-1372, CP 01-1178, CP 01-2459, CP 01-1957, and CP 01-1338 had high TS/H and TC/H yields. Vegetative planting material of CP 01-1178, CP 01-1372, CP 01-1378, and CP 01-2459 is being expanded by the Florida Sugar Cane League, Inc., for potential commercial release in Florida.

The CP 00 series was tested at two locations in the plant-cane crop and nine locations in the first-ratoon crop this year and at nine locations in the plant-cane crop last year. CP 00-1101 and CP 00-1748 had high TS/H, TC/H, and harvest KS/T yields. CP 00-1074, CP 00-1100, CP 00-1446, and CP 00-2180 had high TS/H and TC/H yields. CP 00-1630 had high TS/H and KS/T yields, CP 00-1301 had high TS/H yields, and CP 00-1252 and CP 00-1751 had high KS/T yields. Vegetative planting material of CP 00-1100, CP 00-1101, CP 00-1252, CP 00-1301, CP 00-1446, CP 00-1630, and CP 00-2180 is being expanded by the Florida Sugar Cane League, Inc., for potential commercial release in Florida.

The CP 99 series was tested at one location in the first-ratoon crop and eight locations in the second-ratoon crop this year, at two locations in the plant-cane crop and eight locations in the first-ratoon crop last year, and at nine locations in the plant-cane crop 2 years ago. There are no clones identified for commercial release in Florida from this group.

Stage IV testing of the CP 98 series was completed this year with one second-ratoon experiment. Previous testing of these clones included 2 years and eight locations as plant cane, 2 years and eight locations as first ratoon, and seven locations as second ratoon last year. CP 98-1029 has been released for commercial production and recommended for all soil types in Florida. Mean TC/H, KS/T, and TS/H yields of CP 98-1029 across all plant-cane through second-ratoon experiments were 132.01***, 118.2, and 15.824***, respectively; and 112.70, 119.6, and 13.684, respectively for CP 72-2086.

CPCL clones were tested at five locations in the first-ratoon crop this year, and plant-cane tests were conducted at five locations last year. Vegetative planting material of CPCL 96-0860, CPCL 96-2061, CPCL 97-0393, and CPCL 97-2730 is being expanded by the Florida Sugar Cane League, Inc., for potential commercial release in Florida.

*** Significantly higher than CP 70-1133 at the 1 percent probability level.

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Tables

Notes (tables 2–19):

1. Clonal yields approximated by least squares ($p = 0.10$) within and across locations.
2. Location yields approximated by empirical linear unbiased predictors.
3. *LSD* = least significant difference.
4. *CV* = coefficient of variation.

Table 1. Parentage, fiber content, and ratings of susceptibility to smut, rust, leaf scald, mosaic, and RSD for CL 77-0797, CP 72-2086, CP 78-1628, CP 89-2143, and 80 new sugarcane clones

	Parentage				Rating				
Clone	Female	Male	Increase status†	Percent fiber	Smut	Rust	Leaf scald	Mosaic	Ratoon stunting‡
CL 77-0797	CL 61-620	Mix 75B§	Commercial	11.34	R	R	R	R	---
CP 72-2086	CP 62-374	CP 63-588	Commercial	8.97	R	R	R	S	R
CP 78-1628	CP 65-0357	CP 68-1026	Commercial	10.39	S	S	L	R	R
CP 89-2143	CP 81-1254	CP 72-2086	Commercial	9.85	R	R	L	L	L
CP 98-1029	CP 91-1980	CP 94-1952	Commercial	10.15	R	U	L	S	S
CP 98-1107	HoCP 85-845	CP 80-1827	None	9.73	L	L	S	L	R
CP 98-1118	CL 61-0620	US 87-1006	None	9.26	R	L	R	S	L
CP 98-1139	CP 90-1151	HoCP 85-845	None	8.86	R	U	L	R	R
CP 98-1325	CP 90-1030	95 P 08§	None	8.02	R	S	R	L	L
CP 98-1335	TCP 87-3388	CP 70-1133	None	9.18	R	L	R	R	L
CP 98-1417	HoCP 85-845	CP 80-1827	None	9.53	R	L	L	L	L
CP 98-1457	CP 89-2377	CP 90-1151	None	9.11	R	L	R	L	S
CP 98-1481	HoCP 85-845	CP 88-1836	None	10.05	R	R	L	R	L
CP 98-1497	CP 91-1238	CP 87-1628	None	9.29	R	R	R	L	L
CP 98-1513	CP 90-1424	CP 87-1628	None	11.92	R	R	L	S	L
CP 98-1569	CP 80-1827	95 P 08§	None	9.91	L	L	R	S	L
CP 98-1725	CP 89-2377	CP 89-1756	None	8.33	R	U	R	L	S
CP 98-2047	CP 87-1475	Unknown	None	11.08	R	R	L	L	L
CP 99-1534	CP 89-2377	CP 89-1756	None	9.31	R	U	L	L	L
CP 99-1540	CP 90-1535	95 P 16§	None	11.28	L	S	R	L	R
CP 99-1541	CP 90-1535	95 P 16§	None	8.58	R	R	R	R	R
CP 99-1542	CP 90-1535	95 P 16§	None	11.54	R	R	L	L	L
CP 99-1686	CP 85-1382	CP 70-1133	None	10.25	L	L	L	R	R
CP 99-1865	CP 91-1795	CP 90-1151	None	9.37	L	R	L	R	R
CP 99-1889	CP 87-1475	CP 72-1210	None	12.75	S	S	L	R	L
CP 99-1893	CP 87-1475	CP 72-1210	None	9.94	R	L	L	R	S
CP 99-1894	CP 87-1475	CP 72-1210	None	11.14	R	R	L	R	L
CP 99-1896	CP 90-1204	CP 90-1436	None	10.56	R	U	R	L	S
CP 99-1944	LCP 86-454	Unknown	None	10.43	L	S	L	L	R
CP 99-2084	CP 93-1634	CP 84-1198	None	10.88	R	R	L	S	R
CP 99-2099	CP 89-2377	CP 84-1198	None	10.01	L	S	L	L	R
CP 99-3027	Unknown	Unknown	None	11.07	R	S	R	R	L

Table 1—continued. Parentage, fiber content, and ratings of susceptibility to smut, rust, leaf scald, mosaic, and RSD for CL 77-0797, CP 72-2086, CP 78-1628, CP 89-2143, and 80 new sugarcane clones

Clone	Parentage		Increase status†	Percent fiber	Rating				
	Female	Male			Smut	Rust	Leaf scald	Mosaic	Ratoon stunting‡
CP 00-1074	CP 89-2143	98 P07§	None	8.74	R	R	R	S	L
CP 00-1100	CP 89-2143	Unknown	Hilliard, Lykes, Okeelanta	8.34	R	R	R	U	R
CP 00-1101	CP 89-2143	Unknown	All	9.71	R	R	R	R	R
CP 00-1252	CP 90-1424	CP 92-1167	None	9.18	R	U	U	R	R
CP 00-1301	CP 75-1632	CP 89-2143	All	10.28	R	U	U	U	U
CP 00-1302	CP 75-1632	CP 89-2143	None	9.88	R	R	L	R	R
CP 00-1446	CP 93-1607	CP 91-1150	Sand	8.45	L	U	R	L	R
CP 00-1527	CP 80-1827	CP 92-1320	None	8.76	R	U	R	S	L
CP 00-1630	CP 92-1167	CP 92-1320	Muck except not at SFI	9.85	R	R	U	U	U
CP 00-1748	CP 81-1238	CP 89-1509	None	8.95	R	S	R	S	R
CP 00-1751	CP 81-1238	CP 89-1509	None	8.53	R	S	R	R	R
CP 00-2164	US 95-1063	US 95-1127	None	8.95	R	R	R	L	R
CP 00-2180	HoCP 91-552	Unknown	Sand	8.94	R	R	R	R	R
CP 00-2188	CP 90-1549	Unknown	None	8.43	R	R	R	R	R
CP 01-1178	CP 84-1198	CP 82-1172	All	9.02	R	U	R	R	R
CP 01-1181	CP 84-1198	CP 82-1172	None	7.78	R	U	R	R	U
CP 01-1205	CP 94-2095	CP 89-2143	None	8.61	L	U	U	S	S
CP 01-1321	CP 82-1172	CP 89-2143	None	9.66	L	S	U	S	R
CP 01-1338	CP 94-1200	CP 89-2143	None	8.70	R	U	S	R	R
CP 01-1372	CP 94-1200	CP 89-2143	All	9.03	L	R	U	R	R
CP 01-1378	CP 94-1200	CP 89-2143	Muck	9.30	R	R	S	S	S
CP 01-1391	CP 81-1384	CP 94-1528	None	8.66	R	R	U	S	R
CP 01-1564	CP 93-1634	CP 89-2143	None	10.54	R	R	U	R	R
CP 01-1957	CP 88-1762	Unknown	None	12.42	R	R	S	R	U
CP 01-2056	CP 89-2143	Unknown	None	9.88	L	R	R	S	R
CP 01-2390	CP 95-3218	CP 94-1528	None	9.36	S	U	U	R	S
CP 01-2459	US 95-1023	CP 85-1308	All	11.16	L	U	S	R	U

Table 1—continued. Parentage, fiber content, and ratings of susceptibility to smut, rust, leaf scald, mosaic, and RSD for CL 77-0797, CP 72-2086, CP 78-1628, CP 89-2143, and 80 new sugarcane clones

	Parentage				Rating				
Clone	Female	Male	Increase status[†]	Percent fiber	Smut	Rust	Leaf scald	Mosaic	Ratoon stunting[‡]
CPCL 95-0242	CL 84-3714	CL 84-4234	None	-----	L	R	R	R	-
CPCL 95-1758	CL 61-0620	CP 85-1308	None	-----	S	R	R	R	-
CPCL 95-1907	CL 84-3929	CL 83-2031	None	-----	R	R	S	R	-
CPCL 95-2293	CL 78-1120	CL 78-1600	None	-----	R	R	R	R	-
CPCL 95-2367	CL 79-2243	Mix 88L[§]	None	-----	R	R	R	R	-
CPCL 96-0289	CL 83-3431	CL 84-4234	None	-----	R	R	U	R	-
CPCL 96-0860	CL 75-0853	CL 78-1600	Sand	11.95	R	R	S	R	-
CPCL 96-1165	CL 61-0620	CL 85-2154	None	-----	R	R	L	R	-
CPCL 96-2061	CL 83-3576	Mix 91V [§]	Muck	11.34	R	R	R	R	-
CPCL 96-2375	CL 84-2273	Mix 93G[§]	None	-----	R	R	U	R	-
CPCL 96-4500	CL 83-1364	Mix 95J[§]	None	11.54	L	R	U	R	-
CPCL 96-4527	CL 86-4087	Mix 95K	None	-----	---				
CPCL 96-4974	CL 84-1989	CL 84-3152	None	10.12	R	R	R	R	-
CPCL 97-0393	CL 89-4294	US 87-1006	Sand	10.60	L	R	R	R	-
CPCL 97-1320	CL 82-3664	CP 81-1238	None	9.90	R	R	R	R	-
CPCL 97-1864	CL 83-1364	CL 83-2361	None	11.34	R	R	R	R	-
CPCL 97-2730	CL 75-0853	CL 88-4730	Sand	9.52	R	R	U	R	-
CPCL 97-4983	CL 80-1575	CP 84-1198	None	-----	R	R	U	R	-
CPCL 98-1205	CL 84-4234	CP 80-1743	None	10.94	R	R	L	R	-

· R = resistant enough for commercial production; L = low levels of disease susceptibility; S = too susceptible for production; U = undetermined susceptibility (available data not sufficient to determine the level of susceptibility).

† Commercial = Released for commercial production; None = Not considered as potential release candidate; Otherwise, All: Increasing planted area at all locations; Sand: Increasing planted area at locations with sand soils only plus two locations with muck soils; Muck: Increasing planted area at locations with muck soils only plus Townsite; or specified locations for potential release.

‡ RSD can be controlled by using heat-treated or tissue-cultured vegetative planting material.

§ Mix 75b and 95 P 8 refer to polycrosses. In Mix 75b, female parent (CL 61-620) exposed to pollen from many clones, and in 95 P 8 CP 90-1030 exposed to pollen from many clones, in 1995 crossing season; therefore, male parents of CL 77-0797 and CP 98-1325 unknown. Similar explanations for CP 98-1569, CP 99-1540, CP 99-1541, CP 99-1542, CP 00-1074, CPCL 95-2367, CPCL 96-2061, CPCL 96-2375, and CPCL 96-4500.

Table 2. Yields of cane in metric tons per hectare (TC/H) from plant cane on Dania muck, Lauderhill muck, Malabar sand, and Pompano fine sand

	Mean yield by soil type, farm, and sampling date								
	Dania muck	**Lauderhill muck**					**Malabar sand**	**Pompano fine sand**	
Clone	**Okeelanta 12/15/05**	**Knight 1/10/06**	**SFI 1/18/06**	**Osceola 1/31/06**	**Duda 2/1/06**	**Wedgworth 2/6/06**	**Hilliard 1/3/06**	**Lykes 12/28/05**	**Estimated yield, all farms**
CP 01-2390	164.03	153.43	225.95	162.87	169.35	216.23	153.64	158.34	175.45*
CP 01-1372	151.42	96.61	209.86	158.81	162.92	219.64	152.41	126.42	159.76*
CP 01-1378	151.82	119.45	166.86	147.48	167.08	238.54	138.17	138.85	158.51*
CP 01-1338	156.78	69.56	192.71	149.73	180.59	226.63	164.56	113.20	156.72*
CP 01-1957	165.81	104.38	194.71	155.19	194.09	208.02	119.85	98.76	155.78*
CP 01-1391	144.15	101.36	158.40	131.03	123.80	258.49	109.17	122.32	145.62*
CP 01-2459	159.38	104.16	161.99	123.18	162.11	184.45	123.14	139.21	144.70*
CP 01-1321	150.30	113.11	147.94	126.82	133.87	181.27	139.02	126.66	139.87*
CP 01-1178	123.93	79.38	166.15	131.52	135.06	187.84	135.21	155.59	139.33*
CP 78-1628	142.84	---------	---------	135.44	154.74	----------	130.00	103.33	139.25*
CP 01-1564	152.76	83.25	148.78	126.28	141.75	214.64	125.76	112.16	138.29*
CP 01-2056	149.36	87.24	125.04	131.68	157.54	186.96	132.02	88.24	132.26
CP 89-2143	113.22	---------	142.12	97.24	129.47	----------	117.32	121.83	122.03
CP 01-1205	130.45	61.70	123.10	122.87	114.58	159.57	173.55	91.14	119.63
CP 01-1181	121.16	78.63	131.27	91.68	122.88	153.34	110.26	120.24	115.82
CP 72-2086	120.22	90.18	113.73	---------	111.67	171.88	----------	99.77	114.89
Mean	143.51	96.21	159.72	131.42	147.36	196.82	133.56	120.35	141.12
LSD (p = 0.1)†	17.01	18.83	23.50	18.55	24.75	18.20	19.65	14.39	14.03
CV (%)	12.33	20.28	15.28	14.67	17.45	9.59	15.23	12.43	14.48

***** Significantly greater than CP 89-2143 at p = 0.10 based on *t* test.
† *LSD* for location means of cane yield = 10.15 TC/H at p = 0.10.

Table 3. Preharvest yields of theoretical recoverable 96° sugar in kg per metric ton of cane (KS/T) from plant cane on Dania muck, Lauderhill muck, Malabar sand, and Pompano fine sand

	Mean yield by soil type, farm, and sampling date								
	Dania muck	Lauderhill muck					Malabar sand	Pompano fine sand	
Clone	Okeelanta 10/12/05	Knight 10/11/05	SFI 10/11/05	Duda 10/12/05	Wedgworth 11/17/05	Osceola 11/28/05	Hilliard 11/16/05	Lykes 11/16/05	Estimated yield, all farms
CP 01-1181	131.4	118.6	115.5	137.3	120.6	122.1	121.8	133.6	125.7*
CP 01-1378	123.9	115.5	110.9	125.2	108.6	111.5	114.5	126.3	117.1
CP 01-1205	123.8	107.6	98.5	125.7	116.7	116.2	124.8	119.1	116.4
CP 01-1178	115.9	111.3	106.5	122.6	112.5	115.4	123.0	121.5	116.1
CP 01-2390	116.9	110.7	108.3	123.7	110.2	111.7	115.8	121.1	114.8
CP 89-2143	124.8	----------	98.1	116.2	---------	115.6	120.7	121.3	114.5
CP 01-1372	107.5	102.9	100.2	113.1	107.7	114.4	113.4	120.7	110.0
CP 01-1391	112.3	93.8	96.6	121.8	103.8	113.1	110.5	132.9	110.0
CP 72-2086	117.2	104.6	96.6	105.2	105.2	---------	---------	104.9	107.2
CP 01-1564	115.2	105.0	89.8	109.3	94.2	105.0	112.2	121.5	106.6
CP 01-1321	112.4	83.0	94.2	107.2	100.3	106.0	106.2	132.6	105.2
CP 78-1628	98.1	----------	---------	105.7	----------	111.1	109.7	120.2	104.8
CP 01-2459	107.8	98.5	97.2	103.5	97.6	101.2	111.2	111.7	103.6
CP 01-2056	100.4	112.7	90.6	99.6	92.6	105.4	111.8	111.4	103.1
CP 01-1338	90.0	109.4	86.6	94.0	91.0	92.0	114.8	125.0	100.4
CP 01-1957	97.1	98.1	73.7	96.7	92.6	88.7	109.0	111.4	95.6
Mean	112.1	105.3	97.7	112.6	104.1	108.5	114.3	120.7	109.4
LSD (p = 0.1)†	10.2	10.9	13.1	10.5	13.4	9.1	9.7	11.1	5.1
CV (%)	5.2	5.9	7.6	5.3	7.3	4.8	4.7	5.1	5.9

* Significantly greater than CP 89-2143 at p = 0.10 based on *t* test.
† *LSD* for location means of sugar yield = 2.4 KS/T at p = 0.10.

Table 4. Yields of theoretical recoverable 96° sugar in kg per metric ton of cane (KS/T) from plant cane on Dania Muck, Lauderhill muck, Malabar sand, and Pompano fine sand

	Mean yield by soil type, farm, and sampling date								
	Dania muck	Lauderhill muck					Malabar sand	Pompano fine sand	
Clone	Okeelanta 12/15/2005	Knight 1/10/2006	SFI 1/18/2006	Osceola 1/31/2006	Duda 2/1/2006	Wedgworth 2/6/2006	Hilliard 1/3/2006	Lykes 12/28/2005	Estimated yield, all farms
CP 01-1378	119.0	108.1	115.9	132.5	122.0	112.1	123.3	139.8	121.5
CP 01-1205	119.1	119.9	113.6	129.7	109.1	106.8	123.1	136.3	120.2
CP 89-2143	116.1	-------	110.6	133.3	119.8	-------	127.8	134.3	120.1
CP 01-1178	113.2	109.0	112.8	123.2	116.8	111.6	128.4	136.5	119.0
CP 01-1181	113.0	110.1	116.4	126.4	113.2	104.9	134.7	133.6	119.0
CP 72-2086	110.3	111.9	105.0	-------	116.4	108.7	-------	131.3	117.2
CP 01-1372	116.9	110.6	106.4	129.3	109.8	87.7	133.1	140.6	116.8
CP 01-2056	107.3	112.0	105.1	122.0	108.7	101.5	130.0	136.6	115.4
CP 01-2459	108.9	103.6	107.0	124.1	114.4	103.5	131.2	127.0	115.0
CP 01-1564	110.8	103.1	107.0	120.2	113.6	100.8	124.7	132.8	114.1
CP 78-1628	111.0	-------	-------	122.6	110.3	-------	126.5	127.0	113.8
CP 01-2390	109.8	107.5	109.8	119.7	111.1	91.1	127.0	129.5	113.3
CP 01-1321	104.7	96.9	109.3	129.4	109.8	101.4	121.2	130.0	112.9
CP 01-1391	104.1	98.8	103.1	118.3	104.1	100.6	121.8	133.6	110.3
CP 01-1957	99.7	99.4	105.6	112.8	110.0	91.8	119.3	124.4	107.8
CP 01-1338	102.5	109.0	93.2	108.1	103.8	93.6	112.9	126.1	106.2
Mean	110.5	107.6	108.1	123.4	112.1	101.7	125.7	132.1	115.2
LSD ($p = 0.1$)†	5.0	4.8	6.9	6.4	7.2	8.4	7.7	5.5	3.5
CV (%)	4.7	4.6	6.7	5.4	6.6	8.6	6.3	4.3	5.9

† *LSD* for location means of sugar yield = 2.9 KS/T at $p = 0.10$.

Table 5. Yields of theoretical recoverable 96° sugar in metric tons per hectare (TS/H) from plant cane on Dania muck, Lauderhill muck, Malabar sand, and Pompano fine sand

	Mean yield by soil type, farm, and sampling date								
	Dania muck	Lauderhill muck					Malabar sand	Pompano fine sand	
Clone	Okeelanta 12/15/05	Knight 1/10/06	SFI 1/18/06	Osceola 1/31/06	Duda 2/1/06	Wedgworth 2/6/06	Hilliard 1/3/06	Lykes 12/28/05	Estimated yield, all farms
CP 01-2390	18.056	16.466	24.733	19.327	18.837	19.875	19.588	19.903	19.592*
CP 01-1378	18.060	12.924	19.387	19.538	20.407	26.754	16.970	19.435	19.181*
CP 01-1372	17.742	10.705	22.370	20.500	18.044	19.452	20.339	17.834	18.373*
CP 01-1178	14.040	8.695	18.785	16.261	15.742	21.062	17.331	21.208	16.640*
CP 01-2459	17.350	10.834	17.389	15.284	18.624	19.188	16.154	17.724	16.569*
CP 01-1957	16.522	10.371	20.557	17.553	21.431	19.107	14.144	11.598	16.541*
CP 01-1338	16.078	7.585	17.927	16.151	18.682	21.260	18.679	14.191	16.319*
CP 01-1391	14.965	9.613	16.218	15.492	13.138	26.068	12.717	16.365	15.871
CP 01-1321	15.732	10.887	16.245	16.374	15.535	18.520	16.802	16.528	15.833
CP 78-1628	15.939	---------	---------	16.562	16.932	---------	16.465	13.144	15.663
CP 01-1564	16.949	8.609	15.876	15.184	16.123	21.673	15.691	14.898	15.643
CP 01-2056	15.997	9.735	13.120	16.074	17.040	18.997	17.174	12.077	15.027
CP 89-2143	13.189	---------	15.732	12.943	15.507	---------	15.019	16.338	14.472
CP 01-1205	15.555	7.330	14.107	16.073	12.551	17.151	20.483	12.423	14.215
CP 01-1181	13.761	8.655	15.337	11.619	14.003	16.152	14.909	16.098	13.767
CP 72-2086	13.264	10.101	11.891	---------	13.051	18.661	---------	13.135	13.471
Mean	15.842	10.485	17.196	16.150	16.567	19.842	16.694	15.812	16.073
LSD (p = 0.1)†	2.129	2.022	2.910	2.460	2.979	2.608	2.689	1.992	1.606
CV (%)	13.953	19.990	17.601	15.830	18.682	13.624	16.675	13.089	16.189

* Significantly greater than CP 89-2143 at p = 0.10 based on *t* test.
† *LSD* for location means of sugar yield = 1.396 TS/H at p = 0.10.

Table 6. Yields of preharvest and harvest theoretical recoverable 96° sugar in kg per metric ton (KS/T) from plant cane on Dania muck and Torry muck

	Preharvest yield	Harvest yield by soil type, farm, and sampling date		
	Torry muck	Dania muck	Torry muck	
Clone	**Eastgate 10/12/05**	**Okeelanta 2/3/06**	**Eastgate 2/16/06**	**Estimated yield both farms**
CP 00-1101	126.7*	137.9	139.1	138.5*
CP 00-1748	125.3*	129.3	135.4	132.3
CP 00-1751	129.3*	126.9	137.3	132.1
CP 00-1630	--------	126.9	--------	131.2
CP 00-1252	124.3*	125.6	135.8	130.7
CP 00-1100	115.8	126.7	134.2	130.5
CP 00-1074	111.2	126.3	134.3	130.3
CP 89-2143	114.9	124.4	135.5	129.9
CP 00-2164	119.9	122.3	133.3	127.8
CP 00-1527	121.6	115.2	137.3	126.3
CP 00-2188	106.4	124.2	127.8	126.1
CP 72-2086	119.2	122.8	129.5	126.1
CP 00-1301	121.5	121.0	128.2	124.6
CP 00-2180	110.9	117.3	123.2	120.2
CP 00-1446	115.3	109.1	127.0	118.1
CP 00-1302	97.5	115.8	118.6	117.2
Mean	117.3	123.4	131.9	127.6
LSD ($p = 0.1$)[†]	8.4	5.2	6.2	6.8
CV (%)	4.2	4.3	4.8	4.6

* Significantly greater than CP 89-2143 at $p = 0.10$ based on *t* test.
[†] *LSD* for location means of harvest sugar yield = 2.0 KS/T at $p = 0.10$.

Table 7. Yields of cane and of theoretical recoverable 96° sugar in metric tons per hectare (TC/H and TS/H) from plant cane on Dania muck and Torry muck

	Cane yield by soil type, farm, and sampling date			Sugar yield by soil type, farm, and sampling date		
	Dania muck	Torry muck		Dania muck	Torry muck	
Clone	Okeelanta 2/3/06	Eastgate 2/16/06	Estimated yield, both farms	Okeelanta 2/3/06	Eastgate 2/16/06	Estimated yield, both farms
CP 00-1748	115.72	272.59	194.16*	14.944	36.886	25.915*
CP 00-1101	108.86	249.54	179.20	15.000	34.635	24.818
CP 00-1252	106.60	258.26	182.43	13.436	34.985	24.210
CP 00-1446	124.80	268.96	196.88*	13.662	33.680	23.671
CP 00-1630	117.42	---------	178.68	14.904	---------	23.429
CP 00-1751	96.26	245.87	171.06	12.212	33.761	22.987
CP 00-1074	104.61	235.31	169.96	13.238	31.460	22.349
CP 89-2143	112.59	222.12	167.35	13.983	30.060	22.022
CP 00-2180	118.61	243.72	181.17	13.909	30.130	22.019
CP 00-1100	108.01	223.85	165.93	13.696	30.073	21.885
CP 00-1301	122.20	225.69	173.95	14.618	28.991	21.804
CP 00-2188	105.48	205.87	156.41	13.117	26.316	19.827
CP 72-2086	106.35	204.09	155.22	13.061	26.451	19.756
CP 00-1302	106.60	225.53	166.07	12.359	26.924	19.642
CP 00-2164	79.74	186.84	133.29	9.733	24.895	17.314
CP 00-1527	79.57	168.03	123.80	9.195	23.027	16.111
Mean	107.43	229.51	168.47	13.226	30.244	21.735
LSD (p = 0.1)†	19.71	37.93	27.19	2.501	5.130	3.899
CV (%)	19.08	17.17	18.42	19.672	17.623	19.049

* Significantly greater than CP 89-2143 at p = 0.10 based on t test.
† *LSD* for location means of cane yield = 15.48 TC/H and of sugar yield = 1.711 TS/H at p = 0.10.

Table 8. Yields of cane in metric tons per hectare (TC/H) from first-ratoon cane on Dania muck, Lauderhill muck, Malabar sand, Margate sand, and Pompano fine sand

	Mean yield by soil type, farm, and sampling date									
	Dania muck		Lauderhill muck				Malabar sand	Margate sand	Pompano fine sand	
Clone	Okeelanta 12/12/05	Knight 1/4/06	Osceola 12/13/05	Wedgworth 12/19/05	Duda 12/27/05	SFI 1/9/06	Hilliard 12/6/05	Townsite 1/12/06	Lykes 1/19/06	Estimated yield, all farms
CP 00-1446	145.26	131.55	143.19	153.23	148.36	124.08	42.90	81.98	96.68	118.47*
CP 00-2180	131.21	107.56	135.89	155.40	170.53	123.81	39.56	66.13	70.47	111.54*
CP 00-1748	121.48	98.43	137.61	144.68	139.24	133.19	69.86	73.73	81.79	111.26*
CP 00-1101	104.88	155.99	144.22	130.88	154.29	112.82	41.95	66.45	83.66	110.91*
CP 00-1100	109.69	125.20	141.96	138.58	138.10	132.94	44.54	65.19	89.80	109.90*
CP 00-1302	111.68	103.36	129.72	130.34	177.67	134.25	48.86	70.35	65.72	108.15*
CP 00-1074	113.79	106.78	141.73	122.69	146.30	124.81	46.73	74.18	64.83	104.61*
CP 00-1301	121.15	92.29	118.93	120.72	126.39	138.18	40.21	65.97	72.55	99.70
CP 00-1527	104.20	96.67	127.18	127.33	137.67	116.18	50.61	60.57	53.05	97.27
CP 00-1630	94.84	104.36	114.03	135.35	148.70	125.56	22.57	67.09	57.41	96.58
CP 00-1252	107.19	112.22	122.97	120.51	127.49	97.47	47.81	52.77	71.84	95.89
CP 72-2086	114.91	107.97	---------	109.52	---------	108.13	---------	53.89	54.83	92.93
CP 00-1751	98.41	73.52	121.16	117.23	127.50	104.71	27.11	64.98	65.37	88.67
CP 00-2188	114.46	43.01	85.16	101.00	116.66	133.24	42.49	88.35	57.57	85.97
CP 00-2164	77.42	47.06	88.27	97.04	120.27	108.49	30.62	40.76	37.50	71.92
CP 78-1628	---------	---------	---------	---------	---------	---------	35.30	48.66	96.44	---------
CP 84-1198	---------	---------	---------	---------	---------	---------	---------	55.98	---------	---------
CP 89-2143	109.78	---------	138.14	---------	149.66	99.73	---------	65.04	---------	---------
Mean	111.11	100.39	124.03	126.34	139.82	120.70	43.44	67.49	68.94	100.25
LSD (p = 0.1)†	16.82	18.50	19.81	17.05	15.49	23.50	14.89	16.27	14.15	10.07
CV (%)	306.10	369.45	423.85	313.87	258.94	595.48	239.22	139.05	216.01	330.47

* Significantly greater than CP 72-2086 at p = 0.10 based on *t* test.
† *LSD* for location means of cane yield = 9.96 TC/H at p = 0.10.

Table 9. Yields of theoretical recoverable 96° sugar in kg per metric ton of cane (KS/T) from first-ratoon cane on Dania muck, Lauderhill muck, Malabar sand, Margate sand, and Pompano fine sand

	Mean yield by soil type, farm, and sampling date									
	Dania muck		Lauderhill muck				Malabar sand	Margate sand	Pompano fine sand	
Clone	Okeelanta 12/12/05	Knight 1/4/06	Osceola 12/13/05	Wedgworth 12/19/05	Duda 12/27/05	SFI 1/9/06	Hilliard 12/6/05	Townsite 1/12/06	Lykes 1/19/06	Estimated yield, all farms
CP 00-1101	136.1	120.7	133.6	122.3	117.0	138.9	123.8	147.6	145.2	131.7*
CP 00-1751	128.2	120.1	126.8	123.5	117.1	137.3	130.6	144.2	146.1	130.5*
CP 00-1748	134.7	117.4	125.2	121.9	116.9	135.5	127.9	148.8	145.0	130.3*
CP 00-1630	131.2	118.2	128.8	126.7	119.2	130.9	123.2	144.6	143.9	129.7*
CP 00-2188	130.1	114.1	129.4	125.6	119.8	128.7	126.0	144.8	143.7	129.2*
CP 00-1252	128.1	121.6	125.8	120.4	120.0	126.6	122.7	137.6	140.4	127.1*
CP 00-2164	130.9	113.3	117.6	115.2	111.4	131.7	117.7	141.5	140.7	124.4
CP 00-1074	124.6	110.1	121.6	118.3	109.8	125.3	120.6	144.9	143.9	124.3
CP 00-1301	131.2	111.7	126.3	114.9	111.5	132.1	124.3	136.5	129.1	124.3
CP 00-1100	123.1	119.2	117.9	110.4	108.2	128.8	121.7	143.5	138.2	123.4
CP 00-1527	108.6	118.6	110.8	115.8	107.6	125.5	123.2	143.3	143.2	121.7
CP 72-2086	119.6	112.8	--------	112.5	--------	123.7	--------	139.3	138.6	121.1
CP 00-2180	121.5	107.9	112.3	109.1	97.7	118.5	122.6	143.4	137.2	118.7
CP 00-1446	118.5	105.7	113.6	115.9	105.9	114.7	117.3	135.0	135.6	118.1
CP 00-1302	119.4	109.3	112.4	102.2	78.2	122.6	125.3	139.0	136.9	116.0
CP 78-1628	--------	--------	--------	--------	--------	--------	114.3	134.9	130.5	--------
CP 84-1198	--------	--------	--------	--------	--------	--------	--------	138.3	--------	--------
CP 89-2143	127.3	--------	122.7	--------	115.3	129.4	--------	140.4	--------	--------
Mean	125.7	114.9	121.4	117.1	110.0	128.0	123.1	141.8	140.2	124.7
LSD (p = 0.1)†	4.8	5.1	5.0	4.9	7.4	4.8	6.0	6.6	3.8	3.6
CV (%)	4.0	4.6	4.2	4.4	7.0	3.9	5.1	3.4	2.8	4.4

* Significantly greater than CP 72-2086 at p = 0.10 based on *t* test.
† *LSD* for location means of sugar yield = 1.9 KS/T at p = 0.10.

Table 10. Yields of theoretical recoverable 96° sugar in metric tons per hectare (TS/H) from first-ratoon cane on Dania muck, Lauderhill muck, Malabar sand, Margate sand, and Pompano fine sand

	Mean yield by soil type, farm, and sampling date									
	Dania muck		Lauderhill muck				Malabar sand	Margate sand	Pompano fine sand	
Clone	Okeelanta 12/12/05	Knight 1/4/06	Osceola 12/13/05	Wedgworth 12/19/05	Duda 12/27/05	SFI 1/9/06	Hilliard 12/6/05	Townsite 1/12/06	Lykes 1/19/06	Estimated yield, all farms
CP 00-1101	14.281	18.826	19.252	16.074	18.104	15.686	5.213	9.793	12.157	14.434*
CP 00-1748	16.346	11.551	17.158	17.620	16.322	17.931	8.926	10.948	11.848	14.316*
CP 00-1446	17.315	13.861	16.385	17.767	15.708	14.243	4.913	11.056	13.107	13.785*
CP 00-1100	13.506	14.982	16.753	15.308	14.917	17.097	5.474	9.346	12.415	13.351*
CP 00-2180	15.991	11.626	15.274	16.986	16.647	14.624	4.789	9.459	9.657	12.805*
CP 00-1074	14.225	11.806	17.233	14.481	15.999	15.535	5.715	10.630	9.269	12.751*
CP 00-1630	12.456	12.401	14.658	17.133	17.849	16.501	2.775	9.743	8.253	12.415*
CP 00-1301	15.919	10.581	15.015	13.882	14.144	18.234	4.960	8.991	9.360	12.372*
CP 00-1252	13.739	13.649	15.440	14.476	15.301	12.387	5.881	7.263	10.083	12.088
CP 00-1302	13.348	11.280	14.696	13.331	13.847	16.579	6.080	9.777	8.938	11.974
CP 00-1527	11.373	11.332	14.099	14.758	14.860	14.582	6.219	8.625	7.470	11.493
CP 00-1751	12.657	8.802	15.353	14.471	14.964	14.395	3.529	9.431	9.547	11.444
CP 00-2188	14.847	4.965	11.041	12.697	14.000	17.157	5.372	12.773	8.280	11.115
CP 72-2086	13.766	12.248	------	12.329	------	13.393	------	7.517	7.614	10.977
CP 00-2164	10.094	5.285	10.374	11.212	13.400	14.280	3.597	5.756	5.280	8.822
CP 78-1628	------	------	------	------	------	------	4.121	6.564	12.548	------
CP 84-1198	------	------	------	------	------	------	------	7.755	------	------
CP 89-2143	13.999	------	16.940	------	17.287	12.881	------	9.145	------	------
Mean	13.935	11.571	15.008	14.752	15.226	15.403	5.392	9.565	9.633	12.276
LSD (p = 0.1)†	2.256	2.220	2.468	2.150	2.012	3.050	1.802	2.250	1.956	1.238
CV (%)	16.838	19.934	17.084	15.144	13.728	20.559	34.730	17.046	21.102	19.012

* Significantly greater than CP 72-2086 at p = 0.10 based on t test.
† *LSD* for location means of sugar yield = 1.309 TS/H at p = 0.10.

Table 11. Yields of cane in metric tons per hectare (TC/H) and of theoretical 96° recoverable sugar in kg per metric ton (KS/T) and in metric tons per hectare (TS/H) from first-ratoon cane on Torry muck

	Mean yield		
	Cane (TC/H)	Sugar (KS/T)	Sugar (TS/H)
Clone	**Eastgate 2/22/06**	**Eastgate 2/22/06**	**Eastgate 2/22/06**
CP 99-1541	171.83	134.1	23.026
CP 99-1896	212.23*	106.7	22.685
CP 89-2143	161.19	136.4	22.009
CP 99-1686	171.43	125.8	21.560
CP 99-2099	170.22	125.5	21.350
CP 99-1944	163.89	127.5	20.823
CP 99-1889	177.05	115.7	20.477
CP 72-2086	156.82	130.0	20.386
CP 99-1894	159.45	126.6	20.205
CP 99-1540	175.67	114.4	20.107
CP 99-1534	155.92	128.2	20.017
CP 99-1542	152.98	130.6	19.961
CP 99-1865	150.92	123.5	18.632
CP 99-1893	156.71	116.9	18.374
CP 99-2084	142.66	126.8	18.157
CP 99-3027	138.53	121.4	16.824
Mean	163.59	124.4	20.287
LSD (p = 0.1)	22.00	3.8	2.697
CV (%)	14.00	3.2	13.832

***** Significantly greater than CP 89-2143 at p = 0.10 based on t test.

Table 12. Yields of cane in metric tons per hectare (TC/H) from second-ratoon cane on Dania muck, Lauderhill muck, Pahokee muck, Malabar sand, and Pompano fine sand

	Mean yield by soil type, farm, and sampling date								
	Dania muck	Lauderhill muck			Pahokee muck		Malabar sand	Pompano fine sand	
Clone	Okeelanta 10/14/05	SFI 10/11/05	Knight 10/13/05	Wedgworth 12/5/05	Osceola 10/18/05	Duda 10/19/05	Hilliard 10/17/05	Lykes 10/17/05	Estimated yield, all farms
CP 99-1889	102.37	141.81	72.13	162.59	125.16	114.80	84.98	145.66	118.85*
CP 99-1893	132.88	118.78	76.25	145.93	121.56	129.59	66.79	95.16	111.23*
CP 99-1896	98.83	115.34	49.26	130.12	124.04	114.51	76.17	108.05	102.69
CP 99-1894	92.65	101.18	70.19	144.45	107.75	106.07	70.53	71.49	95.59
CP 89-2143	71.63	113.12	-------	152.77	103.62	74.37	-------	-------	94.27
CP 99-1686	76.81	107.68	98.92	132.29	91.40	87.72	34.06	67.64	86.53
CP 99-1541	67.87	125.90	84.83	117.68	86.53	74.06	58.08	67.32	85.15
CP 99-2084	60.08	102.37	56.17	92.99	100.46	71.96	42.56	107.75	79.47
CP 99-3027	63.06	105.86	55.18	108.37	91.27	69.72	50.50	81.73	78.58
CP 99-1540	50.49	90.43	42.79	68.34	105.20	52.37	64.54	102.82	72.98
CP 72-2086	64.15	108.00	61.11	90.46	--------	-------	-------	56.22	72.11
CP 99-1944	65.20	86.43	44.52	104.27	94.96	85.62	34.39	51.12	71.21
CP 99-2099	33.02	117.40	72.59	78.58	66.83	53.28	49.88	62.34	66.69
CP 99-1542	29.66	89.96	73.76	72.03	114.68	43.33	30.98	78.26	66.37
CP 99-1534	37.83	92.70	79.96	69.72	84.40	45.47	46.48	65.98	65.09
CP 99-1865	30.12	77.84	82.67	82.13	64.20	38.01	29.35	42.02	55.22
CP 78-1628	-------	-------	-------	-------	--------	-------	66.79	97.72	-------
Mean	68.91	103.58	70.63	106.76	96.55	77.30	56.02	81.26	82.63
LSD (p = 0.1)[†]	17.08	17.41	24.74	23.32	18.38	17.93	15.27	26.26	13.34
CV (%)	25.75	17.46	29.41	22.64	19.78	24.10	28.35	33.58	24.89

* Significantly greater than CP 89-2143 at p = 0.10 based on *t* test.
† *LSD* for location means of cane yield = 12.03 TC/H at p = 0.10.

Table 13. Yields of theoretical recoverable 96° sugar in kg per metric ton (KS/T) from second-ratoon cane on Dania muck, Lauderhill muck, Pahokee muck, Malabar sand, and Pompano fine sand

	Mean yield by soil type, farm, and sampling date								
	Dania muck	Lauderhill muck			Pahokee muck		Malabar sand	Pompano fine sand	
Clone	Okeelanta 10/14/05	SFI 10/11/05	Knight 10/13/05	Wedgworth 12/5/05	Osceola 10/18/05	Duda 10/19/05	Hilliard 10/17/05	Lykes 10/17/05	Estimated yield, all farms
CP 89-2143	119.6	136.1	--------	104.3	116.9	119.7	--------	--------	117.8
CP 99-1541	114.8	137.4	114.1	110.8	110.7	110.0	108.3	116.3	115.3
CP 99-1893	119.6	133.4	98.5	108.6	108.9	123.7	109.9	110.5	114.6
CP 99-1686	113.9	129.7	126.5	100.9	104.6	111.0	114.3	108.0	113.4
CP 72-2086	115.5	135.6	112.8	107.6	--------	--------	--------	106.9	112.9
CP 99-1894	110.2	132.3	118.8	107.2	108.2	112.6	107.9	106.8	112.9
CP 99-1534	107.0	131.9	116.7	102.7	106.9	111.7	95.6	101.9	109.2
CP 99-1944	113.6	129.7	97.0	102.0	109.0	113.4	93.7	110.9	108.9
CP 99-3027	109.6	121.6	117.2	105.0	111.3	111.3	99.3	93.5	108.4
CP 99-1865	111.5	130.4	104.5	103.4	106.5	95.0	95.7	104.2	106.5
CP 99-1540	102.3	127.0	110.7	110.7	95.0	97.5	105.3	98.8	105.6
CP 99-2084	104.0	124.5	108.8	92.2	102.6	105.0	92.9	104.4	104.3
CP 99-2099	106.7	124.0	118.9	99.6	95.8	91.0	96.7	97.8	103.5
CP 99-1896	100.9	117.7	106.9	96.3	96.3	98.6	96.8	108.0	102.6
CP 99-1542	101.8	126.0	105.1	108.1	90.0	99.8	85.3	102.6	102.3
CP 99-1889	98.9	121.3	107.0	99.0	95.4	99.8	94.5	100.3	101.9
CP 78-1628	--------	--------	--------	--------	--------	--------	107.7	102.0	--------
Mean	109.3	128.2	111.4	103.6	104.2	107.0	101.0	105.4	108.8
LSD (p = 0.1)†	6.6	6.4	8.8	5.3	8.7	12.4	10.5	10.4	4.3
CV (%)	6.3	5.2	6.6	5.3	8.7	12.1	10.8	10.3	8.5

† *LSD* for location means of sugar yield = 2.4 KS/T at p = 0.10.

Table 14. Yields of theoretical recoverable 96° sugar in metric tons per hectare (TS/H) from second-ratoon cane on Dania muck, Lauderhill muck, Pahokee muck, Malabar sand, and Pompano fine sand

	Mean yield by soil type, farm, and sampling date								
	Dania muck	Lauderhill muck			Pahokee muck		Malabar sand	Pompano fine sand	
Clone	Okeelanta 10/14/05	SFI 10/11/05	Knight 10/13/05	Wedgworth 12/5/05	Osceola 10/18/05	Duda 10/19/05	Hilliard 10/17/05	Lykes 10/17/05	Estimated yield, all farms
CP 99-1893	15.874	15.875	7.441	15.848	13.463	16.053	7.376	10.832	12.915*
CP 99-1889	10.100	17.200	7.731	16.258	11.923	11.490	7.963	14.575	12.171
CP 89-2143	8.555	15.406	--------	15.717	12.219	8.895	--------	--------	11.060
CP 99-1894	10.335	13.371	8.343	15.500	11.667	12.140	7.616	7.472	10.808
CP 99-1896	9.961	13.697	5.215	12.559	11.919	11.345	7.421	11.713	10.549
CP 99-1541	7.781	17.336	9.437	13.038	9.654	8.185	6.377	7.838	9.959
CP 99-1686	8.712	13.989	12.552	13.361	9.578	9.735	3.947	7.269	9.815
CP 99-3027	6.929	12.892	6.488	11.433	10.103	7.869	5.096	7.489	8.564
CP 99-2084	6.255	12.797	6.185	8.542	10.296	7.477	4.000	11.457	8.402
CP 72-2086	7.468	14.667	7.003	9.747	--------	--------	--------	5.854	8.317
CP 99-1944	7.440	11.191	4.273	10.713	10.413	9.724	3.280	5.750	7.902
CP 99-1540	5.227	11.545	4.767	7.518	9.862	5.075	6.787	10.418	7.730
CP 99-1534	4.144	12.264	9.291	7.159	8.989	5.135	4.553	6.768	7.258
CP 99-2099	3.586	14.530	8.798	7.905	6.361	5.059	4.927	6.296	7.161
CP 99-1542	3.050	11.360	7.715	7.786	10.263	4.448	2.513	8.031	6.874
CP 99-1865	3.383	10.159	8.465	8.454	6.849	3.613	2.802	4.367	5.947
CP 78-1628	--------	--------	--------	--------	--------	--------	7.142	10.335	--------
Mean	7.549	13.328	7.838	11.191	10.117	8.416	5.689	8.587	9.089
LSD ($p = 0.1$)[†]	1.988	2.466	2.829	2.504	2.227	2.256	1.720	3.115	1.495
CV (%)	27.368	19.223	30.312	23.252	22.873	27.856	31.414	37.686	27.130

* Significantly greater than CP 89-2143 at $p = 0.10$ based on *t* test.
[†] *LSD* for location means of sugar yield = 1.291 TS/H at $p = 0.10$.

Table 15. Yields of cane in metric tons per hectare (TC/H) and of theoretical 96° recoverable sugar in kg per metric ton (KS/T) and in metric tons per hectare (TS/H) from second-ratoon cane at Okeelanta on Dania muck

	Mean yield		
	Cane (TC/H)	Sugar (KS/T)	Sugar (TS/H)
Clone	Okeelanta 2/3/06	Okeelanta 2/3/06	Okeelanta 2/3/06
CP 98-1335	73.12*	119.7	8.750*
CP 98-1029	65.19*	116.3	7.584*
CP 89-2143	49.48	117.0	5.787
CP 98-1417	53.61	107.4	5.757
CP 98-1325	58.24	93.3	5.434
CP 72-2086	44.96	114.3	5.136
CP 98-1139	47.00	108.2	5.083
CP 98-2047	49.57	101.9	5.050
CP 98-1118	41.64	109.2	4.545
CP 98-1107	42.61	101.9	4.342
CP 98-1457	40.80	103.5	4.224
CP 98-1497	38.41	108.9	4.181
CP 98-1513	38.39	98.0	3.762
CP 98-1725	30.93	111.5	3.449
CP 98-1569	26.65	122.6	3.268
CP 98-1481	29.30	103.7	3.040
CP 98-1335	73.12	119.7	8.750
Mean	45.62	108.6	4.962
LSD (p = 0.1)	12.75	8.0	1.490
CV (%)	24.92	6.6	26.771

* Significantly greater than CP 72-2086 at p = 0.10 based on t test.

Table 16. Yields of preharvest and harvest theoretical recoverable 96° sugar in kg per metric ton (KS/T) and cane and theoretical recoverable 96° sugar in metric tons per hectare (TC/H and TS/H) from first ratoon on Margate/Oldsham sand and Margate sand

	Preharvest KS/T yield	Harvest KS/T yield by soil type, farm, and sampling date			Cane yield by soil type, farm, and sampling date			Sugar yield by soil type, farm, and sampling date		
	Margate sand	Margate/ Oldsham sand	Margate sand		Margate/ Oldsham sand	Margate sand		Margate/ Oldsham sand	Margate sand	
Clone	Benbow 10/13/05	Benbow 1/12/06	Townsite 1/12/06	Mean yield, both farms	Benbow 1/12/06	Townsite 1/12/06	Mean yield, both farms	Benbow 1/12/06	Townsite 1/12/06	Mean yield, both farms
CPCL 97-0393	105.5	130.2	135.76	133.0	74.78	86.55*	80.66	9.737	11.781	10.759
CPCL 95-0242	101.5	130.4	128.24	129.3	81.42	81.30	81.36	10.611	10.428	10.520
CP 89-2143	116.8	139.0	140.42	139.7	82.90	65.04	73.97	11.432	9.145	10.288
CPCL 97-2730	119.7	139.2	141.56	140.4	72.11	74.25	73.18	9.960	10.521	10.240
CP 78-1628	111.5	137.7	134.86	136.3	95.52	48.66	72.09	13.159	6.564	9.862
CPCL 95-2293	113.1	130.2	130.53	130.4	72.33	73.42	72.87	9.355	9.592	9.474
CPCL 97-1320	87.5	118.8	122.87	120.8	73.16	83.34*	78.25	8.689	10.248	9.468
CPCL 96-0860	108.5	128.3	134.38	131.4	73.10	68.90	71.00	9.530	9.198	9.364
CPCL 95-1907	96.9	126.3	124.06	125.2	64.72	70.93	67.82	8.177	8.790	8.483
CPCL 95-1758	112.0	130.4	122.57	126.5	76.91	53.65	65.28	10.034	6.556	8.295
CPCL 95-2367	114.8	129.2	125.03	127.1	74.32	53.64	63.98	9.556	6.839	8.198
CPCL 96-4500	107.7	139.3	133.01	136.2	70.43	47.58	59.01	9.858	6.325	8.091
CPCL 96-4974	105.3	132.2	138.56	135.4	55.07	61.31	58.19	7.269	8.561	7.915
CPCL 96-2375	113.2	128.1	135.14	131.6	65.33	54.72	60.03	8.367	7.365	7.866
CPCL 98-1205	110.7	132.9	137.60	135.2	59.39	54.83	57.11	7.878	7.544	7.711
CPCL 96-0289	94.4	136.7	130.84	133.8	54.72	59.46	57.09	7.491	7.785	7.638
CPCL 97-1864	97.2	132.7	131.58	132.1	58.22	56.36	57.29	7.710	7.420	7.565
CPCL 97-4983	116.9	138.1	146.26	142.2	52.49	52.89	52.69	7.241	7.784	7.512
CPCL 96-1165	96.7	132.4	140.70	136.6	36.85	61.08	48.97	4.844	8.591	6.718
CPCL 96-4527	--	--	139.11	139.1	--	52.03	52.03	--	7.227	7.227

Table 16—continued. Yields of preharvest and harvest theoretical recoverable 96° sugar in kg per metric ton (KS/T) and cane and theoretical recoverable 96° sugar in metric tons per hectare (TC/H and TS/H) from first ratoon on Margate/Oldsham sand and Margate sand

	Preharvest KS/T yield	Harvest KS/T yield by soil type, farm, and sampling date			Cane yield by soil type, farm, and sampling date			Sugar yield by soil type, farm, and sampling date		
	Margate sand	Margate/ Oldsham sand	Margate sand		Margate/ Oldsham sand	Margate sand		Margate/ Oldsham sand	Margate sand	
Clone	Benbow 10/13/05	Benbow 1/12/06	Townsite 1/12/06	Mean yield, both farms	Benbow 1/12/06	Townsite 1/12/06	Mean yield, both farms	Benbow 1/12/06	Townsite 1/12/06	Mean yield, both farms
Mean	106.8	132.2	133.7	133.1	68.09	63.00	65.14	8.995	8.413	8.660
LSD ($p = 0.1$)†	11.7	8.9	8.6	5.3	27.05	17.23	16.71	3.696	2.392	2.271
CV (%)	6.5	4.0	3.8	3.9	28.82	19.84	25.54	28.808	20.627	26.264

* Significantly greater than CP 89-2143 at $p = 0.10$ based on *t* test.
† *LSD* for location means of harvest yield = 3.1 KS/T, of cane yield = 8.86 TC/H, and of sugar yield = 2.354 TS/H.

Table 17. Yields of cane and theoretical recoverable 96° sugar in metric tons per hectare (TC/H and TS/H) from first ratoon on Torry muck and Terra Ceia muck

	Cane yield by soil type, farm, and sampling date				Sugar yield by soil type, farm, and sampling date			
	Torry muck		Terra Ceia muck		Torry muck		Terra Ceia muck	
Clone	**Bryant 12/28/05**	**Prewitt 12/28/05**	**Ritta 12/28/05**	**Mean yield, all farms**	**Bryant 12/28/05**	**Prewitt 12/28/05**	**Ritta 12/28/05**	**Mean yield, all farms**
CP 89-2143	126.50	137.15	110.03	124.56	17.277	18.027	14.230	16.511
CPCL 96-2061	103.72	168.57	113.32	128.54	13.591	21.394	13.937	16.307
CPCL 96-4974	116.63	101.00	76.91	98.18	14.830	12.264	9.429	12.174
CL 77-0797	112.08	89.78	76.55	92.80	13.421	10.910	8.561	10.964
Mean	113.21	118.76	101.08	111.02	14.504	15.070	12.393	13.989
LSD (p = 0.1)†	41.2	54.0	20.8	31.69	5.669	6.809	2.605	3.878
CV (%)	20.63	26.93	10.56	63.02	24.630	28.480	13.250	30.262

† *LSD* for location means of cane yield = 20.42 TC/H and of sugar yield = 2.927 TS/H at p = 0.10.

Table 18. Yields of preharvest and harvest theoretical recoverable 96° sugar in kg per metric ton of cane (KS/T) from first ratoon on Torry muck and Terra Ceia muck

	Preharvest yield by soil type, farm, and sampling date				Harvest yield by soil type, farm, and sampling date			
	Torry muck		Terra Ceia muck		Torry muck		Terra Ceia muck	
Clone	**Bryant 12/28/05**	**Prewitt 12/28/05**	**Ritta 12/28/05**	**Mean yield, all farms**	**Bryant 12/28/05**	**Prewitt 12/28/05**	**Ritta 12/28/05**	**Mean yield, all farms**
CP 89-2143	113.7	119.4	125.5	119.6	136.7	131.8	129.3	132.6
CPCL 96-2061	102.3	116.9	85.3	101.5	129.7	125.7	122.9	126.1
CPCL 96-4974	102.1	102.8	93.2	99.4	126.7	121.6	122.8	123.7
CL 77-0797	105.9	116.3	105.4	109.2	119.8	122.4	111.8	118.0
Mean	107.1	111.8	105.0	107.9	127.6	125.3	122.4	125.1
LSD ($p = 0.1$)[†]	15.2	9.4	11.7	7.2	4.6	9.4	2.7	4.1
CV (%)	6.7	3.9	6.4	3.4	2.6	5.0	1.7	3.6

[†] *LSD* for location means of preharvest yield = 4.3 KS/T and of harvest yield = 3.9 KS/T at $p = 0.10$.

Table 19. Dates of stalk counts of 10 plant cane, 16 first-ratoon, and 9 second-ratoon experiments

	Crop		
Location	**Plant cane**	**First ratoon**	**Second ratoon**
Benbow	---	08/22/05	---
Bryant	---	08/01/05	---
Duda	07/25/05	08/16/05	09/14/05
Eastgate	06/14/05	08/05/05	09/12/05
Hilliard	08/03/05	08/08/05	10/03/05
Knight	08/01/05	08/29/05	09/23/05
Lykes	08/04/05	09/09/05	09/30/05
Okeelanta	07/28/05	08/22/05	09/22/05
Okeelanta (successive)	08/02/05	08/30/05	09/26/05
Osceola	07/22/05	08/17/05	09/16/05
Prewitt	---	07/21/05	---
Ritta	---	08/22/05	---
Townsite (CP)	---	09/16/05	---
Townsite (CPCL)	---	09/16/05	---
SFI	07/21/05	08/18/05	09/21/05
Wedgworth	07/20/05	08/09/05	09/15/05

Appendix 1. Sugarcane Field Station Cultivar Development Program

Timeline	Stage	Population	Field layout	Crop age at selection	Yield and quality selection criteria	Disease and other selection criteria	Seedcane increase scheme
Year 1	Crossing	400-600 crosses producing about 500,000 true seeds	—	—	Germination tests of seed (bulk of seed stored in freezers)	Field progeny tests planted by family	—
Year 2	Seedlings (single stool stage) Seedlings start in the greenhouse from true seed of the previous year	80,000-100,000 individual plants	Transplants spaced 12 in. apart in paired rows on 5-ft. centers	8-10 months	Visual selection for plant type, vigor, stalk diameter, height, density, and population; freedom from diseases	Family evaluation for general agronomic type and disease resistance against rust, leaf scald (LS)*, smut, etc.	One stalk cut for seed from each selected seedling
Year 3	Stage I (First clonal trial)	10,000-15,000 clonal plots	Unreplicated plots, 5 ft. long on 5-ft. row spacing	9-10 months	Essentially the same selection criteria as for Seedlings	Permanent CP-series number assignment made	Eight stalks planted for agronomic evaluation. One stalk planted for RSD screening (inoculation)
Year 4	Stage II (Second clonal trial)	1,000-1,500 clones including five checks	Unreplicated 2-row plots, 15 ft. long on 5-ft. row spacing	12 months	Yield estimates based on stalk number, average stalk weight, and sucrose analysis; freedom from diseases	Family evaluation for disease resistance against RSD* and eye spot (by inoculation) and LS*, yellow leaf syndrome (YLS), and dry top rot (by natural infection)	Eight 8-stalk bundles cut for seed; two stalks used for RSD screening
Year 5-6	Stage III (Replicated test; first stage planted in commercial fields)	135 clones including 2 checks† per location	Four 2-replicate tests (3 organic and 1 sand site) on growers' farms; Two-row plots, 15 ft. long	10-11 months Evaluated in plant cane and first-ratoon crops	Yield estimates based on stalk number, average stalk weight, and sucrose analysis; clonal performance assessed across locations	Disease screening (inoculation) for LS*, smut, mosaic virus, and RSD; also rated for other diseases (rust, etc.)	Two 8-stalk bundles cut for seed at each location
Year 7-9	Stage IV (Final replicated test; planted in commercial fields)	16 clones including 2 checks† per location	Eleven 6-replicate tests (8 organic and 3 sand sites) on growers' farms; Three-row plots, 35 ft. long on 5-ft. row spacing	10-15 months Tests are analyzed in plant cane, first-, and second-ratoon crops	Cane tonnage, sucrose and fiber analyses; yield estimates based on stalk number and average stalk weight	Disease screening for LS*, smut, mosaic, and RSD; also rated for lodging and suitability for mechanical harvest	Initial seed increase for potential commercial release planted from first-ratoon seed following evaluation in the plant cane
Year 8-11	Seedcane increase and distribution	Usually 6 or fewer clones	Plots range from 0.1 to 2.0 hectares	—	Seedcane purity; freedom from diseases and insects	Plots checked and certified for clonal purity and seedcane quality	Seedcane is increased at 9 Stage IV locations (7 muck and 2 sand)
Soil program	Investigates soil microbial activities and plant nutrient availabilities that influence cane and sugar yields						

* LS: leaf scald; RSD: ratoon stunting disease; YLS: yellow leaf syndrome
† Checks in stages III and IV: CP 72-2086 (all locations), CP 78-1628 (sand soils), and CP 89-2143 (organic soils).