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Evaluation of New Canal Point Sugarcane Clones

2004-2005 Harvest Season

Abstract

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Thirty-six replicated experiments were conducted on 15 farms (representing 5 organic soils and 4 sand soils) to evaluate 57 new Canal Point (CP) and 25 new Canal Point and Clewiston (CPCL) clones of sugarcane from the CP 00, CP 99, CP 98, CP 97, 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, CP 98-1029 has been 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., stability, sugarcane cultivars, sugarcane rust, sugarcane smut, sugarcane yields, sugar yields, *Sporisorium scitaminea*.

While supplies last, single copies of this publication can be obtained at no cost from Barry Glaz, USDA-ARS-SAA, 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

Evaluation of New Canal Point Sugarcane Clones

2004-2005 Harvest Season

B. Glaz, S.B. Milligan, R.W. Davidson, J.C. Comstock, S.J. Edme, R.A. Gilbert, P.Y.P. Tai, and J.D. Miller

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 2004–2005 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); and sugarcane mosaic strain E. ratoon stunt, 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.

Sugarcane growers in Florida rely much more on tolerance to sugarcane diseases than on re-

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sistance. In the 2004 growing season, 9 cultivars comprised 91.3 percent of Florida's sugarcane (Glaz and Vonderwell 2005). Six of these nine cultivars—CP 72-2086, CP 73-1547, CP 78-1628, CP 80-1743, CP 84-1198, and CP 88-1762—were susceptible to one or more of the following sugarcane diseases: rust, mosaic, leaf scald, smut, and ratoon stunting. Only CP 89-2143 (14.9 percent of Florida's sugarcane), CL 77-797 (3.3 percent of Florida's sugarcane), and CP 84-1591 (1.1 percent of Florida's sugarcane) were 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 it 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, most of the parental clones in our program originated from Canal Point.

The United States Sugar Corporation (USSC), based in Clewiston, Florida, recently discontinued its breeding program and its clones are also being transferred to other stages of the Canal Point program. Clones in several 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. The donated clones will have a CPCL (Canal Point and Clewiston) designation but will retain their USSC numbers.

The seedling stage in 2005 contained approximately 100,000 new clones that were planted from seeds: 70,000 CP clones and 30,000 CPCL clones. 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 phase contained 17,868 new clones: 12,124 were CP clones and 5,744 were CPCL clones. The stage II phase had 1,448 new clones: 1,135 were CP clones and 313 were CPCL clones. The 2005 plant-cane stage III phase had 135 new clones (102 CP clones and 33 CPCL clones) that were tested in replicated experiments on four 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 and stage I phases. 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 2004 to April 2005, CP clones or seeds were requested from and sent to Burma, the People's Republic of China, Costa Rica, Guatemala, Nicaragua, and Pakistan.

Test Procedures

In 31 experiments, 57 new CP clones were evaluated. Fourteen clones of the CP 00 series were evaluated at nine farms in the plant-cane crop. Fourteen clones of the CP 99 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 98 series were evaluated at two farms in the first-ratoon crop and at seven farms in the second-ratoon crop. Also evaluated were 15 clones of the CP 97 series in the second-ratoon crop; 13 were evaluated at 3 locations, 1 was evaluated at 2 locations, and 1 was evaluated at 1 location. In 5 plant-cane experiments, 25 new CPCL clones of the 95, 96, 97, and 98 series were evaluated; 10 were evaluated at 2 locations, 6 were evaluated at 3 locations, and 9 were evaluated at 5 locations.

CP 72-2086 was the primary reference clone in the plant-cane through second-ratoon experiments of the CP 00, CP 99, and CP 98 series. CP 72-2086 was the fifth most widely grown cultivar in Florida in 2004 (Glaz and Vonderwell 2005). In the plant-cane and first-ratoon CP 00 and CP 99 experiments, CP 89-2143 on organic soils and CP 78-1628 on sand soils were secondary reference clones. CP 89-2143 was the second most widely grown cultivar on organic soils and CP 78-1628 the most widely grown on sand soils in Florida in 2004 (Glaz and Vonderwell 2005). CP 89-2143 was the primary reference clone whenever it was planted at all locations for a CP series. CP 70-1133 was the primary reference clone in the CP 97 series second-ratoon experiments. CP 70-1133 was not a major sugarcane cultivar in Florida in 2004, but for several years earlier was the most widely grown cultivar in Florida (Glaz and Vonderwell 2004).

For the experiments with CPCL clones, CP 89-2143 was the primary reference clone tested at all five locations and for the clones at the three locations with organic soils. CP 78-1628 was the primary reference clone at the two locations with sand soils. CL 77-797, CP 72-2086, CP 73-1547, and CP 84-1198 were also included as secondary reference clones in the CPCL experiments.

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.

The CP 99 series plant-cane experiment and the CP 98 series second-ratoon experiment at Okeelanta Corporation (Okeelanta) south of South Bay were conducted on Dania muck soil. Also the second-ratoon experiments at A. Duda and Sons, Inc., (Duda) southeast of Belle Glade, Sugar Farms Cooperative North—Osceola Region S03 (Osceola) east of Canal Point, and at Sugar Farms Cooperative North—SFI Region S05 (SFI) near 20-Mile Bend in Palm Beach County, and the first-ratoon experiment at Knight Management, Inc., (Knight) southwest of 20-Mile Bend were 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.

The CP 00 series plant-cane experiment, both first-ratoon experiments, and the CP 98 series second-ratoon experiment at Okeelanta were conducted on Lauderhill muck. Also the plant-cane and second-ratoon experiments at Knight and at Wedgworth Farms, Inc., (Wedgworth) east of Belle Glade, the plant-cane and first-ratoon experiments at Duda, and the first-ratoon experiment at SFI were conducted on Lauderhill muck.

The first-ratoon experiments at Osceola and Wedgworth and the plant-cane experiment at SFI were conducted on Pahokee muck. The plant-cane experiments at Osceola and United States Sugar Corporation—Ritta (Ritta) east of Clewiston were conducted on Terra Ceia muck.

The three experiments at Eastgate Farms, Inc., (Eastgate) north of Belle Glade, and the plant-cane 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 plant-cane experiment at United States Sugar Corporation—Benbow (Benbow) was on Margate/Oldsmar sand and the two plant-cane experiments at United States Sugar Corporation—Townsite (Townsite) were on Margate sand.

The CP 99 series plant-cane, the CP 98 series first-ratoon, and the CP 97 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 Oct. 16, 2004, and Feb. 9, 2005. In addition, preharvest samples were cut from two replications of nine CP and one CPCL plant-cane experiments between Oct. 11 and Oct. 18, 2004. 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......... Nov. 22, 2004 to Feb. 9, 2005

First-ratoon crop........ Oct. 23, 2004 to Feb. 3, 2005

Second-ratoon crop ....Oct. 16, 2004 to Jan. 2, 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 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 each CPCL clone because fiber percentages were not previously determined for these clones. Using 5-stalk samples collected from border rows, an average of 12, 14, 10, 10, and 4 fiber samples were calculated for the clones of the CP 97, CP 98, CP 99, and CP 00 series, respectively. Leaves were stripped from these stalks that 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 were 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 x 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 4 and Oct. 7, 2004, except that stubble of the stalks in one experiment was counted on March 14, 2005, after the field was harvested. 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 stunting. 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 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 x 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 00 plant-cane experiments, and tables 6–7 contain the results of the CP 99 plant-cane experiments. Tables 8–10 contain the results of the CP 99 first-ratoon experiments, and tables 11–12 contain the results of the CP 98 first-ratoon experiments. Tables 13–15 contain the results of the CP 98 second-ratoon experiments, and tables 16–17 contain the results of the CP 97 second-ratoon experiments. Tables 18–23 contain the results of the CPCL plant-cane experiments. Table 24 gives the dates that stalks were counted in each experiment.

Plant-Cane Crop, CP 00 Series

When averaged across all nine locations, seven new clones—CP 00-1100, CP 00-1301, CP 00-1101, CP 00-1630, CP 00-1751, CP 00-1748, and CP 00-1252—yielded significantly more TS/H (metric tons of sugar per hectare), TC/H (metric tons of cane per hectare), and harvest KS/T (theoretical recoverable yield of 96^{o} sugar in kg per metric ton of cane) than CP 72-2086 (tables 2, 4, and 5). In addition, six of these new clones—CP 00-1630, CP 00-1751, CP 00-1252, CP 00-1301, CP 00-1748, and CP 00-1101—had significantly higher preharvest KS/T values than CP 72-2086 (table 3). When averaged across all nine locations, CP 00-2180 and CP 00-2188 had high yields of TS/H and TC/H (tables 2 and 5), but their yields of harvest KS/T were similar to the KS/T yield of CP 72-2086 (table 4). The preharvest KS/T yield of CP 00-2188 was higher than that of CP 72-2086 (table 3).

At Hilliard, USSC, and Lykes, the three locations with sand soils, CP 00-1446, CP 00-1074, and CP 00-1527 had high yields of KS/T, TC/H, and TS/H, often significantly higher than those of CP 78-1628 (tables 2–5). CP 00-1446 also had significantly higher yields of TC/H and TS/H than CP 72-2086 averaged across all nine locations, but the mean KS/T yield of CP 00-1446 was similar to that of CP 72-2086 (tables 2, 3, and 5).

The Florida Sugar Cane League, Inc. has begun increasing vegetative planting material at all nine locations of CP 00-1100, CP 00-1101, CP 00-1252, CP 00-1301, CP 00-1630, CP 00-1748, CP 00-1751, CP 00-2180, and CP 00-2188 for potential release (table 1). The Florida Sugar Cane League, Inc. has also begun increasing vegetative planting material of CP 00-1074, CP 00-1446, and CP 00-1527 at the three locations with sand soils. Rust is a concern and will be monitored closely on CP 00-1446, CP 00-1527, CP 00-1748, and CP 00-1751 (table 1). CP 00-1074, CP 00-1527, and CP 00-1748 were too susceptible to mosaic for commercial production. However, mosaic generally does not occur at the sand locations where vegetative planting material of CP 00-1074 and CP 00-1527 is being increased. Otherwise, the clones in the CP 00 series being increased for commercial production have acceptable resistance or tolerance to smut, rust, leaf scald, mosaic, and ratoon stunting and have acceptable fiber levels.

Plant-Cane Crop, CP 99 Series

Last year's report contained the results from nine locations of the CP 99 series plant-cane crop. This year, results are available from two additional locations (tables 6–7). No new CP 99 clone yielded significantly more TS/H, TC/H, or harvest or preharvest KS/T than CP 72-2086 or CP 89-2143 (tables 6–7).

Based on yields reported last year, plantings of CP 99-1534, CP 99-1893, and CP 99-1894 were expanded for potential commercial release at all locations (Glaz, Comstock et al. 2005). CP 99-1893 and CP 99-1894 had TS/H, TC/H, and KS/T yields across both locations similar to those of CP 89-2143. However, both of these clones were too susceptible to leaf scald for commercial production and therefore are no longer considered as promising commercial candidates (table 1). The mean TS/H yield of CP 99-1534 was significantly lower than that of CP 99-1894 but similar to the mean TS/H yield of CP 89-2143 (table 7). Growers found that, in addition to these moderate yields, CP 99-1534 is not well suited to mechanical harvesting. Therefore, CP 99-1534 is no longer being considered as a promising commercial candidate (table 1).

First-Ratoon Crop, CP 99 Series

When averaged across all eight farms, five new clones—CP 99-1893, CP 99-1896, CP 99-1541, CP 99-1686, and CP 99-1894—yielded significantly more TS/H than CP 72-2086 (table 10). CP 99-1541 and CP 99-1894 also yielded significantly more KS/T than CP 72-2086 (table 9), and the mean TC/H yields of CP 99-1541 and CP 99-1894 were almost significantly higher than the TC/H yield of CP 72-2086 (table 8). CP 99-1893, CP 99-1896, and CP 99-1686 had significantly higher yields of TC/H than CP 72-2086 (table 8). The mean KS/T yields of CP 99-1893 and CP 99-1686 were high and similar to the mean KS/T yield of CP 72-2086, and the KS/T yield of CP 99-1896 was significantly lower than the KS/T yields of CP 99-1893 and CP 99-1686 (table 9). CP 99-1893, CP 99-1686, and CP 99-1894 had high TS/H yields as plant cane last year (Glaz, Comstock et al. 2005). The TS/H yields of CP 99-1896 and CP 72-2086 were similar last year, and the TS/H yield of CP 99-1541 was significantly lower than that of CP 72-2086 last year as plant cane.

Last year, due to high yields at Lykes and Hilliard, planting material of CP 99-2084 and CP 99-2099 were increased for potential commercial release on sand soils (Glaz, Comstock et al. 2005). However, both new clones had TS/H yields that were significantly lower than the TS/H yield of CP 78-1628 at Hilliard and similar to the TS/H yield of CP 78-1628 at Lykes this year (table 10). Due to these mediocre yields and mosaic susceptibility (table 1), planting material of CP 99-2084 is no longer being increased for commercial release. CP 99-2099 is the only current clone in the CP 99 series being considered for potential commercial release. The Florida Sugar Cane League, Inc. is now in its second year of expanding plantings of CP 99-2099 on sand soils only. CP 99-2099 has a fiber percentage of 10.01 and acceptable disease ratings for all diseases except sugarcane rust. Glaz, Comstock et al. (2005) reported that CP 99-2099 had moderate cold tolerance.

First-Ratoon Crop, CP 98 Series

When averaged across both farms, no new clone yielded significantly more TS/H, TC/H, or KS/T than CP 89-2143 (tables 11–12). Though it is categorized as susceptible to mosaic and ratoon stunting, and its susceptibility to rust is still not certain, CP 98-1029 was released for commercial production in Florida (table 1). Glaz, Comstock et al. (2005) reported that CP 98-1029 had excellent freeze tolerance. Fiber was 10.15 percent in CP 98-1029.

Second-Ratoon Crop, CP 98 Series

When averaged across all seven locations, four new CP 98 clones—CP 98-1029, CP 98-1335, CP 98-1417, and CP 98-1118—yielded significantly more TC/H and TS/H than CP 72-2086 (tables 13 and 15). Of these four, CP 98-1417 had a low mean yield of KS/T, though not significantly lower than that of CP 72-2086 (table 14). Two years ago as plant cane, no new CP 98 clone yielded significantly more TS/H than CP 72-2086 (Glaz, Tai et al. 2005); and last year as first ratoon, two new clones—CP 98-1029 and CP 98-1335—yielded significantly more TS/H than CP 72-2086 (Glaz, Comstock et al. 2005).

CP 98-1335 was not released commercially due to concerns with its propensity to lodge. CP 98-1118 is too susceptible to mosaic for commercial production in Florida (table 1). Yields of CP 98-1417 were not sufficiently high as plant cane and first ratoon to warrant consideration for release.

Of these CP 98 series clones, CP 98-1029 was released for commercial production and recommended for all sugarcane soil types in Florida (table 1). The disease susceptibilities, fiber percentage, and cold tolerance of CP 98-1029 were discussed previously in the "First-Ratoon Crop, CP 98 Series" section.

Second-Ratoon Crop, CP 97 Series

Mean yields of TS/H and TC/H across all three farms were significantly higher for CP 97-1994, CP 97-1777, and CP 97-1164 than for CP 70-1133 (table 16). No new CP 97 clone had a significantly higher KS/T yield than CP 70-1133 (table 17). In plant-cane experiments at these locations, of these three high yielding new clones, only CP 97-1994 had higher TS/H yields than CP 70-1133 (Glaz, Tai et al. 2005). As first ratoon last year, all three of these clones had TS/H yields similar to the TS/H yield of CP 70-1133 (Glaz, Comstock et al. 2005). CP 97-1994 and CP 97-1777 were too susceptible to rust for commercial production in Florida (table 1). Glaz, Comstock et al. (2005) reported that CP 97-1944 was released for commercial production and recommended for all soil types, CP 97-1989 was released and recommended for sand soils in Florida, and CP 97-1944 and CP 97-1989 had the best and sixth best cold tolerance rankings, respectively, among the CP 97 series clones.

Plant-Cane Crop, Sand Soils, CPCL 95-97 Series

No new CPCL clone at the two locations with sand soils had significantly higher mean yields of KS/T, TC/H, or TS/H than CP 78-1628 (table 18). However, vegetative planting material of three clones from this group—CPCL 97-1320, CPCL 97-0393, and CPCL 97-2730—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 except that the mean KS/T yield of CPCL 97-1320 was lower than that of CP 78-1628. The only disease concern among these three CPCL 97 clones is that there is not yet sufficient information to classify the reaction of CPCL 97-2730 to leaf scald (table 1). Fiber percentages have not been collected for these CPCL clones.

Plant-Cane Crop, Organic Soils, CPCL 95-98 Series

No new CPCL clone had significantly higher mean yields of TC/H, TS/H, or KS/T across the three locations with organic soils than CP 89-2143 (tables 19–20). However, vegetative material of CPCL 96-2061 is being increased at locations with organic soils for potential release (table 1). CPCL 96-2061 had significantly higher mean TS/H and TC/H yields than four of the eight clones in this group that were tested at all three locations (table 19). The KS/T yield of CPCL 96-2061 was significantly lower than that of CP 89-2143 (table 20). There were no disease concerns for CPCL 96-2061 (table 1). Fiber percentage information has not been collected on CPCL 96-2061.

Plant-Cane Crop, Sand and Organic Soils, CPCL 95-98 Series

No new clone had significantly higher mean TS/H yields than CP 89-2143 across the three locations with organic soils and the two locations with sand soils (table 23). The mean TC/H yields of CPCL 96-0860 and CPCL 96-4974 were significantly higher than the mean TC/H yield of CP 89-2143 (table 21). Both of these new CPCL clones had mean KS/T yields that were significantly lower than the mean KS/T yield of CP 89-2143 (table 22). However, CPCL 96-4974 and CP 89-2143 had similar KS/T yields at Prewitt, one of two locations with Torry muck soil. Planting material of CPCL 96-4974 is being increased at locations with organic soils for potential release (table 1).

CPCL 96-0860 had high yields of TS/H on the sand soils at Benbow and Townsite (table 23). The KS/T yield of CPCL 96-0860 was significantly lower than that of CP 89-2143 at each of these two sand locations (table 22). Planting material of CPCL 96-0860 is being increased for potential release on sand soils (table 1).

Planting material of CPCL 96-4500, CPCL 97-1864, and CPCL 98-1205 is also being increased for possible commercial release on sand soils in Florida (table 1). There were no disease concerns for CPCL 96-4974, CPCL 97-1864, and CPCL 98-1205. CPCL 96-0860 is susceptible to leaf scald and the susceptibility of CPCL 96-4500 to leaf scald is undetermined. Fiber percentages and cold tolerance information have not been collected on these new CPCL clones.

Summary

The CP 00 series was tested for the first time this year at nine locations in stage IV. CP 00-1100,

CP 00-1101, CP 00-1252, CP 00-1301, CP 00-1630, CP 00-1748, and CP 00-1751 had high TS/H, TC/H, and harvest KS/T yields. CP 00-2180 and CP 00-2188 had high yields of TC/H and TS/H. CP 00-1101, CP 00-1252, CP 00-1301, CP 00-1630, CP 00-1748, CP 00-1751, and CP 00-2188 had high preharvest KS/T yields. Vegetative planting material of CP 00-1446, CP 00-1527, and nine CP 00 clones previously mentioned is being expanded by the Florida Sugar Cane League, Inc. for potential commercial release in Florida.

The CP 99 series was tested at two locations in the plant-cane crop and eight locations in the first-ratoon crop this year and at nine locations in the plant-cane crop last year. Yields of TC/H and TS/H of CP 99-2099 were similar to those of CP 78-1628 on sand soils. Vegetative planting material of CP 99-2099 is being expanded by the Florida Sugar Cane League, Inc. for potential release in Florida for sand soils. CP 99-2099 had acceptable disease tolerance to all major diseases except rust.

The CP 98 series was tested at two locations in the first-ratoon crop and seven locations in the second-ratoon crop this year, at two locations in the plant-cane crop and six locations in the first-ratoon crop last year, and at six locations in the plant-cane crop 2 years ago. CP 98-1029 has been recommended for release for commercial production in Florida. Averaged across all crops and years, CP 98-1029 had high yields of TS/H and TC/H.

Stage IV testing of the CP 97 series was completed this year with second-ratoon experiments at three locations. Previous testing of these clones included 2 years and 11 locations as plant cane, 2 years and 11 locations as first ratoon, and 7 locations as second ratoon last year. CP 97-1944 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 97-1944 across all plant-cane through second-ratoon experiments were 138.51, 123.96***, and 17.171***, respectively; and 136.15, 116.80, and 15.879, respectively for CP 70-1133. CP 97-1989 has been released for commercial production and recommended for sand soils in Florida. Mean TC/H, KS/T, and TS/H yields of CP 97-1989 across all plant-cane through second-ratoon experiments on sand soils were 129.63***, 111.26, and 14.737*, respectively; and 108.01, 115.55, and 12.610, respectively for CP 70-1133.

This year was the first year that CPCL clones were tested in stage IV; plant-cane tests were conducted at five locations. On sand soils, CPCL 97-0393 and CPCL 97-2730 had high TS/H, TC/H, and KS/T yields; and CPCL 97-1320 had high TS/H and TC/H yields. Vegetative planting material of these three new CPCL clones and of CPCL 96-0860, CPCL 96-4500, CPCL 97-1864, and CPCL 98-1205 is being expanded on sand soils by the Florida Sugar Cane League, Inc. for potential commercial release in Florida. CPCL 96-2061 and CPCL 96-4974 had high TS/H and TC/H yields on organic soils. The KS/T yield of CPCL 96-4974 was low. Vegetative planting material of CPCL 96-2061 and CPCL 99-4974 is being expanded on organic soils by the Florida Sugar Cane League, Inc. for potential commercial release in Florida.

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* Significantly higher than CP 70-1133 at the 10 percent probability level.

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

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Tables

Notes (tables 2–23):

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 ratoon stunting disease for CL 77-0797, CP 70-1133, CP 72-2086, CP 78-1628, CP 84-1198, CP 89-2143, and 80 new sugarcane clones

Clone	Parentage		Percent	Rating*				
Clone	Female	Male	fiber	Smut	Rust	Leaf scald	Mosaic	Ratoon stunting[H]
CL 77-0797	CL 61-620	Mix 75B'	11.34	R	R	R	R	R
CP 70-1133[I]	CP 56-63	67 P 6'	10.37	L	S	L	R	S
CP 72-2086[I]	CP 62-374	CP 63-588	8.97	R	R	R	S	R
CP 78-1628[I]	CP 65-0357	CP 68-1026	10.39	S	S	L	R	R
CP 84-1198[I]	CP 70-1133	CP 72-2086	9.74	R	R	R	R	S
CP 89-2143[I]	CP 81-1254	CP 72-2086	9.85	R	R	L	L	L
CP 97-1068	CP 90-1204	CP 90-1151	10.18	L	R	L	L	S
CP 97-1164	CP 93-1621	94 P 03'	9.95	R	R	L	R	S
CP 97-1362	CP 91-2234	CL 72-0321	8.99	L	L	L	R	R
CP 97-1387	CP 90-1533	CL 61-0620	9.21	L	R	L	L	L
CP 97-1433	CP 90-1497	94 P 13'	8.56	L	R	S	R	R
CP 97-1777	CP 90-1233	CP 57-0603	9.89	S	S	L	S	L
CP 97-1804	CP 90-1424	CP 89-2377	11.99	R	S	S	L	L
CP 97-1850	CP 89-2377	94 P 17'	10.45	S	R	L	R	L
CP 97-1928	CP 90-1533	CP 57-0603	10.57	L	R	S	L	R
CP 97-1944[I]	CP 80-1743	94 P 15'	9.78	R	R	S	L	L
CP 97-1979	CP 75-1091	CL 61-0620	11.52	R	L	L	L	R
CP 97-1989[I]	CP 75-1091	CL 61-0620	10.70	R	L	S	L	L
CP 97-1994	CP 89-1945	CP 70-1133	9.27	L	S	L	R	R
CP 97-2068	CP 90-1204	CP 90-1436	11.06	S	L	R	L	R
CP 97-2103	ROC 12	95 P 14'	13.41	U	R	L	R	L
CP 98-1029[I]	CP 91-1980	CP 94-1952	10.15	R	U	L	S	S
CP 98-1107	HoCP 85-845	CP 80-1827	9.73	L	L	S	L	R
CP 98-1118	CL 61-0620	US 87-1006	9.26	R	L	R	S	L
CP 98-1139	CP 90-1151	HoCP 85-845	8.86	R	U	L	R	R
CP 98-1325	CP 90-1030	95 P 08'	8.02	R	S	R	L	L
CP 98-1335	TCP 87-3388	CP 70-1133	9.18	R	L	R	R	L
CP 98-1417	HoCP 85-845	CP 80-1827	9.53	R	L	L	L	L
CP 98-1457	CP 89-2377	CP 90-1151	9.11	R	L	R	L	S
CP 98-1481	HoCP 85-845	CP 88-1836	10.05	R	R	L	R	L
CP 98-1497	CP 91-1238	CP 87-1628	9.29	R	R	R	L	L
CP 98-1513	CP 90-1424	CP 87-1628	11.92	R	R	L	S	L
CP 98-1569	CP 80-1827	95 P 08'	9.91	L	L	R	S	L
CP 98-1725	CP 89-2377	CP 89-1756	8.33	R	U	R	L	S

Table 1—continued. Parentage, fiber content, and ratings of susceptibility to smut, rust, leaf scald, mosaic, and ratoon stunting disease for CL 77-0797, CP 70-1133, CP 72-2086, CP 78-1628, CP 84-1198, CP 89-2143, and 80 new sugarcane clones

	Parentage			Rating[*]				
Clone	Female	Male	Percent fiber	Smut	Rust	Leaf scald	Mosaic	Ratoon stunting[H]
CP 98-2047	CP 87-1475	CP 87-1475	11.08	R	R	L	L	L
CP 99-1534	CP 89-2377	CP 89-1756	9.31	R	U	L	L	L
CP 99-1540	CP 90-1535	95 P 16[']	11.28	L	S	R	L	R
CP 99-1541	CP 90-1535	95 P 16[']	8.58	R	R	R	R	R
CP 99-1542	CP 90-1535	95 P 16[']	11.54	R	R	L	L	L
CP 99-1686	CP 85-1382	CP 70-1133	10.25	L	L	L	R	R
CP 99-1865	CP 91-1795	CP 90-1151	9.37	L	R	L	R	R
CP 99-1889	CP 87-1475	CP 72-1210	12.75	S	S	L	R	L
CP 99-1893	CP 87-1475	CP 72-1210	9.94	R	L	L	R	S
CP 99-1894	CP 87-1475	CP 72-1210	11.14	R	R	L	R	L
CP 99-1896	CP 90-1204	CP 90-1436	10.56	R	U	R	L	S
CP 99-1944	LCP 86-454	LCP 86-454	10.43	L	S	L	L	R
CP 00-1527[&]	CP 80-1827	CP 92-1320	8.76	R	U	R	S	L
CP 00-1630[&]	CP 92-1167	CP 92-1320	9.85	R	R	L	R	L
CP 00-1748[&]	CP 81-1238	CP 89-1509	8.95	R	U	R	S	R
CP 00-1751[&]	CP 81-1238	CP 89-1509	8.53	R	U	R	R	R
CP 00-2164	US 95-1063	US 95-1127	8.95	R	R	R	L	R
CP 00-2180[&]	HoCP 91-552	HoCP 91-552	8.94	R	R	R	R	R
CP 00-2188[&]	CP 90-1549	CP 90-1549	8.43	R	R	R	R	R
CPCL 95-0242	CL 84-3714	CL 84-4234	-----	L	R	R	R	-
CPCL 95-1758	CL 61-0620	CP 85-1308	-----	S	R	R	R	-
CPCL 95-1795	CL 61-0620	CL 84-4234	-----	R	R	L	R	-
CPCL 95-1907	CL 84-3929	CL 83-2031	-----	R	R	S	R	-
CPCL 95-2293	CL 78-1120	CL 78-1600	-----	R	R	R	R	-
CPCL 95-2367	CL 79-2243	Mix 88L[']	-----	R	R	R	R	-
CPCL 96-0289	CL 83-3431	CL 84-4234	-----	R	R	U	R	-
CPCL 96-0860[&]	CL 75-0853	CL 78-1600	-----	R	R	S	R	-
CPCL 96-1165	CL 61-0620	CL 85-2154	-----	R	R	L	R	-
CPCL 96-2061[&]	CL 83-3576	Mix 91V[']	-----	R	R	R	R	-
CPCL 96-2375	CL 84-2273	Mix 93G[']	-----	R	R	U	R	-
CPCL 96-4500[&]	CL 83-1364	Mix 95J[']	-----	L	R	U	R	-
CPCL 96-4974[&]	CL 84-1989	CL 84-3152	-----	R	R	R	R	-
CPCL 97-0393[&]	CL 89-4294	US87-1006	-----	L	R	R	R	-

Table 1—continued. Parentage, fiber content, and ratings of susceptibility to smut, rust, leaf scald, mosaic, and ratoon stunting disease for CL 77-0797, CP 70-1133, CP 72-2086, CP 78-1628, CP 84-1198, CP 89-2143, and 80 new sugarcane clones

	Parentage			Rating[*]				
Clone	Female	Male	Percent fiber	Smut	Rust	Leaf scald	Mosaic	Ratoon stunting[H]
CPCL 97-1320[&]	CL 82-3664	CP 81-1238	-----	R	R	R	R	-
CPCL 97-1864[&]	CL 83-1364	CL 83-2361	-----	R	R	R	R	-
CPCL 97-2282	CL 89-4290	Mix 96F[']	-----	R	R	U	R	-
CPCL 97-2730[&]	CL 75-0853	CL 88-4730	-----	R	R	U	R	-
CPCL 97-4983	CL 80-1575	CP 84-1198	-----	R	R	U	R	-
CPCL 98-1031	CL 61-0620	Mix 97G[']	-----	L	R	R	R	-
CPCL 98-1123	CL 61-0620	CP 80-1743	-----	R	R	R	R	-
CPCL 98-1205[&]	CL 84-4234	CP 80-1743	-----	R	R	L	R	-
CPCL 98-4392	CL 90-4161	CL 88-5356	-----	S	R	R	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).
[H] RSD can be controlled by using heat-treated or tissue-cultured vegetative planting material.
[I] Released for commercial production in Florida.
['] Mix 75b and 67 P 6 refer to polycrosses. In Mix 75b, female parent (CL 61-620) exposed to pollen from many clones, and in 67 P 6 CP 56-63 exposed to pollen from many clones, in 1967 crossing season; therefore, male parents of CL 77-0797 and CP 70-1133 unknown. Similar explanations for CP 97-1164, CP 97-1433, CP 97-1850, CP 97-1944, CP 97-2103, CP 98-1325, CP 98-1569, CP 99-1540, CP 99-1541, CP 99-1542, CP 00-1074, CPCL 95-2367, CPCL 96-2061, CPCL 96-2375, CPCL 96-4500, CPCL 97-2282, and CPCL 98-1031.
[&] Vegetative planting material currently being increased by Florida Sugar Cane League, Inc., for potential release.

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

	Mean yield by soil type, farm, and sampling date									
	Lauderhill muck				Pahokee muck	Terra Ceia muck	Malabar sand	Margate sand	Pompano fine sand	
Clone	**Knight 12/17/04**	**Okeelanta 1/10/05**	**Wedgworth 1/11/05**	**Duda 1/25/05**	**SFI 12/27/04**	**Osceola 12/13/04**	**Hilliard 1/3/05**	**Townsite 1/10/05**	**Lykes 12/21/04**	**Mean yield all farms**
CP 00-1446	183.10	118.07	217.53	159.28	157.43	188.68	76.03	196.97	156.25	160.24*
CP 00-2180	202.83	134.92	183.98	164.08	193.77	192.93	72.58	165.13	128.78	159.84*
CP 00-1100	184.72	135.70	183.13	150.27	176.90	184.32	78.25	166.43	146.72	156.07*
CP 00-1101	190.33	125.55	230.27	173.12	157.85	183.62	69.57	115.77	123.62	153.42*
CP 00-2188	185.85	102.15	184.60	188.05	201.18	184.70	56.68	171.73	107.65	153.20*
CP 00-1301	143.33	129.85	190.02	168.68	170.87	165.58	72.75	180.73	116.13	147.83*
CP 00-1302	179.67	121.38	181.32	179.42	154.33	166.88	71.82	140.97	119.93	146.44*
CP 00-1252	181.28	131.17	164.78	172.27	145.30	175.97	82.88	106.43	132.99	144.89*
CP 00-1751	166.93	114.27	174.75	143.68	175.15	185.48	58.98	126.97	122.03	141.46*
CP 00-1748	165.67	129.02	164.53	145.15	149.47	170.10	86.30	154.90	108.15	141.19*
CP 00-1630	167.72	117.55	182.98	161.08	170.28	168.57	43.93	146.43	106.69	140.61*
CP 72-2086	167.50	103.67	144.12	140.37	141.35	143.97	58.30	107.00	121.86	126.06
CP 00-1527	135.13	112.75	134.80	152.00	125.70	137.72	77.60	146.97	115.41	125.89
CP 00-1074	131.63	89.53	161.33	141.35	139.92	136.83	67.60	157.13	112.03	125.60
CP 00-2164	161.13	85.97	146.70	127.98	150.50	118.87	57.77	144.07	92.70	120.05
CP 78-1628	--------	--------	--------	--------	--------	--------	57.97	118.73	95.37	---------
CP 84-1198	--------	--------	--------	--------	--------	--------	--------	101.55	---------	---------
CP 89-2143	183.77	112.77	188.98	157.00	162.35	155.78	--------	122.07	---------	---------
Mean	166.14	113.46	172.42	153.55	156.56	161.85	67.56	142.51	117.22	142.85
LSD (p = 0.1)[H]	20.50	17.32	23.34	16.84	24.92	19.29	14.94	44.94	17.61	11.42
CV (%)	12.82	15.86	14.06	11.40	16.54	12.38	22.97	22.85	15.61	14.86

* Significantly greater than CP 72-2086 at p = 0.10 based on *t* test.
H *LSD* for location means of cane yield = 11.74 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 Lauderhill muck, Pahokee muck, Terra Ceia muck, Malabar sand, and Pompano fine sand

	Mean yield by soil type, farm, and sampling date								
	Lauderhill muck				Pahokee muck	Terra Ceia muck	Malabar sand	Pompano fine sand	
Clone	**Duda 10/13/04**	**Okeelanta 10/14/04**	**Wedgworth 10/15/04**	**Knight 10/18/04**	**SFI 10/18/04**	**Osceola 10/15/04**	**Hilliard 10/11/04**	**Lykes 10/11/04**	**Mean yield all farms**
CP 00-1630	102.9	113.1	113.6	91.0	116.8	111.0	136.0	134.8	114.9*
CP 00-1751	79.7	106.8	98.0	96.5	110.4	104.6	129.4	137.4	107.8*
CP 00-2188	93.0	106.4	99.5	96.8	94.9	107.2	130.8	127.5	107.0*
CP 00-1252	98.2	101.7	100.8	85.6	109.7	102.0	127.0	127.0	106.5*
CP 00-1301	92.6	102.6	98.7	90.9	118.6	94.9	127.3	122.0	105.4*
CP 00-1748	91.7	101.3	99.4	84.0	95.8	96.5	139.7	125.0	104.1*
CP 00-2164	90.4	103.9	94.6	92.6	102.6	77.9	134.4	126.5	102.8*
CP 00-1074	75.0	101.8	102.1	84.4	102.9	92.9	123.5	120.7	100.9*
CP 00-1527	86.3	115.0	95.2	84.7	86.0	83.1	132.6	124.7	100.8*
CP 00-1101	78.7	103.0	102.8	83.0	103.1	99.3	111.7	122.5	100.5*
CP 00-1100	88.4	103.4	88.4	81.2	99.3	92.4	122.1	112.4	98.5
CP 00-1446	88.0	100.5	85.0	84.9	105.3	87.8	117.6	108.4	97.7
CP 00-2180	88.7	98.7	93.6	73.6	90.9	87.4	123.0	115.3	96.4
CP 72-2086	76.6	104.4	91.8	81.0	104.4	89.4	90.0	119.2	94.7
CP 00-1302	69.7	89.3	79.0	80.3	98.9	87.3	115.6	115.5	91.9
CP 78-1628	--------	--------	--------	--------	--------	--------	131.7	114.3	--------
CP 89-2143	90.2	101.6	87.8	85.5	102.7	93.7	--------	--------	--------
Mean	87.6	103.3	95.8	86.6	102.3	94.4	123.7	121.5	102.0
LSD (p = 0.1)[H]	15.0	12.9	10.3	15.0	14.2	7.5	13.0	9.6	5.4
CV (%)	9.7	7.2	6.2	9.8	7.9	4.6	6.0	4.5	7.0

* Significantly greater than CP 72-2086 at p = 0.10 based on *t* test.
H *LSD* for location means of sugar yield = 6.2 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 Lauderhill muck, Pahokee muck, Terra Ceia muck, Malabar sand, and Pompano fine sand

	Mean yield by soil type, farm, and sampling date									
	Lauderhill muck				Pahokee muck	Terra Ceia muck	Malabar sand	Margate sand	Pompano fine sand	
Clone	**Knight 12/17/04**	**Okeelanta 1/10/05**	**Wedgworth 1/11/05**	**Duda 1/25/05**	**SFI 12/27/04**	**Osceola 12/13/04**	**Hilliard 1/3/05**	**Townsite 1/10/05**	**Lykes 12/21/04**	**Mean yield all farms**
CP 00-1630	126.8	137.7	132.4	137.5	136.9	128.8	153.9	148.0	155.8	139.9*
CP 00-1751	117.9	141.6	133.0	133.9	138.0	129.5	150.2	150.0	150.2	138.3*
CP 00-1748	118.6	133.3	124.8	135.4	133.8	127.9	154.8	150.6	151.7	136.7*
CP 00-1301	115.3	142.1	127.0	129.5	128.3	137.0	145.3	151.0	146.7	135.8*
CP 00-1101	121.2	140.4	121.4	127.6	128.1	123.6	149.0	150.8	149.6	134.6*
CP 00-1074	114.9	140.5	129.3	131.5	123.4	124.1	149.9	146.0	145.4	133.9*
CP 00-1252	116.9	132.7	126.6	132.0	132.8	127.6	144.0	146.3	144.9	133.8*
CP 00-1527	114.2	135.7	123.4	128.9	127.8	120.6	152.6	148.4	149.9	133.4*
CP 00-1100	111.2	138.5	126.0	125.1	125.8	117.7	149.1	141.3	137.5	130.3*
CP 00-2164	98.3	131.0	117.6	121.0	127.6	113.8	148.1	143.4	147.6	127.5
CP 00-2180	105.2	130.9	120.8	122.7	119.7	118.1	148.2	142.0	137.4	127.2
CP 00-2188	116.7	128.3	112.7	128.3	128.2	122.2	140.8	134.5	131.3	127.2
CP 00-1446	107.3	126.8	119.0	119.6	117.2	110.3	150.4	135.7	142.7	125.4
CP 72-2086	111.2	134.5	119.5	102.3	128.7	115.8	118.4	148.2	140.5	124.1
CP 00-1302	101.3	125.3	102.1	97.1	109.0	106.8	143.2	137.7	142.8	118.3
CP 78-1628	--------	--------	--------	--------	--------	--------	146.6	135.9	133.0	--------
CP 84-1198	--------	--------	--------	--------	--------	--------	--------	145.4	--------	--------
CP 89-2143	98.8	139.6	118.7	135.7	130.1	127.3	--------	146.7	--------	--------
Mean	112.3	134.6	122.0	125.3	127.0	121.8	146.4	144.2	144.1	131.1
LSD (p = 0.1)[H]	6.5	6.4	12.2	6.3	7.2	9.3	5.4	8.1	5.7	4.2
CV (%)	6.0	5.0	10.4	5.3	5.9	7.9	3.8	4.1	4.1	6.0

* Significantly greater than CP 72-2086 at p = 0.10 based on t test.
H *LSD* for location means of sugar yield = 2.7 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 Lauderhill muck, Pahokee muck, Terra Ceia muck, Malabar sand, and Pompano fine sand

	Mean yield by soil type, farm, and sampling date									
	Lauderhill muck				Pahokee muck	Terra Ceia muck	Malabar sand	Margate sand	Pompano fine sand	
Clone	Knight 12/17/04	Okeelanta 1/10/05	Wedgworth 1/11/05	Duda 1/25/05	SFI 12/27/04	Osceola 12/13/04	Hilliard 1/3/05	Townsite 1/10/05	Lykes 12/21/04	Mean yield all farms
CP 00-1101	23.100	17.733	27.767	22.117	20.234	22.700	10.350	17.467	18.417	20.144*
CP 00-1100	20.600	18.800	23.050	18.783	22.267	21.833	11.600	23.400	20.117	20.022*
CP 00-1301	16.633	18.450	24.083	21.767	21.917	22.450	10.600	27.300	17.100	19.888*
CP 00-2180	21.267	17.633	22.117	20.133	23.283	22.833	10.667	23.467	17.733	19.869*
CP 00-1446	19.667	14.933	25.917	19.083	18.367	20.800	11.417	26.767	22.384	19.726*
CP 00-1630	21.350	16.250	24.267	22.133	23.694	21.700	6.733	21.700	16.615	19.379*
CP 00-2188	21.717	13.117	21.083	24.183	25.733	22.683	8.033	23.100	14.167	19.272*
CP 00-1751	19.583	16.133	23.067	19.250	24.133	24.033	8.867	19.000	18.277	19.232*
CP 00-1252	21.183	17.383	20.394	22.700	19.233	22.433	11.967	15.533	19.218	19.086*
CP 00-1748	19.600	17.217	20.550	19.567	20.217	21.750	13.350	23.400	16.417	19.063*
CP 00-1302	18.150	15.183	19.095	17.317	16.850	17.833	10.233	19.333	17.083	16.788
CP 00-1074	15.183	12.583	20.717	18.592	17.333	17.033	10.133	22.967	16.232	16.633
CP 00-1527	15.450	15.267	16.633	19.550	16.067	16.700	11.800	21.667	17.155	16.613
CP 72-2086	18.617	14.000	17.233	14.367	18.200	16.700	6.783	15.800	17.118	15.499
CP 00-2164	15.900	11.250	17.183	15.483	19.167	13.467	8.517	20.600	13.667	14.931
CP 78-1628	----------	----------	----------	----------	----------	----------	8.483	16.133	12.733	----------
CP 84-1198	----------	----------	----------	----------	----------	----------	----------	14.700	----------	----------
CP 89-2143	18.250	15.889	22.500	21.250	21.017	19.850	----------	18.033	----------	----------
Mean	18.537	15.289	20.899	19.131	19.811	19.644	10.001	20.369	16.839	18.410
LSD (p = 0.1)[H]	2.605	2.527	3.451	2.263	3.517	2.751	2.151	6.433	2.574	1.575
CV (%)	14.600	17.171	17.155	12.288	18.447	14.549	22.346	22.889	15.882	16.320

* Significantly greater than CP 72-2086 at p = 0.10 based on *t* test.
H *LSD* for location means of sugar yield = 1.537 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 by soil type, farm, and sampling date			Harvest yield by soil type, farm, and sampling date		
	Dania muck	Torry muck		Dania muck	Torry muck	
Clone	**Okeelanta 10/14/04**	**Eastgate 10/13/04**	**Mean yield, both farms**	**Okeelanta 11/22/04**	**Eastgate 2/9/05**	**Mean yield, both farms**
CP 99-1541	104.4	98.2	101.3	131.5	132.5	132.0
CP 89-2143	108.5	100.5	104.5	120.9	137.9	129.4
CP 99-1894	97.7	97.5	97.6	128.3	128.0	128.1
CP 99-1542	108.1	106.3	107.2	124.6	128.3	126.5
CP 99-1944	101.9	90.0	95.9	125.7	126.5	126.1
CP 72-2086	101.5	104.6	103.0	121.6	125.8	123.7
CP 99-1893	103.9	100.9	102.4	126.3	120.5	123.4
CP 99-1686	101.4	88.7	95.0	122.3	122.1	122.2
CP 99-1534	108.6	92.1	100.4	119.1	122.8	121.0
CP 99-2099	100.6	89.8	95.2	117.5	117.8	117.6
CP 99-3027	98.0	86.1	92.0	119.5	115.2	117.3
CP 99-1540	95.1	80.9	88.0	119.7	110.8	115.3
CP 99-1865	89.3	104.4	96.8	106.8	123.4	115.1
CP 99-1896	64.8	88.8	76.8	115.5	112.0	113.7
CP 99-2084	88.8	83.8	86.3	105.4	116.1	110.6
CP 99-1889	76.7	78.1	77.4	102.6	109.1	105.8
Mean	95.8	94.1	95.0	119.9	121.0	120.5
LSD ($p = 0.1$)[H]	10.6	6.7	13.5	6.1	7.1	9.0
CV (%)	9.0	5.8	7.8	5.3	6.1	5.7

[H] *LSD* for location means of preharvest sugar yield = 5.2 KS/T and of harvest yield = 2.2 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 1/10/05**	**Eastgate 2/9/05**	**Mean yield, both farms**	**Okeelanta 1/10/05**	**Eastgate 2/9/05**	**Mean yield, both farms**
CP 99-1894	110.49	247.25	178.43	14.211	32.711	23.355
CP 99-1893	109.18	243.13	176.04	13.824	29.956	21.874
CP 99-1896	119.89	262.54	190.94	13.857	29.528	21.681
CP 99-1686	99.74	237.11	167.96	12.184	29.558	20.796
CP 89-2143	99.38	209.49	154.66	12.004	29.431	20.641
CP 99-1541	68.97	222.88	145.92	9.085	31.391	20.150
CP 72-2086	97.16	219.85	158.50	11.810	27.837	19.823
CP 99-1540	86.11	241.55	163.42	10.274	27.784	18.996
CP 99-1944	88.00	203.50	145.75	11.064	25.849	18.456
CP 99-2099	99.78	206.69	153.54	11.793	24.234	18.079
CP 99-1534	84.47	208.98	146.59	10.028	25.893	17.929
CP 99-1865	106.37	184.52	146.47	11.428	22.599	17.115
CP 99-2084	101.33	190.12	146.48	10.614	21.765	16.292
CP 99-3027	84.92	186.99	136.38	10.133	21.881	16.092
CP 99-1542	65.35	171.02	118.18	8.188	21.986	15.087
CP 99-1889	120.47	142.98	134.15	12.392	15.921	14.475
Mean	96.64	211.29	153.96	11.467	26.138	18.803
LSD ($p = 0.1$)[H]	17.30	32.15	38.09	2.175	4.418	4.739
CV (%)	18.62	15.77	16.83	19.731	17.498	18.315

H *LSD* for location means of cane yield = 6.47 TC/H and of sugar yield = 0.974 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, Terra Ceia 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	Knight 10/27/04	Duda 12/07/04	Okeelanta 11/02/04	SFI 11/04/04	Osceola 11/08/04	Wedgworth 11/23/04	Hilliard 10/23/04	Lykes 11/01/04	Mean yield, all farms
CP 99-1889	131.16	136.11	91.61	179.09	153.99	141.48	68.80	112.42	126.83*
CP 99-1896	104.05	152.92	102.05	168.65	134.93	144.09	69.86	117.07	124.07*
CP 99-1893	103.69	156.23	108.08	177.59	143.21	122.66	70.77	94.78	122.09*
CP 99-1686	100.25	157.05	96.25	157.01	115.32	152.23	54.63	52.89	110.70*
CP 99-2084	94.21	105.55	99.97	161.30	137.85	118.83	50.43	99.55	108.46
CP 99-2099	110.30	135.33	101.45	155.62	127.82	108.80	57.79	69.48	108.45
CP 99-1894	109.02	146.37	90.07	145.00	109.20	109.43	66.60	73.62	106.16
CP 99-1541	75.10	138.72	102.37	153.33	101.85	142.10	55.51	69.75	104.84
CP 99-3027	111.58	122.51	96.08	146.47	108.81	120.89	48.25	77.60	104.02
CP 99-1944	117.14	124.42	96.76	112.54	119.65	127.71	40.87	52.45	99.06
CP 72-2086	99.17	140.27	114.40	133.70	107.96	130.82	21.15	39.61	98.23
CP 99-1534	88.60	125.24	104.08	144.63	118.01	106.12	54.63	36.24	97.19
CP 99-1865	81.37	123.06	103.24	144.86	99.75	118.78	27.76	48.06	93.36
CP 99-1540	72.98	118.50	67.07	118.05	106.02	75.05	63.29	74.16	86.89
CP 99-1542	70.99	91.69	68.75	119.24	125.29	86.42	44.69	60.16	83.39
CP 78-1628	--------	--------	---------	--------	--------	--------	74.85	97.00	--------
CP 89-2143	118.05	135.50	81.86	146.80	117.87	135.75	--------	--------	--------
Mean	100.71	132.39	96.80	147.83	121.35	122.16	56.03	74.59	104.92
LSD (p = 0.1)[H]	18.31	26.73	24.23	18.53	15.35	29.32	11.46	17.42	11.97
CV (%)	18.89	20.97	26.03	13.02	13.14	24.94	21.25	24.27	20.80

* Significantly greater than CP 72-2086 at $p = 0.10$ based on t test.
H *LSD* for location means of cane yield = 10.69 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, Terra Ceia 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	Knight 10/27/04	Duda 12/07/04	Okeelanta 11/02/04	SFI 11/04/04	Osceola 11/08/04	Wedgworth 11/23/04	Hilliard 10/23/04	Lykes 11/01/04	Mean yield, all farms
CP 99-1541	115.3	124.1	120.6	115.7	112.4	115.3	126.8	121.6	119.0*
CP 99-1542	109.3	133.8	121.5	117.6	92.3	124.3	124.7	123.4	118.2*
CP 99-1894	103.0	124.0	118.1	109.5	98.9	110.8	124.1	126.1	114.3*
CP 99-1893	93.2	117.3	115.0	107.3	104.5	113.6	126.1	121.7	112.2
CP 99-1686	95.7	126.1	110.3	107.5	98.2	101.0	128.2	124.2	111.4
CP 99-1944	87.7	125.9	110.9	109.6	111.5	114.4	116.6	113.3	111.4
CP 99-3027	95.0	115.6	127.2	99.3	99.6	107.2	115.9	121.9	110.2
CP 72-2086	103.7	110.0	111.9	111.6	95.6	111.0	101.2	115.4	107.5
CP 99-2099	99.1	113.7	104.8	98.7	94.3	109.7	117.0	119.8	107.1
CP 99-1540	97.5	105.0	105.5	102.6	104.7	115.9	110.6	112.1	106.7
CP 99-1865	93.5	126.9	102.7	92.2	84.6	124.5	116.1	111.8	106.6
CP 99-1534	96.4	114.2	110.3	107.1	87.6	108.5	106.3	113.7	105.5
CP 99-1896	88.9	107.8	106.1	101.7	94.7	100.6	111.9	123.2	104.4
CP 99-2084	90.7	103.0	104.2	98.9	97.0	100.4	119.7	117.2	103.9
CP 99-1889	84.6	102.6	100.9	91.1	87.6	90.5	103.3	105.0	95.7
CP 78-1628	---------	---------	---------	---------	---------	---------	124.0	116.9	---------
CP 89-2143	98.4	125.1	118.8	112.5	111.1	112.5	---------	---------	---------
Mean	97.7	117.0	111.9	105.6	99.1	110.1	117.1	118.0	108.9
LSD ($p = 0.1$)Ħ	6.9	13.7	13.9	5.1	6.7	15.1	7.9	14.7	5.0
CV (%)	7.3	12.2	12.9	5.0	7.0	14.3	7.0	12.9	10.7

* Significantly greater than CP 72-2086 at $p = 0.10$ based on *t* test.
Ħ *LSD* for location means of cane yield = 3.6 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, Terra Ceia 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	Knight 10/27/04	Duda 12/07/04	Okeelanta 11/02/04	SFI 11/04/04	Osceola 11/08/04	Wedgworth 11/23/04	Hilliard 10/23/04	Lykes 11/01/04	Mean yield, all farms
CP 99-1893	9.808	18.276	12.408	19.039	14.963	14.037	8.948	11.429	13.601*
CP 99-1896	9.227	16.394	10.668	17.187	12.792	14.484	7.794	14.366	12.849*
CP 99-1541	8.627	17.326	12.290	17.708	11.433	16.411	7.061	8.518	12.422*
CP 99-1686	9.651	19.712	10.545	16.852	11.434	15.426	7.014	6.518	12.144*
CP 99-1894	11.184	18.164	10.574	15.825	10.792	12.118	8.301	9.386	12.043*
CP 99-1889	11.114	13.971	9.171	16.287	13.450	12.863	7.065	11.785	11.963
CP 99-2099	10.934	15.397	10.599	15.405	12.100	12.024	6.721	8.335	11.450
CP 99-3027	10.604	14.164	11.686	14.575	10.796	13.079	5.619	9.509	11.254
CP 99-2084	8.523	11.049	10.255	15.987	13.365	11.841	6.050	11.655	11.091
CP 99-1944	10.298	15.613	10.672	12.339	13.346	14.637	4.749	5.910	10.969
CP 72-2086	10.305	15.237	12.873	14.954	10.306	14.535	2.175	4.701	10.615
CP 99-1534	8.575	14.283	11.547	15.460	10.305	11.577	5.836	4.054	10.205
CP 99-1865	7.620	15.581	10.615	13.595	8.487	14.207	3.239	5.481	9.853
CP 99-1542	7.627	13.140	8.346	14.023	11.460	10.732	5.584	7.458	9.800
CP 99-1540	7.119	12.235	7.075	12.087	11.098	8.751	7.012	8.288	9.208
CP 78-1628	----------	----------	----------	----------	---------	---------	9.285	11.394	---------
CP 89-2143	11.639	17.008	9.704	16.509	13.053	15.273	---------	---------	---------
Mean	9.780	15.492	10.754	15.507	11.974	13.344	6.652	8.852	11.298
LSD (p = 0.1)[H]	1.969	3.249	2.633	2.019	1.743	3.449	1.442	2.670	1.366
CV (%)	20.918	21.788	25.468	13.529	15.126	26.858	22.517	31.334	22.917

* Significantly greater than CP 72-2086 at p = 0.10 based on *t* test.
H *LSD* for location means of cane yield = 1.263 TS/H at p = 0.10.

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

	Cane yield by soil type, farm, and sampling date			Sugar yield by soil type, farm, and sampling date		
	Lauderhill muck	Torry muck		Lauderhill muck	Torry muck	
Clone	Okeelanta 11/17/04	Eastgate 2/3/05	Mean yield, both farms	Okeelanta 11/17/05	Eastgate 2/3/05	Mean yield, both farms
CP 98-1118	94.14	147.58	120.86	11.910	19.396	15.653
CP 89-2143	79.13	151.54	115.33	9.756	21.094	15.425
CP 98-1335	100.06	148.87	124.46	12.200	18.492	15.346
CP 98-1029	95.42	144.55	119.98	11.679	18.908	15.294
CP 98-1139	81.00	143.16	112.08	9.698	19.063	14.381
CP 98-1497	67.06	149.22	108.14	8.240	20.250	14.245
CP 98-1417	85.56	131.72	108.64	9.988	16.597	13.292
CP 98-2047	86.22	139.26	112.74	9.549	16.954	13.252
CP 72-2086	61.79	139.91	100.85	7.270	18.387	12.828
CP 98-1725	77.66	127.96	102.81	9.200	16.352	12.776
CP 98-1513	81.91	133.21	107.56	9.512	15.809	12.661
CP 98-1457	66.01	136.11	101.06	7.782	17.502	12.642
CP 98-1325	68.49	153.45	110.97	7.441	17.648	12.544
CP 98-1569	70.16	112.69	91.42	9.073	15.763	12.418
CP 98-1481	69.71	138.81	104.26	8.382	15.859	12.120
CP 98-1107	81.38	128.27	104.83	8.953	14.339	11.646
Mean	79.26	138.99	109.12	9.441	17.625	13.533
LSD ($p = 0.1$)[H]	15.53	15.18	17.41	1.944	2.203	2.565
CV (%)	20.38	11.36	15.27	21.424	13.004	15.972

H *LSD* for location means of cane yield = 6.17 TC/H and of sugar yield = 0.921 TS/H at $p = 0.10$.

Table 12. Yields of theoretical recoverable 96° sugar in kg per metric ton of cane (KS/T) from first-ratoon cane on Lauderhill muck and Torry muck

	Mean yield by soil type, farm, and sampling date		
	Lauderhill muck	Torry muck	
Clone	**Okeelanta 11/17/04**	**Eastgate 2/3/05**	**Mean yield, both farms**
CP 98-1569	129.3	139.9	134.6
CP 89-2143	123.5	139.2	131.3
CP 98-1497	123.1	135.9	129.5
CP 98-1118	125.7	131.1	128.4
CP 98-1029	122.5	131.0	126.7
CP 98-1139	119.0	132.5	125.8
CP 72-2086	117.3	131.6	124.5
CP 98-1725	119.3	127.6	123.4
CP 98-1335	122.2	124.1	123.1
CP 98-1457	117.4	128.4	122.9
CP 98-1417	116.5	126.3	121.4
CP 98-1513	116.2	118.5	117.4
CP 98-1481	120.2	113.7	117.0
CP 98-2047	111.1	121.7	116.4
CP 98-1325	107.9	115.1	111.5
CP 98-1107	109.6	112.0	110.8
Mean	119.0	126.6	122.8
LSD (p = 0.1)[H]	5.8	4.4	7.1
CV (%)	5.1	3.6	4.4

H *LSD* for location means = 2.0 KS/T at p = 0.10.

Table 13. Yields of cane in metric tons per hectare (TC/H) from second-ratoon cane on Dania muck, Lauderhill muck, and Pompano fine sand

Mean yield by soil type, farm, and sampling date

	Dania muck			Lauderhill muck			Pompano fine sand	
Clone	**Osceola 10/20/04**	**SFI 10/26/04**	**Duda 10/29/04**	**Okeelanta 10/16/04**	**Knight 10/18/04**	**Wedgworth 10/25/04**	**Lykes 10/22/04**	**Mean yield, all farms**
CP 98-1029	59.20	99.76	126.07	84.97	166.39	89.80	74.20	100.06*
CP 98-1417	61.83	91.16	110.59	71.96	178.00	79.76	65.63	94.09*
CP 98-2047	71.92	95.22	108.58	61.01	151.11	101.73	65.37	93.56*
CP 70-1133	66.06	114.40	102.37	65.97	132.08	103.08	62.89	92.41*
CP 98-1513	70.77	77.87	111.54	75.20	145.33	94.31	67.46	92.02*
CP 98-1325	59.87	107.47	127.63	64.99	143.50	80.76	54.28	91.21*
CP 98-1335	72.70	93.67	110.28	72.23	122.69	85.99	80.61	91.04*
CP 98-1118	64.42	92.90	124.26	57.08	151.59	83.51	62.17	90.85*
CP 98-1457	63.97	76.29	88.26	65.46	175.59	82.55	54.33	86.64
CP 98-1569	50.85	82.16	117.28	74.09	144.77	82.75	52.35	86.60
CP 98-1139	60.04	93.11	103.71	77.40	105.12	89.16	77.34	86.55
CP 98-1725	62.33	91.21	93.10	55.07	153.14	79.82	63.82	85.50
CP 98-1481	68.36	95.21	90.15	63.52	139.24	73.89	64.26	84.95
CP 72-2086	44.18	70.15	72.83	63.92	159.97	85.80	54.75	79.04
CP 98-1107	58.38	74.74	96.33	48.35	107.57	88.67	58.19	76.03
CP 98-1497	46.14	82.40	95.90	45.81	127.79	87.78	37.16	74.56
Mean	61.94	89.81	104.56	65.92	142.82	86.86	62.83	87.82
LSD (p = 0.1)[H]	12.50	13.23	17.22	14.28	44.81	15.57	7.43	10.60
CV (%)	20.96	15.32	17.13	22.53	32.60	18.65	12.29	24.85

* Significantly greater than CP 72-2086 at p = 0.10 based on *t* test.
H *LSD* for location means of cane yield = 9.16 TC/H at p = 0.10.

Table 14. Yields of theoretical recoverable 96° sugar in kg per metric ton of cane (KS/T) from second-ratoon cane on Dania muck, Lauderhill muck, and Pompano fine sand

	Mean yield by soil type, farm, and sampling date							
	Dania muck			Lauderhill muck			Pompano fine sand	
Clone	**Osceola 10/20/04**	**SFI 10/26/04**	**Duda 10/29/04**	**Okeelanta 10/16/04**	**Knight 10/18/04**	**Wedgworth 10/25/04**	**Lykes 10/22/04**	**Mean yield, all farms**
CP 98-1569	111.5	124.4	98.2	135.6	97.1	113.5	125.1	114.9
CP 72-2086	113.3	116.0	106.2	120.3	99.3	102.6	116.7	110.5
CP 98-1335	108.9	117.0	117.9	116.0	95.5	99.9	116.6	110.2
CP 98-1118	101.3	114.8	116.8	123.9	93.2	101.0	113.8	109.3
CP 70-1133	106.0	113.7	111.9	122.3	100.7	98.9	109.9	109.0
CP 98-1139	95.9	113.2	113.7	119.6	95.2	107.6	113.9	108.5
CP 98-1481	91.3	112.9	122.1	122.8	99.4	100.2	110.9	108.5
CP 98-1497	96.1	114.8	110.7	124.1	100.6	102.1	107.0	107.9
CP 98-1029	99.0	109.7	120.0	120.2	91.7	103.5	110.4	107.8
CP 98-1725	100.8	111.5	108.1	122.7	93.2	102.4	114.8	107.6
CP 98-1417	104.3	113.4	111.5	114.3	97.5	97.9	111.2	107.2
CP 98-1513	95.4	113.6	113.3	116.3	94.8	100.4	110.6	106.3
CP 98-1107	101.0	112.3	110.9	114.3	84.2	98.8	106.3	104.0
CP 98-2047	90.3	119.8	112.5	109.5	94.3	101.1	98.6	103.7
CP 98-1457	93.3	102.4	104.2	108.0	100.4	95.3	108.6	101.7
CP 98-1325	92.3	99.1	102.2	101.7	101.5	100.1	92.6	98.5
Mean	100.3	112.8	111.1	117.8	96.6	101.8	110.3	107.2
LSD ($p = 0.1$)[H]	8.4	5.8	6.8	5.8	8.9	6.4	8.1	4.8
CV (%)	8.7	5.4	6.4	5.1	9.6	6.5	7.6	7.0

H *LSD* for location means of sugar yield = 2.6 KS/T at $p = 0.10$.

Table 15. Yields of theoretical recoverable 96° sugar in metric tons per hectare (TS/H) from second-ratoon cane on Dania muck, Lauderhill muck, and Pompano fine sand

	Mean yield by soil type, farm, and sampling date							
	Dania muck			Lauderhill muck			Pompano fine sand	
Clone	Osceola 10/20/04	SFI 10/26/04	Duda 10/29/04	Okeelanta 10/16/04	Knight 10/18/04	Wedgworth 10/25/04	Lykes 10/22/04	Mean yield, all farms
CP 98-1029	5.902	11.034	15.197	10.252	15.317	9.400	8.193	10.756*
CP 70-1133	7.071	13.050	11.446	8.051	13.497	10.207	6.911	10.033*
CP 98-1335	7.839	10.993	12.951	8.379	11.977	8.598	9.440	10.010*
CP 98-1417	6.469	10.361	12.301	8.177	17.340	7.806	7.291	9.959*
CP 98-1118	7.063	10.694	14.455	7.018	14.059	8.382	7.082	9.807*
CP 98-1513	6.724	8.892	12.627	8.744	14.119	9.456	7.483	9.743
CP 98-1569	5.578	10.227	11.530	10.028	14.287	9.432	6.555	9.684
CP 98-2047	6.501	11.391	12.211	6.597	14.322	10.296	6.452	9.681
CP 98-1139	5.718	10.531	11.794	9.181	10.106	9.621	8.798	9.392
CP 98-1481	6.202	10.733	11.018	7.794	13.933	7.442	7.108	9.176
CP 98-1325	5.475	10.657	13.008	6.597	14.730	8.133	5.172	9.110
CP 98-1725	6.299	10.176	10.089	6.757	14.086	8.215	7.322	8.992
CP 98-1457	5.982	7.781	9.242	7.090	17.722	7.876	5.922	8.802
CP 72-2086	5.029	8.208	7.706	7.652	15.952	8.821	6.430	8.557
CP 98-1497	4.395	9.492	10.592	5.672	12.770	9.001	3.961	7.967
CP 98-1107	5.873	8.403	10.634	5.544	9.222	8.745	6.207	7.804
Mean	6.239	10.135	11.593	7.777	13.805	8.857	6.988	9.342
LSD ($p = 0.1$)[H]	1.312	1.636	1.939	1.678	4.832	1.726	1.015	1.204
CV (%)	21.848	16.797	17.402	22.438	36.300	20.269	15.137	25.832

* Significantly greater than CP 72-2086 at $p = 0.10$ based on *t* test.
H *LSD* for location means of sugar yield = 1.094 TS/H at $p = 0.10$.

Table 16. Yields of cane and of theoretical recoverable 96° sugar in metric tons per hectare (TC/H and TS/H) from second-ratoon cane on Dania muck, Terra Ceia muck, and Malabar sand

	Mean cane yield by soil type, farm, and sampling date				Mean sugar yield by soil type, farm, and sampling date			
	Dania muck	Terra Ceia muck	Malabar sand		Dania muck	Terra Ceia muck	Malabar sand	
Clone	Okeelanta 10/28/04	Eastgate 1/2/05	Hilliard 10/17/04	Mean yield, all farms	Okeelanta 10/28/04	Eastgate 1/2/05	Hilliard 10/17/04	Mean yield, all farms
CP 97-1994	85.57	82.19	91.88	86.55*	9.418	9.042	10.814	9.758*
CP 97-1777	98.92	63.40	90.86	84.66*	10.517	7.335	10.467	9.463*
CP 97-1164	89.55	57.58	96.67	81.26*	9.561	6.440	12.152	9.384*
CP 97-1928	100.04	57.76	78.89	78.90	10.416	6.539	9.798	8.918
CP 97-1362	84.22	77.69	83.60	82.27*	7.769	8.997	9.477	8.827
CP 97-1944	97.15	69.34	63.41	76.63	10.460	8.025	7.791	8.759
CP 97-1979	92.07	62.53	80.70	78.44	9.408	6.910	9.540	8.619
CP 97-1989	86.67	68.75	82.96	79.46	8.402	6.930	8.933	8.089
CP 97-1850	91.62	66.45	71.77	76.61	8.632	7.653	7.850	8.045
CP 70-1133	72.29	54.31	78.48	68.36	7.618	6.284	9.215	7.706
CP 97-2068	71.80	62.00	72.54	68.78	7.583	6.268	8.378	7.409
CP 97-1387	68.52	55.95	80.31	68.26	6.944	6.387	8.695	7.342
CP 97-1068	79.65	38.11	80.46	66.07	8.494	4.221	9.145	7.287
CP 97-1804	84.77	47.26	69.23	67.08	8.624	4.904	7.924	7.150
CP 97-1433	63.92	40.67	65.49	56.69	6.981	4.633	8.018	6.544
CP 97-2103	---------	72.38	--------	--------	--------	7.375	--------	--------
CP 72-2086	78.35	--------	68.76	--------	8.370	--------	8.139	--------
Mean	83.76	62.13	78.74	74.17	8.684	6.902	9.059	8.177
LSD (p = 0.1)[H]	15.71	17.91	15.47	12.17	1.710	1.963	1.867	1.422
CV (%)	19.49	29.95	20.44	22.98	20.460	29.549	21.438	23.509

* Significantly greater than CP 70-1133 at $p = 0.10$ based on *t* test.
H *LSD* for location means of cane yield = 9.84 TC/H and of sugar yield = 1.100 TS/H at $p = 0.10$.

Table 17. Theoretical recoverable yields of 96° sugar in kg per metric ton of cane (KS/T) from second-ratoon cane on Dania muck, Terra Ceia muck, and Malabar sand

	Mean yield by soil type, farm, and sampling date			
	Lauderhill muck	Torry muck	Malabar sand	
Clone	Okeelanta 10/28/03	Eastgate 2/18/04	Hilliard 10/15/03	Mean yield, all farms
CP 97-1944	107.8	115.9	123.5	115.7
CP 97-1164	106.6	111.3	125.6	114.5
CP 97-1433	109.2	112.4	122.1	114.5
CP 97-1928	103.6	113.1	125.0	113.9
CP 97-1777	107.0	116.9	116.1	113.3
CP 97-1994	110.4	110.2	117.9	112.8
CP 70-1133	105.6	115.9	115.2	112.2
CP 97-1979	103.3	111.0	118.8	111.0
CP 97-1068	106.7	110.2	113.1	110.0
CP 97-1387	101.3	113.3	107.7	107.4
CP 97-2068	105.8	101.1	115.4	107.4
CP 97-1362	92.4	114.5	114.3	107.2
CP 97-1804	101.1	104.6	114.9	106.9
CP 97-1850	94.5	115.2	109.5	106.4
CP 97-1989	96.8	101.2	108.9	102.3
CP 72-2086	107.1	-------	118.5	-------
CP 97-2103	-------	102.8	-------	-------
Mean	103.5	110.8	115.9	110.6
LSD (p = 0.1)[H]	5.8	6.3	6.6	6.1
CV (%)	5.8	5.9	5.9	5.9

H *LSD* for location means of sugar yield = 2.1 KS/T at p = 0.10.

Table 18. 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 plant cane on Margate/Oldsham sand and Margate sand

	Preharvest yield	Harvest 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	Townsite 10/14/04	Benbow 1/3/05	Townsite 1/10/05	Mean yield, both farms	Benbow 1/3/05	Townsite 1/10/05	Mean yield, both farms	Benbow 1/3/05	Townsite 1/10/05	Mean yield, both farms
CPCL 95-0242	101.8	119.8	130.2	125.0	132.00	174.92	153.46	15.852	22.655	19.254
CPCL 97-1320	96.6	118.8	136.8	127.8	119.31	168.90	144.11	14.017	23.108	18.562
CPCL 97-0393	100.0	132.3	137.8	135.1	140.14	138.40	139.27	18.630	18.490	18.560
CPCL 97-2730	115.1	134.7	138.4	136.8	143.91	126.94	136.87	19.327	17.483	18.495
CP 89-2143	124.2	142.6	146.7	144.7*	130.35	122.07	126.21	18.584	18.030	18.307
CPCL 95-2367	117.3	134.3	134.7	134.5	125.59	138.39	131.99	16.898	18.604	17.751
CP 78-1628	116.3	137.1	135.9	136.5	141.23	118.73	129.98	19.369	16.125	17.747
CP 84-1198	111.7	135.4	144.8	139.8	140.10	102.31	124.73	18.990	14.687	17.132
CPCL 96-0289	106.9	131.7	148.4	139.0	112.05	124.58	116.81	14.386	18.319	15.963
CPCL 95-1758	103.1	126.7	129.8	128.2	126.78	122.43	124.60	16.033	15.658	15.845
CPCL 95-2293	110.6	129.8	137.8	133.8	108.33	82.02	95.17	14.000	11.259	12.629
CP 72-2086	117.3	-------	148.1	-------	--------	107.01	--------	---------	15.783	---------
Mean	110.1	132.6	138.4	134.6	127.18	127.80	129.38	17.778	16.641	17.295
LSD (p = 0.1)[H]	11.3	7.3	12.1	7.5	47.38	52.38	33.78	6.030	6.561	5.273
CV (%)	7.3	3.9	6.2	5.2	26.45	29.03	27.35	24.083	28.057	26.155

* Significantly greater than CP 78-1628 at $p = 0.10$ based on *t* test.
H *LSD* for location means of harvest yield = 5.5 KS/T, of cane yield = 22.94 TC/H, and of sugar yield = 2.443 TS/H at $p = 0.1$.

Table 19. Yields of cane and theoretical recoverable 96° sugar in metric tons per hectare (TC/H and TS/H) from plant cane 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 12/28/04	Prewitt 12/28/04	Ritta 1/17/05	Mean yield, all farms	Bryant 12/28/04	Prewitt 12/28/04	Ritta 1/17/05	Mean yield, all farms
CPCL 96-2061	192.69	185.53	113.66	163.96	24.185	20.961	14.209	19.785
CL 77-0797	213.05	143.97	110.49	155.83	26.156	16.330	15.465	19.317
CP 89-2143	160.99	142.58	129.27	144.28	20.381	16.145	19.739	18.755
CP 84-1198	149.15	139.08	157.95	148.73	19.508	15.044	21.206	18.586
CPCL 98-1123	150.11	139.67	129.42	139.74	17.504	16.060	18.309	17.291
CPCL 95-1795	165.77	118.26	92.56	125.53	19.898	14.904	13.370	16.057
CPCL 97-2282	148.56	114.82	119.19	127.52	16.985	13.865	16.783	15.877
CPCL 98-4392	131.45	112.16	97.42	113.68	14.334	13.135	14.084	13.851
CPCL 98-1031	100.96	92.99	93.87	95.94	11.711	9.924	12.933	11.523
CP 72-2086	--------	--------	131.38	--------	--------	--------	17.362	--------
CPCL 96-0289	197.58	146.74	---------	--------	21.936	15.544	--------	--------
CPCL 97-2730	152.71	143.00	---------	--------	18.925	15.726	--------	--------
Mean	159.69	135.55	121.41	135.02	19.036	15.513	16.569	16.782
LSD (p = 0.1)[H]	55.81	33.20	44.59	19.77	6.838	3.760	6.369	2.631
CV (%)	24.93	17.47	25.94	24.31	25.623	17.291	27.151	24.823

[H] *LSD* for location means of cane yield = 14.49 TC/H and of sugar yield = 1.882 TS/H at p = 0.10.

Table 20. Yields of theoretical recoverable 96° sugar in kg per metric ton of cane (KS/T) from plant cane on Torry muck and Terra Ceia muck

	Mean yield by soil type, farm, and sampling date			
	Torry muck		Terra Ceia muck	
Clone	**Bryant 12/28/04**	**Prewitt 12/28/04**	**Ritta 1/17/05**	**Mean yield, all farms**
CP 89-2143	126.7	113.2	151.7	130.5
CPCL 95-1795	119.6	125.6	144.3	129.8
CL 77-0797	122.9	113.7	140.3	125.6
CPCL 97-2282	114.3	120.3	141.1	125.2
CPCL 98-1123	116.3	115.0	142.6	124.7
CPCL 98-4392	110.8	117.2	144.7	124.2
CP 84-1198	129.6	108.5	133.7	124.0
CPCL 96-2061	125.2	113.3	125.3	121.3
CPCL 98-1031	116.5	107.0	137.4	120.3
CP 72-2086	---------	---------	133.7	---------
CPCL 96-0289	111.9	105.6	---------	---------
CPCL 97-2730	122.7	109.9	---------	---------
Mean	119.4	113.4	138.3	125.1
LSD (p = 0.1)[H]	8.8	6.1	8.2	6.5
CV (%)	5.2	3.8	4.2	4.5

H *LSD* for location means of sugar yield = 2.1 at p = 0.10.

Table 21. Yields of cane in metric tons per hectare (TC/H) from plant cane on Torry muck, Terra Ceia muck, Margate/Oldsham sand, and Margate sand

	Mean yield by soil type, farm, and sampling date					
	Torry muck		Terra Ceia muck	Margate/ Oldsham sand	Margate sand	
Clone	Bryant 12/28/04	Prewitt 12/28/04	Ritta 1/17/05	Benbow 1/3/05	Townsite 1/10/05	Mean yield, all farms
CPCL 96-0860	211.47	157.73	137.10	145.78	168.49	164.11*
CPCL 96-4974	208.94	167.26	151.25	118.09	158.67	160.84*
CPCL 95-1907	170.51	159.55	138.92	128.44	160.51	151.59
CPCL 98-1205	154.54	159.27	139.26	119.94	133.55	141.31
CP 84-1198	149.15	139.08	157.95	140.10	101.53	140.57
CP 89-2143	160.99	142.58	129.27	130.35	122.07	137.05
CPCL 97-1864	157.89	132.86	123.31	131.25	120.07	134.53
CPCL 96-4500	171.50	122.66	116.84	121.17	140.01	134.44
CPCL 97-4983	148.99	135.90	157.44	105.99	132.32	133.43
CPCL 96-1165	131.81	134.91	111.52	97.39	81.56	113.87
CPCL 96-2375	118.08	133.20	113.30	102.83	86.85	110.85
Mean	158.47	143.21	134.12	124.50	131.78	138.42
LSD (p = 0.1)[H]	45.97	29.50	53.52	33.63	46.95	15.36
CV (%)	20.59	14.62	28.19	19.18	25.16	21.81

* Significantly greater than CP 89-2143 at $p = 0.10$ based on t test.
H *LSD* for location means of cane yield = 17.88 TC/H at $p = 0.1$.

Table 22. Yields of theoretical recoverable 96° sugar in kg per metric ton of cane (KS/T) from plant cane on Torry muck, Terra Ceia muck, Margate/Oldsham sand, and Margate sand

	Mean yield by soil type, farm, and sampling date					
	Torry muck		Terra Ceia muck	Margate/ Oldsham sand	Margate sand	
Clone	**Bryant 12/28/04**	**Prewitt 12/28/04**	**Ritta 1/17/05**	**Benbow 1/3/05**	**Townsite 1/10/05**	**Mean yield, all farms**
CP 89-2143	126.7	113.2	151.7	142.6	146.7	136.2
CPCL 96-1165	127.9	121.3	139.8	133.7	142.7	133.2
CP 84-1198	129.6	108.5	133.7	135.4	145.4	130.5
CPCL 96-2375	118.1	114.8	139.3	130.5	139.3	128.4
CPCL 97-4983	116.5	106.2	133.6	142.2	141.4	128.1
CPCL 96-4500	107.7	109.1	136.7	138.7	145.0	127.5
CPCL 98-1205	108.9	109.5	130.6	139.2	140.7	125.8
CPCL 97-1864	109.5	104.9	135.8	137.3	141.1	125.5
CPCL 96-4974	110.3	111.1	130.5	136.2	135.9	124.8
CPCL 96-0860	110.1	102.0	131.9	131.4	134.7	122.0
CPCL 95-1907	93.9	106.0	130.7	129.7	134.1	118.9
Mean	114.6	109.9	135.8	136.0	140.5	127.3
LSD (p = 0.1)[H]	11.3	7.0	10.2	7.9	8.9	5.4
CV (%)	7.0	4.5	5.3	4.1	4.5	5.2

H *LSD* for location means of sugar yield = 3.0 KS/T at p = 0.1.

Table 23. Yields of theoretical recoverable 96° sugar in metric tons per hectare (TS/H) from plant cane on Torry muck, Terra Ceia muck, Margate/Oldsham sand, and Margate sand

	Mean yield by soil type, farm, and sampling date					
	Torry muck		Terra Ceia muck	Margate/ Oldsham sand	Margate sand	
Clone	**Bryant 12/28/04**	**Prewitt 12/28/04**	**Ritta 1/17/05**	**Benbow 1/3/05**	**Townsite 1/10/05**	**Mean yield, all farms**
CPCL 96-0860	23.341	16.144	18.263	19.023	22.679	19.890
CPCL 96-4974	22.942	18.617	19.882	16.044	21.730	19.843
CP 89-2143	20.381	16.145	19.739	18.584	18.030	18.576
CP 84-1198	19.508	15.044	21.206	18.990	14.687	18.305
CPCL 95-1907	15.946	16.984	18.257	16.747	21.622	17.911
CPCL 98-1205	16.910	17.498	18.090	16.724	18.791	17.603
CPCL 96-4500	18.472	13.341	15.920	16.735	20.260	16.945
CPCL 97-4983	17.352	14.425	20.811	15.098	18.761	16.924
CPCL 97-1864	17.392	13.941	16.642	18.232	16.986	16.776
CPCL 96-1165	16.874	16.333	15.556	13.022	11.635	15.087
CPCL 96-2375	13.976	15.289	16.027	13.434	12.033	14.152
Mean	17.957	16.630	17.781	17.031	17.879	17.456
LSD ($p = 0.1$)[H]	5.619	3.458	7.841	4.717	7.070	2.052
CV (%)	22.217	14.765	31.147	19.665	27.931	23.937

H *LSD* for location means of cane yield = 2.452 TS/H at $p = 0.1$.

Table 24. Dates of stalk counts of 16 plant cane, 10 first-ratoon, and 10 second-ratoon experiments

	Crop		
Location	**Plant cane**	**First ratoon**	**Second ratoon**
Benbow	07/29/04	---	---
Bryant	07/13/04	---	---
Duda	07/14/04	07/07/04	07/13/04
Eastgate	06/04/04	07/20/04	03/14/05
Hilliard	09/13/04	09/16/04	09/16/04
Knight	07/28/04	08/11/04	10/07/04
Lykes	08/05/04	08/12/04	09/13/04
Okeelanta	08/03/04	09/21/04	10/04/04
Okeelanta (successive)	08/04/04	09/17/04	09/23/04
Osceola	07/27/04	08/31/04	09/24/04
Prewitt	07/27/04	---	---
Ritta	07/12/04	---	---
Townsite (CP)	07/14/04	---	---
Townsite (CPCL)	07/14/04	---	---
SFI	07/29/04	08/10/04	09/01/04
Wedgworth	07/21/04	07/22/04	10/05/04

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 stage	Permanent CP-series number assignment	Eight stalks planted for agronomic evaluation; One 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 to LS, yellow leaf syndrome, and dry top rot (by natural infection)	Eight 8-stalk bundles cut for seed; 2 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 sites) 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	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 Analyzed in plant cane and 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 firs 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 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).