PATHOLOGY RESEARCH

Jeffrey W. Hoy, Lori B. Grelen, Carolyn F. Savario, and Jane Q. Paccamonti
Department of Plant Pathology and Crop Physiology

Pathology research addresses the important diseases affecting sugarcane in Louisiana. The overall program goal is to minimize losses to diseases in a cost-effective manner. Projects receiving emphasis during 2006 included: evaluating the effect of brown rust on yield and the feasibility of management with fungicides, ratoon stunting disease (RSD) management, assessing the treat posed by yellow leaf and control measures, evaluating disease resistance in the variety selection program, and billet planting. Research results on billet planting are reported separately.

BROWN RUST

During 2006, a severe epidemic of brown rust, caused by *Puccinia melanocephala*, occurred in the Louisiana sugarcane industry. This provided an opportunity to conduct research on the efficacy of fungicides for brown rust control. Multiple field experiments were conducted on commercial sugarcane farms. In addition, a yield loss experiment was conducted to assess the impact of brown rust on sugarcane yield.

A field experiment (Experiment 1) was initiated at two locations in April at the beginning of the epidemic. Five fungicide treatments, Folicur, Headline + Folicur (tank-mix), Quadris, Quilt, and Stratego were included. Treatments were applied from one to four times to evaluate the effects of application number and timing. Sprays at a St. Mary Parish location were initiated on April 13 with the last spray on June 14. Sprays at a Terrebonne Parish location were initiated on April 11 with a last application on June 13. Spray intervals for multiple application treatments were approximately 3 weeks. Fungicides were applied at a 15 gal/acre spray volume using a CO_2 backpack sprayer with a two-row boom and three nozzles per row to create a 36 inch band. Plots were two rows, 25 ft in length with two non-treated rows between plots. There were three replications. The effect of fungicides on rust severity was evaluated in two ways. During May, a visual rating was made for six plants in each plot using a 1-6 rating scale in which 1 = no rust and 6 = severe rust on all leaves. During June, the second fully emerged leaf was collected from 6-8 stalks per plot, and image analysis was performed in the lab to determine the percentage of leaf area occupied by rust lesions. At the end of the growing season in December, yield components were compared to determine the effects of treatments on yield.

A second field experiment (Experiment 2) was initiated at two locations during June to evaluate Headline by itself at different rates and Folicur, Quadris, Quilt and Stratego at a higher rate. Fungicides were applied to first ratoon of LCP 85-384 in which rust had begun but not spread to the younger leaves. A single fungicide application was made at a Rapides Parish location on June 10. Two fungicide applications were made at a St. James Parish location on June 9 and 27. The percentage of rust was determined on the second youngest fully emerged leaf by image analysis. Yield components were determined and compared only at the Rapides Parish location.

A third field experiment (Experiment 3) also was initiated in June to evaluate rust control efficacy for Headline alone, Headline + Folicur (tank-mix), Caramba at two rates, and Headline

+ Caramba (pre-mix). Fungicides were applied to first ratoon of LCP 85-384 at a Lafourche Parish location on June 2 and June 23. The percentage of rust was determined on the second youngest fully emerged leaf by image analysis. Yield components were determined and compared at the end of the November.

An experiment was conducted in a field of LCP 85-384 plant cane in Iberia Parish to determine the effect of brown rust on yield during 2006. A combination of three fungicides, Folicur at 6 oz/A, Quadris at 10 oz/A, and Tilt (propiconazole) at 6 oz/A, was applied at two week intervals with treatments initiated and stopped at different times during the spring epidemic period. Treatments compared to a non-treated control were fungicide applications in April only; April & May; April, May, & June; May only; May & June; and June only. Rust severity was determined on two dates, and yield data was collected at harvest on 1 December.

Experiment 1. The rust severity rating during May was lower compared to the non-treated control for all fungicides except Folicur at both locations (Table 1). The image analysis results were the same for rust severity determined during June (Table 2). Fungicide treatments reduced but did not eliminate rust.

Yield was increased by some fungicide treatments at both the St. Mary Parish (Table 3) and Terrebonne Parish (Table 4) locations. Treatment effects were compared for five yield components: millable stalk population, stalk weight (St. Mary only), cane sucrose content (lbs. of sucrose per ton of cane), total cane tonnage, and total sucrose yield. Statistical analyses failed to separate many treatments from the non-treated control at both locations despite some large numerical differences between treatment means. Small plot size and the low number of replicates (three) contributed to this outcome. At the St. Mary location, significant differences were not detected in cane tonnage among treatments even though some yielded up to eight tons of cane more than the control. Few differences were detected in sucrose yield, as well, despite some mean differences of more than 2,000 lbs. of sugar per acre compared to the control. At the Terrebonne location, tonnage differences between some fungicide treatments and the control were up to nine tons per acre, and sucrose yield differences ranged up to 2,000 lbs.

The magnitude of these differences would be economically very significant to a grower. So, the question is the degree of confidence that the quantitative differences in the results were due to the fungicide treatments. A comparison of the types of treatments and all the results together helps to draw a conclusion. There were five total treatments for each fungicide or fungicide combination in the experiment (the combined treatments for number and timing of applications for each fungicide type). A comparison of how each fungicide type affected total sugar yield across all five treatments shows whether there was consistency in performance (Table 5). The most consistently beneficial fungicide type at both locations was the Headline + Folicur tank-mix, while Folicur applied alone was consistently not beneficial. All five of the Headline + Folicur treatments increased yield by more than 1,000 lbs. of sugar, whereas only one of five treatments with Folicur alone did. Quadris, Quilt, and Stratego increased yield by over 1,000 lbs. of sugar for three of five treatments at both locations. These results match exactly with the recorded reductions in rust symptom severity and with visual growth differences observed in the field at both locations during the course of the experiment. The best treatment for reducing rust severity at both locations provided the most consistent benefit in substantially increased yield at both locations, whereas the least effective fungicide for rust control provided the least benefit at both locations. The fungicides that gave intermediate levels of rust control

substantially increased yield in a majority of cases at both locations. Considered altogether, the results give a degree of confidence that, at the rates compared in this experiment, the Headline + Folicur treatment gave the best rust control followed by Stratego, Quadris, and Quilt, while Folicur alone did not provide adequate rust control. A final conclusion to be drawn is that more than one application will likely be necessary if a brown rust epidemic begins in April.

Experiment 2. In the experiment begun in June at two locations, all the fungicides tested reduced rust severity (Table 6). Folicur applied alone at a 6 oz/acre rate was less effective than the others at the Rapides Parish location. The lower rust severity in the non-treated control compared to experiment one indicates that the late developing epidemic in these ratoon fields was not progressing rapidly due to the onset of summer temperatures. Despite this, it was possible to obtain some fungicide efficacy information. However, it was not possible to determine whether increased rates of Quadris, Quilt, and Stratego improved efficacy compared to the first experiment. Yield data was collected only from a portion of the experiment in Rapides Parish because of an accidental, premature harvest of part of the field (Table 7). Not many significant differences were indicated by the statistical analysis, but sizable numerical increases were recorded for the Quilt and Stratego treatments compared to the non-treated control. No yield data was obtained from the St. James Parish location.

Experiment 3. In the second experiment started in June at Thibodaux, LA, five fungicide treatments reduced rust severity (Table 8). However, as in the other June start experiment, rust severity in the control was less than in the first experiment. Yield data was collected, but no significant differences were detected among treatments (Table 9).

Yield Loss Experiment. This experiment was conducted in LCP 85-384 plant cane, the crop cycle year in which the rust epidemic usually begins first. However, the cane was planted in heavy clay soil, and the epidemic did not begin as early as in fields of cane planted in light soils. This is confirmed by the rust severity treatment means from a mid-May disease assessment by image analysis (Table 10). Rust severity determined in mid-June was greater in the non-sprayed control, and fungicide applications reduced rust in all treatments except the April only treatment. Severe rust was never observed in this field. However, the lowest numerical yields for cane tonnage and sucrose per acre were recorded for the non-treated control (Table 11). The highest yields were obtained from the April, May, & June treatment (+5.6 tons and +1096 lbs. of sugar). The second highest yields were obtained from the May & June treatment (+4.7 tons and +818 lbs. of sugar). These differences were not significant in the statistical analysis; however, the magnitude of the estimated losses due to rust (-19.9% for tons/acre and -15.6% for sugar/acre) are similar to those found in yield loss experiments conducted during 2004 and 2005.

Conclusions. Multiple fungicide treatments were identified with the ability to reduce brown rust severity in sugarcane. A consideration of the yield loss results suggests that some would have provided positive economic returns for farmers. Based on the 2006 results, the Headline + Folicur tank-mix treatment was the best treatment. Other fungicides showing promise were Quadris, Quilt, and Stratego. Caramba applied alone provided some rust control, so it might be effective in a tank-mix with Headline. The results from one season should not be considered conclusive. Additional fungicide efficacy research will be conducted during 2007. The yield loss experiment confirmed that rust severity is lower in cane planted in heavy clay soils. However, the estimated yield loss in the 2006 experiment was similar to the losses recorded in the 2004 and 2005 experiments.

Table 1. Brown rust ratings determined during May in Experiment 1.

Treatment[1]	St. Mary Parish location[2]	Terrebonne Parish location[3]
Non-treated control	3.2 a	4.2 a
Folicur	2.9 a	3.9 ab
Headline + Folicur	2.5 b	3.3 c
Quadris	2.6 b	3.6 bc
Quilt	2.4 b	3.3 bc
Stratego	2.3 b	3.5 bc

[1]Application rates (formulated product) were 6 oz/acre for Folicur 3.6 F (tebuconazole 38.7% ai), 6 oz/acre Headline (pyraclostrobin 23.6% ai) + 4 oz/acre Folicur, 9 oz/acre for Quadris (azoxystrobin 22.9% ai), 14 oz/acre for Quilt (azoxystrobin 7% ai + propiconazole 11.7% ai), and 16 oz/acre for Stratego (trifloxystrobin 12% ai + propiconazole 12% ai).
[2]Rust ratings made on 5/4/06 14 days after a single treatment. Ratings assigned on a 1-6 scale with 1 = no rust and 6 = severe rust on all leaves. Means within a column followed by the same letter were not significantly different (P=0.05).
[3]Rust ratings made on 5/23/06 nine days after a second application. Ratings assigned on a 1-6 scale with 1 = no rust and 6 = severe rust on all leaves. Means within a column followed by the same letter were not significantly different (P=0.05).

Table 2. Brown rust severity during June in Experiment 1 determined with image analysis.

Treatment[1]	St. Mary Parish location[2]	Terrebonne Parish location[3]
Non-treated control	14.3 a	27.1 a
Folicur	13.7 a	24.8 a
Headline + Folicur	2.4 b	10.1 c
Quadris	4.8 b	13.9 bc
Quilt	4.2 b	13.3 bc
Stratego	4.6 b	14.9 b

[1]Application rates (formulated product) were 6 oz/acre for Folicur 3.6 F (tebuconazole 38.7% ai), 6 oz/acre Headline + 4 oz/acre Folicur, 9 oz/acre for Quadris (azoxystrobin 22.9% ai), 14 oz/acre for Quilt (azoxystrobin 7% ai + propiconazole 11.7% ai), and 16 oz/acre for Stratego (trifloxystrobin 12% ai + propiconazole 12% ai).
[2]Percent rust determined on 6/1/06 six days after third fungicide application. Means within a column followed by the same letter were not significantly different (P=0.05).
[3]Percent rust determined on 6/13/06 13 days after third fungicide application. Means within a column followed by the same letter were not significantly different (P=0.05).

Table 3. Effects of fungicide treatments for brown rust control on yield of LCP 85-384 plant cane at Experiment 1 St. Mary Parish location during 2006.

Treatment/application number and timing[1]	Millable stalks/A[2]	Stalk weight (lbs.)[2]	Sucrose/ton cane (lbs.)[2]	Tons of cane/A[2]	Sucrose/A (lbs.)[2]
Folicur 123	45820 bc	1.91 ab	195.2 de	43.9 ab	8537 bcd
Folicur 1234	46201 abc	1.96 ab	199.7 abcde	45.0 ab	8973 abcd
Folicur 2	46508 abc	1.80 ab	209.6 ab	41.9 ab	8768 abcd
Folicur 23	46352 abc	1.90 ab	196.8 cde	44.0 ab	8654 bcd
Folicur 234	49171 abc	1.96 ab	202.0 abcde	48.2 ab	9745 abcd
Headline + Folicur 123	48376 abc	2.07 a	210.9 a	50.1 a	10571 a
Headline + Folicur 1234	48623 abc	1.84 ab	207.1 abcd	45.0 ab	9295 abcd
Headline + Folicur 2	46085 bc	1.99 ab	205.4 abcd	45.7 ab	9387 abcd
Headline + Folicur 23	48112 abc	1.85 ab	205.2 abcde	44.4 ab	9140 abcd
Headline + Folicur 234	46196 abc	1.99 ab	207.9 abc	46.0 ab	9527 abcd
Non-treated control	46110 abc	1.81 ab	193.7 e	41.9 ab	8114 d
Quilt 123	46883 abc	1.94 ab	210.0 a	45.6 ab	9572 abcd
Quilt 1234	49610 abc	1.75 ab	209.9 a	43.3 ab	9071 abcd
Quilt 2	47367 abc	1.72 ab	197.2 bcde	40.7 ab	8000 d
Quilt 23	49058 abc	2.03 a	210.3 a	49.2 ab	10323 ab
Quilt 234	47918 abc	1.96 ab	199.5 abcde	46.8 ab	9340 abcd
Quadris 123	50270 ab	1.95 ab	206.6 abcd	48.9 ab	10096 abc
Quadris 1234	46158 abc	1.92 ab	201.2 abcde	44.3 ab	8940 abcd
Quadris 2	49611 abc	1.81 ab	209.5 ab	44.7 ab	9388 abcd
Quadris 23	50605 a	1.60 b	207.7 abcd	40.4 b	8386 cd
Quadris 234	48865 abc	1.83 ab	193.1 e	44.7 ab	8581 bcd
Stratego 123	49132 abc	1.98 ab	200.6 abcde	48.5 ab	9741 abcd
Stratego 1234	45578 c	1.83 ab	200.0 abcde	41.7 ab	8337 cd
Stratego 2	46583 abc	2.01 a	207.6 abcd	46.8 ab	9713 abcd
Stratego 23	46062 bc	2.00 a	205.1 abcde	46.0 ab	9422 abcd
Stratego 234	49115 abc	1.88 ab	195.3 cde	46.0 ab	8991 abcd

[1]Five fungicide treatments were included in the experiment with one to four (1-4) applications of each made at different times during the spring epidemic period. All fungicides were applied with a back-pack sprayer with a spray volume of 15 gal/acre. Folicur 3.6 F (tebuconazole 38.7% ai) was applied at a rate of 6 oz/acre of formulated product (fp); a tank-mix of Headline EC (pyraclostrobin 23.6% ai) plus Folicur 3.6 F was applied at a rate of 6 oz/acre Headline and 4 oz/acre Folicur; a premix of Quilt (azoxystrobin 7% ai + propiconazole 11.7% ai) was applied at a rate of 14 oz fp/acre; Quadris (azoxystrobin 22.9% ai) was applied at a rate of 9 oz fp/acre; and a premix of Stratego (trifloxystrobin 12% ai + propiconazole 12% ai) was applied at a rate of 16 oz fp/acre. For treatments 123 and 1234, treatment dates were 1 = 13 April, 2 = 4 May, 3 = 25 May, and 4 = 14 June. For treatments 2, 23, and 234, 2 = 20 April, 3 = 12 May, and 4 = 3 June.
[2]Values within a column followed by different letters were significantly different (P=0.05).

Table 4. Effects of fungicide treatments for brown rust control on yield of LCP 85-384 plant cane at Experiment 1 Terrebonne Parish location during 2006.

Treatment/application number and timing[1]	Millable stalks/A[2]	Sucrose/ton cane (lbs.)[2]	Tons of cane/A[2]	Sucrose/A (lbs.)[2]
Folicur 123	49,542 abcd	128.1 bc	38.6 f	4927 cd
Folicur 1234	53,070 abc	114.6 c	40.9 bcdef	4668 d
Folicur 2	51,637 abcd	145.2 abc	41.1 bcdef	5975 abcd
Folicur 23	52,683 abcd	154.9 ab	42.9 abcdef	6655 abcd
Folicur 234	53,215 abc	139.2 abc	40.6 cdef	5686 abcd
Headline + Folicur 123	53,227 abc	145.5 abc	46.3 abcdef	6749 abc
Headline + Folicur 1234	48,962 cd	152.4 abc	48.2 abcd	7382 ab
Headline + Folicur 2	53,026 abc	150.0 abc	46.7 abcde	6998 ab
Headline + Folicur 23	51,792 abcd	134.3 abc	48.8 ab	6554 abcd
Headline + Folicur 234	48,333 cd	149.0 abc	48.5 abc	7220 ab
Non-treated control	49,348 bcd	132.2 abc	40.3 cdef	5386 bcd
Quilt 123	49,532 abcd	134.8 abc	40.6 cdef	5420 bcd
Quilt 1234	52,587 abcd	151.9 abc	46.4 abcdef	7055 ab
Quilt 2	47,222 d	162.8 ab	41.7 bcdef	6793 abc
Quilt 23	55,245 a	142.0 abc	38.7 f	5475 abcd
Quilt 234	50,025 abcd	167.3 a	43.4 abcdef	7250 ab
Quadris 123	55,195 a	144.7 abc	47.7 abcd	6920 abc
Quadris 2	50,557 abcd	141.9 abc	39.2 ef	5609 abcd
Quadris 23	53,263 abc	131.8 abc	44.9 abcdef	5845 abcd
Quadris 234	49,928 abcd	158.6 ab	40.6 cdef	6437 abcd
Stratego 123	48,698 cd	157.8 ab	41.2 bcdef	6471 abcd
Stratego 1234	54,838 ab	127.3 bc	46.7 abcde	5984 abcd
Stratego 2	50,460 abcd	144.3 abc	43.4 abcdef	6226 abcd
Stratego 23	52,973 abc	137.8 abc	40.9 bcdef	5690 abcd
Stratego 234	50,363 abcd	152.1 abc	49.7 a	7474 a

[1]Five fungicide treatments were included in the experiment with one to four (1-4) applications of each made at different times during the spring epidemic period. All fungicides were applied with a back-pack sprayer with a spray volume of 15 gal/acre. Folicur 3.6 F (tebuconazole 38.7% ai) was applied at a rate of 6 oz/acre of formulated product (fp); a tank-mix of Headline EC (pyraclostrobin 23.6% ai) plus Folicur 3.6 F was applied at a rate of 6 oz/acre Headline and 4 oz/acre Folicur; a premix of Quilt (azoxystrobin 7% ai + propiconazole 11.7% ai) was applied at a rate of 14 oz fp/acre; Quadris (azoxystrobin 22.9% ai) was applied at a rate of 9 oz fp/acre; and a premix of Stratego (trifloxystrobin 12% ai + propiconazole 12% ai) was applied at a rate of 16 oz fp/acre. For treatments 123 and 1234, treatment dates were 1 = 11 April, 2 = 2 May, 3 = 23 May, and 4 = 13 June. For treatments 2, 23, and 234, 2 = 23 April, 3 = 14 May, and 4 = 31 May.
[2]Values within a column followed by different letters were significantly different (P=0.05).

Table 5. Comparison of yield increases greater than 1,000 lbs. of sucrose per acre obtained from five total treatments for five fungicides in Experiment 1 conducted at two locations.

	Number of treatments out of five total with a sugar per acre yield more than 1,000 lbs. greater than the non-treated control	
Fungicide	St. Mary location	Terrebonne location
Folicur	1	1
Headline + Folicur	5	5
Quadris	3	3
Quilt	2	3
Stratego	3	3

Table 6. Brown rust severity in June start fungicide efficacy experiment (Experiment 2) determined with image analysis.

Treatment	St. James Parish location[1]	Rapides Parish location[2]
Non-treated control	5.0 a	6.2 a
Folicur 6 oz/A	2.5 b	3.9 b
Headline 6 oz/A	2.0 b	1.7 c
Headline 9 oz/A	2.0 b	1.5 c
Headline 12 oz/A	1.5 b	1.4 c
Headline + Folicur 6 + 4 oz/A	1.4 b	1.4 c
Quadris 12 oz/A	2.4 b	1.5 c
Quilt 16 oz/A	2.1 b	1.6 c
Stratego 18 oz/A	2.5 b	2.0 c

[1]Percent rust determined on 6/23/06 14 days after fungicide application. Means within the column followed by different letters were significantly different (P=0.05).
[2]Percent rust determined on 6/29/06 19 days after fungicide application. Means within the column followed by different letters were significantly different (P=0.05).

Table 7. Effects of fungicide treatments for brown rust control on yield of LCP 85-384 first ratoon at Rapides Parish location during 2006.

Treatment	Stalks/acre	Stalk weight (lbs.)	Sucrose/ton cane (lbs.)	Tons cane per acre	Sucrose/acre (lbs.)
Folicur 6 oz	51366 ab	1.35 b	222.7 a	34.7 b	7734
Headline 6 oz	49844 b	1.43 b	199.9 b	37.1 b	7425
Headline 9 oz	50569 ab	1.61 ab	217.8 ab	41.7 ab	9084
Quilt 16 oz	53215 ab	1.85 a	207.9 ab	49.0 a	10208
Stratego 18 oz	52309 ab	1.67 ab	223.0 a	45.1 ab	10101
Non-treated control	51439 ab	1.52 ab	215.7 ab	41.1 ab	8895

Yield data were collected from only six of nine original treatments due to a premature, accidental, partial harvest of the field.

Table 8. Brown rust severity in second June start fungicide efficacy experiment (Experiment 3) determined with image analysis.

Treatment	Percentage of leaf with rust lesions[1]
BASF 556 (Headline + Caramba)	3.9 ab
Caramba 12 oz	3.2 b
Caramba 9.6 oz	2.8 b
Headline 6 oz + Folicur 4 oz	3.2 b
Headline 9 oz	3.5 ab
Non-treated control	5.0 a

[1]Percentage of leaf area occupied by brown rust lesions determined on 13 June for second fully emerged leaf (10 per plot) with image analysis.

Table 9. Effects of fungicide treatments for brown rust control on yield of LCP 85-384 first ratoon at Lafourche Parish location during 2006.

Treatment	Stalks/acre	Stalk weight (lbs.)	Sucrose/ton cane (lbs.)	Tons cane/acre	Sucrose/acre (lbs.)
BASF 556	54230	1.41	228.6	38.2	8721
Caramba 12 oz	57311	1.24	233.2	35.4	8283
Caramba 9.6 oz	54375	1.31	228.5	35.4	8053
Headline + Folicur	54411	1.36	234.9	36.7	8638
Headline 9 oz	55716	1.60	233.3	44.3	10335
Non-treated control	52341	1.42	240.4	37.1	8917

Table 10. Brown rust severity in yield loss experiment conducted in LCP 85-384 plant cane in Iberia Parish during 2006.

Fungicide treatments[1]	Percentage of leaf with rust lesions on 18 May[2]	Percentage of leaf with rust lesions on 15 June[2]
April only	2.2 b	8.3 b
April & May	2.8 ab	1.4 c
April, May & June	2.2 b	1.2 c
May only	3.2 ab	1.4 c
May & June	4.1 a	1.3 c
June only	3.3 ab	13.0 a
None	3.6 ab	10.4 ab

[1]Combination three fungicides, Folicur, Quadris, and Tilt, applied every two weeks during selected months.
[2]Percentage of leaf area occupied by brown rust lesions determined on second fully emerged leaf (10 per plot) with image analysis.

Table 11. Effect of brown rust on yield of LCP 85-384 plant cane in Iberia Parish during 2006.

Fungicide treatments	Stalks/acre	Stalk weight (lbs.)	Tons cane per acre	Sucrose/ton cane (lbs.)	Sucrose/acre (lbs.)
April only	53623	1.63	30.1	237.8	7174
April & May	53794	1.62	29.1	246.3	7156
April, May & June	51662	1.60	33.8	241.6	8170
May only	52695	1.83	30.7	241.6	7416
May & June	51467	1.71	32.9	238.6	7829
June only	55438	1.53	32.2	239.5	7718
None	54016	1.67	28.2	249.0	7011

RATOON STUNTING DISEASE

RSD testing was conducted by the Sugarcane Disease Detection Lab for the 10th year during 2006. RSD was monitored on farms, in the LSU AgCenter Variety Selection Program, in the American Sugar Cane League Variety Release Program, and in the Kleentek® and SugarTech® (Helena Chemical Co.) seedcane production systems (Table 12). A total of 4,924 samples were tested. No RSD was detected at any level of Kleentek production or in ASCL Variety Release Program samples. In on-farm RSD testing, 113 fields were sampled on 23 farms. RSD was detected on 13% of the farms, in 3.5% of the fields, and in 0.9% of the stalks tested. RSD was only detected in field-run cane (cane increased more than four times since being obtained from a healthy seedcane source) (Table 13) and was detected at the highest level (29% of fields tested with an average stalk infection of 14%) in older stubble (Table 14). These results serve as a survey of the RSD status in the industry. They suggest that RSD is no longer causing significant yield losses, but the 13% farm infection level indicates that the disease is still present at low levels. In addition to RSD testing, ten varieties were processed through the Local Quarantine to provide healthy material to establish Foundation Stock plants that will serve as the source for tissue culture seedcane production.

YELLOW LEAF

The Sugarcane Disease Detection Lab also monitored for *Sugarcane yellow leaf virus* (SCYLV) in the LSU AgCenter Variety Selection Program, the ASCL Variety Release Program, and SugarTech® and Kleentek® seedcane sources (Table 15). A total of 10,998 samples were tested. Commercial tissue culture seedcane sources were tested for the third season as part of the Louisiana Department of Agriculture Seedcane Certification Program. No field failed to certify due to virus infection.

A field experiment evaluating the effect of yellow leaf on yield of HoCP 96-540 was in first stubble during 2006 (Table 16). Cane tonnage was 14% lower in virus-infected compared to initially virus-free plots. This is similar to the 13% difference detected in plant cane.

Table 12. RSD testing summary for 2006.

Source	Location	No. of fields	No. of varieties	No. of samples
Louisiana growers	State-wide	113	12	2247
LSUAC	St. Gabriel & Iberia	-	14	367
Variety Release Program	1° & 2° stations	-	14	902
SugarTech®	Foundation stock	-	11	49
SugarTech®	1° increase farms	0	0	0
SugarTech®	2° increase farms	0	0	0
Kleentek®	Foundation stock	-	21	81
Kleentek®	1° increase farms	7	1	138
Kleentek®	2° increase farms	8	5	152
Local Quarantine	LSUAC	-	14	85
Research	LSUAC	-	-	903
Totals		128		4924

Table 13. RSD field and stalk infection frequencies as affected by seedcane programs for all varieties combined during 2006.

Seedcane program	Total number of fields	Average field infection (%)	Total number of stalks	Average stalk infection (%)
Heat-treated	4	0.0	80	0.0
Kleentek®	19	0.0	380	0.0
SugarTech®	3	0.0	60	0.0
ASCL	23	0.0	460	0.0
Field-run	64	6.3	1267	1.7
Totals/Averages	113	3.5	2247	0.9

Table 14. RSD field and stalk infection frequencies in different crop cycle years for all varieties combined during 2006.

Crop Year	Total number of fields	Average field infection (%)	Total number of stalks	Average stalk infection (%)
Plant cane	63	1.6	1246	0.1
First stubble	28	3.6	561	0.2
Second stubble	15	0.0	300	0.0
Older stubble	7	28.6	140	13.6
Totals/Averages	113	3.5	2247	0.9

Table 15. Sugarcane yellow leaf virus testing summary for 2006.

Source	Location	No. of fields	No. of varieties	No. of samples
Louisiana growers	State-wide	1	1	20
LSUAC	St. Gabriel & Iberia	-	6	180
Variety Release Program	1° & 2° stations	-	0	0
SugarTech®	Foundation stock	-	11	49
SugarTech®	1° increase farms	10	5	383
SugarTech®	2° increase farms	22	2	833
Kleentek®	Foundation stock	-	12	52
Kleentek®	1° increase farms	69	11	2326
Kleentek®	2° increase farms	112	7	3905
Local Quarantine	LSUAC	-	14	85
Research	LSUAC	-	-	3165
Totals		214		10,998

Table 16. Effect of *Sugarcane yellow leaf virus* (SCYLV) infection on plant cane yield components of HoCP 96-540.

Treatment	Stalks/acre	Stalk wt. (lbs.)	Sugar/ton (lbs.)	Tons of cane per acre	Sugar/acre (lbs.)
SCYLV-	46,908	1.9	209	44.33 a	9272
SCYLV+	45,699	1.7	214	38.11 b	8183

Values within columns followed by different letters were significantly different (P=0.05).

VARIETY SELECTION

Disease resistance levels were evaluated as a routine part of the Variety Selection Program. Inoculated tests were conducted to determine resistance levels in experimental varieties to smut (Table 17) and leaf scald (Table 18). Visual ratings were used to evaluate resistance to brown rust in out-field yield trial plots.

Table 17. Smut infection level and resistance ratings for experimental varieties determined from an inoculated test during 2006.

Variety	Infection (%)	Rating[x]	Variety	Infection (%)	Rating[x]
CP 1965-357	43	8	L 2003-396	0	1
CP 1970-321	16	4	HoCP 2003-704	0	1
CP 1973-351	62	9	HoCP 2003-708	0	1
CP 1981-335	37	7	HoCP 2003-716	0	1
Ho 1995-988	10	4	HoCP 2003-743	10	4
HoCP1996-540	0	2	HoCP 2003-757	0	1
L 1997-128	12	4	L 2004-400	1	2
L 1999-226	0	1	L 2004-403	0	1
L 1999-233	25	6	L 2004-404	0	1
HoCP 2000-950	1	2	L 2004-407	0	1
L 2001-283	2	2	L 2004-408	1	2
L 2001-299	63	9	L 2004-409	0	2
HoCP 2001-523	0	1	L 2004-410	1	2
Ho 2001-564	51	9	L 2004-417	5	3
HoCP 2002-610	24	6	L 2004-423	19	5
HoCP 2002-618	5	3	L 2004-425	0	1
HoCP 2002-620	32	7	L 2004-429	3	2
HoCP 2002-623	9	4	L 2004-430	0	1
L 2003-371	7	3	L 2004-431	3	2
L 2003-378	0	1	L 2004-434	2	2

[x]Resistance ratings assigned on a 1-9 scale in which 1-3 = resistant, 4-6 = moderately susceptible, and 7-9 = highly susceptible.

Table 18. Leaf scald resistance ratings for experimental varieties determined from inoculated test conducted during 2006.

Variety	Rating[x]	Variety	Rating[x]
CP 1965-357	7.1	L 2001-283	3.6
CP 1973-351	6.5	L 2001-299	5.0
CP 1981-335	5.3	HoCP 2002-623	2.9
Ho 1995-988	4.6	L 2003-371	4.0
HoCP 1996-540	4.0	HoCP 2003-743	3.7
L 1997-128	4.7	L 2004-408	2.8
L 1999-226	4.7	L 2004-425	3.6
L 1999-233	4.0	L 2004-434	3.9
HoCP 2000-950	6.6		

[x]Resistance ratings assigned on a 1-9 scale in which 1-3 = resistant, 4-6 = moderately susceptible, and 7-9 = highly susceptible.