ANNUAL REPORT
COMPREHENSIVE RESEARCH ON RICE
January 1, 2004 - December 31, 2004

PROJECT TITLE: Cooperative Extension Rice Variety Adaptation and Cultural Practice Research

PROJECT LEADERS:
James E. Hill, Specialist in UCCE, UC Davis

PRINCIPAL UC INVESTIGATORS:
C.M. Canevari, UCCE Farm Advisor, San Joaquin
C, A. Greer, UCCE Farm Advisor, Colusa, Glenn, Yolo
R.G. Mutters, UCCE Farm Advisor, Butte, Sutter/Yuba
R.L. Wennig, Staff Research Associate, UCCE/UCD

LEVEL OF 2004 FUNDING: $109,394

OBJECTIVES AND EXPERIMENTS CONDUCTED BY LOCATION TO ACCOMPLISH OBJECTIVES:

Objective I

To evaluate cultivars and existing varieties under grower conditions for the purpose of new variety development and release, three maturity groups were conducted at different locations in the Sacramento and San Joaquin Valleys. Several experimental cultivars were compared at each location within these groups to evaluate their performance in the different environments of the rice-growing region.

Very Early Maturity Group - Two uniform trials were conducted at each of the following on-farm sites: the Brumley Ranch (San Joaquin County), the Lauppe Ranch (Sutter County), and the Erdman Ranch (Yolo County). Two additional tests were conducted at the Rice Experiment Station (RES) in Butte County. The Advanced test at each site included eighteen entries (eight commercial varieties and ten advanced breeding lines) in four replications. The Preliminary test included thirty-two entries, all preliminary breeding lines in two replications.

Early Maturity Group - two uniform tests were conducted at each of the following on-farm sites: the Thompson Ranch (Butte County), the Dennis Ranch (Colusa County), and the Quad 4 Ranch (District 10, Yuba County). Two additional trials, Advanced and Preliminary, were conducted at the RES. The Advanced test at each site included twenty entries (ten commercial varieties and ten advanced breeding lines) in four replications. The Preliminary test included thirty-two preliminary breeding lines in two replications.

Intermediate and Late Maturity Group - two uniform tests were conducted at each of the following on-farm sites: the Wiley Ranch (Glenn County) and the Akin Ranch (Sutter County). Two additional tests were conducted at the RES. The first test at each site included fourteen

entries (six commercial varieties and eight advanced breeding lines) in four replications; and the second test consisted of twenty preliminary breeding lines in two replications.

Objective II

To provide research on more efficient cultural practices we established nitrogen by variety studies in Butte and Sutter counties. We also conducted bakanae and blast studies in Colusa and Glenn counties as well as conducting a major stand establishment x nitrogen study at the RES. Additionally, we conducted two nitrogen by variety tests for low amylose lines at the RES.

Objective III

To provide professional technical assistance to other UC research project leaders we assisted in more than 40 trials including the 16 variety tests. Equipment from the UCCE-based pool for planting, fertilizing, treating, and harvesting field experiments was used at more than 50 sites at different times during the season. The most heavily used equipment was the harvester followed by the Clampco precision fertilizer rig. We also continued with the prescribed maintenance program for the SWECO plot combine..

Objective IV

We disseminated research-based information to California rice producers, dryer operators, millers and the general public through winter grower meetings (5), field demonstrations (3), the Rice Production Workshop (2), personal communication, and the publication and distribution of fact sheets and other printed material as well as the UCCE rice website.

SUMMARY OF 2004 RESEARCH BY OBJECTIVE

Objective I - Rice Variety Evaluation

Eight uniform advanced breeding line trials and eight preliminary breeding line trials were conducted throughout the major rice producing areas of California. The rice breeders at the RES conducted six additional tests, two from each of the three maturity groups. Many of the experimental lines have been tested and screened in previous years and many lines were in advanced stages (2 or more years) of testing. The RES provided the seed for public varieties and experimental cultivars.

The following analyses provide single-location yield summaries for the advanced line tests and over-location agronomic performance summaries for each entry in each maturity category. For quick reference, grain yields of commercially available varieties tested in very early, early and late tests across year and location are summarized in Tables 6, 12 and 17. An Agronomy Progress Report, to be published later this year, will provide agronomic performance results for all entries in each experiment.

Very Early Maturity Tests (< 90 days to 50% heading at Biggs) - Ten advanced breeding lines and eight commercial varieties were compared in four very early advanced tests. Commercial

varieties at each location included S-102, CM-101, M-103, M-104, M-202, M-206, L-204, and L-205. Thirty-two cultivar lines were tested in the preliminary trails at each location.

Grain yields in the advanced tests averaged 9420 lb/ac at the Biggs-RES, 8560 lb/ac at San Joaquin, 10540 lb/ac at Sutter, and 9340 lb/ac at Yolo (Tables 5 and 2 respectively). Over three locations (Yolo excluded due to herbicide damage), the highest yielding entry on average was the long grain L-204 (10120 lb/ac) followed by the advanced long grain 99Y469 (10010 lb/ac), medium grain M-206 (9820 lb/ac), and 02Y210, a waxy short grain (9740 lb/ac). Other top yielding commercial varieties S-102, L-205, M-202, and M-104, ranked seventh, ninth, tenth, and eleventh over locations, respectively. Averaged across locations, yields in the preliminary tests ranged from 7620 to 10150 lb/ac (Table 5). Days to 50% heading for most varieties in 2004 were 10-12 days more than in 2003. The increase in days to heading was due to relatively mild summer temperatures. Average lodging scores across all four locations were similar to the 2003 season. Over a 5-year period and across locations, S-102 was the highest yielding variety followed by M-206, 9874 and 9634 lbs/ac respectively (Table 6).

Early Maturity Tests (90-97 days to 50% heading at Biggs) - Ten advanced lines and ten commercial varieties were compared in four early tests. Thirty-two preliminary lines were also evaluated in separate tests at each location. Commercial varieties at each location were CH-201, CM-101, S-102, M-202, M-204, M-205, M-206, CT-201, L-204, and L-205.

Yields in the advanced line tests averaged 9350 lb/ac at the RES; 8750 lb/ac at Butte; 10250 lb/ac at Colusa, and 8720 lb/ac at Yuba (Table 11). The advanced premium quality short grain 01Y327 was the highest yielding entry (9990 lb/ac) when averaged over the four locations in 2004 (Table 11). Other consistently high yielding entries were M-205, 99Y529, 01Y655, 02Y382, and M-202, all ranking within the top ten at three of the four locations. The yield of other commercial varieties M-205, M-202, M-206, M-204, S-102, L-204, L-205, CH-201, CM-101, and CT-201 ranked third, sixth, seventh, ninth, eleventh, fourteenth, fifteenth, and seventeenth through nineteenth over all locations (Table 11). Average days to 50% heading ranged from 84 days at Biggs to 90 days at Yuba. The commercial standard M-202 headed at 87 days at Biggs and 92 days at Colusa. As in the very early tests, days to 50% heading were 10-12 days more than in 2003. M-205 was the highest yielding commercial variety (9881 lb/ac) followed by M-204 (9460 lb/ac) when averaged over the last five years and across locations (Table 12).

Intermediate-Late Maturity Tests (> 97 days to 50% heading at Biggs) - Eight advanced lines and six commercial varieties were compared in three intermediate-late tests. Twenty preliminary lines were also evaluated in separate tests at each location. Commercial varieties at each location included L-205, CT-201, CH-201, M-202, M-205, and M-402.

Average yields in the advanced tests were 10120 lb/ac at the RES, 9410 lb/ac at Glenn, and 10650 lb/ac at Sutter (Tables 16). The 2004 over location average yield increased 1190 lbs/ac, compared to the 2003 season. Except at Biggs, the yield of M-205 (10410 lb/ac) was not significantly different than the leading entry at Glenn and Sutter. L-205 and M-202 were the next highest yielding commercial varieties across locations (Table 16). Short grain entry 03Y324 was the highest yielding advanced entry across locations, at 10820 lb/ac. Days to 50% heading ranged from 87 days at the RES to 95 days at Glenn. Moderate summer temperatures

increased the number of days to heading an average of 3-9 days more than in 2003. M-402 took the longest to head among the commercial varieties at all locations, (average 98 days).

Averaged over the last five years and across locations, M-205 was the highest yielding (10179 lb/ac) commercial variety (Table 17). M-205 and M-402 produced 108% and 98%, respectively, of the yield of M-202 on average over the last 5 years (Table 17).

Objective II - Cultural Practices

***Fertility Trials*.**

***Nitrogen by variety*:** Four field studies were conducted, two in 2003 and two in 2004. In 2003, field experiments were conducted in northern Butte and eastern Colusa counties. In 2004, study sites were located in southwestern Butte and southern Sutter Counties. In both years, M-205 and M-202 were grown under a range of nitrogen levels (0 to 200 lb/acre) applied either as a preplant treatment or as applications split between preplant and tiller, preplant and PI, or as a three way split at the different growth stagers. Incorporated into the study was an in-depth analysis of tissue nutrient concentrations throughout the season. The tissue nutrient data focused a refinement of the calibration of the leaf color chart and identifying optimal tissue levels in term of yield for N, P, and K. The latter exercise is part of UC's current efforts to reevaluate the critical nutrients levels needed to ensure maximum yields under long term straw incorporation. This work was funded in part by RM-2 for field assistance and harvesting operations and by the CDFA Fertilizer Research and Education Program (FREP). The FREP project complements and extends previous work supported by the RRB to investigate nitrogen management of the modern rice varieties in the context of long term straw incorporation.

Nitrogen by low amylose lines: The Japanese are interested in low amylose varieties to improve cooking and eating quality as well as for special products for the industry. The RES breeders have developed low amylose lines that have been tested in the statewide variety trials. Because low amylose lines tend to be lower yielding, a test was conducted jointly with the RES to evaluate nitrogen management for yield improvement. Two tests were conducted on the RES. Although we wanted to see a N response in both trials, one trial was in a soil requiring N and the second in a soil with high native N levels. In the soil with N deficiency, optimum yields were obtained at 50 lbs/ac N (Table 18a) whereas in the high native N soil, no differences were seen among N rates (Table 18b).

***Disease Trials*.**

00-Y-805 Strip Trials: Chris Greer established two strip trials in collaboration with Dr. Carl Johnson to evaluate the race IG-1 resistant blast line 00-Y-805 under commercial conditions. Trials were established in commercial fields with the assistance of Ray Wennig. The two trials were located in Colusa and Glenn Counties. 00-Y-805 was compared with M-202 and M-206 in replicated plots (3 per variety) measuring 50’ x 20’ at each location. Seed was sown by dry seeding onto the prepared soil surface prior to flooding. Other cultural practices including fertilization and weed control were conducted by the grower treating these plots in the same manner as the rest of his field. Milling samples were collected prior to harvest and used by Dr. Johnson to determine grain moisture and milling yield. Additionally, 50’ yield strips were cut from the middle of each plot using the project’s SWECO combine.

The Colusa County trial was lost to conditions which resulted in seed burial and poor stand establishment. However, the Glenn County trial yielded some useful information. The strip trial results were consistent with those of milling row, milling plot and foundation seed field results over the past four years from the RES. Yield results were also consistent with results from statewide variety tests over the past four years. 00-Y-805 yield was similar to M-202 but was 400 lb lower than M-206 in the strip trial. 00-Y-805 had one point less total rice than either M-202 or M-206 in milling tests. 00-Y-805 was similar to M-202 in whole grain milled rice but was two points lower than M-206. No blast was observed in any of the experimental plots.

Variety	Yield @ 14% H_2O	Milling Total	Milling Whole
00-Y-805	9665	69.0	62.4
M-206	10060	69.8	64.5
M-202	9463	69.9	62.2

The strip trial results helped validate the experimental data that has been collected over the last four years. 00-Y-805 shows potential for filling a void in currently available California rice varieties by providing race IG-1 blast resistance without sacrificing too much in the way of agronomic characteristics. If released as a commercial variety, 00-Y-805 should provide rice growers with a blast resistant variety that may be invaluable in those areas of Colusa and Glenn Counties where blast occurs year after year. Although 00-Y-805 may not perform as well as other California rice varieties in the absence of rice blast, it will have a competitive advantage over more susceptible varieties in fields where rice blast disease pressure is severe.

Fungicide Trials: Chris Greer established four small plot fungicide trials to evaluate timing and efficacy of Quadris and Stratego fungicides for the management of stem rot and aggregate sheath spot diseases. Stratego (Trifloxystrobin/Propiconazole) is a Bayer product registered in the southern US for disease management in rice but this product is not currently registered in California. Trials were established in commercial fields to evaluate performance under commercial conditions. One trial was established to evaluate Stratego for stem rot control in Butte County. Two trials were established to evaluate Stratego and Quadris for aggregate sheath spot control in Sutter and Colusa Counties. One trial was established in Glenn County to evaluate Quadris for aggregate sheath spot control. Each trial consisted of replicated plots (4 per treatment) measuring 20’ x 10’ at each location. All cultural practices including planting, fertilization and weed control were conducted by the grower treating these plots in the same manner as the rest of his field. Disease incidence and severity were assessed prior to field drainage and yield strips were cut from the middle of each plot using the project’s SWECO combine.

Each of these fungicide trials were established late in the season. And each trial had its own set of problems that may have compromised the data collected in the trials. The stem rot trial in Butte County had some fertility and weed control lapses that led to severe differences in stand density and yield from one end of the trial to the other. The differences were so severe that yields ranged from 3,500 lbs/ac to 7,500 lbs/ac. These differences were not associated with the fungicide treatment and therefore the data is not a reliable estimator of the efficacy of this product.

The Sutter County trial had a low level of aggregate sheath spot incidence and sustained a severe north wind for several days prior to harvest. The Colusa and Glenn County trials each had an

issue with delayed harvest due to rain. The Colusa trial was actually submerged for several days and had to be hand harvested using a quadrat sampling method. Tillers had to be pulled from the mud prior to cutting and grain was harvested using a hand thresher. Variability between plots was high and aggregate sheath spot incidence and severity were low. The Glenn County trial was the last to be harvested and suffered from the same variability problems that plagued the Colusa County trial.

The results of these trials were disappointing. We are reluctant to report the data from these trials as they are complicated by many factors and may not represent a true assessment of the products. Several fungicide trials will be conducted in 2005 to further evaluate these products.

Bakanae Seed Treatment Trials: Chris Greer and Cass Mutters established three small plot county bakanae trials in collaboration with Jeff Oster from the RES. Mr. Oster and his staff were responsible for seed preparation and plant/disease data collection. UCCE staff was responsible for establishing the plots prior to planting and harvest. Planting was a collaborative effort. The purpose of these trials was to support and validate some of the research Mr. Oster has been conducting at the station. Mr. Oster has reported the findings of these studies in his annual report and that report should be referenced for a complete discussion of these trials. The county trials were established to answer two questions; 1) what is the effect of different inoculum densities on disease incidence and yield? and 2) what seed treatment methods are most effective in managing bakanae disease? Trials were established in one commercial field in Sutter County and two commercial fields in Colusa County. There were 22 different treatments at each location and each was replicated four times in 20' x 10' plots. Seed was soaked for 24 hr and drained for 48 hr in each treatment prior to being sown by hand. Other cultural practices including fertilization and weed control were conducted by the grower treating these plots in the same manner as the rest of his field. Data collected throughout the season included stand count, seedling vigor, tiller density, bakanae incidence and dead head density. Additionally, yield strips were cut from the middle of each plot using the project's SWECO combine.

Results of the county bakanae trials were quite successful in 2004. Across all three locations, higher levels of bakanae inoculum led to a significantly higher incidence of symptomatic plants. Higher levels of bakanae also resulted in significantly reduced yields in M-202 and M-205. There was also a significant negative correlation between bakanae incidence and yield in M-202 and M-205.

Many of the seed treatments tested were quite successful in the county trials. Most of the treatments significantly reduced the incidence of symptomatic M-205 plants from 18% to 2% or less. The reduction in disease incidence was not significantly different for a 24 hr 2% or 3% Ultra Clorox soak when compared to the labeled rate of a 2 hr 5% Ultra Clorox soak. In addition, many of the tested treatments resulted in significantly larger yields for M-205 when compared to untreated seed. The increase in yield was not significantly different for a 24 hr 2% or 3% Ultra Clorox soak when compared to the labeled rate of a 2 hr 5% Ultra Clorox soak. Each of these treatments resulted in yields that were at least 10% higher than untreated seed.

It is hoped that this information may be used by growers when making decisions about using a seed treatment for bakanae management. In addition, we hope that this data may be used to secure a label addition for Ultra Clorox to allow rice seed to be soaked for 24 hr in a 2.5% Ultra

Clorox solution prior to draining for bakanae management. This rate is lower than the currently labeled rate (2 hr 5% Ultra Clorox soak, drain, refill to complete 24 hr soak) but combined with the longer soak time has been shown to be just as efficacious as the labeled rate. In addition, the 24 hr soak will simplify the treatment procedure for seed handlers and reduce the risk of damaging seed and developing seedlings.

***Stand Establishment Trials*.**

***Stand Establishment*:** We established a long term site at the RES to investigate the influence of different stand establishment methods on weed resistance management. Since these stand establishment methods require different water management practices, we included nitrogen management as a factor to evaluate N use efficiency in each system. The five primary treatments are 1) conventional water seeded 2) conventional drill seeded 3) spring tilled delayed water seeding 4) no spring till water seeding and 5) no spring till drill seeding. Treatments 3-5 are pre-irrigated and treated with glyphosate (Roundup) to kill the initial flush of weeds. Seasonal weed/herbicide treatments are made as necessary and reported by the weed group. Different N rates were applied in subplots within each stand establishment method. In the water seeded and delayed water seeded spring till treatments, N was applied preplant incorporated as per conventional practices. The conventional drill seeded and the two no spring till plots were fertilized with a combination of top dress applications. Particularly in the no spring till treatments (4 and 5), the objective was avoid bringing weed seed to the surface by incorporation of N. Optimum N rates differed with the stand establishment method, however, yields were very high and likely not significantly different between the treatments. In the delayed spring till water seeded treatments, it was clear that the two week delay in planting required to germinate weeds, resulted in high native N losses compared to the conventionally water seeded treatment. Thus, 200 lb/acre N was required for optimum yields in that treatment as opposed to 100-150 lb/acre N in the conventionally water seeded treatment. In the conventional drill seeded and the two no spring till treatments, generally, higher yields were obtained with delayed N splits at maximum tillering and PI. The impact of these treatments on weed management is reported in RP-1.

Objective III - Assistance to Other Projects

Significant effort was directed toward the maintenance of the UC SWECO plot combine. Following a major overhaul in 2001, an annual maintenance was established to ensure combine durability and performance. All items listed in the third year maintenance schedule were inspected and replaced as needed.

The rice equipment pool, including an upgraded precision Clampco fertilizer applicator, SWECO 324 plot combine, moisture meters, backpack CO_2 sprayers, and other equipment were used with labor and technical assistance for numerous field experiments in 2004. The Clampco precision fertilizer applicator was used to establish four nitrogen trials in Yuba, Colusa, and Butte counties. The Clampco was also used to apply the pre-plant fertilizer treatments for the Rice Tillage Study at the RES. The SWECO 324 plot combine was used to harvest sixteen variety trials, four fertility experiments, four Bakanae trials, four fungicide experiments, six weed/herbicide trials, a disease strip trial, an entomology test, and a harvester efficiency comparison study. Over 2600 experimental plots were harvested in 2004. In addition to equipment assistance to other projects, labor from this project was used to plant, collect samples,

and monitor growth in several field and greenhouse experiments. Project personnel, also, applied fertilizer treatments and collected leaf samples for nitrogen analysis at four sites. Assistance was also given for the annual RES rice field day and the annual rice breeder's field tour.

Objective IV - Publication and Distribution of Rice Research Information

The following reports were designed, formatted and printed with support from this project:

1. Annual Report Comprehensive Rice Research 2003. University of California and USDA, Note that the Annual Report Comprehensive Rice Research 2004 will be entirely web based.
2. Rice Field Day Program, 2004
   California Cooperative Rice Research Foundation, RES, 46 pp.

3. The UCCE website was updated.

4. The UCCE Rice Production Workshop was given twice.

5. The Rice Quality Workshop was given ???

6. Five UCCE winter grower meetings were held from Butte to San Joaquin Counties.

Publications and Reports

1. Hill JE, AJ Fischer, MJ Moechnig, RG Mutters, YS Cho, K. Pellerin and RL Wennig. An experimental design for testing alternative ice rice stand establishment methods. Presented at the Rice Field Day, 25 August 2004, California Cooperative Rice Research Foundation, Inc. USDA-University of California, P.O. Box 306, Bigg, CA 95917-0306. p. 36-37.
2. Fischer, AJ, M Moechnig, JE Hill, F Perez de Vida, JW Eckert, RG Mutters and C Greer. Strategic concepts for herbicide resistance management in California rice. Presented at the Rice Field Day, 25 August 2004, California Cooperative Rice Research Foundation, Inc. USDA-University of California, P.O. Box 306, Biggs, CA 95917-0306. p. 38-40.
3. UC Rice Research Quarterly (a statewide newsletter for rice).
4. Hill JE, RG Mutters, CA Greer, LD Godfrey, AJ Fischer and RL Wennig. 2004. Rice Production Workshop Manual. 132 pp.

CONCISE GENERAL SUMMARY OF CURRENT YEAR'S RESULTS:

Sixteen on-farm rice variety evaluation trials were conducted throughout the rice growing region of California, with standard, advanced and preliminary varieties across a range of environments, cultural practices and disease levels. Six similar tests were conducted at the RES in Biggs, CA. Average yields across varieties and locations in the advanced line tests ranged from 10,120 lb/acre in the very early trials to 9,990 lb/acre in the early tests. In the intermediate to late test five experimental lines yielded over 10,500 lb/acre. Unlike the exceptionally wet 2003 planting season which resulted in late planting, the 2004 season was dry early providing excellent

conditions for field preparation. Stands were nearly ideal and the remainder of the season was also exceptional for rice resulting in record statewide yields of 8,800 lbs/acre on nearly record plantings of approximately 600,000 acres. Several advanced lines in 2004 produced very high yields as well as representing important breeding goals aside from yield (disease resistance, grain quality, specialty types, etc.). Testing advanced and preliminary lines under a variety of conditions remains a critical aspect of releasing varieties adapted to changing cultural practices, markets and pests.

Several experiments were conducted to improve rice cultural practices. Nitrogen fertility studies were conducted on the varieties M-202 and M-205 to re-evaluate the N tissue critical level guidelines for topdressing decisions as well as to improve the use of the leaf color chart. It is becoming clear that the leaf tissue values need to be lowered. An experiment was conducted on N x low amylose. These lines are lower yielding than standard Calrose types and the purpose was to determine N levels for optimum yield. One of the tests, conducted in a low fertility field, showed that 100 lb/acre N was optimum. Several studies were aimed at disease management. The blast resistant line 00-Y-805 (to become M-207) was tested against M-202 and M206 to determine yield drag. In this test, 00-Y-805 was similar in yield to M-202 and M-206, but generally it has yielded less. However, under strong pressure from blast, it is expected that 00-Y-805 will out yield the others which are susceptible to this disease. Seed treatments for bakanae disease were also evaluated and many were successful in the county trials. Most of the treatments significantly reduced the incidence of symptomatic M-205 plants from 18% to 2% or less. The reduction in disease incidence was not significantly different for a 24 hr 2% or 3% Ultra Clorox soak when compared to the labeled rate of a 2 hr 5% Ultra Clorox soak. In addition, many of the tested treatments resulted in significantly higher yields for M-205 when compared to untreated seed. The increase in yield was not significantly different for a 24 hr 2% or 3% Ultra Clorox soak when compared to the labeled rate of a 2 hr 5% Ultra Clorox soak. Each of these treatments resulted in yields that were at least 10% higher than untreated seed. Several experiments were conducted on fungicide efficacy, but the results were inconclusive due to cultural limitations at the trial sites. A long term experiment on rice stand establishment was begun at the RES. Five different methods of stand establishment were evaluated for their impact on weed management (primarily to find alternatives to combat weed resistance and to lower herbicide costs). Because N management is expected to change with these stand establishment methods we tested various rates and timing of N application. It is clear that N losses can be high where water is removed or if N is applied on the soil surface before it can be used by the rice plant. Efficiency was highest at 100-150 lb/acre N when preplant incorporated in water seeded rice, but when water seeding was delayed the rate had to be increased. In delayed or no till situations, yields were highest when applications were split and applied at tillering and panicle initiation.

Project RM-2 was involved in the planting, sampling and harvesting of more than 40 trial sites throughout the rice growing areas. This project also was also involved in several educational activities including the winter rice grower meetings, the rice production workshop, the UCCE rice website, rice field day, newsletters, fact sheets and other publications..

Table 18a 2004 RES Low Amylose (BL1) Rice Nitrogen Fertility Rate Test.

Pre-plant N Application	Grain Yield at 14% Moisture	Grain Moisture at Harvest	Plant Height	Days to 50% Heading	Lodging
lbs/ac	lbs/acre	(%)	(cm)		(1-10)
0	3454	19.5	65.8	79	1.0
50	7922	19.5	83.5	82	1.0
100	8074	23.3	103.5	83	5.3
150	7335	29.5	107.0	86	7.0
200	7911	26.3	109.5	88	7.8
MEAN	6939	23.6	93.9	84	4.4
CV	14.1	16.8	3.3	1.5	50.1
LSD (.05)	1507	6.1	4.8	2	3.4

Subjective rating of 1-10 where 1 = none and 10 = completely lodged.

Table 18b. 2004 RES Low Amylose (BL2) Rice Nitrogen Fertility Rate Test.

Pre-plant N Application	Grain Yield at 14% Moisture	Grain Moisture at	Plant Height	Days to 50%	Lodgin

		Harvest			g
				Headin	
lbs/ac	lbs/acre	(%)	(cm)	g	(1-10)
0	7184	19.6	79.3	85	4.0
50	6548	22.2	94.8	90	7.0
100	7637	27.2	101.5	91	9.8
150	6854	24.3	103.5	92	9.5
200	7242	25.9	108.0	93	9.0
MEAN	7093	23.8	97.4	90	7.9
CV	13.0	15.1	3.4	1.9	29.6
LSD (.05)	1416	5.5	5.0	3	3.6

Subjective rating of 1-10 where 1 = none and 10 = completely lodged.