

COMPREHENSIVE RESEARCH ON RICE
ANNUAL REPORT

January 1, 1985 - December 31, 1985

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

PROJECT LEADER AND PRINCIPAL UC INVESTIGATORS:

Project Leader: James E. Hill, Extension Agronomist and Associate in the Experiment Station

Principal UC Investigators: L. A. Post, SRA (UCD) and Farm Advisors M. Canevari (San Joaquin), M. Feyler (Stanislaus), S. C. Scardaci (Colusa), D. E. Snell (Fresno), C. M. Wick (Butte), J. F. Williams (Sutter) and B. L. Weir (Merced).

LEVEL OF 1984 FUNDING: \$38,405.00

OBJECTIVES AND EXPERIMENTS CONDUCTED BY LOCATION TO ACCOMPLISH OBJECTIVES:

Objective I

To evaluate experimental cultivars in cooperation with public and private plant breeders for the purpose of new variety development.

Statewide Uniform Rice Variety Tests

Very Early Maturity Group - Two uniform tests were conducted; at the Lauppe Ranch (Natomas District, Sutter County) and Colonial Farms (Valley Home, Stanislaus County). One similar test was conducted by the Rice Experiment Station (Biggs, Butte County). Twenty-one experimental lines and seven commercially available varieties were included in the on-farm tests.

Early Maturity Group - Four uniform tests were conducted; at the Skinner Ranch (Butte County), the Wylie Ranch (Williams, Colusa County), the Geer Ranch (District 108, Yolo County) and the Mohammed Ranch (District 10, Yuba County). One similar tests was conducted by the Rice Experiment Station (Biggs, Butte County). Nineteen experimental lines and nine commercially available varieties were included in the on-farm tests.

Late Maturity Group - Two uniform tests were conducted; at the Dennis Ranch (Maxwell, Colusa County) and Yosuba Farms (Sutter Basin, Sutter County). One similar tests was conducted by the Rice Experiment Station (Biggs, Butte County). Twenty-one experimental lines and three commercially available varieties were included.

Long Grain Test - One test was conducted at the Geer Ranch (District 108, Yolo County). One similar test was conducted by the Rice Experiment Station (Biggs, Butte County). Twenty-two experimental lines and four commercially available varieties were included.

Commercial Variety Tests - Two tests were conducted at the Britz Ranch and the Britton Ranch (Firebaugh, Fresno County) including eight commercially available and one experimental line.

Objective II

To provide research on new and improved cultural practices.

Coated Seed Tests - Coated (RGA) and uncoated presoaked seed of M-9, M-201 and S-201 were compared at six locations; Butte County, Rice Experiment Station, Colusa County, Yolo County, Sutter County and Yuba County. Feeding activity of seed midge, herbicide injury, stand counts and other parameters of stand establishment were measured.

Seeding Rate Studies - Seeding rates of 90, 150 and 210 lb/A were compared at four locations. Two additional seeding rate studies were conducted as a part of the rice modeling studies funded by the UC IPM group.

Variety by Nitrogen Test - Five levels of nitrogen were studies with four to eight varieties at five locations. The primary interest was in the response of long grains (California Belle and L-202) to nitrogen level and in a comparison of M-9 and M-201.

Phosphorus Rates and Method of Application - Two tests were conducted in Sutter County to reinvestigate the costs and benefits of phosphorus fertilization and evaluate alternative methods of application.

Objective III

To provide professional assistance to field research projects of UC rice research leaders; to maintain a UCD Agronomy Extension-based pool of equipment for conducting field research in rice.

SUMMARY OF 1984 RESEARCH OBJECTIVES:

Objective I

Statewide Uniform Rice Variety Tests

Thirteen uniform trials were conducted in nine locations from Durham, Butte County to Valley Home, Stanislaus County. Four of these tests were conducted by the Rice Experiment Station, Biggs, plant breeders, H. L. Carnahan, S. T. Tseng and C. Johnson. Seventy-six experimental cultivars were tested and appropriate commercially available cultivars were included as standards. Approximately eight advanced experimental cultivars were included in both the early and very early tests to evaluate their perfor-

mance in cool as well as in warm environments. The seed for public varieties and experimental cultivars was provided by the Rice Experiment Station, Biggs. Proprietary varieties were provided by their respective owners.

The following analysis and tables are reported from the over location averages for each maturity group. An Agronomy Progress Report to be published later will provide more detail including the results of each location.

Summary of Very Early Tests (less than 90 days to 50% heading at Biggs) - Twenty-eight cultivars were compared in three very early tests. Named varieties included M-101, M-9, M-201, S-201, L-202, California Belle and Calpearl along with 21 experimental types. M-201 and S-201, however, were not included as standards in the Rice Experiment Station test. The purpose of the very early test is to identify outstanding cultivars for cooler rice growing regions, thus aside from the station where all tests are duplicated, these trials were conducted in the Natomas District, Sacramento County and Valley Home, Stanislaus County. 1984 was an exceptionally warm year, therefore some early types (M-201 and L-202 for example) performed much better than would normally be expected for these areas.

The results of these tests are shown in Table 1 as a summary for the three locations. The leading experimental cultivar, 81-y-124, also led all entries in 1983 and is slated to become M-202, a replacement for M-9 in the cooler regions. Several other experimental types showed considerable promise including short, medium and Mochi types. 83-y-45, an experimental long grain, showed excellent yield potential but very low head rice and will not be tested further. Calpearl was the leading commercial variety over three locations, however, M-201 led commercial entries in the two off-station tests.

Summary of the Early Tests (90-97 days to 50% heading at Biggs) - Table 2 shows the agronomic performance of the early experimental and commercial cultivars tested over four locations. The off-station test in Butte County is not included because variability in nitrogen application within the test area made the results difficult to interpret. Nine commercially available varieties were included in the off-station tests and seven were in all locations. The leading variety over all locations was M-201, followed by L-202 and Calpearl with 9600 lbs/A, 9240 lbs/A and 9110 lbs/A respectively. All three of these varieties were equal to or superior in yield to most of the experimental cultivars (Table 2), however, characteristics other than yield are also important in variety development. S-201, Calmochi 202, M-9 and California Belle were all inferior to most experimental cultivars (Table 2). The two additional commercially available varieties added to the off-station tests, M-302 and M-101, ranked intermediate and low among all commercial cultivars.

Several experimental cultivars performed well in these tests. 81-y-124, a medium grain, ranked eighth overall (Table 2). This experimental has good cold tolerance and will be released as M-202 for seed production in 1985. 81-y-124 was the leading cultivar in the 1983 early tests and ranked at or near Calpearl in the very early tests in 1982, 1983

and 1984 (Table 1).

Several other experimental cultivars represent important areas of varietal development. A very early long grain, 83-y-45, performed very well but as previously mentioned in this report, will not be studied further because of low head rice.

Summary of the Late Rice Variety Tests (more than 105 days to 50% heading at Biggs) - Late and intermediate maturity cultivars are included together in these tests. Late varieties have experienced decreasing popularity and, in fact, the intermediate types are considered by many rice producers to be as late as needed by the industry.

Twenty-five cultivars were compared in these tests including three commercial standards, M-302, M-401 and M-7. Calrose 76 was added to the two off-station tests. The agronomic performance of the late cultivars is shown in Table 3 averaged over the three locations. M-302 was the leading commercial variety followed by M-7 and M-401. Separation among varieties was not especially good since varieties that performed well at one location fared poorly at another tending to reach similar average yields. One cultivar, 83-y-414, an experimental aromatic rice, ranked first and second at Sutter and Biggs, respectively, but was last in Colusa. (This was later attributed to deep water at the Colusa site and poor seedling vigor.)

Summary of the Long Grain Test - The agronomic performance of the long grain cultivars is shown in Table 4 for two locations. Twenty-three cultivars were tested in both locations including the long grain standard L-202, and two medium grains, M-302 and M-201. The high yields of many of these experimentals again indicate their ability to produce as well as the medium and short grain types. Most of the high yielding entries are in early testing and probably are at least two years from registration and release. 83-y-45, mentioned earlier with respect to its performance in the very early and early tests, also did well in these tests but will not be released because of low head rice.

Objective II

Cultural Practices Research

Coated Seed Tests - Combined results of the six tests comparing coated vs presoaked seed showed that coated seed had thinner stands, delayed emergence from the water, delayed maturity (approximately two days) and less yield. Populations of seed midge at the trial sites were too low to detect differences in feeding between the two planting methods. Much of the poorer performance of coated seed can be attributed to herbicide injury. The delay in emergence by coated seed caused rice growth to be at a susceptible stage when grass herbicides were applied to most of the trial sites. The delay in emergence and thin stands appear to be the result of planting dry, unsoaked seed rather than an effect of the seed coating. Of the three varieties tested, M-201 was most affected by coated seed followed by M-9 and S-201.

Seeding Rate Studies - Four varieties, M-201, Calpearl, California Belle and L-202, were compared at 90, 150 and 210 lbs/A of seed. The results of these studies have not been analyzed at the time of writing this report.

Variety X Nitrogen Tests - Five varieties, M-201, Calpearl, California Belle, M-9 and L-202 were compared at five levels of nitrogen, 0, 50, 100, 150 and 200 lbs/A. The results of these studies have not been analyzed at the writing of this report.

Phosphorus Rates X Method of Application Trials - Field tests investigating phosphorus fertilizer rates and methods of application on rice growth and yield were initiated in Sutter County. The purpose of these tests was to assess the cost/benefits of phosphorus fertilization on current varieties and to evaluate application alternatives.

Five rates of phosphorus ranging from 0 to 100 lbs P_2O_5 /A were applied by three methods: (1) drilled to a 5-8 cm depth; (2) surface broadcast followed by soil incorporation to a 5-8 cm depth; and (3) surface broadcast without soil incorporation. The studies were conducted in a field of California Belle with soil level of 4.0 ppm P and M-9 with a soil level of 8.0 ppm P.

Deficiency symptoms were severe in California Belle early in the growing season and were less severe with increasing phosphorus rates. Initial crop and weed growth was more vigorous where phosphorus was broadcast and left on the surface (this held true over all phosphorus rates). However, drilled or incorporated treatments quickly caught up when roots contacted the soil phosphorus. These same affects were noted in M-9 but were much wider and disappeared sooner.

Leaf samples collected 35 days after seeding and analyzed for phosphorus content revealed a positive linear response with respect to fertilizer rate. Drilled phosphorus led to a higher leaf phosphorus content in California Belle than broadcast incorporated phosphorus, which was higher than surface applied (Table 5). Data for M-9 was similar.

Maturity of California Belle was influenced by rate of phosphorus but not by the method of application. There was a seven day delay to 50% heading where phosphorus was absent compared to the highest phosphorus level tested (Table 6).

Lodging was so severe in these tests that recovery of yield was poor. Under a supposedly phosphorus deficient condition, plots with the highest rates of phosphorus yielded lowest.

These results indicate a short-lived advantage to early seedling vigor of surface application of phosphorus fertilizer but greatest plant recovery of phosphorus when it is either drilled or mixed in the soil. The lack of valid harvest data from these trials makes further interpretation of the results difficult.

Objective III

Fifty-five rice field experiments were planted or harvested with UC rice equipment. Thirty-one of these were directly related to this project (RM-2). Others included two seeding rate and disease severity studies by Dr. R. K. Webster (RP-2); six trials on nitrogen inhibitors, slow-release fertilizers and N¹⁵ studies conducted by Dr. D. S. Mikkelsen; nine experiments on weed control conducted by Dr. D. E. Bayer and Dr. J. E. Hill; and seven experiments for the development of a physiologically based rice growth model by Dr. J. E. Hill and Baird Miller.

PUBLICATIONS OR REPORTS:

Following is a list of publications resulting from studies conducted by this project. In addition, this information has been used in many popular articles, farm advisor newsletters, and radio reports. Selected studies have been presented at rice grower meetings and field days.

1. Hill, J. E., L. A. Post, M. L. Feyler, M. Canevari, S. C. Scardaci, C. M. Wick, J. F. Williams and D. E. Snell. Cooperative Extension Rice Variety Adaptation and Cultural Practice Research. Annual Report, Comprehensive Rice Research, University of California and U.S. Department of Agriculture. pp. 50-66.
2. Scardaci, S. C., J. F. Williams and C. M. Wick. 1984. The effect of growing short statured rice on rice culture in California. Proceedings of the Rice Technical Working Group (in press).
3. Tseng, S. T., H. L. Carnahan, C. W. Johnson, J. J. Oster, J. E. Hill and S. C. Scardaci. 1984. Registration of 'L-202' rice. Crop Science, 24:1213-1214.

CONCISE GENERAL SUMMARY OF CURRENT YEAR'S RESULTS:

Nine off-station and four on-station tests compared 76 cultivars in three maturity groups. In the very early test, several experimental cultivars showed excellent agronomic performance across all grain types. 81-y-124 was the highest yielding experimental for the third straight year. A decision was recently made to release this variety named M-202 as a replacement for M-9 in the cooler areas where M-201 does not perform well. Other outstanding performances in the very early test included a very early Calmochi, a very early long grain, and a very early pearl and others. The early tests were led in yield by M-201, L-202 and Calpearl. Several experimental types also yielded equally well. No single or few experimental cultivars emerged as clear leaders in the late tests. The long grain tests showed several potentially good long grain types, however, most are relatively new to advanced testing and will need at least another year of performance evaluation.

Several tests were conducted to further define cultural practices for short stature varieties. These included four seeding rate, four variety X nitrogen, two phosphorus and a number of tests on the effects of coated

seed on stand establishment. The seeding rate and variety X nitrogen studies have not been analyzed at the writing of this report. The phosphorus studies, conducted in phosphorus-problem areas, demonstrated a short-lived advantage of surface placed phosphorus but greatest plant recovery when it was properly incorporated into the soil. Tests on coated seed demonstrated that stand establishment and especially herbicide management will be more critical using this seeding method.

Table 1. 1984 Very Early Rice Variety Trial - Three Location Summary

1984 entry no.	Cultivar description	Grain ¹ type	Grain yield @ 14% moisture (lbs/acre)	Grain moisture @ harvest (%)	Seedling ² vigor (1-5)	Days to 50% heading	Plant height (cm)	Lodging ³ (1-99)
10	81-Y-124	M	9890 (1)	19.3 (5)	4.1 (17)	89 (9)	82 (5)	10 (21)
23	83-Y-45	L	9710 (2)	18.1 (12)	4.4 (9)	89 (8)	81 (12)	35 (7)
21	82-Y-126-A	WXY	9650 (3)	14.8 (26)	4.4 (10)	84 (20)	80 (17)	16 (18)
25	Cal Pearl	S	9610 (4)	15.2 (24)	4.8 (2)	85 (17)	80 (17)	5 (24)
20	83-Y-20	S	9550 (5)	16.3 (22)	4.9 (1)	85 (17)	82 (5)	27 (13)
3	83-Y-141	M	9490 (6)	20.6 (3)	4.1 (16)	90 (6)	81 (9)	35 (6)
11	[P-358+4170]	M	9480 (7)	17.7 (14)	4.0 (20)	85 (18)	82 (7)	6 (22)
14	82-Y-14	S	9470 (8)	18.5 (11)	4.3 (14)	90 (6)	84 (3)	28 (12)
22	L-202	L	9420 (9)	18.7 (10)	3.5 (22)	93 (2)	72 (22)	1 (25)
9	[P-357+4168]	M	9350 (10)	17.9 (13)	4.2 (15)	85 (15)	80 (15)	6 (23)
7	83-Y-186	M	9240 (11)	19.0 (8)	4.1 (18)	92 (3)	80 (16)	1 (26)
5	83-Y-158	M	9110 (12)	19.3 (6)	4.2 (15)	88 (10)	85 (2)	17 (16)
12	82-Y-162	M	9090 (13)	16.0 (23)	4.3 (12)	86 (13)	81 (14)	17 (17)
17	82-Y-17	S	9010 (14)	19.7 (4)	4.4 (8)	94 (1)	82 (6)	25 (14)
15	83-Y-116	S	9010 (15)	17.6 (15)	4.2 (15)	90 (7)	81 (11)	36 (5)
13	[P-32+231]	S	8950 (16)	17.3 (17)	4.0 (19)	83 (21)	78 (20)	25 (15)
18	82-Y-172	M	8790 (17)	19.0 (7)	4.0 (19)	88 (11)	79 (19)	11 (20)
24	83-Y-308	L	8750 (18)	17.0 (19)	3.7 (21)	86 (12)	77 (21)	32 (8)
2	M-9	M	8720 (19)	21.1 (2)	4.4 (10)	91 (4)	83 (4)	44 (2)
19	83-Y-24	M	8700 (20)	17.5 (16)	4.5 (5)	83 (22)	81 (13)	32 (9)
16	[P-114+235]	S	8670 (21)	15.1 (25)	4.4 (7)	85 (19)	81 (10)	40 (4)
4	83-Y-149	M	8620 (22)	19.0 (9)	4.3 (13)	91 (5)	81 (14)	15 (19)
1	M-101	M	8280 (23)	17.2 (18)	4.5 (4)	84 (20)	81 (14)	31 (10)
8	[P-268+4162]	M	8230 (24)	16.7 (20)	4.6 (3)	83 (23)	80 (18)	30 (11)
6	83-Y-165	M	8010 (25)	21.2 (1)	4.5 (6)	85 (16)	81 (8)	51 (1)
26	Calif. Belle	L	8000 (26)	16.7 (21)	4.3 (11)	86 (14)	90 (1)	42 (3)
GRAND MEAN			9030	17.9	4.3	87	81	24
CV			7.8	6.1	7.9	2.1	3.7	68.4
LSD (.05)			570	0.9	0.3	1	2	13

¹S = short; M = medium; L = long; WXY = waxy.

²Subjective rating of 1-5 where 1 = poor and 5 = excellent seedling emergence at 28 days after planting.

³Subjective rating of 1-99 where 1 = 1% lodging and 99 = 99% lodging.

Table 2. 1984 Early Rice Variety Trial - Four Location Summary

1984 entry no.	Cultivar description	Grain ¹ type	Grain yield @ 14% moisture (lbs/acre)	Grain moisture @ harvest (%)	Seedling ² vigor (1-5)	Days to 50% heading	Plant height (cm)	Lodging ³ (1-99)
30	M-201	M	9600 (1)	18.0 (6)	3.9 (8)	94 (16)	88 (21)	25 (22)
52	[83P809+4-A-16](A)	M	9250 (2)	17.2 (10)	3.4 (19)	93 (18)	95 (9)	30 (19)
44	L-202	L	9240 (3)	17.1 (12)	3.4 (21)	96 (12)	80 (25)	5 (24)
45	83-Y-45	L	9210 (4)	15.9 (21)	3.8 (10)	89 (21)	90 (18)	50 (13)
54	Cal Pearl	S	9110 (5)	14.5 (26)	4.2 (1)	85 (24)	90 (19)	34 (17)
40	82-Y-270	M	9100 (6)	17.1 (13)	4.1 (4)	96 (10)	95 (10)	44 (14)
46	83-Y-303	L	9050 (7)	16.7 (16)	3.5 (18)	92 (19)	89 (20)	43 (15)
36	81-Y-124	M	8950 (8)	18.8 (3)	3.7 (15)	91 (20)	92 (17)	39 (16)
48	83-Y-402	L	8910 (9)	17.2 (11)	3.5 (17)	97 (5)	86 (23)	3 (25)
37	83-Y-37	M	8870 (10)	17.7 (8)	3.9 (6)	98 (4)	93 (14)	27 (21)
50	83-Y-453	L	8810 (11)	15.9 (22)	3.4 (20)	95 (15)	88 (22)	60 (6)
51	83-Y-271	M	8700 (12)	17.5 (9)	4.1 (3)	96 (11)	94 (12)	57 (8)
39	83-Y-266	M	8630 (13)	19.1 (2)	3.8 (11)	99 (3)	94 (11)	59 (7)
38	83-Y-257	M	8590 (14)	16.6 (17)	3.9 (6)	97 (8)	96 (6)	56 (10)
43	83-Y-216	S	8560 (15)	17.0 (14)	3.8 (9)	100 (2)	96 (7)	56 (11)
42	83-Y-97	S	8360 (16)	17.7 (7)	4.0 (5)	95 (13)	98 (3)	65 (3)
34	83-Y-20	S	8320 (17)	15.4 (24)	4.2 (2)	87 (23)	95 (8)	57 (8)
31	S-201	S	8320 (18)	16.3 (19)	4.1 (4)	97 (7)	92 (16)	57 (9)
32	Calmochi 202	WXY	8280 (19)	18.8 (4)	3.6 (16)	102 (1)	97 (4)	27 (20)
35	83-Y-141	M	8230 (20)	18.1 (5)	3.9 (7)	93 (17)	92 (15)	74 (2)
47	83-Y-399	L	8170 (21)	16.4 (18)	3.8 (13)	97 (9)	86 (24)	24 (23)
41	83-Y-102	S	8170 (22)	15.4 (23)	3.8 (11)	98 (4)	93 (13)	63 (4)
33	82-Y-126-A	WXY	8090 (23)	15.2 (25)	3.8 (12)	84 (25)	88 (21)	52 (12)
49	83-Y-409	L	8000 (24)	16.8 (15)	3.5 (18)	97 (6)	97 (5)	32 (18)
29	M-9	M	7620 (25)	20.3 (1)	3.9 (6)	95 (14)	99 (2)	81 (1)
53	Calif. Belle	L	7590 (26)	16.0 (20)	3.7 (14)	87 (22)	103 (1)	61 (5)
GRAND MEAN			8610	17.0	3.8	94	93	45
CV			10.1	7.7	9.9	1.6	4.1	40.0
LSD (.05)			600	0.9	0.3	1	3	13

1S = short; M = medium; L = long; WXY = waxy.

2Subjective rating of 1-5 where 1 = poor and 5 = excellent seedling emergence at 28 days after planting.

3Subjective rating of 1-99 where 1 = 1% lodging and 99 = 99% lodging.

Table 3. 1984 Late Variety Trial - Three Location Summary

1984 entry no.	Cultivar description	Grain ¹ type	Grain yield @ 14% moisture (lbs/acre)	Grain moisture @ harvest (%)	Seedling ² vigor (1-5)	Days to 50% heading	Plant height (cm)	Lodging ³ (1-99)
79	82-Y-79	M	8810 (1)	16.5 (21)	4.5 (2)	79 (8)	98 (11)	36 (17)
69	82-Y-550	M	8740 (2)	16.6 (19)	4.4 (6)	77 (12)	98 (12)	53 (2)
77	83-Y-477	S	8730 (3)	18.0 (6)	4.3 (9)	76 (16)	97 (17)	35 (18)
78	83-Y-487	S	8610 (4)	17.3 (12)	4.1 (14)	76 (17)	96 (18)	43 (7)
76	83-Y-568	M	8550 (5)	16.9 (14)	4.4 (5)	74 (19)	96 (19)	47 (4)
64	82-Y-502	S	8530 (6)	15.9 (24)	4.2 (13)	75 (18)	91 (22)	40 (11)
66	80-Y-393	M	8500 (7)	16.5 (20)	4.6 (1)	79 (9)	102 (2)	45 (6)
68	82-Y-570	M	8470 (8)	17.9 (7)	4.6 (1)	80 (6)	96 (20)	34 (20)
62	M-302	M	8460 (9)	16.6 (18)	4.4 (8)	71 (21)	99 (9)	33 (21)
75	83-Y-565	M	8420 (10)	16.8 (15)	4.3 (9)	70 (24)	99 (7)	37 (14)
73	82-Y-495	M	8400 (11)	17.6 (10)	4.4 (5)	72 (20)	100 (5)	33 (22)
70	82-Y-578	M	8330 (12)	17.6 (9)	4.4 (7)	78 (11)	98 (14)	41 (10)
80	83-Y-552	M	8290 (13)	17.2 (13)	4.4 (5)	77 (13)	99 (10)	46 (5)
65	83-Y-489	S	8270 (14)	16.0 (23)	4.3 (12)	77 (14)	90 (23)	41 (9)
84	83-Y-414	L	8210 (15)	16.7 (16)	3.2 (15)	71 (23)	87 (24)	4 (25)
67	80-Y-426	M	8180 (16)	15.5 (25)	4.4 (5)	77 (15)	102 (3)	53 (1)
82	82-Y-567	M	8180 (17)	17.9 (8)	4.5 (3)	80 (4)	98 (13)	34 (19)
74	83-Y-539	M	8170 (18)	18.1 (5)	4.5 (2)	71 (22)	105 (1)	38 (13)
72	83-Y-511	M	8160 (19)	18.2 (4)	4.3 (9)	80 (7)	97 (16)	36 (15)
61	M-7	M	8150 (20)	19.1 (1)	4.3 (10)	81 (3)	97 (15)	32 (24)
83	83-Y-266	M	8140 (21)	17.5 (11)	4.3 (9)	67 (25)	93 (21)	39 (12)
71	82-Y-544	M	8130 (22)	18.4 (3)	4.4 (8)	80 (5)	98 (13)	36 (16)
63	M-401	M	7940 (23)	16.1 (22)	4.5 (4)	81 (2)	100 (6)	51 (3)
81	82-Y-587	M	7660 (24)	16.6 (17)	4.3 (11)	79 (10)	100 (4)	43 (8)
85	[4-A-13]	M	7650 (25)	18.6 (2)	4.4 (5)	81 (1)	99 (8)	33 (23)
GRAND MEAN			8310	17.2	4.3	76	97	39
CV			9.9	7.8	7.0	1.4	4.1	31.2
LSD (.05)			660	1.1	0.2	1	3	10

¹S = short; M = medium; L = long.

²Subjective rating of 1-5 where 1 = poor and 5 = excellent seedling emergence at 28 days after planting.

³Subjective rating of 1-99 where 1 = 1% lodging and 99 = 99% lodging.

Table 4. 1984 Long Grain Variety Trial - Two Location Summary

1984 entry no.	Cultivar description	Grain ¹ type	Grain yield @ 14% moisture (lbs/acre)	Grain moisture @ harvest (%)	Seedling ² vigor (1-5)	Days to 50% heading	Plant height (cm)	Lodging ³ (1-99)
723	83-Y-8247126	L	9280 (1)	16.7 (9)	4.2 (4)	96 (7)	87 (11)	4 (16)
714	83-Y-342	L	9250 (2)	15.9 (14)	4.2 (6)	95 (9)	84 (17)	7 (14)
704	83-Y-45	L	9170 (3)	17.0 (6)	4.2 (4)	91 (18)	88 (9)	18 (10)
717	83-Y-377	L	8960 (4)	16.2 (11)	4.2 (6)	100 (4)	93 (5)	8 (12)
702	L-202	L	8920 (5)	17.3 (5)	4.1 (7)	96 (6)	79 (20)	1 (19)
716	83-Y-375	L	8790 (6)	16.1 (12)	4.0 (11)	95 (8)	87 (12)	44 (5)
719	83-Y-436	L	8780 (7)	16.8 (7)	4.2 (2)	101 (3)	92 (7)	1 (18)
722	83-Y-463	L	8740 (8)	15.5 (17)	4.1 (7)	92 (15)	84 (17)	23 (9)
718	83-Y-405	L	8680 (9)	18.5 (2)	4.2 (3)	101 (2)	87 (11)	1 (17)
706	M-302	M	8630 (10)	19.9 (1)	4.2 (5)	103 (1)	95 (4)	6 (15)
721	83-Y-458	L	8530 (11)	15.0 (21)	4.2 (6)	91 (16)	92 (8)	8 (12)
712	83-Y-309	L	8480 (12)	15.3 (19)	4.1 (9)	92 (14)	82 (19)	8 (12)
705	M-201	M	8460 (13)	17.7 (3)	4.1 (8)	92 (13)	84 (18)	8 (13)
711	83-Y-308	L	8350 (14)	15.7 (15)	4.0 (12)	90 (19)	86 (14)	39 (6)
709	83-Y-304	L	8250 (15)	15.5 (18)	4.3 (1)	93 (11)	92 (6)	54 (4)
713	83-Y-333	L	8130 (16)	15.7 (16)	3.6 (15)	91 (17)	86 (13)	34 (7)
708	83-Y-296	L	8100 (17)	17.4 (4)	4.1 (10)	96 (5)	98 (3)	55 (2)
724	83-Y-8248311	L	8040 (18)	14.0 (22)	4.1 (7)	87 (21)	100 (2)	23 (9)
707	83-Y-291	L	7900 (19)	16.0 (13)	3.8 (14)	96 (6)	95 (4)	9 (11)
720	83-Y-453	L	7680 (20)	16.7 (8)	4.1 (10)	95 (10)	86 (15)	54 (3)
725	83-Y-8248878	L	7670 (21)	13.8 (23)	4.1 (7)	84 (22)	88 (10)	1 (17)
710	83-Y-307	L	7620 (22)	16.4 (10)	4.2 (5)	92 (12)	85 (16)	25 (8)
715	83-Y-349	L	7460 (23)	15.1 (20)	3.9 (13)	87 (20)	103 (1)	74 (1)
GRAND MEAN			8430	16.3	4.1	94	89	22
CV			9.1	5.0	5.1	1.2	3.8	71.1
LSD (.05)			760	0.8	0.2	1	3	15

¹M = medium; L = long.²Subjective rating of 1-5 where 1 = poor and 5 = excellent seedling emergence at 28 days after planting.³Subjective rating of 1-99 where 1 = 1% lodging and 99 = 99% lodging.

Table 5. The effect of phosphorus rate and method of application on leaf tissue analysis for phosphorus (California Belle rice)

P rate (lbs/a)	Drilled	Method of application		Mean
		Broadcast + incorporation	Surface broadcast	
-----ppm P-----				
0	497.5	545.0	467.5	503.3
25	702.5	627.5	567.5	632.5
50	742.5	767.5	667.5	725.8
75	932.5	787.5	770.0	830.0
100	965.0	947.5	870.0	927.5
Mean	768.0	735.0	668.5	723.8
LSD, 5%	96.0			

Table 6. The effect of phosphorus rate and method of application on number of days to 50% heading (California Belle rice)

P rate (lbs/a)	Drilled	Method of application		Mean
		Broadcast + incorporation	Surface broadcast	
-----ppm P-----				
0	92.75	91.25	92.25	92.08
25	88.00	87.75	88.75	88.17
50	87.75	86.00	86.75	86.83
75	85.75	86.75	85.50	86.00
100	84.50	85.75	84.75	85.00
Mean	87.75	87.50	87.60	87.62
LSD, 5%	1.75			