Project No. RM-2

COMPREHENSIVE RESEARCH ON RICE
ANNUAL REPORT

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

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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 the Maxwell Ranch (San Joaquin County). One similar test was conducted by the plant breeders on the Rice Experiment Station (Biggs, Butte County). Twenty-five advanced breeding lines and seven commercially available varieties were included in the two on-farm locations.

Early Maturity Group - Four uniform tests were conducted at the Wylie Ranch (Glenn County), Geer and Son (District 108, Yolo County), the Mohammed Ranch (District 10, Yuba County) and Britz, Inc. (Fresno County). One similar test was conducted by the plant breeders on the Rice Experiment Station (Biggs, Butte County). Twenty-three experimental lines and eight commercially available varieties were included in each of the four on-farm locations.

Late Maturity Group - One test was conducted at the Middleton Ranch (Sutter County) and one by the plant breeders on the Rice Experiment Station (Biggs, Butte County). Twenty-one advanced breeding lines and three commercially available varieties were included at each location.

Long Grain Group - One test was conducted at Geer and Sons (Yolo County) and one by the plant breeders on the Rice Experiment Station (Biggs, Butte County). Twenty-three advanced breeding lines and two commercially available varieties were included at each location.

Short and Medium Grain Special Test - One test was conducted on the Erdman Ranch (Colusa County) and one by the plant breeders on the Rice Experiment Station (Biggs, Butte County). The purpose of this test, conducted for the first time in 1986, was to provide additional preliminary screening of superior experimental lines before advancing them to the statewide program. Twenty-three experimental lines and two commercial standards were included at each location.

Objective II

To provide research on new and improved cultural practices.

Water Management - A continuing study funded in part by the UC IPM program was conducted in Sutter County. The purpose of this study is to determine the impact of a number of methods of water management during stand establishment on rice growth and the interaction with weeds, insects, diseases and mosquitoes. A brief summary of this project is included here because Rice Research Board funds supported the project with equipment and some labor.

Objective III

To provide professional assistance to UC research project leaders and to maintain an Extension-based rice project equipment pool for planting, fertilizing and harvesting field experiments.

SUMMARY OF 1986 RESEARCH OBJECTIVES:

Statewide Uniform Evaluation of Advanced Breeding Lines

Nine uniform trials were conducted in the locations, maturity groups and grain types described previously in this report and at five additional locations by the rice plant breeders on the Rice Experiment Station. Several of the experimental lines had been tested in prior years. Seed for these tests was provided by the Rice Experiment Station or, in the case of proprietary cultivars, by their respective owners. The following analysis and tables are reported for over location averages for each group of tests (maturity, grain type). An Agronomy Progress Report to be published later will provide the results at each location.

Summary of the Very Early Tests (less than 90 days to 50% heading at Biggs)

Twenty-six cultivars were compared in three very early tests. The commercial varieties Calmochi 101, M-202 and California Belle were included as standards. The two off-station tests included six additional cultivars, Earlirose 83 (N.F. Davis), S-1 (N.F. Davis) and CBR 31 (N.F. Davis), L-202,

S-201 and M-201.

Table 1 shows the results of the three locations comparing only the 26 lines common to all three tests. Calmochi 101 and M-202 were the leading entries followed by 84-Y-149, an experimental line already in foundation seed production with a status of certification pending. 85-Y-136, an early short grain being considered for varietal release ranked 14th in these tests. There were no significant differences (statistically) among the top five entries in yield. Comparison of the additional entries in the two off-station tests showed Earlirose 83 (N.F. Davis) ranking second between Calmochi 101 and ahead of M-202 in yield.

Summary of the Early Tests (90-97 days to 50% heading at Biggs)

Twenty-three experimental lines and eight commercially available varieties were tested at the off-station locations previously described whereas 20 experimental and six commercially available lines were tested at the Rice Experiment Station. Commercial varieties included M-202, S-201, M-201, L-202, M-101 and California Belle at all locations with Calmochi 101 and Calmochi 202 added to the off-station sites. The three experimental types tested off-station were Earlirose 83, S-1 and CBR 31, all of N.F. Davis Driers.

The five location summary results are shown in Table 2 and the four location results are shown in Table 3. The advanced line 85-Y-136 was the leading cultivar for yield in both the four and five location comparisons. 85-Y-136 is an early short-grain (eight days earlier than S-201) and is being considered for release. In view of the industry dependence on S-201 for a pearl type, 85-Y-136 represents a significant improvement. M-202 ranked second in yield, not significantly different from 85-Y-136. Over all years, M-202 was consistently the highest ranking cultivar for yield. In the four off-station tests Calmochi-101 and Earlirose 85 ranked third and fourth for yield (these were only included in the four off-station tests). Earlirose 83 is a medium grain with very early maturity (two days earlier than M-101). Neither Calmochi 101 nor Earlirose 83 were significantly different from the top two cultivars in yield. 84-Y-149, a medium grain cultivar with certification pending, ranked in the top ten for yield. M-201 was 15th in yield ranking considerably lower relative to M-202 as compared to previous years.

Summary of the Intermediate and Late Rice Variety Tests (more than 105 days to 50% heading at Biggs)

The late rice variety trials were reduced from three locations, as in previous years to the two locations previously described because of the importance of early maturity. Twenty-four cultivars were included; 21 experimental lines and the three variety standards, M-302, M-7 and M-401 (Table 4).

The variety M-7 was the latest in heading of all entries in this test indicating that even in this maturity group, earliness is an important, emphasized criteria in the selection of new varieties.

The experimental short grain 83-Y-502, was the highest yielding cultivar

Table 1. 1986 Very Early Variety Trial - Three Location Summary

Entry	Grain type[1]	Grain yield @14% H_2O (lbs/A)[2]	Grain moisture %	Seedling vigor 1-5	Days to 50% heading	Plant height (cm)	Lodging[3] 1-99
21 Calmochi-101	W	10350 (1)	17.2 (20)	4.0 (15)	87 (21)	89 (11)	40 (5)
10 M-202	M	10320 (2)	21.1 (7)	4.4 (2)	96 (4)	90 (8)	42 (4)
4 84-Y-149	M	10200 (3)	22.0 (3)	4.3 (3)	94 (8)	90 (9)	1 (23)
17 85-Y-130	S	9890 (4)	18.2 (18)	4.3 (5)	93 (11)	92 (5)	30 (7)
16 85-Y-98	S	9860 (5)	19.7 (12)	4.2 (8)	92 (12)	85 (18)	47 (2)
25 85-Y-725	L	9800 (6)	16.0 (23)	3.9 (18)	89 (19)	83 (22)	7 (18)
13 84-Y-103	S	9780 (7)	19.9 (11)	4.1 (13)	95 (6)	82 (24)	7 (19)
6 85-Y-188	M	9760 (8)	21.7 (4)	4.1 (13)	93 (11)	91 (6)	10 (17)
7 85-Y-186	M	9680 (9)	18.3 (17)	3.9 (17)	86 (23)	85 (17)	19 (12)
18 85-Y-99	S	9680 (10)	17.6 (19)	4.4 (1)	88 (20)	84 (21)	15 (15)
9 84-Y-9	M	9640 (11)	18.8 (14)	4.2 (7)	87 (22)	84 (21)	27 (8)
20 85-Y-20	L	9640 (12)	15.6 (26)	3.5 (22)	86 (24)	88 (14)	1 (23)
11 P-224	M	9600 (13)	18.6 (16)	4.1 (11)	90 (15)	89 (13)	17 (13)
12 85-Y-136	S	9490 (14)	19.5 (13)	4.3 (4)	96 (3)	84 (20)	2 (22)
23 85-Y-718	L	9430 (15)	16.0 (24)	3.5 (21)	90 (16)	77 (25)	2 (21)
19 85-Y-121	S	9410 (16)	20.5 (10)	4.1 (12)	89 (17)	86 (16)	10 (16)
8 85-Y-144	M	9370 (17)	22.1 (2)	4.2 (9)	95 (7)	87 (15)	1 (23)
3 85-Y-189	M	9360 (18)	20.8 (8)	4.4 (2)	95 (5)	89 (12)	26 (9)
5 84-Y-170	M	9340 (19)	21.5 (5)	4.1 (14)	94 (9)	90 (7)	16 (14)
24 85-Y-24	L	9330 (20)	17.0 (21)	3.8 (19)	91 (14)	84 (19)	1 (23)
14 83-Y-14	S	9180 (21)	22.4 (1)	4.4 (2)	97 (1)	94 (2)	30 (6)
1 M-101	M	9100 (22)	18.8 (15)	4.3 (6)	88 (20)	92 (3)	49 (1)
15 83-Y-116	S	9000 (23)	21.4 (6)	4.2 (10)	96 (2)	89 (10)	20 (11)
22 85-Y-339	L	8960 (24)	16.5 (22)	3.6 (20)	93 (10)	83 (23)	4 (20)
2 P-307	S	8920 (25)	20.8 (9)	4.2 (10)	92 (13)	92 (4)	23 (10)
26 California Belle	L	8470 (26)	15.8 (25)	4.0 (16)	89 (18)	101 (1)	44 (3)
Grand Mean		9520	19.2	4.1	91	88	19
CV		7.2	5.7	6.1	1.9	3.9	91.4
LSD (.05)		550	0.9	0.2	1	3	14
LSD (.01)		730	1.2	0.3	2	4	18

[1] S = short; M = medium; L = long; W = waxy.
[2] Subjective rating of 1-5 where 1 = poor and 5 = excellent seedling emergence.
[3] Subjective rating of 1-99 where 1 = 1% lodging and 99 = 99% lodged.

Table 2. 1986 Early Variety Trial - 5 Location Summary

Entry	Grain[1] type	Grain yield @14% H_2O (lbs/A)	Grain moisture %	Seedling[2] vigor 1-5*	Days to 50% heading	Plant height (cm)	Lodging[3] 1-99
34 85-Y-136	S	9550 (1)	16.2 (24)	4.4 (2)	91 (24)	84 (23)	4 (13)
29 M-202	M	9500 (2)	20.7 (12)	4.2 (10)	94 (18)	94 (4)	15 (8)
41 85-Y-207	S	9350 (3)	19.9 (13)	4.2 (8)	95 (16)	89 (18)	10 (10)
33 84-Y-149	M	9120 (4)	20.8 (11)	4.3 (4)	92 (22)	95 (3)	2 (19)
39 85-Y-287	M	9110 (5)	19.2 (15)	4.2 (5)	92 (20)	93 (10)	15 (6)
43 85-Y-275	M	9100 (6)	21.6 (7)	4.3 (3)	97 (9)	94 (6)	16 (5)
54 P-1480	M	9050 (7)	21.8 (6)	4.0 (16)	96 (12)	90 (14)	1 (22)
37 206=35-B,254	S	8810 (8)	21.3 (9)	4.2 (6)	96 (11)	89 (17)	3 (16)
36 203=35-A,254	S	8800 (9)	20.8 (10)	4.2 (11)	97 (7)	87 (21)	3 (15)
42 84-Y-298	M	8760 (10)	22.2 (4)	4.1 (12)	98 (4)	90 (15)	1 (21)
52 P-1478	M	8750 (11)	22.1 (5)	4.0 (15)	96 (10)	88 (20)	1 (22)
38 85-Y-197	S	8740 (12)	19.1 (16)	4.0 (14)	93 (19)	87 (22)	15 (7)
31 S-201	S	8680 (13)	22.3 (3)	4.4 (1)	99 (2)	92 (12)	12 (9)
30 M-201	M	8660 (14)	22.4 (2)	4.0 (15)	97 (8)	90 (16)	2 (17)
40 85-Y-231	S	8610 (15)	21.6 (8)	4.2 (7)	94 (17)	96 (2)	45 (2)
48 85-Y-336	L	8540 (16)	19.1 (17)	3.7 (23)	97 (6)	93 (7)	1 (22)
44 L-202	L	8510 (17)	18.7 (18)	3.9 (19)	98 (5)	81 (25)	1 (22)
51 84-Y-257	M	8400 (18)	22.7 (1)	4.0 (17)	98 (3)	93 (8)	4 (14)
47 85-Y-717	L	8350 (19)	15.5 (26)	3.9 (20)	90 (25)	81 (24)	8 (12)
35 S-6196-1	M	8320 (20)	19.5 (14)	3.8 (21)	92 (21)	94 (5)	64 (1)
45 84-Y-348	L	8310 (21)	17.6 (21)	3.8 (22)	95 (14)	88 (19)	9 (11)
49 85-Y-365	L	8290 (22)	16.6 (23)	3.5 (24)	95 (13)	93 (9)	1 (20)
46 85-Y-715	L	8290 (23)	17.6 (22)	3.9 (20)	95 (15)	90 (13)	2 (18)
50 85-Y-384	L	8260 (24)	17.9 (20)	4.1 (13)	100 (1)	77 (26)	1 (22)
32 M-101	M	8040 (25)	18.1 (19)	4.2 (9)	87 (26)	92 (11)	43 (3)
53 California Belle	L	7940 (26)	15.7 (25)	3.9 (18)	91 (23)	106 (1)	21 (4)
Grand Mean		8690	19.7	4.1	95	90	12
CV		7.2	6.3	6.5	1.8	3.8	121.1
LSD (.05)		390	0.8	0.2	1	2	9
LSD (.01)		510	1.0	0.2	1	3	11

*Yuba County is not included in the seedling vigor average.

[1]S = short; M = medium; L = long; W = waxy.
[2]Subjective rating of 1-5 where 1 = poor and 5 = excellent seedling emergence.
[3]Subjective rating of 1-99 where 1 = 1% lodging and 99 = 99% lodged.

in this test and ranked fourth and sixth respectively in 1985 and 1984. M-401 ranked second in yield. Several experimental cultivars were superior to M-7 and M-302 in yield. 83-Y-414, an aromatic rice under consideration for release, ranked last in the late maturity test. This cultivar is intended for a specialty market and should not necessarily need to be competitive in yield with standard types.

Summary of the Long Grain Test

Twenty-five long grain cultivars including 23 experimental lines and two standard varieties, L-202 and M-201 were compared. L-202 ranked seventh and M-201 ninth overall (Table 5). The leading cultivar in yield, 85-Y-349, was the only experimental entry significantly higher than L-202. Some of the more promising entries from this test may be advanced to the statewide trials in 1987.

Summary of the Short and Medium Grain Special Test

Twenty-five short and medium grain cultivars (23 experimental lines) were compared in a special test initiated in 1986 to increase the number of preliminary breeding lines in off-station locations (Table 6). Several short and medium grain types had desirable agronomic characteristics and promising lines may be advanced to the statewide trials in 1987.

Objective II

Summary of Rice Water Management Studies

This work was funded by the UC IPM Program, but is briefly reported here for the information of the Rice Research Board. The project involved studies on the response of invertebrates (midges, rice water weevil, mosquitoes), stem diseases, weeds, herbicide performance, and plant growth to water management regimes. See the 1985 RM-2 report about details of the trial. Table 7 gives yield data, 1985 vs. 1986. Additional data will be included in the report to the funding agency.

Table 7. Grain Yield @ 14% in Water Management Plots 1985 vs. 1986

	No Herbicides Used		Herbicides Used	
	1985	1986	1985	1986
Shallow	1991	3793	7148	9006
Moderate	4928	5944	9240	8105
Deep	7452	5878	8979	6915
Leathers	4457	4895	9116	7521
Delayed Drain	3110	5277	8328	7753
Old Method	4792	6314	9272	7212
LSD (.05)	1428	2293	1289	997
CV (%)	17.6	23.6	8.2	7.1

Table 3. 1986 Early Variety Trial - 4 Location Summary

Entry	Grain[1] type	Grain yield @14% H_2O (lbs/A)	Grain moisture %	Seedling vigor[2] 1-5*	Days to 50% heading	Plant height (cm)	Lodging[3] 1-99
34 85-Y-136	S	9310 (1)	16.4 (28)	4.2 (2)	91 (23)	83 (26)	5 (14)
29 M-202	M	9310 (2)	21.3 (13)	3.9 (10)	94 (15)	95 (6)	6 (13)
58 Calmochi-101	W	9300 (3)	16.6 (27)	3.9 (12)	88 (26)	90 (18)	9 (11)
56 ER 83	M	9030 (4)	15.2 (31)	3.9 (13)	86 (28)	94 (7)	26 (4)
43 85-Y-275	M	8940 (5)	22.7 (6)	4.1 (3)	98 (7)	95 (5)	18 (5)
41 85-Y-207	S	8910 (6)	20.6 (14)	3.9 (8)	95 (14)	89 (20)	12 (8)
39 85-Y-287	M	8850 (7)	19.8 (16)	4.0 (5)	93 (18)	93 (11)	10 (10)
33 84-Y-149	M	8800 (8)	21.5 (12)	4.0 (4)	93 (19)	96 (3)	1 (20)
54 P-1480	M	8570 (9)	22.5 (9)	3.7 (17)	97 (9)	90 (16)	1 (22)
37 206=35-B,254	S	8420 (10)	22.3 (10)	4.0 (6)	96 (11)	89 (19)	3 (18)
38 85-Y-197	S	8380 (11)	19.7 (17)	3.7 (14)	93 (17)	87 (24)	17 (6)
36 203=35-A,254	S	8380 (12)	21.7 (11)	3.9 (12)	97 (10)	87 (22)	4 (16)
40 85-Y-231	S	8310 (13)	22.5 (8)	4.0 (7)	94 (16)	96 (4)	43 (2)
42 84-Y-298	M	8300 (14)	22.7 (7)	3.9 (12)	98 (6)	90 (15)	1 (21)
30 M-201	M	8230 (15)	23.2 (4)	3.7 (16)	98 (7)	90 (18)	1 (22)
31 S-201	S	8230 (16)	23.2 (3)	4.2 (1)	99 (4)	92 (14)	15 (7)
35 S-6196-1	M	8220 (17)	20.4 (15)	3.5 (25)	92 (20)	94 (7)	56 (1)
55 CBR 31	L	8200 (18)	16.7 (26)	3.5 (22)	92 (22)	104 (2)	3 (17)
57 S 1	S	8190 (19)	16.8 (25)	3.7 (17)	90 (25)	86 (25)	1 (22)
52 P-1478	M	8180 (20)	22.9 (5)	3.7 (15)	97 (8)	88 (21)	1 (22)
48 85-Y-336	L	8150 (21)	19.6 (18)	3.5 (24)	99 (5)	93 (10)	1 (22)
44 L-202	L	8100 (22)	19.3 (19)	3.6 (19)	99 (4)	82 (28)	1 (22)
45 84-Y-348	L	8100 (23)	18.3 (22)	3.5 (23)	96 (12)	87 (23)	1 (21)
47 85-Y-717	L	7940 (24)	16.0 (29)	3.5 (22)	91 (24)	82 (27)	9 (12)
53 California Belle	L	7930 (25)	16.0 (30)	3.5 (21)	92 (21)	107 (1)	12 (9)
51 84-Y-257	M	7910 (26)	23.8 (2)	3.6 (18)	99 (3)	94 (8)	5 (15)
46 85-Y-715	L	7890 (27)	18.1 (23)	3.5 (20)	96 (13)	90 (17)	3 (19)
32 M-101	M	7830 (28)	18.7 (20)	3.9 (9)	88 (27)	92 (13)	38 (3)
49 85-Y-365	L	7790 (29)	17.1 (24)	3.3 (26)	96 (13)	93 (9)	1 (20)
50 85-Y-384	L	7640 (30)	18.4 (21)	3.9 (11)	101 (1)	76 (29)	1 (22)
59 Calmochi-202	W	5330 (31)	25.4 (1)	1.9 (27)	100 (2)	92 (12)	1 (22)
Grand Mean		8280	20.0	3.7	95	91	10
CV		7.9	6.7	8.1	1.9	3.9	130.2
LSD (.05)		460	0.9	0.2	1	2	9
LSD (.01)		600	1.2	0.3	2	3	12

*Yuba County is not included in the seedling vigor average.

[1]S = short; M = medium; L = long; W = waxy.
[2]Subjective rating of 1-5 where 1 = poor and 5 = excellent seedling emergence.
[3]Subjective rating of 1-99 where 1 = 1% lodging and 99 = 99% lodged.

Table 4. 1986 Late Variety Trial - Two Location Summary

Entry	Grain[1] type	Grain yield @14% H_2O (lbs/A)	Grain moisture %	Seedling[2] vigor 1-5	Days to 50% heading	Plant height (cm)	Lodging[3] 1-99
64 83-Y-502	S	9300 (1)	15.5 (14)	4.1 (9)	106 (3)	85 (21)	3 (2)
63 M-401	M	9190 (2)	16.6 (2)	4.4 (1)	109 (2)	96 (1)	11 (1)
69 85-Y-502	S	8850 (3)	16.0 (5)	4.0 (10)	104 (5)	90 (13)	1 (8)
83 P-2049	S	8730 (4)	16.4 (3)	4.0 (11)	104 (6)	89 (16)	1 (8)
71 85-Y-497	S	8650 (5)	15.6 (13)	3.9 (16)	102 (13)	88 (17)	2 (4)
82 P-2023	S	8590 (6)	16.0 (6)	3.9 (16)	103 (11)	89 (14)	1 (8)
68 84-Y-480	S	8450 (7)	16.2 (4)	4.1 (8)	102 (12)	91 (8)	1 (8)
74 85-Y-463	M	8400 (8)	15.4 (16)	3.9 (14)	102 (15)	95 (2)	1 (8)
73 85-Y-499	S	8380 (9)	15.7 (10)	4.0 (11)	103 (9)	88 (18)	1 (8)
75 85-Y-466	M	8370 (10)	15.2 (17)	3.9 (18)	102 (14)	90 (12)	2 (3)
65 85-Y-508	S	8310 (11)	15.4 (15)	4.0 (12)	102 (12)	87 (19)	1 (5)
67 84-Y-492	S	8300 (12)	15.7 (11)	4.2 (6)	104 (7)	92 (7)	1 (8)
66 85-Y-487	M	8280 (13)	15.9 (8)	4.3 (3)	105 (4)	93 (5)	1 (8)
79 P-1798	M	8250 (14)	15.1 (18)	4.4 (1)	102 (14)	93 (4)	1 (7)
76 85-Y-501	S	8230 (15)	14.8 (22)	4.1 (7)	102 (16)	86 (20)	1 (6)
62 M-302	M	8220 (16)	15.9 (9)	3.9 (17)	104 (7)	92 (6)	2 (4)
78 P-1795	M	8210 (17)	15.0 (19)	4.0 (13)	100 (19)	92 (6)	1 (8)
77 P-1783	M	8110 (18)	15.0 (20)	4.2 (5)	101 (18)	91 (10)	1 (8)
61 M-7	M	8100 (19)	18.3 (1)	4.1 (7)	111 (1)	94 (3)	1 (8)
70 85-Y-474	M	8060 (20)	14.9 (21)	3.9 (15)	103 (10)	89 (15)	1 (8)
72 85-Y-472	M	7680 (21)	16.0 (7)	4.3 (2)	99 (21)	90 (12)	1 (8)
81 P-1876	M	7670 (22)	14.4 (24)	4.3 (4)	100 (20)	91 (11)	1 (6)
80 P-1802	M	7600 (23)	14.6 (23)	4.4 (1)	101 (17)	91 (9)	1 (8)
84 83-Y-414	L	7320 (24)	15.6 (12)	2.5 (19)	103 (8)	82 (22)	1 (8)
Grand Mean		8300	15.6	4.0	103	90	2
CV		6.0	6.1	8.9	1.0	3.9	171.4
LSD (.05)		490	0.9	0.4	1	4	3
LSD (.01)		50	1.2	0.5	1	5	4

[1]S = short; M = medium; L = long; W = waxy.
[2]Subjective rating of 1-5 where 1 = poor and 5 = excellent seedling emergence.
[3]Subjective rating of 1-99 where 1 = 1% lodging and 99 = 99% lodged.

Table 5. 1986 Long Grain Variety Trial - 2 Location Summary

Entry	Grain[1] type	Grain yield @14% H_2O (lbs/A)	Grain moisture %	Seedling[2] vigor 1-5	Days to 50% heading	Plant height (cm)	Lodging[3] 1-99
709 85-Y-349	L	10330 (1)	15.4 (5)	4.2 (12)	93 (6)	89 (12)	1 (10)
703 85-Y-296	L	10120 (2)	12.4 (21)	4.4 (3)	90 (14)	93 (8)	1 (10)
711 85-Y-354	L	9960 (3)	13.3 (15)	4.3 (4)	91 (13)	81 (21)	2 (8)
710 85-Y-353	L	9850 (4)	13.3 (15)	4.3 (9)	88 (17)	81 (22)	1 (10)
705 85-Y-305	L	9830 (5)	14.1 (10)	3.8 (21)	92 (11)	89 (15)	1 (9)
708 85-Y-342	L	9820 (6)	12.9 (17)	4.3 (8)	91 (13)	93 (7)	2 (7)
701 L-202	L	9810 (7)	16.0 (2)	4.3 (7)	94 (2)	82 (19)	1 (10)
706 85-Y-321	L	9790 (8)	14.6 (8)	4.0 (18)	87 (19)	91 (9)	1 (10)
702 M-201	M	9790 (9)	17.1 (1)	4.3 (5)	93 (4)	91 (10)	1 (10)
714 85-Y-377	L	9710 (10)	15.6 (3)	4.3 (4)	94 (3)	98 (2)	8 (5)
704 85-Y-304	L	9700 (11)	14.1 (9)	3.6 (23)	92 (10)	89 (14)	1 (10)
712 85-Y-363	L	9650 (12)	14.1 (11)	4.2 (14)	93 (5)	94 (4)	4 (6)
716 85-Y-406	L	9630 (13)	15.4 (4)	4.2 (11)	94 (3)	83 (18)	1 (10)
725 8449988	L	9560 (14)	14.6 (7)	4.3 (9)	89 (15)	94 (6)	16 (1)
724 8449685	L	9480 (15)	14.0 (12)	4.3 (6)	88 (18)	81 (22)	1 (10)
713 85-Y-370	L	9460 (16)	14.1 (9)	3.9 (20)	96 (1)	94 (5)	9 (4)
707 85-Y-338	L	9430 (17)	13.3 (15)	4.2 (13)	87 (20)	81 (20)	1 (10)
717 85-Y-407	L	9370 (18)	14.8 (6)	4.3 (10)	93 (8)	85 (17)	1 (10)
723 8433542	L	9260 (19)	12.8 (18)	4.1 (16)	89 (16)	86 (16)	1 (10)
722 8433174	L	9020 (20)	12.2 (22)	4.1 (17)	85 (22)	90 (11)	1 (10)
719 8431177	L	8790 (21)	13.0 (16)	4.5 (1)	87 (21)	98 (3)	10 (3)
715 85-Y-404	L	8730 (22)	12.8 (19)	4.0 (19)	92 (9)	75 (23)	1 (10)
720 8432029	L	8720 (23)	13.7 (13)	3.6 (22)	93 (7)	89 (13)	1 (10)
721 8433041	L	8610 (24)	12.7 (20)	4.1 (15)	91 (12)	71 (24)	1 (10)
718 8431171	L	8430 (25)	13.5 (14)	4.5 (2)	87 (19)	101 (1)	10 (2)
Grand Mean		9470	14.0	4.2	91	88	3
CV		4.9	8.1	3.8	1.9	3.6	246.0
LSD (.05)		460	1.1	0.2	2	3	8
LSD (.01)		610	1.5	0.2	2	4	10

[1]S = short; M = medium; L = long; W = waxy.
[2]Subjective rating of 1-5 where 1 = poor and 5 = excellent seedling emergence.
[3]Subjective rating of 1-99 where 1 = 1% lodging and 99 = 99% lodged.

Table 6. 1986 Short and Medium Grain Variety Trial - 2 Location Summary

Entry	Grain[1] type	Grain yield @14% H_2O (lbs/A)	Grain moisture %	Seedling[2] vigor 1-5	Days to 50% heading	Plant height (cm)	Lodging[3] 1-99
761 P-1477	M	10430 (1)	22.0 (4)	3.5 (17)	97 (7)	95 (8)	1 (18)
768 P-965	S	10420 (2)	23.2 (1)	4.2 (7)	100 (1)	97 (5)	1 (18)
754 P-62	M	10370 (3)	20.8 (16)	4.2 (10)	94 (15)	95 (10)	23 (8)
765 Y-265	M	10300 (4)	21.5 (10)	4.0 (12)	96 (10)	97 (6)	10 (15)
767 P-937	S	10110 (5)	22.4 (3)	4.1 (11)	100 (2)	90 (22)	1 (18)
763 Y-187	M	10100 (6)	21.0 (14)	4.2 (7)	94 (13)	98 (4)	20 (11)
752 M-202	M	10060 (7)	20.9 (15)	4.2 (8)	94 (16)	94 (12)	27 (6)
773 4-A-23(Y-196)	S	10050 (8)	22.8 (2)	4.2 (8)	98 (3)	92 (16)	1 (18)
766 P-798	S	10040 (9)	21.6 (7)	3.8 (16)	95 (12)	94 (13)	13 (14)
771 4-A-14(Y-204)	S	10030 (10)	21.9 (5)	4.3 (5)	98 (4)	91 (20)	1 (18)
764 Y-236	M	10000 (11)	20.0 (21)	4.3 (4)	92 (19)	92 (15)	15 (13)
755 P-137	M	9950 (12)	19.6 (22)	4.3 (4)	92 (19)	92 (18)	18 (12)
769 P-984	S	9940 (13)	21.6 (8)	4.2 (7)	95 (11)	101 (2)	1 (18)
758 P-1348	M	9920 (14)	20.5 (18)	4.3 (2)	96 (9)	94 (14)	1 (18)
770 P-1052	S	9920 (15)	21.5 (9)	4.3 (2)	96 (8)	91 (19)	1 (18)
753 P-21	M	9830 (16)	20.6 (17)	4.0 (14)	94 (17)	100 (3)	30 (4)
774 Y-225	S	9780 (17)	21.2 (12)	4.3 (6)	97 (6)	92 (16)	3 (17)
760 P-1457	M	9680 (18)	21.3 (11)	4.0 (13)	93 (18)	91 (21)	3 (16)
759 P-1453	M	9470 (19)	21.7 (6)	4.2 (9)	97 (5)	101 (1)	23 (9)
775 Y-230	S	9430 (20)	21.2 (13)	4.3 (5)	90 (21)	92 (17)	21 (10)
762 4-A-6	M	9330 (21)	20.3 (19)	3.8 (15)	94 (14)	97 (6)	60 (1)
757 P-1328	M	9310 (22)	20.1 (20)	4.2 (9)	92 (19)	95 (7)	34 (2)
756 P-215	M	9220 (23)	19.3 (23)	4.1 (11)	90 (22)	95 (9)	26 (7)
772 4-A-21(Y-194)	S	9190 (24)	21.2 (12)	4.4 (1)	92 (20)	94 (12)	32 (3)
751 M-101	M	9030 (25)	19.3 (24)	4.3 (3)	87 (23)	94 (11)	29 (5)
Grand Mean		9840	21.1	4.1	95	95	16
CV		6.1	3.3	4.2	1.7	3.7	106.1
LSD (.05)		590	0.7	0.2	2	3	16
LSD (.01)		780	0.9	0.2	2	5	22

[1] S = short; M = medium; L = long; W = waxy.
[2] Subjective rating of 1-5 where 1 = poor and 5 = excellent seedling emergence.
[3] Subjective rating of 1-99 where 1 = 1% lodging and 99 = 99% lodged.

As in 1985, data suggest a beneficial effect of deeper water and avoiding drainage on yield and weed control when herbicides are not used. However, because of improved herbicidal efficacy due to warmer weather at application time, and possibly lower weed population because of treatment in 1985, all plots on the treated side were relatively weed-free. Hence, yield differences are mainly due to effects of water management. In the absence of weeds in shallow water plots (weedy in 1985) yields were highest; deep water plots were poorest. This is essentially the reverse of 1985 when herbicidal efficacy was poorer and weed pressure greater, and field conditions (levelness and seedbed) were generally better for plant nutrition and vigorous growth. Wet seed bed, lower fertility level and toxic effects of a poor straw burn are possible explanations for poor performance in deeper water. Much lower seedling survival in 1986 and greater sensitivity of rice plant growth to water depth suggest substantial differences between the two years.

The best yield without herbicides was 80% of the best with herbicides, in 1985. In 1986, that same comparison was 70%. The combination of appropriate water management and herbicides was better than either alone. The idea of "appropriate" water management was different for the two years, pointing out the difficulty and complexity of defining how best to manage water.

An additional study within this large experiment involved evaluation of rice cultivars at different water depths. Eight cultivars were planted in the shallow, moderate and deep basins in weed controlled side. The following table summarizes their yield performance.

Table 8. Effect of Water Depth on Yield of Rice Varieties

	Yield @ 14 % Moisture, lbs/ac. Water Depth Treatment			
Variety	2-3"	4-6"	7-9"	Mean
S-201	8615	8704	8780	8700
M-201	8689	9131	8330	8717
L-202	8574	8667	8497	8580
M-202	9741	9625	8531	9299
M-101	8430	8406	8779	8538
84-Y-149	9224	8442	8905	8857
Calif. Belle	8826	8354	8134	8438
Calmochi 101	9520	9257	8838	9205
Mean	8952	8823	8599	8792

LSD (.05)
Water depths--n.s.
Varieties--713
Interaction--1254

Perusal of the data show that some vigorous varieties, like S-201 and M-101 are relatively unaffected by water depth, while the less vigorous varieties M-201 and M-202 are affected adversly by deep water. L-202, a low vigor variety, was not affected.

Chemical Control of Stemrot - Sutter County

This small experiment was done to develop efficacy data for Tilt (Ciba-Geigy) for control of stemrot in rice. A field of M-201 with a prior history of disease was chosen as the site. At panicle initiation, 60% of tillers had stemrot lesions at the water line. Lesions developed and spread during the latter part of the season, but never became severe. Severity ratings were made just prior to drainage and suggested a small but beneficial effect of chemical treatment which in turn resulted in a small but significant yield gain. However, disease severity was not high enough to produce economic benefits of treatment. See Table 9.

Table 9. Chemical Control of Stemrot in Rice, Variety M-201

Treatment	Harvest moisture	Disease rating	Grain yield
Tilt @ 6 fl.oz. I.E. + 6 early boot	27.1	1.87	10291
Tilt @ 8 fl.oz. I.E. + 6 early boot	26.5	1.79	10542
Tilt @ 10 fl.oz. internode elongation	26.4	1.87	10468
Untreated control	27.0	2.19	10203
LDS (.05)	.32	.27	114
C.V. (%)	2.4	14.02	2.2

Summary of Variety x Nitrogen Studies

1985 variety by nitrogen studies were conducted in three locations. The data were not available at the time the 1985 report was written, and are therefore included here.

Table 10 shows the response of four varieties to nitrogen as the average of two locations,as well as the response of two varieties at single locations. M-201 and M-202 were the most responsive and least sensitive to overfertilization. S-201, Calbelle, and M-9 were least responsive and most sensitive to overfertilization.

Table 10. Response to Nitrogen on the Yield (lb/A) of Six Rice Varieties

	Nitrogen Rate lb/A				
	0	50	100	150	200
M-201*	4530	7290	9220	10060	10170
M-9	5340	7542	8770	8920	8810
Cal Belle	4730	7070	7760	6810	6390
M-202	4390	7490	9130	9410	9150
S-201**	3400	5820	8110	8350	7100
L-202	4270	6930	8490	8900	8550

*First 4 varieties @2 Locations: Colusa and Sutter
**Second 2 varieties @1 location: Butte and Colusa, respectively

Summary of Seeding Rate Studies

1984 and 1985 seeding rate studies were conducted at 30, 60, 90, 120, 150 and 210 lbs/A of seed, at two locations. Results of these tests were not available at the time of the 1985 report, and are therefore presented here.

Table 11 shows a nonsignificant yield response to seeding rates above 60 lb/A. 1985 data showed a significant yield increase to seeding rate between 30 and 60 lb/A of seed.

Table 11. The response of two rice varieties to seeding rate - two year summary

	30	60	90	120	150	210
S-201	9460	9920	10230	10570	10440	10730
M-201	8980	9990	9940	9960	10300	10470

Summary of Seeding x Nitrogen Rate Studies

In 1985, a seeding/nitrogen rate trial was conducted in Colusa County to determine the effect, if any, of seeding rate and nitrogen rate on rice. Three seeding rates (90, 150 and 210 lb/A) and five nitrogen rates (25, 75, 125, 175 and 225 lbs. N/acre) (rates include starter fertilizer) were studied using the variety M-201.

The results, summarized in Table 12, showed that yield was significantly lower at 90 lbs. of seed/acre over all nitrogen rates compared to higher seeding rates. These results are in contrast to many studies that have shown no difference in yield over a moderate range of seeding rates. Yield increased with increasing nitrogen up to 175 lbs. N/acre and then leveled off or declined.

Table 12. Yield of M-201 rice at various seeding and nitrogen rates.

	Yield at various nitrogen rates[1]					
Seeding rate	25	75	125	175	225	Seeding rate averages
90	4680	7640	9450	10530	10440	8550
150	5070	8300	9850	10550	10880	8930
210	5210	8280	10150	10760	10790	9040
Nitrogen rate Average	4990	8074	9820	10610	10700	
Nitrogen rate LSDOS	343					
CV (%)	4.4					
Seeding rate LSDOS	312					
CV (%)	5.5					

[1]Yield is in lbs/A @14% moisture and nitrogen rates are in lbs. of nitrogen/A including starter fertilizer.

Objective III

Over 39 rice field experiments were planted, managed, or harvested with the equipment pool and manpower provided this project. Fourteen were directly related to this project (Variety). Two tests were on disease control (Webster, Williams); two were cultural practices (water management, nitrogen x variety x drainage [Shu Geng]); 13 were on weed control; two were in cooperation with Dupont; one was in conjunction with the IPM growth model (planting date), and one was in cooperation with BUCRA.

Publications or Reports

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CONCISE GENERAL SUMMARY OF CURRENT YEAR'S RESULTS:

Nine rice variety tests were conducted on farm sites in various rice areas of California ranging from Glenn to Fresno Counties. Four additional tests were conducted by the plant breeders in the Rice Experiment station, Biggs. Several very early maturity cultivars of all grain types showed excellent yield potential. In the early tests, 85-Y-136, a short grain under consideration for release as a variety, was the leading entry in yield and represents on eight day advantage in earliness when compared to S-201. M-202 continued to show excellent yield as in previous years. In the intermediate and late tests, several experimental lines of both medium and short grain types showed excellent agronomic characteristics. Two special off-station trials were conducted, a long grain and a short and medium grain test, to increase the information available for determining advancement of experimental lines into the statewide variety testing program.

Studies on the effect of water management on rice growth and yield and on rice weed control were conducted as part of an IPM-funded project. The results show that field drainage in the absence of weed control can severely depress yields. However, the 1986 data differ from the 1985 results where herbicides were used, in that shallow water in a warmer weather year improved herbicide efficacy and seedling survival on the weed control (herbicide) plots.

The data from nitrogen by variety and seeding rate studies from previous years (not available for previous report deadlines) were also reported.