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COMPREHENSIVE RESEARCH ON RICE

PROGRAM AREA:

Rice Biology - Genetics, Breeding Physiology and Variety Evaluation

PROJECT NUMBER & TITLE:

No. 70-8. Evaluation of New Varieties Under Different Environmental and Cultural Practices

PROJECT LEADER:

Milton D. Miller, Extension Agronomist

PERSONNEL:

Dr. J. Neil Rutger (USDA), Dr. Howard L. Carnahan (CCRRF), D. M. Brandon (Colusa, AES), Jack Williams (Sutter, AES), R. S. Baskett (San Joaquin, AES), B. B. Fischer and G. J. St. Andre (Fresno, AES), D. S. Brown and Milton D. Miller

OBJECTIVES:

1. Conducted uniform field experiments at 11 different California locations ranging from Biggs to the West Side Field Station in Fresno Co. The purpose was to evaluate the agronomic performance of 23 different advanced rice lines as compared to the 4 widely used commercial rice varieties. The advanced lines are products of the USDA-CCRRF-UC rice breeding programs. Dr. Howard L. Carnahan and CCRRF personnel conducted the variety experiments at Biggs.

2. Cooperated with Dr. Howard L. Carnahan in testing the effect of rice grain moisture content at harvest on milling qualities of a proposed early medium grain release, S6183, as compared with other early medium grain varieties. Uniform tests were conducted in Yolo, Sutter, UCD, and at the West Side Field Station. Personnel at CCRRF also conducted a similar experiment.

3. Conducted an early generation rice lines screening test on Staten Island, San Joaquin County, to locate cold tolerant lines suitable for use in areas subject to cool San Francisco Bay winds.

WORK IN PROGRESS:

All of the objectives outlined above have been completed, data summarized, and the results submitted to the plant breeders for use in developing their varietal improvements plans for the future.

EXPERIMENTS COMPLETED

A total of 14 field experiments were completed at locations in Glenn, Yolo, Sutter (2), UCD, San Joaquin (3), Firebaugh and at West Side Field Station. Involved were 5 very early, 13 early, and 9 late lines.

Four S6183 harvest moisture x milling quality uniform experiments were conducted in Yolo, Sutter, UCD and at West Side Field Station.

A field genetic line screening test for cold tolerance, involving 25 advanced lines, was conducted by R. S. Baskett in cooperation with Dr. J. N. Rutger on Staten Island.

WORK PLANNED:

1. In consultation with the cooperating USDA, CCRRF and UC plant breeders, plans have been developed to conduct an expanded 1972 variety testing program at 11 different locations ranging from Biggs to the West Side Field Station. The number of lines in county tests will be expanded from 27 to 36 and to 77 in the tests at UCD and West Side Field Station.

2. The uniform S6183 variety harvest moisture x milling quality experiments will be repeated in at least four locations in 1972.

3. The cold tolerant early rice lines screening project will be continued in the Delta again in 1972.

MAJOR ACCOMPLISHMENTS:

The tables below summarize by maturity groups the results of the uniform variety tests. All yields are at a standard 14% moisture. These data substantiate our thesis that the environmental conditions in the several rice producing districts establish relative precise varietal requirements for each district.

1971 LATE RICE VARIETIES Yield in Lbs/A

Variety	UCD	WSFS	Biggs	Glenn Co.	San Joaquin Co.	Sutter Co.
Caloro	8288	7738	6662	4182	7061	5308
Calrose	8477	7473	7282	5357	8089	5607
CS-M3	8261	7151	7258	6858	8277	5762
S-6001-10	7889	6780	6957	6710	7505	5314
S6186	7815	7353	7413	5599	7820	5750
R45-26-30	7472	6604	6682	5297	7723	6154
5734e5-1-4	7943	7600	6978	5013	7451	5246
5915c-35-8	7053	6311	7705	6843	7785	5495
R45-26-11	8250	7825	7118	5599	7027	5489

1971 AVERAGE YIELD - LATE VARIETIES BY AREA GROUPINGS

NORTH STATE				CENTRAL DISTRICT (UCD, San Joaquin Co.)				STATEWIDE			
(Biggs, Glenn Co., Sutter Co.)											
Var.*	Ave. Yd/A	Sig. .05	Sig. .01	Var.*	Ave. Yd/A	Sig. .05	Sig. .01	Var.*	Ave. Yd/A	Sig. .05	Sig. .01
8	6745	a	a	2	8283	a	a	3	7261	a	a
3	6666	a	ab	3	8269	a	a	2	7055	ab	ab
4	6366	ab	abc	5	7817	ab	a	5	6973	abc	abc
5	6327	ab	abc	4	7697	ab	a	8	6892	bc	abc
2	6157	bc	bc	7	7697	ab	a	9	6892	bc	abc
9	6134	bc	bc	1	7675	ab	a	4	6862	bcd	abc
6	6084	bc	c	9	7638	ab	a	7	6714	cd	bc
7	5823	cd	cd	6	7598	b	a	6	6656	cd	bc
1	5464	d	d	8	7419	b	a	1	6544	d	c

*1 = Caloro

2 = Calrose

3 = CS-M3

4 = S-6001-10

5 = S-6186

6 = R45-26-30

7 = 5734e5-1-4

8 = 5915C-35-8

9 = R45-26-11

1971 EARLY RICE VARIETIES

Yield Lbs/A

BY TEST LOCATION					RANKED BY AVERAGE YIELD Lbs/A				RANKED BY NORTH STATE TESTS (Biggs & Yolo Co.)						
Var.*	UCD	WSFS	Biggs	Yolo Co.	San Joaquin Co.	Ave.	Var.*	Sig.	Sig.	Var.*	YD/A	Ave.	Sig.	Sig.	
								.05	.01				.05	.01	
1	7333	6803	4075	4709	7008	5651	8	6763	a	a	8	6045	6045	a	a
2	8076	8453	3875	5899	7254	6447	12	6643	a	ab	12	5735	5735	ab	ab
3	6969	7494	4055	5352	--	5877	11	6640	a	ab	11	5700	5700	ab	ab
4	7236	7308	4673	5441	6743	6094	5	6463	ab	abc	10	5398	5398	bc	abc
5	7458	7893	5045	5738	6700	6463	10	6456	ab	abc	13	5385	5385	bc	abc
6	6845	7336	4257	6722	6966	6193	2	6447	ab	abc	6	5378	5378	bc	abc
7	6918	7210	4290	5914	7077	5998	9	6373	abc	abcd	5	5360	5360	bc	abc
8	7053	8056	5053	7234	6853	6763	6	6193	bcd	bcd	9	5254	5254	bcd	abc
9	7521	7687	4793	5807	6670	6373	4	6094	bcd	bcd	7	5028	5028	cd	bcd
10	7129	8108	4598	6358	--	6456	7	5998	cde	cde	4	5022	5022	cd	bcd
11	7794	7555	5138	6375	7181	6640	3	5877	de	de	2	4795	4795	cde	cd
12	7668	7618	5557	5948	7736	6643	13	5873	de	de	3	4645	4645	de	cd
13	6005	6814	4912	5954	--	5873	1	5651	e	e	1	4363	4363	e	d

- * 1 = Colusa
 2 = Earlirose
 3 = S-8147
 4 = Colusa HR66/12
 5 = R57 69/138
 6 = R57 69/141
 7 = R57 69/291
 8 = R57 69/423
 9 = R57 69/510
 10 = S-6183
 11 = R57 69/284
 12 = R57 69/488
 13 = R48-257

1971 PERFORMANCE VERY EARLY VARIETIES

AVERAGE YIELD LBS/A

Biggs, UCD, WSFS

EARLY MAY PLANTING				MID JUNE PLANTING			
Variety	Yield	Sig. .05	Sig. .01	Variety	Yield	Sig. .05	Sig. .01
Colusa	6700	a	a	S-8153	5123	a	a
Reimei	6132	b	a b	S-8154	5076	a	a b
S-8153	5967	b	b	Reimei	4832	a b	a b
Na Do	5948	b	b	Colusa	4809	a b	a b
S-8154	5794	b	b	S-8146-10	4649	a b	a b
S-8146-10	5727	b	b	Na Do	4435	b	b

PERFORMANCE OF S-6183

Potential release S-6183 (an early medium grain) has been tested at Biggs, Colusa, Sutter, UCD and West Side Field Station in 1970 and 1971. North of Davis it has proven approximately equal to other commercial early medium grain varieties. South of Davis it has yielded about 8 percent less. Its potential economic advantage is that under low harvest-time grain moisture conditions, when harvested and milled it has produced a significantly higher yield of head rice.

PERFORMANCE OF LONG GRAIN 5915c-35-8

Two potential long grain lines were again tested in 1971. Experimental long grain 5915c-35-8 which, in 1970, yielded about 11 percent more than Calrose or Earlirose in tests north of Davis, in the same area in 1971 averaged 9.8 percent higher in yield than Calrose. At UCD and in test areas south of there, it has only yielded about 71 percent of Earlirose.

 DELTA-STATEN ISLAND EARLY, COLD TOLERANCE
 RICE LINE SCREENING TEST

Within the 25 lines tested, some headed from 78-105 days after planting as compared with Earlirose which headed 112 days and Colusa 116 days after planting. Some lines appeared to equal the yielding ability of check variety Earlirose. Most considerably exceeded the yield of Colusa.

IMMEDIATELY APPLICABLE RESEARCH RESULTS:

As in previous years the new smooth hulled medium grain variety CSM3 in 1971 continued as a top-yielding variety, broadly adapted for use north of Stockton. At Davis and at the West Side Field Station near Five Points CSM3 was slightly, but not significantly, lower yielding than Calrose. The variety is a potential replacement for rough hulled Calrose.

CSS4 (experimental 5734e5-1-4) is a potential replacement for rough hulled Caloro. Smooth hulled, it slightly outyielded Caloro at Biggs, south of Willows, and near Escalon. At Davis, near Robbins and at the West Side Field Station it was about equal in yield. On a statewide basis, there was no statistically significant difference in yield between CSS4 and Caloro. Foundation and registered seed of this new variety will be available to growers in 1972.

EVALUATION OF PROJECT:

The 1971 rice variety testing program has produced varietal performance data essential to the plant breeders and to growers who ultimately will have the choice of new varieties to replace ones in current use.

PUBLICATIONS OR REPORTS:

1970 and 1971 annual reports to the California Rice Research Board.

EARLY VARIETIES
1971 COOPERATIVE RICE VARIETY TESTS
YIELD IN CWT/S/A BY TEST LOCATION

Variety	U.C.D.		W.S.F.S.		Biggs		Yolo County		San Joaquin County		Ave. Yd/A
	Yd/A	Dys.Hd.	Yd/A	Dys.Hd.	Yd/A	Dys.Hd.	Yd/A	Dys.Hd.	Yd/A	Dys.Hd.	
1. Colusa	73.3	96	68.0	98	40.8	102	47.1	97	70.1	93	56.5
2. Earlirose	80.8	94	84.5	94	38.8	96	59.0	91	72.5	90	64.5
3. S-8147	69.7	95	74.9	99	40.6	101	53.5	95	--	93	58.8
4. Colusa HR 66/12	72.4	96	73.1	99	46.7	102	54.4	97	67.4	92	60.9
5. R57 69/138	74.6	96	78.9	99	50.5	102	57.4	97	67.0	94	64.6
6. R57 69/141	68.5	92	73.4	96	42.6	101	67.2	87	69.7	92	61.9
7. R57 69/291	69.2	90	72.1	94	42.9	99	59.2	94	70.8	92	60.0
8. R57 69/423	70.5	96	80.6	99	50.5	102	72.3	94	68.5	94	67.6
9. R57 69/510	75.2	93	76.9	99	47.9	?	58.1	97	66.7	97	63.7
10. S-6183	71.3	92	81.1	95	46.0	95	63.6	83	--	93	64.6
11. R57 69/284	77.9	91	75.6	96	51.4	99	63.8	94	71.8	90	66.4
12. R57 69/488	76.7	96	76.2	97	55.6	?	59.5	97	77.4	93	66.4
13. R48-257	60.1	100	68.1	107	49.1	101	59.5	101	--	92	58.7

Ranked By Yield

Sig. .05		Sig. .05		Sig. .05		Sig. .05		Sig. .05		Sig. .05	
2.	a	2.	a	8.	a	12.	a	12.	a	8.	a
11.	ab	10.	ab	6.	ab	2.	ab	2.	ab	12.	a
12.	abc	8.	abc	11.	abc	11.	ab	11.	ab	11.	a
9.	abc	5.	abcd	10.	abc	7.	ab	7.	ab	5.	ab
5.	abc	9.	abcd	13.	bcd	1.	ab	1.	ab	10.	ab
1.	abc	12.	bcd	9.	abcde	6.	ab	6.	ab	2.	ab
4.	abc	11.	bcd	4.	bcdef	8.	ab	8.	ab	9.	abc
10.	bc	3.	bcde	10.	bcdef	4.	b	4.	b	6.	bcd
8.	bc	6.	cde	7.	bcdef	5.	b	5.	b	4.	bcd
3.	bc	4.	cde	6.	cdef	9.	b	9.	b	7.	cde
7.	bc	13.	de	1.	def	5.	cd	5.	cd	3.	de
6.	c	1.	e	3.	ef	4.	cd	4.	cd	13.	de
13.	d	1.	e	2.	f	1.	d	1.	d	1.	e

LATE VARIETIES
1971 COOPERATIVE RICE VARIETY TESTS
YIELD IN CWTs/A BY TEST LOCATION

Variety	U.C.D.		W.S.F.S.		Biggs		Glenn County		San Joaquin County		Sutter County	
	Yd/A	Dys.Hd.	Yd/A	Dys.Hd.	Yd/A	Dys.Hd.	Yd/A	Dys.Hd.	Yd/A	Dys.Hd.	Yd/A	Dys.Hd.
1. Caloro	82.9	102	77.4	105	66.6	121	41.8	119	70.6	123	53.1	123
2. Calrose	84.8	100	74.7	102	72.8	118	53.6	115	80.9	115	56.1	122
3. CSM3	82.6	100	71.5	101	72.6	116	68.6	111	82.8	114	57.6	121
4. S-6001-10	78.9	98	67.8	101	69.6	112	67.1	111	75.1	112	53.1	119
5. S-6186	78.2	100	73.5	105	74.1	118	56.0	111	78.2	115	57.5	121
6. R45-26-30	74.7	94	66.0	96	66.8	108	53.0	107	77.2	107	61.5	110
7. 5734e5-1-4	79.4	104	76.0	106	69.8	118	50.1	119	74.5	121	52.5	123
8. 5915C-35-8	70.5	99	63.1	104	77.1	103	68.4	107	77.8	106	55.0	112
9. R45-26-11	82.5	100	78.3	98	71.2	115	56.0	111	70.3	120	54.9	119

Ranked By Yield - Duncan's Multiple Range Test

	Sig.		Sig.		Sig.		Sig.
	.05		.05		.05		.05
2.	a	9.	a	3.	a	3.	a
1.	ab	1.	a	8.	ab	2.	ab
3.	ab	7.	ab	4.	ab	5.	ab
9.	ab	2.	ab	5.	b	8.	ab
7.	bc	5.	abc	9.	b	6.	ab
4.	bc	3.	abc	2.	b	4.	ab
5.	bc	7.	bc	6.	b	7.	ab
6.	cd	4.	bc	7.	b	1.	ab
8.	d	6.	c	1.	c	9.	b
		8.	c				

DESCRIPTION OF RICE VARIETIES IN
1971 COOPERATIVE TRIALS 1/

<u>Variety or Selection</u>	<u>Grain Type</u>	<u>1970 Biggs Days From Seeding to Heading</u>	<u>Smooth Hulls</u>
A Caloro	P	116	--
B Calrose	M	117	--
C CSM3	M	114	Yes
D S-6001-10	M	110	Yes
E S-6186	M	114	--
F R 45-26-30	M	104	--
G 5734e5-1-4	P	113	Yes
H 5915c-35-8	L	103	Yes
GG R45-26-11	P	112	--
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I Colusa	P	93	--
J Earlirose	M	90	--
K S-8147	P	93	Yes
L Colusa HR 66/12	P	92	--
M R57 69/138	P	94	Yes
N R57 69/141	P & M	92	Yes
O R57 69/291	P	92	Yes
P R57 69/423	P	94	Yes
Q R57 69/510	P	97	Yes
R S-6183	M	93	--
S R57 69/284	P	90	Yes
T R57 69/488	M	93	Yes
U R48-257	L	92	Yes
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V Colusa	P	93	--
W S-8146-10	P	79	--
X S-8153	P	79	--
Y S-8154	P	79	--
Z Reimei	P	81	--
ZZ Na-Do	P	80	--

1/ Cooperative between University of California Agricultural Extension Service, the California Cooperative Rice Research Foundation, U.S.D.A. and the Department of Agronomy and Range Science, U.C. Davis. M. D. Miller, Extension Agronomist, U.C. Davis, coordinating.