The Rice Experiment Station
2017 Report

California Cooperative Rice Research Foundation
Biggs, California

California Cooperative Rice Research Foundation, Inc.

- A NON-PROFIT RESEARCH FOUNDATION
- Owned by California rice growers (11 Member Board of Directors)
- Owns the Rice Experiment Station (RES)
  - 5 Ph.D and project leaders
  - 8 Breeding Assistants
  - 6 Field and support staff
  - Temporary labor –planting and harvest (~25)
  - 2017 Budget ~$2.5 M
- RES is funded by
  - California Rice Research Board through annual grower assessments (check-off funds)
  - Additional funding by CCRRF and the Rice Research Trust
- Operates in cooperation with the University of California and the USDA-ARS

Variety Protection
Intellectual Property

- RES rice varieties are protected under the U.S. Plant Variety Protection Act (PVP), Title V of the National Seed Act since 1988.
- Export of seed of protected rice varieties is prohibited.
- RES rice varieties are protected by US Utility Patents since 2000.
- Use of these patented varieties for research or breeding purposes requires a Material Transfer Agreement (MTA) from CCRRF.
- RES rice varieties can only be grown as a class of certified seed.
- Seed of RES rice varieties will only be produced by CCRRF certified seed growers.

All in an effort to ensure purity, quality, protect their investment, and ensure benefits go to California grower/owners.

RES Variety Seed Policy in 2018

(anticipated approval January 2018)

Businesses (individuals or organizations) who grow, process and/or sell all classes of certified seed of RES rice varieties will be required to be certified for their seed activity issued annually by CCRRF.

License Market Classes:

Calrose Medium Grains, Premium Medium Grain, Short Grains,
Premium Short Grains, Waxy and Low Amylose, Long Grains, Aromatics

Summary of requirements:

- Agree to terms and sign a Material Transfer Agreement.
- Membership and compliance with the California Crop Improvement Association.
- Registered with the California Department of Food and Agriculture as a rice seed producer/handler.
- Comply with the regulations required by the California Rice Certification Act.
- Must produce the seed for sale or for further increase for seed production and not merely for commercial production as paddy for milling.
- Any production or handling of Tier II Commercial Impact rice varieties will be subject to additional requirements and/or be a disqualification.
- There will be an annual certification fee by market class.
- Grower must sign an annual agreement and report production/sales to CCRRF.
- Failure to comply with CCRRF certification requirements will make the grower ineligible to grow seed of CCRRF rice varieties for production.

12Y3097 – a blast-resistant Calrose medium grain

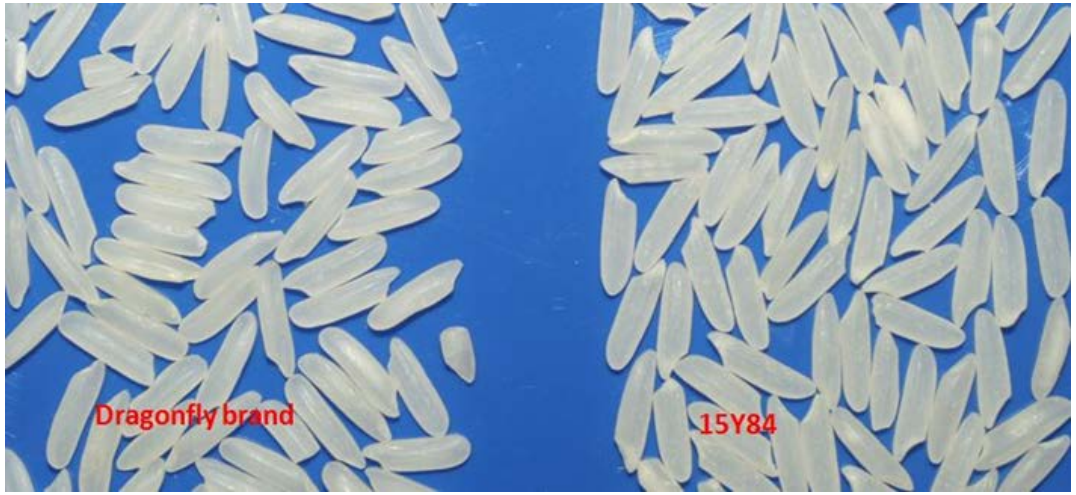
Year	ID	Overall Grain Yield (lb/acre)	%Yield Advantage Over M-208	Seedling Vigor	Days to Heading	Plant Height	% Lodging
2014	12Y3097	9,530	**10.9**	4.9	85	95	32
	M-206	9,520	**10.8**	5.0	85	98	41
	M-208	8,590	-	5.0	91	99	28
2015	12Y3097	9,460	**4.2**	4.8	83	96	13
	M-206	9,480	**4.4**	5.0	82	97	15
	M-208	9,080	-	5.0	86	97	20
2016	12Y3097	10,030	**11.2**	4.9	88	96	31
	M-206	10,002	**10.9**	4.9	87	98	34
	M-208	9,020	-	5.0	90	98	28
2017	12Y3097	8,872	**4.2**	4.7	79	99	51
	M-206	8,819	**3.6**	4.8	79	99	53
	M-208	8,515	-	4.7	82	102	52

12Y3097 is intended as a replacement for M-208. 12Y3097 showed a consistent yield advantage over M-208 from 2014 to 2017 using combined data in the SW test with comparable grain yields to M-206. Compared to M-206, 12Y3097 is shorter, 1 day later, stronger straw, but less vigorous.

15Y84, Jasmine-type long grain

COUNTY	YEARS OF TEST	ENTRY	GRAIN YIELD (lb/a)	% YIELD ADV	SEEDLING VIGOR (1-5)	DAYS TO HEADING	LODGING (%)	PLANT HEIGHT (cm)
BUTTE	3	A-202	9,576	2.90%	4.9	86	35	101
		15Y84	9,866	-	5	88	28	90
COLUSA	3	A-202	9,536	2.30%	4.9	91	1	100
		15Y84	9,763	-	4.7	94	6	94
GLENN	3	A-202	7,157	14.30%	4.9	87	74	103
		15Y84	8,350	-	4.9	90	74	101
SUTTER	1	A-202	8,824	-2.40%	4.8	83	1	94
		15Y84	8,620	-	4.7	85	6	83
YOLO	1	A-202	9,408	1.50%	4.8	84	1	104
		15Y84	9,555	-	4.9	86	1	91
YUBA	1	A-202	8,404	3.30%	4.9	86	49	97
		15Y84	8,691	-	5	89	31	90

Yield and agronomic comparison of 15Y84 and A-202, an aromatic long grain, showed that 15Y84 had higher overall yield than A-202, statewide. It has shorter plant height, 3 days later maturing, and comparable to slightly better seedling vigor.



Herbicide Tolerant Rice Project 2014-16

Funded by the California Rice Research Board

- A plant breeding assistant was hired to support the project in 2015.
- Induced mutant populations of were generated using chemical mutagens and radiation and advance in the greenhouse and field for screening 2014-6.
- Greenhouse and field screening of material was conducted year round involving different herbicides.
- We advanced, confirmed, and evaluated any putative herbicide resistant mutants.

2017 RES Oxyfluorfen Water Seeded Preplant Study

Line	Seedling vigor*				50% Heading				Height (cm)				% Weeds*				Yield (#/acre)*				Avg
Pt./acre#	0.5	1.0	1.5	2.0	0.5	1.0	1.5	2.0	0.5	1.0	1.5	2.0	0.5	1.0	1.5	2.0	0.5	1.0	1.5	2.0	
M-206	1.0	0.5	0.3	0.1	77	75	75	75	102	94	71	95	58	94	96	63	5650				
17Y3000	5.0	4.9	4.6	4.8	73	74	74	74	102	103	103	104	6	15	18	6	8980	8170	8580	9070	8700
14G3	4.8	4.7	4.6	4.7	75	76	76	77	101	103	102	104	11	15	18	5	8410	7990	8490	8980	8470
14G4	4.9	4.8	4.7	4.7	74	75	74	75	102	102	102	104	11	15	17	6	8450	8240	8840	9320	8710
15G4	4.9	4.7	3.5	4.7	75	75	75	77	100	97	99	99	24	30	30	13	7250	7110	7760	8050	7420
CV (%)	14				4				8				40				5				
LSD (0.05)	0.7				1				13				15				530				

No stand so not harvested

*Significant at the 0.05 level.

#GoalTender

"2017 results are encouraging in that the ROXY offers an excellent crop safety to oxyfluorfen, and fits well into the various weed control programs."

Pre-plant oxyfluorfen + herbicide partner testing by UC Davis weed scientists

RICE FIELD DAY

Wednesday, August 30, 2017

Herbicide Tolerant Rice Nursery

California Cooperative Rice Research Foundation, Inc.
University of California
United States Department of Agriculture
Cooperating
Rice Experiment Station
P.O. Box 306, Biggs, CA 95917-0306

ROXY Rice

1. A heritable non-GM rice trait providing resistance to oxyfluorfen developed in our well adapted California Calrose rice variety M-206.
2. 2015-2017 research showed that oxyfluorfen applied preplant in a water-seeded system provides high levels of rice weed control with acceptable level of crop safety in rice with the ROXY trait. It is also effective in drill seeded rice with a preplant application.
3. It would offer a very attractive weed control system for California rice:
   -application on dry fields in the final steps of seed bed preparation
   -allowing use in proximity to sensitive areas or crops
   -resistance to PPO herbicide has not been reported for CA rice weeds
   -only 1 PPO registered whereas there are many ALS herbicides
   -as an off-patent herbicide oxyfluorfen should offer very significant cost saving to California rice growers compared to other available herbicides

- We are funding the extensive research and intellectual property protection.
- Receiving support from the California Rice Commission, California Rice Research Board, and California weed scientists.
- Will continue research on efficacy and data requirements to register oxyfluorfen for application on rice in California.

- **Rice Experiment Station**

http://www.crrf.org

- **University of California Rice On-line**

http://rice.ucanr.edu/

- **California Rice Research Board**

http://www.carrb.com/

- **California Rice Commission**

http://www.calrice.org/