





### Dr. Russell Rasmussen joins RES Staff as Associate Director in 2020

#### Education:

Ph.D. (Plant Breeding), University of Minnesota M.S & B.S. (Plant Science), Utah State University

<u>Previous Experience/Employment</u>: Syngenta Seeds, Inc.-Hybrid Wheat Seed Production NexSteppe, Inc.; STA Laboratories;

BioDiagonistics - Molecular breeding and services

RiceTec Inc.;- Herbicide tolerance rice traits, technology, and molecular breeding

2020 "Planned Overlap & Introgression"

Russell brings experience and expertise from in molecular breeding technology, herbicide tolerant rice, seed production, team programs, and a private sector perspective to RES. 2020 will be dedicated to working closely with me at RES on operations, culture, some special projects, and gaining knowledge and exposure to California rice before taking over as RES Director.



Looks like a "A man for all seasons"



California

Cooperative Rice Research

Foundation

A high yielding short grain variety released in 2019

**S-202** 

Overall Grain Yield of S-202, S-102, and M-206 in all SW location averaged over 5 years (2015-19)

LOCATION	S-202	S-102	M-206
BUTTE-E	10250	8660	9590
BUTTE-I	9940		9410
COLUSA	9590	8410	8960
GLENN	9730	7870	8310
RES	10790	9070	9590
SUTTER	10650	9270	9690
S YOLO	8990	8740	8070
YOLO	10230	8600	9290
YUBA	9370	7990	8740

S-202 consistently out yielded S-102 and M-206 in all locations of the UCCE Statewide tests



#### Grain Attributes of S-202 and S-102

		I	addy Ric	e	ŀ	Brown Ric	e	Milled Rice				
Year	ID	Lengt	Widt	1000-	Lengt	Widt	1000-	Lengt	Widt	I XX/	1000-	
		h	h	seed	h	h	seed	h	h	Ratio	seed	
		(mm)	(mm)	wt	(mm)	(mm)	wt	(mm)	(mm)	Kauo	wt	
Mean	S-102	8.4	3.8	33.5	6.9	3.6	30.2	5.4	3.2	1.7	25.3	
	S-202	7.3	3.5	28.2	6.3	3.3	25.2	5.1	3.0	1.7	21.1	



**S-102** 

**S-202** 

S-202 is glabrous, has smaller grains, higher protein content, lower amylose% compared to S-102



Entry	Apparent Amylose (%)	Protein, Brown (%)	Protein, White (%)	Gel Type
S-102	16.0	6.9	6.2	Low
S-202	14.4	8.2	7.5	Low



## Advanced Lines Proposed for Release in 2020



Premium MC







### 12Y2175, a Calrose with improved cooking quality





- 12Y2175 is early maturing, high-yielding medium grain with excellent quality. The full pedigree is "M-206/4/M203/K397//M205/3/87P1309//M401/M203"
- It has cooked rice quality superior to regular Calrose but not quite at the level of the taste attributes of M-401 .....a "Premium Calrose".



# Overall Grain Yield of 12Y2175, M-206 and M-209 in all SW location averaged over 5 years (2015-19)

	Grain \	Yield advantage		
LOCATION	M-206	M-209	12Y2175	over M-206
BUTTE-E	9660	9180	10060	4%
BUTTE-I	8970	9120	8930	0%
COLUSA	9380	9320	9830	5%
GLENN	8950	9310	9460	6%
BIGGS	9133	9603	9753	7%
SUTTER	9150	9370	10160	11%
South YOLO	8510	7780	8220	-3%
YOLO	8940	9120	9650	8%
YUBA	7760	6990	7070	-9%
MEAN	8940	8870	9240	3%

12Y2175 performed best in high-yielding environment and not adapted to cooler rice area such as South Yolo and Yuba



# Performance of 12Y2175and checks in 5-year SW Test (2015-19)



	(2:	721	75	M	2-00	7	N	120	d of		(	Grai 12Y	n at 217	tribı 5	utes	of	CRUNER CALLER CA	OWNED ROSE TEAGE LITIVARS
											• 12 • M • M • P • P	2Y2175 -206 -209 oly. (12Y2175) oly. (M-206) oly. (M-209) 29		24 MC%	at Harvest	· · · · · · · · · · · · · · · · · · ·	70 65 60 55 50 45 14	% Head Rice
	Paddy Rice		ce	Brown Rice			Milled Rice				S-21			Grain Quality				
ID	Length (mm)	Width (mm)	1000- seed wt	Length (mm)	Width (mm)	1000- seed wt	Length (mm)	Width (mm)	LW Ratio	1000- seed wt	% Chalk Area	% Chalk	White ness	Vitreo	App Amyl (%)	Protein Brown (%)	Protein , White (%)	Gel Type
12Y2175	8.38	3.43	31.47	6.33	3.00	26.12	5.98	2.92	2.05	23.64	22.1	2.4	140.4	128.9	14.37	5.70	5.81	Low
M-209	8.56	3.23	30.60	6.48	2.81	25.00	6.07	2.73	2.22	22.64	18.5	1.7	138.1	128.3	13.31	5.38	5.40	Low
M-206	8.26	3.26	29.49	6.20	2.84	24.33	5.84	2.79	2.10	21.88	16.6	0.9	136.6	127.9	13.98	6.96	6.87	Low

12Y2175 has shorter, wider and heavier grains compared to M-209, slightly higher chalk, and lower milling yield if harvested at low MC



14Y1006 consistently out yielded L-206 and L-207 in all SW locations in 2019, with 14% overall yield advantage over L-206 Performance of 14Y1006 compared to checks in 2019 SW Tests in each location

LOCATION	Grain \	% Yield advantage over		
	L-206	L-207	14Y1006	L-206
BUTTE-E	8720	10390	11420	31%
BUTTE-I	8890	9750	10130	14%
COLUSA	9970	10890	11300	13%
GLENN	10080	9760	10630	5%
BIGGS	9767	10747	11230	15%
SUTTER	10010	10820	11100	11%
South YOLO	8010	8790	9820	23%
YOLO	9510	9470	10230	8%
YUBA	8180	8500	8770	7%
MEAN	9240	9900	10510	14%

#### Grain attributes of 14Y1006

	Paddy Rice			Brown Rice		Milled Rice			S-21				Grain Quality					
ID	Length (mm)	Width (mm)	1000- seed wt	Length (mm)	Width (mm)	1000- seed wt	Length (mm)	Width (mm)	LW Ratio	1000- seed wt	% Chalky Area	% Chalk	Whiten ess	Vitreo	Appare nt Amyl (%)	Protein , Brown (%)	Protein , White (%)	Gel Type
14Y1006	10.07	2.36	27.89	7.83	2.16	22.53	7.39	2.08	3.56	20.61	27	8	138	125	23.94	5.56	5.70	Int
L-207	10.48	2.41	29.04	8.04	2.20	23.48	7.54	2.11	3.57	21.63	27	8	138	123	24.25	5.71	5.80	Int
L-206	10.12	2.46	26.50	7.82	2.22	21.56	7.28	2.14	3.40	19.89	19	3	134	124	22.16	6.45	6.42	Int



14Y1006 overall has grain attributes intermediate between L-206 and L-207.

It has shown better milling performance.

Additional external cooking evaluations underway.









#### **RICE FIELD DAY**

Wednesday, August 30, 2017



### **ROXY<sup>TM</sup> Rice Production System**

- ROXY is a heritable non-GM rice trait that provides tolerance to the post patent herbicide ALB2023 (oxyfluorfen) has been recovered in the variety M-206, California's most widely grown Calrose variety. The backcross selection to M-206 has been tested in 2017-19 University of California Yield Tests and seed increased and purified. Breeders have successfully transferred this trait into other varieties and grain types.
- 2. The trait is controlled by a single recessive gene and is a new mechanism for the herbicide tolerance. The US patent for this trait is pending and a ROXY trademark was granted 9/2018.
- 3. Five years of research involving multiple locations show that ALB2023 applied preplant in a waterseeded system provides high levels of rice weed control with ROXY trait. It is also effective in drill seeded rice with a preplant and preflood application and may have potential in other rice growing regions.
- 4. The ROXY trait offers a very attractive system for rice:
  - Pre-flooding application for early weed control
  - ALB2023 is a Group 14 herbicide mode of action
  - currently no weed resistance to CA PPO herbicides
  - Post-patent herbicide ALB2023 will provide growers with herbicide cost savings
  - May be a integrated management tool to address weedy red rice
- 5. A "shared partnership" with Albaugh LLC to pursue registration & commercialization of ALB2023 for weed control using the ROXY<sup>™</sup> Rice Production System is underway.
- 6. ALB2023 EPA registration process has started & the Canadian Plant Novel Trait approval process has been initiated.
- 7. Targeting a launch of the Roxy<sup>™</sup> Rice Production System in 2023 in CA with commercial seed of a new Calrose variety available with the ROXY<sup>™</sup> trait.









Herbicide Tolerant Rice Nursery



### **RES Genetics** the Next Step Forward





New lab building built, instruments ordered and delivered for full lab operation in 2020.

Thanks to the Donors to the California **RICE RESEARCH TRUST** 



# Thank You

