



Rice with EA Summary

PLANTED MAY 15TH ~ HARVESTED SEPTEMBER 28, 2022



Paddy fields (2) (4) (6) with Well Water

Paddy fields (1) (3) (5) with EA Well Water

Notes:

Paddy (1) (3) used 1 Reactor with pumps powered by a dc power supply
 Paddy (5) used four Aerators only powered by 100-Watt Solar Panels

Resulting:

11.2 additional bushels per acre (bu/A)
13.6% total rice production increase

Market Value: 11.2 (bu/A) x \$16.94 = \$186.34 per Acre increase

Global Value: 507.9 m tons X 13.6% = 69.07 m tons increase
 69.07 m tons x 35.7 (bu) = 2.465 billion (bu)
 2.465 billion (bu) x \$16.94 = \$41.73 billion

2022 Electroaeration in Rice			
Trial ID: 2022 EA Rice		Location: Agricenter International	
Protocol ID: 2022 EA Rice		Investigator (Creator): Bruce Kirksey	
Project ID:		Study Director: Dr. K. Bruce Kirksey	
Sponsor Contact: Talbott Howard			

Rating Date	Part Rated	Rating Type	Rating Unit/Min/Max	Number of Subsamples	Days After First/Last Applic.	Trt-Eval Interval
9/28/2022	GRAIN, C	MOICON	%	0, 100	1	100 DA-A
9/28/2022	GRAIN, C	WEIGHT	lb/plot	-	1	100 DA-A
9/28/2022	GRAIN, C	WEITES	lb/plot	-	1	100 DA-A
9/28/2022	GRAIN, C	YIELD	BU	-	1	100 DA-A

Trt No.	Treatment Name	Rate	Appl Unit	Code
1	Well water	15 gal/a	A	
2	EA Well water	15 gal/a	A	

Stat	Well Water	EA Well Water	Well Water	EA Well Water
LSD P=.05	13.681112481	14.225556976	13.681112481	14.225556976
Standard Deviation	1.1887676174	0.3383812578	25.4445	7.2427
CV	2.43	2.43	5.22	1.69
Grand Mean	13.9533347287	138.7517	45.2233	158.11
Levene's F^	0.00	0.00	0.00	0.00
Levene's Prob(F)	1.00	1.00	1.00	1.00
Rank X2	.	.	.	.
P(Rank X2)	0.0	0.0	0.0	0.0
Skewness^	-1.875	-1.875	-1.875	-1.875
Kurtosis^	2.311	1.666	1.379	1.698
Replicate F	0.3021	0.3752	0.4204	0.3707
Replicate Prob(F)	3.883	3.264	0.220	2.923
Treatment F	0.1876	0.2126	0.6852	0.2295
Treatment Prob(F)				



Agricenter International

2022 Electroaeration in Rice

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Reps: 3 Plots: 21 by 50 feet
Appl. Amount: 15 GAL/AC Mix Size: 2 L (total for 3 plots; minimum=4.106 L)

Trt No.	Treatment Name	Rate Appl		Amt Product to Measure	Rep		
		Rate	Unit Code		1	2	3
1	Well water	15 gal/a	A		102	202	302
2	EA Well water	15 gal/a	A		101	201	301

Sort Order: Treatment

Agricenter International

2022 Electroaeration in Rice

Trial ID: 2022 EA Rice Location: Agricenter International Trial Year: 2022
 Protocol ID: 2022 EA Rice Investigator (Creator): Bruce Kirksey
 Project ID: Study Director: Dr. K. Bruce Kirksey
 Sponsor Contact: Talbott Howard

General Trial Information

Study Director: Dr. K. Bruce Kirksey **Title:** Director of Research

Discipline: SW soil and water

Trial Status: E established

ARM Trial Created On: 6/14/2022

Initiation Date: 5/2/2022

Trial Location

City: Memphis

Country: USA United States

State/Prov.: Tennessee

Postal Code: 38120

Climate Zone: EPPOSE EPPO South East

Latitude of LL Corner °: 35.125713 N

Longitude of LL Corner °: -89.811948 W

Altitude of LL Corner: 256.00 FT

Conducted Under GLP: No

Conducted Under GEP: No

Objectives:

to evaluate the effect of electroaeration and its affect on city and well water in rice

Contacts

Role: STYDIR study director

Study Director: Dr. K. Bruce Kirksey **Title:** Director of Research

Organization: Agricenter International

Address 1: 7777 Walnut Grove Road **Phone No.:** 901-757-7754 **Mobile No.:** 901-355-9124

Country: USA United States **E-mail:** bkirksey@agricenter.org

City: Memphis

State/Prov: TN

Postal Code: 38120

Role: SPONSR sponsor

Sponsor: Talbott Howard

Title: COO

Organization: Electro-Aeration, Inc.

Address 1: 3160 Rustleaf Cove **Mobile No.:** 901-734-3982

Country: USA United States **E-mail:** talbott@electroaeration.com

City: Germantown

State/Prov: TN **Postal Code:** 38138

Crop Description

Crop 1: C ORYSI Oryza sativa Dry-seeded paddy rice **BBCH Scale:** BRIC

Entry Date: 6/14/2022

Stage Scale: BBCH

Variety: Provisia

Planting Date: 5/19/2022

Planting Rate: 75 LB/A

Depth: 0.5 IN

Rows per Plot: 9

Planting Method: DRILLE drilled

Row Spacing: 7.5 IN

Planting Equipment: PD plot drilling machine

Seed Bed: FRIABL friable

Soil Temperature: 74 F

Soil Moisture: EXCELL excellent

Emergence Date: 5/27/2022

Harvest Date: 9/28/2022

Harvest Equipment: Almaco Plot Combine

Harvested Width: 21 FT

% Standard Moisture: 13

Harvested Length: 40 FT

Site and Design

Treated Plot Width: 21 FT

Site Type: FIELD field

Treated Plot Length: 50 FT

Treated Plot Area: 1050.0 FT² **Treatments:** 2 **Tillage Type:** CONTIL conventional-till

Replications: 3

Study Design: RACOB� Randomized Complete Block (RCB)

Soil Description

Description Name: 2022 Rice Field

% Sand: 29.6 **% OM:** 1.8 **Texture:** SIL silt loam

% Silt: 51.6 **pH:** 6.5 **Soil Name:** Falaya silt loam

% Clay: 18.6 **CEC:** 7.8 **Fert. Level:** G good

Soil Drainage: G good



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Application Description	
	A
Application Date	6/20/2022

Crop Stage At Each Application	
	A
Crop 1 Code, BBCH Scale	ORYSI, BRIC
Days after Emergence	24
Stage Majority, Percent	15, -



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	Sponsor Contact: Talbott Howard

Rating Date	8/10/2022	8/10/2022	8/10/2022	8/10/2022	8/18/2022	8/18/2022	8/18/2022	8/18/2022				
Part Rated	PLANT, C	PLANT, C	PLANT, C	PLANT, C	PLANT, C	PLANT, C	PLANT, C	PLANT, C				
Rating Type	CHLCON	HEIGHT	WEIFRE	WEIDRY	CHLCON	HEIGHT	WEIFRE	WEIDRY				
Rating Unit/Min/Max	SPAD, -, -	IN, -, -	g, -, -	g, -, -	SPAD, -, -	IN, -, -	g, -, -	g, -, -				
Number of Subsamples	1	1	1	1	1	1	1	1				
Days After First/Last Applic.	51, 51	51, 51	51, 51	51, 51	59, 59	59, 59	59, 59	59, 59				
Trt-Eval Interval	51 DA-A	51 DA-A	51 DA-A	51 DA-A	59 DA-A	59 DA-A	59 DA-A	59 DA-A				
Trt Treatment	Rate Appl											
No. Name	Rate	Unit	Code	Plot	9	10	11	12	13	14	15	16
1 Well water	15 gal/a	A		102	30.20	41.0	806.6251	215.65002	30.00	43.0	539.12505	82.28751
				202	27.50	40.0	964.7501	184.43752	30.20	40.0	766.12508	161.73752
				302	29.70	40.0	737.7501	158.90002	30.20	40.0	666.81257	147.55001
				Mean =	29.13	40.3	836.3751	186.32919	30.13	41.0	657.35423	130.52501
2 EA Well water	15 gal/a	A		101	28.50	44.0	1106.6251	215.65002	32.60	43.0	663.97507	136.20001
				201	31.10	41.0	994.5001	156.06252	29.80	41.0	950.56260	184.43752
				301	29.80	44.0	995.8751	107.82501	28.80	44.0	1191.75012	227.00002
				Mean =	29.80	43.0	1032.3334	159.84585	30.40	42.7	935.42926	182.54585



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Part Rated

PLANT = plant
GRAIN = grain
C = Crop is Part Rated

Rating Type

CHLCON = chlorophyll content
HEIGHT = height
WEIFRE = weight - fresh
WEIDRY = weight - dry / dry matter content
MOICON = moisture content
WEIGHT = weight
WEITES = weight - test
YIELD = yield

Rating Unit/Min/Max

SPAD, , = spad
IN, , = inch
g, , = gram
%, 0, 100 = percent
lb/plot, , = pounds per plot
BU, , = bushel

ARM Action Codes

TY1 = 1.15238095*[30]*(100-[29])/87

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Protocol ID: 2022 EA Rice		Investigator (Creator): Bruce Kirksey							
Project ID:		Study Director: Dr. K. Bruce Kirksey							
		Sponsor Contact: Talbott Howard							

Rating Date	7/27/2022	7/27/2022	7/27/2022	7/27/2022	8/3/2022	8/3/2022	8/3/2022	8/3/2022	8/10/2022
Part Rated	PLANT, C	PLANT, C	PLANT, C	PLANT, C	PLANT, C	PLANT, C	PLANT, C	PLANT, C	PLANT, C
Rating Type	CHLCON	HEIGHT	WEIFRE	WEIDRY	CHLCON	HEIGHT	WEIFRE	WEIDRY	CHLCON
Rating Unit/Min/Max	SPAD, -, -	IN, -, -	g, -, -	g, -, -	SPAD, -, -	IN, -, -	g, -, -	g, -, -	SPAD, -, -
Number of Subsamples	1	1	1	1	1	1	1	1	1
Days After First/Last Applic.	37, 37	37, 37	37, 37	37, 37	44, 44	44, 44	44, 44	44, 44	51, 51
Trt-Eval Interval	37 DA-A	37 DA-A	37 DA-A	37 DA-A	44 DA-A	44 DA-A	44 DA-A	44 DA-A	51 DA-A
Trt No.	1	2	3	4	5	6	7	8	9
Treatment Name	Well water	EA Well water							
Rate Appl Unit Code	15 gal/a A	15 gal/a A							
	29.87 -	25.3 -	539.1251 b	128.63335 -	28.40 -	38.0 -	553.0834 b	132.41668 -	29.13 -
	31.20 -	26.7 -	762.0834 a	200.51669 -	30.07 -	41.7 -	889.5418 a	190.11252 -	29.80 -
LSD P=.05	7.184	2.87	199.20651	153.191927	13.947	3.79	223.93920	146.561851	6.695
Standard Deviation	2.045	0.82	56.70389	43.605896	3.970	1.08	63.74402	41.718653	1.906
CV	6.7	3.14	8.72	26.5	13.58	2.71	8.84	25.87	6.47
Grand Mean	30.533	26.00	650.60423	164.575016	29.233	39.83	721.31257	161.264599	29.467
Levene's F ^A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Levene's Prob(F)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Rank X2	.	.	.	.	.	.	.	.	.
P(Rank X2)	.	.	.	.	.	.	.	.	.
Skewness ^A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kurtosis ^A	-1.875	-1.875	-1.875	-1.875	-1.875	-1.875	-1.875	-1.875	-1.875
Replicate F	1.928	0.000	8.476	3.093	0.200	3.571	1.002	0.167	0.034
Replicate Prob(F)	0.3415	1.0000	0.1055	0.2443	0.8334	0.2188	0.4996	0.8567	0.9676
Treatment F	0.638	4.000	23.191	4.076	0.264	17.286	41.790	2.869	0.184
Treatment Prob(F)	0.5083	0.1835	0.0405	0.1809	0.6583	0.0533	0.0231	0.2324	0.7101

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
^ACalculated from residual.

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Project ID:	Study Director: Dr. K. Bruce Kirksey
	Sponsor Contact: Talbott Howard

Rating Date	8/10/2022	8/10/2022	8/10/2022	8/18/2022	8/18/2022	8/18/2022	8/18/2022	8/24/2022
Part Rated	PLANT, C	PLANT, C	PLANT, C	PLANT, C	PLANT, C	PLANT, C	PLANT, C	PLANT, C
Rating Type	HEIGHT	WEIFRE	WEIDRY	CHLCON	HEIGHT	WEIFRE	WEIDRY	CHLCON
Rating Unit/Min/Max	IN, -, -	g, -, -	g, -, -	SPAD, -, -	IN, -, -	g, -, -	g, -, -	SPAD, -, -
Number of Subsamples	1	1	1	1	1	1	1	1
Days After First/Last Applic.	51, 51	51, 51	51, 51	59, 59	59, 59	59, 59	59, 59	65, 65
Trt-Eval Interval	51 DA-A	51 DA-A	51 DA-A	59 DA-A	59 DA-A	59 DA-A	59 DA-A	65 DA-A
Trt No.	10	11	12	13	14	15	16	17
Treatment Name	Well water	EA Well water						
Rate Unit Code	15 gal/a A	15 gal/a A						
	40.3 -	836.3751 -	186.32919 -	30.13 -	41.0 -	657.35423 -	130.52501 -	29.67 -
	43.0 -	1032.3334 -	159.84585 -	30.40 -	42.7 -	935.42926 -	182.54585 -	30.53 -
LSD P=.05	3.79	361.33139	63.569071	5.171	5.17	536.214215	70.604796	1.250
Standard Deviation	1.08	102.85254	18.094859	1.472	1.47	152.632725	20.097569	0.356
CV	2.59	11.01	10.45	4.86	3.52	19.17	12.84	1.18
Grand Mean	41.67	934.35426	173.087517	30.267	41.83	796.391746	156.535432	30.100
Levene's F ^A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Levene's Prob(F)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Rank X2	.	.	.	.	.	.	.	.
P(Rank X2)	.	.	.	.	.	.	.	.
Skewness ^A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kurtosis ^A	-1.875	-1.875	-1.875	-1.875	-1.875	-1.875	-1.875	-1.875
Replicate F	1.857	0.672	10.377	0.797	1.462	2.552	8.555	1.105
Replicate Prob(F)	0.3500	0.5981	0.0879	0.5565	0.4063	0.2815	0.1047	0.4750
Treatment F	9.143	5.445	3.213	0.049	1.923	4.979	10.050	8.895
Treatment Prob(F)	0.0942	0.1448	0.2149	0.8450	0.2999	0.1554	0.0868	0.0964

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 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
^ACalculated from residual.

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Protocol ID: 2022 EA Rice	Investigator (Creator): Bruce Kirksey
Project ID:	Study Director: Dr. K. Bruce Kirksey
	Sponsor Contact: Talbott Howard

Rating Date	8/24/2022	8/24/2022	8/24/2022	8/31/2022	8/31/2022	8/31/2022	8/31/2022	9/9/2022
Part Rated	PLANT, C	PLANT, C	PLANT, C	PLANT, C	PLANT, C	PLANT, C	PLANT, C	PLANT, C
Rating Type	HEIGHT	WEIFRE	WEIDRY	CHLCON	HEIGHT	WEIFRE	WEIDRY	CHLCON
Rating Unit/Min/Max	IN, -, -	g, -, -	g, -, -	SPAD, -, -	IN, -, -	g, -, -	g, -, -	SPAD, -, -
Number of Subsamples	1	1	1	1	1	1	1	1
Days After First/Last Applic.	65, 65	65, 65	65, 65	72, 72	72, 72	72, 72	72, 72	81, 81
Trt-Eval Interval	65 DA-A	65 DA-A	65 DA-A	72 DA-A	72 DA-A	72 DA-A	72 DA-A	81 DA-A
Trt No.	18	19	20	21	22	23	24	25
Treatment Name	Well water	EA Well water						
Rate Appl Unit Code	15 gal/a A	15 gal/a A						
	42.67 -	783.15008 -	149.44168 -	30.53 -	45.67 -	746.2917 -	197.67919 -	29.83 -
	42.17 -	1011.09593 -	172.14168 -	30.07 -	48.17 -	932.5918 -	197.67919 -	29.67 -
LSD P=.05	3.286	422.297468	172.226013	1.434	8.145	515.45177	271.445194	2.254
Standard Deviation	0.935	120.206461	49.023925	0.408	2.318	146.72272	77.266545	0.642
CV	2.21	13.4	30.49	1.35	4.94	17.48	39.09	2.16
Grand Mean	42.417	897.123006	160.791683	30.300	46.917	839.44175	197.679186	29.750
Levene's F ^A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Levene's Prob(F)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Rank X2	.	.	.	.	.	.	.	.
P(Rank X2)	.	.	.	.	.	.	.	.
Skewness ^A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kurtosis ^A	-1.875	-1.875	-1.875	-1.875	-1.875	-1.875	-1.875	-1.875
Replicate F	4.333	5.396	0.346	3.240	2.426	0.965	0.793	2.053
Replicate Prob(F)	0.1875	0.1563	0.7432	0.2358	0.2919	0.5089	0.5577	0.3276
Treatment F	0.429	5.394	0.322	1.960	1.744	2.418	0.000	0.101
Treatment Prob(F)	0.5799	0.1459	0.6278	0.2965	0.3175	0.2602	1.0000	0.7805

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Project ID:		Study Director: Dr. K. Bruce Kirksey	
Sponsor Contact: Talbott Howard			

Rating Date	9/9/2022	9/9/2022	9/9/2022	9/28/2022	9/28/2022	9/28/2022	9/28/2022	
Part Rated	PLANT, C	PLANT, C	PLANT, C	GRAIN, C	GRAIN, C	GRAIN, C	GRAIN, C	
Rating Type	HEIGHT	WEIFRE	WEIDRY	MOICON	WEIGHT	WEITES	YIELD	
Rating Unit/Min/Max	IN, -, -	g, -, -	g, -, -	%, 0, 100	lb/plot, -, -	lb/plot, -, -	BU, -, -	
Number of Subsamples	1	1	1	1	1	1	1	
Days After First/Last Applic.	81, 81	81, 81	81, 81	100, 100	100, 100	100, 100	100, 100	
Trt-Eval Interval	81 DA-A	81 DA-A	81 DA-A	100 DA-A	100 DA-A	100 DA-A	100 DA-A	
Trt Treatment	26	27	28	29	30	31	32	
No. Name								
Rate Appl								
Unit Code								
1 Well water	15 gal/a A	43.3 -	876.78759 -	191.05835 b	13.681112481 -	133.410 -	45.370 -	152.5 -
2 EA Well water	15 gal/a A	48.3 -	1003.26843 -	201.16252 a	14.225556976 -	144.093 -	45.077 -	163.7 -
LSD P=.05	10.83	225.060286	8.855423	1.1887676174	25.4445	2.6905	28.11	
Standard Deviation	3.08	64.063137	2.520686	0.3383812578	7.2427	0.7658	8.00	
CV	6.72	6.82	1.29	2.43	5.22	1.69	5.06	
Grand Mean	45.83	940.028011	196.110436	13.9533347287	138.7517	45.2233	158.11	
Levene's F ^A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Levene's Prob(F)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Rank X2	.	.	.	.	.	.	.
P(Rank X2)	.	.	.	.	.	.	.
Skewness ^A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Kurtosis ^A	-1.875	-1.875	-1.875	-1.875	-1.875	-1.875	-1.875	
Replicate F	2.228	4.938	17.144	2.311	1.666	1.379	1.698	
Replicate Prob(F)	0.3098	0.1684	0.0551	0.3021	0.3752	0.4204	0.3707	
Treatment F	3.947	5.847	24.102	3.883	3.264	0.220	2.923	
Treatment Prob(F)	0.1853	0.1368	0.0391	0.1876	0.2126	0.6852	0.2295	

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
^ACalculated from residual.

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Project ID: Study Director: Dr. K. Bruce Kirksey
Sponsor Contact: Talbott Howard

Part Rated

PLANT = plant
GRAIN = grain
C = Crop is Part Rated

Rating Type

CHLCON = chlorophyll content
HEIGHT = height
WEIFRE = weight - fresh
WEIDRY = weight - dry / dry matter content
MOICON = moisture content
WEIGHT = weight
WEITES = weight - test
YIELD = yield

Rating Unit/Min/Max

SPAD, , = spad
IN, , = inch
g, , = gram
%, 0, 100 = percent
lb/plot, , = pounds per plot
BU, , = bushel

ARM Action Codes

TY1 = 1.15238095*[30]*(100-[29])/87