Missouri Rice Research Update

Missouri Rice Research and Merchandising Council

2019

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2019
Rice Breeding and Variety Development
Annual Technical Summary

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1. Medium grain preliminary yield trial (18MGPYT1)

Objective: Identify high yielding lines for 2020 medium grain advance yield trial.

Date of Planting: May 18, 2019
Date of Harvesting: October 8, 2019
Number of entries/treatments: 253
Number of replicates: 2
Number of checks: 7
Plot size: 6.33' x 9'

Trial summary

Individual F_5 plants selected and advanced from the panicle head rows from 2018 are included in the 2019 medium grain preliminary yield trial. Typical number of entries range from 200 to 250 lines planted in two replicates. In 2019, we planted a total of 246 breeding lines with seven (7) checks in two replicates for a total of 506 plots. These were planted in short plots that are 9 foot-long, with 7 rows ~7 inches apart. Yield is the primary data collected and the top 10% will advance to the next year's medium grain advance yield trial. Table 1 shows the mean yield of the entries.

Line 18MO372 which is a Clearfield medium grain showed the highest yield of 201 bu/ac followed by 18MO282 which is a conventional medium grain. Ranking showed 12 other lines exhibiting higher yield than Caffey. Varieties M206, CL271, MM17, Jupiter, Titan and M202 ranks 17, 36, 44, 62, 74 and 253 respectively. Almost all lines do not significantly differ from the checks possibly due to variation with only two replication. However, our main objective here is to identify top 10% with potential larger or equal yield than the check using relatively large lines at minimum resources and two replicate shorter plots will give us a good assumption of which lines can be moved to next year's advance yield trial.

Table 1. 2019 Medium grain preliminary yield trial

Location: Missouri Rice Research Farm, Campbell MO.

Date of planting: 18-May-19

Date of harvesting 8-Oct-19

Investigator: Christian De Guzman

No.	Entry	Pedigree	Type	Yield bu/ac		Yield lbs/ac		Rank
1	Titan	Titan	MG	168	a-d	7579.05	a-d	74
2	MM17	MM17	MG	174	a-d	7848.06	a-d	44
3	CL271	CL271	MG	175	a-d	7885.59	a-d	36
4	Caffey	Caffey	MG	184	a-d	8282.84	a-d	15
5	Jupiter	Jupiter	MG	171	a-d	7679.15	a-d	62
6	M202	M202	MG	32	e	1448.25	e	253
7	M206	M206	CLMG	183	a-d	8235.92	a-d	17
8	18MO127	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-9-1-0	CLMG	158	a-d	7097.35	a-d	137
9	18MO128	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-10-2-0	CLMG	150	a-d	6734.50	a-d	192
10	18MO129	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-11-1-0	CLMG	166	a-d	7478.96	a-d	82
11	18MO130	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-12-2-0	CLMG	163	a-d	7353.84	a-d	102
12	18MO131	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-14-1-0	CLMG	153	a-d	6906.54	a-d	169
13	18MO132	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-108-2-0	CLMG	172	a-d	7732.32	a-d	56
14	18MO133	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-109-1-0	CLMG	175	a-d	7854.31	a-d	41
15	18MO134	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-110-1-0	CLMG	165	a-d	7432.04	a-d	92
16	18MO135	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-22-2-0	CLMG	160	a-d	7191.19	a-d	123
17	18MO136	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-24-1-0	CLMG	170	a-d	7632.23	a-d	70
18	18MO137	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-25-2-0	CLMG	150	a-d	6731.38	a-d	193
19	18MO138	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-27-2-0	CLMG	160	a-d	7181.80	a-d	125
20	18MO139	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-129-2-0	CLMG	163	a-d	7331.94	a-d	104
21	18MO140	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-131-1-0	CLMG	138	a-d	6199.62	a-d	240
22	18MO141	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-133-2-0	CLMG	136	a-d	6099.53	a-d	247
23	18MO142	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-134-2-0	CLMG	150	a-d	6734.50	a-d	191
24	18MO143	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-67-2-0	CLMG	152	a-d	6822.09	a-d	177
25	18MO144	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-108-2-0	MG	167	a-d	7525.88	a-d	80
26	18MO145	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-109-2-0	MG	176	a-d	7913.74	a-d	34
27	18MO146	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-111-1-0	MG	176	a-d	7916.87	a-d	33
28	18MO147	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-112-1-0	MG	175	a-d	7863.70	a-d	40
29	18MO148	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-113-2-0	MG	174	a-d	7838.67	a-d	45
30	18MO149	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-20-2-0	CLMG	161	a-d	7228.72	a-d	118
31	18MO150	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-18-1-0	CLMG	151	a-d	6797.06	a-d	183
32	18MO151	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-16-1-0	CLMG	157	a-d	7053.56	a-d	145
33	18MO152	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-15-2-0	CLMG	135	a-d	6074.50	a-d	249
34	18MO153	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-115-2-0	CLMG	150	a-d	6731.38	a-d	194
35	18MO154	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-113-2-0	CLMG	146	a-d	6571.85	a-d	218
36	18MO155	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-29-1-0	CLMG	144	a-d	6490.52	a-d	223
37	18MO156	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-28-2-0	CLMG	156	a-d	7000.38	a-d	151
38	18MO157	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-140-2-0	CLMG	171	a-d	7679.15	a-d	63
39	18MO158	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-139-2-0	CLMG	155	a-d	6953.46	a-d	161
40	18MO159	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-138-2-0	CLMG	155	a-d	6981.61	a-d	155
41	18MO160	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-137-2-0	CLMG	155	a-d	6981.61	a-d	156
42	18MO161	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-119-1-0	MG	174	a-d	7819.91	a-d	46
43	18MO162	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-118-2-0	MG	183	a-d	8232.80	a-d	18
44	18MO163	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-116-2-0	MG	175	a-d	7882.47	a-d	37
45	18MO164	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-115-1-0	MG	178	a-d	8029.48	a-d	28
46	18MO167	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-24-2-0	CLMG	151	a-d	6790.81	a-d	184
47	18MO168	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-117-1-0	CLMG	170	a-d	7647.87	a-d	68
48	18MO169	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-119-1-0	CLMG	143	a-d	6446.73	a-d	224
49	18MO170	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-120-1-0	CLMG	137	a-d	6171.47	a-d	242
50	18MO171	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-121-1-0	CLMG	133	bcd	5990.05	bcd	250
51	18MO172	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-2-1-0	MG	151	a-d	6787.68	a-d	187
52	18MO173	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-4-2-0	MG	155	a-d	6978.48	a-d	157
53	18MO174	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-35-1-0	CLMG	146	a-d	6553.08	a-d	219
54	18MO175	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-36-2-0	CLMG	137	a-d	6171.47	a-d	241
55	18MO177	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-141-2-0	CLMG	140	a-d	6290.33	a-d	237
56	18MO178	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-143-2-0	CLMG	143	a-d	6446.73	a-d	226
57	18MO179	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-2-2-0	CLMG	142	a-d	6393.56	a-d	229
58	18MO180	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-78-2-0	CLMG	139	a-d	6262.18	a-d	239
59	18MO181	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-79-2-0	CLMG	140	a-d	6312.23	a-d	235
60	18MO182	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-80-2-0	CLMG	141	a-d	6352.89	a-d	233

61	18MO183	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-82-2-0	CLMG	146	a-d	6574.98	a-d	217
62	18MO184	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS}-0-124-1-0	MG	168	a-d	7575.92	a-d	75
63	18MO185	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS}-0-125-2-0	MG	173	a-d	7807.39	a-d	47
64	18MO186	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-31-2-0	CLMG	145	a-d	6543.70	a-d	220
65	18MO187	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-27-2-0	CLMG	159	a-d	7144.27	a-d	132
66	18MO188	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-127-2-0	CLMG	156	a-d	7034.79	a-d	149
67	18MO189	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS}-0-11-2-0	MG	169	a-d	7597.82	a-d	73
68	18MO190	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS}-0-10-2-0	MG	171	a-d	7697.92	a-d	59
69	18MO191	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS}-0-8-2-0	MG	185	a-d	8336.02	a-d	14
70	18MO192	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS}-0-7-1-0	MG	179	a-d	8057.63	a-d	27
71	18MO193	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS}-0-6-2-0	MG	182	a-d	8210.90	a-d	19
72	18MO194	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-45-1-0	CLMG	162	a-d	7297.54	a-d	111
73	18MO196	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-41-1-0	CLMG	173	a-d	7766.73	a-d	54
74	18MO197	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-8-1-0	CLMG	159	a-d	7147.39	a-d	130
75	18MO198	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-6-1-0	CLMG	160	a-d	7219.34	a-d	121
76	18MO199	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-5-2-0	CLMG	155	a-d	6994.12	a-d	153
77	18MO200	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-88-2-0	CLMG	152	a-d	6843.98	a-d	175
78	18MO201	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-87-2-0	CLMG	142	a-d	6377.92	a-d	231
79	18MO202	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-85-2-0	CLMG	128	cd	5755.45	cd	251
80	18MO203	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-83-2-0	CLMG	153	a-d	6887.77	a-d	171
81	18MO204	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS}-0-127-1-0	MG	178	a-d	8026.35	a-d	30
82	18MO205	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-36-2-0	CLMG	145	a-d	6506.16	a-d	222
83	18MO206	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-37-1-0	CLMG	161	a-d	7231.85	a-d	116
84	18MO207	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-38-2-0	CLMG	173	a-d	7766.73	a-d	52
85	18MO208	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-133-2-0	CLMG	164	a-d	7397.63	a-d	98
86	18MO209	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-134-2-0	CLMG	165	a-d	7438.29	a-d	91
87	18MO210	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS}-0-13-2-0	MG	181	a-d	8167.11	a-d	21
88	18MO211	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS}-0-14-2-0	MG	181	a-d	8138.96	a-d	23
89	18MO212	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS}-0-16-2-0	MG	180	a-d	8088.91	a-d	26
90	18MO213	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS}-0-17-2-0	MG	177	a-d	7954.41	a-d	32
91	18MO215	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-47-1-0	CLMG	175	a-d	7879.34	a-d	38
92	18MO216	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-48-2-0	CLMG	171	a-d	7679.15	a-d	64
93	18MO217	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-49-2-0	CLMG	154	a-d	6915.92	a-d	168
94	18MO218	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-51-2-0	CLMG	166	a-d	7475.83	a-d	83
95	18MO219	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-9-2-0	CLMG	141	a-d	6331.00	a-d	234
96	18MO220	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-11-2-0	CLMG	154	a-d	6931.56	a-d	165
97	18MO221	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-12-2-0	CLMG	161	a-d	7244.36	a-d	115
98	18MO222	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-13-1-0	CLMG	143	a-d	6446.73	a-d	225
99	18MO223	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-14-2-0	CLMG	152	a-d	6818.96	a-d	178
100	18MO224	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-89-2-0	CLMG	152	a-d	6837.73	a-d	176
101	18MO225	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-92-2-0	CLMG	165	a-d	7410.14	a-d	95
102	18MO226	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-44-2-0	CLMG	151	a-d	6778.29	a-d	188
103	18MO227	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-39-2-0	CLMG	161	a-d	7231.85	a-d	117
104	18MO228	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-140-2-0	CLMG	155	a-d	6956.59	a-d	160
105	18MO229	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-139-2-0	CLMG	151	a-d	6806.45	a-d	181
106	18MO230	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-137-2-0	CLMG	171	a-d	7676.02	a-d	65
107	18MO231	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS}-0-23-1-0	MG	188	a-d	8461.14	a-d	11
108	18MO232	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS}-0-22-2-0	MG	190	abc	8561.23	abc	8
109	18MO233	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS}-0-21-2-0	MG	177	a-d	7973.18	a-d	31
110	18MO234	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-55-1-0	CLMG	165	a-d	7444.55	a-d	88
111	18MO235	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-53-1-0	CLMG	166	a-d	7450.81	a-d	85
112	18MO236	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-52-2-0	CLMG	181	a-d	8154.60	a-d	22
113	18MO237	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-20-1-0	CLMG	171	a-d	7707.30	a-d	57
114	18MO238	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-19-2-0	CLMG	159	a-d	7147.39	a-d	131
115	18MO239	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-17-2-0	CLMG	164	a-d	7391.38	a-d	99
116	18MO240	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-15-2-0	CLMG	148	a-d	6646.92	a-d	208
117	18MO241	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-100-2-0	CLMG	170	a-d	7651.00	a-d	67
118	18MO242	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-98-2-0	CLMG	157	a-d	7056.68	a-d	143
119	18MO243	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-97-2-0	CLMG	158	a-d	7087.96	a-d	139
120	18MO244	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-61-2-0	CLMG	155	a-d	6997.25	a-d	152
121	18MO245	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-62-2-0	CLMG	160	a-d	7209.95	a-d	122
122	18MO246	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-63-2-0	CLMG	161	a-d	7250.62	a-d	113
123	18MO247	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-22-2-0	CLMG	154	a-d	6928.44	a-d	167
124	18MO248	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-26-2-0	CLMG	149	a-d	6687.58	a-d	202
125	18MO250	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-102-2-0	CLMG	146	a-d	6578.10	a-d	215
126	18MO251	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-103-1-0	CLMG	149	a-d	6693.84	a-d	201
127	18MO252	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-104-2-0	CLMG	168	a-d	7554.03	a-d	76
128	18MO253	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-105-1-0	CLMG	154	a-d	6931.56	a-d	166
129	18MO254	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-106-2-0	CLMG	166	a-d	7460.19	a-d	84
130	18MO255	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-55-2-0	CLMG	163	a-d	7331.94	a-d	105

131	18MO256	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-54-1-0	CLMG	165	a-d	7444.55	a-d	89
132	18MO257	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-53-2-0	CLMG	166	a-d	7447.68	a-d	87
133	18MO258	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-151-2-0	CLMG	149	a-d	6687.58	a-d	203
134	18MO259	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-148-1-0	CLMG	182	a-d	8170.24	a-d	20
135	18MO385	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-31-2-0	MG	161	a-d	7225.59	a-d	120
136	18MO260	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-31-1-0	MG	188	a-d	8445.50	a-d	12
137	18MO261	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-69-1-0	CLMG	150	a-d	6731.38	a-d	195
138	18MO262	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-68-2-0	CLMG	168	a-d	7554.03	a-d	77
139	18MO263	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-67-1-0	CLMG	164	a-d	7400.76	a-d	97
140	18MO264	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-66-2-0	CLMG	175	a-d	7866.83	a-d	39
141	18MO265	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-32-1-0	CLMG	149	a-d	6725.12	a-d	196
142	18MO267	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-29-2-0	CLMG	165	a-d	7425.78	a-d	93
143	18MO268	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-27-2-0	CLMG	149	a-d	6684.46	a-d	204
144	18MO269	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-112-1-0	CLMG	151	a-d	6787.68	a-d	185
145	18MO270	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-111-1-0	CLMG	147	a-d	6628.15	a-d	209
146	18MO271	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-110-1-0	CLMG	158	a-d	7116.11	a-d	136
147	18MO272	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-109-2-0	CLMG	150	a-d	6740.76	a-d	190
148	18MO273	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-107-2-0	CLMG	155	a-d	6965.97	a-d	158
149	18MO274	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-57-2-0	CLMG	158	a-d	7116.11	a-d	135
150	18MO275	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-58-2-0	CLMG	163	a-d	7350.71	a-d	103
151	18MO276	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-60-2-0	CLMG	156	a-d	7019.15	a-d	150
152	18MO277	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-61-2-0	CLMG	135	a-d	6080.76	a-d	248
153	18MO278	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-62-2-0	CLMG	154	a-d	6944.08	a-d	162
154	18MO279	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-153-1-0	CLMG	165	a-d	7410.14	a-d	96
155	18MO280	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-154-2-0	CLMG	168	a-d	7550.90	a-d	78
156	18MO281	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-156-2-0	CLMG	163	a-d	7316.30	a-d	108
157	18MO282	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-36-1-0	MG	196	ab	8798.96	ab	2
158	18MO283	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-38-1-0	MG	183	a-d	8248.44	a-d	16
159	18MO284	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-39-2-0	MG	173	a-d	7782.37	a-d	50
160	18MO285	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-40-2-0	MG	186	a-d	8392.32	a-d	13
161	18MO286	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-70-1-0	CLMG	169	a-d	7622.84	a-d	71
162	18MO287	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-75-2-0	CLMG	162	a-d	7300.66	a-d	110
163	18MO288	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-33-1-0	CLMG	159	a-d	7156.78	a-d	128
164	18MO289	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-34-2-0	CLMG	147	a-d	6615.64	a-d	211
165	18MO290	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-35-1-0	CLMG	151	a-d	6815.83	a-d	180
166	18MO291	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-36-2-0	CLMG	157	a-d	7044.17	a-d	146
167	18MO292	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-37-2-0	CLMG	148	a-d	6675.07	a-d	205
168	18MO293	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-38-2-0	CLMG	142	a-d	6393.56	a-d	230
169	18MO294	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-113-2-0	CLMG	165	a-d	7425.78	a-d	94
170	18MO295	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-114-2-0	CLMG	162	a-d	7291.28	a-d	112
171	18MO296	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-67-2-0	CLMG	180	a-d	8095.17	a-d	25
172	18MO297	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-65-2-0	CLMG	154	a-d	6934.69	a-d	164
173	18MO298	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-3-2-0	CLMG	153	a-d	6872.13	a-d	172
174	18MO299	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-47-2-0	MG	175	a-d	7854.31	a-d	43
175	18MO301	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-42-1-0	MG	192	abc	8648.82	abc	7
176	18MO302	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-81-1-0	CLMG	161	a-d	7225.59	a-d	119
177	18MO303	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-79-2-0	CLMG	139	a-d	6271.56	a-d	238
178	18MO304	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-78-1-0	CLMG	123	d	5514.60	d	252
179	18MO305	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-77-2-0	CLMG	158	a-d	7097.35	a-d	138
180	18MO306	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-44-2-0	CLMG	146	a-d	6584.36	a-d	214
181	18MO307	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-42-2-0	CLMG	169	a-d	7619.72	a-d	72
182	18MO308	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-41-1-0	CLMG	164	a-d	7388.25	a-d	100
183	18MO309	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-40-2-0	CLMG	153	a-d	6890.90	a-d	170
184	18MO310	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-39-2-0	CLMG	157	a-d	7081.71	a-d	140
185	18MO311	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-124-2-0	CLMG	163	a-d	7325.69	a-d	106
186	18MO312	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-122-2-0	CLMG	137	a-d	6165.21	a-d	244
187	18MO313	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-120-1-0	CLMG	159	a-d	7153.65	a-d	129
188	18MO314	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-119-1-0	CLMG	136	a-d	6102.65	a-d	245
189	18MO315	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-69-2-0	CLMG	157	a-d	7044.17	a-d	147
190	18MO316	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-70-1-0	CLMG	136	a-d	6102.65	a-d	246
191	18MO317	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-71-2-0	CLMG	149	a-d	6693.84	a-d	200
192	18MO318	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-72-2-0	CLMG	147	a-d	6615.64	a-d	212
193	18MO319	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-74-1-0	CLMG	147	a-d	6600.00	a-d	213
194	18MO320	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-5-2-0	CLMG	167	a-d	7519.62	a-d	81
195	18MO321	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-6-1-0	CLMG	148	a-d	6662.56	a-d	206
196	18MO322	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-7-1-0	CLMG	155	a-d	6959.72	a-d	159
197	18MO323	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-8-1-0	CLMG	157	a-d	7044.17	a-d	148
198	18MO324	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-9-2-0	CLMG	146	a-d	6578.10	a-d	216
199	18MO325	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-10-2-0	CLMG	163	a-d	7325.69	a-d	107
200	18MO326	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-48-2-0	MG	175	a-d	7888.72	a-d	35

201	18MO327	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-49-2-0	MG	192	abc	8651.94	abc	6
202	18MO328	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-83-1-0	CLMG	166	a-d	7450.81	a-d	86
203	18MO329	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-84-2-0	CLMG	171	a-d	7697.92	a-d	61
204	18MO330	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-85-1-0	CLMG	173	a-d	7804.27	a-d	48
205	18MO331	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-86-2-0	CLMG	170	a-d	7635.36	a-d	69
206	18MO332	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-78-1-0	CLMG	159	a-d	7169.29	a-d	127
207	18MO333	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-75-1-0	CLMG	168	a-d	7550.90	a-d	79
208	18MO334	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-16-2-0	CLMG	158	a-d	7119.24	a-d	134
209	18MO335	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-14-2-0	CLMG	161	a-d	7247.49	a-d	114
210	18MO336	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-12-2-0	CLMG	152	a-d	6818.96	a-d	179
211	18MO337	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-59-1-0	MG	189	abc	8526.83	abc	10
212	18MO338	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-93-2-0	CLMG	148	a-d	6650.05	a-d	207
213	18MO339	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-91-2-0	CLMG	163	a-d	7313.18	a-d	109
214	18MO340	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-56-1-0	CLMG	147	a-d	6618.77	a-d	210
215	18MO341	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-54-2-0	CLMG	157	a-d	7062.94	a-d	142
216	18MO342	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-51-1-0	CLMG	140	a-d	6305.97	a-d	236
217	18MO343	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-136-2-0	CLMG	149	a-d	6700.10	a-d	199
218	18MO344	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-134-1-0	CLMG	145	a-d	6512.42	a-d	221
219	18MO345	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-81-2-0	CLMG	170	a-d	7663.51	a-d	66
220	18MO346	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-83-2-0	CLMG	142	a-d	6374.79	a-d	232
221	18MO347	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-84-1-0	CLMG	154	a-d	6944.08	a-d	163
222	18MO348	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-85-2-0	CLMG	155	a-d	6994.12	a-d	154
223	18MO349	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-19-2-0	CLMG	137	a-d	6171.47	a-d	243
224	18MO350	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-60-2-0	MG	175	a-d	7854.31	a-d	42
225	18MO351	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-63-1-0	MG	173	a-d	7772.99	a-d	51
226	18MO352	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-65-1-0	MG	171	a-d	7704.17	a-d	58
227	18MO353	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-94-1-0	CLMG	159	a-d	7172.42	a-d	126
228	18MO354	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-97-1-0	CLMG	150	a-d	6772.04	a-d	189
229	18MO355	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-99-1-0	CLMG	165	a-d	7441.42	a-d	90
230	18MO356	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-59-1-0	CLMG	160	a-d	7184.93	a-d	124
231	18MO357	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-62-1-0	CLMG	173	a-d	7794.88	a-d	49
232	18MO358	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-141-1-0	CLMG	151	a-d	6787.68	a-d	186
233	18MO359	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-92-1-0	CLMG	142	a-d	6409.19	a-d	228
234	18MO360	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-89-2-0	CLMG	151	a-d	6800.19	a-d	182
235	18MO361	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-87-1-0	CLMG	149	a-d	6709.48	a-d	197
236	18MO362	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-71-1-0	MG	178	a-d	8029.48	a-d	29
237	18MO363	(NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS)-0-68-2-0	MG	195	ab	8777.06	ab	3
238	18MO364	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-105-2-0	CLMG	149	a-d	6703.22	a-d	198
239	18MO365	(A: CL271/3/NEPTUNE//BNGL/CL 161)-0-64-2-0	CLMG	143	a-d	6415.45	a-d	227
240	18MO366	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-10-1-0	CLMG	171	a-d	7697.92	a-d	60
241	18MO367	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-14-1-0	CLMG	159	a-d	7141.14	a-d	133
242	18MO368	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-118-2-0	CLMG	152	a-d	6847.11	a-d	174
243	18MO369	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-119-1-0	CLMG	157	a-d	7056.68	a-d	144
244	18MO370	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-122-2-0	CLMG	172	a-d	7757.35	a-d	55
245	18MO371	(B: CL271/3/NEPTUNE//BNGL/CL 161)-0-54-2-0	CLMG	157	a-d	7081.71	a-d	141
246	18MO372	(A:NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-17-1-0	CLMG	201	a	9046.07	a	1
247	18MO373	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-123-1-0	CLMG	152	a-d	6850.24	a-d	173
248	18MO374	NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS-0-90-0	MG	192	abc	8658.20	abc	4
249	18MO375	NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS-0-102-0	MG	190	abc	8558.11	abc	9
250	18MO376	NEPTUNE/4/BNGL//MERC/RICO/3/MERC/RICO//BNGL /5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/MARS-0-107-0	MG	192	abc	8658.20	abc	5
251	18MO382	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-42-2-0	CLMG	164	a-d	7385.12	a-d	101
252	18MO383	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-42-2-0	CLMG	173	a-d	7766.73	a-d	53
253	18MO383	(B: NEPTUNE/3/BNGL/CL 161//CAFFEY)-0-41-2-0	CLMG	181	a-d	8123.32	a-d	24
LSD		P=.05		27.3793		1232.07		
Standard		Deviation		13.9022		625.598		
CV		8.69		8.69				
Levene's		F						
Levene's		Prob(F)						
Skewness		-1.0606*		-1.0606*				
Kurtosis		6.0976*		6.0976*				
Replicate		F		58.908		58.908		
Replicate		Prob(F)		0.0001		0.0001		
Treatment		F		2.765		2.765		
Treatment		Prob(F)		0.0001		0.0001		

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls)

MG = conventional

CLMG = Clearfield

2. Long grain advance yield trial (19LGAYT)

Objective: Identify the top 20 best lines based on agronomic and milling data.

Date of Planting: May 17, 2019
Date of Harvesting: September 30, 2019
Number of entries/treatments: 117
Number of replicates: 3
Number of checks: 17
Plot size: 6.33’ x 14’

Trial summary

Lines in the F_5 or higher generation that were selected in the previous year’s preliminary yield trial were tested in the advance yield trial. In 2019, we tested a total of 100 advance lines and 17 checks. This trial was planted in 16 foot-long plots with 7 rows ~7 inches apart in a randomized complete block design with three replicates for a total of 348 plots. Table 2 shows the agronomic performance of each lines compared to the checks. The table was rank according to the best yielding lines/checks. Roy J ranks number one with 200 bu/ac, followed by the line 17MO8 with 196 bu/ac and Diamond with 194 bu/ac. Thirteen other lines and 6 checks do not significantly differ with the highest yielding variety Roy J in terms of percent total and whole grain milling, 18MO89 gives the best yield of head rice yield of 76/70 followed by the 18MO113. Several other lines showed comparable or better milling yield to Cypress and CL111. Winseedle analysis is being conducted to further measure seed dimension such as length and width as well as percent chalk.

Table 2. 2019 Long grain advance yield trial

Date of planting: May 17, 2019

Date of harvesting: September 30, 2019

Investigator: Christian De Guzman

No.	Code	Pedigree	Yield (bu/ac)		Yield (lb/ac)		Days to head		Height (cm)		Plot qua	Vigor	% Moisture		Grain total		Grain whole		Grain white		Grain trans		Grain polish		Rank
1	CL111	CL111	166	f-r	7489.4	f-r	104.3	bc	104.9	b-l	10	10	14.9	d-h	74	a-f	64	b-f	41.8	b-f	2.2	d-k	99.7	a-l	86
2	CL151	CL151	185	a-j	8310.3	a-j	104	bc	103.3	b-p	10	10	17.4	b	73	a-g	64	a-f	39.3	b-g	1.9	h-k	87.7	f-o	9
3	CL153	CL153	177	b-p	7944.9	b-p	108	bc	99.7	d-p	10	10	14.6	d-h	74	a-g	67	a-f	40.9	b-g	2.7	a-g	98.3	a-n	31
4	CL163	CL163	177	b-p	7966.2	b-p	110	bc	102.4	b-p	10	10	15.4	b-h	73	a-g	67	a-f	40.3	b-g	2.2	d-k	93.3	b-o	27
5	CL172	CL172	194	a-e	8716.6	a-e	108	bc	96.0	e-p	10	10	15.9	b-h	74	a-g	68	a-e	37.6	c-g	2.4	a-j	83.0	j-p	4
6	Diamond	Diamond	194	a-d	8733.0	a-d	110	bc	103.4	b-o	10	10	15.9	b-h	73	a-g	65	a-f	39.4	b-g	2.4	a-j	90.7	c-o	3
7	Mermentau	Mermentau	175	b-q	7890.8	b-q	107	bc	99.1	d-p	10	10	16.3	b-f	73	b-g	67	a-f	35.5	g	1.9	ijk	70.3	p	37
8	RoyJ	RoyJ	200	a	8991.8	a	110	bc	111.7	abc	10	10	16.3	b-f	74	a-f	66	a-f	36.8	fg	2.5	a-i	79.0	nop	1
9	Wells	Wells	181	a-l	8149.7	a-l	108	bc	106.2	b-h	10	10	15.3	b-h	75	a-e	64	b-f	41.5	b-f	2.8	a-f	101.3	a-k	14
10	CLJ01	CLJ01	153	o-s	6901.2	o-s	108	bc	98.2	d-p	10	10	14.7	d-h	73	a-g	69	abc	32.1	h	2.4	a-j	57.7	q	113
11	Thad	Thad	179	a-o	8041.5	a-o	113	b	111.9	ab	10	10	16.9	bcd	73	a-g	67	a-f	37.2	d-g	2.7	a-g	81.7	k-p	19
12	Lakast	Lakast	184	a-j	8284.0	a-j	106	bc	106.9	b-f	10	10	15.0	c-h	75	a-d	65	a-f	41.5	b-f	2.9	abc	102.0	a-k	10
13	Jazzman2	Jazzman2	151	qrs	6796.3	qrs	108	bc	94.6	g-p	9.7	10	15.1	b-h	73	a-g	68	a-e	31.5	h	1.8	jk	52.3	q	115
14	Presidio	Presidio	147	rs	6622.6	rs	108	bc	96.5	e-p	10	10	14.6	d-h	74	a-g	64	b-f	38.7	b-g	2.5	a-i	87.7	f-o	116
15	Antonio	Antonio	167	f-r	7515.6	f-r	106	bc	82.8		10	10	15.0	c-h	75	a-d	68	a-d	39.8	b-g	2.3	a-j	91.7	b-o	80
16	Rex	Rex	142	s	6411.3	s	108	bc	92.5	nop	10	10	21.5	a	69	h	59	g	32.2	h	1.4	l	53.3	q	117
17	CCDR	CCDR	168	f-r	7561.5	f-r	108	bc	93.7	k-p	10	10	14.7	d-h	74	a-f	68	a-e	36.9	efg	2.1	e-k	77.3	op	77
18	RU180511	Mo0327005/CL161	194	a-e	8710.0	a-e	104	bc	101.4	b-p	10	10	17.2	bc	72	d-g	61	fg	42.9	a-f	3.0	ab	109.0	a-f	5
19	17MO8	Mo0215035/NIL16_2-1	196	abc	8834.6	abc	110	bc	115.0	a	10	10	16.1	b-g	75	a-d	67	a-e	40.5	b-g	3.0	a	98.0	a-n	2
20	17MO47	RU0601013/Trenasse	180	a-n	8084.1	a-n	110	bc	106.4	b-g	10	10	14.6	d-h	74	a-f	67	a-f	38.5	b-g	2.7	a-g	87.3	g-o	17
21	17MO533	Mo0234639/CL161	173	c-q	7799.1	c-q	109	bc	96.9	e-p	10	10	15.5	b-h	74	a-f	69	ab	40.2	b-g	2.5	a-i	94.3	a-o	48
22	17MO46	Mo0404044/Kataki	188	a-h	8457.7	a-h	106	bc	103.4	b-o	10	10	15.6	b-h	75	a-d	65	a-f	41.4	b-f	2.8	a-e	101.3	a-k	7
23	17MO43	Mo04062311	167	f-r	7492.7	f-r	105	bc	96.6	e-p	10	10	15.1	b-h	74	a-g	67	a-f	40.1	b-g	2.6	a-g	94.7	a-o	85
24	18MO31	(CPRS/KBNT//WELLS-1CFX-118/5/TACAURI/3/C	182	a-k	8202.1	a-k	106	bc	99.7	d-p	10	10	15.3	b-h	74	a-f	65	a-f	40.0	b-g	2.7	a-g	94.0	a-o	11
25	18MO32	(9502008-A/DREW//CLR-120/4/CPRS/KBNT//95	175	b-q	7876.1	b-q	107	bc	103.3	b-p	10	10	14.1	e-h	74	a-g	65	a-f	48.5	a	2.2	e-k	95.0	a-o	39
26	18MO33	(CL111/CHENIERE//CL111/CCDR)-0-133-1-0	165	h-r	7414.0	h-r	106	bc	97.1	e-p	10	10	14.8	d-h	73	a-g	65	a-f	41.5	b-f	2.4	a-j	99.3	a-l	93
27	18MO34	(CPRS/KBNT//WELLS-1CFX-118/5/TACAURI/3/C	161	j-s	7246.9	j-s	104	bc	91.6	p	10	10	14.5	d-h	73	a-g	62	c-g	42.9	a-f	2.6	a-g	107.0	a-h	100
28	18MO36	(9502008-A/DREW//CLR-120/4/CPRS/KBNT//95	172	d-q	7753.2	d-q	106	bc	94.7	g-p	10	10	14.7	d-h	75	a-d	67	a-f	42.3	b-f	2.6	a-h	103.7	a-j	52
29	18MO37	(9502008-A/DREW//CLR-120/4/CPRS/KBNT//95	170	d-r	7658.1	d-r	106	bc	98.8	d-p	10	10	15.1	b-h	72	b-g	66	a-f	38.7	b-g	2.3	b-j	87.0	h-o	65
30	18MO38	(TRNS//TCL111/CHENIERE)-0-10-1-0	169	e-r	7605.7	e-r	104	bc	105.8	b-i	10	10	15.3	b-h	71	fg	62	efg	38.0	c-g	1.7	k	80.7	l-p	73
31	18MO39	(CATAHOULA/4/CCDR/3/CPRS/KBNT//WELLS-1CF	176	b-q	7920.3	b-q	108	bc	98.2	d-p	10	10	15.6	b-h	74	a-f	66	a-f	41.0	b-g	2.8	a-f	99.0	a-m	35
32	18MO40	(CL111/4/CPRS/9502008-A//AR-11188/CCDR/6	170	d-r	7656.5	d-r	105	bc	104.2	b-n	10	10	16.4	b-f	74	a-g	66	a-f	41.4	b-f	2.2	c-k	98.7	a-n	66
33	18MO41	(CPRS/KBNT//WELLS-1CFX-118/5/TACAURI/3/C	179	a-n	8066.1	a-n	110	bc	96.8	e-p	10	10	14.7	d-h	74	a-g	65	a-f	39.5	b-g	2.5	a-h	91.3	b-o	18
34	18MO42	LA-141:(CL111/CHENIERE/4/CPRS/KBNT//CFX-	168	f-r	7574.6	f-r	109	bc	102.7	b-p	10	10	15.2	b-h	74	a-f	69	ab	43.8	abc	2.9	ab	112.7	ab	75
35	18MO43	(CPRS/KBNT//WELLS-1CFX-118/3/MBLE/4/CPRS	175	b-q	7871.1	b-q	107	bc	97.3	e-p	10	10	15.6	b-h	73	a-g	66	a-f	40.5	b-g	2.4	a-j	95.0	a-o	41
36	18MO44	(9502008-A/DREW//CLR-120/4/CPRS/KBNT//95	181	a-m	8134.9	a-m	108	bc	102.1	b-p	10	10	15.3	b-h	75	a-d	66	a-f	43.3	a-d	2.2	c-k	107.0	a-h	15
37	18MO45	(TRNS/CATAHOULA)-0-33-1-0	157	k-s	7055.2	k-s	108	bc	98.8	d-p	10	10	14.9	c-h	72	c-g	58	g	38.1	c-g	1.3	l	79.3	m-p	108
38	18MO46	(TRNS/5/CPRS/KBNT//WELLS-1CFX-118/5/TACA	165	h-r	7446.8	h-r	105	bc	101.4	b-p	10	10	15.7	b-h	74	a-g	65	a-f	37.6	c-g	2.0	g-k	80.7	l-p	90
39	18MO47	(CL111/4/CPRS/9502008-A//AR-11188/CCDR/6	161	j-s	7237.1	j-s	105	bc	100.4	d-p	10	10	15.0	c-h	73	a-g	65	a-f	42.3	b-f	2.5	a-i	104.0	a-j	101
40	18MO48	(CL111/4/CPRS/9502008-A//AR-11188/CCDR/6	173	c-q	7779.4	c-q	106	bc	105.4	b-k	10	10	15.6	b-h	74	a-g	67	a-f	42.3	b-f	2.6	a-h	104.3	a-i	51
41	18MO49	(CPRS/KBNT//WELLS-1CFX-118/5/TACAURI/3/C	175	c-q	7853.1	c-q	106	bc	96.0	e-p	10	10	14.3	e-h	75	a-e	66	a-f	42.6	a-f	2.6	a-g	105.7	a-h	42

42	18MO50	(CPRS/KBNT//WELLS-1CFX-118/5/TACAURI/3/C	177	b-p	7958.0	b-p	107	bc	98.3	d-p	10	10	14.6	d-h	74	a-g	65	a-f	37.9	c-g	2.5	a-i	84.0	i-p	29
43	18MO51	(CPRS/KBNT//WELLS-1CFX-118/3/MBLE/4/CPRS	171	d-r	7695.8	d-r	107	bc	100.5	d-p	10	10	15.5	b-h	73	a-g	67	a-f	39.1	b-g	2.3	b-k	88.0	f-o	58
44	18MO52	(TRNS//TCL111/CHENIERE)-0-17-2-0	170	d-r	7648.3	d-r	103	c	103.3	b-p	9.7	10	15.1	b-h	72	b-g	62	d-g	41.7	b-f	2.5	a-i	101.0	a-l	67
45	18MO53	(TRNS//TCL111/CHENIERE)-0-20-2-0	166		7453.3		103	c	104.8	b-l	10	10	15.3	b-h	71	g	64	b-f	40.5	b-g	2.1	f-k	94.3	a-o	88
46	18MO54	(CL111/4/CPRS/9502008-A//AR-11188/CCDR/6	156	l-s	7030.6	l-s	106	bc	102.1	b-p	10	10	14.5	d-h	73	b-g	61	fg	44.0	abc	2.4	a-j	111.0	abc	110
47	18MO55	(CATAHOULA/4/CCDR/3/CPRS/KBNT//WELLS-1CF	174	c-q	7849.8	c-q	105	bc	101.8	b-p	10	10	14.6	d-h	75	a-d	67	a-f	43.0	a-f	2.9	abc	108.6	a-g	43
48	18MO56	(9502008-A/DREW//CLR-120/4/CPRS/KBNT//95	181	a-m	8133.3	a-m	108	bc	101.7	b-p	10	10	15.9	b-h	75	a-d	66	a-f	44.8	ab	2.5	a-i	114.7	a	16
49	18MO57	LA-141:(CL111/CHENIERE/4/CPRS/KBNT//CFX-	168	f-r	7572.9	f-r	106	bc	98.3	d-p	10	10	14.5	d-h	74	a-g	66	a-f	41.9	b-f	2.5	a-i	102.0	a-k	76
50	18MO58	LA-141:(CL111/CHENIERE/4/CPRS/KBNT//CFX-	176	b-q	7917.0	b-q	112	bc	107.7	a-e	9.7	10	15.9	b-h	72	b-g	67	a-f	39.2	b-g	2.7	a-g	91.0	c-o	36
51	18MO59	LA-141:(CL111/CHENIERE/4/CPRS/KBNT//CFX-	171	d-r	7697.5	d-r	106	bc	94.9	g-p	10	10	14.4	e-h	74	a-g	67	a-f	41.9	b-f	2.2	c-k	100.7	a-l	57
52	18MO60	(9502008-A/DREW//CLR-120/4/CPRS/KBNT//95	177	b-o	7982.6	b-o	118	a	104.1	b-n	10	10	15.2	b-h	75	a-d	67	a-f	41.9	b-f	2.5	a-i	102.0	a-k	26
53	18MO61	(CL111/CHENIERE//CL111/CCDR)-0-125-2-0	178	b-o	7998.9	b-o	109	bc	105.8	b-i	10	10	16.1	b-h	75	a-f	71	a	41.8	b-f	2.8	a-e	103.0	a-j	24
54	18MO62	(CL111/4/CPRS/9502008-A//AR-11188/CCDR/6	170	d-r	7648.3	d-r	106	bc	102.5	b-p	10	10	15.5	b-h	74	a-g	68	a-e	41.3	b-f	2.5	a-i	99.7	a-l	68
55	18MO63	LA-141:(CL111/CHENIERE/4/CPRS/KBNT//CFX-	170	d-r	7664.7	d-r	106	bc	99.8	d-p	10	10	16.2	b-g	73	a-g	65	a-f	42.3	b-f	2.7	a-f	105.0	a-i	63
56	18MO64	(9502008-A/DREW//CLR-120/4/CPRS/KBNT//95	175	b-q	7874.4	b-q	108	bc	98.7	d-p	10	10	14.9	c-h	75	a-d	67	a-f	40.9	b-g	2.4	a-j	97.0	a-n	40
57	18MO66	(TRNS//TCL111/CHENIERE)-0-25-1-0	173	c-q	7792.5	c-q	103	c	104.8	b-l	10	10	14.4	d-h	72	b-g	63	b-f	43.3	a-d	2.6	a-g	108.7	a-g	50
58	18MO67	(CL111/4/CPRS/9502008-A//AR-11188/CCDR/6	169	d-r	7623.7	d-r	104	bc	96.8	e-p	10	10	15.9	b-h	74	a-f	67	a-f	42.9	a-f	2.7	a-f	107.7	a-h	71
59	18MO68	LA-141:(CL111/CHENIERE/4/CPRS/KBNT//CFX-	179	a-o	8041.5	a-o	106	bc	98.2	d-p	10	10	14.2	e-h	75	abc	68	a-e	41.5	b-f	2.3	a-j	99.3	a-l	20
60	18MO69	LA-141:(CL111/CHENIERE/4/CPRS/KBNT//CFX-	182	a-k	8193.9	a-k	106	bc	100.1	d-p	10	10	15.3	b-h	74	a-g	68	a-d	39.1	b-g	2.4	a-j	88.7	e-o	12
61	18MO70	(9502008-A/DREW//CLR-120/4/CPRS/KBNT//95	178	a-o	8018.6	a-o	107	bc	103.8	b-o	10	10	15.0	c-h	74	a-g	67	a-f	41.5	b-f	2.2	e-k	98.3	a-n	22
62	18MO71	(CATAHOULA/6/TACAURI/3/CPRS//82CAY21/TBN	160	j-s	7191.2	j-s	104	bc	98.9	d-p	10	10	14.6	d-h	75	a-f	65	a-f	41.2	b-f	2.4	a-j	98.3	a-n	104
63	18MO72	(CPRS/KBNT//WELLS-1CFX-118/5/TACAURI/3/C	178	b-o	8008.8	b-o	109	bc	97.9	d-p	9.7	10	14.6	d-h	73	a-g	67	a-f	39.8	b-g	2.7	a-g	93.7	a-o	23
64	18MO73	LA-141:(CL111/CHENIERE/4/CPRS/KBNT//CFX-	181	a-l	8164.4	a-l	109	bc	98.3	d-p	10	10	15.1	b-h	74	a-g	69	ab	40.1	b-g	2.4	a-j	93.7	a-o	13
65	18MO74	LA-141:(CL111/CHENIERE/4/CPRS/KBNT//CFX-	173	c-q	7797.4	c-q	108	bc	94.3	i-p	10	10	15.1	b-h	74	a-f	70	ab	41.6	b-f	2.6	a-g	100.7	a-l	49
66	18MO75	(9502008-A/DREW//CLR-120/4/CPRS/KBNT//95	167	f-r	7515.6	f-r	107	bc	100.0	d-p	10	10	15.0	c-h	74	a-g	66	a-f	40.6	b-g	2.6	a-g	97.0	a-n	81
67	18MO76	LA-141:(CL111/CHENIERE/4/CPRS/KBNT//CFX-	159	j-s	7166.6	j-s	105	bc	94.0	i-p	10	10	14.1	e-h	73	a-g	65	a-f	42.6	a-f	2.6	a-g	105.3	a-h	105
68	18MO77	(9502008-A/DREW//CLR-120/4/CPRS/KBNT//95	167	f-r	7504.1	f-r	106	bc	102.4	b-p	9.7	10	15.1	b-h	74	a-f	66	a-f	41.3	b-f	2.5	a-i	99.3	a-l	84
69	18MO78	(CL111/4/CPRS/9502008-A//AR-11188/CCDR/6	171	d-q	7717.1	d-q	107	bc	95.0	g-p	10	10	16.5	b-f	74	a-g	69	abc	39.9	b-g	2.5	a-i	91.7	b-o	56
70	18MO79	(TRNS//TCL111/CHENIERE)-0-32-1-0	178	a-o	8026.8	a-o	105	bc	104.5	b-m	10	10	15.6	b-h	73	a-g	63	b-f	44.0	abc	2.4	a-j	110.7	a-d	21
71	18MO80	(9502008-A/DREW//CLR-120/4/CPRS/KBNT//95	170	d-r	7663.1	d-r	107	bc	101.3	b-p	10	10	14.6	d-h	75	ab	67	a-f	42.1	b-f	2.6	a-h	103.0	a-j	64
72	18MO81	(9502008-A/DREW//CLR-120/4/CPRS/KBNT//95	177	b-p	7944.9	b-p	110	bc	94.9	g-p	10	10	15.8	b-h	75	a-e	67	a-f	43.6	a-d	2.6	a-g	110.0	a-e	32
73	18MO82	(CL111/4/CPRS/9502008-A//AR-11188/CCDR/6	162	i-s	7312.4	i-s	107	bc	103.0	b-p	10	10	15.2	b-h	73	a-g	65	a-f	43.5	a-d	2.4	a-j	108.3	a-h	97
74	18MO83	(CATAHOULA/6/TACAURI/3/CPRS//82CAY21/TBN	161	j-s	7246.9	j-s	104	bc	100.8	c-p	10	10	14.5	d-h	74	a-g	65	a-f	43.3	a-e	2.4	a-j	107.3	a-h	99
75	18MO84	(CPRS/KBNT//WELLS-1CFX-118/3/MBLE/4/CPRS	165	h-r	7415.7	h-r	109	bc	103.0	b-p	10	10	15.8	b-h	73	a-g	67	a-f	43.1	a-f	2.8	a-f	108.7	a-g	92
76	18MO85	(9502008-A/DREW//CLR-120/4/CPRS/KBNT//95	170	d-r	7671.3	d-r	107	bc	100.2	d-p	10	10	14.3	e-h	74	a-g	66	a-f	41.4	b-f	2.7	a-g	100.3	a-l	62
77	18MO86	LA-141:(CL111/CHENIERE/4/CPRS/KBNT//CFX-	165	h-r	7428.8	h-r	107	bc	101.3	b-p	10	10	15.3	b-h	74	a-g	67	a-f	42.3	b-f	2.6	a-h	104.3	a-i	91
78	18MO87	(CPRS/KBNT//WELLS-1CFX-118/3/MBLE/4/CPRS	169	e-r	7610.6	e-r	105	bc	102.9	b-p	10	10	15.0	c-h	73	a-g	67	a-f	41.8	b-f	2.8	a-f	102.7	a-j	72
79	18MO88	(9502008-A/DREW//CLR-120/4/CPRS/KBNT//95	167	f-r	7512.3	f-r	106	bc	105.1	b-k	10	10	14.5	d-h	73	a-g	67	a-f	39.8	b-g	2.4	a-j	91.7	b-o	82
80	18MO89	(9502008-A/DREW//CLR-120/4/CPRS/KBNT//95	172	d-q	7746.6	d-q	109	bc	103.8	b-o	10	10	15.9	b-h	76	a	70	ab	41.7	b-f	2.5	a-i	101.3	a-k	53
81	18MO90	(9502008-A/DREW//CLR-120/4/CPRS/KBNT//95	176	b-p	7933.4	b-p	110	bc	103.4	b-o	10	10	15.7	b-h	74	a-g	69	ab	41.8	b-f	2.6	a-h	103.0	a-j	34
82	18MO91	(CATAHOULA/4/CCDR/3/CPRS/KBNT//WELLS-1CF	171	d-r	7674.5	d-r	106	bc	100.0	d-p	10	10	15.2	b-h	74	a-f	66	a-f	41.4	b-f	2.4	a-j	99.0	a-m	61
83	18MO92	(CL111/CHENIERE//CL111/CCDR)-0-48-2-0	152	p-s	6838.9	p-s	106	bc	98.4	d-p	10	10	14.4	d-h	73	a-g	67	a-f	42.7	a-f	2.6	a-g	106.0	a-h	114
84	18MO93	(CL111/CHENIERE//CL111/CCDR)-0-49-2-0	167	f-r	7507.4	f-r	106	bc	98.8	d-p	10	10	14.7	d-h	74	a-f	68	a-d	41.0	b-g	2.7	a-g	98.3	a-n	83
85	18MO94	(CL111/4/CPRS/9502008-A//AR-11188/CCDR/6	173	c-q	7800.7	c-q	106	bc	101.3	b-p	10	10	14.8	d-h	74	a-f	68	a-e	42.3	b-f	2.6	a-h	104.0	a-j	47
86	18MO96	(9502008-A/DREW//CLR-120/4/CPRS/KBNT//95	170	d-r	7630.3	d-r	104	bc	98.6	d-p	10	10	15.1	b-h	72	b-g	66	a-f	40.1	b-g	2.5	a-j	96.7	a-n	70
87	18MO97	LA-141:(CL111/CHENIERE/4/CPRS/KBNT//CFX-	177	b-p	7953.1	b-p	106	bc	102.0	b-p	10	10	14.2	e-h	73	a-g	67	a-f	40.1	b-g	2.5	a-i	94.0	a-o	30
88	18MO98	LA-141:(CL111/CHENIERE/4/CPRS/KBNT//CFX-	171	d-r	7676.2	d-r	108	bc	92.2	op	10	10	13.6	h	74	a-g	67	a-f	43.2	a-e	2.7	a-g	108.7	a-g	60

89	18MO99	LA-141:(CL111/CHENIERE/4/CPRS/KBNT//CFX-	165	h-r	7404.2	h-r	106	bc	97.8	d-p	10	10	13.8	gh	74	a-f	67	a-f	41.9	b-f	2.4	a-j	101.3	a-k	94
90	18MO100	(9502008-A/DREW//CLR-120/4/CPRS/KBNT//95	173	c-q	7807.2	c-q	106	bc	101.3	b-p	10	10	14.7	d-h	74	a-f	66	a-f	39.9	b-g	2.4	a-j	92.7	b-o	46
91	18MO101	(TRNS//TCL111/CHENIERE)-0-43-1-0	189	a-h	8487.2	a-h	105	bc	101.1	b-p	10	10	15.9	b-h	72	b-g	66	a-f	41.2	b-f	2.3	b-k	97.7	a-n	6
92	18MO102	(CATAHOULA/4/CCDR/3/CPRS/KBNT//WELLS-1CF	171	d-r	7681.1	d-r	107	bc	101.2	b-p	9.7	9.7	14.7	d-h	75	a-e	66	a-f	40.8	b-g	2.6	a-h	97.3	a-n	59
93	18MO103	(CL111/CHENIERE//CL111/CCDR)-0-54-2-0	156	l-s	7040.4	l-s	108	bc	94.7	g-p	9.7	10	14.4	e-h	74	a-g	65	a-f	42.8	a-f	2.8	a-f	107.0	a-h	109
94	18MO104	LA-141:(CL111/CHENIERE/4/CPRS/KBNT//CFX-	178	b-o	7990.8	b-o	108	bc	93.2	l-p	10	10	14.8	d-h	74	a-g	68	a-d	41.0	b-g	2.7	a-g	98.7	a-n	25
95	18MO105	(9502008-A/DREW//CLR-120/4/CPRS/KBNT//95	167	f-r	7533.6	f-r	108	bc	98.7	d-p	10	10	15.2	b-h	75	a-d	67	a-f	43.6	a-d	2.8	a-f	111.3	abc	79
96	18MO106	(CL111/4/CPRS/9502008-A//AR-11188/CCDR/6	174	c-q	7833.5	c-q	104	bc	99.5	d-p	9.7	10	14.7	d-h	74	a-f	67	a-f	42.2	b-f	2.3	a-j	102.7	a-j	45
97	18MO107	(CL111/CHENIERE//CL111/CCDR)-0-159-1-0	170	d-r	7643.4	d-r	106	bc	97.5	e-p	10	10	14.4	e-h	74	a-g	67	a-f	41.6	b-f	2.6	a-h	100.7	a-l	69
98	18MO108	(9502008-A/DREW//CLR-120/4/CPRS/KBNT//95	166	h-r	7453.3	h-r	107	bc	95.0	g-p	10	10	15.2	b-h	74	a-g	64	b-f	41.8	b-f	2.7	a-f	102.7	a-j	89
99	18MO109	(CATAHOULA/4/CCDR/3/CPRS/KBNT//WELLS-1CF	166	g-r	7469.7	g-r	104	bc	102.2	b-p	10	10	14.5	d-h	75	a-e	66	a-f	43.1	a-f	2.9	ab	109.7	a-e	87
100	Jazzman	Jazzman	186	a-i	8392.2	a-i	104	bc	109.2	a-d	10	10	16.0	b-h	72	b-g	64	b-f	41.5	b-f	2.5	a-i	100.3	a-l	8
101	18MO112	(CL111/CHENIERE//CL111/CCDR)-0-98-2-0	161	j-s	7224.0	j-s	105	bc	94.5	h-p	10	10	14.7	d-h	73	a-g	66	a-f	42.0	b-f	3.0	a	104.7	a-i	102
102	18MO113	(CL111/CHENIERE//CL111/CCDR)-0-97-1-0	169	f-r	7589.3	f-r	107	bc	94.8	g-p	10	10	14.6	d-h	75	a-e	68	a-e	41.2	b-f	2.8	a-e	101.0	a-l	74
103	18MO114	(CL111/CHENIERE//CL111/CCDR)-0-96-1-0	162	i-s	7304.2	i-s	105	bc	97.3	e-p	10	10	14.4	d-h	74	a-g	67	a-f	42.0	b-f	2.8	a-f	103.7	a-j	98
104	18MO115	(9502008-A/DREW//CLR-120/4/CPRS/KBNT//95	177	b-p	7961.3	b-p	107	bc	93.7	k-p	10	10	15.0	c-h	75	a-e	65	a-f	41.5	b-f	2.7	a-g	100.7	a-l	28
105	18MO116	(TRNS/TCL111/CHENIERE)-0-48-1-0	175	b-q	7885.9	b-q	106	bc	104.3	b-n	10	10	15.5	b-h	73	a-g	67	a-f	42.2	b-f	2.3	a-j	102.3	a-j	38
106	CCDR	CCDR	174	c-q	7840.0	c-q	106	bc	93.7	j-p	10	10	14.6	d-h	73	a-g	67	a-f	41.1	b-f	2.9	a-d	100.0	a-l	44
107	18MO118	(CL111/4/CPRS/9502008-A//AR-11188/CCDR/6	176	b-p	7941.6	b-p	105	bc	98.1	d-p	10	10	16.2	b-g	72	d-g	66	a-f	41.9	b-f	2.6	a-g	102.3	a-j	33
108	18MO119	(CL111/4/CPRS/9502008-A//AR-11188/CCDR/5	156	m-s	6997.8	m-s	104	bc	98.3	d-p	10	10	14.0	fgh	74	a-g	65	a-f	41.7	b-f	2.6	a-h	101.0	a-l	111
109	18MO120	(CL111/4/CPRS/9502008-A//AR-11188/CCDR/5	160	j-s	7192.8	j-s	104	bc	101.2	b-p	10	10	14.2	e-h	75	a-f	65	a-f	43.8	abc	2.6	a-g	111.0	abc	103
110	18MO121	(CL111/CHENIERE//CL111/CCDR)-0-154-2-0	163	i-s	7314.1	i-s	104	bc	95.3	f-p	10	10	14.5	d-h	72	b-g	65	a-f	42.1	b-f	2.6	a-h	103.3	a-j	96
111	18MO122	(CL111/CHENIERE//CL111/CCDR)-0-153-1-0	168	f-r	7559.8	f-r	109	bc	104.0	b-n	10	10	16.1	b-h	73	a-g	67	a-f	42.1	b-f	2.7	a-g	103.7	a-j	78
112	18MO123	(9502008-A/DREW//CLR-120/4/CPRS/KBNT//95	172	d-q	7735.2	d-q	104	bc	98.7	d-p	10	10	14.3	e-h	73	a-g	66	a-f	41.5	b-f	2.3	a-j	99.7	a-l	55
113	18MO124	(CL111/4/CPRS/9502008-A//AR-11188/CCDR/6	157	k-s	7073.2	k-s	104	bc	104.4	b-m	10	10	14.8	d-h	73	a-g	65	a-f	40.9	b-g	2.5	a-i	97.3	a-n	106
114	18MO125	(CL111/CHENIERE//CL111/CCDR)-0-7-1-0	163	i-s	7317.3	i-s	104	bc	95.4	f-p	10	10	14.4	e-h	74	a-g	66	a-f	41.9	b-f	2.7	a-g	102.7	a-j	95
115	18MO126	(CL111/CHENIERE//CL111/CCDR)-0-10-1-0	154	n-s	6943.8	n-s	105	bc	96.4	e-p	9.7	10	14.1	e-h	73	b-g	63	b-f	41.9	b-f	2.7	a-g	102.3	a-j	112
116	Cypress	Cypress	157	k-s	7069.9	k-s	110	bc	99.8	d-p	9.7	10	16.6	b-e	74	a-g	69	ab	38.7	b-g	2.7	a-g	88.7	e-o	107
117	IR64	IR64	172	d-q	7745.0	d-q	106	bc	98.3	d-p	10	10	14.8	d-h	74	a-f	67	a-f	42.0	b-f	3.0	a	105.0	a-i	54
	LSD	P=.05	11.5		519.4		4.2		5.33		0.28	.	1.11		6.53		6.46		4.96		0.4		13.2		
	Standard	Deviation	7.18		322.9		2.61		3.31		0.17	0	0.69		4.06		4.01		3.08		0.25		8.22		
	CV		4.18		4.18		2.45		3.31		1.75	0	4.53		5.53		6.09		7.54		10		8.44		
	Levene's	F	0.59		0.588		0.84		0.59		0.912	0	0.6		0.96		0.9		0.89		0.66		0.73		
	Levene's	Prob(F)	1		0.999		0.86		1		0.712	.	1		0.59		0.75		0.76		1		0.97		
	Skewness	0.0581	0.06		3.7969*		0.23		-5.4697*			.	3032*		-16.353*		-9.5966*		-2.2667*		-1.5341*		-2.0745*		
	Kurtosis	0.7652*	7652*		33.9669*		0.26		28.0741*			.	1848*		294.5658*		139.8561*		54.1835*		7.3338*		9.819*		
	Replicate	F	6.74		6.736		11.4		34.6		1.743	0	11.1		1.07		9.27		14.5		3.47		28.4		
	Replicate	Prob(F)	0		0.001		0		0		0.1772	1	0		0.34		0		0		0.03		0		
	Treatment	F	6.36		6.357		2.26		5.2		0.918	0	5.59		1.02		1.47		2.2		4.01		5.32		
	Treatment	Prob(F)	0		1E-04		0		0		0.6986	1	0		0.43		0.01		0		0		0		

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls)

3. Uniform regional rice nursery (19URRN)

Objective: Determine agronomic performance of advance breeding lines from MO, AR, LA, TX, and MS under Missouri best management practices.

Date of Planting: April 24, 2019
Date of Harvesting: September 27, 2019
Number of entries/treatments: 260
Number of replicates: 2 and 3
Number of checks: 20
Plot size: 6.33' x 14'

The URRN is a cooperative testing conducted by the rice breeding programs in Missouri, Arkansas, Louisiana, Mississippi and Texas. The "Uniform" means that the same breeding lines are tested at each primary research locations. The test is composed of 260 rice lines (or genotypes), each representing an elite line from each breeding program. Breeders include in the URRN lines that may be considered in the future as a new release. Currently grown commercial varieties are also included to provide a standard of comparison. This test is conducted at the research station using the best cultural practices. All data are summarized and provided to each cooperator. This trial was planted in 16 foot-long plots with 7 rows ~7 inches apart in a randomized complete block design with three replicates for URRN groups 1-4 and 2 replicates for groups 5-8 with a total of 560 plots. Missouri lines have a total entry of 16 plus the MM17 check. They are included in groups 5, 6, 7, and 8 where the MO state are highlighted in gray. The table was rank according to yield. Data showed that four Missouri lines fall within the top 10 percent (rank 1-26). These lines are RU1905237, RU1905157 (Clearfield), RU1905228 and RU1805158. They are all medium grains that also displayed acceptable to superior milling yield. MM17 (RU1905234) as a check falls in the 76th rank. Each URRN trial group are designed separately thus statistical calculations and interpretations of variety differences using least significant differences (LSD) are according to each group.

Table 3. 2019 URRN means summary

Location: Missouri rice farm, Campbell MO.

Date of Planting: April 24, 2019

Date of harvesting: September 27, 2019

Investigator: Christian De Guzman

Grp	Trt	Entry	State	Pedigree	Type	Yield bu/ac		Yield lb/ac		Days to head		Height (cm)		Vigor		% Moist		%Lodge	Grain Total		Grain Whole		Grain Whiten		Grain Trans		Grain Polish		Rank
1	1	RU1701081	AR	IRGA409/RXMT/5/NWBT/3/LBNT/9902//LBLE/4/MILL/6/LBNT/9902/3/DAWN/9695//STBN/4/LGRU/5/WLLS	L	205	ab	9240.9	ab	100.7	-	102.4	bc	10.0	a	16.3	b		73.7	ab	61.5	-	40.6	ab	2.2	a-d	94.3	ab	48
1	2	1702183	LA	TRNS//CCDR/JEFF/5/9502008/DREW//CLR20/4/CPRS/KBNT//9502008A	CL	178	a-d	8010.4	a-d	96.7	-	97.3	bc	10.0	a	16.4	b		73.0	ab	66.3	-	40.2	ab	2.2	a-d	93.3	ab	170
1	3	RU1804067	MS	RSMT/KATY//Bowman	L	195	abc	8790.3	abc	101.0	-	102.8	bc	10.0	a	17.5	b		72.0	ab	64.6	-	42.0	a	2.3	a-d	101.7	ab	80
1	4	RU1803156	TX	CCDR/MILL	L	167	bcd	7492.7	bcd	103.7	-	99.0	bc	9.0	a	17.7	b		73.0	ab	67.1	-	38.8	ab	2.1	d	86.3	abc	209
1	5	RU1701084	AR	RU0801076/5/KATY/NWBT//L201/7402003/3/WLLS/4/L201/7402003//KATY/NWBT/3/LGRU	L	229	a	10304.3	a	103.7	-	102.8	bc	10.0	a	16.6	b		73.1	ab	63.3	-	39.2	ab	2.4	a-d	89.0	abc	11
1	6	1602097	LA	CL 131/TRNS	CL	186	abc	8369.2	abc	101.3	-	103.9	bc	9.0	a	16.9	b		71.5	b	64.9	-	40.3	ab	2.0	d	92.3	ab	126
1	7	RU1804187	MS	DXBL//NWBT/KATY/3/Bowman	L	188	abc	8464.3	abc	104.0	-	101.2	bc	10.0	a	16.3	b		72.7	ab	64.2	-	40.7	ab	2.4	a-d	96.0	ab	114
1	8	RU1803140	TX	4579	L	173	bcd	7767.9	bcd	114.7	-	119.2	a	9.7	a	25.7	a	6.6	69.4	c	65.0	-	35.2	b	2.3	a-d	71.0	c	187
1	9	RU1701087	AR	19991516/19951166/7/LBNT/9902/3/DAWN/9695//STBN/4/LGRU/5/WLLS/6/RU9201179	L	205	ab	9237.6	ab	101.3	-	105.0	bc	10.0	a	15.4	b		74.2	a	66.8	-	39.7	ab	2.8	a	93.7	ab	49
1	10	1702140	LA	CHNR/MRMT	L	186	abc	8352.9	abc	106.7	-	95.8	bc	10.0	a	15.3	b		72.2	ab	65.5	-	37.1	ab	2.1	bcd	78.3	bc	129
1	11	RU1704077	MS	Texmont/TeQing(BF7-46)/Tranesse	L	171	bcd	7704.0	bcd	105.0	-	107.0	b	9.7	a	17.3	b		71.7	ab	60.5	-	40.5	ab	2.7	ab	97.3	ab	193
1	12	RU1003098	TX	CPRS/NWBT//KATY/3/CCDR	L	125	d	5605.2	d	108.0	-	99.5	bc	9.7	a	16.1	b		72.9	ab	62.9	-	38.9	ab	2.3	a-d	87.7	abc	239
1	13	RU1801101	AR	CL172/RU1102034	CL	174	bcd	7813.8	bcd	103.7	-	102.4	bc	10.0	a	15.2	b		73.7	ab	66.0	-	42.7	a	2.7	abc	106.3	a	182
1	14	1902014	LA	LGRU/CLR11/4/9302065/3/CFX29/AR1142/LA2031/5/9502008/DREW//CLR20/3/CPRS/KBNT//WLLS/CFX18	CL	176	bcd	7920.3	bcd	100.7	-	96.5	bc	10.0	a	16.0	b		72.8	ab	64.4	-	40.3	ab	2.5	a-d	94.3	ab	177
1	15	RU1804179	MS	RSMT/KATY//Bowman	L	173	bcd	7782.7	bcd	104.7	-	101.8	bc	10.0	a	16.4	b		72.7	ab	59.9	-	41.5	a	2.1	cd	98.3	ab	186
1	16	RU0803153	TX	CPRS/CCDR	L	143	cd	6452.2	cd	103.7	-	94.0	c	7.7	b	16.2	b		72.7	ab	66.9	-	38.0	ab	2.4	a-d	84.0	abc	231
1	17	RU1601010	AR	91642//KATY/NWBT/5/RU9201176/4/KATY/NWBT/3/LBNT/STBN//NWBT/6/CYBT/7/FRNS	L	193	abc	8693.7	abc	98.7	-	105.8	bc	10.0	a	15.0	b		73.5	ab	63.4	-	42.5	a	2.8	a	106.3	a	87
1	18	CL153	LA	CL153	CL	171	bcd	7684.4	bcd	111.7	-	97.2	bc	10.0	a	15.7	b		73.2	ab	65.3	-	41.2	a	2.5	a-d	99.0	ab	197
1	19	RU9903092	TX	PRESIDIO	L	168	bcd	7541.8	bcd	116.7	-	94.9	bc	10.0	a	14.6	b		73.1	ab	61.1	-	37.6	ab	2.8	ab	93.3	ab	205
1	20	CL111	LA	CL111	CL	165	bcd	7435.3	bcd	107.7	-	96.8	bc	10.0	a	16.2	b		74.3	a	66.3	-	41.1	a	2.3	a-d	97.7	ab	214
2	21	RU1801133	AR	CL172/4/9502008-A//AR1188/CCDR/3/CFX-26/9702128	CL	189	b-f	8518.3	b-f	99.3	def	99.0	c-f	10.0	-	15.6	-		72.8	c-f	67.8	abc	38.2	b-e	2.0	de	82.7	b-g	109
2	22	1702165	LA	CAFFEY/CL261	CM	191	b-f	8597.0	b-f	100.7	cde	107.8	ab	10.0	-	16.7	-		72.3	def	65.4	d-g	39.5	a-d	2.8	a	92.3	a-d	101
2	23	RU1804224	MS	REX/Templeton	L	185	c-f	8303.7	c-f	104.7	ab	102.8	b-e	10.0	-	17.3	-		72.6	c-f	64.9	e-h	40.2	ab	2.0	cde	91.7	a-d	135
2	24	RU1303153	TX	IR64/IR 1321-12	L	176	def	7935.0	def	96.0	fg	102.3	b-e	10.0	-	16.0	-		71.7	f	62.8	i	36.6	de	2.2	b-e	76.7	efg	176
2	25	RU1801169	AR	ROYJ/RU1501024	CL	209	abc	9394.9	abc	101.0	cde	103.3	bcd	10.0	-	15.7	-		72.7	c-f	65.4	d-g	39.4	a-d	2.4	a-e	90.0	a-e	42
2	26	1902026	LA	WLLS/CFX18//DREW/CFX18/3/CHNR//CCDR/JEFF	CL	195	b-f	8759.2	b-f	97.3	efg	98.4	c-f	10.0	-	15.2	-		74.1	ab	66.6	c-f	42.1	a	2.2	a-e	101.3	a	82
2	27	RU1804155	MS	Trenasse/Bowman	L	199	a-d	8932.9	a-d	95.3	g	101.8	b-e	10.0	-	16.1	-		72.9	b-f	67.0	b-e	40.7	ab	2.6	abc	96.7	ab	68
2	28	RU1603138	TX	WAB 450-11-1-1-P31-HB (NERICA 5)/RSMT	L	189	b-f	8518.3	b-f	104.7	ab	104.1	bc	9.7	-	14.8	-		73.6	a-d	67.2	bcd	39.8	abc	2.1	b-e	91.0	a-d	110
2	29	RU1701121	AR	EARL/9902028//JPTR	M	198	a-e	8901.7	a-e	102.7	a-d	106.4	b	10.0	-	17.9	-		73.7	abc	69.3	a	40.2	ab	2.5	a-d	94.0	abc	70
2	30	1602195	LA	9502008-A/DREW//CLR 20/4/CPRS/KBNT//9502008A	CL	190	b-f	8562.6	b-f	100.0	cde	105.2	bc	10.0	-	15.4	-		73.8	abc	67.2	bcd	41.0	ab	2.2	b-e	96.0	ab	104
2	31	RU1804204	MS	Bowman/L201//TBNT/BLMT/3/RXMT/IR36	L	170	f	7645.0	f	105.7	a	95.8	ef	10.0	-	15.8	-		70.9	g	60.7	j	37.6	b-e	2.0	de	80.0	c-g	199
2	32	RU1303138	TX	IR64/IR 1321-12	L	183	c-f	8241.4	c-f	96.0	fg	102.1	b-e	10.0	-	16.9	-		72.2	ef	65.5	d-g	36.0	e	2.2	b-e	74.3	fg	147
2	33	RU1901033	AR	RICO/BNGL//RU0602162/RU0502031	M	219	a	9843.9	a	99.3	def	94.1	f	10.0	-	15.7	-		74.2	a	69.5	a	38.2	b-e	2.7	ab	86.3	a-f	18
2	34	1902034	LA	9502008/DREW//CLR20/3/CPRS/KBNT//9502008/6/KATY/CPRS//NWBT/KATY/3/9502008/4/CLR9/5/9502008/TCRI/CLR5	CL	190	b-f	8569.1	b-f	97.3	efg	96.8	def	10.0	-	15.4	-		73.4	a-e	66.5	c-f	39.8	abc	2.3	a-e	91.3	a-d	103
2	35	RU1804214	MS	REX/Templeton	L	187	b-f	8402.0	b-f	101.3	b-e	96.4	def	10.0	-	15.8	-		74.2	a	64.7	fgh	40.4	ab	2.5	a-d	94.7	abc	123
2	36	RU1403141	TX	AC110DH2/AC108DH2//CHEN	L	171	ef	7699.1	ef	103.7	abc	94.9	f	9.7	-	15.9	-		73.6	a-d	68.6	ab	36.9	cde	2.2	a-e	78.0	d-g	194
2	37	1902037	LA	CL162/3/TRNS//CCDR/JEFF	CL	169	f	7620.5	f	101.3	b-e	98.3	c-f	10.0	-	16.6	-		72.2	ef	65.8	c-g	35.9	e	2.0	cde	73.0	g	200
2	38	WLLS	AR	WELLS	L	189	b-f	8485.6	b-f	100.7	cde	111.8	a	10.0	-	16.2	-		74.6	a	63.1	hi	40.3	ab	2.5	abc	94.7	abc	112
2	39	CLL15	AR	16AR1111	CL	178	def	8021.9	def	99.7	def	96.7	def	10.0	-	17.8	-		72.4	def	64.2	ghi	40.0	abc	1.9	e	90.0	a-e	167
2	40	DMND	AR	DIAMOND	L	212	ab	9537.5	ab	99.7	def	103.8	bc	10.0	-	16.6	-		74.2	a	64.9	e-h	39.3	a-d	2.2	b-e	88.3	a-e	33
3	41	RU1901041	AR	CLXAR19 (248WE16i-5/TGRT/7/248DREW16C-1-3/6/LGRU//KATY/STBN/5/NWBT/KATY//RA73/LMNT/4/LBNT/9902/3/DAWN/9695//STBN)	CL	230	a	10335.4	a	103.7	a-f	108.2	b	10.0	-	17.3	ab		72.7	b-e	63.3	de	40.6	b-f	2.8	ab	97.7	b-f	10
3	42	1802162	LA	TRNS//CCDR/JEFF/4/CHNR/3/NWBT/KATY//9902207X2	L	210	b	9449.0	b	100.0	ef	93.7	fg	10.0	-	15.8	ab		74.1	ab	69.2	ab	42.6	abc	2.3	b-f	104.0	abc	40
3	43	RU1804183	MS	DXBL//NWBT/KATY/3/Bowman	L	192	bc	8621.6	bc	100.0	ef	97.7	d-g	10.0	-	15.9	ab		73.0	bc	62.7	de	39.2	c-f	1.9	f	87.0	c-g	99
3	44	RU1403089	TX	CPRS/9901081	L	182	cd	8200.5	cd	107.0	a	107.0	bc	10.0	-	15.8	ab		73.9	ab	68.7	ab	37.7	def	2.2	b-f	82.0	d-g	151
3	45	RU1801237	AR	JPTR/EARL	M	239	a	10764.7	a	101.7	b-f	95.2	efg	10.0	-	16.8	ab		73.9	ab	70.8	a	38.8	c-f	2.5	a-f	88.3	c-g	2
3	46	1802166	LA	CHNR/3/NWBT/KATY//9902207X2/4/CTHL	L	190	c	8531.4	c	100.3	def	95.3	efg	10.0	-	16.6	ab		74.0	ab	68.3	ab	37.5	ef	2.2	c-f	80.7	efg	108
3	47	RU1804234	MS	REX/Templeton	L	186	cd	8388.9	cd	104.3	a-e	98.3	d-g	10.0	-	14.5	b		72.8	b-e	63.6	de	41.9	abc	2.5	a-f	102.0	a-d	124
3	48	RU1603144	TX	WAB 450-11-1-1-P31-HB (NERICA 5)/RSMT	L	187	cd	8408.6	cd	105.0	abc	104.5	bcd	9.3	-	14.4	b		73.1	bc	65.5	cd	40.6	b-f	2.4	a-f	96.0	b-f	119
3	49	RU1701007	AR	FRNS//WLLS/CL161/3/248DREW/CL161	CL	197	bc	8877.2	bc	103.0	a-f	114.6	a	9.7	-	16.0	ab		72.7	b-e	62.4	e	45.4	a	2.8	ab	118.7	a	74
3	50	1802174	LA	ORIN/3/MERC/CAM9/MARS/4/BNGL/5/NPTN	M	201	bc	9034.5	bc	104.7	a-d	101.0	c-f	10.0	-	16.1	ab		71.6	def	64.3	de	41.4	b-e	2.7	abc	100.3	b-e	58

3	51	RU1804195	MS	Bowman/L201//TBNT/BLMT/3/RXMT/IR36	L	194	bc	8741.2	bc	101.7	b-f	100.0	c-f	9.7	-	15.2	ab		70.9	f	62.6	de	42.2	abc	2.5	a-f	103.3	abc	84
3	52	RU1303181	TX	043752/0047277/CHEN	L	184	cd	8297.1	cd	106.0	ab	100.8	c-f	10.0	-	16.6	ab		72.9	bcd	68.7	ab	36.6	f	2.4	a-f	78.0	fg	137
3	53	RU1901053	AR	CFFY/RU1202168	CM	190	c	8556.0	c	106.3	a	103.2	b-e	10.0	-	16.1	ab		73.4	abc	67.6	bc	41.7	a-d	2.9	a	103.0	abc	105
3	54	1802054	LA	CCDR/JEFF//CFX-26/9702128/3/CL151	CL	187	cd	8408.6	cd	101.7	b-f	102.0	b-e	9.3	-	17.9	a		72.1	c-f	64.6	de	38.7	c-f	2.0	ef	85.3	c-g	120
3	55	RU1804191	MS	Bowman/L201//TBNT/BLMT/3/RXMT/IR36	L	179	cd	8076.0	cd	103.0	a-f	91.7	g	10.0	-	17.1	ab		71.2	f	58.7	f	43.5	ab	2.6	a-e	109.7	ab	163
3	56	RU1603178	TX	SABR/CCDR//PRESIDIO	L	181	cd	8128.4	cd	107.3	a	105.4	bcd	10.0	-	18.0	a		71.3	f	65.5	cd	40.3	b-f	2.5	a-f	93.7	b-g	159
3	57	RU1804171	MS	RSMT/KATY//Bowman	L	168	d	7540.2	d	99.3	f	98.1	d-g	10.0	-	16.5	ab		71.5	ef	54.6	g	42.0	abc	2.1	def	100.0	b-e	206
3	58	CHNR	LA	CHENIERE	L	186	cd	8367.6	cd	100.7	c-f	95.3	efg	10.0	-	15.9	ab		74.5	a	69.2	ab	39.3	c-f	2.5	a-f	90.0	b-g	127
3	59	CCDR	LA	COCODRIE	L	184	cd	8287.3	cd	100.0	ef	99.9	c-f	10.0	-	16.5	ab		73.1	bc	67.2	bc	36.6	f	2.1	def	75.7	g	139
3	60	CL272	LA	CL272	CM	193	bc	8665.8	bc	101.3	c-f	100.1	c-f	9.7	-	15.6	ab		72.6	b-e	65.5	cd	40.7	b-e	2.7	a-d	97.7	b-f	91
4	61	RU1801221	AR	CTHL/CL172	CL	192	cde	8629.8	cde	104.3	a	101.3	efg	10.0	-	16.6	ab		73.2	abc	67.2	a-e	39.5	c-f	2.4	bcd	90.7	def	98
4	62	1602071	LA	CLH161 (HYBRID)	CL	209	abc	9414.6	abc	99.0	cd	120.7	a	9.7	-	16.1	ab		73.3	abc	64.9	c-f	42.2	ab	2.5	b	103.3	abc	41
4	63	RU1804163	MS	CPRS//NWBT/KATY/3/Bowman	L	186	def	8377.4	def	103.0	ab	100.3	efg	10.0	-	16.8	ab		71.7	d	65.3	b-f	37.6	f	2.0	d	80.0	f	125
4	64	RU1603113	TX	043752/0047277/CHEN	L	186	def	8367.6	def	106.0	a	106.6	c-f	10.0	-	16.9	ab		72.4	cd	69.1	a	37.2	f	2.3	bcd	80.0	f	128
4	65	RU1901065	AR	----------	L	218	ab	9809.4	ab	104.0	ab	114.3	bc	10.0	-	15.8	ab		74.6	a	67.9	a-d	39.9	b-f	2.1	bcd	90.3	def	19
4	66	1802094	LA	PVL108	L	164	f	7400.9	f	100.0	bcd	110.9	bcd	10.0	-	16.8	ab		73.7	abc	68.5	ab	38.6	def	2.3	bcd	85.7	ef	217
4	67	RU1804063	MS	RSMT/KATY//Bowman	L	183	def	8254.5	def	99.0	cd	95.4	g	10.0	-	15.4	b		72.5	bcd	63.4	fg	43.4	a	2.1	bcd	106.7	ab	146
4	68	RU1603086	TX	CL161/CPRS	L-CL	172	ef	7741.7	ef	105.7	a	108.4	cde	10.0	-	17.2	ab		72.6	bcd	67.1	a-e	40.5	b-e	2.1	cd	93.7	cde	190
4	69	RU1801145	AR	ROYJ/CL142-AR	CL	178	def	8017.0	def	102.0	abc	113.3	bc	10.0	-	16.7	ab		72.3	cd	64.2	ef	41.9	abc	2.4	bc	101.7	bcd	169
4	70	1802098	LA	CHNR/3/NWBT/KATY//9902207X2/4/BASF 2-21	L	180	def	8077.6	def	97.3	d	98.7	fg	10.0	-	14.4	b		72.3	cd	61.4	g	43.4	a	2.1	bcd	106.7	ab	162
4	71	RU1804071	MS	JODON/3/KATY//GFMT/PCOS/Templeton	CL	178	def	8020.2	def	105.7	a	107.1	c-f	10.0	-	16.1	ab		71.7	d	66.9	a-e	38.5	def	2.2	bcd	85.0	ef	168
4	72	RU1403153	TX	L202/LQ39a//SABR	L	168	ef	7564.8	ef	105.7	a	103.4	def	10.0	-	16.0	ab		73.2	abc	68.2	abc	38.6	def	2.1	cd	85.0	ef	203
4	73	RU1801093	AR	----------	L	201	bcd	9024.6	bcd	103.3	ab	108.3	cde	10.0	-	16.1	ab		73.2	abc	65.0	c-f	39.7	b-f	2.3	bcd	91.0	def	59
4	74	1802110	LA	CPRS/BASF 1-14	L	138	g	6209.8	g	104.0	ab	103.5	def	10.0	-	15.8	ab		70.1	e	63.5	fg	33.8	g	1.6	e	61.0	g	235
4	75	RU1804135	MS	Taggart/CL111	CL	190	c-f	8546.2	c-f	105.7	a	103.9	def	10.0	-	16.2	ab		73.7	abc	65.8	b-f	44.2	a	2.5	b	112.7	a	107
4	76	RU1703129	TX	IR64/IR 1321-12	L	171	ef	7689.3	ef	97.3	d	100.4	efg	10.0	-	15.7	ab		71.7	d	65.3	b-f	37.3	f	2.2	bcd	80.0	f	195
4	77	RU1803196	TX	CCDR/L202//TRENASSE	L	177	def	7946.5	def	106.0	a	107.8	c-f	10.0	-	17.7	ab		71.2	d	64.6	def	38.6	def	2.3	bcd	86.3	ef	175
4	78	JPTR	LA	JUPITER	M	230	a	10350.1	a	103.3	ab	104.4	def	10.0	-	18.9	a		71.7	d	69.3	a	40.8	bcd	2.9	a	98.7	bcd	9
4	79	ROYJ	AR	ROY J	L	217	ab	9775.0	ab	105.7	a	117.0	ab	10.0	-	16.3	ab		73.9	ab	65.7	b-f	37.9	ef	2.4	bc	83.3	ef	23
4	80	TITN	AR	TITAN	M	212	ab	9547.3	ab	96.0	d	106.2	c-f	10.0	-	16.8	ab		72.4	cd	64.3	ef	40.6	b-e	3.0	a	98.7	bcd	32
5	81	RU1901081	AR	FRNS//WLLS/CL161//FRNS/6/LBNT/9902/3/DAWN/9695//STBN/4/LGRU/5/DREW	CL	194	a-f	8734.6	a-f	105.0	b	106.0	f-k	10.0	-	18.1	cde		73.5	-	67.9	abc	40.6	a-e	2.3	b-f	95.0	a-e	85
5	82	1802102	LA	CHNR/3/NWBT/KATY//9902207X2/4/BASF2-21	L	178	b-g	8004.7	b-g	96.0	k	96.4	m	10.0	-	15.2	cde		73.2	-	61.6	a-g	40.4	a-f	1.9	e-i	92.0	a-f	173
5	83	RU1804131	MS	Rex/CL151	CL	184	b-g	8265.2	b-g	104.5	bc	104.4	f-m	10.0	-	18.8	b-e		71.8	-	64.9	a-e	40.9	a-e	1.6	hi	93.0	a-f	142
5	84	RU1903084	TX	IR64/IR 1321-12	L	231	abc	10415.7	abc	114.5	a	120.5	b	10.0	-	23.6	b		72.1	-	67.9	abc	35.7	gh	2.3	b-e	73.0	f-j	5
5	85	RU1901085	AR	----------	CL	201	a-f	9054.1	a-f	105.5	b	117.8	bc	10.0	-	17.4	cde		74.0	-	66.7	a-d	37.8	c-g	2.1	c-h	82.0	c-h	57
5	86	1902086	LA	DREW/BASF1-4	L	142	fgh	6407.2	fgh	101.5	b-i	97.9	klm	10.0	-	15.1	cde		76.8	-	59.3	d-h	38.5	c-g	1.8	f-i	83.0	c-h	233
5	87	RU1804147	MS	Rex/CL151	CL	199	a-f	8965.6	a-f	100.0	c-k	109.0	e-i	10.0	-	16.3	cde		72.9	-	66.0	a-d	42.2	abc	2.1	c-i	102.0	abc	64
5	88	RU1703147	TX	CPRS/NWBT//KATY/3/CCDR	L	165	c-g	7429.6	c-g	105.5	b	102.4	h-m	10.0	-	15.5	cde		73.9	-	69.4	a	35.3	gh	2.1	d-i	70.5	g-j	215
5	89	RU1901089	AR	WLLS/CL161//TGRT/3/DREW/CL161//CL142-AR	CL	172	b-g	7751.5	b-g	102.0	b-h	115.8	b-e	10.0	-	15.6	cde		74.6	-	58.2	e-h	41.8	a-d	2.6	abc	102.0	abc	189
5	90	1902090	LA	CTHL/BASF2-22	L	166	c-g	7481.2	c-g	100.0	c-k	88.8	n	10.0	-	14.3	e		72.4	-	60.4	c-h	43.4	ab	2.3	b-f	107.0	ab	211
5	91	RU1504197	MS	RSMT/3/MARS/NWRX//TBNT/4/CL151	CL	188	a-g	8481.5	a-g	101.0	b-j	102.0	h-m	10.0	-	15.4	cde		72.8	-	66.4	a-d	38.5	c-g	2.2	c-h	85.0	c-h	113
5	92	RU1703163	TX	Hayakogane/BALDO	L	150	efg	6758.6	efg	106.0	b	105.9	f-k	9.0	-	16.2	cde		74.3	-	69.6	a	36.0	fgh	1.8	e-i	72.0	f-j	228
5	93	RU1901093	AR	TGRT/3/FRNS/CL161//TEMPLETON	CL	188	a-g	8447.1	a-g	105.5	b	111.9	c-g	10.0	-	15.9	cde		72.6	-	64.0	a-f	41.0	a-e	2.8	a	99.5	a-d	116
5	94	1902094	LA	9302065/BASF1-6	L	101	h	4559.0	h	96.0	k	108.2	e-i	10.0	-	15.5	cde	35	73.9	-	57.2	fgh	40.1	a-f	2.7	ab	94.5	a-e	240
5	95	RU1804123	MS	Rex/CL151	CL	199	a-f	8936.1	a-f	98.0	g-k	107.8	f-i	10.0	-	15.5	cde		72.7	-	66.0	a-d	38.4	c-g	1.7	ghi	82.0	c-h	67
5	96	RU1603166	TX	CPRS/3/CPRS/NWBT/KATY	L	155	efg	6994.6	efg	105.5	b	99.0	j-m	10.0	-	15.0	de		72.7	-	67.5	abc	35.4	gh	1.8	e-i	69.0	hij	227
5	97	RU1801097	AR	RU1102034/RU1302045	CL	188	a-g	8459.4	a-g	98.5	f-k	105.3	f-l	10.0	-	15.3	cde		74.5	-	66.8	a-d	41.8	a-d	2.3	b-f	100.5	a-d	115
5	98	1902098	LA	CTHL/BASF2-18	L	142	fgh	6367.9	fgh	103.5	b-e	101.0	i-m	10.0	-	13.9	e		72.1	-	56.1	gh	40.8	a-e	2.0	d-i	94.5	a-e	234
5	99	RU1604197	MS	CL151//COLUMBIA2/BENGAL	CL	206	a-f	9258.1	a-f	105.5	b	108.8	e-i	10.0	-	18.0	cde		73.6	-	65.6	a-e	40.8	a-e	2.2	c-g	95.5	a-e	47
5	100	RU1903100	TX	IR64/IR 1321-12	L	248	a	11138.2	a	115.5	a	107.5	f-j	10.0	-	22.1	bc		72.8	-	69.3	a	37.1	e-h	2.4	a-d	79.5	d-j	1
5	101	RU1901101	AR	ROYJ/RU1501024	CL	198	a-f	8909.1	a-f	97.0	ijk	105.0	f-l	10.0	-	15.1	cde		72.7	-	63.5	a-f	39.6	b-g	2.2	b-g	90.0	a-g	69
5	102	1802050	LA	CCDR/JEFF//CFX-26/9702128/3/CL151	CL	185	a-g	8338.9	a-g	98.0	g-k	98.8	klm	10.0	-	15.8	cde		73.5	-	64.9	a-e	37.0	e-h	1.7	ghi	76.0	e-j	131
5	103	RU1804083	MS	CL151/JSMN85//CL151	CL	195	a-f	8756.7	a-f	104.0	bcd	110.5	d-h	10.0	-	17.5	cde		73.9	-	67.9	abc	38.7	c-g	1.6	i	83.0	c-h	83
5	104	RU1903104	TX	IR64/IR 1321-12	L	210	a-e	9459.6	a-e	113.5	a	118.4	bc	10.0	-	28.4	a		71.7	-	64.5	a-e	33.6	h	2.0	d-i	62.0	j	38
5	105	RU1801105	AR	JZMN/RU0701124//PI632283	L(A)	172	b-g	7722.0	b-g	102.5	b-g	108.3	e-i	10.0	-	16.4	cde		73.8	-	68.9	abc	33.6	h	2.1	c-h	63.0	ij	192

5	106	1902106	LA	KBNT/CL111	CL	176	b-g	7918.7	b-g	101.0	b-j	101.7	h-m	10.0	-	17.7	cde		74.1	-	67.5	abc	41.3	a-e	2.4	a-d	98.5	a-d	178
5	107	RU1804107	MS	GFMT/KDM105//CL151/JSMN85	CL	187	a-g	8405.3	a-g	104.5	bc	100.7	i-m	10.0	-	16.7	cde		72.6	-	62.8	a-f	40.4	a-f	1.8	e-i	92.0	a-f	121
5	108	M202*5/Kat	TX	1903108		159	d-g	7146.9	d-g	96.5	jk	108.0	e-i	10.0	-	20.4	b-e	5	70.9	-	66.9	a-d	38.8	c-g	2.0	d-i	85.5	c-h	222
5	109	RU1801109	AR	JZMN/PI560239//JES	L(A)	166	c-g	7486.1	c-g	99.0	e-k	109.1	e-i	10.0	-	17.3	cde		69.2	-	54.1	h	39.1	b-g	2.6	abc	89.5	a-h	210
5	110	1902110	LA	LGRU/CLR11/4/9302065/3/CFX29/AR1142/LA2031/4/CFX18//CCDR/9770532DH2/3/CPRS/KBNT//9502008A	CL	174	b-g	7810.5	b-g	98.5	f-k	97.2	lm	10.0	-	16.5	cde		69.8	-	64.1	a-f	39.8	b-g	2.4	a-d	92.0	a-f	184
5	111	RU1804087	MS	Rex/CL151	CL	204	a-f	9167.2	a-f	99.5	d-k	105.9	f-k	10.0	-	17.3	cde		73.6	-	65.0	a-e	44.3	a	2.0	d-i	109.5	a	52
5	112	1903112	TX	1903112		127	gh	5696.9	gh	106.0	b	131.3	a	10.0	-	21.9	bcd		74.0	-	60.6	b-h	41.5	a-e	2.2	c-g	98.5	a-d	238
5	113	RU1801238	AR	EARL/9902028//RU1202068	CM	234	ab	10538.6	ab	103.0	b-f	106.3	f-k	10.0	-	17.6	cde		74.2	-	68.3	abc	37.6	d-g	2.2	c-g	81.0	c-i	4
5	114	1902114	LA	CFX18//CCDR/9770532DH2/3/CPRS/KBNT/9502008/4/LGRU/CLR11/4/9602065/3/CFX29/AR1142/LA2031	CL	181	b-g	8162.0	b-g	97.5	h-k	102.5	h-m	10.0	-	17.5	cde		74.8	-	68.1	abc	39.4	b-g	2.1	c-i	88.5	b-h	155
5	115	RU1804139	MS	CL161/Priscilla//CL151/JSMN85	CL	196	a-f	8825.5	a-f	104.0	bcd	112.9	c-f	10.0	-	18.8	b-e		73.2	-	68.6	abc	36.1	fgh	2.0	d-i	73.0	f-j	79
5	116	RU1703138	TX	CL161/CPRS	L-CL	178	b-g	8004.7	b-g	105.0	b	103.4	g-m	10.0	-	16.0	cde		73.1	-	67.0	a-d	39.6	b-g	2.0	d-i	89.0	a-h	172
5	117	RU1905117	MO	A:NEPTUNE/3/BNGL/CL 161//CAFFEY	(CL) MG	213	a-e	9567.8	a-e	105.0	b	108.6	e-i	10.0	-	16.9	cde		74.0	-	69.0	ab	37.7	c-g	2.3	b-f	82.5	c-h	31
5	118	RU1905118	MO	A:NEPTUNE/3/BNGL/CL 161//CAFFEY	(CL) MG	193	a-f	8680.5	a-f	105.5	b	106.3	f-k	10.0	-	17.5	cde		74.2	-	67.7	abc	39.8	b-g	2.3	b-f	91.0	a-g	88
5	119	CLM04	AR	16AR1030	CM	223	a-d	10037.2	a-d	106.0	b	116.3	bcd	10.0	-	16.6	cde		72.9	-	69.2	a	37.5	d-g	2.3	b-f	81.0	c-i	14
5	120	CL163	MS	CL163	CL	162	d-g	7299.3	d-g	105.0	b	105.5	f-k	10.0	-	18.2	cde		72.2	-	65.5	a-e	39.0	c-g	1.8	e-i	85.5	c-h	218
6	121	RU1901121	AR	RU1102131/CL172	CL	187	c-k	8432.3	c-k	98.0	-	106.9	bc	10.0	-	17.3	b		73.1	a-i	66.9	a-e	38.1	b-h	2.2	a-j	84.0	b-h	117
6	122	1902122	LA	CHNR/6/CPRS/KBNT//9502008/5/KATY/CPRS//NWBT/KATY/3/9502008/4/CLR9	CL	181	f-k	8142.3	f-k	97.5	-	96.3	c	10.0	-	16.2	b		73.9	a-g	66.7	a-e	36.6	e-h	1.7	ij	74.5	e-h	158
6	123	RU1904123	MS	Lemont/Jasmine	L	174	ijk	7808.1	ijk	103.0	-	105.9	bc	10.0	-	16.8	b		71.9	e-i	61.6	g	41.5	b	2.3	a-f	99.5	b	185
6	124	RU1703178	TX	Hayakogane/BALDO	L	184	e-k	8257.8	e-k	104.0	-	105.0	bc	10.0	-	17.5	b		73.2	a-i	67.7	a-e	35.4	h	1.8	hij	69.0	h	144
6	125	RU1901125	AR	JPTR/3/EARL//BNGL/SHORTRICO	M	234	a	10541.0	a	104.0	-	106.9	bc	10.0	-	20.3	b		72.5	c-i	70.3	ab	39.0	b-h	2.6	ab	89.5	b-g	3
6	126	1902126	LA	CHNR/6/CPRS/KBNT//9502008/5/KATY/CPRS//NWBT/KATY/3/9502008/4/CLR9	CL	193	b-k	8673.2	b-k	105.0	-	105.0	bc	10.0	-	17.9	b		74.5	a-d	69.3	abc	38.0	b-h	2.0	c-j	82.0	b-h	89
6	127	RU1904127	MS	RSMT//9403113/3/KCAL/LEAH//LEAH/4///Temp	L	216	a-e	9705.4	a-e	101.5	-	112.5	bc	10.0	-	16.7	b		75.1	ab	69.2	abc	37.8	b-h	2.5	a-d	83.0	b-h	25
6	128	RU1703181	TX	AC110DH2/AC108DH2//CYBT	L	183	e-k	8255.4	e-k	128.0	-	104.8	bc	10.0	-	17.5	b		74.3	a-e	67.5	a-e	37.4	c-h	2.1	c-j	80.0	c-h	145
6	129	RU1901129	AR	RU1102131/14CSIT203	CL	198	b-j	8894.4	b-j	102.5	-	102.8	bc	10.0	-	16.9	b		73.0	a-i	67.6	a-e	36.0	gh	1.8	g-j	72.0	gh	71
6	130	1902130	LA	CHNR/3/CCDR//CFX29/CCDR	CL	189	c-k	8488.8	c-k	101.5	-	101.8	bc	10.0	-	15.3	b		74.6	a-d	66.5	b-e	40.1	b-f	1.9	e-j	90.5	b-g	111
6	131	RU1904131	MS	Rexmont/7///FRNS/6/LBNT/9902/3/Dawn/9695	L	200	b-j	8982.8	b-j	105.5	-	113.8	bc	10.0	-	17.6	b		71.4	hi	63.9	efg	37.7	b-h	1.7	ij	79.0	c-h	62
6	132	RU1703132	TX	CPRS/3/CPRS/NWBT/KATY	L	175	h-k	7886.7	h-k	105.0	-	105.7	bc	10.0	-	17.1	b		73.5	a-h	67.1	a-e	39.4	b-h	2.2	a-i	89.0	b-g	179
6	133	RU1901133	AR	TITN/RU1202168	CM	231	a	10413.2	a	102.5	-	114.6	bc	10.0	-	16.5	b		72.3	d-i	66.9	a-e	39.9	b-g	2.5	abc	92.3	b-f	6
6	134	1902134	LA	CHNR/4/CPRS/9502008/3/CFX29//AR1142/LA2031	CL	183	e-k	8235.7	e-k	99.0	-	111.2	bc	10.0	-	16.1	b		73.6	a-h	67.0	a-e	37.5	b-h	2.0	d-j	79.7	c-h	148
6	135	RU1904135	MS	Lemont/Jasmine 85-220//Francis	L	198	b-j	8894.4	b-j	100.5	-	104.6	bc	10.0	-	15.0	b		73.6	a-h	66.6	a-e	39.2	b-h	2.0	c-j	87.5	b-h	72
6	136	RU1603187	TX	CPRS/3/CPRS/NWBT/KATY	L	162	kl	7289.5	kl	106.0	-	101.8	bc	9.5	-	15.9	b		73.6	a-h	67.9	a-d	36.3	fgh	1.7	ij	73.0	fgh	219
6	137	RU1901137	AR	CL271/JPTR	CM	231	a	10413.2	a	104.0	-	105.0	bc	10.0	-	17.5	b		73.1	a-i	67.3	a-e	38.8	b-h	2.3	a-f	87.0	b-h	7
6	138	1902138	LA	CCDR//CFX29/CCDR/3/CCDR	CL	179	g-k	8039.1	g-k	101.0	-	102.3	bc	10.0	-	14.7	b		73.8	a-g	67.3	a-e	37.5	c-h	2.1	b-j	80.0	c-h	165
6	139	RU1904139	MS	Lemont/Jasmine 85-220//Francis	L	204	a-i	9199.1	a-i	104.0	-	106.4	bc	10.0	-	17.5	b		71.9	e-i	64.4	def	41.5	b	1.7	ij	96.0	bcd	50
6	140	RU1903140	TX	Jangseongbyeo/IR 1321-12	L	168	jk	7564.8	jk	116.5	-	137.0	a	10.0	-	24.1	a		71.7	f-i	67.7	a-e	32.6	i	1.9	f-j	57.0	i	204
6	141	RU1901141	AR	TMPT//CYBT/TMPT	L	213	a-f	9599.7	a-f	106.5	-	119.0	bc	10.0	-	16.7	b		74.2	a-e	69.1	abc	37.5	c-h	2.4	a-e	82.0	b-h	30
6	142	1902142	LA	9502008/DREW//CLR20/4/9502008//AR1188/CCDR/3/CPRS/KBNT//9502008A	CL	193	b-k	8665.8	b-k	104.0	-	98.0	bc	10.0	-	15.8	b		73.9	a-g	69.0	abc	38.3	b-h	2.0	c-j	83.5	b-h	90
6	143	RU1904143	MS	Rex/Cheniere	L	196	b-j	8840.3	b-j	107.0	-	107.7	bc	10.0	-	16.6	b		73.2	a-i	66.9	a-e	39.1	b-h	1.9	f-j	86.0	b-h	78
6	144	RU1903144	TX	CPRS/SABR//Francis	L	181	f-k	8166.9	f-k	100.5	-	99.5	bc	10.0	-	15.1	b		72.9	b-i	67.6	a-e	36.4	fgh	1.9	e-j	74.0	e-h	153
6	145	RU1901145	AR	VSNTLM//L201/9NRZ/3/KATY/4/VSNTLM//L201/9NRZ/3/TBNT/LBLE//L201/9NRZ/5/LGRU2/6/WLLS/7/CYBT/TMPT	L	223	ab	10029.8	ab	108.0	-	117.4	bc	10.0	-	15.8	b		74.4	a-d	64.9	def	39.0	b-h	2.4	a-e	88.5	b-g	15
6	146	1902146	LA	TRNS//TRNS/CL131	CL	185	d-k	8324.2	d-k	98.5	-	101.7	bc	10.0	-	16.5	b		72.4	d-i	65.9	c-f	39.1	b-h	2.1	c-j	86.5	b-h	133
6	147	RU1904147	MS	Rexmont/7///FRNS/6/LBNT/9902/3/Dawn/9695	L	181	f-k	8164.4	f-k	107.0	-	117.7	bc	10.0	-	16.2	b		73.3	a-i	65.9	c-f	36.2	fgh	1.7	j	73.0	fgh	154
6	148	RU1803148	TX	CPRS/3/CPRS/NWBT/KATY	L	145	lm	6503.0	lm	106.0	-	102.5	bc	10.0	-	17.5	b	5	72.2	d-i	66.4	b-e	37.0	d-h	1.9	f-j	77.0	d-h	230
6	149	RU1901149	AR	VSNTLM//L201/9NRZ/3/KATY/4/VSNTLM//L201/9NRZ/3/TBNT/LBLE//L201/9NRZ/5/LGRU2/6/WLLS/7/CYBT/TMPT	L	211	a-g	9494.0	a-g	105.0	-	115.8	bc	10.0	-	16.8	b		74.9	abc	67.0	a-e	38.1	b-h	2.1	b-j	83.0	b-h	35
6	150	1802150	LA	LGRU/CLR11/4/9302065/3/CFX29/AR1142/LA2031/4/CFX18//CCDR/9770532DH2/3/CPRS/KBNT//9502008A	CL	184	e-k	8260.3	e-k	128.5	-	103.3	bc	10.0	-	17.3	b		74.2	a-e	69.0	abc	40.1	b-f	1.8	g-j	90.5	b-g	143
6	151	RU1904151	MS	Rex/Cheniere	L	185	d-k	8336.5	d-k	102.5	-	95.3	c	10.0	-	17.4	b		74.1	a-f	65.8	c-f	40.6	b-e	1.9	f-j	93.0	b-e	132
6	152	RU1903152	TX	FRAN/WELLS//BANKS	L	200	b-j	8997.6	b-j	108.0	-	121.8	b	10.0	-	18.9	b		73.9	a-g	70.5	a	38.6	b-h	2.5	abc	87.0	b-h	61
6	153	RU1901153	AR	TMPT/8/RU9201176/3/KATY/NWBT//L201/7402003/4/WLLS/7/RNS3/5/IR36M4/4/L201/3/TTEP/IR-8//UNKN/6/LMNT//82CAY21/CICA8/3/MARS/TBNT	L	219	abc	9865.1	abc	103.5	-	112.0	bc	9.0	-	18.0	b		75.3	a	69.6	abc	41.0	bcd	2.3	a-g	96.5	bcd	17
6	154	1902154	LA	TRNS//TRNS/CL131	CL	162	kl	7274.8	kl	105.0	-	100.8	bc	10.0	-	16.5	b		73.8	a-g	65.9	c-f	38.4	b-h	2.3	a-h	78.5	d-h	220
6	155	RU1904155	MS	Cheniere/Bowman	L	208	a-h	9346.6	a-h	107.0	-	111.8	bc	10.0	-	16.6	b		73.9	a-g	65.7	c-f	40.5	b-e	2.4	a-e	95.0	bcd	45

6	156	RU1903156	TX	CPRS/SABR//Gulfmont	L	134	m	6011.5	m	106.5	-	110.0	bc	10.0	-	15.5	b		71.1	i	62.8	fg	36.5	fgh	1.9	f-j	74.5	e-h	236
6	157	RU1905157	MO	A:NEPTUNE/3/BNGL/CL 161//CAFFEY)	(CL) MG	218	a-d	9789.0	a-d	105.0	-	97.3	bc	10.0	-	17.8	b		74.3	a-e	69.5	abc	38.8	b-h	2.5	abc	88.0	b-h	21
6	158	RU1805158	MO	Mo0204044/Kataki	MG	215	a-e	9683.3	a-e	106.0	-	115.3	bc	10.0	-	17.0	b		71.7	ghi	66.7	a-e	44.6	a	2.7	a	114.5	a	26
6	159	RU0703144	TX	CPRS/CCDR (ANTONIO)	L	192	b-k	8648.6	b-k	104.0	-	101.4	bc	10.0	-	16.4	b		74.7	a-d	69.4	abc	37.3	c-h	1.8	f-j	77.5	d-h	97
6	160	Thad	MS	Thad	L	197	b-j	8879.6	b-j	104.0	-	100.5	bc	10.0	-	15.1	b		73.0	a-i	66.1	cde	41.3	bc	2.3	a-h	98.0	bc	73
7	161	RU1801161	AR	[illegible]	CL	201	a-f	9024.6	a-f	105.5	abc	110.8	bcd	10.0	-	16.1	bcd		74.0	ab	67.2	a-i	36.5	d-j	2.1	b-f	75.5	e-k	60
7	162	1902162	LA	DREW//CHNR/LMNT/5/9502008/DREW//CLR20/4/CPRS/KBNT//9502008A	CL	178	b-f	8009.6	b-f	104.0	bc	99.9	cde	10.0	-	14.4	d		74.5	a	64.1	g-j	38.7	b-g	2.2	a-e	86.0	b-h	171
7	163	RU1904163	MS	Bowman//Bowman/Te Quing	L	199	a-f	8955.8	a-f	107.5	abc	99.9	cde	10.0	-	15.8	bcd		71.4	bcd	52.8	m	39.1	b-e	1.8	efg	86.0	b-h	66
7	164	RU1803164	TX	CPRS/3/CPRS/NWBT/KATY	L	166	ef	7464.0	ef	107.0	abc	103.0	cde	10.0	-	16.4	bcd		73.2	abc	66.2	c-i	38.7	b-g	2.0	c-f	85.0	b-h	213
7	165	RU1901165	AR	RU1001067/RU0602171	M	226	a	10160.1	a	107.0	abc	97.3	cde	10.0	-	18.6	b		72.6	abc	69.7	abc	36.8	d-i	2.4	a-d	78.0	c-j	13
7	166	1902166	LA	WLLS/CFX18/5/KATY/CPRS//NWBT/KATY/3/9502008/4/CLR9/6/LGRU/CLR11/4/9302065/3/CFX29/AR1142/LA2031	CL	172	c-f	7729.4	c-f	99.0	c	106.0	cd	10.0	-	15.6	bcd		73.0	abc	63.1	ijk	42.8	a	2.3	a-d	105.0	a	191
7	167	RU1904167	MS	Bowman/Roy J	L	175	b-f	7881.8	b-f	106.0	abc	102.8	cde	10.0	-	16.2	bcd		71.0	cd	58.2	l	38.1	b-g	2.0	c-f	82.0	b-h	180
7	168	RU1803168	TX	CPRS/NWBT//KATY/3/CCDR	L	169	def	7611.5	def	106.5	abc	95.0	de	10.0	-	16.3	bcd		73.5	abc	68.5	a-f	35.3	f-l	2.0	c-f	69.5	h-l	202
7	169	RU1901169	AR	EARL/9902028//RU1202068	CM	211	a-e	9474.4	a-e	106.0	abc	103.5	cde	10.0	-	16.5	bcd		73.4	abc	64.2	f-j	39.0	b-e	2.5	ab	88.5	b-g	36
7	170	1902170	LA	1002146*4//JZMN/08CLR004	CL(A)	159	f	7144.5	f	96.0	c	102.7	cde	10.0	-	14.6	cd		74.3	ab	67.1	a-i	33.0	klm	2.0	c-f	59.5	klm	223
7	171	RU1904171	MS	Bowman//Bowman/Te Quing	L	170	c-f	7660.6	c-f	99.5	bc	103.3	cde	10.0	-	15.5	bcd		73.3	abc	60.4	kl	38.6	b-g	1.8	efg	84.0	b-h	198
7	172	RU1703172	TX	AC110DH2/AC108DH2//CHEN	L	187	a-f	8402.8	a-f	106.5	abc	109.8	bcd	10.0	-	15.7	bcd		73.5	abc	67.5	a-h	39.0	b-e	2.0	b-f	86.5	b-h	122
7	173	RU1901173	AR	RU1102034/RU1501024*2	CL	181	a-f	8159.5	a-f	101.5	bc	110.5	bcd	10.0	-	15.0	bcd		73.3	abc	64.9	e-j	41.0	ab	2.3	a-d	97.0	ab	156
7	174	1902174	LA	NPTN//BNGL/CL161/3/NPTN	CM	218	abc	9803.7	abc	108.0	abc	100.2	cde	10.0	-	17.7	bcd		74.0	ab	71.0	a	35.1	g-l	2.0	c-f	69.0	h-l	20
7	175	RU1904175	MS	Bowman/Roy J	L	184	a-f	8302.1	a-f	106.0	abc	103.5	cde	10.0	-	15.8	bcd		72.1	abc	63.1	ijk	38.4	b-g	1.8	efg	81.0	b-i	136
7	176	RU1803176	TX	CPRS/CCDR//WELLS	L	182	a-f	8179.2	a-f	108.0	abc	108.2	cd	10.0	-	16.4	bcd		73.4	abc	68.9	a-e	36.0	d-k	1.9	c-f	73.0	f-l	152
7	177	RU1901177	AR	[illegible]	L	197	a-f	8847.7	a-f	121.0	a	106.7	cd	10.0	-	15.8	bcd		73.0	abc	64.8	e-j	35.2	g-l	2.0	c-f	69.0	h-l	77
7	178	1902178	LA	NPTN//BNGL/CL161/5/BNGL//MERC/RICO/3/MERC/RICO//BNGL/4/9502065/3/MERC//MERC/3/9902028	CM	210	a-e	9467.0	a-e	106.5	abc	114.8	a-d	10.0	-	16.4	bcd		73.3	abc	68.9	a-e	39.0	b-e	2.4	abc	88.5	b-g	37
7	179	RU1904179	MS	Cheniere/Bowman	L	165	ef	7407.5	ef	105.5	abc	117.5	abc	10.0	-	16.6	bcd		73.0	abc	63.8	g-j	40.9	ab	2.0	c-f	95.0	abc	216
7	180	RU1903180	TX	CPRS/SABR//MADISON	L	200	a-f	8980.4	a-f	106.5	abc	129.0	a	10.0	-	18.3	b		74.3	ab	69.6	a-d	38.8	b-f	2.6	a	88.5	b-g	63
7	181	RU1901181	AR	[illegible]	L	197	a-f	8869.8	a-f	105.0	bc	112.4	bcd	10.0	-	15.6	bcd		73.8	abc	63.5	h-k	41.3	ab	1.9	c-f	96.5	ab	75
7	182	1902182	LA	BNGL/CL161//CFFY/3/NPTN//BNGL/CL161	CM	221	ab	9934.0	ab	106.5	abc	115.4	a-d	10.0	-	16.5	bcd		74.5	a	69.6	a-d	39.6	bcd	2.6	a	91.5	a-e	16
7	183	RU1804115	MS	Rex/CL181-AR	CL	172	c-f	7758.9	c-f	106.0	abc	85.3	e	10.0	-	16.6	bcd		73.1	abc	67.2	a-i	38.0	b-g	2.0	c-f	82.0	b-h	188
7	184	RU1803184	TX	CPRS/SABR//MADISON	L	194	a-f	8710.0	a-f	106.0	abc	105.9	cd	10.0	-	16.3	bcd		72.2	abc	65.3	c-j	36.1	d-k	1.8	efg	72.5	f-l	86
7	185	RU1901185	AR	RU1001067/TITN	M	208	a-e	9358.9	a-e	93.0	c	101.2	cde	10.0	-	17.5	bcd		74.1	ab	70.9	ab	36.8	d-i	2.4	a-d	78.5	c-j	44
7	186	1902186	LA	TGRT/3/TRNS//CCDR/JEFF	L	191	a-f	8577.3	a-f	96.5	c	105.8	cd	10.0	-	16.8	bcd		74.2	ab	69.2	a-e	35.6	e-l	1.8	efg	70.0	h-l	102
7	187	RU1904187	MS	Taggart/CL111	CL	192	a-f	8660.9	a-f	105.5	abc	102.5	cde	10.0	-	17.7	bcd		74.4	ab	68.0	a-g	36.2	d-k	2.1	b-f	74.5	e-l	95
7	188	RU1803188	TX	Jangseongbyeo/IR 1321-12	L	179	b-f	8036.6	b-f	116.0	ab	112.0	bcd	10.0	-	25.4	a		72.7	abc	67.5	a-h	32.6	lm	2.1	b-e	58.5	lm	166
7	189	RU1901189	AR	STG11P-04-196/PI632283	L(A)	166	ef	7473.8	ef	103.5	bc	106.0	cd	10.0	-	17.2	bcd		73.2	abc	67.3	a-i	33.3	j-m	2.4	abc	63.0	j-m	212
7	190	1902190	LA	TRNS//CCDR/JEFF/3/CCDR/JEFF//CPRS	L	185	a-f	8314.3	a-f	100.0	bc	103.5	cde	10.0	-	16.5	bcd		74.2	ab	67.9	a-h	37.3	c-h	2.1	b-f	79.0	c-j	134
7	191	RU1904191	MS	Rex/CL151	CL	180	a-f	8115.3	a-f	99.0	c	105.2	cd	10.0	-	16.9	bcd		73.6	abc	66.5	b-i	39.6	bcd	2.1	b-e	90.0	b-f	160
7	192	RU1903192	TX	CL161/CPRS	L-CL	174	b-f	7813.0	b-f	106.0	abc	107.2	cd	10.0	-	18.4	b		73.6	abc	68.2	a-g	38.7	b-g	2.1	b-f	85.0	b-h	183
7	193	RU1901193	AR	BRAZTBNT3/164986-4/NV66/NTAI4/BNGL5/RU9201176/4/LBNTSTBN/NWBT3/MILL6/BNKS7/CYBONNET	L	216	a-d	9725.1	a-d	104.0	bc	112.9	bcd	10.0	-	17.4	bcd		74.7	a	67.8	a-h	35.7	e-l	2.0	c-f	71.5	g-l	24
7	194	1902194	LA	CPRS/KBNT//9502008/3/CCDR/JEFF/4/MRMT	L	195	a-f	8781.3	a-f	100.5	bc	107.5	cd	10.0	-	18.1	bc		73.4	abc	67.7	a-h	33.5	i-m	1.6	fg	60.0	klm	81
7	195	RU1904195	MS	Rex/CL181-AR	CL	175	b-f	7864.6	b-f	102.5	bc	99.2	cde	10.0	-	16.5	bcd		74.6	a	68.1	a-g	39.5	bcd	1.7	efg	87.5	b-g	181
7	196	RU1903196	TX	LD 183-3/Jasmine 85	L	131	g	5898.4	g	109.0	abc	126.3	ab	10.0	-	26.0	a	70	70.0	d	61.7	jk	32.1	m	1.5	g	52.5	m	237
7	197	RU1905197	MO	(9502008-A/DREW//CLR-120/4/CPRS/KBNT//9502008-A/5/CL111/CHENIERE)	(CL) LG	181	a-f	8152.1	a-f	98.0	c	106.3	cd	10.0	-	15.9	bcd		73.4	abc	66.8	a-i	36.9	d-i	2.1	b-f	77.5	d-j	157
7	198	RU1905198	MO	CATAHOULA/TRNS	LG	185	a-f	8346.3	a-f	101.0	bc	102.2	cde	10.0	-	15.5	bcd		74.6	a	64.1	g-j	40.6	abc	2.0	c-f	93.0	a-d	130
7	199	CLJ01	LA	CLJ01	CL	171	c-f	7687.6	c-f	104.0	bc	100.7	cde	10.0	-	16.0	bcd		73.5	abc	69.0	a-e	31.3	m	1.9	def	52.0	m	196
7	200	PVL01	LA	PVL01	PVL	178	b-f	7987.5	b-f	108.0	abc	101.0	cde	10.0	-	15.8	bcd		73.5	abc	65.2	d-j	34.2	h-m	2.0	c-f	64.5	i-m	174
8	201	RU1801201	AR	LGRU//KATY/STBN/5/LGRU//LMNT/RA73/3/LGRU/4/LGRU/6/NWBT/KATY//RA73/LMNT/3/NWBT/KATY/7/19991516/19981467//ROYJ	L	210	a-d	9454.7	a-d	108.0	ab	118.9	a-f	10.0	a	19.3	-		74.3	a-d	69.2	a	40.3	a-g	2.7	a-e	95.5	a-d	39
8	202	1902202	LA	CPRS/KBNT//9502008/3/CCDR/JEFF/4/MRMT	L	191	a-f	8601.9	a-f	98.5	def	106.2	g-n	10.0	a	17.1	-		72.8	a-d	66.1	a-e	33.7	h	1.9	def	62.1	g	100
8	203	RU1905203	MO	A: CL271/3/NEPTUNE//BNGL/CL 161	(CL) MG	203	a-e	9142.6	a-e	107.0	a-d	113.3	c-j	10.0	a	18.4	-		72.4	a-d	66.4	a-e	41.0	a-f	2.1	c-f	95.5	a-d	54
8	204	RU1904204	MS	CL151/JSMN85//CL161	CL	193	a-f	8663.3	a-f	99.5	b-f	104.3	h-n	10.0	a	18.2	-		72.5	a-d	66.9	a-e	40.1	a-g	2.1	c-f	91.5	b-e	94
8	205	RU1903205	TX	CPRS/SABR//MADISON	L	167	c-g	7508.2	c-g	106.0	a-e	102.3	j-n	10.0	a	16.8	-		71.8	cd	66.5	a-e	36.5	d-h	1.9	ef	74.5	d-g	207

8	206	RU1901206	AR	JZMN/STG05F5-08-104//DLL2	L(A)	167	c-g	7503.3	c-g	105.0	a-e	98.2	lmn	10.0	a	16.3	-		71.7	d	61.7	f	41.4	a-f	2.5	b-e	99.5	a-d	208
8	207	1902207	LA	CTHL/4/CPRS/KBNT//9502008/3/CCDR	L	193	a-f	8665.8	a-f	99.0	c-f	105.8	g-n	10.0	a	17.0	-		74.6	abc	68.5	abc	36.6	d-h	2.1	c-f	75.5	d-g	92
8	208	RU1805208	MO	Mo0239718/CL161	CL	190	a-f	8550.3	a-f	98.5	def	111.7	c-k	10.0	a	16.9	-		73.7	a-d	65.4	a-f	41.8	a-e	2.2	b-f	100.0	a-d	106
8	209	RU1904209	MS	CL111//CL151/JSMN85	CL	184	a-g	8267.7	a-g	98.5	def	126.3	ab	10.0	a	17.3	-		73.7	a-d	69.1	ab	35.4	fgh	2.3	b-f	72.5	d-g	141
8	210	RU1903210	TX	RU0302088/CHEN	L	169	c-g	7613.9	c-g	101.5	a-f	107.2	e-m	10.0	a	17.2	-		73.9	a-d	69.7	a	33.7	h	2.1	c-f	63.5	fg	201
8	211	RU1801211	AR	9865216DH2/EARL//JPTR	M	204	a-e	9159.8	a-e	96.0	f	112.8	c-k	10.0	a	16.5	-		72.7	a-d	61.8	f	39.6	b-g	2.7	a-e	92.5	b-e	53
8	212	1902212	LA	TRNS//CCDR/JEFF/3/AR1188/CCDR//9502008/LGRU	L	204	a-e	9186.8	a-e	96.0	f	100.5	k-n	10.0	a	17.0	-		73.2	a-d	66.6	a-e	37.8	b-h	2.0	c-f	81.0	c-g	51
8	213	RU1905213	MO	B: NEPTUNE/3/BNGL/CL 161//CAFFEY	CM	211	abc	9506.3	abc	105.5	a-e	103.5	i-n	10.0	a	16.7	-		73.9	a-d	69.4	a	39.7	b-g	2.4	b-f	91.0	b-e	34
8	214	RU1904214	MS	Taggart/CL111	CL	192	a-f	8651.1	a-f	103.5	a-f	101.4	j-n	10.0	a	16.2	-		75.0	a	67.6	abc	41.0	a-f	2.0	c-f	95.5	a-d	96
8	215	RU1803215	TX	CPRS/SABR//Gulfmont	L	157	efg	7078.1	efg	109.0	a	120.3	a-d	10.0	a	16.7	-		72.6	a-d	63.9	b-f	40.0	a-g	2.5	a-e	93.5	a-e	225
8	216	RU1901216	AR	ROYJ/WLLS	L	202	a-e	9098.3	a-e	101.5	a-f	115.8	b-i	10.0	a	15.7	-		74.7	ab	67.2	a-d	39.6	b-g	2.4	b-f	91.5	b-e	56
8	217	1902217	LA	TRNS//CCDR/JEFF/4/CHNR/3/NWBT/KATY//9902207X2	L	207	a-e	9312.2	a-e	97.5	ef	100.0	k-n	10.0	a	17.2	-		74.8	ab	68.5	abc	41.0	a-f	2.1	c-f	95.5	a-d	46
8	218	RU1905218	MO	B: NEPTUNE/3/BNGL/CL 161//CAFFEY	CM	213	abc	9604.6	abc	106.0	a-e	116.2	b-h	10.0	a	16.6	-		73.6	a-d	68.1	abc	40.8	a-f	2.6	a-e	97.0	a-d	29
8	219	RU1904219	MS	CL131//CL162-616	CL	184	a-g	8292.2	a-g	101.5	a-f	95.0	n	10.0	a	16.9	-		73.4	a-d	66.7	a-e	39.8	b-g	2.8	abc	93.5	a-e	138
8	220	RU1903220	TX	CPRS/SABR//MADISON	L	199	a-e	8958.3	a-e	109.5	a	127.7	a	10.0	a	17.3	-		73.1	a-d	67.4	abc	40.4	a-g	2.8	abc	96.5	a-d	65
8	221	RU1901221	AR	RICO/BNGL//RU1202068	CM	214	abc	9634.1	abc	104.5	a-f	111.7	c-k	10.0	a	17.6	-		71.8	cd	67.4	abc	37.6	c-h	2.3	b-f	81.5	b-g	28
8	222	1902222	LA	MRMT/JPTR	M	228	ab	10241.2	ab	102.5	a-f	107.4	e-m	10.0	a	16.6	-		73.8	a-d	69.3	a	41.1	a-f	2.8	abc	99.5	a-d	12
8	223	RU1805223	MO	Mo0215035 / CIRAD141Q244-3	LG	157	efg	7068.3	efg	98.5	def	111.8	c-k	10.0	a	15.0	-		73.4	a-d	62.3	ef	41.6	a-e	2.6	a-e	101.0	a-d	226
8	224	RU1904224	MS	Lemont/CL111	CL	148	fg	6655.4	fg	103.0	a-f	108.4	d-m	10.0	a	15.1	-		73.2	a-d	66.2	a-e	42.2	a-d	2.2	b-f	102.0	a-d	229
8	225	RU1903225	TX	RU0302085/4593	L	180	b-g	8083.3	b-g	108.0	ab	108.3	d-m	10.0	a	16.9	-		73.3	a-d	68.2	abc	34.5	gh	2.0	c-f	66.5	efg	161
8	226	RU1901226	AR	RPG/WLLS/2/ROYJ/3/FRAN /ROYJ	L	215	abc	9663.6	abc	99.5	b-f	119.2	a-e	10.0	a	15.8	-		74.8	ab	63.4	c-f	42.0	a-d	2.2	c-f	100.5	a-d	27
8	227	1902227	LA	NPTN/JPTR	M	209	a-d	9383.4	a-d	106.0	a-e	97.4	mn	10.0	a	15.1	-		73.3	a-d	68.8	ab	38.8	b-h	2.5	b-e	88.0	b-f	43
8	228	RU1905228	MO	Mo0215035/MM14-1	MG	217	abc	9786.5	abc	102.5	a-f	100.2	k-n	10.0	a	18.3	-		72.7	a-d	69.2	a	39.1	b-h	2.7	a-e	90.0	b-e	22
8	229	RU1904229	MS	Rex/CL181-AR	CL	161	d-g	7225.6	d-g	106.5	a-d	117.3	a-g	10.0	a	17.4	-		72.0	bcd	66.7	a-e	40.4	a-g	2.6	a-e	95.0	a-d	221
8	230	RU1803230	TX	FRAN/WELLS//BANKS	L	193	a-f	8665.8	a-f	107.5	abc	117.9	a-g	10.0	a	19.3	-		72.7	a-d	67.6	abc	37.5	c-h	1.7	f	80.5	c-g	93
8	231	RU1901231	AR	JZMN/RU0701124//TGRT	L(A)	184	a-g	8272.6	a-g	102.5	a-f	113.7	c-j	10.0	a	17.8	-		73.0	a-d	68.3	abc	35.6	e-h	2.3	b-f	73.0	d-g	140
8	232	1902232	LA	LAH169 (HYBRID)	L	202	a-e	9108.2	a-e	100.0	b-f	117.0	a-g	10.0	a	17.4	-		74.2	a-d	64.9	a-f	41.5	a-f	2.2	c-f	98.5	a-d	55
8	233	RU1905233	MO	Mo04062311	LG	182	a-g	8206.2	a-g	107.5	abc	121.5	abc	10.0	a	18.8	-		73.5	a-d	66.3	a-e	45.8	a	3.0	ab	121.5	a	150
8	234	RU1905234	MO	Baldo/RU0201093 (MM17)	MG	197	a-e	8855.0	a-e	103.5	a-f	97.8	lmn	10.0	a	18.0	-		72.3	a-d	67.9	abc	40.2	a-g	2.7	a-d	95.5	a-d	76
8	235	RU1903235	TX	Hayakogane/BALDO	L	143	g	6434.2	g	108.0	ab	107.9	d-m	8.5	b	17.3	-		73.0	a-d	67.5	abc	36.5	d-h	2.1	c-f	75.5	d-g	232
8	236	RU1905236	MO	CPSKBNT/WELLS-1CFX-118/5TACAURI5/CPRS//ICCAY21/TBNT4/.../6/9502008-A-DR1W/ICIR-1203/CL111	CM	157	efg	7085.5	efg	104.5	a-f	112.3	c-k	10.0	a	17.7	-		71.6	d	62.6	def	43.8	ab	2.5	b-e	110.5	ab	224
8	237	RU1905237	MO	NEPTUNE/BNGL/MIRC/RICO/3/MIRC/RICO/BNGL/5/BNGL/MIRC/RICO/3/MIRC/RICO/BNGL/4/MARS	MG	231	a	10396.0	a	108.0	ab	102.4	j-n	10.0	a	19.4	-		72.6	a-d	67.6	abc	42.6	a-d	3.3	a	109.0	abc	8
8	238	RU1905238	MO	Mo0204044 / Cypress	LG	179	b-g	8044.0	b-g	101.5	a-f	108.0	d-m	10.0	a	15.3	-		73.8	a-d	66.6	a-e	41.5	a-f	2.3	b-f	99.0	a-d	164
8	239	ARoma17	AR	JZMN/PI597046	L(A)	187	a-g	8415.1	a-g	100.0	b-f	110.2	c-l	10.0	a	16.6	-		73.2	a-d	68.7	ab	35.8	e-h	2.6	a-e	75.0	d-g	118
8	240	Rex	MS	Rex	L	183	a-g	8225.9	a-g	103.5	a-f	106.4	f-n	10.0	a	17.7	-		72.8	a-d	67.8	abc	42.8	abc	2.7	a-e	106.5	abc	149

Statistical differences are calculated in separate groups (GRP)

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).

Rank is based on Mean Yield of all lines regardless of Groups

Type*

L: Conventional Long grain

CL: Clearfield Long grain

M: Conventional Medium Grain

CM: Clearfield Meadium Grain

(A): Aromatic

4. Arkansas performance trial (19ARPT)

Objective: Determine agronomic performance of advance lines from AR for potential release under Missouri best management practices.

Date of Planting: April 23, 2019
Date of Harvesting: September 24, 2019
Number of entries/treatments: 69
Number of replicates: 4
Number of checks: 18
Plot size: 6.33’ x 14’

For several years, the rice research farm have been conducting the Arkansas Performance Trial (ARPT). This helps provide additional data under Missouri growing conditions new and potential rice varieties for release in Arkansas. We have two entries in ARPT, one is the medium grain line RU1805158 and variety MM17. RU1805158 ranks 30th while MM17 ranks 33rd in grain yield with acceptable milling yield. Results are shown in Table 4 where MO lines are highlighted in gray.

Table 4. 2019 Arkansas Performance Trial

Location: Missouri Rice Farm, Campbell Missouri
Date of Planting: 23-Apr-19
Date of Harvesting: 24-Sept-19
Investigator: Christian De Guzman

No.	Code	VARIETY or RU	Type*	Yield bu/ac		Yield lb/ac		Days to head		Height (cm)		Vigor	% Moisture		Grain Total		Grain Whole		Grain Whitene		Grain Trans		Grain Polishness		Rank
1	201	Diamond	L	220.03		9901.2		100.0	b-k	107.3	b-m	10.00	16.5	b-f	74.6	a-f	63.9	abc	39.1	c-m	2.3	d-o	87.9	c-m	2
2	202	LaKast	L	203.86	a-l	9173.5	a-l	98.3	f-k	111.1	a-i	10.00	14.7	f	74.8	a-f	63.1	abc	41.3	a-e	2.8	a-d	100.4	a-d	29
3	203	Jupiter	M	214.89	a-g	9669.9	a-g	101.3	b-i	99.8	g-o	10.00	19.5	a	72.4	fg	68.8	a	38.6	c-m	2.8	a-d	88.4	c-m	10
4	204	Titan	M	191.18	e-q	8603.3	e-q	98.3	f-k	104.4	c-n	10.00	17.1	a-f	72.6	d-g	58.4	a-d	38.2	d-n	2.9	a	87.1	c-m	50
5	205	RU1701121	M	204.94	a-l	9222.5	a-l	102.5	b-f	108.6	a-l	10.00	17.6	a-f	74.2	a-f	66.0	ab	39.2	c-m	2.6	a-h	90.3	c-m	26
6	206	MM17	M	201.37	b-m	9061.5	b-m	100.5	b-j	97.7	k-o	10.00	17.9	a-d	72.4	fg	64.7	ab	38.2	d-n	2.5	a-k	84.8	d-m	33
7	208	CLM04	CM	215.07	a-g	9678.1	a-g	102.0	b-g	111.8	a-g	10.00	18.1	a-d	73.2	a-g	66.9	ab	37.7	g-o	2.5	a-j	83.1	f-n	9
8	209	CL272	CM	200.07	b-n	9003.1	b-n	101.0	b-j	107.8	a-m	10.00	15.8	c-f	73.5	a-g	63.0	abc	39.0	c-m	2.3	b-n	87.8	c-m	34
9	210	CL151	CL	196.50	b-p	8842.5	b-p	100.3	b-k	104.0	c-n	10.00	17.2	a-f	73.1	b-g	63.2	abc	37.8	f-o	1.8	o	80.1	j-o	40
10	211	CL153	CL	184.52	j-s	8303.5	j-s	101.0	b-j	108.1	a-m	10.00	16.4	b-f	74.2	a-f	64.5	ab	39.9	a-m	2.3	b-m	91.8	b-l	55
11	212	CLL15 (CLX6-1111)	CL	199.41	b-n	8973.6	b-n	98.6	e-k	98.7	j-o	10.00	16.0	c-f	73.9	a-f	63.0	abc	41.2	a-f	2.2	e-o	96.8	a-i	36
12	213	CLX5-4197	CL	194.46	b-p	8750.8	b-p	101.0	b-j	99.4	i-o	10.00	15.8	c-f	73.9	a-f	63.3	abc	40.5	a-i	2.3	c-o	94.4	a-j	43
13	214	CLX6-2097	CL	206.22	a-k	9280.0	a-k	101.6	b-h	96.4	mno	10.00	17.8	a-e	73.4	a-g	67.4	ab	38.2	d-n	2.6	a-h	85.8	c-m	23
14	215	CLX6-2195	CL	207.79	a-k	9350.4	a-k	101.6	b-h	98.8	j-o	10.00	18.4	abc	72.7	d-g	67.2	ab	37.2	i-o	2.4	b-l	78.1	k-p	18
15	216	PVL01	PV	176.04	n-t	7921.7	n-t	106.3	a	100.2	f-o	10.00	16.3	b-f	73.6	a-g	63.1	abc	35.1	op	2.0	i-o	69.4	opq	60
16	217	PVL02	PV	163.04	st	7336.8	st	100.0	b-k	104.7	c-m	10.00	17.8	a-e	73.9	a-f	67.6	ab	39.1	c-m	2.1	g-o	87.1	c-m	68
17	225	Jazzman-2	L(A)	160.53	t	7223.7	t	98.6	e-k	106.8	b-m	10.00	15.3	def	73.3	a-g	65.9	ab	31.2	q	1.9	mno	50.8	r	69
18	226	ARoma 17	L(A)	179.21	l-t	8064.2	l-t	100.3	b-k	99.7	h-o	10.00	16.2	b-f	73.2	a-g	66.3	ab	33.7	p	2.6	a-h	65.4	q	57
19	227	CLJ01	CLA	165.33	rst	7440.0	rst	99.0	d-k	96.9	l-o	10.00	16.2	b-f	73.9	a-f	68.2	a	31.4	q	2.2	e-o	53.4	r	66
20	231	RU1801161	CL	195.33	b-p	8789.9	b-p	103.0	bcd	108.2	a-m	10.00	16.0	c-f	75.5	ab	49.9	cde	39.0	c-m	2.2	e-o	87.5	c-m	42
21	232	RU1901081	CL	196.76	b-p	8854.0	b-p	102.3	b-f	112.1	a-f	10.00	17.9	a-d	74.2	a-f	65.0	ab	40.1	a-k	2.3	c-o	92.8	a-k	39
22	233	RU1901085	CL	198.01	b-o	8910.3	b-o	103.5	bc	116.7	ab	10.00	16.3	b-f	74.3	a-f	63.1	abc	38.9	c-m	2.3	b-n	87.8	c-m	37
23	234	RU1901089	CL	179.11	l-t	8060.0	l-t	101.3	b-i	114.0	a-d	10.00	16.0	c-f	74.9	a-e	48.9	de	41.5	a-d	2.8	a-d	101.5	abc	58
24	235	RU1901093	CL	176.33	m-t	7934.6	m-t	103.0	bcd	107.0	b-m	10.00	16.0	c-f	73.9	a-f	55.3	a-e	42.4	ab	2.8	ab	105.3	ab	59
25	236	RU1901141	L	207.24	a-k	9325.7	a-k	106.8	a	115.3	abc	10.00	18.3	a-d	74.2	a-f	66.0	ab	39.0	c-m	2.7	a-g	88.8	c-m	20
26	237	CLXAR19 (RU1901041)	CL	217.12	a-e	9770.5	a-e	103.8	b	109.9	a-j	10.00	17.5	a-f	73.6	a-g	62.1	abc	39.3	b-m	2.6	a-h	91.5	b-m	7
27	238	RU1901145	L	214.17	a-g	9637.8	a-g	101.0	b-j	119.4	a	10.00	16.1	c-f	75.6	ab	56.1	a-e	39.8	a-m	2.8	abc	95.0	a-j	11
28	239	RU1701007	CL	187.38	h-r	8432.3	h-r	102.5	b-f	114.3	a-d	10.00	16.7	a-f	74.4	a-f	60.0	a-d	40.9	a-h	2.6	a-h	98.3	a-g	53
29	240	RU1901149	L	207.65	a-k	9344.1	a-k	102.8	b-e	117.4	ab	10.00	16.2	b-f	75.3	abc	63.4	abc	38.8	c-m	2.6	a-h	89.3	c-m	19
30	241	RU1901153	L	216.17	a-f	9727.5	a-f	102.8	b-e	111.6	a-h	10.00	16.9	a-f	75.0	a-e	65.8	ab	39.8	a-m	2.5	a-i	92.0	b-l	8
31	242	RU1901177	L	199.78	b-n	8990.2	b-n	101.0	b-j	102.6	d-o	10.00	14.7	ef	74.6	a-f	63.7	abc	38.7	c-m	2.4	b-l	86.8	c-m	35
32	243	RU1801226	CL	165.13	rst	7430.8	rst	103.0	bcd	110.7	a-j	10.00	18.0	a-d	73.9	a-f	52.8	b-e	42.6	a	2.8	abc	106.3	a	67
33	244	RU1601010	L	196.48	b-p	8841.5	b-p	97.8	h-k	112.4	a-e	10.00	16.1	c-f	74.9	a-e	63.0	abc	40.3	a-j	2.6	a-h	94.5	a-j	41
34	245	RU1701084	L	213.69	a-h	9615.9	a-h	102.3	b-f	106.6	b-m	10.00	17.0	a-f	74.2	a-f	62.0	abc	38.0	e-n	2.1	h-o	82.4	g-o	12
35	246	RU1701081	L	197.67	b-o	8894.9	b-o	102.3	b-f	108.4	a-m	10.00	16.9	a-f	74.4	a-f	61.4	abc	39.0	c-m	2.0	l-o	80.1	j-o	38
36	247	RU1701087	L	206.83	a-k	9307.3	a-k	100.8	b-j	109.9	a-j	10.00	17.2	a-f	75.0	a-e	63.7	abc	38.5	c-m	2.5	a-i	87.0	c-m	21
37	248	RU1901181	L	205.74	a-k	9258.1	a-k	102.3	b-f	110.8	a-j	10.00	16.2	b-f	74.2	a-f	61.2	abc	41.8	abc	2.2	e-o	99.8	a-e	25
38	249	RU1901193	L	206.58	a-k	9296.2	a-k	102.3	b-f	113.5	a-e	10.00	16.3	b-f	74.3	a-f	64.9	ab	36.7	l-o	2.2	e-o	78.3	k-p	22
39	250	RU1901216	L	191.29	e-q	8608.0	e-q	98.8	d-k	109.5	a-k	10.00	15.3	def	75.6	ab	66.3	ab	38.6	c-m	2.5	a-k	86.8	c-m	49
40	251	RU1901226	L	209.20	a-j	9414.2	a-j	99.8	b-k	114.1	a-d	10.00	16.1	c-f	75.7	a	63.6	abc	39.7	a-m	2.3	b-n	91.0	b-m	16

41	252	RU1801093	L	202.27	b-l	9102.0	b-l	101.5	b-h	104.9	c-m	10.00	15.6	c-f	74.3	a-f	63.0	abc	39.0	c-m	2.3	b-n	87.0	c-m	31
42	253	RU1901065	L	219.44	abc	9875.0	abc	102.3	b-f	112.5	a-e	10.00	15.6	c-f	75.2	abc	65.5	ab	39.3	b-m	2.0	k-o	86.5	c-m	4
43	254	RU1702140	L	210.74	a-j	9483.1	a-j	100.0	b-k	97.8	k-o	10.00	17.2	a-f	73.3	a-g	66.5	ab	38.1	e-n	2.4	a-l	84.1	e-n	15
44	255	RU1805158	M	203.31	a-l	9148.7	a-l	98.0	g-k	104.4	c-n	10.00	17.1	a-f	72.7	d-g	65.2	ab	40.8	a-h	2.7	a-f	98.0	a-h	30
45	256	STG16L-15-172	LA	173.16	o-t	7792.1	o-t	99.5	b-k	101.6	e-o	10.00	17.2	a-f	71.6	g	64.5	ab	34.2	p	2.5	a-k	67.3	pq	63
46	257	RU1901206	LA	171.96	p-t	7738.0	p-t	101.3	b-i	97.2	l-o	10.00	15.7	c-f	72.7	d-g	59.7	a-d	40.1	a-l	2.3	b-m	91.5	b-m	64
47	258	RU1801105	LA	173.84	o-t	7822.8	o-t	99.5	b-k	103.6	c-n	10.00	15.9	c-f	73.8	a-g	66.5	ab	35.2	nop	2.6	a-h	70.8	n-q	62
48	259	RU1801109	LA	168.73	q-t	7593.0	q-t	99.0	d-k	104.1	c-n	10.00	17.0	a-f	70.0	h	46.0	e	38.5	c-m	2.9	a	88.8	c-m	65
49	260	RU1801133	CL	175.12	n-t	7880.6	n-t	97.3	ijk	99.8	h-o	10.00	15.8	c-f	74.3	a-f	63.8	abc	39.0	c-m	2.0	j-o	88.8	c-m	61
50	261	RU1801221	CL	189.08	g-q	8508.5	g-q	103.5	bc	100.2	f-o	10.00	16.9	a-f	74.6	a-f	66.8	ab	37.3	i-o	2.5	a-i	81.3	i-o	52
51	262	RU1701136	CM	207.93	a-k	9357.0	a-k	101.3	b-i	112.3	a-e	10.00	15.7	c-f	75.0	a-e	59.2	a-d	38.1	d-n	2.5	a-k	84.8	d-m	17
52	263	RU1801097	CL	191.80	d-q	8631.1	d-q	98.6	e-k	107.1	b-m	10.00	16.0	c-f	74.9	a-e	63.6	abc	41.2	a-f	2.5	a-j	98.8	a-f	47
53	264	RU1801201	L	206.06	a-k	9272.8	a-k	107.3	a	116.9	ab	10.00	16.5	b-f	75.1	a-d	66.6	ab	39.1	c-m	2.7	a-f	90.5	c-m	24
54	265	RU1901101	CL	189.51	f-q	8528.2	f-q	97.0	jk	106.3	b-m	10.00	15.5	c-f	74.0	a-f	62.6	abc	39.6	a-m	2.5	a-k	92.3	b-k	51
55	266	RU1901129	CL	193.84	b-p	8722.9	b-p	100.3	b-k	103.8	c-n	10.00	17.3	a-f	73.9	a-f	66.3	ab	36.8	k-o	1.8	no	75.8	m-q	45
56	267	RU1801238	CM	218.35	a-d	9825.6	a-d	101.3	b-i	104.0	c-n	10.00	16.2	b-f	74.1	a-f	66.4	ab	38.2	d-m	2.3	b-n	84.1	e-n	5
57	268	RU1901165	M	217.33	a-e	9779.7	a-e	100.6	b-j	80.3		10.00	18.0	a-d	72.6	efg	68.9	a	37.1	j-o	2.5	a-k	80.4	j-o	6
58	269	RU1901137	CM	213.68	a-h	9615.7	a-h	107.3	a	101.8	e-o	10.00	16.2	b-f	73.4	a-g	64.0	ab	39.7	a-m	2.4	a-l	90.8	b-m	13
59	270	RU1901125	M	227.88	a	10254.0	a	100.8	b-j	104.4	c-n	10.00	19.1	ab	72.7	d-g	66.3	ab	38.8	c-m	2.7	a-f	88.0	c-m	1
60	271	RU1801211	M	194.24	b-p	8740.8	b-p	96.5	k	108.1	a-m	10.00	15.8	c-f	73.7	a-g	59.1	a-d	39.3	b-m	2.6	a-h	90.3	c-m	44
61	272	RU1901033	M	204.84	a-l	9217.7	a-l	99.3	c-k	93.2	no	10.00	17.0	a-f	74.3	a-f	68.1	a	37.6	h-o	2.7	a-e	83.4	f-n	27
62	273	RU1801237	M	211.99	a-i	9539.5	a-i	101.0	b-j	91.9	o	10.00	17.3	a-f	73.5	a-g	67.0	ab	37.5	h-o	2.3	b-m	80.3	j-o	14
63	274	RU1801169	CL	191.78	d-q	8630.2	d-q	102.0	b-g	103.8	c-n	10.00	17.3	a-f	74.0	a-f	64.1	ab	40.1	a-l	2.6	a-h	94.3	a-j	48
64	275	RU1801145	CL	186.32	i-r	8384.4	i-r	100.0	b-k	115.3	abc	10.00	16.7	a-f	73.8	a-f	62.6	abc	40.7	a-h	2.5	a-k	96.5	a-i	54
65	276	RU1901169	CM	201.82	b-l	9081.7	b-l	102.6	b-e	102.2	d-o	10.00	17.5	a-f	73.7	a-g	60.4	a-d	40.6	a-i	2.5	a-k	95.4	a-j	32
66	277	RU1901221	CM	204.45	a-l	9200.3	a-l	99.5	b-k	108.2	a-m	10.00	17.4	a-f	72.9	c-g	63.3	abc	36.5	mno	2.2	f-o	76.3	l-q	28
67	278	RU1801101	CL	192.93	c-p	8681.8	c-p	99.8	b-k	110.1	a-j	10.00	16.2	b-f	74.4	a-f	64.9	ab	41.0	a-g	2.3	b-m	97.0	a-i	46
68	279	RU1901121	CL	182.41	k-t	8208.4	k-t	97.0	jk	107.6	b-m	10.00	16.6	b-f	74.1	a-f	65.5	ab	37.5	h-o	2.4	a-l	82.3	h-o	56
69	280	RU1901133	CM	219.73	ab	9887.8	ab	103.0	bcd	117.7	ab	10.00	17.3	a-f	72.8	c-g	63.4	abc	39.4	b-m	2.7	a-f	91.4	b-m	3
LSD		P=.05		12.352		555.862		1.95		5.6057		-	1.306		1.1074		6.6507		1.551		0.2417		7.26		
Standard		Deviation		8.8502		398.261		1.39		4.0165		0	0.807		0.7935		4.7655		1.112		0.1732		5.2		
CV				4.5		4.5		1.38		3.77		0	4.84		1.07		7.57		2.87		7.11		5.96		
Levene's		F		0.785		0.785		0.588		0.786		0	1.189		0.83		0.77		0.953		0.947		1.116		
Levene's		Prob(F)		0.872		0.872		0.994		0.871		-	0.209		0.81		0.892		0.581		0.593		0.282		
Skewness				-0.224		-0.2237		0.5122*		-0.003		-	0.6002*		-1.6351*		-4.0095*		-0.8008*		-0.164		-0.7513*		
Kurtosis				-0.622		-0.6216		0.2222		-0.552		-	0.588		6.8912*		28.0255*		1.5721*		-0.298		1.4768*		
Replicate		F		14.014		14.014		8.901		16.29		0	0.402		13.644		9.861		9.667		3.55		11.347		
Replicate		Prob(F)		0.0001		0.0001		0.0001		0.0001		1	0.6697		0.0001		0.0001		0.0001		0.0157		0.0001		
Treatment		F		11.353		11.353		10.116		9.117		0	3.544		5.941		3.257		12.789		7.912		13.058		
Treatment		Prob(F)		0.0001		0.0001		0.0001		0.0001		1	0.0001		0.0001		0.0001		0.0001		0.0001		0.0001		

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).

Type*

L: Conventional Long grain

CL: Clearfield Long grain

M: Conventional Medium Grain

CM: Clearfield Meadium Grain

(A): Aromatic

PV: Provisia Long Grain

5. **Crosses**

We made 71 successful crosses majority with long grains from high yielding parents with or without blast resistance gene. With these crosses, six are aromatic to non-aromatic, six are waxy aromatic to non-aromatic, three medium grain, thirteen long grain to CMS male sterile line, nine long grain to heat/drought tolerant N22, the rest are Clearfield, and conventional long grain crosses.

6. **F_1 to F_2 seed increase and testcross with CMS line**

We planted 166 F_1 seeds in the greenhouse and hand transplanted them in the field. We selected and harvested 64 entries equivalent to 64 F_2 populations based on visual estimate of hybrid vigor. Twenty seven test crosses to CMS line Zenshan 97A only yield 5 lines that partially restores fertility to the F_1. These partially restorer lines are indica and japonica types. No tropical japonica types in the cross restores partial or full fertility. The seeds were harvested and several populations are included in the Puerto Rico winter nursery.

7. **F_2 Single panicle selections**

We harvested 100 individual panicles from each 24 F_2 population planted in the rice research farm for a total of 2400 panicles. 600 are from medium grain while 1800 are from long grain conventional and Clearfield F_2 population. All 1800 population are part of the 3000 head rows planted in the 2020 Puerto Rico Nursery.

8. **DNA markers/genotyping**

We run DNA markers/genotyping on 200 lines/varieties in crossing block, 100 lines in advance yield trial, and 768 F_3 single seed descent (SSD) with three markers - amylose, Piz and Pita (blast) for a total of 3204 data points. Additional DNA markers for gelatinization temperature, aroma, Glabrous/pubescent, seed size, and other blast markers are currently being tested to include in marker assisted selection.

Furrow Irrigated Rice Performance Evaluation 2019

Michael Aide, Department of Agriculture

January 2020

Abstract

We planted CL111 in a strip plot design to simulate actual production-based furrow irrigation conditions. The strip plots were approximately 1150 ft long and were partitioned into three zones (zone 1 was the upper third, zone 2 was the middle third, and zone 3 was the lower third which accumulated tail water). Rice assessment involved estimating selective yield components (panicle weights), harvest yield, plant tissue analysis, and drone assisted remote sensing. Drone flights were flown with visual and normalized difference vegetative index (NDVI) camera systems to monitor canopy development. This pilot project was to develop technical and pragmatic flight protocols to guide an understanding of this emerging technology's capabilities and promise for implementing decision making for rice production. Non-significant mean yields across all zones ranged from a low of 163 bu/ac to 175 bu/ac. Panicle weights were greater for zone#1. The visual and NIR remote sensing data demonstrated differences; however, protocols for data interpretation require improvement.

Introduction

Grower interest in furrow irrigation of rice (row rice) is increasing, largely attributed to reduced costs associated with water pumping and field preparation. Perceived advantages of furrow irrigated rice include: (i) reduced water usage (in theory), (ii) reduced labor, (iii) reduced energy usage, (iv) reduced levee construction, (v) more opportunities to use ground equipment instead of airplanes, (vi) more rapid field drying, and (vii) reduced land preparation for rotation crops. Disadvantages of furrow irrigated rice include: (i) requires graded land and producers must place water down each furrow, (ii) potentially a zero to twenty percent yield reduction, (iii) possible delays in maturity, (iv) weed management must be properly adjusted, (v) greater potential of having yield-limiting water stress, (vi) less information and experience with row rice, (vii) nitrogen management practices may need to be adjusted to prevent nitrification-denitrification, and (viii) crop insurance may not be available for row rice until underwriters provide risk assessments.

Remote sensing is the acquisition of information about an object or collection of objects without making physical contact. Hyperspectral imaging collects and processes information from a portion of the electromagnetic spectrum with the goal of finding objects, identifying materials, or detecting processes. Remote sensors collect data by detecting the energy that is reflected from the object. Sensors can be on satellites, aircraft (drones), on a tripod in the field, or in the laboratory. Remote sensors can be either passive or active, with (i) passive sensors responding to external stimuli and (ii) active sensors using internal stimuli to collect data. Robust applications abound in geology, geography, military, intelligence, commercial, economic, planning, agriculture and humanitarian sectors.

Most remote sensing activities utilize the Normalized Difference Vegetation Index (NDVI), which may be mathematically written as:

$$NDVI = (NIR – VIS)/(NIR + VIS),$$

where NIR is the near infrared and VIS is the visible spectrum (Red). For a given pixel, the NDVI ranges from 0 to +1, where 0 implies no green leaves and +1 (typically 0.8 to 0.9) implies the highest possible density of green leaves. Thus, the NDVI of a portion of a field having a dense vegetation canopy will have positive values between 0.3 to 0.8. Thus, green plants absorb solar radiation in the photosynthetically active radiation (PAR) spectral region and re-emit solar radiation in the near-infrared spectral. Thus, living green plants appear dark in the PAR and relatively bright in the near-infrared. The chlorophyll pigment in green plant leaves strongly absorbs visible light (from 0.4 to 0.7 μm); however, leaves strongly reflect near-infrared light (from 0.7 to 1.1 μm), with the leaf area index influencing the intensity of these reflectance differences. Snow fields likely have negative NDVI values and free-standing water will similarly have low reflectance in both spectral bands and result in very low positive or even slightly negative NDVI values. Bare soils generally exhibit a near-infrared spectral reflectance somewhat larger than the red.

The Drone-NDVI project's impact includes: (i) the potential to alter field inspections and scouting to obtain more precise and more rapidly obtainable information, (ii) potential for emerging technology accessibility and usage by a greater field of researchers, (iii) potential for agribusiness commercialization, and (iv) assisting producers to understand the digital information and support their ability to use NDVI in rice production decision making.

MATERIALS AND METHODS

The Missouri Rice Research Farm (Dunklin County, Missouri)

The soils of the very deep, poorly-drained and very slowly permeable Overcup series (Fine, smectitic, thermic Vertic Albaqualfs) consist of Ap – E – Btg – C horizon sequences developed in fine-silty alluvium. Routine soil testing for the Overcup silt loam soils reveals an acidic soil; however, other soil characteristics affecting rice yield potential are appropriate for crop production.

Field Protocols

At the Missouri Rice Research Farm (Dunklin County) the rice variety CL111 was 1 June 2018 drill-seeded in a land-graded, paddock. The irrigation strategy was drill-seeded, furrow irrigation on 0.83-meter beds prepared using a field conditioner "hipper". Irrigation water was supplied by wells having centrifugal pumps delivering 0.19 m^3/s (3,000 gallon / min). Furrow irrigation was performed using poly-pipe, with each furrow receiving water. Nitrogen fertilization consisted of broadcast urea at 134 kg N/ha (120 lbs N/acre) applied near the 5^{th} leaf stage. Nitrogen was applied using a Mudmaster at internode elongation (34 kg N/ha, or 30 lbs N/acre) as urea. Urea (46-0-0) was SuperU, which is a stabilized, urea-based granule containing urease and nitrification inhibitors.

Plot dimensions were two adjacent 1.95-meter (6.33 ft) (total 3.9-meter (12.66 ft) row-beds by 358 meters (1,175 ft). The furrow irrigated plots were sectioned into R1 (row upper) (near the placement of the polypipe), R2 (row middle) and R3 (row lower is also tailwater accumulation). The CL111 variety was planted at a rate of 70 lb/acre (78.4 kg/ha).

Twenty panicles per plot were collected at harvest for panicle weight determination for each variety-zone). Plot yields and moisture contents were obtained using a Case Combine with weigh wagons. Rice milling was accomplished using a Zaccaria PAZ 1 DTA milling machine.

Plant Tissue Analysis

Plant tissue testing for nitrogen, phosphorus and potassium and other nutrient analysis was performed by Midwest laboratories (Omaha, NB, USA) using acid dissolution and inductively coupled plasma emission spectroscopy. Typically, the critical value for plant tissue is the concentration of a nutrient at which there is the likelihood for a five to ten percent reduction in either growth or yield [1, 2]. The proper rice sampling procedure at mid-tillering stage is to collect leaf samples from the youngest, fully developed leaves for approximately 20 plants

within the sampling area [1]. The proper rice sampling procedure at panicle initiation (panicle should be at least 2 mm in length) is similar to the mid-tillering protocol in that one desires to collect leaf samples from the youngest, fully developed leaves (Y-leaves) for approximately 20 plants within the sampling area [1]. The sufficiently levels for rice at two growth stages, in units of g/kg for macronutrients and mg/kg for micronutrients, are: mid-tillering: [Macronutrients N (28 to 36), P (1.4 to 2.7), K (15 to 27), Ca (1.6 to 3.9), Mg (1.2 to 2.1), and S(1.7+) and Micronutrients Fe (90 to 190), Mn (40 to 740), B (5 to 25), Cu (6 to 25) and Zn (20 to 160) and (ii) panicle initiation: [Macronutrients N (30 to 34), P (1.8 to 2.9), K (15 to 27), Ca (1.9 to 3.9), Mg (1.5 to 3.9), and S(1.5+) and Micronutrients Fe (90 to 190), Mn (40 to 800), B (6 to 25), Cu (6 to 25) and Zn (20 to 160) [1].

Results and Discussion

Plant tissue sampling for CL111 during tillering for all zones demonstrated that nitrogen, phosphorus, potassium, magnesium, calcium, sulfur, iron, manganese, boron, copper and zinc were either greater than the established sufficiency levels (nitrogen) or were within the lower and upper limits for nutrient sufficiency (Table 1). Interestingly, manganese appreciably demonstrated greater plant accumulation upon transition from zone #1 to zone #3, possibly reflecting a more anoxic soil environment. Similarly, phosphorus and copper somewhat demonstrated greater plant accumulation upon transition from zone #1 to zone #3. Given the sufficiency levels, there appears that at late-tillering stage nitrogen exhibits surplus plant accumulation.

The ratios of N/P and N/K were greater than the established DRIS norms, whereas the P/K ratio was lower (Zone 1) or approximately equivalent to the desired DRIS ratio (Zone 3). The N/S ratio was lower than the desired ratio, a feature attributed to the greater than expected S content (Table 1).

Table 1. Rice plant tissue analysis taken just prior to internode elongation (July 7, 2019)											
Sample	N	P	K	Mg	Ca	S	Fe	Mn	B	Cu	Zn
	percent	percent	percent	percent	percent	percent	ppm	ppm	ppm	ppm	ppm
Zone 1	4.52	0.27	2.98	0.23	0.39	0.33	111	58	17	8	47
Zone 1	3.69	0.3	3.38	0.2	0.32	0.3	120	59	13	8	52
Average	4.105	0.285	3.18	0.215	0.355	0.315	115.5	58.5	15	8	49.5
Zone 3	5.12	0.38	2.78	0.21	0.58	0.3	113	197	15	14	36
Zone 3	3.37	0.36	2.82	0.19	0.37	0.32	113	343	10	17	39
Average	4.245	0.37	2.8	0.2	0.475	0.31	113	270	12.5	15.5	37.5
Sufficiency levels											
Low	2.8	0.14	1.5	0.12	0.16	0.17	90	40	5	6	20
High	3.6	0.27	2.7	0.21	0.39		190	740	25	25	160
DRIS	N/P	N/K	N/S	P/K							
Zone 1	14.4	1.3	13	0.09							
Zone 3	11.5	1.5	13.7	0.13							
Desired	9.8	1.19	17.3	0.12							

Plant tissue sampling prior to harvest showed vegetative (straw) having consistently greater potassium, magnesium, iron and zinc concentrations in zones #1 and #2 than zone #3, whereas calcium and arsenic shows appreciably greater concentrations in zone #3 (Table 2). Nitrogen, phosphorus, sulfur, manganese, boron, and copper rice straw tissue concentrations do not show any significant differences attributed to zone locations. Paddy (rough) seed analysis demonstrates that the nitrogen, potassium, calcium, iron, manganese, zinc contents are greater for zones #1 and #2 than zone #3 (Table 2), whereas arsenic seed concentrations are greater from Zone #3.

Table 2. Rice plant tissue analysis taken just prior to harvest (2019)													
		N	P	K	Mg	Ca	S	Fe	Mn	B	Cu	Zn	As
Zone	Part	percent	percent	percent	percent	percent	percent	ppm	ppm	ppm	ppm	ppm	ppm
1	stem	1.085	0.115	2.26	0.145	0.255	0.095	87	500	5.5	3.5	51.5	0.665
1	seed	3.01	0.76	0.86	0.28	0.09	0.2	125	557	6	9	63	0.38
2	stem	0.84	0.09	2.3	0.155	0.295	0.08	83.5	476.5	4.5	2.5	43	0.895
2	seed	2.91	0.69	0.73	0.26	0.06	0.2	97	358	5	7	56	0.36
3	stem	1.2	0.115	1.75	0.115	0.405	0.095	77.5	492.5	5	2.5	31	2.835
3	seed	2.81	0.75	0.74	0.27	0.07	0.2	96	431	5	8	53	0.87

Panicle weights (seed) show significant differences based on field location, with the greatest panicle weights in zone #1 and in zones #2 and smaller panicle weights in zone #3

(Table 3). Individual vegetative dry matter accumulations are correspondingly greater in zone #1 and Zone #2 than zone #3. Yields are not significantly different across the zones; however, yields are numerically greater in zones #2 and #3 than zone #1.

Table 3. Mean dry weight and yield (bushel/acre)

Zone	Plant Part (g/plant)	Dry Weight (g)	Yield (Bu/Acre)
1	Stem&Leaf	1.02	
1	Seed	2.45	163
2	Stem&Leaf	0.88	
2	Seed	2.50	174
3	Stem&Leaf	0.90	
3	Seed	2.01	175

All values are the mean of 20 observations

Drone-Imagery and Rice Field Health

One drone flight occurred to assess the rice growth and development. In June 2019 visual image shows green color differences likely attributed to tillering against the soil background, given canopy closure had not occurred (Figure 1). The corresponding NIR image (Figure 2) shows appreciably greater green and red color in zone #1 suggesting better rice growth, whereas zone #2 and #3 have a darker color suggesting greater stress.

Figure 1a. Drone imagery 7 June with red-green-blue composite

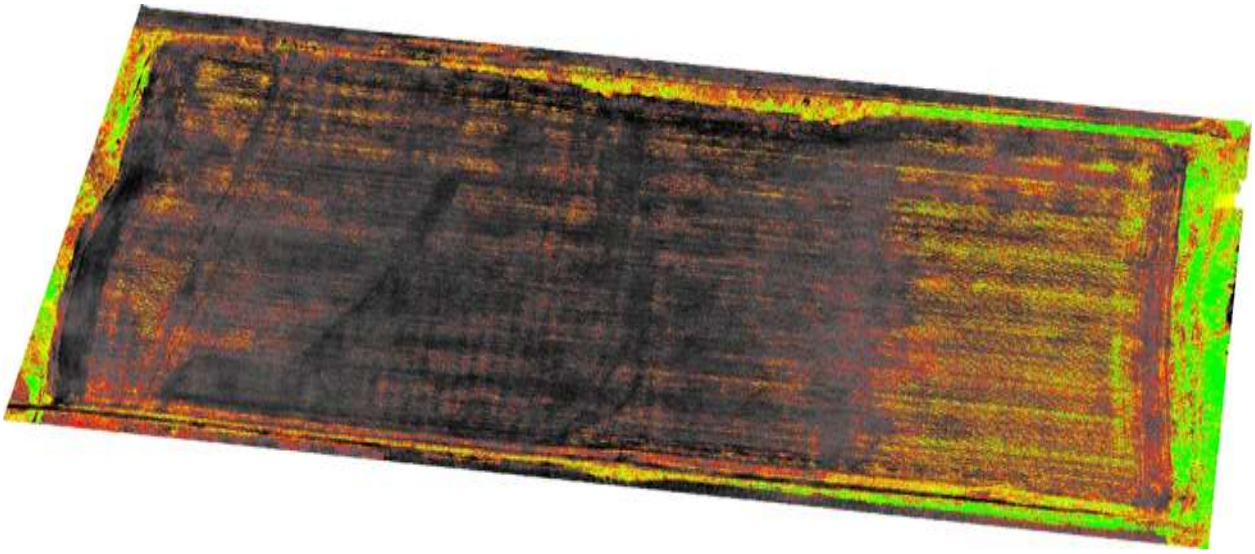

Figure 1b. Drone imagery 7 June with NIR (near infrared) composite

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Furrow Irrigated Rice Row Spacing Test

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Furrow Rice Response to Different Bed Widths

Missouri rice farmers started growing furrow irrigated production beginning around 1990. For many years, the amount of land in "row rice" was small. But interest in the cropping system has increased in recent years. About 30% of the rice is currently produced with furrow irrigation. In fields well suited for flooded rice, furrow irrigation usually does not increase yields. The main advantage of furrow-irrigated rice is that levees and gates are not required. This saves rice producers time and labor costs. Soils are an important factor in the decision process. For fields that do not efficiently retain floodwater, furrow irrigation may be a good fit. Bed spacing and height may differ by soil texture, and should be made to allow complete soil saturation across the entire soil surface (including ridge-tops) after each irrigation. Bed height must be tall enough to prohibit irrigation water from breaking over bed tops A furrow irrigated experiment with three bed widths (30, 38, and 60-inch) was started at the MU Lee Farm in 2019. Bed width had a significant effect on rice yields. Table 1 shows that rice yield decreased as bed with increased. 2019 was a wet growing season and we were not able to record differences in soil moisture between bed widths on August 9 and September 10 (Figure 1 and 2).

Variety/Hybrid x Nitrogen

A nitrogen x rice variety test was started by Dr. Paul Tracey and Steve Hefner and lasted seven years. We restarted the study in 2014. Results provided assurance to Missouri farmers that they were applying the correct nitrogen rate on varieties that were developed at other states. Soil fertility specialists in Louisiana and Arkansas work with breeders in their states to develop N recommendations before new varieties are released. Differences in soils and weather could impact N fertilizer response by varieties in Missouri. This research also provided valuable information that helped the MU Extension service calibrate growth stages for new varieties in the Missouri Rice DD-50 program.

Rice farmers were surveyed to determine which varieties to plant in 2019. Main plots were planted with Caffey, Titan, CLXL745, Jupiter, Diamond, Provisa, CL153, CLJ01, RT Gemini 214CL, and XL753. Treatments were replicated four times. The variety or hybrids in the DD-50 program has 25 options on the list. We will upgrade output from this research. Each main plot was divided into subplots and received total rates of 120, 150, and 180 lbs/acre. Varieties received most of the nitrogen at preflood with 45 lb N/acre at green ring growth stage; 120 (75/45), 150 (105/45), 180 (135/45). Hybrids did not receive nitrogen at green ring but received 30 lb N/acre at late boot growth stage 120 (90/30), 150 (120/30), 180 (150/30). Table 1 shows the yield results. Averaged across varieties, yields were highest with 180 lb N/acre.

Rice yields from three bed widths on Sharkey clay soil at the University of Missouri Fisher Delta Research Center in Portageville, Missouri.

Bed widths	Rice yield†
inches	bushels/acre
30	165 a
38	159 ab
60	150 b

† Yield values followed by the same letter were not significantly different at the 0.05 level.

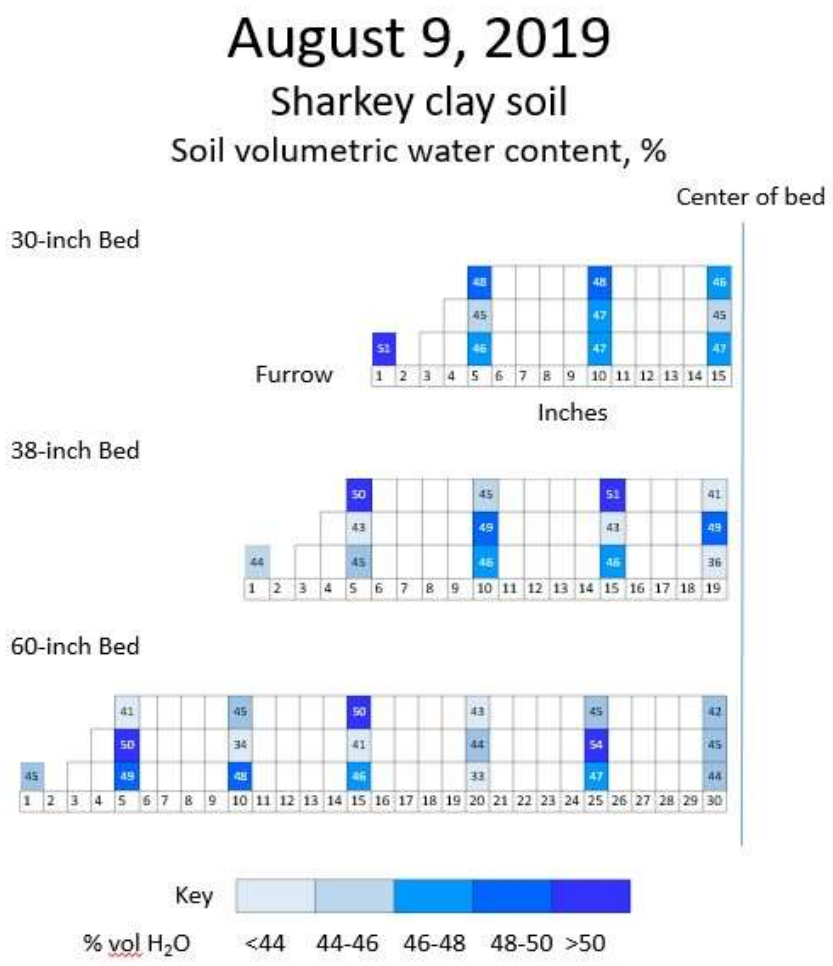


Table 1. Rice DD50 x Variety Test- Sharkey Clay

Trt	Variety	Total N	Bu/A	Total	Head
1	Caffey	120	142.4	68	57
2	Caffey	150	131.2	68	58
3	Caffey	180	152.3	69	57
4	Titan	120	163.2	69	62
5	Titan	150	126.2	68	59
6	Titan	180	156.4	69	58
7	CLXL745	120	126.9	69	56
8	CLXL745	150	150.4	64	50
9	CLXL745	180	175.2	62	51
10	Jupiter	120	142.1	67	55
11	Jupiter	150	144.9	66	56
12	Jupiter	180	153.2	67	55
13	Diamond	120	117.3	71	66
14	Diamond	150	140.3	68	62
15	Diamond	180	135.1	69	53
16	Provisa†	120	145.5	65	54
17	Provisa	150	133.7	68	52
18	Provisa	180	158.6	66	57
19	CL153	120	142.2	65	51
20	CL153	150	143.5	67	56
21	CL153	180	143.1	62	53
22	CLJ01	120	108.9	70	60
23	CLJ01	150	121.9	68	61
24	CLJ01	180	111.6	69	58
25	RTGemini	120	152.8	67	53
26	RTGemini	150	184.1	68	56
27	RTGemini	180	218.7	64	53
28	XL753	120	153.4	67	55
29	XL753	150	145.6	67	51
30	XL753	180	174.4	70	59

† Provisa was split 90/0/30, 120/0/30, and 150/0/30.

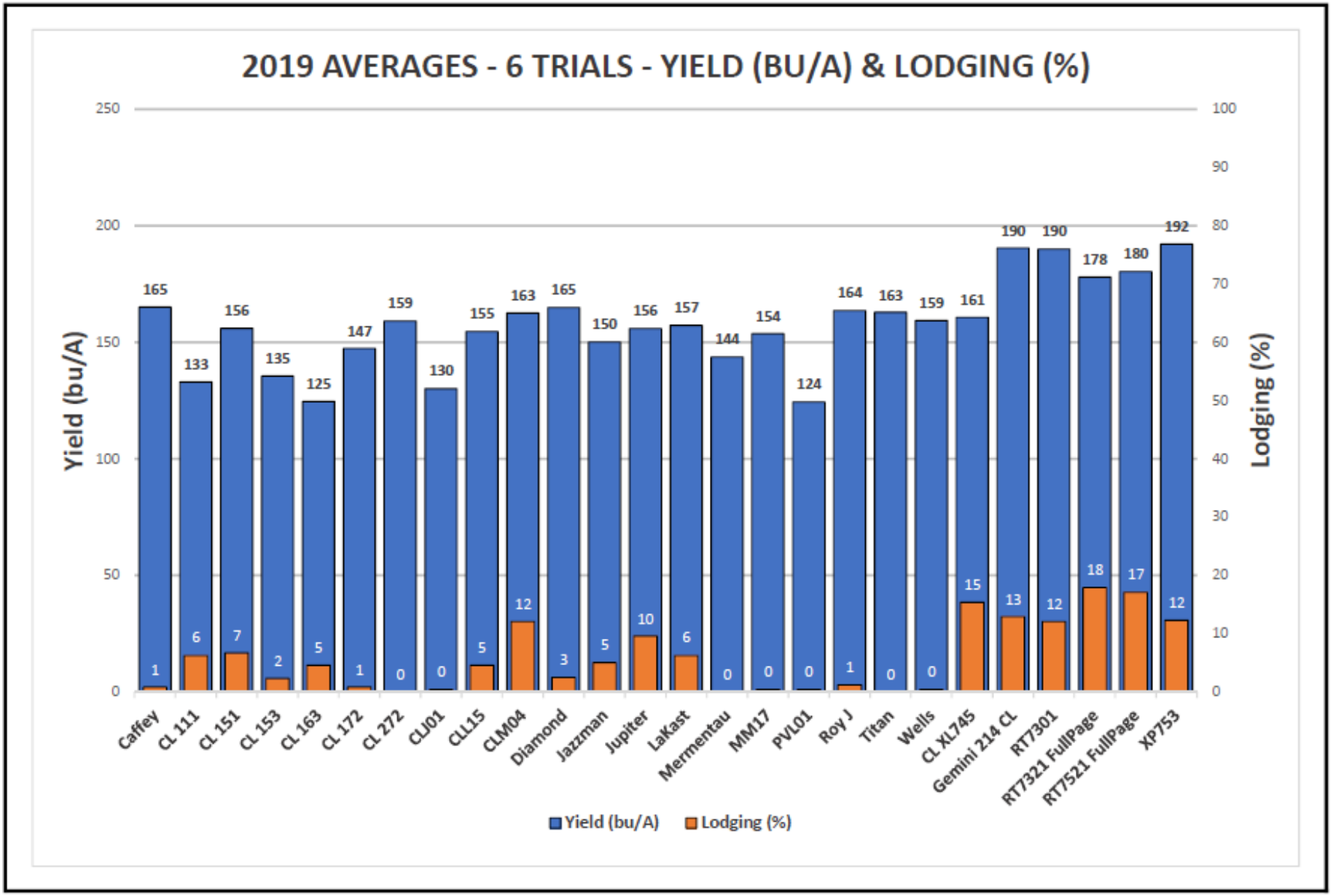
Across varieties	
120	139.5
150	142.2
180	157.9

Missouri Rice Research and Merchandising Council

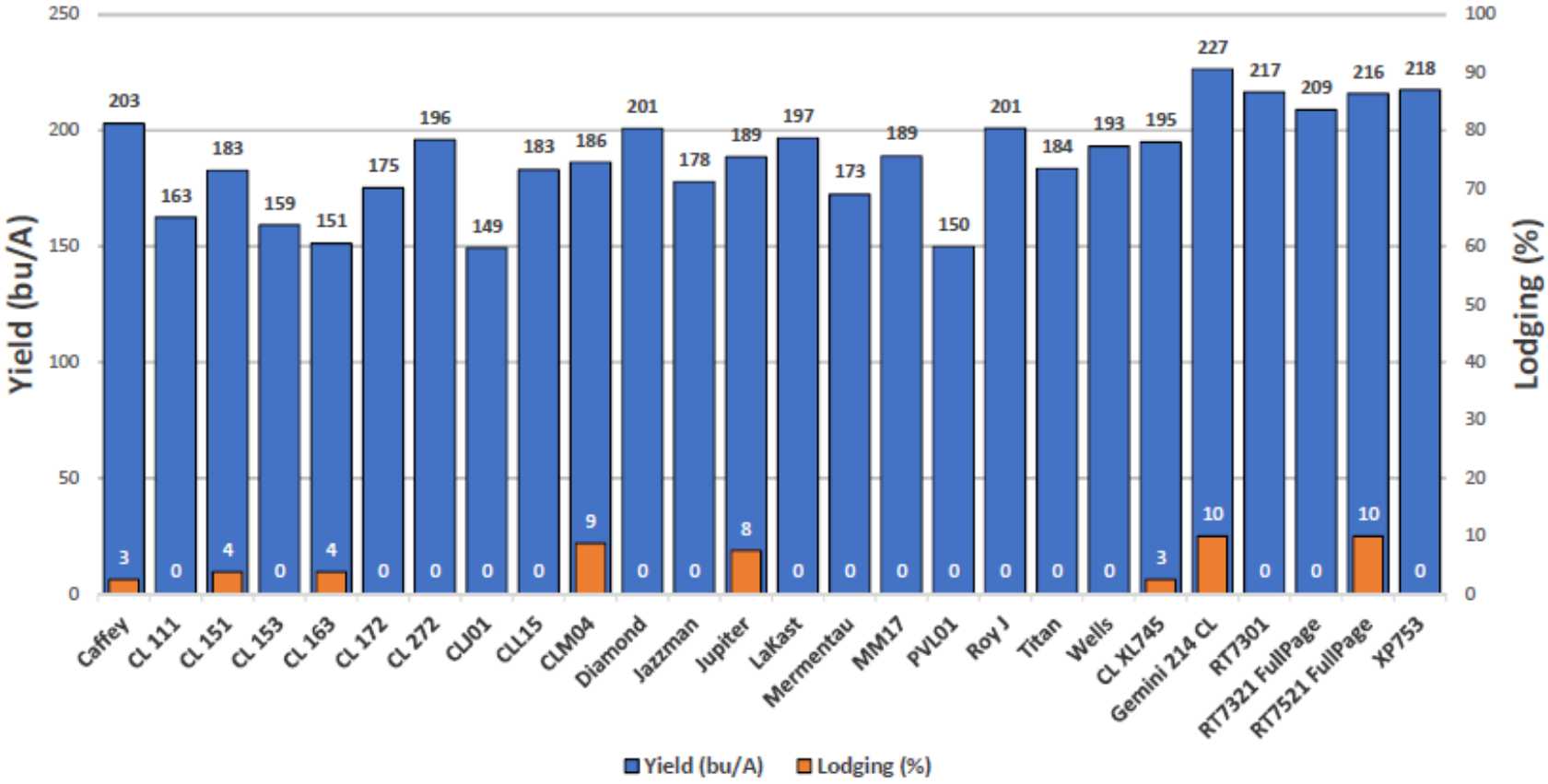
2019 Missouri Variety Trial Data

	Yield (bu/A)																								Lodging (%)																								Milling Total (%)				Milling Whole (%)			
	Glennonville, MO				Fisk, MO				Neelyville, MO		Rivets, MO		Canalou, MO		AVG		Glennonville, MO				Fisk, MO				Neelyville, MO		Rivets, MO		Canalou, MO		AVG		Glennonville, MO				Glennonville, MO			
Variety	Early		Late		Early		Late										Early		Late		Early		Late										Early		Late		Early		Late	
Caffey[6]	216	b-e	185	abc	190	b-f	146	b-e	119	b-f	135	a-e	198	a	170		0	-	0	-	5	-	0	-	0	d	0	b	0	c	1		74.5	bc	73.6	ab	68.2	abc	64.9	a-d
CL 111[23]	173	jk	158	c	152	hi	111	f	98	fgh	106	g-j	155	d-g	136		0	-	0	-	0	-	28	-	0	d	10	ab	0	c	5		75.1	bc	74.7	a	64.9	a-e	59.5	b-h
CL 151[17]	185	ijk	169	abc	181	c-g	148	bcd	143	ab	111	f-j	159	def	156		0	-	0	-	8	-	23	-	3	d	8	ab	10	c	7		75.4	bc	74.7	a	65.3	a-d	62.8	a-f
CL 153[22]	175	jk	163	bc	144	ij	124	c-f	103	d-h	105	hij	163	cde	139		0	-	0	-	0	-	1	-	0	d	13	ab	0	c	2		75.1	bc	74.3	ab	65.6	a-d	64.8	a-d
CL 163[25]	176	jk	164	bc	126	j	81	g	89	gh	112	f-j	149	efg	128		0	-	0	-	8	-	18	-	0	d	3	b	0	c	4		74.5	bc	73.6	ab	65.5	a-d	64.2	a-e
CL 172[20]	184	ijk	179	abc	166	fgh	133	c-f	108	c-g	114	e-j	160	def	149		0	-	0	-	0	-	0	-	0	d	5	b	0	c	1		75.1	bc	74.3	ab	68.1	abc	65.4	abc
CL 272[11]	208	c-f	182	abc	184	c-f	115	def	131	a-d	135	a-e	174	bcd	161		0	-	0	-	0	-	0	-	0	d	0	b	0	c	0		75.3	bc	73.5	ab	67.3	abc	64.2	a-e
CLJ01[24]	156	l	159	c	143	ij	128	c-f	99	fgh	97	j	143	g	132		0	-	0	-	0	-	3	-	0	d	0	b	0	c	0		75.2	bc	73.4	ab	68.8	a	63.2	a-f
CLL15[16]	190	g-j	154	c	176	efg	155	bc	132	a-d	120	d-i	181	b	158		0	-	0	-	0	-	25	-	0	d	3	b	0	c	4		74.0	bc	71.8	b	60.4	fgh	57.0	e-h
CLM04[10]	207	c-g	193	ab	166	fgh	152	bc	128	a-e	130	b-f	166	b-e	163		0	-	0	-	18	-	30	-	25	cd	0	b	48	b	17		74.5	bc	72.8	ab	68.5	ab	61.8	a-g
Diamond[8]	213	b-f	186	abc	189	b-f	149	bc	130	a-e	123	d-h	162	cde	165		0	-	0	-	0	-	0	-	0	d	15	ab	0	c	2		74.7	bc	73.1	ab	62.2	d-g	60.4	a-h
Jazzman[19]	178	jk	167	abc	178	d-g	167	b	101	e-h	109	f-j	168	bcd	153		0	-	0	-	0	-	23	-	0	d	8	ab	0	c	4		74.7	bc	73.9	ab	66.1	a-d	64.3	a-e
Jupiter[18]	208	c-f	153	c	169	e-h	134	c-f	135	abc	136	a-d	.	.	156		0	-	0	-	15	-	8	-	35	bc	0	b	90	a	21		72.7	c	72.7	ab	69.2	a	67.3	a
LaKast[14]	211	b-f	179	abc	183	c-f	128	c-f	117	b-f	126	c-h	179	bc	160		0	-	0	-	0	-	28	-	0	d	10	ab	0	c	5		77.1	ab	74.7	a	64.0	b-f	60.3	a-h
Mermentau[21]	188	hij	166	abc	157	ghi	128	c-f	97	fgh	126	c-h	168	bcd	147		0	-	0	-	0	-	0	-	0	d	0	b	0	c	0		74.0	bc	74.2	ab	67.2	abc	66.6	ab
MM17[15]	200	e-i	176	abc	178	d-g	101	f	129	a-e	138	a-d	196	a	160		0	-	0	-	0	-	0	-	0	d	3	b	0	c	0		74.4	bc	72.9	ab	69.3	a	64.4	a-e
PVL01[26]	170	k	152	c	130	j	113	ef	79	h	102	ij	145	fg	127		0	-	0	-	0	-	0	-	0	d	3	b	0	c	0		74.4	bc	73.2	ab	63.6	c-f	57.6	d-h
Roy J[9]	220	a-d	183	abc	182	c-f	145	b-e	124	b-f	128	c-g	169	bcd	164		0	-	0	-	0	-	2	-	5	d	0	b	0	c	1		76.8	ab	75.3	a	65.6	a-d	64.8	a-d
Titan[7]	198	e-i	169	abc	169	e-h	177	b	123	b-f	141	a-d	200	a	168		0	-	0	-	0	-	0	-	0	d	0	b	25	c	4		75.0	bc	73.1	ab	60.1	fgh	58.0	c-h
Wells[13]	203	d-h	170	abc	184	c-f	157	bc	118	b-f	125	d-h	168	bcd	161		0	-	0	-	0	-	0	-	3	d	0	b	0	c	0		76.3	ab	74.4	ab	59.8	f-i	58.8	c-h
CL XL745[12]	197	f-i	157	c	194	b-e	170	b	122	b-f	126	c-h	.	.	161		0	-	0	-	5	-	23	-	43	abc	23	ab	.	.	15		78.2	a	73.2	ab	58.3	ghi	55.6	gh
Gemini 214 CL[2]	234	a	197	a	219	a	208	a	133	a-d	152	a	.	.	190		0	-	0	-	20	-	0	-	55	ab	3	b	.	.	13		76.4	ab	74.3	ab	60.8	e-h	58.9	c-h
RT7301[3]	224	abc	185	abc	210	ab	217	a	157	a	148	abc	.	.	190		0	-	0	-	0	-	5	-	45	abc	23	ab	.	.	12		75.9	ab	73.9	ab	56.1	ij	57.8	c-h
RT7321 FullPage[5]	216	b-e	172	abc	203	a-d	212	a	129	a-e	136	a-d	.	.	178		0	-	0	-	0	-	8	-	63	a	38	a	.	.	18		75.0	bc	73.8	ab	53.6	j	53.3	h
RT7521 FullPage[4]	228	ab	178	abc	204	abc	177	b	145	ab	150	ab	.	.	180		0	-	0	-	20	-	28	-	55	ab	0	b	.	.	17		76.5	ab	73.8	ab	61.7	d-h	62.9	a-f
XP753[1]	225	abc	197	a	210	ab	221	a	144	ab	155	a	.	.	192		0	-	0	-	0	-	6	-	55	ab	13	ab	.	.	12		76.0	ab	74.3	ab	57.4	hi	56.3	fgh
LSD P=.05	11.40		17.48		15.13		19.82		16.93		13.10		9.39				-		-		10.93		19.50		17.53		18.43		18.48				1.68		1.45		2.81		4.17	
Standard Deviation	8.09		12.40		10.74		14.06		12.02		9.30		6.62				-		-		7.76		13.84		12.44		13.08		13.05				1.19		1.03		2.00		2.96	
CV	4.06		7.19		6.10		9.35		9.96		7.36		3.93				-		-		206.89		141.18		84.03		194.36		151.34				1.58		1.40		3.13		4.82	
Levene's F	1.235		1.186		1.155		1.644		0.732		0.593		1.328				-		-		1.175		3.810		2.479		1.482		6.678				1.024		0.996		1.269		1.432	
Levene's Prob(F)	0.238		0.280		0.308		0.052		0.808		0.929		0.207				-		-		0.289		0.001*		0.001*		0.097		0.001*				0.449		0.483		0.212		0.118	
Skewness	-0.2377		0.0509		-0.3897		0.2690		-0.0991		-0.0469		0.3372				-		-		3.5723*		1.9562*		1.4365*		2.1497*		2.8114*				1.3282*		0.2102		-0.6687*		-0.4999*	
Kurtosis	-0.8392		-0.1469		-0.2219		-0.5097		-0.4197		-0.7738		-0.4969				-		-		14.9461*		3.1869*		0.6174		3.3105*		6.3911*				5.3441*		2.7075*		-0.3476		-0.6513	
Replicate F	1.253		4.108		2.322		0.392		1.440		5.282		1.555				-		-		4.489		3.228		0.836		0.127		0.516				15.672		3.465		4.704		5.089	
Replicate Prob(F)	0.2968		0.0095		0.0820		0.7592		0.2381		0.0023		0.2115				-		-		0.0059		0.0272		0.4781		0.9436		0.6729				0.0001		0.0204		0.0046		0.0029	
Treatment F	25.634		4.469		19.946		26.135		9.594		12.014		23.686				-		-		2.999		2.778		13.434		2.007		11.854				3.683		2.325		19.047		6.449	
Treatment Prob(F)	0.0001		0.0001		0.0001		0.0001		0.0001		0.0001		0.0001				-		-		0.0001		0.0004		0.0001		0.0111		0.0001				0.0001		0.0028		0.0001		0.0001	

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls)
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
* Adjusted means


2019 AVERAGES - 6 TRIALS - YIELD (BU/A) & LODGING (%)
Yield (bu/A)
Lodging (%)
250
200
150
100
50
0
100
90
80
70
60
50
40
30
20
10
0
165 133 156 135 125 147 159 130 155 163 165 150 156 157 144 154 124 164 163 159 161 190 190 178 180 192
1 6 7 2 5 1 0 0 5 12 3 5 10 6 0 0 0 1 0 0 15 13 12 18 17 12
Caffey
CL 111
CL 151
CL 153
CL 163
CL 172
CL 272
CLJ01
CLL15
CLM04
Diamond
Jazzman
Jupiter
LaKast
Mermentau
MM17
PVL01
Roy J
Titan
Wells
CL XL745
Gemini 214 CL
RT7301
RT7321 FullPage
RT7521 FullPage
XP753
Yield (bu/A)
Lodging (%)

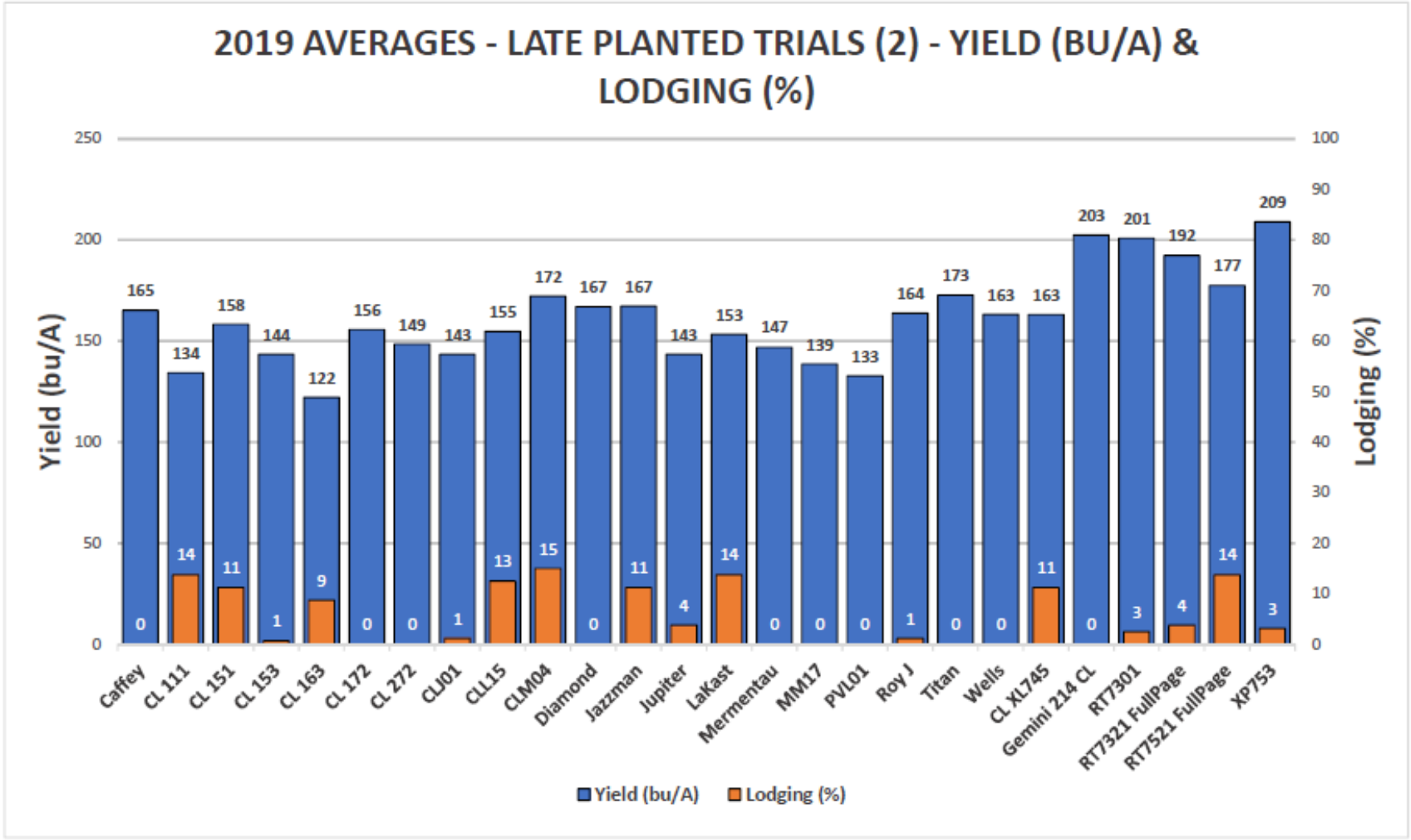
2019 AVERAGES - EARLY PLANTED TRIALS (2) - YIELD (BU/A) & LODGING (%)



Planted: 4/23 & 4/30/19
Harvest: 9/24 & 10/8/19
units @ pre-flood / 30 units @ mid-season

County: Butler and Dunklin
Soil Type: Silt Loam

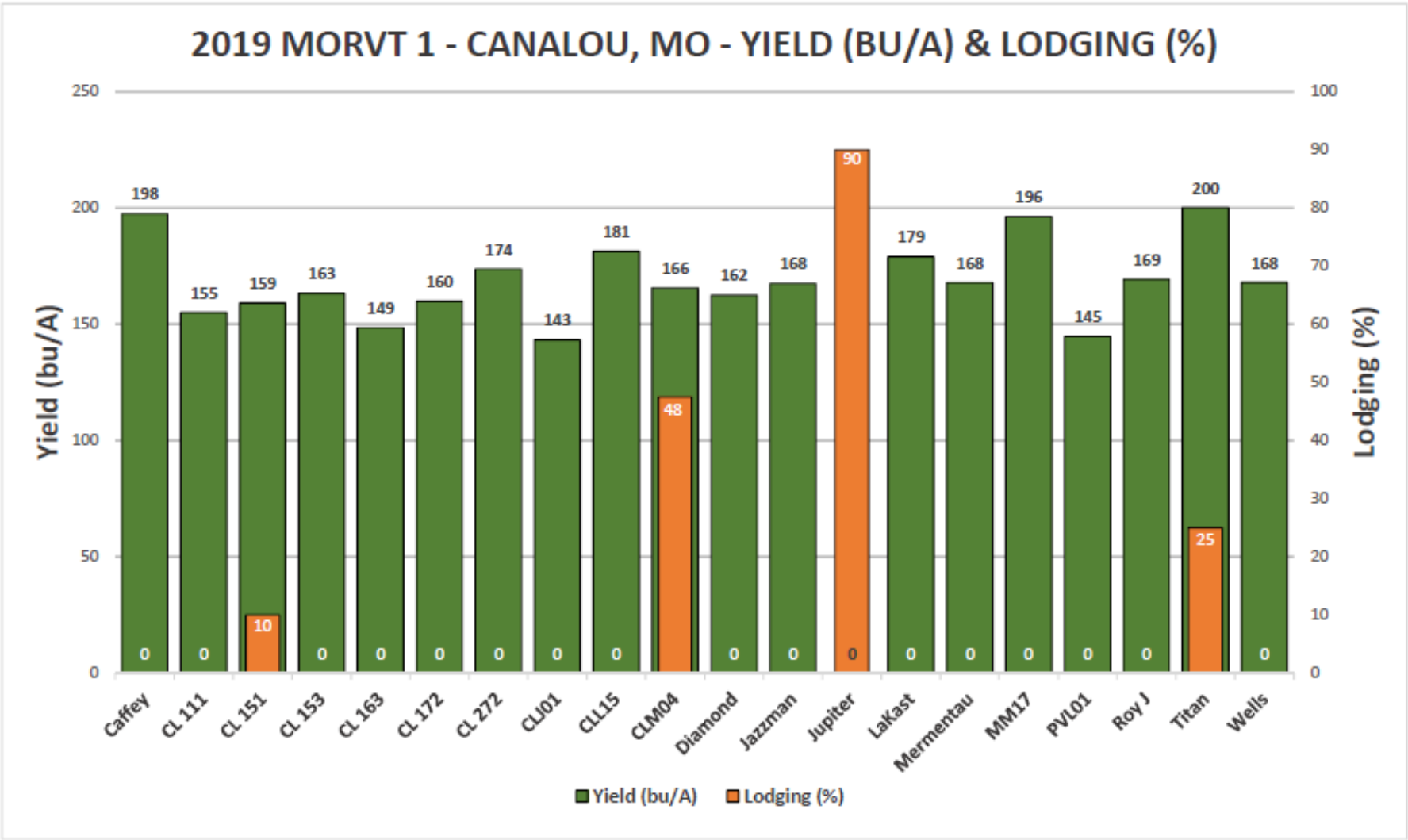
Nitrogen: 120



Planted: 5/17 & 5/25/19
Harvest: 10/1 & 10/17/19
units @ pre-flood / 30 units @ mid-season

County: Butler and Dunklin
Soil Type: Silt Loam

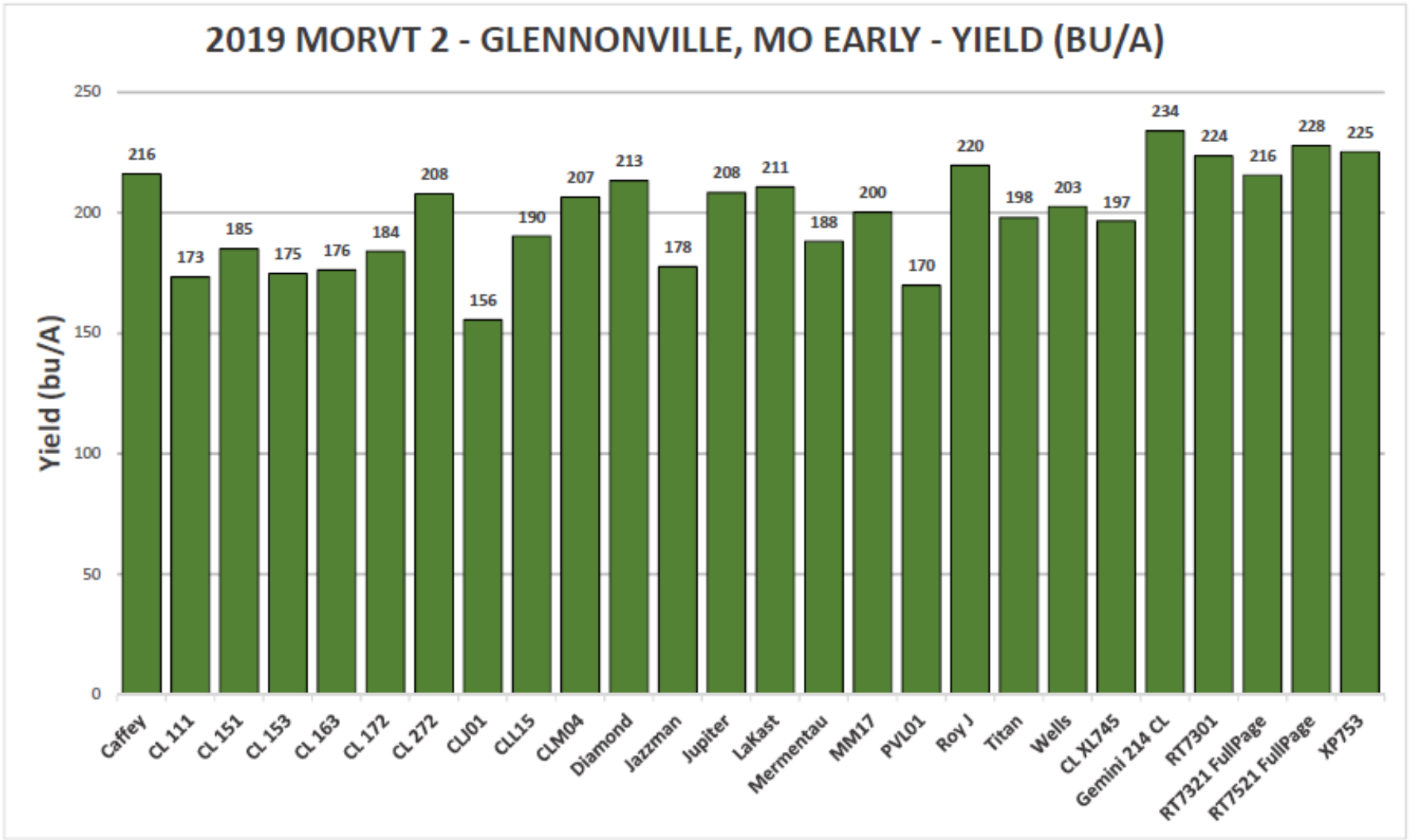
Nitrogen: 120



Planted: 5/14/19
Harvest: 10/10/19
Nitrogen: 120 units @ pre-flood / 30 units @ mid-season

County: New Madrid
Soil Type: Clay

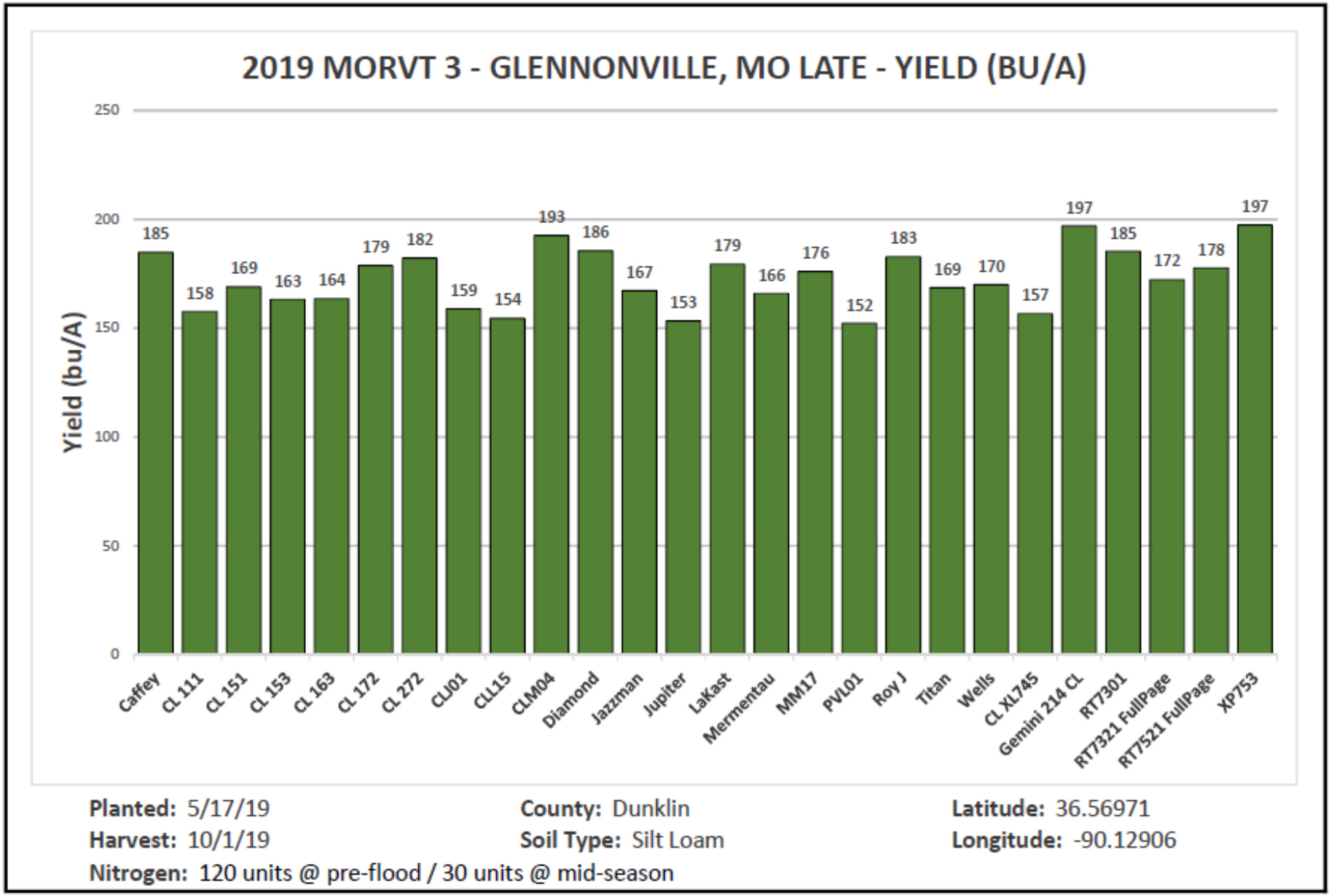
Latitude: 36.80456
Longitude: -89.68283



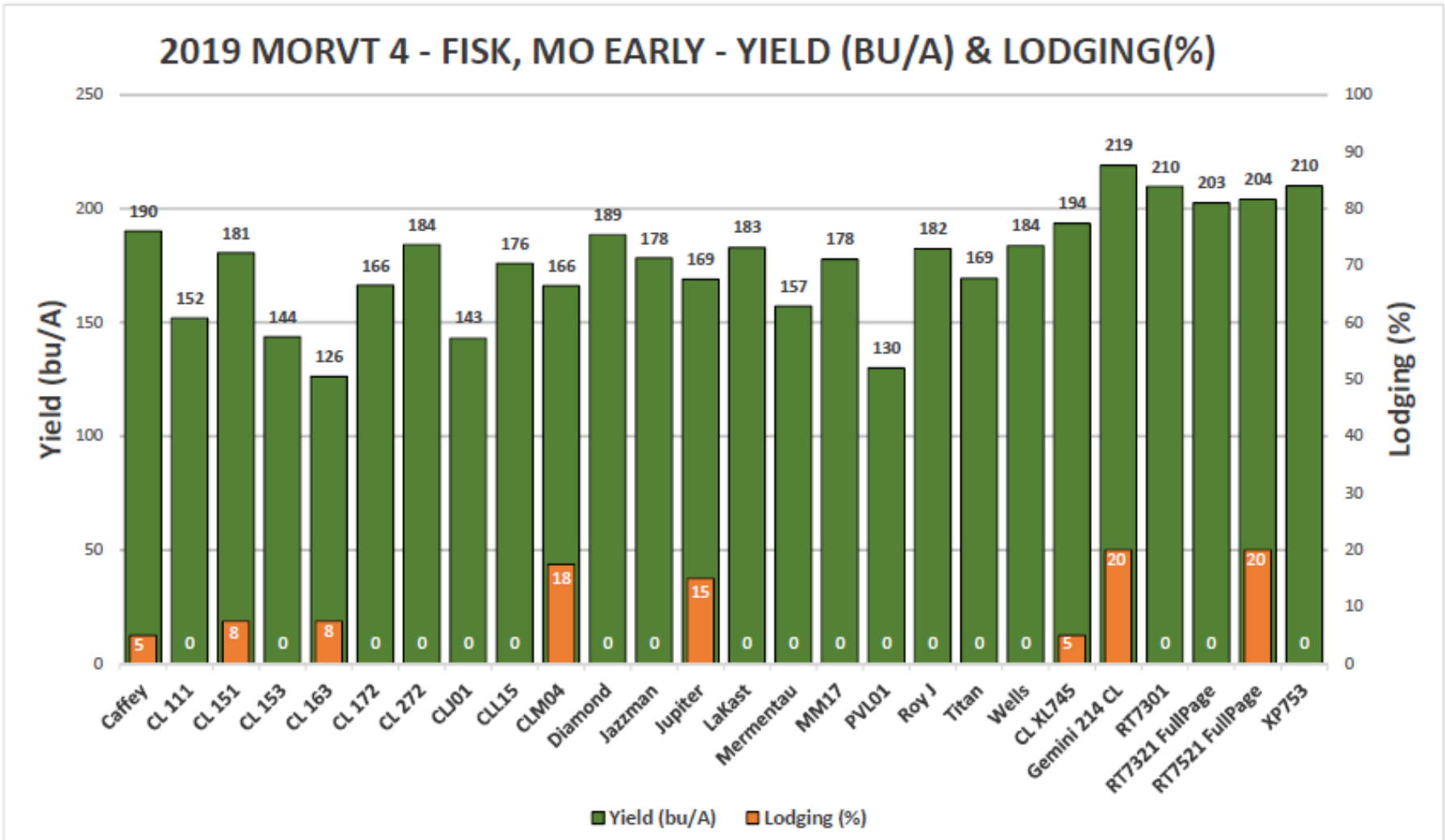
Planted: 4/23/19
Harvest: 9/24/19
Nitrogen: 120 units @ pre-flood / 30 units @ mid-season

County: Dunklin
Soil Type: Silt Loam

Latitude: 36.57142
Longitude: -90.12909



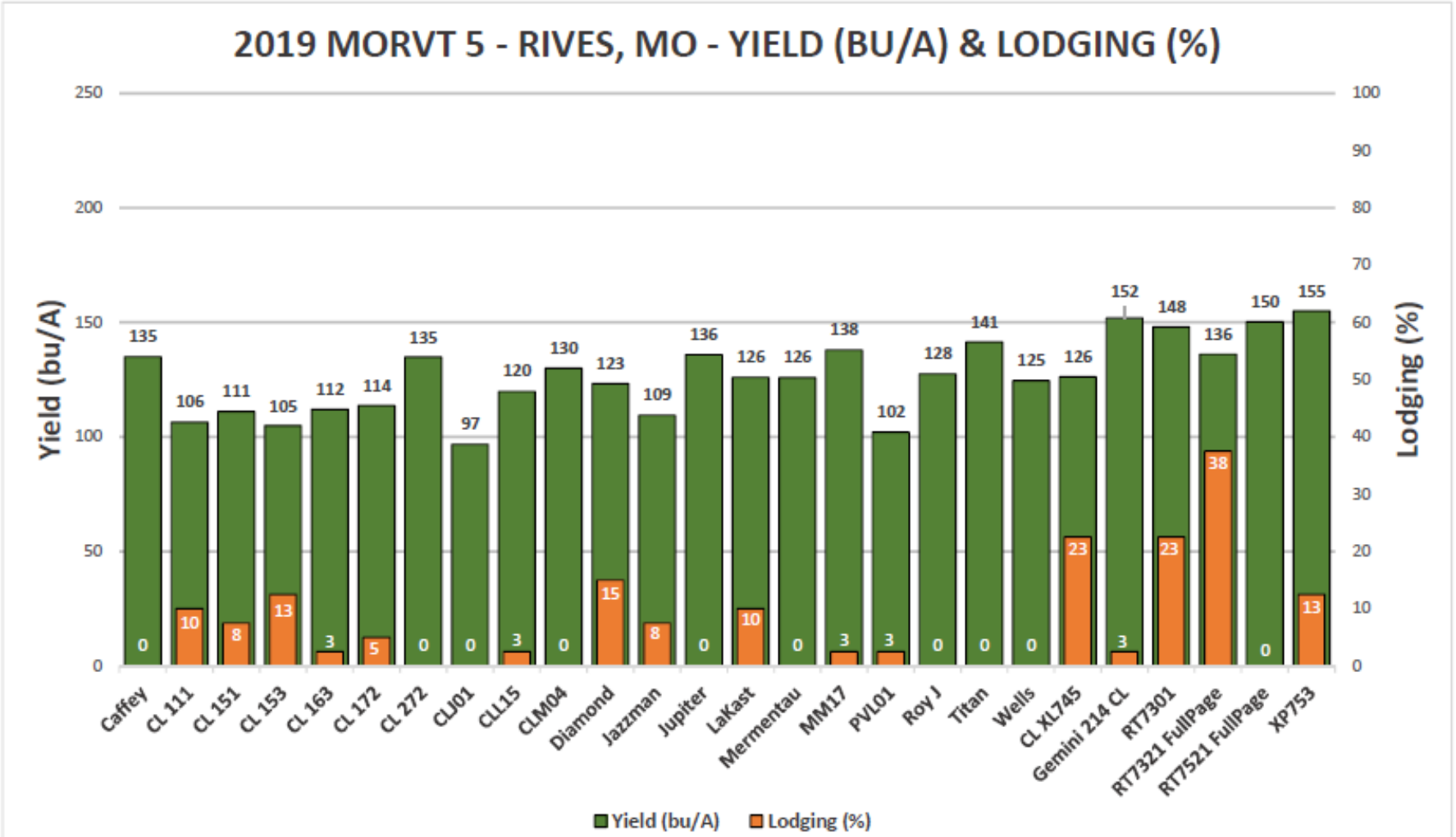
Planted: 5/17/19
Harvest: 10/1/19
County: Dunklin
Soil Type: Silt Loam
Latitude: 36.56971
Longitude: -90.12906
Nitrogen: 120 units @ pre-flood / 30 units @ mid-season



Planted: 4/30/19
Harvest: 10/8/19
Nitrogen: 120 units @ pre-flood / 30 units @ mid-season

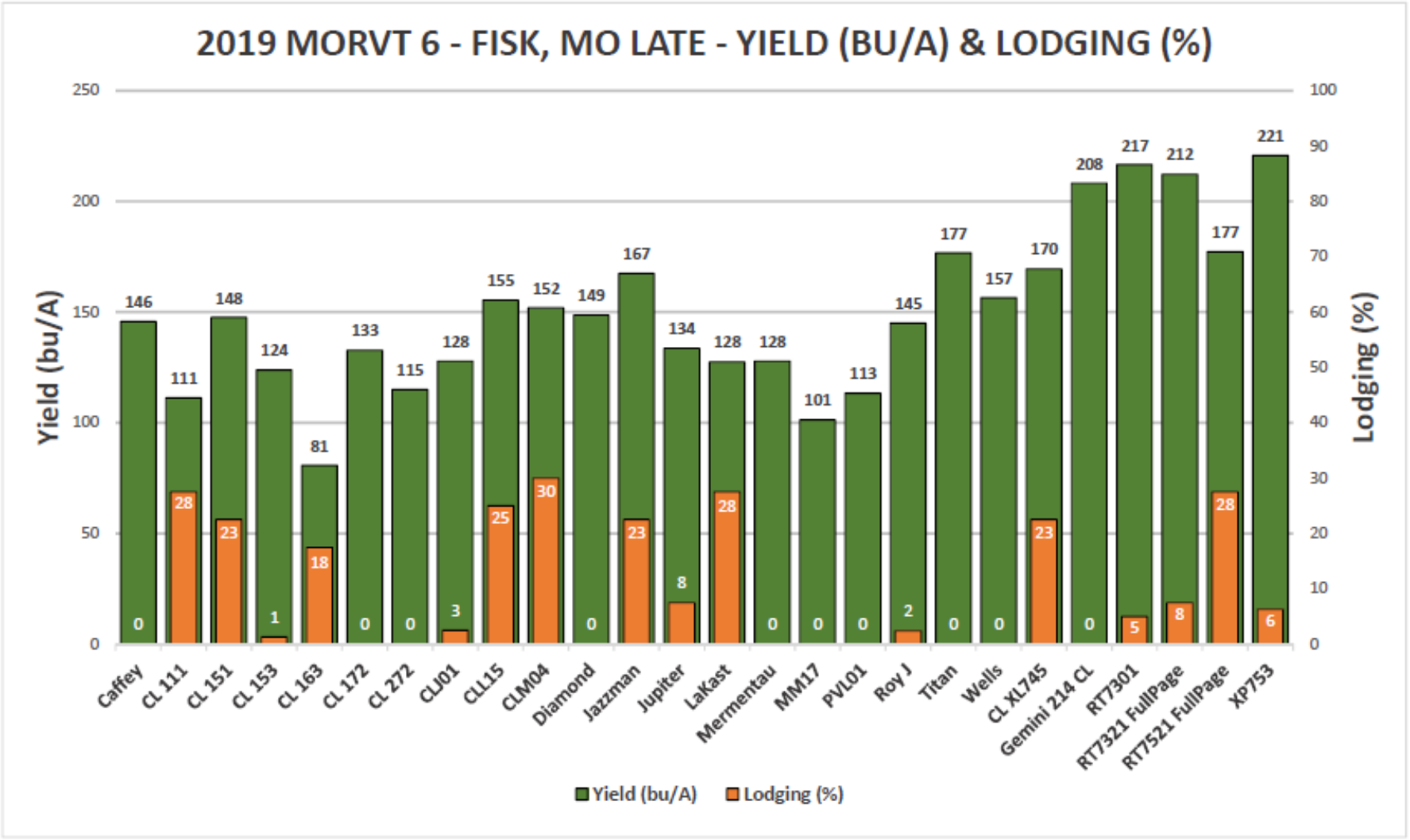
County: Butler
Soil Type: Silt Loam

Latitude: 36.71181
Longitude: -90.19373



Planted: 6/5/19 **County:** Dunklin **Latitude:** 36.10767 **Harvest:** 10/18/19 **Soil Type:** Silty Clay Loam **Longitude:** -90.05741

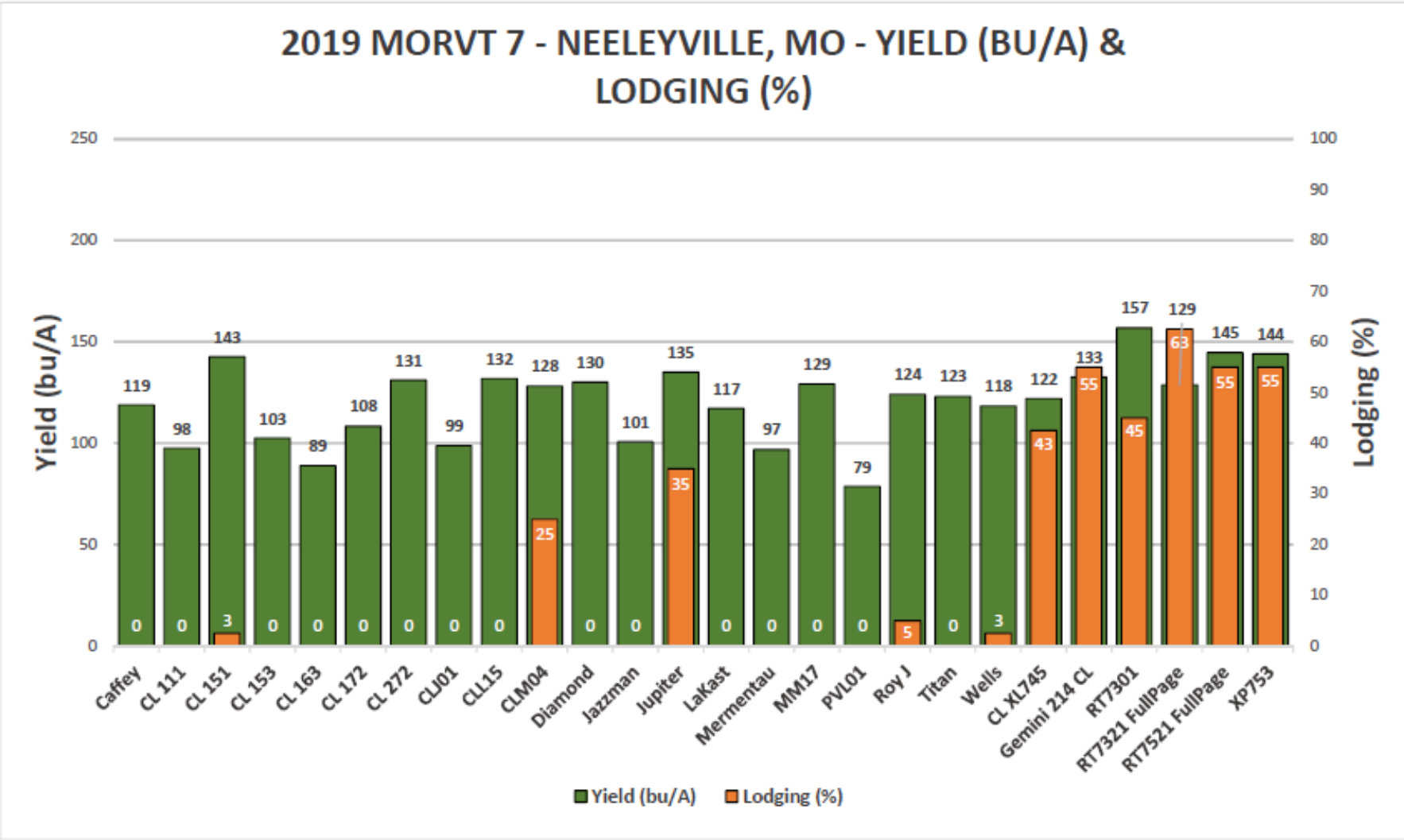
Nitrogen: 150 units @ pre-flood



Planted: 5/25/19
Harvest: 10/17/19
Nitrogen: 120 units @ pre-flood / 30 units @ mid-season

County: Butler
Soil Type: Silt Loam

Latitude: 36.71015
Longitude: -90.19200



Planted: 4/30/19
Harvest: 10/2/19
Nitrogen: 120 units @ pre-flood / 30 units @ mid-season

County: Butler
Soil Type: Sandy Loam

Latitude: 36.60682
Longitude: -90.52000