

2022 Missouri Starter Fertilizer Trials

Flood-Irrigated and Furrow-Irrigated Production Systems

Conducted by the
University of Missouri Rice Agronomy Program

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University of Missouri

Rice Agronomy

2022 Missouri Starter Fertilizer Studies (2- to 3-leaf Application)

Site	Nearest Town	Planting Date	Emergence Date	Starter App	Flood Date	Harvest Date	Soil Type	Water Management	N Management	N Rate (lbs N/ac)
FDRC Flood	Portageville, Pemiscot County	May 12	May 22	June 8	June 22	September 26	Clay	Flood	Single Preflood	150
MRRMC Flood	Glennonville, Dunklin County	May 17	May 27	June 13	June 23	October 4	Silt Loam	Flood	Single Preflood	130
MRRMC FIR Top	Glennonville, Dunklin County	May 19	May 28	June 14	June 21	October 19	Silt Loam	Non-Flood	3-way split	166
MRRMC FIR Middle	Glennonville, Dunklin County	May 19	May 28	June 14	June 21	October 19	Silt Loam	Muddy	3-way split	166
MRRMC FIR Bottom	Glennonville, Dunklin County	May 19	May 28	June 14	June 21	October 19	Silt Loam	Flood	3-way split	166
FDRC FIR Top	Portageville, Pemiscot County	May 11	May 21	June 8	June 23	October 3	Clay	Non-Flood	3-way split	196
FDRC FIR Middle	Portageville, Pemiscot County	May 11	May 21	June 8	June 23	October 3	Clay	Muddy	3-way split	196
FDRC FIR Bottom	Portageville, Pemiscot County	May 11	May 21	June 8	June 23	October 3	Clay	Flood	3-way split	196

Materials & Methods: Two sites were used for flood-irrigated rice and two were used for furrow-irrigated rice. Flood rice included two rice cultivars, RT XP753 and Diamond, and four starter fertilizer treatments: no starter fertilizer, 100 lbs/ac diammonium phosphate (DAP, 18-46-0), 100 lbs/ac urea (46-0-0), and 100 lbs/ac triple superphosphate (TSP, 0-45-0) applied at 2- to 3-leaf stage. Furrow-irrigated trials used only RT XP753 and 16 starter fertilizer treatments: no starter fertilizer applied; 65, 130, 196, 261, and 326 lbs/ac DAP; 65, 130, 196, 261, and 326 lbs/ac TSP; and 26, 51, 77, 102, and 128 lbs/ac urea. These amounts were selected to provide set amounts of phosphorus, nitrogen, both in combination, or neither to tease out which nutrient or nutrient interaction, if any, would be responsible for differences in yield. A precipitation event of 0.23” occurred at Portageville (FDRC) the day of application, while 0.17” were received at the Rice Farm (MRRMC) 3-4 days after starter fertilizer application. The furrow-irrigated rice fields were also flushed within two days after application. Aside from the starter fertilizer application, all trials were treated according to University of Missouri recommendations for rice production.

2022 Missouri Flood Rice Starter Fert Studies

Cultivar	Product	Rate	Rice Farm		Portageville		AVERAGE	
			Yield	Milling	Yield	Milling	Yield	Milling
		lb/ac	bu/ac	HR-TR	bu/ac	HR-TR	bu/ac	HR-TR
Diamond	None	100	191	61-70	160	59-67	176	60-68
Diamond	DAP	100	190	60-70	155	60-68	173	60-69
Diamond	Urea	100	193	60-69	155	60-69	174	60-69
Diamond	TSP	100	194	59-69	159	61-69	177	60-69
RT XP753	None	100	225	58-71	215	61-71	220	59-71
RT XP753	DAP	100	229	59-72	224	61-70	227	60-71
RT XP753	Urea	100	229	57-71	216	62-71	223	59-71
RT XP753	TSP	100	221	58-72	215	62-71	218	60-71
AVERAGE			209	59-70	187	61-70	198	60-70

2022 Missouri Furrow-Irrigated Rice Starter Fertilizer Studies

Cultivar	Product	Rate Applied		Rice Farm						Portageville						AVERAGE		
		Product	P ₂ O ₅	N	Top		Middle		Bottom		Top		Middle		Bottom		Yield	Milling
		lb/ac	bu/ac	HR-TR	Yield	Milling	Yield	Milling	Yield	Milling	Yield	Milling	Yield	Milling	Yield	Milling	bu/ac	HR-TR
XP753	None	0	0	0	164	53-70	192	55-71	234	58-69	161	55-72	183	60-72	171	60-71	184	57-71
XP753	DAP	65	30	12	166	52-71	199	54-70	236	58-71	156	54-71	179	62-72	175	60-70	185	57-71
XP753	DAP	130	60	23	169	56-71	198	56-71	233	58-70	156	55-71	191	62-72	178	60-70	187	58-71
XP753	DAP	196	90	35	175	56-71	199	55-71	218	60-71	161	57-71	183	61-72	177	60-70	185	58-71
XP753	DAP	261	120	47	170	56-71	201	56-71	229	60-72	157	57-71	173	61-72	175	59-70	184	58-71
XP753	DAP	326	150	59	176	57-71	197	56-71	224	60-71	176	58-72	189	61-72	177	59-70	190	58-71
XP753	TSP	65	30	0	168	54-71	195	55-71	230	60-72	156	56-71	187	61-72	175	61-71	185	58-71
XP753	TSP	130	60	0	175	53-71	199	54-70	229	59-71	154	56-71	174	60-72	180	61-70	185	57-71
XP753	TSP	196	90	0	171	53-71	203	56-72	228	59-70	157	55-71	174	61-72	178	60-69	185	57-71
XP753	TSP	261	120	0	173	53-71	201	55-71	221	59-71	148	56-71	187	61-72	178	60-70	185	57-71
XP753	TSP	326	150	0	175	54-70	205	55-70	234	59-71	145	59-72	179	61-72	177	60-71	186	58-71
XP753	Urea	26	0	12	177	54-71	200	55-70	233	58-70	155	54-71	181	62-72	179	61-70	187	58-71
XP753	Urea	51	0	23	178	53-71	192	57-71	232	59-71	161	54-71	179	60-72	174	59-70	186	57-71
XP753	Urea	77	0	35	173	53-71	192	55-71	229	59-71	157	57-71	175	61-72	184	59-71	185	57-71
XP753	Urea	102	0	47	176	55-71	192	56-71	233	59-70	164	56-71	186	61-72	180	61-71	189	58-71
XP753	Urea	128	0	59	173	56-71	203	56-71	224	59-70	155	58-72	182	61-72	179	59-70	186	58-71
AVERAGE					172	54-71	198	55-71	229	59-71	157	56-71	181	61-72	177	60-70	186	58-71

* Furrow-irrigated rice trials were planted at Glennonville on May 19 and Portageville on May 11.

Conclusions: The addition of starter fertilizer on 2- to 3-leaf rice did not significantly improve grain or milling yield in either rice production system in 2022 when averaged across sites. This is contrary to some recent studies out of Arkansas, but agrees with other studies and current recommendations, which are to not apply starter fertilizer in most instances. Again, a precipitation event of 0.23” occurred at Portageville (FDRC) the day of application, while 0.17” were received at the Rice Farm (MRRMC) 3-4 days after starter fertilizer application. It is possible that the rainfall events were not satisfactory to incorporate some of the fertilizer treatments in the flood-irrigated tests, specifically all the phosphorus-containing products. If that is the case, it reiterates the importance of applying treatments just prior to a significant rainfall or flushing the field for incorporation.