Rice variety V071Φ compared with ReiziqΦ

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Key findings

- Three seasons of research have provided confidence that V071Φ is a superior rice variety to ReiziqΦ in all agronomic attributes.
- The V071Φ grain yield was higher than ReiziqΦ in all experiments by an average of 1.43 t/ha.
- V071Φ development does not slow during periods of low temperatures like ReiziqΦ, which is very beneficial in cool seasons.
- V071Φ has strong emergence and establishment vigour like ReiziqΦ, and a higher tolerance to grain shattering than ReiziqΦ.
- Provided V071Φ meets market quality requirements, it is showing potential to be a welcome replacement for ReiziqΦ, the current industry standard bold medium-grain rice variety for the past 18 years.

Keywords rice, V071, Reiziq, variety

Introduction

The standard semi-dwarf bold medium-grain rice variety ReiziqΦ accounted for over 70% of rice production in southern New South Wales in the 2021 season. ReiziqΦ was released in 2004 and, due to its large grain size, still has a strong presence in the Middle East, Australian and New Zealand markets. Although it can produce high yields, cold during the reproductive stage often reduces grain yield below the variety's potential.

V071Φ is a variety bred by the Australian Rice Partnership, a NSW DPI, SunRice and AgriFutures Australia joint venture. V071Φ is a semi-dwarf, bold medium-grain rice variety with high yield potential and is likely to replace ReiziqΦ provided grain quality attributes satisfy the markets.

Site details

Fifteen experiments were established over 3 seasons across the Murrumbidgee Irrigation Area, Coleambally Irrigation Area and Murray Valley rice growing regions of southern NSW. The experiments were established in commercial grower fields covering aerial, dry broadcast, drill and delayed permanent water (DPW) sowing and irrigation methods.

Experiments

All experiments included 3 replications with plots generally 2.4 m wide by 12 m long. All plots were hand sampled at panicle initiation (PI) and harvest. Grain yield was assessed in most experiments by small plot harvester. Tiller and panicle samples were collected to determine yield components together with extensive measurement of growth stage timing. Air and water temperature were measured at each site.

Rice varieties

The varieties ReiziqΦ and V071Φ were grown in all experiments with varieties SherpaΦ, ViandΦ and Opus also included for direct comparison in many experiments.

Nitrogen treatments

All experiments included several nitrogen (N) treatments with a range of permanent water (PW) N rates to suit each specific field and splits with PI applied N to determine each variety's optimal N rate and timing requirements.

The grain yield results presented for each experiment (Table 1) are an average of N rates best suited for each variety at that site.

Results

Grain yield

V071$^{\Phi}$ produced a higher grain yield than Reiziq$^{\Phi}$ in all 15 experiments conducted over the 3 seasons (Table 1). The V071$^{\Phi}$grain yield was between 0.40 t/ha and 2.57 t/ha higher than Reiziq$^{\Phi}$, averaging 1.43 t/ha.

High grain yield can often result in increased crop lodging, although this was not evident in any of the experiments. The increased V071$^{\Phi}$ grain yield has not resulted in a higher susceptibility to lodging compared with Reiziq$^{\Phi}$ at the equivalent N rates.

Table 1 Grain yield (t/ha @ 14% moisture) of Reiziq$^{\Phi}$ and V071$^{\Phi}$ from 15 variety × nitrogen rice experiments conducted in commercial fields over 3 seasons covering the southern NSW rice growing regions.

Season	Location	Sowing method	Grain yield (t/ha)		Yield difference (t/ha)
			Reiziq	V071	
2019/20	Coleambally	Drill	11.70	13.32	1.62
	Jerilderie	Drill	11.71	13.66	1.95
	Logie Brae	Drill	10.55	12.87	2.31
2020/21	Yenda	Drill	14.26	14.60	0.34
	Benerembah	Dry broadcast	11.26	11.66	0.40
	Leeton	DPW	13.52	13.92	0.40
	Mayrung	Aerial	11.91	14.48	2.57
	Jerilderie	DPW	12.39	14.05	1.66
2021/22	Yenda	Drill	14.00	15.29	1.29
	Benerembah	Dry broadcast	12.58	14.19	1.61
	Coleambally	Drill	13.27	14.80	1.52
	Bunnaloo	Drill	12.56	14.12	1.56
	Moulamein	Drill	13.20	14.78	1.58
	Mayrung	Aerial	14.50	15.28	0.78
	Jerilderie	DPW	12.79	14.60	1.81
Average			12.68	14.11	1.43

DPW = delayed permanent water.

Growth duration

Rice growth duration is influenced by sowing/irrigation method, temperature and sowing time. In a season with average temperatures, V071$^{\Phi}$ and Reiziq$^{\Phi}$ take a similar number of days to reach flowering and maturity, but in seasons with periods of cool temperatures during the vegetative period, V071$^{\Phi}$ is quicker as low temperatures do not delay the phenological development as occurs with Reiziq$^{\Phi}$.

It can be seen in Yenda 2020/21 and 2021/22 and Bunnaloo 2021/22 experiments, which were sown early and experienced low temperatures during the vegetative period, that the Reiziq$^{\Phi}$ days to flowering were delayed between 6 and 10 days compared with V071$^{\Phi}$ (Table 2).

Table 2 Days to mid-flowering and 22% moisture for Reiziq^{Φ} and V071^{Φ} at commercial nitrogen rates*.

Season	Location	Sowing method	Sow/first flush date	Days to flower		Days to 22% moisture	
				Reiziq	V071	Reiziq	V071
2019/20	Coleambally	Drill	19 Oct 19	112	112	178	176
	Jerilderie	Drill	21 Oct 19	114	118	178	175
	Logie Brae	Drill	30 Oct 19	112	110	176	166
2020/21	Yenda	Drill	9 Oct 20	110	104	169	165
	Benerembah	Dry broadcast	23 Oct 20	103	103	156	156
	Leeton	DPW	14 Oct 20	118	118	176	177
	Mayrung	Aerial	21 Oct 20	113	111	172	167
	Jerilderie	DPW	21 Oct 20	119	117	183	173
2021/22	Yenda	Drill	30 Sep 21	127	118	181	174
	Benerembah	Dry broadcast	28 Oct 21	106	102	150	148
	Coleambally	Drill	9 Nov 21	106	110	167	166
	Bunnaloo	Drill	11 Oct 21	128	118	170	166
	Moulamein	Drill	14 Oct 21	117	117	-	-
	Mayrung	Aerial	18 Oct 21	112	110	173	165
	Jerilderie	DPW	14 Oct 21	127	123	187	179
Average				115	113	173	168

* Data from 15 experiments conducted in commercial fields over 3 seasons covering the rice growing regions and sowing/irrigation methods.

Summary

Three seasons of research across all regions and sowing methods have provided us with confidence that V071^{Φ} has superior agronomical attributes compared with Reiziq^{Φ}.

The V071^{Φ} grain yield was higher than Reiziq^{Φ} in all experiments and this advantage was maintained when grown using the water saving method, DPW.

V071^{Φ} has higher tolerance to low temperatures during the reproductive period than Reiziq^{Φ} (C. Proud, 2022 pers comm) which helps it maintain high grain yields over a larger range of seasonal temperatures. The phenological development of V071^{Φ} does not slow during periods of low temperatures like Reiziq^{Φ}, which is also very beneficial in cool seasons.

Other research we have conducted over the last 3 seasons shows that V071^{Φ} has strong emergence and establishment vigour, similar to Reiziq^{Φ}, which is the best of all current commercial varieties. V071^{Φ} has a higher tolerance to grain shattering than Reiziq^{Φ}, an important feature during harvest (Dunn and Dunn 2021).

Provided V071^{Φ} meets the quality attribute requirements of the markets V071^{Φ} is showing potential to be a welcome replacement for Reiziq^{Φ} which has been the major industry variety for the last 18 years.

References

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