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DRR Dhan 70 - (IET 29415) - An Aerobic Rice Variety

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Abstract

DRR Dhan 70 [IET 29415 (RP 6326-278-14-1)], an aerobic rice variety was developed from MTU 1010 × WGL 505. It was evaluated in AICRIP multi-location aerobic rice trials during wet seasons of 2020 to 2022. The DRR Dhan 70 consistently surpassed the performance of the comparison varieties in Odisha and Bihar states (Zone III), achieving a mean grain yield of 4287 kg/ha. This yield superiority is evident over the national check by 16%, the zonal check by 11% and the local check by 18%. In addition, it exhibited moderate resistance to leaf blast, brown spot, sheath rot, rice tungro, plant hoppers, stem borer, gall midge and leaf folder. DRR Dhan 70 has a duration of 120 days (seed to seed) and possesses desirable grain and cooking quality parameters. It was released for cultivation in aerobic ecosystems of Odisha and Bihar (Zone III) states through Central Sub-committee on Crop Standards, Notification and Release of Varieties for Agricultural Crops vide S.O. 1560(E) dated March 26, 2024 [CG-DL-E-28032024-253429].

Keywords: Aerobic rice, Grain yield, Cooking quality, Direct seeded.

Introduction

Rice (*Oryza sativa* L.) cultivation spans approximately 22 million hectares under irrigated ecology in India, which represents around 50% of the total rice production area in the country. Given the challenges posed by climate change, resource constraints in terms of water availability, and labor, there is a growing imperative for transitioning to aerobic rice cultivation methods to ensure substantial and consistent crop yields. Recognizing this need, the Indian Institute of Rice Research (ICAR-IIRR) embarked on a focused effort towards aerobic rice cultivation, commencing in 2011 with the cross of MTU 1010 × WGL 505. The resulting segregating populations underwent rigorous evaluation under direct seeded aerobic conditions to advance the development of suitable aerobic rice cultivars.

The promising line RP 6326-278-14-1 was identified and nominated in AICRIP Aerobic trial 2020. Subsequently, the entry performed well in all the three years and released as a direct seeded aerobic rice variety DRR Dhan 70 through Central Sub-committee on Crop Standards, Notification and Release of Varieties for Agricultural Crops vide S.O. 1560 (E) dated March 26, 2024 [CG-DL-E-28032024-253429]. Suitable for cultivation in Odisha and Bihar states of the eastern zone (Zone III),

DRR Dhan 70 demonstrated an overall mean grain yield of 4287 kg/ha. This yield surpassed the national check by 16%, the zonal check by 11% and the local check by 18%. In Odisha state, the mean grain yield reached 4454 kg/ha, marking a significant increase compared to the national check (15%), zonal check (21%) and the local check (63%). In Bihar state, the mean grain yield stood at 4216 kg/ha, displaying notable improvements over the national check (17%), zonal check (7%) and the local check (5%) **(Table 1).**

Table 1: Yield performance of DRR Dhan 70 in Odisha and Bihar states (Zone III)

States	DRR Dhan 70	Superiority over checks (%)		
Mean Grain Yield (Kg.ha^{-1})	(IET29415)	National Check	Zonal Check	Local Check
Odisha	4454	15	21	63
Bihar	4216	17	7	5
Overall	4287	16	11	18

The rice variety demonstrated moderate resistance to a range of prevalent diseases and pests, including leaf blast, brown spot, sheath rot, rice tungro, plant hoppers, stem borer, gall midge and leaf folder. In contrast to the standard checks and qualifying varieties, it demonstrates admirable hulling efficiency at 78.85%, milling quality at 70.40% and head rice recovery rate at 64.80%. Additionally, it exhibits intermediate levels of amylose content at 21.26%, an alkali spreading value of 3.0, and a gel consistency of 38 mm. With a long bold (LB) grain type characterized by a kernel length of 6.14 mm and breadth of 2.20 mm, it also exhibits other desirable grain and cooking quality attributes **(Figure 1).**

DRR Dhan 70 variety is exceptionally well-suited for cultivation in dry direct seeded aerobic conditions with intermittent irrigation. Optimal timing for dry direct seeding falls between the second week of June to the second week of July, coinciding with the onset of rainfall or preceded by pre-sowing irrigation. Immediate post-sowing lifesaving irrigation is crucial to ensure uniform germination and crop establishment. Weed management poses a significant challenge in aerobic rice cultivation. To address this issue effectively, Pendimethalin herbicide should be applied at a rate of 1 kg per hectare at field capacity moisture within 3 days of sowing. Additionally, it is advisable to apply a

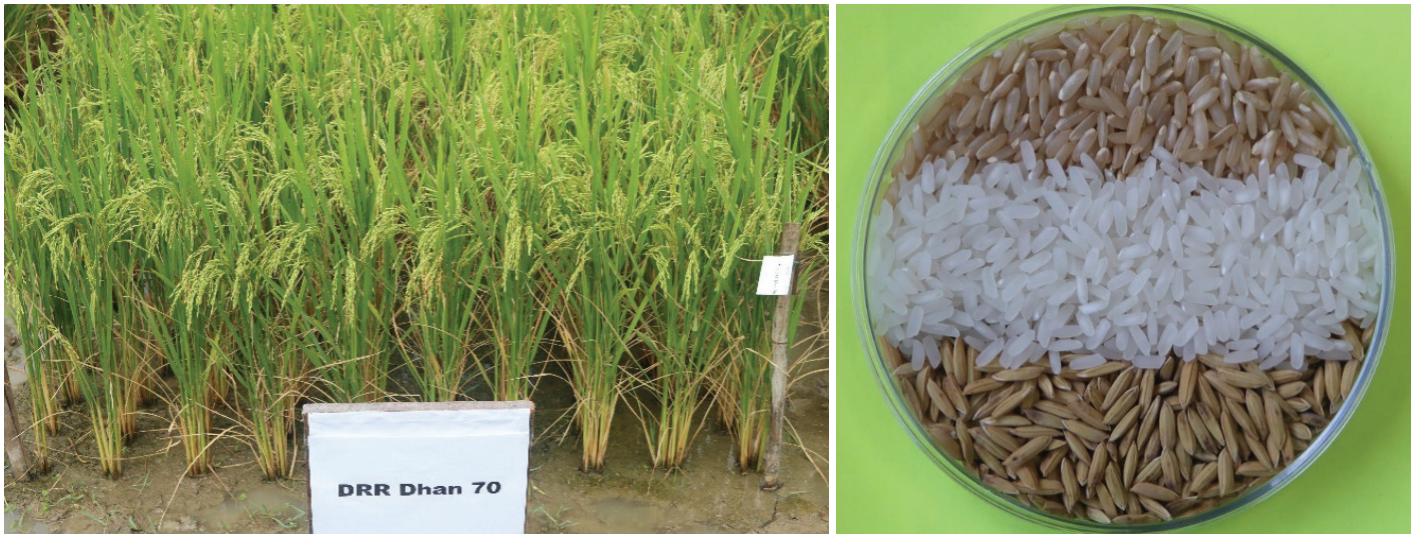

Figure 1: Field view of DRR Dhan 70 (Left); Paddy, Brown rice and Polished rice of DRR Dhan 70 (Right)

post-emergence, broad-spectrum systemic herbicide like Bispyribac Sodium 10% SC (Nominigold) at a rate of 50 ml per hectare at field capacity moisture within 5-15 days of sowing. One intermittent weeding is recommended during the crop growth period, with a provision for two if weed pressure is high. Irrigation should be applied as per the crop's physiological requirements until maturity.

DRR Dhan 70 offers a significant advantage with a duration of 113-120 days (seed to seed) compared to transplanted rice varieties. It has the potential to yield between 5.0-5.5 t/ha when cultivated within the designated area of adoption, recommended climate conditions, and adherence to prescribed agronomic practices. This variety is suitable for direct seeding in both early *kharif* (wet) and *rabi* (dry) seasons.

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DRR Dhan 71 - (IET 29421) - An Aerobic Rice Variety

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Abstract

DRR Dhan 71 [IET 29421 (RP 6324-123-14-4-1)], an aerobic rice variety was developed from CR 691-1 × CR Dhan 202. It was evaluated in AICRIP multi-location aerobic rice trials during wet seasons of 2020 to 2022. Consistently outperforming the check varieties in Odisha, Gujarat, and Tamil Nadu, DRR Dhan 71 achieved a mean grain yield of 4870 kg/ha. This yield superiority is evident with a significant increase over the national check (20%), zonal check (38%) and local check (28%). In addition, it exhibited moderate resistance to leaf blast, neck blast, sheath rot, brown spot, rice tungro, sheath blight, plant hoppers, stem borer, gall midge and leaf folder. DRR Dhan 71 has a duration of 120 days (seed to seed) and possesses desirable grain and cooking quality parameters. It was released for cultivation in aerobic ecosystems of Odisha, Gujarat and Tamil Nadu states through Central Sub-committee on Crop Standards, Notification and Release of Varieties for Agricultural Crops vide S.O. 1560(E) dated March 26, 2024 [CG-DL-E-28032024-253429].

Keywords: Aerobic rice, Grain yield, Cooking quality, Direct seeded.

Introduction

Rice (*Oryza sativa* L.) cultivation in India encompasses approximately 22 million hectares under irrigated ecology, accounting for >50% of the nation's total rice production area. In light of the challenges arising from climate change and limitations in water availability and labour resources, there is a collective need to adopt aerobic rice cultivation techniques to secure substantial and reliable crop yields. Recognizing this need, the Indian Institute of Rice Research (ICAR-IIRR) embarked on a focused effort towards aerobic rice cultivation, commencing in 2011 with the cross of CR 691-1 × CR Dhan 202. The resultant segregating populations underwent thorough evaluation under direct seeded aerobic conditions to propel the advancement of suitable aerobic rice cultivars. The promising line RP 6324-123-14-4-1 was identified and nominated in AICRIP Aerobic trial 2020. Subsequently, the entry performed well in all the three years and released as a direct seeded aerobic rice variety DRR Dhan 71 through Central Sub-committee on Crop Standards, Notification and Release of Varieties for Agricultural Crops vide S.O. 1560(E) dated March 26, 2024 [CG-DL-E-28032024-253429]. It was suitable for cultivation in Odisha, Gujarat and Tamil Nadu states. The overall mean grain yield of DRR Dhan 71 in Odisha, Gujarat, and Tamil Nadu states stood at 4870 kg/ha, marking a marked increase over the national check (20%), zonal check (38%) and