

DRRH-4 (IET 27937) - World's First Public Bred Aerobic Rice Hybrid

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Abstract

DRRH-4 [IET 27937 (IIRRH-124)], is an aerobic rice hybrid developed from APMS-6A / AR 9-18 cross. It was evaluated in AICRIP multi-location aerobic rice trials during wet seasons of 2018 to 2021. DRRH-4 consistently out-performed the check varieties in Punjab, Odisha, Chhattisgarh, Tripura and Gujarat states with a mean grain yield 5030 kg/ha, which is 32%, 28%, 22% and 11% higher than national check, zonal, local and hybrid checks, respectively. In addition, it exhibited moderate resistance to leaf blast, neck blast, gall midge, rice stem borer, and whorl maggot. DRRH-4 has early duration of 120 days (seed to seed) and possess desirable grain and cooking quality parameters. It was released for cultivation in aerobic ecosystems of Punjab, Odisha, Chhattisgarh, Tripura and Gujarat states through Central Sub-committee on Crop Standards, Notification and Release of Varieties for Agricultural Crops vide S.O. 4065(E) dt. 31st Aug., 2022 [CG-DL-E-31082022-238490].

Keywords: Aerobic rice hybrid, grain yield, cooking quality.

Introduction

Hybrid rice is cultivated in more than 350,000 hectares and it is anticipated to cross >4 million hectares. However, in scenario of changing climate, over 80% released rice hybrids are reported to be sensitive to abiotic stresses like high-temperature and drought stress. In this context, aerobic rice is the need of the hour for substantial and stabilized crop returns. Indian Institute of Rice Research (ICAR-IIRR) has initiated the development of rice hybrids suitable for aerobic cultivation and a promising cross combination, APMS-6A / AR 9-18 (IIRRH-124) was identified. The promising hybrid, IIRRH-124 was identified and nominated in AICRIP Aerobic rice trail-2018. Subsequently, the entry performed well all the four years and released as a direct seeded aerobic rice hybrid, DRRH-4 through Central Sub-committee on Crop Standards, Notification and Release of Varieties

for Agricultural Crops vide S.O. 4065(E) dt. 31st Aug 2022 [CG-DL-E-31082022-238490] suitable for cultivation in Punjab, Odisha, Chhattisgarh, Tripura and Gujarat states. The overall mean grain yield of DRRH-4 was 5030 kg/ha, which is 32%, 28%, 22% and 11% higher than National, Zonal, Local and Hybrid checks, respectively. The mean grain yield in Zone II was 4989 kg/ha, which was 26%, 40%, 25% and 10% higher than National, Zonal, Local and Hybrid checks, respectively. The mean grain yield in Odisha state was 5579 kg/ha, which was 46%, 28%, 58% and 15% higher than National, Zonal, Local and Hybrid checks, respectively. The weighted mean grain yield was 5910 kg/ha in Zone-IV and this was 30% higher than the national check. In Chhattisgarh state, the weighted grain yield mean was 5039 kg/ha and out yielded the national, regional, local and hybrid checks



by 52%, 28%, 16% and 9%, respectively. The mean grain yield in Zone VI was 4854 kg/ha, which was 26%, 23%, 29% and 13% higher than National check, Zonal, Local and Hybrid checks, respectively. In Gujarat state of Zone VI, the weighted mean grain yield was

5710 kg/ha and out yielded the national, regional, local and hybrid checks by 34%, 25%, 40% and 15%. The weighted mean grain yield was 5306 kg/ha in Punjab, Odisha, Tripura Chhattisgarh and Gujarat, which was 14% higher than the best check (Table 1).

Table 1: Yield performance of DRRH-4 in Punjab, Odisha, Tripura, Chhattisgarh and Gujarat states

| Zone / State | Mean Grain Yield (Kg. ha ⁻¹) | Superiority over checks | | | |
|--------------|--|-------------------------|-----------------|-----------------|------------------|
| | | National Check (%) | Zonal Check (%) | Local Check (%) | Hybrid Check (%) |
| Zone-II | 4989 | 26 | 40 | 25 | 10 |
| Zone-III | 5579 | 46 | 28 | 58 | 15 |
| Zone-IV | 5910 | 30 | 27 | 5 | 10 |
| Zone-V | 4958 | 46 | 25 | 19 | 10 |
| Zone-VI | 4854 | 26 | 23 | 29 | 13 |
| Overall | 5030 | 32 | 28 | 22 | 11 |

It exhibited moderate resistance to Leaf blast, Neck blast, Gall midge, Rice stem borer and Whorl Maggot. It has good hulling (79.2%), milling (71.3%) and head rice recovery (62.8%) in comparison with the checks and qualifying varieties. It possesses intermediate amylose content (24.6%), medium alkali spreading value (4.0), gel consistency (30 mm), long bold (LB) grain type (KL-6.5 mm; KB- 2.4 mm) and other desirable grain and cooking quality parameters (Figure 1). DRRH-4 is highly suitable for dry direct seeded aerobic conditions with intermittent irrigation. Dry direct seeding is preferable during the second week of June to second week of July (with the onset of rain or with pre-sowing irrigation). Immediately after sowing, life-saving irrigation should be ensured for uniform germination and crop establishment. Weed management is a big menace in aerobic rice. To resolve this, apply Pendimethalin herbicide @1 kg per hectare at field capacity moisture within 3 days of sowing. Further, it is recommended to apply Post Emergence, broad spectrum systemic herbicide like Bispyribac Sodium 10% SC (Nominigold) @50ml per hectare at field capacity moisture within 5-15 days of sowing. One intermittent weeding is recommended (two if more weeds) during crop growth period. Need based irrigation should be followed upto physiological maturity. The DRRH-4 has an advantage of 10-15

days (115-120 seed to seed duration) in comparison with transplanted rice and can yield up to 5.5-6.0 t/ha subject to use under area of adoption and recommended climate conditions and adoption of package of practices. It is suitable for direct seeding of both early *kharif* (wet) and *rabi* (dry) seasons.



Figure 1A and 1B: Field view of DRRH-4



Figure 1B: Paddy, Brown rice and Polished rice of DRRH-4