

PERFORMANCE OF RICE GENOTYPES FOR MORPHO-PHYSIOLOGICAL PARAMETERS AND YIELD IN SUMMER SEASON

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ABSTRACT

The present investigation was conducted during summer season of 2018-2019 at research farm of ZARS Sindewahi in Randomized Block Design (RBD) with seven treatments (seven rice genotypes viz., SYE-1, SKL-6, KJT-184, PKV-Akshad, PKV-Makrand, RTN-5 and PKV-Ganesh). The genotypes were replicated thrice. The data were recorded on the basis of different morpho-physiological parameters at 30, 60 and 90 DAT and at harvest. Genotype PKV-Ganesh and PKV Makrand recorded significantly more plant height, total dry matter production, number of tillers, RWC, RGR, NAR, Root:shoot ratio, LAI, Leaf area and grain yield plot⁻¹ and said to be thermo-tolerant genotypes. Days to fifty per cent flowering and physiological maturity were delayed in these genotypes.

(Key words: Rice, thermo-tolerance, morpho-physiological parameters, yield)

INTRODUCTION

Rice (*Oryza sativa* L.) has a renowned relationship with the human since ages. It is the world's most important staple food crop, rice is among the worlds most important and second most produced crop worldwide. About 90% of the world's rice is grown in China, India, Pakistan, Japan, Korea, Southeast Asia and other adjacent areas. Rice is the most consumed cereal grain in the world, constituting the dietary staple food for more than half of the planets human population. Globally, rice is the second most widely consumed cereal next to wheat and it has occupied an area of 160.6 million hectares, with a total production of 738.2 million tonnes (Anonymous, 2015a). In India, rice occupies an area of 43.95 million hectares with an average production of 105.48 million tonnes with the productivity of 2424 kg ha⁻¹, though increasing marginally, but is still well below the world's average yield of 4360 kg ha⁻¹ (Anonymous, 2015 b).

High temperature stress is one of the most important environmental factors influencing crop growth, development, and yield processes. Exposure of rice crop to heat stress at least during a part of its growth stages may drastically reduce the yield. It was reported that high temperature is negatively affects physiological processes in plants, it may increase stomatal conductance which leads to dehydration. Furthermore, high temperature leads to cellular membranes injury which negatively affects crop productivity. High temperature stress also affects the

physiological processes of plants to a greater extent. Adverse effects of high temperature stress have been noticed during vegetative as well as reproductive stage in rice. Increasing severity of the problem in rice growing areas in Asia is due to rising temperatures (Cathenne *et al.*, 2012). Temperature increases globally and estimated by 1.1 °C to 6.4 °C during the next century (Anonymous, 2012), thereby threatening rice production. Global warming results in high temperature induced floret sterility in rice. Jagdish, *et al.* (2012) reported that high temperature stress negatively affects rice production. Considering the above facts present investigation was under taken on different varieties of rice.

MATERIALS AND METHODS

An experiment was carried out at research farm ZARS Sindewahi, during 2018-19 in RBD with three replications and seven genotypes (SYE-1, SKL-6, KJT-184, PKV-Akshad, PKV-Makrand, RTN-5 and PKV-Ganesh). Experimental gross plot was 4.50 m X 2.40 m and net plot was 3.90 m X 2.00 m. Observations on plant height, leaf area, leaf area index, total dry matter, RWC, root:shoot ratio, were recorded at 30, 60, and 90 DAT. RGR was calculated as formula given by Blackman (1919) and NAR was calculated by using formula suggested by Williams (1946). The RGR and NAR were calculated at 30-60 and 60-90 DAT. Yield plot⁻¹ was also recorded. Observation on days to 50% flowering and physiological maturity were also recorded.

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RESULTS AND DISCUSSION

Plant height

The data presented in Table 1 indicates that the summer rice genotypes exhibited significant differences at 30 DAT. The plant height was in the range of 18.20 cm (KJT-184) to 24.77cm (PKV-Ganesh) with an average plant height of 20.06 cm.

Only PKV-Ganesh recorded significantly highest plant height (24.77cm), whereas, PKV-Makrand (20.29cm), SKL-6 (19.64cm), PKV-Akshad (19.60cm) were found at par w