Popular Article

e-ISSN: 2583-0147

Volume 2 Issue 7
Page: 0221 – 0223

Hybrid Rice in the Perspective of Climate Change

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Rice the major principal food crop for the half of the world population. As the world population increases alarmingly, agricultural scientists are striving towards development of an "evergreen revolution" to ensure the food security in the future. To increase the productivity of rice, many deliberate research programmes are being adopted by using all the technologies prevailing currently. Among the all technologies, hybrid development is a popular technology to increase the rice productivity. In the future also these hybrid development technologies will contribute major portion for the food security. The crop scientific community should be ready to face the challenges come from climatic changes *viz.,* high temperature stress, CO_2 elevation, *etc.,* Hence, the development of the hybrids in the aspect of future climatic factors will help to overcome the food shortages.

INTRODUCTION

Rice is the vital food crop and feeds the half the world population also reduces poverty and hunger. The strategies being adopted currently ensuring the food security. The hybrid rice technologies contributing major portion for the food security in rice growing countries. But the productivity the world's most important food crop viz., rice is being threatened by high temperature stress which is intensified by climate change and global warming. High temperature stress negatively affects rice production, especially in the vulnerable region of South and South East Asia (Jagdish et al., 2012). Rice yields are estimated to be reduced by 41% due to high temperature at the end of the 21st century (Ceecarelli et al., 2010). Aggressive upsurge of the temperature affects both vegetative as well as reproductive stage of the rice crop. The adverse among the climatic factors, the temperature incremental effects and heat waves are injurious to the

rice crop productivity and this harsh environment affects the crop in both vegetative and reproductive stages (Christensen and Christensen, 2007). The increasing level of 3–4°C could reduce crop yields by 15–35% in Africa and Asia and by 25–35% in the Middle East (Ortiz et al., 2008). Fahad et al., 2016bc reported that 3.6°C and 7.0°C higher than critical temperature, from heading to middle ripening stage, shows a decrease in photosynthesis by 11.2% and 35.6% in rice crop, respectively. Since, while comparing the rice varieties, the hybrids are superior in the aspect of yield, the development of rice hybrids (Mahalingam, 2006; Dhivyapriya & Kalaiyarasi, 2015; Meenakumari et al., 2015) with tolerance to predicted future harsh environmental factor is the prime objectives in front of scientific communities. Currently the evaluation of the prevailing varieties and hybrids for the different climatic condition in different regions (Vinoth et al., 2014; Zewdu, 2021) also can help the management of the food security. The development of dwarfs, fertilizer responsive varieties and hybrids in the rice was helped to increase the rice yield. To develop the fertilizer responsive varieties, the isolation of somaclones in rice (BPT 5204) also tried by Ramchander et al., 2015. Due to high yielding potential of the hybrid rice, the inbreds and hybrids in rice with fertilizer responsive and tolerance to future predicted harsh environment is the best way to manage the food security in the near future.

CONCLUSION

The prevailing environmental factors affect the rice crop growth as well as grain quality due to the high temperature stress. The evaluation and screening of currently available varieties for the tolerance to the harsh environment will help to overcome the current food scarcity condition. The development of new varieties, especially, inbreds and hybrids with tolerance to predicted future harsh environmental conditions are very important to feed the future population without any food insecurity. Otherwise we will face the famine in the countries where the rice is the major food.

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