



Development of superior hybrid rice variety using cutting-edge breeding tools

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Abstract:

Feeding more than one half of the world's population, over 90% of rice is produced and consumed in Asia. Bangladesh agricultural economy pre-dominantly based on rice production. In Bangladesh total rice production area is 116.13 lac ha and total production is 36.28 million M tones (BBS, 2007-2018). Bangladesh is an over populated country and population is increasing rapidly. At present, the rice growing areas are gradually decreased due to industrialization, housing and expansion of urban areas. Under such conditions, all the additional rice production must be come from higher yield due to land scarcity for increasing of rice production.

Hybrid rice technology could be an opportunity for Bangladesh to increase the productivity of rice. Therefore, efficient and economic seed production package for hybrid rice is one of the pre-requisites for the exploitation of heterosis on commercial scale. Multiplications of CMS line and higher yield of hybrid seed production are major activities which decide the success of hybrid rice technology. Hybrid rice seed production using cytoplasmic genetic male sterility (CMS) system involves three component lines i.e. CMS or A line, maintainer or B line and restorer or R line.

Rate of higher quantity hybrid seed production depends upon the outcrossing characteristics of restorer and CMS lines. Thus knowledge of outcrossing characters is very much important for effective initiation of hybrid seed production program. Desirable outcrossing characters facilitate transfer of pollen from restorer line. Outcrossing characters of restorer line depend on different floral characters mostly how much viable pollen are produced and transfer to CMS

line. If the pollen production is higher then transfer of pollen will be higher as well as hybrid seed production will also be higher. It is essential for successful commercial hybrid seed production. Increase in hybrid seed production, the price of hybrid seed will be lower which ultimately will increase the hybrid rice cultivation area as well as production. Hybrid seed produced from crossing between restorer line and CMS line. High yield potential restorer line with good outcrossing characteristics is very much important for increasing the hybrid seed production rate and also increasing the productivity in



F1 hybrid. Potential HYV restorer lines facilitate superior heterotic cross combinations with CMS lines. So in case of restorer line both outcrossing characteristics and yield potential must be considered for commercial hybrid rice production. General objective of research is development of superior hybrid rice for Bangladesh. The experiment was carried out at the experimental farm of ACI Limited. For developing superior hybrid rice we developed 9 experiments, 1. Determination of breeding value, 2. Characterization of parental lines, 3. Marker-assisted selection, 4. Genetics basis of heterosis, 5. B X B and R X R cross, 6. Rapid Generation Advance, 7. Line Stage Test, 8. Selection of best performing restorer (R) and maintainer (B) lines on the basis of SCA and 9. Evaluation of superior hybrid.

Biography:

Md. Nur Alam Siddique is a scientist by profession and works with one of the private company in Dhaka, Bangladesh. He holds a MS in Genetics and Plant Breeding in Bangabandhu Sheikh Mujibur Rahman Agricultural University. Nur Alam has 10 years experience in hybrid rice research and development.

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