Seminar II

Technological Nature of Changes of Rice Improvement in Bangladesh

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Summary

The hon'ble speaker highlighted the over all history of chronological changes of rice improvement in this country from the very beginning to till today. The paper comprised the following segments.

Rice improvement started by the farmers. The earlier rice varieties were low land photosensitive groups with flood tolerance characteristcs. They further selected the transplant Aman rice group and varieties tolerant to coastal salinity. Later on they selected photoinsensitive Aus rice varieties with low seed dormancy for Kharif season and photoinsensitive Boro adopted to cooler Rabi season. Heavy selection pressure applied to select rice varieties adopted to low level of soil fertility accelerated genetic erosion.

Rice improvement activity by the scientists started in 1910. Germplams of the local cultivars were collected and pure lines were selected for higher yield. Higher yelding pure varieties were identified through varietal trials for Aus, B. Aman, T. Aman and for Boro seasons. Some hybridization work within Aus, B. Aman, T. Aman and Boro groups led to develop better varieties for Aus and T. Aman groups.

Introduction of rice varieties from abroad with better plant types and high yield helped to select Blue bonnet, Nigersail and DA-31 from USA, Nigeria and Yanmar respectively. Some of the varieties like Pajam and Purbachi were introduced later.

The high yielding varieties (HYV) era started in the sixties of the twentieth century with the introduction of semi-dwarf non-sensitive types of rice IR 8.

The establishment of BRRI enhanced the rice improvement activities. BRRI scientists modified the IRRI plant types suitable to Bangladesh agro-ecology. The change of plant architecture led to the straw grain ratio of 1:1 in lieu of 2:1 of the

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local varieties. The breeding activity by BRRI scientists developed moderately photosensitive in T. Aman varieties. For Boro they incorporated resistance to cooler climate at seedling stage. Resistance to major diseases and pests were two major traits incorporated in all rice varieties.

High yelding varieties demand more inputs and better management along with Integrated Pest Management (IPM). These varieties increased the rice yield significantly.

Mutagenic agents both physical and chemical were also used in rice to develop improved rice varieties. Bangladesh Institute of Nuclear Agriculture (BINA) has developed several rice varieties through mutation.

Haploid breeding technique has also been used to develop rice varieties more quickly than the traditional selection methods. Moreover, the use of embryo rescue method may provide opportunity for transferring genes from the distantly related species through wide crossing. Valuable characters could be transferred in future by applying such techniques.

Hybrid rice has got some potential over our HYVs. The production of hybrid rice requires stable male sterility systems and their restorers. Somatic genes can be used to provide pollen sterility. The hybrid seed production by using sterility systems is an unstable in nature. F_1 seeds need to be produced each year. Perpetual hybrid can be produced by using gamete lethal genes and VG or v and g genes. Both VG and vg are lethal in homozygous condition but the heterozygotes Vv Gg survive easily to provide perpetual hybridity. BR2 (MALA) is such a permanent hybrid.

BRRI has developed supper rice by combining desirable genes from different sources into a rice variety. This variety would lead to the further increase of yield of rice with high input management system.

Transgenic crops are on the horizon. Transgenic rice will be produced in future by incorporating alien genes into the crops through different vectors. Both conventional methods and genetic engineering will be used in future to develop newer rice varieties. However, the most important aspect is agronomical that is to provide proper nutrition and pest protection to the new plant type. For better economy we shall have to develop agronomical manipulation to stop the degeneration of spikelet. However, price support and assured marketing system are needed to encourage farmers to achieve higher rice production per unit of land.