Release of pearl millet hybrid HHB 67 Improved: An improved downy mildew resistant version of HHB 67 produced by marker-assisted selection

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SUMMARY OF ACHIEVEMENTS

An improved version of the popular early-maturing pearl millet hybrid HHB 67, has been released by the Haryana State Varietal Release Committee.

The new version of the hybrid has as its male parent a line bred at ICRISAT-Patancheru by marker assisted backcrossing to add gene(s) for downy mildew resistance from elite parent ICMP 451 to H 77/833-2 (the male parent of the original HHB 67).

The female parent of HHB 67 Improved was bred at ICRISAT-Patancheru by conventional backcrossing to add several genes for downy mildew resistance from ICML 22 to 843A/B (the A/B-pair used as female parent of the original HHB 67), and took three times as long as breeding the improved male parent.

The original HHB 67 is now grown on at least 550,000 ha in Haryana and Rajasthan, and is starting to succumb to downy mildew after more than 10 years of widespread and repeated cultivation.

ICRISAT has recently harvested Breeder Seed production plots of the inbred parental lines of HHB 67 Improved (Fig. 1). The seed from these plots will be sufficient to sow summer season hybrid seed multiplication plots for the production of enough hybrid seed for about 100,000 ha.

The next step towards the deployment in farmers' fields of the first release of a product of marker-assisted selection in India is to get the available parental line seed to the hybrid seed producers i.e. villages of small farmers contracted to produce the seed by the Andhra Pradesh State Seed Development Corporation.

Institutional Uptake

The Department of Biotechnology of Government of India has funded the Central Arid Zone Research Institute in Rajasthan to incorporate drought tolerance and downy mildew resistance into parent material of the most common millet hybrids grown in India. They will also explore elite landrace lines as a resource for new resistance genes.

The private sector in India (such as seed company Pioneer Hybrid) and other donors are using this research to breed for other important traits, such as fodder quality.

The work is now being extended to Africa so that farmers there can benefit from high yielding hybrids in the same way as Indian farmers.

Financial impacts of new improved pearl millet hybrids

To reiterate the benefits that will accrue to farmers. Commonly 30% of the entire grain harvest is lost when a downy mildew epidemic occurs. For HHB 67 this would amount to a loss of at least US\$7.7 million in the first year of the epidemic. This is 30% of the harvest from 550,000 ha yielding 0.7 t ha⁻¹ at Rs3000 t⁻¹. In addition, an increase in yield from the

new hybrids, conservatively estimated at 10%, gives an additional yield each year of US\$2.6 million.





Figure 1. Multiplication plot of the pearl millet seed parent , ICRISAT 2004.