'Miracle rice' finding proves we can never stop rice breeding

October 8 2010

Environmental changes are to blame for a 15% drop in the yield of "miracle rice" – also known as rice variety IR8 – since the 1960s when it was first released and lauded for its superior yields that helped avert famine across Asia at the time.

IR8 used to produce 9.5 to 10.5 tons per hectare, significantly more than other varieties in the 1960s when average global rice yields were around only 2 tons per hectare. But, when grown today, IR8 can yield only around 7 tons per hectare.

"IR8 still performs very well considering global average rice yields still hover around 4 tons per hectare, but a 15% yield drop is significant and we needed to find out what was happening," said Dr. Shaobing Peng, a crop physiologist from the International Rice Research Institute (IRRI) and coauthor of a study published in *Field Crops Research* about the declining yields of IR8.

Dr. Peng and his team grew rice from original IR8 seeds preserved in the International Rice Genebank and compared it to rice grown from IR8 seeds continuously grown and harvested over the last few decades. He wanted to see if the genetics of IR8 had changed over time and if that was responsible for the yield drop – or if something about the environment was the cause.

"Our study eliminated changes in the genetic composition of IR8, which may have occurred over time, and instead identified changes in the

environment as the cause of the decline," Dr. Peng said.

"Hotter nights, which are known to reduce rice yields, and other environmental changes such as modifications in soil properties from maintaining the soil under flooded conditions and air pollution are all possible contributing factors," he added.

According to Dr. Peng, the findings demonstrate the need for ongoing or "maintenance" breeding because it allows rice plants to cope with a changing environment.

Despite their limited progress in increasing yields, maintenance breeding efforts have had significant success in improving grain quality and maintaining rice yields despite substantial increases in diseases, insects, and environmental changes. Coping with these may be far more important today for resource-poor rice farmers across Asia and Africa – who are one of the primary targets IRRI is trying to help through its rice research.

"Maintenance breeding needs continuous support to help farmers to cope with erratic climate changes around the globe and if not given attention, poor farmers will become poorer as they already have few means to cope with their changing environment," said Dr. Peng.

As part of its 50th anniversary celebration IRRI has commenced a fund-raising campaign to boost its programs that support farmers worldwide.

Provided by International Rice Research Institute