Kolkata scientists envision paddy on the shore

Kolkata - In what could be a precursor to growing paddy on virgin seashores lining the Indian subcontinent, scientists here have discovered a gene responsible for salt tolerance in mangroves and copied it to produce wonder rice and mustard varieties that can survive unimaginable levels of soil salinity.

The discovery, which comes after decades of research at the premier Bose Institute here, means that once patented the gene could hold the key to turning hundreds of thousands of kilometres of shore land into lush green paddy and mustard fields.

Arun Lahiri Majumder and his team from the Institute's Centre for Plant Molecular and Cellular Genetics are growing saline resistant crops these days at an 18-acre experimental farm in Madhyamgram, near here.

Expectedly, they are ecstatic.

'When we cloned the gene from a wild rice variety that grows in the Sunderbans mangrove delta in the Bay of Bengal, little did we know something big was in the offing. Today, we are successfully raising salt-tolerant rice and mustard... this indeed makes a lot of sense for India's agriculture-based economy,' says Majumder.

The team has submitted the gene to the international gene bank and is awaiting US and European patents, which he says are in the final stages of processing.

By mimicking the action of the mangrove gene, plant geneticists have ensured that a key enzyme - inositol synthatase - works in the paddy plant and triggers the production of a chemical, inositol, which counters the adverse effect of salt.

The scientists struck upon the all-important gene while trying to understand the biological process of mangroves, which unlike rice plantations can withstand extraordinarily high levels of salinity.

They scoured the creeks and delta, criss-crossed with rivers, to study extensively the chemicals in mangrove plants that are responsible for salt tolerance.

'These chemicals, called osmoprotectants, belonging to a group of compounds named inositols, keep the physiological process of the mangroves going despite the abundance of salt in their surroundings. And this is what caught our fancy,' Majumder says, standing proudly amidst his 'first generation' transgenics.

In normal everyday plants, the enzyme stops functioning in saline environments and they wither due to salt shock. The trick with the mangrove plants is that the enzyme does not stop functioning even in the soil with high salt content and produces enough inositol for its survival in the saline waters.

The scientists found this enzyme in Porteresia coarcata rice variety from the Sunderbans, obtained a full length clone DNA for the inositol synthatase gene from its leaf and sequenced it.

A series of experiments later, the team found that the recombinant gene was ideal for incorporating

into rice varieties as it retained its salt tolerant character.

Majumder and his men are now breeding them for what they call 'generation advancement' under contained trial conditions. They will go till the fourth generation plants and then hand the transgenics over to India's Department of Biotechnology, which is funding the entire project.

The pioneers are eagerly awaiting large scale field trials a

fter that.

Meanwhile, their work has received peer acclaim in the Journal of Biological Chemistry by the American Society for Biochemistry and Molecular Biology, Plant Physiology brought out by the American Society of Plant Biologists and the prestigious FEBS letters.

(© IANS / India eNews)