Why Radiation Induced Mutation?

Pierre Lagoda, Head of the FAO/IAEA Plant Breeding and Genetics Section, explains why 'induced mutation breeding' is a practical, sustainable solution to the world's food crisis.

"We offer a very efficient tool to the global agricultural community to broaden the adaptability of crops in the face of climate change, rising prices, and soils that lack fertility or have other major problems," says Lagoda.

Induced mutation: half the time of traditional breeding methods. Routinely, plant breeding requires seven to 10 years of research to produce a promising new variety. A breeder looking for pest resistance, for example, might find the characteristic in a wild variety with poor quality and yield. This wild variety will be crossed with a plant that does have good quality and yield, and any offspring combining the desired traits will then be selected and propagated.

Induced mutation: more options from which breeders can choose. Hybrids, the product of crosses, are only as resilient and productive as the source parents. Over the past century, about 75% of crop biodiversity has been lost and monoculture has diminished plant variety in farmers' fields.

Both conditions limit researchers when crossing strains to create new plants. "This loss in plant genetic diversity endangers food security as resistance to yet latent biotypes of pests and diseases and extreme weather conditions may have become severely weakened," says Lagoda.

There is a solution: using radiation to artificially induce the variations that plant breeders need. Radiation-induced mutation produces millions of variants. Breeders then screen for the desired traits and crossbreed. "Induced mutation breeding is a safe and proven technology. The method does encounter resistance and the public is generally concerned by anything relating to radiation and mutation," Lagoda explains.

"In plant breeding we're not producing anything that's not produced by nature itself. There is no residual radiation left in a plant after mutation induction. Through its Technical Cooperation Programme, the IAEA provides the tool and the expertise, then national agricultural research systems and plant breeders must take the next step; selecting and cross-breeding plants to achieve the desired result," says Lagoda.

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Genetic Commons Makes Critical Research Easier

For most of us, how scientists conduct their research isn't a big priority. And ways to make it more convenient for them to do that research are even less interesting.

However, while not all research may be scintillating, most of it makes an essential contribution to our daily lives.

For instance, the scientists developing salt-tolerant rice, disease resistant bananas or more nutritious potatoes will ultimately affect how much and what kinds of food are available in markets and on supermarket shelves. Their work will also affect how much nutrition our favourite foods are able to provide us.

The International Treaty on Plant Genetic Resources for Food and Agriculture, which is administered by the Food and Agriculture Organisation, is the key legal instrument helping scientists engage in beneficial food research.

Under the Treaty, 64 of the world's most important crops, which account for 80% of all human consumption, comprise a pool of genetic resources accessible to everyone (the 'genetic commons').

When countries ratify the Treaty they agree to make their nation's plant genetic diversity and related information about the crops stored in their gene banks available to everyone through the Multilateral System.

This gives scientific institutions and private sector plant breeders the opportunity to work with, and potentially to improve, the materials stored in gene banks or even crops growing in fields.

Plant Royalties

Those who access genetic materials through the Multilateral System agree that they will freely share any new developments with others for further research or, if they want to keep the developments to themselves, they agree to pay a percentage of any commercial benefits they derive from their research into a common fund to support conservation and further development of agriculture in the developing world.

"I value the Treaty as essential to undertake my work for the benefit and at the service of our 154 Member States," says Pierre Lagoda. "Anything, especially something this comprehensive, that makes critical food research easier, is something I wholeheartedly embrace."

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