

Improving crop quality in Europe and Central Asia

The challenge...

According to the latest report of the Food and Agriculture Organization of the United Nations (FAO), the agricultural sector in several countries in Eastern and Central Europe and Central Asia remains fragile, due principally to external economic and ecological factors such as climatic variability and droughts. These countries need support to address rural poverty and food security. Nuclear techniques can play an important role in improving yields and quality of food crops.

The project...

The improvement of quality traits in food crops is one of the most important goals in plant breeding and is gaining more and more attention for nutritional, health and marketing purposes. By applying nuclear techniques and related biotechnologies, it is possible to enhance genetic diversity and thereafter to select new variants with improved, economically important traits. For example, changed characteristics such as increased beta-carotene and Vitamin C content add value to crops, generating economic benefit for producers and health benefits for consumers.

Since 2007, IAEA has supported the efforts of Member States of the Europe region to develop new mutant germplasm in cereals through a regional technical cooperation project. Since 2009, cooperation has expanded to cover Solanaceae species such as potatoes, peppers, tomatoes and eggplants. The project has facilitated networking and training for over 100 specialists from 12 countries, who have received in-depth hands-on training in induced mutations, molecular markers, reversed genetics and gene expression analysis, as well as screening for micronutrients, strengthening and consolidating national analytical capabilities.

The impact...

An increased number of pre-breeding and breeding lines with desirable characteristics in crops of great importance for the region, such as wheat, peppers and tomatoes, is now available; this positively affects Europe's agricultural production and food quality. For instance, the hybrid pepper variety "F1 Orange Beauty", which exhibits increased beta-carotene content and was developed in previous years and tested in pre-release trials within this project, was developed in the Republic of Moldova and registered for release in the Russian Federation. In Turkey, advanced lines of barley have been produced and applications submitted to the Ministry of Agriculture for the pre-release registrations of new high yielding mutants of chickpea, tomato and pepper selected by breeders. Counterpart institutions were involved in training undergraduate and postgraduate students in biology and agriculture with a significant component on induced mutagenesis. In Albania, a new curriculum on "Induced Mutagenesis in Plant Genetics" was introduced in 2009 for BSc and MSc courses.

Overall the technical competence and knowledge gained on the use of nuclear techniques, molecular genetics and biochemical analysis for crop improvement, as well as the regional networking that has been established will have a positive long term impact in the region.



"Orange Beauty" pepper with increased β -carotene content released in the Russian Federation in 2011.