

Enhancing crop productivity for sustainable food security in Bulgaria

The challenge...

As a result of a long-standing tradition of vegetable cultivation, Bulgaria is among the largest vegetable producers per capita in the world. The country enjoys one of the best climates in Europe for growing vegetables, due to its favourable climate. Although historically a surplus food producer, Bulgarian agriculture has faced a downturn since the end of 20th century. In recent decades, local vegetable varieties have lost favour with farmers and the canning industry, due to their low productivity.

Deteriorating croplands and declining yields are major priorities for agricultural research and development. Nuclear technologies offer a unique opportunity to address this problem by inducing and accelerating plant mutations to develop improved crop varieties.

The project...

The IAEA's technical cooperation (TC) programme provided the Maritsa Vegetable Crops Research Institute, the Agricultural University, and other Bulgarian institutes and universities, with skills and equipment to carry out mutation induction and characterization. Capacity building efforts—facilitated by training workshops and expert missions—will allow Bulgarian experts to develop molecular markers that indicate a high tolerance to drought stresses, and plant breeding techniques to shorten breeding cycles.



As part of the TC project, the Laboratory of Molecular Biology at the Maritsa Vegetable Crops Research Institute upgraded its infrastructure to improve existing food crops through nuclear and molecular techniques. With the IAEA assistance, many studies were carried out by the Molecular Biology Laboratory to develop mutant varieties of pepper, tomato, potato, bean, pea, onion and watermelon.

The impact...

Induced mutation, and the support techniques included in the project, have contributed to a successful national plant breeding programme in Bulgaria. An assortment of mutant lines have been developed to increase the quality and quantity of targeted crops, and some have been used in cross-breeding to obtain hybrids for the further development of new strains. Through the project, pepper varieties with more favourable ripening and anthocyanin attributes were developed; and new potato breeds with higher drought tolerance and increased flavonoid concentrations were cultivated. Moreover, mutant lines for tomatoes, beans, peas, onions and watermelons are in the pipeline, which will boast competitiveness in international markets.

Small- and medium-scale producers, who have access to more desirable and competitive strains, were among the main beneficiaries of this project.