

## Genetically modified vegetables

The challenge for horticulture in the 21st century is to feed a growing global population with safe and healthy foods while preserving the environment that is subject to increasing stress including climate change. As the leading global center for vegetable research and development, the World Vegetable Center (WorldVeg) is actively contributing to the development and dissemination of safe and affordable vegetable varieties and to improving the livelihoods of economically and socially disadvantaged people in developing countries throughout the world. Given the global commitment to meeting the Sustainable Development Goals and growing demands for vegetable produce and processed products, the best possible array of scientific solutions and tools need to be applied if horticultural science is to benefit resource-poor farmers as well as consumers in developing countries.

Biotechnologies have advanced rapidly in the last decade, and today offer innovative tools to support breeding efforts and develop and improve crop plants. Covering a range of techniques such as tissue culture, marker assisted selection, or genetic modification (GM), they are increasingly being used to complement traditional breeding programs.

### ***Molecular marker assisted breeding***

WorldVeg primarily uses conventional breeding to improve vegetable varieties. With the application of molecular marker technology, WorldVeg has increased the speed and accuracy of its conventional breeding program. The effectiveness of molecular markers and gene mapping will increase, as our skill and knowledge base increase, enabling us to work with traits that are difficult to evaluate phenotypically and minimizing the length of time for variety development and opportunity costs. These technologies have no biosafety or ethical implications.

To make the best possible vegetable varieties that serve the interests of society and the environment, it is essential that all available and emerging biotechnologies relevant to WorldVeg's mission are investigated, along with the crucial issues of safety, environmental protection, and accessibility that may arise from their use. For example, the Center has adopted molecular plant breeding as a complementary tool in its research program to assist in the development and dissemination of new, safe, and affordable vegetable varieties for global use.

### ***GM technology***

When genetic constraints or deficiencies to desirable improvement of vegetable variety quality or production practices cannot be solved through conventional methods, the application of GM technology to the enhancement of vegetable varieties is being explored by the Center as one means to overcome these hurdles. We support the consideration of GM vegetables as part of an integrated agricultural strategy to alleviate poverty and malnutrition. The Center is currently working with partners in the public and private sectors to evaluate the effectiveness and safety of several GM vegetable varieties with classes of introduced genes that have a safe track record or from closely related plant species. The introduced genes are used to enhance traits such as resistance to diseases or insects, tolerance to abiotic stresses, nutritional quality or extended shelf life that are not available through traditional plant breeding.

### ***Biosafety issues***

The World Vegetable Center is committed to high standards of biosafety and ethics in the conduct of laboratory and field experiments, and strongly advocates the establishment and strengthening of global regulatory procedures that will function effectively in individual countries wishing to assess GM plants. The Center is well aware of concerns and constraints regarding products of transformation

technology and is committed to working with policy makers to foster biosafety regulations, promote research capacity and enable informed decisions by the public. The Center recognizes that the protection of human health and the environment cannot be compromised in the effort to adopt new technologies. In this vein, the Center will carefully evaluate the benefits and risks of possible GM vegetable varieties for addressing the food production and environmental constraints of poor farmers, and any eventual submission of a GM vegetable for release will be within the framework of pertinent regulatory bodies.

Intellectual property rights held privately or on behalf of the private sector may apply to conventionally bred or transgenic plant varieties or to plant traits of agricultural significance. With respect to the management of intellectual property, the World Vegetable Center remains fundamentally committed to principles and practices consistent with our mandate to serve the world's poor.