

Eggplant (*Solanum melongena* L.) is a vegetable with worldwide importance. It can have oval, elongated and round fruits that are striped or plain colored ranging from dark purple, light purple, green, yellow and white. The fruits are used in many cuisines. They are boiled, stewed, roasted, pickled, fried, or baked. In the Philippines, eggplant is a popular ingredient in dishes such as *pinakbet*, *torta*, *sinigang*, *ensalada*, and *kare-kare*.



Why is eggplant important?

- Eggplant is a good source of vitamins, fibers, and minerals.
- Eggplant is the number one vegetable crop in the Philippines in terms of area and volume of production.
- Small-scale farmers in many provinces grow eggplants and depend on it for their livelihood.

What are the major constraints to eggplant production?



Eggplant production suffers yield losses from pests, diseases and extreme environmental conditions. The most destructive insect pest for eggplant in the Philippines and other Asian countries is the

Fruit and Shoot Borer (FSB). Eggplant yield losses from 51% to 73% due to FSB have been reported in the Philippines.

How does FSB damage eggplant production?

FSB may cause significant yield loss and reduce the number of marketable fruits. The borer can

be passed on to healthy eggplants by the transfer of eggs, pupae, larvae, or adult insects from the infested plants. It can infect plants soon after transplanting and up to the fruiting stage. FSB larvae or caterpillars feed on leaves and tunnel inside shoots, causing the shoots to wilt. The caterpillars often continue to live and feed inside young and maturing fruits, making them unedible and unfit for market.

How do farmers control and manage FSB?

Farmers can use different ways to control the pest.

- Follow regular crop rotation or intercrop the eggplant with other vegetables
- Use nylon net barriers to protect plants from the insects
- Trap male insects using pheromones to prevent insect mating
- Grow eggplants in a screenhouse before transplanting into the field
- Reduce pesticide use to keep populations of natural enemies of FSB
- Harvest fruits frequently



However, surveys show that the majority of farmers still rely on heavy use of insecticide sprays, which are only effective against newly-hatched FSB caterpillars that have not yet tunneled into the plant.

How can biotechnology offer a better alternative to traditional control methods?

Because of time and resource constraints, small-scale farmers desire pest control methods that do not require additional labor and material inputs. Labor intensive control methods such as manual removal of shoots, trapping of insects and application of netting are usually ineffective. Intensive pesticide use often leads to environmental and health issues, in addition to increasing the

total production costs. There are no existing commercial varieties of eggplants with complete resistance to FSB in the Philippines. This means that FSB-resistance would be difficult to produce using conventional plant breeding strategies. By using biotechnology to introduce FSB-resistance in eggplant, farmers may benefit from good quality fruits and expect maximum yield. They may also be able to save on production costs as less or no pesticide will be necessary to control FSB.

What is FSB-resistant eggplant?

FSB-resistant (FSBR) eggplant is an insect resistant eggplant developed with the help of biotechnology. Also called Bt eggplant in India, it has the Bt protein making it resistant to FSB pests.

Once the FSB caterpillars feed on plant leaves, shoots and fruits, the insects lose appetite and eventually die. The Bt protein in the biotech eggplant only affects FSB and does not affect humans.



What institutions are working on the development of FSBR eggplant?

The Indian Maharashtra Hybrid Seeds Company Limited (Mahyco) has developed a highly-resistant biotech eggplant with help from the Monsanto Company. These eggplant lines have been used as source of the Bt protection of biotech eggplants in India, Bangladesh and the Philippines. The Institute of Plant Breeding at the University of the Philippines Los Banos (IPB-UPLB) is currently doing research on FSB-R eggplants through a partnership with Mahyco, with support from the the United States Agency for International Development (USAID) through the Agricultural Biotechnology Support Project II, EMERGE, and the International Service for the Acquisition of Agri-biotech Applications.

Is FSBR eggplant safe to eat?



Before the FSBR eggplant is approved for commercial use, scientists ensure that it has passed many tests and safety assessments. In the Philippines, biosafety is evaluated

in four stages: (1) contained research in laboratories and screenhouses, (2) small confined trials, (3) multi-location field trials and (4) commercial release. The National Committee on Biosafety of the Philippines (NCBP) is responsible for evaluating the safety of FSBR-eggplant under contained and confined conditions. The Bureau of Plant Industry (BPI) under the Department of Agriculture takes charge of the safety assessment and monitoring during large field trials and prior to commercial release. In addition, the reduced use of chemicals on Bt eggplant will mean that less pesticide residue will remain on the fruit when it is brought to market.

Is FSBR eggplant already available in the market?

In the Philippines, this biotech eggplant is not yet commercially available. The promising varieties are still under contained research in the screenhouse and tests are continually being done to ensure safety of the product. Once it is



approved for commercial release, seeds will be made available to farmers. In India, similar FSBR eggplant varieties are near commercialization and are in the later stages of evaluation under multi-location trials.

For more information, contact:

Dr. Desiree M. Hautea
ABSPII Regional Coordinator and Product Manager
Email: dmh.uplb@gmail.com

or Dr. Josefina O. Narciso
Project Leader
Email: jonarciso@yahoo.com

Institute of Plant Breeding
University of the Philippines Los Baños
College, Laguna 4031
Telefax: 049-536-5140

This pamphlet is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of ABSPII and do not necessarily reflect the views of USAID or the United States Government.



September 24, 2007



Questions and Answers on the Development of Fruit & Shoot Borer Resistant **EGGPLANT** in the Philippines



Project Partners:



ABII SP

