

# DON'T MESS WITH MY TALONG!

*10 Questions & Answers  
on Bt Talong*



The first genetically modified vegetable, widely eaten by common Filipinos, is being field tested in Davao City and will be the first food crop to be commercialized across the country by 2011.

Do you want you and your families to eat genetically modified food?

Why is this being done?

Who is behind this?

Whose interest does it really promote?

## 1. What is Bt talong?

Bt *talong* is the product of genetic engineering where the DNA of the local eggplant variety is inserted with a gene derived from the soil bacterium *Bacillus thuringiensis* so that the *talong* produces a form of Bt toxin that kills a major insect pest of eggplant, the Eggplant Fruit and Shoot Borer (EFSB), *Leucinodes orbonalis*. When the EFSB larva (generally referred to as worm or “uod”) feed on the eggplant, the toxin melts the stomach of these larva.

Bt is a bacterium commonly found in soil and contains genes that are toxic to specific types of insects. It has been valued for many decades as a natural insecticide, making it a logical choice for genetic engineering experiments to insert its genes into crops to produce toxins. But some natural forms of Bt have been found toxic to humans and the health and environmental safety of genetically engineered Bt has been a subject of intense debate in the scientific community since the '80s.

The Philippines is poised to be the first country in Asia to commercialize Bt *talong*. This Bt *talong* will also be the first genetically modified vegetable food crop to be released in the Philippine market.



## 2. Who developed Bt talong?

Bt *talong* (called *brinjal* in South Asia) was originally developed by Maharashtra Hybrid Seed Company (Mahyco), the Indian subsidiary of giant transnational seed and agro-chemical corporation Monsanto. The gene sequences used by Mahyco in the development of Bt brinjal are all patented and owned by its mother company. Monsanto has used and continues to use these patented gene sequences in the development of other genetically modified crops such as corn/maize, cotton, potato, etc.

Mahyco has sub-licensed the technology to public and private sector institutions forming the international research consortium called Agricultural Biotechnology Support Program (ABSP II), led by Cornell University in the US and wholly funded by the United States Assistance for International Development (USAID).

### GENETICALLY MODIFIED ORGANISMS

or GMOs are organisms in which the genetic material (DNA) has been altered from natural processes or in a way that does not occur naturally. Through genetic engineering, selected individual genes are transferred from one organism into another or between non-related species.

25 countries grew genetically engineered crops commercially in 2009. Of these, the US produced the majority in 64 million hectares. Brazil and Argentina have more than 21 million hectares planted with GM crops. India, China and Philippines are the top Asian countries producing commercialized GM crops. Philippines ranks 11<sup>th</sup> in producing GM corn grown in 0.5 million hectares.

Soybeans, cotton, corn, rice, sugar beets, canola, and potatoes are the predominant crop plants being engineered. Crops have been engineered to modify ripening characteristics (tomatoes and cantaloupes), others to be resistant to herbicides (soybeans and sugar beets) and still others to increase resistance to pests (corn and cotton). <http://www.isaaa.org/resources/publications/briefs/41/pptslides/default>.

**GMOs IN THE PHILIPPINES**

Philippines import a lot of corn and soybean from US, the number one producing country in GM corn and soybean in the world. Most likely, the imported corn from US contains about 30 percent GM corn while the soybean contains about 60 percent (Halos, 2000).

**Genetically modified corn**

The Philippines is the first country to allow the first biotech food crop commercially planted in Asia. The Department of Agriculture in the Philippines first approved the propagation and importation of Bt corn in December 2002 – the first genetically modified crop approved for field testing in the country. On 3 December 2002, the certification for Bt corn propagation was awarded to Monsanto by Bureau of Plant and Industry (BPI).

Bt corn is a variety of corn where a specific gene of *Bacillus thuringiensis* is inserted to produce a protein that protects the corn plant from feeding by Asiatic corn borers and makes the corn plant naturally resistant to corn borer attacks. Bt corn is now planted in about 48,022.5 hectares of land in 2009 based on BPI monitoring. Around 20 percent (or 9,516 hectares) of the total GM corn areas are in Mindanao.

In 2005, another Bt corn-event Bt 11 of Syngenta Philippines was approved for planting. The Syngenta Phils' biotech products are marketed under the Agrisure trade name (SEARCA BIC, 2005).

Also in 2005, Ready Roundup corn was approved for commercial use, another variety of GM corn. RR corn is designed as an herbicide tolerant-corn plant. This was the second Monsanto's biotech product approved by the BPI for commercialization in the country (Sarmiento, 2005).

The stacked-trait corn, combination of Bt corn and RR corn, makes it the fourth event approved by the Philippine government for commercial use (SEARCA BIC, 2005).

**Area planted of GM corn, 2009.**

Island	Bt	RR	Stacked (Bt + RR)	Total
Luzon	38,506.5	3,518	183,770.5	225,795
Visayas	0	2,790	8,006	10,796
Mindanao	9,516	40,501	40,618	90,635
Phils	48,022.5	46,809	232,394.5	327,226

Source: Bureau of Plant Industry, 2009.

**3. Who are the proponents of Bt talong in the Philippines?**

The Institute of Plant Breeding (IPB) of the University of the Philippines at Los Banos (UPLB) is the main proponent of Bt *talong* in the Philippines. The project is led by Dr. Desiree M. Hautea, the coordinator of ABSPII in Southeast Asia, who also teaches plant breeding at the IPB. Like all partners of ABSPII involved in the Bt *talong* research and development project, IPB/UPLB entered into a free licensing agreement with Mahyco. The details of the agreement, however, are not disclosed to the public.

ABSPII plans to commercially release open-pollinated varieties (OPVs) of Bt *talong* in the Philippines once it is approved by the regulators. Dr. Hautea claims that releasing OPVs will ensure that poor eggplant farmers can save, exchange and re-use the seeds produced by Bt *talong*.<sup>1</sup> However, higher yielding hybrid varieties will be released later which will be sold to farmers.

**4. What aspects of Bt talong development are undertaken in the Philippines?**

The original genetic engineering of the Philippine varieties of eggplant cells to produce Bt *talong* was done in India by Mahyco.

In 2004, through a shuttle research program, local eggplant varieties from the Philippines, namely Mara, Mistisa, Dumaguete Long Purple and Casino were brought to India by IPB researchers' scientists to transfer the Bt gene into Philippine varieties by conventional breeding involving hybridization and selection.<sup>2</sup> The seeds resulting from this propagation were brought back to the Philippines in 2005-2006 for further breeding at the IPB.

The Bt *talong* variety development in the Philippines basically involved backcrossing which is a process where the progeny is again bred with its parent. After four to six such backcrosses, the progenies are expected to have most of the genes of the original variety plus the Bt gene. The actual development of the genetically modified product was done by Mahyco, whose mother company owns the technology and the gene sequences used in Bt *talong* which was conventionally bred by IPB researchers into local varieties.

<sup>1</sup> Aguiba, 2010.

<sup>2</sup> Insert footnote

## 5. What stage is the development Bt talong in the Philippines?

The Bureau of Plant Industry (BPI) of the Department of Agriculture has approved on 29 September 2009 UPLB-IPB's application for multi-location field trials of Bt *talong* in the Philippines. The areas targeted for field trials are as follows:

1. Pangasinan State University (PSU) in Sta. Maria, Pangasinan
2. UPLB in Bay, Laguna
3. Camarines Sur State Agricultural College (CSSAC) in Camarines Sur
4. Sta. Barabara in Iloilo
5. Visayas State University in Baybay, Leyte
6. UP Mindanao in Davao City
7. University of Southern Mindanao (USM) in Kabacan, North Cotabato

The first (dry) season field trials in Pangasinan and Laguna have been completed between May and June 2010.

In 28 June 2010, field testing was approved for the Visayas and Mindanao sites.

Prior to the multi-location field trials, the proponents must have completed four or six back crosses in a confined environment at the IPB premises in Laguna. To do this, they must first get the approval from the National Committee on Biosafety of the Philippines (NCBP) which assesses and approves applications for contained experiments and confined trials of GM crops. Once this phase is completed, proponents must again seek approval from the BPI because under Administrative Order No. 8 (*Rules and Regulations for the Importation and Release into the Environment of Plants and Plant Products Derived from the Use of Modern Biotechnology*), it is BPI which reviews and approves applications for field releases and commercial propagation of genetically modified crops.

The NCBP also requires that each field site must have an Institute of Biosafety Committee (IBC) whose mandate is to evaluate and monitor the biological safety of this project especially in relation to human health and the environment while ensuring public participation in the process.

In the University of the Philippines (UP)-Mindanao, the IBC is composed of:

- 1) Dr. Annabelle U. Novero – Chairperson
- 2) Prof. Virginia P. Obsioma – Scientist
- 3) Prof. Myfel Paluga – Scientist
- 4) Prof. Skilty C. Labastilla – Member
- 5) Prof. Ruth U. Gamboa – Member
- 6) Mr. Ramon M. Bargamento – Community Representative
- 7) Mr. Jose Amor R. Yabes – Community Representative

### FAST FACTS ABOUT TALONG

- originated from South Asia and has spread through mainland Southeast Asia, where farmers have developed the richest diversity in species and varieties mostly as vegetables for human consumption
- belongs to the family Solanaceae and is known under the botanical name *Solanum melongena* L.
- the family contains 75 genera and 2,000 species
- three main botanical varieties under the species *melongena*<sup>1</sup>, namely *esculentum* (the round or eggshaped cultivar), *serpentinum* (the long, slender types), and *depressum* (the dwarf eggplant plants)
- common eggplant, to which the large fruited forms belong, is known under the scientific name *S. melongena* var. *esculentum*
- is usually self-pollinated, but the extent of cross-pollination has been reported as high as 48%, thus it is often classified as cross-pollinated crop<sup>1</sup>
- high pollination rate in eggplant is due to heteromorphic or dissimilar flower structure called as heterostyly (or flowers with different forms or lengths). Outcrossing primarily takes place with the help of insects.

## 6. What was the basis for approval of Bt talong field releases in the Philippines?

Since the Bt *talong* development in the Philippines is part of a research conducted by a consortium under the ABSPII and implemented in only a few countries in South Asia (India and Bangladesh) and Southeast Asia (Philippines, Thailand and Vietnam), the documents submitted by the IPB to the Philippine regulatory agencies, namely NCBP and BPI, were basically the same dossier submitted by Mahyco to the Indian evaluators. Bt brinjal had undergone at least two years of field trials in India before Mahyco applied for commercial release in 2009, which was eventually turned down by the Minister of Environment of India. Since very little information on the development of Bt *talong* has been publicly disclosed by the IPB and the Philippine regulators, it is not known if the proponents conducted their own risk assessment studies beyond the documents submitted by Mahyco in India where the environment and management practices of eggplant are different from the Philippines.

The Mahyco dossier detailed results of studies that they conducted to show that Bt eggplant is safe for human consumption and poses no threat to the environment.

But independent analyses of the Mahyco data which were done by Professor Gilles-Eric Seralini of the the France-based Committee for Independent Research and Information on Genetic Engineering (CRIIGEN) and Dr. Judy Carman of the Institute of Health and Environmental Research in New Zealand showed the contrary and cast doubts on the safety of Bt *talong*.

Here are some highlights of the findings of Seralini and Carman on Mahyco's dossier submitted to Indian regulators:<sup>3</sup>

- 1) Bt *talong* has been modified to produce an unknown insecticide toxin containing modified genetic sequences. In the toxicity tests on target and non-target insects, this unknown toxin has not been used but instead, an improper toxin was used because this control was easier.
- 2) Bt *talong* cells possess a gene which provides resistance towards at least kanamycin, a widely used antibiotic. This poses a major health problem because of the growing accumulation in the environment of antibiotic resistance genes. It is inappropriate to consider commercializing a food containing an antibiotic resistance gene since several modern biotechnology companies have already developed transgenic plants without this kind of marker genes.
- 3) Bt *talong* appears to contain 15% less kcal/100 g, have a different alkaloid content, and 16-17 mg/kg Bt insecticide toxin poorly characterized for side effects.
- 4) Data contained in dossiers submitted by Mahyco in support of their application showed significant differences in animals fed with Bt brinjal compared to those fed non-Bt controls. This differences were discussed and disregarded by Mahyco as biologically irrelevant. However this differences were significant and raises food safety concerns that warrant further investigation.

### TALONG IN THE PHILIPPINES

- one of the most economically important vegetable crops in the Philippines
- accounted for nearly 30 percent of the total volume of vegetables produced in 2006, equivalent to 187,793 metric tons<sup>1</sup>.
- planted in some 21,000 hectares of land in the country, with the largest production area (24 percent) found in Ilocos Region
- The value of eggplant production is the highest among Philippine vegetables at PhP1.8 billion (around USD32.7 million) in that year.<sup>2</sup> The Philippines ranks sixth in eggplant production area in Asia.

<sup>1</sup> Borromeo, n.d.

<sup>2</sup> Borromeo, n.d.

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<sup>3</sup> Seralini and Carman, 2009; The full report can be found at [http://www.criigen.org/images/stories/Actualites/ActusOGM/btbrinjal-ges\\_%200109.pdf](http://www.criigen.org/images/stories/Actualites/ActusOGM/btbrinjal-ges_%200109.pdf)

In addition, the longest toxicity tests done by Mahyco only lasted for 90 days and is not enough to assess long-term effects like the development of tumors or cancers.

- 5) The experiments on the potential toxicity of *Bt* brinjal to non-target organisms (such as butterflies and moths), to beneficial insects and to long-term soil health do not give sufficient view of possible harm to complicated ecosystems
- 6) The gene flow studies inadequately assess the possibility of GMO contaminations, in particular to neighboring eggplant crops. Contamination of non-GM varieties poses a problem as consumers or even farmers would be unaware that they are handling or eating GMO contaminated eggplant.
- 7) The actual process of inserting the gene disrupts normal genetic expression of the plant and may produce more of something harmful to human health, or less of something beneficial to human health. A probably side effect is that the process may cause the plant to produce another potentially dangerous substance, a toxin or allergen for that plant. Yet, the compositional analyses presented to the Indian Government by Mahyco do not assess these known likelihoods. Mahyco did not do a full protein analysis which would have gone some way to determine if the plant was producing more, or less, of something, or a completely new substance.
- 8) The only real health study that could be used by Mahyco to support its application for safety is a single rat study. The study, however, suffers from numerous procedural mistakes that renders the conclusion presented invalid. For example, the sample sizes are insufficient to be able to find statistical difference for many measurements even if real clinical differences are occurring between groups. The blood biochemistry and haematology data are also quite limited. For example, it is normal to take 18-20 biochemical measurement in blood to determine the health of an animal. The Mahyco study only took seven measurements.

### **7. Has *Bt talong* been commercially released in other countries?**

No. If the BPI approves the application of UPLB-IPB, as part of the ABSPII consortium, the Philippines will be the first country in the world that will allow the commercial cultivation of *Bt talong* in the world.

The Indian government rejected the application of Mahyco for commercial propagation of *Bt* brinjal. In 9 February 2010, India's Minister of Environment and Forestry issued a moratorium on the release of *Bt* brinjal on the basis of *the precautionary principle* until independent studies adequately establish its safety to human health, environment and genetic diversity of India. A full text of the decision is available at [http://moef.nic.in/downloads/public-information/minister\\_REPORT.pdf](http://moef.nic.in/downloads/public-information/minister_REPORT.pdf)

### **8. Why do we oppose the field testing and commercialization of *Bt talong*?**

Just like in India, we believe that the lack of comprehensive and independent risk assessment studies on the potential impacts of *Bt talong* on human health and environment should be enough to stop the folly for quick-fix solutions to agricultural challenges. There is no long-term study that looks into the long term effects of *Bt talong* to health and environment.

Furthermore, the introduction of GM in the city even if only through field trials is contrary to the principles enshrined in the recently passed Organic Agriculture Ordinance of Davao City (Ordinance No. 0384-10) that promotes the adoption and mainstreaming of organic farming systems and practices and which clearly states that "*organic agriculture cannot co-exist with genetically modified crops*".

Even the recently-passed Organic Agriculture Act of 2010 or RA 10068, states that crops and plants that have genetically-modified organisms (GMOs) do not fall within the definition of organic agriculture.

We are also specifically concerned about the following:

- 1) **LACK OF INFORMATION.** There is lack of information about the status of the Bt *talong* project in the country – copy of application of the proponent, safety studies conducted, status reports of the project including results of the field trials in Luzon, names of members of the Scientific and Technical Review Panel (STRP) and their reviews, among others.

Calls made by our national counterparts for the release of information were met with silence by the Bureau of Plant Industry (BPI). The project proponents and the government have the obligation to release information on Bt *talong* because its study and eventual release will affect Filipino farmers and consumers. The farmers need to know the risks in planting Bt *talong* and must not be treated as a mere market for Bt *talong* seeds. Moreover, the public has the right to know what food they consume, from where and how they are produced.

- 2) **NO PUBLIC CONSULTATION.** There was very little transparency in the assessment and approval process done by the STRP and by BPI. Genuine public participation processes as provided for in the constitution and enumerated in the National Biosafety Framework (NBF) and the Local Government Code were not followed.
- 3) **FOOD SAFETY AND SECURITY ISSUES.** The lack of comprehensive and independent risk assessment studies on the potential impacts of Bt *talong* on human health and environment should be enough to pause and reconsider. The safety test on Bt *talong* submitted by the proponents or by the product developers/sellers themselves in India have been widely debunked by internationally renowned scientists, and thus was one of the many bases by which the Indian government halted the release of Bt *talong*.
- 4) **CONTAMINATION AND LOSS OF BIODIVERSITY.** This is a real threat based on documented experiences on GMOs around the globe. In Mexico, their local maize varieties were contaminated with Monsanto's GM corn. It has seriously destroyed not only their local germplasm, but the culture and traditions of the Mexican people that are so embedded with it. The same happened in Hawaii and Thailand with GM papaya, which seriously compromised the livelihoods of many Hawaiian and Thai farmers, and jeopardized the countries' agricultural trade. To let this happen in the Philippines - and compromise our diversity and the livelihood of Filipino vegetable farmers - would be plainly careless and irresponsible.
- 5) **LOSS OF CONTROL.** The expected contamination of local varieties would result to loss of control by farmers of their traditional seeds and would make farmers dependent on multinational companies who would sell the GM seeds or their hybrids.
- 6) **REGULATORY MECHANISMS OF GMOs IN THE COUNTRY WERE NOT FOLLOWED, OR LACKING, OR INADEQUATE, OR COMPROMISED.** The NBF provides specific requisites for biosafety decisions such as risk assessments made by DENR, and studies to ensure food safety by the Department of Health, and others. We have not found any information made publicly about these matters. Also the country does not have a GMO labeling law, as well as a law that addresses liability and redress issues resulting from GMO release. An analysis made by Greenpeace also found that some people in regulatory agencies, have been, at one time or another, connected with seed and chemical corporations that sell GMOs, hence, compromising biosafety decisions on

grounds of conflict of interest. Thus, GM field testing and commercialization should only be allowed once the current regulatory system is overhauled.

- 7) **UNNECESSARY.** There is no overriding urgency in the country for *Bt talong*. The fruit and shoot borer pest has been managed successfully by organic farmers using organic methods that do not pose threat to health and environment. In fact, other than this pest, there are other problems in eggplant production that are also sufficiently addressed by diversified organic farming approaches at no cost to health and environment.

## **9. What do we want to happen?**

In view of the foregoing, we urge the local government of Davao City to:

- **conduct an investigation on the status of the field trial in the city and require for transparency and the conduct of public consultations on *Bt talong*** because it is the public's right to be informed and to participate in the decision making on matters that affect our health and environment in consonance with the local government code;
- **halt the field trial immediately** in case it has begun;
- **expedite the implementation of the Organic Agriculture Ordinance**, since agro-ecological farming is the more strategic answer to local and global food security and environmental problems.

The national government must:

- **halt the field trials of *Bt talong*** all over the country as well the planned commercialization; **fully implement Organic Agriculture Act.**

## **10. What could you do?**

- **Organize** fora, educational activities within **your group or community** to increase awareness on the issue.
- **Tell** as many people about this issue through blogs, emails and texts.
- **Send letters** to government leaders to stop the field trial and commercialization of *Bt talong*:

**Mayor Sara Duterte**  
Davao City Hall  
City Hall Drive, Davao City

**Secretary Proceso Alcala**  
Department of Agriculture  
Elliptical Road, Quezon City

- **Attend/organize** prayer vigils, creative street actions to protest against *Bt talong*
- **Sign** signature campaign on the issue and **volunteer** to support this cause.

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