



Monthly Bulletin  
on Genetic Engineering  
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*For details:*

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## National News

### 1. Battle against Bt Brinjal Stepped Up

Prof G.E Seralini, in his independent scientific appraisal of Mahyco-Monsanto's bt brinjal feeding studies, says: "bt brinjal may present a serious risk for human and animal health & the release should be forbidden".

- ***His critique of Mahyco's dossier confirms the mounting evidence against India's Apex Regulator (the GEAC) in the Supreme Court proving that it acts to support the 'Industry', mortgaging the Nation's health, food security and biodiversity. These potential impacts will be irreversible if Bt Brinjal is commercialised.***
- ***Since it is a civil society that is now bearing and will in future bear the brunt in perpetuity of the Regulators' reckless rush to commercialise this technology in India in partnership with the US Government and Monsanto, how we proceed is of the uttermost national importance. It therefore requires the most serious application of wills and hearts of the National Government and civil society to ensure that India gets it right, NOW, for we will not get a second chance.***

In August 2008, after a protracted two-year battle and a Supreme Court Order in the PIL by lead petitioner Aruna Rodrigues and Co-Petitioners R Baruah, PV Satheesh and D Sharma, the GEAC published the Mahyco-Monsanto test dossier on Bt Brinjal and placed it in the public domain on the Ministry of Environment & Forests website. In the meanwhile, however, the GEAC permitted pre-commercial large-scale field trials of transgenic (Bt) brinjal in blatant Contempt of Court. Brinjal is a 'favourite' and important vegetable in India and it has a major presence on the 'dinner plate' of the urban and rural, rich and poor. Brinjal is known to have existed in India for 4000 years. Given that India is also a functional Centre of

Origin of brinjal, any release of Bt Brinjal into the environment, poses a significant risk of contamination to sexually compatible wild species and consequent harm to biodiversity, in addition to the contamination of Non-GM varieties.

Prof. Gilles-Eric Seralini was commissioned by GreenPeace India to appraise the Mahyco studies in a qualitative assessment of them. The Seralini Bt Brinjal Appraisal covers (a) health impacts and (b) environment studies, in particular, gene flow as the route to environmental contamination, as well as impacts on 'target' (the pest that it is directed at) and 'non-target' organisms (other organisms). Three issues need to be highlighted right away which **invalidate** Mahyco's studies:

Good laboratory practice has been seriously flouted because (a) reference materials have not been checked by the receiving lab for their authenticity (b) most of the laboratory tests are unsigned by the researchers who have performed the tests (signature frames are empty); (c) the other surprising discovery of importance is that whereas Bt brinjal has always been referred to in every regulatory document as **Cry1Ac (a protein)**, it now transpires as a result of Seralini's scrutiny of its molecular characteristics that this Bt brinjal is in reality a **chimeric** transgene (hybrid or fusion gene) that has been modified "*to produce an unknown chimeric insecticide toxin containing **Cry1Ab and Cry1Ac modified sequences***". Furthermore, in the "*toxicity tests on target and non-target insects, this chimeric toxin has not been used but instead, an improper Cry1Ac toxin (was used) because this control was easier*".

The main points:

#### Health

- a. Bt brinjal produces a protein in the vegetable cells, inducing resistance towards at least kanamycin, a well known antibiotic. This is typical of first generation GMOs, which were engineered without consideration of the problem. Antibiotic resistance is recognized to be a major health problem because of the growing development of antibiotic resistance

genes. It is very inappropriate to consider commercialising a food containing an antibiotic resistance gene, since several modern biotechnology companies have already developed transgenic plants without these marker genes. *“It is possible that Mahyco has bought an old unused GMO technology to Monsanto Company”.*

- b.** Bt brinjal has not been properly tested for health or environmental safety. In feeding trials, numerous significant differences were noted compared to the best corresponding non-Bt controls: Bt brinjal appears to contain 15% less kcal/100 g, has a different alkaloid content, and 16-17 mg/kg Bt insecticide toxin poorly characterized for side effects, and produced by the plant genetically modified for this. In animals fed this GMO, several parameters were effected including blood cells or chemistry, with significant differences according to the period of measurement during the study or the sex of the animal. These include prothrombin (blood clotting) time, biochemical parameters such as total bilirubin (an indicator of liver health). Alkaline phosphatase was also changed, as well as feed consumption and weight gain; milk production in cows was 10- 14% higher. There was more milk and more roughage dry matter intake as if the animals were treated by a hormone. Rats GM-fed had diarrhoea, higher water consumption, liver weight decrease as well as relative liver to body weight ratio decrease.

These *differences* are frequently unreported in the summaries of the different experiments but are ‘visible’ in the raw data. These differences were, when discussed, disregarded, on a number of grounds, principally on the grounds that they were within the range of a wide “reference” group (really larger than the real closest control group). This reference group represents a wide range of brinjal types and is not a strict comparison. Such declarations that the differences seen are not of biological relevance are not substantiated by the data presented in the feeding trials. Clear significant differences were seen that raise food safety concerns and warrant further investigation.

*“This makes for a very coherent picture of Bt brinjal that is potentially unsafe for human consumption. “—It will be also be potentially unsafe to eat animals with these problems that have been fed GMOs. The GM Bt brinjal cannot be considered as safe as its non GM counterpart. Indeed, it should be considered as unsuitable for human and animal consumption. In addition, the longest toxicity tests which are for only 90 days do not assess long-term effects like the development of tumours or cancers”.*

### Environmental

- a. Non-target Organisms:** It is a very serious matter that studies directed at impacts on Non-Target Organisms are perfunctory and effectively absent. Seralini states: *“it is almost impossible through measurements of toxicity to a few species of non-target organisms to get a sufficient view of possible harm to complicated ecosystems, which moreover vary substantially from place to place in India. The experiments on the potential toxicity of GM Bt brinjal to non target organisms (such as butterflies and moths), to beneficial insects and to long-term soil health are woefully inadequate and give no assurances for the environmental safety of growing GM Bt brinjal. Indeed, in many cases the experiments were considered **irrelevant** (e.g. do not take indirect effects, such as effects up the food chain into account)”.*
- b. The gene flow** studies are inadequate particularly with regard to the possibility of GM contaminations to neighbouring brinjal crops.
- c.** The studies neglect other routes of proven contamination (e.g. seed mixing), human error etc.

*“Based on these tests, Bt brinjal cannot be considered as ‘safe’. It is known anyway that natural Bt toxins have never been authorised for mammalian consumption. Artificial ones should not be either, before a more serious assessment. Significant effects in comparison to controls are also noticed with other GMOs tolerant to Roundup, and in total with at least four GMOs for which these kinds of tests have been done. These resemble the classical side*

*effects of pesticides in toxicology; and these have also been observed for MON810 maize producing a related insecticide which is present in part in the Bt brinjal, Cry1Ab".—"The agreement for Bt brinjal release into the environment, for food, feed or cultures, may present a serious risk for human and animal health and the release should be forbidden".*

*Prof Seralini's expertise in this field is widely acknowledged. For nine years (1998-2007) he was a member of two Commissions for evaluating GMOs before and after commercial release, (the Commissions of the French Ministry of Agriculture and Ministry of Ecology). In particular, Mon 810 a Bt corn was found to be toxic after it had been approved for release by EFSA (European Food Safety Authority), as a result of which, it is now banned in France and is under serious review by other EU countries. He was also an 'Expert' witness for the EU on their first panel in the WTO conflict with the US on a GM moratorium (2003); 'Expert' also for the European Committee for the Reassessment of Biotechnologies (2008). His expertise as a renowned toxicologist and author is acknowledged. He undertakes specialist research on the effects of pesticides on health.*

**Aruna Rodrigues**  
(Lead Petitioner, in the PIL to the Supreme Court for a moratorium on GMOs in India)  
9<sup>th</sup> January, 2009

## 2. "Genetic Roulette" Launched!

DDS, SAGE and Other India Press have jointly published an Indian edition of "Genetic Roulette- Documented Health Risks of Genetically Modified Foods," authored by Jeffrey Smith of Institute for Responsible Technology, USA. The publishers have taken it up as a mission to launch the book in as many cities as possible, so as to involve large sections of people in combating the inroads of genetically modified foods. Beginning with Hyderabad (12 Jan 2009), the book has already been launched in Bangalore, Madurai, Trivandrum, Chennai, Delhi, and Bhubaneswar. It was first launched in Hyderabad on 12th January. by Dr. MV Rao, Ex-Vice Chancellor of Andhra Pradesh Agricultural University

In Bangalore (17Jan 2009) the book was released by Dr.U.R.Ananthmurthy (Jnanpith awardee and Kannada litterateur). This event was jointly hosted by DDS, SAGE, ICRA, KRRS, IAT and OFAI. Scientists, writers, media people, university administrators, farmers and eco-activists emphasized the importance of consumer awareness. The occasion was marked by a lively debate on the role of GE food in Karnataka.

In Madurai, the book-launch event was jointly organized by DDS, SAGE, Indian Medical Association (IMA), Madurai Chapter and Indian Organic Agricultural Movement (IOAM) and the book was released by Dr. Nammalvar, a champion of organic farming in Tamilnadu.

In Trivandrum (Jan 20), the launch was organized by SAGE, Kerala Biodiversity Board and Thanal, and the book was released by Kerala State Agricultural Minister "Mulakkara Retnakaran". The book launch at Trivandrum was again a great one with around 200 participants from different sections of Society. It was an interactive session with representatives from every generation and walk of life, participating enthusiastically in the discussions that followed the launch of the book.

The Chennai book launch (22 Jan 2009) went off extremely well with more than 125 people (more than 70% women farmers) and the media. Dr Markandan, the former VC of Gandhigram University was the chief guest. Nammalvar released the book and presented the first copy to Dr Markandan. The meet was also attended by all members of SAFE food alliance of Chennai, of which SAGE-TN is a part.

Speaking on the occasion, Dr,Markandan said that agricultural universities should work for the upliftment of people. He also expressed the hope that, Nammalar would translate the main contents of the book into Tamil for the benefit of all. Mr Velliyan, Chairman of Merchants' Association of Tamilnadu also participated in the meet and expressed solidarity with the concept of safer food for all citizens. Later, a protest meet organized by Sheelu, in association with Safe Food Alliance (of which NGOs, Lawyers, docotors, Students,

merchants association, are members) was held at Chennai Memorial Hall, Opposite to Government Hospital, Chennai Central. More than 150 people attended the protest, which went on for two hours with slogan shouting against the GM crops and GM research in Indian Research Institutes.

In Delhi (23 Jan 2009) the book was launched by Dr. Syeda Hamid, Member of the Planning Commission, Health at a press meet attended by a large gathering.

Releasing the book in Bhubaneswar (25th January 2009), Jeffery M Smith, Executive Director of the US Institute for Responsible Technology, on Tuesday urged the Orissa Government to take steps to ensure that no BT Brinjal and BT Cotton entered the market. He further said that Bt brinjal had not been properly tested for health or environmental safety. In feeding trials, numerous significant differences were noted compared to the best corresponding non-Bt controls.

### 3. Farmers and experts call for moratorium on GM crops

[http://economictimes.indiatimes.com/Commodities/Farmers\\_and\\_experts\\_called\\_for\\_moratorium\\_on\\_GM\\_crops/articleshow/4024347.cms](http://economictimes.indiatimes.com/Commodities/Farmers_and_experts_called_for_moratorium_on_GM_crops/articleshow/4024347.cms)

NEW DELHI: Farmers and experts have called for a moratorium on genetically modified (GM) crops in the country in view of health and environmental hazards. Charging the key regulatory body of "compromising" its fundamental brief of securing public health and safety in the context of GM crops, they have called for a stop on the introduction of both GM Brinjal and GM rice.

Dr Bhargava charged that the GEAC has allowed field trials and release of GMOs without any proper biosafety measures. Noted farmer leader and the President of Bharatiya Krishak Samaj, Dr Krishan Bir Chaudhary, alleged that the government has allowed and encouraged the seed companies and multinationals like Monsanto to take over seeds, thus negating the farmers' sovereign rights over seeds. Such a situation would lead

to food security problems and endanger the livelihood of farmers, he said.

Jeffrey Smith, author of the best selling "Genetic Roulette and Seeds of Deception" supported Dr P M Bhargava's contention that regulatory measures have been compromised. He added that even Food and Drug Administration [FDA] in the USA is also responsible for the lapse.

Both Dr Bhargava and Dr Chaudhury charged that there was a dangerous nexus between regulatory authorities, bureaucrats, politicians and multinational corporations which can utterly compromise the health of Indian people.

### 4. US Body alerts India's Supreme Court

The Center for Food Safety is a non-profit, civil society organization based in Washington, DC, that supports sustainable agriculture and advocates for stringent, science-based standards in the assessment of novel, potentially hazardous food production technologies, such as genetic engineering.

Since 2006, the Center has won three US Federal District Court cases against the U.S. Dept. of Agriculture for failing to assess the environmental impacts of various GM crops. Following is the letter written by its executive director, Andrew Kimbrell

See: <http://www.centerforfoodsafety.org/pubs/Three%20Case%20Victory%20Summary%202-20-07'.pdf>

As the executive director and science policy analyst of the Center for Food Safety, we are writing with regard to Dr. Pushpa Bhargava's recommendations for biosafety assessment protocols for GM crops in connection with the Supreme Court case involving the Indian government's Genetic Engineering Action Committee (GEAC). We have examined Dr. Bhargava's recommendations in the Application filed by Aruna Rodrigues, lead petitioner, in August 2008 (I.A. No. 25 of 2008 in the matter of Writ Petition (Civil) No. 260 of 2005), GEAC's counter affidavit to the same filed in September 2008, and the Petitioners' rejoinder affidavit.

In brief, we find Dr. Bhargava's biosafety assessment recommendations to be scientifically-grounded, consistent with those of many other leading independent scientists experienced in the relevant disciplines, and strongly protective of human health and the environment. In contrast, GEAC's minimalist regulatory standards are scientifically flawed, reflect the interests of the agricultural biotechnology industry in rapid rubber-stamp approval, and so are much less protective of human health and the environment.

Perhaps the most serious indictment of the cursory testing standards relied upon by GEAC, as expressed by its Secretary Dr. Ranjini Warriar in the counter affidavit, is the growing number of scientific studies showing that GM crops already approved according to these very standards have adverse environmental and, potentially at least, adverse human health impacts.

Dr. Warriar makes repeated reference to impressive-sounding "norms" or even "international norms" for GM crop testing that he maintains are followed by GEAC. However, these supposed "international norms" in fact represent a cursory set of inadequate tests that biotech companies have found it convenient to perform, and these tests fall far short of what international experts have recommended. Before we give a few examples, it is pertinent to note that the US regulatory system, which has become the model for India and the world in this regard, was designed chiefly by biotechnology companies, and in particular the startling conclusion:

For all of these reasons, the Center for Food Safety respectfully urges the Supreme Court

of India to rule positively on the testing recommendations outlined by Petitioners and Dr. Bhargava. This course of action would best ensure that any GM crop approved for field testing or commercial use would not harm India's citizens, livestock, or environment. While it would take time to properly establish the necessary testing procedures and protocols, we believe that a moratorium to accomplish this would be time well spent.

## 5. Cotton seed farmers seek compensation

<http://www.thehindu.com/2009/01/09/stories/2009010955690600.htm>

Rains during November last year have caused extensive damages to Bt cotton seed production in several parts of the State.

According to a release from Tamil Nadu Seed Association, the Bt cotton seed production has been affected in Villupuram, Cuddalore and Salem Districts.

A team of scientists from the Tamil Nadu Agricultural University visited the affected fields and assessed the seed yield losses, according to M. Ramasami, President of the association. The crops were affected by magnesium deficiency. Water lodging resulted in unopened bolls, boll rot and boll shedding and the yield loss was roughly 75 per cent.

Nearly 12,000 farmers in these districts were hit by crop loss and the value of the cotton lost was estimated to be Rs. 51 crore, he said. A memorandum seeking Rs. 40,000 per acre as compensation for each affected farmer has been submitted to the Government.

## *GE & Health implications*

### 6. A critical look at Golden Rice

[http://www.foodwatch.de/english/golden\\_rice/index\\_ger.html](http://www.foodwatch.de/english/golden_rice/index_ger.html)

Golden Rice, the genetically engineered rice was offered as The Most important contribution by the biotech industry to the poor and the malnourished. As the article below by Foodwatch underlines, the

project has not even come up with the technical details of why this rice is important for the poor. Our every day food in South Asia including the uncultivated foods that the poor get from their non chemical agriculture is ten times more Vitamin A rich in comparison to the GE rice. And this is constantly available, fresh and at no cost at all.

The first generation of Golden Rice was developed nearly 10 years ago. Golden Rice is genetically modified so that it generates carotenoids which the human body synthesizes into vitamin A. This variety of rice is supposed to combat vitamin A deficiency in developing countries. Current research has shown that most questions about the quality and safety of this product are unanswered even today.

Even trivial technical data on how much carotenoid content remains in the rice after it has been stored and cooked have not been published. Although publication of this data has been expected for several years, no findings have been made available to the public. However, such findings are highly relevant for assessing the technical quality of genetically modified rice. For example, carotenoids can degrade relatively quickly during storage. Even if asked directly, the project managers refuse to reveal more details. This lack of transparency calls the entire authenticity of the project into question.

Although the project has not published even the most simple and basic data, it claims again and again that delays are due to consumer rejection in Europe and the influence of environmental organizations, whose exaggerated criticism has led to delays in product development and the setting of standards for risk assessment that are too high. However, this claim is designed to deflect attention from the many open questions that the project managers, the Humanitarian Board, still haven't been able to answer so far.

But it is particularly in the issue of risk assessment that the dubiety of the project's position becomes apparent. The project claims to be committed to upholding the highest safety standards, but at the same time is calling for a broad loosening of standards in the approval process for cost reasons. In addition, possible risks have been largely ignored. Issues such as out-crossing and the creation of new health risks are hardly taken on by the project managers and to date no test results have been published. However, there are strong indications that genetically modified rice can spread uncontrolled when it crosses with wild

strains of rice. Additionally, unexpected effects that are health-threatening have already been expressed in animals that have consumed genetically modified plants.

Although basic technical data is lacking and findings on the risk assessment of Golden Rice have not been made available to the public to date, the project managers are now planning to test the rice on schoolchildren in developing and threshold countries. Testing that was supposed to take place this summer was not called off until the Chinese authorities intervened.

The project presents itself altogether as a campaign to see through the acceptance of genetically modified plants, and it is wrapped in a cloak of humanitarianism to be publicly effective. The project is supposed to lower the standards for the risk assessment of genetically modified (GM) seed as well as put moral pressure on the critics of GM seed and break consumer rejection.

But in the meantime, the expectations raised by the project's managers themselves seem to have put them under pressure. The hastily planned tests on Chinese schoolchildren are no small indication of this. With this background, it is now high time to fundamentally look at and evaluate the Golden Rice project again. In view of the availability of other successful measures to combat vitamin A deficiency, many observers believe the potential effectiveness of genetically modified rice to be quite low.

## 7. Doctors join fray against GE Foods!

Eminent medical experts from across the country from a network called "Doctors for Food & Bio-Safety" called for a moratorium on all open air trials of GM crops in India. These experts, after perusing through the first independent analysis of Mahyco's biosafety data of Bt Brinjal by France's CRIIGEN, sent a resolution to the GEAC to this effect.

They pointed out that the French analysis of Mahyco's data adequately addresses and questions the validity of the so called bio-safety

data of Bt Brinjal in terms of: validity of biological/ animal experiments carried out by the applicant.

The doctors pointed out that the obsolete technology used in Bt Brinjal- incorporating antibiotic resistant markers- is likely to have disastrous implications for developing countries like India which are struggling with communicable diseases burden. This may jeopardize National Health Programmes for control of Tuberculosis (already struggling with MDR/ XDR tuberculosis), diarrhoeal diseases, sexually transmitted diseases etc.

They further observed that the decreased calorific content (15% lesser) in Bt Brinjal and altered consumption in different studies will mean impact on nutrition which an already malnourished public could avoid.

The changes in bilirubin indicate effect on hepatic functions. Study with lactating cows showed increased milk production indicating hormonal effects. If this is so, what are the implications on pregnancy, foetal health, reproductive functions etc. There is an obvious requirement for longer term studies especially

on reproductive health. Absence of these aspects in Mahyco's dossiers is not acceptable, the doctors said.

In Ayurveda and Siddha, herbs are used according to the taste (Rasa), medicinal property of phyto-chemical (Guna), strength (Veerya), the end taste after digestion (Vipaaka Rasa) and synergistic medicinal property (Prabhaava). Any intrusion in the basic component of a drug may cause major change in the constitution of the drug, leading to unknown impacts. The difference in solamargine and solasonine is the clear evidence of loss of synergy and imbalance in the phytomolecules, which may largely affect the therapeutic and nutritive benefit of brinjal. There is no study as part of the impact assessment done to study related aspects, they pointed out.

The doctors endorsed Dr Pushpa Bhargava's comments on the regulators compromising objectivity by basing their approval processes based on data submitted by the applicant itself and emphasized the need for mandatory independent research by mandatory elaborate protocols including for long term research.

## *GE issues around the World*

### **8. Biotech crops in food and feed prompt warning on monitoring**

By PHILIP BRASHER

Des Moines Register, December 6 2008

<http://www.desmoinesregister.com/article/20081206/BUSINESS01/812060321/1029/BUSINESS>

Washington, D.C. Federal agencies should improve their monitoring of genetically engineered crops to ensure they don't harm the environment or human health, government investigators say.

In at least six incidents since 2000, unapproved versions of biotech crops got into the food and feed supply, and there are likely to be more because it is so easy for plant genetic material to spread, according to a report released Friday by the Government Accountability Office.

The report urged the three federal agencies in charge of regulating biotech crops - the Agriculture Department, Food and Drug Administration and Environmental Protection Agency - to work more closely together to evaluate and monitor crops, including those already on the market. A concern scientists have is that the use of herbicide-tolerant crops could lead to the spread of weedkiller-resistant weeds.

The report also called on the FDA to post on its Web site safety evaluations of biotech crops. FDA officials said that they would try to do that but that other concerns have taken a higher priority. The chairman of the Senate Agriculture Committee, Iowa Democrat Tom Harkin, plans to get commitments from the incoming Obama administration "to pay closer attention to these issues," said Kate Cyru, a spokeswoman for the panel.

Harkin “will also keep the pressure on the responsible people in the agencies to improve coordination,” she said.

Both the USDA and the EPA are responsible for monitoring research plots. But the USDA doesn't have the resources to inspect all sites, and neither the EPA nor the states it has delegated the job to have made such inspections a priority, the investigators said. Most contamination incidents have been reported by the crop developers.

## 9. Safety comes first; Jill Evans

<http://www.walesonline.co.uk/countryside-farming-news/country-farming-columnists/2008/12/16/gm-feed-is-not-the-answer-for-our-animals-91466-22483001/>

NOTE: Jill Evans MEP represents Wales in the European Parliament where she is a member of the Environment Committee. She is also the Vice President of Plaid Cymru.

THE high cost of animal feed is a very serious concern for farmers and it has caused the issue of genetically modified feed to be raised again.

In the current financial situation, it is not surprising farmers, like all of us, are looking at how to cut costs. But turning to GM feed is not the answer. Neither is it cheaper.

And there is now evidence that genetically modified animal feed may well lead to higher costs in the long term.

Studies in Germany and the USA by farmers themselves have shown that animals raised on non-GM feed produce better quality and a higher quantity of meat than animals fed on genetically modified feed. The same studies reported health problems, such as stomach ulcers, found in the animals fed on GM feed.

So, far from cutting costs for farmers, the widespread use of GM feed could over time have the opposite effect. This would also push up prices for the consumer.

Further detailed study is needed. That's why I would like to see a professional, controlled scientific study being done in Wales into the effects of using genetically modified animal feed.

Last week, EU government ministers meeting in Brussels agreed on much stricter rules for assessing the risks of GMOs to health and the environment.

There will be more independent scientists and other groups involved in the process and all information and studies done by the companies themselves should be made public. All the potential risks will be looked at. Regions and local communities will now have the right to declare GM-free zones, as Wales has done.

This is good news for everyone concerned because it will give us more confidence that safety comes first. The promise of more research is also important so that farmers and consumers alike know all the facts about GM feed.

## 10. GM cotton under investigation in Queensland

Reports of medium to large *Helicoverpa* caterpillar survivors in Bollgard II cotton crops in the Emerald Irrigation Area are being investigated by Queensland's Department of Primary Industries and Fisheries and the Cotton CRC. DPI&F/Cotton CRC cotton extension officer, Susan Maas, said surviving larvae had been collected and tested but there was no evidence of any Bt resistance.

“We are continuing our quest for answers after up to 1.5 medium to large larvae per square metre were reported in December and all affected fields were at the mid- to late-flowering stage of crop growth,” she said in a statement from the DPI&F.

The DPI&F says that of the 85 *Helicoverpa* larvae collected from the Bollgard II plants at Emerald, 31 were *Helicoverpa punctigera* and 54 were *Helicoverpa armigera* but there is no evidence to suggest that either species may be differentially surviving.

“Moths from a sample of *Helicoverpa* eggs collected last month have been submitted for second generation Bt resistance,” Ms Maas said.

“While scientists have identified moths carrying the resistance gene, they have found no evidence of resistance in the field.”

Ms Maas said it was possible to test plants for the presence or absence of the Bt genes.

“One theory is that at the peak flowering stage, there could be a dip in expression of the plant gene conferring the toxin,” she said.

The threshold for Bollgard II cotton is the same as for Ingard cotton, and equates to two larvae greater than 2mm/metre in two consecutive checks or 1 larvae greater than 8mm/m. Further research on the thresholds for Bt susceptible *Helicoverpa* survivors in Bollgard II was being undertaken this season by Cotton CRC scientist Boaqain Lu.

Throughout the flowering period at St George this season, CSIRO researcher Sharon Downs is monitoring levels of expression for the Bt genes.

Ms Maas said the 2008-09 Central Highlands cotton planting of 12,000 hectares was generally looking good.

“Unfortunately, there is likely to be significant boll damage on the Bollgard II crops impacted by the *Helicoverpa* survivors as the plants were at the flowering cut out stage with no compensatory boll set,” Ms Maas said.

**This monthly bulletin is brought out by South Against Genetic Engineering (SAGE), a coalition of civil society activists, farmers, scientists, academicians, and consumer groups of four Southern States of India, viz., Andhra Pradesh, Karnataka, Tamil Nadu and Maharashtra. SAGE has been waging a concerted battle against genetic engineering through a series of activities that involve public protests, media actions, seminars, consultations and publication of a series of educational materials.**