Testimony in Opposition of HB 1770 before the
PENNSYLVANIA HOUSE COMMITTEE ON AGRICULTURE AND RURAL AFFAIRS
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Thank you for the opportunity to testify before you in opposition to HB1770, a bill that would mandate unfounded and discriminatory labels for the safest and most sustainable foods modern agriculture has produced.

You have heard a number of arguments to justify the legislation you are being asked to adopt. It is claimed these arguments are based in science and experience. They are not. The arguments you have heard in support of this legislation are either false, or fatally flawed. They have been put forward in denial of the fact that the objectives this legislation claims to advance are already a reality. And they have been advanced through an indefensible denial of the robust worldwide consensus on the safety of crops and foods improved through biotechnology.

You have been told this legislation is necessary to provide consumers with the ability to choose foods derived from crop varieties other than those improved through biotechnology. But consumers already have multiple means for exercising such freedom of choice: they can buy food labeled USDA organic, because that marketing program prohibits the intentional use of crops improved through biotechnology in organic production. Or they can buy food certified through the NonGMO project, and other private certifying schemes. They can even download a smartphone app with which they can scan a product's barcode in the grocery store aisle and determine whether or not it is a genetically improved food (GIF). Consumers' freedom of choice is already today a concrete reality made available through multiple independent means.

You have been told that consumers have a "right to know" what is in their food, and that labels are required to inform them. But existing FDA regulations already require that any novel ingredient that may affect the health, safety, or nutritional value of a food MUST be identified on the label. Existing federal law requires all food placed on the market to be safe, with criminal penalties for violators. The claim also ignores the fact that consumers have a right to labels that are accurate, informative, and not misleading. These are legal mandates already in place that would ensure this bill would fall to a legal challenge if it were adopted by Pennsylvania.

You have been told that the processes used to produce GIFs are fundamentally different from those used to develop other foods, and that insufficient studies have been done to allow us to be confident of their safety. Such allegations are false. Plant breeders and credible scientists around the world generally agree that the techniques used to produce transgenic plants,

derived directly from natural phenomena, are but an extension of traditional plant breeding, and that the potential hazards are the same (see http://www.amazon.com/Plants-Genes-Biotechnology-Maarten-Chrispeels/dp/0763715867 and http://www.amazon.com/Mendel-Kitchen-Scientists-Genetically-Modified/dp/030909738X). The U.S. National Academy of Sciences explicitly rejected this claim in its very first publication in this area "Introduction of Recombinant DNA-Engineered Organisms into the Environment – Key Issues (National Academy Press, Washington, D.C., 1987) and has upheld this view in every subsequent study. The Government of Canada in its regulatory structure has specifically repudiated the assertion that plants improved through recombinant techniques are necessarily and intrinsically different than those produced through conventional breeding (see http://www.inspection.gc.ca/plants/plants-with-novel-traits/general-public/novelty/eng/1338181110010/1338181243773). The government of Australia has done likewise (http://www.ogtr.gov.au//internet/ogtr/publishing.nsf/Content/gmorec-index-1) and the vast preponderance of scientists around the world concur in this assessment.

Indeed, the advent of modern genomics has shown us that genes are shared and transferred widely not only among different species, but between genera, families, and even phyla and kingdoms. Recent discoveries have confirmed that gene exchange was the essential element in the survival of ferns when the explosive radiation of flowering plants radically changed their environment. This natural gene transfer is just like that used by modern genetic engineers to create plants improved through biotechnology. These natural processes of gene exchange are so widespread among plants, animals, and microbes on planet Earth that the single most common gene in humans is one that came from a virus; as did half of the other genes in our genomes; and humans share 98% of our genes with chimpanzees, 92% with mice, 44% with fruit flies, 26% with yeast, and 18% with dandelions. Those who claim crops improved through biotechnology are "unnatural" could not be more profoundly refuted than by what we find throughout nature.

You have been told there are unresolved safety concerns about GIFS, and that they have been insufficiently studied. These claims are false, robustly contradicted by the scientific literature, worldwide scientific opinion, and vast experience. Indeed, the global consensus on the safety of these GIFs is stronger than that behind climate change.

You have been told that there is a dearth of independent research evaluating the safety of crops and foods produced through biotechnology, and that companies hide behind intellectual property claims to prevent such research from being done. These claims are false. The American Seed Trade Association has a policy in place to ensure research access to transgenic seeds, and Monsanto has made public a similar commitment. The public sector scientists who

made the 2009 complaint cited above, in fact, had the access they sought at the time they made the unfounded complaint.

Furthermore, there has been an abundance of independent research over the years: see Nicolia et al., 2013, the GENERA database at BioFortified.org, and a massive compilation underwritten by the EU involving more than 130 research projects, covering a period of more than 25 years, involving more than 500 independent research groups, concluding "that biotechnology, and in particular GMOs, are not per se more risky than e.g. conventional plant breeding technologies…"

Some representative voices include the following:

"Indeed, the use of more precise technology and the greater regulatory scrutiny probably make them even safer than conventional plants and foods; and if there are unforeseen environmental effects - none have appeared as yet - these should be rapidly detected by our monitoring requirements. On the other hand, the benefits of these plants and products for human health and the environment become increasingly clear."

> --European Commission, Press Release of 8 October 2001, announcing the release of 15 year study incl 81 projects/70M euros, 400 teams (http://ec.europa.eu/research/fp5/eag-gmo.html and http://ec.europa.eu/research/fp5/pdf/eag-gmo.pdf)

"The main conclusion to be drawn from the efforts of more than 130 research projects, covering a period of more than 25 years of research, and involving more than 500 independent research groups, is that biotechnology, and in particular GMOs, are not per se more risky than e.g. conventional plant breeding technologies…"

> http://ec.europa.eu/research/biosociety/pdf/a_decade_of_eu-funded_gmo_research.pdf

"…because the technique is so sophisticated, in many ways it is probably safer for you to eat GM products - plants that have been generated through GM - than normal plant foods, if you have any sort of reaction to food, because you can snip out the proteins that cause the negative reaction to certain parts of the population."

> --Sir David King, Chief Science Advisor, UK. *The Guardian Unlimited*, 27 November 2007 http://www.guardian.co.uk/gmdebate/Story/0,,2217712,00.html

"In contrast to adverse health effects that have been associated with some traditional food production methods, similar serious health effects have not been identified as a result of genetic engineering techniques used in food production. This may be because developers of

bioengineered organisms perform extensive compositional analyses to determine that each phenotype is desirable and to ensure that unintended changes have not occurred in key components of food." (p. x).

> --National Academy of Sciences, 2004. *Safety of Genetically Engineered Foods: Approaches to Assessing Unintended Health Effects*. National Research Council, Washington DC. 256pp. ISBN 0-309-53194-2. http://www.nap.edu/catalog/10977.html.

"…in consuming food derived from GM plants approved in the EU and in the USA, the risk is in no way higher than in the consumption of food from conventionally grown plants. On the contrary, in some cases food from GM plants appears to be superior in respect to health."

> --- Union of the German Academies of Science and Humanities. Commission Green Biotechnology, InterAcademy Panel Initiative on Genetically Modified Organisms. Group of the International Workshop Berlin 2006. "Are there health hazards for the consumer from eating genetically modified food?" at http://www.akademienunion.de/_files/memorandum_gentechnik/GMGeneFood.pdf

"If we look at evidence from [more than] 15 years of growing and consuming GMO foods globally, then there is no substantiated case of any adverse impact on human health, animal health or environmental health, so that's pretty robust evidence, and I would be confident in saying that there is no more risk in eating GMO food than eating conventionally farmed food."

> Anne Glover, Chief Scientific Adviser, European Commission, 2012 http://www.isaaa.org/kc/cropbiotechupdate/article/default.asp?ID=9966

"GMO products have been tested to a particularly high extent and are subjected to rigid legislation control."

> --Commission on Green Biotechnology, Union of the German Academies of Science & Humanities, at www.abic2004.org/download/reportongmohazards.pdf

"Food from GM Maize is more healthy than from conventionally grown maize… samples with the highest fumonisin concentrations are found in products labeled 'organic.' "

> --Commission on Green Biotechnology, Union of the German Academies of Science & Humanities, at www.abic2004.org/download/reportongmohazards.pdf

"…the dangers of unintentional DNA mutation are much higher in the process of conventional plant breeding… than in the generation of GM plants. Furthermore, GM products are subject to rigid testing with livestock and rats before approval."

> --Commission on Green Biotechnology, Union of the German Academies of Science & Humanities, at www.abic2004.org/download/reportongmohazards.pdf

"Whereas for conventional varieties there is no legal requirement for allergy tests of their products, for GMO products, very strict allergy tests are mandatory… For this reason, the risk of GM plants causing allergies can be regarded as substantially lower than that of products from conventional breeding."

> --Commission on Green Biotechnology, Union of the German Academies of Science & Humanities, at www.abic2004.org/download/reportongmohazards.pdf

As for claims of "unexpected effects" – to date there are none reported, and

> "According to present scientific knowledge, it is most unlikely that the consumption of …transgenic DNA from approved GMO food harbors any recognizable health risk."
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> --Commission on Green Biotechnology, Union of the German Academies of Science & Humanities, at www.abic2004.org/download/reportongmohazards.pdf

The most recent scientific publication in this crowded catalogue examined the effects on livestock of eating feed derived through biotech improved crops over the course of 29 years through more than a trillion meals. This unprecedented observational study not only failed to find any negative impacts, it found that over this period the average health of livestock animals improved (see also http://www.geneticliteracyproject.org/2014/09/30/podcast-uc-davis-van-eenennaam-on-health-impact-of-gmo-crops-on-humans-and-animals/).

Despite the overwhelming consensus documented above, you have been told that this consensus does not exist, and that its absence is demonstrated by "a petition signed by over three hundred scientists." This false assertion presents no new arguments or data, and ignores the staggering mass of studies already cited demonstrating the safety of these foods, and their unblemished safety record. Instead, it recycles the usual stable of discredited claims such as those of Séralini et al. (for additional critical analyses see www.AcademicsReview.org). It is worthwhile therefore to note that the group behind this press release is comprised of individuals with a long history of opposition to agricultural biotechnology that relies on ignoring or distorting reality. Indeed, the group is merely one element in a campaign that has propagated claims that the biology is unclear despite the fact that the science is far more settled on GM foods than it is on climate change. One blogpost has dismissed them with these words:

> "A group of [300] "scientists have signed a letter saying "GMO is bad…" They did so in response to a roundup of more than 2,000 actual studies, almost all done over the last

decade, that have failed to produce any evidence that GMO is anything other than plain old food, and some of the safest food we consume.

“Forget who they are (they are largely nobodies, often from unassociated fields, and all with past anti-GMO agenda) but… [300]? …Even 9-11 truthers were able to get more than 2000 architects and engineers to sign their loony position. You don’t want to know how many nut-jobs still believe they can challenge the scientific consensus on Climate Change and Evolution based on wishful thinking and petition.

“Scientific consensus is not done by opinion poll, nor is it done by petition (though if it were these “dissents” would all fail due to the hasty generalisation fallacy). The scientific consensus is a consensus of data, is born out by peer reviewed study and published work. Thus a meta analysis of a topic is a perfect way of determining consensus. The consensus, by the way has stood for decades. GMO is not only as safe as any other food, it is provably so (most other food never having been tested) and in fact it is simply food, not magic.”

The Australian Agricultural Biotechnology Council reaffirmed this judgment, and further showed that European agriculturalists are keen to adopt the technology, and increasingly dissatisfied with the innovation stifling and scientifically indefensible European regulatory regime.

“ABC chair Julian Little said the statement had been put together by an anti-GM group and he insisted that contrary to the claims, there was an “overwhelming weight of evidence” that points to the safety of GM crops. Dr Little said: “Biotech crops are among the most extensively tested foods in the history of food safety.

“In 2010, the European Commission concluded on the basis of 130 research projects involving 500 independent groups over 25 years that ‘there is, as of today, no scientific evidence associating GMOs with higher risks for the environment or for food and feed safety than conventional plants and organisms’.

“This year, the representative body of the national science academies of the EU Member states agreed, saying that ‘there is no validated evidence that GM crops have greater adverse impact on health and the environment’ than any other crops produced using plant breeding techniques.”

“Dr Little added that an estimated three trillion meals containing GM ingredients have been eaten around the world over the past 13 years “without a single substantiated case of ill-health”.

"The World Health Organisation (WHO) has said that: 'No effects on human health have been shown as a result of the consumption of such foods by the general population in the countries where they have been approved'."

"Dr Little said the WHO's statement was backed up by government regulators around the world, including the Food Standards Agency (FSA) in the UK.

"The Agricultural Biotechnology Council (ABC) of Australia said the ENSSER's statement "flies in the face of a consensus of an overwhelming majority of scientists".

"Every legitimate scientific organisation that has examined the evidence has arrived at the conclusion that GM crops and the foods they produce pose no risk to human health or the environment beyond those posed by their conventional counterparts," added ABC Australia.

"Meanwhile, EU farming groups, including the NFU, NFU Cymru, NFU Scotland and the Ulster Farmers' Union (UFU), have added their name to a different letter, which voices "deep concern" about the effects of GM policies and regulations in the EU.

"In an open letter sent to the European Commission on behalf of the French Association for Plant Biotechnology (AFBV)[and 13 other groups], they called for better for access to the best crops, including GM varieties, so that agriculture in Europe can be more sustainable and less reliant on imported products. The letter states that the lack of options for GM technology available to farmers in Europe can equate to significant loss of income and a missed opportunity.

"Helen Ferrier, NFU chief science and regulatory affairs adviser, said: "The heads of EU institutions have a great deal of power to sort out this mess and ensure the EU doesn't become uncompetitive in both agricultural production and scientific research.

"This letter demonstrates the strength of feeling in the agriculture sector across Europe. Swift action must be taken."

Ignoring all this, proponents of the legislation before you have claimed nevertheless that there are studies raising legitimate questions about the safety of GIFs. One frequently cited example is that of a long term feeding study conducted by a well-known organic advocate and biotech opponent from France, who dissembled about his financial conflicts of interest that lay behind his claims. Biotech opponents claim this study has been wrongly criticized, but the facts repudiate this claim. The alleged "attacks in the media" aimed at the Séralini "study" were the direct consequence of its remarkably poor design, execution, and analysis (see http://parrottlab.uga.edu/parrottlab/Publications/Arjo-et-al-TRAG-2013.pdf and

http://www.vegangmo.com/?p=711) and the unprecedented media manipulations imposed on journalists prior to its release, in an attempt to compel favorable media coverage. The criticisms of the study and the way it was released were spontaneous and widespread among credible scientists and journalists. That is how peer review works. The criticisms were, in fact, more severe than is commonly seen, but this was entirely due to the extraordinary shortcomings in design, execution, and interpretation of the experiment, and the unprecedented departure from the norms of publication designed to produce slanted media coverage.

Some have claimed that "*the French Food Safety Agency and the European Food Safety Authority have functionally agreed with Doctor Séralini."* This claim is flatly contradicted by the historical record. Regulatory bodies in Europe and around the world uniformly rejected the study, and have made the following statements:

> European Food Safety Authority: "EFSA is presently unable to regard the authors' conclusions as scientifically sound."

Six French National Academies of Science (Agriculture, Medicine, Pharmacology, Sciences, Technology, and Veterinary Medicine) condemned the study, stating "Given the numerous gaps in methods and interpretation, the data presented in this article cannot challenge previous studies which have concluded that NK603 corn is harmless from the health point of view, as are, more generally, genetically modified plants that have been authorised for consumption by animals and humans." They further dismissed the study as "a scientific non event" that served only "to spread fear among the public that is not based on any firm conclusion." These findings were echoed by the French Higher Biotechnologies Council (HCB) and the National Agency for Food Safety (ANSES).

Federal Institute for Risk Assessment: (BfR, Germany): "The authors' main statements are not sufficiently corroborated by experimental evidence, due to deficiencies in the study design and in the presentation and interpretation of the study results."

The Australia New Zealand Food Safety Authority stated "On the basis of the many scientific deficiencies identified in the study, FSANZ does not accept the conclusions made by the authors and has therefore found no justification to reconsider the safety of NK603 corn, originally approved in 2002." Canada concluded "The overwhelming body of scientific evidence continues to support the safety of NK603, genetically modified food and feed products in general, and glyphosate containing herbicides."

Indeed, the condemnation of the Séralini study from the international scientific and regulatory community was so deep, broad, and spontaneous, that even Marion Nestle, NYU Professor of Nutrition and food safety advocate long known for her skepticism of agricultural biotechnology, agreed "It's a really bad study." One blogger distilled the consensus, and coined the "Séralini

Rule": "If you favorably cite the 2012 Séralini rats fed on Roundup ready maize study, you just lost the argument."

In the end, the evidence of the study's inadequacies was so overwhelming that the journal in which it was published retracted it, providing this explanation from the editor and eliciting much commentary in the blogosphere. Séralini apologists have made numerous false and misleading claims about the retraction, but these have failed to persuade.

It must be noted that in citing the robustly discredited Séralini study opponents illustrate a pattern they have followed throughout their public representations. Repeatedly they cite one or another from a small handful of studies published by well-known campaigners against biotechnology. In so doing they ignore the devastating criticisms they have received from the scientific community (peer review) as well as the vast body of accepted scientific literature contradicting their unsustainable claims. This pattern of advocacy is deemed to be scientific misconduct under widely accepted standards standards (see, e.g. http://www.ease.org.uk/sites/default/files/ease_guidelines-june2013-ethics.pdf [1]).

Some have claimed that crops improved through biotechnology have resulted in an increase in the use of pesticides. This claim is, at least, mischievous, if not false, and depends on a number of intellectual gymnastics:

- It wrongly conflates "herbicides" with "pesticides" in a way that is flatly misleading. Pesticides are commonly understood to kill pests, usually insects. Herbicides are used to control weeds, which are certainly pestiferous, but agriculturalists use the different words for very good reasons;
- The argument is based on the misleading measurement "pounds on the ground" when that has long since been supplanted in the weed control literature by the "Environmental Impact Quotient" developed at Cornell University. The EIQ gives a vastly more accurate and useful way to evaluate comparative environmental impacts;
- The argument measures absolute application rates, instead of the far more logical rates per unit yield, which actually show a decline in herbicide usage;
- Such claims ignore the devastating critiques that have been leveled specifically at his claims in at least 17 peer reviewed papers in the literature and several accessible blogposts;
- Such claims are, in fact, directly contradicted by USDA's interpretations of their own data.

[1] The relevant language: "None of our data presented in this MS has been fabricated or distorted, and no valid data have been excluded…Results of this study have been interpreted objectively. Any findings that run contrary to our point of view are discussed in the MS" At http://www.ease.org.uk/sites/default/files/ease_guidelines-june2013-ethics.pdf.

In addition to these spurious claims that seem designed deliberately to mislead consumers about the environmental safety of foods derived from crops improved through biotechnology, we are routinely bombarded with a host of claims about alleged dangers to humans from their consumption. In an arena marked by the incredible, it is hard to find claims that are farther "out there", divorced from reality, than those we have heard today from Dr. Seneff, who seems to have some difficulty identifying any evils that cannot be laid at the feet of glyphosate.

The facts tell quite a different story. One can hardly do better than to consult a summary of the data on the safety of glyphosate compiled by independent scientists at BioFortified last year, with a useful primer also available here. Bottom line – glyphosate is less toxic than table salt, baking soda, chocolate, or caffeine. Yet some would have us believe it is responsible for nearly every ailment imaginable, and these claims find a ready echo chamber in a credulous and scientifically ill-trained press.

The claims made by Dr. Seneff are so outlandish they cannot be taken seriously. Let me draw your attention to a few relevant points:

- The paper in which the claims were made was published in an obscure, pay-for-play journal that is not even indexed in the standard catalogue of biomedical journals, PubMed;
- The journal is dedicated to subject matter ("Entropy") far afield from the topic of the paper;
- No credible mechanism is presented which could conceivably explain the wide range of disparate claims of harm;
- The argument is not based on any demonstration of causality, but on dubious inferences of correlation.

There is a reason scientists are skeptical about correlational analyses: more often than not, they simply don't hold up. Let me give you some examples of spurious correlations that are every bit as valid as those advanced by Dr. Seneff's paper:

- Per capita consumption of cheese (US) correlates with number of people who died by becoming tangled in their bedsheets;
- Number of people who died by becoming tangled in their bedsheets correlates with total revenue generated by skiing facilities (US);
- Per capita consumption of mozzarella cheese (US) correlates with civil engineering doctorates awarded (US);
- Per capita consumption of sour cream (US) correlates with motorcycle riders killed in noncollision transport accident;

- Honey producing bee colonies (US) inversely correlates with juvenile arrests for possession of marijuana (US).

I trust the point is made.

At the end of the day, it is important to remember this: unlike conventional or organic foods, bioengineered foods are routinely screened in the United States and other industrial nations (per regulations rooted in the OECD guidelines) to ensure they have no toxins or known allergens. The emergence of previously unknown, novel allergens is so vanishingly rare as not to constitute even a remotely legitimate concern[2]. No such hazards have ever been reported from bioengineered foods in the scientific literature, nor any credible hypothesis through which such hazards might possibly arise.

The claim, therefore, that labeling is needed to inform consumers of potential hazards is not only unfounded, but the opposite of the truth: the only safety differential ever reported between bioengineered and other foods shows the bioengineered foods to be safer.

But if protecting human health or the environment is not the objective for these anti-technology opponents, what is? To be clear the real objective behind the campaign for legislation like this being advanced in a number of legislatures is to falsely stigmatise foods derived from crops improved through biotechnology as a means of driving them from the market. Proponents of mandatory labels have on occasion been honest in acknowledging these objectives.

[2] Substances featured in reports of "new" allergens fall overwhelmingly into the well-established categories of foods known to be allergenic, e.g. http://www.sciencedirect.com/science/article/pii/S0091674995700358 and http://www.karger.com/Article/FullText/113512.

And most recently "mandatory labeling and bans, or GMO-free zones, should be seen as complementary, rather than contradictory."

It takes very little digging to uncover the motivations behind this organized push for mandatory labeling: it is a fear-based marketing campaign aimed at expanding the market share for organic foods. And this is because these advocates simply distrust technological innovation *per se*, preferring Americans to live in an idyllic, simpler world that is "back to nature" but totally imaginary. The reality is that a world without GMOs will be a world with higher food prices for working American families. Perhaps labeling advocates can afford to pay higher prices for organic foods at upscale stores like Whole Foods – which is and should be their right – but using state legislatures to force all Americans to follow this path (e.g., to spend much more for food) is elitist at its core.

Consumers have a right not only to not be deceived and misled. They also have a right not to be forced to pay more for food so they have more money for health care, education and other needs. Compulsory labeling of “GMOs” would deprive them of these rights.

A host of additional claims have been made to advance the mistaken notion that this legislation would meet a need. The facts contradict these claims at each and every turn. This legislation would add nothing to the consumer choice and safety already provided under existing law and policy, and should be rejected.