Open Letter to Two Eminent Plant Physiologists who claim that Roundup only affects plants, fungi and bacteria

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You claimed, together with Monsanto and global pesticide regulators, that Roundup only affects plants, fungi and bacteria because they had the shikimate pathway which is absent in humans and animals. But humans and animals have trillions of bacteria in their gut: the gut microbiome. **The gut microbiome; the collective genome of organisms inhabiting our body.**

Roundup (and other biocides) causes gross obesity and neuropsychiatric disorders

Humans and animals can only absorb nutrients via trillions of bacteria in the gut, the gut microbiome

The gut microbiome is the term for the collective genome of organisms inhabiting our bodies. Glyphosate disrupts the shikimate pathway within these gut bacteria, without which we cannot survive. Glyphosate is a strong chelator of essential minerals, such as cobalt, zinc, manganese, calcium, molybdenum and sulphate. In addition, it kills off beneficial gut bacteria and allows toxic bacteria such as *Clostridium difficile* to flourish. Two key problems caused by glyphosate residues in our diet are nutritional deficiencies, especially minerals and essential amino-acids, and systemic toxicity.[1]

Obesity is associated with low bacterial richness in the gut

Chatelier, E.L. *et al.* Richness of human gut microbiome correlates with metabolic markers *Nature* 29 August 2013; 500: 541-550.[2]

"*We are facing a global metabolic health crisis provoked by an obesity epidemic*." In a multi-author study of obese and non-obese individuals, those with "*low bacterial richness in the gut (23% of the population) are characterized by more marked overall adiposity, insulin resistance and dyslipidaemia and a more pronounced inflammatory phenotype when compared with those with high bacterial richness. Low richness of gut microbiota has been reported in patients with inflammatory bowel disorder*. *Also, notable diversity differences were observed between the urban US population and rural populations from two developing countries*."

The microbiome of uncontacted Amerindians has the highest diversity of bacteria[3]

"We characterize the fecal, oral, and skin bacterial microbiome and resistome of members of an isolated Yanomami Amerindian village with no documented previous contact with Western people. These Yanomami harbor a microbiome with the highest diversity of bacteria and genetic functions ever reported in a human group."

Regulation of prefrontal cortex myelination by the microbiota[4]

Extracts from Abstract *The prefrontal cortex (PFC) is a key region implicated in a range of neuropsychiatric disorders such as depression, schizophrenia and autism. In parallel, the role of the gut microbiota in contributing to these disorders is emerging. Germ-free (GF) animals, microbiota-deficient throughout life, have been instrumental in elucidating the role of the microbiota in many aspects of physiology, especially the role of the microbiota in anxiety-related behaviours, impaired social cognition and stress responsivity. Here we aim to further elucidate the mechanisms of the microbial influence by investigating changes in the homeostatic regulation of neuronal transcription of GF mice within the PFC using a genome-wide transcriptome profiling approach. Our results reveal*

[1] https://www.mdpi.com/1099-4300/15/4/1416
[2] http://www.nature.com/nature/journal/v500/n7464/abs/nature12506.html
[3] http://advances.sciencemag.org/content/1/3/e1500183.short
[4] https://www.nature.com/articles/tp201642

a marked, concerted upregulation of genes linked to myelination and myelin plasticity. This coincided with upregulation of neural activity-induced pathways, potentially driving myelin plasticity. Subsequent investigation at the ultrastructural level demonstrated the presence of hypermyelinated axons within the PFC of GF mice. Notably, these changes in myelin and activity-related gene expression could be reversed by colonization with a conventional microbiota following weaning. In summary, we believe we demonstrate for the first time that the microbiome is necessary for appropriate and dynamic regulation of myelin-related genes with clear implications for cortical myelination at an ultrastructural level. The microbiota is therefore a potential therapeutic target for psychiatric disorders involving dynamic myelination in the PFC. They postulate the microbiome has relevance for both gastrointestinal and brain disorders, including autism spectrum disorders, Parkinson's disease and even demyelinating disorders of the central nervous system.

Department of Health's School Fruit and Vegetable Scheme (SFVS) has residues of 123 different pesticides analysed by PAN-UK: DOH said 'pesticides are not the concern of the DOH'

Pesticide Action Network UK's analysis of the last 12 years of residue data published by the Expert Committee on Pesticide Residues in Food (PRiF) shows that there are unacceptable levels of pesticides present in the food provided through the Department of Health's School Fruit and Vegetable Scheme (SFVS).[5] **Residues of 123 different pesticides were found**, some of which are linked to serious health problems such as cancer and disruption of the hormone system.

In many cases, multiple residues were found on the produce. This is another area of serious concern as the scientific community has little understanding about the complex interaction of different chemicals in what is termed the 'cocktail' effect. We have also found that the levels of residues contained on SFVS produce are higher than those in produce tested under the national residue testing scheme (mainstream produce found on supermarket shelves). When PAN-UK sent its 2017 findings to the Department of Health, it was told that **pesticides are not the concern of the DoH**.

Many children become obese when they go to school because they are being poisoned by the Department of Health's School Fruit and Vegetable Scheme (SFVS)

Thousands of UK children, mainly in deprived city areas, are already classed as severely obese when they leave primary school. [6] The UK is the most obese country in western Europe, according to the Organisation for Economic Co-operation and Development.[7] Its annual Health at a Glance report, published on Friday, shows that 26.9% of the UK population had a body mass index of 30 and above, the official definition of obesity, in 2015. Only five of the OECD's 35 member-states had higher levels of obesity, with four outside Europe and one in eastern Europe. The OECD's report, which says obesity in the UK has increased by 92% since the 1990s, illustrates the scale of the public health challenge, with fears it could bankrupt the NHS

Between May 2010 and the end of 2013, the Department of Health alone had 130 meetings with representatives of industry

Jonathan Gornall, in a BMJ investigation, discovered: "*the extent and effects of contact between ministers and interest groups lobbying against the minimum unit price*."

Gornall concluded that the consultation itself was a sham. "*While MPs struggled to gain access to ministers, representatives of alcohol companies and major supermarkets had easy access – made easier by the well-oiled revolving doors between industry and special advisory posts." Academics quoted by Gornall express concern about the misuse of the scientific process by the alcohol industry and its mouthpiece.* Alcohol companies were using tactics reminiscent of the tobacco industry.

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[5] http://www.pan-uk.org/food-for-thought/

[6] https://www.childinthecity.org/2018/06/07/uk-child-obesity-worst-in-poorest-cities/?gdpr=accept

[7] https://www.theguardian.com/society/2017/nov/10/uk-most-obese-country-in-western-europe-oecd-report-finds

Documents released under a freedom of information request showed that between the coalition taking power in May 2010 and the end of 2013 the Department of Health alone had 130 meetings with representatives of industry.[8] The extensive investigation shows "*beyond doubt that commercial interests are currently in control of key decisions about the public's health*.
David Cameron met 26 times with officials of Murdoch's News Corporation in the first 14 months of office, more than twice the number of visits he has had with any other media organization.[9]

Dr Don Huber a Senior US Plant scientist wrote to the US Secretary of Agriculture Hon Tom Vilsack about a pathogen new to science

January 17th 2011: Extracts: *A team of senior plant and animal scientists have recently brought to my attention the discovery of an electron microscopic pathogen that appears to significantly impact the health of plants, animals, and probably human beings. Based on a review of the data, it is widespread, very serious, and is in much higher concentrations in Roundup Ready (RR) soybeans and corn-suggesting a link with the RR gene or more likely the presence of Roundup. This organism appears NEW to science!*
… We are informing the USDA of our findings at this early stage, specifically due to your pending decision regarding approval of RR alfalfa. Naturally, if either the RR gene or Roundup itself is a promoter or co-factor of this pathogen, then such approval could be a calamity. Based on the current evidence, the only reasonable action at this time would be to delay deregulation at least until sufficient data has exonerated the RR system, if it does.
…Laboratory tests have confirmed the presence of this organism in a wide variety of livestock that have experienced spontaneous abortions and infertility. Preliminary results from ongoing research have also been able to reproduce abortions in a clinical setting… It is found in high concentrations in Roundup Ready soybean meal and corn, distiller's meal, fermentation feed products, pig stomach contents, and pig and cattle placentas…
…This previously unknown organism is only visible under an electron microscope (36,000X), with an approximate size range equal to a medium size virus. It is able to reproduce and appears to be a micro-fungal-like organism. If so, it would be the first such micro-fungus ever identified. There is strong evidence that this infectious agent promotes diseases of both plants and mammals, which is very rare.
… The organism is prolific in plants infected with two pervasive diseases that are driving down yields and farmer income—sudden death syndrome (SDS) in soy, and Goss' wilt in corn. The pathogen is also found in the fungal causative agent of SDS (Fusarium solani fsp glycines).
…The pathogen may explain the escalating frequency of infertility and spontaneous abortions over the past few years in US cattle, dairy, swine, and horse operations. These include recent reports of infertility rates in dairy heifers of over 20%, and spontaneous abortions in cattle as high as 45%. For example, 450 of 1,000 pregnant heifers fed wheatlege experienced spontaneous abortions… Over the same period, another 1,000 heifers from the same herd that were raised on hay had no abortions. High concentrations of the pathogen were confirmed on the wheatlege, which likely had been under weed management using glyphosate…

For the past 40 years, I have been a scientist in the professional and military agencies that evaluate and prepare for natural and manmade biological threats, including germ warfare and disease outbreaks. Based on this experience, I believe the threat we are facing from this pathogen is unique and of a high-risk status. In layman's terms, it should be treated as an emergency."

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[8] jgornall@mac.com BMJ 2014; 348: f7646
[9] http://www.independent.co.uk/news/uk/politics/revealed-camerons-26-meetings-in-15-months-with-murdoch-chiefs-2314550.html

The letter was leaked to the press. Lobbyists put it about that it was 'a fake'. Dr Huber's letter of explanation (and confirmation) on 25nd March 2011 and his original letter can be seen here together with illustrations of Goss's wilt in a field of GM RR Maize, next to a green field of non-GMO maize.[10] It did not deter Vilsack from approving GM Roundup-Ready alfalfa. Huber's letter was sent to UK and EU officials at their request.[11]

Roundup causes diseases in trees and crops

Dr Don Huber's confirmation that glyphosate is associated with diseases in plants and trees

Abstract: *"Given the reliance of many plant defenses on the shikimic acid pathway, and the fact that glyphosate blocks this pathway, it is not surprising that this herbicide would render plants more susceptible to pathogens. Glyphosate stimulation of fungal growth and enhanced virulence of pathogens such as Fusarium, Gaeumannomyces, Phytophthora, Pythium, and Xylella can have serious consequences for sustainable production of a wide range of susceptible crops and lead to the functional loss of genetic resistance that is dependent on metabolites through the shikimate pathway.* [12] *It is important to understand the effect of glyphosate on the chemical and biological properties of soils and its overall effects on the agricultural production system to permit its judicious use. Ignoring potential non-target detrimental side effects of any chemical, especially used as heavily as glyphosate, may have dire consequences for agriculture such as rendering soils infertile, crops non-productive, and plants less nutritious (Altman and Campbell, 1977). To do otherwise might well compromise not only agricultural sustainability, but also the health and well-being of animals and humans (Ozturk et al., 2008)*

Don Huber explains: "*Glyphosate is a strong mineral chelator to immobilize nutrients physiologically. This is how it works as an herbicide and why it kills most things eventually. The Shikimate pathway is a major route for disease defense in plants. By shutting it down by chelating Mn, Co, and a number of other essential minerals, the plant essentially has a severe case of AIDs and is very susceptible to many diseases. Then, as a powerful antibiotic against the beneficials needed for disease suppression and nutrient recovery, it provides a perfect environment for glyphosate resistant pathogens (the Roundup Ready genetics came from a plant pathogen that causes tumors in plants called crown gall). Seralini is right that you can't kill a plant with glyphosate IN STERILE SOIL (his greenhouse experiment in PASTURIZED SOIL TO REMOVE SOILBORNE PATHOGENS),* ***but in non-sterile field soil, the plants treated with glyphosate succumb to heavy pathogen attack*** *because their defenses are compromised.* ***This is the herbicidal mode of action!*** *The adjuvants etc. in the formulation don't enter the plant, they just damage the cuticle etc. so the glyphosate is taken up more to do its job systemically by shutting down the defense physiology - especially in the roots. Glyphosate also stimulates the virulence factors (oxidation of Mn to non-available valence states) in the pathogens (Examples are Fusarium*[13] *and Xylella etc. diseases), and can increase virulence of several non–pathogens so they become serious disease organisms (examples are diseases caused by Corynesporium and Marasmius). The olive decline in Italy is a classic example of glyphosate predisposition to Xylella.*[14] *The plugging of the xylem plumbing by the bacterial biofilm is stimulated by glyphosate by chelating Zn that suppresses biofilm formation and stimulating the oxidation of Mn to form MnPO4 or birnesite (CaMnPO4) precipitation in the polysaccharide matrix to plug things up." Glyphosate is systemic in the plant – moves in both the xylem and phloem. It is the phloem movement that takes it to the roots, but it concentrates in all growth points – stems, root tips, reproductive structures especially (that is where the minerals are also accumulating. The*

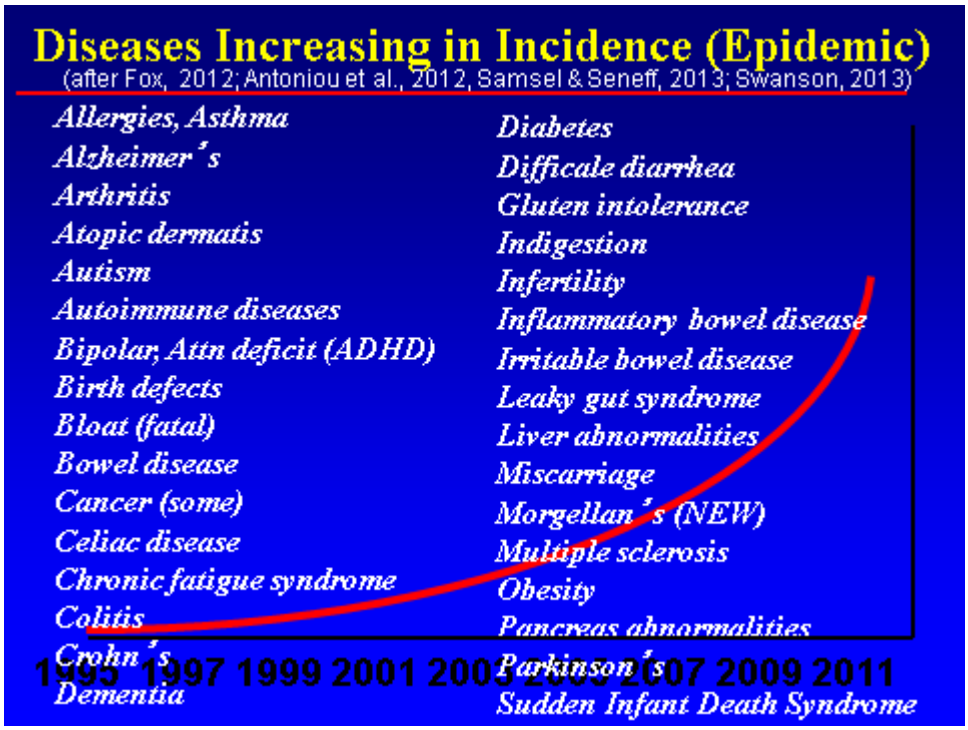
[10] http://www.greenpasture.org/documentFiles/5.pdf
[11] http://www.cbsnews.com/news/mystery-science-more-details-on-the-strange-organism-that-could-destroy-monsanto/
[12] https://www.sciencedirect.com/science/article/abs/pii/S1161030109000628
[13] https://www.sciencedirect.com/science/article/abs/pii/S1161030109000689
[14] https://www.oliveoiltimes.com/olive-oil-making-and-milling/blight-threatens-olive-crops-italy/40947

bottom 1-2 ft of a tree trunk is highly absorptive of glyphosate. It is just that conifers are more tolerant of it than hardwoods and brush, but it is still affected.
Spraying of glyphosate on conifer forests is almost a universal practice in the US. It definitely stresses the plants and changes the biology. British Columbia and adjacent areas are reported to be quite concerned with the outbreaks of Crypotococcus in hikers and others as well as horses visiting the areas[15] because this respiratory fungus now can sporulate on tree trunks with the antibiotic effect of glyphosate killing the natural suppressing microflora.
In chelating (immobilizing) a number of essential mineral enzyme co-factors, the whole system is diminished so photosynthesis, amino acid synthesis, hormone production, etc. are all compromised

The following two slides from the meeting in Parliament are shown by kind permission of Don Huber – Professor Emeritus of Plant Pathology at Purdue University
Four different patents have been filed and granted for glyphosate**.** As a chelator of heavy metals and a wetting agent in 1961;[16] as a herbicide in 1968;[17] as an antibiotic in 2002;[18] and as an anti-protozoal agent in 2003.[19]
In addition, Dr Huber shows that glyphosate is an organic phosphonate, a growth regulator, a toxicant, a virulence enhancer and is persistent in the soil. It chelates (captures) and washes out the following minerals: boron, calcium, cobalt, copper, iron, potassium, magnesium, manganese, nickel and zinc.

Antibiotic-resistant diseases are an apocalyptic threat to humans; but when Monsanto is to blame UK public health doctors, the UK Science Media Centre, the Wellcome Trust, BBSRC and the Media Corporations are unaccountably silent

[15] https://academic.oup.com/mmy/article/49/7/734/951129
[16] http://www.google.com/patents/US3160632
[17] http://www.google.com/patents/US3455675
[18] http://www.google.com/patents/US7771736
[19] http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO1&Sect2=HITOFF&d=PALL&p=1&u=%2Fnetahtml%2FPTO%2Fsrchnum.htm&r=1&f=G&l=50&s1=7771736.PN.&OS=PN/7771736&RS=PN/7771736



Dr Huber's second slide shows diseases which have increased in incidence since 1995, correlated with the red line, which represents the increasing use of glyphosate in the US

Plant immune systems are similar to those of animals. Is that why we are plagued with diseases of trees?

Prof Jeff L Dangl of North Carolina, Chapel Hill is an expert on the plant immune systems. "*Many of these proteins* (in plants) *fall into a class of proteins that has related members which function in innate animal immunity...Thus activation of plant immune systems is akin to that of animal immune systems where 'modified self' can be recognised to trigger an appropriate response...*"

Salicylic acid modulates colonization of the root microbiome by specific bacterial taxa[20]

Abstract: *Immune systems distinguish "self" from "nonself" to maintain homeostasis and must differentially gate access to allow colonization by potentially beneficial, nonpathogenic microbes. Plant roots grow within extremely diverse soil microbial communities but assemble a taxonomically limited root-associated microbiome. We grew isogenic Arabidopsis thaliana mutants with altered immune systems in a wild soil and also in recolonization experiments with a synthetic bacterial community. We established that biosynthesis of, and signaling dependent on, the foliar defense phytohormone salicylic acid is required to assemble a normal root microbiome. Salicylic acid modulates colonization of the root by specific bacterial families. Thus, plant immune signaling drives selection from the available microbial communities to sculpt the root microbiome*.

Ash dieback is just the start of killer plagues threatening Britain's trees.[21]

George Monbiot: Deadly diseases are marching across Europe unchecked – all in the name of free trade: **"***Just as we need a precautionary approach, every lid is being ripped off, every barrier smashed, facilitating trade in everything, including pathogens. But the UK's import and export of all live plants amounts to £300m a year – 2% of the costs of this disease. The paper estimates that*

[20] http://www.sciencemag.org/content/349/6250/860.abstract

[21] https://www.theguardian.com/commentisfree/2019/aug/15/ash-dieback-killer-plagues-britain-trees

another 47 major tree pests and diseases now threaten to arrive in Britain, and these are just the known plagues. In ecological terms, this legislative failure is a total disaster."

Defra Minister defends the UK record on biosecurity.[22]
We took the lead in strengthening EU protections against Xylella – prevention is always better than cure – and will deploy more stringent controls than the EU where necessary. We continue to review our actions against high-risk hosts like olive trees, and will not hesitate to act swiftly. Partnership is also crucial. This comprehensive action takes place alongside industry bodies like the Horticultural Trades Association, nurseries and the public.

But Xylella is caused by Roundup that Defra has authorised: it is sprayed on crops, in cities to kill weeds on pavements, open spaces, City Parks, playgrounds and playing fields in all London Boroughs but one and all councils in Wales
Only the London Borough of Hammersmith and Fulham has agreed to ban Roundup and try other non-chemicals methods.[23] All the Councils in Wales use Roundup.[24] Presumably, like us in Wales, they asked the Health and Safety Executive, who said that glyphosate was perfectly legal.

UK Farmers increased their use of Roundup from 226,762 kg in 1990 to 2,240,408 kg in 2016, a 10-fold increase in 16 years. We have residues of weedkiller in UK breakfast cereals aimed at children
UK Farmers started spraying crops pre-harvest with Roundup to 'desiccate' them in 1980 [25] as recommended by a scientist from Monsanto and endorsed by ADAS. There are increasing residues of the weed killer, Roundup (and AMPA, the most toxic metabolite) in non-organic diets. In the US the use of Roundup as a desiccant did not start until the late 1990s. The UK obesity levels now exceed those of the US. Children in Wales have been as obese as those in the US since 2014.[26]

Toxic blue-green algae in lakes in the UK has killed many dogs

Dog owners in the UK have been warned to take extra precautions while walking their pets amid a rise in reports of potentially toxic blue-green algae. [27]
The British Veterinary Association (BVA) said it had seen an increase in reports including in Southampton, Edinburgh, Cornwall and Lincolnshire. Contact with the algae can be fatal for animals if left untreated and can cause rashes and illness to humans. The BVA urged owners to keep dogs on a lead around affected lakes and rivers. It follows a number of reports of dogs becoming ill or even dying after swimming in water suspected to be contaminated with blue-green algae.

Toxic algae in the US iskilling pets and wildlife
Erin Brockovich is an American legal clerk and activist and who, despite her lack of formal education in the law, was instrumental in building a case against the Pacific Gas and Electric Company (PG&E) of California in 1993. She has regularly won lawsuits against Corporations that are poisoning communities. She wrote in the US *Guardian* on 06/12/2018: **The weedkiller in our food is killing us**[28]
"On a recent Saturday afternoon, in an estuary near Tampa Bay, Florida, I watched airboats move up and down the river banks, spraying massive plumes of weedkiller on to the vegetation. The state of Florida was trying to control and kill off scores of plant species. Nearby, children were lying out in the

[22] https://www.theguardian.com/environment/2019/aug/18/uk-standards-on-biosecurity-are-second-to-none
[23] https://www.hortweek.com/london-council-bans-contractor-use-glyphosate-parks/parks-and-gardens/article/1398373
[24] https://www.walesonline.co.uk/news/local-news/welsh-councils-use-carcinogenic-weedkiller-15086510
[25] http://www.hgca.com/media/185527/is02-pre-harvest-glyphosate-application-to-wheat-and-barley.pdf
[26] http://www.wales.nhs.uk/sitesplus/888/news/33512
[27] https://www.bbc.co.uk/news/uk-49344232
[28] https://www.theguardian.com/commentisfree/2018/dec/06/the-weedkiller-in-our-food-is-killing-us

sun, though they knew better than to swim in the water, which has recently been blooming with toxic algae. Mists of weedkiller drifted downwind toward them.
The main active ingredient in that mist, and in the weedkiller being sprayed throughout Tampa Bay, is glyphosate, one of the most widely used herbicides in the US. First registered for use here in 1974, it is now an ingredient in more than 750 products, including the most widely deployed herbicide in the world, Monsanto's Roundup. For more than a generation, Americans have been using Roundup and other glyphosate-based chemicals to improve agricultural yields, manage forests, ripen fruit and kill the dandelions sprouting from our front lawns.
There is also evidence that glyphosate is an important driver of Florida's toxic algae bloom and of similar algal efflorescences across the country. According to research conducted on Lake Erie, the algae thrive off the phosphorus released when the compound is sprayed on certain soils. In turn, human exposure to the toxic algae, which regularly kills pets and wildlife, has been linked to neurodegenerative disorders such as Parkinson's, Alzheimer's and ALS.

Glyphosate, the controversial main ingredient in Monsanto's Roundup and other herbicides, is being connected to Lake Erie's troubling algae blooms, which has fouled drinking water and suffocated and killed marine life in recent years.
The herbicide Roundup may be contributing to the growth of harmful algal blooms in Lake Erie, according to Ohio Sea Grant researchers. Drs. R. Michael McKay and George Bullerjahn of Bowling Green State University are studying the impact of glyphosate, a phosphonate and the main ingredient in the commonly used herbicide, on the strains of blue-green algae found in Lake Erie.[29] Phosphorus has long been known to act as fuel to blue-green algae, and efforts in the 1970s reduced harmful algal blooms and nuisance algae by limited phosphorus loading in the Lake Erie watershed. However, the last 15 years have seen an increase in the growth of the toxic blooms, contributing to an ever bigger Dead Zone in the lake's Central Basin and massive fish kills each summer.
Scientists have believed phosphonates to be inaccessible to plankton, but McKay and Bullerjahn have begun to look to glyphosate as a potential phosphorus source with funding from Ohio Sea Grant. "*Our research is finding that Roundup is getting into the watershed at peak farming application times, particularly in the spring*," McKay explains. Their work has shown that glyphosate cannot be detected in the lake in April but can be found from mid-May through July, after crops are planted, which corresponds to the forming of the Dead Zone. They have also discovered that the blue-green algae, also known as cyanobacteria, are capable of using phosphonates.

Roundup and clothianidin have destroyed the Great Barrier Reef

The coral on the Great Barrier Reef has been destroyed because the Australian Regulators did not read the instructions: Roundup and the systemic neonicotinoid pesticides are highly toxic to aquatic life. Instructions for use state that all water bodies should be protected
Instructions for using Roundup Advance AG Herbicide by Monsanto include: "*Protection of Wildlife, Fish, Crustacea and Environment. Do not contaminate dam, river or stream with the product*." [30]
Clothianidin (Sumitomo Shield a systemic neonicotinoid insecticide) has been granted registration by the Australian Pesticides and Veterinary Medicines Authority (AVMA) for use on very low-lying sugar cane plantations draining into the Great Barrier Reef. In addition to global warming that is why there has been progressive destruction and bleaching of coral.
Instructions: PROTECTION OF WILDLIFE, FISH, CRUSTACEANS AND ENVIRONMENT [31]
DO NOT apply under weather conditions, or from spraying equipment, that may cause spray drift onto nearby or adjacent areas, particularly wetlands, water-bodies or watercourses. ***This product is***

[29] https://ohioseagrant.osu.edu/news/2009/fe052/researchers-study-roundup-as-possible-cause-harmful-algal
[30] http://websvr.infopest.com.au/LabelRouter?LabelType=L&ProductCode=70096
[31] http://www.sumitomo-chem.com.au/sites/default/files/pdf/labels/shield_label.pdf

***highly toxic to aquatic invertebrates**. DO NOT contaminate streams, rivers or waterways with the chemical or used containers. DO NOT apply when there are aquatic and wetland areas including aquacultural ponds or surface streams and rivers downwind from the application area and within the mandatory no-spray zone shown in table 1.*

The 27–year decline of coral cover on the Great Barrier Reef and its causes[32]
Extracts: Based on the world's most extensive time series data on reef condition (2,258 surveys of 214 reefs over 1985–2012), we show a major decline in coral cover from 28.0% to 13.8% (0.53% y^{-1}), a loss of 50.7% of initial coral cover. Tropical cyclones, coral predation by crown-of-thorns starfish (COTS), and coral bleaching accounted for 48%, 42%, and 10% of the respective estimated losses amounting to 3.38% y^{-1} mortality rate. Importantly, the relatively pristine northern region showed no overall decline. Thus, reducing COTS populations, by improving water quality and developing alternative control measures, could prevent further coral decline and improve the outlook for the Great Barrier Reef. **Such strategies can, however, only be successful if climatic conditions are stabilized, as losses due to bleaching and cyclones will otherwise increase.**

Glyphosate persistence in samples of seawater[33] taken from the Great Barrier Reef; this biocide has probably been responsible for the gradual poisoning of the GBF's aquatic vertebrates and invertebrates over 40 years of use.
Extracts: Glyphosate is one of the most widely applied herbicides globally but its persistence in seawater has not been reported. Here we quantify the biodegradation of glyphosate using standard "simulation" flask tests with native bacterial populations and coastal seawater from the Great Barrier Reef. The half-life for glyphosate at 25 °C in low light was 47 days, extending to 267 days in the dark at 25 °C and 315 days in the dark at 31 °C, which is the longest persistence reported for this herbicide. AMPA, the microbial transformation product of glyphosate, was detected under all conditions, confirming that degradation was mediated by the native microbial community. This study demonstrates glyphosate is moderately persistent in the marine water under low light conditions and **is highly persistent in the dark**. Little degradation would be expected during flood plumes in the tropics, which could **potentially deliver dissolved and sediment-bound glyphosate far from shore**. *'A wide spectrum of pesticides has been detected in waters of the GBR, but herbicides are often more water soluble and mobile than contemporary insecticides and fungicides, and as a consequence, are more frequently detected in the river mouths and GBR lagoon. The photosystem II herbicides have been the primary group detected in GBR waters; however, glyphosate (CAS number 1071- 83-6) is the most widely used herbicide in Australia, in the GBR catchments and elsewhere, with approximately 15,000 tonnes applied annually to control agricultural, urban and roadside weeds.'*

Massive kills of wildlife during flooding now make sense with glyphosate and clothianidin having been found to be toxic to aquatic invertebrates, biocides and immune suppressants
In 2011, Australia (New South Wales and Queensland) had disastrous floods.[34] The Darling River area had suffered prolonged drought followed by heavy rain and flooding. On March 11 Bourke Township experienced a massive fish kill. An eye- witness said: "*It was phenomenal; you couldn't see the water, there were carp gasping for breath and crayfish crawling onto the bank.*" Counting the dead fish passing Bourke Weir at 100/sec. Geoff Wise estimated 8 million per day and the event continued for 5 days; 40 million dead fish was said to be an underestimate. It was described as a 'Black Water' event and attributed to lack of oxygen from organic material being washed down the

[32] http://www.pnas.org/content/109/44/17995.full
[33] http://www.sciencedirect.com/science/article/pii/S0025326X14000228
[34] http://www.water.nsw.gov.au/__data/assets/pdf_file/0003/549282/menindee_lakes_management_community_summary.pdf

river following flooding of a plain. But beekeepers suspected otherwise: "*why were the crayfish trying to escape the water if it was only due to lack of oxygen*?" [35] Agricultural land borders 2,500 km of the Darling River. Cotton is grown in the area; at the time, more than 95% was seed-treated GMO and 96% was imidacloprid treated. BUT, OF COURSE, GLYPHOSATE WOULD HAVE BEEN PRESENT IN THE WATER TOO. Two further ecological disasters have occurred down the Queensland Coast after the floods in December 2010 and January 2011. In July 2011 "*the northern coast of Queensland has become littered with sick and dying turtles and dugongs (sea cows).*" It was attributed to run-off of nutrients into the ocean "*potentially killing the sea grass that both turtles and dugongs feed on*."[36]
On September 19 2011 in Gladstone Harbour many sick fish were discovered; barramundi and bream were found with sores, skin rashes and infected eyes.[37] Capricorn Conservation Council suspected industrial pollution, so fishing was prohibited.
According to beekeeping sources, the entire Queensland Coast above Gladstone are the biggest areas for sugar cane in Australia and clothianidin (Sumitomo Shield Systemic insecticide) and Roundup have been granted registration by APVMA for use on these very low-lying sugar cane farms. "*A sudden mass starvation of turtles and dugongs, a rare sea mammal, off the coast of Queensland has prompted warnings of a long-term natural disaster in the normally sheltered waters just inshore of Australia's Great Barrier Reef*."

Two pieces of vital evidence that the devastating deterioration in the Great Barrier Reef is man-made and not due to natural disasters came from two papers:

- "*Importantly, the relatively pristine northern region showed no overall decline.*"[38]
- "*Glyphosate has not often been included in regular monitoring programs as the stand-alone analytical methods are often cost-prohibitive, resulting in a long-term deficiency in global datasets.*"[39]

Report by the Queensland Government in 2003 on water quality[40]
"Regional assessments of coastal water quality condition found that sites in the Burdekin, Mackay/Whitsunday and south-east Queensland regions most commonly experienced poor water quality. Phosphorus and nitrogen were the two indicators contributing to this rating. Metals bioaccumulated in prawns, shellfish and other marine fauna were greatest in south-east Queensland waterways, particularly canals, and occasionally exceeded Australian food quality standards. In central and north Queensland, the persistence of pesticides and herbicides, including a number of banned substances, in sediment, seagrass and some marine mammals is an issue."

Herbicides: A new threat to the Great Barrier Reef [41]
In 2009, researchers showed runoff of herbicides particularly associated with sugar cane cultivation in the adjacent catchment.
Abstract: *The runoff of pesticides (insecticides, herbicides and fungicides) from agricultural lands is a key concern for the health of the iconic Great Barrier Reef, Australia. Relatively low levels of herbicide residues can reduce the productivity of marine plants and corals. However, the risk of these residues to Great Barrier Reef ecosystems has been poorly quantified due to a lack of large-scale datasets. Here we present results of a study tracing pesticide residues from rivers and creeks in three catchment regions to the adjacent marine environment. Several pesticides (mainly herbicides) were*

[35] http://www.theabk.com.au/article/neonicotinoids-australia
[36] http://www.telegraph.co.uk/news/worldnews/australiaandthepacific/australia/8753630/Mass-starvation-of-dugongs-and-turtles-on-Great-Barrier-Reef.html
[37] http://www.abc.net.au/news/2011-11-09/gladstone-harbour-in-pictures-and-quotes/3650296
[38] http://www.pnas.org/content/109/44/17995.full
[39] http://www.sciencedirect.com/science/article/pii/S0025326X14000228
[40] https://web.archive.org/web/20070614223713/http://www.epa.qld.gov.au/register/p01258bs.pdf
[41] https://www.sciencedirect.com/science/article/pii/S0269749109001304

detected in both freshwater and coastal marine waters and were attributed to specific land uses in the catchment. Elevated herbicide concentrations were particularly associated with sugar cane cultivation in the adjacent catchment. We demonstrate that herbicides reach the Great Barrier Reef lagoon and may disturb sensitive marine ecosystems already affected by other pressures such as climate change.

Advice for Cane Sugar farmers (sugarresearch.com.au) is the first organisation that has admitted that herbicides are being detected in the Great Barrier Reef Lagoon (GBR) [42]
They state that: "*Products of major concern are atrazine, ametryn, hexazinone and diuron (all Group C or PSII herbicides). These products and others are being detected in waterways and in the Great Barrier Reef Lagoon (GBR)*" Page 108. Even though glyphosate is one of the most widely applied herbicides globally, it is evident that very few studies had been done because it is expensive. Herbicides such as glyphosate, atrazine and dicamba were recommended by sugarresearch.com.au (2013) for weed control: pre-emergent or post-emergent, sometimes by aerial spraying. Aerial spraying is commonly used for the control of vines at the out-of-hand stage or in the mature crop, particularly in the areas when extreme crop lodging occurs. *"These products and others are being detected in waterways and in the Great Barrier Reef Lagoon (GBR). Control of weed growth in tidal drains should be carried out in accordance with the guidelines in the SmartCane Riparian and Wetlands Area practice booklet or with an individual permit. All other watercourses in Queensland are protected under the Water Resources Act 1989."*

Sugarcane industry managers are promoting lectures by a controversial scientist who argues farm runoff is no threat to the reef
Former James Cook University Professor of Geophysics, Peter Ridd is on a speaking tour of Queensland arguing against regulations that would set restrictions for sediment and chemical runoff from cane farms into the Great Barrier Reef catchments. Earlier this year Canegrowers was handed one of the first grants awarded by the Great Barrier Reef Foundation's partnership with the federal government, for a behavioural management program called "Cane Changer". The $1.4m grant aims to help promote best management practice and to improve uptake.
The Queensland environment minister, Leeanne Enoch, told Guardian Australia: "*There is a clear expectation that the organisation uses that taxpayer funding for its stated purpose.*"
Enoch said science had "*come under attack for political purposes*" and pointed to a Liberal National party suggestion that the state establish a scientific review office, prompted partly by unhappiness about the scientific consensus that agriculture is harming the reef.
"*This office of 'alternative facts' would be used to undermine science in this state*," Enoch said.
"*For the last decade, the Queensland government has supported agricultural industries to voluntarily improve their practices. However, uptake has not been fast enough, so water quality has continued to decline*." On Wednesday, the Australian Coral Reef Society released a statement saying it was "deeply concerned" about Ridd's lecture tour, and provided a detailed scientific response to claims he has made "*They're not supported by any other scientist we can think of. On one side we have hundreds of scientists from dozens of institutions in Australia and overseas, lots of universities involved in this work publishing thousands of peer-reviewed papers, brought together in the consensus statement [in 2017]*," Brodie said.

Cane sugar contains glyphosate residues; linked to chronic kidney disease amongst workers
Glyphosate [N-(phosphonomethyl) glycine], a nonselective systemic herbicide, has been utilized since 1980 as a sugarcane ripener in Louisiana sprayed by air six weeks before harvest.[43]

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42 http://www.sugarresearch.com.au/content/FlippingBooks/Sugarcane%20Advisors%20Information%20Kit/files/assets/common/downloads/Sugarcane%20Advisor%20Information%20Kit%20FINAL.pdf

43 http://etd.lsu.edu/docs/available/etd-11072012-134904/unrestricted/Orgeron_diss.pdf

"Little noticed by the rest of the world, chronic kidney disease (CKD) is cutting a swath through one of the world's poorest populations, along a stretch of Central America's Pacific Coast that spans six countries and nearly 700 miles. Its victims are manual laborers, mostly sugarcane workers." A growing community of researchers is calling for recognition of a new illness not yet included in medical manuals: "*Mesoamerican nephropathy*," "*endemic agricultural nephropathy*" or "*sugarcane nephropathy*." The director of El Salvador's national CKD program has written of a "*Mesoamerican Regional Nephropathy*" that would one day be internationally recognized.[44]

The fungicidal action of Roundup is destroying the means by which trees communicate

Net transfer of carbon between ectomycorrhizal tree species in the field: the 'wood-wide-web'
A professor of forest ecology at the University of British Columbia's Department of Forest and Conservation Sciences in Vancouver, Suzanne Simard studies the surprising and delicate complexity in nature. Her main focus is on the below-ground fungal networks that connect trees and facilitate underground inter-tree communication and interaction. Her team's analysis revealed that the fungi networks move water, carbon and nutrients such as nitrogen between and among trees as well as across species. The research has demonstrated that these complex, symbiotic networks in our forests -- at the hub of which stand what she calls the "mother trees" -- mimic our own neural and social networks. [45] This ground-breaking work on symbiotic plant communication has far-reaching implications in both the forestry and agricultural industries, in particular concerning sustainable stewardship of forests and the plant's resistance to pathogens. She works primarily in forests, but also grasslands, wetlands, tundra and alpine ecosystems.

Emerging pathogens wipe out wildlife species across the globe secondary to immune suppression by glyphosate and neonicotinoid insecticides

Emerging pathogens as threats to animal and plant health
Outbreaks of infectious diseases amongst species of wildlife around the world (such as amphibians, honey bees and wild bees, fish, birds and bats) have occurred over the last 25 years. Kiesecker (2002) found that atrazine (herbicide) and malathion (pesticide) made frogs more susceptible to a parasite, a burrowing trematode worm, which caused limb deformities in tadpoles. [46] Field experiments conclusively demonstrated that exposure to trematode infection was required for the development of limb deformities in wood frogs, *Rana sylvatica*. Even very low levels of exposure *("at concentrations considered safe for drinking water by the US Environmental Protection Agency"*) could produce *"dramatic effects on the immune response of the animals"*. Field studies showed *"considerably higher rates of limb deformities where there was pesticide exposure… Amphibian deformities, in particular those related to limb development, have now been reported in 43 states in the U.S. and in five Canadian Provinces, as well as in several other countries around the world."*[47]

Since the late 1990's scientists have written in increasingly desperate tones. In 2012 there were two papers in *Nature*: "Biodiversity loss and the impact on humanity" [48] and "Emerging fungal threats to animal, plant and ecosystem health". [49] Authors of this last review had appealed to scientists urgently to find *'the elusive magic bullet.'* Only one other (in addition to Kiesecker's) paper from California dared to mention pesticides. Davidson *et al*. [50] reported in 2002 spatial patterns of decline

[44] http://lab.org.uk/thousands-of-sugar-cane-workers-die-as-wealthy-nations-stall-on-solutions
[45] https://www.nature.com/articles/41557
[46] http://www.pnas.org/content/99/15/9900.full.pdf
[47] http://onlinelibrary.wiley.com/doi/10.1002/1096-9926(200009)62:3%3C147::AID-TERA2%3E3.0.CO;2-2/full
[48] http://www.nature.com/nature/journal/v486/n7401/full/nature11148.html?WT.ec_id=NATURE-20120607
[49] http://www.ncbi.nlm.nih.gov/pubmed/22498624
[50] http://onlinelibrary.wiley.com/doi/10.1046/j.1523-1739.2002.01030.x/abstract

for four California ranid frogs and matched the declines with the distribution of agricultural lands (based on USGS land use maps and key predominant wind directions based on California Air Resources streamline wind maps). The authors stated that "*In California, the transport and deposition of pesticides from the agriculturally intensive Central Valley to the adjacent Sierra Nevada is well documented, and pesticides have been found in the bodies of Sierra frogs.*" The widespread use on agricultural crops of the systemic neonicotinoid insecticides[51] and the herbicide glyphosate,[52] both of which cause immune suppression, make species vulnerable to emerging infectious pathogens, driving large-scale amphibian extinctions.

Chytrid fungus has wiped out amphibian populations over five continents.
Chytrid fungus, *Batrachochytrium dendrobatidis* has wiped out amphibian populations over five continents. A spokesman for IUCN said: "*The IUCN Red List currently considers 31% of the earth's amphibians are threatened with extinction…it's thought that 159 species have vanished forever in recent years*." Amphibians, particularly tadpoles, are considered to be environmental indicators of indirect ecosystem effects because of their unique niche at the boundary of the aquatic-terrestrial ecosystems as well as their sensitivity to pollutants. While tadpoles feed on periphyton, adult amphibians are strictly insectivorous. Amphibians were the first group of vertebrates to be affected by the epidemics of diseases caused by uncommon pathogens. Joseph Mendelson an amphibian taxonomist wrote in 2011.[53] "*The reality of amphibian declines and extinctions has shifted the ecological baseline in so many ecosystems, that an entire generation of biologists is conducting their research in a framework that has been very recently remodelled. I am a taxonomist and I have seen my career vacillate between the thrill of discovering new species and the chill of tracking extinction events—including species that I described."*

The science behind GMOs is fraudulent

US Attorney Steven Druker says: Governments and leading scientific institutions have systematically misrepresented the facts about GMOs
On 4 March 2015 the Organisation Beyond GM facilitated the Press Release of American public interest attorney Steven Druker's acclaimed new book, Altered Genes, Twisted Truth How the Venture to Genetically Engineer Our Food Has Subverted Science, Corrupted Government and Systematically Deceived the Public.[54]

Steven Druker initiated a lawsuit against the US Food and Drug Administration (FDA) that forced it to open its files on GM foods
Those files revealed that GM foods first achieved commercialisation in 1992 only because the FDA:
** Covered up the extensive warnings of its own scientists about their dangers*
** Lied about the facts*
** And then violated federal food safety law by permitting these foods to be marketed without having been proven safe through standard testing*

Druker challenges UK Royal Society over misleading statements made about GM foods
Open Letter to the UK Royal Society can be read here.[55]
Extracts: *"Because clarifying the facts about GM foods is crucial for developing an intelligent, science-based policy on the future of agriculture, and because the Royal Society has significantly*

[51] http://www.boerenlandvogels.nl/sites/default/files/JEIT%20Immune%20Suppression%20pdf_6.pdf
[52] http://www.fs.fed.us/foresthealth/pesticide/pdfs/seratr01_43_08_04.pdf
[53] http://nationalzoo.si.edu/support/volunteer/documents/HR_Mar2011_JoeM_proofs.pdf
[54] http://beyond-gm.org/new-book-exposes-systematic-government-and-scientific-fraud-over-gm-food/
[55] http://beyond-gm.org/wp-content/uploads/2015/03/DRUKER_OPEN-LETTER-TO-THE-ROYAL-SOCIETY_Final.pdf

contributed to the confusion that currently surrounds this issue, it is imperative that remedial action be promptly initiated. This is especially so considering that:

- *The European Commission is about to approve substantial regulatory changes in regard to GM crops.*
- *The UK is seriously considering allowing them to be commercially planted.*
- *The Society and other proponents of GM foods have inculcated the widespread illusion that there is an overwhelming scientific consensus that the safety of these products has been established through rigorous testing…"*

Pandora's Potatoes: The Worst GMOs[56]

Defra allowed a trial of GM Potatoes at farms in Suffolk and Cambridge to proceed despite the book by Caius Rommens, ex-Director at Monsanto. Considering the huge number of scientists employed by Defra and Rothamsted Research, not one of them has read the new book by Caius Rommens, former team leader at Monsanto, the creator of GM potatoes, who has retracted his research on GM Potatoes. It shows an ignorance beyond belief! It just demonstrates how narrow the scientists' reading is and how arrogant and brainwashed they have become.

'Pandora's Potatoes: The Worst GMOs'
The Ex-Director of J.R. Simplot and team leader at Monsanto, Caius Rommens, has revealed the hidden dangers of the GMO potatoes he created, in a wide ranging interview for Sustainable Pulse, on the same day that his book 'Pandora's Potatoes: The Worst GMOs' was released on Amazon. Here are some extracts from the interview.

How many years did you spend working on creating GM potatoes? Was this all lab-based work or did you get out to see the farms that were growing the potatoes?
"During my 26 years as a genetic engineer, I created hundreds of thousands of different GM potatoes at a direct cost of about $50 million. I started my work at universities in Amsterdam and Berkeley, continued at Monsanto, and then worked for many years at J. R. Simplot Company, which is one of the largest potato processors in the world. I had my potatoes tested in greenhouses or the field, but I rarely left the laboratory to visit the farms or experimental stations. Indeed, I believed that my theoretical knowledge about potatoes was sufficient to improve potatoes. This was one of my biggest mistakes."

Why have you decided to reveal information about the failings of GM potatoes after spending many years creating them?
"I dedicated many years of my life to the creation of GMO potatoes, and I initially believed that my potatoes were perfect but then I began to doubt. It again took me many years to take a step back from my work, reconsider it, and discover the mistakes. Looking back at myself and my colleagues, I believe now that we were all brainwashed; that we all brainwashed ourselves. We believed that the essence of life was a dead molecule, DNA, and that we could improve life by changing this molecule in the lab. We also assumed that theoretical knowledge was all we needed to succeed, and that a single genetic change would always have one intentional effect only.
We were supposed to understand DNA and to make valuable modifications, but the fact of the matter was that we knew as little about DNA as the average American knows about the Sanskrit version of the Bhagavad Gita. We just knew enough to be dangerous, especially when combined with

[56] https://sustainablepulse.com/2018/10/09/the-creator-of-gmo-potatoes-reveals-the-dangerous-truth-exclusive-interview/#.W70H-i97E_V

our bias and narrowmindedness. We focused on short-term benefits (in the laboratory) without considering the long-term deficits (in the field). It was the same kind of thinking that produced DDT, PCBs, Agent Orange, recombinant bovine growth hormone, and so on. I believe that it is important for people to understand how little genetic engineers know, how biased they are, and how wrong they can be. My story is just an example."

Have the GM potatoes you helped create been approved by the FDA and EPA in the U.S. or indeed elsewhere in the world?
"It is amazing that the USDA and FDA approved the GM potatoes by only evaluating our own data. How can the regulatory agencies assume there is no bias? When I was at J.R. Simplot, I truly believed that my GM potatoes were perfect, just like a parent believes his or her children are perfect. I was biased and all genetic engineers are biased. It is not just an emotional bias. We need the GM crops to be approved. There is a tremendous amount of pressure to succeed, to justify our existence by developing modifications that create hundreds of millions of dollars in value. We test our GM crops to confirm their safety, not to question their safety.
The regulatory petitions for deregulation are full with meaningless data but hardly include any attempts to reveal the unintended effects. For instance, the petitions describe the insertion site of the transgene, but they don't mention the numerous random mutations that occurred during the tissue culture manipulations. And the petitions provide data on compounds that are safe and don't matter, such as the regular amino acids and sugars, but hardly give any measurements on the levels of potential toxins or allergens.
The Canadian and Japanese agencies approved our GMO potatoes as well, and approvals are currently considered in China, South Korea, Taiwan, Malaysia, Singapore, Mexico, and the Philippines."

Is it possible for GM potatoes to cause gene-silencing in other potatoes or pollinating insects such as bees?
"The problem with certain insects, including bees, is that they cannot degrade the small double-stranded RNAs that cause gene silencing. These double-stranded RNAs were intended to silence several potato genes in tubers, but they are likely to be expressed in pollen as well. So, when the pollen is consumed by bees, the double stranded RNAs in this pollen may silence bee genes that share inadvertent homology."

Your new book Pandora's Potatoes, which is available to the public for the first time this week, includes many points as to why the GM potatoes you helped create should not be grown by farmers or eaten by the public. What would you like to say to the FDA and EPA?
"The main problem about the current process for deregulation of GMO crops is that it is based on an evaluation of data provided by the developers of GMO crops. There is a conflict of interest. I propose that the safety of GMO crops is assessed by an independent group of scientists trained at identifying unintended effects."

Release of Genetically Engineered Trees would be a massive and irreversible experiment

The Genetically engineered American Chestnut (GE AC) is specifically intended to be released into forests, and to spread its GE pollen and seeds. Locating and monitoring all GE AC trees and their progeny will be nearly impossible, especially over a long period of time.[57]
The release of GE AC into forests would be a massive and irreversible experiment. The introduction of GE AC could not only fail, but also create new problems and exacerbate existing pressures on

[57] https://stopgetrees.org/wp-content/uploads/2019/04/biotechnology-for-forest-health-test-case-american-chestnut-report-WEB-1.pdf

forest ecosystems. Forests are already threatened by unsustainable logging practices, invasive species and introduced pests and pathogens, urban sprawl, and the escalating impacts of climate change. Without solving these underlying causes of forest demise, the restoration of the American chestnut through any technology is highly improbable.
Page 16: In a 2016 article, Beckers *et al*. state: "*The interactions between a plant and its microbiome are highly complex and dynamic, involving multiple reciprocal signaling mechanisms and an intricate interplay between the bacteria and the plant's innate immune system. Therefore, even small changes in the host genome (ecotypes, cultivars, genetically modified genotypes, etc.) may influence the plant microbiome and may even feed-back to modulate the behavior and the productivity of the host plant.*" Very little is known about the impact of genetic engineering on tree microbiomes, nor has it been a focus of environmental impact studies. However, one study of genetically engineered poplars did report changes in endosphere microbiome as a result of altered lignin biosynthesis.
Page 21: A 2018 review of GE trees sums up the commercial focus of current research: "*Genetic engineering of trees to improve productivity, wood quality, and resistance to biotic and abiotic stresses has been the primary goal of the forest biotechnology community for decades. ... Examples include novel methods for lignin modification, solutions for long-standing problems related to pathogen resistance, modifications to flowering onset and fertility, and drought and freeze tolerance.*"

New methods of genetic engineering and the 'poisonous CRISPR mushroom'[58]
18 July 2018 / Today Testbiotech[59] is releasing a video clip about the first mushroom to be created through having its genome manipulated by CRISPR-Cas. It is worldwide the first CRISPR organism to be approved for use in food production: US authorities gave their go-ahead in 2016. Because no additional genes were inserted, the regulatory authorities did not request a detailed risk assessment. As yet, the mushroom is not available on the market.
Conclusion: in the case of the CRISPR mushroom, it would be necessary to examine whether the metabolism in the mushroom was changed unintentionally. The risk assessment cannot be confined to the level of DNA and the question of whether genes are inserted or not. The composition of the mushroom components also has to be investigated. However, no such investigations were carried out in the US, so it is not possible to draw any conclusions on their safety.

Fast-spreading genetic mutations pose ecological risk: US science academies advise caution in experimenting with gene drives[60]
But as molecular biology research on gene drives has surged forward, it has outpaced our understanding of their ecological consequences, says Heitman. Even a small, accidental release from a laboratory holds the potential to spread around the globe: "*After release into the environment, a gene drive knows no political boundaries,*" the committee wrote.

The Bill and Melinda Gates Foundation paid a PR firm to lobby the UN [61]
Jonathan Latham of Independent Science News reports: *"The Bill and Melinda Gates Foundation this year paid a PR firm called Emerging Ag $1.6 million to recruit a covert coalition of academics to manipulate a UN decision-making process over gene drives, according to emails obtained through*

[58] https://www.testbiotech.org/en/node/2241
[59] What are the consequences of genetic engineering for humans and the environment? From a critical point of view, Testbiotech provides information and scientific expertise on the risks associated with these technologies, that is completely independent of the biotech industry.
[60] http://www.nature.com/news/fast-spreading-genetic-mutations-pose-ecological-risk-1.20053?WT.mc_id=TWT_NatureNews
[61] https://www.independentsciencenews.org/news/gates-foundation-hired-pr-firm-to-manipulate-un-over-gene-drives/

Freedom of Information requests. Gene drives are a highly controversial new genetic extinction technology. They have been proposed as potentially able to eradicate malarial mosquitoes, agricultural pests, invasive species, as well as having potential military uses. Emerging Ag calls itself "a boutique international consulting firm providing communications and public affairs services." Its president and founder is Robynne Anderson, a former international communications director of CropLife, the global lobby group for the biotechnology, seed, and pesticide industries."

Demise of wild species secondary to Roundup being sprayed on Japanese Knotweed near our nature reserve [62]

We established a small nature reserve in 2006. We published two photo-journals in 2010 of the species that we had seen over the period. Moths, butterflies, ladybirds, beetles, six species of shieldbugs, 4 species of crickets, grasshoppers, spiders, six species of bumble bee, many species of solitary bee, hoverflies, dragonflies, damselflies, nymphs, newts, diving beetles, water boatmen, pond skaters, water boatmen, pond skaters and bats. By 2013 we found they were declining and we measured glyphosate in tap water and river water in August 2013 and August 2014. Between 2013 and 2014, the levels had increased 10-fold, from 30 ppt to 300 ppt. These were of the order of concentrations found in a study in 2013 which showed that breast cancer cell proliferation is accelerated by glyphosate in extremely low concentrations: "*The present study used pure glyphosate substance at log intervals from 10^{-12} to 10^{-6} M. These concentrations are in a crucial range which correlated to the potential biological levels at part per trillion (ppt) to part per billion (ppb) which have been reported in epidemiological studies."* In the UK the incidence of breast cancer almost doubled between 1975 and 2010.

A US EPA toxicologist says: It is essentially certain that glyphosate causes cancer

Jess Rowlands US EPA allegedly bragged he could kill off the cancer risk
It included emails in which an Environmental Protection Agency official Jess Rowlands who was in charge of evaluating the cancer risk of Monsanto Co.'s Roundup allegedly bragged to a company executive that he deserved a medal if he could kill another agency's investigation into the herbicide's key chemical.

A letter written by the late Marion Copley US EPA toxicologist to her colleague Jess Rowland [63]
It's been four years since Marion Copley, a toxicologist who had worked for 30 years for the EPA, wrote this letter to her then-colleague, Jess Rowland, accusing him of conniving with Monsanto to bury the agency's own hard scientific evidence that it is "*essentially certain*" that glyphosate, the key ingredient in Monsanto's Roundup weed killer, causes cancer. The date of the letter comes after Copley left the EPA in 2012 and shortly before she died from breast cancer at the age of 66 in January 2014. She accuses Rowland of having "*intimidated staff*" to change reports to favor industry, and writes that research on glyphosate, the key ingredient in Monsanto's Roundup, shows the pesticide should be categorized as a "*probable human carcinogen*."
"Jess,
Since I left the agency with cancer [breast] *I have studied the tumor process extensively and I have some mechanism comments which may be very valuable to CARC based on my decades of pathology experience. Glyphosate was originally designed as a chelating agent and I strongly believe that is the identical process involved in tumor formation."*

[62] https://gmandchemicalindustry9.wordpress.com/2014/10/27/a-personal-witness-to-the-devastating-demise-of-wild-pollinators-and-other-species-as-glyphosate-herbicide-residues-increase-in-the-environment/
[63] https://www.organicconsumers.org/sites/default/files/marioncopleyletter.pdf

In a 1-page letter Dr Copley makes 14 observations about chelators and/or glyphosate, including that they are endocrine disruptors, suppress the immune system, damage the kidneys or pancreas which can lead to clinical chemistry changes that favor tumor growth; glyphosate kills bacteria in the gut, the gastrointestinal system is 80% of the immune system making the body susceptible to tumors.
She goes on to say: "***It is essentially certain that glyphosate causes cancer.***"
Dr Copley ends with the statement: "*I have cancer, and I don't want these serious issues in HED [EPA's Health Effects Division] to go unaddressed before I go to my grave. I have done my duty*."

Marion Copley
March 4, 2013"

Massive numbers of cancers in the UK where glyphosate is used extensively
In the UK there were 13,605 new cases of Non-Hodgkin Lymphoma in 2015 (and 4,920 deaths in 2016): there were 41,804 new cases of bowel cancer in 2015 (and 16,384 deaths in 2016); 12,547 new cases of kidney cancer in 2015 (and 4,619 deaths in 2016); 5,736 new cases of liver cancer in 2015 (5,417 deaths in 2016); 15,906 new cases of melanoma in 2015 (2,285 deaths in 2016); 3,528 new cases of thyroid cancer in 2015 (382 deaths in 2016); 10,171 new cases of bladder cancer in 2015 (5,383 deaths in 2016); 8,984 new cases of uterine cancer in 2015 (2,360 deaths in 2016); 7,270 cases of ovarian cancer in 2015 (4,227 deaths in 2016); 9,900 new cases of leukaemia in 2015 (4,712 deaths in 2016); 55,122 new cases of invasive breast cancer in 2015 (11,563 deaths in 2016); 47,151 new cases of prostate cancer in 2015 (11,631 deaths in 2016); 9,211 new cases of oesophageal cancer in 2015 (8,004 deaths in 2016); and 5,540 new cases of myeloma in 2015 (3,079 deaths in 2016); 2,288 new cases of testicular cancer in 2015 (57 deaths in 2016); 9,921 new cases of pancreatic cancer in 2015 (9,263 deaths in 2016); 11,432 new cases of brain cancer in 2015 (5,250 deaths in 2016); 46,388 new cases of lung cancer in 2015 (and 35,620 deaths in 2016). In the US in 2014 there were 24,050 new cases of myeloma.

Each year there are steady increases in the numbers of new cancers in the UK and increases in deaths from the same cancers, with no treatments making any difference to the numbers.

Why did the European Commission set up the Standing Committee on Plants, Animals, Food and Feed to make decisions that affect human health?

I wrote to the European Ombudsman: "*It is totally unacceptable, possibly negligent or even criminal, for the European Union to allow a group of plant scientists on the **Standing Committee on Plants, Animals, Food and Feed,** whose knowledge of human physiology is so out of date that they do not recognise that glyphosate has effects on humans, **to make decisions that affect human health***."
She dismissed my complaint.

European Legislation was set up for the benefit of the agrochemical industry: exchanges between Monsanto Europe and the Health Commissioner confirm this
Monsanto Europe replied to Health Commissioner Andriukaitis on 04/04/2016 to say that the 24 Glyphosate Task Force GTF members were prepared to grant very limited access to the data. [64]
From this very revealing letter we learn that the current EU legislation is set up to "*protect intellectual property and confidential information from public disclosure.…All confidential data …shall be deleted or redacted (Regulation 1107/2009, Article 63*)." Much of the industry data submitted to the German Rapporteur Member State was redacted.

[64] https://ec.europa.eu/commission/sites/cwt/files/letter_1.pdf

European Commission decision on middle management staff [65]

Page 2 (2) Middle managers should not only have a *very good knowledge of their subject areas*, they should also be outstanding in managing work and people.
Page 5 Article 4 The role of heads of unit is regarded as particularly important. They shall possess specific management (i.e. work organisation, people management and, where relevant, financial resources management) competencies and *an appropriate degree of specialist knowledge and technical expertise.*

On 15/03/2017 European Chemicals Agency declared that glyphosate wasn't a carcinogen[66]

But glyphosate is classified as a substance that causes serious eye damage and is toxic to aquatic life with long lasting effects. However, Jack de Bruijn, in charge of risk assessment, explained that ECHA's role is in the labelling and classification of chemicals. "*We only look at the hazardous properties of a chemical,*" he said, *"not at the risks that occur when you use a chemical."*

The European Parliament has no legislative function in the approvals process

According to the European Glyphosate Task Force, the renewal process is legislated for by means of a Commission Regulation (No. 1107/2009). Therefore, the European Parliament has no legislative function within the framework of the approval process. [67]

Weedkiller found in non-organic food around the world

Weed killer found in granola and crackers, internal FDA emails show [68]

"I have brought wheat crackers, granola cereal and corn meal from home and there's a fair amount in all of them," FDA chemist Richard Thompson wrote to colleagues in an email last year regarding glyphosate. Thompson, who is based in an FDA regional laboratory in Arkansas, wrote that broccoli was the only food he had "on hand" that he found to be glyphosate-free.
That internal FDA email, dated January 2017, is part of a string of FDA communications that detail agency efforts to ascertain how much of the popular weedkiller is showing up in American food. The tests mark the agency's first-ever such examination. The FDA is charged with annually testing food samples for pesticide residues to monitor for illegally high residue levels. The fact that the agency only recently started testing for glyphosate, a chemical that has been used for over 40 years in food production, has led to criticism from consumer groups and the Government Accountability Office (GAO)"

Weed killer found in UK cereals marketed for children

We read an article in the *Guardian* in August 2018 about the weedkiller Roundup being found in US oat-based cereals marketed for young children. But the *Guardian* said "*There was no indication that the claims related to products sold outside the US*.**"** In view of the reassurance by the *Guardian,* we bought four oat-based cereals from our local Co-op in Killay, Swansea, South Wales and sent samples of them to the Health Research Institute in Fairfield, Iowa. In October, I had some alarming results. Dr John Fagan wrote that they were "*shockingly high levels*". He said, "*to think they are being given to children.*"

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[65] https://ec.europa.eu/info/sites/info/files/european-commission-decision-on-middle-management-staff_3288_c_2016_en.pdf
[66] https://echa.europa.eu/-/glyphosate-not-classified-as-a-carcinogen-by-echa
[67] http://www.glyphosate.eu/system/files/sidebox-files/renewal_process_for_glyphosate_faqs_0.pdf
[68] https://www.theguardian.com/us-news/2018/apr/30/fda-weedkiller-glyphosate-in-food-internal-emails Carey Gillam, 30 April 2018.

Type of breakfast cereal marketed for children Product description	Glyphosate level ng/g	AMPA ng/g	Effective glyphosate level ng/g
Kelloggs No added sugar granola with Apricot & pumpkin seeds	499.90	ND	499.90
Quaker/Oat So simple/Original Microwaveable Oats	464.23	24.04	500.28
Weetibix Oatibix 100% wholegrain oats	318.85	16.96	344.28
Nestle Multigrain Cheerios Whole Grain Oat Flour 29.6% Whole Grain Wheat 29.6% Whole Grain Barley Flour 17.9% Whole Grain Corn Flour 2.1% Whole Grain Rice Flour 2.1%.	137.29	ND	137.29

The *Daily Mail* published them. [69]

The EU and glyphosate: it's time to put children's health before pesticides

The UN expert on Toxics, Baskut Tuncak wrote in the *Guardian* on 06/11/2017: The EU and glyphosate: it's time to put children's health before pesticides [70]

"A pending decision on Monsanto's ubiquitous weedkiller is a crucial opportunity to protect our children from the toxic cocktail of pesticides polluting their food, water and play areas."

*"Our children are growing up exposed to a toxic cocktail of weedkillers, insecticides, and fungicides. It's on their food and in their water, **and it's even doused over their parks and playgrounds.** Many governments insist that our standards of protection from these pesticides are strong enough. But as a scientist and a lawyer who specialises in chemicals and their potential impact on people's fundamental rights, I beg to differ. Last month it was revealed that in recommending that glyphosate – the world's most widely-used pesticide – was safe, the EU's food safety watchdog copied and pasted pages of a report directly from Monsanto, the pesticide's manufacturer. Revelations like these are simply shocking.*

The UN Convention on the Rights of the Child, the most ratified international human rights treaty in the world (only the US is not a party), makes it clear that states have an explicit obligation to protect children from exposure to toxic chemicals, from contaminated food and polluted water, and to ensure that every child can realise their right to the highest attainable standard of health. These and many other rights of the child are abused by the current pesticide regime. These chemicals are everywhere and they are invisible. The only way to protect citizens, especially those disproportionately at risk from exposure, is for governments to regulate them effectively, in large part by adhering to the highest standards of scientific integrity.

Paediatricians have referred to childhood exposure to pesticides as creating a "silent pandemic" of disease and disability. Exposure in pregnancy and childhood is linked to birth defects, diabetes, and cancer. Because a child's developing body is more sensitive to exposure than adults and takes in more of everything – relative to their size, children eat, breathe, and drink much more than adults – they are particularly vulnerable to these toxic chemicals. Increasing evidence shows that even at "low" doses of childhood exposure, irreversible health impacts can result. But, most victims cannot prove the cause of their disability or disease, limiting our ability to hold those responsible to account. In light of revelations such as the copy-and-paste scandal, a careful re-examination of the performance of states is required. The overwhelming reliance of regulators on industry-funded studies, the exclusion of independent science from assessments, and the confidentiality of studies relied upon by authorities must change."

[69] https://www.dailymail.co.uk/health/article-6315209/Revealed-UK-cereals-contain-potentially-harmful-amounts-WEEDKILLER.html

[70] https://www.theguardian.com/environment/2017/nov/06/the-eu-and-glyphosate-its-time-to-put-childrens-health-before-pesticides

UN Rapporteur: Report of the Special Rapporteur on the right to food: Pesticides are "global human rights concern" and UN experts urge new treaty[71]

The United Nations received a report by the Special Rapporteur on the right to food, presented to the United Nations Human Rights Council, focused more narrowly on agricultural chemicals. The UN report states unequivocally that the storyline perpetuated by companies like Monsanto—the one that says we need pesticides to feed the world—is a myth. [72] The Report presented to the UN human rights council on 08/03/2017, is severely critical of the global corporations that manufacture pesticides, accusing them of the "*systematic denial of harms*", "*aggressive, unethical marketing tactics*" and heavy lobbying of governments which has "*obstructed reforms and paralysed global pesticide restrictions*".

Assessment of Glyphosate Induced Epigenetic Transgenerational Inheritance of Pathologies and Sperm Epimutations: Generational Toxicology

Michael Skinner, a WSU professor of biological sciences, and his colleagues exposed pregnant rats to the herbicide glyphosate between their eighth and 14th days of gestation. The dose–half the amount expected to show no adverse effect–produced no apparent ill effects on either the parents or the first generation of offspring. But writing in the journal *Scientific Reports*, the researchers say they saw "dramatic increases" in several pathologies affecting the second and third generations. The second generation had "significant increases" in testis, ovary and mammary gland diseases, as well as obesity. In third-generation males, the researchers saw a 30 percent increase in prostate disease – three times that of a control population. The third generation of females had a 40 percent increase in kidney disease, or four times that of the controls. More than one-third of the second-generation mothers had unsuccessful pregnancies, with most of those affected dying. Two out of five males and females in the third generation were obese.

Skinner and his colleagues call this phenomenon "generational toxicology" and they've seen it over the years in fungicides, pesticides, jet fuel, the plastics compound bisphenol A, the insect repellant DEET and the herbicide atrazine. At work are epigenetic changes that turn genes on and off, often because of environmental influences.

Rosemary Mason 20 August 2019

[71] http://www.pan-uk.org/site/wp-content/uploads/United-Nations-Report-of-the-Special-Rapporteur-on-the-right-to-food.pdf

[72] http://apps.who.int/iris/bitstream/10665/254678/1/WHO-FWC-IHE-17.01-eng.pdf?ua=1