



20 Jahre Grüne Gentechnik und Agrarökologie



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Lösungsversprechen der Gentechnik

Grosse Ziele und Hoffnungen:

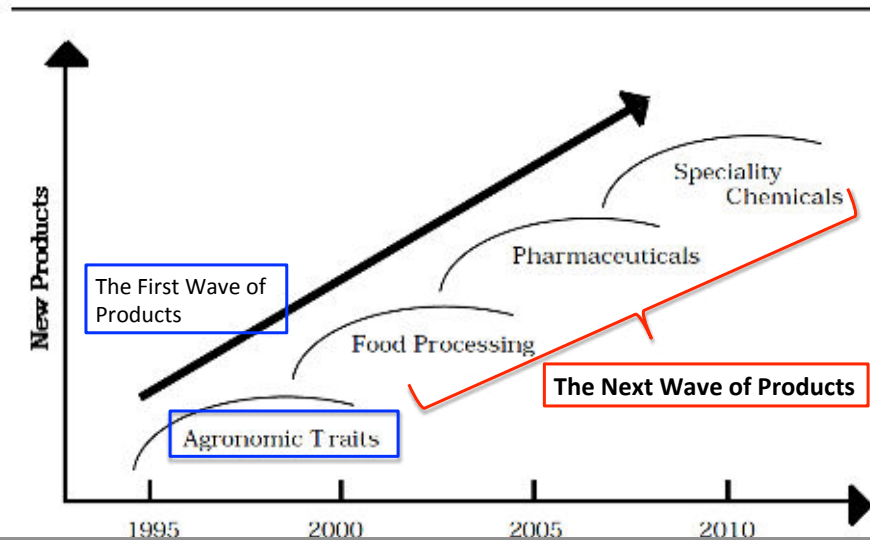
- Höhere Erträge
- Reduktion oder Abschaffung des Welthungers/
Armut
- Besserer Schutz der Gesundheit
- Schutz und Einsparung von Wasser
- Lösungsoptionen für Klimawandel
- Schutz der Biodiversität



<http://d1jkwgdw723xjf.cloudfront.net/wp-content/uploads/2014/06/Annual-Report-2013.pdf>

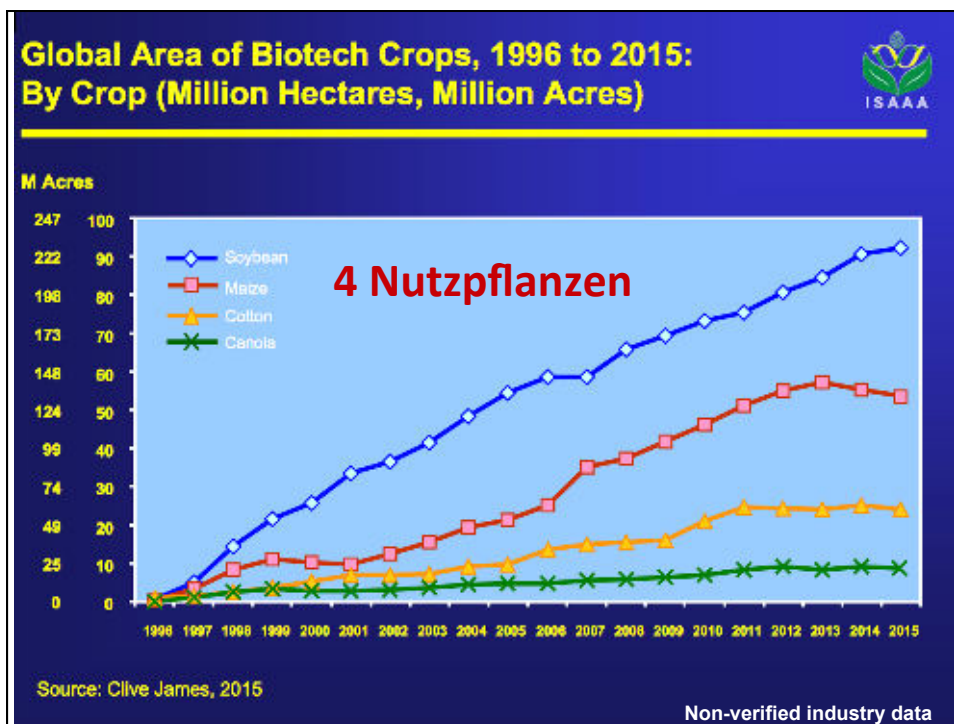
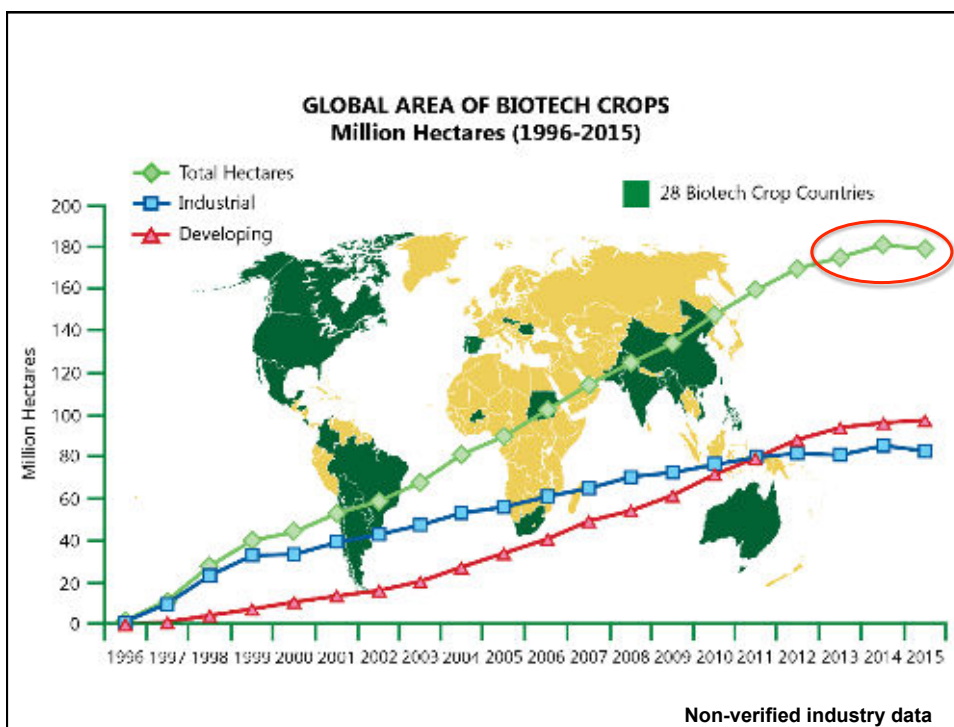
The Contributions of Plant Biotechnology to Agriculture in the Coming Decades, R. T. Fraley
 Krattiger, A.F. and A. Rosemarin. 1994. Biosafety for Sustainable Agriculture: Sharing
 Biotechnology Regulatory Experiences of the Western Hemisphere.

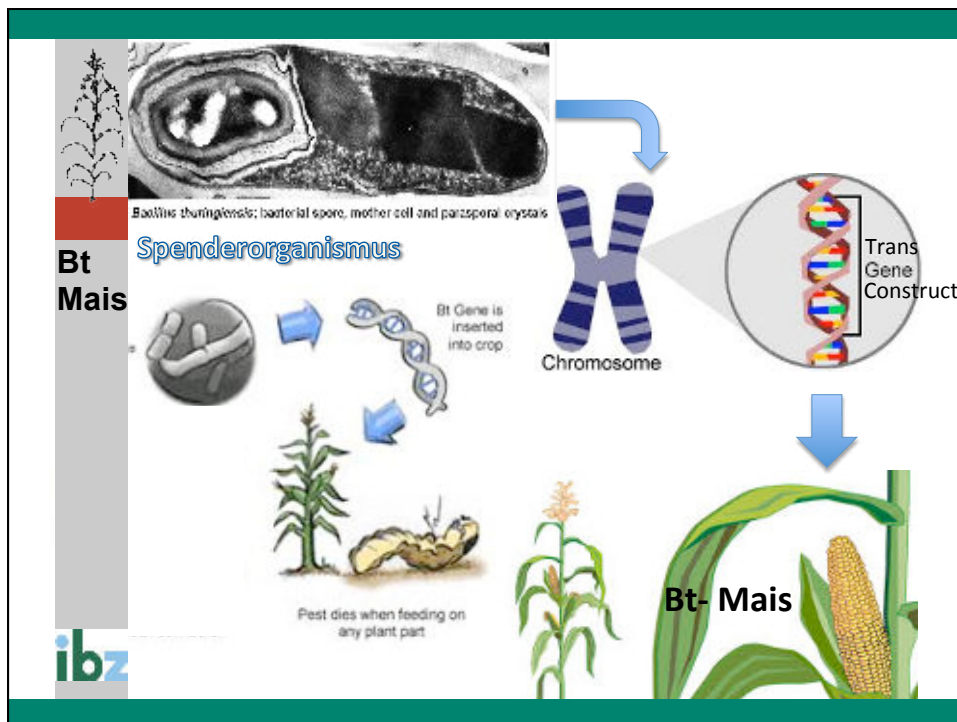
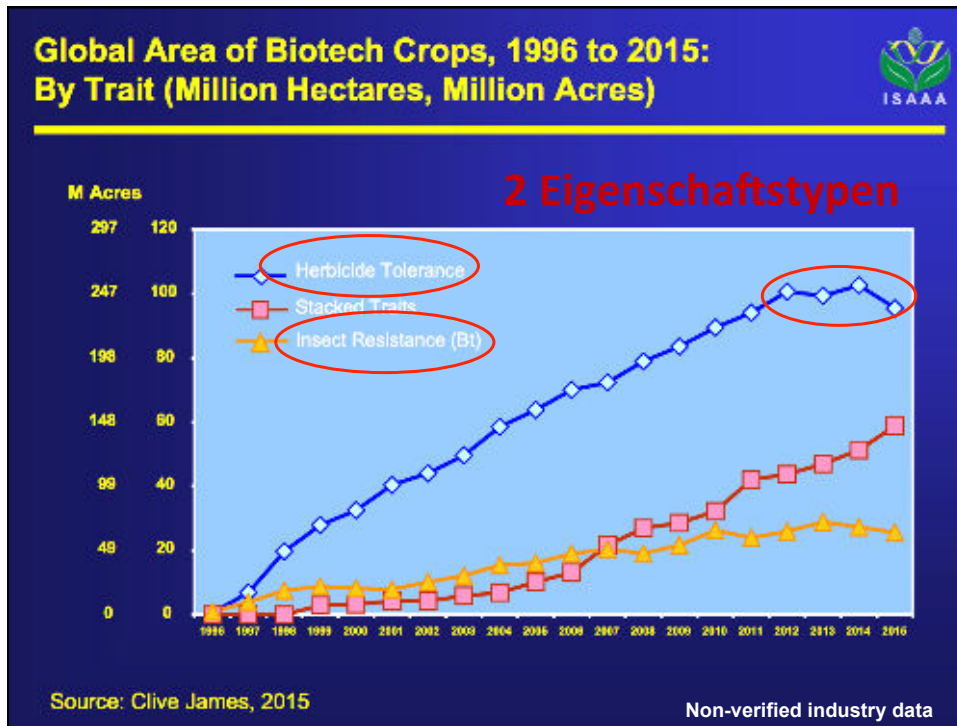
Figure 2: Plant Biotechnology Promises to Deliver Many New Products in Coming Decades

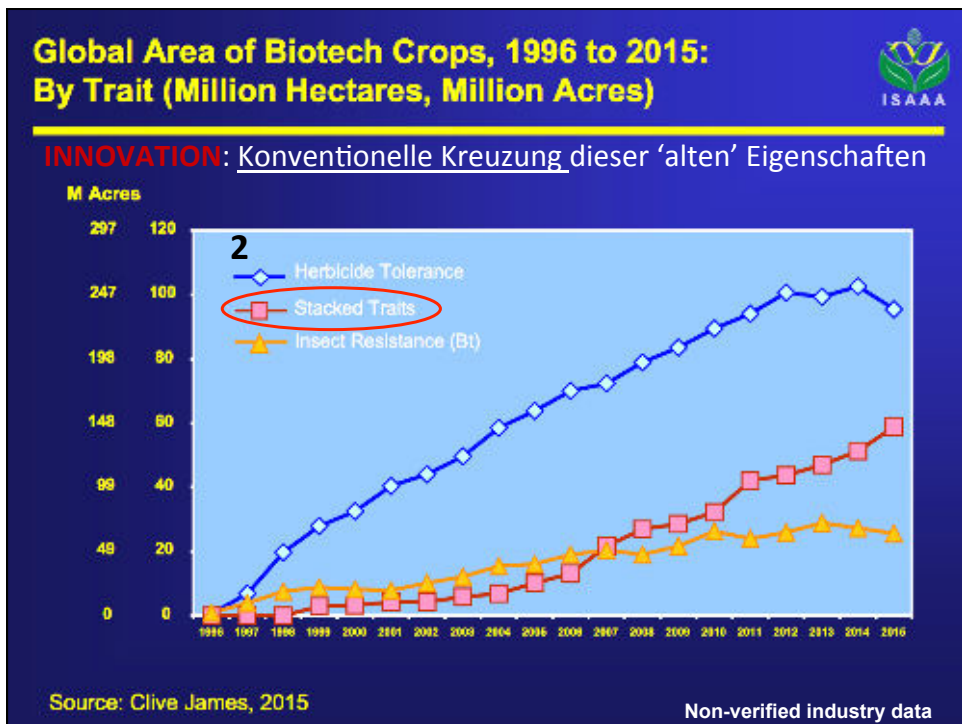


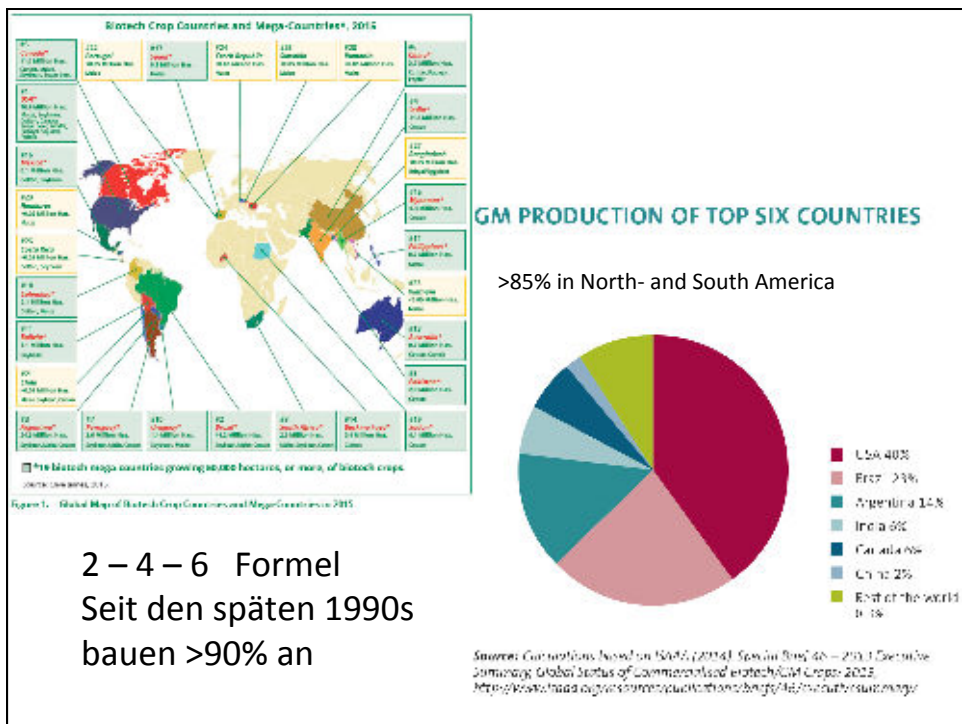
Ein Realitätscheck

Aktuelle GV Nutzpflanzen im Anbau










Andere Eigenschaften – zum Beispiel:

- Virusresistenz
- Veränderung Inhaltsstoffe
- (e.g. Stärkezusammensetzung – Amflora, Ölzusammensetzung, etc.)
- Standortanpassungen (Trockenheit, etc.)



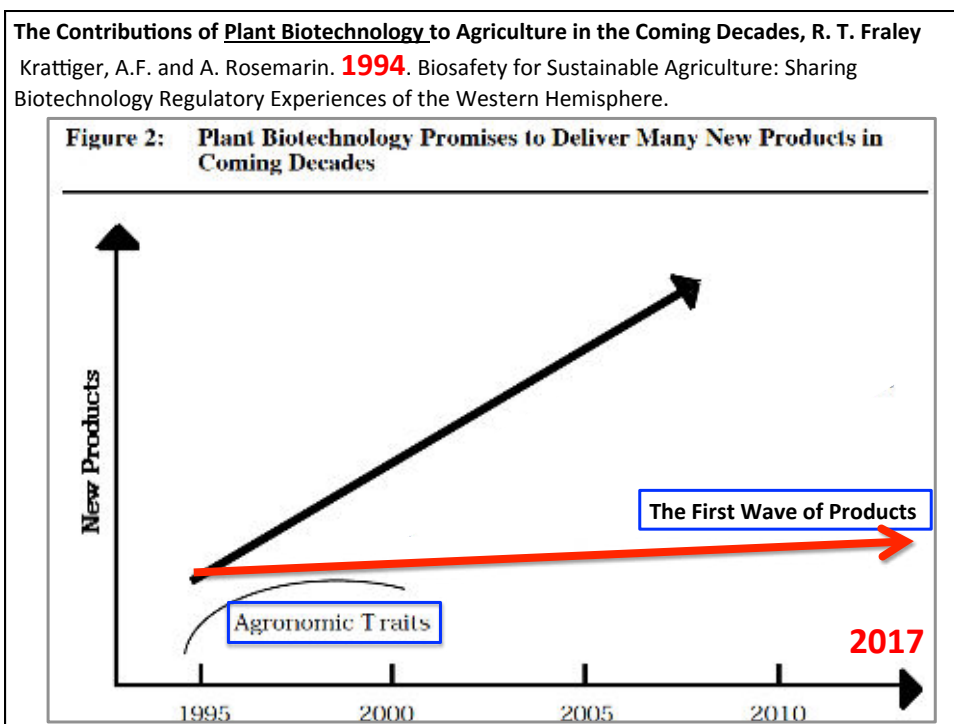
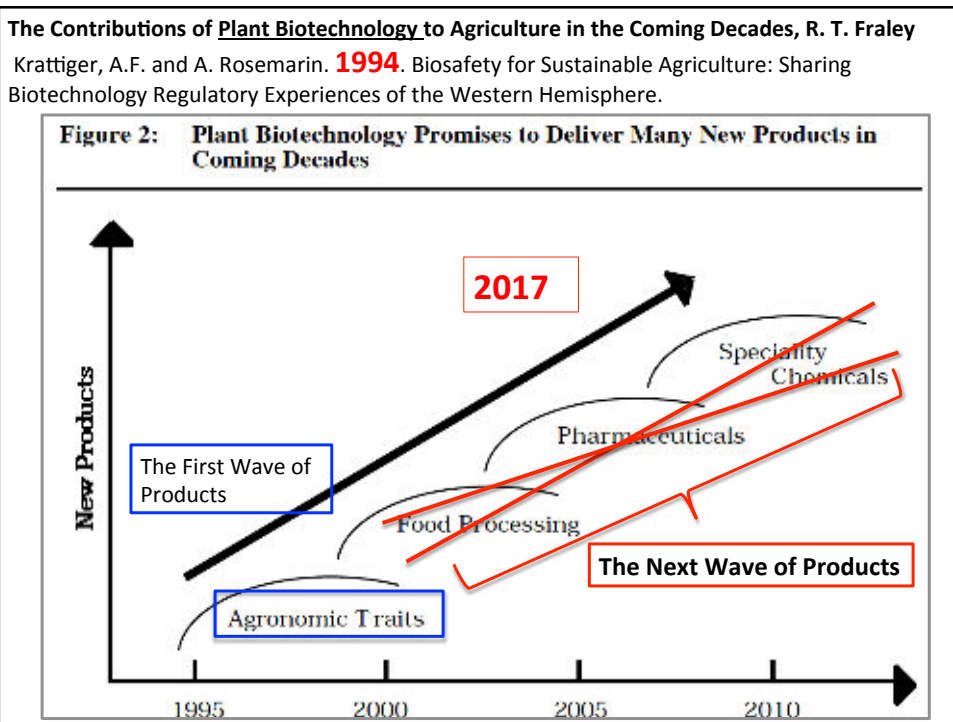
Legend:
■ H&R
■ Other traits (not successfully developed)


Source: Based on: *ISV Act (Special 2014)* <http://www.isv.de/ressourcen/publications/brief/44/boxquerschnittsreport> and *Nature Special Report: GM3: Crops, Forage and Livestock* <http://www.nature.com/nature/climate/comm/prop/indocum>

**Der arktische Apfel – zugelassen
Frühjahr 2015 - Nicht-bräunend**




Arctic
APPLES





Risikoabschätzung



Risiken

Konkurrierende Narrativen

TYP I Ganzheitliche Nutzenvereinnahmung vs enge Risikoanalyse	TYP II Risikoanalyse wie Nutzenanalyse
KEIN PROBLEM	VIELE PROBLEME




Bt Pflanzen

Für den agrar-industriellen Anbau zur Rohstoffproduktion



Breiter 'holistischer' Nutzen – **Gentechnik** -relevant

Insekten-resistente Pflanze **Reduzierter** Pestizideinsatz



Bt Toxin

gegen Zielschädling

VT DOUBLE PRO CORN

- Keine Pestizidanwendung gegen Zielschädlinge – geringere Exposition und Gefährdung der Umwelt und Menschen
- Vereinfachte Schädlingskontrolle
- Wirtschaftlicherer Anbau
- Mehr Einkommen, besseres Leben, etc

Breite 'holistische' Risiken

Insekten-resistente Pflanze

Erhöhter Pestizideinsatz



Bt Toxin



gegen Nicht-Zielschädlinge



- Resistenzen in Zielorganismen
- Sekundärschädlinge
- Auswirkungen auf Nichtzielorganismen in Nahrungskette (einschl. nützlicher Insekten) – Biodiversitätsauswirkungen im Feld
- Zunahme des Pestizideinsatzes (gegen Ziel- und Sekundärschädlinge)

Engen Risiken – nicht gentechnik-relevant

Insekten-resistente Pflanze

~~Erhöhter Pestizideinsatz~~



Bt Toxin



gegen Nicht-Zielschädlinge



- ~~• Resistenzen in Zielorganismen~~
- ~~• Sekundärschädlinge~~
- ~~• Auswirkungen auf Nichtzielorganismen in Nahrungskette (einschl. nützlicher Insekten) – Biodiversitätsauswirkungen im Feld~~
- ~~• Zunahme des Pestizideinsatzes (gegen Ziel- und Sekundärschädlinge)~~



Herbizid-resistente Pflanzen

Für den agrar-industriellen Anbau zur Rohstoffproduktion



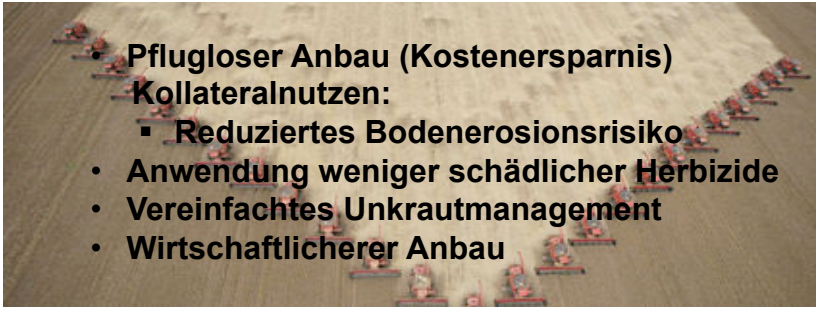

Breiter, 'holistischer' Nutzen - **Gentechnik-relevant**

Glyphosat-resistente
GV Pflanze



+

Glyphosat-basierte Herbizide

- Pflugloser Anbau (Kostensparnis)
- Kollateralnutzen:
 - Reduziertes Bodenerosionsrisiko
- Anwendung weniger schädlicher Herbizide
- Vereinfachtes Unkrautmanagement
- Wirtschaftlicherer Anbau

The Contributions of Plant Biotechnology to Agriculture in the Coming Decades, R. T. Fraley Krattiger, A.F. and A. Rosemarin. **1994**. Biosafety for Sustainable Agriculture: Sharing Biotechnology Regulatory Experiences of the Western Hemisphere.

“Herbicide-tolerant plants will have the **positive impact of shifting overall herbicide usage through substitution of more effective and environmentally acceptable products.**”

“The commercial strategy behind engineering herbicide tolerance is to gain market share through a shift in herbicide use, **not to increase the overall use of herbicides as is popularly held by critics** (Goldburg et al., 1990).”

Breiter, ‘holistischer’ Risiken

**Glyphosat-resistente
GV Pflanze**



—

Glyphosat-basierte Herbizide

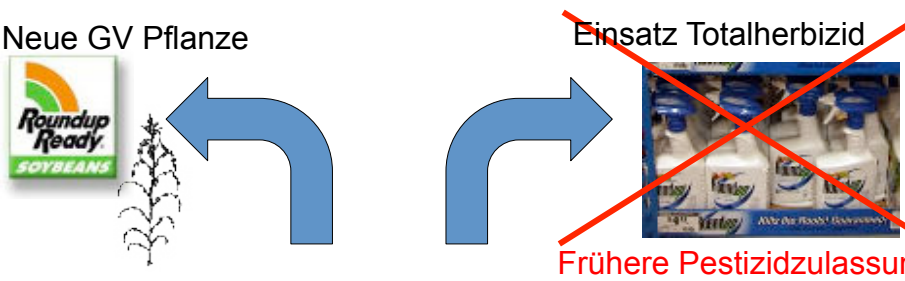


- **Resistenzen und Superunkräutern**
→ Anwendung alter, toxischerer Herbizide nötig
- **Rückstandsproblematik im Erntegut**
- **Umweltprobleme: reduzierte Aktivität der Bodenmikroben, reduzierte Mikronährstoffverfügbarkeit, erhöhte Düngung nötig, massiv reduzierte Biodiversität**

Enge, 'reduktionistische' Risiken

Neue GV Pflanze

Einsatz Totalherbizid



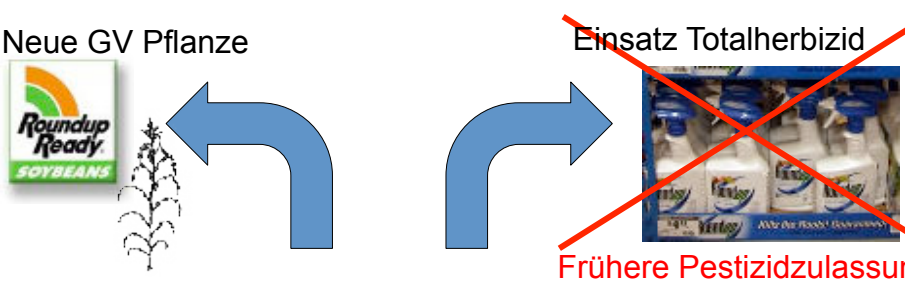
Frühere Pestizidzulassung

- Resistenzen und Superunkräutern
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Umweltwirkungen



Ökologische Effekte:


Bt Pflanzen – produziert Insektengift aus *Bacillus thuringiensis*:

- Neue oder Sekundär-Schädlinge
- Adverse Effekte auf Nützlinge
- Schädlingsresistenz

TRANSGENIC PLANTS AND INSECTS

Western Bean Cutworm, *Striacosta albicosta* (Smith) (Lepidoptera: Noctuidae), as a Potential Pest of Transgenic Cry1Ab *Bacillus thuringiensis* Corn Hybrids in South Dakota

MICHAEL A. CATANGUI¹ AND ROBERT K. BERG
Department of Plant Sciences, South Dakota State University, Brookings, SD 57007-1096



2006

Environ. Entomol. 35(5): 1409-1452 (2006)

The western bean cutworm is an emerging or potential pest of transgenic Bt corn in South Dakota. ... Untreated conventional corn hybrids were less infested with western bean cutworm larvae but more infested with European corn borer larvae.

...

Results from this study underscore the need to investigate other emerging or potential arthropod pests of transgenic Bt corn hybrids in addition to the western bean cutworm.

Offener Brief an Saatgut-Industrie :




2016

“Over the next decade, the pest began to move deeper into the Midwest, eventually establishing itself as a threat to cornfields as far east as New York and Pennsylvania and as far north as Ontario.” **Non/Target** ➡ **Secondary pest (replacing others)**

“**WBC is now the PRIMARY Lepidopteran ear pest** in many parts of the Great Lakes region.”
“We also urge the industry to regard western bean as a **primary, not a secondary, pest.**”

Non/Target ➡ **Secondary pest (replacing others)** ➡ **Primary pest**

<http://blogs.cornell.edu/ccfieldcropnews/2016/10/04/an-open-letter-to-the-seed-industry-regarding-the-efficacy-of-cry1f-bt-against-western-bean-cutworm-october-2016/>; https://www.dtnpf.com/agriculture/web/ag/news/crops/article/2016/10/05/herculex-trait-fails-western-bean-4?referrer=twitter#.V_pK2lHBh9g.twitter






Other predictable nontarget pests

nature International weekly journal of science

GM crop use makes minor pests major problem - Pesticide use rising as Chinese farmers fight insects thriving on transgenic crop.

Jane Qiu

Published online 13 May 2010 | Nature | doi:10.1038/news.2010.242

Wenig bis keine unabhängigen, wissenschaftlichen Publikationen. Dagegen viele Medienberichte


Secondary pests reported from India


Punjab whitefly epidemic: We need a new ... - The Indian Express
indianexpress.com > Blogs > [Diese Seite übersetzen](#)
 15.10.2015 - A whitefly epidemic has devastated 60 per cent of the Bt cotton crop in Punjab and farmers have used 10-12 sprays, each costing Rs 3,200.

Whitefly lessons | The Indian Express
indianexpress.com > Opinion > Editorials > [Diese Seite übersetzen](#)
 23.10.2015 - Widespread damage to cotton from whiteflies in large parts of North India has led many to blame it on Bt gene technology. Environmental ...

Whitefly fear: Cotton acreage drops to 61-year low - Times of India
timesofindia.indiatimes.com > City > Chandigarh > [Diese Seite übersetzen](#)
 10.07.2016 - Fear of another attack of whitefly pest, which ravaged huge tracts of ... When a Bt Cotton pod breaks the flying SHORTER LENGTH LINT gi.

Pest blights India's GM cotton crop, fuelling debate over risks | Reuters
www.reuters.com/.../us-india-cotton-whitefly-idUSKCN0S30QW... > [Diese Seite übersetzen](#)
 09.10.2016 - Two Indian states are suffering the first major pest infestation since the ... Damage from the whitefly attack on the Bt cotton variety in the states of ...





Cross-order and cross-phylum activity of *Bacillus thuringiensis* pesticidal proteins


Kees van Frankenhuyzen*

Great Lakes Forestry Centre, Canadian Forest Service, Natural Resources Canada, 1219 Queen Street East, Sault Ste. Marie, Ontario P6A 2E5, Canada
Journal of Invertebrate Pathology 114 (2013) 76–85

Cross activities reported for 27 proteins affecting 69 taxa

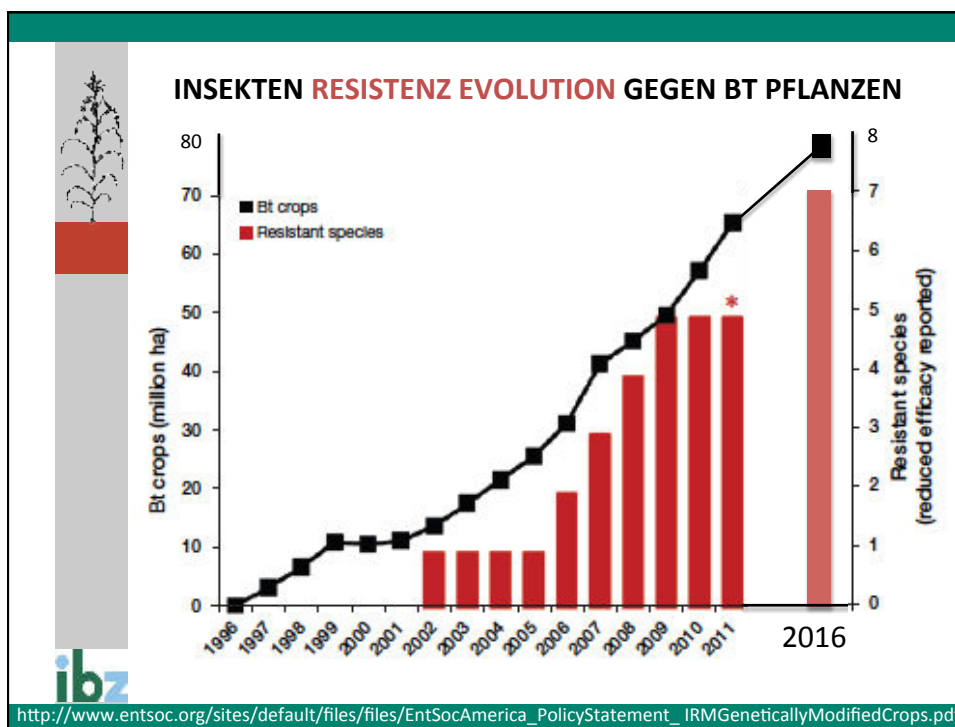
Kreuzaktivität für 27 (Bt) Proteine auf 69 (Insekten) taxa berichtet


13 cross-activities are in the low-toxicity range (10–1000 µg/ml), 12 in the medium – (0.10–10 µg/ml) and two in the high-toxicity range (0.01–0.10 µg/ml).



Wissenschaftliche Publikationen zu Effekte von Bt Toxinen und Bt Pflanzen auf Nichtzielorganismen


Nontarget organisms	Effects	Publications
Terrestrial insects		
<i>Tetranychus urticae</i> and <i>Phytoseiulus persimilis</i>	Behavior: prey preference	Zemkova Rovenska et al. 2005,
<i>Chrysoperla carnea</i> & apids	Behavior: prey preference	Meier and Hilbeck 2001
<i>Harmonia axyridis</i>	Abundance in field, adult life span	Stephens et al. 2012
<i>Henosepilachna vigintioctomaculata</i>	Survival	Song et al. 2012
<i>Adalia bipunctata</i>	Survival	Schmidt et al. 2009, Hilbeck et al. 2012
<i>Cheilomenes sexmaculatus</i>	Survival, adult emergence	Dhillon and Sharma 2009
<i>Propylea japonica</i>	Development, behavior	Zhang et al. 2006a,b,c
<i>Coleomegilla maculata</i>	Development time	Moser et al. 2008
<i>Chrysoperla carnea</i>	Survival	Hilbeck et al. 1998a,b, 1999
<i>Eisenia fetida</i>	growth, reproduction, enzyme activity	Shu et al. (2015)
<i>Lumbricus terrestris</i> (earthworm)	Weight, growth	Zwahlen et al. 2003
Dung beetles	Community composition	Campos and Hernandez (2015)
Aquatic insects		
<i>Daphnia magna</i>	Sexual maturation, egg production	Bohn et al. (2008, 2010)
Crane flies	Growth	Jensen et al. 2010
Chironomidae		Prihoda & Coats 2008
<i>Lepidostoma liba</i> and <i>Helicopsyche borealis</i>	Growth, survival	Rosi-Marshall et al. (2007), Chambers et al. (2010)
<i>Aquatic insects - litter feeders</i>	Community composition	Axelsson et al. (2011)
Others		
<i>Cantareus aspersus</i> (Snail)	Growth rates	Kramarz et al. 2009
Cray fish		Linn and Moore 2014





Ökologische Effekte:

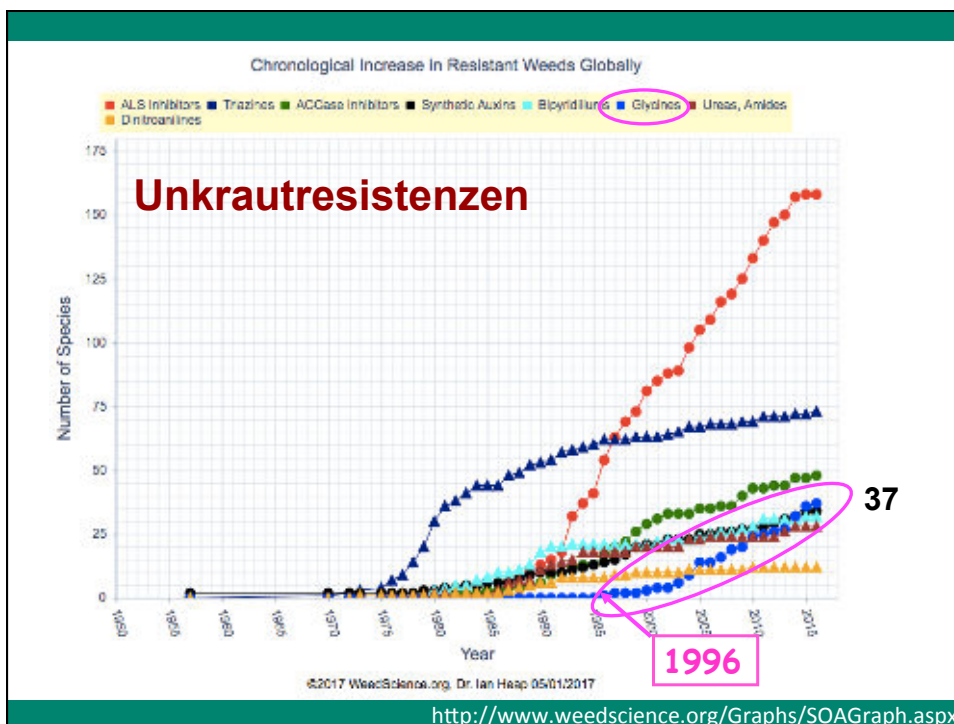
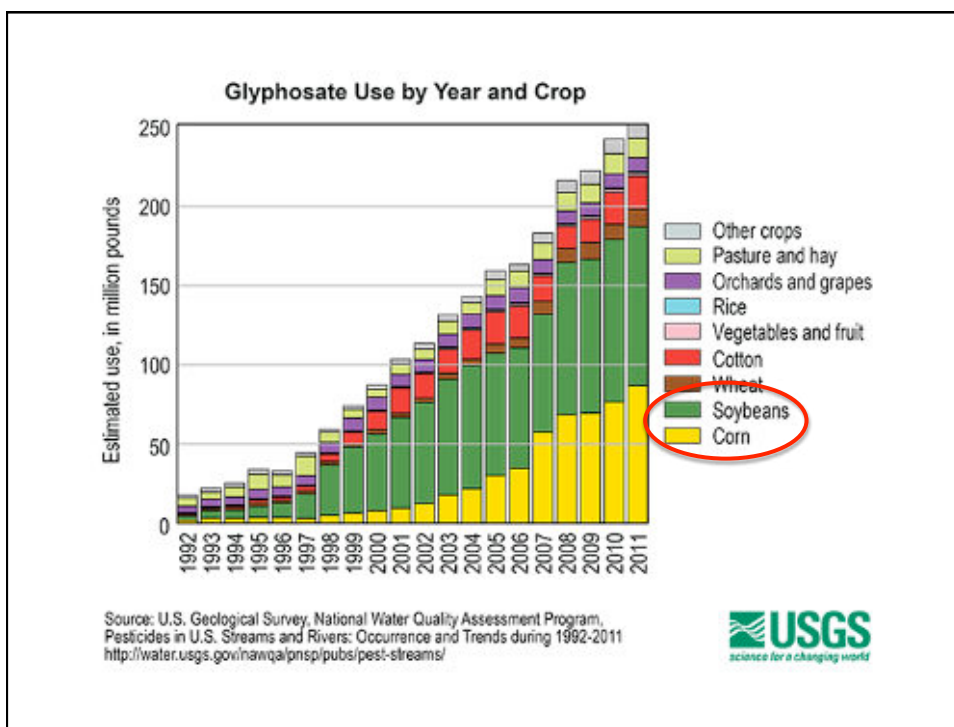
**HR Pflanzen – resistent gegen
Totalherbizide**

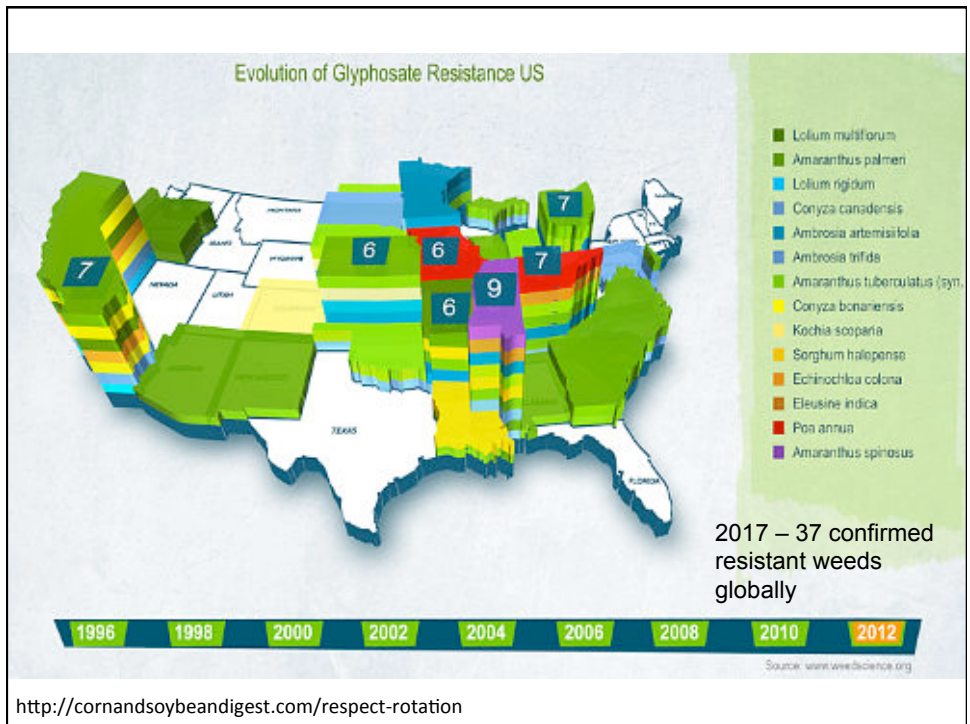



Adverse Effekte durch Herbizideinsatz



- Resistenzen und Superunkräutern
 → Anwendung alter, toxischerer Herbizide nötig
- Rückstandsproblematik im Erntegut
- Umweltprobleme: reduzierte Aktivität der Bodenmikroben, reduzierte Mikronährstoffverfügbarkeit, erhöhte Düngung nötig, massiv reduzierte Biodiversität







Probleme

1) Grenzwerte für Glyphosatrückstände werden überschritten

LÖSUNG – ad-hoc:


Anhebung des Grenzwerts per politischem/regulatorischem Entscheid

EU seit 2002: erhöhte ADI* auf 0.3mg Glyphosate pro kg Körpergewicht pro Tag (von 0.1mg, bzw. Nachweisgrenze**) - 20 kg Kind – **6 mg** Glyphosat pro Tag

FAO seit 2004: erhöhte ADI auf 1 mg/kg/day:
20 kg Kind – **20 mg** Glyphosat pro Tag

**COUNCIL DIRECTIVE of 24 July 1986 on the fixing of maximum levels for pesticide residues in and on cereals (86/362/EEC) - http://publications.europa.eu/resource/ellar/34582525-ea75-417e-8fc5-399fcb7e1dda.0004.01/DOC_1

*Acceptable Daily Intake – Akzeptable tägliche Einnahme



Year ADI was set for each food/feed	Crop	Increase of international MRL (from – to)	(multiple)
1997 [14]	Soybeans	5 - 20mg/kg	(x4)
	Soybean fodder	20 - 200mg/kg	(x10)
1999 [15]	Cotton seed	0.5 - 10 mg/kg	(x20)
	Maize grain	0.1 - 1 mg/kg	(x10)
	sorghum	0.1 - 20 mg/kg	(x200)
2006 [16]	Cotton seed	10 - 40 mg/kg	(x4)
	(EU MRL remains 10 mg/kg)		
	Maize grain	1 - 5 mg/kg	(x5)
	(EU MRL remains 1 mg/kg)		
	Barley straw and fodder	None - 400 mg/kg	
2012 [17]	Grass hay	50 - 500 mg/kg	(x10)
	Lentils	0.1 - 5 mg/kg	(x50)
	(EU MRL increased to 10 mg/kg)		
	Sweetcorn	0.1 - 3 mg/kg	(x30)
Sugar beet	1 - 20 mg/kg	(x20)	

MRL = Maximum residue level (maximale Rückstandskonzentration)

https://www.foeeurope.org/sites/default/files/press_releases/foee_4_human_contamination_glyphosate.pdf

EXPOSITION – gemessen am Feld in Argentinien

Table: Overview of results (numbers in bold exceed MRL of 20 mg/kg)

#	Residue (mg/kg), June 2013			Residues (mg/kg), Sept. 2013		
	Glyphosate (acid)	AMPA	Glyphosate (Sum)	Glyphosate (acid)	AMPA	Glyphosate (Sum)
M1	5,3	<0,05	<5,34			
M2	7,4	6	16,54	1,4	10	16,63
M3	11,6	<0,05	<11,67	7,5	46	77,54
M4	22,5	18,1	50,06			
M5	18,8	13,7	39,66			
M6	11	13,2	31,10	12	12	30,27
M7	19,4	22,6	53,81			
M8	11,3	23,6	47,23			
M9	25,8	47	97,36	16,2	52,5	96,14
M10	14,3	<0,05	<14,38			
M11	23,9	33,8	75,36	4	46,5	74,80

AMPA has a molecular weight of 111.04. Glyphosate has a molecular weight of 169.07, the AMPA residues were thus calculated with a factor of 1,52 for generate a Glyphosate equivalent. (Glyphosate acid + (AMPA*1.52) = Glyphosate (sum)). Moisture of the samples was around 6 percent.

Testbiotech report: www.testbiotech.de/en/node/926

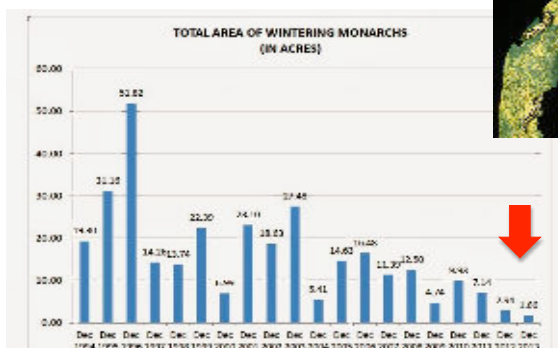
Umweltprobleme – Grosse Biodiversitätsverluste -

Beispiel: MONARCH Schmetterling in USA

2014 – Monarch vom Aussterben bedroht

“The main cause of the monarch butterfly's decline is **the loss of milkweed** — its food — in its U.S. breeding grounds, a new study has found. That all but confirms that the **spread of genetically modified crops** is **indirectly killing the monarch.**”*

HR und Bt gestapelte Maissorten + HR Sojabohnen



*<http://www.cbc.ca/news/technology/monarch-butterfly-decline-linked-to-spread-of-gm-crops-1.2665131>



Glyphosate-basierte Herbizide reduzieren die Aktivität und Reproduktion von Regenwürmer

Mailin Gaupp-Berghausen, Martin Hofer, Boris Rewald & Johann G. Zaller
Scientific Reports 5, Article number: 12886 (2015) doi:10.1038/srep12886

We demonstrate, that **Reproduction of the soil dwellers was reduced by 56%** within three months after herbicide application.


Herbicide application led to **increased soil concentrations of nitrate by 1592% and phosphate by 127%**, pointing to potential risks for nutrient leaching into streams, lakes, or groundwater aquifers.

These sizeable herbicide-induced **impacts on agroecosystems are particularly worrisome because these herbicides have been globally used for decades.**



<http://www.nature.com/articles/srep12886>


EXPOSITION



Contents lists available at ScienceDirect

Reproductive Toxicology

Journal homepage: www.elsevier.com/locate/fraprotex



Maternal and fetal exposure to pesticides associated to genetically modified foods in Eastern Townships of Quebec, Canada

Aziz Aris^{a,b,c,*}, Samuel Leblanc^c


^aDepartment of Obstetrics and Gynecology, University of Montreal Hospital Centre, Montreal, Quebec, Canada
^bGlobal Research Centre of Sherbrooke University Hospital Centre, Sherbrooke, Quebec, Canada
^cFaculty of Medicine and Health Sciences, University of Sherbrooke, Sherbrooke, Quebec, Canada

Serum 3-MPPA and CryAb1 toxin were detected in PW, their fetuses and NPW. This is the first study to reveal the presence of circulating PAGMF in women with and without pregnancy, paving the way for a new field in reproductive toxicology including nutrition and utero-placental toxicities.

Rückstände von Roundup (3-MPPA) und Bt Toxinen (Cry1Ab) wurden in schwangeren und nicht schwangeren Frauen und im Fötus gefunden.

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EXPOSITION

Environmental & Analytical
Toxicology

Krüger et al., J. Environ. Anal. Toxicol. 2013, 3:5
<http://dx.doi.org/10.1072/2161-0525.1000188>

Research Article
Open Access

Field Investigations of Glyphosate in Urine of Danish Dairy Cows

Monika Krüger¹, Wieland Schrödl¹, Jürgen Neuhaus¹ and Awad Ali Shehata^{1,2,3*}

¹Institute of Bacteriology and Mycology, Veterinary Faculty, University of Leipzig, An den Tierkliniken 29, D-04103 Leipzig, Germany
²Avian and Rabbit Diseases Department, Faculty of Veterinary Medicine, Minoufiya University, Egypt
³Albert-Ludwigs-Institut für Agronomie, University Leipzig, Leipzig, Germany

Abstract

In the present study, thirty dairy cows from each of eight Danish dairy farms were investigated for excretion of glyphosate in urine. Blood serum parameters indicative of cytotoxicity as alkaline phosphatase (AP), glutamate dehydrogenase (GLDH), glutamate oxaloacetate transaminase (GOT), creatinine kinase CK), nephrotoxicity, (urea, creatine), cholesterol and the trace elements as manganese (Mn), cobalt (Co), selenium (Se), copper (Cu) and zinc (Zn) were investigated. All cows excreted glyphosate in their urine but in varying concentrations. Increased levels of GLDH, GOT and CK in cows from all farms demonstrate a possible effect of glyphosate on liver and muscle cells. High urea levels in some farms could be due to nephrotoxicity of glyphosate. Also the unexpected very low levels of Mn and Co were observed in all animals which could be explained due to a strong mineral chelating effect of glyphosate. In contrast the mean levels of Cu, Zn and Se were within the normal reference range. In conclusion, this study gives the first documentation to which extent Danish dairy cattle are exposed to Glyphosate and its impact on blood parameters.

EXPOSITION

Insgesamt ließen sich bei 99,6 Prozent von insgesamt 2000 Probanden eindeutig Glyphosatrückstände nachweisen. Die höchsten Belastungen zeigten sich bei Kindern im Alter von 0 bis neun und Jugendlichen von zehn bis 19 Jahren, nach Berufsgruppen vor allem bei Landwirten. Studienteilnehmer, die Fleisch konsumieren, wiesen höhere Belastungen als Vegetarier und Veganer auf.

Die Belastung bei 75 Prozent der untersuchten Menschen liegt um ein Fünffaches höher liegt, als es der Grenzwert für Trinkwasser zulässt. Ein Drittel der Bevölkerung hat demnach sogar eine zehnfache bis zu 42-fache Menge der für Trinkwasser zulässigen Grenzwerte im Urin.

<http://www.umweltinstitut.org/aktuelle-meldungen/meldungen/glyphosat-praktisch-jeder-belastet.html>

<http://www.umweltbundesamt.de/themen/neue-uba-untersuchung-zu-glyphosat>

EXPOSURE

EMISA (Multidisziplinärer Raum für ökologische Interaktion) von der argentinischen Universität La Plata durchforstete zahlreiche Supermärkte und Apotheken nach Baumwollprodukten aller Marken. Wattestäbchen, Tampons, Binden, Wattepad, Pflaster, Verbandsmaterial. Bei der Untersuchung bestätigte sich ihr Verdacht: „**85% der untersuchten Produkte waren Glyphosat-positiv, und 62% enthielten den Abbaustoff AMPA (Aminomethylphosphorische Säure)**“, berichtet Dr. Damián Marino, der Leiter des Forschungsprojektes.



<http://www.taz.de/!5251145/>

SPIEGEL ONLINE
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Nachrichten > Wirtschaft > Verbraucher & Service > Glyphosat > Glyphosat in Bier in beliebigen Biermarken gefunden
Geldanlage

Pestizid: Tester finden Glyphosat in beliebigen Biermarken

Das Pestizid Glyphosat steht unter Krebsverdacht. Nun hat das Umweltinstitut München den Unkrautvernichter in den 14 meistverkauften deutschen Biersorten nachgewiesen. Das Bundesinstitut für Risikobewertung sieht keine Gefahr.



GESUNDHEITSEFFEKTE**International Agency for Research on Cancer**

20 March 2015

**IARC Monographs Volume 112: evaluation of
five organophosphate insecticides and herbicides**

Lyon, France, 20 March 2015 – The International Agency for Research on Cancer (IARC), the specialized cancer agency of the World Health Organization, has assessed the carcinogenicity of **five organophosphate pesticides**. A summary of the final evaluations together with a short rationale have now been published online in The Lancet Oncology, and the detailed assessments will be published as Volume 112 of the IARC Monographs.

What were the results of the IARC evaluations?

The herbicide glyphosate and the insecticides malathion and diazinon were classified as probably carcinogenic to humans (Group 2A).

<https://www.iarc.fr/en/media-centre/iarcnews/pdf/MonographVolume112.pdf>



European Food Safety Authority

EFSA Journal 2015;13(11):4302

CONCLUSION ON PESTICIDE PEER REVIEW

**Conclusion on the peer review of the pesticide risk assessment of the active
substance glyphosate¹**

European Food Safety Authority (EFSA)²

European Food Safety Authority (EFSA), Parma, Italy

ABSTRACT

“... EFSA concluded that glyphosate is **unlikely** to pose a **carcinogenic hazard** to humans and The evidence does not support classification with regard to its carcinogenic potential according to Regulations (EC) No 1272/2008.”

http://www.efsa.europa.eu/sites/default/files/scientific_output/files/main_documents/4302.pdf

November 27, 2015

Schlagabtausch zwischen WHO IARC und EFSA zu Glyphosat/Roundup Risk Assessment

Mr. Vytenis Andriukaitis
Commissioner Health & Food Safety
European Commission
Rue de la Loi / Wetstraat 200
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Belgium

Cc: (email only)

Mr. Phil Hogan, European Commissioner for Agriculture and Human
Development
Dr. Ladislav Miko, Deputy Director General, DG Health & Food Safety
Dr. Bernhard Url, Executive Director, EFSA
Dr. Giovanni La Via, Chair, EMVI Committee
EFSA Panel on Plant Protection Products and their Residues
Mr. Christian Schmidt, Minister of Food and Agriculture
Dr. Helmut Tschiersky, President of the Federal Office of Consumer Protection
and Food Safety (BVL)
Professor Dr. Dr. Andreas Hensel, President, BfR
Dr. Christopher Wild, Director, IARC
Mr. Jim Jones, Assistant Administrator, USEPA

[http://www.zeit.de/wissen/umwelt/2015-11/
glyphosat-offener-brief.pdf](http://www.zeit.de/wissen/umwelt/2015-11/glyphosat-offener-brief.pdf)

Open letter: Review of the Carcinogenicity of Glyphosate by EFSA and BfR

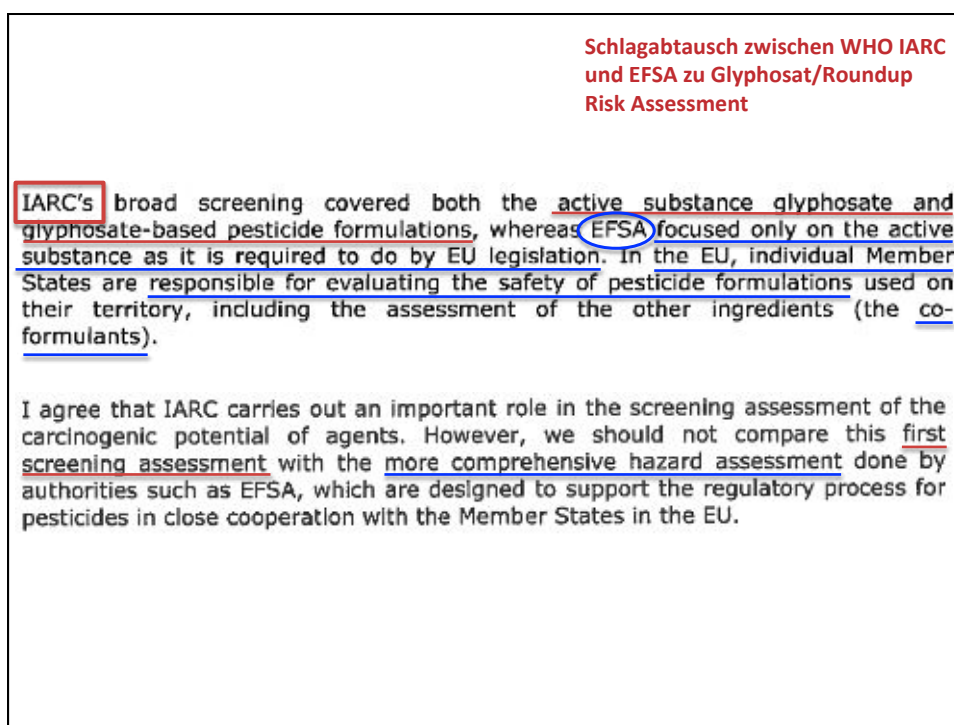
Prof. Christopher J. Portier (Corresponding Author)
Senior Contributing Scientist, Environmental Defense Fund, Washington, DC
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Adjunct Professor, Emory University, Atlanta, Georgia, USA
Honorary Professor, University of Queensland, Brisbane, Queensland, Australia
Former Director, National Center for Environmental Health, Atlanta, USA
Former Director, Agency for Toxic Substances and Disease Registry, Atlanta, USA
Former Associate Director, US National Toxicology Program, RTP, NC, USA

Schlagabtausch zwischen WHO IARC und EFSA zu Glyphosat/Roundup Risk Assessment

[http://www.zeit.de/wissen/umwelt/2015-11/
glyphosat-offener-brief.pdf](http://www.zeit.de/wissen/umwelt/2015-11/glyphosat-offener-brief.pdf)

Industriedaten

We believe that the arguments promoted by the BfR to negate the human, animal and mechanistic evidence are fundamentally and scientifically flawed and should be rejected. We strongly object to the almost non-existent weight given to studies from the literature by the BfR and the strong reliance on non-publicly available data in a limited set of assays that define the minimum data necessary for the approval of a pesticide. We believe that the IARC WG evaluation of *probably carcinogenic to humans* accurately reflects the results of the published scientific literature on glyphosate and, on the face of it, the unpublished studies to which the BfR refers. Conversely, the BfR evaluation, and consequently the EFSA evaluation, do not reflect the available science.



c) Conclusion

Considering a weight of evidence approach, taking into account the quality and reliability of all available data, it is concluded that glyphosate is unlikely to be genotoxic *in vivo* and does not require hazard classification regarding mutagenicity according to the CLP Regulation. It is noted that unpublished studies that were the core basis of the EFSA evaluation were not available to the IARC experts as reported in the IARC monograph 112 on glyphosate.

GESUNDHEITSEFFEKTE

Myers et al. *Environmental Health* (2016) 15:19
DOI 10.1186/s12940-016-0117-0

Environmental Health

REVIEW

Open Access



Concerns over use of glyphosate-based herbicides and risks associated with exposures: a consensus statement

John Peterson Myers^{1,2*}, Michael N. Antoniou², Bruce Blumberg³, Lynn Carroll⁴, Theo Colborn⁴, Lorne G. Everett⁵, Michael Hansen⁶, Philip J. Landrigan⁷, Bruce P. Lanphear⁸, Robin Mesnage⁹, Laura N. Vandenberg⁹, Frederick S. vom Saal¹⁰, Wade V. Welshons¹¹ and Charles M. Benbrook^{12*}



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Ökologische Effekte: Nutzen gegen Schäden aufgewogen?



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2011 MOHSANTO TECHNOLOGY STEWARDSHIP AGREEMENT 2/14/14 (EN) 1437417

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MONSANTO TECHNOLOGY/STEWARDSHIP AGREEMENT (Limited Use License)

- To use Seed containing Monsanto Technologies solely for planting a single commercial crop.
- Not to save or clean any crop produced from Seed for planting, not to supply Seed produced from Seed to anyone for planting, not to plant seed for production other than for Monsanto or a Monsanto licensed seed company under a seed production contract.
- Not to transfer any Seed containing patented Monsanto Technologies to any other person or entity for planting.
- To plant and/or clean Seed for Seed production, if and only if, Grower has entered into a valid, written Seed production agreement with a Seed company that is licensed by Monsanto to produce Seed. Grower must either physically deliver to that licensed Seed Company or must sell for non-seed purposes or use for non-seed purposes all of the Seed produced pursuant to a Seed production agreement.

- Grower may not plant and may not transfer to others for planting any Seed that the Grower has produced containing patented Monsanto Technologies for crop breeding, research, or generation of herbicide registration data. Grower may not conduct research on Grower's crop produced from Seed other than to make agronomic comparisons and conduct yield testing for Grower's own use.

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<http://thefarmerslife.com/whats-in-a-monsanto-contract/#jp-carousel-6513>



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Keine unabhängige Forschung –
Forschung nur mit Erlaubnis der
Industrie möglich




Lösungen à la Industrie


2,4 D – resistente **GV** Pflanzen

R 51/53 poisonous for aquatic organisms, can have damaging effects in the long run in aquatic systems

S 13 Keep away from food, beverages and feed



umweltgefährlich



reizend

Dicamba - resistente **GV** Pflanzen

<http://www.blw.admin.ch/psm/produkte/index.html?lang=de&item=1293>


Leading trait technology. Exceptional weed control. DOW

Weed control gets easier with the very latest trait technology. Enlist™ traits enable exceptional control against the toughest weeds — while giving you greater application and planting flexibility.

With tolerance to a new 2,4-D and glyphosate, Enlist corn, soybeans and cotton build on the Roundup Ready® system. Enlist E3™ soybeans combine tolerance to a new 2,4-D, glyphosate and glufosinate in a single gene insertion for efficient breeding and better varietal performance.

Tolerance to 2,4-D means fewer plant-back restrictions — you can plant Enlist crops immediately after applying 2,4-D for burndown.¹

ROUNDUP READY 2 XTEND® SOYBEANS



INNOVATIVE TRAIT

Roundup Ready 2 Xtend® soybeans combine the proven yield potential of the Genuity® Roundup Ready 2 Yield® soybean trait, along with tolerance to both dicamba and glyphosate. Genuity® Roundup Ready 2 Yield®, which is a key component of Roundup Ready 2 Xtend® soybeans, has been shown to produce more beans per pod and more bushels per acre vs. original Roundup Ready® soybeans.

MONSANTO

CORPORATE SOLUTION OPTIONS: LOADED CROPS/FOOD

GENUITY[®] SMARTSTAX[®] RIB COMPLETE[™] **MONSANTO**
CORN



Contains:
6 Bt transgenes
2 resistance transgenes
against 2 broad spectrum
herbicides

Harvested products of GM plants contain:

6 Bt toxins + residues of **2 herbicides** + usual
residues of **neonicotinoids** + the usual other
insecticide- and fungicide sprays


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Wer hatte Recht?

The Contributions of Plant Biotechnology to Agriculture in the Coming Decades, R. T. Fraley Krattiger, A.F. and A. Rosemarin. **1994**. Biosafety for Sustainable Agriculture: Sharing Biotechnology Regulatory Experiences of the Western Hemisphere.

Herbicide-tolerant plants will have the **positive impact of shifting overall herbicide usage through substitution of more effective and environmentally acceptable products.**

The commercial strategy behind engineering herbicide tolerance is to gain market share through a shift in herbicide use, **not to increase the overall use of herbicides as is popularly held by critics** (Goldburg et al., 1990).



Ein Realitätscheck

Höhere Erträge?

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Globale Ertragsentwicklung

International Journal of Agricultural Sustainability
Sustainability and innovation in staple crop
production in the US Midwest

Jack A. Heinemann, Melanie Massaro, Dorien S. Coray, Sarah Zanon Agapito-Tenfen & Jiajun Dale Wen

Hilbeck et al. *Environmental Sciences Europe* 2013, **25**:12
<http://www.enseurope.com/content/25/1/12>

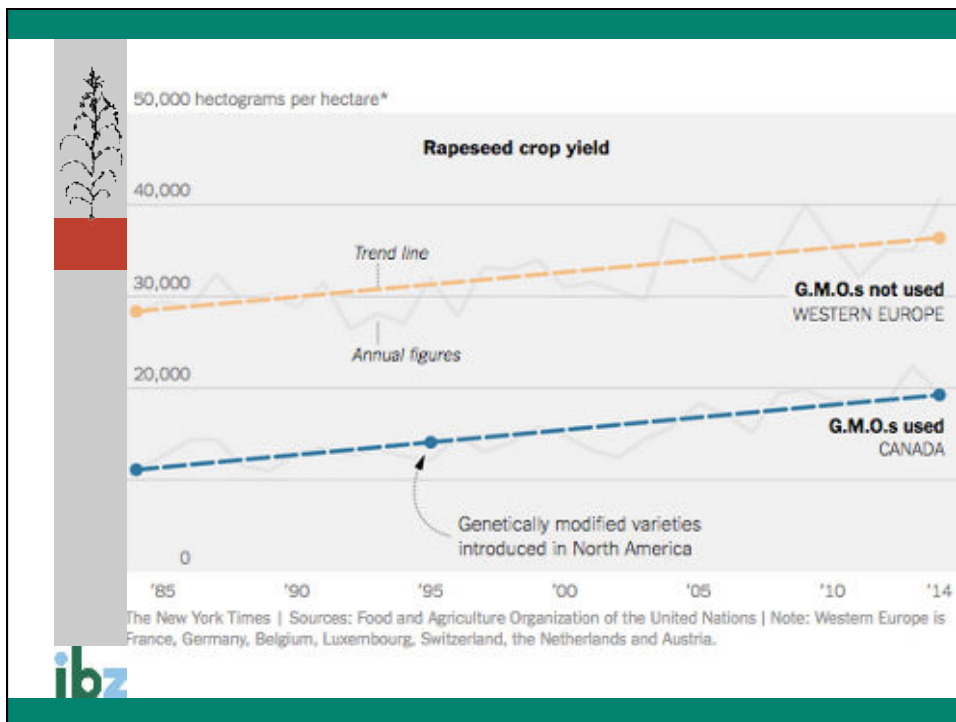
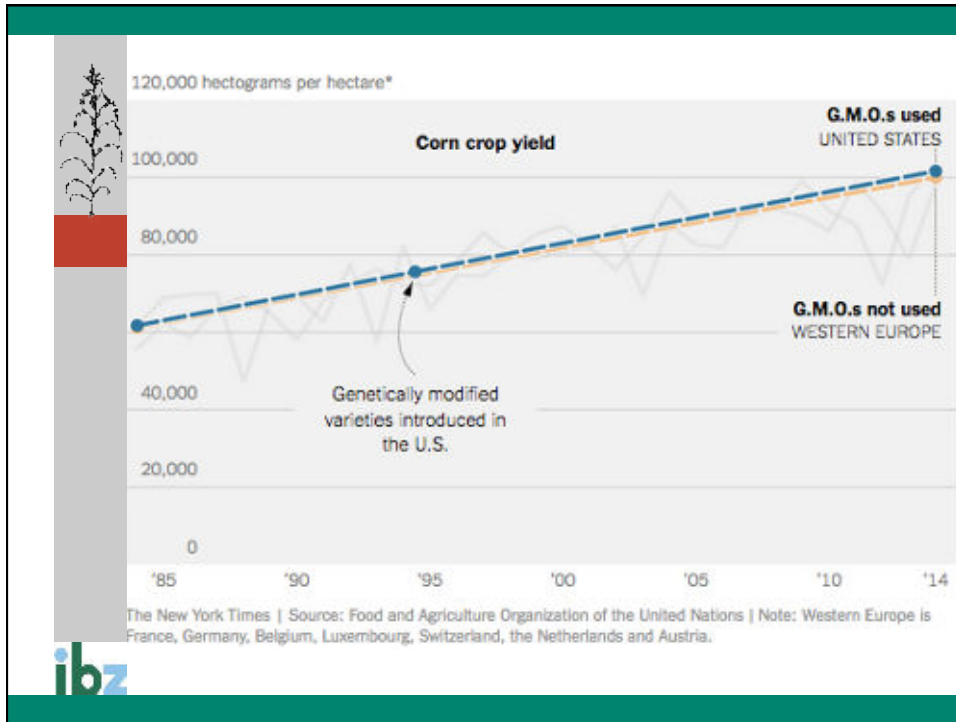
Environmental Sciences Europe
a SpringerOpen Journal

DISCUSSION

Open Access

Farmer's choice of seeds in four EU countries
under different levels of GM crop adoption

Angelika Hilbeck^{1*}, Tamara Lebrecht¹, Raphaela Vogel¹, Jack A. Heinemann² and Rosa Binimelis^{3,4}



120,000 hectograms per hectare*

Corn crop yield

G.M.O.s used UNITED STATES

Broken Promises of Genetically Modified Crops

By KARL RUSSELL and DANNY HAKIM OCT. 25, 2016

ALTERNATIVE WAHRHEITEN?

“First 20 years early promise of crop biotechnology has been fulfilled” ISAAA 2016

Source: Food and Agriculture Organization of the United Nations | Note: Western Europe is France, Germany, Belgium, Luxembourg, Switzerland, the Netherlands and Austria.

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Wir müssen uns über Landwirtschaftssysteme unterhalten!




Industrielle Landwirtschaft mit Fokus auf **Rohstoffgewinnung** für lange, profit-maximierte, export-orientierte Wertschöpfungsketten

oder

Kleinräumige, bäuerliche Landwirtschaft mit Fokus auf **Nahrungsmittel**, Direktvermarktung, lokale kurze Wertschöpfungsketten





Danke für's Zuhören!

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