Co-Existence and Global GMO-Contamination

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Die Agro-Gentechnik zwischen Gen-Verschmutzung und Gentechnik-Freiheit

- eine Analyse im globalen Kontext

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Dezember 2008

Abschlussbericht für das Projekt BF89/ 02

New Austrian study: Genetic engineering in agriculture between GMO-contamination and GMO-free Food – an analyses in a global context

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Topics

- **Introduction: contradiction GMO-contamination vs. Co-existence**
- **Global GMO-contamination cases, selected country case studies (USA, Japan, Australia, EU)**
- **Reactions, counter-actions - What had been the consequences?**
- **The concept of Co-existence has enormous problems!!**

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Definitions: Co-existence as a concept

Co-existence guidelines of EU-DG-AGRI

- **Co-existence refers to the ability of farmers to make a practical choice between conventional, organic and GM-crop production, in compliance with the legal obligations for labelling and/or purity standards.**

Open Questions: Does it refer only to farmers? – or also to protected areas? food and feed industry? - regional trade? – <u>global trade?</u>

What are the purity standards? -
<u>0,9 %</u> labelling threshold ?,
adventitious and technically unavoidable presence

<u>0,1% GMO-contamination level</u> (Austria – Styrian GE-precautionary law - the spread of GMOs above a threshold value of 0.1 percent (%)“?)

What should we do, with non-authorised GMOs?

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GMO-contamination – GMO-pollution

The German Nobel Laureate GEORGE KÖHLER gave 1992 an interview in an Austrian magazine ("Industrie" Nr. 21 92. Jg.) :

"We will have as one of the consequences of genetic engineering "Gene Pollution" …. But I do not think it is an absolute obstacle that should frighten us to such an extent, that we do not practice genetic engineering any more. Even if new pathogens are created, I think we are intelligent enough to cope with it."

2002: positioning of the organic farming movement:
IFOAM believes that GE in agriculture causes, or may cause:

*** Pollution of the gene-pool of cultivated crops, micro-organisms and animals**
*** Pollution off farm organisms ……**
Therefore, IFOAM calls for a ban on GMOs in all agriculture.

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Global GMO-contamination cases - USA

- **2000: StarLink-Bt-Maize**
  Cry9C – potentially allergic – slow digestability

*** legal status: authorized for feed (Aventis – Bayer CropScience)**

*** area planted: 0,5% of maize (3 years 1998-2000 – up to 150.000 ha)**

*** contamination: 22% of tested stocks**

*** food: yes, Taco Bell – Corn Chips – 300 products - 150 brands (2001)**

*** cause: pollen and technical admixture**

*** economic impact: testing and call-back 100 Mio. $**
2001 export to Japan - first 8 month minus 8 %

*** countries affected: Japan (mainly) – Mexico**

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Impact of StarLink: JAPAN: maize-imports – feed and maize for processing to food (in Mio. MT)

Country	1995	1999	2000	2001	2002	2003	2004	2005	2006
Feeding maize:									
World		**11,6**	**11,5**	**12,0**	**12,3**	**11,2**	**12,0**	**12,4**	**10,9**
USA		11,0	11,1	11,4	11,8	10,4	11,6	11,7	10,6
USA-Anteil		94,5 %	96,8%	95,1 %	96,1	92,7	96,3 %	94,2 %	96,8 %
China		0,106	0,109	0,146	0,164	0,581	0,445	0,649	0,278
Argentina		0,435	0,247	0,257	0,138	0,223	-	0,055	0,069
Maize for processing to food :									
World		**5,0**	**4,6**	**4,2**	**4,1**	**5,9**	**4,4**	**4,2**	**5,9**
USA		4,9	4,4	**2,8***	**3,3**	**4,9**	**4,1**	4,0	5,7
USA-%		98,6 %	95,4%	**66,4 %**	**81,5**	**82,9**	**92,1 %**	93,9 %	96,7 %
China		0,003	0,039	0,219*	0,116	0,571	0,234	0,142	0,171
Argentina		0,048	0,039	0,201*	0,085	0,216	0,012	-	0,011
Brazil				0,335*	0,374	0,184	0,087	-	-
SA		0,02	0,119	0,625*	0,168	0,021	0,006	0,101	-
MAIZE-IMPORT	**16,0**	**16,6**	**16,1**	**16,2**	**16,4**	**17,1**	**16,5**	**16,7**	**16,9**

Quelle: USDA, 2001…Das Jahr der Starlinkverunreinigung

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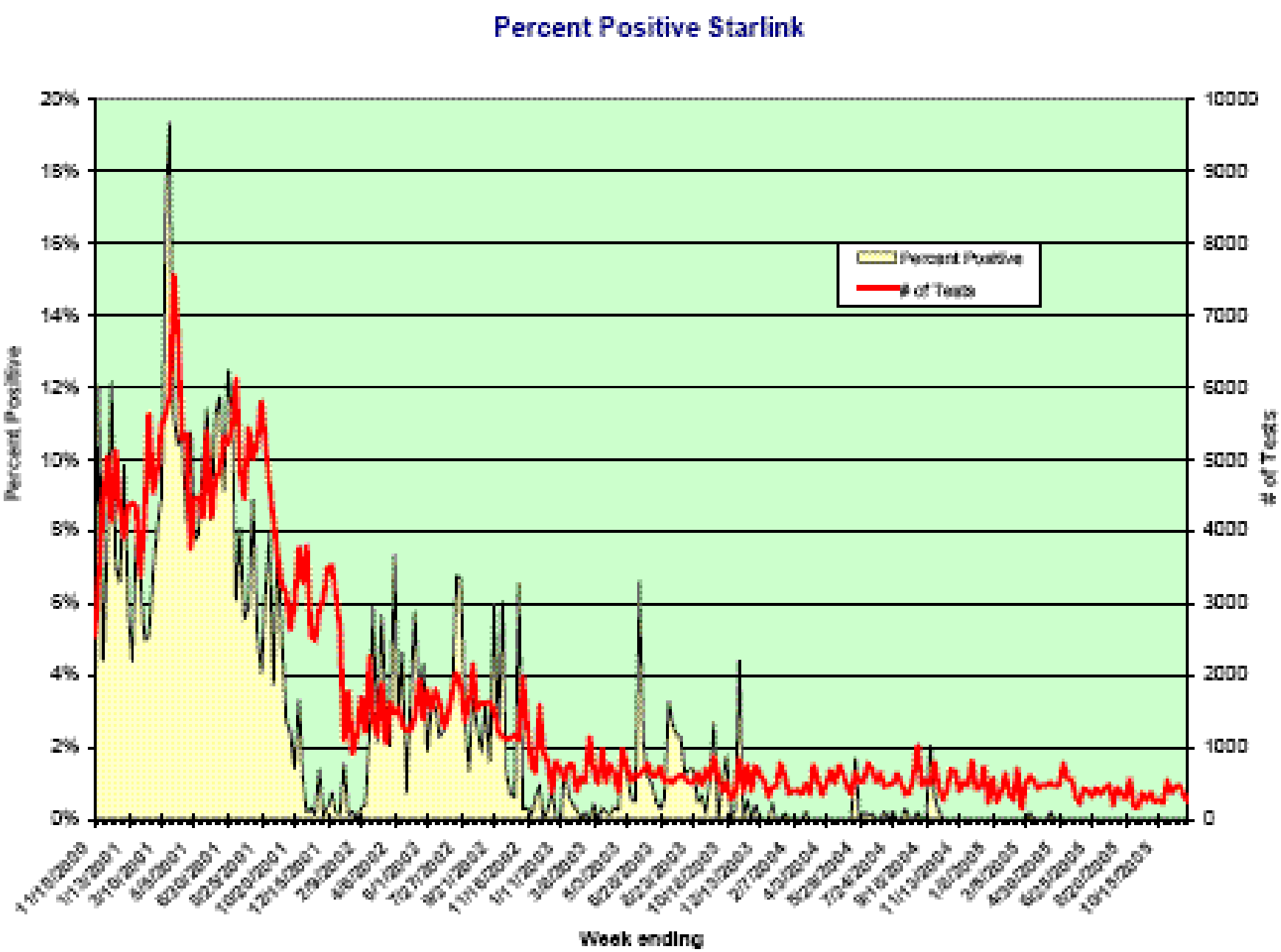

Source: USDA's Grain Inspection, Packers and Stockyards Administration (GIPSA)

Global GMO-contamination cases - USA

2004: GONE to SEED - Transgenic Contaminants in the Traditional Seed Supply – UCS-Study --- contamination of NON-GMO-Seed

- **The production systems for seed sold in the United States are porous**
- **In percentage terms, the reported levels of contamination are very low.**
- **Business- as-usual seed production ensures the perpetuation of contamination and a probable increase in the level and extent of contamination.**
- **The seed supply for major food crops in the United States is vulnerable to contamination with drugs and industrial substances.**

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GMO-contamination of traditional varieties in the USA

Crop (of each crop 6 varieties tested)	Number of contamination cases within testes varieties und % of Total Genomes Containing Transgenically Derived DNA			
	Round 1 (3000 Seeds)**		Round 2 (10.000 Seeds)***	
	Number	% Quantity	Number	% Quantity
Corn	3 varieties out of 6	**50 0,05 – 0,2 %**	5 Sorten von 6	**83 about 1%**
Soybean	3 varieties out of 6	**50 <0,05%**	5 Sorten von 6	**83 0,5 to 1% (2x) and >1% (3x)**
Rape seeds	6 varieties out of 6	**100 0,05 – 0,1%**	5 Sorten von 6	**83******

Source: Union of Concerned Scientists (2004) Gone to seed. Transgenic contaminants in the traditional seed supply. UCS: Cambridge, MA. http://www.ucsusa.org

*3,000 und 10,000 seeds of each variety have been tested in round 1 and/or round 2.

**Limit of quantification = 0.05% except Bt176 (0.2%).

***Limit of quantification = 0.1%.

****No quantification.

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Global GMO-contamination cases - USA

- **2003: RR-Creeping Bentgrass - case (RRCB)**
  ***Agrostis stolonifera* L** - wind-pollinated perennial grass

➢ **Legal status: experimental site - discovery of accidental or unauthorized releases – in 2 cases not notifying accidental releases** as a result of an unanticipated wind event

- **2004: Scotts Company was fined 3.125.- $,**
- **WALTRUD et al. 2004: The maximal gene flow distances observed were 21 km and 14 km in sentinel and resident plants (test side 162 ha). ..**
- **Since 2002 – Oregon: GM-Bentgrass Control Area in Jefferson County (at the border ¼ mile distance) .**
  But GM-Bentgrass may not be planted in Willamette Valley counties

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GMO-contamination cases – USA: permits (and notification) of GMO-grass releases

SPECIES	1993-1997	1998	1999	2000	2001	2002	2003	2004	2005
Creeping bent grass (Flechtstraußgras)	11(12) HT8	16 (19) HT3	25 (26) HT7	20(24) HT13	22 (23) HT15	43(45) HT37	13(13) HT12	18(18) HT15	5(8) HT3
Kentucky blue grass (Wiesenrispe)		1 (2)	8 (8)	7 (7)	7 (7)	5(5)	5(5)	5(5)	1(2)
Perennial Ryegrass (Deutsch Weidelgras)			1 (1)	1 (1)	1 (1)	1(1)		3(3)	
Festuca arundinacea (Rohrschwingel)			2 (3)	1 (1)	5 (6)	2(3)	3(5)	3(3)	
Bermuda grass			2 (2)	2 (2)	3 (3)	4(4)	1(1)	2(2)	1(1)
Russian Wildrye				1 (1)	1 (1)	1(1)	1(2)	1(1)	
Paspalum notatum					1 (1)		1(1)	1(1)	2(2)
Kentucky blue grass xTexas blue grass					1 (1)				
St. Augustine					2 (2)	11(12)	3(3)	1(1)	
Velvet bent grass (Sumpfstraußgras)					1 (1)				

Source: http://www.nbiap.vt.edu/cfdocs/fieldtests1.cfm ; (Wipff 2004); since 2002 own analyses

Global GMO-contamination cases - USA

- **2005: BT-10 Case (similar to Bt11, but with an ampicillin-resistance gene)**

*** legal status: not authorized (Syngenta)**
*** area planted: in 4 U.S. states (4 years 2001-2004 – ab. 15.000 ha)**

*** contamination: mainly feed - according to Syngenta:**
--- food: but „some entered the human food chain“

*** cause: hundreds of tons of contaminated seeds**

*** countries affected: Japan (mainly) – Europe**

*** economic impact: more than 10 shiploads of maize to Japan**
April 2005: EU - emergency measure - imports of corn gluten feed and brewers grain to be certified as free of Bt10 – (till 2007)
Japan: August 2005 – quarantined 32.000 tons – accepted 1 % tolerance in 2006 – forced exporters to stringent testing regimes

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Global GMO-contamination cases - USA

- **2006: LLRice601- Case (Liberty Link = gluphosinate resistence)**

*** legal status: not authorized (Bayer CropScience)**

*** area planted: samples from its five-state growing region —nearly all rice growing states were affected)**

*** contamination: Sept 06:** European Federation of Rice Millers 33 out of 162 samples tested positive

- **cause: Rice Research Station in Crowley planted Cheniere and LL601 side by side from 1999-2001.**
- **countries affected: USA (authorized in Nov.06), EU, Japan (a little) – Europe : 19 EU countries – 2006: 99 early warnings 2007: 19**
- **economic impact: all imports to Japan and EU had to be tested; some recalls in the EU – trade disruptions.**

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Impact of LL-Rice 601: EU: rice-imports – (in Mio. MT) : loss of 150.000 MT

	year	rice (non husked) (in Schale)	rice brown (husked)	rice milled	other rice (geschrotet)
TARIC Code		100610	100620	100630	100640
import in MT	**2007**	**100**	**7.898**	**27.828**	**1.163**
	2006	**1.220**	**131.948**	**44.728**	**2.637**
	2005	**1.130**	**193.104**	**44.054**	**4.056**
% - of all rice imports	**2007**	15,2	0,9	9,1	0,6
	2006	61,5	18,4	18,6	1,4
	2005	62,3	26,9	23,9	3,2

Source: Eurostat, DG(SANCO)/ 2008-7857-MR-FINAL

Costs accordiing to Greenpeace: **$1.2 billion**, included losses of
up to **$253 million** from food-product recalls in Europe,
of **$254 million** - U.S. export losses in the 2006/07 crop year and
of **$445 million** future export losses

Brookes 2008: EU-rice millers: **€ 52 to 111 Mio.** Euro
between **6% and 13% of the total value** of the long grain rice market in the EU
and between **27% and 57% of the total market gross margin**

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Global GMO-contamination cases - Japan

- **2004: RR- and LL Canola in JAPAN**

SAJI et al.: Monitoring the escape of transgenic oilseed rape around Japanese ports and roadsides (National Institute for Environmental Studies)

***status: imported from Canada - feral populations of GM-canola-plants in a nation where they have not been commercially cultivated**

*** surveyed area : screened 7500 feral *B. napus*, 300 *B. rapa*, and 5800 *B. juncea* seedlings from maternal plants in 143 locations at several ports, roadsides, and riverbanks**

*** contamination: *B. napus* plants with herbicide-resistant transgenic seeds were found at five of six major ports (26 locations 3 LL and 8 RR) and along two of four sampled roadsides in the Kanto District (38 locations 3 LL and 8 RR)**

*** cause: spilled during transportation**

*** environmental impact – potential of introgression**

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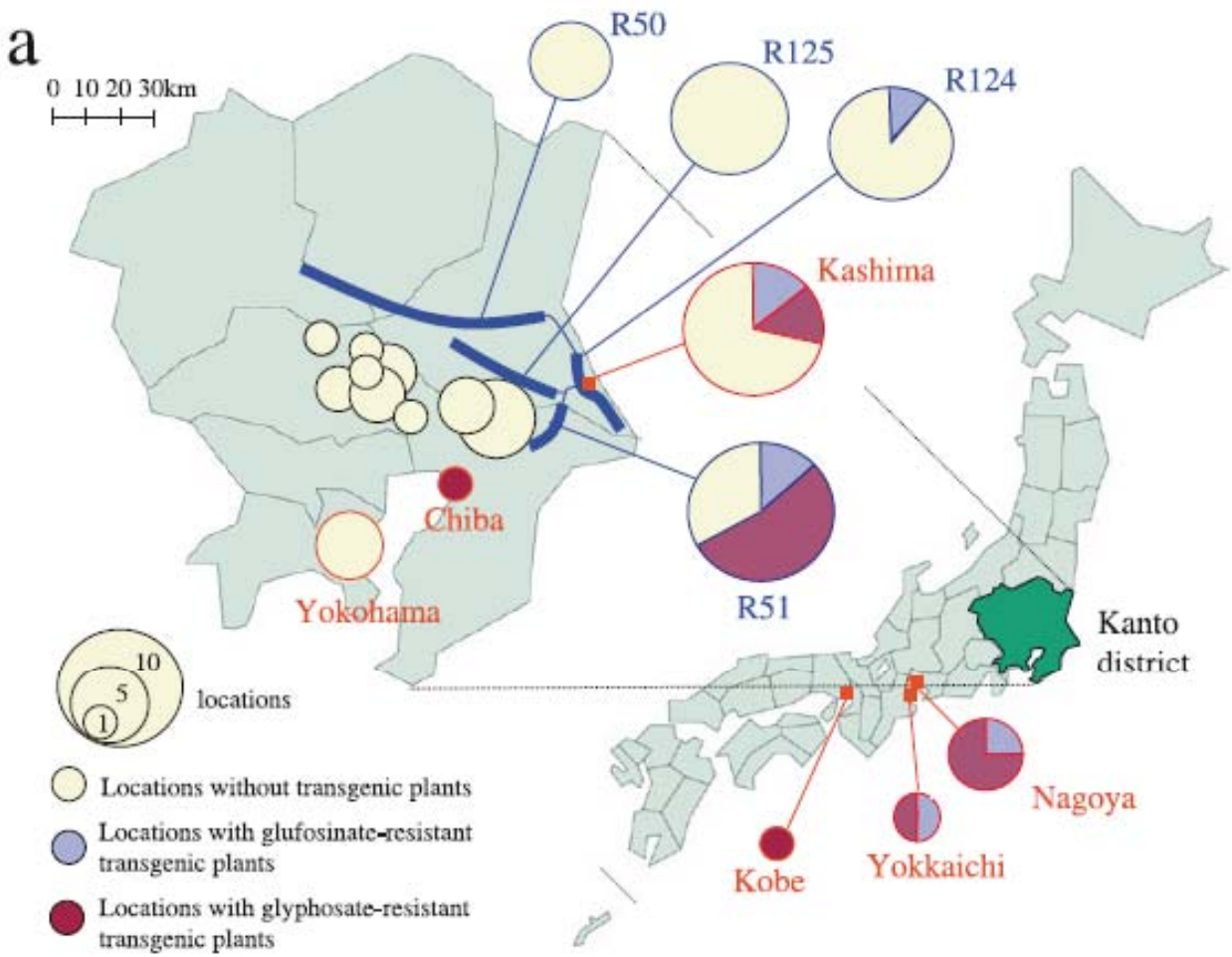

„NO! – GMO – Campaign“- Japan

Nationwide survey of GM canola pollution in JAPAN:

Survey Site	*Samples*			**Positive samples *2005***	**Positive *2006 primary test***		***Positive 2006 secondary test***			***Positive 2007***	
	2005	2006	2007		***RR***	***LL***	***RR***	***LL***	***RR+LL***	RR	LL
Fukuoka		504	402		12	13	13	8	0	14	9
Kumamoto			37							0	1
Kagoshima			22							0	1
Oita		19			0	1	0	1	0		
Hyogo		30	27		0	1	0	1	0	1	1
Osaka			114							0	1
Ibaraki		21			2	0	0	2	0		
Chiba		238	170		1	1	4	0	1	3	2
Shizuoka			43							2	2
Others (37)		1130	802		4	3	0	0	0	0	0
TOTAL	**1169**	**1942**	**1617**	**14**	**19**	**19**	**17**	**12**	**1**	**20**	**17**
				14	**(Total=38)**		**(Total=30)**			**(Total=37)**	

RR=RoundupReady Canola, LL=LibertyLink: Basta tolerant canola

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Global GMO-contamination cases - Australia

- **1998-2000: RR-Canola Field trial sites in Tasmania**

*** Area: Field trials of GM canola took place at 57 sites in the late 1990s and in 2000**

*** 2001: GMO-free policy: auditing former trial sites – aim: eradication of GM canola**

*** 2004 *Genetically Modified Organisms Control Act:***

Permits under the Act were issued requiring each former trial site to be managed in accordance with a specific site management plan.

Aim: eradication and prevention of out-crossing;

➢ **2008: after 7 years - volunteer canola plants were still found at twelve sites.**

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Volunteer Canola Detection and Site Clearance Status in Tasmania

Auditoring of release site Survey date	Total number of sites inspected		Canola dedected (not-flowering / flowering)	Cumulative number of sites	
	All	Canola not dedected		Released from permit	Sites well progressed towards sign off
Apr 01*	**52**	**8**	**44 (39, 5)**	**0**	**0**
Oct 01	57	29	28 (24, 4)	0	0
Feb 02	57	38	19 (12, 7)	0	0
May 02	57	34	23	0	0
Oct 02	59	42	17 (16, 1)	0	0
Jan 03	57	44	13	0	0
Jun 03	57	37	18	0	0
Oct 03	57	35	22 (11, 11)	0	0
				0	3
				1	3
				1	3
May 05	57	28	29 (27, 2)	1	4
Oct/Nov 05	19	14	5 (3, 2)	1	Not assessed
Feb 06	54	42	12 (10, 2)	1	8
Mai 06	56	41	15 (15, 0)	1	8
Oct 06	54	45	9 (5, 4)	3	5
Jan/Feb 07	54	42	12 (4, 8)	3	5
May 07	54	42	12 (1, 11)	3	5
Oct 07	54	41	13 (11, 2)	3	5
Feb 2008	54	46	8 (2, 6)	4	5
May 2008	53	43	10(9, 1)	4	5
Nov/Dec 2008	**53**	**41**	**12(8, 4)**	**4**	**5**

Source: Biosecurity and Product Integrity Division Department of Primary Industries and Water - Tasmania

Co-existence ? - South-America (Brazilia, Argentina)

- **Direct destruction of forests and savannahs – replacement by soy monoculture – intensive use of glyphosate and other herbicides**

- **indirect human rights vioalations:**
  landgrab and expulsion of small farmers and indigenous people

- **direct human rights violations: destruction of local crops through arial spraying and signs of severe health problems in towns near soybean areas**

*** Some 200 million litres a year of glyphosate are used in Argentina. Soybeans cover around 50 percent of all farmland - nearly 17 million hectares. The herbicide is mainly applied by aerial spraying.**

- **A report by the NGO „Rural Reflection Group“ (GRR), points to an increase in health problems in the countryside,**

(Source: http://www.ipsnews.net/news.asp?idnews=45974)

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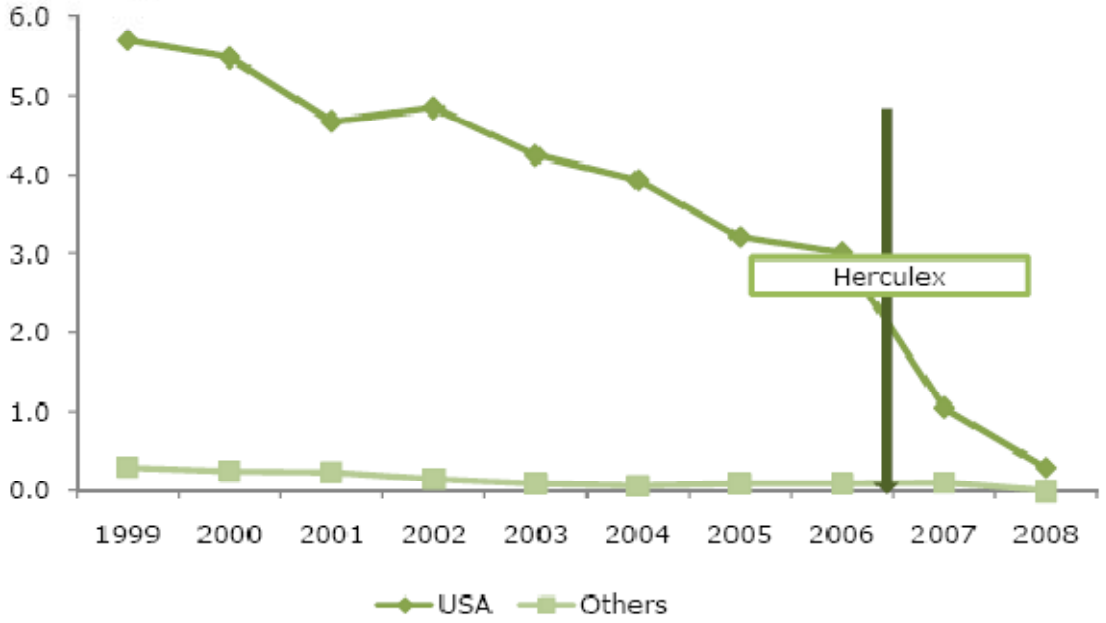
Global GMO-contamination cases - EU

Cardy-Brown CoLtd

Fig 9: Imports of DDG & Corn Gluten in EU27



Direct substitution cost for EU maize and CGF/DDGS 2007/2008

- EU to import 11m tonnes of Brazilian "non-GM" maize + €50 per tonne = €550Mio
- EU to substitute 4.5m tonnes of CGF/DDGS+€70 per tonne (maize/rapeseed)= €315Mio

Indirect cost impact on EU cereals due to feed import restrictions

- EU compound feed used 71m tonnes of EU cereals + €10 per tonne = €710Mio
- **Total EU extra-cost feed 2007/08 = €1,575Mio**
- **Total EU extra cost feed "0-tolerance" 2006/2007 = €950Mio**
- **Total added cost disadvantage "0-tolerance" = €2,525Mio**

Industry-lobbies are pushing for fast track procedures of GMO-authorization

and for a synchronization of authorization procedures of the EU with the U.S.

e.g. through exaggerating problems and costs

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Reactions, counter-actions – What had been the consequences? (1)

- **E.g. StarLink: 3 years later still tested in a shipload to JAPAN – 4 years in USA**
  Long interruptions of trade are possible, enormous costs for the whole food chain.

- **Speeding up of the creation of a testing-industry**
  – detection methods are crucial –
  the sensitivity of the tests correlates with the quantity of problems

- **EU: enormous pressure to accept contaminations of non-authorized GMOs – pressure to synchronization of GMO-authorization with U.S.**
  JAPAN: many authorizations for GMO-imports – higher thresholds

- **Japan, EU got more and more sensitive to GMO contaminations (to some extend also China) – but, tendency to handle the problems more pragmatically (minimizing contamination costs)**

- **Governmental administrations do not pro-active screen for GMO-contaminations (aim: „to keep the eyes closed as long as possible“)**

Reactions, counter-actions – What had been the consequences? (2)

- **NGOs and civil society and free public research institutions are crucial for uncovering and monitoring the GMO-contamination cases –**

  It is a dialectical process:
  - **An "open society" (freedom of speech, freedom the press, academic freedom) is essential to enforce the freedom of choice**
  - **the pursuit of the freedom of choice through the civil society and NGOs is enabling an "open society"**

  "We have a right to know! ------ We have a right of GMO-free Food!"

- **I am optimistic:**
  as long as we are living in an "open society" we are able to uncover illegal GMO-contaminations and to monitor "legal" GMO-contaminations.

In Short: "We need democracy and democracy needs us!"

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The concept of Co-existence has enormous problems!!

1. **It is too narrow! – The „Co-existence“ at farm level is not a solution – it is the starting point of a great problem: the so called GMO-contamination**

   The practical choice has to include the consumers.
   This means also industry, trade, global trade and nature.

2. **Co-existence is a political concept – not a scientific concept!**
   The purity standards have to be defined on a political level.
   It is essential what the partners of a possible „co-existence“ are think about what are their rights.
   - **e.g. the principle of minimizing GMO-pollution in organic produce –**
   - **Definition of GMO-Contamination:** „the spread of GMOs above a threshold value of 0.1 percent (%)“? – if so, there have to be applied different rules (e.g. liability)
   - **consumers and their needs have to be integrated – and the rural communities have a right of participation.**

3. **Non-authorized – illegal GMO-releases:**
   The concept of Co-existence is dissolved !!

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A nice view into a GMO-free future –

All the time there is a need for an open discussion!

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