IG Saatgut
Interessengemeinschaft für gentechnikfreie Saatgutarbeit

Protecting Seed against GM Contamination

Impacts of GMO Labelling Thresholds and Ending Zero Tolerance in Seed – the Perspective of Organic and Conventional Seed Producers

A Report of the Initiative for GM-free Seeds and Breeding (IG Saatgut)

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1. Background

Seed is the very foundation of agriculture and food production. Hence, preserving GM-free seed production is the cornerstone of GM-free agriculture and food.

The **Initiative for GM-free Seed and Breeding (IG Saatgut)** is an association of commercial and non-commercial seed conservation organisations, seed growers, breeders and seed companies located in Austria, Germany and Switzerland. They breed new and conserve old varieties on-farm, and reject genetically engineered agriculture and horticulture as well as bio-patents.

The global cultivation of GM crops as well as GM research and field trials represent significant risks to conventional and organic seed production. Seed producers need to take preventive measures to protect against contamination with genetically modified organisms (GMOs) – even in countries where GM crops are not commercially grown. At the same time, no accurate assessments are available of their efforts and the costs of preventive measures.

According to EU law, a **'zero tolerance'** applies to seed: Seed lots contaminated with GMOs that have not been approved in the EU may not be marketed. Moreover, seed lots containing GMOs that are authorised in the EU must be labelled as genetically modified (**'labelling obligation'**). However, as this report exemplifies, the implementation of zero tolerance is insufficient in many EU Member States. Seed containing non-approved GMOs can still be sown, or seed contaminated with GMOs that have been authorised by the EU does not need to be labelled as GM.

For years, industry lobbies have made **political efforts to repeal the policy of zero tolerance and the labelling obligation for GMOs in seed** in Europe. For GMOs with EU authorisation, they call for thresholds below which seed containing GMOs would not need to be labelled ('**labelling thresholds'**). For GMOs not approved for cultivation, they aim to allow a certain presence of unauthorised GMOs in seed ('**ending zero tolerance'**)[1]. These efforts have become more concerted in the context of harmonising EU Member States' official controls for GMO presence in seed,[2] as well as negotiations of a Transatlantic Trade and Investment

[1] In political jargon and by the proponents of ending the zero tolerance policy, abolishing zero tolerance is also referred to as tolerating a "low level presence – LLP".

[2] The EU Commission and EU Member States discuss the harmonisation of EU Member States' controls for GMO presence in seed in the Regulatory Committee under the Deliberate Release Directive 2001/18/EC on the basis of the following report: JRC Technical Reports (2015): European Network of GMO Laboratories. Working Group "Seed Testing" (WG-ST), Working Group Report.

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Partnership (TTIP) and the Comprehensive Economic and Trade Agreement between Canada and the EU (CETA).[3]

In the past years, several EU Member States have infringed zero tolerance and the labelling obligation for GMOs in seed. They failed to intervene when seed lots contaminated with a certain level of GMOs were marketed without labelling, or when seed lots contaminated with non-approved GMOs were traded and sown.[4]

For instance, in Austria, seed lots are not withdrawn from the market when GMOs are detected in official post-marketing seed controls in a proportion of up to 0.1 per cent, even if the GM constructs detected are not approved for cultivation. The seed can still be sown, implying a possible 100 hidden GM maize plants per hectare and up to 50 million pollen grains per GM plant.[5]

Assessing the legal conditions for GM-free seed production in Germany, Switzerland and Austria, the report concludes that none of the countries is currently implementing the polluter pays principle. Instead, it is GM-free seed producers that are forced to bear the costs of GMO tests and measures to prevent GM contamination. They also bear any costs they may incur in cases of actual GM contamination. Furthermore, official controls are financed by tax payers' money. The report argues that those who developed the GM constructs and hold the respective rights should bear these costs instead – both the costs of ensuring GM-free production and those to compensate for losses due to contamination.

1. Research questions

The report[6] summarised here assesses the potential effects of labelling thresholds and the abolition of zero tolerance in seed on GM-free seed production. Case examples based on interviews with nine (conventional and organic) seed producers in Germany and Switzerland illustrate the burden the threat of GM contamination already places on breeding, conservation breeding, seed growing, processing and trade with agricultural and horticultural seed

[3] See for instance: American Seed Trade Association, European Seed Association (2015): Transatlantic Trade and Investment Partnership Agreement (TTIP). Priority Issues for the Seed Sector. Joint Statement of the American Seed Trade Association and European Seed Association; EU Food and Feed Chain Coalition (2015): Position paper for a functioning evidence-based EU policy on GMOs.

[4] Central Science Laboratory (2007): Adventitious traces of genetically modified seeds in conventional seed lots: current situation in Member States. Research tender ENV.B.3/ETU/2006/0106r.

[5] Frieder Hofmann, Mathias Otto, Werner Wosniok (2014): Maize pollen deposition in relation to distance from the nearest pollen source under common cultivation – results of 10 years of monitoring (2001-2010), in: Environmental Sciences Europe 2014, 26: 24.

[6] Published in German: IG Saatgut (2012): Saatgut sichern – Schwellenwerte verhindern. Auswirkungen von GVO-Verunreinigungen im Saatgut auf die ökologische und konventionelle Saatguterzeugung. Download at www.ig-saatgut.de

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species, and how this pressure would increase if labelling thresholds were introduced or zero tolerance abolished.

2. Main results

2.1. The cost of (preventing) GM contamination

Under current conditions, all of the seed producers interviewed **take measures to protect against GM contamination.** The cost of preventing contamination include monetary costs, such as sampling and testing crops for GM contamination, as well as costs, measures, losses and risks that cannot be quantified in monetary terms but still significantly impact production.

Seed producers implement different strategies depending on the estimated contamination risk for the plant species concerned. The higher the risk for GM contamination, the more measures they take – in addition to those already taken to ensure the purity of seed and varieties in order to comply with legal standards for marketing.

Internationally operating seed companies invest up to six-digit sums annually in preventive measures for crops such as soy or maize that are at risk of GM contamination ('at-risk crops'). **Preventing GM contamination takes a lot of effort**. One company interviewed has established an entirely separate production system for breeding, multiplying and trading conventional maize in order to exclude GMOs. This system comprises 250 propagation holdings which are located in EU countries and guarantee to never have cultivated GMOs. Moreover, it includes fields for seed multiplication in GM-free valleys in Chile, where contracts are concluded for securing GM-free production and GM-free production is maintained. "*The effort and sensitivity are enormous*", one interviewee comments on seed production in Chile. Before processing certified seeds, GM tests are routinely carried out. Laboratory tests for the presence of GMOs in multiplied maize seed alone cost the company 100,000 euros per year – excluding all additional in-house cost such as labour.

Companies producing seed in countries without commercial cultivation of GMOs also test at-risk crops as a precautionary measure and implement internal risk management. One of the companies interviewed not only tests at-risk crops such as maize, but also regularly checks whether deliberate releases or cultivation of GM plants are taking place in the regions where the seed is grown. If necessary, the company agrees additional precautionary measures with seed growers. The additional cost that would be incurred under changing circumstances, for instance an increase in GM cultivation, is considered unpredictable and incalculable.

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Local seed breeders and local companies in regions without GMO cultivation and GMO releases also bear the disadvantages resulting from contamination risks. For instance, breeders state that their choice in parent material is limited as they need to refrain from using at-risk parent material. One interviewee stated that they avoid mustard seed originating from regions with rapeseed cultivation, especially outside of Europe. Generally, for mustard, seed material is routinely tested for GM contamination as a precautionary measure, for which one of the interviewed companies pays up to 10,000 euros per year. The costs that would be incurred in case GM contamination was detected are considered incalculable.

All breeders working with at-risk crops need to test their parent material. One of the breeding companies interviewed pays 100,000 euros per year to prevent GM contamination of its soy program. According to the interviewee, "*these costs grow exponentially if varieties from outside the EU are procured for variety development*", and: "*GM cultivation in Europe would increase that cost tremendously*".

A small organic breeding company explains that it is too expensive for them to test several types of parent material for GM contamination. Hence, when starting a new breeding programme or changing ongoing programmes, they are prevented from using parent material that would be interesting from a breeding perspective. In case of GM risks, variety comparisons need to be limited to parent material that is safe from GM contamination. Overall, the costs breeders incur by abstaining from interesting parent material cannot be expressed in monetary terms.

All local seed multipliers interviewed (organic and conventional) make efforts to avoid contact with at-risk plant species and companies, for instance by avoiding seed produced by companies working with GMOs. As long as alternatives exist, this only incurs limited financial costs related to the choice of varieties and capacity utilisation of machines. The search for alternatives can result in additional effort, though. Another measures consists of no longer sharing machines with other holdings in order to avoid contact with at-risk or GM crops. If new machines, for instance harvesters, need to be purchased, this can cause high financial costs.

Moreover, seed breeders and companies state that they need additional time to reply to customers' enquiries on whether they can guarantee GM-free production, resulting in additional administration cost. In addition, several of the interviewees see the need to be involved in awareness raising and political work for securing GM-free seed production which costs them time and money.

All seed producers face the dilemma that no single measure can guarantee blanket protection from contamination. The consequences and costs in case of GM contamination are impossible to foresee or estimate and uncertain, especially in conjunction with liability costs or

the loss of breeding material and seed lines due to contamination. One interviewee states: "*What is expensive and difficult is liability. In the Pioneer contamination case 4 million euros have been mentioned. Our company could not bear that cost. Nobody can get insurance against such damage*".

2.2. Limits of protecting seed producers against GM contamination

All seed producers interviewed consider **GM cultivation to be a key limiting factor of** zero contamination. Several stated that they could no longer sufficiently protect their crops from GM contamination if GMO cultivation were to take place in the regions where they produce seed.

The seed growers associated in the IG Saatgut consider the **co-existence of GMO-free and GM cultivation not possible**. A conventional seed producer states: "*Cultivating wheat, especially volunteer plants, endanger co-existence. If there was commercial GM wheat cultivation, growers would need to keep detailed plot records over many years, and integrate them into the seed growing system (…) For rapeseed, solutions would need to be sought for whole landscapes and beyond in order to make co-existence possible. Constitutional lawyers, property lawyers would need to look for solutions."* And: "*I do not know any country where co-existence with Brassicaceae works*"

With increasing GMO cultivation, fewer **and fewer fields would be available for growing seed without contamination risk.** One seed producer states: "*How to price "not being able to grow seeds"? The price is a different one: (…) Consumers would need to accept that traces of GMOs are contained in certain food products".*

Furthermore, **information on whether seed material has been tested for GM contamination is often lacking.** Both conventional and organic breeders report that companies delivering seed material for breeding purposes sometimes do not document that their samples are GM-free. Sometimes information on samples is not reliable, which means breeders need to run their own tests anyway. Moreover, there have been cases where gene banks that have been or are cultivating GM plants do not share the results of GM tests upon request. One conventional seed grower criticises that she does not receive information on whether the basic seed she receives has been tested for GM and with what results. She also does not receive any information on the origin of purchased seed that would enable her to gather her own information on GM risks in the region of origin.

Another problem is that **authorities sometimes fail to publish the results of their official GM controls** in seed in due time ahead of sowing, or, as happens for instance in Austria, fail to publish the locations where seed with GM contamination below 0.1% is sown. For seed

producers, this kind of information can be very important in order to estimate contamination risks or to decide on precautionary measures.

Long transport distances of seed material are also a challenge for preventing GM contamination. One interviewee states: "*It is not in the breeder's hands what happens between the different growing steps of basic and certified seed*".

Moreover, protecting the entire seed production chain against GM contamination could, at a certain point, become too expensive, as one of the interviewees states. At this point consumers may no longer be able or willing to pay a premium for GM-free products.

If GM contamination risks reach a point where they become frequent and common, sophisticated technical measures will no longer be sufficient to avoid GM in seeds, states one of the producers interviewed. Effectively, this would spell the end of GM-free seed production. "*The price is that we lose our freedom of choice. (…) You can destroy seed lots with GM contamination as long as you have alternatives. If no alternatives remain, the question has changed*".

Results of GM tests are never 100% representative for the whole seed lot. As it is only a sample and never the whole seed lot that is tested, uncertainty always remains whether a negative result means the whole seed lot was indeed free from GM. Moreover, tests are relatively expensive. Especially for small breeding companies, this is a challenge. One of the breeders states: "*In seed conservation breeding, the elite [note: plants to produce vegetable seed for seed growing] of one cross-pollinating species consists of a minimum of 100 plants. Of this population, I would need to test individual plants before flowering in order to find the plant that is genetically modified. This is too expensive for my budget*."

Routine measures which seed producers take as a matter of course to comply with legal provisions for seed purity as a condition for market approval are not sufficient to protect against GM contamination. For instance, measures to single out plants with a deviant phenotype do not detect plants with genetically modified traits that are not expressed visually. Minimum distances required by EU and national seed marketing laws between fields with cross-fertile plant species are too small to protect against cross-fertilisation with crops from GM-contaminated fields.

Isolating seed production to avoid GM contamination is no solution for growing the seed of certain horticultural species, such as bulbs or courgettes which are grown in open land. Growing seeds of these crops in insect- and pollen-proof isolation (such as tunnels or glass houses) would cause higher costs, increase the plants' susceptibility to diseases and render crop management more difficult. The seed of agricultural species such as rapeseed is grown on large surfaces. Isolating these surfaces against insects would be economically inefficient.

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Damage resulting from GM contamination is not covered by insurances – neither the damage seed producers suffer through external GM contamination, nor any damage for which seed producers are themselves liable, for instance when they unwittingly pass on seed contaminated with GMOs. One of the interviewees says: "*For a seed growing company, damage in seed production swiftly exceeds 100,000 euros. It is not reasonable that damage from GM contamination is uninsurable. Contamination threatens a company. (…) This shows how high the risks linked to GMOs are*".

2.3. Labelling thresholds and ending zero tolerance: impacts on seed production

How would the introduction of labelling thresholds or ending zero tolerance impact the work of seed producers? Based on the interviewed seed producers' knowledge and assessment the following scenario is likely:

1. Thresholds or ending zero tolerance would **exacerbate the risk for seed producers that their seed is contaminated with GMOs.** It is expected that more contaminated seed lots would pass official controls without being removed from the market or labelled, and be sown. For seed producers, possible **sources of GM contamination would be even less transparent** than today. Seed lots could be contaminated with GMOs unbeknown to the farmer sowing it, or to growers or breeders in the surroundings. Every field with cross-fertile species of crops at risks of GM contamination within distance of possible cross-breeding as well as seed material that breeders and growers obtain from other sources would need to be considered even more risky than to date. Activities such as sharing machines with other holdings, storage, processing, and transport would be even more vulnerable to GM contamination. Particularly seed growers operating in open land and embedded in complex production processes would be badly hit. Yet possible damages that seed producers might suffer from GM contamination, for instance by losing breeding lines (after many years of breeding effort), losing varieties, product lines, customers or reputation, would not be covered by insurances.
2. Thresholds or ending zero tolerance would **increase the cost of GM-free seed production**. Increasingly sophisticated and expensive measures would be necessary in order to limit contamination risks. The resulting higher costs could threaten the existence of small companies. Beyond a certain limit, it would be difficult to explain the costs of preventive measures to buyers and consumers, especially if widespread GM contamination endangered the GM-free status of products. Furthermore, contamination cases could severely damage the reputation of GM-free seed producers.
3. Increased contamination risk could **hinder GM-free seed growing for concerned crops in entire regions**. Seed companies could see themselves forced to eliminate seeds of plant

species at risk of GM contamination from their product line, whereas breeders would need to stop using basic seed material for which the GM contamination risk is too high.

4. Thresholds or ending zero tolerance could further **exacerbate the structural change from decentralised breeding and seed growing towards concentration in a few capital-intensive multinational companies**. Small-scale seed producers in local structures would be hit most severely (i.e. growers, small-scale breeders, farmers saving seeds on their farm, seed production for self-supply, non-commercial conservation initiatives). Rising costs to prevent GM contamination as well as costs resulting from contamination of seed material could, eventually, induce them to give up seed production for the crops concerned.
5. As the introduction of thresholds would lead to widespread GM contamination, the quantities of GM contamination detected in seed could increase in the medium run. Hence, it is likely that introduced thresholds would need to be raised to adapt to rising contamination levels, leading to ever increasing GM contamination. In the medium term, thresholds or ending zero tolerance would lead to **increasingly widespread GM contamination and could spell the end of GM-free seed breeding and GM-free seed production.**

Only one of the interviewees considers labelling thresholds an opportunity to overcome operational uncertainties for seed producers and to protect them against liability claims or losses incurred by unmarketable seed lots due to GM contamination.

3. Political demands

Based on this assessment, IG Saatgut calls upon decision-makers at EU and national levels to take political action in order to secure a future for GM-free seed production:

1. The European Commission and EU Member State governments need to swiftly enact a moratorium, or even better a ban, on the deliberate release and cultivation of GMOs in the European Union; they must stop any further authorisations of GMOs in Europe. The moratorium in Switzerland should be prolonged and extended in scope to cover also deliberate releases.
2. Decision-makers in the European Union and Switzerland need to implement the polluter pays principle. Those who developed the potentially contaminating gene constructs and hold the licencing rights to them need to bear the costs of ensuring GM-free production, both those costs now borne by GM-free seed producers and those of official controls. The polluter pays principle must apply to the entire food and feed production chains.

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3. The EU Commission and EU Member States must ensure that the EU labelling obligation for authorised GMOs in seed and the EU's zero tolerance for non-authorised GMOs in seed are maintained.
4. The EU Commission must enforce the rigorous implementation of the labelling obligation and zero tolerance by EU Member States, including effective official controls *before* seed is marketed:
    a. When contamination with non-authorised GMOs is detected, the seed lots concerned must be prevented from being marketed and destroyed;
    b. When contamination with authorised GMOs is detected, the seed lots concerned must be labelled as GM according to EU law; if the seed is sown, all relevant information on the concerned surfaces has to be recorded in a publicly accessible register;
    c. The results of official controls for GMO presence in seed and detailed information about governmental measures to remediate any detected contamination with GMOs must be published completely and in due time before the cultivation season starts with sowing.

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