

Coexistence between GM crops and conventional/organic crops: the Spanish seven years experience of commercial GM corn growing^a

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Spain is presently the only country in the EU that tolerates large scale commercial release of GM crops, with approximately 20,000 – 50,000 hectares grown each year since 1998. In 1998, one variety of insect resistant corn with the genetic modification Bt176 was approved and since then commercially grown. The government authorised other 5 and 9 GM corn varieties - with genetic modifications Bt176 and MON810 - in February 2003 and February 2004 respectively so that they can be planted in Spain.

During all those years, the cultivation of GM corn in Spain has taken place without any official evaluation and only since second part of 2003 some very few monitoring results begin to be published. Government has failed to seriously monitor commercial plantings in order to provide an objective assessment of the impact of GM corn on farming, health and the environment and to adopt the necessary measures to prevent negative impacts of GM crops.

The Spanish legislative framework regulating the use of GMOs in agriculture is fundamentally the transposition of the European Directive 90/220 (derogated by the transposition of Directive 18/2001 since April 2003), under which both events grown in Spain, Bt176 and MON810, have been approved. The only additional legal provisions are the ones adopted in the Ministerial Decrees that include the varieties in the National Register of Seed Varieties and therefore give green light for commercial growing in Spain. These Decrees require the compliance of a monitoring plan, requirement that have been largely disregarded during years. No regulation on coexistence - that should at least address prevention of genetic contamination and liability in case of contamination or other problems - has been adopted and no satisfactory draft of law has been presented by the government until now.

As a consequence, the release of GMOs into the environment for commercial purposes has been done without a proper control and is already originating problems, in particular genetic contamination due to pollen flow or lack of segregation between GM and non-GM crops.

Lack of transparency, control and coexistence measures

GM corn: how much and where?

During the 7 years of GM corn growing in Spain, no official data on the extension of GM crops nor on the regional share have been made available to public and only once (in 2003) the Ministry of Agriculture facilitated data of seed sales to a very reduced number of organizations, even though many NGO's and farmer unions have asked once and again for information. Furthermore the data sent correspond to the seed sales declared by biotech industry (Syngenta and Monsanto), with no information about the real area.

What is even more worrying is that nobody seems to know where GM crops are exactly. According to Syngenta data¹, during the 1998/2002 period GM corn has mainly been planted in Huesca, Zaragoza,

^a This paper is based on two publications both available at www.tierra.org/transgenicos/transgenicos.htm:

Amigos de la Tierra and Greenpeace. *The impact of GM corn in Spain*. August 2003

Amigos de la Tierra, Ecologistas en Acción, COAG and Greenpeace. *Una crítica al borrador de Orden Ministerial por la que se dispone la publicación de las recomendaciones sobre coexistencia de los cultivos modificados genéticamente, convencionales y ecológicos*. April 2004

Lleida, Girona, Albacete, Badajoz and Sevilla but these data are in some extent contradictory with the data facilitated by the Ministry of Agriculture².

As for the field scale, it is obvious that in this context no registers for recording the location of GMOs commercially grown have been established. Although such registers were not mandatory under Directive 90/2002, they constitute a very important tool so that the possible effects of GMOs can be monitor and prevent. In particular, in order to prevent genetic contamination between GM and no-GM crops, it is essential for farmers to know if GMOs are grown next to their fields. Even today, with Directive 18/2001 in force, no registers are in place.

Missing monitoring

Unfortunately the only studies on GM crops available in Spain since 1998 have been produced by industry, while the Government has failed to monitor commercial plantings.

On the other hand, the biotech industry has failed to meet the very lax mandatory requirements established by law. The 1998 Ministerial Decree whereby the first variety of Bt176 corn was included in the National Register of Seed Varieties states that "marketing of this variety is conditioned to compliance with a Monitoring Plan that must be carried out by the company who applied for the registration of the GM variety". Within this Plan, the company had to present a Prevention Plan before March 2000 in which the following issues should be included: an evaluation of the effectiveness of the Bt insecticidal trait; possible development of resistance in insects; possible effects on soil; possible effects on the evolution of bacterial population of digestive flora of the animals eating the Bt plants, particularly regarding the resistance to ampicillin; refuges to prevent resistance in insects; information program for farmers about alternative crop management for transgenic varieties. Syngenta, who sells the GM seeds grown since 1998, presented this Plan in June 2003, more than 3 years late compared to what the Ministerial Decree establishes. During all that time, no attention has been paid to the agronomic results of GM seeds, the development of resistance to Bt toxin in target insects - and concrete practises to prevent it - or the impact on non-target insects, between other issues that should have been addressed.

The Government has failed to ensure compliance with legal requirements related to the deliberate release into the environment and to monitor the effects of a GM corn containing the Bt176 event that has been withdrawn even in the US (in October 2001, Bt 176 varieties were withdrawn by the EPA from the revised list of registered products, for concerns about an uncompleted protection against target insects and thereby the risk of appearance of insect resistance) and which use has been recommended not to continue in the EU by the European Food Safety Authority³.

No contamination prevention

It is worthwhile to notice that at no moment before end of 2003 the government addressed the issue of coexistence and contamination prevention of non-GM crops. This issue is not even mentioned in the three Ministerial Decrees that register the 15 GM corn varieties currently authorised for commercial growing and no special attention to that is required in the Monitoring Plans.

First of all is the lack of information to farmers that do not grow GM varieties. As already mentioned, no data on GM fields location is made available and an investigation carried out during 2003 revealed an unwholesome atmosphere of secrecy and fear where farmers and cooperatives don't want to speak openly about what they are doing and what is happening. In this context, no way for farmers to know if their neighbours are growing GM crops and to adopt measures to prevent genetic contamination.

Secondly, no special recommendations from the government and or seeds companies are made to GM farmers about alternative crop management for transgenic varieties, in particular on distances between GM and non-GM fields. The only very weak measure about preventing GM negative consequences is the recommendation by the seed industry to plant non Bt corn around the Bt fields to

reduce the developing of resistance to Bt toxin in insects, with a lot of uncertainty about the compliance by GM farmers.

Neither effort has been made to segregate the GM corn production. As recognized by the proper biotech industry, *“the Bt maize grown in Spain is sold through the usual channels for animal feed use. The supply chain has not seen a need for segregation”*¹. But, as farmers do not declare that they are planting Bt corn and there is no public control, farmers sell their crop to the usual channels, so it is highly probable that part of the GM production is also ending in the direct human food chain.

The extent of the genetic contamination

In these conditions, it is to expect that some of the negative impacts of GM crops for health, agriculture and the environment are already a reality in Spain. But the lack of (independent) monitoring and research is leading to a situation where very few case-studies are available and it is difficult to know the real impact of GM crops in Spain.

The problem of the genetic contamination of non-GM crops is the one to which less attention has been paid during all those years and no official data are available on that issue. Nevertheless the experience in North America, where a last year study⁴ shows that seeds of traditional varieties of corn, soybeans and canola are contaminated with DNA sequences derived from transgenic varieties (up to 50 percent for corn and soybean and 83 percent for canola) and the scientific literature on pollen dispersal, indicating that outcrossing has been recorded at up to 800 m and maize pollen has the potential to travel over much longer distances⁵, induce to believe that genetic contamination of conventional and organic seeds, crops and products is occurring in Spain.

Furthermore, added to the total lack of preventing measures, the particular conditions of Spanish corn farming - small size of the farms, sharing of machinery, lack of segregation, etc. – strengthen this fear. It is worthwhile to notice that Spain is also importing big quantities of GM corn and soya, which represented another source of contamination.

The following examples of cases of genetic contamination reveal that this problem already affects crops, seeds, grains and feed, both from conventional or organic agriculture.

Contamination of crops

Traces of GMO were identified in 2001 in the corn crops of two organic farms of the Navarra region. Careful analysis revealed that the polluting agent was the Bt176 event, cultivated still in small areas in this region, but enough to contaminate. No quantitative test was done but in both cases, the proportion of GM material was higher than 0.05%. It definitely is a case of cross-pollination.

Consequently, the organically grown maize had to be withdrawn from the organic food chain and could only be sold as conventional. The concerned farmers did not receive any compensation for the economic losses sustained because the legislation regarding the use of GM crops made it impossible for the farmers to make a claim.

After these first cases of contamination found 2001, in 2002 very little organic corn has been planted in this specific region, because organic farmers do not want their organic crops to be contaminated, given that, in case of contamination, “the polluted farmer pays”.

In August 2003, another case of non-GM crop contamination was detected in Aragon: a conventional corn field was found to contain traces of Bt176 corn in a village near Zaragoza. A Bt176 corn field were situated at around 200 meters. Also in that case, it is obvious that the contamination originated in the pollen dispersal.

At beginning of 2005, the organic certifying body in Aragon detected a very high level of contamination by Bt176 and MON810 varieties in an organic corn production. The affected farmer grows organic crops since more than 15 years in a village near Sariñena (Huesca). The contamination of a 2 hectares field traditional autochthon corn variety was as high as 34% and can only be explained by an accumulation of the contamination during several years.

Contamination of seeds

At the end of 2001, the public organic certifying body in Navarra found transgenic material in organically grown soya. It was thought to be contaminated by the seeds bought by the farmer from the company Monsanto. There is no soya planted in the region and nobody had done so for 15 years: the seed packages contained GM seeds without any mention. This thesis was confirmed by the organic certifying body in Aragon that detected in the same lot GM seeds. The origin of the contamination was the importation of seeds, yet Monsanto imported this lot from USA. The planting of the GM variety was illegal in Spain (GM soya is not authorized in the EU for cultivation) but Monsanto sold the seeds and do not compensate the affected farmers for the economic losses.

Contamination of grains

In October 2003, the seeds producer Pioneer invited farmers to a demonstration of harvesting several of its varieties to compare yields in the region of Lleida (Cataluña). About 200 farmers attended. Two of the varieties included the genetic modification MON810 and only one of them was authorized in Spain for commercial growth. Once harvested, all varieties (no-GM and GM, included the non-authorized one) were mixed and would have ended in a neighbouring feed factory if some of the assistants would not have denounce this fact to police. At this moment, the legal resolution of the case is pending. An important point is that Pioneer organized several of these demonstrations also with non-authorized varieties in Cataluña and nobody knows where ended the harvest of the GM varieties.

This example is a very good illustration of the total lack of segregation of GM crops from the traditional channels. If biotech industry do not hesitate to mix a non-authorized GM variety with other GM and non-GM varieties to enter into the food chain (in that case though animal feed), no doubt that most of the GM corn produced in Spain ends in the food chain without any segregation. Spain is now faced to the big challenge of adopting the necessary measures in order to fulfil the European Regulation 1831/2003 concerning the traceability and labelling of genetically modified organisms and the traceability of food and feed products produced from genetically modified organisms and definitely has to change this practice of mixing GM and non-GM grains.

Contamination of feed

Since 2001, the Basque farmers union EHNE is analyzing samples of conventional feed to detect GMO presence. GM corn and soya has been found in at least five samples without any mention in the labelling. As much of the feed production is based on imported prime material, the contamination probably originates in the importation of GM bulk grains.

Another case of feed contamination has been revealed to public from the affected farmer. The owner of an organic cattle farm of Cataluña discovered by an analysis in laboratory that the sample of the feed he bought was contaminated by 0.7% of GM soya Roundup Ready, although the feed should not have contained soya at all.

Only the tip of the iceberg

All these examples have been found by organic certifying bodies, farmers unions, farmers or NGOs but no official monitoring at all has been put in place. Even worse, the former government was affirming repeatedly that no genetic contamination was occurring in Spain, but this affirmation relied on a total lack of detection campaign, systematic analysis and statistical results instead of realistic facts.

In the described conditions, it is obvious that the cases of genetic contamination presented in this paper are not the only ones. The disinterest of public authorities and the reduced economic resources of the potentially affected persons or organizations have made impossible a systematic analysis of the problem and some detected cases certainly have not been revealed to public. It is very likely that other conventional and organic seeds, crops, grains, feed and food are polluted in areas where GM plants are grown or due to importation of GM products, but insufficient testing and controls are allowing them to slip undetected into the food chain.

GM Bt176 corn declared unsafe for human health after 6 years in fields and in the food chain

All those facts are particularly worrying because Bt176 corn, grown in and imported to Spain since 1998, has been recognised last year unsafe for human health. The European Food Safety Authority (EFSA) published an opinion on 19th April 2004 in which it recommends that Bt176 corn "*should not be present in GM plants placed on the market*" for its gene of resistance to the antibiotic ampicillin³. Four days later, the Spanish Agency for Food Security stated that "*this Bt176 corn will not be allowed to be sown and grown from January 2005*"⁶.

The two official food agencies recognized that this GM corn has to be removed from the market for health concerns, six years after the authorities granted the authorizations to be grown and to enter in the food chain. During all those years, Spanish farmers have been growing it and Spanish people have been eating it without any control or information to consumers. Even worse, sources of the Ministry of Agriculture recognized that Bt176 varieties will be grown in Spain in 2005.

In the meanwhile, Bt176 has been contaminating all along the food production and the extent of the contamination remains unknown. Let's hope that contamination is not so generalized that no way back is possible.

This experience with Bt176 corn in Spain clearly show that the precautionary principle have not been a priority in the decisions of the European and Spanish authorities, although such a controversial and potentially dangerous technology have not yet proven to be safe for health, environment and farming.

Since July 2005, the 5 varieties in the catalog are phased out. However there is no answer from the government about what is going to be done with the already planted hectares. In fact, it is being harvested with no segregation at all.

Furthermore, Greenpeace and other farmer groups have identified some cases of contamination of conventional and organic corn with Bt 176, which is being denounced through Prsss conferences and reports.

Conclusion

The Spanish experience with GM corn growing and GM corn and soya importing reveals that conventional and organic farming and food production are deeply affected by the introduction of GMOs. In the conditions experimented in Spain, good coexistence between GM, conventional and organic crops is very far from being a reality and it is to expect that genetic contamination generalizes within a few years if no radical change is operated.

The uncertainty around the environmental, farming and health impacts of GMOs fully justifies the preservation of agriculture and food production from GMO contamination. The spreading of genetically modified DNA without control, as occurred in Spain in the last seven years, is considerably reducing

the capacity to withdraw a GMO from the market in case of problem and endangers the survival of a GM free agriculture and food, necessary on the other hand to respect the consumer choice.

Europe (and hopefully Spain) still has the possibility to avoid a generalized contamination of its agriculture and food. The North American experience has shown that a large scale uncontrolled release of GM varieties produces in ten years a non-return situation. Europe and the European countries have to find the mechanisms to avoid such a situation before GMOs are introduced in agriculture and food.

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