

Supplement “GM plants” (2007) Summary and Core Statements

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The global cultivation of genetically modified varieties is concentrated on the four crop types soya, maize, cotton, and rape, and on their characteristics of pest-resistance and herbicide tolerance. Farmers can profit from cultivating transgenic varieties if the result is a reduction in losses caused by pest infestations and costs for weed management. The constant global increase in the cultivation of genetically modified plants shows, in accord with diverse studies that despite higher costs for seeds there are economic benefits for farmers.

In 2006, commercial cultivation of genetically modified crops in Germany totalled approximately 950 hectares of land. The general conditions, particularly the EU-wide regulation concerning the labelling and traceability of transgenic plants and the coexistence of transgenic and non-transgenic plants in both cultivation and processing, clearly differ from those in countries with a rapidly increasing cultivation quota. Therefore, a rapid diffusion of genetically modified varieties is not to be expected in Germany.

The research in the field of genetic engineering for agriculture is dynamic and is being intensively pursued all over the world. Researchers are currently working on second and third generation plants in which either more complex metabolic processes or regulation mechanisms are modified or various attributes are combined. At the same time, the research objectives, and accordingly the potential products, have expanded in scope (e.g. nutrient efficiency, modified nutrient composition, biomass research). These studies are increasingly supported by comparative genomics, and at this time the genomes of several types of plant are being sequenced. This accelerates the identification of genes and regulation mechanisms that determine the environmental behaviour of plants or are relevant for technical applications.

The process of 'smart breeding' is currently under development. This procedure involves the traditional method of cross breeding between individuals of one species or between closely-related species. Subsequently, the manifestation of desired traits in the progeny will be traced by means of molecular markers (directly on the genetic level). The positive reaction in the media suggests that plants developed using smart breeding would be more likely to find consumer acceptance than transgenic plants.

The second current development is that of cisgenic plants. These are produced using gene transfer methods, but they in fact only contain DNA elements characteristic of the species.

However, neither smart breeding nor cisgenic technologies will be able to replace transgenic plants, and cross-species gene transfers, which are already standard in industrial (white) biotechnology, will continue to be necessary.

Generalized arguments about the safety of GM plants and GM food (health and ecological risks) cannot be employed as a central argument against the utilization of this technology. Discernable risks are subject to legal regulation. At the same time, it is generally recognized that monitoring genetically modified plants following their introduction is a prudent measure.

It remains to be seen whether the technology will fail to become established due to a lack of consumer acceptance. Due to organized social pressure, food producers and retailers are not prepared to offer foodstuffs containing genetically modified plants, despite the freedom of choice rooted in the European Union and the pertinent regulations concerning labelling.

Public acceptance of GM plants and GM food in Germany and the European Union has thus far been hindered by a lack of convincing products (output traits) from first-generation plants. However, in the USA, Canada and several newly-industrialized countries (Argentina and China), first generation transgenic plants (insect resistance, herbicide resistance) have assumed increased significance in recent years judging by the increase in cultivation of these plants.

In Germany, experts have serious concerns about the constant loss of scientific expertise. Young, well qualified science graduates in particular might be inclined to turn away from gene technology or seek posts abroad due to the uncertain future of the field in Germany. New developments such as smart breeding and cisgenic technologies, and the increasing shift towards biomass research, could reverse this trend.

The genetic engineering for agriculture lacks an unambiguous scientific policy in Germany. The policies of the German Ministry for Education and Research (BMBF) and the Ministry of Nutrition, Agriculture and Consumer Protection (BMELV) are still not cohesive. A 'greening' of agriculture should not be seen as being limited to a transition to organic cultivation, and it should not exclude the possibilities offered by GM plants. On the level of applied research, there is a risk of losing touch with international research programmes in the field of genetic engineering for agriculture.

The destruction of authorized field trials jeopardizes the potential knowledge gains for German researchers, specifically in terms of evaluating the risks associated with the cultivation of genetically modified varieties.

Genetic engineering for agriculture is gaining importance in newly-industrialized nations. This is evident in the increasing areas of cultivation devoted to such crops. Moreover, increased financial support has been granted for research in these countries. By way of example, the provision of royalty-free Golden Rice can prove to offer financial and health benefits for subsistence farmers. There is a growing tendency for newly-industrialized nations to develop domestic research programmes focussed on crops of local importance.