

Crop Biotechnology: An Overview

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Agricultural Biotechnology in Europe
Promoting an open and informed dialogue



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Introduction

This report is the first in a series to be issued by Agricultural Biotechnology in Europe (ABE). ABE is an initiative supported by Europe's leading agricultural biotechnology companies. In this report, we will summarise the situation in Europe (in a global context), whereas future editions will address individual key issues in more depth. Our intention is to present the facts as we know them, and explore each area in an open and honest way.

The application of modern biotechnology (often referred to as GM technology) to crop production is an area which we believe holds great promise for farmers and the food chain, and also for consumers and society in general. Not only can this tool be used to improve agricultural productivity, but also to contribute towards reductions in the environmental impact of farming.

We recognise, however, that the introduction of crops produced with biotechnology and the use of these crops in foods have raised concerns in Europe, and that future introductions can only be made once consumers feel they have sufficient information to make an informed choice. Our aim is to promote an open and informed debate with all stakeholders, with confidence that, in the fullness of time, agricultural biotechnology (agbiotech) crops will gain acceptance in Europe as they have in other parts of the world.

This series of reports represents one of the first steps in wider communications about agricultural biotechnology. We hope this communication will be two-way: We will be seeking your feedback and requests for specific information. We will also keep you informed about other activities we are undertaking.

Global status

The use of crop varieties produced with modern biotechnology has grown rapidly in recent years. In 1996, only 1.7 million hectares of biotech crops were planted in 6 countries worldwide, compared with 44.2 million hectares in 13 countries in 2000, and an estimate of 50 million hectares in 2001 (see Figure 1). In addition to commercial planting, many more countries are conducting field tests to develop and evaluate new plant varieties.

This is the most rapid adoption ever of a new agricultural technology, and the fact that the growth is sustained is indicative of the real benefits seen by farmers.

The United States is by far the biggest grower of agbiotech crops. In 2000, farmers there grew 30.3 million hectares of crops from modified seed, and are expected to report a further increase of about 10% for 2001 (ISAAA Brief 23). Other countries growing these crops include several Latin American countries, Canada and China. In these countries, agbiotech represents an important contribution to the agricultural sector: for example, Argentina has a significantly higher proportion of its soyabean crop produced from modified seed than even the USA.

Figure 1: Global area of GM crops: 1996-2001

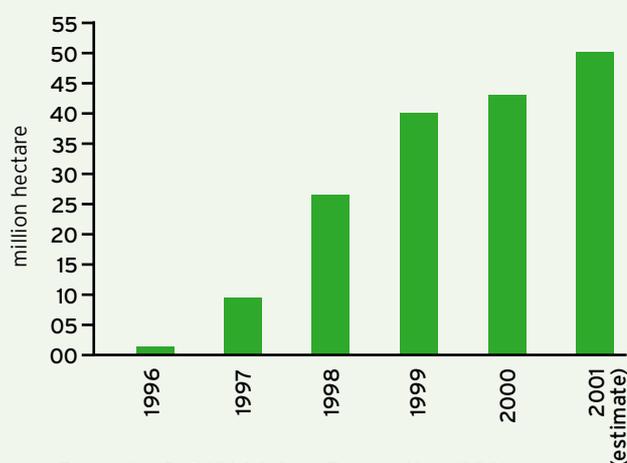
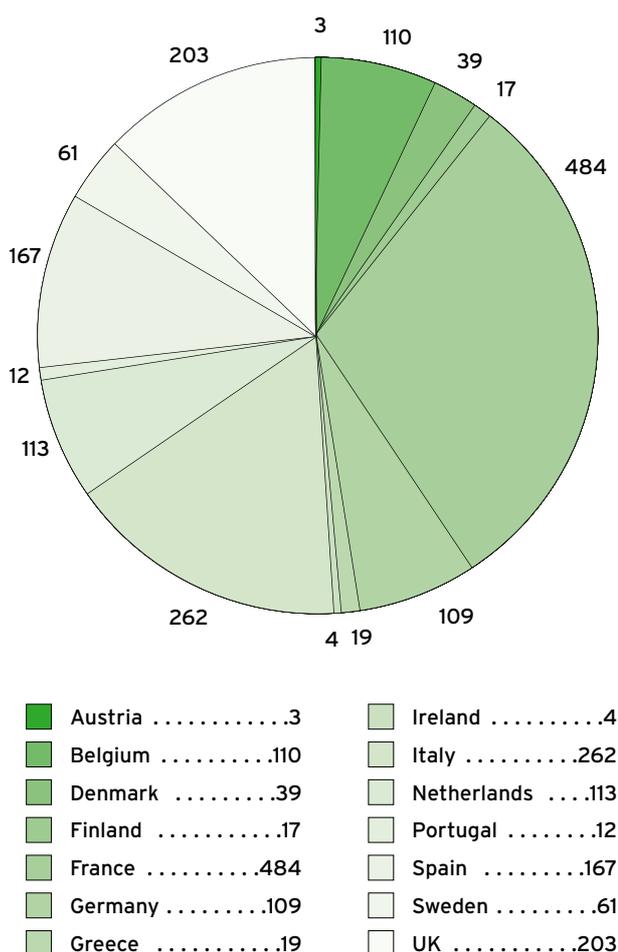


Figure 1 (Ref: ISAAA Crop Biotech Net) (2001)

Figure 2: Field Trial permits granted in the European Union from 1986 to April 2001



(2001)

European situation

In Europe, Spain is the only country to grow agbiotech crops commercially, with 30,000 hectares of Bt maize grown in 2001 (source: Spanish AGPM). Elsewhere in Europe, small areas of modified crops are being grown on a trial basis, e.g. France (200 hectares in 2000 and 34 hectares in 2001) and Germany (some 300-400 hectares in 2001).

Of particular note is the Farm-Scale Evaluation programme in progress in the UK. This programme - sponsored by the UK government and planned and managed by a team of independent scientists - is designed to test the environmental effects of the management regimes associated with herbicide tolerant

varieties of sugarbeet, fodder maize and oilseed rape. In each case, adjacent conventionally-managed fields, as well as the agbiotech plantings, are being monitored for their numbers of typical farmland insects. The UK agricultural biotechnology industry, represented by SCIMAC (Supply Chain Initiative Modified Agricultural Crops) has agreed a voluntary moratorium on commercial plantings of modified crops until after the results from these trials have been collected and evaluated at the end of the 2003 growing season.

Figure 2 shows the total number of individual trials for which permission was granted over a five-year period for each of the European Union countries. Each trial had to receive individual evaluation and approval by the national regulatory authorities under current EU regulations, and is subject to stringent containment controls.

In addition to the small area of agbiotech crops grown in some EU countries, significant quantities of modified soya and amounts of maize are imported in commodity streams for use mainly in animal feed.

Biotechnology in the agricultural economy

Within the EU, national governments and institutions have become increasingly aware of, and interested in, the potential economic importance of biotechnology. In Spain, for example, a recent study conducted by Universidad San Pablo-CEU in Spain in 2001 determined that the increased use of modified crops could have benefits in terms of crop yields, manpower savings, savings to the agricultural sector, and by extension, consumer price reductions.

Similarly, a London Economics study suggests that, while the field of biotechnology is young, it is an important and growing sector of the UK economy. Their report calls on government "to create a business environment for biotechnology in which it can stand or fall on its own merits."

European leaders are increasingly aware of the economic potential of agricultural biotechnology. Witness the number of senior politicians voicing their views recently:

"It is of strategic and long-term importance that Europe masters the new frontier technologies, in particular the life sciences and biotechnology, and uses them for the benefit of society."

(Romano Prodi, Commission President, European Commission stakeholder meeting, 27/28 September 2001, Brussels)

"The important thing is that we need access to the best scientific evidence..You get the real facts, not the prejudices." (Tony Blair, UK Prime Minister, G8 conference; 2000)

"Faced with the enormous needs, it would be contrary to the fundamental interests of humanity to prohibit the modification of the specificities of certain plants, so as to improve their yields or make possible their cultivation in arid regions or fragile soils. The real question is to ascertain how best to achieve this without disrupting the natural balances, necessary to humans". (Jacques Chirac, 8 February 2001, Lyon, France)

European legislation and regulation

The current marketing approval process

The process for bringing products developed using modern biotechnology into commercial use in the EU (whether for import or cultivation) is complex and still being modified. This section of the report gives a brief overview.

Adopted in 1990, European Commission Directive 90/220 established the EU authorisation procedure for the deliberate release into the environment of GM products, including crops produced using modern biotechnology. It applies to "viable" materials (such as seeds) but does not apply to "non-viable" products processed from modified crops (such as tomato purée). The Directive created an EU-wide authorisation procedure for the commercialisation of agbiotech products for import, cultivation and other uses where there is no product specific legislation (e.g., animal feed use).

This piece of legislation was recently updated as European Commission Directive 2001/18 in April 2001. EU Member States have 18 months to implement the

new Directive (by 17 October 2002). The updated Directive tightens the earlier Regulation and main changes introduced include:

- The limitation of authorisations to 10 years (renewable)
- Broad-based risk assessment including direct, indirect, immediate and delayed effects
- The imposition of mandatory post-release monitoring of biotechnology products
- Phasing out of the use of antibiotic resistance marker genes
- Establishing public registers to identify the location of modified crops grown in the EU
- Traceability at all stages of placing agbio products on the market

In addition to the requirements of this Directive, agbio products to be used for human food are subject to the Novel Food and Food Ingredients Regulation (EU Regulation 258/97). This specifies evaluation and approval procedures for all food products which do not have a history of regular consumption in Europe. In practice this system, although cumbersome, works adequately for "novel foods" which are not genetically modified (for example, active ingredients for cholesterol controlling margarine).

However, approval of new agbio seed crops for cultivation and food use has effectively been blocked for several years, initially while the deliberate release Directive was being revised, and more recently because several Member States want to take no action until further regulatory regimes on traceability and liability have been agreed.

Labelling and traceability

Under EC Regulation 258/97, agbiotech and other novel foods must comply both with the general labelling requirements imposed by EU law and also, in certain circumstances, with specific labelling of the characteristics that have been modified and the method by which the characteristic was obtained. In practice, this means that all food components of modified origin must be labelled as such, however minuscule the amount of novel genetic material or protein, unless it can be shown

that it was derived from a non-modified source. Even in this case, a maximum permitted level of 1% is allowed for modified material unavoidably mixed in. Given the significantly lower levels of purity accepted for other agricultural commodities, the costs involved in full identity preservation necessary to guarantee that labelling is not needed can be quite significant.

Additional requirements imposed by Directive 2001/18 (from October 2002) will oblige Member States to ensure that at all stages of the placing on the market, the labelling and packaging of agbiotech products comply with the individual product specifications determined during assessment. Labelling in the future must also indicate how the general public may view the publicly accessible information on the approved product.

The future legislative environment

The recent changes in EU legislation dealing with agbiotech products were primarily intended to improve existing laws and also to build a firm foundation for a comprehensive system of regulation and improve public confidence.

In July 2001 the European Commission published a package of proposals designed to complement and consolidate the existing legislation. The draft Regulations (COM (2001) 182) propose a comprehensive safety assessment and authorisation for agbiotech foods and feeds, and additional provisions for traceability and labelling of agbiotech products.

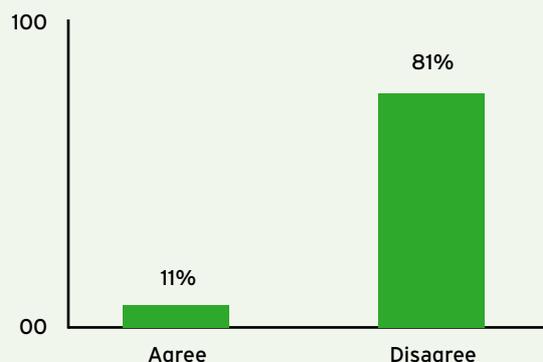
In practice, a workable system is unlikely to result until all EU Member States have the political will to make it happen.

Public perceptions

In general, the European public feels that not enough is known about agricultural biotechnology. Time and again, when asked whether they are sufficiently informed about biotechnology and related advancements, the vast majority of Europeans (upwards of three-quarters) state that they are uninformed (see Figure 3).

And yet, despite the general climate of insufficient information, the majority of the European public con-

Figure 3: I feel sufficiently informed about biotechnology



Source: ABE (2001)

tends that they have read a fair amount about GMOs and biotechnology (see Figure 4).

The divide between perceived lack of information and actual levels of awareness has contributed to a climate of apprehension among some consumers. That said, it is important to note that biotechnology, GMOs and food safety in general do not appear to be a top-of-mind concern among many European consumers.

A recent survey commissioned by the UK Food Standards Agency in September 2001 found that "food safety concerns" are among the least important factors influencing the food that UK respondents

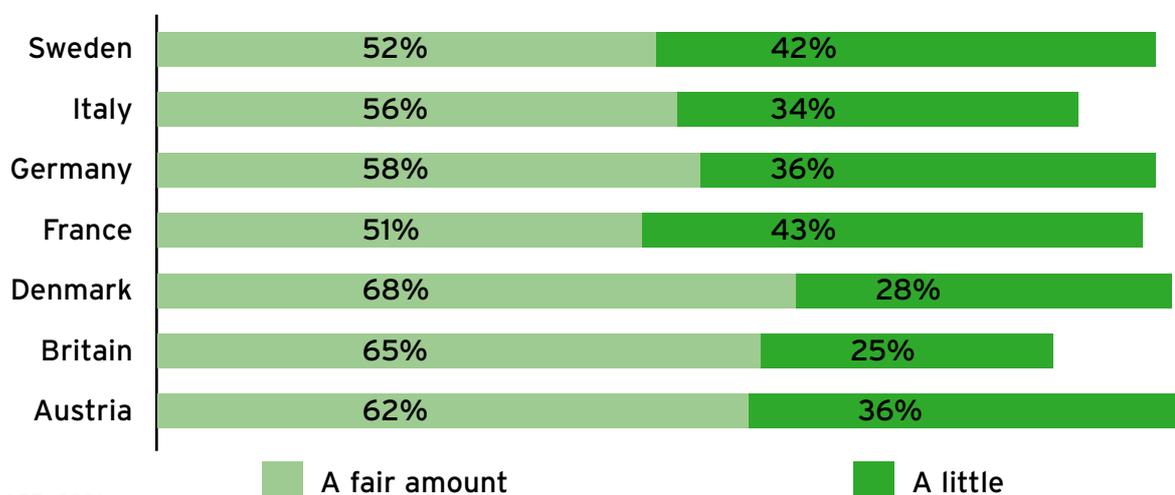
purchase, with just 4% of the respondents selecting this factor. In addition, when asked about how concerned they are about the way in which food is produced, about three-quarters (77%) state that they are "very" or "fairly" concerned, but among this particular group, just 11% list genetically modified foods as their primary concern.

At the same time, however, while agbio foods may not be a top-of-mind concern for many Europeans, this does not mean that when people are asked to turn their attention to these foods that they are not concerned. In fact, they say they are quite concerned. Many consumers describe these foods as a "very serious problem" (see Figure 5). In many instances, this may be due to the generally heightened public concern about food following well-publicised safety issues such as BSE, dioxin and harmful E Coli.

Notwithstanding general levels of concern about foods and crops made with biotechnology, it is also important to note that public opinion begins to soften when specific applications of biotechnology are taken into consideration, a finding underscored in a 1999 Eurobarometer study.

Another interesting poll conducted by NOP on behalf of CropGen in February 2001 showed a small majority of the UK public is willing to eat agbiotech foods if they were clearly labelled. When asked "Would you person-

Figure 4: How much have you read or heard about GMOs or biotechnology?



Source: ABE (2001)

Figure 5: Percentage who view GM crops as a 'very serious problem'



Source: UK Food Standards Agency (2001)

ally eat food if you knew that it was genetically modified or contained genetically modified ingredients, or would you not eat it?", 48% of respondents said "yes" and 44% said "no". Clearly, the situation as far as the public is concerned is not as simple as some pressure groups would have us believe.

Future applications of biotechnology in agriculture

Crop biotechnology is an additional and important tool for plant breeding. At present, the future of the technology lies in producing either uniquely valuable varieties for the benefit of farmers, or varieties with unique functional properties for the benefit of consumers and/or food processors. Some of the products of the technology will be more suited to the needs of the developing world – such as cereal varieties able to thrive in the acidic, high-aluminium soils common in the tropics or virus-resistant cassava to improve food security in parts of sub-Saharan Africa. Others will be more aligned to the industrialised world: cereals with improved starch extractability, oilseed rape in which the seed pods have less tendency to shatter and reduce harvest yields, or melons with guaranteed ripeness, for example.

Yet more applications will be part of the move towards better agricultural and industrial sustainability for example, sugar beet which allows weed control at a late stage of growth so as to maximise food resources for insects and farmland birds. Another example would be cereals grown both as a source of food and of

valuable industrial raw materials from the straw (50% of total biomass) which is currently a waste product. These and other examples show the potential of biotechnology to contribute to more sustainable agricultural practices.

Summary and conclusions

In agricultural biotechnology, we have a tool of enormous promise. This is evident in the unprecedented growth in its use that is occurring in a number of countries around the world. Many feel that those countries that adopt these technologies in agriculture will have an economic advantage over those that do not. If so, those economic implications will be felt all along the food value chain.

Despite these potential benefits, the European public demands more information and the right to make their own choice before embracing this technology. Only through an open and informed dialogue between our industry and a wide community of interests will the best possible options for the use of crop biotechnology be identified. Such a dialogue should precede informed decisions by key stakeholders – among them farmers, consumers, trade and industry, scientists, health professionals, environmental groups and government – to determine the wisest ways to harness the potential of this technology.

We hope you have found this report useful and interesting. Please give your feedback to the contacts below. We will be following this summary with a series

of reports addressing individual issues in more depth. These will include: the contribution of biotechnology to the agricultural economy, environmental and food safety issues, future applications and a review of the European regulatory scene.

The next report in the series will cover the area of public perception, and address questions including: What do people really think about biotechnology? Why are perceptions different in different countries? How do these perceptions affect buying decisions? Look out for it in early 2002.

Who we are

The companies involved with the development of agricultural biotechnology believe strongly that biotechnology has the potential to enrich our lives in many ways. We recognise, however, that the introduction of genetically modified crops and foods has raised concerns in many European countries.

Our industry has an ongoing commitment to scientific research and testing, and to ensuring that products are developed and commercialised in a responsible and safe manner. We also recognise that the success of any new technology in Europe needs to be based on respect for people's viewpoints.

The biotechnology industry believes that consumers should be as informed as possible. The agricultural biotechnology industry is therefore working with various organisations across Europe to improve transparency and to foster a useful dialogue on agricultural biotechnology. Our efforts focus on broad and serious communication to a range of audiences - media, NGOs, policy-makers, retailers and others - with the aim of listening to and respectfully addressing the concerns of European citizens as well as making information available about our industry and this technology.

The following companies are participating in this effort:

Aventis CropScience	BASF
Bayer	Dow Agrosciences
DuPont	Monsanto
Syngenta	

Our aim is to increase the dissemination of information and contribute to an informed debate about crop biotechnology. If you are interested in receiving more information about agricultural biotechnology, please contact; Peter Wynne Davies at:

info@ABEEurope.info or consult the ABE website at www.ABEEurope.info

