

AGRICULTURAL BIOTECHNOLOGY IN EUROPE

A recent conference held in Amsterdam on 9-11th July and organised by Informa Life Sciences brought together representatives from the agricultural biotechnology industry and specialists from universities and government departments. The one common concern arising from the conference titled Harnessing the Potential for Agricultural Biotechnology for Europe was the continued delay in gaining registrations through the EU process.

Market dimensions

Colin Merritt, external affairs manager, Monsanto UK and Ireland, gave a report on the status of agricultural biotechnology worldwide which he said had a commercial value of \$6.2 billion in 2006. It was one of the most successful agricultural technologies and had no proven adverse health problems associated with it. He went on to say that the technology needs to be considered as just one important tool to help feed a growing global population. Since the commercial introduction of biotech crops the global population had grown from 5.8 billion in 1997 to 6.6 billion in 2007. By 2017 the projected population will be 7.4 billion. 102 million hectares of biotech crops were grown worldwide in 2006 by 10 million farmers in 22 countries where some 3.6 billion people currently live. The opportunity to increase yield and meet the demands of this growing population has been the main reason why farmers have adopted biotech crops. In India, for example, yield increases as high as 80% have been achieved on cotton.

In the EU, GM registrations have been delayed against the advice of the European Food Standards Authority (EFSA). Mr Merritt said: "It is clear that politics still dominate over rational science based decisions. The EU has the most rigorous approval scheme in the world, but there is a duty to make it work." He was encouraged somewhat by a quote from the EU Trade Commissioner, Peter Mandelson, who said that isolation was not a viable option. Mr Merritt believes that the time has come for the EU to move forward in a more pragmatic way.

Much of Monsanto's R & D effort is targeting traits for drought tolerance, as lack of water will be the major barrier to increased crop production world wide. Improvement in nitrogen utilisation is another important target as nitrogen fertiliser utilisation is the largest single agricultural source of greenhouse gas emissions. Health giving traits are also getting closer to the market through Omega-3 oilseed crops. Results of a UK survey run by the Institute of Grocery Distribution (IGD) (www.igd.com), indicated that premium prices would be paid by 36% of consumers for health benefits, compared with 41% for quality and 14% for organic food.

Graham Brookes, PG Economics, painted a picture of the economic benefits that have been gained at industry and farm level since the first biotech introductions. Farm income gains had accumulated to \$27 billion in the ten years from 1996 to 2005. Herbicide tolerant (HT) soybeans generated an extra \$11.7 billion; insect resistant (IR) cotton \$7.5 billion and insect resistant maize \$2.4 billion. Geographically, the US had gained \$12.9 billion, Argentina \$5.4 billion, China \$5.2 billion, Brazil \$1.4 billion, Canada \$1.0 billion and India \$0.46 billion.

Mr Brookes had calculated that over the same period, in countries where GM crops were grown, the quantity of herbicides and insecticides used had been reduced by 6.9%. This translated to a reduction of 15.3% in the associated environmental impact. The largest reductions had been with IR cotton and HT soybeans. In terms of reduction of CO₂ emissions the gains from GM crops were equivalent to 4 million cars being taken off the road.

Dr John McDougall, Phillips MacDougall, outlined the commercial status of the technology and the industry. There are still only four important crops where biotechnology is significant - soybeans, cotton, maize and canola. By 2005 soybean was dominantly GM. In the US it accounted for 95% of the area planted, in Argentina 98% and in Brazil, where the crop was only introduced in 2004, 37%. Cotton had

reached 78% in the US, 51% in India and 35% in China. GM maize in the US accounted for 70% of the crop with an increasing proportion based on stacked traits (HT and IR). In Canada, GM canola accounted for 82% of the crop area.

Dr McDougall compared the 2006 seeds and biotechnology sales and R & D expenditure of the six agrochemical based multinationals.

- Monsanto: sales \$4 billion, R & D \$700 million
- DuPont: sales \$2.7 billion, R & D \$350 million
- Syngenta: sales \$1.8 billion, R & D \$300 million
- BASF: sales minimal, R & D \$150 million
- Dow: sales \$250 million, R & D \$120 million
- Bayer: sales \$400 million, R & D \$100 million

The only other European seed companies developing GM crops are Limagrain and KWS using licensed traits.

Improving communication with farmers

Klaus Amman, guest professor, Technical University, Delft, Netherlands, believes that improved dialogue with farmers is important. Lengthy presentations from officials and scientists can often backfire. He cited the example of a meeting in Denmark in the early days of trying to explain biotechnology. An EU official talked to a large farmer audience for over an hour, explaining all the benefits. At the end a solitary elderly farmer stood up to say – “You have talked so much about the technology, there must be something wrong with it.” By way of contrast, Klaus Amman was party to a discussion with Amish farmers in the US. Because of their religion and adopted lifestyle most Amish farmers grow their crops organically without the use of chemicals. However by giving the farmers an opportunity to quiz the specialists on the merits of insect resistant transgenic crops, many were persuaded that they met a need, which did not contravene their beliefs, and so they decided to grow them. Klaus Amman favours the Precision Biotechnology approach, where the technology is adapted to the precise local needs of farmers and the environment, and eliminating gene flow where it is necessary to do so.

Paul Temple, vice president NFU, the UK's National Farmers Union, had satisfied himself that gene flow was not an issue with maize crops. He had seen for himself in field trials in France that the cross contamination distances were just a few metres. He recognised that his visit had given him the opportunity to see and learn more about the technology than most but encouraged more farmers to find out as much as they could for themselves.

Influencing public opinion

Professor Vivian Moses represents CropGen, an organisation aiming to support the agricultural biotechnology industry in the UK (www.cropgen.org) through communication based on sound science. He said that he had come to recognise that most opinions are based on perceptions which are often wrong. He believes that where real benefits can be demonstrated farmers will soon be on board. He quoted the British Grasslands Society survey carried out earlier this year which concluded that 47% of farmers are willing to grow GM crops and a further 28% would be willing if the demand is proven to exist. Only 16% were not willing to grow such crops. In Professor Moses's view British public opinion is not so antagonistic to GM technology as many believe. A survey on food labelling carried out by IGD showed that 13% of consumers check labels to make sure there is no GM content and 27% rarely check but would prefer not to buy GM food. On the other hand 13% are happy to buy GM food and 47% do not bother to check labels at all.

For those trying to gain acceptance of GM technology there are several potential points of influence. Governments at national and EU level have so many other issues to deal with and in any case respond to what they believe consumers want. Direct influence is therefore difficult. The better targets are the food

retailers and the press. Because of the long safety record and the fact that the larger green activist organisations may have developed other interests, Professor Moses believes it is possible that retailers could be persuaded to adopt a less hostile approach to GM foods.

Co-existence

Alberto Ojembarrena, Pioneer-Hybrid Spain, outlined how *Bt* maize crops with resistance to European Corn Borer (ECB) and Pink Stalk Borer (PSB) had proved so successful in Spain. Of the total crop area, 380,000 hectares in 2007, about 25% is subjected to high ECB/PSB pest pressure, mainly in Aragon and Catalunya. Around 60,000 hectares of *Bt* maize were planted this year based on 42 hybrids and following steady expansion since the first introduction in 1998. With new traits arriving, it is envisaged that the area will increase to 80-90,000 hectares. The real benefits are in yield enhancement, with average increases of 15%, as well as removing the need for insecticide treatments. *Bt* maize is now being grown on some 100,000 hectares in the EU this year including 20,000 hectares in France, 4000 hectares in Portugal, 3000 hectares in Germany, 5000 hectares in the Czech republic and small areas in Romania and Slovakia.

In Spain, *Bt* maize is grown for starch while organic maize production in the region is minimal. However if the national organic movement has its way, and is permitted to apply a veto on co-existence rules, this will effectively bring an end to the production of *Bt* maize. Alberto Ojembarrena, made a strong plea for EU authorities to speed up the regulatory process, to heed the recommendations of EFSA and to outlaw illegal Member State bans.

Denise Dewar, CropLife Canada, the plant science trade association, is responsible for biotechnology issues. She said the wide acceptance of herbicide tolerant canola by farmers is a consequence of the unreliability of soil applied herbicides in the dry spring conditions that prevail in the prairies. Although the important export markets, EU and Japan, are not accessible for GM canola seed this has not been a barrier to growth as extracted oil is supplied instead. Much of Ms Dewar's activities are now geared up to managing stewardship programmes. The approach in Canada is to adopt Best Management Practice for the co-existence of conventional, organic and biotech production systems. Co-existence and crop management rules are mutually agreed on a case by case basis during the trial phase and after introduction. Practical guides and training modules are then communicated to farmers.

Despite the rapid growth in GM crops, organic systems have also grown in popularity. Organic producers have been able to capitalise on the market created by a demand for the non GM option, and have been able to add value to their products.

New traits

Jürgen Logemann, vice president of technology management for BASF Plant Science, said that his company had invested in biotechnology much more recently than many of its competitors and with some success. A team of some 700 people is now working on biotech crops. In the US BASF is collaborating with Monsanto. Discoveries are to be kept independent but will be commercialised through Monsanto. A major breakthrough for BASF, with important relevance to Europe, is the blight fungus resistant potato crop now in development. This, he said, is based on the expression of two separate genes. Dr Logemann called for a much more open attitude to the technology within the EU. He believes that innovation in Europe will only come from market access. If closed attitudes persist companies will desert the continent.

Crisis for corn gluten supply

The slow EU registration process has given rise to an acute problem now affecting the European livestock industry, particularly poultry. The current situation was outlined by Hilde Willekens, representing EuropaBio, the European biotechnology association based in Brussels, Belgium. Much of Europe's corn gluten feed is sourced from the US and until recently there was a ready supply of gluten from GM free crops. There has, however, been an increased take up of GM corn in the US. The import of GM gluten feed into the EU requires approval and while registration applications have been with the EU authorities for several years they have yet to be cleared. The consequence is reduced availability of GM free gluten and this is now contributing substantially to the increased prices that the European farmer is asked to pay.

For an industry already under pressure this could mean an even more rapid transfer of poultry production to other continents.

Subsequent to the conference the European feed and livestock industry organisations have put out a press release that includes the following statement: “European Commissioners Mandelson, Fischer Boel and Kyprianou have acknowledged the supply crisis developing in the European feed industry and the need to find practical solutions. This underscores the need to improve the EU approval system to function more swiftly or risk threatening Europe's ability to fundamentally source sufficient feed for our livestock sector.”

Coupled with the general increase in grain crop prices due to climatic factors and biofuel demand, there was a feeling amongst some of the conference delegates that the feed supply crisis could be the issue which finally brings about a sea change in European policy on agricultural biotechnology. Other delegates were less sure, they still believe it will take 15 to 20 years before the EU takes to the technology, by which time crops offering more tangible nutritional or health benefits should become available.