

# ABIC 2008

*This year the Agricultural Biotechnology International Conference (ABIC 2008) which is co-ordinated by the Canadian ABIC Foundation ([www.abic.ca](http://www.abic.ca)), took place in Ireland. The three day conference attended by around 450 international delegates was hosted by the Irish Government's Agricultural Research and Advisory organisation, Teagasc, together with the University College, Cork. CPM covered ABIC the last time it was held in Europe, in Germany in 2004. Since then the conference has expanded in scale and in breadth of topics. This year livestock biotechnology was included. Some 100 speakers addressed an audience made up of around 60% public sector and 40% industry representatives. Protesters, advocating GM free Ireland, were in evidence for the opening evening of the conference but kept well away from the exhibition and reception area.*

## Ireland and GM technology

The chairman of the conference, Professor Jimmy Burke of Teagasc, welcomed delegates. He referred to various national reports that have identified biotechnology as one of the core technologies, alongside nanotechnology and information technology, which Ireland and Irish industry must embrace. He made the point that, aside from GM technology, much success in yield gains from plant breeding had been achieved through marker assisted selection techniques. Billy Kelleher, Minister of State at the Department of Enterprise, Trade and Employment, performed the official opening. He recognised the potential of GM technology in addressing the "Biofuel versus Food" issue. He also recognised that science is the answer to many of today's global problems but that scientists must be permitted to carry out their work without interference from politicians.

## Meeting a global demand for food and fuel

In the opening plenary session Professor Patrick Cunningham, chief scientific adviser to the Irish Government, gave a wide ranging overview of the pressures facing the world today and how agriculture tackles the challenges of food supply, renewable energy and climate change. Among some significant statistics which he presented were how diets are changing in the developing countries. In the period between 1990 and 2005, Brazil and China have seen the most significant increases in meat and milk consumption. In China the growth has been 140% and 200% respectively. This is reflected in the massive increase in consumption of cereals for animal feed over the same period. In terms of cereal production per capita, there remain big differences, however, between the developing countries, 215kg/ person, and the developed countries, 700 kg/person.

## Monsanto targets global challenges

Colin Merritt, direct of biotechnology at Monsanto, put the current status of GM technology into focus. Around 20% of global canola, 43% of global cotton, 24% of global maize and 64% of global soybean production is now GM. Farmer surveys over several years in the US have indicated that the main driver for adoption of GM crops is increased yields through improved pest or weed control (54-76% of respondents). Also important is the need to reduce pesticide costs (19-42%).

Mr Merritt said that Monsanto's R & D effort continues to address the main challenges for world agriculture:

- Higher yields to meet demands for food, feed and fuel
- Limiting water use (agriculture is responsible for 70% of global water consumption)
- Responding to climate change pressures by minimising the carbon footprint
- Meeting nutrition and health requirements for food.

The most advanced of the new traits from the Monsanto pipeline is RReady2Yield soy beans, based on a combination of marker assisted selection and a new GM event. Field trials in 2005 confirmed average yield benefits of 10%. Approval in the USA was granted in 2007. The aim is to introduce varieties on a limited scale, around 200,000ha in the US in 2009. The company launched Roundup Ready sugar beet in the US in 2008. This has been very well received gaining a 55% share of the 450,000ha of crop grown.

It is forecast that by 2025 the global deficit in grain production specifically attributed to water shortages will be 300 million tonnes. Monsanto, through an agreement with BASF and based on their gene, are developing drought tolerant

crops. The objective is to protect against yield loss caused by general shortage of water as well as providing insurance against complete crop failure from severe water shortfalls. Trials with corn have so far demonstrated 8 -10% yield benefits. Crops based on this trait could be introduced in three to four years. Drought tolerance is also the objective of a big programme in Africa in which Monsanto and organisations such as the Gates Foundation are working together, using access to genes on a royalty free basis.

The prospects for corn traits which optimise nitrogen uptake are also promising but unlikely to reach the market before the end of the next decade. In early trials, lead events show 10% yield gains and no reduction of yield with nitrogen rates reduced by over 75%.

Monsanto's Vistive 1 soybeans were introduced in the US in 2005. The oil is low in trans fats and is of improved stability, and low linolenic acid content. The target for Vistive 2 and 3 soybean oil is to match, as closely as possible, the characteristics of Omega-3 generally found in fish oils.

## Other new developments

Ganesh Kishore, has spent much of his biotechnology career with Monsanto and Du Pont, and now works with Burrill & Company, a US based venture capital organisation. He opened his presentation by explaining that encouraging investment in agricultural biotechnology remained difficult because of the perceived business risks. While biotechnology has made good progress it has not moved out of the first generation and there are still a limited number of traits. There is, for example, still no insect resistance for sucking insects. Some progress with induced sterility in insects is however being made in Oxford with the biotechnology company, Oxitec. The main target here, however, is for vector control.

Work on improved nitrogen uptake response in rice and maize is now at an advanced stage with Du Pont and Monsanto. There are also potential improvements in biofuel productivity, Bioethanol production from maize grain in the US averages about 18 gallons/acre. The potential if lignocellulose conversion of the whole maize plant is achieved is 100 gallons/acre.

Global investment in agricultural biotechnology R & D is around \$5 billion of which Monsanto's share amounts to around \$1 billion, over \$2 million a day. With investment now coming from BP and Shell into conversion technologies for biofuels the field is opening up.

An application of GM technology in a minor crop was outlined by Ralph Scorza, US Department of Agriculture - Agricultural Research Service (USDA-ARS) horticultural biotechnology programme. One focus of ARS horticultural research is on problem solving and risk reduction relating to economically important crops. As 80% of dried plums are produced in California a concern exists that the plum pox virus could put the crop at risk. The virus originated in Bulgaria early in the 20th century and had caused losses valued at \$51 million in the EU by 1980. It arrived in Pennsylvania in 1999 necessitating an eradication programme on 1600 acres. Further outbreaks have occurred since in Michigan and New York States. The first genetic modification work started in 1990 through collaborations in Europe. A virus resistant trait was finally submitted for regulatory clearance in 2006 and 2007. Dr Scorza sees no reason why registration will not be granted in the near future.

Juergen Logemann, BASF, confirmed that his company's policy is to focus on transgenic crop development and to establish trade relationships with companies better able to develop and market commercial varieties, such as Monsanto in the US. He explained that BASF test 5-10,000 genes per year and narrow these down to 100 for more detailed examination. Areas of interest include drought tolerance, potato blight resistance, amylopectin starch and high protein corn for feed.

## Public sector scientists speak out

Robert Watson, scientific advisor to Department of Environment, Food and Rural Affairs (DEFRA), in the UK had recently chaired the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) which published its report in April 2008. IAASTD ([www.agassessment.org](http://www.agassessment.org)) is an intergovernmental organisation responding to many of the issues impacting, in particular, on the developing world. These include food prices, food export bans, drought, biofuels, climate change etc. It is made up from around 30 representatives from governments and a similar number from the private sector, NGOs and consumer organisations.

Dr Watson explained that while the majority of the conclusions from the report were accepted by all governments, the statements on the role of agricultural biotechnology were not accepted by the US, Canada or Australia. The contentious statements were that the proof of yield benefits from GM technology was limited and that there was evidence that GM crops did not result in reduced pesticide use. Dr Watson also was critical of the fact that company presentations on GM technology do not include the potential disadvantages. He then faced a barrage of criticism from many public sector scientists in the audience. The most pronounced criticism was that the findings of the IAASTD report had not been peer reviewed. Furthermore the recent report published by Brookes and Barfoot ([www.pgeconomics.co.uk](http://www.pgeconomics.co.uk)) which clearly demonstrates significant reduction in pesticide use, and was peer reviewed, had been offered to IAASTD but had not been accepted.

Piet van der Meer of the Public Research and Regulation Initiative (PRRI) gave an interesting presentation on how his

organisation had been formed and how since 2004 it had developed into a significant force. The objective of the PRRI ([www.pubresreg.org](http://www.pubresreg.org)) is to ensure that the voice of public sector scientists is heard through well co-ordinated statements when policy meetings on biotechnology are being held. One of their most recent communications had been to the IAASTD criticising them for a bias against biotechnology. They argued that IAASTD should have reported more positively on the potential for agricultural biotechnology to reduce hunger, poverty and improve health.

## Barriers to be overcome

Roger Beachy, Donald Danforth Plant Science Centre, St Louis, US, an independent research institute, listed the factors that limit the development and release of GM crops from public sector sources even in the US. These included the difficulty in accessing intellectual property, cost of R & D and the cost and delay in achieving approvals. Consequently, the public sector research expenditure had peaked in 2000 and has declined significantly ever since. Currently there is active collaboration work with companies using public sector laboratories for the examination of second generation traits. However, once these come through to the market Mr Beachy predicts that companies will tend to re-focus their efforts into in-house development. He said there may be a lesson to be learnt from India where the Government is encouraging increases in food production research, including biotechnology, and has created a new pathway for regulation.

## Public attitudes

Edna Einsiedel, Faculty of Communication and Culture, University of Calgary, Canada, reported on the different approaches towards public attitudes between countries. Attitudes to GM food are not so different now between North America and the EU. In 2006 in the EU there was a 62% approval rating. In Canada in 2007 it was 72%. A Eurobarometer survey gave qualified support to the role of scientists relating to new technologies: 70% of the population are satisfied with their role, 60% feel that scientists should make a better effort to communicate their findings and 30% believe them to be totally responsible for all outcomes.

Ms Einsiedel outlined initiatives in Europe, notably in Denmark, where through consensus conferences the public has a role in shaping new developments. The US based Loka Institute ([www.loka.org](http://www.loka.org)) is a leader in this approach.

The subject of attitudes towards GM technology was also covered by a poster, relating to how scientists think in Ireland. The survey showed that amongst a broad range of scientists, across many disciplines, there was more than 60% willingness to consume GM food irrespective of the type of food. The only exception was for baby food where if anything attitudes had hardened with only 32% willingness today compared with 42% in 1999.

## Dispelling the myths

Klaus Ammann, Delft University, the Netherlands, is a strong advocate of dispelling the myths on GM technology put out by pressure groups (see CPM July 2007 ). He made some interesting observations. "There is less genomic disturbance in transgenic plants than there is in organically grown ones" and "Since GM corn was introduced in the US average yields have increased. Yields have not increased in the same period in the EU." He was highly critical of the way the UK farm scale evaluation trials had been interpreted, although recognised the good intentions. He saved his most scathing comments for the UK's Prince Charles whom he christened "The Dunce of Wales" because of his recent statements on biotechnology.

The ABIC Foundation's goal is to ensure ongoing opportunities for continuous learning and networking within the agbiotechnology community. ABIC now appears to have gained a momentum of its own. Next year it will be held in Thailand before returning again to Canada in 2010.

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