



Know-how for Horticulture™

GMOs Guiding Meaningful Opinions



The Gene Technology Newsletter for the
Horticulture Industry

February 2006

Welcome to this edition of *GMOs*, the bi-monthly gene technology newsletter for the horticultural industry. *GMOs* is compiled by Agrifood Awareness Australia Limited in conjunction with HAL.

We welcome any comments or enquiries you may have regarding the content of this publication. We also encourage the use of this information in industry newsletters and web pages.

Knowledge Bank

SIGNIFICANT MILESTONES ACHIEVED BY GM CROPS

According to the latest statistics published by the International Service for the Acquisition of Agri-biotech Applications (ISAAA), the tenth anniversary of the commercialisation of genetically modified (GM) crops saw several milestones achieved - the billionth GM crop acre was planted (approximately 400 million hectares), three more European countries grew GM crops, and GM rice was commercialised.

Genetically modified crops were grown across 21 countries by 8.5 million farmers on 90 million hectares in 2005. This represented an 11 per cent increase from the 81 million hectares planted in 2004. This increase represents a 50-fold increase in hectares since the first introduction of GM crops in 1996.

As expected, plantings of GM crops were dominated by the USA, Argentina, Brazil, Canada and China, with Brazil recording the largest growth. Australia ranked 10th for its use of insect resistant and herbicide tolerant GM cotton varieties across approximately 200,000 hectares.

Four new countries grew GM crops in 2005 and three of these were European – France, Portugal and the Czech Republic – and all grew insect resistant maize. Including Germany and Spain, this takes the number

of European countries growing GM maize to five. The other new country is Iran, where insect-resistant rice was grown on approximately four thousand hectares.

Over the past decade the global GM crop area has been dominated by varieties of soybean (60 per cent of global area), corn (24 per cent), cotton (11 per cent) and canola (five per cent), so the introduction of GM rice in Iran is a major development. Rice is considered to be the world's most important food crop, grown by 250 million farmers, and the principle food of the world's 1.3 billion poorest people. The commercialisation of GM rice is seen by ISAAA as vital for the alleviation of poverty, hunger and malnutrition in Asia, and for the acceptance of all GM crops globally. China has conducted GM rice field trials and is also expected to commercially approve it soon.

For more information – www.isaaa.org

Hot Issues

GERMAN GM CANOLA OUTCROSSING STUDY

According to European Union (EU) legislation, foods do not require GM food labels, if GM content is less than 0.9 per cent, and it is "adventitious or technically unavoidable during seed production, cultivation, harvest, transport, or processing."

Keeping this threshold in mind, researchers in Germany looked at the outcrossing frequencies of GM canola into non-GM plants over a two-year period. The research findings were published in the *European Journal of Agronomy*, and included the conclusion that a separation distance as low as 1.1 metres would be sufficient to comply with the EU threshold.

For more information -
<http://dx.doi.org/10.1016/j.eja.2005.04.002>

Reports of Interest

GM CROPS TAKEN UP WITH EASE IN USA

Farmers in the USA are adopting GM crop varieties with greater ease than ever before because of the increasing benefits they offer according to information published by the US National Centre of Food and Agricultural Policy (NCFAP).

In 2004, US farmers planted GM crops on 118 million acres, an increase of 11 per cent over the previous year. Compared to conventional crops, GM varieties increased food production by 6.6 billion pounds, a 24 per cent improvement from 2003, and provided US\$2.3 billion in additional net returns for US growers, a 21 per cent increase from the previous year. Genetically modified crops also reduced pesticide use by an additional 34 per cent, or 15.6 million pounds.

The study examined 11 case studies of six GM crops planted in the US in 2004 - corn, soybean, cotton, papaya, canola and squash - and is based on data from the U.S. Department of Agriculture's National Agricultural Statistics Service and surveys of Crop Specialists from various universities.

According to the study, insect-resistant crops again produced the greatest yield increase among the crops studied, improving food and fibre production by 6.5 billion pounds. While insect-resistant traits increased production, herbicide-resistant varieties generated the greatest reduction in production costs by reducing the amount of pesticide needed and lowering costs associated with hand weeding and mechanical cultivation. Herbicide-resistant varieties cut costs by US\$1.8 billion and reduced pesticide use by 55.5 million pounds.

For more information: www.ncfap.org

Research Updates

Grapes on steroids

Recent research by the CRC for Viticulture at CSIRO Plant Industry in Adelaide, in collaboration with researchers at the University of Tasmania, has demonstrated that Brassinosteroids (BRs), steroidal hormones essential for plant growth and

development, may have an important role in the ripening process in grapes.

Fruit species are either climacteric, such as tomato and banana, or non-climacteric, such as citrus or grape. While much is known about how climacteric fruit ripen, the mechanisms of ripening in non-climacteric fruit are still unclear. An increased understanding of ripening in grapes has direct implications for improved grape production and downstream processing.

To attack the problem, the research team used gas chromatography and mass spectrometry to analyse hormone levels in Cabernet Sauvignon grapevine flowers and grape berry samples from two to 16 weeks post flowering.

The data revealed a dramatic increase in the levels of a bioactive BR at the onset of berry ripening. Changes in the activities of grape genes associated with producing and responding to BR were consistent with the increased levels.

Further research by the team showed that applying BR to individual berries promoted ripening, while applying an inhibitor of BR synthesis significantly delayed ripening.

While more work is needed to find out the mechanism by which BR influences ripening, researchers believe BR may promote increased berry size, one important part of the ripening process. Further work may eventually lead to methods of controlling ripening through the application of BRs or inhibition of their action.

Future research will look into the possibility that changes in BR levels may be a common part of ripening for other non-climacteric fruit species, such as citrus and strawberry, which may have important agricultural and economic implications. The research may also improve the understanding of fruit ripening generally, as common processes may be involved in the early stages of ripening of all fruits.

This work was supported by the Cooperative Research Centre for Viticulture, the Grape and Wine Research and Development Corporation and the Australian Research

Council. It was published in the journal *Plant Physiology* in January.

For more information:

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CURRENT GM HORTICULTURAL PROJECTS INCLUDE:

NEW ZEALAND – Researchers from Crop & Food Research have joined the International **Potato** Genome Sequencing Consortium, which aims to map the genetics of the potato by 2010. The aim of the project is to develop information that will lead to faster improvements in the flavour, colour and nutritional value of potatoes. Other countries involved in the project include China, Canada, Scotland, Poland, Russia, Brazil, USA, India and the Netherlands.

USA – Monsanto is currently developing a new range of consumer-oriented products through molecular technologies including gene technology. Gene technology will be applied to soybean with various improved health properties, but will apply molecular techniques, not resulting in the production of GM products, in its fruit and vegetable research programs. Nematode-resistant **tomatoes**, and **melons**, **capsicum** and **corn** with improved taste, shelf life and processing characteristics are in the spotlight.

USA – Alabama A&M University researchers have successfully 'switched off' one of the genes in **peanuts** that causes allergic reactions. Peanut allergies are considered to be the most deadly of the food allergies according to the researchers and the ultimate aim of their research is allergen-free peanuts.

USA – A team from Texas A & M University have developed **tomato** plants with stronger, larger root systems that make better use of limited water. The so-called 'drought-tolerant' tomatoes over-express a particular gene. According to the researchers, the technology could be applied to all crops.

Market Research

SOCIAL VALUES, SCIENCE AND TECHNOLOGY – OPINIONS IN THE EU

A special 2005 Eurobarometer survey of 1,000 EU citizens seeking views on social

values, science and technology asked participants their thoughts on GM products. The survey sought the approval level of respondents in relation to three particular applications of gene technology.

Firstly, in relation to "growing meat from cell cultures so that we do not have to slaughter farm animals". Fifty-four per cent said they would never approve of this application; 12 per cent approved in exceptional circumstances and 18 per cent approved if it was highly regulated and controlled.

Secondly, the development of GM crops "to increase the variety of regionally grown food", received support from 39 per cent, with 37 per cent saying they would never approve and 17 per cent only approving in exceptional circumstances.

The final scenario surveyed involved the development of a GM bacteria "that could clean up the environment after environmental catastrophes. Fifty-seven per cent supported this application, with a further 16 per cent supporting its development in exceptional circumstances. Nineteen per cent said it should never be developed.

For more information:

http://europa.eu.int/comm/public_opinion/archives/ebs/ebs_225_report_en.pdf

Events

GENE TECHNOLOGY WORKSHOPS

Dates: 16-17 & 21-22 February; 27-28 March 2006

Description: The workshops offer agribusiness representatives an opportunity to understand the science and regulation of gene technology in Australia. The two-day course, run by CSIRO is a hands-on educational opportunity, allowing participants to gain a basic understanding of the laboratory techniques that underpin gene technology. Training includes laboratory work in DNA extraction, gene isolation and gene transfer, as well as formal lectures. Participants will gain an understanding of the research involved, the advances currently provided by gene technology, an insight into future research opportunities, and details of the regulatory system underpinning gene technology research. Attendees will also have the opportunity to participate in discussions about key issues, such as the social and economic implications of gene technology.

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ABARE OUTLOOK 2006

Date: 28 February – 1 March 2006
Description: ABARE's national OUTLOOK conference is the premier market assessment forum for Australia's agricultural and natural resource industries. HAL is one of the event's sponsors.
Location: National Convention Centre, Canberra
Email: kmackay@abare.gov.au
Web: www.abareconomics.com/outlook
Telephone: 02 6272 2303

AGRICULTURAL BIOTECHNOLOGY INTERNATIONAL CONFERENCE (ABIC) 2006

Date: 6-9 August 2006
Description: The Agricultural Biotechnology International Conference (ABIC) is the major global conference for agricultural biotechnology. This year's theme is 'Unlocking the potential of agricultural biotechnology'. Conference organisers aim to address what they consider to be two of the most important challenges in the AgBio sector - the public perception of what "biotechnology" means; and, the lack of effective commercialisation of innovative technologies.
Location: Melbourne Convention Centre, Melbourne
Web: www.ABIC2006.org

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Phone: (02) 6272 5852

Australian Quarantine and Inspection Service - AQIS
www.aqis.gov.au/
Phone: 1800 020 504

Food Standards Australia New Zealand – FSANZ
www.foodstandards.gov.au
Phone: (02) 6271 2241

Office of the Gene Technology Regulator - OGTR
www.ogtr.gov.au
Phone: 1800 181 030

Therapeutic Goods Administration – TGA
www.health.gov.au/tga/
Phone: (02) 6270 4318

Science

Commonwealth Scientific and Industrial Research Organisation - CSIRO
<http://genetech.csiro.au/>
Phone: 1300 363 400 - CSIRO Enquiries

Public Awareness

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