



Know-how for Horticulture™

GMOs Guiding Meaningful Opinions



The Gene Technology Newsletter for the
Horticulture Industry

February 2005

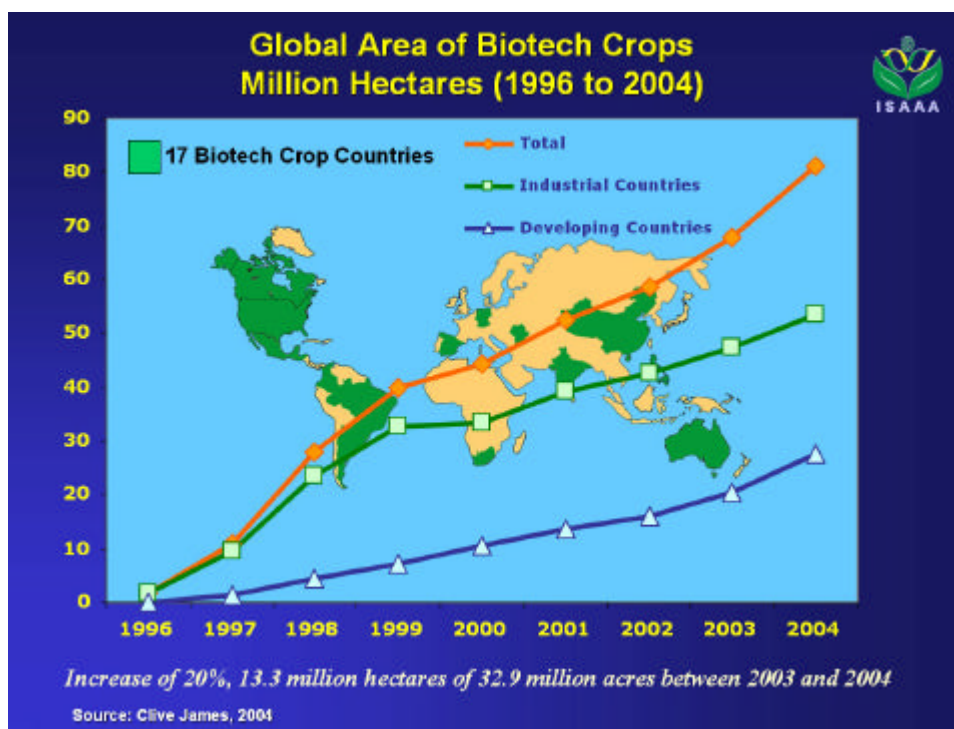
Welcome to this edition of *GMOs*, the bi-monthly gene technology newsletter for the horticultural industry. *GMOs* is compiled by Agrifood Awareness Australia Limited in conjunction with HAL.

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

This issue of knowledge bank focuses on the latest statistics released regarding the global GM crop area. According to the International Service for the Acquisition of Agri-Biotech Applications (ISAAA) which releases the figures each January, near record growth has occurred in the uptake of genetically modified (GM) crops in the past year.

In 2004, there were 81 million hectares of GM crops grown around the world, up 20 per cent from the 67.7 million hectares grown in 2003, by 8.25 million farmers in 17 countries. This growth represents a 47-fold increase since the introduction of GM crops in 1996 as indicated in the graph below. The area involved in 2004 can be compared to the equivalent of 15 times the size of the United Kingdom or 40 per cent of the USA or China land area.



The countries accounting for the majority of the global GM crop area are USA (59 per cent of GM crop area), Argentina (20 per cent), Canada (6 per cent), Brazil (6 per cent), and China (5 per cent).

Other countries growing more than 50,000 hectares of GM crops include Paraguay, India, South Africa, Mexico, Spain, Philippines, Uruguay, Australia, and Romania. Germany, Honduras and Colombia also grew small areas of GM crops.

Australia produces insect resistant and herbicide tolerant GM cotton varieties across approximately 200 hectares according to the report.

The dominant crops grown continue to be soybean (representing 60 per cent of the global GM crop area), corn (23 per cent), cotton (11 per cent) and canola (6 per cent). The crops express herbicide tolerance, insect resistance or a combination of both.

Future predictions made in the report are that China may soon approve the first commercial GM rice, and up to 15 million farmers will grow GM crops in up to 30 countries by the end of the decade.

For more information:
www.isaaa.org

Hot Issues ELECTION PROMISES IN WA

According to media reports, the WA Coalition is set to review the state's ban on growing GM canola crops if it is victorious at the election on 26 February.

Shadow Agriculture Minister Paul Omodei is quoted as saying that he will discuss the issue with farmers, scientists and grain marketers to see whether the debate needs to be re-opened.

GM RICE IN CHINA

China's Ministry of Agriculture officially announced that it was reviewing the safety of three pest resistant rice varieties and one bacterial blight resistant rice variety according to the *China Daily* newspaper. If the varieties receive favourable approvals, they will have to undergo a further two years of field studies before commercialisation.

FURTHER MOVEMENT IN THE EU

Six applications to conduct field trials in France have been lodged with the European

Commission's Joint Research Centre. The applications all relate to GM varieties of corn expressing herbicide tolerance, insect resistance or pharmaceutical properties. The French Minister for European Affairs reportedly said that France is a long way behind Britain and Germany in biotechnology research and field trials have dropped from more than 1,000 in 1999 to just 40 in 2005.

GM RESEARCH LICENCE UPDATES

Since the last edition of *GMOs* there has been one notification issued by the Office of the Gene Technology Regulator (OGTR) in relation to field trials of the Indian mustard variety listed below. A decision on this application will be made by late February.

Reference	Crop	Modification	Developer
DIR057 2004	Indian Mustard	Herbicide tolerant	Bayer CropScience Pty Ltd

For more information:
www.ogtr.gov.au/new/index.htm

Reports of Interest GM HORTICULTURE PRODUCTS IN THE PIPELINE

A newly released report written by Professor Ford Runge on the global effort underway on GM plant research and uptake was mentioned in the last edition of *GMOs*. The modifications being made to fruit and vegetable crops in laboratories worldwide identified in the report are outlined below.

Fruits

According to the report, 16 fruits have seen biotech research interest in 29 countries. In 11 countries the investigation has included field testing. The Western Europe group of 15 countries had the most research activity. The United States of America and Canada, however, have regulatory approval for papaya, which is commercially produced in Hawaii. Papaya is the most researched fruit, with at least 15 countries in some stage of investigation. Melon also has USA market approval for environmental release and human consumption. Banana (and the kindred plantain) has been the subject of biotech research in nine countries, including the USA.

Apples, pineapple and grapes have undergone trials in multiple countries, whereas, plums, strawberries, watermelon, citrus, cherries, cantaloupe, kiwi and raspberry may only have undergone field trials in one country. Two fruits, mango and coconut, have only reached the laboratory stage.

Crop	Characteristics
Apple	Fungal resistance
Banana	Heat tolerance, virus resistance, fungal resistance, herbicide tolerance, altered ripening, bacterial resistance
Cherry	***
Citrus	Virus resistance, fungal resistance
Coconut	High lauric acid content
Grape	Fungal resistance, modified fruit colour, virus resistance, stress tolerance
Kiwi	***
Mango	Delayed ripening
Melon	Virus resistance, altered ripening
Olives	***
Papaya	Virus resistance*, fruit quality, delayed growth
Peanut	Virus resistance, fungal resistance
Pineapple	Insect resistance, herbicide tolerance, fungal resistance, blackheart reduction, controlled flowering
Plum	Fungal resistance
Raspberry	***
Rockmelon	Virus resistance
Stone fruit	Altered ripening
Strawberry	Herbicide tolerance, fungal resistance, mildew resistance
Watermelon	Seedlessness

* Indicates commercial production already underway.

** Previously available commercially, however no longer in production.

*** This research is being undertaken in Italy, and exact details of the modification were not provided in the report.

Vegetables

Fourteen vegetables have drawn biotech research interest in 50 countries according to Professor Runge, including 13 Western Europe and 10 Eastern European countries. Potatoes and tomatoes are most researched and have the most regulatory approvals. But squash in the USA and Canada and sweet peppers and tomatoes in China also have approval for commercial production. The

widest biotech vegetable research interest is in Western European countries, and includes lettuce, cabbage, carrots, eggplant, onions and cucumbers. The leading countries for regulatory approvals are Canada and the USA (potatoes, tomatoes, squash); Japan (potatoes, tomatoes); China (tomatoes, green peppers); and Mexico (tomatoes).

Crop	Characteristics
Broccoli	Herbicide tolerance, male sterile
Cabbage	Virus resistance, insect resistance
Carrot	Enhanced carotenoid content, foreign protein production,
Cauliflower	Herbicide tolerance, male sterility
Cucumber	Virus resistance, fungal resistance, salt tolerance
Eggplant	Insect resistance
Garlic	Fungal resistance
Lettuce	Virus resistance, enhanced ferritin content, reduced nitrate levels, altered leaf development
Onion	Herbicide tolerance
Pea/Bean	Virus resistance, herbicide tolerance, insect resistance, enhanced nutrition, heat stress resistance
Peppers (various)	Altered ripening, virus resistance
Potato	Insect resistance**, virus resistance**, frost tolerance, herbicide tolerance, reduction of natural toxicants, altered starch composition,
Squash	Virus resistance**,
Sweet potato	Virus resistance, improved flour quality
Tomato	Virus resistance, fungal resistance, delayed ripening**, herbicide tolerance, frost tolerance, pectin rich
Zucchini	Virus resistance

* Indicates commercial production already underway.

** Previously available commercially, however no longer in production.

*** This research is being undertaken in Italy, and exact details of the modification were not provided in the report.

This information has been sourced from *The Global Diffusion of Plant Biotechnology: International Adoption and Research in 2004*.

For more information –

www.apec.umn.edu/faculty/frunge/globalbiotech04.pdf

Research Updates

GM POPPY RESEARCH

The results of Australian research into GM poppies were published in *Nature* magazine in September last year. CSIRO Plant Industry researchers have developed a GM poppy which they believe has significant potential in the pharmaceutical industry. The research team was able to block the morphine pathway within the plant, so that it instead of creating morphine and codeine it produced another compound called reticuline, which could one day be used as a treatment for malaria or cancer.

For more information:

www.nature.com/nature

CURRENT GM HORTICULTURAL PROJECTS INCLUDE:

INDIA – A GM potato will soon undergo commercial field-testing according to scientists at the National Centre for Plant Genome Research in Jawaharlal Nehru University. Known as the "protato" - "pro" from protein and "tato" from potato – the GM potato has up to 35 percent more protein than a normal potato due to the introduction of a gene from the amaranth plant.

Potato, a starch-rich tuber, contains barely one percent protein while the amaranth plant has nutrition-rich leaves and seeds used for culinary purposes.

UNITED KINGDOM – Researchers at Warwick HRI are undertaking horticulture crop improvement work involving biotechnology. The areas they are investigating include the use of molecular markers to select breeding lines, gaining an understanding of plant tolerance to environmental stresses, improving the genetic components of product quality and conserving plant biodiversity. Specific crops involved include brassicas, apples, pears, stonefruit and berries.

Market Research

UNITED STATES OF AMERICA AND NORWAY COMPARED

Research comparing the responses of consumers in the USA and Norway on their acceptance (or not) of GM foods was

undertaken in 2002 by researchers from the University of Norway and the University of Ohio. From the USA, 250 people were involved in the telephone survey, while 200 people participated in Norway.

The results from this survey are interesting from an Australian perspective for three reasons:

- The use of GM animal feed is also under the spotlight in Australia
- Salmon may be the first GM animal anywhere in the world to be approved for commercial release
- The use of GM soybean in foodstuffs has been approved for sale in Australia for a number of years.

The survey compared consumer acceptance and willingness to pay for GM foods, and focused on three products – soybean oil from GM soy, GM-fed salmon, and GM salmon compared to conventional salmon. Genetically modified salmon is not yet commercially available. Some of the key results are:

- Not surprisingly, US consumers have more favourable attitudes to GM foods than Norwegian consumers.
- The opposition to GM foods is reduced when some benefits associated with them are introduced into the questions. Reduced pesticide use was seen as an important benefit by 65 per cent of Norwegian respondents and 55 per cent of the American respondents.
- Eighty per cent of Norwegians chose the non-GM alternative of each product offered, whilst in the case of US consumers, 45 per cent of consumer chose oil from non-GM soy, 59 per cent elected for non-GM fed salmon over GM-fed salmon and 69 per cent chose non-GM salmon.
- Norwegian consumers were willing to pay between 54-67 per cent more to purchase non-GM alternatives.

The researchers will follow up this research with larger surveys in the future.

These two countries are at opposite ends of the spectrum in relation to the uptake of gene technology, which makes this an interesting comparison. The USA is the main user of GM crops and grew 59 per cent of the global area

last year, whilst in Norway, according to the research author, none of the major food retailers sell GM foods because of consumer opposition.

For more information –

www.akf.dk/som/konference/papers/Kyrre_Rickertsen

Events

ABARE OUTLOOK 2005 CONFERENCE

Date: 1-2 March, 2005

Description: ABARE's annual national OUTLOOK conference is the premier market assessment forum for Australia's agricultural and natural resource industries. The OUTLOOK 2005 conference will stimulate debate on the future of Australia's agricultural and natural resource industries and their contribution to the dynamism of the Australian economy. The topics and issues to be considered at this year's event include economic prospects, fisheries management, trade reform, water resource management, forestry, future of farming and climate.

Location: National Convention Centre, Canberra

Email: ksanders@abare.gov.au

Web: www.abare.gov.au/outlook/index.html

Telephone: 02 6272 2303

GENE TECHNOLOGY WORKSHOP

Date: 17 - 18 March, 2005

Description: Agrifood Awareness Australia Limited (AFAA) and CSIRO have developed a new gene technology workshop which offers agribusiness representatives an opportunity to understand the science and regulation of gene technology in Australia. CSIRO teaching and scientific staff deliver the two-day, hands-on course – 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.

Location: Perth, CSIRO site, Floreat Park

Email: RowenaSmith@afaa.com.au

Web: www.afaa.com.au

Telephone: 02 6273 9535

Gene Technology Contacts

Regulation

Australian Pesticides and Veterinary Medicines Authority - APVMA

www.apvma.gov.au/

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

Agrifood Awareness Australia Limited - AFAA

www.afaa.com.au

Phone: (02) 6273 9535

Biotechnology Australia – BA

www.biotechnology.gov.au

Phone: 1800 631 276 – Gene Tech Enquiries

Industry

Horticulture Australia Limited - HAL

www.horticulture.com.au/

Phone: (02) 8295 2300

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