

APHIS intends revisions of biotech rules

The US Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) has announced its intent to revise existing regulations regarding the importation, interstate movement and environmental release of certain genetically modified organisms. The proposed revisions to the regulations are in response to emerging trends in biotechnology, APHIS says in a press release. One of the proposed changes would involve aligning the regulations with the plant pest and noxious weed provisions of the Plant Protection Act of 2000 so that certain GMO organisms would be subject to the regulations if they could pose a plant pest or noxious weed risk, or their plant pest or noxious weed risk is unknown. APHIS also proposes to discontinue the notification procedure but retain the permitting procedure for authorising the importation, interstate movement or environment release of those GMOs that fall within the scope of the regulations. The Agency is seeking public comment on the proposed changes. (For the proposal: <http://www.aphis.usda.gov/> For more information: <http://www.aphis.usda.gov/newsroom/content/2008/10/brs340.shtml>)

Germany to fund safety projects on GM crops

The German Federal Ministry of Education and Research (BMBF) announced that it will be funding a large number of biosafety research projects from 2008 to 2011. The main focus of the projects, with funding amounting to around 8 million (\$11 million), is to prevent the spread of genetically modified plants. Researchers will be concentrating on limiting the spread of oilseed rape via volunteer rape. Rape seeds can survive for long periods in the soil, reappearing as volunteer rape in subsequent crops and leading to an unintentional spread of the plants. Researchers will also conduct further research into the environmental impacts of genetically modified Bt maize. Field trials will test whether the different Bt proteins expressed in the Bt maize plants influence or increase each other's effects, thereby leading to negative environmental impacts. (For more information: <http://www.gmo-safety.eu/en/news/658.docu.html>)

FAO stresses need for a review on biofuel policies and subsidies

The Food and Agriculture Organisation's annual publication "*The State of Food and Agriculture*" stresses the need to review biofuel policies and subsidies urgently to "preserve the goal of world food security, protect poor farmers, promote broad-based rural development and ensure environmental sustainability". Biofuels present both opportunities and risks, which will depend upon the specific context of the country and the policies adopted. The challenge is to reduce or manage the risks while sharing the opportunities more widely. There is a case for directing expenditures on biofuels more towards R&D, especially on second-generation technologies, which, if well designed and implemented, could have a greater potential in reducing greenhouse gas emissions with less pressure on the natural resource base. (For more information: www.fao.org/newsroom/en/news/2008/1000928/index.html)

Bt cotton and Indian farmer suicides

Although officially recognised for having increased production and farmers' income, Bt cotton remains controversial in India. Among other allegations, it is accused of being the main reason for a resurgence of farmer suicides in India. The International Food Policy Research Institute (IFPRI) has provided a comprehensive review of evidence which has been used to evaluate a set of hypotheses on whether or not there has been a resurgence of farmer suicides since 2002, and the potential relationship suicide may have with the use of Bt cotton (*Bt Cotton and Farmer Suicides: Reviewing the Evidence*). It shows that there is no evidence in available data of a resurgence of farmer suicides in India in the last five years, finds that Bt cotton technology has been very effective overall in India and clearly shows that Bt cotton is neither a necessary nor a sufficient condition for the occurrence of farmer suicides. (For more information: www.ifpri.org/pubs/dp/ifpridp00808.asp)

Application for GM clover release in Australia

The Australian Office of the Gene Technology Regulator (OGTR) has

received an application for the limited and controlled release of clover genetically modified to resist infection by the alfalfa mosaic virus from the Victorian Department of Primary Industries (DPI). The purpose of the trial is to conduct experiments to evaluate the agronomic performance, including seed yield, of the GM white clover line under field conditions. The transgenic line harbours a virus resistance gene from a common gut bacterium and the antibiotic resistance marker gene *nptII*. OGTR has prepared a Risk Assessment and Risk Management Plan (RARMP) for this application, which concludes that the proposed release poses negligible risks to people and the environment. If approved, the trial will be conducted at one site in New South Wales, on a maximum area of 633 m² from 2009 to 2011. DPI is bound to adopt certain measures to restrict the dissemination of GM plant materials, such as surrounding the trial site with a pollen trap and postharvest monitoring of fields. (For more information: www.ogtr.gov.au/internet/ogtr/publishing.nsf/content/dir089-2008)

BASF seeks GM potato release authorisation

BASF Plant Science GmbH in Germany has submitted a notification report for the release into the environment of genetically modified potatoes with altered starch metabolism. This information was posted in the website managed by the Joint Research Centre of the European Commission on behalf of the Directorate General for the Environment. Seed potatoes to be produced from the amylopectin potatoes will be used in subsequent field trials. (All notifications can be found at: http://gmoinfo.jrc.ec.europa.eu/gmp_report.aspx)

Frontrunners in securing and increasing yield in crops

BASF Plant Science and Monsanto have been collaborating to address how farmers can increase and secure crop yields. Within the collaboration, which focuses on the four main crops (corn, soybeans, cotton and canola), Monsanto and BASF Plant Science have already exchanged hundreds of gene constructs resulting in an enlarged gene pool with less than 10% overlap. Of the

total market for plant biotechnology, which the companies estimate will be \$50 billion in 2025, increasing and securing yield is believed to have the most business potential and impact. BASF and Monsanto will pioneer this segment with their first drought tolerant corn product to be launched after 2012 targeting yield advantages of 6-10%. (For more information: Website: <http://www.basf.com>) **CBNB**

BASF and Belgians target plant genetics

BASF Plant Science and the Flanders Institute for Biotechnology (VIB) have entered into a three-year collaborative project to advance plant genetics research. The research will specifically focus on the genetic mechanisms that affect crop yield and tolerance from cold and drought. VIB brings into the deal its expertise in functional and computational analysis of genetic networks. BASF, through its subsidiary CropDesign, will carry out tests to validate the research findings. **CBNB**

BASF and University of Manitoba sign a licensing agreement

BASF Plant Science and the University of Manitoba have signed a licensing agreement on a promising gene discovery related to increased crop yields and stress tolerance. The discovery may be used in major food crops such as corn, soybeans, cotton, canola and rice. The 'hardiness' gene will be tested and validated in model plants by BASF Plant Science. Researchers at the University of Manitoba will continue its research to deepen the understanding of the gene's entire function. Financial terms of the agreement were not disclosed. (For more information: www.basf.com/corporate/news_2008/news_release_2008_00297.htm)

Monsanto acquires sugar cane breeding company

Monsanto announced plans to acquire the sugar cane-breeding company Aly Participacoes Ltda, in a bid to tap the growing demand for raw sugar and biofuels. Monsanto agreed to pay US\$ 290 million for the Brazil-based company, which operates CanaVialis S.A. and Alellyx S.A. CanaVialis is the world's largest private sugarcane breeding company. Alellyx is an applied genomics company that focuses on

developing biotech traits primarily for sugarcane. Monsanto has previously established a licensing and trait-collaboration agreement with these companies to develop and commercialise Roundup Ready and Bt insect-protected technologies for sugarcane growers in Brazil. Monsanto expects to increase yields in sugarcane while reducing the amount of resources needed for this crop's cultivation, just as it is doing now for corn, soybeans and cotton. (For more information: <http://monsanto.mediaroom.com/index.php?s=43&item=656>)

Rockefeller Foundation supports golden rice

The Rockefeller Foundation (RF) will provide funding to the International Rice Research Institute (IRRI) to shepherd Golden Rice through national, regulatory approval processes in Bangladesh, India, Indonesia, and the Philippines. This was announced by Dr. Judith Rodin, president of the Rockefeller Foundation, during her keynote address at the World Food Prize Borlaug Dialogue in Iowa, USA. The RF president spoke on "*Mobilising the Next Green Revolution: Alleviating Poverty in the Age of Climate Change*". RF is committed to connect families with technologies that can help them lead healthier, better, more productive lives, to see innovation through to action and impact, and to give great ideas, 90% down the road, that extra 10% they need to reach their destination. (For more information: www.rockfound.org/about_us/speeches/10170food_prize.shtml)

PhilRice developing 3-in-1 rice

Four years from now, a 3-in-1 rice variety that is now being developed by the Philippine Rice Research Institute (PhilRice) is expected to be planted on a commercial scale throughout the Philippines. The seven-year breeding project was started in 2004, soon after PhilRice received genetically modified Golden Rice grants donated by the Gates Foundation. Field tests are expected to start before the end of 2008. The 3-in-1 variety contains three important traits never before found at the same time in a rice variety - the genes for beta-carotene biosynthesis, the genes for rice tungro disease and bacterial leaf blight resistance. Golden Rice, one of the parents of the 3-in-1 rice, was genetically modified to introduce two genes from

other organisms that allow beta-carotene production in the rice grain, giving it the distinct yellow color. The latest version has about 23 times more carotenoid (pro-vitamin A) than the prototype, which has 1.6 mg per g of grain. However, Golden Rice is a japonica rice variety, which thrives in temperate rice-growing countries, but not under tropical conditions such as in the Philippines. In the Philippines, Vitamin A deficiency (VAD) is considered a major health problem. A survey by the Food and Nutrition Research Council in 2003 showed that 71% of total households in the country did not meet their recommended vitamin A requirements. Four out of every 10 Filipino children (6 months to 5 years old) suffer from VAD. Resistance to rice tungro disease and bacterial leaf blight are being incorporated into the 3-in-1 rice because these devastating rice diseases recurrently plague the country.

Vaccines in transgenic rice

Scientists from the University of Tokyo, Gifu University and the Japanese National Institute of Agrobiological Sciences have developed transgenic rice accumulating significant levels of an antihelminthic vaccine. The transgenic rice expresses As16-an antigen protective against the roundworm *Ascaris suum*-fused with cholera toxin B subunit (CTB). *Ascaris* roundworms are gastrointestinal nematodes infecting both humans and animals, and the infection is widespread in many parts of the world. The cholera toxin was used as a mucosal adjuvant for the efficient induction of an immune response. The scientists reported that expression level of the chimeric fusion protein in the endosperm reached 50 µg/g seed. GM rice fed-mice orally administered with nematode eggs had a lower lung worm burden than control mice. The scientists noted that this is the first study that demonstrates how a rice-based oral vaccine can provide protection against a parasite, in an animal model. (For more information: <http://dx.doi.org/10.1007/s11248-008-9205-4>)

Tool for rice functional genomics

Scientists from University of California Davis, led by plant pathologist Pamela Ronald, have developed a new tool for investigating rice gene function. The inexpensive, publicly-available rice DNA microarray covers nearly all the

45,000 genes in the rice genome. The researchers hope their tool will lead to the advancement of functional genomics studies of rice. Details are published this week in the open-access journal *PLoS ONE*. Scientists have developed high-throughput methods to examine gene expression profiles using DNA Microarrays or genomic chips, thousands of fragments of DNA fixed to a glass slide. The technology allows scientists to get a better picture of the interaction of thousands of genes simultaneously. To date, most microarray studies in rice have not focused on discovery of gene function *per se*, but instead have provided a profile of a particular organ, environmental response, or genetic background, the researchers say. Using the NSF45K array, Ronald and her team were able to identify genes that carry out important light-related biochemical processes such as photosynthesis and photorespiration. The group also has developed a web-based program that allows the user to compare gene expression profiles across multiple rice microarray platforms, which will further accelerate this research. (For more information: <http://dx.plos.org/10.1371.pone.0003337>)

Functional foods – purple tomatoes

Tomatoes that have been genetically modified to be rich in antioxidants can

give protection against cancer, a team of British scientists has found. Researchers at the John Innes Centre in Norwich created the crop of purple tomatoes by altering them with genes for the antioxidant anthocyanin from snapdragon flowers. In tests, mice that were prone to cancer lived almost a third longer if their diet was supplemented by the modified tomatoes. The findings, which appear in the journal *Nature Biotechnology*, pave the way for a new generation of “functional foods” that could potentially offer protection against serious diseases.

RIP genes shown to confer insecticidal activity to tobacco

Scientists at Ghent University in Belgium have developed transgenic tobacco lines resistant to several insect species including the beet armyworm and tobacco aphid by inserting a gene coding for type-2 ribosome-inactivating protein (*SNA-I'*) from elderberry (*Sambucus nigra*). Ribosome-inactivating proteins (RIPs) are a group of plant proteins that are capable of inactivating eukaryotic ribosomes, which are necessary for protein synthesis catalytically. RIPs are widespread in the plant kingdom, with various degrees of toxicity. Insecticidal activity of elderberry RIP is well documented and its enzymatic mechanism is well defined. However, the physiological steps by which ribosome

inactivation leads to cell death are not well understood. Transgenic plants accumulating elevated levels of RIP in their leaves were found to be capable of resisting insect attack, specifically the tobacco aphid *M. nicotianae* and the beet armyworm *S. exigua*, in small-scale trials carried out under controlled conditions. In addition, significant increases in mortality were noted for insects fed on the transgenic lines as compared to wild type plants. (For more information: <http://dx.doi.org/10.1007/s11248-008-9215-2>)

China second in biotech publications

China has surpassed the United States for the first time in the number of ‘biotech’ papers published, says Gaspar Taroncher-Oldenburg and Andrew Marshall in the latest issue of *Nature Biotechnology*. China is now ranked second to the European Union with close to 1,500 biotechnology related papers published last year. Taroncher-Oldenburg and Marshall gathered the data by analysing papers at the The National Center for Biotechnology Information’s PubMed. Their results indicate that the countries with a rapid growth in biotech publications also include India, which is ranked above Germany but trails the United States and Japan. (For more information: www.nature.com/nbt/journal/v26/n10/full/nbr1008-1062)

***CBNB:** These abstracts were taken from Chemical Business NewsBase (CBNB) which is produced by Elsevier, E-mail: cbnb@elsevier.com, Website: <http://www.ei.org/databases/cbnb.html>

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Please note that contributions are refereed by two members of our Editorial Board and so publication is not guaranteed.

Please send manuscripts to Len Copping, *Outlooks on Pest Management*, 34 Saxon Way, Saffron Walden, Essex, CB11 4EG, UK. Fax: +44(0)1799 521369; email: lcopping@globalnet.co.uk.