

BioLines

Where Nature and Science Meet

biolines@africabio.com

Vol. 47

Oct 2003

Editor: M. Koch

AfricaBio

Biotechnology Stakeholders Association

Tel: 012 667 2689

Fax: 012 667 1920

www.africabio.com

BioLines is AfricaBio's 'Biotechnology Headlines' – a quick guide to what is topical. By design, the articles are not exhaustive, but references are given to follow up points of interest. Let us know what you like and dislike about **BioLines** and what you want to see as part of this service. Articles are edited to meet space requirements. It is not the intention of this service to infringe on copyright.

BioLines is issued free of charge and every effort is made to acknowledge the source of information.

CONTENTS:

- i Taste the Future (1)
- i Ethanol from GM maize (2)
- i Africa should guard against misguided greens (3)
- i IFPRI brief on food safety (3)
- i FAO report on access options for biotechnology R&D (3)
- i DNA studies help reclassify African birds (4)
- i Ethiopia: Call for Africa to accept GM crops (5)
- i Greenpeace sowing confusion (5)
- i Buttered maize may replace vitamin E pill (6)
- i Slimming down soy (7)
- i The Canadians & GM canola (8)
- i Australian regulator clears 2 breaches of GM law (9)
- i Hundred million \$ GM plan to develop Third World (10)
- i Research looks at GM canola hybrids (11)
- i Risk perceptions – a questionnaire (12)
- i Course (12)

Taste the Future

Agbioview, 30 Sep 03

Learn how plant biotechnology is being used to develop more nutritious food in this 26-page publication. Biotechnology may sound like a daunting subject, but it's made easy to understand in a new publication called Taste the Future. Developed by the Council for Biotechnology Information, the new publication is intended to introduce the potential of food biotechnology to an audience that has heard about the subject and wants to learn more. The issue is designed to look like a food magazine and includes front cover promotional headlines such as "High Octane Foods: Are More Nutritious Foods Coming to Your Grocery Store" and "Eating Yourself Young: Do Stronger Plants Mean Stronger Bodies."

Inside the 26-page issue are feature stories on how biotechnology helped save the papaya industry in Hawaii and how the technology could be used to save the banana industry in India and Asia. Also included are stories about how biotechnology is being used to reduce allergic reactions to food, how it's being used to develop cost-effective ways to administer vaccines, a comprehensive Q & A about biotechnology and short biographies of plant biotech experts who are available to answer media questions. And, perhaps most importantly to some, the issue contains an assortment of recipes - all using at least some crops developed with biotechnology, from a "papaya smoothie" to a "roasted root vegetable Napoleon."

Taste the Future

Ethanol from GM maize

SolarAccess.com, 29 Sep 03. From Agbioview 30 Sep 03 (Adapted)

Biotechnology industry giant Monsanto, best known for their somewhat contentious GM crops is teaming up with General Motors and the National Ethanol Vehicle Coalition (NEVC) to deliver what the company calls "improved" maize for the dry mill ethanol industry. The NEVC aims to drive increased fuel ethanol demand and expand fuel ethanol infrastructure to support that demand. "This announcement underscores Monsanto's commitment to strengthening the demand for bioenergy in the US and creating new markets for our customers' products," said Kerry Preete, lead of Monsanto's US Crop Production business. "This collaboration is a major step forward for the industry and we feel that it will aid in the development of rural economic growth."

Monsanto said the collaborative project would provide a major boost to the US ethanol industry, through Monsanto's Fuel Your Profits programme, by generating a multi-million dollar investment over the next 2 years. This investment will be aimed at fuelling ethanol profits from maize planting to ethanol processing and beyond. The Fuel Your Profits programme takes advantage of Monsanto's research capabilities by promoting improved maize hybrids for the dry mill ethanol industry offered through the Processor Preferred High Fermentable Corn (HFC) brand. However, the Fuel Your Profits programme is about more than just providing products to the industry, Monsanto notes.

"We wanted to provide a way for maize growers and ethanol plant owners to take advantage of Monsanto's advancements while increasing ethanol demand and expanding the ethanol fuel infrastructure in our country," said Amy Rutherford, Processor Preferred business manager. "The Fuel Your Profits programme is designed to increase the profitability potential of both maize growers and ethanol plants." Participants in the Fuel Your Profits programme will be eligible for reward certificates off of a negotiated purchase price of General Motors' E85 vehicles as well as incentives to increase the number of E85 fuel pump stations that are located throughout the country.

"Monsanto has responded to maize growers' requests for programmes that provide value added opportunities with Fuel Your Profits. This is a sound, sensible way to help grow the ethanol industry," said National Maize Growers Association President, Fred Yoder. "The programme offers a science-based analysis by which the Processor Preferred system determines a list of High Fermentable Corn. Ethanol plants and maize growers can utilize this list to their mutual benefit."

According to John Gaydash, General Motor's Director, Marketing of GM Fleet and Commercial Operations, "General Motors has more than one million vehicles on the road today capable of burning E85. We have demonstrated our interest in increasing ethanol demand through our E85 awareness efforts with NEVC. Fuel Your Profits ties nicely with these efforts." To date, there are 17 dry mill ethanol plants participating in the Fuel Your Profits programme. These plants are located throughout the country and will collectively consume grain from 1.5 million acres of the 2004 harvest.

Through the Fuel Your Profits collaboration, Monsanto will also provide ethanol plants access to and use of a Near Infrared proprietary measurement tool developed under ISO 17025 compliance by Monsanto's crop analytics scientists. The tool will help plant managers and growers understand which maize hybrids yield more ethanol in the dry mill process. Such information allows ethanol plants to optimize efficiency and output by providing an indicator of the fermentability of maize at the front end of their process. Grower enrollment in the Fuel Your Profits programme is currently underway and ends 1 Feb 04.

QUOTE:

Scares about pesticide residues are another myth. As Sir John Krebs, the head of the UK Food Standards Agency, wrote: "A single cup of coffee contains natural carcinogens equal to at least a year's worth of carcinogenic synthetic pesticides in the diet."

Africa should guard against misguided greens

Tawanda Zidenga (zidenga.1@osu.edu), Graduate Student (from Zimbabwe), Plant Biotechnology Centre, The Ohio State University. From Agbioview 6 Oct 03 (shortened)

As the debate on GMOs continues on an international scale, Africa risks being bullied by the so-called "Greens" into accepting dubious philosophies. So far the European stance has negatively affected African opinion on GMOs. This is partly due to the perceived trade implications if Africa decides to go GM. The green voice is loudest in African debates on GM matters. In my home country Zimbabwe, the debate hit centre stage last year when we were about to receive food aid from America (we had poor yields due to bad weather and our own problems). Predictably, the media was in control and unfortunately our media has a history of misreporting science. Consequently, GMOs were reported as some western invention being tested on poor helpless Africa. One sociologist, in a fit of excitement, actually wrote that Africa is being taken as one big laboratory. Phrases such as genetic imperialism, genetic holocaust and the now all too popular Frankenstein were common in the papers.

Like what we are getting from the "GM Nation?" in the UK, the reaction of the African public was predictable. And the loudest voices were those that have never been in a decent science class, like our dear sociologist (who at one time aspired to be the mayor of the capital!!). The government was misled into rejecting the donation. Fortunately, we have a strong science team in Zimbabwe, and a functioning biosafety system. Finally, the government got good advice and the food aid was accepted. Our brothers and sisters in Zambia were not so lucky. Their president, Levi Mwanawasa, outrightly rejected GM food, saying his people would not feed on "poison".

The Greens have learnt the basic fact that a lie will travel half the world before the truth has had a chance to put its pants on. They never have to prove their claims. It is a point of consensus that Africa, like everyone else, must develop functional biosafety frameworks if it is to benefit from the biotech revolution. The problem comes when focus is put on biosafety more than on strengthening research capacity in biotechnology itself. It then appears as if we are defending ourselves against a monster called biotech. I argue that the precautionary principle makes Africa reactive rather than proactive on biotech issues. It must be rejected in the interests of development! Africa does not need Green scaremongering. It is not conveniently placed to accommodate that mindless luxury. What we need in Africa is sound science. And we need all the support from those willing to support science.

IFPRI brief on food safety

Global Biotech Science News, Sep 03

The International Food Policy Research Institute (IFPRI) has released a brief "Food Safety and GM Crops: Implications for Developing Country Research." According to the authors, "food safety assessment is not just about science, but also about perceptions, concerns and standards about how to assure safety." The authors state that agreement on reasonable standards of safety for developing countries will be critical and competency to assure food safety for biotech crops is essential as part of capacity building for biotechnology and biosafety.

The brief by Joel I. Cohen, Hector Quemada, and Robert Frederick is available at:
http://www.ifpri.org/2020/focus/focus10/focus10_16.pdf

FAO report on access options for biotechnology R&D

Global Biotech Science News, Sep 03, http://www.fao.org/es/ESA/wp/ESAWP03_08.pdf

A working paper by Carl E. Pray and Anwar Naseem "Biotechnology R&D: Policy Options to Ensure Access and Benefits for the Poor" reviews the status of crop biotechnology research worldwide and analyzes the influence of intellectual property rights and market concentration on the development and diffusion of new technology. The paper provides policy measures that could focus more biotech research on the problems of the poor and alleviate some of the concerns about the impacts of biotechnology.

The authors recommend 3 groups of policies to provide more technology to the poor:

- x Policies to encourage private investment in research and marketing biotech that meets the needs of the poor
- x Additional public research on the problems of the poor
- x Public-private joint ventures to make efficient use of the proprietary technology developed by the private and public sector in industrialized countries.

DNA studies help reclassify African birds

Percy FitzPatrick Institute, Africa–Birds & Birding, Dec 02

We live in exciting times. With the end of the Human Genome Project, molecular biologists have set their sights on all other life. And so the Tree of Life project is born – an ambitious programme designed to discover the evolutionary relationships among all organisms. Far-fetched as it may sound, within the next 10 years or so there should be a family tree that chronicles the evolution of all major branches of life on earth. Birds are major targets in this endeavour. Already the use of robust inference techniques (systematics) coupled with new forms of data (principally, but not exclusively, molecular) have caused us to radically rethink the way we believe birds evolved. This evolutionary revolution began with Charles Sibley and Jon Athlquist's monumental work based on DNA-DNA hybridisation, and continues to be refined.

In early 2002, papers by Keith Barker (American Museum of Natural History, New York) and Per Ericson (Swedish Museum of Natural History, Stockholm) appeared in the Proceedings of the Royal Society of London. Both showed that Sibley was right to highlight the ancient nature of the Australo-Papuan avifauna, and confirmed that the New Zealand wrens *Acanthisitta* were the most ancient living passerines (songbirds). Until recently there had been little consensus about the origins of the rather odd passerines found in Australia and New Guinea; most believed they were recent offshoots from the radiation of the Old World passerines.

The main difference from Sibley's work was that the Australo-Papuan radiation was not distinct from the radiation of most Old World passerines. Rather, all passerines evolved from this group, giving convincing support for the idea that passerines evolved in Gondwanaland, the vast southern continent which later broke up to form Africa, South America, India, Australia and Antarctica. Further support for this comes from the fossil record, with no early passerines being found in Laurasia, the super-continent that later formed North America, Europe and Asia.

So what does this have to do with the Fitztitute or the title of this article? The renaissance in bird systematics globally is being supported within the Fitztitute by a generous bequest from Dr Phillip Clancey, the doyen of southern African avian taxonomists. We are using the Clancey Fund to address a suite of systematic questions, including many of the hoary old favourites like what are rockjumpers, sugarbirds, Grassbird, Victorin's Warble, Herero Chat, Rockrunner, White-tailed Shrike, etc. We already know the answer for some of these birds. During August, at the International Ornithological Congress in China, it was reported that rockjumpers sit on the lowest (i.e. most ancient) "perch" of the tree for Old World passerines. They share this distinction with another uniquely African group, the picathartes or rockfowl of West Africa. These are thus the sole remnants of an ancient evolutionary lineage with no apparent close relatives, making them SA's first endemic bird family.

Plans are now afoot to see where all the other southern African "oddballs" fall. Evidence from plants and insects increasingly suggest that south-western Africa is mausoleum for relict species and we may well find that the same holds for birds. We are also leading the way by the adopting the new evolutionary sequence in the revision of *Roberts'*. Birders may bemoan the turmoil that a new classification causes to the well-worn sequence in which birds are listed in books, but having a robust family tree for birds will be an immense boon for researchers interested in comparative biology. It may also give you new respect for some of our more enigmatic birds.

"THERE IS NO HUMAN ACTIVITY THAT DOES NOT PRESENT RISKS, AND GMOs ARE CERTAINLY NOT MORE RISKY THAN THE FOODS WE ALREADY CONSUME"

Bishop Jesus Y. Varela, of the Diocese of Sorsogon, Phillipines. From Kuza Issue No. 15

Ethiopia: Call for Africa to accept GM crops

IRIN News, 7 Oct 03, <http://www.irinnews.org/> From AgBioView 8 Oct 03 (shortened)

Africa must "seize" the opportunity offered by controversial GM food, a conference in the Ethiopian capital Addis Ababa heard this month. Biotechnology can boost food production and cut back environmental degradation, Kingsley Amoako, who heads the UN Economic Commission for Africa (ECA), told a 3-day conference on sustainable development. "Not enough attention has been paid to impacting the daily lives of ordinary people," he told delegates from around the continent. "It is therefore important that we now focus on exploring the ways in which science and technology can empower the poor to make beneficial changes in their own condition."

Amoako noted that a "famine" on the continent had put 38 million people at risk of starvation, but it had helped focus attention for a permanent and sustainable solution. He said new technology had a vital role to play in the agricultural sector of the continent, but so far it was sadly lacking. Gebremedhin Belay, Ethiopia's deputy agriculture minister, said "incentives" must be offered to encourage science and technology in the agricultural sector.

Participants in the conference, hosted by the ECA, said that while biotechnology was not the single answer to the continent's food crisis it should be "embedded" in future strategies. They said the potential risks of biotechnology were outweighed by the benefits it could offer the continent. "The biggest risk would be to do nothing and let the biotechnology revolution bypass the continent," said an ECA report on harnessing technology. "Africa must seize the day as other regions, particularly Asia, are rushing to catch up."

"Africa, which depends so heavily on agriculture, stands to benefit from technologies that can increase the production of food, enhance its nutritional quality and minimise the exploitation of forests and marginal lands" the report stated. Officials at the conference are urging African governments to boost investment in biotechnology research and establish national institutions for risk assessment.

Greenpeace sowing confusion

Jay M. Holmes, 7 Oct 03, Food Safety Network, www.foodsafetynetwork.ca From AgBioView 8 Oct 03 (shortened)

Last week's media event courtesy of Greenpeace - activists dangling from cranes aboard the bulk carrier *Glory Island* unfurling banners reading "Biohazard: GE Export", featured the kind of flash that has become standard among activist groups. The *Glory Island* was used by Greenpeace to call attention to the Japan-bound ship's cargo of canola, which may have included GM varieties. The demonstration also called attention to Greenpeace's campaign to ban the development and production of biotechnology-derived crop varieties in Canada. In conjunction with the event, Greenpeace spokesman Patrick Venditti attempted to spread uncertainty regarding the introduction of biotechnology-derived products into Canadian agriculture. Greenpeace's claims are typical of those used by anti-biotechnology campaigners. They are designed to provoke anxiety amongst the public in the hopes of spurring the mass rejection of these new crops.

Contrary to Venditti's assertions, the fact remains that Canada has a rigorous regulatory system that is based on the most up-to-date science. New biotechnology-derived products must be subjected to years of testing before they can even be considered for approval by the government. Following this testing, new products face intensive environmental safety assessments and human health safety assessments by the Canadian Food Inspection Agency and Health Canada.

Canola varieties like those that are likely aboard the *Glory Island* passed this regulatory scrutiny 8 years ago and have been deemed safe for the environment and for human consumption. Since that time, millions of tonnes of the canola have been produced, and people around the world have consumed the oil derived from the crop without incident. Canada's trading partners have conducted their own safety assessments of biotechnology-derived products like canola and have concluded that their importation does not pose a danger.

Although Venditti claims that Canada is neglecting its obligations under the Cartagena Protocol on Biosafety by exporting the crop, this is not the case. Under the Protocol, an exporting country has a duty to its fellow signatories to provide information on the contents of shipments (not individual consumer products) so that informed decisions can be made about what to import. The cargo aboard the *Glory Island* is no different; the Japanese importers know what they are buying. Whether the canola should be labelled as a product of biotechnology on consumer products in Japan is a matter for Japanese regulators, not Canadian activist groups, to decide. According to a news release issued by the Canola Council of Canada in reaction to the incident, there is no truth to the assertion that exports of canola are disappearing: the market for Canadian canola remains strong. While exports to the EU have been lost since the EU introduced a moratorium on the importation of some biotechnology-derived products, producers have found new markets and continue to export conventional and GM canola and canola oil around the world.

Promoting environmental stewardship and protecting public health are noble and widely shared goals. Politicians, government regulators, corporate and institutional researchers, farmers and the food industry all have a vested interest in pursuing such goals, a fact that is often lost on those opposing the use of new technologies in food production. Negligence in the areas of food and environmental safety is unacceptable, which is why new technologies are heavily regulated and cautiously implemented. People generally expect that a company will spin any news or information that it releases so that it plays out in their best interests. What is less widely recognized is that a similar process operates within groups like Greenpeace. These groups have a vested interest in the outcome of the biotechnology debate that is equal to that of the corporate interests they oppose. For organisations that fund themselves almost exclusively through public donations it is in their best interest to portray the introduction of biotechnology-derived crops in the worst possible light in order to motivate people to open their wallets, thus ensuring the ongoing survival of the organizations themselves. This explains the wording of the banner that was unfurled from the ship and it explains their spokesman's attempts to frighten rather than inform.

Consumers concerned with the outcome of the biotechnology debate would benefit from becoming good consumers of information. Any claims, either for or against the safety of biotechnology-derived products, should be viewed with a healthy skepticism and should be supported with proof. In addition, consumers must recognize the different motivations of the participants in the biotechnology debate. Demanding proof of claims and recognizing bias will keep them from being bogged down by the rhetoric that is found on the extreme edges of the debate. Consumers would do well to keep this in mind the next time they see someone dangling from a crane.

Jay M. Holmes is a graduate student with the Food Safety Network at the University of Guelph;
holmesj@uoguelph.ca

Buttered maize may replace vitamin E pill

South East Farm Press, 9 Oct 03 <http://southeastfarmpress.com/> From AgBioView 11 Oct 03 (shortened)

Forget getting your Vitamin E from an uninspiring supplement you wash down with a glass of water each morning. Thanks to work by USDA (US Dept of Agric) scientists you may soon be able to get the same amount of Vitamin E offered by that tasteless pill from a much tastier, buttered ear of corn. Edgar Cahoon, a research molecular biologist with the USDA-ARS (Agric Research Services) Plant Genetics Research Unit and his colleagues from DuPont Crop Genetics have produced maize with 6 times the Vitamin E content of regular maize. "Most of the biotechnology we hear about, Roundup-Ready soybeans and Bt maize, has been directed toward reducing the farmer's input costs," Cahoon says. "Our research, however, involves the development of a trait that improves the dietary quality of food."

Vitamin E positively affects human health because it is a powerful antioxidant that protects cells from oxidation damage caused by "free radicals." These radicals attack the cells' membranes, proteins and DNA, contributing to the development of health problems such as heart disease, diabetes, cataracts and cancer. Beyond human health benefits, the antioxidant qualities of Vitamin E will help maize resist spoilage caused by free radical-mediated oxidation, lengthening the shelf life of vegetable oils, which contain Vitamin E, and processed foods produced from those vegetable oils.

Cahoon says the increase of Vitamin E in leaves and other tissues may also increase the productivity of maize plants in the field. Although Vitamin E maize does have many other benefits, it was originally produced for a Pioneer Hi-Bred study aimed to improve the quality of maize for livestock feed applications. After studying how Vitamin E is made in cereal grains such as barley, wheat and rice, researchers identified a key gene responsible for the production of the vitamin in barley seeds and introduced that gene into maize seeds. "The combination of the gene and where it is expressed gives the high level of this type of Vitamin E," William Hitz, a Research Fellow with Pioneer Hi-Bred International, Inc. who was also involved in the project. This discovery, which could not have been accomplished by traditional plant breeding, shows biotechnology can benefit the consumer directly, Cahoon says.

Vitamin E maize must be tested extensively before it is available for consumers. First, it must be evaluated on its agronomic performance and its value in livestock feed applications. If these tests are successful, Vitamin E maize will be tested for regulatory approval, which can be time consuming. "My best guess is 5 to 7 years before this product is available, if it is decided that the trait will be commercially viable," Cahoon says. He says a new market for maize could be created with the commercial availability of Vitamin E maize since the antioxidant is isolated from vegetable oils for use in dietary supplements. "By increasing the Vitamin E content 6-fold, it is more likely that processors can use maize oil for the production of Vitamin E for nutraceutical applications," Cahoon says.

Slimming down soy

Rachel Melcer, St. Louis Post Dispatch, 9 Oct 03, <http://www.stltoday.com/> From AgBioView 11 Oct 03. (Shortened and adapted)

When the Frito-Lay unit of PepsiCo Inc. decided to substitute maize oil for partially hydrogenated soybean oil in its chips, consumers got the promise of a more heart-healthy snack. It was the first major salvo in a war against trans fats, the nasty component of hydrogenated oil that can elevate your bad LDL cholesterol and your risk of heart disease. Food producers hope to reduce or eliminate trans fats before the first day of 2006, when they must be listed separately on food labels, under a regulation issued in July by the Food and Drug Administration.

Biotech seed companies are looking for a solution for soybean processors: They are developing soybeans that produce healthier oil. Soybeans contain 2 types of polyunsaturated fats: linoleic and linolenic acids. These fats are heart-healthy, but they can break down when exposed to air. So, food made with soybean oil becomes rancid quickly. To get around the problem, food makers use a process called partial hydrogenation. It involves, in part, bubbling hydrogen through the oil at a high temperature. The result is oil that has a longer shelf life; and a higher melting point, so it can be used in semisolid products, such as margarine. But it contains trans fat.

Biotechnology companies are breeding and genetically modifying soybeans to produce an oil that doesn't have to be partially hydrogenated to turn out tasty, long-lasting chips and pastries. At the same time, breeders are increasing the soybeans' natural portion of oleic acid, a healthy monounsaturated fat that boosts good HDL cholesterol. "We're making the fat that's there healthier," said David Stark, vice president of global industry partnerships. "We're part of the food chain, clearly. And food manufacturers and producers are very concerned about trans fats. We're responding to a real issue.

"We want soybean oil to remain the oil of choice." Through conventional breeding, companies have developed strains of soybeans with less polyunsaturated fat than maize oil. They are being field-tested and analyzed. They're likely to be available for sale in 2005. They will continue cross-breeding to produce soybeans with half as much polyunsaturated fat, plus double the amount of healthy monounsaturated fat. These seeds should be available in 2007 or 2008. In addition they are modifying soybeans genetically to eliminate all but a minuscule amount of their natural, unhealthy saturated fat, leading to an oil that could be labelled "free of saturated fat and trans fat." Pending regulatory approval, it could hit the market in 2011.

Foodmakers are marching on, regardless of whether the soybean industry is ready. They don't want to be caught with trans fats in their cookie jar in 2006, when the food-label regulation kicks in. "Our companies are looking for ways to reduce trans fats in products now," said Stephanie Childs, a spokeswoman for the Grocery Manufacturers of America, an association of food, beverage and consumer-products companies. "That includes looking at non-soy-based oils or switching to maize oils or other types of oils that are free of trans fats and, quite frankly, the sooner the better," she said. Trans fats alone aren't a huge health issue, because they make up just 2% to 4% of calories in the average American's diet, according to the Institute of Shortening and Edible Oils, a Washington-based trade group. Unhealthy, saturated fats account for 12% to 14% of the average diet. Consumers have known of their risks for years.

"Relatively speaking, we really ought to be concentrating on saturated fat rather than the over-blown issue of trans fats," said Robert Reeves, president of the institute. But news reports are driving consumer concern over trans fats, and the consumer is king. "Right now, consumers are relatively confused, and it's going to be a while before it's all straightened out," Reeves said. But "our responsibility here is to provide the consumer with healthful foods." Shoppers are likely to be won over by foods stamped "heart-healthy" or "trans-fat-free," said Christine Bruhn, director of the Centre for Consumer Research at the University of California at Davis. "It's not going to be a revolutionary, earth-shaking change in the American diet," she said. But if there is health information that says these products are indeed providing a benefit to consumers, then consumers will buy them. The benefit is likely to outweigh consumer concerns about GM foods, she said. Even in Europe, where there has been vehement opposition and a 5-year moratorium on commercial approval of GM products, foods with added consumer benefits, such as healthier soybeans, could win the day.

The Canadians & GM canola

Food Safety Network, 13 Oct 03 (shortened)

Has Canada damaged its export markets by introducing GM crop varieties? Will New Zealand's (NZ) agricultural exports disappear if they follow suit? The answer is no. But the Sustainability Council (SC) believes they will, writes Jay M. Holmes from the Food Safety Network. The recent SCNZ media statement questioned the NZ government's claims that export markets will not be affected by plantings of GM crop varieties at a time when debate over the introduction of GM crops to NZ agriculture is intensifying as the deadline for lifting a moratorium on GM approvals approaches.

The Sustainability Council cites a Canadian newspaper account of a document produced by Agriculture and Agri-Food Canada (AAFC). The document describes the Canadian government's concerns that consumer uncertainty over the GM content of some products could negatively impact export markets and damage "Brand Canada". The media account of the document was used as a basis to conclude that the introduction of GM crops could jeopardize world markets for NZs agricultural products. Drawing these conclusions from one never-published government document is an oversimplification of a complex situation.

There is little evidence that backs a simple cause and effect relationship between the introduction of GM canola and a negative impact on the agricultural sector. Perhaps SCNZ could have asked Canadian farmers or exporters about GM canola. Canola production in Canada is thriving. Canada dominates the world trade in canola seed, representing nearly 75% of the total. Data provided by Statistics Canada and available on the Canola Council of Canada's website shows that demand for canola oil, canola meal and canola seed has exceeded domestic production levels every year since 2000. Moreover, yearly production of canola since the introduction of GM varieties has averaged 6.2 million tonnes (1996 - 2003), compared with a yearly average production of 4.5 million tonnes prior to the introduction of GM varieties (1986 - 1995) (www.canola-council.org).

Barbara Ismann, President of the Canola Council of Canada estimates that 86% of the canola produced in Canada is GM. A 2001 report commissioned by the Canola Council of Canada provides solid evidence that the introduction of biotechnology-derived canola varieties has benefited growers. The report did not reveal any evidence that the adoption of transgenic varieties had a negative impact on canola prices or producer returns (Serecon Management Consulting Inc. & Koch Paul Associates, 2001: available at <http://www.canola-council.org/>).

The report titled, "Agronomic and Economic Assessment of Transgenic Canola" which covered a 4-year period from 1997 - 2001 revealed:

- x growers received an average of C\$5.80 per acre in net return for transgenic varieties over conventional varieties due to higher yields and lower tillage, herbicide and docking costs;
- x transgenic varieties allowed growers to use better soil management practices which contributed to soil conservation efforts and saved 31 million litres (or C\$13 million) of fuel;
- x 77% of growers find volunteer management in GM varieties to be easier than with conventional varieties;
- x although the number of herbicide applications was greater for transgenic varieties (2.07 vs. 1.78 with non-transgenics), transgenic varieties required 6 000 tonnes less herbicide. Also, those herbicides used on transgenic varieties were perceived as "less harsh" than those used on conventional canola.

The market for Canadian Canola remains strong. The oft-quoted decline in exports to the EU is due to several factors, not simply the introduction of GM canola into Canadian agriculture. Europe stopped importing canola seed from Canada pending the outcome of its own regulatory assessments of GM varieties. Additionally, Europe has not historically been Canada's most consistent customer, and has become a net exporter of canola. It comes as no surprise that, when taken together, these factors have led to the decrease in canola exports to the EU. Other customers such as Japan, Mexico, the Pacific Rim and the US have continued to purchase Canadian canola products. (Ag-West Biotech: <http://www.agwest.sk.ca/pubs/canola.pdf>, www.canola-council.org).

NZ producers can also take some comfort from Canada's experience with other GM crops. Canada exports both GM and non-GM soybeans to Europe. The demand for both is strong, as is the market for GM maize products. The experience of Canadian canola farmers with GM varieties has been positive. Benefits have been realized at the farm level and the market for canola remains strong. The successful introduction of transgenic canola and the minimization of its associated risks are due to the diligent work of researchers, regulators, and growers and is a testament to the efficacy of Canada's science-based regulatory system. The introduction of any new technology requires a thorough risk assessment. The same is true for all GM crops. Each one must be assessed on a case-by-case basis to ensure that the benefits of its introduction outweigh its risks. With a system like this in place, New Zealanders can be confident that any new GM crops will benefit their island's agricultural system rather than imperil their export markets. (Jay M. Holmes is a graduate student with the Food Safety Network at the University of Guelph holmesj@uoguelph.ca)

(Ed. People often ask me if there are accidents with GMOs. Here is a report which includes the cleanup measures required by the regulators...)

Australian regulator clears two breaches of GM law

Newsquest 10 Oct 03. From The Life Sciences Network 13 Oct 03 (shortened)

Australia's gene technology regulator has investigated and cleared 2 breaches of laws governing the use of GM material. The Office of the Gene Technology Regulator (OGTR), in its quarterly report, said in one case 15kg of GM cotton seed was spilt at a Darwin transport depot. It said the cotton seed was part of a 400kg shipment on its way to Kununurra in Western Australia. Somehow some of the seed was spilt and an employee of the transport company, unaware that the cotton was GM, put the seed in a bin. The bin and its contents were later taken to a landfill. The regulator completed a risk assessment of the incident and found there was a negligible risk to both the environment and human health. In a second incident, research using a GM medicine was started before formal approval from the regulator had been given. The regulator found there was no risk to human health from the incident. As part of its monitoring programme, the regulator found 2 occasions where GM plants started re-growing in paddocks after they were supposed to have been cleared. In one case, 7 GM cotton plants started re-growing on a 20 ha site. In the other case, between 100 and 1000 GM plants were found in a paddock with between 10 and 50 of the plants mature and dropping lint. The GM cotton was at the time under trial. It has now been approved for general use by the regulator.

Hundred million \$ GM plan to develop Third World

Newsquest, 15 Oct 03. From LSN 15 Oct 03 (shortened)

Crop scientists have announced a \$US100 million plan, partly funded by software tycoon Bill Gates, to breed a new, more nutritious generation of the developing world's favourite crops. Researchers from the Nigeria-based International Institute for Tropical Agriculture (IITA) told reporters that the 10-year HarvestPlus plan would harness selective breeding and biotechnology to improve cassava, maize and yams. For the first 4 years, breeders at the IITA's Ibadan campus in southwestern Nigeria will identify currently existing strains already high in iron, zinc and betacarotene, a precursor of vitamin A. Iron deficiency affects billions of people in the developing world and leads to 100 000 deaths during childbirth every year, the IITA said. Vitamin A deficiency causes more than 500 000 children to go blind each year, and is a leading cause of child mortality.

Through selective breeding and, if necessary, genetic modification, better crops will be developed that will help the world's poorest farming communities fight disease and malnutrition, the scientists said. The foods selected for the first phase of the plan which also include sweet potatoes, beans and cowpeas, are the starchy staples of life in Africa and large parts of Asia and Latin America. "The plan has the potential to change the world," said IITA spokesman David Mowbray. "Vitamin pills are not the answer for Africa. With HarvestPlus we can reach people we could not reach any other way."

The programme will be co-ordinated worldwide by the International Centre for Tropical Agriculture and the International Food Policy Research Institute, and funded by the World Bank, governments and private donors. New crop strains will be put in the public domain, unlike the patented varieties marketed by private agribusinesses and the programme will seek a method to distribute fortified seeds to poor farmers.

The key process is known as "biofortification", or increasing the nutritional content of normally low-value foods through breeding, such as that carried out at the IITA site. However, within HarvestPlus scientists will also look at more controversial remedies. "Breeders working with biotechnologists will look at other options besides classical plant breeding," the launch statement said. Genetic modification, such as gene transfer from one plant to another rather than through breeding within the species, will not be carried out until other avenues are exhausted, IITA maize breeder Abede Menkir said.

Some environmental campaigners accuse scientists of endangering human health and biodiversity by experimenting with crop genes, creating "Frankenstein food" for the benefit of big business. "There have been quite a lot of issues raised with regard to genetic modification. Some of the issues are certainly being tested, through science, to prove or disprove these claims," Menkir said. "I think we have to give science a chance." For the moment HarvestPlus is focusing on using biotechnology to isolate the beneficial genes in naturally occurring crops, rather than for reconstructing plants from the ground up. "When there's so much variety which naturally exists, then why do we have to go to genetic modification?" he asked.

The Bill and Melinda Gates Foundation, set up by US software giant Microsoft's multi-billionaire founder, will be the biggest single donor at the launch of the programme, with \$US25 million. The World Bank, the US Agency for International Development (USAID) and the government of Denmark have contributed a further \$US22 million between them, and the IITA and its partners are overjoyed at the response. The sums are large, but a fraction of what it would cost to hand dietary supplements or vitamin fortified processed foods to the world's poor, the researchers said. The whole programme will cost \$US100 million but to have almost half of that at the start is very, very heart-warming," Mowbray said.

"The Greens have learnt the basic fact, that a lie will travel half the world, before the truth has had a chance to put its pants on. They never have to prove their claims."

Tawanda Zidenga (zidenga.1@osu.edu), Zimbabwe Graduate Student,
Plant Biotechnology Centre The Ohio State University

Research looks at GM canola hybrids

ABC News, 14 Oct 3. From LSN 15 Oct 2003 (shortened)

A national UK study has been conducted to quantify for the first time how much hybridisation can occur between oilseed rape (canola) and related wild weeds. The study, headed by Dr Mike Wilkinson from the University of Reading aimed to set targets for strategies to eliminate hybridisation between GM crops and wild plant species. Published in *Science*, the study estimates that 50 000 new individual hybrids form each year across the country, of which 11% are between plants more than 30m apart. Wilkinson and colleagues examined hybridisation between 2 plants which are known to often cross-fertilise, the commercially grown non-GM oilseed rape (*Brassica napus*), known as canola in Australia, and the weed *Brassica rapa*.

The researchers used a combination of population surveys, remote sensing, pollen dispersal profiles and herbarium data to estimate the number, frequency and location of hybrids which occur across the UK between these plants. The study is the first phase of a multi-million dollar, 5-year research programme funded by the 2 UK research councils: The Biotechnology and Biological Sciences Research Council and the Natural Environment Research Council. The programme, involving 8 institutions, is probing the ecological implications of GM crops, using non-GM canola as a model (no GM crops have been commercialised in the U.K. at this stage). The findings will be useful to British regulators in assessing the risk of GM crops, says Wilkinson, who heads the consortium.

Wilkinson and team report that 59 million hectares of GM crops were cultivated around the world last year. "GM cultivars offer economic and environmental benefits," they write in *Science*, "but also raise concerns that hybridisation with wild relatives could cause unwanted environmental change." They emphasise the research is baseline and is "only the first step" towards any quantitative risk assessment of gene flow from GM crops into the wider environment. Given that in the future there may be a broad range of genes deployed in GM crops, the potential for hybrid formation was important to consider, Wilkinson told ABC Science Online.

Australian weed scientist Dr Chris Preston, from Adelaide University and the Weeds CRC in Adelaide, says he does not see the need for further studies on GM canola outcrossing in Australia: "GM canola is no different from ordinary canola except it's got a couple of little genes in it," he told ABC Science Online. Preston says the research findings are consistent with aspects of canola outcrossing found in an earlier Australian study he co-authored, which was published in *Science* in 2002. That study measured how many hybrids formed between a non-GM, herbicide resistant canola and a type of canola that was not resistant. Hybridisation was found to occur, probably via bees, between canola crops up to 2.7km apart.

At that time, organic farmers who wished to prevent flow of transgenes into their crops called for buffer zones of 10 to 16km (in addition to regulated grain harvesting and grain transport to prevent contamination). Subsequently, the Office of the Gene Technology Regulator (OGTR) approved the commercial release of Bayer CropSciences Pty Ltd's herbicide tolerant GM canola in Australia but left the question of buffer zones up to industry. Preston says hybrids would be inevitable no matter how big buffer zones were, but describes the rate of outcrossing as "low". He says it would not create environmental problems such as the much talked-about "superweeds", adding that the weed in the UK study was only a problem in Tasmania where there is little commercial canola grown. He says that the OGTR in Australia has taken a "broad brush" examination of the potential hazards, and canola doesn't present a risk that can't be managed.

However, senior plant geneticist, Dr Phil Davies disagrees. Speaking on behalf of the Adelaide-based Institute of Health and Environmental Research Inc. (recently formed by scientists concerned about the environmental and health impacts of GM crops and other technologies), Davies told ABC Science Online that he believes there could be a problem in the future. "I think it's important to look at the big picture," he says, adding that the approach described by Preston was "only looking at the short term impact of one particular gene on one particular crop". Davies says transgenes (a gene from one organism inserted into another) may become more of a problem down the track as genes from a broad range of GM crops flow into weeds. One scenario is the accumulation of a number of different herbicide resistance genes in one weed such as had already occurred in Canada, he said: "The analogy is human bacteria that have built up a large number of antibiotic resistance genes over a number of years [of exposure to different antibiotics]."

Davies says other issues were not taken into consideration during risk assessment of GM canola, such as the transfer of "novel transgenes" and their proteins into honey, via pollen: "There hasn't been any human health testing for those proteins. Maybe they're harmless but we don't really know," he says. Superweeds aside, some farmers are also concerned that "contamination" of what are supposedly 'GM-free' canola crops may pose problems for export to Europe, which has set strict thresholds on GM levels. Preston says his study found the level of hybridisation was below the detectable European limit: "Cross pollination is unlikely to cause a trade problem," he says, adding that seed mixing in the processing and handling of grain was much more likely to do so. Davies says this argument is fine, as long as farmers don't save seeds from season to season. If they did, the frequency of any transgene in the crop may increase over time. The OGTR is currently calling for comments on its risk assessment of another type of herbicide tolerant canola, from Monsanto. Submissions close on 28 Nov 03.

Risk perceptions – a questionnaire

Questions on risk and risk perception are part of a PhD study at the Austrian Institute of Risk Research (www.irf.univie.ac.at), financed by a grant from the University of Vienna. The investigation is carried out using a questionnaire on topics regarding environment, agriculture and health. The more general first and second part of the questionnaire deals with 4 different risk topics and the third part deals with agriculture and diversity. The goal of the research is to assess the differences and common views of experts and lay people in an international context (therefore the questionnaire is available not only in English but in 7 other languages). In addition to the scientific aim the results of the study also may serve as a basis to improve communication between experts and lay people, especially if there is or will be increased public awareness and debate (e.g. GM-crops).

The researcher, Markus Schmidt, has specifically requested Africans to complete the questionnaire which is available online at <http://www.irf.univie.ac.at/perception/>

Course

22 – 25 March 04: Theoretical Course "Genome Dynamics and Evolution" - Trieste, Italy.
Closing date for applications 30 Oct 03. Contact Tel: +39 040 375 7333; Fax: +39 040 226 555; Email: courses@icgeb.org

DID YOU KNOW?

The first GM animal was a mouse, which was developed in early 1988, when the Harvard Oncomouse was patented in the USA. The technology has been applied during the 1990s to some mammals, including cattle, pigs, sheep and mice. It has also been applied to poultry. The creation and use of GM animals continues to increase.

IUCN Environmental Policy and Law Paper 46, 2003