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international news, comments, features and conference reports

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CONTENTS

CONFERENCES AND FEATURES

BOOK DISCOUNTS

LEAD ARTICLES

USDA CLEARS ROUNDUP READY ALFALFA

Following a statement by President Obama that the regulatory process for GM crops should not be “overly burdensome for businesses.” the US Department of Agriculture (USDA) has moved positively to deregulate *Roundup Ready* alfalfa in the USA. This is after a very long discussion period that followed the removal of GM alfalfa from the market in 2008. The ruling is based on a lengthy USDA environmental review that determined the product was safe.

On 20 January the House Agriculture Committee held a public forum to review the biotechnology product regulatory approval process. The discussion focused on the pending decision on the herbicide tolerant alfalfa. Three options were considered: no deregulation; total deregulation; or partial deregulation with isolation standards to prevent contamination of non-GM crops. In the forum Agriculture Secretary Tom Vilsack made it clear that the USDA would make a decision driven by science. He showed his support for the role that biotechnology plays in increasing productivity and helping to feed a growing world population. “We believe that biotechnology stands to play a significant role in our effort to support our drive toward energy independence, conserve our natural resources, and meet the world’s growing demand for food, feed, fibre, and fuel,” he said. He estimated that deregulation with isolation conditions could mean that up to 20% of land would be excluded as potential areas for growing GM alfalfa.

There was strong support from Charles Conner, president and CEO of the National Council of Farmer Cooperatives. He pointed out that in 2008, before GM alfalfa was withheld from the market, farmers benefited from higher productivity and a $110 increase in profit per acre. Based on his assessment of the pending decision, Mr Conner said the USDA should have no authority other than to deregulate the product since scientific review under the Plant Protection Act had confirmed its safety. The USDA announced its decision on 31 January to deregulate *Roundup Ready* alfalfa without conditions.

Alfalfa is the fourth largest field crop in the US. More than 5,000 farmers had planted *Roundup Ready* alfalfa on over 250,000 acres before a court ruling regarding USDA's administrative process halted further sales and planting. Steve Welker, alfalfa commercial lead at Monsanto, said: "The overwhelming feedback from the farmers who first planted *Roundup Ready* alfalfa was positive and ongoing grower surveys indicate significant farmer interest in the product." The final Environmental Impact Statement published by USDA in December concluded that one outcome of renewed planting could be an increase in quantity of high quality alfalfa hay. "This is good news for farmers who have been waiting for the green light before planting. USDA's action gives farmers the choice to enjoy the benefits of this product, including superior crop safety and high quality yield." *Roundup Ready* alfalfa was developed by Monsanto and Forage Genetics International (FGI). The USDA decision comes in time for spring planting. Monsanto, FGI and other alfalfa seed companies have varieties of *Genuity Roundup Ready* alfalfa seed in stock and ready for sale.

BRAZIL PLANTS RECORD LEVELS OF GM CROPS

Brazil has planted record levels of genetically modified (GM) crops for the 2010/11 harvest according to a study by the agrobusiness consultancy group Céleres. It added that the proportion of GM plantings is likely to increase further over the next few years. Céleres forecasts that 18.1 million hectares of transgenic herbicide-tolerant soybean has been planted for the current crop season, representing 76.2% of the total area sown. An estimated 57.2% of the total area of corn crops are insect-resistant transgenic GM varieties, including 44.4% of summer corn and 75.4% of winter corn. About 325,000 ha of cotton crops, representing nearly a quarter of the total area, will be planted with GM varieties containing insect resistance technologies, herbicide tolerance or both technologies ‘stacked’. Stacking technology will also cover about 8% of the area planted with cotton in the first season it has been used.

EUROPEAN NEWS AND MARKETS

DOW LAUNCHES SPITFIRE

Dow AgroSciences UK have launched a new broadleaved weed herbicide for use in cereal crops. *Spitfire* contains a unique blend of two well-proven active ingredients, florasulam and fluroxypyr, that can be applied when weeds are actively growing from as early as GS13 in all the main cereal crops, as well as winter rye and triticale but not durum wheat. The spectrum of control includes black bindweed, cleavers, charlock, chickweed, knotgrass, mayweeds, volunteer rape and beans, and many other economically damaging weeds. As well as an early start to treatment, *Spitfire* can be used right up to GS45 in winter wheat and winter barley, up to GS39 in spring wheat and barley, and up to GS31 in winter and spring oats, winter rye and triticale.

Spitfire contains the same active ingredients as Dow's other post-emergence herbicide *Starane XL*. However, it has double the amount of florasulam at 5g per litre, to offer greater activity in cooler and fluctuating temperatures. "Cleavers control is every bit as good as, if not better *than Starane XL* but *Spitfire* offers considerably more convenience due to its very wide window of application, and broader range of weeds," says Dow AgroSciences marketing specialist James Knight. "It is effective in warm, cold and fluctuating diurnal temperatures. The herbicide is compatible with a range of fungicides and can be applied in a tank mix or in sequence with most grassweed herbicides, including *Broadway Star* (pyroxsulam + florasulam), *Atlantis* (iodosulfuron + mesosulfuron) and other mesosulfuron-based products. Mr Knight said *Spitfire* will be supplied in liquid form in 5 litre (5ha) packs. This is new packaging from Dow AgroSciences that uses recycled plastic, is lighter, does away with foil seals and offers simpler disposal.

CERTIS TO MARKET MOCAP IN EUROPE

Certis Europe has been appointed as the primary European distributor for the soil nematicide/insecticide *Mocap* (ethoprophos), which was acquired by American Vanguard Corporation (Amvac) from Bayer CropScience in December 2010. The partnership with Amvac grants Certis Europe exclusive distribution rights to *Mocap* in its direct sales territory which includes the UK, Ireland, France, Netherlands, Belgium, Spain, Portugal and Italy. Certis Europe says it is well positioned in the high value fruit and vegetable crops that are important for *Mocap* and that it has gained considerable expertise through the marketing of Kanesho's soil fumigant products as Certis *CleanStart.*

Kevin Price, corporate marketing manager for Certis Europe, stated: "*Mocap* presents an exciting new opportunity for Certis and fits well with our existing portfolio in potatoes, fruit and vegetables in both Northern and Southern Europe. It is an important tool for growers to control a number of yield and quality-limiting nematode and insect species. It provides a good complement to our range of soil treatment and foliar insecticide products and is a welcome addition to our portfolio". *Mocap* is registered in 50 countries where it is used to combat many nematode and insect species in a wide range of crops.

CERTIS TO MARKET MATING DISRUPTION PRODUCTS

Certis Europe has entered into a partnership with Trécé Inc. based in Adair, Oklahoma, US and has been appointed distributor for their product range used for mating disruption in plant protection under the trade name *Cidetrak*. Certis Europe will act as the exclusive partner in the 27 EU countries for the development, registration and distribution of this product range except in Spain where, for some products, historical commitments will continue. *Cidetrak* does not yet have regulatory approval for sales in Europe, however, both companies say that Certis Europe has experience of securing regulatory approval for similar products and their subsequent distribution and sale in Europe. First regulatory approval and sales are expected for 2012.

The *Cidetrak* technology and product range provides a new opportunity for Certis Europe as the company considers there is a good fit with its existing and developing range of chemistry, soft chemistry, natural products and beneficials. Key markets for *Cidetrak* products are apples and pears, peaches, nectarines and grapes. Trécé and Certis Europe have also decided to co-operate in securing the regulatory approval

of any similar products developed by Trécé within Europe in the future. This could also include the Trécé *Pherocon* range of products for monitoring and trapping.

BAYER LAUNCHES BIXAFEN ON WHEAT AND BARLEY

A new generation SDHI fungicide bixafen will be available this season in combination with triazole prothioconazole for use in wheat and barley in the UK and Germany. Bayer CropScience UK will be marketing *Aviator 235 Xpro*, containing (160g/l prothioconazole+75g/l bixafen) formulated with Bayer's *Leafshield* formulation system for use on wheat. This contains a higher dose of prothioconazole than its German equivalent. The barley product will be marketed as *Siltra Xpro* (200g/l prothioconazole+ 60g/l bixafen). According to Bayer, the benefits offered by the new fungicides include enhanced crop coverage, extended activity and improved rainfastness, green leaf area and drought tolerance, conferring disease control and yield benefits over current industry standards.

Bayer is positioning *Aviator 235 Xpro* for use at the T2 timing in wheat in high yield potential crops for optimum disease control and return on investment. James Taylor-Alford, Bayer's product agronomy support manager, who had analysed 40 trials over three seasons, added that the product would be strongly targeted at the T2 flag leaf market. He said: "Technically it is right at T2. It is the strongest Septoria product and most active against rust. But to get the best from the product it has to be used at least at the 1.0 litre/ha rate", he stressed. "If you reduce the dose to 60% of the label rate of 1.25 litres/ha, then you are not getting anything you can not achieve with existing chemistry. In high potential crops the company has seen yields increase by over 4% compared to commercial standards." He also warned against mixing the product with chlorthalonil. At 1.0 litre/ha farmers can, he said, expect to be paying a £6-8 ($10-13) premium.

On barley, growers will be paying a 12-15% premium for *Silta Xpro* over Bayer's other fungicide *Fandango* (50g/l fluoxastrobin + 100g/l prothioconazole). For that extra spend they can expect to see better activity on Rhynchosporium, Ramularia and net blotch and an extra three weeks persistence. Bayer has also stressed the importance of its *Leafshield* triple adjuvant formulation system. The company says that the choice of active ingredients supported by the *Leafshield* system makes the *Xpro* technology the market standard 'in-can' resistance management strategy for difficult diseases like Septoria and Rhynchosporium. It says that the unique patented formulation system is specifically tailored to bixafen and prothioconazole (**www.xprotechnology.co.uk**).

SYNGENTA TO LAUNCH MIXTURE WITH EPOXICONAZOLE ON WHEAT

Syngenta successfully launched its barley fungicide *Bontima* in 2010. It was the first product based on the company's new carboxamide fungicide isopyrazam (IZM). Approved for use on both spring and winter barley, *Bontima* (isopyrazam + cyprodinil*)* was developed as an all-in-one solution for use at both T1 and T2. The company is now awaiting registration for its wheat product which it expects to launch in time for the 2011 season and has recently embarked on more than 20 events throughout the UK where it is introducing the product directly to growers and advisers.

"IZM is a next-generation member of the SDHI group of fungicides and works by shutting down fungal energy production," says the company cereal fungicide expert Paul Varney. "However the significant thing with IZM is that it is from a specific 'benz-pyrazole' branch of SDHI chemistry. The 'pyrazole' part binds it to the target site in the fungus, while the other part, containing the 'benz' element, is attracted to waxes and lipids. It is this benz-pyrazole structure which gives IZM its advanced double binding properties whereby it not only binds strongly to the fungus making it highly potent against disease but also to the leaf wax where it provides long-lasting and durable protection. "We knew from early evaluations that the product looked special, now research has added to this. Field trials in wheat have shown excellent control of the major diseases of *Septoria tritici* and yellow and brown rusts, extended green leaf retention and repeatedly high yield responses," he confirmed.

The product's long lasting activity against wheat diseases combined with a lack of systemic movement makes it a good fit at the T2 flag leaf timing. To maximise curative activity against Septoria and to protect against resistance development Syngenta has decided to formulate isopyrazam with epoxiconazole on wheat. Trials examining the effects of combining IZM with epoxiconazole in wheat have shown significant

disease control and yield gains over straight epoxiconazole. Yields were also boosted by around 4t/ha over untreated and 1.4t/ha over plots where epoxiconazole + chlorothalonil were used. Where Septoria is present Syngenta says you get the benefits of the new chemistry when using full or three-quarter dose.

BASF LAUNCHES NEW EPOXICONAZOLE FORMULATION

BASF UK has announced the launch of a new emulsifiable concentrate (EC) formulation, *Ignite,* containing 83g/litre epoxiconazole, for the 2011 season. Over time it is expected to replace the popular standard *Opus,* a suspension concentrate (SC) formulation containing 125g/l epoxiconazole in most growers' programmes. "Whilst *Opus* has been the triazole product of choice for the last 16 seasons due to its effective, flexible and consistent performance, *Ignite* offers growers a step on from this as a result of its advanced 'stick and stay' formulation technology," says Peter Hughes, fungicide cereal product manager for BASF. "Unique characteristics of the new EC formulation means that the epoxiconazole particles are completely dissolved in the solution and are highly available to the plant resulting in improved uptake and retention of the active ingredient. This gives greater curativity, improved consistency and represents a step up in yield. Field trials have shown improved disease control and consistency across the major diseases," continued Mr Hughes. "Looking at the data, there is no question that the game has moved on from *Opus*, with *Ignite* offering significant benefits."

BASF TO CULTIVATE GM STARCH POTATOES IN GERMANY AND SWEDEN

BASF Plant Science has concluded its *Amflora* cultivation plans for the 2011 season. *Amflora*, the genetically enhanced potato for use in the starch industry, will this year be cultivated on two hectares of land in Üplingen, Germany. "There are many good reasons for the use of *Amflora* in Germany, which is renowned for growing starch potatoes," said Peter Eckes, managing director of BASF Plant Science. "Separating the starch components in conventional potatoes for industrial use is not cost effective or environmentally sound. *Amflora* is an innovative new variety which produces pure amylopectin starch. It therefore helps to cut down on resources, energy and costs and offers farmers and the starch processing industry real added value." In addition to Germany, BASF will again be planting *Amflora i*n Sweden during the 2011 season. After receiving approval from the authorities BASF will, this year, be concentrating on propagating seed stock for cultivation in subsequent years.

EU PRODUCES DRAFT REPORT ON GM DECISIONS

A draft report by the European Parliament Agriculture Committee says Commission plans to allow member states more freedom over planting GMs do not give countries enough flexibility to create their own rules for accepting or banning them. It says member states should have a greater say over GMs than whether they are acceptable on moral and ethical grounds. It should not just be the responsibility of the European Food Safety Authority (EFSA) to decide if GMs should be banned for health and environmental reasons, it adds. MEP Corinne Lepage, who wrote the draft, said the diversity of ecosystems across Europe meant member states should be able to carry out their own risk analyses of the suitability of GMs, even if similar tests had been carried out by the EFSA. The suitability of GMs should also be considered in terms of changes in agricultural practices, GM crops' effects on soils and their socio-economic effect on farmers, she added.

Referring to a Europe-wide poll, which found 61% of people were 'nervous about' GM food, the draft report says the Commission should also adopt new risk assessment guidelines that identify the possible effects of GMs. It also calls for European-wide rules to ensure non GM products are not contaminated with those which have been genetically modified. The report is due to be voted on by the European Parliament's Environment Committee in April. Its publication came as Bulgaria announced it had banned farmers from growing GM maize in a bid to "protect Bulgarian agriculture". The variety, MON 810, was approved for cultivation in the EU in 1998 but has since been banned by six countries, including Austria, Hungary and France.

AMERICAN NEWS AND MARKETS

BAYER TO CLOSE CARBAMATE MANUFACTURING FACILITIES

Bayer CropScience is to close certain manufacturing facilities dedicated to carbamate chemistries in Institute, West Virginia, US and is shutting down its Woodbine, Georgia, formulation facility. As a result of these changes there will be 300 job losses over the next two years. "The decision was based on a number of factors, with both strategic and economic considerations. It is fully in line with our global strategy to focus on delivering innovative solutions to modern agriculture and replacing older compounds in our portfolio, including WHO Class I products", said Achim Noack, member of the Board of Management of Bayer CropScience.

In recent years, Bayer's carbamate products have been largely substituted by newer products, prompting a review of the company's carbamates business strategy. In August 2010 the company reached agreement with the US Environmental Protection Agency (EPA) to phase out the insecticide/nematicide *Temik* (aldicarb). "*Temik* was the cornerstone of our carbamate manufacturing strategy," said Chris Evans, senior vice president of Industrial Operations in North America for Bayer CropScience. "The decisions to exit *Temik* and to discontinue our methomyl and carbofuran production made it impossible to maintain competitive operations at our sites in Institute and Woodbine." Another product affected by the decision is carbaryl, the active ingredient in the insecticide *Sevin*, as well as certain intermediate materials. Production operations, including methyl isocyanate (MIC), will be phased out over the next 18 months, to allow for an orderly market exit and to honour the company's commitment to growers. Bayer plans to continue supplying its customers with *Temik* in the US and other markets worldwide until the end of 2014, after which sales of the compound will cease. The company intends to continue marketing *Sevin* based on active ingredient supplies from alternative sources.

ANDERMATT AND CERTIS TO MARKET NEW GRANULOVIRUS TECHNOLOGY

Andermatt Biocontrol AG (**www.biocontrol.ch**), a leader in the research and development of granulovirus technology, and Certis USA, a biopesticide company, have entered into an agreement to develop and market new granulovirus insecticides for the NAFTA region. The companies will collaborate on the development of new generations of granulovirus products targeted for fruit production that are more potent and broader spectrum than current products on the market. The new insecticide will be launched between 2012 and 2014.

Daniel Zingg, managing director of Andermatt, added: "Certis USA has been the market leader in insecticidal virus products in the US and is naturally our preferred choice of partner to develop the new generation of technologies which will permit the expansion into new markets and geographies within the NAFTA region." Based in Grossdietwil, Switzerland, Andermatt has been producing baculovirus products since 1988. "The Certis product, CYD-X, set the standard for granulovirus insecticides when it was introduced in 2003. It has become an integral insecticide that allows US apple, pear and walnut producers to practice integrated pest management," said Tim Damico, Certis USA executive vice president of NAFTA. "We are excited to be working with Andermatt to develop more of this important class of insecticides. Like CYD-X, the new generation of products will be residue-free, IPM-friendly and a resistance management tool. Primarily used in pome fruit today, our new granulovirus products will expand pest control options for peaches, nectarines and other stone fruits."

US EPA APPROVES HERBICIDES BASED ON AMINOCYCLOPYRACHLOR

The US Environmental Protection Agency (EPA) has granted approval to DuPont for three new herbicides, *Perspective, Streamline* and *Viewpoint*. Based on new chemistry aminocyclopyrachlor, these products provide long lasting control of a wide spectrum of difficult brush and broadleaf weeds on roadsides, railways, nature reserves, parks and other amenity areas. The US registration marks the first commercialisation of the new chemistry which is also being developed for use in land management, pasture and sugar cane markets around the world. First sales of pasture products is expected in the US in 2013.

VALENT TO DISTRIBUTE TEBUFENOZIDE

Valent BioSciences Corporation has signed an exclusive agreement with Nippon Soda Co to supply and distribute tebufenozide for the North American forestry markets. Tebufenozide is a highly selective insect growth regulator that will be branded as *Mimic* in Canada and the US for the control of insect defoliators in forests and woodland sites. "The addition of this insecticide to our forestry product portfolio will offer operational flexibility to professional programme managers across a broad range of forest pest species and population conditions," said Mike Donaldson, Valent BioSciences president."Valent BioSciences Corporation is recognised worldwide for pioneering the aerial application of biorational insecticides for the control of insect defoliators in urban and rural forests. Valent will work with governments and key stakeholders responsible for forest insect control to optimise the use of Mimic." Tebufenozide is used to control Lepidoptera pests in forests and food crops. It has a novel mode of action in that it imitates the action of the insect molting hormone, ecdysone. Lepidoptera larvae cease to feed within hours of exposure and then undergo a lethal, unsuccessful molt. Tebufenozide has an excellent environmental and safety record and was recipient of the Presidential Green Chemistry Award. *Mimic* is scheduled for launch in 2011.

BASF TO MARKET PYROXASULFONE IN NORTH AMERICA

BASF has signed an agreement with the Japanese companies Kumiai Chemical Industry Co., Ltd. and Ihara Chemical Industry Co., Ltd. Under the agreement BASF has been granted the exclusive rights to develop and commercialise the herbicide pyroxasulfone for corn, soybeans, wheat and sunflower in the US and Canada. It was also granted the right to develop premix formulations and to evaluate the herbicide active ingredient for additional crops, such as cotton, peanuts, and potatoes. BASF anticipates introducing its first pyroxasulfone product under the brand name *Zidua* in the US in 2012.

APPROVAL FOR WILLOWOOD HERBICIDES

Willowood USA has received California Department of Pesticide Regulation approval for two post patent crop protection herbicides. *Oxyflo 2EC* and *Oxyflo 4SC* are herbicides that contain the same active ingredient, oxyfluorfen, as *Goal 2XL* and *Goaltender.* These products provide pre and post emergent control of grasses and weeds on a wide variety of crops including artichokes, cole crops, citrus, corn, cotton, garlic, mint, onions, tree fruit, nuts, grapes as well as on fallow beds. "We currently have registered and are producing a number of high quality post patent alternatives including *Ethofumesate* 4SC, *Pronamide* 50WSP, *Tebucon 3.6SC*, *Tebucon DF*, *Propicon 3.6EC* and *Glyphosate 41%. Oxyflo 2EC* and *Oxyflo4 SC* are an important additions to our growing line of crop protection products," said Brian Heinze, president & CEO Willowood USA.

Located in Hong Kong, Willowood has established overseas branch offices in the US, China and India. The company has recently acquired a factory in India and there are plans to set up a state-of-the-art active ingredient plant in India, primarily concentrating on production of ais coming off patent. To expand its global presence, Willowood is also on lookout to acquire marketing companies in Russia and Brazil, and in other major markets.

BRAZIL TO PHASE OUT METHAMIDOPHOS

The organophosphate insecticide methamidophos, commonly used on rice, is to be phased out in Brazil. While the manufacture and formulation of the active ingredient will be banned immediately the government has agreed to allow inventories to be used throughout the year and for the first part of 2012. The Board of the National Sanitary Surveillance Agency (ANVISA) has characterised methamidophos as neurotoxic, immunotoxic and endocrine disrupting. After 30 June 2012, former manufacturers of methamidophos will be responsible for collecting unused inventories from farmers and disposing of them within 30 days. Sometime in 2012, it is possible that other organophosphates could take the place of methamidophos, creating market opportunities for crop protection companies with newer chemistries.

BRAZIL APPROVES SYNGENTA'S TRIPLE CORN STACK

Syngenta announced today that the National Biosafety Committee (CTNBio) in Brazil has approved its triple corn stack Bt11 x MIR162 x GA21 for cultivation. The triple stack will now be available to Brazilian growers for the 2011/2012 season. "We are very pleased to receive this first approval for any triple stack product in Brazil. It demonstrates our ability to bring innovative technology to market," said Davor Pisk, chief operating officer Syngenta Seeds. "The approval reinforces our portfolio for Brazilian growers and brings greater convenience and increased productivity." The triple corn stack combines herbicide tolerance and insect resistance. The MIR162 trait (*Agrisure Viptera*) offers control of fall army worm, the main insect threat to corn in Brazil, and of other damaging lepidopteran pests.

MONSANTO'S VISTIVE GOLD CLEARS FDA CONSULTATION PROCESS

The US Food and Drug Administration (FDA) has notified Monsanto that the biotechnology consultation process for MON 87705, a key component of the company's *Vistive Gold* soybeans that produce a high-oleic, low-saturate, low-trans fat soybean oil, has been completed. This concludes one of the key regulatory steps to allow for full commercial introduction of *Vistive Gold* soybeans.

"*Vistive Gold* soybeans will enable food companies to produce foods made with soybean oil to have lower saturated fat levels and maintain low levels of trans fat. Consumers and farmers will benefit from this product, which was developed with input from the food and nutrition communities," said Joe Cornelius, Monsanto's global technology lead for food quality traits. "It will give farmers an opportunity to produce nutritionally improved soybean oil for food companies and consumers."

Vistive Gold soybeans will now be commercialised after receipt of appropriate regulatory approvals. The soybeans will be combined with *Genuity Roundup Ready 2 Yield* soybeans, giving farmers an increased yield opportunity in addition to providing the nutritionally improved oil.

The completion of the FDA consultation process supports the use of oil from *Vistive Gold* soybeans under the intended conditions of use, which enabled food companies to develop and evaluate foods that contain this nutritionally improved oil. Monsanto petitioned the US Department of Agriculture for non-regulated status of high-oleic soybeans in June 2009. The petition is currently under review. Monsanto has also made submissions for import approval in key export markets. Upon commercialisation, food companies will be able to purchase the new oil and sell food products prepared with it.

FBSCIENCES CONTRACTS R&D TO AGRITHORITY

FBSciences Inc. has contracted research and development of its proprietary plant growth regulator technologies for seed treatments and crop protection products to AgriThority LLC, a global life science research and technology transfer company. "Our plant growth regulator technology, regardless of delivery platform, is showing huge potential in delivering a higher level of plant health and overall crop performance – not just from yield increases but in a higher quality of the grain or produce," says FBSciences CEO Peter Stromberg. "AgriThority has the expertise to guide our PGR technology through the process from product development through commercialisation and transfer of products to the marketplace."

AgriThority scientists under the direction of agronomist Dr Robert Lemon will concentrate on the development and commercialisation of FBSciences products utilising proprietary, naturally-derived plant growth regulator (PGR) technology. AgriThority currently has field and lab research underway in the US, Canada, Germany, Argentina, Brazil, Australia and India, and is consulting on research in China. The PGR technology has demonstrated an ability to influence key genetic responses, improving plant health and productivity in a wide variety of agronomic and horticultural crops. FBSciences anticipates registration of the new technology by the US EPA in the second quarter of 2011. The EPA has already assigned the PGR technology as a new class of biopesticide chemistry.

EPA ANNOUNCES PHASE OUT OF SULFURYL FLUORIDE

Dow AgroSciences has expressed disappointment at the EPA's announcement of a proposal for a multi-year phase out of food tolerances for the post harvest fumigant sulfuryl fluoride. Dow says that EPA's proposed action offers no meaningful public health or environmental benefits and would actually detract from US public health objectives. EPA has said that it will open a 90-day public comment period for stakeholder input on its proposal and will not take final action until it has evaluated stakeholder response.

The EPA has acknowledged that its proposal is in response to a petition and threat of legal action by activists. Its proposal is intended to address concerns about aggregate exposure to fluoride, a material intentionally added to drinking water by public and private water systems to prevent dental cavities. It also accepts that the use of sulfuryl fluoride to protect the food supply results in only "a tiny fraction" of overall fluoride exposure.

Sulfuryl fluoride, marketed by Dow as *ProFume,* protects food from contamination by pests such as rats, moths and cockroaches. Sulfuryl fluoride is also the sole practical alternative for food processing and storage facilities to methyl bromide phased out due to concerns about safeguarding the earth's protective ozone layer. Stan Howell, vice president, North America Dow AgroSciences said: "Consistent with our commitment to US agriculture, we are working with government and affected agricultural stakeholders toward a resolution of this issue that addresses the public's need for a safe, affordable and sustainable food supply."

OLAH TO USE BAYER'S COTTON BRAND NAMES

Bayer CropScience and New York-based textile company Olah Inc have signed a licensing agreement to use Bayer's cotton brand names *FiberMax* and *Stoneville*. Under a ten year agreement, Olah has been granted an exclusive license to develop and market the two brands for clothing and home furnishings. The agreement initially covers North America, Mexico and Japan and can be extended to more countries. It also includes the right to sublicense the brand names to other manufacturers. Both *FiberMax* and *Stoneville* are well known cotton brands and Bayer says that each offers a unique quality profile that is appealing to different segments of the textile industry. *FiberMax* is high quality, long-staple upland cotton mainly grown in the US that is ideally suited for finished goods that require finer yarns for manufacturing. Such products include t-shirts, chinos, towels and bedsheets. *Stoneville* cotton is strong and suitable for use in heavier weight fabrics and outdoor and work clothing, sports and casual wear such as jeans.

"Together, Olah and Bayer CropScience will create a unique connection between cotton producers, spinners, merchants, textile manufacturers, retailers and consumers," said Joachim Schneider, head of the BioScience business group at Bayer CropScience. "Bayer CropScience will continue to invest heavily in growing its cotton business, including new research and development innovations targeted at improving fibre quality, yields and stress tolerance." Olah's CEO Andrew Olah added: "This agreement provides us with the means to develop new products for today's consumers using best-in-class technology, production techniques and style. At the same time it gives us the opportunity to document the origin of the cotton used on a mass scale, thus providing consumers with transparency."

OTHER NEWS AND MARKETS

ISAGRO TO FOCUS ON R&D

Isagro S.p.A. is restructuring its business to refocus on researching and developing new molecules. The company has accepted a proposal from a multinational corporation to purchase the company's 50% investment in the distribution company Sipcam Isagro Brasil. It has also transferred its 50% stake in the distribution company Isagro Italia to Sumitomo Chemical Company which now owns the entire share capital. The transfer of the two distribution businesses, which will subsequently change their names, will generate a total revenue of €35 million. Isagro intends to use the proceeds to reduce its financial exposure and to continue to finance activities related to its core business.

Sipcam Isagro Brasil has a staff of 191. It formulates and distributes crop protection products for the Brazilian market and reported sales of €79 million in 2009. Isagro Italia employs 71 people and 40 agents. Its sales in Italy reached €79 million in 2009.

ISAGRO AND CHEMTURA TO CREATE ALLIANCE

Isagro and Chemtura AgroSolutions have finalised a joint venture which will create a strategic alliance between the two businesses. They will share investments in innovative research that will focus on discovering new active ingredients. To do so they will have equal ownership in a company ISEM set up by Isagro with an equity value of €40 million. Chemtura has made a payment of €20 million to Isagro. The latter has contributed a commercially registered herbicide orthosulfamuron and the fungicide valifenalate as well as the intellectual property related to two new active ingredients ready for development and commercialisation. These activities realised €2.1 million of sales in the first nine months of 2010.

Chet Cross, executive vice president of Chemtura, stated: "The alliance is the next step in our commitment to growing the Chemtura agrochemical business. We started last year with the rebranding of our agrochemicals division to Chemtura AgroSolutions. The joint venture with Isagro is a key step in our commitment to investing in new product discovery and development and we are confident it will help to accelerate our ability to offer new solutions."

RIVENDELL OPENS SUBSIDIARY IN JAPAN

Global regulatory affairs consultancy Rivendell International has recently opened its fifth subsidiary, Rivendell Japan. The company already has a presence in Ireland (headquarters), Spain, the Netherlands, and the US. The Japanese operation is based in the Chiyoda ward area of Tokyo and will be the local office for the Japanese market specifically, and for the Asian region. The office will serve Rivendell clients locally and those seeking an entry into the Japanese market. It will also act as a centre for assisting Japanese companies in global markets. All services are offered in Japanese. The venture will be headed by John Sheehy previously the general manager of the Rivendell headquarters in Ireland.

DUPONT REPORTS HIGHER FOUTH QUARTER SALES

DuPont has reported fourth quarter sales in 2010 of $1.5 billion, up 13% due to higher volumes. The increased sales primarily reflect a strong start to the North American season, an increase in Latin America corn sales, an increase in Brazil soybean volume, and higher sales for crop protection products across all regions, led by continued expansion of the insecticide *Rynaxypyr*. Pre-tax operating income for the fourth quarter was a seasonal loss of $117 million compared to a loss of $97 million in the fourth quarter 2009, reflecting continued growth investments.

SYNGENTA CONSTRUCTS CORN PROCESSING PLANT IN THE PHILIPPINES

Syngenta Philippines has invested $8 million to put up the Asian region's most state-of-the-art seed corn seed processing plant in Binalonan, Pangasinan. The construction of the plant is in line with the Philippine government's thrust to invest in infrastructure and post harvest facilities which should have a wider impact in raising farmers' income and reducing poverty. "We are using high-tech, computerised equipment for drying, shelling, and conditioning," said Recher Ondap, Syngenta country head for seeds. The plant has a

capacity to process 2,000 metric tons of hybrid corn seeds per year. It is expected that the processing time, normally 72 hours, will be reduced by 15 to 20%.

The plant will employ 150 people and should help raise the income of farmers by making hybrid corn seeds available that can double their yield from around five tonne per hectare. “This will contribute significantly to the economy of Pangasinan. They can get seeds that are newly-harvested, have excellent germination potential and are well-suited to local conditions. In this way, Syngenta also contributes towards the food security goals of the Philippines,” added Mr Ondap.

Syngenta is looking forward to integrating into future hybrid corn varieties important GM traits that will raise farmers’ yield and income. The traits include those resistant to the Asiatic corn borer and other pests such as the earworm, and herbicide tolerance. The company has also been developing hybrid corn varieties that are designed for specific regions.

CONFERENCES AND FEATURES

FOOD SECURITY

A major two year study, The Future of Food and Farming: Challenges and Choices for Global Sustainability*, from the UK's Foresight programme (**www.bis.gov.uk/foresight**) was published on 24 January. As the scope of the study was international, it was presented to a session of the EU Council (Agriculture and Fisheries). Bruce Knight reports on some of the findings which could impact on the crop protection and agricultural biotechnology industries.*

The project was led by the UK government's chief scientific adviser, Sir John Beddington, with contributions from a panel of eight experts. It called on 80 scientific reviews and involved around 400 leading experts from 35 countries. Funding came jointly from the Department of Environment, Food and Rural Affairs (Defra) and the International Development Department.

The aim of the project was to explore the pressures on the global food system between now and 2050 and to identify the decisions that policy makers need to take today, and in the years ahead, to ensure that a global population rising to nine billion or more can be fed sustainably and equitably. The report, which is aimed at policy makers, proposes strategies, policies and priorities for action for each of five overarching challenges which are:

- balancing future demand and production sustainably
- addressing the threat of future price volatility in the food system
- ending hunger
- meeting the challenges of a low emissions world
- maintaining biodiversity and ecosystem services while feeding the world.

Overall it presented a strong message that decisive action is needed now and that food security has to be managed at a global level with an integrated response.

Balancing future demand and production sustainably

Not surprisingly the authors of the report stated clearly that there is no one simple way to balancing future demand and production sustainably. The key policy actions range from: producing more food by the application of existing technologies and knowledge, especially in low income countries; applying new science and knowledge especially to meet the challenges of a changing environment; and reducing waste along the food chain. There is also scope for influencing demand through better international governance to minimise trade restrictions and by influencing diets.

Using existing knowledge

Transferring existing knowledge to under developed countries is a critical need. It has been estimated that the application of existing knowledge and technology could increase average yields two to three fold in many parts of Africa, and even in Russia it could be twofold. In the case of wheat, only the EU countries UK, Denmark, France and Germany have yields in line with, or even slightly above, the optimum based on the agro-ecological status for rain-fed high-input farming. In most countries, including the US, yields are well short of their potential.

The study concluded that organic agriculture, as currently defined, should not be the main strategy to achieve sustainable and equitable global food security. Some specific organic practices could, however, make a significant contribution, in low income regions. All possible production methods should be considered, provided they are supported by proven evidence.

Investing in new technologies

The application of new science and technology to raise the limits of sustainable production, as well as addressing new threats, was given considerable attention in the study. However it is recognised that its

impact may be too slow to make a significant impact by 2030, when the global population could already have reached eight billion.

A strong case is made for reversing the downward trend, particularly in the EU, on public sector expenditure in research on agriculture, fisheries and the food system. From studies carried out in both developed and developing countries, economic rates of return of around 40% can be achieved. Examples quoted are Brazil where agricultural research spend in 2009 was $1.1 billion, and China $1.8 billion in 2007. In both cases agricultural productivity has dramatically increased.

Environmental challenges set by climate change, water scarcity, and soil degradation call for the application of chemistry, engineering and soil science, which is currently being overlooked.

The report comes out strongly in favour of continuing investment in agricultural biotechnology to benefit both the developed and developing markets. But a broad approach encompassing the whole food system is needed. A blend of approaches will be required, including agronomy and agro-ecology. Both have received less investment recently. Research in the social sciences is also advocated to help the implementation of existing and new knowledge by food producers.

Not all research will be aimed at yield enhancement. On-going research is required to maintain productivity at current levels because weeds, pests, diseases and pathogens continually evolve. Globalisation increases the risk of these agents spreading, so recent scientific advances in entomology, disease resistance, immunology and vaccine development offer great potential to develop new ways to protect food production.

Public/private partnerships

The need for partnerships, involving governments, NGOs and private sector companies is a core conclusion of the report. They are seen as the only way forward to bring new technologies to the developing countries. In this way low-income countries can gain access to new technologies such as GM to enhance traits, such as drought and heat tolerance, and pest resistance. A number of examples of such partnerships are quoted including that between Syngenta and the International Maize and Wheat Improvement Centre (CIMMYT).

Message for policy makers

The study warns about the consequences of inaction: “Food production and the food system must assume a much higher priority in political agendas across the world. To address the unprecedented challenges that lie ahead the food system needs to change more radically in the coming decades than ever before, including during the Industrial and Green Revolutions”.

Finally, and on an optimistic note, there is growing recognition that global poverty cannot be tolerated, that the population increase will not go on forever, and that through the application of the multi discipline sciences the challenges can be met. But the citizen will have to play his or her part.

MANAGING HERBICIDE RESISTANCE IN COTTON

Representatives of the major chemical companies developing new cotton varieties told growers and others at the recent Beltwide Cotton Conference *(**www.cotton.org/beltwide**) held in Atlanta, US on 4-7 January that there is no pipeline full of new herbicides to deal with weeds resistant to glyphosate or any other herbicide. Instead they are developing new varieties that are tolerant to three older herbicides.*

Cotton varieties resistant to the herbicides 2,4-D, dicamba and HPPD-inhibitors are being developed. Two of the herbicides 2,4-D and dicamba, have bad environmental profiles with histories of volatility, unwanted drift and odour issues. However, the companies are working to re-formulate those products to work with the new varieties.

Representatives of Bayer CropScience, Dow AgroSciences/Phytogen and Monsanto admitted that rapidly growing glyphosate-resistant weeds like pigweed, marestail and others are problematic. However, none are abandoning glyphosate tolerance in new varieties. “There are 300 weeds glyphosate still controls. It is now the cornerstone of weed control in all crops,” said Monsanto’s Ty Vaughn. However, Monsanto’s *Roundup* is no longer the silver bullet it once was. No single mode of action will do the job.“We need to be thinking in different ways to control weeds,” Mr Vaughn added.

Bayer CropScience will be offering new *FiberMax GlyTol* cottons for the first time this season. Walt Mullin, a company representative, said that this new proprietary Bayer trait technology is an “alternative” to using glyphosate “without the obligation of buying a specific brand of glyphosate.” Bayer is targeting the West Texas market with commercial quantities of *FiberMax 9101GT* and *FiberMax 9103 GT.* There also will be limited supplies of *GlyTol FM 2011GT* for the Southwest. Bayer is going even farther by combining its new generic glyphosate resistance trait with its *Liberty Link* (glufosinate tolerant) trait in *FiberMax* and *Stoneville* cotton varieties. “Small quantities” of this double stack herbicide resistance package will be available this season in *FiberMax FM 9250GL*, the first cotton variety available with full tolerance to both glyphosate and glufosinate *(Ignite*) herbicides.

Mr Mullin said Bayer CropScience will also offer varieties in the future with the two herbicide traits, *GlyTol* and *Liberty Link* plus *Bollgard II.* Bayer is also developing HPPD-inhibitor resistance traits in cotton. This will allow growers to control pigweed in its later growth states (25 to 30cm tall). This, however, is several years down the road. Bayer also has breeding programmes underway that are developing varieties that are nematode resistant and insect resistant as well as having improved fibre and yield enhancement traits.

Many of Dow AgroSciences *Phytogen* cotton varieties already have *Roundup Flex* traits. The company has said that it will manage the growing glyphosate resistance problem with a 2,4-D gene trait in new *Phytogen* cottons. It will be stacked with the *Roundup Flex* gene as well as a glufosinate tolerant gene, giving some *Phytoge*n cotton resistance to three different post emergence cotton herbicides. Dow AgroSciences has applied for a federal registration for the new 2,4-D formulation to reduce volatility, odour and drift potential. It will be commercialised for corn in 2013, soybeans in 2015, and cotton in 2015 or 2016.

Dow AgroSciences is also developing new *Phytogen* varieties with *WideStrike III* technology and Syngenta’s Vip3A protein for insect control.

Monsanto is relying on dicamba and glufosinate for its strategy to control glyphosate-resistant weeds. according to Mr Vaughn. It will be four or five years before the three-way mix will be deregulated. Dicamba has a bad reputation for drift, so Monsanto is working with BASF to develop a new formulation to reduce offsite movement of the post emergence herbicide.

Monsanto is also accelerating its nematode resistance breeding programme in the wake of the loss of *Temik*. “We have been working for several years on reniform and root-knot nematode resistance and are getting closer to a solution,” said Mr Vaughn.

THE YIELD CHALLENGE

*Bill Clark, director at the Broom's Barn Research Centre (**www.rothamsted.ac.uk/broom/sbrindex.php**) told delegates at the recent* Oxford Farming Conference *(**www.ofc.org.uk**) held in Oxford, UK that increased yields will be necessary if agriculture is to meet the world demand for both food and energy. He said the World Bank estimates that cereal production will need to increase by 50% by 2030 to meet food demands. This, he said, was a massive challenge for scientists. The same estimate has been used by Professor John Beddington, the UK government's chief scientific adviser who qualified his estimate by adding limitations on the use of inputs. "We need 50% more production on less land, with less water, using less energy, less fertiliser and fewer pesticides by 2030."*

In his presentation Mr Clark posed the question: How can science help? He said there were two ways in which scientists could increase crop yields. Firstly by increasing the attainable yield of crops by reducing losses due to pests, diseases and abiotic stresses. Secondly by increasing the potential yield of the crop. Reducing losses due to pests, diseases and weeds is what the industry has been very successful at over the last 30 years. The crop protection industry has consistently delivered more and more effective products, tackling the problem of resistance development, discovering new areas of chemistry all within increasingly stringent legislation to improve safety and protect the environment. We have also learned how to optimise those inputs and have developed decision support systems to help growers and advisers to implement what is often termed 'integrated pest management', However, the industry is now beginning to struggle to deliver ever more active products and we cannot expect them to continue to deliver as they have in the past.

The yield potential of wheat

In the UK we have had dramatic yield increases in crops in the last few decades. Bill Clark pointed out that over the last 60 years we have doubled average yields of wheat twice, from just over 2 t/ha in the 1940s to 4 t/ha in the 1960s and now at just over 8 t/ha. These increases came about from investment in production orientated research that delivered high yielding varieties which responded to increased inputs of fertiliser and pesticides. The best UK wheat growers now routinely achieve yields of 10-12 t/ha. The limitation on these growers is now water availability and the amount of solar radiation that is available to the crop. The varieties currently grown have a higher potential yield that is not attainable in the UK. Take these varieties to New Zealand, give them sufficient nitrogen and water and they will deliver yields almost double our national average. The current theoretical yield potential of wheat is estimated to be close to 20 t/ha. This target of achieving wheat yields of 20t/ha is one of the strategic goals of the UK's Rothamsted Research.

Further increases in yield potential depend on an increase in canopy photosynthesis per unit of intercepted light or a decrease in the metabolic costs of synthesis and maintenance of carbohydrates, proteins, and lipids. To date there is little evidence that plant physiologists or breeders have been successful at increasing the assimilatory or metabolic efficiencies of the major cereal crops. Therefore, the most likely scenario for yield potential of the major cereal crops is one of small, incremental increases during the next three decades, and these modest improvements will require considerable research investment. Even with investment in applied science this incremental increase in yields will not allow us to reach the challenging targets imposed upon us by increasing global population. The global demand for wheat is predicted to increase at a faster rate than the annual genetic gains that are currently being achieved. As a result it is generally agreed that improvement in genetic yield potential will need to be accelerated in order to avoid the otherwise inevitable destruction of sensitive ecosystems. Those production targets demand radical change to our crops and cropping systems.

Many farmers and advisers are now well-qualified technically but there must be scope for increasing their technical knowledge still further. There are also opportunities to achieve increases in the attainable yield by further research into optimising inputs such as water, nutrients and pesticides, and delaying senescence by reducing disease effects and maintaining canopy growth. Clearly the genetic potential for 12 t/ha yields exists in our current varieties as the current world record wheat yield of 15.6 t/ha was achieved in New Zealand using the variety Einstein almost 10 years ago. The world record crop was, however, grown on deep silt soils with high radiation levels and no water deficit. It is not possible to reproduce those conditions in the UK.

To begin to tackle the targets imposed by global population growth we must be more radical than just tinkering with inputs. To meet a production target of 50% yield increase by 2030 we need to alter the fundamental biology of the crop. There are already some good indications that we can increase yields significantly by increasing the radiation use efficiency of the crop. There is increasing belief that wheat may be 'sink-limited', ie the crop may be able to produce more biomass but there is insufficient storage capacity for the carbohydrate. More grain sites per ear would help increase that storage capacity. C_4 plants such as maize have a competitive advantage over plants possessing the more common C_3 carbon fixation pathway under conditions of drought, high temperatures, and nitrogen or CO_2 limitation. Increasing photosynthetic capacity, either by modifying wheat to C_4 metabolism or selecting for C_4 traits, must be a major target for breeders. Under the same growth conditions, C_4 grasses lose less than one third of the amount of water per CO_2 molecule that is fixed, compared with C_3 grasses. This increased water use efficiency of C_4 grasses allows them to grow for longer in arid environments. Introducing this trait into wheat could increase yields dramatically.

Even in the UK, 30% of wheat is grown on drought-prone land, equating to potential losses of up to £60 million/year. This situation is only likely to become worse with climate change. A simpler but more radical approach may be to select for existing C_4 plants such as maize which are adapted to UK climatic conditions. Broadening the genetic base of wheat is also often quoted as a necessary route to achieve these targets. Whichever it is will require a multi disciplinary approach and close co-operation between fundamental and strategic research on the one hand and applied plant breeding on the other.

There is a view that the major world crops have reached a genetic 'glass ceiling', meaning that no matter how much more conventional crossing is done there is simply not enough genetic diversity available to significantly improve their agricultural value. This view is not held universally but it seems clear that conventional breeding techniques are not currently delivering the yield increases demanded by population growth.

GM technology

GM technology, however, can have dramatic effects on the attainable yield of crops and can have environmental benefits in terms of reduced pesticide and nutrient use. Second generation GM crops under development aim to improve yield by improving salt-, cold- or drought-tolerance. The same technology may also begin to increase water-, nutrient- and radiation-use efficiencies. Only second generation GM crops will have a significant impact on the potential yield of crops. Important targets for GM approaches include modification of photosynthetic efficiency, abiotic stress tolerance, biotic stresses and plant breeding for disease resistance. Abiotic stresses are those derived from non-living factors such as drought, salinity, heat. Increasing water uptake from soils can be a useful strategy, which is why phenotyping of root characteristics is receiving so much research attention. This would almost certainly increase yields dramatically. Worldwide, drought stress is probably the number one restriction to growth of crops. Biotic stresses are the pests, diseases and weeds that steal so much crop yield worldwide. For that reason there has been intensive research into genetic and crop management strategies to mitigate these losses. In many respects this research into plant defence has been highly effective and there are many examples of current and emerging crop protection strategies. However, complete success is impossible because weeds, pests and pathogens continue to evolve to overcome plant defence systems and agrochemical interventions. RNA interference (RNAi) is a vital part of a plants normal immune response to viruses and other foreign genetic material. This can be induced in plant material, making the plants immune to certain diseases, much like vaccination in animals. In this process no new genes are introduced, not even from same species. However, this can currently only be done with GM technologies.

The wider deployment of GM approaches will be needed for the introduction of novel genes from diverse sources. The constraints on regulatory and consumer acceptance of GM are still considerable in many parts of the world particularly Europe. Consumer acceptance may be greater and regulatory approvals simpler in future where plants are transformed with cisgenic vectors in which only host gene sequences are used.

For inbreeding species such as rice and wheat, hybrid vigour can theoretically offer very large yield increases, up to 50%. However, there are many challenges and constraints to this technology and as such

it is not yet fully developed in a wide range of crops. The next step in developing hybrid vigour would be apomixis, where plants produce seed without the need for fertilisation. This allows hybrid vigour to be 'fixed' so that crops do not need to be bred from different parental lines.

Pesticide compounds are the mainstay of global crop protection and they are likely to remain so for the foreseeable future. New chemistry resembles chemicals present in plants that activate natural resistance mechanisms and, because they do not target pests and pathogens directly, they could have environmental advantages and be perceived by the general public as 'safer'. Chemical modification of plant metabolic processes is now commonplace. 'Fungicides' no longer just control fungal diseases, they can also control viral and bacterial diseases via host defence triggers. They can increase nitrate uptake, increase root activity and water use efficiency, and delay senescence. These are not fungicidal products *per se* but fall into that category of EU pesticide legislation.

New language

It is time to develop a new language that the general public is comfortable with such as 'vaccination' or 'immunisation' rather than 'genetic modification' or 'gene silencing'. 'Biotech crops' may be more acceptable than 'genetically modified'. Scientists need to be much more careful about promoting their science and they need media training so that they can manage the way their science is promoted. Currently they use inappropriate language, concentrate too much on the science without thinking about the benefits and end up falling into the trap of scaring the general public.

Mr Clark said that research is essential to ensure that yields are at least doubled in the next 50 years. The dilemma is that we have to feed a rapidly increasing world population and there are only two choices: increase yields or plough up more land with high biodiversity – accepting an almost certain acceleration of climate change with the latter.

Achieving these scientific advances is possible, but present levels of investment in these specific research areas are currently not adequate to meet the challenge. Public investment in scientific research is key but we are rapidly losing skills in the industry through an historic lack of investment. This includes key research skills but also the skills of knowledge transfer which many researchers lack. The ability to translate research findings into key messages for industry is a skill that is important if research is to have real social and economic impact.

Much of the technology to produce much higher yields is scientifically possible but is not being applied as much of it relies on genetic modification. The confusion around the use of the term 'GM' is unfortunately a hindrance to progress. For example, should a food from soya be labelled 'GM' if it has been genetically engineered to have a gene from another soya plant or only when it has a gene from another plant species? Equally, what if the 'GM' product (eg vegetable oil) is identical to the non-GM version and there is no 'foreign' DNA present? This is the argument for concentrating on the product and not the process by which it is produced. All technology should be adopted provided that it is safe and sustainable. The concept of 'sustainable intensification' of agricultural production should be accepted and promoted.

*(A full transcript of Mr Clark's presentation can be found at (**www.ofc.org.uk/images/stories/File/Clark%20 Bill.pdf**).*

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