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LEAD ARTICLES

CHEMCHINA NEGOTIATES TO BUY MAKHTESHIM

China National Chemical (ChemChina), a Chinese state owned company, is negotiating to buy Makhteshim Agan Industries in a transaction that would value the company at $2.7 billion. The deal is to convert Makhteshim into a private company controlled by ChemChina and jointly owned by ChemChina and Koor. Koor Industries, an investment company controlled by Nochi Dankner's IDB group which currently controls 47% of Makhteshim, says it has reached “preliminary principle understandings” on the transaction. Terms call for ChemChina to buy the 53% of Makhteshim shares now publicly traded and another 17% owned by Koor, giving the Chinese company a 70% interest in Makhteshim. Koor would retain a 30% interest. Makhteshim Agan has been one of Dankner's worst failures since he bought control of IDB Holdings in May 2003. Since gaining control of the company, he has seen its EBITDA go down 38%, to $232 million, equivalent to 10.3% of turnover, despite turnover growing by 30% over the same period.

If the deal is successful it would give ChemChina access to markets in Europe and Latin America where Makhteshim is strong. The transaction would also benefit Makhteshim by providing access to ChemChina’s financial resources and a low cost source of fungicides, insecticides and herbicides. ChemChina’s agrochemicals activities are centered in its subsidiary Blue Star, of which it owns 80%. The Blackstone Group, which manages assets of about $100 billion, holds the remaining 20%, which it purchased in September 2007 for $600 million. Blackstone was at one time involved in negotiations to purchase Makhteshim Agan itself. If the transaction goes ahead, ChemChina would displace DuPont as the world’s sixth largest producer of agricultural chemicals with Makhteshim Agan’s sales of $2 billion being added to ChemChina’s sales of around $500 million.

Makhteshim last month called off the acquisition of US generic crop protection firm Albaugh in a $1.3 billion deal because of discrepancies it found in Albaugh’s records. That deal would have increased the Israeli company’s access to US and South American markets and lowered production costs. In 2007, ChemChina failed in an attempt to buy Nufarm for $2.8 billion.

The major hurdle to this new deal had appeared to be getting the unions in Israel to agree to it but this seems to have been overcome. Management and workers at Makhteshim have now signed an agreement to streamline the company after prolonged negotiations and demonstrations including the threat of a strike. The cornerstone of the agreement is Makhteshim's promise to keep production in Israel, rather than exporting it in the event of a sale. Makhteshim's management has undertaken to keep the company's main production facilities operating until at least June 2017. The agreement also includes the voluntary retirement of Makhteshim employees over the age of 57. This means 100 employees at the Agan Chemical Works factory in Ashdod, and another 100 employees at Makhteshim’s Ramat Hovav factory. Some 70 employees will retire in 2011 and the other 130 in 2012. The retiring employees will receive salaries until the age of 67, as well as a one-time severance bonus.

SYNGENTA SALES INCREASE IN THE THIRD QUARTER

Syngenta has reported that its sales in the third quarter of 2010 increased by 11% at constant exchange rates. In the first nine months of the year, sales were up 1% at constant exchange rates to $8.9 billion. In Crop Protection, third quarter sales volume increased by 18% with strong growth across all product lines and all regions. Prices were 7% lower and 5% lower excluding glyphosate, an improved performance compared with the second quarter. In Europe, there was growth in most major markets driven by herbicides and by seed care products. NAFTA saw sustained volume growth across the portfolio, more than offsetting lower prices. The company says that Latin America continued to deliver an excellent performance, particularly in Argentina where sales were up by more than 40%. In Brazil, moisture levels improved towards the end of September resulting in a good start to planting. Growth in Asia-Pacific accelerated, driven by the emerging markets.

Mike Mack, CEO, said: “The third quarter performance confirms our expectation of continuing positive volume momentum in the second half of 2010. This, coupled with careful control of costs and increasing profitability in seeds, should allow us to achieve a full year operating income around last year’s level. Looking ahead to 2011, we are in a strong position to capture value from improving conditions in the crop protection market and from the significant advances in our seeds technology.”

MONSANTO SALES DOWN DESPITE LATE RECOVERY

Monsanto also reported increased sales for the fourth quarter of fiscal year 2010, a 4% increase over the same period in fiscal year 2009 to $1.95 billion. The seeds and genomics segment represented more than 70% of the company's net sales for the year, which helped to offset the lower sales for the agricultural productivity segment. However, overall sales for the year dropped 10% to $10.5 billion. Gross profit increased 1% for the quarter as compared to the prior year period, reaching $861 million for the quarter and $5.1 billion for the year. Monsanto reported a net loss of $143 million in the fourth quarter of fiscal year 2010 compared with a net loss of $233 million in the same period last year. Net income for fiscal year 2010 was $1.1 billion, a decline from last year's net income of $2.1 billion.

Sales for Monsanto’s seeds and genomics segment were $970 million for the fourth quarter of fiscal year 2010, an increase of 7% over the same period last year. This was driven by an increase in trait revenues for the company's core crops, trait penetration in Latin America and the increase in cotton acres in the US. With the seeds and genomics segment driving the company's growth, Monsanto realised record segment sales of $7.6 billion for the fiscal year 2010, representing a 4% increase over the previous fiscal year. The year also saw some significant product launches for the company, as farmers chose to conduct on farm trials of *Genuity SmartStax* corn and *Genuity Roundup Ready 2 Yield* soybeans.

Sales for Monsanto’s agricultural productivity segment were $983 million in the quarter, a slight increase over the prior year driven by the aggressive pricing actions Monsanto implemented for *Roundup* and other glyphosate-based herbicides. The decreased price was offset by increased volumes in most markets. Sales for the segment were $2.9 billion for fiscal year 2010, a 35% decrease over the previous year due to the supply and demand imbalance in the global glyphosate industry.

The seeds and genomics segment, which will account for the bulk of Monsanto's business in fiscal year 2011 and beyond, is expected to deliver both single digit unit volume growth and a product mix improvement primarily driven by the US corn product strategy. In Latin America, the company sees an opportunity in both Brazil as more traits become available, and Argentina, where there has been an increase in acreage as more growers move to double stacks. The company also expects steady growth in cotton and vegetables at a global level. In cotton, Monsanto will continue to upgrade its germplasm mix improvement and promote penetration of second generation stacked traits in the US and move to second-generation traits in India.

The stabilised agricultural productivity segment is expected to deliver gross profit in the range of $550 million to $600 million in fiscal year 2011 as the company expects to sell between 250 million and 300 million gallons of glyphosate at an average gross profit contribution of $1 per gallon (4.55 litres). With savings realised as part of Monsanto's restructuring actions, the company expects 2011 selling, general and administrative expenses to be flat or to show an inflationary increase over the 2010 base of $2.06 billion. In 2011, the company is projecting a research and development spend of $1.25 billion to $1.3 billion as it continues to manage more products in the later phases of development.

EUROPEAN NEWS AND MARKETS

AGROQUALITA ACQUIRES ITALIAN MONSANTO SEED PRODUCTION SITE

Agroqualità, a Sipcam-Oxon Group company, has acquired Monsanto's seed production site located in Lodi, in the southern agricultural area of Milan. The plant is equipped to process and store 800,000 bags of seed each year and will allow Agroqualità to expand its activity in the seed business. It should also have a strong synergy with the company's crop nutrition business which is built on the *Umostart* brand of microgranular starter fertilisers. The agreement with Monsanto also includes a long term exclusive licence for soybean varieties under the *Asgrow* brand and supports Sipcam-Oxon's strategy to acquire a strong position in the downstream oilseed business in Italy.

FRENCH CRO EXPANDS NETWORK IN EUROPE

The French contract research organisation (CRO) Staphyt (**www.staphyt.com**) is continuing to expand its network of field station facilities in Belgium, Hungary, Romania, Slovakia, Spain and France. It has now signed a strategic alliance with Agrofil in Hungary and Romania. Agrofil is a leading CRO in Hungary and conducts many seed and variety trials using high tech seed trials controlled by Global Positioning Systems (GPS). The company has two sites, one in Kisbodak-Puski in the north west and another in Mindszent in the south east. Agrofil customers will now benefit from Staphyt's data management system. Agrofil is also carrying out trials in the Arad region in northern Romania. In Slovakia Staphyt has, since spring 2010, been conducting seed and variety trials from its Good Experimemtal Practice (GEP) field station near Brno in the Czech Republic.

The company has also set up strategic alliances in Spain with two important CROs, Agrosoler and Trialcamp. Agrosoler will conduct GEP trials while Trialcamp will carry out Good Laboratory Practice (GLP) studies including ecotoxicology studies under field and laboratory conditions. All the various regions of Spain will be covered and all crops. Trials will be representative of the southern zone of Europe according to the new pesticide regulation EC 1107/2009.

In Staphyt's home country, France, the company has formed an alliance with Heliantis Experimentation. The two companies remain independent but complementary in terms of geographical spread. Staphyt will benefit from better coverage in the Rhône Valley and Burgundy region. Heliantis has built a strong reputation for its trials with both crop protection and seed trials. It will now have access to Staphyt's international markets and its IT tools. Staphyt has also received government recognition for its GEP trials conducted from the Belgium field station located near Gembloux. Trials are conducted there on cereals, sugar beet, potatoes, vegetables and orchards. Of particular importance are its large irrigated and inoculated potato blight trials.

ARYSTA EXPANDS DISTRIBUTION AGREEMENT FOR PGR

Arysta LifeScience Corporation has signed an agreement with Japan-based Asahi Chemicals to distribute and market nitrophenol-based plant growth regulator (PGR) *Atonik* in Central Europe, Western Europe, Russia, Ukraine, Africa and the Middle East. The product is a unique, residue-free plant stimulant based on synthetic nitrophenols that naturally occur in all plants. Crops treated with *Atonik* show better growth and generative development, biomass accumulation, and higher efficiency of photosynthetic apparatus, water status and membrane integrity. *Atonik* reduces the negative impact of stress providing a better tolerance to unfavorable crop growth conditions. In the field, the product increases yield and the quality of arable crops, fruits, greenhouse and field vegetables. *Atonik* is widely commercialised in Europe on various annual and perennial crops including oilseed rape, potato, sugar beet, sunflower, cereals, maize, fruit trees, berries, cucurbits and solanaceous vegetables.

Since 1991 Nichimen Corporation, a legacy company of Arysta LifeScience had developed successful sales of *Atonik* in Poland, Slovakia, Czech Republic, Hungary, Bulgaria and Spain. In 2009 Arysta and Asahi Chemicals submitted three nitrophenol compounds for EU Annex I inclusion and are now working together on post inclusion maintenance in these countries. Arysta says it is looking forward to expanding upon the 10 year partnership with Asahi Chemicals and bringing to growers in Western Europe, Russia,

Ukraine, Africa and the Middle East a unique plant protection solution that improves crop tolerance and yield quality.

EU DOSSIERS FOR NEW FUNGICIDES APPROVED AS COMPLETE

Dossiers for the approval of two new fungicide active ingredients, fluxapyroxad and penflufen, have been voted through as complete by the EU Standing Committee for the Food Chain and Animal Health. The vote is an early stage in the EU registration process. Both the fungicides are for use on a wide range of crops. BASF has evaluated fluxapyroxad, *Xemium*, on 20 crops against over 60 pathogens. The company expects to introduce products based on fluxapyroxad including mixtures with epoxiconazole in Europe and the Americas in 2012. Bayer has also applied for US approval for penflufen, as *Emesto/Emerion*, and expects a registration decision in 2012.

AMERICAN NEWS AND MARKETS

DOW SUBMITS SULFOXAFLOR DOSSIER

Dow AgroSciences has submitted the global joint-review dossier for sulfoxaflor insecticide. This submission, featuring the largest regulatory dossier in the company's history, keeps the molecule on track for an anticipated launch in 2012. The dossier was submitted to regulatory authorities in Australia, Canada and the US. The company has also announced the global brand names for the molecule as *Closer* and *Transform*. Field studies show that sulfoxaflor is broad spectrum, fast acting, and effective at low use rates. Testing to date has demonstrated that the product provides outstanding Lygus control in cotton, which is significant as this sap-feeding pest is a significant limiting factor in cotton yield. Rice is another potential market segment, and research is showing good activity on the brown planthopper which is a significant yield limiting pest in Asia. The two products will have key roles in the company's insecticide portfolio and will address a $2 billion market segment where Dow currently does not participate. The company says that this is also a market segment where biotechnology solutions are not imminent. The molecule has a favourable regulatory profile and will be an attractive alternative to insecticides currently on the market. "When approved, this new molecule will provide growers with an outstanding solution to control insects as it represent a new class of chemistry," said Don Kelley, global product manager insecticides for Dow AgroSciences. "Current research demonstrates a lack of cross-resistance with other insecticides."

BAYER RECEIVES NEW REGISTRATION FOR SPIROTETRAMAT

Bayer CropScience has received a new registration from the US Environmental Protection Agency (EPA) for its spirotetramat-containing insecticides *Movento* and *Ultor.* Production and shipment of the insecticides had been halted earlier this year due to an administrative error committed by the EPA during its initial review and approval of spirotetramat in 2008. While conducting its second review, EPA allowed the distribution channel to sell and distribute existing stocks of the products in their possession, and growers could still legally use the products according to the previously approved labeling. With the recent EPA registration action, growers may purchase and use new product according to the new label instructions.

Bayer CropScience has also established import tolerances (Maximum Residue Levels or MRLs) for the two insecticides on certain commodities intended for export to Japan. An announcement by Japan's Ministry of Health Labour and Welfare establishes MRLs for spirotetramat, the active ingredient in the two products. The regulatory approval and establishment of MRLs followed a comprehensive safety review by Japanese regulatory officials. "We are pleased that Japan has established the MRLs for commodities treated with spirotetramat," said Kevin Adam, product manager for Bayer CropScience. "Japan was the last major export market to give their go-ahead. This is good news for growers of grapes, citrus and other label-approved crops who want to incorporate *Movento* and *Ultor* treatments into their integrated pest management programmes on their crops bound for Japan." The insecticides had already gained regulatory approval from the US, EU, Codex, Canada and Mexico with the establishment of MRLs by regional and national authorities there.

BASF RECEIVES APPROVAL FOR HERBICIDE ON SOYBEANS

BASF has received approval for its herbicide active ingredient *Kixor* (saflufenacil) to be used on soybeans. To highlight the newly expanded label, BASF has changed the product name to *Verdict* from *Integrity. Verdict* is a corn preemergence herbicide with the flexibility of use on soybeans. "With the label expansion, it becomes the only enhanced corn preemergence herbicide that is also labeled for use on soybeans. It is a simple solution for preemergence burndown and residual control of 46 of the toughest weeds in corn, grain sorghum and soybeans, providing a foundation for maximum yield potential," said Bryan Perry, product manager at BASF. The current *Kixor* family of products can be used on a wide range of crops and controls more than 70 broadleaf weeds. BASF says that the herbicide, based on unique chemistry, tackles tough broadleaf weeds and offers growers an additional mode of action to manage resistance to glyphosate, ALS inhibitors and triazines.

ARYSTA RECEIVES US APPROVAL FOR EVITO

Arysta LifeScience North America has received approval from the US EPA for its strobilurin fungicide *Evito* (fluoxastrobin) fungicide for use on wheat and sweet corn. Prior to these label extensions the label included corn, soybeans, fruiting vegetables, celery, peanuts and potatoes. The formulation of *Evito* allows growers to use less active ingredient on their crops. The fungicide's innovative *Xylem-Pro Technology* allows the fungicide to get into the plant within 15 minutes of treatment for rapid and reliable protection. *Evito's* performance in field trials has shown significant increase in yields.

DOW IS GRANTED US PATENT FOR ITS NEW HERBICIDE TRAIT

Dow AgroSciences has announced the allowance of its US patent application for crop plants that contain one of the company's new class of herbicide tolerant traits. The trait, which has shown exceptional promise for use in corn and other monocot crops, conveys robust tolerance to broadleaf and grass herbicides, including 2,4-D and the FOP family of herbicides. Dow AgroSciences was previously granted patents for crops containing this herbicide tolerant trait in New Zealand and South Africa. In addition, Dow AgroSciences has filed for broad patent protection in major crop growing countries around the world. Its patent filings are expected to provide proprietary protection for plants containing the trait, methods for controlling glyphosate resistant weeds, and uses of the trait in combination with 2,4-D, the FOP family of herbicides, and other broad spectrum and selective herbicides. "The continual expansion of our IP portfolio will help ensure that Dow AgroSciences has a leading position in herbicide tolerance in key crops," said Tony Klemm, Dow AgroSciences global business leader. Pending regulatory approval in key countries Dow AgroSciences expects to introduce this technology system in corn as early as 2012 with other Dow AgroSciences herbicide tolerant traits in soybeans and cotton to follow.

BASF AND MONSANTO PROGRESS DICAMBA WEED CONTROL SYSTEM

BASF and Monsanto have made significant progress toward launching next generation dicamba-based weed control systems for soybeans and cotton. The two companies say they have made major advancements in the development of dicamba formulations which could be available globally for farmers this decade. The companies recently completed joint field testing of the new formulations on dicamba-tolerant soybeans currently in development. The research, conducted at Monsanto's Monmouth, Illinois research facility, has demonstrated excellent weed control and crop safety.

"The recent announcement is an indication that together with BASF, we are making significant progress in bringing this new technology to farmers," said Kerry Preete, Monsanto vice president of crop protection. "The strength of the formulation expertise BASF has with dicamba and our team's biotech focus seeks to deliver another breakthrough product in weed control." Upon commercialisation, the dicamba tolerance trait is expected to be stacked with the high yielding *Genuity Roundup Ready 2 Yield* soybean trait. These next generation technologies are aimed at offering farmers multiple modes of action and superior application timing flexibility. The two companies entered into a joint licensing agreement to develop innovative formulations for dicamba for use with herbicide-resistant cropping systems in January 2009. They have also established R&D collaboration to develop other new trait technologies for farmers.

MONSANTO SECURES NEW GM APPROVALS IN LATIN AMERICA

Monsanto has secured two new GM approvals in Latin America, *Genuity VT Triple PRO* corn in Argentina and *Bt Roundup Ready 2 Yield* (BtRR2Y) soybeans in Brazil. In Argentina, the company has received full regulatory approval for *Genuity VT Triple PRO* corn, which represents the first *Genuity* trait launched from Monsanto's pipeline in South America. It provides a broader spectrum of insect control for below and above ground insects, resulting in higher yield potential and better crop stability. The next and last step prior to commercialisation is hybrid registration, which the company expects to complete this month. In Brazil, Monsanto has received full regulatory approval for insect-protected and glyphosate-tolerant BtRR2Y soybeans from the National Technical Biosafety Committee (CTNBio). The BtRR2Y soybean represents the first trait the company has developed specifically for a market outside the US and the only soybean to combine *Bt* insect-protection technology with herbicide tolerance, which together provide a higher yield opportunity. BtRR2Y soybeans will be introduced in Brazil after import approvals in important markets are secured.

BAYER INVESTS IN NEW SEED FACILITY

Bayer CropScience's Nunhems subsidiary has opened a new vegetable seed processing facility at its site in Parma, Idaho. US. The company has invested around $30 million in the new facility and in modernising its existing capacities for seed processing and storage. The site has been extended to a total area of 60 acres (24 ha) and has thus almost doubled in size. Bayer CropScience expects the demand from its customers in the US and the rest of the world for high quality vegetable seed to continue to increase and plans to further expand its seed business by investing in both research and development and infrastructure.

Parma is the site of the US headquarters of Bayer CropScience's Nunhems subsidiary which, with annual sales of €240 million in 2009, is among the world's top commercial vegetable seed producers. It is there that most of the company's onion and carrot seeds are processed, packaged and stored. Nunhems employs approximately 300 staff in the US.

OTHER NEWS AND MARKETS

MONSANTO INTRODUCES NEW WEED MANAGEMENT PLATFORM

Monsanto Company has introduced its new weed management platform to deal with weeds in the absence or presence of glyphosate-resistance. The *Roundup Ready Plus* platform allows farmers to increase the benefits of their *Roundup Ready* crops by using best practice recommendations and receiving financial incentives for following the programme. The platform is designed to provide effective and sustainable weed control benefits for farmers. The company says that it has talked with farmers, weed scientists and others in the industry to develop a set of best management recommendations to control glyphosate-resistant weeds where they exist and to reduce the risk of developing these weeds on other fields where farmers are growing *Roundup Ready* crops.

The *Roundup Ready Plus* platform provides recommendations for *Roundup Ready* crops for each farm situation, by pairing herbicides from Monsanto with those from other companies. The *Roundup Ready Plus* recommendations place emphasis on residual control of tough weeds including resistant pigweed and tall waterhemp. Cotton farmers in the south east and mid south who follow the *Roundup Ready Plus* recommendation are eligible for a rebate of $20 per acre as part of the Cotton Performance Plus Programme. Soybean farmers using the *Roundup Ready Plus* recommendation for soybeans are eligible for Residual Rewards, a programme that provides a rebate of up to $3 per acre if they include qualifying residual herbicides in their weed management plans.

Monsanto and FMC have drawn up an agreement that broadens the *Roundup Ready Plus* platform to include selected FMC products. FMC herbicides covered under the agreement include a range of soybean preemergence residual herbicides including *Authority First* DF, *Authority MTZ* DF, *Authority XL*, and *Authority Assist*. Under the agreement, Monsanto will license its *Roundup Ready Plus* weed management trademarks for use with these specific FMC herbicides. Dr Bob Trogele, FMC North America Area crop director, said: “We believe this platform sets a new industry standard, encouraging growers to take a proactive approach in residual weed management control with the *Authority* brands which provide excellent control of tough weeds like marestail, waterhemp, common ragweed, giant ragweed and many others resulting in grower productivity gains.”

Monsanto has also announced an agreement with Makhteshim Agan Group that makes that company a key partner of selected off-patent molecules to support Monsanto's weed management platform. “Makhteshim Agan is a global leader in crop protection, and it is well positioned to serve as a reliable supplier of the off-patent molecules that will help farmers manage weed resistance,” said Mike Frank, Monsanto vice president crop protection. Under the agreement, Monsanto will license its *Roundup Ready Plus* trademark for use with select products from Makhteshim Agan. The products, combined with glyphosate, offer multiple modes of action to combat weeds that have developed resistance to glyphosate.

There is a third agreement with Sumitomo Chemical Co (SCC) and their wholly-owned subsidiary, Valent USA Corporation, that makes these companies strategic partners in the *Roundup Ready Plus* weed management platform. In addition, Monsanto and SCC have agreed to seek further collaboration on weed management opportunities with SCC's flumioxazin products in other countries such as Brazil and Argentina. Valent herbicides covered under the agreement include preemergence residual herbicides such as *Valor SX, Valor XLT, Gangster* and *Fierce*, a new product pending registration, along with the *Select* branded post emergence grass herbicides in the US. The agreement will make the Valent products key elements of the Cotton Performance Plus and Residual Rewards soybeans programme. Under the agreement, Monsanto will also license its *Roundup Ready Plus* weed management trademarks for use with the Valent herbicides.

DUPONT PROTECTS INTELLECTUAL PROPERTY RIGHTS IN CHINA

The Public Security Bureau in Nantong City, China, recently announced the successful raid of an underground plant which had produced $5 million worth of illegal chlorantraniliprole. Chlorantraniliprole is the innovative, patented active ingredient in DuPont's *Rynaxypyr*. This is believed to be the largest agricultural chemical counterfeit case in terms of value uncovered in China. "DuPont is grateful to the Nantong police for acting so quickly to stop the criminal activity," said Tom McHale, global IP protection manager, DuPont Crop Protection, at a press conference attended by national and local media. "Successful action to combat counterfeiting efforts requires good cooperation between governmental regulators, law enforcement agencies and legal manufacturers, and users on intelligence gathering, product testing and case reporting. "DuPont will cooperate fully with enforcement authorities to stop illegal activities with pesticides, and to protect the rights of our business partners, Chinese farmers and end consumers," said Mr McHale. Wang Hua, deputy director of the Nantong Public Security Bureau, said the case highlighted the Chinese government's commitment to protecting IP. He said the local prosecutor had filed a criminal charge against three owners of the plant, and the trial is expected to begin soon.

SYNGENTA OPENS NEW R&D FACILITY IN SINGAPORE

Syngenta Asia Pacific has officially opened its new research and development facility in Singapore which will house molecular marker and formulation development laboratories. The company says that the Kendall laboratory will support the development of new technology for agriculture around Asia Pacific that can help maintain food security in a sustainable way. "The Asia Pacific region is expected to have an additional billion mouths to feed by 2030 and with limited natural resources, new technology in agriculture is necessary to help farmers grow more with less," said Peter Pickering, the region head of Syngenta's seeds business in the Asia Pacific. "The new Kendall R&D laboratories will support our research network around the region and allow us to bring better technology to Asian farmers as they work to provide greater food security across the region."

Syngenta's Molecular Marker Laboratory will help plant breeders to develop better varieties of crops in less time. The laboratory will identify DNA markers in plants that are associated with desirable traits, which facilitates Marker Assisted Breeding (MAB) in plants. MAB compresses the product development cycle by as much as half when compared to traditional plant breeding techniques. The marker laboratory also has the ability to locate and unlock genetic networks behind complex traits which may lie undiscovered in the plant genome. This may include important traits that can help improve yield and environmental stress tolerance. The formulation development laboratory will translate active ingredients into products that can be easily used by farmers.

BASF TO COLLABORATE WITH PRECISION BIOSCIENCES

BASF Plant Science and Precision BioSciences (**www.precisionbiosciences.com**)have entered into a collaborative agreement to create site-specific genome modifications in plants. The agreement provides BASF Plant Science with non-exclusive access to aspects of Precision BioSciences' proprietary *Directed Nuclease Editor* (DNE) technology, which can be used to develop advanced agricultural products. The technology uses advanced protein engineering methods to produce rationally designed enzymes which have the ability to modify single, unique sites within a large genome. According to BASF scientists, using DNE technology can remove or insert multiple genes at a single site within a plant chromosome. The technology can therefore streamline the trait development and breeding processes, and potentially accelerate a trait's time to market.

Precision BioSciences has already produced hundreds of custom endonucleases for partners and internal development that can precisely alter naturally occurring sequences within genomes. The company has successfully partnered its DNE technology with several of the world's largest agbiotech firms and is internally developing applications in biological production and human therapeutics.

DOW AND VIAMET SET UP R&D AGREEMENT TO DEVELOP NEW AIS

Dow AgroSciences and Viamet Pharmaceuticals (**www.viamet.com**) have entered into a crop protection research, option and license agreement to evaluate the potential use of Metallophile Technology to develop novel agricultural chemicals with new modes of action. Under terms of the agreement, Viamet will utilise its proprietary Metallophile Technology, and Dow AgroSciences will employ its proprietary compound screening and product development capabilities to discover and develop product candidates against priority targets in the crop protection field. "We are excited about working with a partner who is a proven pioneer in novel technology," stated Dr Dan Kittle, research and development vice president for Dow AgroSciences. "Viamet has demonstrated success in developing markedly improved inhibitors of large and commercially validated classes of enzymes in the pharmaceutical arena. This collaboration with Viamet and its Metallophile Technology will accelerate the development of new agricultural chemistry and bring new, robust solutions to the agricultural market and farmers around the world."

ARYSTA RECEIVES NEW REGISTRATIONS FOR MIDAS

Arysta LifeScience has received registrations for iodomethane (methyl iodide) in Mexico and Morocco. The product is a broad spectrum soil fumigant that controls soil-borne diseases, nematodes, weed seeds and insects that threaten high value crops. Iodomethane was developed as a replacement for methyl bromide and will be sold commercially as *Midas* in both countries. Iodomethane is already registered for use in the US, Japan, Turkey, and New Zealand, with additional registrations pending in Australia, Guatemala, Costa Rica, Chile, Egypt, Israel, South Africa and other countries. "*Midas* approval in Mexico and Morocco supports the objectives of the Montreal Protocol treaty to reduce the use of ozone depleting substances around the globe," said Hildo Brilleman, global marketing manager fumigants for Arysta LifeScience. "The phase out of methyl bromide by 2015, as mandated by the Montreal Protocol, can be significantly expedited with *Midas* use."

Arysta LifeScience has worked closely with local and international stakeholders in implementing *Midas* trials in Mexico and Morocco. Mexico's Federal Health Protection Commission and Health Commission Authority granted technical registration for the product in August following an extensive review. Technical registration will pave the way for formulation registrations for *Midas* 33:67 and *Midas* 98:2 in 2011. A full commercial launch is planned for 2012. Morocco's Pesticide Registration Commission has registered *Midas* 98:2 for tomatoes and French beans. Arysta LifeScience will launch the fumigant to the Moroccan agricultural market during the International Exhibition of Fruit and Vegetable Industry's annual trade show in Agadir in December 2010. Amaroc SA will distribute and apply the product using Arysta's proprietary application equipment, *Symmetry*.

BECKER UNDERWOOD ACQUIRES SOUTH AFRICAN BUSINESS

Becker Underwood has acquired Biological Control Products (BCP) (**www.biocontrol.co.za**). BCP was founded in 1995 and is based near Durban, South Africa. Its core business is the development, registration, manufacture and sales of a range of biologically based products for agriculture. The company is a leader in Africa for the solid-state fermentation of fungal products. "The addition of BCP gives us manufacturing capability for a wide range of fungal products, a sales office for promotion of existing Becker Underwood products, and a new range of biorational products that we can now take to the rest of Africa and to our other global businesses," said Peter Innes, CEO of Becker Underwood. The acquisition extends Becker Underwood's geographical reach to 12 locations in nine countries over five continents.

"BCP is uniquely positioned to help Becker Underwood capitalise on a fast growing segment of agriculture that is seeking solutions for managing residues," said Fernando Lopez, in charge of global strategic marketing at Becker Underwood. "In addition, this acquisition helps us better meet the strong demand of growers to utilise biorational tools, alongside conventional chemicals in integrated spray programmes. "BCP operates principally in South Africa, but also derives a significant part of its business from export sales into the rest of the African continent. Its portfolio of products, including *Broadband* (bioinsecticide), *Green Muscle* (bioacricide for locust control), *Trichoplus* (biofungicide) and *PL Gold* (bionematicide) will continue to be available through its existing distribution channels.

CONFERENCES AND FEATURES

CLIMATE CHANGE AND AGRICULTURAL INNOVATION

Is Agricultural Innovation such as Biotechnology a Solution for Addressing Climate Change and Food Security *was the theme of a conference hosted jointly by the US Department of Agriculture (USDA) and the US Department of State on 28th September in London. The seminar covered North and South America and developing nations in Africa. Professor Sir Gordon Conway gave the keynote address to an invited audience of around 75 delegates. Other speakers came from the US and Brazil. Roger Turner reports for* Crop Protection Monthly.

Professor Sir Gordon Conway, Imperial College, London said that most Governments can respond to one or two major incidents that occur simultaneously. However, at the moment the world is under threat from terrorism, the financial crisis, climate change, energy supplies, and water shortages with consequent impact on food security and loss of habitats. All these factors raise urgent issues for agriculture and food supplies. There are many significant drivers for change including rising population numbers, rising food demands, fuel and fertiliser prices, an increasing per capita income which leads to a growing demand for livestock products and biofuels which in turn may compete with food crops for available land. There is also an increasing shortage of land and water together with a slowing down of agricultural productivity gains.

Despite rising food prices poor farmers in developing countries cannot respond because of a lack of inputs, poor infrastructure, inappropriate technologies and poor land tenure. This mix of issues varies from country to country and from place to place. If progress is to be made suitable interventions are necessary. It is vitally important that agricultural production moves from traditional to new platform technologies that embrace the best available systems from the range on offer. Thus to combat drought the farmer could grow different crops with better drought tolerance, use plastic film or mulches and make better use of available water. Simple manpowered pumps were available to allow local irrigation. Control of difficult weeds like *Striga* is now possible using herbicide tolerant crop varieties.

Professor Conway said that the new platform technologies offered great promise in resolving many problems. Sustainability could be built into seeds and animals by selective breeding, both conventional and GM. Improvements in the nutrient uptake and nutritive value of produce were possible as in Golden Rice. Marker Assisted Selection could also help to conquer pest and disease and drought tolerance. The rapid advance of GM cropping showed the clear benefits of this technology. In 2009 there were 25 countries growing GM varieties on 134 million hectares with over 14 million participating farmers. GM crops have developed globally since 1996 because of the on-farm benefits seen by the farmer since the technology was first commercialised. North and South America, Australia and South East Asia have become the main GM growing regions with Europe conspicuous by its absence apart from a small area of GM maize in Spain. GM crops can now even be found in Egypt and South Africa.

Nanotechnology is also much discussed and there are hopes it will give improved efficiency in fertiliser use with nanosensors improving soil quality and reducing contamination. Another fascinating example of new platform technologies is the use of mobile telephones in Uganda where farmers are able to get better prices for their crops from local markets and traders.

Anderson Galvao, director of Celeres, said that Brazil had showed significant benefits from their widespread adoption of GM crops. A survey carried out by Celeres Agribusiness Intelligence on 1.5 million hectares showed that there were substantial reductions in water use, diesel fuel usage, greenhouse gas (GHG) emissions and agrochemical use. Brazil was confident it could grow its agriculture with improved sustainability worth around $6 billion a year to the Brazilian economy.

David Green, of the US United Soybean Board, said that there is an expectation that record soybean yields will be achieved in 2010 from 32 million hectares. There had been a rapid uptake of GM soybean in the US and some 93% of the crop is now down to GM varieties. The technology has given greater flexibility in weed control, improved soil health and structure and reductions in soil erosion, GHG

emissions and water loss. Overall there is an increase in biodiversity with more birds and beneficial insects. Fewer agrochemicals are used and there are less mycotoxins currently found in GM maize. GM crops are also more profitable requiring less labour and management. In stark contrast organic soybeans now need a $333 premium to compete with non-organic methods. There are some issues arising from the use of GM systems particularly the need for herbicides other than glyphosate to prevent any weed resistance spreading on farms. There had also been a significant impact on the breeding and development of non-GM cultivars. There were also very significant impacts on trade with Europe.

The EU regulatory framework is seen as too slow and limiting for EU farmers and growers. There are over 100 new varietal traits being developed in the US and clearly the EU approach will not be able to cope with such numbers being submitted for approval. The meeting also discussed how European consumers might be persuaded to accept GM crops.

IMPLEMENTATION OF PESTICIDE REGULATION 1107/2009

The UK regulatory authority, the Chemicals Regulation Directorate (CRD,) held a one day conference on 19 October 2010 to provide the crop protection industry with an update on the progress that has been made with the implementation of the new pesticide regulation (EC) 1107/2009. Peter Chapman of JSC (**www.jsci.co.uk**) *reports for* Crop Protection Monthly*.*

CRD summarised the procedural changes required for the evaluation of new active substances once the new regulation is applied on 14 June 2011. Speakers stressed the need to submit a package of MRL and import tolerance proposals with the application dossier, to improve the efficiency of the system. Procedures are being developed to integrate the classification and labeling requirements with dossier submission and evaluation. Joint discussions have already been held between the European Commission, the European Food Safety Authoriity (EFSA) and the European Chemicals Agency (ECHA) on this issue to ensure a smooth integration. It is anticipated that the German regulatory authority will hold a workshop on the subject in early 2011. Once the rapporteur member state has submitted the draft assessment report for a new active substance to EFSA it will be possible for the applicant company to submit dossiers for zonal product authorisations.

Renewal

Active substance and product renewal were also discussed. The regulation that sets out the procedures for dealing with substances included on Annex I of Directive 91/414, for which inclusion expires in 2011/12, is expected to be voted in at the Standing Committee meeting in November. The background document setting out state of the art for each active substance was now to be called the 'Updating Statement' rather than the 'Summary Report'. There is a requirement for efficacy data to be submitted with the active substance dossier for renewal and it is anticipated that this would be in the form of a tabulated overview. For active substances for which Annex I inclusion expires after 2012, the Commission has not yet addressed the need for a transparent programme with a realistic timetable. It is clear that with shorter timelines required by Regulation 1107/2009 there will be considerable challenges to be addressed and a need for much more efficient procedures.

Endocrine disrupters

CRD has developed a set of five criteria which it has proposed as a basis for assessing whether adverse effects might be associated with endocrine disruption and which may have implications for the human health risk assessment. It was explained that there was a need for standardised decision trees to be developed that could be followed in order to determine the relevance of possible endocrine effects for human health and in relation to ecotoxicity. As far as human health is concerned there are already sufficient higher studies available on which to judge the potential for endocrine disruption, although additional mechanistic studies may be necessary in borderline cases. The situation for the assessment of potential endocrine disruptor effects in the environment was, however, much less clear.

Zonal authorisation

Although the Regulation sets out new rules and requirements for zonal authorisations it is clear that processes and procedures to actually implement the system will need to be developed and published. The limited experience of trying to operate the zonal system had thrown up a number of procedural issues. Areas requiring further work include increased harmonisation of risk assessment/risk mitigation measures, efficacy and fate in particular, further development of the risk envelope approach, clarification of the transitional arrangements and development of a standard format for authorisations. It is anticipated that detailed guidance in applying the risk envelope approach will be available by the end of 2010.

Currently efficacy evaluation is almost entirely conducted at member state level with different approaches being adopted as far as non-national data are concerned. Efficacy evaluations have therefore not been open for general scrutiny, having been written principally for a 'national' audience within each country. This situation will have to change. Efficacy evaluations have been largely driven at an international level by European and Mediterranean Plant Protection Organisation (EPPO) guidelines. A key issue to address is the relevance of the four EPPO climate comparability zones in relation to the three zones established under the new regulation. The guiding principles offered for the submission of efficacy data at a zonal

level were to include any relevant data with an appropriate case. It was recommended that the data submitted are not restricted to that generated within a single zone, but that the applicant should generate and submit sufficient data to confirm that the patterns of effectiveness hold for each of the regions and range of conditions likely to be encountered.

Low risk substances

There was an update on low risk substances and how these might relate to the CRD biopesticides scheme. It was clear from the regulation that it was up to applicants to propose a substance as low risk in accordance with the criteria that were set out in the regulation. Currently the UK Biopesticides Scheme includes four categories: semiochemicals/pheromones, micro-organisms, natural plant extracts and 'other' novel products. CRD is evaluating how the criteria relate to microbial pesticides to determine whether they can be considered low risk. As far as plant extracts were concerned these would be reviewed on a case by case basis to determine whether they fall into the low risk category. It was important to note that a low risk substance would not automatically be included in the UK Biopesticides Scheme.

Transitional arrangements

The handling of the transitional arrangements under the new regulation was explained. The UK is planning to introduce a national regulation (Statutory Instrument) to ensure that all extant registrations under existing national legislation would be deemed to be authorised under Regulation 1107/2009 and subject to the requirements of the regulation from 14 June 2011. In the majority of cases applications ongoing on 14 June 2011 would continue to be regulated under Directive 91/414 and relevant national regulations. New applications made on or after 14 June 2011are to be regulated under the Regulation 1107/2009.

CROPWORLD 2010

*The BCPC Congress and Exhibition, held previously in Glasgow, this year evolved into CropWorld 2010 (**www.crop-world.com**)and opened at the ExCel Centre in London on 1 November.*

According to the organisers UBM this three day event had broadened its scope to cover global crop production issues from 'seed to market'. Claire Tulloch, the event director, said that UBM and the BCPC (**www.bcpc.org**) were delighted with the new event which had attracted more exhibition stands and hospitality suites than before and included a new feature, a Speakers Corner. CropWorld has already spread to other parts of the world with regional events taking place in India and South America in 2010. There are also plans to launch into the US in February 2011 and in Asia Pacific in the third quarter of next year. The organisers say that the event in London is the flagship event and will be rebranded as CropWorld Global in 2011.

As well as growing the exhibition area the event saw more visitors, with a significant number coming from outside Europe, particularly the US and Middle East. Ms Tulloch commented that the broader scope of the event had attracted visitors from finance, food buyers and retailers and the spray technology sector. There was also more interest from the six big agrochemical companies she said. Some 120 international speakers presented at the conference which was structured into 24 modules and ran over two and a half days. The conference opened with a plenary session that featured keynote speakers including Maive Rute, director of Biotechnologies, Food and Agriculture Research from the European Commission. This was followed by a 'My Big Idea' session with speakers debating how they would tackle the issue of feeding the world. The conference concluded with a presentation by the UK's chief scientist Professor Sir John Beddington.

Maive Rute said that adoption of GM technology in Europe will depend largely on the level of public support. A barometer on EU public opinion including the use of GM technology in agriculture would be published in the next few days. About 53% of EU public were supportive of the technology in agriculture, believing it could offer significant benefits. But the bias between EU countries and the use of biotechnology in different crops was considerable Estonia had the highest level of support for GM with three-quarters of those surveyed in favour. Conversely, Austria had the lowest acceptance level with only a third of the population surveyed in favour and 30% yet to make up their mind.

Rik Miller, from DuPont Crop Protection, said improving the cultivation of GM crops could have a 'dramatic positive impact' on the world food supply.But he warned that regulatory procedures in some parts of the world are causing trade disruption in GM products and delayed development of the new technologies that 'could lead to a great increase of grower productivity and deliver an improved global food supply'.He called for a harmonised predictable science-based regulatory system for GM and said the public and private sectors must work in partnership on this and other solutions to feeding the world's growing population. He said, while the first generation of GM crops were mainly about inputs used by farmers, the next generation was focusing much more on output traits, such as yield, making crops more drought tolerant and the more efficient use of nitrogen.

My big idea – how we can feed the world

In the following plenary session speakers were asked to discuss their big idea on how to feed the world. Dominic Dyer chief executive for the UK's Crop Protection Association said that the intensification of agriculture in a sustainable way was essential along with improving communication. Increasing productivity was a major concern, but to gain public support for this, the industry needed to communicate better with the public. Recruiting talented people in public relations would be crucial to sending the correct message

Mike Bushell, principal scientific advisor for Syngenta said opening trade bottle necks was important. "No single country can grow everything it needs, so trade is vital." Changing unhealthy western diets to reduce consumption and continuing work on crop protection was valuable as well as increasing agricultural productivity. Yield depended on better seed, technology, fertiliser and agrochemicals. Technology was

part of the solution, but not the only part, he said. "Firms need to work together to give practical solutions for farmers worldwide." Genetic improvements to crops through plant breeding would have the biggest impact, said Douglas Kell from the Biotechnology and Biological Sciences Research Council (BBSRC). “My big idea is to produce plants with big roots to save the planet,” Professor Kell told the delegates at the conference. “We need to recognise that we have spent rather too much time looking at above ground traits. The solution to sustainability in terms of water usage, nutrient usage and in particular carbon sequestration, which also leads to better soil structure, is to develop large bushy roots,”. He claimed that applying the principle globally across a range of plants grown for food and other purposes could ultimately reduce atmospheric CO2 levels by 500 parts per million. “That is a huge effect and one well worth pursuing. ”He said progress made in recent years in genomics, mapping the genes of plants, could be the ‘driving force’ that turns an ambitious plan like this into reality. He said the technology could provide plant breeders with the means to ‘rapidly determine’ which elements of the plant genome are responsible for root size, rather than ‘flying in the dark’ and breeding only on the basis of observable phenotype.

Outlook 2011: Exploring global harvest and economic forecasts

In a session *Outlook 2011: Exploring global harvest and economic forecasts*, Katherine Smith from the Economic Research Service of the USDA outlined global crop areas and crop price projections based on USDA’s models. She started by looking at the short term. The spike in the price of maize and wheat over recent years has come about mainly as a result of lower than expected yields of maize in the US, even although wheat production estimates were up in the EU and Russia. Her only firm forecast for 2011 was that crop areas will expand. Cotton prices were also high because production is lagging behind demand. The USDA’s near term forecasts assume high commodity prices, limited but continued increase in demand for ethanol, continued economic recovery, and low end season stocks. As always weather remains the main uncertainty. Longer term forecasts take into account growing populations, year to year variability in crop yields, climate change impacts but also the benefits from investment in technical innovations. The other global forecaster is the OECD. Katherine Smith explained that, generally, there is agreement with the USDA for wheat volumes. Rice forecasts by the OECD are however the higher of the two.

Mark Berrisford-Smith, HSBC Bank, gave an all-embracing indicator of the likely global economic scenarios. This was not specific to agriculture, but he put the agricultural industry in a better light than most industries. The fact that in US farming the debt to asset ratio is low is a positive factor. In general he described the western economies as in the hangover stage. We have come through the financial crisis without continued social unrest and it is unlikely that any major banks will now be in trouble. However, true recovery will not occur until the existing debts are cleared. He believes it could be 2015 before we are back to something approaching normality. On a pessimistic note there is evidence that Europe’s debt crisis could be overshadowed by the weakening US dollar and its own debt crisis. The possibility of oil prices doubling was another factor to embrace. This could lead to a reversal of the trend towards globalisation.

Promoting an enhanced global understanding of science and research

The final plenary session *Promoting an enhanced global understanding of science and research*, covered how public sector research organisations in particular are moving to more international collaborations, a consequence in part to restricted budgets at national level but also because most of the challenges are global.

Sue Popple, deputy director of Farming and Food Science, Department of Enviroment, Food and Rural Affairs (Defra), described the role of the *Global Research Alliance*. This international collaborative programme has been established for just one year and to date has the participation of 30 countries, mainly from the developed world. The overall mission is to bring countries together to find ways to grow more food without increasing greenhouse gas emissions. The challenge of the Alliance is to find ways to reduce the emissions from agricultural production, increase the potential for soil carbon sequestration, while enhancing food security. At the same time, work will be aiming to improve the understanding, measurement and estimation of agricultural emissions and to help farmers to adopt best practice and mitigation technologies. There are currently three research streams: paddy rice field management led by Japan; crop land led by the US; and livestock led by New Zealand and the Netherlands.

Professor Maurice Moloney, the recently appointed head of the UK's Rothamsted Research, also stressed how, in these times of economic constraint, it is essential to mobilise every source of scientific skill irrespective of its location. He made the point also that the time lag from first concept to commercial adoption is long, and therefore time is not on our side. He quoted from his own research experience in Canada. Scientists identified the glyphosate tolerant gene in soil microorganisms in 1979. It took until 1996 before *Roundup Ready Canola* was commercialised.

Guy Riba, vice president of INRA, the French Government's National Institute for Agricultural Research, showed how agricultural yields in Europe had plateaued. Average yields of winter wheat had been around 7.2 tonnes/ha in France now for several years. So there are major research tasks needed into genomics, diagnosis techniques, adaptation to climate change, soil and water management and many more. No longer is it feasible for each member state to work in isolation: the funding is insufficient. He proposed a European wide network for recording and comparing crop phenotypes. Dr Riba's concept in meeting the global challenges for agriculture is to follow the example of the international collaboration established for climate change studies, through the Intergovernmental Panel on Climate Change (IPCC). There is no reason why similar high level programmes could not be set up for improvements in crop genomics, cropping systems and nutrient management.

In the next issue of *Crop Protection Monthly* there will be further coverage of the CropWorld conference on new compounds and approaches, resistance, application systems, formulations and GM technology.

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