

crop protection monthly

international news, comments, features and conference reports

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LEAD ARTICLES

MONSANTO REPORTS ON SALES AND R&D PIPELINE

Monsanto has had a good start to its fiscal year 2012 and has reported that its first quarter net sales increased 33% over the same period in the previous year to \$2.4 billion. Gross profit also increased by 33% to \$1.1 billion. R&D expenses were up \$351 million based in part on investments in breeding facilities to support international and US corn. Hugh Grant, chairman, president and chief executive officer for Monsanto, said: "We have seen a very strong start to the year, with real growth in Latin America and early orders in the US. We are pleased growers have recognised the value of our products and the benefits they provide on farm."

Sales for Monsanto's Seeds and Genomics segment increased 32% in the first quarter to \$1.5 billion. Corn seed and traits sales increased 46% to \$895 million, driven by significant trait expansion in Brazil and Argentina. Cotton seed and traits sales jumped 73% to \$194 million based on a timing effect in Australia, where growers' decisions to purchase technology upfront advanced revenues to the first quarter that would traditionally have been expected following harvest based on growers' yields in the fourth quarter of this fiscal year. Higher planted hectares in Australia compared to the prior year was also a contributor.

In soybeans, seed and trait sales were up 7% to \$242 million. Vegetable sales were \$157 million, a decrease of 14% on the previous year. The Agricultural Productivity segment consisting of crop protection products including *Roundup* and other herbicides saw an increase of 34% to \$905 million.

Monsanto also gave details of the 14 projects within the company's R&D pipeline that are being advanced. "We are excited about the record progress we have made over the past year across all of our R&D platforms, as the projects in our pipeline today will help us provide an even stronger toolkit of solutions to meet the needs of farmers in the future," said Robb Fraley, Monsanto chief technology officer. In addition to annual germplasm improvements, three targeted breeding traits have advanced phases: Phytophthora Resistant Peppers, Downy Mildew-Resistant Cucumbers and Beneforte Broccoli. Beneforte naturally contains two to three times the phytonutrient glucoraphanin compared with other leading broccoli varieties produced under similar growing conditions

Monsanto also highlighted a number of projects in both its agronomic traits pipeline and its yield and stress collaboration with BASF Plant Science. Yield and stress projects advancing phases this year are Drought-Tolerant Cotton and Higher-Yielding Corn. Six advancements designed to provide improved pest and weed management solutions were announced in the agronomic traits pipeline including *Corn Rootworm III* and *Second-Generation Insect-Protected Genuity Roundup Ready 2 Yield* soybeans, which would both offer multiple modes of action for enhanced insect control and durability. Monsanto's Cotton Lygus Control project, the first to target piercing-sucking insects in cotton, has also advanced phases.

Also included were three advancements in the company's agronomic solutions platform, including a new premix formulation of *Roundup* and low volatility dicamba that would provide farmers with an additional tool for weed management, and a novel nematicide chemistry designed to improve plant health. The company's *Integrated Farming Systems(SM) I* project, which ties hybrid recommendations to variable-rate planting to help drive yields further, also advanced to the final phase before commercialisation.

CROP PROTECTION MARKET 2010

Speaking at Informa Life Sciences *Crop Protection, Off Patent Products* conference in Brussels,. Dr Matthew Phillips of consultants Phillips McDougall said that in 2010 the agrochemical market including \$5,880 million of non-crop sales increased marginally by 1.2% to \$44,195 million. Seed sales, both conventional and GM, reached \$30,820, up 11%.

In 2010 there was some very modest growth in crop protection sales in the Africa and Middle East region and increases in Asia and Latin America. The biggest decreases were in Europe and NAFTA. The very modest growth in 2010 was driven by rising crop prices set against weather affected harvests and low glyphosate prices.

Crop protection sales in 2011 look set for a good increase due to greater glyphosate price stability, a stronger Brazilian economy, improving markets in Argentina and price improvements in Europe. Dr

Phillips showed how in the first half of 2011 compared to the same period in 2010 manufacturers sales were up some 15% on average. Company sales increased as follows: DuPont 10.5%, Amvac 49.4%, Sumitomo Chemicals 31.1%, Makhteshim Agan 14.2%, Chemtura 14.9%, Monsanto 32.9%, Bayer 13.3%, Cheminova 11.7%, BASF 9.4%, Dow 17.4% and Syngenta 12.8% (all expressed in US dollars). There will be a further increase in the area of GM crops grown driven by area increases in Asia and Brazil and value growth due to new stacked trait acceptance in the Americas.

As in 2010 Dr Phillips is still projecting that the crop protection market through to 2015 will increase by an average of 2.2% per annum.

EUROPEAN NEWS AND MARKETS

CERTIS EUROPE TO DISTRIBUTE ARKEMA'S FUMIGANT

French company Arkema (www.arkema.com) and Certis have entered into an exclusive joint development and distribution agreement in Europe for *Paladin*, a new and innovative pre-plant fumigant for modern and sustainable soil pest control. Developed by Arkema's R&D teams and produced in its Lacq plant in the south of France, *Paladin* is a new and effective soil fumigant based on dimethyldisulfide (DMDS) for worldwide substitution of old fumigants which are being gradually withdrawn due to ozone depletion or regulatory restrictions. DMDS has already been registered as a soil fumigant in the US and Israel in 2010, and in Morocco in 2011. Europe is another key target for registration of *Paladin*.

Under the agreement, Certis will be Arkema's exclusive partner for the development, registration and distribution of *Paladin* in Europe. Arkema will initiate the EU approval process for DMDS by submitting a regulatory application by the end of 2012. In the meantime, should *Paladin* be authorised by way of derogation by national authorities on some European markets, Certis Europe and Arkema say they are ready to supply these specific needs.

EU MARKET VALUE DECREASES IN 2010

The European Crop Protection Association (ECPA) has reported that the value of sales in the European crop protection sector decreased by 1.7% (3.3% in real terms) in 2010, with nominal sales in the EU-15 decreasing by 3.8% (5.3% in real terms). The decrease in the market in France (-10.8%) and the UK (-5.7%) contributed to the overall decrease as did more substantial decreases in smaller markets such as Slovakia (-13.5%) and Belgium (-8.4%). The drop in sales was partly balanced by growth in other markets, in particular Spain (+4.7%), Greece (+7.3%) and Romania (+24.1%). While the sales of crop protection products have increased slightly in nominal terms over the last decade, the real value has decreased. Comparing the average sales values in the period 2002-2004, nominal sales in the EU-15 were 6.4% higher in 2010. However, in real terms, this equates to a decrease of 7.3%.

EU PHASE-OUT FOR ACETOCHLOR

The European Commission has decided not to re-register the herbicide acetochlor. It has instructed EU member states to withdraw approvals by 23 June 2012. Grace periods for using existing stocks must be less than 12 months. Dow AgroSciences and Monsanto jointly resubmitted acetochlor's application in 2009. The decision not to re-register was based on concerns over the potential human exposure above the acceptable daily intake, and the potential for human exposure to the surface water metabolite t-norchloro acetochlor. There is a high risk of groundwater contamination for several metabolites, a high risk for aquatic organisms and a high long term risk for herbivorous birds. Finally, the information available was not sufficient to draw a conclusion on the risk assessment for groundwater contamination for the metabolites t-norchloroacetochlor and t-hydroxyacetochlor.

DOW UK ON TRACK WITH INNOVATION

For the past five years Dow AgroSciences has launched at least one new product a year in the UK. This success is set to continue according to Scott Boothey, UK managing director. In 2012 the company expects to fully launch the blackgrass herbicide GF-2070, based on pyroxsulam, and to introduce a new oilseed rape herbicide. The company sees stewardship as equally important to its success and with this in mind has launched a new programme for its insecticide chlorpyrifos. "We see stewardship as vital", said Mr Boothey. "However, it is a real frustration when competing in the market against generic suppliers whose main sales pitch is price."

Kerb (propryzamide) is still an important product to Dow because it controls blackgrass in oilseed rape and there is no sign of resistance developing. The company says it continues to fund third party research to find ways to keep the herbicide out of water courses and shares this information with the whole industry.

UK'S CROP PROTECTION ASSOCIATION TO FOCUS ON FOOD SECURITY

At a briefing for journalists held in London on December 7th, Dominic Dyer, CEO of the UK Crop Protection Association, CPA, gave a summary of the Association's main activities in 2011 and looked forward to the challenges for 2012. He said food security had moved up the agenda significantly during the year and the CPA had been actively involved in trying to bring over the message that well

managed crop protection was vital. Publications included the analysis by Sean Rickard, Cranfield University, which estimated the value of farm to food industries in the UK at £180 billion (\$278 billion) annually, around 15% of the nation's GDP. Crop protection products save the nation around £70 billion - the extra cost of food through reduced yields, if the products were not available.

More specific studies carried out included a detailed report on using agrochemicals effectively to minimise the risks to bee populations, as bees as pollinators are vital to a number of important UK crops. Mr Dyer made the point that higher food prices are here to stay and that it is time to readjust communication policies accordingly. There needs to be a wider understanding of how food is produced and he has been encouraged by the results of surveys that the CPA has commissioned. Amongst younger consumers in the UK there is an increasing awareness of, and support for, the application of technology for food production. He sees the need to define much more effectively how intensive crop production can be achieved and yet sustainably. Having visited China during the year he was impressed on how the Chinese are dramatically stepping up crop productivity but at the same time ensuring the approaches on land use are sustainable in the long term.

He does not see the proposed reforms to the EU's Common Agricultural Policy (CAP), or the new legislation on agrochemical registration, being appropriate if food security in the EU is to be taken seriously. Britain is about two thirds self-sufficient in food production. It would be unacceptable if through lack of investment in technology and the agricultural industry it became even more dependent on imported food. However to bring about a change in political direction will require, ultimately, public opinion to change.

Although Mr Dyer's remit covers the UK, he explained to *Crop Protection Monthly* that several of the communication initiatives that he was leading were also gaining traction at EU level through ECPA and direct with other national industry associations.

The importance of keeping food security at the forefront will be maintained during 2012. A number of new studies are underway at national and international level and it will be the CPA's task to contribute to them. Ensuring that there is a strong scientific base to any policy developments will be essential.

RESTRICTIONS ON CLETHODIM USE LIFTED

Arysta LifeScience has received approval for the herbicide clethodim in Europe and the removal of the restriction for use on sugar beet only. When the decision for a restricted approval was taken in January 2011, Arysta LifeScience submitted a supplementary dossier containing new data, to re-confirm the safety of clethodim and to enable the regulatory authorities to lift the restrictions on the approval. The company says it welcomed the efficient evaluation carried out by the Rapporteur member state, the Netherlands. "Clethodim is now registered in 15 of 27 EU countries where the main crops are sugar beet, oilseed rape, sunflower and potato. Over the last decade Arysta LifeScience has also developed its clethodim products on many minor crops too," said Christophe Sepulchre de Condé, herbicide product manager for Europe. The company says it has continued the development of clethodim in Europe while awaiting the removal of the use restrictions.

INCOTEC AND EUROFINS TO PROMOTE SEED HEALTH TESTING FACILITIES

Incotec (www.incotec.com) and Eurofins STA Laboratories (ESTA) have agreed to join forces to promote ESTA's seed health testing capabilities to the European seed market. As a result of this strategic alliance, Incotec will be able to offer Eurofins STA seed health testing services on an exclusive basis to its customers. The testing of the seeds will be performed at Eurofins STA's facilities in the US. Incotec will handle the daily contacts with customers, the collection and the shipping of samples, communication of results to customers and all other marketing activities to promote the sophisticated high quality testing capabilities of Eurofins STA.

The companies say that this cooperation will be beneficial for the seed industry in Europe. With this alliance two of the leaders in the seed service industry will provide companies with easy access for their seed health testing to the well-known Eurofins STA seed testing lab. Managing director of Incotec Analytical lab at Zwaagdijk, the Netherlands, Rob Pronk said: "We are very pleased with this alliance. It will broaden our product portfolio and give Eurofins STA better access to the European market. We hope that we can expand our partnership with Eurofins STA to other parts of the world."

AMERICAN NEWS AND MARKETS

BAYER SETTLES GM RICE CLAIMS

Bayer CropScience has announced that settlement agreements with US long-grain rice growers involved with biotech rice litigation have now taken effect. A sufficient number of verified registrations for the settlement programme have been filed by growers representing 85% of the US long-grain rice acreage, a threshold point established for the agreements to become binding. Bayer is to pay up to \$750 million to resolve the claims submitted by growers.

These claims arose following the detection in 2006 of traces of biotech rice in long-grain rice harvested in several southern US states. Europe imposed restrictions on US long-grain rice imports, even though the rice posed no food safety issues. Rice destined for Europe at the time accounted for less than 5% of US grown rice. Markets adjusted and that rice quickly was diverted and sold in other markets.

The settlement programme, however, was available to all US farmers who had been growing long-grain rice during the period 2006 to 2010. Bayer regards the inclusion of all long-grain rice growers, whether they had filed a lawsuit or not, to be crucial to demonstrating the company's long-term commitment to the rice crop globally. Although Bayer believes it acted responsibly in the handling of its biotech rice, the company considered it important to resolve the litigation so that it can move forward.

MONSANTO SUES SEED COMPANIES OWNED BY DUPONT

Monsanto is suing six US seed companies acquired by DuPont, accusing them of not paying royalties. It has filed a lawsuit saying the companies - Agventure, Doebler's Pennsylvania Hybrids, Hoegemeyer Hybrids, Nutech Seed, Seed Consultants, and Terral Seed - all failed to pay fees for using *Roundup Ready* corn and soybean seeds. The companies were all acquired by DuPont's Pioneer Hi-Bred business unit. The lawsuit says that Pioneer, in 2007, launched a programme called PROaccess that allowed the companies to circumvent the licensing agreements they signed with Monsanto, prior to being bought by Pioneer. As a result, the lawsuit says, Monsanto lost "tens of millions in royalties" that the companies were required to pay for selling soybean and corn seed containing *Roundup Ready* technologies. In 2009, Monsanto sued Pioneer for combining a DuPont-developed technology with Monsanto-developed technology, and in 2010 a federal judge ruled that DuPont was not licensed to do so.

BASF TO DISTRIBUTE ITS FUNGICIDE SOVRAN THROUGH CHEMINOVA IN US

BASF has granted Cheminova exclusive distribution rights and use of the trademark *Sovran* in the US. BASF will discontinue selling the fungicide which will be sold through Cheminova immediately. *Sovran* contains the active ingredient kresoxim-methyl. It controls powdery mildew, Botrytis and other diseases on crops such as grapes, cucurbit vegetables, pome fruit and pecans. "The transition of *Sovran* distribution to Cheminova will allow BASF to focus on its innovations such as *Kixor* herbicide technology, *Xemium* fungicide, and our growing portfolio of new products," said Paul Rea, vice president, BASF US Crop Protection.

GOWAN TO DEVELOP DOW FUNGICIDE

Dow AgroSciences and Gowan have announced a new development and marketing license agreement that will allow Gowan to license the novel active fungicide meptyldinocap. Under the agreement, Gowan will develop the fungicide active for use in fruits and vines in the US and Canada. Meptyldinocap represents a new mode of action and solution to the problems of powdery mildew in grapes and a number of fruit and vegetable crops," said David Hindes, global business leader fungicides for Dow AgroSciences. "The decision to license the development to Gowan means that American and Canadian growers will have the chance to use this active in the future."

VALENT IS GRANTED EPA REGISTRATION FOR PGR ON CORN SEED

Valent BioSciences Corporation (VBC) has been granted EPA registration for *BioNik*, a plant growth regulator for use on corn seed. The product is a 25% formulation of s-abscisic acid (s-ABA), one of the five classes of plant growth regulators naturally present in plants. Abscisic acid regulates numerous plant processes including dormancy, maturation, growth, and response to stress conditions. Hybrid AHouseleyand female parents. Typically, pollen shed from the tassels of the male line plants does not

completely overlap the receptivity period of the silks from the female line plants and fertilisation is not maximised. To get the most value from their female line plants, seed producers typically make a second planting of the male line to ensure that pollen is available throughout the silking period. Now, seed producers will have a new tool. When s-ABA is applied to the seed of the male line, germination is delayed. By treating their male line seed with *BioNik*, seed producers can extend the overall germination period and expand the pollen shed window from a single planting. This provides significant benefits to seed producers in terms of flexibility and cost-savings.

“*BioNik* is a good example of how a strong research effort can address a very specific market need and deliver value to a production system looking for innovative solutions,” said Mike Donaldson, president and CEO of Valent BioSciences. *BioNik* is the first product from VBC’s new Physiological Seed Enhancement business platform, under its plant growth regulator umbrella brand *Massivo*. *BioNik* can be applied along with or on top of other seed treatment products using standard seed treatment equipment. It can be applied months or hours prior to planting, with no effect on performance. In 2012, the product will be available on a semi-commercial basis as use patterns are fine-tuned through large scale trials conducted with key corn seed producers. The first wide scale commercial use is planned for 2013. VBC is developing *BioNik* in other regions including Europe, Argentina, and Chile. Research is also ongoing in hybrid seed production for other crops such as sunflower, canola, and sorghum.

NUFARM RECEIVES US REGISTRATION FOR SEED TREATMENT

Nufarm Americas has received federal registration for *Spirato 480 FS* seed treatment. The flowable fungicide seed treatment contains fludioxonil. It prevents early season damage from decay, damping-off and seedling blight caused by seed-borne and soil-borne fungi such as *Fusarium*, *Rhizoctonia*, seed-borne *Sclerotinia*, *Helminthosporium*, *Tilletia caries*, *Aspergillus*, and *Penicillium*. “For years fludioxonil has been the standard for control of decay, damping-off and seedling blight caused by seed- and soil-borne fungi,” said Nathan Wright, Nufarm director of seed treatment sales. “We are pleased to be able to offer seed companies, distribution, dealers and growers a high-quality alternative based on this proven active ingredient.” *Spirato 480 FS* can be used on a wide variety of crops including soybeans, potatoes, sorghum, corn, rice, sunflowers and cotton. US state registrations are still pending.

SYNGENTA RECEIVES EPA APPROVAL FOR ZEMAX

The US Environmental Protection Agency (EPA) has granted registration for Syngenta’s herbicide *Zemax*. The product is powered by *Callisto Plant Technology* and specially formulated to deliver long lasting residual weed control and application flexibility. “Based on the same capsule-suspension formulation technology as the corn herbicide *Halex*, *Zemax* combines two active ingredients mesotrione and S-metolachlor. According to the company it features good compatibility with sulphur-containing nitrogen fertilisers and other critical tank-mix partners. Mesotrione provides burndown and residual broadleaf weed control while S-metolachlor offers residual grass and small-seeded broadleaf weed control. “This combination results in more effective residual control than competitive corn herbicides on tough grasses and small-seeded broadleaf weeds such as waterhemp, pigweeds, foxtails, lambsquarters and ragweeds,” said Syngenta’s Carroll Moseley. “*Zemax* is also targeted at weed biotypes like waterhemp and pigweed that are tolerant or resistant to glyphosate, ALS-inhibiting, PPO and triazine herbicides.” Mr Moseley added that *Zemax* features excellent crop safety based on the proven corn safener, benoxacor, as well as good application flexibility. The herbicide can be applied in areas like Wisconsin and Minnesota where atrazine use is limited or prohibited. *Zemax* is registered on more corn types such as field corn, seed corn, sweet corn, yellow popcorn and also grain sorghum, than competitive corn herbicides.

NEW DATA REINFORCES SMARTSTAX PERFORMANCE

Five years of data, including new 2011 data from university field trials has shown that Dow AgroSciences’ *SmartStax* corn, which contains multiple traits for insect protection and herbicide tolerance, continues to provide effective control of corn rootworm (CRW). Data from 31 trials demonstrated that *SmartStax* protects corn from CRW more effectively than hybrids with single mode of action traits and non-*Bt* hybrids. *SmartStax* also showed a yield advantage under moderate to heavy insect pressure. “The multiple modes of action in *SmartStax* provide the broadest level of insect protection available and keeps damage from reaching economic thresholds,” said Cole Hansen, traits marketing manager, Dow AgroSciences.

OTHER NEWS AND MARKETS

BAYER HAS EXCLUSIVE RIGHTS TO HEAT AND DROUGHT TECHNOLOGY

Bayer CropScience and Performance Plants Inc. (PPI), Kingston, Canada have entered into a research and commercial license agreement, giving Bayer exclusive rights for PPI's Heat and Drought Tolerance Technology (HDT) in cotton. The new technology preserves yield by enhancing plant tolerance to heat, drought or combined stress. HDT plants achieved significantly higher yields when faced with periods of hot and dry growing conditions in the critical stages of development.

This is the second research and commercial agreement both companies have entered into with each other within the last two years. In 2009, Bayer licensed PPI's leading Yield Protection Technology (YPT) for product development and commercialisation of drought tolerant cotton.

All PPI technologies target different mechanisms such as heat and drought tolerance, water use efficiency, yield enhancement, and biomass accumulation. Due to this diverse range, PPI's biotech traits can be combined or stacked into a single plant variety for genetic and agronomic improvements of all staple crops. "We are pleased to be extending our research collaboration with Performance Plants as a partner in developing drought tolerance in cotton," said Dr Frank Schmidt, head of Research BioScience for Bayer CropScience. "We anticipate that the technology will contribute to further strengthening our leadership position in the global cotton market, especially with regard to ensuring higher yields in difficult climatic conditions. Their technology fits well with our strategy to explore multiple approaches to drought tolerance in order to bring the most effective, high-performance trait solutions to market."

COROMANDEL INCREASES STAKE IN SABERO ORGANICS

Fertiliser manufacturer Coromandel International has increased its stake in Sabero Organics, an established agrochemical manufacturer headquartered in Mumbai, to 67.75%. With the completion of this acquisition, Sabero becomes a subsidiary of Coromandel. Coromandel, part of the \$3.8 billion-Murugappa Group, is a strong player in the pesticides formulation market in India and has a broad dealer network. Sabero is well placed in the technical pesticides market, both in India and overseas. Coromandel says that the two companies, already a force in the domestic and export pesticide markets, expect to grow stronger.

Coromandel is India's second largest phosphatic fertiliser player. It has also introduced a range of specialty nutrient products including organic fertilisers. In the crop protection business, Coromandel is an important manufacturer of malathion and phenthoate. It also has more than 425 rural retail centres focused on agriculture and lifestyle.

SYNGENTA TO SUPPLY ENOGEN GRAIN TO CORN PROCESSOR

Syngenta has announced that it has signed a commercial agreement with Quad County Corn Processors (QCCP) in North America to supply the Iowa ethanol plant with *Enogen* grain in 2012. Syngenta and QCCP successfully conducted a trial using *Enogen* grain in 2009 and were able to develop that into a formal agreement after Syngenta received regulatory approval for *Enogen* corn early last year. *Enogen* corn is bio-engineered specifically to express the alpha amylase enzyme necessary for dry grind ethanol production directly in the endosperm of the grain itself, eliminating the need to add liquid amylase. It is the first corn output trait designed to allow ethanol production to be more efficient, cost effective and better for the environment.

"We're excited about our collaboration with QCCP and the value we can deliver to both the ethanol plant and local area growers," said David Witherspoon, head of renewable fuels with Syngenta. "We're confident that *Enogen* grain will help QCCP reduce energy and input costs while boosting production, and that hybrids featuring *Enogen* technology will perform up to the standards that growers expect from us." Syngenta is currently collaborating with QCCP to recruit growers to supply the plant with *Enogen* grain. Selected growers must sign production contracts that specify acres to be grown, testing requirements, marketing options, delivery timing and stewardship needs. In exchange, they will receive a premium price for their grain.

CERTIS USA TO COMMERCIALISE NEW DISEASE CONTROL TECHNOLOGIES

Certis USA has entered into a global license agreement with Montana State University (MSU) and Montana BioAgriculture to develop and commercialise new plant disease control technologies based on *Bacillus mycoides* isolate BmJ. MSU has patented methods for inducing SAR (systemic acquired resistance) in plants by applying BmJ-based control agents. The technology has been under development by MSU and Montana BioAgriculture, and the collaboration has demonstrated efficacy of BmJ against *Cercospora* leaf spot in sugar beets, white mould and early blight in potatoes, and several other crop diseases.

Certis USA plans to commercialise this technology worldwide in an expanded range of crops and diseases. BmJ is a naturally occurring, nonpathogenic bacterium that triggers a plant's immune response to pathogenic fungi, bacteria and viruses resulting in SAR to diseases. BmJ does this by a mechanism very similar to that of chemical SAR activators, but with equal or better disease control for longer periods and with lower risk of phytotoxicity. While some microbial biofungicides have been reported to also have moderate activity as SAR activators, BmJ is unique in that it works entirely as a microbial SAR activator with no direct effect on the plant pathogen itself. According to Certis these characteristics make BmJ a valuable tool for use in fungicide resistance management programmes.

DUPONT ENTERS R&D COLLABORATION ON DROUGHT TOLERANCE

DuPont and Rosetta Green, an Israeli agro-biotechnology company (www.rosettagreen.com), have entered into a strategic research agreement to identify drought tolerance genes in corn and soybeans. "Drought can lead to losses for corn growers of up to \$13 billion annually," said John Bedbrook, vice president, DuPont Agricultural Biotechnology. "We are pleased to collaborate with Rosetta Green to identify new genes which can help farmers protect yield and feed a growing population and build on our strong pipeline of leads for drought tolerance."

Under the agreement, Rosetta Green will use proprietary technology and bioinformatics capabilities to identify microRNAs, which are small RNA molecules in corn, soybeans and other plants. They represent an additional mode of action to develop important trait solutions in corn and other crops. DuPont, through its Pioneer Hi-Bred business, will test candidate genes in target crops. Pioneer will have an exclusive commercial license for genes identified through this collaboration.

AGROCHEMICAL OUTPUT IN CHINA RISES

Agrochemical output in China rose 15.7% in the first nine months of 2011, compared to the first three quarters of 2010 according to CCPIA, the China Chemical Producers Industry Association. Total output for the first nine months reached 1.92 million tonnes, 32% of which was exported. Total export value for the first three quarters reached \$1.85 billion, a 44% rise since the same period last year. Similarly, imported pesticide value rose 9% to \$380,000. China imported 41,000 tonnes of pesticides, a 13.8% rise compared to last year. Herbicides accounted for almost 62% of all exported pesticide volumes, the value of which reached \$1 billion, according to CCPIA. China's fungicide export value rose 43.7% to \$290 million. The value of the Chinese domestic market rose in double digits as well.

BIOPESTICIDES GROWING FASTER THAN CONVENTIONAL PESTICIDES

Marcus Meadows-Smith, CEO of AgraQuest, speaking at Informa Life Sciences' inaugural Biopesticide conference on 6-7 December in Amsterdam, said that the biopesticide market was growing by around 10% per annum, much faster than synthetic pesticides at 2%. He put the market value at \$2.0 billion as against \$0.9 billion in 2000 and said that 36% of the market is in the US, 26% in Europe, 17% in Asia-Pacific, 8% in Latin America and 3% in the rest of the world. Mr Meadows-Smith said he expects the market to grow to \$2.7 billion by 2015. He said that the new drivers were the need to feed a growing population sustainably, the regulators, growers and the major agchem companies as well as consumers and the food value chain.

He said to be successful new biopesticides had to be as effective in spray programmes as conventional pesticides. They had to be consistent in performance, cost effective and be the preferred option for food value chains. He pointed to the use of biopesticides in IPM programmes where, used together with conventional pesticides, they can increase efficiency, raise yields and lower the chemical load. Biopesticides, he said, were generally exempt from tolerance because they do not leave residues on food. In fact they helped growers to manage pesticide residues. For these reasons AgraQuest had been able to form partnerships with BASF, Bayer, DuPont and Monsanto. Biopesticides, he said, were now being seen as proprietary active ingredients that could be used in resistance management, to fill portfolio gaps and to assist in life cycle management.

ARYSTA APPOINTS NEW GLOBAL HEAD OF BUSINESS DEVELOPMENT

Bryan Koepl has joined Arysta LifeScience as the new global head of business development. He will be responsible for identifying new opportunities and acquisition targets and for implementing strategies that enable the company to achieve its acquisition and divestiture goals. The company says that Mr Koepl, who reports to CEO Wayne Hewett, brings a wealth of experience in corporate development and investment banking as it looks to build on previous mergers and acquisitions on a global basis. Mr Koepl, who becomes part of Arysta's leadership team, served recently as managing director for investment banking and corporate restructuring at Teneo Capital.

CONFERENCE AND FEATURES

CALLS FOR CONTROLS ON USE OF RICE PESTICIDES

The International Rice Research Institute, IRRI, which is based in Manila, the Philippines, has issued a strong plea for more effective use and the withdrawal of some rice insecticides throughout rice growing countries in Asia.

At a conference held in Hanoi, Vietnam, on 16 December, IRRI brought together leaders in the rice industry from across the region. The conference *Threats of Insecticide Misuse in Rice Ecosystems - Exploring Options for Mitigation* was aiming to make progress towards a "greener game plan" to manage brown planthoppers, the major rice pest. The plan recommends two major principles, to enhance biodiversity and to regulate the marketing and use of insecticides, including the banning of certain insecticides which can make pest outbreaks worse.

Dr Bas Bouman, head of the Crop and Environmental Sciences Division at IRRI and leader of the Global Rice Science Partnership (GRiSP) programme on sustainable production systems, said: "We need to seriously rethink our current pest management strategies so we do not just cope with current outbreaks, but prevent and manage them effectively in the long run." K L Heong, a senior ecology scientist with IRRI stated: "Planthopper outbreaks occur when there is a breakdown in 'ecological resilience' on a rice farm. Beneficial predators such as spiders and bugs that feed on planthoppers are part of a natural system of 'checks and balances' that keeps planthopper populations below outbreak levels. When this natural balance is disrupted, however, planthopper outbreaks occur. Many beneficial insects that prey on planthoppers are killed inadvertently when insecticides are misused or are used indiscriminately. Also, growing three rice crops a year or using the same varieties over a large area and for a long period can lead to pest outbreaks due to the adaptation and build up of pest populations."

National Governments have already taken action. Earlier in 2011, Thailand, the number one rice exporter in the world, banned two pesticides - abamectin and cypermethrin - that according to IRRI are not only ineffective in controlling pests, but can lead to brown planthopper outbreaks. In Vietnam, the world's second most important rice exporter, cypermethrin is still among the most popular insecticides on the market. Bui Ba Bong, Vietnam's vice minister of agriculture and rural development, stated that the Vietnamese government is expected to phase out some pesticides, introduce controls for pesticide marketing and encourage use of biopesticides. He was reported to have said: "The misuse of pesticides threatens rice production, but also threatens the environment and the health of farmers and consumers."

In March 2011, the Vietnamese province of An Giang started what has been described as 'ecological engineering', such as growing flowers in nearby paddies to encourage planthopper predators. Van Chien, director general of Vietnam's Southern Plant Protection Centre, described pesticides as a "big problem" in many towns and villages in the country's fertile south. However, according to Mr Chien, there are only around 2,000 farmers in seven Vietnamese provinces currently using insecticide-free growing methods and the planting of flowers.

In conclusion Dr Bouman said: "With the two leading rice-exporting countries, Thailand and Vietnam, showing such leadership in better pest management, we remain optimistic that, in the future, planthopper outbreaks will lessen in both their frequency and severity."

AAB HOLDS ANNUAL CONFERENCE ON BIOPESTICIDES

The Association of Applied Biologists (AAB) held its annual conference Biopesticides 2011 in conjunction with the International Biocontrol Manufacturers Association (IBMA) in Grantham, UK on 29 November. The 2011 conference addressed matters relating to the new European legislation for pesticides and the EU's Sustainable Use Directive as well as issues surrounding the successful implementation of biopesticides.

Dr David Cary, executive director of IBMA, told delegates that it was taking a long time to establish appropriate systems across Europe that support the registration of biopesticides in the same way as in the US. Some EU member states had embraced the Sustainable Use Directive (SUD) and are proactively encouraging the use of biopesticides while others such as the UK are not. Dr Cary said there was a real opportunity with the SUD to enhance the registration and use of biocontrol products. He said that the NAFTA partners (US, Canada and Mexico) are carrying out joint reviews, providing guidance to registrants and are upgrading their biopesticide services. They were also calling for a global review of biopesticides. He very much hoped that the EU would become involved.

Rob Mason, director of UK regulatory policy at the Chemicals Regulation Directorate (CRD) said that a major consultation had been conducted on the implementation of the SUD. The main message was that the UK was in a good position and already had comprehensive controls for plant protection products. Additional regulation, he said, will only be required in a few areas where it is necessary to bring the UK regime in line. A National Action Plan has to be communicated to the European Commission and other member states by 26 November 2012. It will encourage the development and introduction of Integrated Pest Management (IPM) and alternative approaches. Mr Mason said that the UK Biopesticide scheme introduced in 2006 following a pilot was being evaluated by an external contractor and a review of schemes in other countries would be included.

According to Dr Dave Chandler, the new EU SUD places IPM at the centre of crop protection and gives a preferred status to biologically-based control agents. However, conventional chemical pesticides will retain a vital place in IPM because of their high levels of efficacy. He said while microbial biopesticides are valuable tools many have low levels of efficacy so some thought must be given to how they can best be used in an IPM programme. Dr Chandler has conducted a desk study on the use of microbial biopesticides. While there were serious flaws in many of the 140 or so scientific papers he studied there were some positives about the way forward. There were indications that microbial natural enemies can reduce the expression of resistance to conventional pesticides or slow down the evolution of resistance. There was some research on potentiating chemicals which are non-toxic to insects by themselves but which make insects significantly more susceptible to entopathogens by their effect on the immune system. He said new research was needed to characterise the nature of the interaction of different components, to understand the mechanism of interaction itself, and to develop practical systems for use in crops. In the meantime Dr Chandler believes that combination treatments that involve microbial biopesticides with or without chemical pesticides do have potential in IPM.

Vivian Powell described the four year HortLINK SCEPTRE project designed to support the approval of new products and IPM programmes for high priority pest, disease and weed problems in fruit and vegetables. She said that growers rely on synthetic pesticides to grow quality produce in a cost effective manner. The availability of pesticides in UK horticultural crops is, however, under increasing pressure from legislation, climate change, resistance and market requirements for reduced pesticide inputs and residue levels. While there are new pesticides with a lower environmental impact for use on major crops there are few new actives being developed for minor crops. Ms Powell said the SCEPTRE project will evaluate new pesticides suitable for use on edible crops. For pests and diseases these will include safer pesticides and biopesticides for use in IPM programmes. The project will also carry out herbicide screening with an emphasis on crop tolerance and more targeted weed control.

Dr Toby Bruce said semiochemicals direct movement and behaviour of both pests and their natural enemies which is useful in IPM. They can be used to create crop habitats less attractive for pests and more attractive for natural enemies. As they are volatile, however, sustained release in open field situations is extremely challenging. Rothamsted Research has been looking at the possibility of using crop plants to emit appropriate semiochemicals. Researchers have now developed a transgenic wheat that releases the aphid alarm pheromone which is a strong repellent for aphids.

Dr Owen Jones, president of IBMA and vice president for global strategy at Suterra, said the use of pheromones and other semiochemicals in insect pest monitoring has now become well established

worldwide. It is estimated that it now constitutes a global market with sales in the region of \$50 to \$60 million. He said that with the advent of controlled release formulations more than a thousand species of important insect pests are regularly monitored by the use of pheromone and semiochemical-based traps and have, therefore, assumed a very important role in IPM. This is likely to increase as IPM is more widely encouraged by legislative stimuli such as the SUD. The use of pheromones and semiochemicals for pest reduction has not been as successful as their use for monitoring. Of the three population reduction strategies – mating disruption, mass trapping and lure and kill, the first has achieved the greatest market penetration with over 750,000 ha treated worldwide in 2009. New formulations and application techniques have made their use easier and as a result the market for semiochemical-based control systems is now over \$200 million and growing at over 10% per annum. The main drivers are coming from the demands of the food supply chain and the regulatory network.

Dr Paul Sopp is technical and energy director at Fargro, the largest supplier of biopesticides in the UK. He presented two new biopesticides that his company had added to its range. *Met52*, a granular formulation of the entomopathogenic fungus *Metarhizium anisopliae*, is approved for use against vine weevil larvae in ornamental and soft fruit crops. *Prestop* is a formulation of the fungus *Gliocladium catenulatum* J1446 approved for use against *Didymella*, *Botrytis*, *Pythium*, *Phytophthora*, *Rhizoctonia* and *Fusarium* on protected crops and strawberries. Both offer effective control as well as resistance management tools to the grower for use in both conventional and organic programmes.

Dr Andrew Brown, product development manager at Becker Underwood, stressed the need for technical support for biologically-based crop protection products. He said that correct application is essential in order to achieve good product performance as mis-application is the most common reason for poor performance. Using Becker Underwood's product *Nemasys*, an innovative biocontrol product based on nematodes, as an example, he said it was necessary to take into account factors such as product formulation, application equipment, rates and frequency of use as well as having a good understanding of the target pest, crop and environment. It is increasingly important that commercial companies supplying new biologically-based technology give adequate support in order to increase efficacy and reliability.

COMBATING CORN ROOTWORM RESISTANCE

There have been several reports of severe corn rootworm injury reported in Bt corn grown in the US since 2009. In all cases, western corn rootworm was the predominant rootworm species in the fields. Damage has now been reported in Iowa as well as in Illinois, Minnesota, Nebraska and South Dakota.

Entomologists at the Iowa State University have found that western corn rootworm survival on Cry3Bb1 corn (sold commercially as *YieldGard RW* and *YieldGard VT Triple*) is significantly higher for larvae from problem fields compared to control fields. However, they have found no cross-resistance with the Cry34/35Ab1 protein. The findings suggest that for the first time a beetle has evolved resistance to a *Bt* crop in the field. They admit that these findings are not a total surprise because the *Bt* proteins targeting corn rootworm are not considered high dose like they are for European corn borer. The resistant strains of western corn rootworm can, in fact, be produced in a laboratory within three generations.

The research highlights the importance of incorporating integrated pest management (IPM) and insect resistance management into field crop production. The entomologists say: "All problem fields visited in 2009 had a production history of at least three years of continuous corn with the Cry3Bb1 protein, and this is likely to have contributed to the development of resistance."

Crop rotation is among the most effective management strategies for controlling western corn rootworm. They say growers should also consider rotating *Bt* proteins if planting continuous corn. They add that growers should always comply with refuge requirements for the seed type, which can range from 5 to 20%. A soil-applied insecticide can be used with a non-*Bt* hybrid or could supplement root protection for *Bt* corn in areas with known high larval pressure. All corn fields should be evaluated annually by assessing root injury from corn rootworm and management strategies should be adjusted if injury above 0.5 nodes is observed for roots that are protected against corn rootworm.

Monsanto has said that it continues to take reports on the performance of its corn rootworm products seriously and remains committed to working with farmers to encourage the adoption of integrated pest management practices when managing high rootworm populations on farm. The company's remarks came following a memorandum from the US Environmental Protection Agency (EPA), which evaluated available information about areas where greater than expected rootworm damage occurred to Monsanto's single mode of action technologies that contained the Cry3Bb1 protein. The Agency notes that resistance is suspected in some field locations where farmers faced greater than expected rootworm damage when utilising single mode of action products containing the Cry3Bb1 protein.

Monsanto has been working with independent researchers to better understand the factors that led to greater than expected rootworm damage when using the single mode of action technology and to recommend specific best management practices to support its farmer customers. The company said it shares the EPA's recommendations that careful monitoring and stewardship needs to occur in fields with greater than expected rootworm damage, and that dual mode of action approaches with an integrated pest management recommendation are critical to the long term durability of trait technologies. The Agency recently extended the registrations of the company's dual mode of action technologies, *Genuity SmartStax RIB Complete* and *Genuity SmartStax*, reinforcing the value of these products and their ability to provide farmers sound management options in areas faced with high populations of corn rootworms.

Monsanto stresses that the Cry3Bb1 protein has delivered exceptional protection against corn rootworm since it was first introduced in 2003, and says it continues to do so today on greater than 99% of the acres planted with *YieldGard VT Triple* and *Genuity VT Triple PRO* corn products in the US. It says that farmers who continuously plant corn on corn have always faced pressure from high populations of rootworms for years even prior to the introduction of insect protection trait technologies during the last decade and adds that today, there are "geographical pockets" of heavy rootworm infestation in areas where there is a long history of corn on corn, where "some single mode of action products, either a soil-applied insecticide or trait technology have seen intense rootworm pressure that can overwhelm the plants, leading to damage and some surviving insects. Farmers in these areas, says Monsanto, have been working to effectively manage this problem in their fields every year.

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