crop protection monthly

international news, comments, features and conference reports

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LEAD ARTICLES

CROPWORLD AND SUSTAINABLE INTENSIFICATION

“Food has become too cheap and people are all too ready to throw meals away because they do not cost enough,” said Jan Kees Vis, global director for sustainable sourcing development at Unilever, when addressing executives from leading bio-science and food production industries from around the world at UBM’s CropWorld Global 2012 conference and exhibition. The theme of the conference, held this year at the Queen Elizabeth II Conference Centre in London on the 6–7 November, was ’sustainable intensification.’ Various speakers addressed issues surrounding the growing demand for food in an environment of limited resources by using science and technology in a sustainable way.

The keynote address on improving sustainability in US agriculture was given by Keith Kemp, director of the levy-funded United Soybean Board which represents 500,000 US farmers. Mr Kemp, who is also a soybean and corn grower from Ohio, had little doubt that GM crops were key to sustainable intensification. On his 700ha farm which has been no-till for 30 years all his soya and corn is biotech. He said that after the worst drought in living history there is little doubt that without biotech his yields would have been a lot less than expected. “Biotech crops not only improve production efficiencies, they bring direct benefits for the environment. Herbicide tolerance gives much improved weed control, allowing a switch to min-till and no-till." With fewer passes he claimed that his fuel savings amount to more than 28,000 litres of diesel a year. “There is less soil damage too. Continuous no-till encourages earthworms and builds organic matter. In many ways we are actually building our top soils. And that is the same for farmers the world over."

Presentations on the delivery of sustainable agricultural intensification were given by Juan Ferriera of Monsanto, Jan-Kees Vis of Unilever, Egil Hogna, of Yara International and Ignacio Dominguez of Makhteshim Agan Industries. Juan Ferreira, Monsanto’s vice-president for Europe, Middle East and Africa, said policymakers needed to hear from producers. "I am convinced farmers are much more in the driving seat than we, in industry, are. As food becomes less cheap, consumers could become more supportive”, he noted. “If yields remain flat 72 - 85 million ha of extra cropping will be needed by 2050 to feed the world. But only 27- 48 million ha of land is available, mainly in South America and Eastern Europe. More yield per hectare is the key. It is not a choice, it is fundamental. However, for these technology gains to be realised the policies of national governments need modernising.”

NFU President Peter Kendall, Dr Trevor Nicholls of CABI, Dr Pedro Machado, Director General of Embrapa Rice and Beans, John Reifsteck of Truth about Trade and Technology, Dr Bruce Lee of CSIRO and Phil Bloomer, director of Campaigns and Policy, Oxfam UK all discussed how sustainable intensification might be achieved in practice.

Peter Kendall decried the fact that EU politicians had still not woken up to the fact that the region had to be producing more food, not less. He also reflected on the UK Government chief scientist’s, Sir John Beddington, admission that it had been a mistake to focus on the needs for 2050, when he described the global food security challenge. The problem of feeding the world today and by 2025 was real enough and talking about the shorter term challenges would stand a better chance of focusing the minds of elected politicians.

Dr Bruce Lee took a look at some of the technical routes which could be called upon to improve crop productivity. Developing oilseed crops with a high oil content in the leaves rather than just in the seed was one pathway that CSIRO researchers were examining. Phil Bloomer stressed the need to invest in the more than 500 million smallholder farmers in the world as they have the potential to alleviate much of the hunger. He said setting a balance between large scale and smallholder farming is essential and yields results. A good example was in Vietnam where the government had set a target of halving the number of people living in hunger. They have achieved it in a relatively short time through the investment in a balanced agriculture.

There were also speakers from KWS SAAT AG, Macquarie Bank, the OECD, ECPA, Exosect, Marrone Bio Innovations, Syngenta, Bayer and a host of other companies operating in the sector. The second day covered a range of political, commercial and technical topics, from the impact of regulatory changes to assessing modern plant breeding, biopesticides and soil management techniques.

The busy exhibition provided an opportunity for the industry to display and discuss new products and business opportunities. There were more than 70 exhibitors including agrochemical manufacturers and distributors, biotech companies, universities and research and manufacturing organisations from around the world.

CropWorld Global brand director Haf Cennydd told *Crop Protection Monthly* at the networking reception that she was pleased with the response to this year's event. However, UBM is intending to relocate to Amsterdam for the 2013 event. Ms Cennydd said: "Amsterdam is an ideal location for next year's event because of easy access for Europe and the rest of the world. The size and importance of Netherland's agricultural and food sectors are important factors too. The country is also regarded as a leader in the field of efficient and sustainable agricultural production and has strong business links with China, Saudi Arabia and India."

A further report on CropWorld Global *will appear in the November issue of* Crop Protection Monthly.

EUROPEAN NEWS AND MARKETS

STERILISED FRUIT FLIES RELEASED IN CROATIA'S TANGERINE ORCHARDS

A report from the United Nations International Atomic Energy Agency, IAEA, describes how fruit flies are made sterile through bombardment with Cobalt-60 are proving effective in reducing the fruit fly problem in southern Croatia. The Neretva delta area is expected to produce around 60,000 tonnes of tangerines this year. About 75% of the production is exported to Russia, the EU and neighbouring Balkan states. However, many countries have strict quarantine rules and ban imports of any fruit suspected of carrying fruit flies. Niko Kapovic, manager of AgroFructus, a leading Croatian tangerine wholesaler reported: "Every year we add new crops and the output grows by around 20%. We aim to reach 150,000 tonnes by 2020. Last year we had a big infestation of fruit flies but the treated areas produced very few larvae," said Mr Kapovic. Twice a week, between April and November, shipments containing five million sterilised male flies reached the fertile Neretva valley. Some farmers used boats to spread the male flies in remote areas. "We have had excellent results and more and more farmers now want to take part. The next step will be to release the males from aircraft, which is the most efficient way," said Luka Popovic of the Croatian Centre for Agriculture and Rural Affairs.

The technology used is based on the Sterile Insect Technology (SIT) devised by scientists at the UN's International Atomic Energy Agency (IAEA) Seibersdorf Laboratory outside Vienna. They are also looking at different species - including the tsetse fly in Africa. Jorge Hendrichs, who heads the joint pest control programme of the IAEA and the UN Food and Agriculture Agency, said the SIT method was a win-win because it enabled farmers to fight a pest which "can easily eliminate 30 to 100% of the crop" and at the same time use fewer pesticides.

Andy Garner, an IAEA programme coordinator, said he believed there was more demand to use nuclear applications for food production, though he acknowledged a potential 'branding' issue. "If you talk about irradiating food. I think you do think twice before you eat that apple unless someone explains to you that it is no different to having something out of the microwave," Mr Garner said. A scientific adviser to environmental group Greenpeace, which opposes nuclear energy on safety grounds, said the use of nuclear technology in this way needed to be looked at carefully. "We should neither view it as risk free and nor should we view it as the panacea to all food security issues," said Paul Johnston of the Greenpeace Research Laboratories at the UK's University of Exeter.

EU AIMS TO CUT THE USE OF FOOD-BASED BIOFUELS

The European Commission has announced that it is proposing to cut targets for the use of biofuels in order to reduce the negative impact on food production and prices. This follows a call from a number of organisations including the UN (*September Crop Scene*). The Commission said it would now propose limiting the role of 'first generation' biofuels based on crops such as corn, sugar beet or oilseed rape so as to ease the pressure on food prices and encourage investment in non-food biofuels.

Under the new ruling first generation biofuels would account for no more than 5.0% of transport sector energy use by 2020. This compares with the current figure of 4.5% but is half of the overall 10% target for all renewables. The balance of the 10% would have to be met by new biofuels based on non-food sources such as biomass or waste, or other renewable energy sources as in electric vehicles. The EC announcement stated that cutting the target to 5.0% aims to stimulate the development of alternative, second generation biofuels from non-food feedstock which emit substantially less greenhouse gases than fossil fuels and do not directly interfere with global food production.

Commissioner for Climate Action Connie Hedegaard commented that for biofuels to be effective, they had to be "truly sustainable." She added: "We must invest in biofuels that achieve real emission cuts and do not compete with food." The change comes after persistent criticism of the impact of biofuels on food production and prices, with food security emerging as a top item on the international agenda. Furthermore, some recent research showed that some biofuel production was failing to deliver hoped-for reductions in greenhouse gases because changing land use to grow crops for energy had its own adverse impact on emissions. The proposals will need to be agreed by EU politicians in 2013.

Coinciding with the EC's announcement in Brussels, the UN's special rapporteur for the right to food, Olivier De Schutter, called on the EU and the US to stop using biofuels altogether. Aside from a meeting of the UN Food and Agriculture Organisation (FAO) in Rome, Olivier De Schutter was understood to have said: "Europe has to do more than lower its targets for production of biofuels as it is planning. It has to have the political courage to abandon them and the US should do the same… It is dangerous in a situation in which global cereal stocks are so low to set unattainable objectives."

A similar sentiment was offered by the environmental NGOs. Robbie Blake, biofuels campaigner for Friends of the Earth Europe, said: "The proposed action to limit future EU demand for biofuels is better than nothing, but the fact remains that these reforms would maintain the status quo and make climate change and hunger worse…With a new food crisis looming and nearly a billion people on the planet going hungry, we need to stop burning food altogether. Combating global hunger must come ahead of the narrow interests of the big farming lobby and biofuels industry."

AMERICAN NEWS AND MARKETS

SYNGENTA AND NOVOZYMES COMMERCIALISE NEW BIOFUNGICIDE

Syngenta and Novozymes have signed an exclusive global marketing and distribution agreement to commercialise *Taegro*, a fermented biological fungicide based on a naturally occurring bacterium *Bacillus subtilis*. It offers growers broad-spectrum disease control at very low application rates in a variety of crops. Its multiple modes of action make it complementary to Syngenta's fungicide product range. In April, Syngenta and Novozymes announced a global agreement to commercialise Novozymes' technology *JumpStart*, a seed-applied biological that increases phosphate solubility in the soil.

John Atkin, Syngenta's chief operating officer, said: "We are delighted to enter into another agreement to commercialise a Novozymes technology. Having worldwide commercial rights for *Taegro* will further strengthen our ability to offer high-performing integrated crop solutions." By expanding the product's existing registrations in the US, the two companies aim to offer the technology to growers around the world for use on a broad range of crops.

SYNTECH ACQUIRES BAYER'S ECOTOXICOLOGY FACILITY

SynTech Research has announced the acquisition of Bayer CropScience's state-of-the-art US ecotoxicology facility at the Bayer Research Park near Stilwell, Kansas. The unit's activities include both short and long-term avian (acute and reproduction) and aquatic (fish, plants, invertebrates and amphibia) studies. Thirteen of the current Bayer CropScience ecotoxicology staff at the Stilwell site will transfer to SynTech Research, and will continue to perform studies for Bayer CropScience. Following the acquisition, SynTech intends to add further staff to increase the unit's capacity, particularly in regulatory/risk assessment.

SynTech Research will also form a new analytical unit at the Stilwell campus, which will include 12 former Bayer CropScience staff involved in sample processing, study management, quality assurance, and administrative capabilities. Dr Khosro Khodayari, president and CEO of SynTech Research, said: "This is a very exciting event for SynTech Research, allowing us to globally extend our ecotoxicology offering, already well represented in Europe. We can now provide a complete package to our clients worldwide, including avian, aquatic, bee and non-target organism studies, accompanied by analytical and regulatory support. As well as supporting our ecotoxicology services globally, the analytical teams will also provide a significantly enhanced GLP offering to SynTech Research customers worldwide, many of whom want a complete package of field trials and associated analytical studies".

BRAZIL RESTARTS ORANGE JUICE EXPORTS TO US

Brazilian orange juice exports to the US have restarted as growers discontinue carbendazim use. In December 2011 it was announced that the US Food and Drug Administration (USFDA) would be testing all oranges and orange juice concentrate imported from Brazil to ensure they did not contain any residues of the fungicide carbendazim (*January CPM*). As the product was widely used in Brazil this effectively curtailed exports to the US. However, it has now been confirmed by Brazil's juice industry association that shipments of frozen orange juice concentrate can be exported to the US once again.

Brazil is once again meeting US standards, which have prohibited the use of carbendazim on oranges since 2009. Christian Lohbauer, spokesperson for the Brazilian Citrus Exporters Association (CitrusBR), has reported that orange growers in Brazil have managed to move away from carbendazim uses "a bit earlier than thought." He added that the industry-owned plantations account for 40% of Brazil's orange output. Those growers have to pledge to their processors that the fruit is carbendazim-free, and they are now conducting their own testing to ensure that any product going to the US is free of the fungicide,

PUBLIC TO VOTE ON LABELLING OF GM FOODS IN CALIFORNIA

In November the Californian public will be asked to vote on a proposal that, if passed, would require the labelling of most foods made with genetically modified ingredients. The proposal, Proposition 37, is supported by the organic industry while major food suppliers oppose it arguing that it will result in higher prices. A recent opinion poll showed a clear majority in favour of the proposal which came

about from a grassroots campaign that yielded more than a million signatures. More than 50 countries around the world stipulate labelling.
There have been attempts in 18 states to change labelling laws on genetically modified foods via legislation. None has been successful. If passed, the statute will require labelling on raw or processed food offered for sale to consumers if the food is made from plants or animals with genetic material changed in specified ways.

Kathy Fairbanks, speaking on behalf of farmers, business groups and food manufacturers, described Proposition 37 as a poorly written law that gives inaccurate and misleading information and will raise grocery costs for California families by up to $400 a year. Opponents also argue that it is unfair to single out GM as something that requires labelling while not including antibiotics, pesticides or hormones used in food production.

Supporters argue that consumers in the US, which has the largest proportion of its food containing GM, have a right to know. They make the case that there are already food labels showing nutrition, allergy information and other facts that US consumers want to know. This measure would simply add information telling them if food is produced using genetic engineering. An estimated $40m will be spent mainly on TV advertisements, in an attempt to convince people to vote for or against. According to an analysis by independent researchers MapLight, the vast majority of the advertising money is coming from biotechnology firms including Monsanto and Du Pont who, between them, have contributed around $12 million.

Some commentators believe that a vote in California on GM labelling will have serious implications beyond the state. In an analysis of voter intentions that showed strong support for the measure, researchers at Oklahoma State university say the proposal could add to consumer confusion. The authors believe that Proposition 37 could disrupt the flow of agricultural products to and from California and other parts of the US and would lead to food companies having to deal with competing requirements in different parts of the country. Dr Philip Howard from Michigan State University says that where California goes others will have to follow. He said: "As with other California labelling requirements, many manufacturers will not go to the trouble and expense of having separate packaging for other states." He added: "Internationally the effect will not be as direct, but it is likely to encourage governments that do not already require labelling to adopt similar measures."

GM CROP PRODUCTION LEADS TO INCREASED USE OF HERBICIDES

Washington State University research professor Charles Benbrook, who has published several reports arguing against the use of GM crops, has published a new report. The study claims that the use of herbicides in the production of three genetically modified herbicide-tolerant crops in the US, cotton, soybeans and corn, has actually increased. This finding is based on an exhaustive analysis of publicly available data from the US Department of Agriculture's National Agriculture Statistics Service. Professor Benbrook's analysis is claimed to be the first peer-reviewed, published estimate of the impacts of genetically engineered herbicide-resistant crops on pesticide use.

The study appeared in the open-access, peer-reviewed journal *Environmental Sciences Europe*. Professor Benbrook writes that the emergence and spread of glyphosate-resistant weeds is strongly correlated with the upward trajectory in herbicide use. Approximately 95% of US soybean and cotton acres, and over 85% of corn, are planted to varieties genetically modified to be herbicide, mainly glyphosate, resistant. He was quoted to say: "Resistant weeds have become a major problem for many farmers reliant on GM crops, and are now driving up the volume of herbicide needed each year by about 25%."

Professor Benbrook points out herbicide-tolerant crops worked extremely well in the first few years of their use. However, over-reliance on them may have led to shifts in weed communities and the spread of resistant weeds that forced farmers to increase herbicide application rates (especially glyphosate), and to spray more often. It has also encouraged the additional use of new herbicides with alternative modes of action.

OTHER NEWS AND MARKETS

NEW STRAIN OF RICE BLAST FOUND IN AUSTRALIA

In 2011 a strain of rice blast, *Magnaporthe grisea* or *Magnaporthe oryzae*, destroyed large areas of rice crops in the Kimberley's Ord river Irrigation Scheme in Western Australia. So far the strain is not found to be matching any other strains of rice blast known to science. Samples from the Ord river scheme were sent to France for testing, but early results suggest the disease is either an unknown native or a mutated version. Vincent Lanoiselet, from the Western Australia Department of Agriculture, said: "The samples that came back were not closely related to any of the isolates that were present in the reference lab and they have got more than 3,000 isolates collected from all over the world."

"Nothing matches it, but it could be somewhere in the world and has not been collected by researchers. It could also be a native isolate from Australia or a re-combination of different strains. "It is a bit of a surprise that the isolates were not closely related to those in Indonesia or East Timor, but this does not mean we cannot control the disease or are not able to work with the breeders to find a variety that will be tolerant (to the disease)." Strains of rice blast exist right across the world and it is estimated that an extra 60 million people could be fed if the disease did not exist.

INDIA: COMMITTEE PROPOSES 10 YEAR MORATORIUM ON BT TRIALS

A technical expert committee, appointed by the Supreme Court of India to advise upon open field trials for genetically modified (GM) crops, has recommended a 10 year moratorium on all *Bt* (*Bacillus thuringiensis*) food crop trials. There is already a moratorium in place on the development of *Bt* brinjal (eggplant), imposed in February 2010, but open field trials for other food crops have been permitted.

The committee was established in May this year, in response to a petition filed by environmental activist Aruna Rodrigues. The committee's report was scheduled to come up before the supreme court at the end of October. The conclusion is the latest in a series of contradicting recommendations on GM crops, and contrasts with advice from the prime minister's scientific advisory council on biotechnology and agriculture, which met on 9 October. However, a parliamentary committee on the cultivation of GM food crops, submitted in August, came down heavily against GM crops and recommended that all GM field trials should be discontinued and research on GM crops only conducted under strict regulation.

The technical expert committee's new report recommends overhauling the regulatory authorities that oversee GM trials, and revisiting regulations altogether, to ensure GM crops present no risk to human health or the environment. It outlines the need for specifically designated and certified field trial sites, and says that sufficient mechanisms must be established for monitoring trials before any field trials resume. It also stipulates the need for preliminary biosafety testing, and recommends appointing an independent panel made up of scientists qualified in the evaluation of biosafety data.

Part of the sensitive background behind the controversy on *Bt* crops relates to experience with *Bt* cotton. About 90% of India's cotton growers are reported to have adopted *Bt* cotton. They paid high prices for the seed with the expectation that they would save money on insecticides. However the major pest, cotton bollworm, has developed resistance to *B*t cotton in certain regions, particularly Vidarbha region, in the eastern part of Maharashtra state, in central India. The high incidence of suicides amongst farmers in the region has been attributed to the failure of the cotton crop.

NEW CEO FOR BAYER CROPSCIENCE

Liam Condon has been appointed chairman of the executive committee of the Bayer CropScience subgroup and chairman of the board of management of Bayer CropScience effective December 1, 2012. He succeeds Sandra E Peterson, who is leaving the company at the end of November. Mr Condon has been managing director of Bayer Vital GmbH, Leverkusen, and head of Bayer Pharma's business in Germany since January 2010. Bayer Vital is the business operations company for the Bayer HealthCare subgroup in Germany.

"Liam Condon is a highly successful and experienced manager with proven expertise in marketing and sales, who has demonstrated his leadership skills internationally over a 20 year period. We are

convinced of his ability to continue the dynamic development of Bayer CropScience," said Bayer Group CEO Dr Marijn Dekkers.

Irish born Mr Condon studied International Business in Dublin and at the Technical University of Berlin. He holds a BA degree in International Marketing & Languages from Dublin City University and has taken an MBA course at the Management Centre of the Japan Management Association. He has held positions of increasing responsibility in the Pharmaceuticals Division in Europe and Asia. From 2007 until 2010 he was Managing Director of Bayer HealthCare China and Bayer Pharma General Manager for China. Prior to joining Bayer Mr Condon worked in various marketing and sales roles at Schering in Germany.

RESEARCHERS LIST MOST IMPORTANT PHYTOPATHOGENIC FUNGI

A survey involving 495 international researchers has resulted in a list containing the most important phytopathogenic fungi. The list has been published in the journal *Molecular Plant Pathology* and each one of the species mentioned is analysed by an expert in the field.

The first on the list is the rice blast fungus (*Magnaporthe oryzae*). Experts have highlighted the economic significance of this species as it can devastate rice paddies which are the food base for half the world's population. In second place is the fungus 'botrytis bunch rot' or 'grey mould' (*Botrytis cinerea*). This impacts in a variety of areas as it is a wide-ranging pathogen. It is also one of the few species on the list that also has a beneficial use due to its role in some stages of wine production. In third place are the species that include the genus Puccinia, which mainly affect wheat crops, whilst in fourth and fifth place are two species from the Fusarium genus (*Fusarium graminearum* and *Fusarium oxysporum*). The first of these mainly damages cereals whilst the latter can affect very different crops such as tomato, cotton or banana. Other cereal pathogens, namely *Blumeria graminis* and *Mycosphaerella graminicola,* are in sixth and seventh place on the list.

One of those experts who drew up the list is the Spaniard Antonio Di Pietro from the department of genetics in the University of Cordoba. He said: "The authors are trying to inform the public about the importance of phytopathogenic fungi as they represent a growing threat to global agriculture. Most of the pathogens on the list attack cereals like rice, wheat and maize. This is logical considering the huge importance of these crops in world agriculture."

SYNGENTA AND BASF COLLABORATE ON CLEARFIELD SUNFLOWERS

Syngenta has signed a global, non-exclusive agreement in which BASF will license its Clearfield Plus herbicide tolerance technology for sunflowers to Syngenta. In addition, the companies entered into a non-exclusive agreement under which BASF will supply Syngenta with imazamox-based herbicides for use with *Clearfield* and *Clearfield Plus* sunflowers in Europe.

"The *Clearfield Plus Production System* for sunflowers, developed using traditional plant breeding, delivers improved, season-long weed control and provides growers with sunflowers that have greater crop tolerance across environmental stresses as well as the potential for increased oil content and grain yield," said Eckart Stein, vice president marketing management Europe for BASF Crop Protection. "Combined with Syngenta's outstanding portfolio of hybrid seeds, growers will have more opportunities to achieve sustainable higher sunflower yields." Syngenta will commercialise both the herbicide tolerance technology and the chemistry beginning in 2013.

SYNGENTA REPORTS INCREASED SALES

Syngenta reports that sales in the third quarter of 2012 increased by 6% at constant exchange rates driven by an excellent performance in Latin America. Sales in the first nine months of the year increased by 9% to reach a record $11 billion, with volume up 6% and prices up 3%. Total integrated sales increased by 7% at constant exchange rates.

In Latin America, a strong start to the season drove sales growth of 18%, with expansion across all product lines. Syngenta says that high soybean prices are leading to acreage expansion and increased investment by soybean growers in Brazil and Argentina. Sales of crop protection for sugar cane doubled as a result of rapid technology adoption. In Asia Pacific, sales increased 3% due to significant growth in corn seed, notably in South East Asia. Vegetables seeds showed a marked recovery with double digit growth. Crop protection sales were lower in Japan and also in India, owing

to a delayed monsoon; expanding seed care use across the region was, however, reflected in sales growth of more than 50%.

In Europe, Africa and the Middle East, the success of the integrated hybrid barley product offer drove sales particularly in Germany and Northern Europe. Eastern Europe maintained its record of broad-based growth, with sales in the CIS up by almost 20%. Overall crop protection sales in the low season were unchanged after a strong first half, with significant growth in fungicides offsetting lower herbicide and insecticide sales. In North America, crop protection sales were broadly unchanged despite a reduction in fungicide applications due to drought and a shift in selective herbicides to the fourth quarter. Non-selective herbicides and seed care grew strongly; in addition, sales of *Force* (tefluthrin) tripled with increasing grower awareness of resistance to a competitor's corn rootworm trait.

In 2012 Syngenta has revised its total sales target for its eight key crops from $22 billion by 2020 to $25 billion. These targets comprise growth in the existing portfolio and the launch of new products, with an increasing emphasis on integrated offers reflecting the company's new R&D and crop team structure.

Mike Mack, CEO said: "Continued growth in the third quarter demonstrates the breadth of our portfolio and the gathering momentum of our strategy. In Latin America, where Brazil is in its third year of integration, we are starting to realise the full potential of our leading commercial offers and new technologies. This, together with the increase in our targets for key crops, gives us increased confidence in our long term growth potential. We will continue to invest in growth opportunities while maintaining a high level of profitability. For the full year 2012, we expect an increase in the EBITDA margin at constant exchange rates and strong growth in earnings per share."

BAYER CROPSCIENCE INCREASES SALES BY 19%

"Our agricultural business maintained nearly the same momentum as in the first half," said Bayer Group CEO Dr Marijn Dekkers. The CropScience subgroup raised sales by 19.0% (Fx & portfolio adj 12.8%) €1,641 million (Q3 2011: €1,379 million). Bayer says sales growth was especially brisk in Europe and North America, but revenue also expanded by a double-digit percentage in Latin America/Africa/Middle East. Business was supported by the positive market conditions, with continuing high prices for agricultural commodities.

The Crop Protection business developed positively in all product groups and regions. Seed Growth, Bayer's business with seed treatment products, showed a particularly strong increase of 23.7% (Fx & portfolio adj). The fungicides business also developed very successfully (Fx & portfolio adj plus 15.5%). Insecticides sales also advanced by a substantial 7.5%, while sales of herbicides increased by 4.3% (Fx & portfolio ad.). The Seeds business expanded by a substantial 39.1% (Fx & portfolio adj). The increase was driven by sales in North America, especially of canola seed. Sales of vegetable seeds were level with the previous year.

Bayer CropScience's Global Head for Research and Development Dr C David Nicholson speaking at the CropWorld Global Conference 2012 in London, said that the company has one of the strongest pipelines of new products in the industry. "We are raising our overall R&D spending to more than €850 million a year by 2015, and will increase our Seeds R&D budget to achieve a 50:50 ratio in R&D for Seeds/Biologics and Chemistry." In the period 1995-2010, the company introduced 35 products in the crop protection arena.

At a panel discussion on biopesticides at CropWorld Global Marcus Meadows-Smith, head of Biologics at Bayer CropScience, spoke about new technologies and the evolving role of biologicals. "Today's farmers face unique challenges, and increasingly seek solutions that span synthetic chemistry, molecular biology and biologics. At Bayer CropScience, we leverage our expertise and competency in these different technology platforms to lead in providing sustainable crop solutions." Mr Meadows-Smith said that demand for biologics, which are often effective in very small quantities, is growing, and the broader biologics market is expected to triple to around $4 billion by 2020.

AMVAC SALES UP 23% IN Q3

Sales of American Vanguard (AMVAC) increased by 23% to $90.8 million in the third quarter of 2012. Net income improved by 75% to $8.1 million. For the first nine months, sales rose by 20% to $262.8

million and net income was boosted by 75% to $25.6 million. The good performance reflected continued strong demand for the company's products and excellent profitability of business. This quarter's results were driven by participation in cotton and seasonal sales of soil fumigants for post-harvest applications.

Sales also included initial shipments of granular soil insecticides in response to grower demand ahead of the 2013 planting season, commented Eric Wintemute, chairman and CEO of American Vanguard.

A higher-valued product mix, selective price increases and solid manufacturing performance all contributed to higher gross profit margins. The company's finished goods inventory and accounts receivable levels have both risen, in response to the production associated with the pre-season sales build-up for the upcoming corn planting season. "Notwithstanding the current strong growth the company is experiencing, we continue to have sufficient cash and credit available for capital expenditures and/or potential product acquisitions that we may undertake in the coming quarters," said Eric Wintemute.

Mr. Wintemute concluded: "Our business segments continue to perform well. Looking forward, we believe that much of our growth will be driven by the continuing adoption of our Best-of-Both-Worlds approach for soil insect control and by the success of our *Impact* herbicide co-marketing programme with Monsanto's *Roundup* brands. Our marketing programmes will be emphasising AMVAC's Yield Enhancement Solutions (YES) not only for US corn growers but for all of our customers in all of the crop markets that we serve.

FMC SALES UP 11% IN Q3

FMC reports that sales in its Agricultural Products segment were up 10.9% to $423.6 million in the third quarter of 2012 compared to the prior year with substantial sales gains in Latin America and North America. Segment earnings of $99.8 million increased by 23.4% driven by strong volume growth, partially offset by unfavorable exchange rate impacts and higher spending on targeted growth initiatives. Sales in the first nine months were $1,271.4 million, up by 20.5% compared with same period of 2011. Earnings in the first nine months rose by 23.6% to $340.8 million.

In Latin America, sales increased significantly reflecting strong market conditions, successful new product introductions and an increased planted area of soybeans in Brazil. FMC's market access joint venture in Argentina also contributed. In North America, sales also increased significantly driven by strong pest pressures. Sales in Asia were up slightly, while sales in Europe/Middle East/Africa were down in part due to unfavourable exchange rate impacts.

FMC expects the segment to achieve its ninth consecutive year of record earnings, delivering a mid-twenties percent year-on-year increase in earnings, reflecting increased volumes in all regions, due to strong market conditions and growth from new and acquired products, but partially offset by higher spending on targeted growth initiatives.

CONFERENCES AND FEATURES

CHEMISTRY IMPROVES AGRICULTURAL PRODUCTIVITY

The Royal Society of Chemistry held a lecture in its series of events addressing the role of chemistry in agricultural productivity at Burlington House in London on 26 September 2012. Dr John Clough, a research fellow at Syngenta, and one of the inventors of azoxystrobin, described the origins and success of this blockbuster fungicide and the whole strobilurin class of chemistry. Dr Alan Baylis reports for Crop Protection Monthly*.*

Wander through woodlands this autumn and you may come across toadstools of *Oudemansiela mucida*, the slimy beech cap fungus, which is the origin of a fungicide that has notched up global sales of more than $10 billion since its launch in 1996. The fungicide is azoxystrobin, sold in over 100 countries and used on more than 140 crops. Launched as *Amistar* in Germany in 1996, it became the first active ingredient to be recognised as 'reduced-risk' by the US Environmental Protection Agency. In 1999, Syngenta legacy company Zeneca Agrochemicals was awarded the Queen's Award for Technological Achievement for the invention and development of the product.

Lead generation and optimisation

The azoxystrobin story started in 1981 when researchers at Syngenta's Jealott's Hill Research Centre, then ICI Plant Protection Division, noticed a research paper describing the fungicidal effects and novel mode of action of two natural products isolated from *Oudemansiela mucida,* oudemansin A and strobilurin A, and a third from a gliding bacterium, myxothiazol A. The mode of action had been identified as the inhibition of mitochondrial respiration at a new binding site in the respiration pathway. Samples of oudemansin A and myxothiazol A were obtained from the author, and ICI chemists made a small quantity of strobilurin A. These compounds then entered the fungicide primary screening programme. The compounds were active in an in vitro assay for mitochondrial respiration inhibitors and on a selection of fungi growing on agar, but strobilurin A failed in a glasshouse test on diseases on whole plants. The problems were identified as photochemical instability and volatility.

Strobilurin A was attractive as a lead because of the potential its structure gave for exploring analogues. It was discovered that chemical modification of the β-methoxyacrylate group resulted in loss of activity and so chemical synthesis became focused on making compounds that all possessed this toxophore. More than 1400 compounds were synthesised before azoxystrobin was made, an effort entailing some 50 chemist-years' worth of resource. An estimated 50,000 strobilurin compounds have been made by the whole industry and over 1000 patent applications have been filed so far.

Strobilurin analogues with reduced volatility and better photostability were found to have good glasshouse activity, but then failed in field trials due to insufficient persistence. Other issues to be tackled were overcoming phytotoxicity and increasing efficacy at low application rates. One of the main features of the lead optimisation phase was to make analogues that explored the effect of varying the octanol-water partition coefficient (log P) - the physicochemical property important to the systemicity of active ingredients in plants. Azoxystrobin has a log P of 2.65, enabling the fungicide to move to leaves emerging after a crop has been sprayed, and which gives a good balance of protective, curative and eradicant activity.

Unbeknown to either company for several years, BASF was also researching strobilurin fungicides on a similar schedule to ICI. ICI's patent was filed in January 1990, beating BASF to the invention of azoxystrobin by some seven months. BASF went on to develop kresoxim-methyl and the two strobilurins were launched within one month in 1996. Later, BASF reached the Patent Office just two days ahead of ICI to claim a different area of strobilurin chemistry.

A further coincidence was that the Japanese company Shionogi had been pursuing a similar chemistry programme that resulted in the commercialisation of the third strobilurin, metominostrobin, in 1999. However, Shionogi chemists had been unaware of strobilurin A as a natural product lead.

A number of other strobilurins followed, including Novartis's trifloxystrobin (now sold by Bayer CropScience) and BASF's pyraclostrobin. Fungicides with the same mode of action, but different

chemistry have also been developed, eg famoxadone by DuPont and fenamidone by Aventis (now sold by Bayer CropScience). Collectively, they are all classed as QoI (quinone outside inhibitor) fungicides.

Disease control and resistance

Azoxystrobin was developed as a broad spectrum fungicide for a number of different markets - *Amistar* for cereals, *Quadris* for fruit and vegetables, *Heritage* for turf grass and *Abound* as a post-harvest treatment for fruit. A major contribution of the active ingredient to global food security was its role in combating the Asian soybean rust (*Phakopsora pachyrhizi*) pandemic. Spreading from South Africa across to South America, it reached the southern states of the US in 2004. In the 2005 season, azoxystrobin gave outstanding control of this devastating disease.

Resistance to azoxystrobin first arose in 1998 to wheat powdery mildew (*Erisyphe graminis*). In 2002, *Septoria tritici* became widely resistant too. The major mechanism for resistance has been identified as a mutation known as G143A. An estimated one in a billion individuals in natural fungal populations has the amino acid alanine substituted for glycine at one point in the DNA coding for a protein at the target site. This mutation confers little or no fitness penalty and individuals possessing it came to dominate populations after other genotypes were controlled. Strobilurins and all QoI fungicides are cross-resistant, none being able to bind effectively at the mutated active site. However, not all regions of the world have resistance issues and there is no resistance in rusts and late blight (*Phytophthora infestans*).

PGR effects

In cereal trials, plots treated with azoxystrobin often yielded surprisingly more than those in which diseases were equally successfully controlled by standard fungicides such as triazoles. This was typically associated with a prolonged duration of green leaf area, which might be expected to indicate the potential for more photosynthesis for grain filling. In commercial use, the strobilurin 'greening effect' became a benefit of using *Amistar* and was much in demand.

The primary mode of action of the strobilurins is to bind at the outer binding site of cytochrome b in the cytochrome bc1 complex located in mitochondria. This blocks the transfer of electrons in respiration, which normally produces the 'universal' energy molecule ATP. Research indicated that a secondary mode of action involving the weak inhibition of ethylene biosynthesis was a key factor in the delayed senescence effect. Much subsequent research has also pointed to effects on photosynthesis, water use and nitrogen assimilation, leading to significant interest in yield enhancement and stress tolerance as new markets for crop protection products.

Finally, John Clough had the answer to the question as to how come *Oudemansiela mucida* is unaffected by the strobilurin A it naturally produces? The answer is that the fungus has the G143A mutation and a much higher respiration rate.

AGCHEM FORUM

*The 12th Annual AgChem Forum 2012 was held in Barcelona on 5-6 September 2012. The Regulatory Framework stream discussed industry and regulators' experiences of the new EU Regulation 1107/2009 including the zonal procedure, Peter Chapman from JSC (**www.jsci.co.uk**) reports on some of the important presentations.*

EU peer review of active substances

Ragnor Peterson, European Food Safety Authority (EFSA), gave an overview of the work the organisation is doing in relation to the peer review of 'green track' substances, new actives and the implementation of the new Regulation 1107/2009.

EFSA, he said, is due to provide conclusions on 59 approved 'green track' (substances without problems identified) active substances by the end of 2012. A total of 38 conclusions have already been finalised with the remainder scheduled to be completed in 2012. In the case of new active substances, 71 compounds were ongoing prior to Regulation 1107/2009 coming into force. The procedures for these active substances are covered in Regulation 188/2011. By September 2012 the peer reviews were finalised or ongoing for 61 active substances. For most of the active substances additional information had to be requested after the commenting phase, resulting in the clock being stopped. This has led to a delay in finalising conclusions, with the result that EFSA is expecting to fall short of the planned target of 47 new active substance conclusions for 2012.

Under Regulation 1107/2009 EFSA is obliged to make public several documents, including summary dossiers, applications for renewal, Draft Assessment Reports (DARs) and EFSA conclusions that potentially contain confidential business information. Following discussions with member states on division of responsibilities EFSA has now published guidance on their website providing an overview document which deals with the removal of confidential business information and a form which should be completed to identify and justify the removal of any confidential business information (**www.efsa.europa.eu/en/pesticides/pesticidesconsultations.htm**).

EFSA has also been working with the European Chemicals Agency (ECHA) on a pilot project testing the working procedures for the parallel evaluation of classification and labelling requirements under Regulations 1107/2009 and 1272/2008.

In response to concerns raised about the potential link between honey bee colony collapse disorder and pesticides, EFSA has taken on a range of different responsibilities including:

- developing a new risk assessment methodology for bees
- following up recently reported scientific studies to assess their validity
- evaluation of individual active substances, including imidacloprid, thiamethoxam, clothianidin for which EFSA conclusions will be delivered by the end of 2012, with fipronil following in 2013.

Experience with Regulation 1107/2009

Sarah Shore of the Chemical Regulation Directorate (CRD), the UK's regulatory authority, explained that it was looking at more effective ways of delivering what UK ministers wanted from the regulatory system. CRD was operating several regulatory regimes and had to ensure consistency and coordination. She said that whilst there was a need to continually embrace change it was not possible to deliver everything as in the past. It was, however, important to maintain CRD's good reputation. The current economic climate meant that there was less resource to deliver regulatory regimes. The current political background was deregulatory to ensure the competitiveness of British business in the global marketplace.

Industry feedback to CRD on the operation of Regulation 1107/2009 was largely consistent with CRD's own experience. The UK is looking for opportunities to align with the rest of the EU by adopting compromises where possible.

Harmonisation and mutual recognition were necessary to achieve efficiency and more work was needed to make this a reality as far as plant protection products were concerned. Member states were taking different approaches to similar issues. It was essential to build trust to ensure a common understanding and acceptance of each others' evaluations. National data requirements hindered the process particularly if member states were using different risk management approaches when making decisions. This is something that the UK is working on.

Ms Shore accepted that harmonisation and mutual recognition take time to achieve. However, the regulation of pesticides needs to be proportionate, relating costs to benefits. There were issues to address such as how much scientific developments impact on data requirements, the availability of resources, harmonisation and public expectations. She confirmed that despite pressure on resources there was no intention on the part of CRD to close its doors to new applications. There was, however, a need for quicker routes through the process. Efficient operation of the zonal system will be a major preoccupation for the future with compromises needed from all concerned in order to make the system work. The Commission is due to present a report on the operation of the Regulation by December 2014. This will present an opportunity for simplification. CRD intends to be prepared and informed in order to influence the debate regarding future changes.

Euros Jones, European Crop Protection Association (ECPA), expressed industry concerns that since the introduction of Regulation 1107/2009 the legislation had become more complex and was more resource intensive. The more detailed text has turned out to be neither better nor clearer, which in turn had created its own problems in providing less 'wiggle room' and needing increasing involvement of lawyers. A major area of increased complexity was the application of the cut-off criteria. Of particular concern is the process and criteria for establishing the candidates for substitution. The Commission is due to publish an initial list in December 2013 with all active substances to be considered at re-review. There is a huge potential impact on workload, let alone the negative association with the candidates for substitution being regarded as a 'black list' in some quarters.

Many of the problems being faced with Regulation 1107/2009 were not those that were necessarily expected. They include transition issues from Directive 91/414, the need to follow full process for amendments to active substance approval and the lack of member state resources to act as zonal rapporteur.

Zonal authorisation

Darren Flynn, CRD, updated delegates on the latest developments regarding zonal authorisation. He said that the quality of submissions, capacity, and commenting are key issues if member states are to meet deadlines. Those member states with a disconnect between the evaluation process and the official issue of authorisations would have difficulties in completing the whole authorisation procedure within 12 months. It was clear that those member states operating with a unitary authority for the completion of the whole of the authorisation process were more efficient.

Concerns had been expressed over the capacity of member states to act as zonal rapporteurs with some member states/zones unable to accept applications. In such cases mutual recognition from another zone may be the only option. There was clearly a role for the zonal steering committees in identifying a zonal rapporteur. One area not yet working effectively was in sharing the evaluation of the 'zonal independent' parts of the risk assessments. This needed better communication between industry and member states so that submissions were timed to facilitate work sharing by submitting to all zones simultaneously and informing the zonal rapporteur of the countries where authorisations were required. For applications where the EU is considered a single zone a single draft Registration Report (dRR) is required to be submitted to just one member state. In cases where the zonal rapporteur refuses authorisation it has now been clarified that the prepared assessment may be used as a basis for the assessment in the concerned member states and should be completed within 120 days.

Although there was limited experience of operating the new regulatory process, some key issues have been addressed through the revision of the Guidance Document on zonal authorisation. Better communication between all parties is critical, together with simplification and increased work sharing. This should help alleviate capacity issues in the member states. Euros Jones commented that harmonisation was being achieved slowly and that it would be a long term project.

UPCOMING CONFERENCES

Biopesticides

Informa Life Sciences is holding its annual Biopesticide conference (**www.informa-ls.com/event/biopesticides12**) at the Radisson Blu Hotel, Berlin, Germany on 5-6 December 2012. It promises an extensive agenda that addresses the most critical regulatory developments and examines key strategies that will optimise biopesticide production. There are sessions on the regulation of biopesticides, R&D case studies and updates, biopesticide manufacturing and technology platforms for biopesticide production. There will also be a number of presentations from the European Commission and five regulatory authorities. The organisers say the event will bring together market pioneers who are experts within the biopesticide sector.

Off Patent Products and Generics

The 7th annual *Crop Protection: Off Patent Products and Generics* event *(***www.informa-ls.com/event/crop2012***)* held at the Crowne Plaza Amsterdam City Centre Hotel on 20-21 November 2012 is organised by Infoma Life Sciences. It says the meeting will explore revenue generating opportunities for R&D and post patent and generic companies. Topics to be presented include The Future Outlook for Off Patent and Generic Products, Maximising Commercial Opportunities, Regulatory Procedures and Business Prospects in Latin America and CIS Markets, Anti-Counterfeiting Strategies, Implementation of 1107/2009, Data Protection, Zonal Authorisations Procedures, Impact of AIR 3 and Parallel Trade.

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www.crop-protection-monthly.co.uk/samples.htm

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Editor: Martin Redbond E-mail: mredbond@aol.com
Deputy Editor: Bruce Knight E-mail: innovationmanagement@btopenworld.com
Contributors: Elaine Warrell, Peter Chapman, Alan Baylis
Editorial and Subscription Enquiries to:
Crop Protection Monthly
Blacksmiths Cottage
Ashbocking Road
Henley,
Ipswich,
Suffolk
IP6 0QX
UK
Tel: +44 (0) 1473 831645
E-mail: **Cpmsubs@aol.com**