Biopesticides and China Special

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Biopesticides figure prominently in crop protection future

Welcome to Agrow’s fourth annual biopesticide special issue. Before delving into the goings on in the sector during the last year, let us do a quick recap of the last 3-4 years. Corporate activity in biopesticides focused mainly on acquisitions during 2012, 2013 and the early part of 2014.

The year 2012 was dominated by news of acquisitions of the Europe-based majors. BASF acquired US specialty products company Becker Underwood; Bayer CropScience acquired US biopesticide company AgraQuest, German biopesticide company Prophyta and Argentine biological seed treatment business Biagro Group (in March 2014); and Syngenta acquired US biopesticide company Pasteuria Bioscience.

In 2013, big US-based companies became active. Monsanto acquired US agricultural biotechnology company, Agralis; formed a partnership with Danish company Novozymes to develop and commercialise biopesticides worldwide; and supported the establishment of a US company, Preceres, aimed at the development of delivery methods for RNAi-based biopesticides. FMC entered into an exclusive global collaboration with the Danish bioscience company, Chr Hansen. Arysta LifeScience consolidated its presence in the sector by acquiring French sustainable agricultural technology company Goëmar.

The last year from April 2014 onwards has been one of comparative stability with the focus being on licensing deals, consolidating the gains of the previous years and submitting registration dossiers for the acquired products. The biological product portfolios of most companies have also substantially increased with more products being commercially available now rather than companies simply talking about pipelines.

Among the niche biopesticide-based companies, the trend has been to go in for an increasing number of deals, either research-focused or with the aim of expanding distribution.

US company Marrone Bio Innovations (MBI) signed research agreements with: New Zealand Institute for Plant and Food Research, Japanese Kao Corporation, US Brookhaven Science Associates, Italian biostimulants firm Valagro, Dutch life sciences firm DSM Food Specialties and Israeli plant biotechnology firm Evogene. The move to new headquarters last year provided more space including tripling the space of the on-site greenhouse. That has given MBI new capacity for R&D. “We have added a new formulation lab and pilot plant with new capabilities for making granule formulations and several new fermentation tanks of all sizes and biological labs for expanded testing,” says chief executive officer Dr Pam Marrone.

Israeli biopesticide company Stockton expanded distribution for its biofungicide, Timorex Gold (Melaleuca alternifolia extract). “The Stockton Group is in a rapid commercial and geographical expansion process with Timorex Gold,” says chief executive officer Ziv Tirosh. The product is already registered in 30 countries worldwide and the company is continuing discussions to bring it to new geographies.

Company portfolios...

Let’s look at the portfolios and plans of some of the big crop protection companies and niche biopesticide players.

BASF’s biological crop protection product portfolio consists of naturally occurring organisms such as bacteria, fungi and beneficial nematodes that can be used to control pests or diseases. The company also offers nematicides to control parasitic nematodes. Another part of its portfolio comprises inoculants to improve plant nutrition and vigour. These are used as a seed treatment to improve nitrogen fixation.

BASF says that it has dozens of biological crop protection products in its portfolio for use on a wide variety of crops and geographies. The company plans to expand its offer in terms of broadening the uses for existing products in its portfolio and has recently launched a new biological fungicide, Serifer (Bacillus amyloliquefaciens strain MB1600). It is produced in a spore formulation and combines multiple modes of action. This biological fungicide exhibits broad-spectrum disease control such as Botrytis spp in grapes and strawberries, the company says. “We will see further applications in other important crops in the near future,” says senior vice-president of the Functional Crop Care global business unit Juergen Huff. Serifer was launched in North America (US and Canada) and Central America at the beginning of 2015 and will be launched...
in key countries in South America, Asia, and Europe starting in 2016.

Bayer CropScience sells about 20 biological brands globally with the present focus being on expanding registrations around the world. Major brands are Votivo (Bacillus firmus + clothianidin), Serenade (B subtilis strain QST 713), Sonata (B pumilus QST 2808), Requiem (extract of Chenopodium ambrosioides), Contans (Coniothyrium minitans) and BioAct (Paecilomyces lilacinus 251). The company also points out that it has different biological crop protection products in its pipeline that will be introduced from 2016 onwards.

Bayer’s integrated West Sacramento site in California opened in mid-2014, and is the global headquarters for research and development of biological crop protection products. “Here we take beneficial microbial products that fit the needs of growers around the world from discovery through to development and commercialisation,” says global head of marketing biologicals Ashish Malik. The expansion in Wismar, Germany, will support research facilities and production of biological products based on fungal microbes, such as BioAct and Contans.

Monsanto highlights a number of biological product offerings that are now commercially available through Monsanto BioAg, including TagTeam LCO (Penicillium bilaii), Optimize (Bradyrhizobium japonicum, lipo-chitooligosaccharide), Torque (lipo-chitooligosaccharide), QuickRoots (Trichoderma virens and B amyloliquefaciens), Actinovate (Streptomyces lydicus WYEC 108) and Met52 (Metarhizium anisopliae). “While we are proud of our current product offerings, we are also excited about the potential that lies ahead,” says global microbes commercial lead Brad Griffith. The initial focus of the new technologies under development is on broad acre crops, he adds. “The BioAg Alliance currently has two products in early development (one each in maize and soy) and we are in the process of testing a number of microbial strains on a scale never attempted before.” In 2014, the Alliance tested hundreds of microbial strains in 170,000 field plots across 70 US locations. In 2015, the Alliance plans
to more than double the number of field plots in the US and test thousands of microbial strains.

Syngenta gained access to *Pasteuria* spp-based bioinematicides when it acquired *Pasteuria* Bioscience in 2012. The company has since launched the *P. nishizawai*-based bioinematicide, Clariva pn, in the US and Canadian approval is round the corner with the Pest Management Regulatory Agency having proposed full approval in March. The company estimates peak sales potential for the product at over $200 million.

Arysta LifeScience’s (part of Platform Specialty Products) biopesticide portfolio comprises approximately 30 products. “It consists of our IPM range of natural enemies, including Carpovirusine, which is a virus-based insecticide with over 20 registrations globally and Biomite, a residue-free miticide suitable for resistance management,” says global head of BioSolutions Jean-Pierre Princen. It has launched *Beauveria bassiana*-based products, such as Ostrinil, inside its TechniPalm technology to protect palm trees against red palm weevils (*Rhynchosporus ferrugineus*), and more recently, Vacciplant, a seaweed-based product derived from the *Laminaria digitata* algae that stimulates the natural defence of plants against a wide variety of pests. “We expect to continue to grow our portfolio of biopesticides, aligned with our overall BioSolutions focus,” says Mr Princen.

Arysta produces a portion of the portfolio in-house (such as Carpovirusine, Ostrinil and Vacciplant), while sourcing other elements of the portfolio, such as its IPM range in Japan, from key partners.

MBI has nine products based on four active ingredients: Regalia (*Reynoutria sachalinensis* extract) for plant disease control and plant health, Grandevo (*Chromobacterium subsugae*), Venerate (*Burkholderia rinojensis*) and Zequanox (*Pseudomonas fluorescens*). MBI manufactures Grandevo, Regalia and Zequanox at its facility in Michigan. “We have a large pipeline of products including a downy mildew fungicide, bioherbicides, and biostimulants; the next up is a nematicide,” says Dr Marrone.

US company BioConsortia established its US headquarters in March 2014 and has completed the first year of limited US field trials. The company focuses on consortia of several beneficial microbe products rather than standalone microbes. The consortia “multi-task” with each microbe performing a distinct function, but all working together synergistically. The other benefit of consortia products is that the microbes are discovered and multiple product leads are created in about nine months, as opposed to the standard 3-4 years it takes just to discover one good microbe that can do just one thing very well, the company says. It began research through its proprietary Advanced Microbial Selection process. “We anticipate the release of first products by 2017 on maize, soybeans and wheat, as well as pasture, tomatoes and leafy vegetables,” says chief executive officer Marcus Meadows-Smith. “We are also working on collaboration with third parties for other crops that will likely be launched on a slightly later time scale,” he adds.

Stockton’s focus is solely on commercialising Timorex Gold. “Due to the fact that Stockton is a commercial company and not solely an R&D operation, we are involved in all stages of commercial development (either directly to the farmer or together with the distributor),” explains Mr Tirosh. Even though biopesticides have a clear value proposition, it is a work in progress to fit biopesticides in an optimal way to each relevant spraying programme and then continue working at optimisation, he adds. In some markets, Stockton claims to have been able to replace 25% of the conventional spraying programme working in conjunction with leading distributors.

Extending the efficacy of Timorex Gold to new crops has opened new markets. Crops such as rice or coffee, where the product performs well within the conventional spraying programmes, are adding growth and opening new horizons, Stockton says. The company is also positioning it as a bactericide, in addition to being a fungicide.

Brazilian company Ihara started to invest in biological products in 2009 and at the end of 2014, it created a separate Bio division. The company has four biopesticides in its portfolio, comprising three bioinsecticides and one biofungicide. “Among them is Gemstar (*Helicoverpa zea* nucleopolyhedrovirus), one of the most effective products on the market to fight against *H. armigera*, even recommended by Embrapa (Brazilian agricultural research corporation) to the producers,” says manager of Bio division Evandro Macente Sasano. Another bioinsecticide, Costar, is *Bt*-based.

**Expansion plans and pipelines . . .**

BASF says that Functional Crop Care, a global business unit of its crop protection division, focuses on solutions beyond conventional crop protection such as addressing abiotic stress, and it is one of BASF’s main growth fields in the agriculture industry. “In order to extend our technology basis in this strategically important area, we will continue to consider potential acquisitions, broaden our interdisciplinary work within research and development as well as leverage external partnerships,” Mr Huff says.

Bayer points out that with the acquisition of AgraQuest, Prophyta and BiAgro, it has an extensive portfolio of biological crop protection products for foliar, soil and seed treatment use.
LOOKING FOR COUNTRY LEADER

Job Description
Take responsibility of operating the whole business operation in a specified country, including marketing and sales, financial management, human resource management...

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- Make business plan in line with strategic objectives;
- Define sale channel, identify partners, brand building, strategies on price level, sales, product development;
- Can balance the sales for both new products and generic products;
- Give advice on product development based on deep analysis of local market;
- Set up suitable team structure according to different stages. If need, set up the local team, train and manage this team;
- Collect and submit specified reports as headquarter’s requirement;
- Coordinate with headquarter for financial, supply chain, human resource etc. these matters;
- Act as a team leader and in charge of all kinds of management work to keep well running of company.

Qualifications
- A minimum of 6-8 years’ experience in agrochemical area, 3 years and above senior management role is a plus;
- Have worked on marketing related position, as well as sales, no less than 5 years;
- Good leadership skills for building up, training, managing and guiding a whole team;
- Good business acumen for marketing analysis and strategic planning;
- Solid skill in brand building, sales and build customer relationships;
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Fax: +86-571-89229999
Website: www.udragon.cn
“We will however continue looking for opportunities that can complement and/or accelerate the development of solutions that meet our customers’ needs,” says Mr Malik.

Monsanto says that it will continue to seek innovation wherever it can find it. The company is encouraged to see many more start-ups becoming interested in this area. “Monsanto has a track record of both partnering externally and investing internally for success,” says Mr Griffith. “As we work with academics, partners, and others to develop our Agricultural Products platform, we currently focus on two core technologies: microbes and BioDirect.” The company is exploring microbes through the BioAg Alliance, which brings together Novozymes’ and Monsanto’s capabilities within microbial discovery, development and production. The Alliance is dedicated to fundamentally enhancing the research and development of microbial technology derived from natural materials to significantly increase productivity of the world’s crops. “We see continued opportunity to invest, partner and seek additional strength for our BioAg Alliance with Novozymes,” says Mr Griffith. “We are always looking for novel active strains and technology to increase options for growers,” he adds. “While we have excellent complementary expertise in the BioAg Alliance, we continue to welcome and actively partner with innovators.”

“With BioDirect technology, our researchers are using their knowledge of plant and pest genomes to develop targeted, new topical solutions for sustainable pest and virus control,” explains Mr Griffith. This technology leverages naturally occurring rocesses to develop products for potential use in topically applied crop protection and other products. These are all in early phases of research and development and include: BioDirect Bee Health to control varroa mites and multiple viruses to improve health and colony survival in honey bees; BioDirect Virus Control (Tospovirus Control) – this would be the first topically applied product to directly target a disease-causing plant virus; BioDirect Weed Control (for Palmer amaranth and waterhemp) – designed to target glyphosate-resistant weeds and provide a more effective spectrum of control, and using ag biologicals with existing herbicides to create new value through improved weed control; and BioDirect Insect Control (for Colorado potato beetle – *Leptinotarsa decemlineata*) – this is a biological pesticide potentially protecting crops from the pest (in January 2015, the Colorado potato beetle project advanced to Phase II – early development – of R&D).

Arysta says that the Goëmar acquisition has provided it with the Vacciplant range of products, which has “great potential synergies” with the company’s traditional crop protection offering, enabling the company to offer complete solutions to growers around the world. Furthermore, Goëmar is engaged in the research of new biocontrol products from natural resources and from different sourcing. “We will continue to explore internal and external opportunities to grow the BioSolutions portfolio, which we define as biopesticides (or biocontrol), in addition to biostimulants and value-added nutrients,” says Mr Princen.

Stockton plans to continue the “rapid expansion” around Timorex Gold into new markets in the coming year. It also plans to expand into additional crops and solutions. “In terms of our pipeline, we will continue developing it in preparation of the arrival of new formulations to the market as well as the continued expansion of our early stage screening and development,” says Mr Tirosh.

Impact of MNC entry . . .

BASF says that the biological pesticide market is diverse and will continue to expand as growers’ demands evolve. “Several larger crop protection companies have undertaken to complement their portfolios through acquisitions and in-house development of biological pesticides, which indicates some consolidation,” says Mr Huff. Meanwhile, however, smaller companies with specialised competencies advance their capabilities in this innovation-rich environment to maintain a niche market presence, to partner with larger companies on projects or to operate independently in the market space providing more service based business models. All are focusing on advancing new technologies for farmers worldwide.

Bayer feels that the entry of multinational companies has leveraged the acceptance of biological crop protection products in the market and has increased farmers’ understanding of how to integrate them in their farm management. “Smaller players who offer high-quality products that address farmer needs in a sustainable way, benefit from this increased understanding and acceptance,” says Mr Malik.

Monsanto is of the opinion that the markets for agricultural biologicals are as diverse and varied as the agricultural sector itself. There are growing opportunities in specialty crops, lawn and garden, as well as in row crops. This is an exciting sector that is still in its infancy. “The emerging agricultural biological technologies can be a supplement to every farmer’s toolbox and complement

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Best New Biopesticide 2013

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the integrated systems approach that is necessary in modern agriculture, combining breeding, biotechnology and agronomic practices to improve and protect crop yields,” says Mr Griffith.

Arysta points out that several start-ups from universities are engaged in this expanding world of new biopesticide research. “Many of them succeed, register and launch new products both in Europe and globally and often in partnership with large firms,” they say.

Dr Marrone says that the entry of the large players is good for everyone in the biopesticide sector, giving credibility to the segment. “There are many opportunities for partnering of small companies with large companies and smaller companies partnering with each other to provide scale and complementary capabilities,” he predicts.

Stockton’s Mr Tirosh points out that there was an initial, and short wave, of acquisitions followed by several years with no follow-on acquisitions. The space is still much segmented, with very few leading companies dedicated to this space. There is still a lot of exploration around biopesticides and a long and costly development processes. “As such, the big players will continue collaborating with the smaller, dedicated players in the near future in the field of biopesticides,” he predicts.

BioConsortia says that historically it has been relatively low-cost and easy for small companies to enter the biopesticide market, particularly in the US. “Small companies are often more nimble and innovative, and thus able to make discoveries of interest to the major players. This is the standard model in the pharmaceutical market,” says Mr Meadows-Smith. However, the cost of R&D has increased and the standard of product efficacy and consistency will increase as soon as the next wave of new biological products comes from the big players. “Therefore, the days when a small company can make a profit developing a low-cost product with inferior or inconsistent efficacy are numbered,” he cautions. This will probably deter companies that do not have a “great new product with IP” and good financing.

Biopesticides as products have traditionally been viewed as beset with problems related to formulations, storage and transport. Let us examine any progress on these issues.

**Formulation . . .**

BASF says that formulation technologies for biological crop protection products are largely dissimilar to those for chemical active ingredients. Since biological crop protection products are living organisms, specific fermentation and formulation technologies are required. “We have in-depth experience in fermentation and formulation technologies for biologicals, and we will continue to expand our technology base in this area, as it is crucial for growers’ continued success worldwide,” Mr Huff says.

In Bayer’s view, in general, formulation technologies for biological crop protection products are similar. However, when spores of bacteria or fungi need to be formulated, specialised know-how, experience and sometimes patented or trade secret techniques are needed to establish high quality, stable and lasting formulations.

Monsanto says that agricultural biologicals are typically topical or seed treatment products that are derived from or contain natural materials and formulation development is an important step in the development of any microbial product.

Arysta says that many biopesticides require novel formulation technologies to address the unique challenges of long-term stability and product viability. The company will continue to investigate new technologies and to work with industry leaders to develop and commercialise innovative formulations.

**Storage and distribution . . .**

BASF points out the difference in the properties of biological crop protection products. It says that some products, such as its biofungicide, Subtiles (Bacillus subtilis), are extremely stable. Others require some special handling, such as temperature-controlled environments for storage and transport. “As with any of our products, we continuously work to improve formulations, which includes ways to extend the shelf life and performance of biological crop protection products in order to extract their full potential in integrated pest management,” says Mr Huff.

Bayer says that most biological crop protection products that it markets can be stored and transported like chemicals. In some cases, the shelf life is limited or products need cooled storage. Such cooled storage requires special efforts but can be managed well.

Monsanto’s view is that the ability to develop and deliver robust formulations that enable usability in real agronomic systems is part of the success of its current BioAg commercial portfolio. That will remain an ongoing objective of the company’s new product development process.

Arysta says that only one of its biopesticides requires special handling and storage capabilities. “These are common requirements in the biopesticides segment and therefore we do not view these as a barrier to success since many companies and distributors are already prepared to handle the products appropriately,” says Mr Princen. Arysta has operated in this sector for years and has an efficient supply chain suitable for biopesticide products distribution to customers, he adds.

MBI maintains that most biopesticides do not have low shelf life. “Our ag products have shelf life of at least two years,” says Dr Marrone. The company uses established distribution channels for its products.

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In 2015, there is a place for both biopesticides and traditional agrochemicals in virtually all areas of agriculture. Researchers involved in fruit and vegetable, greenhouse, and row crop production say these two forms of crop protectants can be used solo or in tandem, depending on the situation. In either case, however, planning ahead is required.

In general, the biggest difference between these two classes of materials is selectivity. Most biopesticides are highly targeted in the pests they kill, and as a result have less impact on beneficials or natural enemies. Traditional agrochemicals, on the other hand, are often considered to be broad spectrum products.

Defining biopesticides and their benefits

Virtually everyone in agriculture understands the definition of a traditional crop protectant. The term “biopesticide,” however, may be a little murkier to most people. As defined by EPA, biopesticides fall into two major classes:

- Microbial pesticides consist of a microorganism (e.g., a bacterium, fungus, virus, or protozoan) as the active ingredient.
- Biochemical pesticides are naturally occurring substances that control pests by non-toxic mechanisms.

According to Shimat Joseph, IPM entomology advisor at the University of California, no matter which class a biopesticide falls into, the product generally provides several benefits to specialty crop growers including a fast breakdown of the residue and a reduction in non-target exposure or impacts. In addition, some products, such as Bacillus thuringiensis (Bt), act on specific pests at specific life stages.

In fact, Shimat says biopesticides are often a better fit for growers if used when the pest populations are below the economic threshold or at least the action threshold for traditional materials. In the case of Bt, early season applications to combat caterpillar pests when pressure is low can provide economic benefits by reserving applications of some of the more expensive conventional products for later in the production cycle.

Biopesticides’ complex modes of action also serve as an effective resistance management tool.

Angus Catchot, an entomologist at Mississippi State University, says row crop farmers can see many similar benefits with biopesticides. In particular, he says products containing a virus often are successful at suppressing pests, such as bollworms, and reducing non-target exposure, as well.

“Once [the virus] infects larvae, those larvae become a source of the virus, and it just keeps working and working,” Catchot explains. “These products actually take some of the pressure off the traditional insecticides from a resistance management standpoint.”

Working in tandem

In spite of the apparent cost benefits of off-patent traditional chemicals, using both biopesticides and traditional chemistries, sometimes in tandem, can help with resistance management, preserve beneficials, and offer a better environmental fit.

According to Catchot, often biopesticides can be rotated with other products for a cycle, reducing the chance for resistance to develop. The timing is earlier than for traditional products, however. “Put them out earlier and on a lower pest population, particularly if [the biopesticide] is some kind of virus,” he explains. “You want to give [the virus] time to infect, sporulate, and spread.”

Raymond Cloyd, a professor in the department of entomology at Kansas State University who focuses on insecticides and miticides in greenhouse vegetable, fruit and floral production, says biopesticides and traditional agrochemicals can be used in tandem to target all stages of an insect’s life. For example, he says applying Bt early in the season will kill young caterpillars. If a second generation develops later in the season or larger caterpillars are present, a traditional material, such as a pyrethroid, can be used. No matter the product, however, Cloyd says timing is critical.

“You want to time applications to kill the most susceptible life stage. That goes back to knowing the biology of the insect and mite pests, their behaviors, and understanding the pesticide you are using because some products are more effective.
on adults and some are more effective on eggs and nymphs. Make applications when the predominant life stages are susceptible to the material.”

Joseph says it is equally important to know the products’ properties. For example, biopesticides typically won’t disrupt other beneficial organisms.

“Some act on certain pests, certain life stages of the pest, function only during a given humidity/temperature range, and translocate within plants or act only by contact,” he explains. Joseph says once growers know how the products work and interact, both traditional agrochemicals and biopesticides can be used more strategically and effectively. He adds that preferred products will have activity against the pest, attack the vulnerable life stage, and have lower residual activity.

By combining biopesticide products with these strengths and traditional chemicals that can fill in the gaps for other stages or environmental conditions, growers are, in effect, adding a whole new set of tools to their crop protection tool box.

Biopesticides have become necessary tools for the preservation of trade around the world. The EU, of course, is leading the way with the establishment of maximum residue limits that create a de facto global standard. This regulatory reality is driving greater adoption of biopesticides, especially among horticulture producers. Global biopesticide sales are expected to reach $2.8 billion next year. That’s about 4% of the total crop protection market, according to CPL Scientific, an executive-search and business consultancy for companies working in specialty chemicals, biotechnology, animal health, pharmaceuticals and other industries. CPL estimates the sector will continue to grow 15% per year until 2020, when biological pesticide sales are projected to reach $6.6 billion.

**Distribution important to success**

Agriculture distributors are capitalizing on the heightened scrutiny generated by food safety laws by carrying more products to meet demand. In the 2014 Farm Chemicals International State of the Industry Survey, 78% of agricultural distributors, retailers and cooperatives reported an increased demand for biological products. Almost 40% of respondents from 46 countries are buying and selling biopesticides, up from 29% in 2009 when the survey began.

Most interesting is why the growth has been so strong: About half of respondents say grassroots consumer demand for pesticide-free foods is the No. 1 driver behind heightened demand for biopesticide products. The No. 2 demand (27%) is reported to be purchasing policies by large grocery retailers. Environmental/food safety regulations and demand from agriculture retailers were cited as driving adoption as well.

**Trade preservation**

Produce exporters from developed agriculture economies like the U.S. and Brazil and emerging agriculture economies in Africa and Southeast Asia all must adhere to agronomic practices that ensure the global viability of their produce and protect agricultural export GDP. In Turkey, for example, government subsidies have been put in place to encourage the use of integrated pest management and biological products to address the importance of the EU as a key destination of its produce.

Turkey’s Ministry of Agriculture is also reclassifying its pesticides based on residue limits. The Ministry is collecting residue data on crops and crop protection products to determine whether a product will be considered a plant health product or plant protection product.

This reclassification using MRLs will allow farmers to apply plant health products, biological products and certain traditional chemistries that don’t produce significant residues without a prescription, which applicators require in Turkey. Products that are classified as plant protection products will still require a prescription, and it is likely that any crop destined for sale in the EU will require prescriptions regardless of the products being used.

As a result of these measures, only 1.5% of Turkey’s produce is rejected for residues by the EU, Ministry of Agriculture Deputy Director General Dr. Nevzat Birisik told Meister Media in his office last year. By comparison, the EU’s European Food Safety Authority reported in June2014 that it rejects about 3% of all produce that enters the Union. EFSA scientists analyzed 79,035 samples of 647 types of food in 29 countries, looking for residues of 900 pesticides. Other countries, notably Brazil, are following suit with their own MRL thresholds that mimic the EU’s standard to modernize their production infrastructure.

Written by Bill Stoneman

Executive Director | Biopesticide Industry Alliance (BPIA)

Meet Bill Stoneman and colleagues of the BPIA at the upcoming BPIA Registration Workshop, taking place at the Renaissance Arlington Capital View Hotel, Arlington, VA on September, 15 - 16, 2015. This 1½ day workshop and training event aimed at companies wishing to register or gain a further understanding of the requirements involved in registering a biological pesticide in the United States.

Further information and registration can be made by visiting http://www.bpiaconference.com/
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Biopesticides

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Stockton says that the difficulties relate to microbial-based biopesticides, which is where most of the industry is focused. The company’s focus is on botanical-based molecules, which have “substantially fewer challenges” relating to formulation, shelf life, storage or transportation.

Registration . . .

The biopesticide industry has been asking for years for a simpler approval process for biopesticides compared with conventional pesticides. Have things become any simpler?

BASF says that biologicals can be used as biological crop protection, soil amendment agents, seed treatments or for other purposes depending on their inherent properties. Depending on these factors, they may fall under different regulations. Some regulatory approaches allow companies to make the products more quickly available to growers, it adds. For instance, if the biological crop protection product is naturally occurring, has been already investigated and has a non-toxic mode of action, authorities can rely on existing information. “Consequently, less time is needed to produce all of the data that may be required for a new chemical crop protection product,” Mr Huff explains. Further, in some countries such as Brazil, regulation supports a faster review time for biological crop protection products. Naturally occurring biological stimulants fall under a different regulatory framework than plant protection. Their safety also has to be demonstrated, but nevertheless, such products can be placed on the market comparatively faster than chemical crop protection products.

After registration . . .

Bayer points out that all biological and chemical crop protection products are regulated to the same high safety standard. However, some of the regulatory studies performed may vary since some of the typical chemical data requirements are not applicable for biological substances. The process for registering biological crop protection products varies country by country. The company notes that the US EPA has a separate division that works on biological crop protection products, which often leads to faster reviews. Brazil is using a process for certain biological products that makes expansions of labelled uses faster. Other countries use tier-based approaches, which means some chronic toxicity studies can be waived. “A similar approach to that of the US has been recently introduced in the Netherlands by the Ctgb under the project title ‘the Green Deal’, which significantly speeds up registration of biological products,” says Mr Malik.

Monsanto says that the specific regulatory path is determined by the microbial product characteristics and proposed uses.

Aryста feels that in some cases, the registration process for a new biopesticide may be facilitated and faster when compared to a new chemical pesticide. “However, regulations are still evolving and are not yet harmonised around the world,” says Mr Princen.

MBI contends that the registration of biopesticides has, in fact, become more cumbersome. “Europe was supposed to be faster under the new zonal rules, but the opposite occurred,” points out Dr Marrone. Brazil is improving in speed. “US EPA is getting closer to the statutory timelines for approval but all regulatory bodies are asking for additional information for novel microbes without a history at the EPA,” she says

Stockton says that the regulatory requirement for biopesticides is very location specific. In some countries there are certain waivers while in other countries, there are not. “But, regardless, it is neither a rapid or cheap process,” says Mr Tirosh.

BioConsortia says that for many years, the US EPA has had a logical, favourable and faster (18 month) process for biopesticides and biofertilisers (PGRs), with biofertilisers being registered in a very fast process (often done in a matter of months) at the state level. “The EPA have said they plan to maintain this logical approach, though they are going to review the guidelines and process for biofertilisers and biopesticides,” says Mr Meadows-Smith. This might lead to longer registration times and additional data requirements. The EPA is very aware of the recent M&A activity, entry of the big players and increased volumes. “The EU remains frustrating, as it is the market with the biggest need for biopesticides for resistance management, given the delisting of many traditional pesticides, and for residue management, given the lower pesticide residue limits set by some of the supermarkets and food value chain,” he adds.

Ihara says that the process in Brazil is simpler because biological products require the presentation of fewer studies. He adds that the presentation of fewer studies compared with chemical pesticides. “What happens in the case of bio products is that it is not necessary to submit chronic toxicological studies (can be required in a second step, but is unusual), as well as there is no need for residue studies in crops presentation,” explains Mr Sasano. Another positive point is that since 2014 biological products based on micro-organisms are now recorded by target purposes depending on their inherent properties. Depending on 2014 biological products based on micro-organisms are now recorded by target purposes depending on their inherent properties. Depending on their inherent properties.

No longer niche . . .

BASF will continue to focus its research and development both in seed treatments and foliar applications. “We provide biological crop protection products for field use, such as Broadband (Beauveria bassiana strain PPRI 5339) or PL Gold (Paecilomyces lilacinus strain BCP2),” Mr Huff says. Broadband is registered for the control of mites, thrips, whiteflies and

(continued on page 14 . . .)
Sustainable and productive agriculture needs a continuously innovative approach for improved management of crop production. SGS provides services in the following activities:

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Tel.: +41 22 739 9111
Email: seed.crop@sgs.com
Biopesticides

(. . . continued from page 12)

diamondback moths on specified field crops. PL Gold, a second-generation ovicide product, is registered for the control of parasitic nematodes.

Bayer says that biologicals will provide new growth opportunities in agriculture. “We are looking at market opportunities in all crops, primarily in fruits and vegetables, but also in broad acre crops such as soybeans and oilseed rape, including seed treatment applications,” says Mr Malik. He cites the example of Poncho/Votovo as a combination seed treatment product that protects maize and soybean seeds against nematode damage. “In general, we see high potential for innovations in the area of biologicals for a range of uses, from additional seed treatment and specialty crop uses to broader use in row crops,” he adds.

Monsanto says that ag biological products on the market today include inoculants and nutrients, as well as biopesticides, such as insecticides, fungicides, nematicides and herbicides that can complement or replace agricultural products. Agricultural biologicals can be used to complement or replace agricultural chemical products. Microbial technologies could offer real benefits to growers like season-long insect control and disease protection that protects plant vigour, in ways that some chemical solutions cannot provide, it adds.

It is exploring the development of ag biological solutions for both row crops as well as specialty crops. The BioAg Alliance currently has two products in early development with a focus on broad acre crops (one each in maize and soybeans). Additionally, the microbial products currently commercialised through Monsanto BioAg include solutions for both, broad acre and specialty crops. One of its BioDirect product concepts currently in early phases of research and development also aims to target row crops.

BioConsortia says that the series of acquisitions starting in 2012 was essential for the transformation of the biological market. It has increased the awareness and credibility of microbials with all growers and moved biologicals from a niche position mainly in fruit and vegetable residue management to conventional agriculture and even row crops.

Ihara says that in Brazil, biopesticides based on Bt and viruses account for a larger share of the market, especially in soybeans and maize. But their use is not limited to just these two crops. “There are records of a satisfactory efficacy in various crops, such as peanuts, for example,” says Mr Sasano.

Outlook . . .

It seems evident from the reaction of the bigger companies as well as niche players that biopesticides are becoming an intrinsic part of the crop protection portfolios of all these companies with the foreseen usage not being limited to specialty crops any more. “Biological crop protection products for use in agriculture represent an exciting growth opportunity,” says Mr Malik.

Stockton points out the several industry-related reasons including, but not limited to, the successful market education around the value proposition of biopesticides and the growing conviction by farmers and industry professionals. “This evolution of thinking has allowed for a quicker adoption rate,” says Mr Tirosh.

Monsanto expresses its commitment to exploring a broad range of solutions to help nourish the world. “We believe that ag biologicals hold great promise and can expand customer choice,” says Mr Griffith. The company estimates ag biologicals to represent a growing market segment of roughly $2.6 billion in annual sales, “which reflects an increasing interest among consumers, farmers and companies like Monsanto to produce food in a sustainable way”. Monsanto points out the ongoing innovation in the sector as entrepreneurs seek to develop the next generation of products.
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The BPIA (Biopesticide Industry Alliance) and TSGE Forum, in cooperation with the US EPA BPPD returns to Arlington, VA for the second annual BPIA Registration Workshop - a 1½ day workshop and training event.

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• Gain practical advice, guidance and updates on the requirements and key challenges for the registration of biopesticides in the United States
• Hear from the US Environmental Protection Agency (EPA), Biopesticide division staff
• Network with key representatives and other industry service providers

WHEN
September 15 - 16, 2015
(prior to the BPIA Fall Semi-Annual Meeting)

WHERE
Renaissance Arlington Capital View Hotel,
Arlington, VA

PRICE
$650 (inclusive of 1½ day workshop and drinks reception)

WHO SHOULD ATTEND
Industry representatives, service providers such as consultants, lawyers and contract laboratory scientists and managers involved with biopesticide registrations.

Should you wish to register or would like to discuss sponsorship opportunities, please contact us:
T: +44 (0) 1423 863 522 | E: enquiries@tsgeforum.com

www.bpiaconference.com
Biopesticide company mergers, acquisitions and deals

2014

The US agricultural biologicals company, Advanced Biological Marketing (ABM), entered into an agreement with Dutch seed treatment firm Incotec to combine ABM’s inoculants with Incotec’s seed coating technologies.

Arysta LifeScience acquired French sustainable agricultural technology company Goëmar from parent companies BeCapital and Pechel Industries.

The US agricultural biotechnology company, AgBiome, entered into a microbial research partnership with Syngenta subsidiary Syngenta Biotechnology.

Bayer CropScience acquired the sole European distribution rights to its biofungicide, Contans WG (Coniothyrium minitans), from Belgian crop protection company Belchim.

Bayer agreed to acquire Argentine seed treatment business Biagro Group. The company produces and distributes biological seed treatments.

Mitsui & Co’s agrochemical distribution company, Certis USA, granted exclusive marketing rights for eight biopesticides in Mexico to Sumitomo Corporation subsidiary Summit Agro Mexico.

The US biopesticide company, EcoPesticides, acquired an exclusive global licence to encapsulation technology from the University of New Mexico’s technology transfer and development organisation, STC.UNM.

US biopesticide company Marrone Bio Innovations (MBI) signed a research agreement with the New Zealand Institute for Plant and Food Research for the development of biopesticides and plant health products.

MBI gained a licence from the Japanese Kao Corporation for an active ingredient aimed at boosting yields through stress resistance.

MBI gained an exclusive licence to an unnamed plant endophyte from US Brookaven Science Associates for increasing yield and providing drought tolerance.

(continued on page 18 . . .)
MBI and the Italian biostimulants firm, Valagro, agreed to collaborate on the discovery and development of biopesticides and other bioactives.

MBI and the Dutch life sciences firm, DSM Food Specialties, signed a collaborative agreement involving early-stage research of several biological active ingredients.

MBI and Israeli plant biotechnology firm Evogene reached a multi-year agreement aimed at the joint discovery of new modes of biological action for insect pest control.

Monsanto and Danish company Novozymes completed the formation of their BioAg partnership. The companies agreed to form the alliance in December 2013 to develop and commercialise biopesticides and other microbial products worldwide.

Monsanto supported the establishment of a new US company, Preceres, aimed at the development of new delivery methods for RNAi-based biopesticides.

2015

Swiss biopesticide company Andermatt Biocontrol acquired a 21% stake in South African biological biological farming products firm Madumbi Sustainable Agriculture, taking its holding to a majority 61% share.

Arysta LifeScience’s (part of Platform Specialty Products) Japanese subsidiary, Arysta Japan, signed a renewed collaboration agreement with Dutch bioproducts company Koppert Biological Systems.

The US agrochemical company, Brandt, agreed to market and distribute US company Proptera’s rhamnolipid-based biofungicide, Zonix, throughout the US.

The US biopesticide company, EcoPesticides, signed a co-operative research and development agreement with the USDA’s Agricultural Research Service to further validate its micro-encapsulation technology.

French contract research company Staphyt acquired the Italian contract research firm, Agrobiocontrol.

Nufarm entered into an agreement with US crop protection and nutrition company Verdesian Life Sciences to distribute Verdesian’s biopesticide, Bloomtime (Pantoea agglomerans strain E325), in the US and Canada.

The US biopesticide companies, Phylom BioProducts and Vestaron, entered into research and development collaboration aimed at developing novel bioinsecticides.

Israeli biopesticide company Stockton Group appointed Agroklinge as the sole distributor of its biofungicide, Timorex Gold (Melaleuca alternifolia extract), in Peru.

Sumitomo Corporation subsidiary Summit Agro Chile gained exclusive rights to sell Chilean biopesticide supplier BioAgri’s products worldwide excluding Spain and the US.

Sumitomo Chemical subsidiary Valent BioSciences and Spanish marine biotechnology company Biomar Microbial Technologies agreed to collaborate on the development of biopesticides and biorational products.

Stockton entered into a distribution agreement with South Korean agrochemical company Atlatech for Stockton’s biofungicide, Timorex Gold (Melaleuca alternifolia extract).

Stockton agreed a distribution deal with Syngenta in Argentina for its Melaleuca alternifolia extract-based biofungicide, Timorex Gold.

Stockton appointed Canadian agrochemical company Engage Agro as its exclusive distributor of the biofungicide, Timorex Gold (Melaleuca alternifolia extract), in Canada for fruit, vegetables and specialty crops.

Sumitomo Chemical’s US-based biopesticides and biorational products subsidiary, Valent BioSciences, acquired the US company, Mycorrhizal Applications.

Valent BioSciences and Swiss sustainable company Evolva agreed to co-develop and commercialise active ingredients for use in “next-generation agricultural bioactives”.
## 2014

<table>
<thead>
<tr>
<th>Company &amp; active ingredient</th>
<th>Use</th>
<th>Status</th>
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</thead>
<tbody>
<tr>
<td><strong>Biopesticides</strong></td>
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<tr>
<td><strong>Company &amp; active ingredient</strong></td>
<td><strong>Use</strong></td>
<td><strong>Status</strong></td>
</tr>
<tr>
<td>AgBiTech</td>
<td><strong>Helicoverpa ze a ABA NPV [bioinsecticide]</strong></td>
<td>Sorghum, cereals, alfalfa, cotton, potatoes, oilseeds, pulses, fruit, vegetables &amp; ornamentals</td>
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<tr>
<td>Andermatt Biocontrol</td>
<td><strong>Helicoverpa armigera NPV [bioinsecticide]</strong></td>
<td>Fruit, vegetables, arable crops &amp; ornamentals</td>
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<tr>
<td>Arysta LifeScience</td>
<td><strong>Metarhizium anisopliae [bioinsecticide]</strong></td>
<td>Aubergines, cucumbers &amp; peppers</td>
</tr>
<tr>
<td>Bayer CropScience</td>
<td><strong>Bacillus firmus strain I-1582 [bionematicide]</strong></td>
<td>Carrots, tomatoes, aubergines, courgettes, melons &amp; tobacco</td>
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<tr>
<td>FuturEco BioScience</td>
<td><strong>Bacillus pumilus QST 2808 [biofungicide]</strong></td>
<td>Approved in <strong>EU</strong></td>
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<tr>
<td><strong>Koppert Biological Systems</strong></td>
<td><strong>Streptomyces lydicus strain WYEC 108 [biofungicide]</strong></td>
<td>Approved in <strong>EU</strong></td>
</tr>
<tr>
<td>Marrone Bio Innovations</td>
<td><strong>Trichoderma harzianum strain T22 [biofungicide]</strong></td>
<td>Field crops, greenhouse crops &amp; greenhouse ornamentals</td>
</tr>
<tr>
<td>Phyllov BioProducts</td>
<td><strong>Burkholderia</strong>* spp strain A396 [bioinsecticide/ acaricide/ nematicide]</td>
<td>Arable crops, fruit, vegetables, turf &amp; ornamentals</td>
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<tr>
<td>Stockton</td>
<td><strong>Reynoutria sachalinensis extract [biofungicide]</strong></td>
<td>Fruit &amp; vegetables</td>
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<tr>
<td><strong>Verdesian Life Sciences/ Northwest Agricultural Products</strong></td>
<td><strong>Bacillus thuringiensis subsp galleriae [bioinsecticide]</strong></td>
<td>Turf, ornamentals &amp; arable crops</td>
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<tr>
<td>Melaleuca alternifolia extract [biofungicide]</td>
<td>Agricultural &amp; horticultural crops</td>
<td>Approved in <strong>US</strong> as Timorex Gold</td>
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<tr>
<td><strong>Vestaron</strong></td>
<td><strong>Pseudomonas fluorescens strain D7 [bioherbicide]</strong></td>
<td>Cereals, grass grown for seed, alfalfa, rangeland &amp; non-crop areas</td>
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<tr>
<td>GS-omega/kappa-Hxtx-Hv1a [bioinsecticide]</td>
<td>Turf, ornamentals &amp; edible crops</td>
<td>Approved in the <strong>US</strong> as Versitude</td>
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</table>

## 2015

<table>
<thead>
<tr>
<th>Company &amp; active ingredient</th>
<th>Use</th>
<th>Status</th>
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</thead>
<tbody>
<tr>
<td>Anatis Bioprotection</td>
<td><strong>Beauveria bassiana strain ANT-03 [bioinsecticide]</strong></td>
<td>Fruit, vegetables, field crops, turf &amp; ornamentals</td>
</tr>
<tr>
<td>Andermatt Biocontrol</td>
<td><strong>Autographa californica nucleopolyhedrovirus strain FV11 [bioinsecticide]</strong></td>
<td>Greenhouse-grown cucumbers, peppers &amp; tomatoes</td>
</tr>
</tbody>
</table>

(continued on page 20 . . .)
### Biopesticides

(continued from page 19)

<table>
<thead>
<tr>
<th>Product Description</th>
<th>Application</th>
<th>Approval Location</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cydia pomonella granulovirus</strong></td>
<td>Pome &amp; stone fruit &amp; walnuts</td>
<td>Approved in France</td>
</tr>
<tr>
<td><strong>Andermatt Biocontrol/FMC</strong></td>
<td>Helicoverpa armigera nucleopolyhedrovirus [bioinsecticide]</td>
<td>Soybeans</td>
</tr>
<tr>
<td><strong>BASF</strong></td>
<td>Trichoderma asperelloides strain JM41 R [biofungicide]</td>
<td>Soil &amp; growing media in greenhouses</td>
</tr>
<tr>
<td><strong>BioProdex</strong></td>
<td>Tobacco mild green tobamovirus strain U2 [bioherbicide]</td>
<td>Pastures &amp; wooded areas</td>
</tr>
<tr>
<td><strong>FMC</strong></td>
<td>BLAD [biofungicide]</td>
<td>Grapevines, strawberries, tomatoes, almonds, stone fruit &amp; ornamentals</td>
</tr>
<tr>
<td><strong>Koppert Biological Systems</strong></td>
<td>Trichoderma harzianum strain T22 [biofungicide]</td>
<td>Field crops, greenhouse crops &amp; greenhouse ornamentals</td>
</tr>
<tr>
<td><strong>Mitsui &amp; Co</strong></td>
<td>Bacillus amyloliquefaciens subsp plantarum D747 [biofungicide]</td>
<td></td>
</tr>
<tr>
<td><strong>Stockton</strong></td>
<td>Melaleuca alternifolia extra [biofungicide]</td>
<td>Coffee, grapevines, fruit &amp; vegetables</td>
</tr>
</tbody>
</table>

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Rimsulfuron + Thifensulfuron
Tebuconazole + Imazalil
Imidacloprid + Tebuconazole
Chlorpyrifos + Cypermethrin

REMARK-Products with * are under research, more details, welcome to contact with us freely.
Global biopesticide regulations – challenges, opportunities and future prospects

Dr Philippa Guest

Biopesticide regulation is a complex and dynamic field. The key challenge facing regulators is to develop predictive and efficient regulatory processes that ensure product safety and consistency without inhibiting commercialisation. This is especially vital for the many small- and medium-sized enterprises (SMEs) in this sector where lengthy registration delays and disproportionate data demands can have a major impact on their willingness and ability to submit products for regulatory review.

An extensive body of regulatory and industry experience already exists with biopesticides. There are some clear examples of regulatory innovation as well as good (and bad) regulatory practice. Some countries are clearly leading the way whereas others are lagging behind.

Rapid growth . . .

Estimates of market size vary but there is broad consensus that global biopesticide sales increased from around $600,000 in 2003 to around $2.8 million in 2014, and are projected to reach $6.6 million by 2020.

Biopesticides currently constitute the fastest growing market sector for crop protection with a compound annual growth rate of over 15%. The largest regional market is Europe, followed by North America, Asia Pacific, Latin America and Africa/Middle East, respectively. The value and growth rate of different product types varies by region but overall, biochemicals is the largest and most rapidly growing segment.

Key drivers of growth include: political and societal pressure for greener, safer and more sustainable crop protection products; retailer demands for low or no residues on food crops; an increasingly tough regulatory climate for chemical products; resistance development to existing conventional chemical pesticides; and a lack of novel chemistry. Additionally, technological advancements that deliver improved biopesticide product performance are helping to build credibility with growers and input suppliers.

The sector has attracted increasing attention from the larger multinational agrochemical companies who recognise the value of biopesticides in managing residues; extending the life cycles of conventional chemical products; reducing regulatory costs and timelines for new product development; and providing an opportunity to offer complete solutions to growers through a combination of biological and chemical crop protection products.

Dynamic sector . . .

The past five years has witnessed a flurry of research and development and commercial agreements as well as a number of acquisitions. Such developments are expected to significantly increase market access and global presence for biopesticides through faster product commercialisation, increased R&D investment and more effective technology transfer to growers.

Registration is widely perceived to be one of the biggest hurdles to successful commercialisation of biopesticide products. The regulatory system in many countries has been designed for conventional chemical pesticides and has difficulty in responding to the different properties and characteristics of biological products.

Inappropriate evaluation methods and disproportionate data requirements often result in a long and cumbersome registration process that is unnecessarily costly. Product developers, often SMEs, are discouraged from applying for registration or find the process to be unduly lengthy, onerous and expensive.

Regulatory hurdles . . .

The registration process is further complicated by different regulatory frameworks, most notably in the key markets of North America and the EU. For example, although data requirements for registering a microbial pesticide in the US and the EU are similar, the registration processes are markedly different.

Legislation for registration of semiochemicals, microbial and botanical/biochemical biopesticides has evolved slowly, with most countries initially following their own procedures, usually based on requirements designed for chemicals.

The US EPA has led the way in simplifying the registration process for these product groups through the development of modified test methodologies with reduced data requirements that have significantly lowered registration timelines and costs.

(continued on page 25 . . .)
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• Fluoroxyprpy
• Bipyridox-Sodium

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• Spinosad

• Lufenuron
• Fipronil
• Thiamethoxam

fungicide
• Carbendazim
• Propiconazole
• Pyraclostrobin

• Chlorothalonil
• Diniconazole
• Pyraclostrobin
• Iprodione
• Procymidine
• Cyproconazole
• Mepronazole

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In the EU, biopesticides are assessed using the same regulatory model as chemical pesticides while the US operates a separate, less extensive set of data requirements. Furthermore in the EU, biological efficacy must be shown to be comparable to that of chemical counterparts to obtain registration at member state level. As a result, registration of a particular biopesticide product in the EU can take at least 3-4 times longer and is considerably more expensive than in the US.

A common finding for many countries in the key North American and European markets is that data requirements continue to become ever more demanding. Regulators are requesting new “non-standard data” requirements, often late in the registration process, making the timelines longer and unpredictable. Additionally, increasing numbers of biopesticide registrations coupled with fewer staff and resources in the regulatory agencies are leading to slower review processes.

Global standards . . .

At a global level, the OECD’s Biopesticides Steering Group is responsible for harmonising regulatory data requirements for biopesticides and facilitating work sharing between governments of member countries. There is a special focus on developing detailed guidance and decision criteria to support regulatory authorities with biopesticide risk assessments.

Regulation of macrobials is generally (but not always) handled under the auspices of agencies and legislation covering plant quarantine rather than plant protection. Most countries have regulations in place regarding the import and release of non-indigenous invertebrate biological control agents (IBCA). There is typically no regulatory oversight of releases of indigenous organisms.

Several international initiatives have generated useful guidelines and recommendations for simplified assessments and authorisations of IBCA; key contributions have been made by the UN FAO, the International Plant Protection Convention, OECD and the European and Mediterranean Plant Protection Organization. The most well-established national schemes can be found in Australia, New Zealand, the US and Canada.

Major steps have been taken at OECD, North American and European levels to promote a harmonised approach to biopesticide regulation development and facilitate work sharing between governments.

Dr Philippa Guest is the managing director of sustainable agriculture consultancy Agronomica.

♦ For further details of the Agrow Global Biopesticides Regulation Report, visit: https://store.agra-net.com/reports/globalbiopesticideregulation15.html
Sichuan Leshan Fuhua Tongda Agro-Chemical Technology Co., Ltd. specializes in glyphosate manufacturing, with current annual Glyphosate 95% Tech production capacity of 120,000MT (glycine route). It is the largest producer in China and the second largest world-wide. Fuhua is projecting an increase in capacity of 120,000MT per annum in three years’ time by fully utilizing the advantages of its integrated industrial production chain involving phosphorus, brine, glyphosate and silicone, making it to be the most competitive glyphosate producer in the field. The factory is located in Leshan city, Sichuan Province, an area with extensive resources for glyphosate manufacturing, while the international sales office is located in Shanghai and Singapore. Fuhua exports glyphosate to America, Asia, Africa, Oceania and Europe, with over 2000 employees around the world.

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Despite having become a global leader in pesticide manufacturing, the structure of China’s agrochemical industry has long been seen by Chinese industry experts as backwards and in need of modernisation. In late 2010, China issued a raft of pesticide industry policies aimed at updating its industry. They were jointly published by the Ministries of Industry and Information Technology (MIIT), of Environmental Protection, and of Agriculture, and the General Administration of Quality Supervision, Inspection and Quarantine.

One of the major targets of those policies was to reduce the overly fragmented, small-scale nature of pesticide manufacturing in the country by increasing industry consolidation. The targets were linked with the country’s 12th five-year plan (2011-15), and stipulated that by the end of 2015, the number of pesticide companies in China should have been reduced by 30%.

Almost five years later, Chinese commentators are saying that the country’s pesticide industry is unlikely to achieve its end-of-year consolidation goal. The newswire, China Chemical Industry News, has said that hitting the consolidation target is “already practically impossible”. China is already beginning to draw up plans for its next five-year plan (2011-15), and stipulated that by the end of 2015, the number of pesticide companies in China should have been reduced by 30%.

In 2015, the Chinese government set a target of cutting the number of pesticide companies by 30% between 2011 and 2015. The target was to be achieved by government decree. However, despite many companies announcing they were going to retire from the pesticide market, the number of companies remained high. In 2016, the MIIT began publishing details of mergers and acquisitions more attractively, and sure enough, companies were exempted from turnover tax on asset restructuring activities.

The MIIT began publishing details of mergers and acquisitions in 2011, after the industry targets were announced. More recently, it has taken to publishing details of companies that are voluntarily retiring from the pesticide market in a bid to promote consolidation. Before May of this year, five agrochemical companies had “voluntarily given up” their pesticide production businesses and left the Chinese market, with the unspecified “assistance” of other chemical companies. The MIIT has published the details of another company that has exited the pesticide market this month, bringing the tally so far this year to six. All companies to do so have been manufacturers of pesticide formulations. While it might be easy to dismiss such reports as “too little, too late”, and even if its end-of-year consolidation target has proven unrealistic, China is nevertheless working hard to streamline one of the world’s most fragmented pesticide industries.

**Five Chinese companies exit pesticide market**

Five agrochemical companies have “voluntarily given up” their pesticide production businesses and left the Chinese market so far this year, reports the country’s Ministry of Industry and Information Technology (MIIT). All five have done so with the assistance of other chemical companies. The MIIT has published their details in a bid to promote industry consolidation. The companies were relatively small-scale manufacturers of pesticide formulations. Chinese analysts believe that the country will miss its industry consolidation target of cutting the number of pesticide companies by 30% between 2011 and 2015.

**China’s top formulators up in 2014**

Sales for China’s top 30 agrochemical formulation companies increased by 13.4% to Yuan 14,031 million ($2,261 million at the current rate) in 2014, reports the China Crop Protection Industry Association (CCPIA). The ranking only includes companies whose main business is the sale of pesticide formulations.

Shenzhen Noposion retained the top spot for the fourth year running with Yuan 2,203 million ($355 million) in annual sales. Noposion’s sales grew by over a quarter last year. Jiangsu Rotam Chemistry followed in a distant second place, with Yuan 1,388 million ($224 million) in sales, and Guangxi Tianyuan Biochemistry came in third with Yuan 1,069 million ($172 million).

The barrier for entry into the top 30 was raised by 27% to Yuan 185 million ($30 million). In the latest ranking there were four companies that recorded annual sales of over Yuan 1,000 million ($161 million). Growth was more pronounced for formulators than for manufacturers of technical material, the CCPIA says.
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- Difenconazole 95% TC, 250g/l EC
- Mancozeb 85% TC, 80 WP
- Terbucenazole 95% TC, 250g/l EW
- Azoxystrobin 95% TC, 250g/kg SC
- Dimethomorph 98% TC, 500g/kg WP

2,4-D 98% TC, 720g/l, 860g/l Amine Salt
Atrazine 95% TC, 80 WP
Glyphosate 95% TC, 360g/l, 450g/l SL
Oxadiazon 95% TC, 125g/l EC
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China’s top 100 sales up 9%

China’s top 100 agrochemical companies saw their sales increase by 9% to Yuan 106,334 million ($17,135 million at the current rate) in 2014, reports the China Crop Protection Industry Association (CCPIA). The figures come from this year’s ranking of the country’s top pesticide companies, based on last year’s agrochemical sales.

This represents a slowdown in growth, as the top 100 in 2013 enjoyed sales expansion of nearly a quarter. The CCPIA suggests that the top 100 is unlikely to see double-digit growth in the coming years. The barrier for entry to this year’s top 100 increased from Yuan 297 million ($48 million) to Yuan 324 million ($52 million).

The top spot this year is held by Zhejiang Wynca Chemical, with 2014 sales of Yuan 3,805 million ($613 million). Some manufacturers of the herbicide, glyphosate, such as Zhejiang Jinfanda and Jiangsu Yangnong, dropped down the top ten. Nanjing Redsun came in third, on the back of strong pyridine and paraquat performance.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Province</th>
<th>Company</th>
<th>Sales ($ million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Zhejiang</td>
<td>Zhejiang Wynca Chemical</td>
<td>3,805 (613)</td>
</tr>
<tr>
<td>2</td>
<td>Beijing</td>
<td>Huapont Nutrichem</td>
<td>3,737 (602)</td>
</tr>
<tr>
<td>3</td>
<td>Jiangsu</td>
<td>Nanjing Redsun</td>
<td>3,547 (572)</td>
</tr>
<tr>
<td>4</td>
<td>Shandong</td>
<td>Rainbow Chemical</td>
<td>3,097 (499)</td>
</tr>
<tr>
<td>5</td>
<td>Zhejiang</td>
<td>Zhejiang Jinfanda Biochemical</td>
<td>3,025 (487)</td>
</tr>
</tbody>
</table>

China unveils pesticide brand sales rankings

Zhejiang Wynca Chemical’s 30% glyphosate aqueous solution, branded as “Nongxingwang” took China’s herbicide sales ranking for 2014, according to China’s Crop Protection Industry Association (CCPIA). The ranking lists China’s crop protection brands by annual domestic sales, although sales figures were not released.

Zhejiang Wynca also led the CCPIA’s overall sales ranking for the year (see this issue). Shandong Luba Chemical came in second with its 20% paraquat aqueous solution, “Xunchu”. Other active ingredients to make it into the top ten were 2,4-D, acetochlor and bentazon.

The top ten of the insecticide ranking was dominated by miscible oil formulations, followed by water-dispersible granules. The top spot was taken by Beijing Yoloo Pesticide’s 80% nitenpyram/pymetrozine water-dispersible granule formulation, “Saofei”. Shenyang Sciencreat Chemicals’ “9080”, a 10% suspension agent of the company’s own pesticide ai, SYP-9080, was fifth in the insecticide ranking.

In the fungicide ranking, the top ten was comprised of more established products. The leaderboard was topped by Limin Chemical’s “Limin”, an 80% mancozeb wettable powder. Other ais such as carbenzadizam, tebuconazole and hexaconazole all featured in the top ten. In terms of new products, Jaingsu Pesticide Research Institute’s “Jinhu”, a 25% suspension agent of its own ai, JS399-19, was third on the list.

The plant growth regulator brand sales ranking was led by Chengdu New Sun Crop Science, with its 0.0075% brassinolide-ethyl aqueous solution, “Meiduoshou”. Three of the top ten best-selling plant growth regulator products were brassinolide-ethyl formulations, while second and third place were taken by gibberellic acid formulations.

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BCPC Congress offers a varied programme for all stakeholders in EU Regulation

The BCPC Congress (EU Regulatory Affairs), organised by BCPC (the British Crop Production Council), in association with TSIE Forum, will again be held at the Hilton Metropole, Brighton, UK on 6-7 October 2015. In the past, BCPC’s Brighton conferences were hugely popular to a global audience in the crop production industry. The days of large events in this sector have now long gone – attendees are looking for more targeted events in key areas of technical and political interest, but still with strong science content, networking and opportunities for conducting business. The BCPC Congress was re-launched in Brighton in 2013, with a focus on providing an event for those working in European Regulatory Affairs, and this has proved a highly popular event.

In addition to its events, BCPC provides views and responses to government consultations, most recently on EU regulatory topics such as EFSA residues surveys, on endocrine disruptor regulation, and agricultural biotechnology. These topics are well represented at the 2015 Congress; which has an upbeat theme – “A Positive Outlook for the Regulation of Pesticides in Europe?” A full and varied programme is already in place, which includes a wide range of sessions focussing on current regulatory and associated technical and policy topics.

Tim Benton, UK Champion for Global Food Security & Professor of Population Ecology at the University of Leeds, will deliver the headline presentation on Day 1, on “European sustainable, intensive, agriculture and the role of pesticides”.

A key aim of this year’s event is to meet the strong demand for more speakers and attendees from the EU regulatory community, particularly from Member State authorities.

So there will be presentations from representatives of the Regulatory Authorities of Spain, Hungary, Austria and Sweden, on the positive aspects of 1107/2009, the issues to be faced in implementing the Regulation – and the likely solutions. Last year, a UK HSE Chemicals Regulation Directorate Q&A session, led by Sarah Shore, Head of Biocides, Pesticides and Environment from the Chemicals Regulation Directorate (CRD) of the UK HSE, proved very popular with a big audience. A similar session will again be held at the end of Day 1 of the Congress, for those interested in understanding how CRD is managing the implementation of the Regulation.

EU regulation and political compromises around GM crops will again be a big subject for discussion during the event. Matina Tsalavouta, Head of Communications, Rothamsted Research, will be giving a Day 1 presentation on “Lessons on public acceptance, the world of GM crop trials in Europe”. In this context, it is worth noting that BCPC has just launched a new three-tier service, “Biotech Crops Info”. This provides comprehensive and up-to-date global information on novel traits – including GM – derived from genome editing.

Endocrine disruption and the regulation of this effect in agrochemicals is a particularly key topic right now, with the ongoing review and anticipated replacement of the interim – and scientifically unjustified – provisions in EU 1107/2009. Laura Fabrizi, from the European Commission, DG SANTE, will describe the future for regulating endocrine disruptors.

The drivers, evidence and state of play in the current standoff on Neonicotinoid insecticides and their impact on pollinators could fill several conferences! This year’s BCPC Congress will provide an ideal opportunity for delegates to get up-to-date with the status of this
controversial subject. This area in particular illustrates the difficulties and paradoxes in providing relevant, high quality, independent data and conclusions which will be accepted for regulatory review and by the general public. More on this from Paul Leonard, BASF – whose talk on the “Innovation Initiative” at last year’s Congress was warmly received in a plenary address at the start of Day 2.

The Sustainable Use Directive will be addressed by a senior representative of the UK Chemicals Regulation Directorate (CRD), Health and Safety Executive, whilst the Water Framework Directive will receive extensive treatment at the Congress, in a dedicated stream on Day 2. Dr. Jodie Whitehead, from Severn Trent Water, UK, will give a stimulating address on “Water Company Catchment Management – all carrot and no stick” explaining the need for successful partnerships working on pesticides issues to meet Water Framework Directive (WFD) obligations. Dr. Benoit Real, Arvalis Institute, France, will give insights on improved management of diffuse source pesticide transfer to water, comparing the results of predictive modelling with field experimentation, whilst Dr. Per Kudsk, from the University of Aarhus, Denmark, will describe alternative technologies for driving competitive, sustainable arable production in the Northern Zone.

Bio-stimulants are a focus for Discovery research, and their regulatory status is a hot topic. Kristen Sukalac, will be speaking on behalf of the European Biostimulants Industry Council (EBIC), delivering a valuable review of the area, entitled “Everything you ever wanted to know about bio-stimulants, but were afraid to ask”. This will enable those unfamiliar with this fast growing area of research and commercialisation to get “up to speed”. Aspects of the environmental assessment of Biopesticides will be explored by Adi Cornelese from Ctgb.

The impact of Regulation in the horticultural sector and progress in risk mitigation and product stewardship in this critical sector, which suffers from withdrawal of products with arable uses that drive their value and priority to agrochemical companies, is covered by Vivian Powell of the UK HDC. The now traditional and very popular topic of current Legal Highlights will again be covered by Claudio Mereu, from the Competition and Regulatory branch of Fieldfisher.

The emphasis on facilitating lots of interaction between delegates, exhibitors and speakers, is further increased with a Reception, Conference Dinner and buffet lunches in the Exhibition Hall, allowing networking and further discussion.

There is already strong interest in participation in this year’s event with Headline Sponsorship from the regulatory consultancy provider JSCi and further sponsorship from four other organisations. Many delegates, from regulators, manufacturers, formulators, retail and service companies have already taken advantage of the Congress “Early Bird” registration facility, and the Exhibition has grown for the third year running. The latest BCPC Congress information can be found at: www.bcpccongress.org/

BCPC’s involvement in the Congress reflects its mission to promote the science and practice of sustainable crop production; the organisation pays particular attention to EU regulatory matters, where science and politics are frequently at odds. BCPC’s publications such as the global Pesticide Manual, its annual UK Pesticide Guide and the Manual of Biocontrol Agents, all provide valuable information for those in the field of regulation. As well as printed publications all are now available as searchable online versions which are regularly updated with new products and other information, see www.bcpc.org.

The UK Pesticide Guide is now available online
Maxunitech — achieving growth through generics

When we look at the Chinese agrochemical market, it is perhaps unsurprising that we tend to focus on the larger companies, such as Zhejiang Wynca, which tops the annual revenue rankings. But what about all the other pesticide producers? There were, after all, over 1,800 agrochemical companies operating in China in 2011 (a number that has no doubt fallen in recent years, but not by the 30% the Chinese authorities had hoped for).

Maxunitech is one of the smaller companies that rarely makes the headlines, and it is telling of the scale of the Chinese pesticide industry that Ma Mingliang, chief executive officer of Maxunitech, sees his company as "small-sized", despite it being a chemical group that has its own pesticide subsidiaries operating across China, in the provinces of Jiangsu, Zhejiang and Sichuan.

Maxunitech’s main business involves the development and manufacture of off-patent agrochemicals for global markets. Over 60% of the company’s revenues come from the US market, followed by Australia, Europe and Argentina. It company recorded annual turnover of around $90 million in 2014, more than enough to bring it over the threshold for entry into the Chinese industry’s top 100 companies (the barrier for entry being $60 million), but still at the lower end of the ranking.

Nevertheless, Mr Ma still aims high. As he says: "Our target is to be either the first or the best generic producer in this field."

In 2014, the company became the first Chinese generic pesticide manufacturer to gain Argentine approval for the herbicide, sulfentrazone, and EU approval for the herbicide, flufenacet. It was the first Chinese manufacturer to acquire a registration for the herbicide, carfentrazone-ethyl, in Australia in 2012. In terms of production output in 2014, Maxunitech was the world’s top producer of the herbicide, prodiamine (over 500 tonnes/year), and the second-largest producer of the herbicide, chlorpropham (over 120 tonnes/year). In the next few years, the company hopes to become the second-largest producer of sulfentrazone, carfentrazone-ethyl and flufenacet, behind only the original patent holders, FMC and Bayer CropScience.

Like most industry insiders, Mr Ma believes that China’s pesticide industry can transform itself into a more globalised, large-scale model, but that this will take time. "The upgrading and transformation of the agrochemical industry in China is necessary, but time-consuming," he says. As the industry alters, Mr Ma asserts that the world will need to face a "new reality" towards the Chinese industry – namely that Chinese pesticides will no longer be as cheap as they once were. Prices will be driven up by the increasing costs of raw materials, energy and labour in China, alongside the appreciation of the Chinese yuan and stricter laws for the treatment of waste.

Developing intellectual property . . .

In an industry that is geared towards the major players, and with smaller companies being encouraged either to leave the market completely or merge to form larger entities, it must be hard for a small-scale enterprise to survive.

Mr Ma does not see Maxunitech’s place in the industry as a simple manufacturer of low-cost generics. In fact, Maxunitech only began selling its products domestically some three years ago. It says that multinational "giants" provide integrated solutions to farmers, and that some Chinese producers, such as Noposion, are trying "to reframe the distribution network with IT technologies and the internet".

In the face of this changing industry, Maxunitech sees itself at a learning stage, but it is not without its own strategies. The company’s resources are funnelled into developing off-patent aids with its own intellectual property (IP) on the process chemistry, formulation or purification stages. "If you fail to add some value..."
to your products, it will be quite difficult to survive for the next decade,” says Mr Ma.

One pitfall of operating in China is that of frequent copyright infringement. As a technology-driven company, Maxunitech places great emphasis on IP. Over the last five years, the company has filed 59 patent applications in China and abroad, and has been granted 18 patents. It also provides technology consultancy services and works with R&D companies on product defence at a global level, on a case-by-case basis.

Take the case of flufenacet. Maxunitech was approached by a client for help to overcome the patent barriers surrounding manufacture of the ai. Mr Ma claims that other developers in China were simply employing Bayer’s patented technology (90% yield). Instead of using an old, expired patent method from Bayer (40% yield), Maxunitech developed new technology that enabled it to gain a final yield “very close” to Bayer’s patent-protected method, thus making the economic model feasible for its client without any patent infringement.

Mr Ma is also keen to highlight the recent developments from his company’s mesotrione herbicide development team. He says that it only started to look into mesotrione “after we kept hearing about the purification patent barrier … and were approached by a few marketing companies for technological solutions”. He emphasises the difficulty in overcoming the technological barriers to producing “high quality” mesotrione, but the company has recently been awarded two international patents for its mesotrione production technology.

It is with technological achievements such as this, Mr Ma believes, that Maxunitech can carve out its own niche in what is still an over-crowded industry.

Rainbow buys 73% stake in Ningxia Grenada

Chinese company Rainbow Chemical has acquired a 73% stake in the Chinese chemical manufacturer, Ningxia Grenada. Ningxia Grenada’s major product is the glyphosate herbicide intermediate, N-(phosphonomethyl) iminodiacetic acid (PMIDA). Rainbow acquired the stake from Zhejiang Shenghua Biok, and plans to increase its share in Grenada in the near future. In the China Crop Protection Industry Association’s 2015 ranking of China’s top 100 pesticide manufacturers (based on last year’s agrochemical sales), Rainbow came in fourth place with revenues of Yuan 3,097 million ($499 million at the current rate). That company also claims to have been China’s lead pesticide exporter in 2014. Growth in its international markets has led to increased production demands, and Rainbow expects that this new acquisition will help it to “enrich” its product portfolio and diversify its production base. Rainbow last year unveiled plans to build a pesticide plant and distribution centre in Panama.
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**Nutrichem eyes opportunity to become Chinese MNC**

Huapont-Nutrichem burst onto China's agrochemical scene in 2012, becoming the largest pesticide company in China in terms of sales for that year. In its first annual report as a joint entity, the company (known as Huapont Pharma before merging with Nutrichem International) recorded agrochemical sales of Yuan 3,023.1 million ($487.1 million). In 2014, the company was China's second-largest agrochemical major, behind only Zhejiang Wyncna Chemical in terms of annual revenues.

Many Chinese agrochemical companies, especially the larger ones, have internal structures that are quite difficult to fathom. Huapont-Nutrichem is no exception. Nutrichem is the main pesticide manufacturing arm and wholly owned subsidiary of the listed Chinese chemical company, Huapont-Nutrichem. Nutrichem was acquired by Huapont Pharma in 2010, and the latter changed its name to Huapont Nutrichem in 2012. But Nutrichem also has its own agrochemical subsidiaries – five, no less, in Shangyu Nutrichem, Hebei Wanquan Lihua, Hebei Wanquan Hongyu, Yancheng south and Hangzhou Nutrichem.

Over the past dozen years, the company has gone through three stages of development. During the first stage, from 2003 to 2007, it invested in pesticide technologies and developed its client base in the US. The company retains strong links with the US, agreeing to acquire a 20% stake in the US agrochemical and fine chemical firm, Albaugh, last year. In the second stage (2008-2011), it opened its first pesticide manufacturing base, Shangyu Nutrichem. In the third stage, (2012 – present), it became listed on the stock market as a joint entity.

The company is banking for growth based on three main trends. The first is the Chinese government’s thrust for increased consolidation in the domestic industry. Secondly, the company predicts a global shift in manufacturing with multinational companies investing more heavily in developing biotechnology while outsourcing their production of chemical pesticides. As China has a “relatively well-developed” fine chemicals

(continued on page 38. . .)
Chemspec Europe celebrates its 30th year with a number of firsts, as well as a series of regular features

Celebrating 30 years of Chemspec Europe this year, the popular business event will be held for the first time in Cologne in what promises to be one of the largest events in the series to date. The organiser, Quartz Chemicals, have confirmed that thousands of international visitors have already confirmed their attendance. If you haven’t already done so then sign up for your fast-track entry badge at www.chemspeceurope.com/register

Another first will be the new networking web-based app to encourage industry professionals to MEET@CHEMSPEC. People attending the event can go to iwaz.at/chemspeceurope2015 in order to plan their agenda, pre-arrange meetings and connect with each other prior to and during the event. Free wifi this year throughout the exhibition will enable visitors to fully utilise the app and do business.

For those attending the event there will also be 30 chances to win a Kindle HD Fire to honour the 30 year anniversary of the exhibition and in recognition of the new digital networking opportunities on offer.

The International Exhibition
There will be over 400 companies present as exhibitors. These include some of the largest players in fine and speciality chemicals, notably Saltigo, Lonza, Evonik, Solvay, Dottikon Exclusive Synthesis, Siegfried, Novasep Group, Isochem CABB, Chemie Uetikon, AMRI, Vertellus and PCAS, among many others. BASF, DPx Fine Chemicals and ICL-IP will also be there in meeting rooms.

Other exhibitors include some of Europe’s largest speciality chemicals distributors (e.g. Azelis, IMCD, Biesterfeld Spezialchemie), REACH and regulatory compliance service providers in the Regulatory Services Zone (e.g. WIL Research, CitoxLAB, REACHReady, catalogue companies, CROs, solvent recyclers, niche chemistry service specialists and others too diverse to classify. And, of course, there will be many suppliers of all kinds from India, China and the rest of the world. Full details are on the website (www.chemspeceurope.com).

Free-To-Attend Features & Content
Long gone are the days when Chemspec Europe was simply an exhibition. Over the past decade, we have added a huge amount of related content on and off the show floor in order to enhance the visitor and exhibitor experience and to boost the number and diversity of networking opportunities available. All of these are free to attend and take place in dedicated theatre areas on the show floor; you can dip in and out as you please, subject only to space being available.

The week of Chemspec Europe begins with the show build-up on Monday 22 and Tuesday 23 June. The afternoon of Tuesday 23 also sees the European Fine Chemicals Group (EFCG), a long-term partner to the show, hold its annual EFCG Crop Protection & Fine Chemicals Summit. You can register to attend via the website. Speakers and subjects are:

10.30 - The Formulation Challenge of Designing Enhanced Biodelivery & Performance into Crop Protection Suspension Formulations, Malcolm Faers, Bayer CropScience

11.00 - Functionalisation of Polyurea Microcapsules to Enhance Binding to the Leaf Surface, Lorenzo Aulisa, Dow AgroSciences

12.00 - Development of Microcapsules as Additives for Advanced Composites, Isabel Martins, Devan Chemicals

12.30 - Core-Shell Microcapsules from Clay-stabilised Pickering Emulsions, Jon Phipps, Imerys Minerals

13.30 - Synthesis & Characterisation of Theophylline & Budesonide Co-encapsulated PLA Nanoparticles, Mira Buhecha, University of Brighton

14.00 - Print-Drying: Mild Processing Conditions & High Quality Powders, Joris Salari, TNO

15.00 - Structured Liquid Surfactant Systems for Personal Cleansing Applications, Matthew Giles, Innospec

15.30 - Improved Skin Delivery of Actives with Silicone Technologies, Marc Eeman, Dow Corning Europe
On Thursday 25 June, the sessions resume with the following:

10.30 - Encapsulation: Perfumes & Beyond, A Moving Target to Aim at, Antonio Quintieri and Denis O’Sullivan, Procter & Gamble

11.00 - Encapsulation Technologies for Stabilisation of Actives in Consumer Cleaning Products, Melanie Hughes, Revolymer

11:30 – Encapsulation by Membrane Emulsification, Marijana Dragosavac, Loughborough University

12.00 - Improving Efficiency & Quality in Development of Coatings Using High Throughput Technologies, Thomas Brinz, Bosch

12:30 - Continuous Flow Technology as a Tool for Process Intensification of Formulation Processes, Dirk Kirschneck, Microinnova Engineering

Another highly popular feature of past shows is the Pharma Outsourcing Panel Discussion, an open-ended, high-level discussion among senior executives from the pharmaceuticals and related industries that is designed to be of interest to a wide audience from pharma, CROs and CMOs engaged in contract research and custom synthesis of APIs. It will look approaches to developing global outsourcing strategies, identifying outsourcing partners, identifying approaches to mitigate risks, and addressing challenges associated with outsourcing and how to manage partnerships.

The panel is once again chaired by Dr Magid Abou-Gharbia, director of the Moulder Centre for Drug Discovery Research at Temple University’s School of Pharmacy. Confirmed speakers are Dr Robert Waltermire, executive director of late phase chemical development at Bristol-Myers Squibb, Dr John Dillon, president of Porton Americas, and Dr Rudolf Hanko, CEO of Siegfried. Others will be confirmed later. Sessions will take place at 14.00 on 24 June and again at 10.00 on 25 June.

As part of the Regulatory Services Zone, REACHReady, the UK Chemical Industries Association’s REACH compliance body, is organising a series of conference presentations on regulatory compliance issues of all kinds. These are all scheduled to take 30 minutes with time built in for Q&A. Timings and schedules are as follows on Wednesday 24:

10.00 - Choose the best authorisation strategy for your supply chain, Ying Zhu, REACHLaw

10.45 - Improving Communication of REACH Information in the Supply Chain, Bridget Ginney, ECHA

11.30 - Strengthening Product Stewardship in the Supply Chain, Lisa Allen, REACHReady

13.30 - The Challenges Facing 2018 Registrants, Rachel Green, ReFac

14.15 - Read-across and alternative testing strategies for REACH 2018, Jeanette Paulussen, WIL Research

15.00 - REACH 2018 Environmental Testing Strategies: Annex VII & VIII Versus Realistic C&L Conclusions, Damien Carson, Blue Frog Scientific

15.45 - The Challenges of Managing the SIEF-Consortia Interface for 2018 Registration, Alan Ritchie, WSP

On Thursday 25, speakers, subjects and times are:

10.00 - REACH Enforcement: Be Prepared for an Inspection, Sandra Meijer, The REACH Centre

10.45 - The new EU Biocidal Products Regulation, Carlos Miguel Fazendeiro, REACh ChemAdvice

11.30 - Harmonisation of Information for Poison Centres – Key Developments on the Horizon, Nishma Patel, CIA

13.30 - Regulatory and Safety Communications Considerations for Nanomaterials, Hugh Roberts, Lisam Systems

14.15 - Regulations to Comply with when Placing Chemical Products on the Turkish Market, Melih Babayigit, CRAD Cevre

15.00 - REACH Around the Globe: An Update on Non-EU Chemical Legislation, Nadia Kauni, 1cc

Agrow magazine will be bringing its Agrochemical Intermediates Conference to Chemspec again this year. Full details are still to be confirmed but some confirmed papers include:

- Performance Solvents: Safe & Bio-based Alternatives for Agrochemical Formulation, Bas Verkeuij, Corbion Novel Fermentation Technology, Jeff Tremain
- AbbVie The Agrochemical Intermediates Business: A Current Overview, Sanjiv Rana, Agrow

As for many years, leading consultancy Scientific Update will run a series of Pharma Workshops. Led by Scientific Update tutor Dr John Knight these sessions are intended to give an overview of recent developments in particular areas and provoke discussions. Timings and subjects are:

- Wednesday 24, 10.00-11.30 - Quality by Design: A Discussion of the Possible Impact of this Approach
- Wednesday 24, 15.00-16.00 - What can Pharma Learn from the Agro Sector?
- Thursday 25, 11.00-12.00 - Increasing Efficiency in Chemical Process R&D

Finally, another show partner, executive recruitment and coaching specialist Chemical Search International is offering a free ‘careers clinic’ to anyone interested in discussing their anything from finding a first job or securing promotion. This is free of charge but you should book via the website to secure one of the limited number of slots.

We look forward to seeing you there!

For further details please see www.chemspeceurope.com
China

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industry, it will attract more multinationals to either establish production bases in the country, or develop closer working relationships with Chinese manufacturers.

Wynca’s pesticide sales up 7% in 2014

Chinese company Zhejiang Wynca Chemical recorded a 7.1% rise in agrochemical sales of Yuan 3,805 million ($613 million at the current rate) in 2014. Costs for the agrochemical division were up 27.7%, and consequently the gross profit margin for pesticide products dropped by almost 50 percentage points.

Agrochemicals accounted for over half (51%) of the company’s total sales, down three percentage points from the previous year. Total sales outperformed the agrochemical business, with overall revenues up some 14% year-on-year. Wynca’s second major business area is organosilicone products. The company’s net profit slid 88.6% to Yuan 49.7 million ($8 million) in 2014.

Wynca produced some 83,273 tonnes of pesticides throughout the year, selling 85,068 tonnes, resulting in a production to sales ratio of 102.2%. The company’s agrochemical stocks totalled 4,145 tonnes at the end of the year.

Higher prices of its main product, the herbicide, glyphosate, helped Wynca to a 25.5% rise in agrochemical sales in 2013. Despite the slower year, the company’s pesticide sales for 2014 should be enough for it to have remained China’s largest agrochemical company in terms of annual revenues.

Max Chemicals gains mesotrione patents

Chinese company Max (Rudong) Chemicals has been awarded two international patents for “clean” production technologies for the herbicide, mesotrione. The company claims to have overcome “extremely high IP and equivalency barriers” to develop the new technologies. Max Chemicals specialises in developing and manufacturing off-patent agrochemicals for global markets. Mesotrione is a systemic pre- and post-emergence herbicide for the control of broadleaf weeds in maize, launched by Syngenta in 2001.