Biologica 2016
(an analysis of corporate, product and regulatory
news in 2015/2016)
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Contents

02-13 Biologicals becoming part of integrated crop protection offers
17 Mergers, acquisitions and deals in 2015
18 Mergers, acquisitions and deals in 2016
19 New active ingredients registered or launched in 2015
20 New active ingredients registered or launched in 2016
25-28 Biopesticides and the EU regulatory process
29-30 Mega Consolidation 2.0 – Business not as usual
China Special
35-36 Hard times for China’s agrochemical exports in 2015
37 Chinese pesticide industry needs “concerted effort” to pull out of slump
38 Huapont’s sales up 9% in 2015; Redsun’s 2015 agchem sales flat; Wynca’s pesticide sales down 6% in 2015
39 Yangnong up 9% in 2015; Noposion’s sales flat in 2015; China’s agchem trade down 9% in first quarter
41 China’s top 100 sales down 2%
43 China’s pesticide prices remain low in May; China to focus on biopesticide quality; China details crop planting targets; China targets growth in soybean area and yield
Welcome to the fifth instalment in Agrow’s series of annual biopesticide reviews. An obvious change this time round is in the name of the supplement, which we call the “Biologica...
distribution deals and licensing arrangements have continued in the biologicals sector.” He points to Agrow’s list of M&As and deals since last year, which indicates activity by players of varying sizes and geographical locations. “These distribution deals in particular, demonstrate the ‘roll-out’ of a number of bio-products through commercial collaborations, often between mid-sized companies, aimed at expanding the use and market coverage of these products.”

There also seems to have been a change in the approach towards biopesticides. From being used as specialist products for use on specialty crops, they are increasingly being amalgamated into integrated product offerings, often combining a chemical active ingredient and a biopesticide.

For BASF, developing complementary chemical and biological modes of action that can work in combination is a research and commercial priority. The company points out that farmers are looking for additional and alternative solutions to be more competitive, productive and efficient in the global marketplace. “They are not primarily concerned with whether a product is biological or chemical, but rather how it addresses their problems,” says BASF Crop Protection’s vice-president of global business management for Functional Crop Care, Alyson Emanuel. She points to the “particular benefits” of biologicals such as resistance management, additional modes of action, and flexible pre-harvest intervals.

Bayer CropScience concurs. “We at Bayer are convinced that combining chemicals with biological crop protection products helps farmers around the globe to produce high-quality food in a sustainable manner,” says Bayer Biologics’ vice-president of global marketing, Ashish Malik. He says that the company is enhancing its portfolio by new and advanced products based on chemical and biological modes of action and is concentrating on integrated crop solutions. “With integrated crop solutions, farmers will be able to address unmet needs, for example reducing losses, increasing yields, enabling global trade (residue management), resistance management and flexibility in use,” Mr Malik points out.

Monsanto says that agricultural biologicals can be used to complement or replace agricultural chemical products. The company feels that microbial technologies could offer real benefits to growers such as season-long insect control and disease protection that defends plant vigour, in ways that some chemical solutions cannot provide. “The emerging agricultural biological technologies can be a supplement to every farmer’s toolbox and complement the integrated systems approach that is necessary in modern agriculture, combining breeding, biotechnology and agronomic practices to improve and protect crop yields.”

Dow AgroSciences points out that when evaluating the needs of farmers in the future, it is important to look at where there are gaps today. “Certainly combination products are a good way to fill gaps in control as each product brings strengths.” The company feels that in future, farmers will need as many tools as possible to handle tough challenges for their crops, which means that combinations are a good option.

“For their crops, which means that combinations are a good option.

“the best biological products will be those that can survive in the presence of standard chemical inputs and bring a significant yield increase above current agronomic practice”

Arysta LifeScience (part of Platform Specialty Products) claims to have been a pioneer in creating offers that combine conventional crop protection with biosolutions, including biopesticides, biostimulants and innovative nutrition, through its ProNutivo focus. “We expect this trend to continue. Specifically in regards to combinations of chemicals active with biopesticides, these can help growers manage residues while maintaining the desired level of protection to their crops,” says Arysta’s vice-president, global portfolio management, Paula Pinto.

“We believe that the best biological products will be those that can survive in the presence of standard chemical inputs and bring a significant yield increase above current agronomic practice,” says Arysta LifeScience chief executive officer, Marcus Maedows-Smith. But he feels that it is unrealistic to think that growers will replace their reliable chemistries altogether at this point in time. “Biologicals offer an innovative and effective solution, but to gain that necessary trust from the grower and traditional industry players, we believe it’s essential to show superior efficacy in standard agricultural conditions - with treated seeds and application of fertilisers.”

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“I strongly believe the future lies in the combination of biopesticides with chemicals,” says Mr Cooper. He points out that biopesticides add new values such as reduced chemical loads, lower risk of resistance development and enhanced yields. “All this is achieved without increasing the cost of the spray programme, but this is only possible when the two segments are carefully and professionally combined together.”

Mr May has a slightly different view. “In mainstream agriculture, biopesticides will be used together, not as mixtures but used to complement the use of conventional pesticides as part of integrated pest management programmes,” he says. He adds that full acceptance of biopesticides in field crops will rely on their ability to effectively compete with conventional pesticides in terms of efficacy and cost effectiveness. “Intensive managed crops currently might present the best opportunity for biopesticides, but as agronomic practices and pest management in field crops becomes more advanced, with more intensive crop monitoring, improved yields, more effective cultural pest control programmes, then the use of biopesticides will become more viable.”

Company portfolios Bayer acquired US biopesticide company AgroQuest in 2012 and followed that up with German biopesticide company Prophyla the following year. Then came expansions at its US biologicals site in West Sacramento, California and German site at Wismar. In 2014, Bayer acquired Argentine seed treatment business Biagro Group, which had a portfolio of seed-applied inoculants and plant growth-promoting micro-organisms based on bacterial and fungal strains.

Its current portfolio comprises: the nematicides, Vativo (Bacillus firmus + clothianidin) and Flocter (B firmus strain...
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I-1582); the biofungicides, Serenade (B subtilis strain QST 713) and Sonata (B pumilus QST 2808); the bioinsecticides, Requiem (extract of Chenopodium ambrosioides), Contans (Coniothyrium minitans) and BioAct (Paecilomyces lilacinus 251); the insecticide-based trap, Decis Trap (deltamethrin + attractants); and the inoculant, Biagro 10 (Rhizobium spp). “In March 2016, we launched Serenade in Australia,” says Mr Malik.

BASF has been giving a lot of indications about its focus on biologicals. Following the acquisition of US specialty products company Becker Underwood in 2012, the company formed its Functional Crop Care division with a focus on biologicals and seed treatments. The company set a target of over €500 million (US$655 million at the current rate) by 2020 out of the entire crop protection division. Last year, BASF doubled its capacity at its nematodes and inoculants. Last month, it launched the biofungicide, Serifel (B subtilis strain MBI600), in the US and plans to launch in key countries in South America, Asia, and Europe from 2016. It is registered for use in a range of fruit and vegetable crops in the US, while in additional regions in coming years, Serfel will also cover a wide range of agricultural and specialty crops.

The company points out the positive response to the fungicide, Xanthion, comprising the streblurin fungicide, pyraclostrobin (trade-marked as F500), and the biofungicide, Integral (B subtilis strain MBI 600). It was launched in the US last year. “It signals market interest in combinations of complementary chemistry- and biology-based solutions,” says Ms Emanuel.

BASF has also launched the biofungicide, TrichoPlus (Trichoderma asperelloides strain JMA1 R 5.5%), in South Africa. The US EPA proposed its approval last year. Other biological products in its portfolio include: the bioinsecticide/acidin, BroadBand (Beauveria bassiana strain PPRI 5339 4.3%), with the global trade name, Velfer; the inoculants, HiStick, HiCoat and Vault; the biofungicide, Integral (B subtilis strain MBI 600); and beneficial nematodes for insect management under the brand name Nemasys.

BASF claims to be one of the few companies that can provide a seed treatment with a mixture of both biological and chemical compounds. Apart from Xanthion as an example of such complementary products, it highlights the insecticide/fungicide seed treatment, Standak Top (pyraclostrobin + thiophanate-methyl + fipronil), and the biological inoculant, HiCoat HC 530. “These two products work well together and are typically applied all at once by a retailer or seed company into the slurry mix along with a functional coating to cover the seed,” says Ms Emanuel.

Monsanto acquired US agricultural biotechnology company, Agradis, which has a collection of thousands of plant-associated micro-organisms; formed the BioAg Alliance 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.

In January this year, Monsanto agreed a North American distribution agreement with Sumitomo Chemical’s US-based biologicals subsidiary, Valent BioSciences, for the Streptomycetes lydicus strain WYEC 108-based Actinovate biofungicide range. Meanwhile, in April, Sumitomo Chemical started the process of integrating Valent BioSciences with its crop protection division. Sumitomo will form a Biорational Business Unit with responsibility for business target setting and related research, manufacturing and supply chain management.

“The BioAg Alliance has several products that are actively promoted and distributed through Monsanto’s channels, including our newest US soybean extra concentrated inoculants, Optimize XC (Braardyhizobium japonicum, lipo-chitoooligosaccharide) and TagTeam LCO XC (Penicillium bilaii),” the company says. It is also excited about the microbial product, Quickroot (Trichoderma virens + B amyloliquefaciens), which provides plant health benefits to wheat, maize and soybeans.

Among products in its pipeline, the company highlights an enhanced maize inoculant product that has been advanced to phase four (pre-launch) this year, with an anticipated US launch in 2017. The “advanced formula” will deliver high on-seed stability and convenient upstream microbial application to help enable microbial growth along plant roots improving nutrient access, enhancing root and shoot development and unlocking yield potential.

Syngenta gained access to Pasteuria spp-based bioinematicides when it acquired Pasteuria Bioscience. The company has since launched the P nishizawae-based bioinematicide, Clariva, in the US and Canada. It estimates peak sales potential for the product at over $200 million. Last year, it agreed a deal with Dutch life sciences firm DSM Food Specialties to develop microbial-based agricultural solutions, including biological controls, biopesticides and biostimulants. In March, Syngenta sold its predatory mites-based biological control subsidiary, Bioline, to the French InVivo co-operative group. But the company did reiterate its commitment to the broader field of biological solutions.
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**Dow AgroSciences** believes that microbe-based biological products are a logical extension of its “leadership in the natural products market space”. “We have expertise both inside the company and with collaborators that can help us grow in this area.” The company has an active testing programme to work with multiple third-parties in the “biological technology space”. It points to its R&D collaboration with US genomics company Radiant Genomics and its deal with UK bio-engineering company Synthace for development of fermentation-based production of crop protection products as representing its long-term commitment to natural products.

**Arysta LifeScience** was an early entrant in the biocontrol sector and consolidated its presence in 2014 by acquiring French sustainable agricultural technology company Goemar. Earlier this year, Arysta signed a licensing agreement with the Chinese Academy of Agricultural Sciences’ Institute of Plant Protection for exclusive global access (excluding China) to certain protein-based plant disease control technology. “We will continue to explore internal and external opportunities to grow the BioSolutions portfolio, which we define as biocontrol (or biopesticides), in addition to biostimulants and innovative nutrition,” says Ms Pinto.

Arysta’s biocontrol portfolio is comprised of around 30 products. “It includes our IPM range of natural enemies for the Japanese market, Carpovirusine, which is a virus-based insecticide with over 20 registrations globally,” says Ms Pinto. She goes on to list: *Beauveria bassiana*-based products, such as Ostrinil and Vacciplant; *Trichoderma asperellum* strain ICC012 + T gamsii strain ICC080), to protect palm trees against red palm weevils (*Rhynchophorus ferrugineus*), Biomite, a residue-free acaricide suitable for resistance management; and Vacciplant, a seaweed-based product derived from the *Laminaria digitata* algae that stimulates the natural defence of plants against a wide variety of pests.

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.

The company also highlights multiple biopesticide products in the pipeline. It points to the deal with the Chinese Institute of Plant Protection. It intends to bring products for the control of viral and bacterial diseases to market from that deal by 2022. “We also have numerous launches planned for our biostimulants and innovative nutrition portfolio, including the geographic expansion of our seaweed based PhysioActivator portfolio that came with the 2014 acquisition of Goemar,” says Ms Pinto.

“most biologials needs a technical sales force that understands how to educate, position, and sell a biological versus a chemical”

**Marrone Bio Innovations** was appointed Isagro USA’s distributor for Isagro’s biofungicide, Bio-Tam 2.0 (*Trichoderma asperellum* strain ICC012 + T gamsii strain ICC080), to agricultural crop markets in the US states of California, Oregon, Washington and Arizona. “Isagro chose MBI because they think a product such as Bio-Tam 2.0, as with most biologicals, needs a technical sales force that understands how to educate, position, and sell a biological versus a chemical,” explains Dr Marrone. Sales forces specialised in biologicals know how to provide this technical education and can focus the time needed for this education, she adds.

The company’s highest-selling products in 2015 were the bioinsecticide, Grandevo (Chromobacterium subsugae strain PRAA4-1T), and the biofungicide, Regalia (*Regavalia sachalinensis* extract). “We expect this to change as Venerate (*Burkholderia* spp strain A396 94.5%-based bioinsecticide/acaricide/nematicide) and Majestene (*Burkholderia rinojensis* strain A396-based bionematicide) ramp up,” says chief executive officer Dr Pamela Marrone.

Among products that are near to launch, the company mentions the biofungimant, MBI-601 (*Muscador albus* strain SA13), for which it expects to have US registration this year. MBI has not set a specific launch date for the anti-transpirant, MBI-505, but expects a small targeted placement with a few customers later this year. The company expects US approval in the second half of next year for the biofungicide, MBI-110, which is based on a new strain of the bacterium, *B amyloliquefaciens*. It plans to do an initial small targeted placement with a very early adopter customers after it receives EPA registration.

“We expect to grow well by ramping up sales of existing products, launching a few near-term products, and increasing our international business,” says Dr Marrone.

Chinese chemical company Hebang Group acquired a majority 51% stake in Israeli
biopesticide company Stockton for $90 million last year. “The investment has naturally brought us into the next phase in the company’s journey with significant resources to accelerate our plans,” says Stockton’s chief executive officer, Guy Elitzur. That would help in research and development activities and the ability to accelerate different projects in the company’s pipeline. The investment would also provide it increased ability to penetrate into new countries such as the US and China. “Obviously, having a strong Chinese shareholder will assist in a successful penetration in China for the biological segment,” Mr Elitzur points out.

The company also intends to allocate some of the funds to M&A opportunities. “We will aim at various levels of collaboration, from full M&A (purchasing a product), to distribution agreements, focusing on biocontrol registered products which comply with sustainable agriculture, mainly in the US, EU and Brazil.”

Stockton has agreed many licensing deals during the last couple of years for its Melaleuca alternifolia extract-based biofungicide, Timorex Gold. The company has chosen its partners “carefully” around the world. “Thus, in some countries we have chosen to license-in for Timorex Gold, while in other regions we employ other methods to go to market.”

US company BioConsortia was established in 2013 with the former chief executive officer of AgroQuest and Bayer Biologics Marcus Meadows-Smith as CEO. “While no specific product is at a market-ready stage, multiple consortia are in their second year of large-scale field testing and are being trialled by partners as well,” he says. The seed treatment and in-furrow products in field trials are for drought tolerance, cold tolerance, fertilizer use efficiency and yield increase, he adds.

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. By the end of this year, it will launch Eco-shot (Bacillus amyloliquefaciens strain D747) for use on fruits and vegetables.

The company feels that the approvals are obtained faster for biopesticides. “It happens because the authorities are using a specific team to evaluate biopesticides with a different waiting list for such aiz,” says Ihara’s crops and biologics manager, Evandro Macente Sasano. The process itself is not different, but once the dossier is submitted, it is evaluated faster than conventional chemicals.

Regional regulatory systems
Agrow sought views on the approval process for biopesticides from the industry associations in the EU, US and Brazil

EU: Comments were sought from David Cary, executive director, International Biocontrol Manufacturers Association, who provided the following answers:
How different is the approval process of a biopesticide compared with a chemical ai?

There is, in fact, no mechanism within the EU regulatory process to differentiate between biopesticides and chemical pesticides unlike in the US where a separate stream with distinct evaluators and timelines is in place. There is, however, provision under the EU legislation to facilitate differentiated pathways for low-risk active substances and products. Most of these low-risk active substances and products will be biopesticides.

However, the criteria are being revised and the procedures need repair as currently status can only be granted after the full process of approval has occurred. The low-risk biopesticide would currently be evaluated in the same timeframe as any chemical active substance despite EU regulation calling to favour them. The Netherlands under its EU Presidency has identified this anomaly and is proposing that procedures are amended to facilitate more biopesticides to enter the market quickly.

How many biopesticides are approved in the EU?

There are five low-risk active substances only listed through the EU system. There would be just over 120 biopesticide active substances and this is about half of those that have been through the US EPA process.

What are the IBMA’s recommendations for the EU registration process for biopesticides?

IBMA would ideally welcome a totally separate set of legislation for biological inputs into the environment to enhance agricultural production. This regulation would be proportionate to the risk that these substances pose to human health and the environment and evaluations undertaken by experts with knowledge and experience of these biological inputs rather than with chemical expertise. This, however, is a long-term goal and things need to be done now rather than waiting several years for any outcomes of a full review to be brought into legislation.

In the meantime, we urgently need some repairs to the legislation and these can be simply done. We would strongly advise bringing back the provisional approvals and authorisations for low-risk substances and plant protection products to allow products to be brought onto the market when the evaluator is sure that the data exists through conducting a low-risk completeness check. We also see no reason to re-evaluate substances and products classified as low-risk and would therefore support an unlimited approval and authorisation. So, IBMA has a two-phase approach to optimal regulation of biopesticides.

US: Comments were sought from Keith Jones, executive director, Biopesticide Industry Alliance, who provided the following answers:

How different is the approval process of a biopesticide compared with a chemical ai?

New biopesticide ais can be reviewed and a decision made in just over a year, while new conventional pesticide registrations are reviewed and a decision made in about two years. The fundamental process of making an application to the EPA Office of Pesticide Programs’ (OPP) Biopesticide and Pollution and Prevention Division (BPPD) is the same as for a conventional chemistry, however, there are usually less data or fewer studies needed to support a biopesticide application than required for a conventional pesticide.

The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) requires that the data and risk assessments address the same primary toxicity concerns as conventional pesticides but a reduced data set is justified by the preliminary requirements that the biopesticide must either be microbial or a biochemical with a non-toxic mode of action and a history of safe use. For instance, caffeine would not be accepted as a biopesticide with a reduced data set because it has a toxic mode of action. It would have to be reviewed as a conventional product. The process can get complicated depending on the product and the results of the data. If there are issues in the data or because of a lack of data, it may trigger the requirement for more studies or may not be able to pass the risk assessment. In that case, EPA may not be able to make a safety finding for a biopesticide registration.

How many biopesticides are approved in the US?

According to the EPA website, as of April 2016, there are 299 registered biopesticide ais and 1,401 active biopesticide product registrations. The number of registrations of chemical ais is fluid as new pesticides are registered and some are cancelled. However, through various reports it is estimated that there are somewhere between 600 and 900 registered ais.

What are the BPIA’s recommendations for the registration process for biopesticides?

BPIA’s recommendations are that the EPA continues to facilitate biopesticide registrations and use science-based decisions that are commensurate with the risks. The OPP already has three divisions responsible for regulatory activities: Antimicrobial Division (disinfectants and sanitizers); Registration Division (conventional pesticides); and BPPD (biologically-based pesticides). The Agency is unique in the world in that it has developed a regulatory group that specialises in biopesticides. The independent unit was created in 1996 to facilitate the registration of low-risk biopesticides. BPPD also has reduced timelines and fees compared to conventional pesticides.

Brazil: Comments were sought from Amalia Piazentim Borsari, executive consultant of the Brazilian association of biological control companies, the ABCBio, who provided the following answers:

How different is the approval process of a biopesticide compared with a chemical ai?

Biopesticides fall under the same legislation as conventional pesticides. Due to the intrinsic characteristics of biopesticides, the number of toxicity tests demanded is generally lower than with conventional agrochemicals. That leads to a lowering of time and costs. Besides, biopesticides enjoy priority of analysis through law. Another major difference is that biopesticides in Brazil are registered by biological targets and not by crop, as is the latter case with conventional agrochemicals.

How many biopesticides are approved in Brazil?

The number of biopesticide products and the comparative with conventional products has been steadily increasing over the years as is evident in the table below:

Biologicals

While the focus during the earlier supplements was solely on microbial biopesticides, the sector has evolved and expanded, making it difficult to subsume the...
entire industry based on products derived from microbial or natural sources within the term, biopesticides. The term, biologicals, is increasingly being used to define the sector comprising microbials and biostimulants.

The US EPA has always had an expansive view of biopesticides, which it defines as “certain types of pesticides derived from such natural materials as animals, plants, bacteria, and certain minerals”. The definition includes substances such as canola oil and baking soda that have pesticidal applications and are considered biopesticides. The EPA classes biopesticides into three types: biochemical pesticides, microbial biopesticides and plant-incorporated protectants. The Agency makes no mention of biostimulants, which in the US as well as in the EU are clubbed together with fertilisers.

Biostimulants

Biostimulants occupy a somewhat confusing domain as the industry and regulators try to make up their minds about whether they lie closer to fertilisers or to crop protection. Industry associations insist that they lie within neither and occupy a distinct space. But for regulatory purposes, they have been aligned with fertilisers.

The European Biostimulant Industry Council (EBIC) points out that biostimulants operate through different mechanisms than fertilisers, regardless of the presence of nutrients in the products. Biostimulants also differ from crop protection products because they act only on the plant’s vigour and do not have any direct actions against pests or disease. Crop biostimulation is thus complementary to crop nutrition and crop protection, the EBIC says.

The EBIC has proposed the definition of biostimulants as: “A material that contains substance(s) and/or micro-organisms whose function, when applied to plants or the rhizosphere, is to stimulate natural processes to benefit nutrient uptake, nutrient efficiency, tolerance to abiotic stress, and/or crop quality, independent of its nutrient content.”

In March, the European Commission published a proposal for a fertilising products regulation and amending EU agrochemical Regulation 1107/2009 and Regulation 1069/2009 relating to animal by-products and derived products not intended for human consumption. Under the proposal, plant biostimulants would be eligible for European conformity CE (Conformité Européenne) marking for free movement and marketability within the EU. Although the EBIC has reservations about the scope of the new regulation, it hailed the regulation as a key step towards the development of a truly European market for biostimulants.

The definition of the US-based Biostimulant Coalition, while similar to EBIC’s on several key points, differs slightly from the proposed EU definition: “A biostimulant is a material that, when applied to a plant, seed, soil or growing media - in conjunction with established fertilisation...
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plans, enhances the plant’s nutrient use efficiency, or provides other direct or indirect benefits to plant development or stress response.” As examples, the Coalition points to biological or naturally derived additives and/or similar products, including but not limited to bacterial or microbial inoculants, biochemical materials, amino acids, humic acids, fulvic acid, seaweed extract and other similar materials.

“A biostimulant is a material that contains substance(s) and/or micro-organisms whose function, when applied to plants or the rhizosphere, is to stimulate natural processes to benefit nutrient uptake, nutrient efficiency, tolerance to abiotic stress, and/or crop quality, independent of its nutrient content”

In the US, fertilisers are not registered at the federal level. Instead, each state has its own fertiliser regulatory programme. Thus, there are a number of different – and often conflicting – standards for managing fertilisers, plant or soil amendments and/or biostimulants, says the Biostimulant Coalition. The fact that there is no single, existing framework for how to register or label these products makes it difficult for many companies to register them in a number of US states, it adds.

The Coalition has come to an agreement about definitions with the Association of American Plant Food Control Officials (AAPFCO), an organisation of fertiliser control officials from each US state. The AAPFCO defines “beneficial substance” as any substance or compound other than primary, secondary, and micro plant nutrients that can be demonstrated by scientific research to be beneficial to one or more species of plants, when applied exogenously. It has agreed with the Coalition to develop a process by which subcategory definitions under the Coalition’s concept of “biostimulants” would be able to apply for their own respective definitions. For example, a specific fulvic acid definition could be developed that would be defined and placed under the Beneficial Substances category. Each subcategory material will have to go through a similar process.

### 2015 market and outlook

The global chemical-based crop protection market in 2015 fell by 9.6% to $51,210 million at the distributor level, according to figures from Agrow parent company Informa’s seed and agrochemical consultancy, Phillips McDougall. The situation is not as clear cut for biopesticides because of a variety of estimates for market size and differing definitions of biopesticides.

Monsanto believes that the biologicals market continued to see annual growth globally, benefiting from product enhancements as well as a growing demand for additional sustainable solutions. BioConsortia concurs with the estimate, pointing out that many farmers were adding biologicals to their tool kit for the first time and experienced users were continuing to expand their usage.

Other companies point to a slight dip but not as drastic as for agrochemicals. “I believe that overall biologicals suffered a lower impact. On the one hand they were less exposed to soft commodity pricing but on the other hand were impacted by the negative economic situation as well as dry weather conditions,” says Mr Cooper. Dr Marrone points out that the adoption of biologicals in large acreage crops such as soybeans and maize slowed down in the US and Brazil, but in high-value specialty crops they continued to grow. “The high plantings of nut crops in California (thus reducing nut prices) and the reduction in citrus production in Florida are having an effect on all inputs,” she adds.

Talking about Brazil’s market, Ihara says that it suffered a drastic decrease in insecticide sales. That happened after two seasons with very high pressure of bollworms (Helicoverpa armigera), which decreased “a lot” during the last season. There was a lot of inventory build-up for chemical as well as biological products. Despite that, in specialty markets such as fruit and vegetables, pre-harvest sprays increased in many crops for biologicals. There was an increase in the use of bionematicides as well. “So, although the biopesticides market decreased last season. However some specific markets for biologicals, which are still small compared with Bt, increased, says Mr Sasano.

Estimates vary about the size of the biologicals markets in 2015 although the consensus figure was around $3 billion. Out of that, microbial biopesticides accounted for some $2 billion while biostimulants made up the rest. The market is expected to grow by over 10% annually in the coming years. “We expect that biologicals’ integration into tank mix and chemical spraying programmes will only keep increasing,” says Stockton.

Mr Smith believes that there is a much bigger market for the next generation of microbials that will demonstrate significant benefits across a wide range of traits in the $40 billion traits and seeds business. He also point to an even larger market for products that drive nutrient use efficiency in the $170 billion fertiliser market.
Overview of the Biopesticide Industry

The biopesticide industry is a $1.6 billion industry. The industry is projected to grow at a compound annual growth rate of 16% through 2019. This industry’s growth is fueled by two major factors including consumers’ demands for safer pest control products that can be used in both conventional and organic agricultural programs. The second major impetus to growth comes from innovation and technology, adding science-based jobs and contributing to the economy while at the same time providing growers, pest control applicators and public health officials with effective and safe pest control options.

Biopesticides are low risk pesticides that are naturally derived from or synthetic equivalents of plants, bacteria, fungi, and minerals, generally posing little risk to humans or the environment. Growers use biopesticides to control plant disease, insects, weeds and other pests. Biopesticides can be used to protect our food supply in food processing establishments as well as protect the public from pest-borne illness and disease by controlling or repelling rats, fleas, ticks and mosquitoes. The members of this industry segment, from small start-up to large established companies, have active research and development programs to address a broad array of pest problems on the farm as well as emerging threats such as Zika virus.

Generally, biopesticides are not persistent and pose little risk to people, birds, fish, bees and other wildlife. They help to maintain beneficial insect populations, break down quickly in the environment, and provide low risk alternative tools for conventional growers in integrated pest management programs.

Benefits of Biopesticides

Growers, pest control applicators and public health professionals are increasingly turning to biopesticides because they provide the following significant benefits:

- Biopesticides are versatile and functional in both organic and conventional production systems.
- Biopesticides allow organic growers to control pests while maintaining USDA National Organic Program (NOP) certified status.
- Biopesticides fit with integrated pest management systems and contribute to environmentally responsible production systems – while not compromising crop yield and quality.
- Biopesticides may offer greater flexibility when harvesting crops because of short pre-harvest and restricted entry intervals or waiting periods before individuals can enter a treated area.
- Biopesticides are important public health protection tools. They are used in food processing establishments to protect our food supply and in mosquito and tick control programs to protect the public from diseases like West Nile virus, Lyme disease and other pest-borne illness.
- Because naturally derived biopesticides often control pests through multiple modes of actions they can be less prone to pest resistance.

Biopesticide Regulation

The United States has one of the world’s most robust programs to review and register biopesticides and is unique in that specific expertise has been developed within a single division of the Environmental Protection Agency (EPA). The EPA’s Office of Pesticide Programs houses the Biopesticide and Pollution Prevention Division (BPDP), which conducts vigorous reviews of biopesticide products before they can be registered and brought to market. The Federal Insecticide Fungicide and Rodenticide Act (FIFRA) and Pesticide Registration and Improvement Act (PRIA) ensure that the highest safety standards are met while including specific incentives to encourage the adoption of these beneficial pest control products through tiered data requirements, significantly reduced registration fees and shorter timelines compared to conventional pesticides.

There are some instances where regulation could unnecessarily limit growers’ ability to use biopesticides. Three such examples are 1) EPA’s proposal to Mitigate Exposure to Bees from Acutely Toxic Pesticides, 2) when science-based risk decisions for exemptions from tolerance are trumped by legal interpretations and policy considerations that do not give priority to lower risk pesticides and 3) the U.S. Department of Agriculture National Organic Program (USDA-NOP) work with EPA to address inert ingredients allowed in pesticides approved for organic production without industry’s input on the effect of their decisions.

EPA Proposal to Mitigate Exposure to Bees from Acutely Toxic Pesticide Products

In some cases, “catch-all” pesticide policies, which do not distinguish between types of pesticide products, fail to recognize the significant benefits associated with biopesticides and actually create obstacles to product registration. EPA’s proposal to Mitigation Exposure to Bees from Acutely Toxic Pesticides is one such example.

In May 2015, EPA proposed mitigation measures for pesticides that are considered acutely toxic to bees. The biopesticide industry is concerned that EPA’s proposed approach to pollinator mitigation departs from FIFRA’s risk-based standard and simply applies a hazard-based bright line number standard which leaves little or no room for varying interpretation. The proposed hazard classification is an indiscriminate trigger that could result in unnecessary restrictions on the use of biopesticides. This approach would deprive conventional growers from using some biochemicals in an integrated pest management program and severely diminish the already limited number of tools organic growers can use to control pests.
Science-Based Risk Assessments

Biopesticides are usually exempt from tolerances because of their negligible risk based on general lack of adverse health effects and low dietary exposure. An exemption from tolerance allows the biopesticide to be broadly labeled and used on any crop without the need for costly residue testing. However, over the past few years EPA has asserted that exemptions from tolerance for biopesticides cannot incorporate limitations from the label such as preharvest intervals and application rates to minimize exposure because FDA cannot enforce that label. Enforcement of the pesticide label has always been the responsibility of EPA and its state partners. EPA’s new legal interpretation is unnecessarily restrictive. Moreover, it is at odds with EPA’s past practice with biopesticides, its current practice with other pesticide product ingredients, and with the manner in which FDA has implemented the food safety provisions of the Federal Food, Drug, and Cosmetic Act for decades.

The label is the law and a fundamental compliance tool for all pesticide products. EPA and FDA can - and have in the past - worked together to ensure enforcement of tolerances and the biopesticide industry sees no reason that a label cannot be used effectively with tolerance exempt biopesticides when necessary. Moreover, EPA’s narrow legal interpretation without the context of science drives unnecessary cost and time to a biopesticide registration. Since most biopesticides are targeted to minor crops such as vegetables and fruit, the expected revenues are considerably smaller. Unnecessary regulatory hurdles for low risk pesticides stifle the innovation the biopesticide industry seeks to foster.

The biopesticide industry is keenly supportive of stringent safety standards to protect consumers as well as our industry and reputation. The biopesticide industry has raised the issue of “exemptions with label imitations” to EPA and provided recommendations. The biopesticide industry understands that this matter as well as other concerns relating to biopesticide risk assessment are under active discussion at EPA with the goal of developing Office of Pesticide Program-wide guidance so that substances such as biopesticides, antimicrobials and inert ingredients are assessed in a consistent manner.

Inert Ingredients Allowed by the National Organic Program

Inert ingredients are an integral part of effective biopesticide formulations, which require years of research to provide stability, crop safety and efficacy. Inerts are reviewed to stringent safety criteria by the EPA. In order for biopesticides to be used in organic production, the pesticide active ingredient and any inert ingredients in the formulation must be approved by the USDA National Organic Program (NOP). Because biopesticide active ingredients are often fragile, naturally derived ingredients, the inerts in the formulation are a vital part of making the product stable and efficacious. If certain inert ingredients are no longer allowed in organic production, growers could be left without critical tools to produce NOP compliant organic crops.

The National Organic Program regulations, 7 CFR Part 205, allow for the use of synthetic inert ingredients in pesticide formulas which appear on the EPA’s List 4 –Inerts of Minimal Concern. Because EPA no longer maintains this list, the NOP is also looking at future criteria for the review of inert ingredients. Although under consideration, the NOSB does not yet have a draft process nor has it approved a new inert in 12 years making it difficult for industry to innovate new inert products with the desirable characteristics of biopesticides.

Unfortunately, the biopesticide industry is not adequately represented in discussions on appropriate new criteria even though we are the only industry that can provide important technical guidance about the current inert ingredients used in organic pesticides and the feasibility of formulation changes. The USDA NOP and its National Organic Standards Board (NOSB), established under the Federal Advisory Committee Act (FACA), works with EPA on policy and procedures to assist the development and adoption of an alternative inert evaluation that adheres to the National Organic Program philosophy. The biopesticide industry would like to be a part of that discussion, since it will have a major effect on our business, and FACA’s requirements support our participation in that effort.

Conclusion

The rapidly growing biopesticide industry is adding jobs and contributing to the economy while also providing organic and conventional growers, pest control applicators and public health officials with effective pest control tools that are safe for the environment and help reduce pesticide resistance. In order for the industry to continue to provide the world with these pest control solutions, it is essential that regulations recognize the significant benefits associated with these products.
Saint-Amand, BELGIUM (March 22, 2016) - REDEBEL S.A., a benchmark company in the approval of plant protection products, biocides and chemical substances (REACH), has decided to divide its testing and regulation activities by creating a new structure, RRA (Redebel Regulatory Affairs SCRL), which will encompass the regulatory affairs division. This came into effect on 1 March 2016, and the move is a reflection of the company’s willingness to continuously strive to better meet its clients needs and its goal to strengthen its position on the market. REDEBEL S.A. is known and recognised for the quality of its pesticide trials in Belgium (efficacy, selectivity and residue). Its regulatory affairs division, on the other hand, has developed considerably over the last few years and plays an active role in plant protection legislation, as well as in biocide and REACH legislation. The division also operates in all 28 member states of the European Union.

As Tanguy Dumont de Chassart, Managing Director of REDEBEL S.A., states:

“The creation of a separate division dedicated to regulatory affairs is a very important step in the development of our Group. It will allow us to continue developing our respective activities, with specific expansion plans adapted to meet the needs of each entity. It gives me great satisfaction to see the progress our regulatory affairs division has made over the last few years and I am very confident as regards its ability to continue playing a major role within the European business of Regulatory Affairs.”

As for the new company’s name, we wanted to maintain the name “REDEBEL” as it is synonymous with very high standards of quality and this is one of the important values we want to see as a foundation of the new company. However, we also wanted to have a specific name for our current and future clients.

Sébastien Dumont de Chassart, Managing Director of RRA, tells us:

“I am very enthusiastic about the idea of taking control of RRA and contributing to its development. Ever since my arrival at REDEBEL in 2012, I have been hugely impressed by the potential of the different departments and the performance prospects that this has facilitated. With legislation becoming increasingly complex and given that it is evolving at such a fast pace, it has become very difficult for companies to maintain an in-house team tasked with staying up-to-date on regulatory affairs.

That’s why our clients solicit our services, because this task is an integral part of the work undertaken by our collaborators.

Elsewhere, we have employed more than 10 people over the last three years with a view to strengthen our existing teams, and we are continuing to grow. I am convinced that we have a place on the market as client feedback is very positive. We are also hoping that the nature of our organisation will attract new collaborators willing to actively participate in the development of the division by taking part in the company’s capital.”

In short, both companies will work together as sharing information between the testing and regulatory affairs divisions is fundamental. We have been able to note that this form of collaboration often provides our clients with considerable added value as it allows us to ensure that all of the company’s activities share a single goal: i.e. the approval of the product or active substance in question.

We assure all of our clients that the commitments undertaken by REDEBEL S.A. will be carried out without the imposition of conditions or alterations by RRA, which undertakes to ensure the continuity of the same. This applies to current and future contracts, as well as any confidentiality agreements. Nevertheless, if any of our clients so wish, we can draw up new agreements in the name of the new company upon request.

As for RRA’s future, we are aware of the challenges that lie ahead and we are confident that we will be able to meet them. We are also looking forward to working closely with our clients to ensure that we continue to meet their needs and exceed their expectations.

As Sébastien Dumont de Chassart, Managing Director of RRA, states:

“With the creation of RRA, we will be able to provide our clients with a more focused and targeted service. We will be able to concentrate on regulatory affairs and ensure that our clients have the best possible support for their products. We are looking forward to working closely with our clients and providing them with the highest level of service.”

In conclusion, the creation of RRA is a major milestone in the development of our Group and we are confident that it will be a success.”
Mergers, acquisitions and deals in 2015

JANUARY
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.

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

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

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

APRIL
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.

Dow AgroSciences entered into a research and development agreement with the US genomics company, Radiant Genomics, to discover natural ingredients for use in crop protection products.

DuPont agreed to acquire the US microbial genomics company, Taxon Biosciences.

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.

Israeli biopesticide company 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, and Swiss sustainable company Evolva agreed to co-develop and commercialise active ingredients for use in “next-generation agricultural bioactives”.

MAY
UK company Eden Research signed an agreement with Sipcam and its Spanish subsidiary, Sipcam Iberia, to evaluate two of Eden’s terpene-based biofungicides.

JUNE
Chinese chemical company Hebang Group agreed to acquire a 51% stake in Israeli biopesticide firm Stockton for $90 million.

JULY
Arysta LifeScience’s (part of Platform Specialty Products) regional business for Africa, India and the Middle East agreed to launch UK plant health company Plant Impact’s stress-tolerant Banzai biofungicide in West Africa.

Brazilian biological crop protection company Promip acquired the Brazilian bioproducts company, Insecta Agentes Biologicos.

Sumitomo Chemical decided to merge the Chilean operations of its biopesticide and biorational products subsidiary, Valent BioSciences, with its post-harvest crop protection company, Pace International.

SEPTEMBER
Dutch bioproducts company Koppert Biological Systems acquired Mitsui & Co agrochemical distribution business Certis Europe’s beneficial insects business in the UK, France and Italy.

Koppert formed an Indian joint venture with Indian biopesticide company Som Phytopharma.

OCTOBER
Dow AgroSciences agreed to co-operate with the UK bio-engineering company, Synthace, on improving technology through accelerated development of fermentation-based production of crop protection products.

BASF doubled its capacity at its facility in Littlehampton, UK to 190,000 litres, increasing production volumes of beneficial nematodes and inoculants.

NOVEMBER
Syngenta and Dutch life sciences firm DSM Food Specialties agreed a partnership to develop microbial-based agricultural solutions, including biological controls, biopesticides and biostimulants.

DECEMBER
The US private equity company, Paine & Partners, acquired a majority stake in the Australian biopesticide firm, AgBiTech.
Mergers, acquisitions and deals in 2016

JANUARY
Sumitomo Chemical’s US-based biopesticide and biorational products subsidiary, Valent BioSciences, entered into a North American distribution agreement for the Streptomyces lydicus strain WYEC 108-based Actinovate biofungicide range with the BioAg Alliance between Monsanto and Danish company Novozymes.

The French InVivo co-operative group acquired Syngenta’s biological control subsidiary, Bioline.

Italian agrochemical company Isagro’s US subsidiary, Isagro USA, appointed US biopesticide company Marrone Bio Innovations as the distributor of Isagro’s biofungicide, Bio-Tam 2.0 (Trichoderma asperellum strain ICC012 + T gamsii strain ICC080), to agricultural markets in four US states.

Sumitomo Chemical’s US-based biopesticide and biorational products subsidiary, Valent BioSciences Corporation, reached a global licensing agreement with the US company, LidoChem, for a Bacillus amyloliquefaciens-based bioinsecticide for use on maize, soybeans and other crops.

ITALIAN BIOSTIMULANTS COMPANY VALAGRO HAS ACQUIRED INDIAN BIOSTIMULANT AND BIOPESTICIDE COMPANY SRIßBIO.

Sumitomo Chemical is to expand its US agrochemical and biopesticide research facilities. The company’s US-based biopesticide and biorational products business, Valent BioSciences is to relocate its R&D facilities and build a new Biorational Research Center, while Valent USA Corporation is to build a new field testing station.

MARCH
US agrochemical company American Vanguard acquired a 15% stake in the Belgian biological products company, Biological Products for Agriculture (Bi-PA), and gained distribution rights to Bi-PA’s Trichoderma spp-based grapevine biofungicide, Vintec, in the Americas and access to products in development.

Arysta LifeScience (part of Platform Specialty Products) signed a licensing agreement with the Chinese Academy of Agricultural Sciences’ Institute of Plant Protection for exclusive global access (excluding China) to certain protein-based plant disease control technology.

Sumitomo Chemical’s US-based agrochemical and biopesticide technology subsidiary, Valent BioSciences Corporation, reached a global licensing agreement with the US company, LidoChem, for a Bacillus amyloliquefaciens-based biofungicide for use on maize, soybeans and other crops.

Italian biostimulants company Valagro has opened a Chinese subsidiary in Shanghai.

Mitsui & Co’s US subsidiary, Certis USA, appointed UAP Canada as exclusive distributor of its biofungicide, Double Nickel (Bacillus amyloliquefaciens strain D747), in Canada.

The French InVivo co-operative group acquired Syngenta’s biological control subsidiary, Bioline.

Italian agrochemical company Isagro’s US subsidiary, Isagro USA, appointed US biopesticide company Marrone Bio Innovations as the distributor of Isagro’s biofungicide, Bio-Tam 2.0 (Trichoderma asperellum strain ICC012 + T gamsii strain ICC080), to agricultural markets in four US states.

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Sumitomo Chemical’s US-based biopesticides and biorational products subsidiary, Valent BioSciences, has entered into a research and development agreement with the Argentine seed treatment and inoculants specialist, Rizobacter.

Sumitomo Chemical is carrying out the second phase of the integration of its US-based biopesticide and biorational products business, Valent BioSciences Corporation, with Sumitomo’s crop protection business.

BASF put into operation a new R&D centre at its crop protection headquarters in Limburgerhof, Germany.

APRIL
Italian biostimulants company Valagro has opened a Chinese subsidiary in Shanghai.
# New active ingredients registered or launched in 2015

<table>
<thead>
<tr>
<th>Company &amp; active ingredient</th>
<th>Use</th>
<th>Status</th>
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<tbody>
<tr>
<td><strong>BIOPESTICIDES &amp; OTHERS</strong></td>
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<tr>
<td><strong>Anatis Bioprotection</strong></td>
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<tr>
<td><em>Beauveria bassiana</em> strain ANT-03 [bioinsecticide]</td>
<td>Fruit, vegetables, field crops, turf &amp; ornamentals</td>
<td>Approved in US as Bioceres</td>
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<tr>
<td><strong>Andermatt Biocontrol</strong></td>
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<tr>
<td><em>Autographa californica</em> nucleopolyhedrovirus strain FV11 [bioinsecticide]</td>
<td>Greenhouse-grown cucumbers, peppers &amp; tomatoes</td>
<td>Proposed approval in Canada as Loopex</td>
</tr>
<tr>
<td><em>Cydia pomonella</em> granulosis virus strain V22 [bioinsecticide]</td>
<td>Pome &amp; stone fruit &amp; walnuts</td>
<td>Approved in France as Madex Twin; approved in Australia as Grandex Biological Insecticide</td>
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<tr>
<td><strong>Andermatt Biocontrol</strong></td>
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<tr>
<td><em>Helicoverpa armigera</em> nucleopolyhedrovirus [bioinsecticide]</td>
<td>Soybeans, sweet corn, cotton, berries, vegetable &amp; ornamentals</td>
<td>Launched in Brazil by FMC as Helicovex; approved in US</td>
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<tr>
<td><strong>BASF</strong></td>
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<tr>
<td><em>Trichoderma asperelloides</em> strain JM41 R [bioinsecticide]</td>
<td>Soil &amp; growing media in greenhouses</td>
<td>Proposed approval in US as TrichoPlus</td>
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<tr>
<td><strong>Bayer CropScience</strong></td>
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<tr>
<td>Terpenoid blend QRD 460 [bioinsecticide]</td>
<td>Approved in EU</td>
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<tr>
<td><strong>BioProdex</strong></td>
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<tr>
<td>Tobacco mild green tobamovirus strain U2 [bioherbicide]</td>
<td>Pastures &amp; wooded areas</td>
<td>Approved in US as SolviNix LC</td>
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<tr>
<td><strong>Certis USA</strong></td>
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<tr>
<td><em>Bacillus amyloliquefaciens</em> strain D747 [biofungicide]</td>
<td>Fruit, vegetables, grapevines &amp; soybeans</td>
<td>Approved &amp; launched in Mexico as Double Nickel; approved in Canada as Double Nickel 55 &amp; Double Nickel LC</td>
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<tr>
<td><strong>De Ceuster</strong></td>
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<tr>
<td>Pepino mosaic virus strain CH2 isolate 1906 [viral pesticide]</td>
<td>Tomatoes</td>
<td>Approved in EU</td>
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<tr>
<td><strong>Ecologia y Protección Agrícola</strong></td>
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<tr>
<td>Rescalure [attractant]</td>
<td>Citrus fruit</td>
<td>Approved in EU</td>
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<tr>
<td><strong>Eden Research</strong></td>
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<tr>
<td>Eugenol/geraniol/thymol [biofungicide]</td>
<td>Grapevines</td>
<td>Approved in Malta &amp; Greece</td>
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<tr>
<td><strong>FMC</strong></td>
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<tr>
<td>BLAD [biofungicide]</td>
<td>Grapevines, strawberries, tomatoes, almonds, stone fruit &amp; ornamentals</td>
<td>Approved in Canada as Fracture</td>
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<tr>
<td><strong>John I Haas BetaTec Hop Products</strong></td>
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<tr>
<td>Potassium salts of hop beta acids [biochemical acaricide]</td>
<td>Beehives</td>
<td>Proposed approval in US as HopGuard</td>
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<tr>
<td><strong>Koppert Biological Systems</strong></td>
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<tr>
<td><em>Trichoderma harzianum</em> strain T22 [biofungicide]</td>
<td>Field crops, greenhouse crops &amp; greenhouse ornamentals</td>
<td>Approved in Canada as Trianum G &amp; Trianum WG</td>
</tr>
</tbody>
</table>
### Company & active ingredient
### Use
### Status

<table>
<thead>
<tr>
<th>Company &amp; active ingredient</th>
<th>Use</th>
<th>Status</th>
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</table>
| **Meiji Seika**<br>
Lactobacillus plantarum [biofungicide] | Vegetables & potatoes | Approved in Japan as Lactoguard WP |
| **Mitsui & Co**<br>
Bacillus amyloyiquefaciens subsp plantarum D747 [biofungicide] | Grapevines | Approved in EU |
| **Silvar Technologies (Andermatt)**<br>
Autographa californica NPV [bioinsecticide] | Greenhouse tomatoes, cucumbers & peppers | Approved in Canada as Loopex |
| **Stockton**<br>
Melaleuca alternifolia extra [biofungicide] | Coffee, grapevines, fruit & vegetables | Approved in Macedonia, South Korea, Mexico, Colombia & the Philippines as Timorex Gold |
| **Syngenta**<br>
Pasteuria nishizawae Pn1 [bionematicide] | Soybeans | Approved & launched in Canada as Clariva pn |
| **Valent BioSciences**<br>
Bacillus thuringiensis subsp aizawai strain ABTS-1587 [bioinsecticide] | Fruit, vegetables, oilseeds & ornamentals | Approved in Canada as XenTari WG |
| **Zelam**<br>Aureobasidium pullulans [biobactericide] | Pome fruit | Approved in New Zealand as Blossom Protect |

### New active ingredients registered or launched in 2016

#### BIOPESTICIDES & OTHERS

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<tr>
<th>Company &amp; active ingredient</th>
<th>Use</th>
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| **Andermatt Biocontrol**<br>
Cydia pomonella granulovirus [bioinsecticide] | Almonds, walnuts, pome & stone fruit | Approved in Spain as Madex Twin |
| Helicoverpa armigera nuclopolyhedrovirus [bioinsecticide] | Soybeans, beans, tomatoes, rice, cotton, peanuts, maize, potatoes & other crops | Approved in Brazil as Verpavex & Spain as Helicovex |
| **Chinese Academy of Sciences’ Institute of Applied Ecology**<br>
Bacillus methylotrophicus strain BAC-9912 [biofungicide] | Cucumbers | Approved in China |
| **Eden Research**<br>eugenol/geraniol/thymol [biofungicide] | Grapevines | Approved in Bulgaria & Italy as 3AEY |
### HERBICIDES

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Herbicide</th>
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<tr>
<td>Flumioxazin</td>
<td>Butroxydim</td>
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<tr>
<td>Diclosulam</td>
<td>Cloransulam</td>
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<tr>
<td>Flumetsulam</td>
<td>Florasulam</td>
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<tr>
<td>Isoxaflutole</td>
<td>Mesotrine</td>
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<tr>
<td>Foramsulfuron</td>
<td>Fluridone</td>
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<tr>
<td>Sulfentrazone</td>
<td>Carfentrazone</td>
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- 2,4-D, 2,4-DB, 2,4-DP-p
- MCPA, MCPB, MCPP-p
- Glyphosate
- Glufosinate
-Dicamba
- Clethodim
- Atrazine
- Ametryn
- Terbutryn
- Terbutylazine
- Diuron
- Hexazinone
- Bromacil
- Metribuzin
- Tebuthiuron
- Pendimethylin
- Propanil
- Bispyribac
- Clomazone
- Bentazone
- Picloram
- Clopyralid
- Triclopyr
- Fluroxypyr

### FUNGICIDES

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<tr>
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<td>Propineb</td>
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### INSECTICIDES

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<td>Methoxyfenozide</td>
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<tr>
<td>Dinotefuran</td>
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- Imidacloprid
- Acetamiprid
- Chlorpyrifos
- Methomyl
- Lufenuron
- Profenofos
- Lambda-cyhalothrin
- Indoxacarb
- Thiamethoxam
- Fipronil
- Emamectin
- Abamectin

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Stockton’s commitment to developing new solutions by integrating innovation and sustainability provides important benefits to agriculture and the cause of environmental conservation. The company’s R & D center in Israel is positioned at the forefront of biosciences development and innovation, producing highly effective protection solutions that are eco-friendly, safe, residual-free and non-staining.

Stockton Research and Development Innovation Center is constantly developing natural crop protection solutions that are effective and environmentally friendly, preventing and/or overcoming the effects of pests, weeds and plant diseases in a manner suitable for conventional IPM and/or organic farming.

Stockton’s flagship product Timorex Gold® is used to control a broad spectrum of crop diseases. The product demonstrates an efficacy similar to that of chemical fungicides, and is suitable for use with both conventional and organic crops. Timorex Gold® is registered and/or sold in over 30 countries, and is a leading biofungicide throughout Latin America and some countries in APAC. The brand is both an effective biofungicide and bactericide, working effectively for the protection of a variety of crops, including tomatoes, grapes, berries, cucurbits, peppers, peanuts, onions, soybeans and others.

Timorex Gold® is a plant extract (Melaleuca alternifolia), and belongs to the Frac 7 Group, meaning it has a superior environmental profile and performs especially well for resistance management.

Stockton is interested in In-Licensing Partners, including small bio companies to broaden the company’s portfolio through exploration, development, acquisition and commercialization of innovative and sustainable modern agriculture.

For more information on Stockton, please contact Judy Jamuy, Marketing & Communications Manager, Stockton Israel Ltd, 17 Ha’Mefasim Street, PO Box 3517, Petach Tikva 49134, Israel +972(0)72-257-0000 Email: info@stockton-ag.com
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Biopesticides and the EU regulatory process

By Lars Huber, Senior Manager Regulatory Affairs
Head of Biostimulants, Fertiliser, IPM,
SCC Scientific Consulting Company GmbH

Do biopesticides exist in EU legislation?
The regulatory approach in Europe, according to EU plant protection Regulation 1107/2009, does not recognise “biopesticides” as a regulatory category of plant protection active ingredients. In the lack of an unequivocal regulatory definition of biopesticides, many countries around the world use this term. In many cases, they have to decide on a case-to-case basis if an ai falls under this category, for instance, if an ai is not a natural biochemical but only biochemical-like. To avoid any confusion or discrimination of aises with similar favourable characteristics ascribed to “biopesticides”, a risk based approach was chosen in the EU under which, irrespective of the origin of an ai, categories of basic substances and low risk substances were introduced. Nevertheless the term “biopesticide” is widely used also in the EU by all participants in the regulatory system.

What about special characteristics of the different biopesticide categories such as microorganisms or plant extracts?
The characteristics of specific substances such as plant extracts or microorganisms and differences between them regarding data requirements and points to be addressed in a registration dossier are considered by respective guidance documents.

How different is the approval process of a biopesticide compared with a chemical ai?
In general the approval process is identical for biopesticides and chemicals, at least regarding the ai approval, with the exemption of basic substances for which the approval process and the requirements differ hugely compared with low risk or conventional aises. Differences exist between conventional and low risk plant protection products after the low risk status of an ai is confirmed by an approval. Authorisation of low risk plant protection products for example only takes 120 days compared with the 12 months process for conventional aises. Furthermore, very often the authorisation fees are less for low risk aises and respective products.

What is so special about basic substances?
Basic substances are substances with a low toxicity profile such as foodstuffs, that are not already placed on the market as plant protection product or are not predominantly

Lars Huber, Senior Manager Regulatory Affairs, Head of Biostimulants, Fertiliser, IPM
EASTCHEM CO., LTD.

EASTCHEM, as the headquarters located in Changzhou, Jiangsu, covers two factories Nanion Weliike Chemical Co., Ltd and Jiangsu LionChem Co., Ltd as technical and formulation base in Yangkou Coastal Economic Development Zone, Nantong, Jiangsu. The company aims at supplying pesticide via research and development, production, sale and registration, also developing new environmental pesticides, and will try the best to satisfy the customers.

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Website: www.eastchem.net
used for plant protection purposes but, nevertheless, could be useful in plant protection. Application for approval is made by a member state or by any interested party. The evaluation is mainly based on already existing evaluations for a substance carried out in accordance with other EU legislation regarding possible effects on human or animal health or the environment. Should studies be necessary, no data protection is granted.

And what about low risk substances?
Low risk substances have to fulfil certain criteria such as being not carcinogenic, mutagenic or toxic to reproduction. The criteria are listed in Annex II of Regulation 1107/2009, but are currently under review and will be adapted to the technical and scientific progress, for example, regarding sensitisation potential of micro-organisms.

As already mentioned, the general approval process is similar to conventional chemical ais, but a more scientific approach can be used including the use of literature data to demonstrate the natural occurrence or the natural background levels for the use in risk assessments and scientific justifications in place of formal studies.

Is it simpler? How are the requirements for making an application for a biopesticide different from that of a chemical ai?
Due to the huge variety of substances falling under the category biopesticides such as plant extracts, micro-organisms, pheromones etc, this question is not easy to answer. This is a problem each country in which the “biostimulant approach” is used encounters. In the US for example there is a special committee which decides on a case-to-case basis, if a substance is eligible as a “biostimulant”. This is why the EU approach is easier to handle, because it deals with the actual risk of a substance not with artificial categories. Being a biological substance is not automatically the same as being harmless. The same applies vice versa for chemicals.

Special “biological features” are accounted for by the respective guidance documents as far as they are already available. For example, plant extracts very often consist of a variety of components which cannot be characterised in a way a synthetically produced chemical ai can be. In such cases, the main constituents can be identified and used for scientific argumentation in a registration dossier.

I already referred to the huge variety of substances and the differences between them if they are of natural origin. There are still guidance and guidelines missing but a sound scientific approach is to be recommended and the way forward to a successful registration.

Is the time frame for the approval of a new biopesticide ai shorter compared with a chemical ai?
Regrettably not, and this is one of the reasons, why many companies still refrain from a registration. One of the main improvements, and a huge incentive for industry, would be a shorter time frame or prioritisation schemes for the approval of low risk ais. This, as well as lower registration fees which are already reduced in many member states, but not yet everywhere.

How many biopesticides are currently approved in the EU?
Difficult to tell as there is no “biopesticide stream” as in other countries. The low risk and basic substance concept was only introduced with Regulation 1107/2009 some years ago, but we expect the number of low risk ais will increase in future, not only due to new substances to be approved, but also due to substances evaluated as low risk in context of the currently on-going or outstanding renewal process for many substances. Potential candidates are many substances included in the fourth list for first Annex I inclusion according to Directive 91/414/EEC.

Currently, eleven basic substances and five low risk substances are approved. The fourth list for first Annex I inclusion according to Directive 91/414/EEC contains about 90 ais and a lot of them possibly qualify as low risk ais. Therefore, an increase in the number of low risk ais could be expected in the next years. It remains to be seen if the number of new approvals will increase in future. That will mainly depend on whether the regulatory and scientific requirements are adapted in a way to attract industry to apply for approval of new low risk ais, that is, “biopesticides”.

What are SCC’s recommendations for the EU registration process for biopesticides?
SCC’s recommendation is very clear. In any case, use a sound scientific approach incorporating studies, if necessary, as well as scientific peer reviewed literature and start
Do you recommend a separate regulation for biopesticide registration or amendments to certain aspects of EU Regulation 1107/2009?

In our opinion, a separate regulation for biopesticides is neither required nor would it be productive. To the contrary, we would have favoured, if plant biostimulants would also have been included in the plant protection regulation – by applying adequate registration requirements of course – and not in the fertiliser regulatory framework. With the inclusion of biostimulants in the fertiliser regulation many substances and products most likely will not be deployable to their full beneficial potential.

The problem we currently encounter with biopesticides is not the joint regulation, but mostly the harmonisation of the implementation of Regulation 1107/2009. Certain amendments, of course, would be beneficial, as well as absolutely necessary, if the sustainable use of plant protection products is to be fostered further and European agriculture is to be advanced.

Some improvements are already under way, such as the modification and adoption of low risk criteria by separate guidance for example, others are not.

As already mentioned, the time frame for approval of a low risk ai is currently similar to that of the approval of a conventional ai. That should be remedied. Also, a two-step approval process would be helpful to give companies a solid basis that the active they want to register is really a low risk substance. In step one, which should be as short as possible, the low risk criteria could be assessed. In a second step, the full evaluation should be conducted as needed to fulfill the complete regulatory requirements in order to safeguard the special safety requirements characterising such low risk substances. By using a scientific approach, as described above, this can be already done today, but there is no certainty that such a concept will be approved by all member states in the end - an insufficient basis for business decisions especially for small companies.

In other areas, more clarification is required, for example, regarding the differentiation of basic substances and active substances. This also applies for certain data requirements stipulated in various guidelines which are not binding and can be interpreted differently by the parties involved in the approval/authorisation process.
The agricultural input market is currently witnessing its second major consolidation wave in two decades. These massive tsunami waves affect not only the size of the leading players but also the way they do business. The previous wave created three clear giants: two in crop protection (Syngenta and Bayer) and one in seeds (Monsanto). The current wave is changing things again by creating new giants (DuPont+Dow, ChemChina) and new modes of operation.

Lessons from the first wave
The first wave, early in the 2000’s, created for the first time a “crop centric – unified platform” approach, combining inputs from three previously separate markets: crop protection, seeds and biotechnology traits. This approach was rolled out in major arable crops such as maize and soybeans with a particular focus on crops dominated by annual purchases of certified seeds. The success of this approach led to the accelerated growth of companies like Syngenta in crop protection, and Monsanto in seeds and traits. Other innovative leaders like Bayer CropScience, BASF, Dow AgroSciences and DuPont, adopted more conservative approaches, and ended up delivering lower growth rates.

A second clear group of winners were cash rich second-tier players, able to buy cheap assets disposed of by the newly-created giants, in order to satisfy anti-trust demands. UPL with 20.8% average annual growth and Adama with 12.1% average, took the best advantage of the situation over the last decade. These purchases along with major investments in independent distribution channels created a select group of major generic players which were able to increase their market share at the expense of others.

Characteristics of the current wave
The current wave is intensifying the mega giant trend, and creating an even more concentrated market. In effect, we are witnessing the creation of an even more exclusive “champion’s league” which will become home to only 3-5 mega “clubs”.

Mega Consolidation 2.0 – Business not as usual

By Guy Cooper, Cooper investment and Consulting
These players will control more than 70% of trade but more importantly almost all the basic innovation in a $95 billion market.

In addition, on the off patent front, we are witnessing two key developments. The first is a slight enlargement in size of leading off patent players through a parallel mini consolidation wave. Recent examples include FMC+Cheminova and Arysta+Chemtura+Agiphar. The second development is of more and more Chinese manufacturers attempting to increase their direct participation in global markets at the expense of small and medium crop protection traders.

These two phenomena are increasing the already large pressure on many small and medium players.

**Time to focus your strategy**

These developments should cause many to at least reflect on their strategy and commercial go-to-market approaches. Now is a time where strategic thinking and strong balance sheets will play an important role.

Players lacking the ability to significantly grow their market access through large-scale acquisitions will need to engage fresh thinking and focus their growth strategies. Options could include concentrating commercial efforts on specific niches where competition is less intensive, alignment of certain assets with the portfolios of the mega giants, cost leadership in specific technologies etc.

The following is a short list of key issues to reflect on:

**Channel access:**
- How much effort should we invest in building channel access in the large markets?
- Should we now concentrate our efforts on smaller markets?
- Is it worth buying distribution in key markets and what will it cost?

**Innovation level:**
- Should we now avoid innovation altogether?
- Should we increase innovation in specific portfolio gaps of the mega giants?
- Should we invest in specific technologies?
- Should we focus on “simple” innovation which could also be introduced to the market through second tier players?

**Consolidation efforts:**
- Should we engage in our own consolidation initiatives?

**Asset purchase:**
- Do we have the financial basis to participate in the expected asset disposals which are expected to be imposed by the anti-trust approval process?
- How can we maximize our cash position?

One thing is clear – companies that continue to deploy simplistic strategies, are putting themselves at risk. Such companies may face corporate resource dilution due to loss of market share and profit to competitors that adopt more sophisticated approaches.

(Guy Cooper is the owner of Cooper investment and Consulting, a firm focused on the business and investment aspects of the global agricultural market. For more information, visit www.cooper-ag.com.)
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Which regulatory requirements are coming up in 2016 - 2017 that companies need to prepare for?

The requirements for endocrine disruptors are currently being intensively discussed by regulatory authorities. A report on the consultation of defining criteria for identifying endocrine disruptors in the context of the implementation of the Plant Protection Regulation was published in July last year.

Another topic in regulatory discussions is nanotechnology, which can contribute to improved pest management and crop protection through better efficacy of pesticides and other agrochemicals, e.g. by mixing/encapsulating active substances in micro or nano-emulsions and nano-dispersions. Changing the release and efficacy can on the other hand impact the environmental fate and behaviour of pesticides or agrochemicals.

Which topics are relevant in the industry? Within aquatic ecotoxicology, which areas are being discussed?

In the area of aquatic ecotoxicology, the design and the significance of endocrine disruptor studies have been discussed. Key points are the difficulties to meet the validity criteria following the relevant OCPSS and OECD guidelines and the significance of the histopathology results. The risk of having false-positive results is high and could result in high costs for the industry.

Another topic covers the analytical support during formulation testing with more than one active substance. There is no guidance about which active substance shall be measured. A pragmatic approach would be to confirm analytically the correct dosage at the beginning of the test by measuring the more toxic active substance and relate the results to nominal concentrations of the formulation and the more toxic active ingredient.

The third topic affects the reduction of number of vertebrates used for testing. The new regulations allow avoiding fish testing for formulations in case fish was not shown be the most sensitive species. Another approach, which is already used in other areas, is the use of fish eggs instead of juveniles. However, this approach is still not accepted from the competent authorities in the agrochemical area.

Looking towards 2016 – 2017, are any of these services going to become more necessary and should it be a priority for companies to develop relationships with suppliers of these services?

The demand for studies in the area of aquatic ecotoxicology will remain at a high level over the next few years. At the same time, the requirements in terms of quality and additional endpoints will increase. Therefore, it is mandatory to have well equipped laboratories with state-of-the-art equipment to have the possibility to meet these high standards. In certain areas specific studies are required for product registration purposes, and may range from acute standard testing to chronic and/or bespoke studies. In order to develop an appropriate test design for such cases, highly-educated and experienced staff are required. Thus, it is crucial for companies to find an efficient and reliable supplier of these services, so that they are able to schedule studies quickly and keep unnecessary costs to a minimum.

What makes the IES aquatic ecotoxicology department unique?

IES experts have over 20 years’ experience in aquatic ecotoxicology testing, both for the biological part as well as for the analytical support. That includes testing of numerous compounds with difficult properties such as instability, insolubility or complex mixtures. Another strength of the team is the expertise with tailor-made designs such as pulsed-dose and recovery tests or bioaccumulation studies. The availability of versatile, state-of-the-art equipment and the residue analytical experience of staff is favourable for testing of compounds with high ecotoxicology or other difficult properties.

The structure of the team with biological and analytical experts sitting in one office, working in the same department avoids
misunderstandings and allows the best possible scientific procedures during the testing.

Does having the department in one location have an impact on the time it takes to turn projects around?

This organisation is beneficial for the project turnaround time. The biological and analytical experts have the possibility to discuss the design, the results and upcoming difficulties immediately. By working in the same department, cross training happens automatically, which helps in achieving a better understanding of the problems and difficulties of the other part of the study. This way of working allows us to run studies more efficiently and to a higher standard.

What types of test are performed by IES?
In the area of aquatic ecotoxicology, the following study types are performed:

Acute and chronic toxicity on fish, daphnia, algae, higher water plants and sediment-dwelling invertebrates. The chronic vertebrate testing includes the fish early life stage test, fish full life cycle test, bioaccumulation test and the ecotoxicological tests required for the endocrine disruptor screening program (fish short-term reproduction assay and the amphibian metamorphosis assay).

Further to this, tailor-made studies are conducted (e.g. with recovery phase, with humic acids, species sensitivity distribution and pulsed dose). This portfolio is completed by bacterial toxicity and biodegradation studies.

Most of the studies are supported by analytical verification including method implementation, development and/or validation.

What issues can IES solve with its studies?
The IES aquatic ecotoxicology study portfolio covers all relevant areas. Active substances as well as formulated products can be tested for their toxicity to the environment. In case refinements are required, IES can support the client in finding the best test design to satisfy the needs of the competent authorities.

How does IES fit in the agrochemical market?
IES is a mid-size CRO offering the full portfolio of environmental toxicology and environmental chemistry studies to support agrochemical companies in the notification of their compounds. The experience of its staff both in their scientific discipline and from working in the CRO industry makes IES an ideal partner to help in the selection of the appropriate test design. Fast decision making and short internal ways of working ensure a quick turnaround of studies.

Beyond aquatic ecotoxicology, IES performs a wide range of tests in the following areas:

- Environmental Fate
- Crop Metabolism
- Terrestrial Ecotoxicology
- Analytical Chemistry (Residue Analysis, 5 Batch, Dose Verification)
- In vitro Metabolism
- Dermal Penetration
- Physical Chemistry

STEFAN HÖGER, COO
Stefan studied biology at the University of Constance, Germany, with a focus on developmental neurobiology, immunology, behaviour biology and ecotoxicology. He has several years of experience in the CRO industry. His field of expertise covers ecotoxicology, toxicology, biodegradation, analytical chemistry and also regulatory know-how (agrochemicals, biocides, chemicals and pharmaceuticals). He previously worked as a study director, team coordinator, team leader, department head and GLP test facility manager in academia and industry. Since 2014, Stefan is the COO of IES Ltd.

JÖRN SCHREITMÜLLER, HEAD OF AQUATIC ECOTOXICOLOGY
Jörn studied Chemistry at the University of Ulm with a focus on analytical chemistry and organic spectroscopy. He has twenty years of experience in the CRO industry and his field of expertise covers multiple analytical areas including analytical support for ecotoxicology and toxicology, product analysis (five batch analysis and physicochemical analysis) analysis of food contact materials (migration and polymers) and medical devices, residue analysis, bio analysis and pharmaceutical analysis. Since October 2015 Dr. Jörn Schreitmüller is the Head of Aquatic Ecotoxicology at IES Ltd.

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China’s pesticide exports endured a historically bad year in 2015, affected by falling prices and oversupply of the country’s leading pesticide export, the herbicide, glyphosate. Nevertheless, the country’s Institute for the Control of Agrochemicals (ICAMA), the official regulatory body of the Chinese pesticide industry, handled almost 120,000 import/export permits in 2015, an increase of 4.3% on the previous year. Some 96% of the permits were for pesticide exports. The figures were presented by Zhang Wenjun from the ICAMA’s international division at the CAC Conference, organised by the China Council for the Promotion of International Trade, held in Shanghai this month.

Last year was the first time in five years that pesticide exports saw a drop in both value and volume, with total export value falling 16.9% to $7,283 million and volumes dropping 8.1% to 1.5 million tonnes. China’s agrochemical exports rose by 10.7% to $4,147 million in 2014. Exports of technical material accounted for 58.5% of the total export value in 2015, up 1.1 percentage points on the previous year. In volume terms, technical material exports accounted for 36.2% of the total. Pesticide formulations accounted for 63.9% of total export volumes, up 1.4 percentage points.

Half of the top 30 exported active ingredients in terms of value and volume saw both metrics decline in 2015. The top 30 exported ais accounted for 58.3% of total export value, and 70.7% of total volume. China exports over 400 different agrochemical ais. There were only ten ais that had export values of over $100 million for the year. The herbicide glyphosate, was by far the most-exported ai at some 526,400 tonnes (-14.5%), accounting for over one-third of total volume exports.
Glyphosate exports dropped by 39.2% in value terms to $1,273 million, and accounted for 17.5% of total value exports.

The herbicide, paraquat, was the second-largest pesticide export, with $443 million (-15.8%) and 181,400 tonnes (+22.8%). Exports for the insecticide, imidacloprid, were valued at $224 million (-29.3%) while volumes for the ai fell 7.9% to some 21,700 tonnes. The only ai to record growth in the top five was the herbicide, clethodim. Export values for clethodim increased by 47.1% to $144 million, while volumes rose 52.4% to 16,800 tonnes. The insecticide, chlorpyrifos, rounded out the top five with $133 million in value exports (-27.5%).

The insecticide, emamectin benzoate, recorded the fastest growth in export value, almost quadrupling to some $22 million in 2015. Exports of the insecticide, abamectin, were up 49.2% to $109 million. The insecticide, bioallethrin, saw the sharpest decline in export value, dropping 55.2% to $14.9 million last year.

In terms of export destinations in 2015, over one-third (35%) of volume exports were to Asia, followed by Latin America (25%), Africa (15%), Europe (10%), North America (8%) and Australasia (7%). China exports to over 180 countries, 22 of which accounted for 71.1% of value exports. In value terms, the US was the top export destination for Chinese pesticides, with exports valued at $977.7 million, down 1.6% on the previous year, and accounting for 13.4% of the total. Brazil remained unchanged in second place, despite export values falling 26.6% to $617.6 million. Up two places from last year was Australia in third place, accounting for 5.4% of China's exports ($394.7 million, +1.9%).

Argentina moved down one spot to fourth, with exports falling 35.2% to $308.6 million. Rounding out the top five and up two places from the previous year was Vietnam, which accounted for 4.1% of China's exports. Glyphosate was the most exported ai to all these five countries. Some $93.7 million worth of glyphosate was exported to the US in 2015, accounting for 9.6% of the total. Glyphosate exports headed to Brazil amounted to $176.7 million, accounting for 28.6% of the country's total.

Growth destinations for Chinese pesticide exports included Iraq, with exports more than doubling in both volume and value. Other growth regions were Croatia and Latvia.
Chinese pesticide industry needs “concerted effort” to pull out of slump

Chinese pesticide companies should work with each other, their industry associations and the government in a “concerted effort” to survive in a difficult time for the market, said Zhao Jungui, vice-president of the China Petroleum and Chemical Industry Federation. Mr Zhao was talking at the CAC Conference, organised by the China Council for the Promotion of International Trade, held in Shanghai this month.

China’s petrochemical industry, within which the agrochemical industry is traditionally grouped, underperformed in 2015, with revenues down 6.1% and total industry profits falling 18.2%. Agrochemical manufacturing dipped as costs rose and the tax burden on companies increased. Manufacturing costs accounted for some Yuan 84.10 ($12.93 at the current rate) out of every Yuan 100 ($15.38) in revenue.

In order for the industry to come out of its current slump, Mr Zhao called upon the government to set up a national pesticide innovation centre to create new technologies to strengthen the pesticide sector. He also suggested new policies to encourage pesticide research and development, emphasising the protection of intellectual property (IP) and the creation of an IP protection association that would help research institutes and pesticide majors to work together to create new IPs.

Pesticide companies, for their part, should stop trying to “become bigger and then stronger”, as the Chinese business maxim goes, but instead “become stronger first”, Mr Zhao said. “Every Chinese company wants to become a big company”, but none are focused on first strengthening their foundations, he added. Companies should eschew traditional business models, and change their copycat mentality.

In a closing remark, Mr Zhao said that in this “new period of transition for the pesticide industry”, the companies that can survive by finding their place will “become future industry leaders”.

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Huapont’s sales up 9% in 2015

Chinese company Huapont Life Sciences (formerly Huapont Nutrichem) recorded a 9.2% increase in agrochemical sales in 2015 to Yuan 4,081.4 million ($630.7 million at the current rate). The main growth driver was domestic sales, which increased by 68.3% to Yuan 2,886.9 million ($446.1 million). Net profit increased by 48.3% to Yuan 636.6 million ($98.4 million). Huapont-Nutrichem recorded a 7.4% rise in agrochemical sales of Yuan 3,737.2 million ($588.4 million at the current rate) in 2014. Agrochemicals accounted for over 66% of the company’s total sales last year. The company produced 127,701 tonnes of agrochemicals during the year, up almost a quarter (24.5%) on the previous year. Sales volumes were up 20% year-on-year to 156,798 tonnes.

Redsun’s 2015 agchem sales flat

Chinese company Nanjing Redsun recorded pesticide sales of Yuan 3,544.9 million ($547.8 million at the current rate) in 2015, about level with the previous year (-0.1%). Pesticide sales accounted for over three-quarters (77.8%) of the company’s total revenues, an increase of 25.8 percentage points year-on-year. Redsun’s net profit on all sales in 2015 more than halved to Yuan 181.9 million ($28.1 million). In 2014, Redsun was the third-largest Chinese pesticide company in terms of annual agrochemical sales, behind Zhejiang Wynca Chemical and Huapont Nutrichem (now Huapont Life Sciences).

Redsun’s main markets are in the Chinese provinces of Jiangsu and Anhui. Jiangsu, the company’s home province, accounted for over a quarter - Yuan 1,179.3 million ($182.2 million) - of its consolidated sales, dropping from over a third in the previous year. Sales in Anhui were up 27% to Yuan 725.2 million ($112.1 million), accounting for 15.9% of the total. Exports of all products dropped 12.3% in 2015 to Yuan 1,584.4 million ($244.8 million).

Wynca’s pesticide sales down 6% in 2015

Chinese company Zhejiang Wynca Chemical recorded a 6.1% decline in agrochemical sales to Yuan 3,574.9 million ($552.4 million at the current rate) in 2015. Costs for the agrochemical division dipped 0.4%, and the gross profit margin for pesticide products dropped by 5.2 percentage points.

Agrochemicals accounted for just under half (49.7%) of the company’s total sales, down a percentage point from the previous year. The company blames the “large decline” in the sale price of its main product, the herbicide, glyphosate. Total sales were down 4.6% year on year. Wynca’s second major business area is organosilicone products. The company made an operating loss of some Yuan 266.8 million ($41.2 million) in 2015, a far cry from its profits of Yuan 49.7 million ($7.7 million) in 2014.

Wynca produced some 81,728 tonnes of pesticides throughout the year, selling 87,805 tonnes. The company’s agrochemical stocks totalled 7,876 tonnes at the end of the year (almost double the previous year’s figure).
Yangnong up 9% in 2015

Chinese agrochemical company Jiangsu Yangnong Chemical recorded a 9.4% increase in agrochemical sales in 2015 to Yuan 3,049.9 million ($471.3 million at the current rate). Net profits were level with the previous year (+0.1%), at Yuan 455.1 million ($70.3 million). Yangnong saw a 6.3% drop in agrochemical sales to Yuan 2,787 million ($430.7 million) in 2014.

Exports accounted for the majority of Yangnong’s annual sales, and were level with 2014 at Yuan 1,969.9 million ($304.4 million). Domestic sales increased by a third (+32.2%) to Yuan 1,080 million ($166.9 million). The company attributes this growth to its increased product variety and quality, and “perfecting” its domestic sales channels.

Insecticide sales, the company’s main business area, were up 9.3% to Yuan 1,583.8 million ($244.7 million). Costs for the insecticide division rose by 5.3%. Herbicide sales dropped fractionally, down 0.6%, at Yuan 1,212.8 million ($187.4 million). Manufacturing costs for herbicides rose 0.4% on the previous year.

In volume terms, production and sales of insecticides increased by 27.5% and 24.3%, reaching 10,465 and 10,199 tonnes respectively. Herbicide production and sales dipped, down 1.3% and 1.6% to 35,393 tonnes and 35,311 tonnes.

Noposion’s sales flat in 2015

China’s leading pesticide formulator, Shenzhen Noposion Agrochemicals, recorded a sales increase of just 0.3% to Yuan 2,209.7 million ($339.7 million at the current rate) in 2015. The flat growth figure follows a 27% rise in 2014. Net profit was up 18.7% year-on-year to Yuan 230.9 million ($35.5 million).

Annual sales of the company’s largest product category, insecticides, rose by 4.2% to Yuan 795.8 million ($122.4 million). Herbicide sales fell 37.8% to Yuan 385 million ($59.2 million). Revenues from fungicides were up 12.8% to Yuan 692.3 million ($106.4 million), while sales of plant nutrients increased by 17.7% to Yuan 170.5 million ($26.2 million). Adjuvants also saw growth, rising 9.4% year-on-year to Yuan 12.8 million ($2 million).

Shenzhen Noposion focuses primarily on the Chinese market. Sales in eastern China, the largest sales region, experienced the strongest growth, up 22.2% to Yuan 638.8 million ($98.2 million). Sales in northern China saw the steepest decline in 2015, down 19.4% to Yuan 194.4 million ($29.9 million). Exports increased by almost a third (+31.3%) to Yuan 15.4 million ($2.4 million).

China’s agrochem trade down 9% in first quarter

China’s combined agrochemical imports and exports fell 8.5% during the first quarter of 2016 as trade continued to stagnate, despite a slight rally in March. China’s agrochemical trade dropped by 20.1% in the first two months of the year. The data come from the county’s General Administration of Customs and are reported by the China Crop Protection Industry Association.

China’s agrochemical exports were valued at some $936 million in the first quarter of 2016, a decline of 8.8% on the same period last year. Volumes inch ed up 1.4% to 336,000 tonnes. Herbicide exports saw the most significant decrease in value, down 14.6% to $585 million, while volumes fell by 2.5% to 244,000 tonnes. Insecticide exports saw growth in value and volume terms, up 0.5% to $204 million and 11.6% to 56,000 tonnes, respectively. Fungicide exports also rose during the period, increasing by 3.7% to $119 million, while volumes grew 20.9% to 24,000 tonnes.

Agrochemical imports also declined in the first three months, falling 7.3% in value terms to $230 million, with volumes sliding 1% to 28,000 tonnes. Fungicides, historically the largest import category, saw value imports drop 5% to $88 million alongside a 9.7% increase in volumes, reaching 9,000 tonnes. Herbicide imports fell by over a quarter (27.7%) to $57 million on a 12.6% drop in volumes to 10,000 tonnes. Insecticide imports were the only category to see relatively strong growth, with values up 21.3% to $57 million, while volume imports increased by almost a third (31.6%) to 3,000 tonnes.
Nitrogen Fixers; Phosphate Solubilizers and Mobilizers - Companies, Products, Markets, Sales and Distribution Channels

Biofertilizers are a fast-growing niche market, representing plenty of future potential and scope for new entrants, products and innovations. On the flip side of the coin, it can be challenging to comprehend due to a lack of clear definition of a biofertilizer and significant differences in level of adoption and regulatory environments at a country level.

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In addition to covering the main types of biofertilizers, this new Fertecon report provides detailed analysis of the global inoculant companies, markets, sales and distribution channels with a focus on Brazil, Argentina, the United States and Asia.

A few words about the author

John Winder is a highly experienced agribusiness markets consultant who has worked in both the crop protection and fertiliser sectors for over forty years, including BASF and FMC. He has wide and direct knowledge of sales, marketing and distribution channels, and new product research and development. John is from England originally and now lives and works in Brazil.

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China’s top 100 sales down 2%

China’s top 100 agrochemical companies saw their sales fall by 2.4% to Yuan 103,839 million ($15,992 million at the current rate) in 2015, reports the China Crop Protection Industry Association (CCPIA). The figures come from this year’s ranking of the country’s top 100 pesticide companies, based on last year’s agrochemical sales.

The decline comes after an increase of 9% in combined sales for last year’s ranking, and growth of almost a quarter of that of the previous year. The CCPIA attributes the general slowdown to large-scale restructuring of the industry, falling prices for the herbicide, glyphosate, and the negative impact of restrictions of the herbicide, paraquat. The barrier for entry to this year’s top 100 decreased by 1.24% to Yuan 320 million ($49 million).

The top spot this year was claimed by Nanjing Redsun, with 2015 sales of Yuan 3,545 million ($546 million) and replacing Zhejiang Wynca Chemical, which came in second with Yuan 3,398 million ($523 million). Jiangsu Yangnong re-entered the top five, taking fourth position behind Huapont Life Sciences subsidiary Beijing Nutrichem. One of the most prominent fallers was Zhejiang Jinfanda, a glyphosate manufacturer, which dropped from fifth position last year with sales of Yuan 3,025 million ($466 million) to 16th this year on revenues of Yuan 1,663 million ($256 million).

Top five pesticide companies by 2015 sales (Yuan million)

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Province</th>
<th>Company</th>
<th>Sales ($ million)</th>
</tr>
</thead>
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<tr>
<td>1</td>
<td>Jiangsu</td>
<td>Nanjing Redsun</td>
<td>3,545 (546)</td>
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<tr>
<td>2</td>
<td>Zhejiang</td>
<td>Zhejiang Wynca Chemical</td>
<td>3,398 (523)</td>
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<tr>
<td>3</td>
<td>Beijing</td>
<td>Beijing Nutrichem</td>
<td>3,333 (513)</td>
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<tr>
<td>4</td>
<td>Jiangsu</td>
<td>Jiangsu Yangnong</td>
<td>3,050 (470)</td>
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<tr>
<td>5</td>
<td>Shandong</td>
<td>Shandong Weifang Rainbow Chemical</td>
<td>2,912 (448)</td>
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</tbody>
</table>

1 at the current rate. Source: CCPIA.
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For more details please visit the “Conferences & Workshops” section of the Chemspec Europe website.

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Chemspec Europe 2016 will take place in hall 1.1 at Basel Messe. Dates and opening hours of the exhibition are 1–2 June 2016, from 9.00–17.00h. The venue is well connected and located in Basel’s centre. Important and useful information about travel and accommodation is available in the travel section of the Chemspec Europe website. You can also download the official Chemspec Europe Visitor Guide, subscribe to a free Chemspec Europe newsletter, view the regularly updated exhibitor list as well as the comprehensive conference programme.
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- Pyrimethanil
- Zineb
- Propineb
- Cymoxanil
- Metam-sodium

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TEL: 0086 025 57908355  FAX: 0086 025 63246229  HTTP://www.chinalimin.com  EMAIL: ameya@chinalimin.com
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China’s pesticide prices remain low in May

China’s pesticide prices remained depressed in early May this year as demand has continued to stagnate, according to Chinese company Sino-Agri Leading Biosciences’ agrochemical price index. Of the 47 active ingredients it has been tracking since 2014, 35 saw lower prices in early May when compared with the same period last year, with four ais level, and eight showing an increase in price.

Among herbicides, the price of glyphosate has fallen 14.6% on last year, at Yuan 17,500/tonne ($2,700/tonne at the current rate), while atrazine prices has dropped 2.6% year-on-year to Yuan 18,500 ($2,800)/tonne. The average transaction price for glyphosate in the first two months of 2016 was Yuan 16,000-17,000 ($2,500-2,600)/tonne.

The price of the insecticide, abamectin, has fallen 16% year-on-year to Yuan 420,000 ($64,700)/tonne, also dropping 2.3% on the previous reporting period. The price of imidacloprid was down 2.1% on last year to Yuan 95,000 ($14,600)/tonne.

Fungicides were almost uniformly down on last year, with difenoconazole dropping 22.9% to Yuan 135,000 ($20,800)/tonne. Tricyclazole prices were down 36% on the same period last year, at Yuan 48,000 ($7,400)/tonne.

China to focus on biopesticide quality

China’s pesticide management authorities will pay special attention to the safety of biopesticide products and fumigants in all agrochemical product quality inspections carried out this year, reports the country’s Ministry of Agriculture. It carries out regular inspections of pesticide products on the market across the country, and inspectors have been told to focus on the illegal addition of unregistered active ingredients. Less than one third of Chinese biopesticide products passed the country’s second pesticide product quality inspections in 2015.

China details crop planting targets

China is seeking to “balance and stabilise” the planted area of the country’s major crops crop for the 2016-2020 period. The targets were revealed in a Ministry of Agriculture report. China hopes to achieve a stable rice area of 30 million ha by 2020, with “high-quality” rice varieties making up 80% of the total. The country is targeting a planted area of 24 million ha of wheat in 2020, of which 22 million ha will be winter wheat. China also wishes to maintain a stable maize area of 33 million ha, as well as expand the planted area of maize grown for silage to some 2 million ha. China aims to increase its planted area of soybeans by around 40% to some 9.3 million ha by 2020.

China targets growth in soybean area and yield

China aims to increase its planted area of soybeans by around 40% to some 9.3 million ha by 2020. That would represent an expansion of 2.7 million ha on the 2015 planted area, reports the country’s Ministry of Agriculture. The plans are also to increase average yield to 135 kg/mu (Chinese unit of area, 1 ha = 15 mu), 15 kg more than the 2015 figure. In addition, the plans are targeting a 2 percentage point increase in soybean protein content, and a 1 percentage point enhancement in soybean oil content. In 2014, China approved three genetically modified soybean crops for import.
OBITUARY

Peter Tirosh Pioneer of Stockton Group Passes Away

In February, the Stockton Group with great sorrow announced the death of Peter Tirosh, founder of the Stockton Group, who passed away on February 19, 2016 after a short illness.

“Peter was an incredible human being, a special kind of person who put his needs aside in service to another. He was not only the founder and leader of Stockton, but he was like the father and big brother of those who worked with him,” explained Guy Elitzur, CEO of the Stockton Group. “Peter's passing has left a deep hole in the hearts of all who have known him and those who have had the pleasure of working with him. Stockton was his second family and his spirit will forever guide us as Stockton continues to advance in Peter’s vision for a greener tomorrow.”

Peter had been in the crop protection business throughout the whole of his professional career. He began his career in 1970 when he took a position on a UN FAO project in Central America. He then continued with a 23 year career at Makhteshim Agan (from 1972 until 1994).

In 1994, Peter left Makhteshim Agan and founded AGRIMOR, which later evolved into the Stockton business. In the first years, Peter worked alone and developed a successful trading company. Later on, hand-in-hand with his son, Ziv Tirosh, who served as Stockton’s CEO until 31.12.2015, the business evolved into Stockton Group (Stockton), a company which specializes in the development, manufacturing and marketing of plant extract based bio-pesticides.

Peter worked tirelessly for our industry. He was dedicated to the land and agriculture, while also investing substantial time, energy and money towards research of biological plant protection and production. He cared about helping to turn the planet green, one plant at a time, in order to create healthier produce for the next generation.

Brief Biography

Peter was born in 1940 in Kazakhstan, to Polish Jews who escaped the Nazi invasion. He spent his first years migrating and in refugee camps. He lost his father and a young brother during the war. He arrived to the recently founded State of Israel in 1949, where he lived in Kibbutz Sdot Yam and he later served as an officer in the Elite Paratroopers Unit. Peter continued to a 45 year career in the global crop protection industry, with 22 years at Makhteshim-Agan (Adama) and 21 years at Stockton.

Peter who resided in Netanya, Israel and in Miami, FL. He is survived by his partner Rachel Levy, son Ziv Tirosh, daughter Zohar Tirosh-Polk and his five grandchildren.
The BPIA (Biopesticide Industry Alliance), in association with TSGE Forum brings you two events in one location - The BPIA 2016 Fall Meeting and The BPIA Registration Workshop.

The two day BPIA 2016 Fall Meeting will cover the current and most important issues facing biopesticide manufacturers and service providers. There will also be opportunities to network with colleagues including leaders of the biopesticides industry.

Prior to the BPIA 2016 Fall Meeting, the BPIA Registration Workshop will provide an additional opportunity to gain a further understanding of the requirements involved in registering a biological pesticide in the United States and will include seasoned regulatory professionals and Environmental Protection Agency, Biopesticide division staff.

Should you wish to register, express your interest or would like to discuss sponsorship opportunities, please contact us:

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