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TWO B MONTHLY

The Global Biocontrol & Biostimulants E-Newsletter

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Welcome!

The 2BMonthly Team is delighted to bring our subscribers the latest news in both the biocontrol and the biostimulant industries.

We wish you good reading!
The 2BMonthly Team

Trending Now

Compass Minerals acquires a 35% stake in Produquímica Industria.
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EuroChem Group AG and Agrinos AS jointly announce their intention to enter into multi-year agreement.
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M2i Life Sciences and BioBee Sde Eliyahu Ltd. sign an agreement.
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Mergers, Acquisitions and Partnerships

Compass Minerals agreed to acquire a 35% stake in the Brazilian company, Produquímica Industria for ~452M reais (\$115.9M); the deal also includes a path to full ownership by early 2019. Compass Minerals expects Produquímica to generate ~1B Reals in 2015 revenue, and says the deal provides an attractive entry into Brazil's specialty plant nutrition market and represents a significant piece of the acquisition element in its strategy to exceed \$500M in EBITDA. **Comment from 2BMonthly:** Produquímica has been active as a manufacturer of a broad range of specialty plant nutrition products for 50 years. The company is becoming increasingly active in the biostimulants sector.

EuroChem Group AG and Agrinos AS jointly announced their intention to enter into multi-year marketing, distribution & sales, research & development and equity investment agreements. The marketing, distribution and sales agreement is to market, distribute and sell Agrinos High Yield Technology (HYT®) products within specific international territories. By combining EuroChem's pipeline of high value-added products and Agrinos' biological R&D capabilities, the research and development agreement will enable the companies to not only grow commercial opportunities for their current product offering, but also develop next-generation fertilizer products through the integration of biological and chemical crop nutrition technologies. In addition, the companies intend to enter into an investment agreement for EuroChem to purchase 21,500,000 new ordinary shares of Agrinos with an option to purchase up to 31,533,333 of additional Agrinos shares over the next 24 months.

Philippe Guerret, M2i Life Sciences President and Shaul Bassi, CEO of BioBee Sde Eliyahu Ltd. signed an agreement for a long term collaboration. BioBee and M2i have already been working together over the past year on three R&D projects with pheromones, as the first step leading to a wider collaboration. Under terms of the agreement, M2i will be responsible for the development and production of pheromone-based biocontrol solutions, while BioBee will be responsible for the registration and marketing of these solutions in various countries. The first result of this agreement will be the commercial launch in 2017 of a mating disruption solution in Israel and Chile. BioBee will begin commercially marketing M2i products in 2016.

Laboratorio Farroupilha, a Brazilian company, has become the latest addition to Lallemand's Plant Care division, bringing a wealth of knowledge, experience and innovative product development to the privately owned Canadian company. Lallemand, a global leader in yeast and bacteria, is also active in plant health care for agriculture, horticulture, forestry and turf management. Laboratorio Farroupilha will be Lallemand Plant Care's platform for expansion into Latin America. In addition, Laboratorio Farroupilha is expected to help expand Lallemand Plant Care's production capacity, bolster its R&D activities, and augment its bio-insecticide offering.

Company News

Insecticides India announced plans to set up a manufacturing plant to produce bio-products and will soon launch new products in biotechnology related to soil fertility and plant nutrition. The company had launched its first bio-product Mycoraja last year, which marked the company's entry into the bio product segment.

Valagro launched a new app dedicated to agricultural solutions. Making full use of the potential made possible by new technologies, the Valagro app, available for Android and iOS systems, completes the set of tools created to illustrate the wide range of solutions that Valagro designs and produces for the specific crop needs. It provides an additional consultation tool besides the Farm catalogue which can be downloaded from the Group website.

Agrinos announced the construction of a new, 28,000 square-foot production facility. The 28,000 square-foot (2601 square meter) facility near Portland, Ore will accommodate increased production capacity for the Agrinos line of proprietary High Yield Technology; microbial products, marketed under brand names that include HYT®A, iNvigo™, AMPLUS™, N-Gage as well as others. Strategically located relative to Agrinos' Global Biological Solutions R&D Center in Davis, Calif., and its production facility near Navojoa in Sonora, Mexico, the new production facility will be leveraged to supply both domestic and international markets and meet growing demand from distribution partners and growers.

STAPHYT presented its new visual identity and announces the launch of its new website (www.staphyt.com) in January 2016. The design of the new web site reflects the new image of Staphyt, while keeping the fundamental values of the company as a key partner for its worldwide clients.

The BioAg Alliance, a collaboration between Novozymes and Monsanto to improve crop harvests through naturally-occurring microbes, announced results from its 2015 field trial program. Those results included a corn inoculant product, which increased yields by an average of 4 bushels per acre in U.S. field tests. The product is based on a fungus found in soil and researchers from the two companies have found a way to coat the microbes on corn seeds without harming the microbes' performance or longevity. The Alliance plans to launch the new solution in the United States in 2017. With the agricultural market for microbials estimated at \$1.8 billion and the market for traditional fertilizers and pesticides totals \$240 billion, continued research is pivotal to forward growth. Today, The BioAg Alliance's products are used on around 65 million acres, but Monsanto and Novozymes envision that their products will be used on 250-500 million acres globally by 2025.

Biofeed has been selected to receive a grant from the Grand Challenges Canada (GCC) program, a joint Canada-Israel initiative modeled on the Gates Foundation Grand Challenges competition. The GCC is a competitive funding platform, to promote commercialization of health-related innovations in emerging countries. The funds will be used to develop a non-spraying solution for the control of the notorious pest Oriental fruit fly (*Bactrocera dorsalis*) in India. *B. dorsalis* is responsible for over US\$400 million in damage to the country's fruit crops, mainly mango, guava, sapota and citrus fruits. The purpose of this project is to significantly reduce the overuse of sprayed pesticides for this fruit fly.

Koppert Biological Systems in the Netherlands and KOI Group of Sudan, signed a partnership agreement to further develop sustainable solutions in Sudan. Sudan is blessed with a wealth of millions hectares of fertile land. Dams have been built throughout the country that divert nearly sixty percent of the water resource to sustain the agricultural sector. Sudan grows a variety of crops that include cereals (wheat, sorghum, millet, corn and rice), oil seeds (sesame, groundnuts and sunflowers), beans, chickpeas, and lentils as well as a range of horticultural, tropical fruits, and fiber crops. Koppert and KOI Group will now explore opportunities for biological crop protection and IPM in Sudan in order to support growers to move away from chemicals and support the building of the 'future food basket' of Africa and the Arab world.

Valagro announced that it has started the construction of its new plant in Pirassununga, in the state of Sao Paulo, Brazil. The project, announced in 2014 with an investment of 10 million euro, includes the construction of a plant with two production lines for the processing and packaging of solid water-soluble fertilizers and biostimulants. The plant will cover an area of about 60,000 m² and will ensure a production of about 8,000 tons of product a year. The transition to the operational phase of the project - which will end in January 2017, with the opening of the plant - has been achieved through the attainment of the national and regional environmental licenses.

Monsanto Growth Ventures (MGV), along with three other partners, has invested €5.7 million in a fledgling local spin-off company from the Technical University of Madrid, Spain, called **Plant Response Biotech**. In total, the agro-biological industry in Spain

has an estimated market value of 300 million Euros, with an annual growth of 15%. Plant Response Biotech is one of the largest operations of its kind in Spain. Plant Response Biotech has developed a broad portfolio of biological-based products to help farmers' crops handle environmental stresses such as drought, plus biotic stress related to fungal and bacterial diseases. One of Plant Response Biotech's newest biological products is derived directly from plants. Driving this initiative is Monsanto's MGX (Monsanto Growth Ventures). The three other partners involved in this Series A financing include the venture capital division of La Caixa – Caixa Capital Risc, Middleland Capital and the world leader in biological solutions company Novozymes in Denmark.

The Spanish Ministry of Economy and Competitiveness (MINECO) has granted the 'Pyme Innovadora' (Innovative SME) certification to SEIPASA, a company in the manufacture of biologicals (biopesticides and biostimulants) for residue-free agriculture. With this recognition, not only is the inherent researcher character of the company awarded, but also the history of a firm in which R&D has been one of the mainstays since its creation.

Stockton Israel announced that their flagship product, Timorex Gold was launched in Mendoza (Argentina) by Syngenta for the control of fungal and bacterial plant diseases in vineyards, such as *Botrytis cinerea* or *Oidium (Erysiphe necator)*. During the launch, Syngenta Argentina and Syngenta Chile presented their Timorex Gold experiences and results of the field experiments conducted in the last 5 years in their countries.

Regulatory

BIOCONTROL

Chinese Ministry of Agriculture recently initiated a pesticide quality inspection campaign, where a total of 1,447 pesticide samples were taken at random for inspection. The result of the overall inspection reveals 82.3% conformity, but the biopesticide product conformity is found to be at a lower side being only 31.3%, suggesting that Chinese biopesticide market needs an urgent regulation. In general, the inspection result shows the non-conformity being attributable to following problems: a) active ingredients as indicated not detected; b) discretionary addition of other pesticide ingredients; c) inadequate content of active ingredients; d) manufacturer not identifiable.

Vestaron Corporation announced that it has received U.S. EPA approval to delete the bee toxicity warning statement from its SPEAR™ Biopesticide label following a review. The removal of the toxicity statement is supported by third-party topical and feeding evaluations that show SPEAR™ has no increased mortality or detrimental effects to honeybees.

The Great Lakes Fishery Commission says the U.S. Environmental Protection Agency has registered a sea lamprey mating pheromone it's hoped can be used in combating the invasive species. Since the 1990s, scientists have been researching the use of pheromones – natural odors used by sea lampreys to communicate – to manipulate sea lamprey behaviors. The newly registered mating pheromone has been used as bait in

traps that collect and remove adult sea lampreys before they have a chance to spawn. Once registered in both the U.S. and Canada, the sea lamprey mating pheromone can be used to help control invasive sea lampreys throughout the Great Lakes. Health Canada's Pest Management Regulatory Agency is in the process of registering the mating pheromone for use in Canada.

BIOSTIMULANTS

During the launch of its Circular Economy (CE) package on 2 December, the European Commission announced that the long-awaited revision of the fertilizer regulation would be part of the CE work program. The Commission indicated that the draft regulation would enter the legislative procedure in early 2016. A few days earlier, the Directorate-General for the Internal Market, Industry, Entrepreneurship and SMEs (DG GROW) presented the main contours of the regulation to Member States and stakeholders attending its Fertilisers Working Group meeting. The regulation uses the New Legislative Framework (NLF), which is based on defining essential requirements for products and using one or more conformity assessment procedures to ensure that only products meeting the essential requirements are allowed to bear the CE-mark and circulate freely on the internal market.

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Biolchim S.p.A announced that five special products were recently successfully registered in Russia. Though the process took two years, investing in the registration was a strategic decision aimed to make Biolchim gain a leading position also in the segment of special fertilizers. Biolchim has already been operating in Russia for more than five years with its premium WSF Green-Go line. Now, it can also provide the Russian farmers with some technical solutions already well established in other parts of the world. For extensive



crops, Biolchim registered Sprintalga, a biostimulant of seed germination, Fyllo-ton, an anti-stress biostimulant to help plant to recover and continue growing even in harsh environmental conditions and Boromin Gel, which is based on Boron, fully complexed with ethanolamine. For the greenhouse segment, Biolchim will launch into the market Fulvumin, a soil biostimulant to improve nutrient uptake, root development, soil structure and fertility and Ligoplex Ca, a deficiency-corrector based on Calcium complexed by ammonium liginosulphonate.

(Biobest group) and our Swiss partner is Andermatt Biocontrol.

Executives Speak

Tom De Ceuster, CEO, De Ceuster Group

How was 2015 in terms of business and in particular for biologicals?

Last year was a rather peculiar year for Group De Ceuster. It was the first full year after the divestment of our environmental care division end of 2014. Biocides and pesticides were no longer part of our core business and this in favor of a more biorational approach towards pests and diseases. Although, our environmental care division accounted for over 50 million euro in sales, we succeeded in closing three fifth of the carved gap with the remaining divisions of Group DC in 2015.

There were thirteen entries for the inaugural Bernard Blum award launched at ABIM in October. DCM, a daughter company of Group DC was ranked number 2 with your product PMV®-01 plant vaccine, which is efficient against the damaging tomato viral disease. How long did it take to develop the concept to a commercial product?

In 2005 our research center Scientia Terrae started with research on Pepino mosaic virus (PepMV), in collaboration with the Flemish tomato industry. A first proof of concept for PMV®-01 vaccination as a PepMV control strategy was obtained in 2008. The concept was further evaluated and optimized in the following years, and a complete registration dossier was submitted in July 2012. Product registration is expected in January 2016, so from basic research to a fully authorized product will take 10 years. However, because of the high emergency and the lack of alternative control methods, the product is on the market since 2011 through emergency authorizations.

The active substance of PMV®-01 is authorized under EC regulation 1107/2009. PMV®-01 was already applied under emergency authorizations on more than 1500 ha of tomatoes. Are you ready for a full international launch and how will you distribute it?

At this moment the product is on the market in four EU countries (Belgium, Germany, France, the Netherlands) and two countries outside the EU (Switzerland and Morocco), so the international launch has already started. Full authorizations in these and other countries, mainly in the EU, are expected in the course of 2016. Distribution is done by Group DC in our core countries Belgium, the Netherlands, France and Germany. Outside these countries, we work with distribution partners with a strong presence in the greenhouse tomato industry and a good expertise in biocontrol. Our Moroccan partner is Biobetter

With your new range « Naturapy® » - which focuses on biorational plant health products (biofertilizers/biostimulants/biopesticides), DCM aims to offer sustainable solutions for garden problems. One focus lies on the most important pest insects in the garden, i.e. grubs, aphids, spider mites, Colorado potato beetle, black vine weevil, codling moth, etc. Is DCM the manufacturer of this product line and do you expect it to generate more business than commercial horticulture in a not too distant future?

DCM has indeed recently launched a line of beneficial insects and nematodes for home gardeners. As a leading brand supplier of garden centers, we believe it is our responsibility to help consumers make the shift from a rather retroactive to a more preventive and integrated garden management. From a product perspective, macro-organisms and microorganisms play a vital role in reaching that goal. They will definitely become a trend in home gardening. Although we produce the majority of our product offerings ourselves, we have set up an exclusive partnership with Biobest for supplying the macro-organisms. Microorganisms on the other hand are produced in house.

In 2001, you have set up a non-profit organization, Scientia Terrae, a research and education entity at the interface between academic research and the agricultural industry to translate the results of academic research into practical solutions. What is this entity researching today in the field of biologicals? How does your Group directly benefit from this activity?

The research institute is very active today in the development of novel approaches towards an integrative soil and plant health management. From molecular diagnostics and metagenomics over microbial ecology and phytopathology to nearby sensing and imaging. Historically, our internal expertise was built around microbiology and soil organic matter, but a few years ago we decided to expand our internal activities with more biochemical related research such as enzymatic hydrolysis of organics and extraction of bio-actives. In several of these fields GroupDC is an important sponsor.

You have a commercial position in more than 40 countries. Where are your main exports going and which product line is the most important in the export markets?

Our core geographic export markets are located in our neighboring countries France, Germany and The Netherlands, where we hold leading positions with fully owned subsidiaries. Minigran® fertilizers for integrative soil management remain our most important export product.

You have been traditionally involved in organic fertilizers more than in plant protection. Do you believe that in the commercial agriculture and horticulture, biostimulants will develop more quickly than biopesticides?

Hard to say. At DCM we are much in favor of engineering these products into total soil fertility solutions rather than



selling these products as standalones in management programs. This integrative approach towards soil management should create happy plants with an optimum vigor that are in general less affected by pests, diseases and stresses. Hence, biopesticides, and certainly plant protection products for curative use will be the last step in our cascade approach.

You are very active in the golf and amenities and hobby gardening sectors. Do you develop a specific marketing approach for placing biologicals in these segments as compared to the professional horticulture?

DCM's goal in all market sectors is offering proven solutions that help plants grow better and healthier, with respect for human and nature. This is often a combination of bringing the right quality product together with the right advice and training on how and when to use it. This approach will only become more important with offering biologicals. DCM products for home and gardening have the same quality inside as our professional products. Only the packaging is smaller or the product is offered as a 'ready to use'. Our marketing department also does a great job to translate our professional knowledge into information and visuals, understandable for all hobby gardeners.

Your group posts revenues of about 150 million Euros. In other words, you are big enough to pursue external growth via means of acquisitions. Is this something you are contemplating to speed up your growth in biologicals or will you first favor organic growth?

Although we still have to encounter our first year with no internal growth, we are definitely interested in providing growth capital or even fully integrating existing businesses in the field of biologicals. Currently, we are following some SME's that generate significant revenues and operating profits, and could use a strategic partner to support their rapid growth and boost their commercial activities. For early-stage, high-potential start-up companies we decided to invest indirectly through participation in the brand new Belgian-based V-Bio Ventures fund.

Dr. John Sorenson, CEO, Vestaron

There were thirteen entries for the inaugural Bernard Blum award launched at ABIM in October. Vestaron was chosen as the winner for its Spear product line, a series of bioinsecticides derived from spider peptides with activity on Thrips, Lepidoptera and Coleoptera. What is the status of your development and commercialization program with Spear?

This year, 2016, will see the market introduction of SPEAR™-T for control of thrips in greenhouses. We've completed our first manufacturing scale fermentation run with product within specifications. We're making final arrangements for our 2016 manufacturing campaign and expect to finalize a distributor relationship in the first quarter. 2017 will see the release of SPEAR™-P for control of Colorado potato beetles and SPEAR™-C for control of caterpillars. Our 2015 field trial data was very exciting showing performance equivalent to recently introduced synthetics. We have some formulation work to do to incorporate co-formulation with a Bt, which will enable us to fix the ratio of Bt and our active in commercial practice.

Two of the Spear products, Spear-C and Spear-P, include *Bacillus thuringiensis* in the formulation. What are the advantages of the combination of insecticidal peptides with Bt? Do you plan additional combination products with other biological actives?

Up until 2013 our progress was limited by the poor oral availability of our active ingredient. Like many proteins it has limited ability to cross the gut. In an insight we found that when we co-applied our product with Bt, we had much higher bioavailability and far better control. In fact, our recent field trials in combination with Bt show control that is equivalent to that achieved by recently launched synthetics. We have shown this bioavailability effect works for several strains of Bt and their respective targeted insects. And to the extent that other biologics may compromise the intestinal tract or exterior of insects we think we will see the same results.

The US EPA recently approved the removal of bee toxicity warning statements from your Spear product labels. How challenging was it to achieve this given the increased focus on pollinator safety by regulators? Will this label change apply to all Spear formulations?

Demonstrating pollinator safety has been a challenge for everyone. We worked with the EPA and were able to move forward with a protocol based on one identified by the OECD. In the event, after reviewing the data, which showed no excess mortality in adult and larval feeding trials the agency agreed to removal of the precautionary bee language for control of insects on our master label. We have not submitted our co-formulations with Bt to the agency and so we cannot say anything about that. But, in the interim, tank mixing with Bt carries no warning.

What are your plans for commercialization of Spear products outside the USA? Have you identified partners or will Vestaron be developing in other markets independently?

We are just finishing our registration with all the states. Outside the US we are targeting Canada and then Mexico first. We expect to initiate preliminary discussions with an EU country this year. After that we will pursue select Asian countries and Latin America. America is fortunate to have a separate and expedited process for lower risk biopesticides like SPEAR™. Some forward-looking countries are moving in this direction, but there are many that impose the same burdens on biopesticides as are required for synthetics.

Does Vestaron have new peptides in your development pipeline? What markets are you hoping to target with new products? Are the public health or veterinary markets on your radar?

There are a multitude of peptides we are evaluating for promotion into our development pipeline. We have freedom to operate, a basis for exclusivity and evidence for safety in all of these insecticidal peptides. We will do so on their ability to differentiate within our existing product offerings. Right now we are prioritizing speed of action and to a lesser extent spectrum of activity gaps. The former is particularly important in the Animal health and Public health markets that you have appropriately anticipated, specifically control of flies and mosquitoes.



New Products

BIOCONTROL

As a new company, what have been the biggest challenges Vestaron has faced in developing and bringing a novel technology to market? Any changes you would make in your approach if you were starting over today?

The use of peptides isolated from the venom of predatory insects has been a goal of a number of major players in the insect control industry reaching back to the 80s. One of our biggest challenges has been to overcome skepticism that we have solved the three significant challenges in this field: manufacturing, bioavailability and a regulatory path. An additional complication is that we have found that we do significantly better in the field than in classic laboratory assays. We have a better understanding for why that is now. If we were to do it over again, I suspect we would have spent less time with large companies in their screening studies and let traction in the market speak for itself.

What are your commercial objectives for the Spear product line in 2016? Do you have specific sales goals for key markets (potatoes, fruits & vegetables, others)?

We anticipate hitting cash flow neutral in 2018.

Vestaron closed a Series C round of financing for a total of \$14 million in October 2014. Will additional financing be required in 2016?

With our recent technical, regulatory and field success we enjoy the committed support of our recently broadened C round of investors. We have not yet decided if we will open any additional rounds to outside investors.

Where do you see Vestaron in 5 years? Will it remain independent, become part of a larger organization, or something else? How does the potential for further consolidation among the global crop protection companies impact your view?

As a venture backed company, all of us are committed to rewarding our investors with a liquidity event. So, I cannot predict how long we will remain independent. The current consolidation of the crop protection industry is aiming to fix among other things an R&D efficiency problem. And while they have to do what they have to do, we're committed to building a far more competitive R&D platform for introduction of next generation environmentally responsible products.

In the UK a new formulation of the granular **Inematicide NEMguard, distributed by Certis** Europe and based on garlic (*Allium sativum*) has now been approved for use on carrots and parsnips. NEMguard DE is an improvement on the old formulation used by some farmers in development work providing availability of the product in the soil for up to six weeks. The polysulfides released from the product in this patented formulation have a detrimental effect on free-living nematodes and root knot nematodes. EAMUs (a type of off-label approval) have been granted on fodder beet, red beet, bulb onions, shallots, leeks and garlic.

XiteBio Technologies Inc. announced the **introduction of XiteBio® PulseRhizo™, a liquid** inoculant for pea, lentil & faba bean, to the Canadian and US markets for the 2016 season. XiteBio® PulseRhizo™ officially replaces the previously registered XiteBio® PeasRhizo and expands on an enhanced label. PulseRhizo™ features enhancements including expanded crop uses to include faba bean, on-seed compatibility with most popular seed treatments, extended 48 hours application methods, expanded in-furrow as well as on-seed treatment. XiteBio® PulseRhizo™ works to invigorate the natural microflora in the soil while also adding fresh rhizobia for optimum nitrogen fixation.

Marrone Bio Innovations, Inc. announced the **launch and commercial availability of a new** formulation of its REGALIA® Biofungicide. Key improvements of the new REGALIA formulation include easier mixing and dispersability in the tank, no film left in empty containers that ensure all product is used, and a bold green container color with clear fill-line allowing handlers to easily measure product. As part of an integrated disease management program, REGALIA can be used to control plant pathogens on a wide range of crops.

Nufarm Benelux has introduced **Fado on the Dutch market. Fado is a new biological agent** against powdery mildew. "Fado activates several systems in the plant which increase the resistance of the plant against powdery mildew. By preventive use of Fado, powdery mildew gets no chance," says the company. The drug was approved last fall and is Nufarm's third biological product. Fado (12.5 g/l COS-OGA) has an admission as an

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agent for cucurbits fruit vegetables with edible and inedible peel and Solanaceae (covered crop). The product is organic, has no safety term and is therefore ideal for residue management. COS (Chito-OligoSaccharides) -OGA (Oligo-Galacturonic Acid) consists of an oligosaccharide complex composed of a polyanionic structure stabilized by one polycationic chain. COS is also known as chitosan and OGA is derived from pectin.

Scientific Findings

A predatory mite might feed on a pest of cucumbers, a \$125 million-a-year crop in Florida, newly published University of Florida Institute of Food and Agricultural Sciences research shows. Because this thrip preys on many vegetable crops, the predator could be employed in a range of crops. Armed with new data, it's important for growers to use the mite to mitigate the pest, UF/IFAS researchers said. For the study, UF/IFAS researchers conducted a trial to investigate if certain mites would control *Thrips palmi*, which poses a serious threat to cucumbers and other vegetable crops in South Florida. *A. swirskii* provided the most effective and consistent control of *T.palmi*.

A specific group of useful fungi -- the arbuscular mycorrhizal fungi (AM fungi) -- may be able to help alleviate drought stress in wheat. These fungi live in a symbiotic relationship with plant roots. Recent research from Aarhus University demonstrates that the fungi can improve growth and yield in some wheat varieties under drought stress. Scientists from the Department of Agroecology at Aarhus University have recently examined whether the association with AM fungi can alleviate drought stress in wheat. The scientists used two different varieties of spring wheat. One was drought-tolerant and the other was a drought-sensitive cultivar. The plants were divided into two groups; one group was given sufficient water and the other group was exposed to drought stress. Half of the plants in each group were inoculated with AM fungi and the other half were grown without the fungi. The two cultivars of wheat reacted differently to drought stress and inoculation with AM fungi. The drought sensitive cultivar, benefited from the AM fungi under drought conditions, resulting in increased biomass, improved photosynthesis and improved nitrogen-use. Under drought conditions and without useful AM fungi, the drought tolerant wheat cultivar performed better

Sometimes it takes time to find a winning formula. That's how it was with First Step+ 10, according to Joshua Gurtler, a USDA Agricultural Research Service scientist and his collaborators at NatureSeal, Inc., tested hundreds of antimicrobial formulations, in a series of laboratory experiments, before they found the right combination of lactic acid, fruit acids, and hydrogen peroxide for a wash that reduces the risk of food-borne pathogens contaminating fresh produce in food processing operations. *Escherichia coli*, *Listeria*, *Salmonella* and other food-borne pathogens sicken approximately 48 million people each year, or about 1 in 6 Americans resulting in an estimated 4,200 hospitalizations and 80 deaths in 2013. First Step+ 10 is designed to reduce those numbers and is expected to be used in flumes and rinse tanks to wash fresh produce. Along with recently securing approval from the U.S. Food and Drug Administration (FDA), Gurtler and NatureSeal have filed a patent application and presented findings at scientific meetings. To test the

winning formula, Gurtler inoculated fresh-cut apples, baby spinach, cantaloupe rind, and cherry tomatoes with highly resistant outbreak strains of *E. coli*, *Listeria*, and *Salmonella*. The antimicrobial wash reduced pathogen levels on the produce up to 99.99 percent. It also rid the wash water of 100 percent of the pathogens, making it safer to reuse. The wash can be shipped in concentrated form. The wash ingredients are all classified as Generally Recognized as Safe by the FDA. The wash has also been approved for use in Canada and is USDA listed for organic use and does not affect the taste, texture, smell, or appearance of produce.

Country Report

The Taiwan Council of Agriculture said it has developed biological control agents to help strawberry growers manage pests and diseases, as well as a pesticide test kit that can screen hundreds of chemicals within a short period of time. "Intensive use of pesticides is common in strawberry farms to ensure yearlong harvests, making the fruit a high-pesticide-residue crop," Miaoli District Agricultural Research and Extension Station director Lu Hsiu-ying said. "The station has also developed a biopesticide with a species of probiotics that can significantly reduce the occurrence of strawberry blight by 73 percent. *Bacillus amyloliquefaciens* was selected as the basis of the biopesticide after the station tested more than 300 different bacteria, as the probiotic could kill harmful germs and boost the immunity of strawberries," Lu said. The technology can speed up food inspection to create a safer environment for consumers, with a global business potential of up to NT\$6.6 billion (US\$199.8 million) over the next decade, the institute said.

The Government of India is promoting use of biopesticides under the Integrated Pest Management (IPM) approach, which employs cultural, mechanical & biological methods of pest control along with need based judicious use of chemical pesticides. The Central Integrated Pest Management Centres (CIPMCs) promote IPM through Farmers' Field Schools and various training programs. Package of practices for control of pests and diseases in 66 crops have been revised to include techniques to reduce dependence on chemical pesticides and encourage use of biopesticides and other alternative plant protection measures.

Personnel Announcements

Marrone Bio Innovations, Inc. announced that Nancy Hood has joined the company as its Vice President of Marketing. In this role, Nancy will be responsible for the strategic marketing of MBI's portfolio of products to growers and distributors of agriculture products. Ms. Hood is a veteran of the agriculture industry with more than 20 years of strategic marketing experience. Nancy joins MBI from Silverlake Consulting, a boutique-marketing firm she founded in 2012, where she conducted marketing projects for the largest biopesticide company (Valent Biosciences) in the industry.

BRANDT has named John Guglielmi as director of business development for the company's Specialty Formulations division. Guglielmi has over 20



years of experience marketing and selling ag, turf and ornamental products. He has held numerous management positions where he was responsible for setting strategic direction and delivering a profit. Most recently, Guglielmi served as senior vice president of sales, marketing & business development at QC Corporation, a Verdesian Life Sciences company.

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Syngenta is looking for Global Regulatory Manager. The position is located in Basel, Switzerland. In this position you develop global regulatory strategies for a portfolio of biopesticides and biostimulants. You provide regulatory support and advice to allow regions and countries to operate in line with agreed business plans. You provide leadership and regulatory expertise to multi-functional project teams to ensure challenges and opportunities are addressed in a timely manner. You lead teams within Regulatory and Product Safety to ensure appropriate work plans are developed and implemented. Requirements: Degree in Science with post-graduate qualification. Detailed knowledge and experience of worldwide registration of biologicals and chemicals in agriculture. Preferably an in-depth knowledge in a regulatory science discipline. Proven ability to deal with complex regulatory issues and the development of effective strategies. Please submit your resumes to: <http://www.syngentajobs.com/apply.html?Match=18921&Portal=620> Please visit www.syngenta.com.



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✓ Company activities, type, location & key contacts

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✓ Trade names, uses, product types, etc.

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Upcoming Events

MARCH 1-2, 2016: BPIA Spring Meeting. This conference will take place in Monterey, California, USA. For more information, please visit, <http://www.biopesticideindustryalliance.org>.

APRIL 6-8, 2016: The 14th New Ag International Conference & Exhibition. The World's Leading Annual Event for High-Tech Agricultural Inputs & Technology will take place in Beijing (China). A unique opportunity to get acquainted with one of the most dynamic markets for such inputs and technologies in the world. There will be a dedicated section on biostimulants in the Chinese and broader Asian context. Please visit, <http://www.newaginternational.com>.

SEPTEMBER 21-23, 2016: Natural Products and Biocontrol in Perpignan (France). The Congress is opened to scientists, technicians, industrials whose research are centered on biocontrol and natural products. The main points of the event: open conferences, scientific presentations (spoken or displayed), BtoB meeting, discussions. To register, submit abstracts of your communication and find all relevant information: www.biocontrol2016.com.

OCTOBER 24-26, 2016: The 11th Annual Biocontrol Industry Meeting International Biocontrol Manufacturers' Association (IBMA) & the Research Institute of Organic Agriculture FiBL, Basel, Switzerland. For further information, please visit www.abim.ch.

NOVEMBER 15-17, 2016: Biocontrol Latam will take place in Sao Paulo (Brazil). The Largest International Event Covering Biocontrol in Latin America. Call for papers to be launched in January 2016. Still a few sponsorship opportunities open + pre- book your exhibition stand as the number will be limited. Please contact, jacqui@newaginternational.info.

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