



The Global Biocontrol & Biostimulants Newsletter

A DunhamTrimmer and New AG International Publication

April Highlights

Greetings and welcome to the April 2023 Issue of 2BMonthly.

At last year's ABIM meeting, Dr. Mark Trimmer of DunhamTrimmer put the biologicals industry firmly within Stage 2 of the *Harvard Business Review* Industry Consolidation Life Cycle model. His estimate seems spot on.

Case in point: this month's issue includes no less than six new M&A and Partnerships news items (page 2), bringing the 2023 total to 26 deals in just four short months. Particularly noteworthy are the number of distribution deals materializing as companies seek improved market access to facilitate growth.

We encourage you to check out April's Executives Speak interviews, which feature two excellent discussions with companies operating from different positions on the buy and sell spectrum. First is our visit with Courtenay Wolfe, CEO and Chairwoman of recently acquired FBSciences. In the interview, Wolfe provides insights as to what it is like to be open to acquisition in this climate of accelerated M&A activity. She also explains how FBSciences' acquirer, Valent BioSciences, was just the right fit for the company.

Our second interview is a fascinating discussion we conducted with CXC co-founder and CEO François Lamoureux. A seasoned veteran of the music industry who now focuses on technology transfer, Lamoureux provides a unique and refreshing perspective not only on commercial agriculture and the role of biologicals, but also how inventors and entrepreneurs should approach and navigate the daunting process of finding and securing the right investors for their technologies. It's an interview you won't soon forget.

Stay safe, and see you next month.

~2BMonthly Editorial Team

In this Issue

AMGUARD Environmental Technologies has entered into a supply agreement with NewLeaf Symbiotics to bring biological solutions to North American specialty markets.

Read more on page 2.

BRANDT has entered into an agreement to acquire Mendenhall Ag Services of Springfield, Illinois.

Read more on page 2.

Eden Research PLC has received regulatory approval for its new biofungicide and bionematicide offerings in multiple US states.

Read more on page 3.

US Congressmen have reintroduced the Plant Biostimulant Act to create a uniform process for approving commercial plant biostimulant use.

Read more on page 4.

Researchers suggest greater awareness of biopesticide availability, efficacy, and application could help tackle locust outbreaks in China.

Read more on page 11.

A new bioinsecticide using RNA interference has been developed to suppress elimination of a damaged protein in Colorado potato beetles.

Read more on page 12.

2BM Executives Speak

Courtenay Wolfe, CEO, Chairwoman, FBSciences
Read more on page 6.

François Lamoureux, Co-founder, Chairman, and CEO, CXC.

Read more on page 7.

Mergers, Acquisitions and Partnerships

Nichino Europe Co., Ltd. has acquired Interagro (UK) Limited. The companies intend to research and develop new products to support agriculture globally. Established in 2007, Nichino Europe, a wholly-owned subsidiary of Nihon Nohyaku Co., Ltd. based in Tokyo, manages the development, registration, and distribution of its parent company's active ingredients for use in plant protection products, including biocontrols. Interagro, established in 1994, is a manufacturer of in-can adjuvants and biostimulants. The company operates in 27 countries.

AMGUARD Environmental Technologies, the specialty markets division of AMVAC Chemical Corporation, a wholly-owned subsidiary of American Vanguard Corporation, has entered into a supply agreement with NewLeaf Symbiotics to bring biological solutions to major North American specialty markets. Under the agreement, AMGUARD becomes the exclusive seller of NewLeaf products including biostimulants and bioprotection products in golf, ornamental, controlled-environment agriculture (CEA), cannabis, and consumer markets in the US, Canada, and Mexico. Together these production areas are estimated to comprise slightly more than 50 million treatable acres in North America. The agreement broadens a [partnership established in October 2022](#) between NewLeaf and AMVAC designed to bring biological solutions to North American agricultural crop markets including the recently launched BioWake dual-use biological seed lubricant for corn and soybeans.

Canada-based Lucent Bio and value-added plant-based agri-food processor AGT Food and Ingredients Inc., their subsidiary AGT Soileos Saskatchewan, and Federated Co-operatives Limited (FCL) have entered into a partnership to bring new crop nutrition solution, Soileos Zinc, to western Canadian farmers. Soileos is made by upcycling pea, lentil, and oat hulls from Lucent Bio's partner AGT Foods into micronutrient fertilizers that provide improved nutrient delivery and sustained bioavailability, according to the company.

BRANDT has entered into an agreement to acquire Mendenhall Ag Services of Springfield, Illinois. The addition of Mendenhall Ag Services will add operating personnel, input-application assets, and increased storage capacity. The location will continue to operate as Mendenhall Ag Services, under current

management, with business as usual for the 2023 calendar year. BRANDT will take possession of the location and assets on January 1, 2024, bringing on-board the Mendenhall Ag Services employees into the BRANDT organization.

Sumitomo Corporation has obtained an exclusive global manufacturing, development and distribution license for a new biosolution from an Argentine-based company called Annuit. The product, which contains a fungi-derived active ingredient, helps plants fight off diseases and pests, and is likely to be used for grains and legumes, such as wheat and soybeans. Sumitomo Corporation will start production and sales of the product around April 2023 to promote its widespread use in Latin America and further around the world via sales channels of Summit Agro, a member of the Sumitomo Corporation Group.

Agrauxine by Lesaffre, a specialist in biosolutions, announced it has entrusted the distribution of its biostimulants to Sumi Agro France and its biocontrol products to Certis Belchim in France. After nine years of commercial existence, Agrauxine "takes a new step in its development" with the change. The agreement takes effect on of September 1, 2023.

Company News

UK agritech firm SOLASTA Bio has secured investments totaling £4 million to scale up the development of its nature-inspired pesticides. Based in Glasgow, SOLASTA Bio has developed a technology platform for creating neuropeptide-based insect control products that are nature-inspired, and the platform can be mobilized for any pest of interest. With the funding, SOLASTA Bio is aiming to scale up its UK and US operations, expand its technical and commercial teams creating 25 jobs, accelerate the development of its technology platform, and target new markets. The company is on course to bring its first products to market in 2027. Investment in this pre-Series-A funding round was led by Yield Lab Europe. Other investors include Rubio Impact Ventures, Scottish Enterprise, Cavallo Ventures, SIS Ventures, UKI2S, and several private agritech investors. Funding includes grant support from Innovate UK's Transforming Food Production competition and Scottish Enterprise. This latest round brings the total raised by SOLASTA Bio to £5.5 million.

Lallemand Plant Care's LALSTOP G46 WG is now registered on powdery mildew in California. The product also controls other foliar diseases such as

Botrytis of fruit, vegetable, herbs, and ornamental crops. The biofungicide works through multiple modes of action, reducing resistance development, and is compatible with organic and conventional IPM programs.

Bayer has revealed an investment of overall 60 million euros from 2023 onward in its corn seed production facility Pochuiky, Ukraine. This investment includes a new seed dryer, agricultural field equipment, storage facilities, and the construction of two bomb shelters to ensure the safety of the Ukrainian colleagues who have been operating the facility and executing this investment project under very difficult circumstances. Prior to the war, the company made an investment of close to 200 million euros to establish corn seed production through a network of skilled Ukrainian farmers and the greenfield seed processing site in Pochuiky. The plant was inaugurated in 2018 and operates with around 100 on-site employees and about 250 to 300 seasonal workers.

ADM and BiOWiSH Technologies, Inc. announced ADM will offer a BiOWiSH fertilizer enhancement as an option to urea, monoammonium phosphate (MAP), diammonium phosphate (DAP), and NPK blends. The BiOWiSH fertilizer enhancement is a blend of proprietary microbial cultures coated onto dry fertilizer or mixed with liquid fertilizers. Featuring BiOWiSH's proprietary HoloGene 3 technology, BiOWiSH endophytic *Bacillus* spp. delivers soil nutrients to crops through the rhizophagy cycle, creating a symbiotic relationship between the plant and soil microbes. The new product will be available from ADM Farm Direct Fertilizer as well as the company's wholesale business.

Rovensa Next's Biimore biostimulant has received additional crops approval under EU Fertilising Products Regulation (FPR). Adding to its initial certification for foliar application to woody perennials and efficacy trials, the registration has been extended to vegetables, ornamental and AMP crops, and broadacre crops. Derived from biological fermentation, Biimore uses a specific bacterial strain of

Corynebacterium glutamicum using an exclusive and sustainable plant fermentation process. The Biimore fingerprint is the result of Tradecorp's sustainable proprietary process that uses bacterial fermentation of sugarcane molasses. In addition to becoming one of the first biostimulants to be registered under the FPR in Europe, Biimore, under the brand name of Vorax, became the first biofertilizer to be registered in Brazil, and has also been approved in the Indian market.

Bionema Ltd. reports it has successfully expanded the quantity and scope of its portfolio as the company launches new biological products to support biological agriculture, horticulture, forestry, and turf. Bionema's new product catalogue lists more than 70 biopesticides, biostimulants, biofertilizers, molluscicides, biocides, efficacy boosters, insect monitoring tools and nutrient management products. The portfolio expansion reflects Bionema's evolution in focus and strategy, announced last year following the company's deal with Syngenta that secured Bionema's position as a leading biocontrol technology company.

Eden Research PLC has received regulatory approval in 17 US states for its biofungicide Mevalone, while Cedroz, its post-planting nematicide, has received regulatory approval in eight US states. The products are based on the essential oil components gernaniol and thymol, while Mevalone also includes eugenol. Eden received regulatory authorization from the United States Environmental Protection Agency (EPA) in September 2022 for all six petitions it submitted: three active ingredients, two formulated products and its Sustaine polymer-free encapsulation technology. "Further efforts are underway to continually grow our footprint across the US with a primary focus on obtaining regulatory clearance in California and several additional states," the company stated, adding that it expects approval for its application in California in the coming months.

AgBiome's Theia fungicide has been approved by state regulators in California for use on specialty crops. Theia fungicide protects crops through multiple



The banner features the DunhamTrimmer logo on the left, which consists of a globe icon and the text "DunhamTrimmer". To the right of the logo, the text reads "2023 Global Biocontrol Market Report" in a large, bold font. Below this, a smaller line of text states: "Comprehensive, global Biocontrol market data and analysis from DunhamTrimmer, the world's leading authority on Biological Business Intelligence for agriculture." At the bottom left of the banner, there is a white rectangular button with the text "ORDER NOW" in black. The background of the banner is a dark blue gradient with several large, glowing, spherical particles in shades of yellow and green, resembling biological cells or spores.

modes of action by blocking fungal and bacterial pathogens and activating crops' natural defenses. The biofungicide contains the active ingredient *Bacillus subtilis* strain AFS032321. The fungicide received EPA approval in June of 2022 and is registered in 49 states.

ICL has launched microbial inoculant Vitalnova TriBoost for plants grown in peat-reduced and peat-free growing media. The growing media incorporated biostimulant contains enzymes and three live cultures of *Bacillus subtilis*, *Enterococcus faecium*, and *Lactobacillus plantarum*.

Syngenta Italia released four new biocontrol products in Italy. Biofungicide Romeo is formulated as a wettable powder. It is based on cerevisane, an inert substance made up of the cell wall of *Saccharomyces cerevisiae* strain LAS117. It acts as a resistance inducer in plants and can be used on vines and vegetables against powdery mildew, downy mildew and botrytis. Arbiogy is a bioinsecticide containing *Beauveria bassiana* - ATCC 74040, a parasitic fungus of insects and mites, registered for use on vines, stone fruit, floral, and ornamental crops. Bemotius is a bioinsecticide for protection of apple trees, citrus fruits, vines, strawberries, floral/ornamental, and horticultural crops against aphids, mealybugs, whiteflies, leaf miners, thrips, flies, Colorado potato beetle, nocturnals and other lepidopteran larvae. Clavitus 13SL is a liquid formulation containing potassium salts of fatty acids combined with vegetable oils and essential oils, making the exoskeletons of target parasites, such as aphids, thrips, whiteflies, leaf miners and mites, more permeable.

ADAMA Ltd. has exercised its call option to acquire the remaining 40 percent stake in ADAMA Chile, formerly known as Chile Agro. This is following ADAMA's initial investment in Chile Agro in 2013, whereby the company acquired 60 percent of its equity. ADAMA Chile specializes in the development, production and commercialization of bio plant nutrition and agrochemical products in Chile, including ExpertGrow, a triple mode-of-action biostimulant for the increase of yield in a variety of fruits and vegetables as well as in soybeans. ExpertGrow is based on a unique fermentation process that improves the plant's photosynthesis, thereby reducing abiotic stress and improving fruit/pod retention and plant growth. ExpertGrow is sold across Latin America in Brazil, Columbia, Peru, Ecuador, and Paraguay, and in Italy, France, Spain, China and Thailand. In the coming

years it is expected to be rolled out to additional countries.

Oerth Bio, an agricultural biotechnology company developing targeted protein degraders for plants, has entered into a research and facilities collaboration with the North Carolina Plant Sciences Initiative (N.C. PSI), a global hub for plant science innovation. Oerth Bio will be the first company to conduct independent research at N.C. PSI, and also the first company to occupy the rooftop greenhouse facility. Oerth's novel degrader technology aims to set a new standard in crop protection solutions, as the company develops PROTAC degraders for weed control, disease control, insect control, and crop efficiency. The agreement unlocks the potential for Oerth to showcase PROTAC degraders and their utility in sustainable agriculture while providing N.C. PSI a unique research focus in plant science. Oerth Bio plans to take residency of the new facility in spring 2023.

Regulatory

On March 15, US Representative Jimmy Panetta (CA-19) and Representative Jim Baird (IN-04) reintroduced the Plant Biostimulant Act to create a uniform process for approving commercial plant biostimulant use and require more federal research on the technology's benefits for soil health. The legislation would help create a consistent and predictable path to market for plant biostimulants with federal guidance from the US Environmental Protection Agency and the US Department of Agriculture. Companion legislation was introduced by Senators Alex Padilla (D-CA) and Mike Braun (R-IN).

"The lack of a standard regulatory definition or pathway to market for plant biostimulants makes accessing this innovative technology difficult for the sustainable agriculture industry," Rep. Panetta said. "I'm proud to reintroduce this bipartisan legislation that would remedy these barriers and encourage the adoption of these new products. Improving the accessibility of plant biostimulants is critical to the continued leadership of Californian and American producers in providing global food security and protecting our environment."

"As newer technologies become available to farmers and ranchers to improve efficiency, productivity, and sustainability of American agriculture, we have a responsibility to ensure we have a regulatory process that creates a pathway to market without sacrificing safety or efficiency," Rep. Baird said. "Biostimulants have the significant potential benefits for producers and their sustainability footprint, and defining these

products is an important first step in getting these tools into farmers' toolboxes.”

“Agriculture is essential to California’s economy and allows us to put food on the table for families across the country,” Senator Padilla said. “As our practices evolve to make our agriculture sector more sustainable, we must ensure they are properly implemented to ensure their efficacy and safety. Oversight and regulatory standards for plant biostimulants, which could replace or reduce the use of synthetic pesticides and fertilizers, are critical at this stage and help ensure California remains at the forefront of this bio-based agricultural technology.”

“Plant biostimulants are important tools that allow farmers to make more with less, which preserves our natural resources and increases efficiency. I’m glad to lead this bipartisan bill with Sen. Padilla so that there is clear pathway for these innovative products to be on the market for farmers in Indiana and across the nation,” Senator Braun said.

The Plant Biostimulant Act will:

- Amend the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) to define what is a plant biostimulant and exclude it from being regulated under the Act
- Require the US Environmental Agency (EPA) to revise existing Code of Federal regulations to include this new plant biostimulant definition
- Require the US Department of Agriculture (USDA) to study how plant biostimulant products can contribute to soil health

The Plant Biostimulants Act is endorsed by the Biological Products Industry Alliance (BPIA), the trade

association representing the biostimulant industry, as well as the Agriculture Retailers Association (ARA), American Seed Trade Association (ASTA), Biotechnology Innovation Organization (BIO), Council of Producers and Distributors of Agrotechnology (CPDA), CropLife America (CLA), The Fertilizer Institute Biostimulant Council, Golf Course Superintendents Association of America (GCSAA), Humic Products Trade Association (HPTA), International Fresh Produce Association (IFPA), National Association of Landscape Professionals (NALP), Responsible Industry for a Sound Environment (RISE), and Western Growers.

“We are thankful to Representatives Jimmy Panetta and Jim Baird for reintroducing the Plant Biostimulant Act,” Keith Jones, Executive Director of the Biological Products Industry Alliance (BPIA), said. “BPIA believes this legislation is critically important to the future of the biostimulant industry because it will codify a federal definition for plant biostimulants and clarify the path to market for these innovative products. BPIA looks forward to working with Congress to see this bill become a law.”

The California Department of Pesticide Regulation (DPR) released its annual Pesticide Use Report for 2021 which confirmed preliminary data that showed a more than 10 percent statewide decline in pesticide use compared to the prior year. In 2021, 191 million pounds of active ingredients were applied in California, and 95 million acres were treated. That was a decrease of 24.8 million pounds, and 10.9 million acres, compared to 2020. Pesticides classified as cholinesterase inhibitors, which can damage the nervous system, and those classified as groundwater contaminants saw the biggest percentage declines. Other high-risk pesticide declines included those



Your Microbes Deserve Only The Best Accommodations

Through innovative materials engineering and elegant formulation science, ProVas® granules combine the sustainability benefits of organic solid carriers with the improved viability, consistency, and adaptability of functionalized sorbent minerals.

Developed over decades of research and collaboration with the world’s leading biologicals companies, ProVas® EG and FC granules combine an optimal environment for microbes with micropores that maximize surface area and Liquid Hold Capacity.

[Click for brochure download](#)

ProVas
BIOLOGICAL CARRIERS

classified as carcinogens, biopesticides, toxic air contaminants, and fumigants. Notably, lower-risk biopesticide and horticultural oil use has increased over a 10-year timeframe since 2012.

Executives Speak

Courtenay Wolfe, CEO and Chairwoman, FBSciences

On January 30 of this year, Valent BioSciences announced its acquisition of FBSciences. To learn more about the deal, *2BMonthly* caught up with Courtenay Wolfe, FBSciences CEO and Chairwoman.

Let's cover some admin to begin with. Firstly, on a point of procedure, this was announced as an acquisition by Valent Biosciences, which is a Sumitomo Chemical Company subsidiary. Is there a regulatory process to go through before the deal is concluded?

The deal has concluded, and the acquisition was officially closed on March 1, 2023.

In keeping with most announcements of this nature, there was limited detail on the financial side of the transaction in the press release. FBSciences is a private company so presumably this is a cash transaction. Is that correct? Is it full buy-out from all shareholders? Including all IP?

The acquisition was a full buyout of all shareholders and all IP. I cannot reveal the purchase price, but I will say that all shareholders are very pleased with the outcome. Competitive financial consideration was obviously important but finding a world-class platform to advance our mission to transform every managed acre with our technologies was also critical, along with finding the right home for our people to grow and thrive, and we feel that we have done all three successfully with this transaction.

FBSciences might have been on the radar of a number of companies. How did Valent BioSciences come to the fore?

We have been very fortunate that FBSciences has enjoyed a lot of attention in the industry over the last number of years given our reputation for superior performance, robust commercial platform, profitability, and accelerated growth over the industry. Having said that, it was very important to us to find the right partner on a number of factors, and Valent BioSciences checked all those boxes. Valent BioSciences and its

parent company Sumitomo Chemical Co., Ltd., were clear kindred spirits to FBSciences from the start, and that feeling only grew with time as we continued to explore our synergies. We share a profound commitment to bettering society and the health of our planet, but also to provide growers with the most innovative, effective, and sustainable biorational solutions. They are also a world-class employer that has a genuine commitment and reputation towards the advancement and welfare of their people. Our common science-driven approach and combined decades of experience make Valent BioSciences and FBSciences extremely synergistic, and the combining of the two results in an unmatched portfolio of innovative and powerful solutions and an accelerated growth platform for both companies' crop nutrition and crop protection products.

Why was it the right time to conclude this deal?

FBSciences has always had the ambitious goal of transforming every managed acre globally with its technologies. The industry is accelerating at a rapid rate, and it is critical to ensure that our technologies and products have a global platform for expansion to maximize our market share while this adoption and acceptance of biorationals is occurring. Valent BioSciences has the global platform and powerhouse of resources, and is already a proven leader in biorationals, making Valent BioSciences the perfect family to become a part of in order to realize our collective objectives. On October 1, 2022, Valent BioSciences began selling biostimulant products directly to its US customer base. This acquisition will significantly expand their biostimulant offerings. The biorationals sector is expanding rapidly, with the USD\$3.5 billion global biostimulants market currently the fastest-growing sector in agriculture. This is the perfect moment to leverage the exploding interest in and adoption of biorationals and to combine the shared innovation, expertise, and experience of Valent BioSciences and FBSciences to have the greatest impact possible on plant, soil, and climate health.

Would it be a fair summary to say that the deal creates a full house of bio-based inputs, by combining the nutrition and soil health products of FBSciences with the crop protection products of Valent BioSciences?

Yes. This definitely puts this combined entity in a category of one as the global leader in the biorationals space. FBSciences' biostimulant technologies and products will be joined into the Valent BioSciences biostimulants division. FBSciences' expertise, innovative solutions, and entrepreneurial spirit along

with Valent BioSciences' global powerhouse of resources and robust solutions will deliver a platform unrivaled in the industry and continue to propel Valent BioSciences' position in the biorationals space. The product development opportunities made possible by the combination of both companies' innovative technologies and products, along with Valent BioSciences' impressive research and development facilities, are limitless. We look forward to leveraging the opportunities presented to deliver an unmatched platform of biorational products, including biostimulants, biopesticides, and crop nutrition solutions.

Sumitomo has committed to carbon neutrality by 2050. Is FBSciences' portfolio seen as playing a part in that ambition?

Absolutely. FBSciences' technologies and products are another powerful tool, enabling them to accelerate their efforts to achieve carbon neutrality by 2050. Valent BioSciences and Sumitomo Chemical Co., Ltd., have a keen eye on developing products that sequester carbon and advance overall climate health, and the acquisition of FBSciences will be integral in meeting this goal.

Obviously, a lot happens in the months ahead — how is this going to work in the short-term?

We are already well underway with our integration, and we are balancing that with managing our busy season and ensuring that we continue over the coming months to efficiently and smoothly integrate without disruption to our growers and customers. Everyone on both sides is very excited about the future and the opportunities presented by this acquisition.

And a short question to end on. For the longer term — what's the plan?

Long term, we look forward to the full integration, providing a platform that is unrivaled in the industry, continuous innovation, and continuing to propel Valent BioSciences' leadership position in biorationals. FBSciences, Valent BioSciences, and Sumitomo Chemical Co., Ltd. are strongly committed to working toward long-term benefits to society and to our planet, and we know that collectively growing our global market share will achieve these objectives.

Executives Speak

François Lamoureux, Co-founder, Chairman and CEO, CXC

Building upon decades of research by Professor Donald L. Smith at McGill University on the plant microbiome and plant growth promoting rhizobacteria, technology transfer upstart CXC has developed proprietary strains that produce signalling molecules which act as abiotic stress mitigators in plants with substantially greater activity than first generation LCO products - at significantly lower use rates. This month, we connected with CXC co-founder and CEO François Lamoureux to learn more about the technology and his unique take on the biologicals industry.

It is interesting that your career started in the music industry as both an artist and producer. How did you get from there to the biologicals industry and what experiences from music were you able to apply to the transition?

That is quite the story, actually. I am blessed to have been able to follow my passion for music and make a great living at it. I enjoyed writing music, and I figured out at a young age how to get paid for my work, receiving my first performance royalties for my compositions at age 13. In high school, I had my own



A&L BIOLOGICAL

YOUR PARTNER IN BIOLOGICAL PRODUCT DEVELOPMENT

A&L Biological Inc. is a Research and Discovery company focused on bringing practical bio-based solutions to the agricultural industry. Our efforts focus on improving crop productivity through better understanding of soil microbiome relationships, soil health, and the development of biological-based crop solutions.

- Accredited research facility with state-of-the-art equipment, and a team of research scientists with diverse specializations in agronomy and microbiology
- Unique platform to isolate and characterize biological agents
- Solutions to key agronomic issues such as nutrient use efficiency, stress tolerance and disease control

albiological.com • info@albiological.com Contact us to discuss your biological development needs.

band, but I was also very good at school, especially science. I was also strongly motivated by the fact if I were able to do the schoolwork quickly and get good grades, everyone would leave me alone and I could spend a lot of time playing guitar, writing music, and performing with my band!

The unintended consequence, of course, was that I was fast-tracking myself through school, and I decided to go to McGill University to study music at the age of 17. My band was getting traction and I realized I wanted to finish my degree as fast as I could so I could use my 20s to hit the road and tour the world playing my music. And that is exactly what I would end up doing. But in the meantime, I decided to take all my electives in science and ultimately accumulated enough science credits that I was able to teach High School science, which I did for a time at the age of 20 years before hitting the road with my band.

We had a good run. Then at 29, I retired from playing and focused on Producing, Recording, mixing music and directing music films. I started Fogo (<https://fogo.tv/>) with my brother and got the chance to work with many of my heroes growing up – from The Who, Rush, Deep Purple to hundreds of other great artists like Harry Connick Jr., Willie Nelson, Keith Urban, Little Big Town, Slipknot, Branford Marsalis and Rihanna. I especially got to work with legendary guitarists such as Steve Vai, Joe Satriani, John Petrucci, Zakk Wylde, Ritchie Sambora, Pat Metheny, Peter Dinklage and Buddy Guy among many others. I was even fortunate enough to work on projects that won a Grammy and a couple of Emmy Awards, to name a few.

The way that fits in with biologicals is that one day I was asked to mentor at McGill University through its Dobson Center for Entrepreneurship. I realized there was a fantastic opportunity to help with technology transfer since a lot of amazing technology was not making it from academia to commercialization, and when it did, I felt it could have been done better.

The most immediate connection between this path and my first career was that emerging technology is brought forth from an “inventor” just as new music is brought forth by a “composer.” That is the real link: the creator. Just as all great artists want the best outcome for their art, the same is true for inventors. Pete Townshend and Joe Satriani, for example, had reputations for being extremely demanding. It turns out that they were not difficult at all - *provided* one approached their artwork with passion and delivered excellence in the end. The same can be said for technology inventors.

With that in mind, I created CXC with two friends three years ago with the goal of catalysing university technology transfer, which is to say, investing in university-developed technology (starting with McGill University technology) focused on real world problems with the goal of transferring it to industry. Today CXC has built 2 labs housing 12 employees as well as several contract workers specializing in various technology sectors all the way from skin care to quantum computing (). By far, though, our biggest investment has been in biologicals.

As you may know, McGill is known internationally for its chemistry and biology programs - which includes agriculture as well as ag economics. Knowing that, I asked the university who was the most prolific person in the McGill agriculture space, and they suggested I have a conversation with Professor Don Smith. Don had had some real success in biologicals space, specifically with LCOs (Lipochito-oligosaccharides) which were invented by Don and masterfully commercialized by Novozymes. It turns out that Don was, in effect, gently “hoarding” all of these AMAZING biological solutions backed by decades of research, but remained focused on research himself and was not interested in commercializing his work. I convinced him to let me and my team at CXC handle the commercialization.

That does not mean we are “technology flippers.” We have dedicated, full-time, scientific teams on the payroll for all the projects we invest in including, but also beyond, agriculture. In the case of the biologicals segment, Dr. Fazli Mabood is our Head of Plant Science and he and his team have added a lot of value to the technologies. The result is that we have a ready-to-go portfolio of biological solutions with proven results – from superior signalling compounds, such as our Abio™ biostimulant, to biocontrols that feature strong efficacy against Tomato Canker and Potato Scab, for example.

Before we dive deeper into Abio, what are some of the most important things you have learned about the biological products industry over the course of your journey?

Certainly, I have learned a LOT. But if I had to choose just one thing, it would be that the biologicals business segment can be described succinctly as a “Build, Borrow or Buy” segment.

Let’s be honest, here. There has been a tendency to modify the generally accepted definition of the term “biologicals” which I believe is directly proportional to our innate desire to jump on the buzz-word

bandwagon. By “biologicals”, you and I are referring to so-called “inputs” and not peripheral things like precision agriculture or smart agriculture or other subsets of agriculture disguised as “biologicals” so as to check a box on some VC’s list of investment requirements.

In my view, the brutal reality about true agriculture (farming) is that unlike Artificial Intelligence or Quantum Computing or similar technologies, one cannot simply *make up* development time by throwing piles of money at a problem. Buying more computers and hiring more people in an effort to catch up to the competition does not apply to agricultural inputs. The simple reason is that rain falls in real time: you must wait until the crops you are testing, grow. In the biologicals development space, this reality is even more brutal because within a tablespoon of soil you have something like 50 billion organisms. Where do you start? Can you even “own” what can be found in that tablespoon? Which bugs are the good ones? What compounds do they produce, what do they do, and how do I know they will work in the field? You don’t know. And it takes lots of skill to get the answers. It takes a lot of time. It takes a lot of money. It is a huge risk. And so, apart from Big Ag, it is extremely difficult to properly develop true biological solutions all the way from discovery to proven usability in the field.

There are “start-up” companies out there that have raised Series H (!!!) and hundreds of millions of dollars and flaunt that they have tens of thousands of strains in their library. But, having your -80° freezer full of strains does not mean you will have a product. It can take 10 years to get from bioprospecting to having isolated compounds from the microbes and then having proven efficacy in the field. That is the hardest part: actually screening, isolating, and purifying the compounds. That is where most endeavors fail. In pharma, you start off with 10,000 molecules and only one of them makes it to FDA approval as a drug – and that process takes 10 years. It is the same in the biologicals space: you start looking in the soil and around 10 years later you may have a product ready to go. Or not.

If you are Big Ag, this makes you quite happy because you have the wherewithal – both scientifically and financially – to devote more than a decade to developing robust and functional biological solutions emanating from Plant Growth Promoting Rhizobacteria (PGPRs), for example. So, you can “BUILD.” This is a huge barrier to entry for others, however.

So, what if you don’t have the resources of Big Ag? Well, you can still develop your own biological

solution (you’re still allowed to try to be lucky), but the question becomes WHEN do you (or did you) start? Remember, the biologicals game is being played out now. That means if you have something ready to go to market now, you must have started developing it 10 years ago! That’s another parallel to the music business: if you are trying to copy what is popular now, you are already too late.

But there is hope: because you can still “BORROW” (license) or “BUY” (acquire) your way into the biologicals space.

That is the premise of what we do at CXC. We can help fast-track technologies to the front of the line and enable companies to be competitive today with best-in-class, ready-to-go solutions. That is why we feel so great about ensuring Don Smith’s legacy. Don has been working on signalling compounds and other biologicals for over 30 years dating back to his groundbreaking work on flavonoids, which in turn led him to discover that genistein could trigger a gene in a *Bradyrhizobium japonicum* to produce Lipochito-oligosaccharides (LCOs). As a result, CXC has a biologicals portfolio already built upon decades of diligent, scientific research and proof that very few builders could afford to accumulate in-house.

Tell us about the research behind Abio. Why has it taken more than 20 years for the technology to get to this stage of commercialization?

Abio is the trade name for what is scientifically known as Thuricin 17 and Bacillin 20. It started in 1999 with a soybean nodule that Don Smith found on the McGill University Macdonald campus farm. In the nodule, he discovered a *Bacillus thuringiensis* (Bt) right beside a *Bradyrhizobium japonicum* (Bj).

The reason it has taken more than 20 years for the Abio technology to get to commercialization is two-fold. Firstly, as we discussed earlier, even collecting promising strains you can claim ownership to is difficult enough. And only then does the truly back-breaking (and budget-breaking) work start, which is screening, isolating, and purifying the compounds that a given organism produces – then verifying their efficacy at the field level. Fortunately for us, Don and his students successfully accomplished this many times, proving efficacy in the field, year after year, decade after decade.

The second reason it took so long, as I mentioned before, is that Don was not interested in commercialization. Instead, he was genuinely interested in research and using his unique Bt strain and Thuricin 17 signaling compound as a research platform to produce cohort after cohort of PhD students – students that have since

become experts in the field of microbe-to-plant signaling. In fact, you'd be hard pressed to find any other biological solution that has been studied more. I'd challenge anyone to Google Thuricin 17, look at the peer-reviewed studies and papers as well as all the published data, and point to another biological solution with as much pedigree.

One last point I'd make is that a lot of scientists do not understand farmers. Some start-ups have one good planting season and try to extrapolate future value or imply consistently reproducible results, but agriculture does not work that way. Farmers know that you need years and years of data because no product has a 100%-win rate. Don is a son of a farmer and grew up on a farm. He understands that and has always wanted to help farmers succeed. That is why he has devoted his life to biologicals.

How would you summarize what differentiates Abio from other products in the space?

In the end, it is all about de-risking. And over the course of these last 23 years, Abio has been de-risked more than any other PGPR biostimulant. It truly mitigates abiotic stress in monocots, dicots, C3 and C4 as well as mitigating the effects of herbicide and pesticide applications. It also has clear bacteriocin capabilities. It is extremely stable and can be boiled and still be effective. It can be applied as a seed coating and-or foliar spray straight in the tank mix without any further special handling or dedicated spraying.

Another important aspect of Abio relates to the IP protection inherent to it. Because Abio is a metabolite, if you don't possess the organism, you cannot produce the compound. In so far as new precision agriculture goes and genetics and other omics technology being a threat to Abio, I can tell you that we hired the best of the best in proteomics and over these last many years and no-one can figure out the way the protein is folded. They can't figure out the disulfide bridges. In so far as finding the exact Bt strain that we have and hoping that the secondary compounds they produce yields another Abio-type product, all we can say is "Good Luck." You can't patent an organism (not easily, anyway), and Don has the propriety method of isolating compounds. Without a control, you would be spending a long time on your HPLC machine. In our lab right now, we can produce, without much effort, 26 million acres worth of soybean seed coating with a purity of over 95%. We have that in stock right now. With little effort we could increase this by 10x.

We also do not know of any other biostimulant that can be used in lieu of LCOs in formulations. LCOs are wonderfully effective. But Abio is much easier to

produce than LCOs while working at even lower concentration than LCOs: Abio works at concentrations of at 10^{-11} and 10^{-13} and gets the plant's defenses up before the stress event occurs. The quicker you get out of the ground, you win. The yield increases are real. The science is real. The decades of work on it are real.

Given your unique outlook and journey, what advice would you give to entrepreneurs or inventors that want to bring a new technology to this space but aren't sure where to start or who to talk to? We've heard you refer to the "Van Halen Syndrome" in this regard. What do you mean by that?

(laughs) This is another music business reference but I think, a really pertinent one. It comes down to what I refer to as "purity of intent."

I am 53 years old and started playing guitar when I was 10, back in 1980. I really loved playing guitar just for the sake of playing guitar and got to be rather good - pretty quickly – for whatever reason. Then MTV arrived and suddenly all my friends saw Eddie Van Halen playing guitar – and the flocks of adoring fans (many of them female) that surrounded the band. So, of course, they ALL wanted to play guitar like Eddie Van Halen in order to get the girls. What they quickly realized, however, is that it was suspiciously difficult to play guitar like Eddie Van Halen! Eddie just made it look easy.

Fast forward to today, and the kids don't really want to be Eddie Van Halen anymore. Most are more interested in becoming Elon Musk or Steve Jobs. They see the amount of money those types of guys make and want to be part of that "entrepreneurial" culture as a result. Enter the Van Halen Syndrome, and they find out it is suspiciously difficult to become Elon Musk or Steve Jobs. But why is that? I believe it is because Elon Musk and Steve Jobs did not start out with the goal of making billions of dollars as their main purpose. Instead, they were truly passionate about technology. They worked at their craft out of purity of intent.

How does this apply to agriculture? I went to the World Ag Conference in San Francisco last month and I was forced to realize that the Silicon Valley start-up culture has impregnated the agriculture world more than I had imagined. This is not necessarily a bad thing – don't get me wrong. But I kept hearing things like "Agriculture is ripe for disruption" or "there is so much opportunity here because farming is so antiquated." I don't pretend to have all the answers or a crystal ball, and I bet most of your readers don't either. All I can say is – if there's

one thing I do not want to “disrupt,” it is what is currently feeding the planet.

And so advice-wise, I would tell people with a true passion for their technology that they need to be able to spot the Eddie Van Halen fakers out there and find the people that wanted to play guitar for the right reasons. We need to pick out the people that are excited about bringing great solutions to the world, and not the ones looking to build personal empires and emulate some off-base image of Elon Musk or Steve Jobs. In all our investments at CXC, we are wary of the Eddie Van Halen Syndrome. We are in the Don Smith business: an inventor that epitomizes what “purity of intent” really means.

If you had told me in high school that I would produce two film projects for Rush (R30 and Snakes& Arrows) and be their head of archives for almost 20 years, or work on Pete Townshend’s Lifehouse project (the music behind Who’s Next) or win a Grammy, I never would have believed you. So, how did I do it? I did it by running out into highway traffic and risking everything while at the same time striving to being a good person. Purity of intent means you have to have guts, but you also have to be honest and truthful. You have to have guts because, believe me, there will be incalculable consequences to getting out into the traffic. On the other hand, if you stay in your basement practicing your guitar all day long and don’t play out in the world: nothing will happen. You must get out there. And if you do get out there and try your best, you will be astounded as to where you will end up. You will most likely not end up where you planned (that rarely happens), but I think you will be amazed by just how great the place where you end up can be if you give it your all with purity of intent. Don’t shoot for the moon – aim for the stars. Aim as high as you can and outwork everyone. Pretty simple.

Scientific Findings

A new study led by scientists from the Chinese MARA-CABI Joint Laboratory for Biosafety suggests greater awareness of biopesticide market availability, efficacy, and field application processes could help tackle locust outbreaks in China. The researchers, who outline their findings in the journal *Sustainability*, argue that future studies should also focus on modelling the expected impact and cost effectiveness of chemicals versus biopesticides — therefore increasing the evidence base for promoting more environmentally friendly biopesticide use. The scientists say successes have been achieved by using

emerging technologies — including spraying of the locusts using drones, GPS tracking, GIS mapping and satellite data imagery — but chemical pesticides in China and other countries remain the primary method of control for the pests. Though China has made great strides with the use of biopesticides, the researchers stress and further highlight that a reason why chemical pesticides are chosen is due to their fast action despite more negative impacts on the environment.

The scientists say the uptake of biopesticides remains low due to various factors including inconsistent field results, shorter product life, high costs and effectiveness on a smaller range of pests as compared to other products. Despite this, there is increasing evidence of the benefits of biopesticides in general, including for locusts.

Co-author Dr. Mariam Kadzamira, senior researcher, agribusiness, based at CABI’s head office in Wallingford, UK, said the research shows that despite the availability of biopesticides in local markets, their use is dampened by inadequate information about market availability, negative perceptions by decision-makers about their efficacy, and concerns about their costs, as well as limited knowledge of their application techniques. “Actions are, therefore, needed by relevant authorities to enhance stakeholder awareness of biopesticide market availability, efficacy, and field application processes.” The researchers stress that to increase the use of biopesticides for locust control there should be evidence-based local exemplars and case studies, and where possible, this should include comparisons with the long-term outcomes of using biopesticides versus chemical pesticides on locust populations. They further add that since pest outbreaks necessitate quick and decisive actions for success, information packages should be made available to decision-makers on an on-going basis — not just when there is an outbreak.

A University of Cordoba study shows that the FO12 strain of the *Fusarium oxysporum* fungus improves cucumber plants’ responses to iron deficiencies, promoting their growth without having to resort to environmentally harmful products. The research is published in the journal *Planta*, an international journal of plant biology. In calcareous soils (abundant in Spain), poor solubility and availability make it challenging for plants to obtain iron. The research staff at the María de Maeztu Unit of Excellence – Department of Agronomy, University of Córdoba (DAUCO) — working in the plant physiology group have been studying these plant responses for decades and looking for strategies that make iron more

available to plants, avert iron chlorosis, and increase crop growth. Although the *Fusarium oxysporum* fungus is harmful to many crops, "the FO12 strain is non-pathogenic and has proven to be a biocontrol agent against *Verticillium dahliae*," DAUICO professor Javier Romera explains.

The regulation of this defensive response relies on substances such as ethylene and nitric oxide, which are also involved in activating responses to iron deficiency. "As this fungus already induced defensive responses, we thought it could also induce ones to iron deficiency, and that was the idea behind the study, to prove that it also induces them," researcher Carlos Lucena says. Twenty-four hours after the inoculation of the roots of cucumber plants with this microorganism, results were seen: genes related to the response to iron deficiency were activated and, after several days of cultivation, the plant's growth increased.

The study was carried out with cucumber plants grown in nutrient solution and also in pots with calcareous soils under greenhouse conditions "because the idea is that these microorganisms can be applied as biofertilizers favoring the acquisition of iron in those calcareous soils, where there are more problems," Romera explains. The fungus stimulated iron acquisition and plant growth with both cultivation methods. "The ultimate goal is to develop a biostimulant that both protects crops from attack by possible pathogens, as well as to improve the ferric nutrition of plants under adverse conditions," researcher Miguel Ángel Aparicio says. The way to make its use a reality in the field is to analyze its effect on other nutrients, such as phosphorus; optimize the treatment doses; and verify the most suitable conditions for its application in the field.

Using RNA interference technology, a new bioinsecticide that suppresses elimination of a damaged protein in Colorado potato beetles (*Leptinotarsa decemlineata*) has been developed. Graduate student Samuel Pallis and principal investigator Andrei Alyokhin, PhD, at the University of Maine at Orono and Brian Manley, PhD, Thais Rodrigues, PhD, Ethann Barnes, PhD, and Kenneth Narva, PhD, of GreenLight Biosciences in North Carolina tested the effects of this RNA bioinsecticide, known as ledprona, on mobility and reproduction in Colorado potato beetles. They reported their findings in a study published in March in the *Journal of Economic Entomology*. Ledprona is manufactured by GreenLight Biosciences, under the brand name Calantha. The dsRNA in ledprona uses a gene-silencing process called RNA interference (RNAi), and

ledprona is one of the first insecticides on the market using RNAi. Ledprona inhibits the expression of an enzyme in Colorado potato beetles that facilitates the breakdown of proteins. With this enzyme inhibited, metabolites accumulate, which, if allowed to continue, eventually leads to mortality. In their studies, researchers noted negative impacts to the potato beetles were observed in terms of mobility, pupation and reproduction. Alyokhin's team will begin testing the effects of ledprona on Colorado potato beetles in commercial potato farms during the 2023 field season.

A study has determined the optimum height for a drone to fly and target desert locusts with biopesticides in order for it be most effective as a tool to fight the crop pest. Violet Ochieng of the University of Nairobi, supervised for her PhD by Dr. Ivan Rwomushana, CABI's senior scientist, Invasive Species Management based at CABI's regional center for Africa in Nairobi, found that a height of 10 meters is best for the drone to spray biopesticide on the desert locust below. The study by Ochieng, the first winner of the Carol Ellison Science Award, awarded to a student doing her/his research with CABI with the objective of enriching their research experience with the organization, was published in the journal *Drones*. The research, was also conducted in partnership with fellow scientists from the University of Nairobi, CABI, and Astral Aerial Solutions. In 2019-20, according to the Food and Agriculture Organization (FAO), around 20 million people in Ethiopia, Kenya, Somalia, South Sudan, Tanzania, and Uganda faced acute food insecurity due to swarms of desert locust. In Kenya, the outbreak represented the worst locust crisis in 70 years; by its peak, the country was tackling over 500 swarms in 28 of Kenya's 47 counties.

The new study highlights that while current methods of control rely on conventional chemical insecticides during invasion, some biopesticides based on *Metarhizium acridum* and insect growth regulators can also be deployed in preventative control operations. "The successful use of drones to control pests such as fall armyworm, planthoppers, [and] aphids, among others, makes it an attractive technology that has the potential to also improve locust management, especially in inaccessible areas," Ochieng said. "Management of desert locusts by the use of drone technology appears promising when the biopesticides are applied at an optimum height of 10 meters and standard operating procedures are followed. Further research could also explore the gap in the effects of environmental parameters on flight application efficiency."

Amoéba, a company developing a biocontrol agent for the treatment of plants in agriculture, announces that, in the framework of a material transfer agreement, Nissan Chemical Corporation has started a performance evaluation study of the mixture of one of its products with an Amoéba biocontrol experimental product. The aim of this evaluation is to determine the performance in controlling grapevine downy mildew of the combination of Nissan Leimay product (suspension concentrate at 200 g/l amisulbrom) and Amoéba AXP12 experimental product (suspension concentrate at 215 g/l lysate of *Willaertia magna* C2c Maky). This extemporaneous mixture was tested in two trials against grapevine downy mildew in Italy, in conditions of high disease pressure. Ten applications at seven-day intervals were made. The combination Leimay + AXP12, tested at a reduced dose of both products, was very efficient on leaves and bunches. It is superior to Leimay and AXP12 used alone at their full dose, which could allow a reduction in the dose of either or both products. Moreover, the performance of this mixture is significantly better than the reference product of the trials, copper hydroxide (at the rate of 200g active ingredient/ha/treatment). These results support the continuation of the experiment in 2023.

A study of spotted lanternflies is being conducted inside Pennsylvania's Lafayette College LaFarm's newest greenhouse. Spotted lanternfly (SLF; *Lycorma delicatula*), an invasive planthopper native to Southeastern Asia, was first detected in Pennsylvania in 2014. Since then, the United States Department of Agriculture (USDA) has confirmed spotted lanternfly infestations in 13 additional US states including Connecticut, Delaware, Indiana, Maryland, Massachusetts, Michigan, New Jersey, New York, North Carolina, Ohio, Rhode Island, Virginia, and West Virginia. It feeds on a wide range of fruit, ornamental and woody trees, with tree-of-heaven being one of the preferred hosts; as it spreads, it is impacting the country's grape, orchard and logging industries.

Kyle Kaye, an employee of East Stroudsburg University working as a collaborator for the USDA, is using the greenhouse to help develop biocontrols for spotted lanternflies. LaFarm's greenhouse is vital to Kaye's work, as the USDA researcher had not been able to find a greenhouse to exactly suit their research needs regarding tempered climate control. First opened in January, the LaFarm greenhouse is a climate-controlled space. This allows the temperature to be controlled for research. Kaye's research will involve hatching and rearing spotted lanternflies to aid with other research projects. After their time at the greenhouse, the lanternflies will be sent to a lab in

Massachusetts, where different biocontrols will be tested on the lanternflies to see which ones are the most effective.

"The spotted lanternflies we rear this way will be transferred under permit to a bio-secure USDA research facility in Massachusetts to study parasitoid wasps that are natural enemies of spotted lanternflies in their native range," Kaye said. In addition to Kaye's research, students working with biology professor Daniel Ströembom have been developing theoretical mathematical models to help with the lanternfly research at LaFarm. Student Mary Ball previously created a model to help dispel the spread of sap-sucking insects called aphids, but her focus has now turned to lanternflies. "I've been working on creating models for the attraction of lanternflies in order to try and get rid of lanternflies," Ball said. "So, I made one that models the actual setup of the attractant and then just working with them to get the data to fit it to that model or come up with different models, depending on what they need." The end goal of the experiments on the lanternflies is to use biocontrols to eliminate and control the lanternfly population through biological means.

Rhodes University BSc alumnus, Nkululeko Ngqinambi, has produced a biofertilizer to help lower production costs for farmers who have been battling high fertilizer prices. He said he thought of the idea to start his own fertilizer product, which he calls SmartRoot, when he saw how his mother and other local farmers were battling high input costs and reduced yield. Kraal manure used to fertilize the soil and crops did not help much. Having majored in chemistry and geology while at Rhodes, Ngqinambi, now 30, said he used the knowledge he gained from his studies to develop a product that would provide a much-needed service to farmers of the Eastern Cape in South Africa.

SmartRoot is a blend of four indigenous species of mycorrhizal fungi species picked for optimal performance over a wide range of bioclimatic zones throughout the seasons. Ngqinambi said SmartRoot booster improves the plant's ability to efficiently absorb and use nutrients and water from the soil. It is applied by mixing it with existing synthetic and organic fertilizer. Based on efficacy trials conducted, use of the SmartRoot booster resulted in an average increase of 50 percent in yield. SmartRoot booster biofertilizer is registering as a group 3 fertilizer in terms of the Fertilizer and Farm Feeds Act 36 of 1947, a regulatory requirement for the production, marketing, and sale of fertilizer products in South Africa.

Scientists are exploring the use of *Cyrtophora citricola* as a biological control agent against the tomato leafminer (*Tuta absoluta*). In the recent scientific paper “Group-Living Spider *Cyrtophora citricola* as a Potential Novel Biological Control Agent of the Tomato Pest *Tuta absoluta*”, Thomas A. Roberts-McEwen, Ella K. Deutsch, Monica A. Mowery, and Lena Grinsted noted tropical tent web spiders live in groups and are not cannibalistic, and thus, create large, predator-dense webs. Their global range overlaps with regions of moth infestations, as well.

In lab settings, the scientists introduced different prey types to small colonies of spiders of varying body sizes and found that spiders were equally efficient at capturing pest moths and easily caught fruit flies (*Drosophila hydei*). Larger spiders built larger webs and were better at catching prey. Spiders from southern Spain were large enough to capture pest moths during the tomato growing season, but >50 percent of spider egg sacs were attacked by egg predatory wasps (*Philolema palanichamy*). “*Cyrtophora citricola* spiders, therefore, have the potential to be an effective biological control agent of flying insect pests, at least after growing to medium-sized juveniles, and if wasp infections are controlled, forming part of integrated pest management to defend against pest infestations in the future,” the scientists noted.

Jose Lozano Torres (Wageningen University & Research) and Rik Korswagen (Hubrecht Institute and Utrecht University) have received a NWO Open Technology Programme grant for their research project on plant-parasitic nematodes. When nematodes infect a plant, they can cause the plant to create special cells that are designed to feed the nematode, stealing nutrients away from the plant. These special cells can range from individual to groups of merged cells. Lozano Torres and Korswagen want to better understand how these cells have evolved and developed. To study these cells, they will use a technology that allows them to see which genes are turned on and off in specific parts of tomato roots. Finally, they will try to block certain parts of the cell development process to limit the damage the nematodes can cause to the plant. Overall, their research is aimed at gaining a better understanding of how nematodes interact with plants and finding ways to limit the damage they can cause. This can result in crucial advantages for society.

“If we can find a way to make plants resistant to these plant-parasitic nematodes, we can create a broad resistance that is non-specific and durable,”

Korswagen said. This, in combination with using the tomato as a model plant in the project, facilitates the transfer of the projects’ results to other economically important plant species (e.g., potato, pepper, and eggplant). Torres added that each seed company involved in the project is within the world's top eight of vegetable plant breeding, representing more than half of global sales of high-quality vegetable seeds. “Our industrial partners will help translate our research into novel nematode-resistant varieties for the consumer market.”

Technical University of Denmark (DTU) is helping a large international company find nature's own substances to combat fungal diseases in crops. The university's large collection of mold fungi and a minor collection of bacteria are part of the project in the hopes they can be used to produce biofungicides. 38,400 mold fungi isolates take the lead role in the large research project, “Smarter AgroBiological Screening” (SABS). In the project, DTU collaborates with FMC.

Niels Bjerg Jensen, a project manager on the project and liaison to FMC, said DTU's entire fungi collection will be “modernized.” This will entail two laboratory technicians first retrieving the isolates from the basement and unscrewing the red lid, one by one, to pipette spores from the fungus and transfer them to an agar plate where they can grow in the laboratory. After 8-10 days, the laboratory technicians can harvest the fresh spores and transfer them to a plastic tray with 24 wells (holes) where each well houses its own fungal isolate. Then a robot takes over and eventually transfers the fungi to a plastic tray with 96 wells. Now the format of the fungi fits into the automated process where a robot can pipette spores from 96 fungi at once. In the SABS project, DTU has already screened and identified some promising fungi that were able to produce bioactive substances in the laboratory. The candidates have been delivered to FMC for further investigation. If the promising results continue, the next step is to test the substances under controlled conditions in field experiments where grain is grown using the natural fungicides.

Personnel

Syngenta adds to its turf and landscape team in the UK with the appointment of Sarah Hughes as a dedicated business manager to strengthen support for its broadening product range. Joining from the company's seeds division, Hughes is an experienced agronomist with a background in plant science and genetics. A Nuffield Scholar in innovative plant growing

technology, she will work with **Daniel Lightfoot MG**, who is now responsible for Syngenta's professional solutions business across Western Europe and Italy. She will also be supported in the UK by specialist technical managers, **Sean Loakes** and **Glenn Kirby**.

ADAMA Ltd. has appointed Steve Hawkins, currently ADAMA's senior vice president, Americas, as its president and chief executive officer, effective May 1, 2023. Hawkins succeeds **Ignacio Dominguez**, who has elected to retire from the company after serving in a series of senior roles at ADAMA, including as a key member of its management and executive committee for more than a decade.

Hawkins has spent his entire career in agriculture, beginning in sales with GROWMARK in Canada before joining one of Syngenta's legacy companies, ICI Canada, nearly three decades ago. He has held a number of senior roles during his time with the company, including regional director EAME, head of sales CP and Seeds USA, head of commercial operations for NA Corn and Soya Seeds, country head for Japan and South Korea, and regional director APAC for both CP and Seeds. As ADAMA's senior vice president, Americas since 2021, he has overseen its North American and Latin American businesses, as well as its consumer and professional (non-crop) businesses globally. Hawkins holds a diploma in agriculture and an executive MBA in food and agribusiness, both from the Ontario Agricultural College at the University of Guelph, and has a bachelor's degree in administrative studies from Toronto's York University.

Lavie Bio Ltd., a subsidiary of Evogene Ltd., has appointed Amit Noam as chief executive officer. He has extensive experience as a senior executive, particularly in the agriculture and healthcare sectors, leading teams in the development and execution of commercialization strategies. Since 2018, Noam served as chief operating officer of AgriTask, an ag-tech company, leading the company's commercial and operational strategies. He also has previous experience with pharma company Teva Pharmaceuticals, as well as Shaldor, an Israeli consulting firm, and Themis UAV, providing robotics solutions. Noam holds an MBA from Tel Aviv University and a BSc in Industrial and Management Engineering from Ben-Gurion University in Beer Sheva, Israel.

Following the closing of Symborg's acquisition by Corteva Agriscience on March 2, Raphael Godinho takes over Symborg as the new general manager, replacing former CEO and co-founder Jesús Juárez.

Godinho, an agricultural engineer, previously served as global product manager and global program leader of biologicals at Corteva. He will be located at company headquarters in Murcia, Spain.

Biotalys announced that Douglas Minder will be promoted to chief financial officer (CFO), effective July 1, 2023. He will take over responsibility from **Wim Ottevaere** who will conclude his operational role and will continue to serve Biotalys in an advisory capacity. Minder joined Biotalys in January 2021 and was appointed deputy CFO after the company's IPO to prepare for the role of CFO and start leading the finance team. He has over 30 years of financial experience, which includes more than eight years at Belgium-based multinational biopharmaceutical company UCB; his most recent position there was finance business partner. He also worked for 20 years as an auditor and consultant at Deloitte, both Belgium and in the US.

Upcoming Events

Biocontrol LATAM

15–16 August 2023, Medellin, Colombia

Advance biocontrol solutions for sustainable farming in LATAM – Meet with entrepreneurs, newcomers, and established stakeholders within biocontrol to form successful partnerships in Latin America.

<https://informaconnect.com/biocontrollatam/>

Biocontrol & Biomes

29-30 Nov 2023, Milan, Italy

Bringing together scientific excellence and high tech innovations within biocontrol.

<https://informaconnect.com/biocontrol-biomes/>

Biostimulants World Congress

29 Nov- 1 Dec 2023 Allianz Milco, Milan, Italy

The world's largest event focused on scientific excellence for optimizinb biostimulants.

<https://informaconnect.com/biostimulants-world-congress/>



2BMonthly | www.2BMonthly.com
A DunhamTrimmer LLC | New Ag International Publication
Info@2BMonthly.com

DunhamTrimmer LLC
11523 Palmbrush Trail, Suite 301
Lakewood Ranch, FL 34202 USA

New Ag International
A brand of Informa Connect Limited,
5 Howick Place
London, SW1P 1WG, UK

Rick Melnick - Editor
Rick@DunhamTrimmer.com

Luke Hutson - Editor
luke.hutson@newaginternational.com

Janet Kanters - Editor
Janet.Kanters@newaginternational.com

Mark Trimmer - Editor-at-large
Mark@DunhamTrimmer.com

Carolyn Gangi - Production
Carolyn@dunhamtrimmer.com

Sales and Marketing
Carmen Hernandez
Carmen.Hernandez@newaginternational.com

Subscriber Services
Adeline Lang
Adeline.Lang@newaginternational.com

Subscription Details

Format: Digital
Price: US \$1,620 Per Year
Frequency: Monthly,
12 Issues Per Year

To subscribe, contact:
Subscribe@2BMonthly.com

Disclaimer: While all efforts have been taken to ensure that the information included in this e-newsletter is accurate, 2BMonthly accepts no liability for the content of this report, or for the consequences of any actions taken on the basis of the information provided.

Copyright Notice: This e-newsletter and its contents are the copyright of 2BMonthly 2023. All rights reserved. The reproduction of all or any part of the contents in any form without written permission from the publisher is prohibited. It is further prohibited to copy, distribute, reproduce or sell any of the content without written permission. Permission to store this document on any website or any document retrieval/sharing system must be granted by 2BMonthly.