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TWO B MONTHLY

The Global Biocontrol & Biostimulants E-Newsletter

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Welcome to October 2BMonthly

Greetings, and welcome to the October 2020 issue of 2BMonthly.

Hopefully you read in this space last month that our collective antennae were detecting a subtle change in the tenor of business activities following the pandemic-driven slowdown. No sooner had we suggested that optimism could be heard in the voices of our corporate biocontrols and biostimulants colleagues than the largest acquisition in the history of the biostimulant company took place just a few weeks before this issue published. We will continue to report on Syngenta's acquisition of Valagro as more details emerge.

There was also the announcement that AMVAC Chemical Corporation had acquired the Agrinos group of chemicals. Could these two deals signal greater activity in the M&S space in Q4?

Such thoughts will no doubt occupy the discussions, albeit virtual, at this year's ABIM – the Annual Biocontrol Industry Meeting, starting Monday 19 October and running to 21 October. There is a full conference program, exhibition with avatars, panel discussions, training workshops, all delivered online. The 2BMonthly team will be there at the DunhamTrimmer booth and New Ag International booth, so come and say hello.

Enjoy the issue.

~2BMonthly Editorial Team

Trending Now

Syngenta Group has acquired Valagro by its business unit Syngenta Crop Protection.

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American Vanguard Corporation announced that AMVAC Chemical Corporation has acquired the Agrinos group of companies.

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AgBiome and Tropical Melhoramento e Genética (TMG) have entered into a new global R&D collaboration.

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SOPEF, the Investment Fund Managed by MCH, enters into Symborg.

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IBMA is poised to name its 2020 Bernard Blum award winner at ABIM, from an auspicious list of nominees.

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The European Patent Office has granted Futureco Bioscience the certificate of two patents.

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PMRA is proposing registration for the sale and use of Koppert's Mycotal Technical Biological Insecticide and Mycotal Biological Insecticide.

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A team comprised of researchers from Texas Tech University and Nanjing Agricultural University have discovered that arbuscular mycorrhizal fungi (AMF) act as a supplier of nitrogen (N) to plants.

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Executives Speak:

Jeff Ivan, Chief Executive Officer - Soilgenic Nutrients Inc.

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Eric Gantoy, CEO - Agronutrition

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Mergers, Acquisitions and Partnerships

Syngenta Group has acquired Valagro by its business unit Syngenta Crop Protection. Valagro will continue to operate as an independent brand in the market within the Syngenta Crop Protection business. Valagro is a producer of biologicals, with a ~10 percent CAGR from 2009-2019 and an approximate revenue of US\$175 million in 2019. Headquartered in Atessa, Italy, Valagro serves customers around the world with a strong presence in Europe and North America, as well as a growing footprint in Asia, including China, and LATAM.

American Vanguard Corporation announced that its principal operating subsidiary AMVAC Chemical Corporation has acquired the Agrinos group of companies, a privately-owned technology leader in biological crop inputs. "In addition to our leading position in crop protection, we intend to expand our global participation in bio-nutritional inputs that contribute to improving soil health," said Eric Wintemute, chairman and CEO of American Vanguard.

"The Agrinos portfolio will complement our Greenplants liquid nutrition products which have enjoyed successful growth in the Central American market. Additionally, these biostimulant products are tailored perfectly for use in our SIMPAS prescription application system." Agrinos' intellectual property includes nearly 50 patents issued and nearly 100 pending worldwide. Agrinos has two manufacturing facilities, a state-of-the-art microbial input manufacturing facility located in Oregon, capable of customizing high-quality strains and a high throughput manufacturer of high quality biostimulants using naturally derived raw materials located in Mexico.

Anuvia Plant Nutrients has entered into a commercial agreement with The Mosaic Company to exclusively license its SymTRX10S product in the US. The agreement enables Mosaic to utilize Anuvia's SymTRX10S technology to introduce a next-generation biobased phosphate fertilizer with sulfur to the marketplace under the Mosaic brand name Susterra. Anuvia will continue to sell its SymTRX20S product in the US, along with commercialization of all SymTRX products in markets outside the US.

AgBiome and Tropical Melhoramento e Genética (TMG), a Brazilian soy and cotton breeding company, have entered into a new global R&D collaboration. The goal is to discover and develop traits with novel modes of action to combat the cotton boll weevil. The partnership will pair AgBiome's Genesis platform with TMG's proprietary germplasm and Cotton Improvement Program to provide genetic solutions to farmers worldwide. With the adoption of these technologies, the number of pesticide applications for weevil control can be reduced. Brazil is one of the world's leading cotton producers and the

second largest exporter of the fiber, with TMG contributing to 38 percent of the country's cotton seed market. Boll weevil (*Anthonomus grandis*) is a major pest of cotton.

CEV SA. and Ceradis Crop Protection B.V. have entered into an R&D agreement to develop new, innovative crop protection products based on CEV's biological active ingredient and Ceradis' technology. Based in Portugal, CEV produces and commercializes biofungicides in which the active ingredient is a polypeptide, called BLAD, obtained from germinated lupin seeds. Ceradis develops and sells innovative environmental-friendly products for plant nutrition and crop protection. The agreement's goal is to deliver new biological crop protection products to farmers as an alternative to chemicals. This will enable farmers to protect their crops with biologicals, while reducing the rate of chemicals used per hectare of farmland while lowering residues on the crop. This will advance CEV's goal to commercialize polypeptide-based fungicides and Ceradis' mission to help farmers feed the world sustainably.

Ceradis has created the poly-electrolyte matrix (PEM) formulation technology which can act as an "enabler" to form a wide variety of different crop protection products. Ceradis has demonstrated it can increase the efficacy of certain active ingredients two- to fourfold by incorporating them into a poly-electrolyte matrix. The PEM itself is a matrix with heterogeneous gaps which can hold different fungicidal particles. The poly-electrolyte matrix consists of a combination of a polycation and a polyanion. The PEM itself also offers functional benefits in use. By holding the active ingredients in the matrix, it improves dispersal and release. Due to its film forming nature upon drying, PEM can also provide improved adherence to a substrate (such as a leaf or a seed), thereby improving rain-fastness and extending the window of protection against the target pests.

SOPEF, the Investment Fund Managed by MCH Enters into Symborg, a Leading Company Specialized in Biotechnology Applied to Agriculture with presence in more than 50 countries. Thanks to SOPEF's entry, Symborg strengthens its shareholding structure and obtains financial support as part of its strategic growth and expansion plan.

Spain Oman Private Equity Fund ("SOPEF"), the investment fund managed by MCH Private Equity has completed its fourth transaction through the investment in Symborg.

Symborg was established in Murcia in 2009 and is a leading company specialized in biotechnology research and development with agricultural innovation, providing farmers innovative solutions that optimize their crops and ensure the conservation of their habitats and ecosystems. Symborg has established itself as a world reference in the development of biostimulants based on microorganisms whereby the applications to agricultural uses are patent protected.

Over the last years, the Company has evolved from its first products based on mycorrhizal fungi to the development of biofertilizers such as BlueN, which allows the plant to naturally nourish itself with nitrogen, reducing the use of nitrogen fertilizers through a sustainable and environmentally friendly solution.

In this new stage, SOPEF and Symborg's shareholders aim to promote and consolidate the international growth strategy of the Company, taking advantage of the industry trends which are evolving towards sustainable solutions. The objective is to meet the food demand of a growing population facing the challenges that climate change will present in the coming years.

As a result of the agreement, Symborg reinforces its shareholding structure by a strategic partner who adds a markable contributions to continue supporting the company's expansion plan.

The expansion plan includes the construction of a production plant in Alhama de Murcia to incorporate new products into the existing portfolio. This will facilitate the international consolidation to key agricultural markets such as the United States and Latin America.

According to Jesús Juárez, founding partner and CEO of Symborg, *"Our objectives of growth, professionalism and leadership find in the SOPEF Fund a great ally. The commitment of this prestigious fund with Symborg reinforces our strategic plan, which will consolidate us as international leaders in agricultural biotechnology in the coming years."*

According to Jose Manuel de Bartolome, Partner of SOPEF, *"Symborg meets all the requirements that are sought in private equity investments. It is a growth project, born purely from an entrepreneurship consolidated by development of proprietary technology. The market presents great opportunities in the coming years and the Company has a top-level management team who have in mind a very defined business plan to undertake"*.

Company News

The International Centre of Insect Physiology and Ecology (ICIPE) has developed new biopesticides that gives hope to sustainable agriculture in Africa. The biopesticide products includes 417 botanicals, 274 microbial and 271 microbial extracts, or fermentation products. Of the products, 23, including Neem and *Bacillus thuringiensis* and sex pheromones and microbials that are registered within sub-Saharan Africa, are recommended for further consideration. Through a partnership with Real IPM

Ltd, a Kenya-based private sector company, two ICIPE biopesticides are being commercialized as Campaign (icipe69) and Achieve (icipe78). The campaign has been registered in Ethiopia, Kenya, Ghana, South Africa, and Tanzania, where it is being used against mealybugs, thrips and fruit flies, in crops such as cucumber, mango, papaya, roses and tomatoes, among others.

Mologic Ltd, a developer of lateral flow and rapid diagnostic technologies, has launched its first crop pathogen diagnostic test, BotrytisAlert. As part of an Innovate UK funded initiative, Mologic is applying its lateral flow expertise to better inform decision making at critical points across the food production and processing chain. BotrytisAlert is a low-cost test which can be used to measure the fungal crop pathogen *Botrytis* both in air and plant material, enabling growers to apply controlled measures ahead of symptom development, prevent disease establishment and post-harvest rot. Mologic developed and trialled BotrytisAlert in the UK with Berry Garden Growers, NIAB EMR and the Warwickshire College.

The list of nominations for the annual Bernard Blum Award has been released by the International Biocontrol Manufacturers Association (IBMA). The Bernard Blum Award was launched in 2015 by the IBMA to commemorate its founding president. The award goes to the most innovative biocontrol product of the year. The award recipient should have a high impact in the management of pests or diseases while having a low impact on human health and the environment. The award will be presented at the opening of ABIM, the Annual Biocontrol Industry Meeting. The nominations for this year's Bernard Blum Award were, in alphabetical order: Agro Advance Technology, Bio Bee Sde Eliyahu, Biobest, Bionovatic, Biotalys, E-nema, IPL Biologicals, Kwizda Agro, UV Boosting. The shortlist for this year's Bernard Blum Award are in alphabetical order:

- Bio Bee
- Biobest
- E-nema
- UV Boosting

Your path to success on international biorational markets

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The winner will be announced on the first day of the digital ABIM conference and exhibition running 19-21 October.

Certis Spain has added two new products to its biorotational portfolio: Valcure and Majestik.

Valcure is a biological fungicide for soil diseases, registered for greenhouse horticultural crops. It has a total of five different modes of action: colonization of the rhizosphere, formation of a protective physical barrier in the root against pathogens, fungicidal action linked to the presence of lipopeptides including destruction of the membrane and cell wall of the fungus, induction of resistance in-plant (ISR) and plant growth promotion (PGPR). Majestik is an insecticide/miticide registered for use in all greenhouse plant species for the control of mites and whiteflies.

Plant technology firm Plant Response, a Spanish agricultural biologicals company with North

American headquarters in Durham, NC, has raised \$1 million in debt, according to a recent securities filing. It comes less than a year after the firm, under the business name Delta PRB, raised \$75.9 million in equity and debt. Four investors contributed to the current round, which kicked off on Sept. 15 and accepted a minimum \$250,000 from any outside investor. The company is still seeking to raise an additional \$1.5 million. The round is capped at \$88.189 million with \$11,289,300 remaining to be sold. Plant Response launched in March 2008 as a Universidad Politécnica de Madrid (UPM) spin-off. In 2017, the firm picked Research Triangle Park for its North American headquarters. In late 2019, the firm announced that Response Biotech and Koch Biological Solutions, LLC. combined operations to form Plant Response Biotech, Inc. Earlier this year, the newly merged company acquired Pathway BioLogic of Plant City, Fla., to broaden its portfolio of biological products for agriculture.

Amoeba has filed an application for the authorization of its biocontrol solution in the US.

Amoeba is still in the testing phase of a biocontrol product with the active substance lysate of *Willaertia magna* C2c Maky. The biocontrol solution is intended for use as a fungicide in agriculture. Being a naturally occurring substance, the biocontrol active ingredient is considered a biopesticide and the application for approval will be evaluated by the Biopesticides and Pollution Prevention Division (BPPD) of the US EPA. The approval process will take between 18 and 24 months, with a decision expected in 2022.

Biotalys NV has been awarded a €1.1 million research grant from Flanders Innovation & Entrepreneurship (VLAIO).

The grant will run over three years and will support the development of the company's novel protein-based bio-bactericides for the management of bacterial plant diseases. The funding will allow the company to accelerate research and development activities of its protein-based biocontrol solutions with completely new mechanisms-of-action for the management of bacterial plant diseases, including cankers, blight and spots. In May of this year, Biotalys was awarded a €1.6 million research grant from VLAIO to support the accelerated development of cost-efficient microbial cell factories for the industrial production of Biotalys' unique new generation protein-based biocontrol solutions.

Natutec Drive is the latest in the series of Natutec associated technologies from Koppert for

agriculture and horticulture. Natutec Drive is a tool that makes it possible to apply all beneficials in various carrier

materials from a moving vehicle via ventilated air tubes to the crop. The essential part of Natutec Drive is a box with tubes that distributes the company's predatory mites and other insects in the correct dosage and uniformly over multiple crop rows. The user puts beneficial insects inside a drum in the box, which can carry up to 30 litres of material. The Natutec Drive rotates the drum to keep the beneficial insects homogeneously mixed.

By using air, the beneficial insects are then transported through tubes and eventually land on the crop. Because of the system's unique design, the beneficial insects suffer no damage when the blower is used. The Natutec Drive module can be used as a customized vehicle or on existing farming equipment, no matter what crop system. At present, it is being used mainly for the biocontrol of pests in strawberries in the Netherlands, the United Kingdom, Ireland and Germany. Trials on citrus have also started in Spain. Trials are now underway in a number of different crops and in a growing number of countries.

The European Patent Office has granted Futureco Bioscience the certificate of the patents EP

3209132 B1 *Bacteria with nematocidal activity and ability to promote plant growth* and EP 3258785 B1 *Ensifer adhaerens with nematocidal activity*. The first product, based on the B25 strain of *Lysobacter enzymogenes*, is expected to begin the authorization process as a new phytosanitary active substance during 2021 globally, while several of the prototypes of *Ensifer adhaerens* strains are being evaluated in massive trials in different regions.

Andermatt Nederland will bring the portfolio of Andermatt Biocontrol to the Belgian market

beginning in 2021. In addition to the well-known products from the Andermatt Biocontrol Group, such as Madex Max and Vitisan, the product range of biological crop protection products, biostimulants, monitoring traps and efficient solutions for poison-free rodent control, will be further expanded.

Idai Nature has opened its first subsidiary in Brazil, which will serve as a hub for the growing future

presence in the country. This new subsidiary consolidates and strengthens the company presence in the Americas, where the Idai Nature USA and the Idai Nature Mexico subsidiaries are already established. Idai Nature has a presence in 40 countries.

Marrone Bio Innovations, Inc.'s president and chief financial officer (CFO) James Boyd is

retiring from his positions. A national search process for the new CFO is underway, and Boyd will continue as president and CFO during the search process.

2B Monthly Exclusive

Botanical Solution Inc. is set to bring biofungicides to new markets, plus a botanical active that could be used in pharma as vaccine adjuvant.

Botanical Solution Inc (BSI) is looking to take its biofungicide product Botristop to other Latin American markets and to the US.



BSI has had Botristop on the market in Chile since 2016, and through a partnership between BSI and Syngenta since 2019.

The company is well advanced with its registration application to Peru and is beginning efficacy trials in Mexico as part of its registration process in that country, CEO Gaston Salinas told 2BMonthly.

The company is also in the process of submitting its registration documents for the EPA in the US.

Botristop is primarily used against the fungal disease *Botrytis cinerea*. The product, which is supplied in liquid formulation, is based on botanical extract from a plant that is native to Chile, named *Quillaja saponaria Molina*.

The plant has been traditionally harvested from the wild for many decades and has not so far been cultivated. In contrast, BSI grows this plant in the laboratory, turning it into a dry biomass. The active compounds are extracted from the dry biomass and then incorporated into the formulation. The end product can be tank mixed with conventional pesticides, said Salinas when speaking to 2BMonthly from Davis, California.

Salinas, who is Chilean, is one of the co-founders of the company, the other being fellow Chilean Gustavo Zuñiga, who led the research work on extracting the botanical compounds from the *Quillaja saponaria* plant.

Founded in 2013, BSI's main production facilities are in Santiago, Chile.

"In our 500 square metre laboratory, we can produce enough material to service the new markets," said Salinas. The plant is used as a raw material by other industries. Salinas explained this can be an exploitative use of the raw material. He said their process means the plant can be harvested in the laboratory, rather than depleting the native habitat.

Other botanical compounds, such as QS-21, are found in this plant, and in the highest quantities in the bark of 15-year-old mature trees, so these tend to be harvested.

"We're raising the bar on botanicals," said Salinas, highlighting the problem of making botanical products scalable. "It doesn't make sense to have a raw material that requires harvesting part from the wild."

BSI is backed by venture capital and shares the same backer as a Chilean table grape exporter who was an early adopter of Botristop.

The registration process for Botristop in Chile took four years.

There is no separate registration process for biocontrol over conventional pesticides.

"For a mono-product company, that's quite a challenge," said Salinas. "Today we are generating revenue, but we still need resources from venture capital."

The company is nearing registration in Peru and is aiming to launch Botristop there in the second quarter of 2021. After the US, Salinas said the company is eyeing Europe as an opportunity.

The company is also developing new products. Using extracts from the same raw material, the company has a nematicide and herbicide in the early stages of development.

Another possible end use is the production of QS-21 compound, which is used by the pharmaceutical industry to make an adjuvant for vaccines.

In a similar way to adjuvants in crop protection, adjuvants help the effectiveness of the active in a vaccine.

Salinas said the QS-21 is beneficial to the action of the antigens in a vaccine. The *in vitro* plants that BSI cultivate in the laboratory also produce QS-21 and in quantities that could be of interest to the pharmaceutical industry.

Salinas said there have been attempts to produce QS-21 synthetically, but so far nobody has achieved a low-cost process.



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Global Biostimulant Market Report

Comprehensive, global Biostimulant market data and analysis from Dunham Trimmer, the world's leading authority on Biological Business Intelligence for agriculture.



"We're in the process of packaging the information to show that our extracted QS-21 is equivalent, and we're confident we will begin production very soon."

Executives Speak

Jeff Ivan, Chief Executive Officer - Soilgenic Nutrients Inc.

Soilgenic Nutrients Inc. was recently launched to develop new sustainable fertilizer technologies that utilize food and agricultural waste streams.

Let's begin with the corporate side before diving into the products – what's the relationship between Soilgenic Nutrients and ESG? Perhaps you can tell readers a little bit about ESG and its investment strategy.

Soilgenic Nutrients is a subsidiary of ESG Global Impact Capital Inc. and is focused on the sustainable agriculture space. ESG (Environmental, Social and Governance) is a Canadian investment issuer focused on high growth projects and opportunities which have a commitment to a socially responsible, ethical and sustainable alternative to traditional business models. ESG is traded on the Toronto venture exchange (TSX.V: ESGW and OTCQB: ESIF).

Before asking what the plan is for you as CEO, could you give a brief summary of your career to date and how you became interested in sustainable agriculture?

I've been in agriculture for 32 years now and pretty much all of those years focused on the fertilizer sector. I started my career in the retail sector in Western Canada and then moved over to Tiger-Sul products focusing on sulphur-based fertilizers and micronutrients. After moving into managing the Canadian market, I switched focus to managing the international business development for the group.

I also worked with The Sulphur Institute (TSI) as the project lead for the promotion of sulphur-based fertilizer in the India market working closely with the Fertilizer Association of India.

For the past 10 years I've worked with Ag Growth International (AGI)/Yargus Manufacturing and continued to focus on international development projects including in developing regions, working closely with NGOs and governments on the development of fertilizer plants to increase food security.

During this period, we saw the IPCC release the report on agriculture and the impact on climate change. Globally we have seen a push for sustainability in agriculture. One of the major contributors to climate change is food and agricultural waste streams as they contribute up to 30 percent of GHG emissions.

I have also been working closely with a couple of groups with innovative sustainable nutrient technology that utilizes food and agricultural cellulose waste that would have a significant impact globally. This has brought me to Soilgenic Nutrients and our focus on sustainability and how we can play a major role in providing new technologies for farmers transitioning to a low carbon farming system.

So, what's the plan? You have proprietary technologies and a pilot plant – what is Soilgenic aiming to produce and where is it planning to sell?

We have three products groups that have patented our unique IP technology that we are focusing on. Two technologies are similar in that they can work closely together and utilize the same granulation process. We are working with a company that is moving its production from R&D to a mid-production facility. The technology utilizes food waste and creates a hybrid sustainable fertilizer with phosphate and sulphur.

Through the production process, the bio-active formulation will enhance the soil with added carbon and organic matter and through a host of beneficial bacteria. The beneficial bacteria utilize the carbon as a food source and work with the fertilizer minerals to feed the crop through the growing season. In addition, the second technology is a cellulose based micronutrient technology that creates a natural chelate that is safe for the plant and the environment.

The micronutrient stays available in soils with a pH of four to 10 and is bioavailable to the plant when it needs the micronutrients. The research has shown amazing results, with plant response and uptake much higher than traditional micronutrient sources. We are also able to incorporate the micronutrient into the bio-active phosphate / sulphur technology to create a formulation to address the crop's micronutrient needs or to correct deficiencies. This creates a line of sustainable low carbon fertilizers for farmers to utilize.

In terms of marketing, how would you categorize your intended product offering? You are incorporating nutrients and microbials, and there doesn't seem to be a category term for those yet.

You are correct that the products are unique, but we will be categorizing them as nutrients and promoted as sustainable low carbon nutrients that can be used in the conventional, sustainable organic and regenerative markets. We see these products as a tool to assist farmers to improve the health of their soils and the microbiome and our unique nutrient formulations.

I said "technologies" because you also have a biopolymer technology that encourages the leaching of sodium out of soils – can you elaborate?

Yes, the technology is a polymer that will be a solution for saline, sodic and compacted soils. Approximately 500 million acres globally are affected by sodium. The technology is added at low quantities to the soil and helps to liberate the salts without added cations. When used in a proper management strategy, we have seen significant yield increases as high as 50-70 percent with a significant improvement on plant quality and nutrient density. We are quite excited about this technology as it is a new tool for growers with salt issues as well as soils that have been written off due to the high level of salt in the soil profile.

When we spoke, you mentioned the possibility of a commercial scale plant for the P-S products in Canada – when might we see that coming on-stream?

As mentioned, we are increasing production in 2021 to a mid-size production plant to continue to scale out the technology for the North American and international



markets. We have several groups looking to test the products in their regions and are looking for strategic partners who want to grow the technology together. Globally, we see all countries that must deal with food and agricultural waste streams, and we offer a viable cost-effective solution.

We can build out the production facilities in these regions and provide the IP and know-how for the plants. The result is an enhanced low carbon nutrient solution that will help to reduce agriculture's effects on climate change while increasing food security as the population grows.

I understand you are also looking at the broader sustainability picture – for example, looking at other forms of nitrogen production. How does that fit with the Soilgenic vision?

Yes, our focus is to provide a complete sustainable nutrient solution, not just one piece of the nutrient puzzle. We are looking at nitrogen and how we can not only reduce the carbon footprint but also increase the efficiency and minimize loss to the environment. This is currently under review and will be a focus once we get the P-S and micronutrient technologies established although we have technologies that we can easily work with in this space.

Executives Speak

Eric Gantoy, CEO - Agronutrition

Agronutrition traces its roots to Société Commerciale des Potasses d'Alsace (SCPA) more than 45 years ago. Since 2000, you have grown to become one of the leading specialty fertilizer and biostimulant producers in France. What do think differentiates Agronutrition from your competitors and has contributed to your success?

Indeed, our roots lie in plant nutrition in the broad sense of the term. Our know-how allows us to take a global approach to optimization of plant nutrition, with the goal of increasing the profitability of production. Since 2008 our R&D has been rendered fully internal. We have two research laboratories: one is dedicated to organic and mineral chemistry, the other to microbiology, bacteria and mycorrhizae. Our success rests on a team of professionals, expert in each of Agronutrition's activity domains.

The market of plant nutrition shows a strong growth and our distributors can rely on our competences and on the proximity that we assure with our daily presence in the field.

In 2009, Agronutrition became a subsidiary of De Sangosse group. Agronutrition completes the De Sangosse focus on biosolutions by targeting the biostimulant and biofertilizer market. How has this change impacted the decision-making process at Agronutrition and what synergies do you enjoy with the De Sangosse group?

De Sangosse is a major player in the field of biocontrol and enjoys a solid position in France: 23 specialties in all four product families of microbials, natural substances, semiochemicals and macrobials. It was quite natural to take advantage of synergies putting together our forces in the R&D area. We set up a joint laboratory with the LRSV

(Laboratoire de Recherche en Sciences Végétales), located in Toulouse, France.

Your foundational focus relies mainly in specialty fertilizers, but biosolutions have become a more important subject. What percentage do biostimulants represent of your total turnover? Is their share growing?

Biostimulants already represent more than 30 percent of our turnover and their share is progressing. We predict that they will grow to more than 50 percent in the next few years. That being said, we forecast a strong growth across the entire range of our nutrition specialties, with a 50 percent turnover increase over the next three years.

Being close to the value chain with a strong commercial focus has been key for succeeding in biostimulant and special nutrition markets, but we see a shift in some companies' strategic focus by reinforcing the R&D and IP focus in order to keep competitive. What is Agronutrition's focus and what do you believe are your key success factors?

Competition is strong in this sector, also due to an access to the market that has been relatively easy until today. However, and fortunately, the market is being restructured: the increased demands in terms of quality and proven performance should render it healthier and help clarify the offer. Only the more performing and rigorous actors will have an international visibility.

Research, intellectual property, regulatory conformity, relevance of technical advice and professionalism of our teams are pillars of our strategy. Our challenge is to keep the highest performance level, and secure a competitive edge to our partners and distributors.

Agronutrition has a leading position in France, but with your internationalization process, the rest of Europe and Latam are becoming more important, and international markets already represent over a half of your total turnover. What are your different strengths in the French and international markets, and where do you see your main priority markets in future?

France is our "garden" and we are recognized as being the leaders. Our development rests on a solid field team of 20, that each day guarantees a support to our partners. We work in collaboration with all the players: technical services, agronomic advisors, extension services, distributors. We also organize numerous training sessions for technicians, in particular through extensive use of digital technologies in these Covid-19 times.

As to export: in 2020, Agronutrition's products are sold in 75 countries. The strategy is actually twofold. On one side, we make good use of the De Sangosse operating companies' channel. Thanks to it we have direct access to 20 countries, among which are those that are strategic for our growth such as Brazil, Mexico, Argentina, UK and so on.

All other important markets are served directly via the Agronutrition's distributors channel, which covers 55 countries in Europe, Asia, Middle East, Russian-speaking countries and Africa, with a team of 15 business managers and promoters.

The entire area of plant nutrition is strategic for the De Sangosse group. Our perspectives of "organic" growth are excellent, but we are also very attentive to all opportunities of external growth susceptible of strengthening our development strategy. The 2019-2020 "campaign" has been a very good one for the group's plant nutrition activities, with a turnover close to 100M€. We forecast that the figure will rapidly climb to 150 M€.

You've been a founding and very actively involved member of EBIC. What, in your opinion, should be the next immediate priorities for EBIC and which challenges do you see in the coming future for the biostimulants industry?

True, we joined EBIC at the very beginning, in 2011. One has to recognize the endeavor of the association, that successfully contributed to the adoption of the FPR, the EU Fertilising Products Regulation, published in June 2019. The regulation marks a big step forward to a more circular, bio-based economy and for the first time allows plant biostimulants access to the single European market.

That being said, the FPR needs to be improved by amending certain "blocking" aspects, not quite coherent. Without going into details here, I will quote as examples the parts addressing reach registration requirements and natural polymers. And the FPR should be modified in order to allow the development of innovative microbial products.

But beyond the regulatory aspects, we believe that EBIC must engage itself in helping in the evolution of the crop management techniques to take into account the use of biostimulants. A lot of work in terms of advocacy, communication and education, but vital for the growth of the industry and, ultimately, for the benefit of farmers and the entire "Farm to Fork" value chain.

Regulatory

Biocontrol

Health Canada's Pest Management Regulatory Agency (PMRA), under the authority of the *Pest Control Products Act*, is proposing registration for the sale and use of Koppert's Mycotal Technical Biological Insecticide and Mycotal Biological Insecticide, containing the technical grade active ingredient *Lecanicillium muscarium* strain Ve6, for suppression of whiteflies on greenhouse tomato. *L. muscarium* strain Ve6 is the active ingredient in the commercial class microbial product Mycotal Biological Insecticide, which suppresses whiteflies on greenhouse tomato. *L. muscarium* strain Ve6 is a fungus that kills insects by infection and growth of hyphal bodies.

It is active by contact. An evaluation of available scientific information found that, under the approved conditions of use, the health and environmental risks and the value of the pest control products are acceptable. Before making a final registration decision on *L. muscarium* strain Ve6 and Mycotal Biological Insecticide, Health Canada's PMRA will consider any comments received from the public. Health Canada will then publish a registration decision which will include the decision, the reasons for it, a summary of comments received on the proposed registration decision and Health Canada's response to these comments.

Scientific Findings

Together with Brazil's agricultural research organization, **Embrapa**, CABI organized a webinar on integrated pest management (IPM) programs in big commodity crops in Brazil to celebrate the International Year of Plant Health. The webinar focused on the challenges and opportunities facing Brazil in relation to plant health. One of the key messages from the webinar was that biological – or natural – control of crop pests is now possible. One of the major challenges for big commodity crop farmers in Brazil is pest monitoring and releasing natural enemies of pests, such as *Trichogramma* wasps, as part of an IPM strategy.

During the webinar, the experts discussed options such as releasing biocontrol agents via drones and even using drones for pest monitoring, helping to overcome the challenge that large farms pose. A key part of the discussion was sharing the ideas and opinions from different sectors, for example, why extensionists favor certain strategies, and why farmers sometimes cannot follow researchers' recommendations. CABI indicates it was a good opportunity to talk about the differences and similarities of tackling pests in corn and cotton, and how to make adjustments for pest technologies.

Mirian Pimentel, a Southern Illinois University Carbondale agricultural sciences doctoral student, has discovered a promising new tool to fight sudden death syndrome (SDS) in soybeans. The findings were that several beneficial fungi that can act as biological control agents, or BCA, were able to reduce the growth of the pathogen that causes SDS. Pimentel's findings were recently published in *Plant Disease*. Pimentel said the research "opens doors for the ag industry to explore the promising biocontrol agents that we characterized and develop cost-effective products with optimized formulation that can be available for farmers to manage SDS." With collaborators in Michigan and Iowa, Pimentel also examined the beneficial fungi activity against *Pythium* damping off, another devastating disease on soybean seedlings.

A new multistate project will bring together researchers from the University of Georgia (UGA) and partner universities to fight *Alternaria* leaf blight and head rot in broccoli, a plant disease that thrives in warm temperatures and humidity. The U.S. Department of Agriculture's National Institute of Food and Agriculture awarded a \$2.7 million Specialty Crop Research Initiative (SCRI) grant to UGA College of Agricultural and Environmental Sciences faculty to study the *Alternaria* pathogens' biology, population structure and fungicide resistance. The team's research will build on previous surveillance work done in finding fungicide alternatives. The team of research and extension faculty will work to triangulate the disease by characterizing the pathogen or pathogens, host and environment. They will also develop diagnostic tools for identifying *Alternaria* sp., screen commercial varieties, and evaluate production practices including nitrogen levels and irrigation, which is how the disease spreads. The team will use what they learn to conduct economic assessments.

Some organic pesticides contain live spores of the fungus *Trichoderma*, which have the ability to suppress other pathogens. However, researchers at the University of Göttingen have now discovered that one *Trichoderma* species can cause severe rot in cobs of maize (corn). The results were published in the journal *Frontiers*

in *Agronomy*. The massive outbreak of a previously unknown species of *Trichoderma* on corn cobs in Europe was first detected in Southern Germany in 2018. In affected plants, grey-green spore layers formed on the grains of corn and between the leaves that form the husks of the cobs.

In addition, the infested grains germinated prematurely. For this study, the scientists brought maize plants in the greenhouse into contact with *Trichoderma* by inoculation. They were then able to prove that the dry matter content of the maize cobs is greatly reduced. Annette Pfordt, PhD student at the Department of Crop Sciences of the University of Göttingen and first author of the study, analyzed 18 separate *Trichoderma* strains mainly from maize cobs in Southern Germany and France over two years. She found that some of these strains are highly aggressive with a cob infestation of 95 to 100 percent. By means of molecular genetic analyses, these spores could be assigned to the relatively new species *Trichoderma afroharzianum*.

Within this species of fungus, previously unknown plant-pathogenic strains seem to have evolved which are now responsible for this newly discovered disease affecting maize. "The species used in organic plant protection products is a close relative, namely *Trichoderma harzianum*. Strains of this species were not as aggressive in the study, but in the inoculation experiments they also led to a slight infestation on the cob," says Pfordt. "Although the investigations carried out so far show that the *Trichoderma* strains used in organic plant protection products differ from the aggressive forms now found, it is also clear that the risks from the use of living microorganisms in plant protection must be thoroughly investigated," adds Professor Andreas von Tiedemann, head of the Department of Plant Pathology and Protection at the University of Göttingen.

As chemical options are withdrawn from use, a group of Scottish producers and researchers have turned their attention to biocontrol methods, which include using a chitin-rich compost made from a substance that occurs naturally in shellfish. Brechin-based Martin Cessford of Angus Horticulture developed the compost and is currently trialling it on a potato cyst nematode (PCN)-scheduled field (one the pest has put out of production) on his Whanland Farm.

The impact of the compost on PCN infestation is being monitored by a research station in Belgium. Cessford said that Dr. Andy Evans of Scotland's Rural College (SRUC) got dispensation to use seashells from food waste 12 years ago, and in six years the fields were clear. "We know it enhances the flora in the soil, we know it improves the soil, we just need to prove it." The group is also working with the Rural Innovation Support Service (RISS), led by Soil Association Scotland, alongside SoilEssentials, Scottish Agronomy and SASA, to improve soil sampling to help farmers and agronomists decide on the best measures to take. Other PCN measures being investigated by RISS include trap crops, where nematodes hatch and attach themselves to other plants where they can't complete their life cycle, as well as PCN-resistant potato varieties.

A team comprised of researchers from Texas Tech University and Nanjing Agricultural University have discovered that arbuscular mycorrhizal fungi (AMF) act as a supplier of nitrogen (N) to plants, the protein (NPF4.5) responsible for transporting nitrates from the fungi to the plant, and that this symbiotic nitrate pathway

and the function of the protein are present in crops such as rice, and probably most other plant species. Research found that the fungi colonization efficiency, promotion of plant growth and nutrient uptake were maintained and even enhanced at high nitrogen (N) supply levels, which is opposite to the high phosphate suppressed colonization, indicating the general contribution of mycorrhizal route to improving N use efficiency at varied N presence.

The discovery could lead to groundbreaking agricultural practices that allow for a reduction in the amount of nitrogen fertilizer required for crop production, which will help reduce production costs and benefit the environment by reducing agrochemical use. Next steps in the project will be to test the transgenic plants under field conditions and deeply understand the mechanisms that specifically activate the NPF4.5 nitrate transporter gene when the plant joins with the fungi, as well as discovering the chemical signals the fungi send to the plant to specifically activate this and other nutrient transporter genes probably required for this interaction.

Personnel

BioAg has expanded its team with the addition of **Dr. Johann Buck as director of technical services** and innovation. Buck attended Fort Hays State University in Hays, KS earning a bachelor's degree in agriculture. Upon graduation he relocated to Arizona to attend The University of Arizona. There, he studied plant sciences at the university's Controlled Environment Agriculture Center (CEAC). After Arizona he attended the University of Arkansas where he continued his focus on plant sciences. Over the past 12 years he has worked in various roles including technical services, product development and sales. These roles have involved plant measurement technologies, supplemental lighting using LEDs, soilless media, soil amendments and humic substances across many facets of agriculture, including field and greenhouse production of food, ornamental and turf crops.

Lesaffre's board of directors elected **Thibaut de Ladoucette as chairman, to replace Lucien Lesaffre**, chairman of the board of directors since 2012 and having reached the statutory age limit. A graduate of EM Lyon Business School and holder of an MBA from the University of California Los Angeles, de Ladoucette, 55, began his career in London with the investment bank UBS. In 2004, he joined C3D, a Caisse de Dépôts subsidiary, as head of development. In 2005, he joined Egis as group chief financial officer and joined the executive committee in 2006. de Ladoucette has been a member of the board of Lesaffre since 2006.

Hugo Bony has been appointed **vice-president and secretary of IBMA France on Sept. 17**. He joins Céline Barthe, president, and Ronan Goff, vice-president and treasurer, in the office of the French association of companies of biocontrol products. Bony has been managing director of Agrauxine by Lesaffre since 2016. He joined the board of directors of IBMA France in January 2018 and has been particularly involved in the association's events actions. He co-piloted the multi-site conference project (January 2019) and is at the initiative of the (ongoing) project of a "biocontrol village" during trade shows. He is also vice-president of the public-private consortium on biocontrol since May 2020.

Job Vacancies

BioWorks Inc. is hiring a full-time Director of Research & Development. With headquarters in Victor, New York, BioWorks has been a leader in providing environmentally responsible, safe, and effective biologically based pest control and plant nutrition products for the horticulture, turf, and specialty agriculture markets for more than 25 years. Together, with their team of experts, their customers are enhancing conventional programs as well as developing leading edge pest control and plant health programs. For more information, please visit <http://www.bioworksinc.com/careers.php>

Upcoming Events



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19-21 October 2020

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The Premier Global Meeting Place for the Biocontrol Industry

Please visit <https://www.abim.ch/home.html> for more information.

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