

Heard and Seen at...

ABIM in Basel

ABIM is the premier global meeting for the biocontrol industry and is internationally recognised as the global platform for the industry to network, discover and unveil new products, market opportunities and research areas. As well as promoting biocontrol and networking it is the platform to liaise with and inform policy makers and regulators of the specific needs of a unique growth industry. During the three days of the 11th conference, organized by IBMA in cooperation with FiBL, 898 delegates from 48 countries representing 426 companies and organisations from all over the globe were present. Two keynote speeches and one panel discussion enriched the programme. The scientific programme with 8 sessions with 29 presentations covered the latest developments in market development, regulatory affairs and novel products for plant protection. The exhibition was at the core of the congress, giving 59 companies excellent visibility. Marianne Loison reports.

“THE MAJOR OBJECTIVE OF IBMA is to associate biocontrol companies and be a spokesman for policy makers, the public and the media.” declared William Ravensberg President of IBMA in his opening speech. IBMA gathers 234 members worldwide, including 165 active members and 63 associates. “Our association is growing and this 11th conference is the biggest ever organised”.

ROMEO MICROBIAL PRODUCT FROM THE FRENCH COMPANY AGRAUXINE-LESAFFRE AGRO GROUP WINS THE BERNARD BLUM AWARD

Three products were shortlisted (out of 8 entries in the contest) for the second edition of the now prestigious BBlum award for Novel Biocontrol Solutions: Attracap product from the German company Biocare GmbH, Isonet LPF from the Italian company CBC and Romeo from the French company Agrauxine-Lesaffre agro. To have a pheromone product like the Isonet LPF that controls pests of different insect orders attacking the one crop is truly innovative. No other product can do this by selectively controlling two unrelated pests in one crop without impact on any other fauna within that crop. The Attracap product also is truly novel in that the formulation generates CO2 as an attractant to bring the target pest to the product to be inoculated by the fungal biocontrol agent, said



David Cary, Executive Director of IBMA. The award went to the product named Romeo from the French company Agrauxine-Lesaffre Plant Care. The Romeo microbial product shows true innovation in that we have the first cell fraction product to go on the market and also the first product with a systemic resistance inducing mode of action. It should also help to reduce the copper usage with a new mode of action in organic farming, something of concern within that sector.

Commenting on the trophy Mr Hugo Bony, General Manager of Agrauxine, said "we are very proud to present the first biofungicide originating from Lesaffre R&D pipeline. ROMEO aims at becoming a worldwide leader on its markets, demonstrating that white biotechnology is now at the heart of modern agriculture."

400 BIOACTIVE INGREDIENTS AND 1500 PRODUCTS REGISTERED IN THE USA

Jim Jones from EPA (US Environmental Protection Agency) reviewed the market trends and issues currently developing in the U.S. "We are expecting the growth of the market for biopesticides to continue for some time," said Jim Jones. "We see more and more biopesticides included in rotation with conventional pesticides." Biopesticides sales represent between 2 and 3 billion dollars out of the 56 billion total US pesticide market. They are used on 18 million acres in the U.S in a very active market. More than 400 bioactive ingredients have been registered until now, representing approximately 1500 different products. And 13 new active ingredients were approved in



Hugo Bony, MD of Agrauxine (right) receives the BBlum award from Willem Ravensberg, President of IBMA (left) and Jean Pierre Leymonie, MD of New Ag International.

2016. One of them was the potassium salts of beta acids registered to combat Varroa mite in honeybees' colonies. Another example is the pheromone registered against California Red Scale, an orchard pest developing resistance to conventional pesticides. The list of new biochemicals in 2016 included also choline chloride, hexanoic acid and male sea lamprey mating pheromone. In the USA six microbials were regulated this year: Helicoverpa armigera; Bacillus mycoides isolate J.Sodoptera exigua; Bacillus amyloliquefaciens; Bt kurstaki EVB 113-19; Phlebiopsis gigantea. "EPA has been a pioneer at the biopesticide frontier" says Jim Jones. "our vision is to become a world leader in biopesticide regulation, and biopesticide pollution prevention." One division of EPA is entirely dedicated to registering biopesticides.

Jim Jones also described developing issues in the U.S.A: LMR and tolerances for biopesticides; developing guidance on biostimulants fitting with U.S. regulatory framework. And he showed how EPA works to provide beekeepers and to protect pollinators' health consistent with President Obama's 2014 pollinator health initiative.

The industry representative bodies are also very active in the USA. BPIA in particular (Biopesticide Industry Alliance), works hard on fostering increased awareness and adoption

of biopesticide technology. BPIA membership includes biological pesticide manufacturers and allied industries. It includes several committees that meet periodically with key regulators. The association shares opinions with EPA and the members of congress in the U.S., also trying to have science-based risk assessments. "We started BPIA with 5 companies and we are 106 companies today. The aim is to avoid unnecessary legislation and obstacles to registrations," explained Keith Jones, Executive Director of BPIA. "The story of biologicals is a positive one, creating new technologies and new jobs."

The most recent move of BPIA has to publicly declare that starting this November they will also accept membership from companies whose core business is biostimulants.

BIOCONTROL AND HUMAN HEALTH: AN FAO PROGRAMME NOW IN THE PIPELINE

Crop protection is not the only sector needing biocontrol. FAO has launched a six years programme (WHO Pesticide evaluation scheme) on biocontrol use against main human major vector-borne disease: malaria, dengue, chikungunya, zika, etc. which are all spreading and threatening more than half of the world population. FAO has established a list of recommended bio-larvicides against vectors, including BT

israelensis strains and Bacillus sphaericus. "74 countries are using FAO efficacy data, which can help for registration of these biocontrol agents," explained Rajpal Yadav from FAO.

A CONTRASTED SITUATION FOR BIOPESTICIDES FROM ONE COUNTRY TO ANOTHER

"India owns a captive market of 195 million hectares for biological products," says Ketan Mehta from PMFAI. "We have a very competitive and high-quality industry for semiochemicals. But we still need to develop microencapsulation technology for these active compounds." Botanicals are also produced on a large scale in India, extracted from a wide range of species: neem, qassia, reynoutria... Compared to many countries, registration is very easy for a company based in India: only 6 to 8 months to register a microbial. India has other projects for biocontrol uses. The Agriculture department is willing to develop seed coating technology, as 80% of seeds used in India are not protected against diseases.

In Japan a group of 30 Japanese companies have joined last year to form a biocontrol association. Nevertheless, their position in the crop protection market stays small compared to total crop protection industry. "Most growers still rely on chemicals, except for glasshouse production. Companies have developed different pest enemies of Japanese origin against aphids, thrips, leaf miners," said Tetsuo Wada from Arysta LifeScience. He acknowledges the fact that registration is difficult in Japan and has a high cost. "Japan is a unique country to require registration even for natural enemies!" In other words, Japan looks like a very closed market!

"Biocontrol products represent only 2% of the crop protection market in Brazil. Our market mainly calls for efficacy. If your product is not effective in pest or disease control, it won't enter the Brazilian market!" says Pedro Faria, President of ABC Bio, the Brazilian Biocontrol Industry Association. "But we notice a





Prof. Reuveni, Stockton STK

Six questions to...

Prof Reuveni, Stockton STK

Timorex Gold® is a contact biofungicide based on Melaleuca alternifolia plant extract. Thanks to its multiple components, it controls a broad spectrum of fungal and bacterial disease in various crops. Which components are key to the efficacy of the product?

During the years, we have accumulated reach experience on this plant extract and the understanding of the different component within the extract. Today, we can say that we have the ability to identify the active components in each extract and thus create better and more effective products. These include mono-terpens and their alcohols. Timorex Gold® reflects part of this ability and of course remains part of our confidential information.

One can say that you have dedicated your life to investigating the activity of Melaleuca alternifolia! Is there anything new about this plant that you think can emerge or is Timorex the happy end.

This is indeed the case. A lot of time and efforts have invested in Melaleuca alternifolia by myself and the other team members of Stockton during the years and I have to admit that it keeps surprising us all the time. We are exploring new characters of

Melaleuca alternifolia, which enable us to develop new applications following Timorex Gold® to new crops ad diseases. These include activity against new fungal and bacterial plant pathogens. Recently, we have been investigating the impacts and involvement in plant metabolism and plant growth and yield. This is definitely a very potent active ingredient that has not reached its peak.

Stockton (STK), with whom you are affiliated, has recently signed a major agreement with Syngenta as the exclusive global distributor of a new biofungicide technology based on tea tree oil for the control of several diseases in ornamental crops. Can you tell us more about the ingredients in this oil extract and how it works on diseases?

We are very proud in the global agreement signed with Syngenta which reflect the strength of Stockton in developing botanical biopesticides solutions to different arenas in the agriculture and definitely reflect the advantages and values of plant extract as an important biological source for biopesticides. The Melaleuca alternifolia extract composed of many ingredients that has different impact and together create a perfect synergy to create a successful source for biopesticides. In addition, the unique formulations of these promote enhanced efficacy. These ingredients disrupts fungal cell membrane and inhibit respiration process.

Stockton has an active R&D program for the development of future natural products for crop protection. Is all the research

and development conducted in Israel under your supervision and is it only focusing on plant extracts?

Stockton's R&D program is being managed mainly in Israel by our VP R&D and with myself as the Chief Scientist, and naturally goes to the target countries for future development. We are very much proud in the unique knowledge and expertise we have accumulated in botanical biopesticides and we intend to keep improving this expertise. Provide some details on R&D capabilities such as:

- Rapid screening methods, extraction and production practices.
- Formulation expertise: efficacy, efficiency and speed of effect.
- Experienced Registration team.

How many research staff do you have in Stockton and is all the research conducted in-house?

During the years, we have established a special structure where we are conducting part of our R&D internally in and concurrently we have a wide collaborations with universities and academic institutions like the Weismann institution in Israel. The uniqueness in what we're doing is the bridging between early stage research and real farmers' needs constantly.

Are you conducting University teaching and Public Research on top of your work for Stockton?

As a professor in Plant pathology in academic Institute, I also conduct public research in various aspects in plant pathology which includes ethology, epidemiology and development of effective eco-friendly disease control programs for grapevines and deciduous trees in Israel.

demand for Trichogramma in sugar-cane and for Trichoderma against crops diseases. And we need more active ingredients for foliar diseases." The Brazilian biocontrol association which has 24 members, meets many challenges. The first is to improve the slow process of legislation (2-3 years) and the misunderstanding from regulators on how biocontrol works. "Then biocontrol companies have to invest a lot on marketing and offer the same payment conditions than the chemical companies," adds Pedro Faria who remains confident for the future: "There will be opportunities to develop biocontrol with new generations of farmers. IPM is the key!"

BIOCONTROL IN AFRICA: CHANGE IS IN THE AIR!

The example of Kenya shows how a complete change to IPM can occur rapidly in plant protection. "In 2001 we were confronted with a strong resistance of leaf miners to pesticides. We looked for other solution and in 2003 we introduced biocontrol products in IPM programs. We rapidly had a great success with IPM, allowing to spray smaller volumes of conventional pesticides and use more beneficial insects." says Tom Mason, Managing Director of Dudutech. The other driver of the Kenyan market was the residue level, as many vegetables are exported to Europe where controls are strict. In 2013, the LMR for peas changed in the EU and some pea crops were refused. The growers were confronted to a change in crop management if they wanted to continue exporting their crop. "So we must adapt to the retail chain requirements. I think that in the next 10 years, small scale farms will adopt new technologies such as biocontrol and there will be a big change."

South Africa, a promising market? A wide country with 9 provinces, South Africa has a crop protection market still dominated by chemical pesticides. The value of this market is estimated at around 500 million US dollars for 2015. Biocontrol products are probably less than 5%, mainly on

fruit and vegetables. Main crops in South Africa are corn, sunflower and soybean. The fruit production has also big ambitions relying especially on avocado, litchi, macadamia... "But there are factors stimulating the growth of the biocontrol market: new pests; pests resistance; need of solutions for minor crops; improvement of crop quality," says Thilivhali Nepfumbada from the South African Dept of Agriculture. "Our regulation system is on the same basis as the US system. Products are regulated under Act 36 but there are other legislations that can interfere, such as National health, GMO legislation, Medicine act. We have a 'crop group' labelling approach which can make it easier to register. Timeframes for new products are generally 627 days." Thilivhali Nepfumbada concludes that South Africa is an attractive market for biocontrol.

NATURAL AND BIOCHEMICALS PRODUCTS: A PARADIGM SHIFTING SOLUTION

Nicolas Cock Duque (Ecoflora Agro) described the contribution of plant extracts to conservation and management of biodiversity (pollinators, beneficial microorganisms) as well as to agro-systems sustainability. "Though their lethal and sub-lethal effects are there, botanicals are a paradigm shifting solution for sustainable crop protection," declares Nicolas Cock Duque.

S. Balaji (E.I.D. Parry) reviewed different results of biocontrol on grapes using 2 formulations of the botanical NeemAzal. In 4 locations in East Asia, NeemAzal was applied against thrips, mealybugs and mites where it gave effective control. The residue dissipation data suggest that after application of NeemAzal, traces of the active compound azadirachtin were detected up to 10 days. "The residues were below MRL prescribed by the European Union (1 mg/kg in grapes) every day including day one. On the 15th and 30th day, the residues were even below the limit of quantification," concluded S. Balaji establishing that this botanical is safe for the consumer as well as for

the environment. NeemAzal, developed by EID Parry in collaboration with Trifolio, has 24 patents in 42 countries.

Moshe Reuveni (Stockton Israel Ltd.) introduced a plant extract named TTO from tea tree (*Melaleuca alternifolia*) with different mode of actions. TTO is active against different diseases due to fungi (ascomycetes, basidiomycetes, oomycetes) and bacteria. "Melaleuca is rich in many terpene molecules, inducing breakdown of the cell wall and membrane in these pathogens. It has a strong curative activity" said Moshe Reuveni. The Stockton Group used TTO in coffee protection programmes against diseases (mycenia, rust). The great advantage of TTO is that it permits a new growth of leaves after an attack. In tankmix with fungicides such as triazoles, it has a high efficacy on coffee rust. And it can also improve coffee quality and berry size."

Owen Jones (Lisk and Jones Consultants) described the development of a novel insecticidal soap. Based on fatty acids, it is formulated to have a reduced phytotoxicity and improved efficacy against insects that are not well-controlled by soaps. "An old dog with new tricks" according to Owen Jones. Formulated by Naturiol and Bangor University in Wales, this bioinsecticide is in patenting process in the U.K. It is effective against plant hoppers, potato aphids, red spider mites, thrips, whiteflies and mealy bugs....

SEMIO-CHEMICALS: CUTTING EDGE TECHNOLOGY AT WORK

Mating Disruption is back to the future, says Vittorio Veronelli (CBC Europe).

"Recent data indicate that more than 8000 pheromones were identified in 2015, compared to 1 in 1959" says Vittorio Veronelli describing the history of semio-chemicals. Pheromones are used on more than 1 million hectares around the world. In 2015, they had 120 registrations in the U.S.A and 50 in the EU. Many technologies have been developed with different dispensers: reservoir

dispenser, aerosol dispensers, sprayable dispensers. Today, cutting-edge technology is based on several ideas: capillary shape to maintain wet the whole surface of dispenser, but also extrusion process and multiple polymers to improve release performance. The technology has given birth to another innovative product: a dispenser containing 2 different pheromones against Vine mealy bug and European grapes berry moth.

Pheromone traps applications also develop trough pest monitoring networks. Matej Štefancic (Efos/Trapview) showed how an automated pest monitoring was settled around Mediterranean countries, from Spain to Turkey. This project has received funding from the European Union. More than 1000 traps using semiochemicals are spread for pest population forecasting. "With daily pest data and weather data we can improve forecasting."

World use of mating disrupters (in ha)

Vines	330 000
Forestry	250 000
Pomefruit	230 000
Stonefruit	120 000
Nuts	80 000
Vegetables	25000
Total	1,025,000

MACROBIALS: NEW SUCCESS STORIES

There are many success stories with macrobials. One of them is mealybug biological control of grapes in Turkey. There are more than 461 000 ha of grapes in Turkey. In order to control mealybug invasions, the release of different macrobials started in 2014 in 2 organic and conventional vineyards. The beneficials were adults of *Cryptolaemus montruzieri* and *Leptomastix dactylopii* distributed manually. "In both releasing sites, results were successful." notices Lerzan Erkilic from Biyotar. "In the first vineyard, the harvest had no mealybug damage and in the second only 2% infestation."

Another success story in the future could be genetic improvement of beneficial nematodes in order to improve efficacy and the range of

new applications. "E-nema owns 50 wild nematodes types of strains and more than 200 lines and cross. Most strains have been phenotyped for longevity, heat tolerance, virulence against 2 insects pests." says Ralf-Udo Ehler. He recalls that in biocontrol, new associations, not sharing a co-evolution, are superior to old associations according to entomologists Hokkanen & Piemental. "New associations' effect is as safe as old associations in terms of environment. Our approach is the use of classical genetics to improve beneficial traits of beneficial nematodes." This research has received a funding from the E.U. And eNema announces some new developments, in particular for seed protection.

Prey-mites release is an indirect way of helping beneficials' preservation in vegetable production. Prey-mites are used to feed beneficials such as swirskii mite (*Amblyseius Swirskii*). The company Agrobio tested prey-mites on the soil and onto the plants. The release of prey mites has provided an effective biocontrol programme for chrysanthemums and development of higher predatory populations on cucumbers. It also improves the control of thrips in winter and allows for fast establishment in spring," says Eunric Vila. Similar results were obtained on other ornamentals and vegetables. A patent is now pending.

"Turning ants from foes to friend is an old concept," says Felix Walkers from Biobest. "Ants activity is well-known since a long time. They can be a bodyguard for the plants but also a bodyguard for pests (aphids)." The alternative proposed by Biobest is to give an 'ant diet' based on sugar, that will reduce ants' visits on the crop. Sugar application on the ground could reduce ant activity. Biobest trials show that the size of the aphid colonies is significantly reduced when ants find alternative sugar sources. Another new idea to expand biocontrol potential with a simple concept. This is definitely another illustration of a main trait of this industry today: innovators who have ceased to just be dreamers!! ■