PEST CONTROL

November/December 2015 Volume 57 Number 6



Public Health + Agriculture + Horticulture + Forestry + Animal Health



PelGar International making an impact

Improvements in application techniques

Robots the future of agriculture

A holistic approach to vector management

The state of pesticide application at PestTech

FAOPMA gathers in Malaysia

Is there a vacuum in your professional service

ECPA members engaged in IPM Celebrating success in Central European pest management

BCPC & the regulation of pesticides in Europe

International biocontrol industry gathers in Switzerland



FAOPMA

Integrated pest management (IPM)

IPM is a holistic approach to sustainable agriculture that focuses on managing insects, weeds and diseases through a combination of cultural, physical, biological and chemical methods that are cost effective, environmentally sound and socially acceptable.¹ This includes the responsible use of crop protection and plant biotech products.



responsibly



¹ ECPA and its member companies support the IPM definition put forth by the International Code of Conduct on Pesticide Management (FAO, 2012). See also Article 3 of Directive 128/2009/EC on Sustainable Use and its annex 3.

crops

action

November/December 2015 Volume 57 Number 6

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Federation of Asian & Oceania Pest Managers Associations

Editorial

Technical Consultants



David Loughlin, Editor International Pest Control Magazine

rapping insects relies as much upon knowing where best to place a trap, as using the right pheromone or attractant. In the same way, knowing which spray application method to use, is equally if not more crucial when applying a pesticide, to get the best from whichever formulation or active ingredient is chosen.

Many years ago, I was fortunate to study Silwood Park which is also the home to IPARC, (The International Pesticide Application Research Consortium). A Director of IPARC for 31 years and now one of our Technical Consultants, Professor Graham Matthews helped establish IPARC as a global pathfinder in research and training, in improved methods of applying pesticides as well as running the M.Sc. course and mentoring many students and post docs. As our special feature this issue is Application Technology, Graham has contributed two articles covering vector management and crop spraying and, should

you wish to read further on the subject, we are pleased to also provide a review of the recent reissue of his book: Pesticides: Health, Safety and the Environment.

Also within our special feature, Martin considers how robotics are beginning to find a place in crop management systems. Maybe the 'I' in IPM should now stand for 'Intelligent'? Clive meanwhile took a walk around PestTech and not finding much new in application equipment, he has prepared a wider review of what has changed in formulation management and application this year. Our company profile this issue features PelGar International, a company that is going from strength to strength, especially since its recent acquisition of Agropharm Ltd. in May this year. The newly enlarged company is certainly making an impact in global pest control.

My own contributions include a review of the pest control, FAOMPA conference in Malaysia and the biocontrol industry, ABIM gathering in Switzerland. Immediately after the latter we have an article from (European Crop Protection Association) as a timely reminder that IPM involves the use of chemicals too. Not content with just writing on his specialist subject, Graham also attended the BCPC Congress in Brighton and has provided a full review of the October meeting jointly organised with TGSE, looking at the current state of the regulation of pesticides in Europe. At the same time, north of London, the Amenity Forum held its second annual conference and there is much to be proud of as the forum gathers momentum.

In public health we consider recent issues on calls to ban rodent glue traps; which wood does a termite prefer; how vacuums can improve professional services; celebrations for two Central European pest management product manufacturers; and a new combination two-way insecticide mixture for indoor residual spraying.

I have now completed my third year as editor and I hope you have enjoyed the last six issues. We remain open as always for contributions long and short from near and far. I hope you enjoy your year-end celebrations and I look forward to 2016 with more news and views in pest management.



Email David on editor@international-pest-control.com



Linkedin Groups International Pest Control discussion forum Short link: http://linkd.in/11H6KW8

Twitter https://twitter.com/IPCmagazine @IPCmagazine



Facebook Join us on Facebook Short link: http://on.fb.me/VQTOI9

Website www.international-pest-control.com



Clive Boase runs the Pest Management Consultancy, probably the UK's longest-running urban pest consultancy. "I continue to be amazed by the diversity of urban

pest issues. We now work with a broader range of projects and clients than ever before, including pests and construction materials, poultry pest strategies, development of experimental pesticides, bed bugs and the Olympics, strategies for urban housing, invasive species risk assessments, not forgetting training and legal work. This is a very dynamic sector." www.pest-management.com



Rob Fryatt B.Sc. held senior positions within ICI, Zeneca and Sorex and now leads Xenex Associates who provide advice to agrochemical suppliers, pest

management companies and other organisations around the globe. Rob has been a Director of the BPCA, Director General of CEPA and chairs the CEN European Committee developing a common pest management service standard. Rob is a frequent invited speaker at industry events and has written regular opinion columns for a number of international industry publications. www.xenexassociates.com



Dr Terry Mabbett is a pest, disease and weed control specialist with forty years of international experience covering research, consultancy

and journalism in agriculture, horticulture, forestry, amenity, livestock and public health. His current areas of particular interest are the protection of tropical tree crops and exotic insect pests and plant pathogens of Britain's native, naturalised and forest plantation trees. Drterrymabbett@btinternet.com



Graham Matthews DSc., FSB., FRES. began his career in Africa working on cotton pest management before joining Imperial College. Research and

teaching pesticide application at Imperial and overseas has been interspersed with consultancies for international organisations, such as the World Bank. Author of several books, he was formerly an editor of Crop Protection. Retired in 2001 and now Emeritus Professor of Pest Management. www.dropdata.net



Martin Redbond B.Sc. has spent nearly forty years working in the crop protection industry where he has held various sales, marketing, technical and regulatory

management positions with multinational companies and in contract research. He is the author of a number of important crop protection reports and has been editor of Crop Protection Monthly for the past eight years. www.crop-protection-monthly.co.uk

UK: World's largest production site for beneficial nematodes

ith the opening of its expanded Littlehampton, UK production site, BASF is strengthening its ability to meet the growing global demand for biological solutions for agriculture and horticulture. At this site, BASF increases its production volumes of beneficial nematodes and inoculants, moving ahead with its strategy to develop solutions beyond conventional crop protection.

"We are making significant investments in innovating and delivering the best in biological and chemical solutions. This will support our customers to produce more efficiently with an even better outcome while meeting the evolving expectations of society. Now and for the long-term we are committed to being an innovative partner in this dynamic area," said Philipp Rosendorfer, Vice President R&D Functional Crop Care.

The expansion will allow BASF to double production capacities for beneficial nematodes, which are microscopic organisms that can control a diverse range of insect and slug pests. With six different types of beneficial nematodes, BASF offers a unique global portfolio, including the Nemaslug® and Nemasys® products, each with a distinctive mode of action for customers in vegetable, horticulture, and turf.

"The demand for our beneficial nematodes has increased significantly over the past five years, with 2014 being our best year to date," explained Graeme Gowling, Global Biologicals Marketing, Functional Crop Care. "Our customers see an increasingly important role in using beneficial nematodes in IPM programs, as they are easy to apply, have a longer window of activity and can effectively control yieldrobbing pests," concluded Graeme.

Taiwan: Snoopy, Miffy and Oatmeal help eradicate fire ants at Taoyuan airport

hree beagles trained by National Changhua University of Education may be among Taiwan Taoyuan International Airport's most accomplished employees, having successfully detected colonies of red imported fire ants over the past five years. The work of the detector dogs, which have been under contract since 2011, has helped airport management eradicate most of the stinging insects. According to the airport administration, nine-yearold Snoopy, seven-year-old Miffy and four-year-old Oatmeal start their daily four-hour shifts at around 5 am and spend their time sniffing out red fire ant colonies at the airport's manhole covers and navigation aided lighting facilities. Excluding runways, parking aprons and terminal buildings, the 616-hectare airport area is divided into 94 red fire ant prevention zones, and only one zone on the airport's periphery continues to have scattered ant colonies. The invasive pests have plagued Taiwan for the past 10 years, mostly in areas with high degrees of moisture. The Taoyuan airport, located near Taiwan's northwestern coast, found itself infested with numerous ant mounds and unsighted ant colonies years ago, and its management moved to eradicate them because the red fire ants could cause serious damage to electrical equipment. Once the detector dogs locate where ant colonies exist, pest control personnel use potato chips to lure the ants out of their nests and kill them with pesticides.

■ Source: http://focustaiwan.tw/news/ asoc/201510110014.aspx

USA: Terminix expansion

id November, Terminix announced the acquisition of Alterra Pest Control, one of the largest pest control companies in the U.S. Alterra was founded in 2012 by David Royce and employs 400 people in 22 branches across 15 states. Terminix is a subsidiary of Memphis-based ServiceMaster. "It was an easy decision to sell to Terminix," Royce said. "We built this company with core values based on exceptional customer service, environmental responsibility and, above all, a positive team mentality. We were only interested in finding a company that met these high standards and made commitments to develop our employees and meet the expectations of our customers." Terminix will continue to operate the company under the Alterra name. This is the latest acquisition the company has made in the last 12 months. Terminix has also acquired Ace Pest Control, Atlanta Pest Control, Bug Busters, Cabot Pest Control, Capelouto Termite and Pest Control, and Excel Pest Control. "By adding Alterra's customers and employees to Terminix, we build on our already strong presence in the residential pest market," said Bill Derwin, president of Terminix. "This acquisition is a perfect complement to our existing business and enables us to leverage our technical expertise, marketing strength and systems to bring value to these new customers."

■ Source: http://mwne.ws/1HKZcCJ

Scotland: Clamp down on illegal pest control and raptor persecution

cottish Natural Heritage (SNH) has introduced General Licence restrictions in areas of confirmed wildlife crime, after four grouse moors came under suspicion of illegally killing raptors. SNH restricted the use of General Licences on four properties in two wildlife crime hotspots in Stirlingshire and Borders in early November - sites where they believe there is sufficient evidence of crimes against birds of prey in recent years. The decision was based on evidence of wildlife crime against wild birds provided by Police Scotland. General licences allow landowners or land managers to carry out actions

which would otherwise be illegal, including controlling common species of wild birds such as crows and Magpies to protect crops or livestock. The new measure complements other recent actions to reduce wildlife crime, including the introduction of vicarious liability for offences against wild birds in 2011. Restrictions will prevent people from using the general licences on the land in question for three years. This period will increase if more evidence of offences comes to light.

■ Source http://bit.ly/1kiqADp. The full licence restrictions are available at http://bit.ly/1kiqADp.

Canada: Disease carrying mosquito found in British Columbia

mosquito that is both invasive and able to carry a number of serious diseases, including La Crosse encephalitis and West Nile virus, has been found in stagnant water in Western Canada. This is the first sighting of the species Aedes japonicas, a native to Asia that scientists believe was brought in from the U.S. as a result of human action. According to a study published in the Journal of Entomology, the mosquito could be a significant threat to the health of humans and domestic animals, and its population should be monitored. They believe that the mosquito is now established in the Lower Mainland region and will likely be found in other parts of B.C. The species was discovered after a resident of Maple Ridge called a Vancouver hotline in July 2014, reporting mosquito larvae in stagnant water caught in a garden tarpaulin. Researchers from Simon Fraser University and Burnaby pest control company, Culex Environmental Ltd. investigated and collected larvae of the species. Returning in February this year, they discovered over 200 adult mosquitos.

Although the study says the mosquito could pose a significant threat, Dr. Michael Jackson, one of its authors who works at Culex, said there's almost no risk to the public. The mosquito is capable of carrying particular diseases only if that disease is present, and none of the diseases it carries are present.

■ Source: http://jme.oxfordjournals. org/content/early/2015/10/30/jme. tjv164#F1

Australia

andowners are being urged to help monitor rabbit numbers during the run up to next autumn's release of a Korean strain of the Rabbit Haemorrhagic Disease Virus, known as RHDV1 K5. K5 is expected to boost the effectiveness of the current RHDV1 strain released in 1996. Invasive Animals CRC chief executive officer Andreas Glanznig said the more people who were involved across Australia, the more the effective pest manage-

ment could be delivered. "We are asking all Australian's to get involved and help us monitor rabbit numbers" Mr Glanznig said. "Rabbits don't stop at fence lines and we need landholders, Landcare groups and councils alike to take a coordinated community-led approach to assist in monitoring the effectiveness of our management methods. "An integrated approach is crucial - K5 is not a silver bullet. The data collected by the community will be used to provide advice for land managers and farmers on the effectiveness of their management programs and best practice approaches for future management methods." Anyone wanting to be involved in monitoring rabbits can also download the free RabbitScan App to their phone and contribute to a rabbit sightings map maintained by the Invasive Animals CRC.

■ Find out more via www.pestsmart. org.au

USA: New EPA pesticide related websites

PA's pesticide websites have a new look, feel, and address. With the new pesticides websites, information should now be easier than ever to access, regardless of the type of electronic device used, including tablets and smartphones. With the transition to the new site completed, web page addresses will be different. This may cause previous links and bookmarks to break and EPA is working to fix any broken links. The majority of the old pesticide pages will redirect to the new web areas.

Below are the updated URLs for some of the most popular web areas:

- Pesticide Registration www2.epa.gov/pesticide-registration
- Bed Bugs
- www2.epa.gov/bedbugs
- Worker Safety www2.epa.gov/pesticide-workersafety
- Pollinator Protection www2.epa.gov/pollinator-protection
- Endangered Species www2.epa.gov/endangered-species
- Biopesticides
- w w w 2.epa.gov/pesticides/ biopesticides

- Pesticide Labels www2.epa.gov/pesticide-labels
- Managing Pests in School www2.epa.gov/managing-pestsschools
- Pesticide Safety for Consumers www2.epa.gov/safepestcontrol

France: Paintballing pine tree pests

2i Life Sciences has been presented with an Enterprises & Environment Prize in the Innovation category, at the inaugural Paris World Efficiency show and congress, for its innovative solution using pheromone paintball technique to manage Pine Processionnary Moth (*Thaumetopoea pityocampa*) that affects over 300,000 ha of forest and 67% of French municipalities.

The pest, besides its impact on pinewood forests, is a major public health concern because the hairs produced by the larvae are highly irritant and dangerous for people and animals. M2i has developed a process to deliver a pheromone mating disruption solution, when during the flight period for the adult moths, the air is saturated with a large amount of the insect specific sex pheromone. This prevents males and females from detecting each other and therefore limiting mating and thus egg laying and caterpillar emergence.

The M2i approach micro-encapsulates the active pheromone ingredient in a natural wax emulsion which allows for a prolonged and controlled release over time. The pheromone formulated gel is inserted into biodegradable paintballs (developed by the French company Polytek) that are then propelled onto trees over 10m in height (the higher the pheromone is deposited the more effective it will be) and thus spread throughout the plot. The release is claimed to be 120 days which covers the entire life cycle of the pest.

This solution is currently the subject of an experiment on multiple sites in France in collaboration with INRA as part of an Eco Phyto program started in July 2014.

■ For more information visit http:// www.world-efficiency.com/GB.htm and http://www.m2i-lifesciences.com/

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Japan: Pest management among Japan's climate change adaptation plan

n October, Japan unveiled a draft of its first 10-year plan to ease the effects of global warming, that cannot be prevented just by cutting emissions, including building levees against floods and countering rice diseases with new technology. The government aims to adopt the climate change adaptation plan by Cabinet approval before the U.N. climate change conference opens in Paris at the end of November, as it has lagged behind other countries such as the United States, China, South Korea and major European nations in formulation one. With Japan's average temperature forecast to climb by as much as 4.4 C through this century and the risk of major rivers flooding increasing by 1.8 to 4.4 times, the plan, subject to review in five years, outlines measures to address key issues such as floods, heatstroke and agricultural damage. Saying floods are likely to increase with concentrated rainfall occurring more frequently, the plan not only calls for building more levees but also constructing them so that they give people more time to evacuate, as well as visualizing flooding risks to encourage people to move to low-risk areas. As the quality of rice is expected to fall and diseases to increase due to climate change, technologies will be developed by around 2019 to reduce damage caused by agricultural pests and diseases, according to the plan. The plan also covers spreading public awareness on how to prevent getting heatstroke and introducing more robots in farming to reduce the burden on people working outside in hot weather.

■ Source: http://bit.ly/1MikBFf

Korea: Protecting cross border forest assets

outh and North Korea plan to jointly treat pine trees damaged by insects at Mount Kumgang on North Korea's east coast. For this project, Seoul will deliver relevant treatment including insecticide and sprayers worth 130 million won (US\$109,900) to the North. A group of South Korean forestry experts visited the mountain in late July to look into the cause of the diseased pine trees at the mountain. Sitting on the east coast near the heavily fortified inter-Korean border, Mount Kumgang is famous for its scenic views, impressive peaks and thick pine tree forests. The ministry earlier said that two types of diseases caused by insects were found in the pine trees, adding that it would be appropriate to conduct an extermination treatment on such trees in spring and autumn. South Korean company Hyundai Asan kicked off a cross-border tour program at Mount

Kumgang in 1998, a symbol of inter-Korean reconciliation. But Seoul suspended the tour program in 2008, after the fatal shooting of a South Korean female tourist by a North Korean soldier at the resort. The ministry said that Mount Kumgang is an asset that the two Koreas need to protect together, but Seoul's recent probe into the ailing trees has nothing to do with the possible resumption of the joint tour program.

■ http://bit.ly/1MsmkLR

Northern Ireland: Biopesticide company named agriinventor of the year

extGen Biopesticides, a company which uses selective breeding approaches to develop effective and safe biopesticides for the control of crop pest insects, has won the Agri-Food Invention of the Year Award at the recent Northern Ireland Science Park (NISP), Invent 2015 Awards. Coming top in the Agri-Food category, which was sponsored by Fujitsu, NextGen Biopesticides not only secured a share of the £33,000 prize fund, but will also now travel to California on Northern Ireland's Tech Mission to pitch to prospective investors and partners. Dr Jonathan Dalzell from Queen's University who heads up NextGen Biopesticides said "I'm absolutely delighted to win the Agri-Food category of Invent 2015 with our NextGen BioPesticides venture. This represents a strong foundation from which we can commercialise our enhanced nematode bioinsecticides. In

particular, the opportunity to join the NI Tech Mission to San Diego will help us create important international links. As a lecturer within the Institute for Global Food Security at Queen's University Belfast, my research focus is to address the biggest challenges we face locally, as well as globally. This is another example of research from Queen's University Belfast meeting the challenge of food security head on. Fujitsu are developing a big reputation for innovation within the global Agri-Food sector, and represent a valued supporter of our work."

NextGen Biopesticides use selective breeding approaches to develop more effective organic biopesticides. They are working with insect parasitic nematodes, that is, microscopic worms that find and kill pest insect larvae in the soil.

■ http://bit.ly/1L4pOif



India: Mosquito-breeding spots will get residents in trouble

umbai has witnessed a spike in the number of dengue cases. To make matters worse, a few housing societies, which are considered plush, have been stonewalling attempts by municipal workers on their campus to check for mosquito-breeding spots. So, the municipal corporation will initiate action against those housing societies which forbid them access, especially if conditions conducive to mosquito-breeding are found to exist in any flat or elsewhere on the premises of the same society. A senior municipal official said, "The chairman, secretary and other office-bearers of the housing society are responsible for taking adequate steps so that there is no mosquitobreeding on the terrace, in flats, and in the compound and lobby area of the society buildings. However, if mosquitoes are still found to be breeding, we will slap a notice on the society's office-bearers." The municipal corporation's pest control department has, since the beginning of the year, been conducting training for citizens on how to detect breeding spots. Civic officials from the insecticide department said that despite the continuing public awareness sessions, which they have been conducting, it is disappointing that they still find mosquitoes breeding in feng shui plants, petri dishes, drums or buckets used to store water and in flower vases. Workshops to train citizens were held in the city. "When any dengue patient is found in a particular housing society, we need to check the adjoining areas too. However, not everyone cooperates with us," said a civic official.

■ http://bit.ly/1HmM3oy

UK: Location, location... infestation

or any home buyer there are obvious deal breakers such as location, space, condition, transport links, crime, schools and so on. But what about the many hidden factors that could make an otherwise keen property buyer reduce their offer – or worse, lose interest in the purchase entirely? A UK property blog 'SellingUp' has conducted an exclusive survey with Populus, one of the UK's leading market research firms, to look into some of the lesser known reasons that potential buyers may be put off entirely, or encouraged to make a reduced offer.

The 1000+ who were surveyed were asked 'Imagine you are looking to buy a property, and you noticed there was an issue. To what extent do you think each of the following would influence your offer on the property?' In the results, evidence of an infestation such as droppings or mousetraps would be enough to send almost half (44%) of buyers scurrying off. Around a quarter (23%) would be inclined to make a substantially lower offer and 16% would drop the price by a few hundred pounds. A mouse-sized minority of 3% would have no reservations in proceeding despite the potential presence of some pesky house guests.

■ Source http://www.sellingup. com/property-buying-dealbreakerssurvey

And finally... USA: 10 Most bugged cities in America 2015

arlier this year the US Census Bureau released data from ■ 2013 in its American Housing Survey which shows Tampa, Florida is the city with the most cockroaches and Seattle and Austin have the most rats. But that was two years ago and a lot has changed since then. Data analysers at Thumbtack (www.thumbtack.com) were able to see what bug and pest removal services are most requested in real time. To determine which were the buggiest cities, they looked at 159 of the largest metro areas across the U.S. and measured the number of requests for pest-removal services, relative to the population in that metro, using these figures to develop a Thumbtack Pest Index. This index ranges from 0 to 100, with the former representing cities with the fewest pest-related requests per person and the latter the most. The categories included in the measure of pest-removal requests were: pest control services, bed bug extermination, outdoor pesticide application, and termite and pest inspection. Phoenix, Arizona was far and away the leading bug zone followed by not one but four metropolitan areas in Texas. Some surprises on the list were the relatively colder (in the winter) areas like Kansas City, Dover, Delaware, and Indianapolis. The least 'buggy' metro areas in the U.S. with almost no demand for pest removal include El Paso, Texas, Fresno, California and Santa Cruz, California.

■ Our thanks to the folks at Thumbtack. Source: https://www.thumbtack.com/ blog/buggiestcities/



NPTA enjoy a successful PestTech

he National Pest Technicians Association (NPTA) annual one day event at the National Motorcycle Museum was again well attended with 1,147 visitors (several from outside the UK) and 208 exhibitor staff being in attendance on the day (a little down on last year). The exhibition included some old names and new, including the newly merged Pelgar and AgroPharm and Pelsis displayig its manufacturing businesses Network and Insect-O-Cutor alongside its distribution enterprise SX Environmental which was due to be rebranded Edialux following the recent acquisition. Elsewhere Killgerm did its best to take up the entire Manxman room while other distributors Barrettine, 1Env and Lodi were happy to sit alongside agrochemical and rodenticide manufacturers BASF, Bayer, Syngenta and Bell. In between visitors could see first-hand products from speciality firms such as Russell IPM, Woodstream, Brandenburg and discuss wider issues with support groups such as the Bat Conservation Trust.

In the workshop and seminar sessions, first up was the Asian hornet, the subject of the talk by Julia Coats of the Animal and Plant Health Agency. As these insects are spreading in Europe, it is very likely they will arrive in the UK soon. Elaine Gill, from Natural England, discussed badgers and the legislation that protects them. John Bryan of Fourteenacre,

For those wanting to know the AtoZ of mouse control a visit to the Pelgar stand was well worthwhile.





NPTA staff waiting for the rush (from left) Barrie Sheard, David Jenkins, Trevor Hayden (NPTA Ireland Representative), Steve Hallam, Bill Fountain (NPTA Insurance Provider)

looked at the spring traps regulations in the UK, the Spring Traps Approval Order and recent changes to it including the addition of the Goodnature A24 from New Zealand which is expected to appear in the UK soon. Is no kill pest control the future? was the title of the talk from John Bryant of Humane Urban Wildlife Deterrence who explained how his pest control business manages to keep clients happy without killing a single pest and heat treatment for bed bug control was the subject for Jeremy Smith of Secomak who described how his company improved the efficiency of heat treatment as a technique to control bed bugs, making it more cost effective.

The morning seminar session gave plenty of opportunity to discuss the Rodenticide Stewardship. Most technicians have a relevant qualification, or can obtain the CRRU-approved safe use of rodenticides qualification either in person or online. All users have until December 2017 to meet the standard, if not those professional pest controllers that do can be ready to take on the work.



In addition to displays on ferreting and air guns, James Rawlings of Wide Horizons provided one of the outdoor workshops with a drone demonstration.

■ The next PestTech event is scheduled for 2nd November 2016, same place as usual, see you there.

New Additions to the NPTA team (from left): Michael Flatters, Steve Hallam, Trevor Hayden (NPTA Ireland Representative), Sherwin Curran (NPTA Northern Ireland Representative).





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CEPA chairman recognized at PestWorld, Nashville

t the Univar International Reception at PestWorld last week, Benjamín Gómez Guerrero, Univar Director Specialties for Latin America, presented three Global Ambassador Awards to acknowledge and thank individuals who have made a major impact on the global pest management industry.

Motokazu Hirao was recognized for his work with Matsushita Electric Works to fund the first 20 professional pest management companies in Japan to respond to the country's enormous rodent population. Hirao has devoted his life to improving the professionalism of the industry throughout the world.

Mirko Baraga, a former Pilot who used to risk his life spraying fields in his homeland of Argentina, has since moved away from airplane applications to become the leading influencer of IPM in Latin America. Baraga specializes in food industry plants, teaching thousands of fellow PMPs from down the Rio Grande to Ushuaia, Argentina.

Last but not least, Bertrand Montmoreau was honoured for his work as chairman of CEPA. Benjamín Gomez explained the decision to select Bertrand as a recipient of the Ambassador Award by reminding guests that "though there have been many attempts to unify European nations over the years, Bertrand succeeded in taking 28 disparate national and regional organizations and consolidating them into one unified body, while finding a way to work with NPMA and his colleagues in pest management around the world". Well deserved, Bertrand!

IBMA Feeding Europe while reducing pesticide dependency

s we went to press, the 4th edition of the symposium, 'Feeding Europe while reducing pesticide dependency' was taking place at the European Commission (19th November). Experts were on hand to share their experience on the growing demand and market for non-chemical tools as alternatives to pesticides in pest management. Farmers, scientists, industry, NGOs and co-operative retailers were to present insights and ways forward to significantly reduce pesticide dependency. This year the symposium will also address the economic opportunities that reducing pesticide dependency provides, as well as present concrete and promising changes to move from intensive apple production to sustainable apple growing. Participants will, in addition, discuss the progress and limitations of Member States' implementation of the EU Directive on Sustainable Use of Pesticides (SUPD; EC/128/2009). The event is hosted by MEP Pavel Poc (S&D), Vice-Chair of the Committee for Environment, Public Health and Food Safety and letters of invitation were sent to MEPs and others to attend. The event was co-organized by Euro Coop, Greenpeace, IBMA, IOBC-WPRS and PAN Europe. For more information see http://bit.ly/1T0BdpJ.

New FAOPMA president addresses conference

rior to the annual FAOPMA conference, the Executive held its annual meeting in which it welcomed Huang Xiao Yun as its new and first Chinese President for a term of 2 years. Huang Xiao Yun, in her opening remarks, recognized that as the Asia Pacific region was home to more than 50% of the global population, the industry had to understand both the potential and the challenges. Most importantly she was clear that industry had to come together to exchange and collaborate to face the challenges ahead. She identified three key areas of collaboration: To strengthen our mutual co-operation, to promote a greener environment and within that to strengthen the branding of the value of the pest management industry and to make a concerted collaborative effort to build a stronger scientific hase

To achieve this FAOPMA needed to be seen by all in the industry as a point of information exchange and to promote even more international collaboration. Ms Huang said that the PCAM has put both its heart and its soul into the event. FAOPMA she said, had always been a great opportunity to meet old friends and make new ones as well and concluded quoting a Chines proverb "Isn't it a great joy when friends come to visit from far places".

CPA respond to EFSA peer review of glyphosate

he European Food Safety Authority (EFSA) has published (in id November) their peer review of the active ingredient glyphosate as part of the EU renewal process. The review concludes that; "Glyphosate is unlikely to pose a carcinogenic hazard to humans and the evidence does not support classification with regard to its carcinogenic potential" Nick von Westenholz, CEO of the Crop Protection Association said: "We are pleased to see that EFSA concurs with the numerous health assessments conducted by public authorities on glyphosate over the past 40 years which have all concluded that, when used correctly, it poses no meaningful risk to human health.

"As an industry we take pride in the fact that our products are demonstrably safe. Pesticides are amongst the most heavily regulated products in Europe and it currently takes about ten years, costing over £150m to bring an active ingredient to market. It is this process, backed by effective and independent regulatory scrutiny that ensures the public can have absolute confidence in our products. "Glyphosate is an important part of a farmer's and gardener's toolbox. It is particularly important in minimising food waste by controlling a broad spectrum of weeds and therefore reducing the need for ploughing of soils. This protects soils from degradation and reduces greenhouse gas emissions and energy consumption. This is just one example of how modern farming relies on innovations in crop protection such as glyphosate to protect soil whilst helping make our land as productive as possible."

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PelGar International - making an impact in global pest control

elGar International is the leading British manufacturer of highly effective rodenticide and insecticide products for the control of public health and agricultural pests. It develops and supplies innovative and novel products to the global public health pesticide market. With an active and dynamic R&D programme, which draws on a wide range of market intelligence and technical feedback, PelGar aims to provide solutions to any global pest problem.

Background

Incorporated in 1995, PelGar has invested heavily in regulatory support and has complete dossiers on the three rodenticide actives difenacoum, bromadiolone and brodifacoum, with a wide range of registered formulations. A core range of insecticides based on synthetic pyrethroids and insect growth regulators has been further enhanced with the acquisition of Agropharm Ltd. in May 2015.

PelGar is operated from its UK headquarters in Hampshire and through local offices in mainland Europe, Australia and North America. The recent acquisition of Agropharm has added a second UK manufacturing facility to PelGar's portfolio, specialising in the manufacture and packaging of insecticides. Its analytical and formulation laboratory ensures the highest product quality from both UK manufacturing sites, while PelGar's research centre provides the technical team with valuable insights into the behaviour and biology of the rodents and insects being targeted.

PelGar provides products and expertise in over 60 countries worldwide, supporting customers who are directly involved in controlling nuisance pests, national campaigns against the vectors of disease and local and national Conservation in Partnership (CiP) projects. PelGar's global network of experienced staff and in-country resources guarantee an exceptional level of service while seeking out the next strategic partnership to further develop the business.

Diversification

PelGar's core business has, until recently, focussed predominantly on the rodenticide sector, manufacturing and supplying rodenticide concentrates and finished baits across the globe, with its wellknown brands Roban, Rodex, Vertox and Brigand. Insecticides have also been an important part of PelGar's product offering with brands such as Cytrol and Cimetrol, which control a host of insect pests in many countries. The acquisition of Agropharm has significantly broadened this range of products.

"The Agropharm acquisition provides an excellent synergy with the PelGar product range and customer base. In particular, Agropharm's natural pyrethrum range will help to boost our market share in the international pest control and agricultural sectors," comments Dr Gareth Capel-Williams, PelGar's Managing Director. "Both companies have extensive international businesses with very limited overlap of territory and distribution. The Agropharm products will expand PelGar's portfolio in the home and garden and crop protection markets, as well as allowing PelGar to introduce its innovative range of highly effective rodenticides and insecticides to Agropharm's existing customers."

Product Development

PelGar believes that while the active ingredients used in the rodenticide industry may be common, the target pests and the environment in which they live are very different. Providing cost effective control therefore means that the active substances need to be available in a wide range of high quality formulations. "We spend considerable time studying the biology and behaviour of the target pests in order to develop the most effective products for optimal control," comments Alex Wade, PelGar's Technical Manager. 'Before our products are brought to market they undergo extensive field and laboratory trials, both in the UK and the destination country, to ensure palatability and efficacy. We then go that extra mile to try and educate the end user to ensure the best results are achieved in application; this can range from writing pictorial guides for household users in Africa, to running practical training sessions for farming groups in Latin America.

When it comes to insecticides, innovative formulation technology, coupled with advanced packaging help to maximise product efficacy against the target pest, whilst minimising any potential risk to the user, non-target species, and the environment. PelGar's insecticides range from the cost effective 40% cypermethrin wettable powders to advanced multi-active ingredient microencapsulated formulations which can also incorporate an insect growth regulator (IGR). Products such as PelGar's

PelGar's rodenticides, available with three active ingredientss and in eight different formulations.





PelGar has produced a pictorial guide about rodenticide use for French speaking Africa

natural pyrethrum concentrates are number one in organic farming, offering rapid and effective control of insect pests with just a 24 hour withdrawal period, meaning crops can be harvested and sent to market, pest free the following day. A range of permethrin smoke generators add to the range, with unique non-sparking packs for household use, and jumbo packs for the professional user which can clear 1000-4000m³ voids of a host of pests.

Company Integration

While a lot of work is happening behind the scenes to integrate the two companies and product ranges, the first stage of combining the UK sales team has been seamless. Tim Bridge, UK Sales Manager, heads up the team with four experienced Area Managers and a Key Account Manager. "We have a fantastic, enthusiastic team with a wealth of knowledge and experience to support our growing UK customer base," comments Tim.

New websites and catalogues are currently in development to integrate product information and useful resources, with a planned launch in January 2016. Until then the full range of products can be viewed at www.pelgar.co.uk and www.agropharm.co.uk.

The Future

Over the last 15 years PelGar has made huge investment in active ingredient and product dossiers to secure the sales of products into the future. The last five years have seen significant investment in manufacturing equipment and people to meet the rising demand across the globe for PelGar's products, and while this will continue as the business grows PelGar will also be concentrating its effort on the development of new and innovative products. "Tolerance and resistance are common words to be heard in this industry," explains Dr Capel-Williams. "As pests evolve it is vital that we respond and develop new products. We as a company need to stay one step ahead and provide the products that offer the control demanded by our customers who are looking for a pest-free environment."

■ For more information visit www. pelgar.co.uk.'

PelGar's UK Sales team from left to right: Craig Turner, David Gill, Tim Bridge, Nick Ulyatt, Andrew Knowles & Jen Smithson



Improvements in application techniques

Graham Matthews*

ecently much has been said about the registration of pesticides, concern about the highly hazardous pesticides and the moratorium on the use of neonicotinoid insecticides to protect bees. Relatively little has been said about the way farmers can apply these pesticides.

In the UK there has been a long history of developing application technology, alongside changes in how they are registered. When pesticide use started to expand, the UK government set up the Pesticide Safety Precaution Scheme, which later evolved with the Advisory Committee on Pesticides and now the Expert Committee on Pesticides. In the early days concern about the highly hazardous pesticides, due to some farmers using Metasystox to control aphids on vegetable crops, led to the removal of some insecticides used as sprays, which had an acute mammalian toxicity in WHO Class I¹. From this early recognition of the hazard associated with the highly toxic pesticides, some products were reformulated and re-registered for application as granules.

Later, concern about spray drift resulted in the British Crop Protection Council (BCPC) Group

*IPARC. Silwood Park. Ascot. SL5 7PY.

on Application to review the situation (Elliot and Wilson, 1983), which lead to the publication of the Spray Quality Scheme. In this spray droplet spectra of nozzles were placed categories of very fine, fine, medium, coarse and very coarse (Doble et.al. 1985). This introduced farmers to the need to select a coarse or very coarse spray nozzle to reduce the risk of spray drift. Subsequently the Spray Quality Scheme was adopted and modified for use in Europe and the USA. In the UK, the Pesticide Safety Directorate (now the Chemical Regulatory Directorate (CRD)) introduced the Local Environment Risk Assessment for Pesticides (LERAP) scheme that took into account not only the spray quality, but also the dose of pesticide being applied, in order to adjust the width of the 'No-spray Buffer Zone' to protect water courses. Alongside these changes, the use

Alongside these changes, the use of organophosphate insecticides for sheep dipping had been leading to health problems. This was in part due to the supply of the insecticides in large metal drums, which tended to cause the concentrated insecticide to splash onto the user and expose them to the retained liquid on the top of the container which had a surrounding rim. More attention has since been given to packaging



Tractor cab with modern control including Global positioning system for accurate application.

with specific shapes and diameter of opening so that the contents are dispensed more safely. For large scale users, closed transfer systems are now available and for the small scale farmer, containers which have a built-in measure, or the use of water soluble sachets, decreases the exposure of the user to the pesticide, when preparing a solution for spraying. The operator of self-propelled,



Comparison of spray drift with conventional flat fan (left) and drift reduction nozzles (right)

tractor mounted or trailed sprayers also now have a low level induction bowl that makes spray preparation easier and facilitates the triple-rinsing of containers.

Global Positioning Systems (GPS), new types of nozzle and sprayer designs are other developments that have improved the efficiency of spraying and have helped to reduce environmental pollution. One example is in the growing of smaller fruit trees, where sprays do not need to be projected upwards and where vertical booms or 'tunnel sprayers can project the spray more effectively sideways into the tree foliage, with less subsequent drift. The adoption of tramlines in crops, originally to enable fertilizer to be applied during the growing season, has also allowed easier access for sprayers and more timely applications of pesticides.

Along with these developments, pesticide formulation also has an important role, especially where protection of young crops is key. Seed treatment has been a very important application technique for apply insecticides and fungicides to protect young seedlings. Unfortunately, some years ago, poor quality seed treatment resulted in insecticide dust being emitted from the planting equipment that used an air flow, which resulted in dust being blown into the atmosphere. With too high a dose of insecticide on that occasion, there was subsequent bee mortality. Since then seed treatment formulation has been improved and equipment retro-fitted to add any dust from the seed to the soil. In the case

Seed treatment has been a very important application technique for apply insecticides and fungicides to protect young seedlings.



of the neonicotinoids, the low dose used as a seed treatment is much more protective of bees. It is applied months before the crop is flowering and before it becomes attractive to bees, which can still be affected by sprays that are applied later, which leave a deposit on the foliage.

Sadly the importance of application research has not been recognised over the years with closure of the Weed Research Organisation and Silsoe Agricultural Engineering Institute, and mergers within agrochemical companies, despite the continuing need to apply pesticides in a safe, efficient and economical way.

Notes

 In the new Global Harmonized System of Classification and Labelling of Chemicals (GHS) the old Class I a and Ib pesticides are now in Category 1 and 2 with the hazard "Fatal if swallowed or in contact with the skin."

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An example of a tractor mounted no drift spray boom

Robots – the future of agriculture

Martin Redbond*

griculture is man's oldest and still most important economic activity, providing the food, feed, fibre, and fuel necessary for our survival. However, with the global population expected to reach nine billion by 2050 agricultural production must double if it is to meet the increasing demands for food and bioenergy. Given limited land, water and labour resources, it is estimated that the efficiency of agricultural productivity must increase by 25% to meet that goal, while limiting the growing pressure that agriculture puts on the environment. Farm enterprises require new and innovative technology to address these challenges and robotics is one that promises to provide a solution.

For six decades robots have played a fundamental role in increasing the efficiency and reducing the cost of industrial production and products.

*Market Scope Europe Ltd, Blacksmiths Cottage, Ashbocking Road, Henley, Ipswich, Suffolk. E-mail: mredbond@aol.com Many research activities in the field of agricultural robotics started more than 20 years ago, but most of them were discontinued due to the high cost of implementation and unsuccessful results. However, many researchers have now started new projects and have proposed new applications for robots in agriculture. Moreover the rising cost of labour and new safety regulations make the adoption of automation far more attractive. As a consequence GPSand vision-based self-guided tractors and harvesters are already being made available commercially. Farmers have also started to experiment with autonomous systems that automate or augment operations such as pruning, thinning, and harvesting, as well as mowing, spraying and weed removal. In the fruit tree industry, for example, workers riding robotic platforms have shown to be twice as efficient as workers using ladders. Advances in sensors and control systems allow for optimal resource and integrated pest and disease management. This is just

the beginning of what will surely be a revolution in the way that food is grown, tended, and harvested.

Crop spraying is one of the most critical, expensive and time consuming processes for any arable farm business. When spraying pesticides, operators are exposed to potentially harmful chemicals thus a system using autonomous spraying robots that are highly selective when spraying would not only reduce a farm's use of pesticides by up to 80% but would improve safety to both humans, wildlife and the environment. Robots of the future will be required to identify produce from surrounding leaves, spray periodically for insects, and pick individual pieces of produce such as grapes, peppers and apples at harvest time. Drones are also being employed on the farm to identify fungal diseases in the field well before crops show signs of infection thus allowing for earlier and more successful treatments. A GPS directed drone, which is equipped with a camera, will take high-resolution images



Bonirob in action in the field

of crops, giving farmers a birds-eye view of which crops are healthy and those, which need protection. Farm drones could also allow for targeted spraying, especially for speciality crops that are either too difficult or too dangerous to spray with manned aircraft. Autonomous robotic equipment will reduce the environmental impact, increase precision and efficiency, and allow care and management of crops in new ways. Future research will need to address the development of robotic systems that can handle the complex, dynamic and semi natural environment encountered in agriculture.

In order to find organisation within the virtual disorder of an agricultural environment, researchers are working on intelligent sensing systems. Multispectral cameras that analyse wavelengths of light bouncing off of objects that can be used to find a consistent pattern that would tell the robot when it is seeing a pepper whether it was the right-side-up or upside-down. The robot would then learn from its mistakes and improve as it works. An algorithm will see simple shapes, and when produce is partially covered by leaves, it will not use the full-shape algorithm but since it only sees part of the fruit or vegetable, it will complete the shape. After the robot identifies the crop, it needs to pick it. Therefore, a grasping tool that will grab produce in the right place and pick it with the right amount of firmness will be needed. Researchers are studying human hand movement and using another set of algorithms to replicate what comes easily to human hands. A lettuce robot is capable of hoeing away ground weeds from around the base of plants. It can thin a field of lettuce in the time it takes about 20 workers to do the job by hand. A wine robot rolls through vineyards pruning vines, while other robots are under development to remotely check crops for their growth, moisture and signs of disease.

A robot has been developed in France, which has four wheels, two arms and six cameras and it prunes 600 vines per day. The Wall-Ye VIN robot, which is the brainchild of Burgundy-



Drone spraying vines

based inventor Christophe Millot, is one of the robots being developed aimed at vineyards struggling to find the labour that they need. It assumes tasks, such as pruning and de-suckering, while accumulating important data on the health and vitality of the soil, fruit and vine stocks. Vision Robotics, a San Diego company, is working on a pair of robots that would move through orchards plucking oranges, apples or other fruit from the trees. In a few years, these machines could perform the labour-intensive task of fruit picking that currently employs thousands of migrant workers each season. The two robots would work as a team. as one would scan the tree and build a 3-D map of the location and size of each orange, calculating the best order in which to pick the oranges. The other would be a metallic octopus with a gentle touch. The first robot will scan and send information to the second

On the beet field of the future

robot, a harvester that will pick the tree clean, following a planned sequence that keeps its eight long arms from bumping into each other.

Horizon 2020, the EU funding programme for research and innovation aims to develop a new programme for robotics that are able to interact safely with humans in everyday environments, especially in the manufacturing, commercial, civil and agriculture markets. By bringing together the best minds and most talented research scientists in the field of robotics and supplying them with the financial support needed (the estimated budget for the Horizon 2020 Programme for Robotics is around €200 million) to realise their projects, it is believed that Horizon 2020 will advance European research into a leadership position. Agriculture is one of four 'priority domains' for robotics funding under H2020. The objective is to address some of the key challenges facing the automation of agricultural equipment and to support the introduction of robotics into agriculture.

Flourish is one project explicitly related to agriculture which has been funded at just over €3.5 million. It is managed by Cyrill Stachniss of the University of Bonn, Germany. The project addresses the challenge of developing new methods of sustainable farming that increase yield while reducing reliance on herbicides and



pesticides. Precision agricultural techniques seek to address this challenge by monitoring key indicators of crop health and targeting treatment only to plants that need it. This is a time consuming and expensive activity and while there has been great progress on autonomous farm robots, most systems have been developed to solve only specialised tasks. This lack of flexibility poses a high risk of no return on investment for farmers. The goal of the Flourish project, however, is to bridge the gap between the current and desired capabilities of agricultural robots by developing an adaptable robotic solution for precision farming. By combining the aerial survey capabilities of a small autonomous multi-copter Unmanned Aerial Vehicle (UAV) with a multi-purpose agricultural Unmanned Ground Vehicle, the system will be able to survey a field from the air, perform targeted intervention on the ground, and provide detailed information for decision support, all with minimal user intervention. The system can be adapted to a wide range of crops by choosing different sensors and ground treatment packages. This development requires improvements in technological abilities for safe accurate navigation within farms, coordinated multirobot mission planning that enables large field survey even with short UAV flight times, multispectral three-dimensional mapping with high temporal and spatial resolution, ground intervention tools and techniques, data analysis tools for crop monitoring and weed detection, and user interface design to support agricultural decision making. As all of these aspects are addressed it is believed the Flourish project will unlock new prospects for commercial agricultural robotics in the near future.

Bosch start-up, Deepfield Robotics, has recently developed a new machine that can find and analyse weeds in crops. The technology, named Bonirob, will make plant breeding more efficient and reduce the environmental impact of arable farming. Bonirob, is the size of a compact car and can monitor how well new crop varieties grow, whether they are resistant to pests and how much fertiliser and water they need. Currently, this is a painstaking manual process done by plant scientists in a laboratory. The agricultural



Pepper-picking robot with integrated modules

robot also makes every day work in the field easier. Bonirob can distinguish between crops and weeds based on the shape of their leaves and can eliminate weeds mechanically, rather than with herbicides. Unwanted plants are simply rammed into the ground with a rod. Using machine learning, Bosch researchers highlight weeds in a large number of image files so that Bonirob can accurately identify them. Professor Amos Albert, general manager of Deepfield Robotics, explained: "Over time, based on parameters such as leaf colour, shape, and size, Bonirob learns how to differentiate more and more accurately between the plants we want and the plants we don't want." Bonirob is the product of a public joint project funded by Germany's Federal Ministry of Food and Agriculture that saw experts from Bosch, Osnabrück University of Applied Sciences, and the agricultural machinery manufacturer Amazone join forces. Bonirob recently won a 2015 euRobotics Technology Transfer Award. In September, the German Federal Minister of Food and Agriculture Christian Schmidt presented the agricultural robot with the Deutscher Innovationspreis Gartenbau, a national award for innovation in horticulture. Bosch has since assumed complete responsibility for the machine.

With the global market for unmanned systems in agriculture on the rise, companies that make robotic ground and air systems are paying close attention. It is believed that more than 25,000 'field' or agriculture robots will be sold by 2015, about the same as robots for military use, according to the International Federation of Robotics (IFR). Together, defence and agriculture make up the lion's share of the nearly 94,000 'service robots for professional use' that the IFR believes will be sold in the next couple of years. IFR statistics for 2011 sales of 'professional use' robots - as opposed to robots for the industrial sector - offer a snapshot of this market. Overall unit sales in 2011 were up 9% over 2010, with unmanned systems for armies around the world coming in at 6,570, or 40% of the total. Right behind were sales of unmanned systems for agriculture at 5,000 units, or 31%.

Japan is well ahead of the US in the use of unmanned aerial systems for agriculture. In 1983, the Japanese government asked Yamaha to help it develop an unmanned helicopter for agricultural use. The country was faced with an aging farming population and wanted to make things like spraying more efficient. In 1991 Yamaha began to market its first agoriented unmanned helicopters, the R50. Today, 2,150 Yamaha RMAX unmanned helicopters spray about 2.5 million acres a year in Japan, covering about 40% of the country's rice paddies. The government backed the idea from the beginning, with the Japanese department of agriculture responsible for regulation.

Yamaha now sells agricultural drones in Japan, South Korea and Australia, and hopes the certificate of authorisation it obtained in May 2015 from the Federal Aviation Authority (FAA) for the RMax in the US will not only unlock the US market but also those in European countries. One area that it thinks is promising is spraying vineyards in the Nappa Valley in California. They are about the same size as rice paddies in Japan, five acres or so, and therefore a good match to the RMAX's four-gallon chemical payload capacity. Tractors, traditionally used in Napa vineyards, can spray about two acres an hour, but RMAX can do 12 to 15 acres an hour. And with RMAX Yamaha says there is no soil compaction, no crop damage, the operator is not exposed to chemicals and it is safer, because he does not have to drive in challenging terrain.

With annual revenue of just Y5 billion (\$41 million), Yamaha's drone business was a tiny portion of the group's total sales of Y1.5 trillion last year. But the company hopes to increase sales from an anticipated 320 drones this year to at least 500 by

2020. Analysts say the potential for agricultural drones is huge. The market for commercial drones is expected to reach \$1.7 billion in 2025, of which \$350 million will be generated from unmanned aerial vehicles focused on agriculture, according to data group Lux Research. The economic benefits of commercial drones in the US should be \$13.6 billion in the first three years after they gain permission to fly, of which agriculture and public safety will account for 90%, according to the Association for Unmanned Vehicle Systems International.

The availability of a skilled workforce that accepts repetitive tasks in the harsh climate conditions of a greenhouse is decreasing rapidly. The resulting increase in labour costs and reduced capacity puts major pressure on the competitiveness of the European greenhouse sector. As a consequence there is a high demand to automate labour in modern greenhouses. The EU-project CROPS (Clever Robots for Crops) project which has been funded by the European Commission under the 7th Framework Programme within the theme 'Automation and robotics

for sustainable crop and forestry management' has enabled research to be conducted with robots in greenhouses. One of the applications is a sweet pepper harvesting robot which was shown to be economically and technically viable. The SWEEPER project has received over €4 Million and is managed by Jan Bontsema of Wageningen UR. Thee project involves 6 partners from 4 different countries (The Netherlands, Belgium, Sweden and Israel). The consortium consists of fundamental and applied research organisations, a system integrator and a modern grower of sweet pepper. The robot will be the first harvesting robot in the world, operating in a commercial greenhouse. It will strengthen Europe's leading role in agricultural robotics and will also improve the competitiveness of the European greenhouse sector. The successful CROPS software modules based on the Robotic-Operating-System (ROS) will be maintained and expanded in SWEEPER. The pepper-picking robot, which runs on a rail system across a greenhouse, has a snake-like arm with pincers. To harvest a pepper, it first uses cameras to find a pepper. Once a target has been identified, its colour is analysed to tell if it is ripe, and the robot begins to move its articulated arm. The basic system is planned to harvest the first fruits in spring 2016. The evaluation results will be used to develop the final advanced sweet pepper robot.

It is very clear that robots will do a large part of farming by the middle of this century. According to the recent report Agricultural Robot Market Shares, Strategy, and Forecasts, Worldwide, 2014 to 2020 (www.whatech.com/market-research/ agriculture) the agricultural robot market size was worth \$817 million in 2013 and is anticipated to reach \$16.3 billion by 2020. It says robots are being used more widely in a variety of sectors and the trend is likely to continue with robotics becoming as common place as computer technology over the next 15 years.

■ Video footage of the Bosch Robotic Ultra-Precise Weed Control can be viewed at https://youtu.be/ drlmop0w91I.



Needing a holistic approach to vector management

Graham Matthews*

veryone wishes to have a simple answer to a problem, but seldom is controlling a pest, whether a weed, insect or pathogen, easy to achieve with one "tool". Much has been said about the very welcome reduction in deaths from malaria in sub-Saharan Africa, where the proportion of households owning at least one insecticide treated bed net (ITN) increased from 3% in 2000 to 67% in 2013, and the proportion of the population sleeping under a net increasing from 2% to 44% over the same period (Kleinschmidt et al. 2015). Bhatt et al., (2015) have calculated that the use of insecticidetreated nets contributed to averting 68% of the cases of malaria, but do not say how many deaths were averted. Children who are most susceptible to malaria are much more effectively protected from Anopheles mosquito bites as they are more likely to stay under a bed net throughout the night, whether treated with insecticide or not. Adults rarely go to bed as soon as the sun sets and may visit the latrine during the night, so are much more likely to be bitten either indoors or outside their home.

When DDT made its dramatic effect on malaria in the 1950s, it was applied as an indoor residual spray covering all the inside walls of a house. It was accompanied in many areas by better drainage and houses were fitted with screens on doors and windows. These two non-chemical methods were the key to suppression of malaria in the USA prior to the arrival of DDT. Application of DDT ceased after concerns that the mosquitoes were soon resistant to it, but later its persistence in the environment led to the use of DDT being banned in agriculture. Today the resistance of mosquitoes to the widely used pyrethroids is repeating history, although adding a synergist, piperonyl butoxide (PBO) can extend the effectiveness of the pyrethroid insecticides. However, little is heard about developing the practice of integrated vector management, when many people in rural areas are migrating to towns and cities to live in urban housing. In these more densely populated situations, drainage is often not very good and housing is of poor quality, making indoor residual spraying much more difficult to implement.

The proportion of the population at risk of malaria in Africa protected by IRS, increased from 5% in 2005 to 11% in 2011, but fell to 7% in 2013 This fall is possibly in response to having to spray more expensive insecticides instead of pyrethroids, due to the impact of insecticide resistance. Preference has been given to using ITNs, the number of which was projected to reach 214 million in 2014 in sub-Saharan Africa, rather than promote non-chemical approaches or to adopt area-wide fogging, a technique widely used in the USA to control nuisance mosquitoes and the vectors of other diseases such as West Nile Virus (WNV).

Fogging is done in Asia when there is an upsurge of dengue fever, but consideration of fogging against *Anopheles* spp. has been ignored, possibly as optimum time to fog is



Using a motorised knapsack sprayer to apply a cold fog in an urban area in South America.

during the night, when the mosquitoes are active. Another factor is that the effect of fogging is transitory as it kills only the adults that are present when the small droplets, ideally around 15 micron diameter, are drifting downwind. The immature stages - larvae and pupae are unaffected by the very low dose of insecticide used in the fog so the adults can emerge later. Thus fogging has to consist of a sequential series of treatments, to kill mosquitoes as they emerge on the days following a treatment. Treating large areas during the early part of the wet season could significantly reduce the vector population and delay any build of disease transmission.

Vehicle-mounted and manually carried cold and thermal fog equip-

A truck-mounted cold fogger used to control mosquitoes in Florida, USA.



^{*}IPARC, Silwood Park, Ascot, SL5 7PY.



A thermal fogger show dense white cloud of fog to penetrate areas where mosquitoes can rest.

ment are manufactured so that in combination, densely populated urban areas can be treated – using the manually carried fog equipment in areas inaccessible to a vehicle. Fogging is done with a much lower dosage of insecticide than with indoor spraying as it is not intended to leave a residual deposit.

One of the problems of both ITNs and IRS is that mosquitoes are exposed to surfaces on which the insecticide can be active for over 5-6 months. Some bed nets remain effective for over 3 years so it is not surprising that there is selection towards mosquitoes that have the enzymes that break down the insecticide and so the population becomes increasingly resistant to insecticides with the same mode of action. It is another example of biological evolution, through the process of natural selection, similar to the peppered moth (Biston betularia), where the dark (melanic) form was selected during the industrial revolution and soot was deposited on trees, but has been reversed by the introduction of the Clean Air Act that has resulted in selection of the pale form of the moth. Thus there is an urgent need for new insecticides with a different mode of action, to allow a resistance management system for IRS, whereas the non-persistent fog is less likely to result in selection of a resistant population.

Larviciding has also not attracted much interest against *Anopheles* spp. mainly as it is difficult to determine all possible breeding sites, especially in rural areas. The range of insecticides is much greater, but treatments are usually confined to permanent areas of water, such as ponds or irrigated agricultural land, where efforts have been made by drainage to reduce water collecting within areas of housing.

There is little doubt that to move from reducing the number of cases of malaria, to eliminating the disease, the concept of integrated vector management has to involve more than just using bed nets and indoor residual spraying. This will require much better coordination of efforts, to enable appropriate insecticide and non-chemical treatments to be made, in relation to the local situations in both urban and rural areas.

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A vehicle mounted thermal fogger being used in Cairo



PestTech 2015 – and the state of pesticide application

Clive Boase*

s in previous years, PestTech 2015 was held at the National Motorcycle Museum, Solihull, England. As always, the event proved extremely popular, with about 1150 visitors passing through the doors during the one-day event, and over 50 stands to visit.

The stands covered most aspects of commercial pest control, from the central issue of pest detection and monitoring, through controlling pests with pesticides and other means, pesticide application devices, personal protective equipment, and then out to staff training, reporting systems, professional insurance, and beyond. In addition to the stands, there were seminars covering a wide range of topics, with the latest changes around rodenticide use attracting much attention. For those who had had enough of the thronging indoor areas, outdoor demonstrations provided an opportunity to get some fresh air and engage with something more practical.

However the aim of this article is not to review PestTech as a whole, but to specifically review the state of pesticide application in the UK pest control industry, as seen from the stands at PestTech. After all, pesticide application is a critical part of pesticide use, with most of the pesticides being promoted at PestTech requiring some form of application beyond the packaging itself. A good pesticide application system is a way of:

- Ensuring that the statutory label dose of the pesticide is actually applied.
- Applying the pesticide in a way where it will have most impact on the target pest.
- Avoiding contamination of the operator, others, and the surrounding area.

So sprayers are not expensive watering cans, but employ a wide range of sometimes sophisticated technology to produce the desired result. This technology is still being developed and refined, as evidenced by the recent appearance

*The Pest Management Consulancy, the Pest Management Consultancy, www.pestmanagement.com of the 4th edition of Graham Matthews' book on 'Pesticide Application Methods' (2014), and the publication of Bill Robinson's 'Application and Equipment Manual' (2015). Clearly there is still much to say about innovation in the field of pesticide application. However, how much of this innovation was translated into stands and information for the pest control technician visiting PestTech?

Unfortunately, for a technician wanting to find out more about the range of surface sprayers and liquid application devices available, a tour of PestTech would not have taken long. There were very few sprayers on display, and most were the default 5-litre compression sprayer with a flat fan nozzle (Fig 1). There was little or no information on the pros and cons of different sprayer types (e.g. compression or hydraulic), or on the accessories such as nozzles (there are actually a wide range available, with very different properties and performance), or on the very helpful pressure and flow regulators that are available to ensure a constant output and reduce the need to keep re-pressurising the sprayer. However the application of residual sprays to surfaces is not a closed book. For example, as a result of the rise in bed bug problems, technicians now frequently need to apply thorough treatments with liquid residual insecticides onto structures such as a bed frames, headboards, and other bedroom furniture. These items are often non-sorbent, so run-off occurs frequently, with the risk of local over-dosing and puddles on the bedroom floor. Development of a bed bug nozzle, capable of applying

Fig 2: How to spray this for bed bugs without excessive run-off? Where are the solutions?





Fig 1: Compression sprayer plus flat fan nozzle – the default liquid insecticide application system.

label dosages to these types of structures, would be real help to technicians and

Fig 3: Bayer's Ezidose granule dispenser. Avoids waste, even when using small volume sprayers.





Fig 4: B&G's gel applicator, with extension for out-of-reach areas.

would reduce the risk of local overdosing.

Although not strictly an application device, Bayer's Ezidose device is an innovative piece of engineering that is worth a mention. It screws directly onto the container of their water-dispersiblegranule formulation (Fig 3), and each pull of the trigger provides precise and simple delivery of the required dose of granules into the sprayer. Importantly, because each pull of the trigger delivers enough granules for just one litre of water, it can be used for small hand-held compression sprayers without wastage, as well as the larger 5-litre sprayers.

One application area where there has been innovation that has changed the way that pest technicians work, is in the development of insecticide baits. A quar-

Fig 5: BASF's ant gel packaging is also the applicator.





Fig 7: The Dustick allows wasp nests to be treated, with both feet safely on the ground.

ter of a century ago, insecticide gel applicators were a novelty, but now they are standard kit in most technicians' vans. At PestTech there were some bait applicators on display including one from B&G sporting a novel extension tip, allowing the application of gel into difficult-toreach areas such as behind machinery or tops of walls (Fig 4). However in order to sidestep the need to buy, use, and maintain a specific insecticide bait applicator, BASF have chosen to develop a relatively low-tech device for their ant bait, where the packaging doubles up as the applicator (Fig 5).

In contrast to insecticide gel baits, insecticide dusts are one of the oldest formulation types, as are many of the various devices they are applied through. As with B&G's gel applicator extension, the last decade or so has seen the development of a range of dust applicators designed to increase the range of treatment. Devices such as the Dustick are capable of applying dust to wasp nests at up to 6 or more metres high, while still keeping both feet safely on the ground (Fig 7). These devices have greatly improved safety for technicians. However not all dusts are used for treating wasp nests, and one small but growing area is the use of diatomaceous earth (DE) for bed bug treatments. DE has a useful desiccant action on tough modern bed bugs. However dusts can be messy to use indoors, so Killgerm have developed a dust-in-a-can product. The carriers and propellants used in the aerosol product allow the controlled and directional application of a liquid suspension of the silica dust into bed bug harbourage areas. The volatile liquid components then evaporate, leaving an active layer of the dust on target surfaces.

Overall, the casual visitor to PestTech could be forgiven for concluding that most pesticides simply leap out of their container and deposit themselves onto the target areas, at the right dose, as if by magic. Some PestTech visitors expressed the view that the low profile of spraying equipment on display was because most pest controllers have got a sprayer already. However in the same way that car design and development did not stop with the Ford Model T, there has to be a busier and brighter future for indoor pesticide application in the UK. At pest control events aimed at the technician, pesticide application devices offer the opportunity to create very tangible, engaging and interactive exhibits that demonstrate the practical and commercial benefits of the equipment on display. Let's hope next year's exhibitors rise to the challenge.

Fig 6: Killgerm's diatomaceous earth in an aerosol. Allows precision placement of the dust.



FAOPMA gathers in Penang, Malaysia

David Loughlin*

he Federation of Asian and Oceania Pest Managers Associations was established in 1989 by members from Asian and Oceanic countries to promote and develop the professional pest management industry throughout the region. One of the highlights for FAOPMA is the annual convention hosted by a member country and with many international speakers and presenters at these events, they have built a reputation as one of the industry's key global events.

The 26th FAOPMA event was held in September and was hosted by the Pest Control Association of Malaysia (PCAM). Over 350 delegates enjoyed 2 days listening to 20 presentations in 6 sessions and visited 46 booths from 16 countries in the exhibition halls.

Prior to the annual FAOPMA conference, the Executive held its annual meeting in which it welcomed Huang Xiao Yun as its new and first Chinese President for a term of 2 years. It was the honour of Ms. Huang to welcome the delegates to the congress and ask Tuan Haji Jabar Bin Shaik Mohideen, Deputy Director General. Department of Agriculture, Malaysia to open the conference.

In his opening message, Organizing Chairman and FAOPMA Deputy President (2013-2015), Mr Raymond Lee, explained how the convention theme "'Managing Invasive Pests for a Sustainable Tomorrow" was chosen because the pest control industry is facing challenging times which need meaningful partnership in understand-

ing the growing trend in this globalized world. Pests can move freely globally with modern transportation, thanks to the increase in trade and tourism. At the same time, invasions of pest species into foreign habitats remain an important threat and worldwide, invasive pests have been recognized as one of the greatest threats to biodiversity, second only to habitat destruction. The Asian region is experiencing rapid economic development, including an explosive growth in international trade and transportation. Invariably, this has increased the potential for introduction of new pest species across borders.

The presentations were opened by keynote speaker Michael K. Rust, of the University of California, USA who looked at managing invasive insect pests for a sustainable tomorrow. He explained how the unintentional and accidental movement of animals and plants is a story as old as human migration. Increased globalization will intensify the need for better surveillance, detection, and corrective strategies. In 2010, the top 20 countries exported 114.3 million full cargo containers and so the task of intercepting and preventing the movement of pests is daunting. According to the Global Invasive Species Database there are 145 animals and plants considered invasive to Malaysia but this can be considered an underestimate. Identifying exotic plants or animals as non-native



Key note speaker Michael K. Rust, of the University of California, looked at managing invasive insect pests for a sustainable tomorrow. He explained how increased globalization will intensify the need for better surveillance, detection, and corrective pest management strategies.

species that do not necessarily have an adverse impact Michael included important food, ornamental, and economic crops in this category. These include the European honeybee *Apis mellifera*, and the silkworm *Bombyx mori*. Many parasitoids and predators used in successful biological control programs are also exotic.

Sustainability has become an important concept in agriculture ecosystems.

Official opening of the exhibition hall by guest of honour Tuan Haji Jabar Bin Shaik Mohideen, Deputy Director General, Department of Agriculture, Malaysia (2nd from right) with either side, Ms Huang (FAOPMA President) (3rd right) Mr Raymond Lee, Organizing Chairman (far right) and from left, conference sponsors Mr. Lee Teck Peng (Bayer), Mr. Chow Kwee Lin (Sumitomo), Mr. Koki Oikawa, (Fuji Flavor) and Mr. Tay Boon Liang, (Syngenta).



*Editor, IPC Magazine

Sustainable urban pest management is an integrated system of control practices having a site-specific application, over the long term that 1) satisfies the needs of urban consumers, 2) enhances environmental quality, 3) efficiently uses resources, (4) satisfies the economic viability of the structural pest control industry, and 5) enhances the quality of life of society as much as possible. This can become a tremendous challenge when certain invasive pests represent a major public health threat, economic threat or nuisance in an urban setting and the likelihood of sustainable urban pest management programs being widely adopted will depend upon Pest Management Professionals (PMPs) but they will not incorporate them in to their routine practices if they are not economically viable.

The theme for Session 1 was Bed Bugs and was kicked off by Mr Stephen Doggett (Westmead Hospital, Sydney, Australia) who discussed Managing Global Invasion of bed bugs: Challenges and Solutions.

Both the common, *Cimex lectularius*, and the tropical species, *C. hemipterus* are a public health pest responsible for a range of adverse dermatological reactions through their propensity to blood feed. Arguably however, bed bugs greatest impact is due to the fiscal costs associated with the insect and their control and many sufferers do not have the financial resources to pay for eradication. Sadly, it has been the disadvantaged

who have become reservoirs for bed bug infestations society wide. The key trigger for the resurgence has undoubtedly been insecticide resistance. Many of the commonly used insecticides are ineffective at controlling the insect and can even lead to their dispersal. Poor pest control is often blamed for the resurgence. All control products have limitations and knowing which product to use and how to use it is a major battle. In response to the resurgence, a three point strategy was implemented in Australia. First was the development of 'A Code of Practice for the Control of Bed Bug Infestations in Australia' (available free from www.bedbug.org.au). Second is education on best practice and third research to enhance and develop best practice. It is unlikely that a management solution will reach the market in the near future, which means that bed bugs will remain a problem for many years to come.

Mr Espen Roligheten from Anticimex, Norway provided a European view on bed bug management. Like elsewhere, bed bug infestations are on the rise in Europe and most of the bigger cities have serious problems. The Biocide Directive and a 2-year ban on neonicotinoids has reduced the product options in the fight against the insect and this has led to the pest control industry to look for non-toxic methods. Different cold and heat treatments are being employed. Other methods like vacuuming, discarding furniture, bed encasements, bed bugs detection traps and the use of desiccant dusts are also being used. Integrated pest management (IPM) provides a good guidance and by combining different methods, the chance of success is increased. Treatment failure is one of the problems the pest industry is often facing an accepting this and making plans to avoid treatment failure will be a good step in the right direction to help turn the tide of bed bugs coming back. In his presentation he showed how Anticimex do inspections, treatments and follow-up inspections in Norway and how they use the different tools to achieve bed bug eradications including documenting the job and mapping the problem helps to understand where resources should be used in the fight. His view was that bed bugs are not hard to eradicate as there are lot of tools that if used effectively can avoid failed treatments. Doing the bug treatments cost effectively however is the real challenge.

Moving over to the USA, Prof Dini Miller (Virginia Tech, USA) consider new global innovations in bed bug management strategies. The continuous increase in bed bug populations has been the inspiration for many research studies focusing on why bed bugs are so difficult to control. These studies have investigated pesticide efficacy, toxicology, and the genetics of the bed bug. Overall, these studies have come to the same conclusion- bed bug resistance to insecticides is ubiquitous, extremely high, and the product of multiple genetic mechanisms. These studies have repeatedly documented that these resistant populations are not susceptible to dried residues of liquid formulations and therefore, little mortality can be expected once the pest manager has left the building. Further, behavioural studies have indicated that bed bugs travel more than had been previously considered. These studies suggest that a comprehensive, buildingwide approach is needed to keep both bed bugs and costs at a manageable level.

Session 2 grouped major flying and crawling insect pests with a look at mosquitoes and cockroaches. The subject of the talk by Prof Theeraphap Chareonviriyaphap ofKasetsart University, Thailand was 'Managing the Invasive Dengue Vectors in Thailand'.

Mr. Raymond Lee, Organizing Chairman welcomed a record of more than 350 delegates from 18 countries attending this convention in Penang, Malaysia.



People in many areas of the tropical and subtropical world are at risk to dengue and dengue hemorrhagic fever (DF/DHF) with approximately 50-100 million people at risk worldwide. Much of urban Thailand is regarded as hyperendemic for dengue infection and the total dengue cases are increasing. The dengue virus is transmitted by Aedes aegypti, a common peridomestic and indoor day-biting mosquito that is recognized as a highly efficient vector due to its proximate relationship with humans. Although, more advance control approaches like sterile insect technique and genetically modified mosquitoes are currently available, these techniques are not applicable in Thailand. The primary methods for controlling dengue rely on chemical applications and community participation against the mosquito to reduce human-vector contact.

Dr Nazni Wasi Ahmad (Institute for Medical Research, Malaysia) continued the talk on dengue looking at new global initiatives to manage the disease. Presently, specific treatment and effective tetravalent vaccines against dengue are lacking and dengue control depends solely on the control of the two most important vectors, Aedes aegypti and A. albopictus. New insecticide-based tools include outdoor residual spraying with deltamethrin deposited onto sprayable surfaces to kill adult mosquitoes. An insecticide impregnated paint is now available for indoor residual treatment. Other insecticide-based innovations include an autodissemination ovitrap which uses Aedes adults to disseminate pyriproxifen to breeding containers, and application of insecticide that are both adultical and larvicidal in action. Regular application of Bacillus thuringiensis israelensis (Bti) can suppress dengue, while Wolbachia-infected A. aegypti are incapable of supporting development of dengue virus and with shortened life span. Gene-based sterile insect technique for both vectors is now being actively researched and a mechanical autocidal trap is also in development, to trap both adult & larva. In other innovations, dengue outbreak prediction is being enhanced by developing mathematical models to help outbreak be predicted and give time for remedial action.

Prof Chow-Yang Lee (Universiti Sains Malaysia) switched subject from flying to crawling insects with a look at

the perennial problem of cockroaches in Southeast Asia. Cockroach management remains as one of the most important activity to the pest management industry in Asia. A good understanding on cockroach biology and behaviour is essential to their successful management. Chemical methods such residual insecticide spraying and baiting remain among the most popular control options. Over the last 60 years, there have been several challenges underlying cockroach management. Perhaps the most important and significant one is insecticide resistance. Today, this remains a major and common problem. Another issue, affecting the effectiveness of cockroach baits is glucose and bait aversion issue (although the situation was very much limited to the US and South Korea). Managing insecticide-resistant populations requires good management strategies. Taking into consideration the need for speed-of-kill and effectiveness, several strategies for managing insecticide-resistant cockroaches have been executed (namely insecticide rotation, integration of insecticide-insect growth regulator, and baiting).

The third session of the day turned to stored product insects and pest ants. Dr Rikiya Sasaki (Fuji Flavor, Japan) considered the temporal and spatial performance of pheromone devices used in insect monitoring. Pheromones are species specific so are very convenient for monitoring a specific insect species but they have to be used in the right way. Performance values have a temporal component such as shelf life in storage and the replacement period. The spatial component considers distance and capturing efficacy such as height and placement spacing at which devices are located. The New Serrico is a pheromone device for trapping tobacco (or cigarette) beetle, Lasioderma serricorne. This trap has its own four numerical values (shelf life: one year, replacement term: one month, height: 1.5m, space: 10m). These constitute directions for usage of pheromone devices and Dr Sasaki continued to discuss the proper way of monitoring with pheromone devices, showing concrete results about temporal and spatial performance.

From beetles to ants, Mr Garry Webb (Sumitomo Chemical Australia) looked at invasive ant eradication and management in Australia. With a small population of just 23 million people, a vast land mass and 66,000 kilometres of coast line, Australia is at high risk of invasion and establishment by unwanted organisms, particularly in today's increasing global trade and declining border quarantine effort. Red imported fire ant (RIFA) was first found in Brisbane in 2001. There are currently eradication and control programs for a number of invasive ant species in Australia, foremost being the high-profile RIFA, but eradication efforts are also under way for many other species which constitute varying degrees of threat to human health and the environment.

Mr Savvas Othon (Rentokil Pest Control, UK) discussed managing stored product insects (SPI) in industrial settings. The implications of having an outbreak of SPI within a food establishment will inevitably result in customer complaints and tainting of food. This means just a handful of small insects could damage reputation and cost money. Prevention is better than cure and for SPI, prevention comes in the form of proactive monitoring. Building a successful monitoring system to detect the presence of SPI cannot be built on insect traps and moth pots alone and a monitoring strategy is only one part of successful pest management for SPI. A control strategy is also required and best planned in advance. Chemical control should involve the use of the least toxic chemical first and will usually involve the application of a residual insecticide for localised outbreaks. For larger outbreaks, methods such as gas fumigation or insecticide fogging may be an option but require the area to be out of operation for a number of days Non chemical methods include the use of heat and the use of compressed air to dislodge insects and webbing. Pheromones for mating disruption are also proving popular in food industries. The one method which will prove the most effective is detailed cleaning.

From bugs to business, session 4 considered marketing strategies, quality management and auditing. Mr Su-chart Lee (King Service Center, Thailand) explained about the blue spot strategy. The aim to make operations as lean as possible, by reducing costs, creating and raising buyer value, in short, differentiation through value innovation. Naturally, everyone wants to be an alternative of choice, not just another substitute for



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Gladenbacher Weg. 13 Biebertal, Germany 35444 info@airofog.de commodities in a flooded and saturated market. Therefore differentiation from others is key, by aligning innovation with utility, price, and cost propositions.

Mr Rob Fryatt (Xenex Associates, UK) discussed global pest management services and quality standards in managing invasive species. Every day the pest management industry becomes more international with many key client groups, such as food manufacturers, distributors and retailers, operating without borders. These clients increasingly expect their service partners to operate to consistent and professional standards however within the industry there are only a few service companies that operate outside their home country and culture. Rob's paper outlined the progress and achievements made by FAOPMA's European counterpart CEPA, in establishing and promoting the first international standard for pest management service: EN 16636 and the value this can being to global pest management service and quality, especially in Asia.

Session 5 continued with termites with a presentation by Professor Brian Forschler (University of Georgia, USA) on global invasive termite species. Termites have six taxonomic families only four have provided species that can be called invasive. The Kalotermitidae and the Rhinotermitidae have produced 75% of the known invasive termite species. The majority of invasive termite species originated from Southeast Asia. Predicting which species can be invasive will provide the information required to correctly identify new infestations in a timely manner. The earlier an invasion of termites is identified the higher the likelihood that it can be successfully eradicated.

Prof Tsuyoshi Yoshimura (Kyoto University, Japan) looked in detail at Incisitermes minor (Hagen), the western drywood termite, an invasive pest that was originally distributed in the U.S. western coastal states and eastern and inland states. Drywood termites are onepiece nesters, and easily transported by human activity. I. minor in Japan was first reported in 1976 in Tokyo and 26 prefectures are reported to currently have infestations estimated to affect up to 100,000 houses. In order to understand the spreading speed/manner of I. minor and to establish sustainable management strategies, a survey has been conducted in Yokohama since 2003. By the latest 2013 survey, there were 263 infested houses and results suggest that 10-years is sufficient for a five-fold increase in infestation in an urban landscape. Results indicate that colony development of I. minor is very slow and early diagnosis of infestation, ideally within 2 - 3 years, is one of the most important management strategies. Use of acoustic emission (AE) monitoring devices and microwave detectors to structural timbers, together with a detailed laboratory survey, give an approximate 80% accuracy of an infestation.

Professor Dini Miller (Virginia Tech, USA) who spoke on new global innovations in bed bug management strategies, raises a question to one of her fellow speakers.



Dr Hou-Feng Lee (National Chung Hsing University, Taiwan) looked at (Wasmann), the Asian subterranean termite and the most destructive and invasive termite pest in tropics. Originating from Southeast Asia, it has been introduced to North and South America and numerous oceanic islands. The general invasive pattern extends from coastal areas to inland cities, and from warmer areas to cooler areas. Gene analysis of samples collected from Taiwan indicates C. gestroi was most likely introduced from the Philippines. By using mark-release-recapture methods, three C. gestroi colony sizes have been estimated as including 130k-210k individuals in forest ecosystems. C. gestroi is considered the second major termite pest in Taiwan behind the Formosan subterranean termite, Coptotermes formosanus Shiraki. By analyzing environmental factors, the habitats of the two species were significantly different with C. gestroi found at warmer and drier areas. As urbanization creates drier and warmer conditions, the fast urbanization in the tropics is likely to increase the expansion of C. gestroi and damage will increase along with the economic growth in tropical regions.

From insects to vertebrates, session 6 was mixed and discussed rodents, rove beetles and innovation. Dr Partho Dhang (Philippines) looked at the role of innovation in sustainable pest management. Innovation has touched the pest management industry over time and new discoveries in insect science, combined with new tools and technologies, have increased safety of applicators and led to a reduced use of pesticides in the environment. The earliest innovation would be use of baits in managing pest population to replace conventional sprays. New research in pest sensory physiology has led to innovative baits and baiting methods. Insects such as houseflies, ants, cockroaches and termites are major pests which are attracted to food baits and can be managed with baits. Baits have provided a rational solution to urban health by controlling cryptic pests that dwell indoors, and permit treatments to inaccessible and sensitive areas. Baits offer no odour, no translocation and no staining potential and leave lower or no residues. Furthermore, baiting is most suitable for treating sensitive locations

where there is a high-density human population. Apart from insecticide baits notable innovations have taken place in development of multi-functional pesticide formulations. Today's formulation have improved properties such as resistance to environmental degradation, spreading characteristics, permeability onto application surfaces, slow release, transfer properties and even the power to attract or lure. These multi role formulations have make pest control operations highly sustainable through cutting down cost, number of applications, reduced area of application and features which are desirable for sustainability.

Two presentations followed on rodent. The first was by Associate Professor Shahrul Anuar Md Sah (Universiti Sains Malaysia) who considered managing urban rodents in Malaysia. Leptospirosis or rat-urine fever is an endemic disease in Malaysia and recently has received increasing attention mainly due to several incidents that have resulted in human mortality. Although chemical controls by using anticoagulant and non- anticoagulant rodenticides are most commonly used for rodent management, by combining these with several other methods, such as trapping, rat proofing structures and rodenticide application have helped develop integrated solutions to deal with rat infestations in urban areas. In agriculture sectors, rodenticides integrated with biological control using barn owls has been adopted since the late 80's in paddy and oil palm plantations.

Mr Steve Broadbant (Ensystex Australia) spoke on managing invasive rodent pests to protect native wildlife where concepts developed in this arena could offer opportunities for the control of commensal rodents, as more governments may Europe and the USA, to restrict the use of Second Generation Anticoagulant Rodenticides (SGARs). In wildlife environments rodents, particularly rats, threaten many native animal species. For example, in Malaysia, rats have been their main enemy in turtle conservation efforts over the past decade. In the Galápagos Islands, rats and mice pose a serious problem as they attack the nests of many bird species and are a particular threat to the many ground-breeding species present throughout the islands. One estimate provided that there are more than 183 million rats present! For many years it has been a delicate balance to protect the native wildlife from rodents, whilst minimising the risks of non-target poisoning. Traditionally, brodifacoum has been the rodenticide of choice due to its high activity, improved palatability and quick kill from a single-feed. However, recent studies in the Galápagos have shown that the toxicant can be found in species such as the lava lizard (Tropidurus spp.) some 12 months after application. Steve provided examples

FAOPMA Past President, Myeon-Ha Park of the Korean pest Control Association hands responsibility as next host to the Australian (AEPMA) President Vasili Tsoutouras.



of eradication programs conducted in Australia and New Zealand with alternatives products such as the Goodnature E2 automatic resetting trap that is successfully controlling rats in wildlife areas.

The Rove beetle, Paederus fuscipes, a new invasive pest insect in Malaysia which causes dermatitis reactions due to its poisonous vesicant agent known as pederin was the subject for the final talk by Dr Wan Fatma Zuharah (Universiti Sains Malaysia). First reported in 1919 in Malaysia, many cases have been reported especially in wet areas such as rice fields, where, even though Rove beetle are insect of public health importance, it is also an important bio-control agent for rice pests such as leafhoppers. Indirect control of Rove beetle in rice fields has been made by the farmers using pesticides to control other pests. Although fungicide had been used to control fungi, only a lower dosage is required to kill rove beetle compared to using insecticide. The movement of Rove beetles from rice fields to residential areas has been linked to the light source from the houses as an attractant factor for Rove beetle to invade human settlements. Direct control has been used by residents using household insecticide products sold in open market. Results showed that higher dose of crawling insect killing product was required to cause death in Rove beetle population. There are several ecological and behavioural aspects of the Rove beetle that needs to be studied in the future.

FAOPMA moves around the region and next 14-16 September the 27th event moves to the Sea Word Resort on the Gold Coast, Australia. The event entitled 'Solving Pest Problems' will be managed by the Australian Environmental Pest Management Association (AEPMA), recognized as one of the largest, best developed and most professional industry associations within the region.

■ For more information visit www. faopma2015.com, www.faopma.com. Full presentations can be downloaded at http://www.faopma2015.com/ conference_download.html. For next year's event see www.aepma.com.au/ Conference.

Is there a vacuum in your professional service?

Steve Zeilinger*

Performance est management professionals (PMPs) offer a different service to those engaged in hygiene enterprises and there may be a view that using a vacuum equates with duties provided by such cleaning and janitorial services companies. Clearing an area of debris to assess current pest activity should be the job of a PMP. Leaving behind insect bodies for a client to 'see' how hard a technician has worked to solve a pest problem is not professional. In fact, leaving any mess behind for a client to clean up afterwards, is not professional nor the beginning of a stable partnership.

Having a vacuum cleaner on a pest control service vehicle should be considered to be as important as having a torch or flashlight, but it must be one that is designed to pick up potentially dangerous material and not blow it back into the room through the exhaust.

Some studies show that the allergens left behind by cockroaches can remain in the domestic environment for an extended period of time, where they remain as a threat to those suffering from allergic asthma. This can also be the case with rodent allergens and one study shows that 18% of children with asthma are sensitive to the mouse allergen Mus m 1. Furthermore, vacuuming can remove sources of bacterial or viral contamination, such as rodent droppings - think salmonella, E. coli and Hantavirus! Of course, an appropriate disinfectant should be used first, to minimize risk. Flea control can be aided by the use of a vacuum and one study showed that 90% of flea eggs, 50% of larvae and 90% of adults can be removed from a property by using a vacuum with a HEPA filter.

High-Efficiency Particulate Air (HEPA) vacuums are designed to capture such materials, with a 99.97% efficient at 0.3 micron and larger, and keep it contained in the filter. This is the type that should be carried and used by a PMP. This level of filtration is achieved through either a multiple stage filtering process which includes a messy filter bag and a secondary or tertiary filter system, or an immediate containment

*Atrix International, Inc., 1350 Larc Industrial Blvd. Burnsville, MN 55337, USA. stevez@ atrix.com. www.atrix.com cartridge filter system with all three layers of filtration built into a safe self-contained all-in-one filter cartridge-- with the latter being optimal for pest control use.

Vacuums, with a HEPA immediate containment cartridge filter, such as the Atrix Green Supreme are the most efficient for the pest management industry. The benefit of a cartridge, compared to a multi stage filter systems, is that sucked up material is contained and the machine itself stays much cleaner. Changing the filter is a simple matter of dropping in a new cartridge without the danger of insects, odours and filth being scattered in the process.

An example of a how a vacuum can be included in an integrated pest management programme, is to use the vacuum first to remove any observable insects i.e. bed bugs, cockroaches, ants, etc. In the case of rodents, removing old droppings, spilt product and debris will give a clean environment to assess activity in more detail. This will also remove any loose dirt or soil that would inhibit the effectiveness of any treatments. Then the appropriate interventions are delivered: heat, cold, fumigation, chemical or mechanical; whatever processes are considered relevant. The vacuum is then used again to remove as much of the dead or dying insects and remains of the job as possible. This not only removes potential survivors (for reinfestation later), health hazards and contaminants, but can help remove sources of odours as well. This represents a professional approach to pest control. Also, it should not be considered a free, add-on service, as time and vacuum consumable costs i.e. cartridge



The use of vacuum cleaners in pest control is probably under-rated and they should be considered as part of a service. In fact, some pest controllers are already starting to include the use of vacuums as part of their service or as an add-on post-treatment.

replacement, can be costed into the job as necessary.

No matter what the pest, there are things that must be vacuumed up for control processes to be more effective. It is a necessary and effective layer of intervention to achieve a pest free environment demanded by clients. Understanding the potential of a vacuum's ability to safeguard the client's health and wellbeing, demonstrates a commitment to delivering a professional service.

■ For more information on Atrix visit www.atrix.com



Removal of dead insects, dead mites, allergens, rodent hairs, rodent droppings and other pest-related contaminants can be just as important as controlling them in the first place. Removal of such contaminants removes potential allergens from premises, which may be important in terms of triggering allergic asthma.

Date announced for ICUP 2017 conference

eld once every three years, the next and ninth ICUP conferences International Conference on Urban Pests (ICUP) will take place on 9 - 12 July 2017 at Conference Aston, which is based on the University of Aston campus in central Birmingham, UK. This highly popular, non-profit, conference is the leading international forum for sharing information and ideas on the impact, biology and control of pests in the urban environment. It is attended by entomologists, pest management professionals, and academic and government scientists from around the world.

The 2017 organising team, chaired by Dr Matthew Davies from Killgerm are working on the programme. Matthew explains "The conference programme will address the science and management of a wide variety of urban pests, including coverage of hygiene, structural, medical and vertebrate pests. In particular, we want to address the importance of emerging environments



and how they are impacting on emerging pests that are both 'old' and 'new' to us. We are especially keen to see interaction between a new generation of researchers and established contributors. Of course, no event of this standing would be complete without sessions looking at the future direction for urban pest control as well as the impacts of regulatory and stewardship challenges."

Delegate registration is expected to start in spring 2016. Details on how to offer a paper for consideration by the organising committee will be announced early summer 2016. As before, the official language of the conference is English. Speaking about the new logo, ICUP executive committee member, Clive Boase, explained: "It's more than 20 years since the very first ICUP conference was held in Cambridge. Since then the event has developed its own identity and has come to be universally recognised as an international forum where scientists can gather, present their latest research findings and freely exchange information in an informal and purely technical environment. Both I and Dr Bill Robinson, my fellow ICUP executive committee member, felt the time had come to create an identity for ICUP itself. Our new logo is straightforward and can easily be modified for each event every three years."

The conference website is in development and further details will be announced as events progress. The central ICUP website is www.icup.org.uk where interested parties can view all presentations from the previous conferences.



Humane Society call for ban on rodent glue traps

he UK arm of animal welfare charity Humane Society International has launched an #Unstuck campaign to highlight the cruelty of rodent glue traps and to call for a UK sale ban on the devices. Although widely marketed and used around the world, these glue traps are designed to capture, but not kill the target animal. In the UK, glue traps are widely available online as well as in retail outlets. Their use by professionals is permitted but prescribed as an option of last resort (see http://www.pmalliance.org. uk/downloads/Glue board COP.pdf).

The traps are already banned in New Zealand and Ireland and now UK celebrity wildlife experts Nick Baker and Iolo Williams from BBC's Spring/Autumn Watch, as well as ITV's Downton Abbey Peter Egan, have given the campaign their backing.

In an HIS commissioned YouGov opinion poll (survey of 2,044 adults between 16th and 17th June 2015 online, weighted to be representative of all GB adults (aged 18+)) the research revealed that of those surveyed:

- 23% had used, or would consider using this type of trap
- 51% said they either wouldn't know what to do with an animal caught on a glue trap or would recommend an action that risked committing an offence under the Animal Welfare Act (2006).
- 20% recommended killing a trapped animal using the method advised by the professional pest control industry and accepted by experts as being 'humane' (hitting the animal with a sharp blow).
- 68% agreed that glue traps should be banned in the UK.

Claire Bass, executive director for Humane Society International/UK, said "Rodent glue traps are hideous devices that can cause extended and extreme suffering, which we wouldn't dream of inflicting upon other animals. Rats and mice may be tiny in size but they still have a great capacity to suffer. We're heartened to see the majority of the British public support a ban and, until we get that ban in place, we're asking people to join us in calling on wholesalers and retailers to take these barbaric devices off shop shelves."

The British Pest Control Association in principle supports the ban for public use. BPCA Chief Executive Simon Forrester said "HSI's research shows that misuse of rodent glue traps by the public is of serious concern, and one shared by the British Pest Control Association. BPCA Members are fully trained and qualified, and are bound by a code of practice for the safe and ethical use of glue traps. Our members take their ethical and legal responsibilities seriously. Rodent glue traps are a 'last line of defence' when dealing with rodent infestations, and professional pest controllers will use a variety of other methods under Integrated Pest Management before considering their use. Glue traps are not for everyday use, particularly where non-target species may be exposed to risk. Widespread sale to people with neither training nor knowledge of humane despatch methods must cease.

The BPCA view is that rodent glue traps should only be sold to or used

by technicians who have been given adequate training and are competent in the effective and humane use of this technique. We would recommend their immediate removal of sale to anyone except professional pest controllers, and we would join HSI in supporting prosecutions under the Animal Welfare Act 2006."

The Law Commission is due to publish its review of UK wildlife legislation and its proposal for a new and simple wildlife law, including provisions governing the management of pest species. HSI/UK has submitted a robust case for a glue trap ban to be included.

■ The full press releases can be seen here http://bit.ly/1KHvYVm and here http://bit.ly/1M3aurq

■ The emotive video 'Stuck To Death' from The Humane Society of the United States which anthropomorphises rodents by use of a child's voice (caution advised) can be viewed at https://www.youtube. com/watch?v=pwTcRZaWTEA.

Calling all poster authors

ave you written a poster for a conference, seminar or exhibition. Do you wonder where they all go to? So do we!

Following the success of our PestEx poster competition, International Pest Control magazine has created a web space to host all the posters that were on show. Not just the winning entries. Rather than stop there, however, we have opened up the facility for all

posters to be available long after they have fulfilled their initial brief at their specific meeting or event. We ask only that the subject be related to pest control and pest management.

If you have a suitable poster, we invite you to submit a 300 word abstract and the poster file to posters@international-pestcontrol.com The abstract should be in Word format and posters as PDF format

The archive will be open to all – no subscription necessary.

As the archive develops, we will include a search function for easy retrieval.

http://international-pest-control. com/category/poster/



What 'wood' a termite prefer to eat?

Kim Kaplan*

very year, termites cause about \$40 billion in damage globally and destroy parts of more than 600,000 homes in the United States alone. The amount of wood a single colony destroys principally depends on the type of termite, the type and condition of wood, and what has been done to treat the wood. But today's growing concerns about the environmental impact of preservative chemicals, such as chromated copper arsenate, used to treat wood against insects got Agricultural Research Service entomologists Mary L. Cornelius and Weste L. Osbrink looking for a better way to build structures with resistance to termites.

Cornelius is now with the Invasive Insect Biocontrol and Behavior Laboratory in Beltsville, Maryland, and Osbrink is with the Tick and Biting Fly Research Unit in Kerrville, Texas. Both were with the ARS Formosan termite research project in New Orleans, Louisiana, at the time the research was done. The researchers already knew that the heartwood of some trees contains "allelochemicals," which can act as repellents and toxicants to insects, including termites. The question was whether or not boards of lumber contain enough of these chemicals to have a real impact against termites.

"So we tested Formosan termites on a diet of commercial lumber from 10

*Chief, Special Projects, Information Staff. Agricultural Research Service, U.S. Department of Agriculture.

different species of wood-redwood, birch, spruce, southern yellow pine, red oak, Brazilian jatoba, Peruvian walnut, Honduran mahogany, teak, and Alaskan yellow cedar-to see how well the termites would do," says Cornelius. When termites were given no choice but to consume just one variety of wood for six weeks, six of the woods-redwood, Brazilian jatoba, Peruvian walnut, Honduran mahogany, Alaska yellow cedar, and teak-showed some level of natural resistance and caused an average of better than 75% termite mortality. Termites found southern yellow pine and spruce the most palatable and teak the least palatable.

Termites had significantly lower survival on a diet of teak compared to a group not fed at all-called a starvation control. This indicated that there is something in teak that actively kills the termites. The study also provided the first evidence that termites will eat, damage, and survive to some extent on Peruvian walnut. Average termite survival on Peruvian walnut was only 16.4% after the 6-week diet, but the amount of Peruvian walnut destroyed was similar to the amount of birch and red oak damaged, both of which are termitesusceptible woods. So Peruvian walnut caused high mortality, but also sustained a high rate of feeding damage; in the rest of the woods, low termite survivability went hand in hand with low consumption rates.

Our ranking could be a guideline when it comes to a choice of lumber in major termite-ridden areas," Cornelius adds. "If the specific compounds in the



resistant woods are identified, these chemicals could eventually offer the possibility of a natural treatment for wood to protect against termites."—By J. Kim Kaplan, Agricultural Research Service Information Staff.

■ "What "Wood" a Termite Prefer To Eat?" was first published in the November 2015 issue of AgResearch Magazine.

Key Facts

- Termites cause \$40 billion in damage globally per year.
- Some trees contain natural chemicals that can repel or kill termites.
- In tests of lumber from 10 tree species, termite survival was very low on a diet of teak.
- Termites preferred southern yellow pine and spruce.
- Termites will eat and damage Peruvian walnut.

The publishers and staff of International Pest Control wish their readers and advertisers the compliments of the season and a healthy and prosperous 2016!



Celebrating success in Central European pest management

Physical control pioneers open new premises in Poland

n early October ICB Pharma, a family owned company, who are pioneers in the development of advance formulation technologies and physical control products for a wide range of pest in various sectors, opened their new premises in Jaworzno, Poland.

ICB owners Paweł Świętosławski, Tomasz Świętosławski and Janusz Świetosławski were pleased to welcome over 200 international guests who have worked with ICB Pharma over many years and who came from various parts of the world, to the grand opening of the new production, research and office space

A welcome reception was held in the evening of 7th Oct, while next day commenced with a short "ICB Innovation session" presented by Dr Wojciech Wieczorek and Dawid Liszka, providing the latest information on ICB Pharma activities.

The ICB Pharma Management team had worked closely with the architects and builders to create a facility to house their state of the art research laboratories and equipment. Guests arriving at the new



ICB owners Paweł Świętosławski, Tomasz Świętosławski and Janusz Świetosławski were pleased to welcome over 200 international guests to the opening of their new facility.

premises late afternoon signalled the start of 'party time' where the entertainment bill mixed a relaxing live string quartet and live acrobatic performances with ICB's very own rock band.

After dinner, Guest were give a guided tour of the premises. ICB Pharma now have an analytical laboratory so that some trails can now be done in-house and offer services to third parties. The entertainment continued outside after the tour with dancing water fountains' and the firework finale.



During the opening ceremony, ICB Pharma received quality certificates ISO 9001:2008 for the production of pest control products and agrochemicals and ISO 13485 for a quality management system for the design and manufacture of medical devices.

ICB's very own rock band included Pawel on keyboards and Dawid on guitar.



With a few additions, the new warehouse doubled up as a party space for the grand opening of the ICB Pharma premise

From state farm to international business - 50 years of Bábolna Bio

ince its foundation in 1965, Bábolna Bio has grown from a small pest control servicing company into an internationally recognized firm. In some respects the company may consider itself lucky, but throughout its existence, it has been an active partaker in developing and disseminating modern pest control methods and products. In the beginning, it operated within the frame of its mother company, Bábolna State Farm until 1992 when Bábolna Bioenvironmental Centre Ltd was established as an independent company. Subsequently, in 2011 the service division detached from Bábolna Bio Ltd. The production of the company is not limited to the professional pest control sector as a wide range of products are also available for the household market. In the past 20 years Bábolna Bio has grown into the leading biocide dis-

tributor in Hungary and whose products can be found in numerous retail outlets. Bábolna Bio's product lines include a number of brands, like Protect, Biostop, Ratata, Kilrat Plus, Happypet for the consumer market, and Protect, Kilrat Plus, Biopren, Peststop, Mosquitox, Methograin for the professional market.

The company recently celebrated its 50 year anniversary in the picturesque castle of Bábolna national stud. Apart from Hungarian guests, partners from abroad also attended the event. Vice Mayor Mária



Veresné Szkocsek welcomed the audience on behalf of the town of Bábolna which was followed by reminiscences of the last 50 years by Managing Directors Dr. Dániel Bajomi and Mr. János Daru.

As a result of its 50-year growth, the company currently employs 130 people within Bábolna Bio and 4 staff in its subsidiary company in Slovakia. Forty people are employed in the separate pest control service. Bábolna Bio are currently preparing several product dossiers containing s-methoprene and other active substances and they have plans to extend their portfolio further.

Before cutting a giant birthday cake to celebrate the occasion, Managing Directors Dr. Dániel Bajomi and Mr. János Daru treated the audience with remembrances of the last 50 years.



Organisers expect strong interest in UK rodent control course

new-look training course delivering a licence to purchase and use professional rodenticide products is expected to attract a surge of interest. The 'Principles of Rodent Control' certificate will provide a key qualification for the use of Second Generation Anticoagulant Rodenticides (SGARs) laid down in the stewardship regime published by the Campaign for Responsible Rodenticide Use (CRRU). Dates for next year's one-day courses, developed by Killgerm and assessed by BASIS Registration, have been announced.

Stephen Jacob, Acting Chief Executive for BASIS - an independent standards-setting and auditing organisation for the pesticide, fertiliser and allied industries - said: "This is an important course for the pest control sector and we're expecting it to be very popular. "It's aimed at both existing operators and those entering the industry and will effectively deliver a licence to practice rodent control. It will provide a thorough understanding of rodent pests and their management in the context of public health pest control operations. And, by passing the course, controllers intending to purchase and use SGAR products will be better equipped to carry out their professional duties safely, efficiently and humanely."

The syllabus of the classroombased course, which provides useful advice and includes practical demonstrations, was recently amended to meet CRRU approval. Robin Moss, head of technical services at Killgerm, said: "The course has been developed using knowledge gained from many years of providing comprehensive training to the pest control industry. We've been strong supporters of CRRU and the BASISaccredited Wildlife Aware course from the outset. We understand only too well that, as CRRU tell us, pest control technicians must be able to 'protect wildlife while promoting and providing effective rodent control through the responsible use of rodenticides'."

An online course delivering a similar qualification was launched last month by the British Pest Control Association (BPCA). It leads to a 'Using Rodenticides Safely' certificate, also awarded by BASIS Registration and approved by CRRU. Mandy McCarthy-Ward, Training Manager for the BPCA, said: "Everyone who continues to use professional rodenticides will need to ensure their certification is both up to date and included on a list approved by the CRRU."

Pest controllers wishing to take the online course can do so via the BPCA website at www.bpca. org.uk/training. To reserve a place on a Killgerm call or book online at www.killgerm.com/technical.

Largest rat ever discovered

rchaeologists with The Australian National University (ANU) have discovered fossils of seven giant rat species on East Timor, with the largest up to 10 times the size of modern rats. Dr Julien Louys of the ANU School of Culture, History and Language, who is helping lead the project said these are the largest known

Dr Julien Louys holds the jaw bone of a giant rat species discovered on East Timor, up against a comparison with the same bone of a modern rat. Image: Stuart Hay, ANU.



rats to have ever existed. "They are what you would call mega-fauna. The biggest one is about five kilos, the size of a small dog," Dr Louys said. "Just to put that in perspective, a large modern rat would be about half a kilo." The work is part of the From Sunda to Sahul project which is looking at the earliest human movement through Southeast Asia. Researchers are now trying to work out exactly what caused the rats to die out.

Dr Louys said the earliest records of humans on East Timor date to around 46,000 years ago, and they lived with the rats for thousands of years. "We know they're eating the giant rats because we have found bones with cut and burn marks," he said. "The funny thing is that they are co-existing up until about a thousand years ago. The reason we think they became extinct is because that was when metal tools started to be introduced in Timor, people could start to clear forests at a much larger scale." Dr Louys said the project team is hoping to get an idea of when humans first moved through the islands of Southeast Asia, how they were doing it and what impact they had on the ecosystems. The information can then be used to inform modern conservation efforts. "We're trying to find the earliest human records as well as what was there before humans arrived," Dr Louys said. "Once we know what was there before humans got there, we see what type of impact they had." Dr Louys returned from the project's latest expedition to East Timor in August and has presented the findings at the Meetings of the Society of Vertebrate Palaeontology in Texas. The project is part of Sue O'Connor's ARC Laureate 'From Sunda to Sahul: Understanding Modern Human Dispersal, Adaptation and Behaviour en route to Australia'.

■ Source:http://bit.ly/1HdFQLJ

New two-way insecticide mixture for indoor residual spraying

onsistent with its mission of delivering 'Science For A Better Life', Bayer has recently submitted a dossier to the World Health Organization Pesticide Evaluation Scheme (WHOPES) for the evaluation of a new two-way insecticide mixture which includes a new modeof-action for indoor residual spraying (IRS) against disease vectors. Named Fludora Fusion, this first IRS based on two active ingredients a pyrethroid and neonicotinoid (deltamethrin + clothianidin) is intended to provide an effective solution to help African disease control programs address the challenge of insecticide resistance in malariatransmitting mosquitoes.

Field testing of the product has shown excellent results against many different kinds of resistant mosquitoes and strong performance across a wide range of surfaces. Bayer foresees the WHOPES evaluation and testing process to take about 2 years and anticipates market availability of the product by the end of 2017, according to Bayer. "We have been able to draw upon experience from other pest control situations, including agriculture, where mixtures have been shown to be very effective in situations where insecticide resistance is present", said Frederic Schmitt, Global Project Manager Vector Control at Bayer CropScience's Environmental Science Division. "In Fludora Fusion we took the decision to pair up a new insecticide with an unrelated mode of action as a two-way mixture. Used in conjunction with an integrated vector management approach, we think this innovation could continue to be a valuable tool long into the future."

Malaria is one of the leading causes of infant mortality in Sub-Saharan Africa and a significant barrier to economic development. Vector control of malaria-transmitting mosquitoes remains critical to the success of its elimination. However, insecticide resistance in mosquitoes against the currently used insecticides threatens the significant gains made in the fight against the disease in the last 15 years. Commonly, resistance is managed by rotation of alternative modes of action, but unfortunately there are currently only four insecticide classes available for malaria vector control, which limits potential management strategies.

"Given the current situation with insecticide resistance, any new insecticide is precious and must be introduced in a way which gives it the best possible chance of remaining useful for malaria control programs for the long-term", added Justin McBeath, Market Segment Manager Malaria Vector Control at Environmental Science.

Active in the field of vector control for more than 50 years, Bayer remains committed to supporting the fight against malaria through the development of new tools which address challenges such as insecticide resistance. Bayer is convinced that Fludora Fusion will fit into disease control programs and deliver the best outcomes in helping to protect and improve the lives of those at risk from malaria.

■ Source: http://bit.ly/1kinjUz

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International biocontrol industry gathers in Switzerland

David Loughlin*

BIM and the IBMA enjoyed a joint celebration in October, with the association acknowledging 20 years in existence and the annual industry meeting having been going for half that time. The IBMA at the time of the conference had 226 member companies of which 158 are active, 64 associate and 4 honorary.

Welcome speeches and contributions to the opening elements of the programme were made by David Cary (Chief Executive), Lucius Tamm (FiBL and ABIM Steering Committee) and Willem Ravensberg of Koppert and IBMA current President. Willem had found the original documents of the founding meeting and the first AGM was held on November 23, 1995 in Brighton, UK. The first IBMA conference and exhibition however took place in 2003 in Bezier France but it was thanks to the efforts and enthusiasm of Martin Andermatt, that with the support of Lucius Tamm, the IBMA concept was formed and following the steering committee approval, a contract was formed with the KKL in Lucerne to host the inaugural event. ABIM has grown over the last ten years, from 247 attendees at the first meeting in Lucerne to 830 at this year's event in Basel. Twenty one original exhibitors has grown to forty seven with a speaker programme almost twice as full as ten years ago and delegates from 52 countries attended.

New to the programme this year, the US company Vestaron, who develop and market bioinsecticides derived from naturally occurring peptides, were presented with the inaugural Bernard Blum Award. Dr Robert Kennedy, Chief Scientific Officer, received the award and gave a brief opening presentation on the products for which the company got the award, a series of bioinsecticides derived from spider peptides with activity on lepidoptera and coleoptera. The Spear product, with the addition of Bt



(Bacillus thuringiensis) can improve performance as a part of an integrated pest management system.

A slight tweak to the programme saw Dr. ir. L. P. (Luuk) van Duijn (Director Ctgb) take the lead keynote address slot and he considered sustainable agriculture in Europe, looking at the activities of an EU Member State, the Netherlands, The Green Deal initiative and other activities that NL had planned during their upcoming EU Presidency. In highlighting the need for change, Luuk claimed that agricultural production needs to match a growing world population that places societal demands in an increasingly urbanising world. Manufacturers are taking greater responsibility for their products through stewardship and as represented by ABIM, the industry is innovating towards a greener portfolio. The Netherlands has opted for green growth: an economic growth that takes into account environment and sustainable development. Through its Green Deal approach (http://bit.ly/1WZI0G6), the Dutch Government has created space for innovative initiatives from society aimed at accelerating the transition to a sustainable economy. The deal aims to stimulate sustainable growth by collaboration between all stakeholders. To resolve obstacles in the authorisation process and to enable innovation of plant protection products. The Dutch presidency (which will be for the 1st half of 2016) has several possible actions including an acceleration of the approval and authorisation procedures for "lowrisk" substances and PPP's; finalizing EU-criteria for low-risk substances; a promotion of IPM-research and improving IPM-communication by means of an EU-website. In conclusions Luuk stated that there is a need to speed up the approval and authorisation process for lower risk substances and PPP's. A tailor made approach is necessary and a special attention for SME's.

Following a deliberate and well established commercial bias, the seminar programme was delivered over eight sessions covering: Biocontrol – what is the impact; Regulatory Issues; Biocontrol solutions of microbial origins; Biocontrol solutions of natural biochemical product and semiochemicals origin; macrobials; two sessions looking at biocontrol as a business from the perspective of small, medium and large enterprises; concluding with a session on hot biocontrol issues and lessons learned.

Most data cited at ABIM and in general, ignores the markets of China and India. With this consideration, the biocontrol market is still expanding at 12%-17% pa. and by 2020 the value is expected to be in excess of US\$4b and US7b by 2025. This is thanks in no small part to countries like Brazil which now has over 100 registered biocontrol products and grew by US\$100m in 2014 alone once BT crops were found to be prone to attack by Corn earworm (Helicoverpa armigera). Globally there are over 250 known biopesticide active ingredients used in over 1000 products. According to Bill Dunham's presentation, 98% of Bio Companies are privately held. Approximately 5 Biocontrol Companies have >US\$100m in annual revenue and the majority.(75%) turnover <US\$10m. The market is still seeing acquisition by multinationals and further consolidation can only improve market access and penetration.

The 11th Annual Biocontrol Industry Meeting will take place 24-26 October 2016, at the Congress Center Basel. See www.abim.ch for details where registered participants can have access to the full archive of 10 years of presentations.

^{*}Editor, IPC Magazine



David Cary reported on the association activities and achievements of the past year in which the focus was on creating political support for improvement of registration of low-risk plant protection products. Two aspects are crucial in this respect: getting the criteria for low-risk actives established and developing a fast track approval process.



The keynote address on day one was given by Dr. ir. L. P. (Luuk) van Duijn (Director Ctgb) who replaced Jim Jones (US EPA) who was unable to attend. The Dutch presidency of the EU has several possible actions including an acceleration of the approval and authorisation procedures for "low-risk" substances and PPP's



Willem Ravensberg, IBMA President, said that ABIM retains its place as the important meeting in our calendar. We had the largest number of sponsors, the largest number of exhibitors and the most delegates to ever attend ABIM. This to me reflects how much our industry has grown in the 10 years since ABIM began. It was really impressive to be able to celebrate two big events in one show with IBMA celebrating it's 20th birthday coinciding with our 10th ABIM.



IBMA executives and post holders past and present raise a glass to conference members in toasting the joint celebration of IBMA (20 years)_ and ABIM (10 years). The specially labelled methuselah (6L) of wine came by road from Italy from a key grower and supporter of the industry.



Thirteen companies were considered for the Bernard Blum award. The judging panel, headed by Dr. Owen Jones (left) with Dr Robert Kennedy of winners Vesteron (right), were unanimous in support of the 3 shortlisted entries. DCM & De Ceuster (Belgium) was ranked second for a microbials based plant vaccine and Belgium's Biobest third for its 'Flying Doctors' biocontrol delivery service



Rio Praaning Prawira Adiningrat Managing Partner, PA Europe NV presented results of an 'Elite Opinion Poll' on Low-Risk Pesticides that the PA International Foundation executed at the request of IBMA. 93% of key regulators want the EC to facilitate and accelerate approval of low risk pesticides. 78% want the Commission to inform the public about the lowest possible residues in food.



Norbert Fuchsbauer (left) claimed HiPP Foods consider themselves pioneers of organic agriculture and the world's largest processor of organic materials. Having detailed the "Phosphonate Case", which was a fertiliser widely used in organic farming until 2013 in products such as foliar feeds, it was subsequently registered as pesticides in 2013 by EU but not cleared for use for organic farming. However as it was still contained in certain EU fertilizers, residues could be found in crops treated only with P-fertilizers. Farmers must be able to act in compliance with specifications and producers of PPP and fertilizers have to acknowledge their responsibility for labelling all ingredients of any product to avoid contaminations. All elements of the supply chain in organic (baby) food production have to work together to maintain credibility.

Wynn Grant of Warwick University (right) thought some people felt he was too critical of aspects of IBMA in the RELU programme, but it needed to improve to get the important biocontrol message across - and it has. Great progress has been made but, as always, there is more to do and new challenges ahead. There is now a good organisational platform to meet those challenges. Despite all the engagement and development of guidance the industry is still regulated by a disjointed regulation that is not fit for purpose for the needs of a growing industry. Still insufficient recognition by decision makers and opinion formers of the importance and potential of biocontrol.



FOCUS ON AGRICULTURE



Ulf Heilig was first to speak in the regulatory session. There is an increasing awareness and understanding of specificity of biocontrol agents and products by evaluators and regulators thanks to an active participation of IBMA in working groups of international organisations with regulators and evaluators. On the up side, there is improved guidance but the industry is still locked into existing legislative framework for PPPs (in EU). IBMA is recognised and respected as partner by stakeholder NGOs: industry, farmers, and environmentalists. There is a long way to changes in EU PPP legislation and procedures for biocontrol substances and products but we are on the right track!



Wolfgang Reinert of the European Commmission, DG Sante considered low risk substances and products and asked – where now? Regulation (EC) No 1107/2009 introduces a new system of approvals, tiered by risk. Low risk products shall be authorised in 120 days (article 47) but member states do not find that feasible. The use of such substances in PPP should be favoured (recital 17) - but "low risk" must not be advertised as a property or used on the label as a claim (article 66).



Jeroen Meeussen is the 'champion' for the smaller grower and producer, as he holds the role of Coordinator at the European Union Minor Uses Coordination Facility. Their mission is to enable farmers in the EU to produce high quality crops by filling minor uses gaps through efficient collaboration to improve availability of chemical and nonchemical tools within an integrated pest management (IPM) framework'.





According to Willem Ravensberg, numerous delegates and exhibitors commented on the atmosphere of ABIM 2015 being very positive and with strong networking activities being prime focus across the industry. Expansion of the exhibition space and provision of an overflow area for watching the presentations was received well by almost all. There are 3 new exhibitors and 3 new sponsors who have approached the association to participate in ABIM 2016 based on the success of the 2015 event!



Bill Dunham tapped into his database to provide the conference with the latest market statistics. Perhaps the most surprising was the quote from the UN FAO which states that the world needs to produce more food between 2000 and 2050 than was produced during the previous 10,000 years.



The biocontrol conference had a record attendance in 2015 and a keen audience was present throughout despite the numerous distractions of side meetings, exhibition and poster sessions.





Representing the large biocontrol company, Denis Troalen (Sales and Marketing Director, EMEA, Sumitomo) explained how Sumitomo Chemical was the first mover with regard to development of a combined conventional + Biorational product portfolio when it acquired Valent Biosciences in 2000. Since that time, Pace International, MGK, and Mycorrhizal Applications have been added to the group. The growth strategy is based on commercializing complementary products and technologies to cover from 'at-plant' through to postharvest use.



Ashish Malik, Global Head of Marketing, Bayer Biologicals, stated that targeted spray programs combining chemicals and biologicals improve quality, market access and tradeability of fresh produce. Without any inputs crops would only yield 30% of their potential. Crop protection products double this to 60% and adding crop efficiency products can raise the yield to 100% of the potential. There could be a third green revolution if we can understand better how biologicals interact with plants.



Daniel Zingg of Andermatt Biocontrol, Switzerland concluded that SME's will continue to be an important driver of biocontrol in the future and there are still many opportunities. Andermatt has ambitions to be within the top 3 biocontrol companies, not owned by an agrochemical major. A growth strategy is needed to adapt to changing environment and registration is a key challenge, especially for niche products.



ABIM provides a platform also for the smaller SME's and Matej Stefancic of Trapview presented developments of the Slovenian company's automated insect pest monitoring system which has been presented to the conference before. The company has enlarged the scope of Trapview to tackle moths and now also flies.



From founding grandfather to the third generation of the Koppert family. Rene Koppert made his first delivery at ABIM 2015 recounting the Koppert story. The company started in 1967 with a beneficial mite to control spider mite infestation and nowadays a more holistic or total approach is used in both horticulture and agriculture. Koppert are moving beyond protected crops to tackle pest problems in field crops such as wheat with products such as Panoramix.



Massimo Benuzzi introduced Biogard whose company slogan is 'Biological First'. It is a division of CBC (Europe) which in turn is a subsidiary of CBC Co. Ltd (Tokyo, Japan), who are world leaders in pheromone technologies. Biogard deals only with authorized pheromone, botanical and microbial PPPs. And when considering pheromones he asked the question why semiochemicals were regulated like pesticides when they do not kill any pests?



Roma Gwynn (left) again confirmed her view that we are moving to an era of biology and that technology transfer, getting the knowledge to the farmer, is still key. The biopesticide industry is knowledge intensive and there is a risk that as a business grows from SME to multinational, knowledge can be diluted to the detriment of the technology.

Lieselot van der Veken, Biobest (right), considered the challenges of controlling aphids with macrobials. Early detection and a combination of IBCAs are key to effective control.



ECPA (European Crop Protection Association) members engaged in IPM

Jean Charles Bocquet *

rop protection products (pesticides) are perhaps one of the most misunderstood technologies used in modern agriculture. On many uses, there are currently no viable alternatives to chemical crop protection, and in spite of an enormous volume of misinformation, we need to remember that when the product is used correctly, pesticides offer safe and effective protection for both conventional and organic crops.

In fact the European crop protection industry contributes to the sustainable use of its products across a whole chain of activities; the commitment starts at the beginning of the cycle when researchers aim to develop the safest possible product and it comprises farmer training and education on safe and sustainable application of the product, including IPM. Our Hungry for Change initiative includes projects that focus on the crop protection industry's role and contribution in providing high quality, affordable food, safeguarding water, promoting practices that conserve and enhance biodiversity, and protecting health.

Integrated Pest Management (IPM) is a way of controlling pests which is designed to be sustainable and therefore it is a system that our industry fully supports. It encompasses techniques used in different farming systems, including conventional and organic farming systems. It involves using a combination of cultural, physical, biological and chemical measures, as well as plant biotechnology to provide solutions for prevention and suppression of pest, disease and weed problems. Sometimes there may be a misconception that IPM does not include chemical crop protection, but it does. It is important to note that even organic production systems use chemical solutions, though these are derived from natural sources and not synthetically manufactured.

IPM promotes a flexible approach to pest management and offers pesticides as part of the farmers' 'toolbox'. The the aim is not to overuse them but that they form part of the overall pest, disease and weed defence strategy.

An IPM strategy comprises techniques in the areas of prevention, monitoring

and cure. By selecting adequate prevention tools, observing their effectiveness and monitoring the health of crops only the necessary control solutions will be applied; with the right timing and the right dose. Often, the most appropriate response will be a combination of different solutions. For instance, an insect infestation could be managed in its early stages by using pheromone traps for detection, or introducing natural predators, but should the population increase over a certain threshold, then a chemical insecticide might be needed to save the crop. It is the complementarity of solutions that makes IPM so robust, so widely used in many agricultural systems, and also helps contribute to resistance management.

The reality of agriculture is that pests must be managed to avoid devastating loss to crops. Certain weather conditions also lead to an increase of pests which can aggravate the usual pest invasions. All this is something independent of the ideology of farmers, consumers or type of agriculture. In fact without advanced pest, disease and weed control, up to half of Europe's present food supply would be lost. Even with the most effective techniques, about 30% of food crops are destroyed by various pests and diseases each year. This leaves plenty of room for innovation in food crop productivity, and also convincingly demonstrates that crop science makes, and will continue to make, a critical contribution to European and global food security.

In this spirit the crop protection industry invests close to 8% of sales in Europe in new product development¹. There is a constant drive to deliver better solutions on the market. These include: better profiles for chemical substances, biocontrol solutions, services including decision making tools, new varieties for members involved in seed breeding and research. Significant achievements have been made. Today's chemical solutions are more targeted on the actual problem of the pest, disease or weed and are at the same time more environmentally and human friendly.

To illustrate this progress, an internal analysis, made by the French crop protection association (UIPP), shows that today, the average registered use rates (in g ai/ ha) for authorised products in France are 25 times lower than 65 years ago. It also shows that, the ADI (Acceptable Daily Intake) has increased by 6 times. These

The need for a collaborative approach to finding solutions for sustainable production of food has never been clearer, and this includes collaboration between ECPA members and IBMA members.



efforts for "low risk" active substances are both chemical and biocontrol solutions².

Many of the chemical companies also produce biocontrol solutions and organic solutions³ – we are in the business of agriculture and therefore in the business of providing solutions to the farmers. Farmers need different solutions in their toolboxes as all of them will be complimentary to each other.

We all recognize the paramount importance of safeguarding human health and the environment, and the need for all parties to continue to work together to find safe, sustainable and effective solutions to pest problems. Both ECPA and IBMA (International Biocontrol Manufacturers Association) members are constantly learning and adapting to rapidly evolving technologies and techniques, and it is becoming increasingly evident that solutions frequently lie in applying complimentary combinations of approaches

in order to produce crops under IPM principles. The need for a collaborative approach to finding solutions for sustainable production of food has never been clearer, and this includes collaboration between ECPA members and IBMA members

■ For more information visit http://www. ecpa.eu and http://www.hungry4change. eu

This article was ■ Editor's note: originally scheduled to appear in our September/October issue alongside our biological pest control special feature. We strive to provide balance at all times in our content as well as aiming to represent all pest management markets. We are happy to include the important message from ECPA here, alongside our ABIM review. It is important to remember that while the biopesticide market is expanding,

they currently represent only 3% of the agrochemical pest management market which by calculation means conventional products still represent 97% of all crop solutions currently employed to protect food crop from attack by weeds, fungi or insects.

References

- 1) according to Philipps McDougall-R&D trends for chemical crop protection products and the position of the European market/September 2013
- 2) Today,14 ECPA members among 21 are also members of IBMA - International Biocontrol Manufacturing Association.
- 3) for example, in France, and according to the UIPP analysis ,early 2013, among the 376 products authorized in organic farming, 135(40%) where supplied by UIPP members (and 16 among 21 UIPP members-75%- are offering solutions for organic farming)

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products/ biopesticides

A positive outlook for pesticide regulation in Europe?

Graham Matthews*

his year's BCPC Congress focused on EU regulations governing crop protection products. In his keynote address, Professor Tim Benton (UK Champion for Global Food Security and Professor of Population Ecology, Leeds University) referred to the Global Food Security Programme. With increasing populations and increasing global income, the demand for more food, security, nutrition and sustainable agriculture are all priorities on the political agenda. Professor Benton asked if it is possible to intensify agricultural production by increasing output per unit area, in a sustainable way? Yields have been increased by plant breeding, energy and management, but 'business as usual' is not a long-term option. To continue in this way would require the consumption of 120% more water, 42% more land for crops and the loss of 14% more forest and much of the world's biodiversity.

Professor Benton argued that the age of the pesticide is coming to an end and we will have to implement integrated pest management (IPM), with new ways of pest control. In addition, we will need to maintain ecosystems at a landscape scale, as well as meet societies' needs and ethical values. He also raised the point that smarter landscapes, not just on individual farms, but throughout an agro-ecosystem, are possible, with some parcels of land producing higher yields alongside other areas with greater biodiversity. Pesticides

Professor Benton asked if it is possible to intensify agricultural production by increasing output per unit area, in a sustainable way?

will continue to have a role in IPM, but applied in a more effective way and we will see a greater use of biopesticides and other techniques for pest management. In the future instead of a 'postpesticide' era, we need to see an era with more responsible use of pesticides.

A concurrent session discussed the implementation of EU Regulation 1107/2009 and problems faced in the northern, central and southern zones of Europe. In one of the presentations, Dave Bench (Director of Science, Engineering, Analysis and Chemicals Regulation, CRD) provided an interesting view on achieving the balance between risk and benefit, asking whether society sets the 'bar'. The UK view is that effective regulation protects people and the environment and enables business growth, whilst harmonisation facilitates trade across the EU. However regulation should be based on scientific assessment of risk with proportionate decisions which reflect

*IPARC, Silwood Park, Ascot, SL5 7PY.



The 2015 event attracted 23% more delegates than the 2014 meeting, which was very encouraging. The organisers, TGSE and BCPC, are hopeful that there will be an even larger number of delegates in 2016.

particular circumstances within each member state. Unfortunately, the current operation of EU legislation of plant protection products does not entirely meet these criteria. In the UK significant progress has been made and levels of risk to operators and bystanders is very low, however this is not perceived as such by many. There is a need to develop, implement and communicate the right balance, so that benefits can be seen to outweigh the risks. Vivian Powell (AHDB) spoke about the use of pesticides on minor crops, which may not be widely grown in a member state or have an exceptional plant protection need. The commercial cultivation of vegetables and fruit represents 22% of the total EU agricultural production, but only 3% of the land area. Retailers are very demanding wanting no pesticide residues. In the UK, the Specific Off-Label Approval (SOLA) system has now been replaced by the Extension of Authorisation for Minor Use (EAMU). This requires residue data for edible crops, but not data on efficacy or crop safety.

Currently there is a GAP analysis to determine which products are missing, including biopesticides and the EU Commission is assisting in the setting up of an independent co-ordination centre for minor uses. This will support an European Research Area Network (ERA-NET) on integrated pest management, with specific reference to minor uses. (see http://ec.europa.eu/ research/era/era-net en.html) Euros Jones (Director of Regulatory Affairs, ECPA) gave an account of the European Crop Protection Associations activities regarding regulations and improving the working of the current legislative frameworks. This will involve training and setting up of databases, including the Plant Protection Products Authorisation Management system. Looking to the future, he concluded that there were too many challenges, which will have a negative impact on resources, science, R&D and farmers, but there are too few solutions to the outstanding issues. A review of the legislation will be an opportunity to improve matters but it will take time.

In a further concurrent session, Dr Ioanna (Joanna) Tzoulaki (Senior Lecturer, Faculty of Medicine, School of Public Health, Imperial College) referred to a comprehensive review of literature published between 2006 and 2012 on the epidemiology of pesticide exposure in relation to leukaemia and other conditions and diseases. However, much more detailed information was needed on exposure. What pesticide, what dose and for how long were important factors that were not adequately reported.

Laura Fabrizi (Policy Officer, Unit E3 Sector Pesticides and Biocides, DG SANTE) discussed the future for regulating endocrine disrupters, a very complex issue which is highly politicised. Much more work is needed to identify and distinguish between opinion and scientific evidence of the impact of pesticides considered to be endocrine disrupters. Alex Charlton (Principal Technical Expert, Syngenta Ltd.) then gave an account of progress in replacing animal tests. A case study predicting human safety at realistic doses of an herbicide was presented, referring to models to determine an adverse outcomes pathway (AOP) for use in risk assessment. However, it was concluded that exposure information is essential for context and to be able to replace animal data. Some databases on AOPs are being developed, but further development work is needed with prioritisation on studies for focused short term in vivo screening.

Natalie Ruddle (Study Manager in Terrestrial Ecotoxicology, Syngenta) then provided useful realistic data from a higher tier field study on the impact of treating winter sown oil seed rape seeds with the neonicotinoid thiamethoxamon bees. The moratorium on the use of neonicotinoids was introduced following claims that these insecticides were having a severe adverse impact on bees. This was based on data from laboratory tests in which bees were exposed to a dose of thiamethoxam 36x normal within 2 hours, a dose that does not reflect real exposure in the field. The field study set up hives in three, one hectare plots, 0.5 km apart, one of which had been sown with treated seed, while two were untreated. Bees were monitored leaving and entering hives, using radio-frequency identification tag



Jodie Rettino of Severn Trent Waterexplained how in order to improve drinking water safety, ideally some pesticides may need to be substituted by safer products, but the current situation can be improved by liaison with farmers to know what has been applied within catchment areas.

(RFID), over 5 weeks during the period the oil seed rape was flowering. The activity of 3000 foragers, making 9000 flights, revealed 97% of flights were under 2 hours duration with no difference between the treated and control plots and no effect due to exposure to the treated oil seed rape. With the long period between sowing and flowering and the low dose applied to seeds, the result is not surprising. In another study in Germany, red mason bees were shown to prefer oak tree pollen to oil seed rape, even though the trees were further away. It may be possible that if bees detect more favourable pollen, they may prefer to avoid the farmers' crops.

'Science, Independence and Us' was the title of Paul Leonard's (Head of Innovation & Technology Policy, EU Government Relations, BASF) plenary presentation at the start of day 2, which followed on from his 2014 plenary about innovation. He referred to media reports on when science goes wrong. Many people are not trained sufficiently to be able to make sound impartial judgements on scientific studies, so it is easy for organisations to severely criticise the use of pesticides without knowing the facts. Scientific papers are often criticised, even if written by an independent academic, just because an agrochemical company may have funded the study. Much of the developmental data accumulated by a company is kept confidential, with the exception that data has to be submitted to the authorities to obtain its registration. Clearly some route is needed to enable the public to recognise the importance and relevance of the data used to get a product approved.

The next four presentations were all concerned with the EU Water Framework Directive. Jodie Rettino (Principal Catchment Scientist, Severn Trent Water, UK) reported on the management of the catchment area of the water company. This delivers 2.2 billion litres of clean water daily; 69% of which is sourced from surface water, while the remainder is from groundwater via 181 treatment works. The catchment area management is important to meet the requirements of the Drinking Water Safety Plans, the Water Framework Directive and the National Environment programme. To improve drinking water safety, ideally some pesticides need to be substituted by safer products, but the situation is improved by liaison with farmers to know what has been applied within catchment areas and by having accurate weather forecasts.



Dr. Colin Ruscoe, Chairman, BCPC again welcomed everyone attending this year's Congress, to the third year in Brighton, continuing the BCPC tradition of bringing together participants in the EU crop protection industry in one annual, dedicated event.

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Per Kudsk (Dept. of Agroecology, University of Aarhus, Denmark) then gave a history of Danish efforts to reduce pesticide use. Farmers have to record annually what pesticides have been used on a crop basis. Far fewer pesticides can now be used compared with the UK. To support the legislative requirements, there has been research on non-chemical controls, characterization of cultivars and nationwide disease monitoring, with use of thresholds and forecasting models to optimize pesticide use, focussing on IPM. There is now a web-based decision support system integrating available knowledge that is available to farmers but mostly used by crop advisors. Non-chemical inter-row cultivation is also carried out. although under some weather conditions and soil types, farmers prefer using herbicides.

Improved management of diffuse source pesticide transfer to water in France was presented by Benoît Réal (Senior Scientist, Arvalis Institute, France). Trials have compared runoff from plots with or without drainage. Generally movement of pesticides to water is greater when the soil is saturated, so there is little chance of the pesticide being absorbed in the soil. A lower dose is advised if water drainage problems occur. To summarise this session, Jim Orson (NIAB) talked about the increase in winter wheat in the UK between 1971 – 2013, with more farmers using minimum tillage and the eventual failure of isoproturon to control black grass due to resistance. This has induced some farmers to sow more crops, including barley in the spring and use alternative herbicides. Herbicide use is preferred to mechanical weed control as it loosens the soil, which may then be lost with run-off. Modern application systems in precision farming can allow more accurate lower dose applications, thus minimising the risk of run-off.

In the last session, Rebecca Wells (Operations Director, The Voluntary Initiative) gave an account of the implementation of the sustainable use directive (SUD) with 2.6 million hectares having a crop protection management plan. The National Register of Spray Operators (NRoSo) now has 21,672 trained members, and their spraying equipment, tested annually, is used to



Dr. Matina Tsalavouta, spke during the closing session on day one looking at lessons on public acceptance, the world of GM crop trials in Europe.

treat 94.8% of the sprayed area under the National Sprayer Testing Scheme (NSTS).

The last speakers covered 'Linking REACH and CLP with pesticide registration'. Martin Richards (Principal Consultant, Linmark Consulting GmbH) was primarily concerned with co-formulants in pesticide formulations. Legal issues with the EU review and Zonal authorisation process was presented by Claudio Mereu (Partner, Fieldfisher) and lastly a presentation entitled 'Everything you ever wanted to know about biostimulants, but were afraid to ask' was given by Kristen Sukalac

(Consulting Partner, Prospero & Partners, on behalf of the European Biostimulants Industry Council (EBIC)). A plant biostimulant has been defined by the European Biostimulants Industry Council (EBIC) as a material which contains substance(s) or microorganisms(s) whose function, when applied to plants or the rhizosphere, is to stimulate natural processes to benefit nutrient uptake, nutrient efficiency, tolerance to abiotic stress and/or crop quality independently of its nutrient content. Companies selling biostimulants need to demonstrate efficacy. They are seen as complementary to conventional crop protection products and are hoping for optimal regulatory frameworks that stimulate innovation.

Overall the BCPC Congress' focus, on taking a Positive Outlook for the Regulation of Pesticides in Europe, did highlight some positive but slow progress towards implementation of EU Regulation 1107/2009. It attracted 23% more delegates than the 2014 meeting, which was very encouraging. The organisers, TGSE and BCPC, are hopeful that there will be an even larger number of delegates in 2016, when the theme will be "Changes in European Agriculture - How the Regulatory Environment Might Adapt", so set aside the dates, 4-5 October at the Hilton Metropole Hotel, Brighton, UK.

■ For information on next years congress visit www.bcpccongress.org

The TSGE BCPC conference will return once more on 4th and 5th October at the Hilton Metropole Hotel, Brighton, UK., when the theme will be "Changes in European Agriculture - How the Regulatory Environment Might Adapt".



Taking pride in amenity management

John Moverley*

record number attended this year's Amenity Forum conference held at the King Power Stadium in Leicester. It was billed as a premier event at a premier location and certainly the high quality speakers excellently addressed the key issues and challenges facing the sector in terms of all aspects of weed, pest and disease control. There was a wide range and high number of member organisations with exhibition stands demonstrating their products, services and innovation, The amenity sector is complex and diverse but highly important and, at the conclusion of the event, everyone was urged to have pride in what they do and the essential role they undertake in producing high quality sports surfaces, safe and clean streets and transport infrastructure and so much more.

Awards

*Chair Amenity Forum

Also at the event, winners of the inaugural amenity sprayer operator of the year awards were announced and more information is provided at the end of this conference report. The awards are sponsored by Everris ICL and Syngenta and the winners received a Pro Nero camera and a £250 training voucher as well as BASIS Registration offering them free one year enrolment on the Amenity Training Register.

Policy & Message

The conference began with presentations from the Chemicals Regulation Directorate and the Environment Agency. These reported on very good progress in amenity, in meeting the changes arising from the Sustainable Use Directive and promoting best practice through its voluntary initiative, the Amenity Forum. However it was stressed that there remains more to do in engaging everyone in amenity within the Forum objectives and in particular increasing numbers engaged in continuing professional development, adopting integrated approaches to weed control and ensuring everyone understands the new legal obligations for sprayer testing and in relation to selling pesticides. Standards of water quality and the legal requirements were also presented stressing the importance of ensuring a targeted approach to pesticide use, avoiding run off and taking particular care close to water courses ensuring all methods of non-chemical control are considered.

Darren Brown, chairman of the CPA Amenity Group, then spoke to the title of 'Getting our message across'. He saw it as vital that everyone involved in the sector at whatever level stands together and ensures we are pro-active in communicating the essential role undertaken and ensuring debate is based upon facts and evidence. He referred to the importance of the new initiative being led by the Amenity Forum in this regard, funded by its members, and how important it was for everyone to fully get behind it.

Integration in Practice

There then followed a number of presentations including a Panel debate on integrated approaches and what they meant and required. Andy Evans from SRUC ably introduced matters by defining what the approach meant to him and the many ways in which we can control weeds, pests and diseases. He referred specifically to football pitches and that well planned integrated approaches can produce required outcomes involving chemical, non chemical, cultural and other means. He also made reference to current discussions in Europe on endocrine disruptors, another reason for the sector to respond positively and stand together in demonstrating best practice. The panel session, ably chaired by Ruth Mann from STRI, included the views of a manufacturer, a contractor and a local authority. The issue of tenders especially by local authorities was raised. Whilst the financial pressures on such bodies were recognised, authorities needed to recognise the new legal obliga-



Winners and runners up in the Amenity Sprayer Operator of the Year Awards: From left to right Adam Bell (winner Hard and Porous Surfaces using Vehicle Mounted Equipment) Ian Haworth, Andrew Kerr, (winner Sports and Amenity Turf using a Boom Sprayer), Daniel Clarke (winner Hard and Porous Surfaces or Invasive Weed Species using Hand-Held Equipment) and James Wright.

tions. Continuing on a path of least cost results in limited control options and higher costs in the longer term. There was felt to be a need for better guidance to those specifying weed and pest control programmes. This debate prompted a questioner to refer to the reducing number of actives available to amenity and the differing approaches to approval that seemed to apply to amenity compared to other sectors. For example an active ingredient used for pest control on golf greens has been withdrawn, yet it can still be used on turf in an agricultural context. This issue is being actively pursued on behalf of the sector by the Amenity Forum.

Case Studies & Research

In the afternoon, a series of speakers addressed specific areas of amenity. Al Mason, from Languard, described the challenges and requirements in delivering contracts in urban areas. Neil Strong from Network rail gave his presentation on keeping the trains running and this was followed in this particular sequence by Andrew Heald from Confor, talking about pests and diseases affecting trees. He commented on the developing closer working of forestry with the Amenity Forum. The key message of all three presentations was to plan correctly and treat individual areas and situations according to needs, whether using chemicals or not. Professor Alan Gange spoke to the title of 'Keeping amenity grass at high class standards - a research perspective'. He recorded the recent upsurge in interest in cultural methods and soil biology. Alan has a particular interest in using the soil microbial community to improve disease resistance in amenity grasses. Alan also referred to plans for a Turf Research Foundation initiated at a conference some 18 months ago and he hoped could be made to happen with Amenity Forum support.

Pride in our sector

The author of this report concluded proceedings. He reported on how the influence and participation of the sector in best practice had substantially increased in recent years but that there remained much more to be done. It



A record number attended this year's Amenity Forum conference held at the King Power Stadium in Leicester

was vital that everyone in the sector at whatever level got involved and supported the objectives of the Amenity Forum. He referred to new guidance material launched at the conference on IPM planning and available on the Forum website, www.amenityforum.co.uk He also re-emphasised the importance of the new communication project being backed by members of the Forum and seeking to strengthen the voice of the sector. There were many issues facing everyone involved but with the right unified approach and clear communication of our vital role, these can be turned into opportunities. He also reported on free updating events being held across the UK in early 2016 and that information on these would soon be available on the website

He concluded by once again urging the sector to be proud of its achievements in producing high quality amenity areas fit for purpose and as safe and sustainable environments. He thanked everyone involved including sponsors and speakers in making the conference such a great success.

Sprayer of the Year Award winners Winner of the amenity turf boom sprayer category, Andrew Kerr from West Malling Golf Course in Kent, was praised by the judges for incorporating new technology into his spraying operation to ensure accurate application. The whole course has been GPS mapped, coupled to GPS equipment on the sprayer to ensure only the targeted areas are sprayed, to minimise use and waste. Fitting new Syngenta XC Nozzle technology has minimised risk of drift losses and achieve better application on the target.

Already a highly experienced sprayer operator, Andrew was also praised for his ongoing commitment to education and training, including gaining BASIS Foundation Award and BIGGA Master Greenkeeper qualifications. The judges were particularly impressed by his skills in practical application techniques and his innovation to design and modify the filling site and wash-bay optimised for safety, speed and ease of working.

In the category for hard and porous surface application, winner Adam Bell, of Yorkshire-based JSD R&D Ltd, was commended for his exceptional approach to detail and utilising innovative treatment techniques. Sprayers have been fitted with the capability to adjust the boom to avoid drift, with a flow meter for chemical injection into a clean water line, and sensors for spot weed treatment.

Daniel Clarke, of the DTMS Group and winner of the application using hand held equipment award, was exemplified for the Yorkshirecompany's safe dealing with chemical washings and containers, to eliminate risk of spillages, along with excellent chemical store management. Both DTMS and JSD R&D are members of the Amenity Assured scheme.

■ Copies of presentations made at the conference are available at http://www. amenityforum.co.uk/conference.html

Pesticides: Health, Safety and the Environment.

Second Edition, Wiley Blackwell. G.A. Matthews, Emeritus Professor, Department of Life Sciences, Imperial College, UK

f farmers are to continue to increase productivity in a sustainable way, innovation and compromise will be necessary. Farm outputs must be increased without encroaching further into forests and wilderness, to cultivate more land at a time when the industry is faced with issues, including a rapidly declining farm labour force and the spread of pesticide resistant weeds, pests and diseases.

The concept of integrated pest management (IPM), using a variety of crop protection methods, is not new but it is an essential way forward. Pesticides will continue to play a key role, yet inevitably, the use of pesticides carries risks that must be effectively managed.

The opening chapter provides an overview of the history of pesticide discovery and their commercialisation and the impact that they have had on crop productivity. Selected examples in major crops are given. In addition, non-agricultural pesticide markets, including forestry, amenity areas, home and garden use, and the public health sector are briefly described.

The European registration process is covered in some detail. The European Regulation 1107/2009, which came into force in 2011, demands a much more precautionary approach and this has resulted in the loss of hundreds of active ingredients previously available to European farmers. Regulatory authorities focus first on the intrinsic hazard posed by the properties of pesticides rather than determining the risk in their particular use pattern. Efforts to simplify the regulatory process have to deal with added complexity, as knowledge grows and concerns over particular aspects of pesticide use become more acute, e.g. endocrine disruption effects. The amount of ecotoxicological data now required by regulatory authorities comprises a substantial part of dossiers. Biopesticides have



become a fast growing sector and regulations have had to evolve to cope with assessing products from various categories, including microorganisms. There have been calls for more data to be required, to cover use outside the countries directly covered by EU regulations. Most developing countries rely on dossiers already evaluated in Europe or the US, where environmental conditions, and some aspects of their use, will be different. While farmers in the EU may generally use appropriate personal protective equipment, in developing countries this is often not the case and sprayers may be poorly maintained.

To maximise pest control in a given situation, attention must be paid to appropriate means of application. A comprehensive range of application equipment is described, including hydraulic sprayers, knapsack sprayers, weed wipers, aerosols, granule applicators and seed treatments. The process, whereby diluted formulated active ingredients leave spray nozzles as droplets, which impact on targets to become potentially biologically available, is complex. This is described in detail, especially in relation to minimising spray drift. In addition to wasting active ingredient, spray drift also threatens non-target organisms in the field and may pollute water bodies, risking further damage.

The way in which pesticides are applied and their subsequent move-

ment into soil, water, air and harvested produce determines their impact on people. These may be operators and other workers, bystanders in the immediate vicinity, or residents in their homes and gardens, or consumers. The methodologies employed and results obtained from measuring exposure to pesticides and off-target spray drift are comprehensively covered across several chapters. Residues in food are also extensively covered.

The options for crop protection are many, complex and entail risks. It is pointed out that while the emphasis should be on the use of pesticides within IPM systems and restricting the use of more toxic products, the huge efforts expended on lobbying for the general withdrawal of pesticides could arguably be usefully redirected towards training farmers in developing countries, in their correct use and in the maintenance of spraying equipment. Moves to limit the availability of pesticides however, demand serious scientific scrutiny, when the food supply for a burgeoning world population must be ensured. In some cases, notably recently with certain neonicotinoids insecticides, the weight of scientific evidence has been over-ruled and bans on their use have been enforced.

This is a well-written book, clearly presented and illustrated. It emphasises that, in addition to selecting appropriate pesticides in terms of their biological performance, the whole context of their presence on-farm, their use and its consequences must be recognised and managed by measuring and monitoring, regulations, education and training. The book provides a wide-ranging overview of the context in which pesticides are used and a great deal of detail on aspects of health, safety and their environmental impact. Graham Matthews has put a valuable source of background and reference information at the disposal of students and professionals interested in the use of pesticides in the global food chain and how they must be managed safely to contribute to food security.

■ Review by Dr Alan Baylis, Nuvistix Innovation Ltd, Chair of SCI Agrisciences Group

International Pest Control calendar of events

Please find below a list of key international events in the world of pest management. If you know of a exhibition or conference that is not listed here, please send information to editor@international-pest-control.com. It is sadly not possible to list all the events in the pest control world, however we will aim to publicise as many as possible. If you have attended an event and believe the discussions might be of interest to our readers, we are also interested in receiving reports and photos that you are happy to share with our readership.

Date	Days	Event / Venue / Website		
04-Nov-15	1	PestTech 2015 / National Motorcycle Museum, Birmingham / http://www.pesttech.org.uk/		
12-Nov-15	1	2015 BCPC Weeds Review (British Crop Production Council) / Rothamsted Research, Harpenden, Herts, UK / http://bit.ly/1Cemrpg		
23-Nov-15	3	The International miCROPe2015-Symposium / Schönbrunn Palace in Vienna, Austria / http://www.micrope.org		
25-Nov-15	2	Parasitec 2015 / WOW Convention Center, Istanbul, Turkey / http://turquie.parasitec.org/index.php/en/		
29-Nov-15	5	Strategies for a sustainable agriculture in Europe: innovative biocontrol options / Gottingen, Germany / http://inbiosol.uni-goettingen.de/		
5-Jan-16	3	PesTech ³ 2016 / San Jose, California, USA / http://npmapestworld.org/pestech/		
12-Jan-16	3	International Crop Production Show (SIVAL) / Angers, France / http://www.sival-angers.com/en/		
08-Feb-16	4	Annual Meeting of the Weed Science Society of America / San Juan, Puerto Rico / http://wssa.net/		
29-Feb-16	4	Global Food Safety Conference 2016 / Berlin, Germany / http://www.tcgffoodsafety.com/		
1-Mar-16	4	BPIA semi annual meeting and Bio Controls USA 2016 / Monterey, California, USA http://www.biopesticideindustryalliance.org/		
2-Mar-16	2	Pest-Protect, The new trade fair of the German Pest Control Association / Stuttgart, Germany / http://www.pest-protect.eu/		
2-Mar-16	2	CropWorld Global 2016/ Amsterdam RAI, Netherlands / http://www.cropworld.com/		
6-Mar-16	4	12th Fumigants & Pheromones Conference and Workshop / Adelaide, Australia / http://www.insectslimited.com/adelaide		
16-Mar-16	1	PPC Live (BPCA) / Peterborough, UK / http://bit.ly/1X57Jrd		
17-Mar-16	1	Driving integrated vector control in the global sustainable development framework, ISNTD Bites 2016 / London, UK http://www.isntdbites.com/		
26-Apr-16	1	Benelux Pest 2016 / Eindhoven The Netherlands / http://beneluxpest.nl/en/		
19-Jun-16	7	7th International Weed Science Congress / Prague, Czech Republic / http://www.iwsc2016.org/		
5-Sep-16	3	2nd Euroasian Pest-Management Conference / Technopark SLAVA, Moscow, Russia / http://www.pestmanagement.su/english/invitation/		
11-Sep-16	5	20th Australasian Weeds Conference (20AWC) / Perth, Australia / http://www.20awc.org.au/		
14-Sep-16	3	FAOPMA 2016 / Gold Coast, Australia / http://bit.ly/1SWhZS5		
4-Oct-16	2	Changes in European Agriculture - How the Regulatory Environment Might Adapt BCPC Conference / Brighton, UK http://www.bcpccongress.org/		
18-Oct-16	4	PestWorld 2016 / Seattle, Washington / http://conference.npmapestworld.org/		
24-Oct-16	3	Annual Biocontrol Industry Meeting (ABIM) / Basel, Switzerland / http://www.abim.ch/home-abim.html		
2-Nov-16	1	PestTech 2016 / Birmingham, UK /		
22-Mar-17	2	PestEx 2017 / ExCeL, London, UK / http://bit.ly/1EwYDPn		

International Pest Control intends to be at the following events, we hope to see you there.

- PestTech 2016 Birmingham, UK 02 Nov 2016
- PestWorld 2016 Seattle, USA 18-21 Oct 2016PPC Live 2016 Peterborough, UK 16 Mar 2016
- ABIM 2016 Basel, Switzerland 24-26 Oct 2016
- BCPC Congress 2016 Brighton, UK 04-05 Oct 2016
- Pest-Protect 2016 Stuttgart, Germany 02-03 Mar 2016

www.international-pest-control.com

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