

The independent UK pest management magazine

A threat to UK shores?

Issue 28 July & August 2013





House mice surprise researchers



Preventing foreign body contamination



Tracking bed bugs on the move!

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As the industry's only independent magazine, **Pest** aims to deliver a mix of unbiased news, impartial advice and topical technical features. We are committed to being as inclusive as possible covering every sector of the pest management industry.

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Pests of today. Pests of tomorrow?

We are never satisfied! Too cold, too wet and, just recently, too hot! But the earlier rain followed by the heat seems to be getting those insects moving! There have been reports of unusual numbers of bees and bumblebees, with wasps at last starting to make their presence felt. Thank goodness!

One insect which has certainly made an impact worldwide is the bed bug. Whilst the USA appears somewhat fixated with the problems it causes, things are a bit different in the UK. Whilst the incidence of bed bugs over here does seem to be increasing, the degree of interest it attracts more than out-weighs its significance as a wide-scale pest.

Having said that, the amount of both research work and also new product innovation marches onward – as illustrated by the extensive coverage given over to this single pest in this bed bug special edition.

If bed bugs are a problem today – maybe mosquitoes are the pest of tomorrow? Read the article on pages 32-34 and make-up your own mind. Happy reading!

Janen Hala

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BPCA – so near yet!

Having reached the shortlist, both BPCA's website and the biennial PestEx exhibition narrowly missed out on being named winners at the recent Trade Association Forum Best Practice Awards 2013.

At the awards ceremony held on 11 July in London, the website and PestEx went headto-head with tough competition from across the world of UK trade associations.

BPCA chief executive Simon Forrester said: "We are absolutely gutted to have not come away with anything this year. However it's a great achievement for the association to even be nominated for both awards – we only entered the two, and to be shortlisted for both, shows the quality of our projects."

Exosect extra funding

Winchester-based research company, Exosect, has announced the completion of a \$4m round of funding. The investment comes from its existing investor base.

Martin Brown, managing director said: "This investment is a further testament to the versatility of our platform technology, Entostat. We have demonstrated its potential as a sustainable delivery system for a wide range of pest control applications ranging from moth control in food processing facilities to stored grain protectants."

Green award for Cleankill

Staff from Croydon-based Cleankill Environmental Services are celebrating after winning the Best Green Business at the South London Business Awards and being named as a finalist in the Commitment to the Community category.

Croydon-based Cleankill Environmental Services beat hundreds of other companies from across South London to win the award for its efforts to be green. Cleankill managing director Paul Bates said: "For the last few years, striving to be greener has been one of our top priorities and to think that a firm that is involved in our sort of business can be recognised in this way is fantastic. We've being doing things like using Boris' bikes to visit customers in London, purchasing 'Blue Motion' vehicles and using green pest control methods, such as hawks, to deter seagulls.



Collecting their award, Cleankill's directors Jon Whitehead and Paul Bates (right)

"Winning this award can only be good for our business as many of our customers and potential customers are keen to use pest control companies who care about the environment. It has also been a huge morale boost for staff to have their efforts recognised in this way."

The 2013 South London Business Awards has been developed and organised by Prospects Services (SLB) to reward and celebrate the many dynamic and innovative businesses in South London. The winners were announced at a Gala dinner held at Riverbank Park Plaza, on 4 July 2013 in front of 350 guests.

Rokill at the Palace

Royal Warrant holders, Rokill Pest Control recently took part in the Coronation Festival at Buckingham Palace. The event was organised by the Royal Warrant Holders Association to celebrate the 60th anniversary of the Queen's coronation.

Royal Warrants are issued by the Queen, The Duke of Edinburgh and



The Prince of Wales to companies that have supplied goods or services for over five years, demonstrating the values of quality and service. Around 800 companies hold a Royal Warrant and 200 Warrant holders were selected for the Coronation Festival. One of the key objectives was for the companies involved to demonstrate the incredible range of products and services provided to the Royal Households, including pest control.





New library required to be a bird-free zone

After three years in the building, and at a cost of £188.8 million, the last thing Birmingham City Council wants to see on its prestigious new Library of Birmingham is bird droppings!

Due to open to the public on 3 September 2013, Kym Martin from Contego is already on patrol with her Harris hawk and gyr saker falcon to ensure neither pigeons, nor gulls become the first visitors.

At the moment Kym is visiting Centenary Square once a week to fly the birds, but once the library opens these visits will have to be out of opening hours when fewer people are around.

Kym, who lives in Wolverhampton, has been working with her birds – a job she obviously enjoys – for ten years and says: "Falcons and

hawks really are the most effective way of ensuring pigeons and gulls don't use the structure of the new library as a nesting site."

Grahame flies-off to Mitie

Grahame Turner, well known in the industry for his expertise and innovative ideas in bird management has joined Mitie Pest Control as training and technical manager. His primary role will be staff training in all aspects of pest control and representing the company on technical issues. Grahame is also a member of the **Pest** technical advisory board.

Previous to this Grahame was technical

manager at Network, now part of P+L Systems, where he was technical manager – bird control. Commenting on the appointment, Peter Trotman, managing director of Mitie Pest Control said: "It was the strong growth in the business last, and also this, year which has given us the opportunity to invest further in quality training."

New European manager for PelGar



British manufacturer, PelGar International, has announced the appointment of Vincent Russo as European sales and marketing manager. Vincent will be working in a business development capacity to expand PelGar's European rodenticide and insecticides activities and broaden these

into new and developing markets. To date Vincent's career has been primarily in the area of new export business development for blue chip organisations in FMCG and biotech fields. He has travelled extensively and has experience of working in four continents which has helped him to develop multi-language skills and work in a variety of culturally sensitive situations.



IVCC has a new CEO

Liverpool-based Innovative Vector Control Consortium (IVCC) has appointed Dr Nick Hamon as its new CEO. Nick comes to IVCC with over 25 years experience in product development in the crop protection and environmental science industries. Most recently he was head of sustainability at Bayer CropScience, North America.







CRRU asked to develop SGARs stewardship

The next step in the saga concerning the use of the second generation anticoagulant rodenticides (SGARs) has emerged. The Health & Safety Executive (HSE), the UK's Competent Authority for biocides, has invited pest control industry stakeholders, co-ordinated through the Campaign for Responsible Rodenticide Use (CRRU), to develop a stewardship regime for SGARs.

Plans have to be developed and proposals presented to HSE, Department for Environment Food and Rural Affairs (Defra) and Department of Health (DoH) by the end of September 2013.

In a process that began in August 2012, (see **Pest** issue 23 September & October 2013) HSE invited comments from stakeholders and other interested parties on Environmental Risk Mitigation Measures for SGAR use in the UK.

In April this year, HSE held a meeting with stakeholders to discuss the responses (as reported in **Pest** issue 27 May & June 2013). The outcome was that future use of SGARs requires a stewardship campaign for all main rodenticide user groups, including pest control professionals, local authorities, farm and land managers, gamekeepers and amateurs.

If the proposed stewardship regime is

endorsed by the government oversight group, implementation will start as soon as possible after the end of September.

Alongside this, HSE will determine the regulatory requirements for the authorisation of SGAR products to align with the stewardship regime. This will include any changes required to authorisations for existing products.

Assuming agreement on an acceptable stewardship regime is reached, on-going monitoring of the success of the initiative, including occurrence of anticoagulant residues in wildlife, will follow implementation.

Success criteria will be agreed, with periodic review to consider the impact of the regime and make changes if required. A decision to revert to more stringent regulation may be necessary if effects on non-target organisms are found to be unacceptable.

A successful stewardship regime for SGARs will:

- Define roles and responsibilities for all stakeholders;
- Ensure delivery of agreed 'best practice' in all use sectors;
- Provide the information/data required to inform and monitor success:
- Include an oversight mechanism to receive, review and respond to intelligence;
- Understand and define the risks and benefits to strike the right balance between; environmental, public health and commercial concerns;
- Be fully implemented by all parties.

Dr Alan Buckle, CRRU chairman said: "CRRU welcomes the opportunity to coordinate this important stewardship initiative. It is now in the hands of the suppliers and users of rodenticides to show that these essential products can be applied without unacceptable impacts on UK wildlife."

on the web



Starting out in business?

In our last edition of **Pest** (Issue 27 May & June 2013) we examined the characteristics that make a good, practical pest controller. Now, we would like to take this one stage further.

Having learnt 'the ropes' many of you branch-out and set-up your own operation. If you have recently started, or are about to start, your own servicing business and are willing to share some of the challenges you have faced and your experiences – good and bad - we would like to hear from you.

Have you struggled with any particular technical or business issues? Have you thought about, or joined, one of the trade associations?

> Please get in touch to let us know, in confidence, how you have fared.

Email the editor at editor@pestmagazine. co.uk or give us a ring on 01509 233219.



Draft CEN standard en out for consultation

On 15 July, the long awaited document which sets-out the international standard for pest control servicing was published. All within the industry are encouraged to make comment and feed-back by 4 November 2013.

The CEN European Standard for Pest Management Services is a voluntary industry initiative that specifies the requirements, recommendations and basic competences under which pest management servicing companies must operate to guarantee a professional service to their customers and ensure that the industry is recognised for responsibly protecting European citizens, animals and the environment in which they live against public health risks.

Copies of the draft Standard - prEN 16636 - are available from each country's individual National Standards Institutes. For the UK this is the British Standards Institution (BSi). Printed copies are also available to purchase (£20) from BSi by calling 020 8996 9001 or emailing cservices@bsigroup.com.

All comments have to be made using the BSi draft review system accessed via their website at http://drafts.bsigroup.com/Home/Details/51554. The closing date for comments is 4 November 2013, after which the BSi national committee will review all comments before submitting the UK response to CEN. The final version is expected to be released in the spring of 2014.

Greeting the publication of the Standard, Rob Fryatt, chairman of the CEN TC 404 workgroup said: "I am delighted to see the CEN draft standard now available for the important public consultation phase and right on time! The work by the CEN European workgroup and the members of each of the national mirror groups has led to a document that the European industry should feel proud of. It's a first for our great industry - anywhere in the world. I would encourage the industry to read the document and feedback any comments. The consultation stays open until November so there is plenty of time for everyone to comment."

on the web

Fipronil also now EU restricted

On 16 July, the European Commission added fipronil to the list of agricultural pesticides whose uses are to be restricted in an attempt to halt the decline in European honey bee numbers. Fipronil joins the three neonicotinoid insecticides - imidacloprid, thiamethoxam and clothianidin – already subject to a two year ban. Fipronil will no longer be able to treat maize and sunflower seeds at the end of this year.

BASF, the manufacturers of fipronil, expressed its disagreement with the Commission's decision, saying it would limit growers' access to valuable and approved technologies. In the pest control sector, fipronil is widely used and is the active substance in such products as Goliath gel.

Although bad news for the manufacturers, there is no need to panic regarding the use of imidacloprid (contained in Maxforce products) and fipronil in the pest control

sector. **Pest** approached the Health & Safety Executive (HSE) to clarify the position. A spokesman said: "At present the use of these biocidal products is unaffected by the decision that has been taken at EU level concerning the use of these plant protection products. The draft text of the Commission Regulation only refers to professional users of products containing imidacloprid, thiamethoxam and clothianidin and specifically to plant protection products."



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Conference organisers, Gary Williams and Louise Summers demonstrate the Huntsim device, which allows remote monitoring of cage traps

New urban wildlife group



The Association of Urban Wildlife Professionals was launched at the Urban Fox Conference on 12 July. Pictured above (from left) are the three urban wildlife professionals behind the new group: Bruce Lyndsay Smith of County Pest Control, Steve Barron from Pest-Go and Gary Williams from Urban Wildlife. They are calling on other like-minded professionals to join them to stand up for professional wildlife management.

As Gary Williams explained: "In a society where urban wildlife is increasingly co-habiting with man, we professionals have an obligation to provide the best available information and advice to local councils, wildlife crime officers and the public at large."

The 'urban wildlife three' have already attracted support from the Chartered Institute of Environmental Health's National Pest Advisory Panel (NPAP) and Jo Fozzard from Killgerm, representing NPAP, attended the conference. If you are a professional dealing with urban wildlife management then Bruce, Steve and Gary want to hear from you so email:

auwp_org@yahoo.com or call: 0330 010 0550.

read more on the web



Urban fox challenge

The challenges of urban fox management were the subject of the second Urban Fox Conference held on12 July in Old Harlow, Essex. Associate editor, Helen Riby was in the audience.

Urban foxes have become an established part of city living and, given that to have any significant impact on urban fox populations would require a cull of at least 70% year-on-year, that is a situation unlikely to change. It should also never be forgotten that the majority of city dwellers do not want foxes killed. For this reason, the pest management professional's job boils down to either excluding the animals from areas where they are causing a nuisance, or dealing with problem individuals by cage trapping and humane despatch or, if circumstances allow, shooting in the open.

However, simple as that may sound, there is plenty of confusion out there among the public, local authorities and, dare we say it, pest controllers. Some councils tell residents that foxes are protected and that there is nothing they can do to solve a nuisance problem. Some, so called pest controllers, are happy to cage trap urban foxes and dump them in the countryside where they either die of starvation (a lack of MacDonalds) or are attacked by the resident fox whose territory they have, inadvertently, invaded.

Unfortunately, perhaps due to a last minute, enforced change of venue, there were only a few people in the audience and the key afternoon speaker – a wildlife crime officer – was unable to attend.

However, in the morning session, Paul Butt from Natural England gave an excellent and wide ranging presentation on the legal aspects of fox management and, in particular the implications of the Animal Welfare Act.

The morning session also included a interesting paper from Jacques Frojmovic from Belgium-based electronics company, Simtelligence. He explained how his company's Huntsim device can provide 24/7, 365 days a year monitoring for cage traps. The simple plug-and-play device is attached to the cage and alerts the pest controller when the trap is sprung. It allows pest controllers to prioritise their trap checking visits and has the potential to offer significant cost savings.





The conference was filmed for the BBC





Pigeons get rescue services into a real flap!

At the beginning of July, it took two fire engines with nine crew, a police car and the RSPCA to rescue what? Three pigeons!

The pigeons had got caught in bird netting poorly stuffed-down the sides of solar panels (see picture above) on the roof of a shop in Spennymoor, County Durham. First on the scene was the RSPCA who had been contacted by a member of the public. But when they were unable to access the shop roof, they called the local fire service.

A fire engine was dispatched, but firemen decided to send another soon after with specialist equipment to aid the release of the birds. As they tried to rescue the birds, the two fire engines blocked the road, so a police car turned up to control the traffic. All three pigeons were eventually rescued and later released unharmed.

Believe it or not, there was virtually a repeat performance, when three days later a further single bird became entangled. The RSPCA was once again contacted and a fire engine despatched to perform the rescue.

Local residents have questioned the emergency services' decision to send so many people to the scene. One said: "I am an animal lover, but pigeons are actually

classed as vermin. Would you rescue a rat? This must have cost a fortune."

A spokesman for County Durham and Darlington Fire Service claimed the crews responded to stop members of the public trying to rescue the birds themselves.

Michael Taylor, managing director of local pest control company Contego, commented: "Solar panels offer an ideal nesting place for pigeons due to the install distance between roof and panel. We are seeing an increasing number of calls regarding this

each month. We have come across several cases like this where pigeon netting has been incorrectly installed by the solar panel installers creating a 'trap'. With pigeon numbers on the increase locally proofing of panels is an excellent opportunity for pest controllers.

The emergency services were out in force! Nine fire crew, the police and RSPCA to rescue three pigeons



Specialist equipment was brought in



Seagulls drunk on flying ants!

Residents in Bristol are reporting new gull behaviour. The city is well-known for its high gull population and associated problems, but experts are now investigating a rise in seagull attacks. It seems the birds are lashing out because they are drunk on record numbers of flying ants. The recent hot and humid temperature has prompted the annual flying ant season and gulls find the ants an irresistible meal. The theory is that once eaten, the ants produce formic acid in the pigeons' stomachs. This acts like alcohol -



causing the gulls to lose inhibitions around humans and brazenly steal food etc. They are apparently left so tipsy that gulls have been seen flying straight into buildings and into the paths of moving cars. Fortunately for the residents - and also the gulls the flying ant season is short lived.

Bad news for native ladybirds

Originally from China, harlequin ladybirds (right) are good at controlling aphids and have been widely used as a biological control agent. They arrived in the UK in 2004 and, not only do they out-compete our smaller native ladybirds - see **Pest** issue 6 November & December 2009 – but recent research shows they carry a disease - a kind of fungus – that lives in their blood. This disease is harmless to harlequins but fatal to other ladybirds. Research suggests that the association between the harlequins and the fungus is an adaptation and that they are using the fungus as a biological weapon to compete with other ladybirds.



How to outwit a house



When it comes down to it, mice have always been trickier to deal with than rats. As new research clearly demonstrates, enticing them to take a lethal dose of bait requires plenty of ingenuity.

Yes, mice are generally trickier to deal with than rats and probably have closer contact with people as they are mainly found living in our buildings. Although they are much more inquisitive, enticing them to take a lethal dose of bait requires pest controllers to display a degree of ingenuity.

Research undertaken by Professor Gai Murphy from Salford University, College of Science and Technology and research assistant Alex-Felix Thomas, in conjunction with Mike Fowler, pest control services manager of Manchester City Council, clearly demonstrates this.

Whilst similar work was undertaken by Drs Alan Buckle and Colin Prescott in 2010 observing rat behaviour and published in their paper 'Effects of tamper resistant bait boxes on bait uptake by Norway rats (*Rattus norvegicus*)', this project, the first independent trial of its kind in the UK, concentrated totally on mice.

Authorities need to take note of findings

The results ring-out a warning to the European Commission and to the Health & Safety Executive (HSE) that their proposals to tighten regulations on how baits should be formulated and presented, with a view to reducing the risks of contamination and primary poisoning of people and non-target animals, may lengthen the time to gain control.

Professor Murphy's team looked at a variety of typical housing types where mice problems had been reported to Manchester City Council.

At each site the quantity of the bait taken by the mice was measured. The particulars of the trial were:

- Four different types of housing (terraced houses, flats for the elderly and flats used to shelter homeless families);
- Four properties from each housing type;
- Four different types of living accommodation within each property type were baited (kitchen, bedroom, bathroom and meter room);
- Two different bait formulations were used (loose wheat or wax block);

- Baits were presented in three different types of container (open trays, cardboard tubes and tamper-resistant plastic bait boxes);
- Baits were checked daily and the amount of bait taken, recorded.

Whilst intuition would suggest that wax blocks may prove a little less palatable than other formulations, this coupled with knowledge of the love of the house mouse for investigating holes, might suggest that tubes and boxes would be favoured over open trays, the results proved surprising.

"Bait presentation did influence the amount of bait taken by house mice infesting urban dwellings."

Professor Murphy presented the results of this work at one of the seminars held at PestEx 2013 in April. She asked the audience, which consisted mainly of experienced pest controllers, to rank the results achieved. Whilst they did pretty well, even they were surprised by the outcome. What do you think? Why not have a go and then check the actual results over the page?

Research questions What do you think the results were?

- Q1 In which type of housing was most bait consumed? (Choice: terraced houses, flats for the elderly and flats used to shelter homeless families)
 Q2 How much bait, in percentage terms, was taken from open trays, cardboard tubes, tamperresistant plastic boxes?
- Q3 In which room was the most bait taken? (Choice: kitchen, bedroom, bathroom or meter room)
- Q4 What proportion of bait, in percentage terms, was taken on each of the four days of the exercise?





The PestEx audience members least surprised by the results were those who had been in the industry the longest and can remember when open trays and cardboard tubes were the norm and when most baits were loose grain based.

Practical implications for mouse baiting

Amongst the audience was Dr Alan Buckle from the University of Reading, who succinctly summarised the practical implications of these findings, saying: "These results pose serious questions for our regulators. There is a drive towards achieving zero exposure to rodenticide by insisting on ever more secure bait boxes and bait formulations that ensure that bait cannot be spilled from those boxes. Is this making successful baiting against rodents in certain situations, impractical?"

And he concluded: "This work seems to suggest that the answer to that question is 'yes'. Regulators might argue that this is a small price to pay in order to eliminate the risk of human exposure to rodenticide, but has any work been done to balance this risk against the heightened human risk of exposure to the rodents that have not been eradicated?"

More questions to be answered

Whilst this research provided some useful results, as Professor Murphy observes there is still work to be done.

There is scope to continue improvements in bait box design. Following his work with rat boxes, Roger Quy of Defra's Central Science Laboratory, observed in 2011 that: "Tamper resistant bait boxes with internal baffles would seem overly to restrict a rat's access and discourage group feeding." To this could be added that, in comparison to cardboard,



Research findings Did you guess the results correctly

Q1	Terraced houses	63 %
	Flats for the elderly	32%
	Flats used to shelter homeless families	5%
Q2	Bedroom	46 %
	Kitchen	33%
	Meter room	12%
	Bathroom	9 %
Q3	Wheat in cardboard tube	75%
	Wheat in tamper-resistant box	16%
	Wheat in open tray	9 %
	Wax block in tamper-resistant box	0%
Q4	Day 1	51%
	Day 2	6%
	Day 3	32%
	Day 4	11%

walking on plastic is not pleasant for a mouse, it is cold, slippery and, once in the box, noisy! Also comparing wax blocks with loose whole wheat is a comparison of extremes. Would the use of pasta or gel formulations bring the current difference between the two formulations closer together?

With questions still to be answered and this research so pertinent to regulatory developments in the field of rodent baiting, the industry looks forward to the next phase in Prof Murphy's work with, dare we say it? – bated breath!

The research measured the difference in bait take between wax blocks and grain bait in tamper-resistant plastic boxes, cardboard tubes

and open trays. The results were, to say the least, surprising







Annual meetings held

Formal Annual General Meetings (AGMs) are pretty routine affairs with accounts presented for approval, auditors appointed and officers elected. Both BPCA and NPTA held their meetings in June.

NPTA was first on 5 June. To liven-up proceedings they took the opportunity to hold an Open Day for members to view the new set-up at NPTA House in Eastwood, near Nottingham. This took the form of a series of presentations on business development, risk assessments, non-toxic monitoring baits and lone working with a buffet lunch provided. The AGM which followed formally received the final National Rodent Survey Report for 2010/11 (published in April 2012). With so many changes in local authorities, and many now disinclined to participate in this voluntary survey, it was felt that the results would no longer be representative so the time had come to stop.



From left: NPTA chairman lain Turner, chief executive John Davison and director Adam Hawley fielded questions. Iain was pleased to report membership had risen to 883



Time to vote at the BPCA meeting, which was supplemented this year by an Extraordinary General Meeting (EGM) to approve a revised merged Memorandum and Articles of Association as required by updated company law

At the BPCA AGM on 12 June, all last year's officers were returned unopposed and four new non-executive board members were elected - Kevin Brown of Rentokil Initial, Rob Long of Goodwin Pest Management, Tim Peeling of Prokill and Mark Williams of Ecolab.

Once the formalities were complete, president Henry Mott presented an overview of the Association's activities during the previous year and its plans for the future. During the year BPCA had launched its 'affiliate scheme' for individual pest controllers. It is currently free of charge and has already recruited 600 affiliates. The AGM is also the opportunity for BPCA to recognise excellence. Three awards were made: the Charles Keeble Award to Rachel Waterworth of Cannon, the John Bull Award to Robert Smith of Smith Pest Control and the Del Norton Award to Mike Kelly of Acheta.



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Sleeving lamps the art of getting it covered

EFKs are one of the simplest and most widely used devices in the food industry. But the lamps they contain can pose a risk of foreign body contamination. The solution is sleeving, or coating to offer shatter resistance but that's nowhere near as easy as it sounds.

For those working in the food industry, flying insects pose a multitude of health risks. Electronic fly killers (EFKs) are one of the simplest, most easily installed and most frequently employed preventative measures. But, ultra violet lamps made from glass and the phosphors which generate the UV, can also pose a hazard of foreign body contamination if the lamp is broken.

EFK manufacturers have responded to this challenge by 'sleeving', or coating, the lamps so offering shatter-resistance.

But this is no easy task chiefly because, over the last 20 plus years, the industry has developed a multitude of different lamps used by various EFK manufacturers with varying wattages and different shapes, sizes and diameters.

Fortunately the purchasing and manufacturing departments of Wembleybased Bower Products have risen to that challenge so that today, the company aim is to provide a one-stop-shop for all lamps – sleeved or un-sleeved.

Bower director, David Bowerman explains: "It is important to recognise that there is currently no official standard for the sleeving of specialist UV lamps. However, along with the other specialist sleeving/coating companies working in the pest control industry, the closest standard we can work to is BS61549. This covers fragment retention lamps – lamps which have 'additional integral protection by means of sleeving or coating to reduce the risk of cap detachment and ejection of glass fragments in the event of lamp breakage. This standard only deals with 'double-capped fluorescent fragment retention lamps for general lighting, he adds.

The standard covers straight white lamps, but not UV or shaped lamps – shapes frequently used in the modern EFK machines of today.

To meet the standard, various tests and checks

Right, the end result shatterresistant lamps are required, including a four metre drop test carried out at various stages in the life of the sleeving to ensure all glass fragments are retained and the end caps stay in position. Fire hazard testing is also carried out using a glow wire system to ensure the material being used cannot support a flame.

Specialist UV stabilised material is used by companies sleeving lamps for the flying insect control industry. This material has to be highly flame-retardant, able to cope with extremes of temperature and, most importantly, be capable of transmitting UV light rather than allowing light to be absorbed into the sleeving material itself.

For the past 15 years Bower Products has been sleeving lamps and is now one of the leading companies offering this service to its customers throughout Europe and the Middle East.

So - how's it done?

Due to the wide variety of lamp shapes and sizes, lamps are sleeved in different ways. Generally straight lamps are processed through a machine – as seen right. The sleeving arrives preformed and on an enormous roll. It is fitted over the lamp, a bit like stuffing the skin when making a large sausage. Once applied, it goes through heat tunnels which shrink the material onto the lamp.

Lamps which are not straight have to be either 'booted' or heat-shrunk by hand. Here the sleeving is pulled over the lamp and then shrunk around the base to retain it.





This process is called booting, as it is rather like pulling-on a pair of socks. But a very hot pair of socks. Specially selected heat resistant gloves are imported from Sweden to ensure the safety of Bower's staff when performing this task.



Machines have been developed to developed to



More complicated shapes have to be sleeved or booted by hand



Bed bug realities Survey sheds light on UK bed bug work

The latest National UK Pest Management Survey sheds some revealing light on the opportunities bed bugs offer and the extent to which pest control professionals are involved in bed bug management. It puts bed bug control today, firmly into perspective.

Bed bugs have certainly been the talk of the industry in recent years, with a plethora of new products and techniques promoted to detect, exclude and eliminate what is known to be a 'difficult' pest. But how significant are the opportunities bed bugs actually offer professional pest controllers? To what extent are PCOs taking advantage of them? And how are they employing the extended armoury of management tools now available in commercial practice?

Involving a broad cross section of nearly 300 pest controllers from across the UK, the 2013 National UK Pest Management survey run jointly by BASF Pest Control Solutions and **Pest** magazine suggests that around three quarters of pest controllers are currently undertaking bed bug work.

That's a significant increase over the 2012 survey when just over half of respondents

said they were active in bed bug management.

Big increase in bed bug work

Indeed, 44% of pest professionals reported an increase in bed bug work over the past year against 18% seeing a decrease – an overall net increase of 26%. This net increase was most apparent among private companies and local authorities and least evident with the self-employed (Figure 1).

"While this level of increase is impressive in percentage terms, our 2012 survey showed bed bug control was only 5% of average annual activity," points out **Pest** magazine survey co-ordinator, Helen Riby. "So it is only a small part of most pest control businesses.

"Taking those who do no bed bug work out of the equation and looking more closely at

bed bug special



the figures, we see that for over a third, bed bug work was a very small fraction of their workload – often just 1% or 2%. However for half of all pest professionals involved in bed bugs the work accounted for between 5% and 10% of their total activity.

"Perhaps, unsurprisingly, as the proportion of total activity made up of bed bug work increases, the likelihood that it will be conducted by a private pest control company, rather than a local authority or self-employed pest controller, also increases (Table 1). This may be indicative of the scale of bed bug contract work with hotel chains for example and the risks involved should something go wrong; making the protection offered by a limited company essential.

"Interestingly too, in the 2013 figures, the net 26% of controllers reporting an increase over the previous year contrasts with the



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65% expecting one in our 2012 survey. This suggests less than half those anticipating an increase in work actually saw it happen.

Growing sense of realism

"Add to this the fact that net expectations of an increase in future bed bug work fell sharply – to 50% – in our 2013 survey and it appears that many professional pest controllers may have been overly-bullish about their prospects here and are now beginning to temper them in the light of experience."

Part of this growing sense of realism after several years of what can best be described as 'hype' over the growing problem of bed bugs almost certainly relates to the fact that problems with the pest do not appear to have taken-off as dramatically as originally feared.

Bed bugs are clearly a particular issue in some urban environments. And resistance to insecticides, as well as the exceptional ability of the pest to spread both nationally and internationally, remain significant threats. But across the UK as a whole, it seems, most pest controllers have yet to see any massive upsurge in problems.

The time-consuming and resource intensive

nature of the control work involved is also likely to be governing attitudes. After all, with time accounting for almost 70% of treatment cost, pest professionals



generally estimate it to be the least profitable of any pest job.

Equally, more than any other work, successful control depends on customers'

willingness and ability 'to do their bit' in clearing clutter, laundering or disposing of infested bedding and soft furnishings, and leaving rooms out of service for sufficient time to ensure effective treatment.

Unless much of the work involves regular contracts with co-operative clients and a time-based charging structure, it can be difficult for professionals not specialising in the work to earn enough from bed bug control to justify the time involved. Certainly so when compared to rodent,

Table 1: Bed bug management activity					
Type of pest control	Proportion of total pest control activity				
organisation	Up to 5%	5% to 10%	Over 10%		
Private companies	30%	44%	52 %		
Self-employed	13%	31%	29 %		
Local authorities	56 %	25%	19 %		
	-	Lung Book and			

Source: The National UK Pest Management Survey 2012

pest 17



SURVEY Bed bug activity

cockroach, wasp, ant and almost any other pest work, which is both less time-consuming and not nearly so dependent on active client involvement.

"Our experience in Europe and the USA suggests that the sheer scale of inspection and treatment work required means many initial bed bug treatments take five hours or more," reports BASF insect control specialist, James Whittaker. "And an average of between two and three treatments are needed to get an infestation under control.

"In the USA, a University of

Kentucky survey found that over half of American pest controllers report that it takes them more than three treatments to achieve control where the environment is cluttered. This compares with less than 10% in uncluttered surroundings. Under these circumstances, the most reliable and effective treatment regimes are essential to minimise unnecessarily lengthy visits and costly call-backs."

So, exactly what techniques are pest controllers using in their bed bug work?

Well, despite well-publicised developments

Figure 2: Which management methods do you use against bed bugs?



Proportion of those undertaking bed bug management

Source: The National UK Pest Management Survey 2013

in heat, steam and freezing treatments, the National UK Pest Management Survey shows they remain very much a minority sport in practice.

None of these non-chemical controls is currently being employed by much more than one in every 10 pest controllers.

Sprays used by all

In complete contrast, insecticide sprays are used by almost every single PCO, complemented in most cases by dusts and powders (Figure 2). Simple cardboard or plastic bed bug monitors are being used by just over six in 10 pest controllers, while more complex monitoring devices are only being employed by around one in 10, and bed bug detection dogs by even fewer – although this may be considerable relative to the number of dogs currently in service.

98%

100

As far as prevention is concerned, mattress encasements are the most widely used measures, with devices that prevent bed bugs climbing onto beds also being employed in significant numbers.



Survey shows bed bug epidemic continues in USA

A survey by the American trade association, the NPMA, in conjunction with the University of Kentucky earlier this year focussed specifically on bed bugs. These pests have rather taken the USA by storm and continue to be a hot topic across the pond. The headline results were that bed bugs continue to plague American cities, large and small, with 98% of pest control companies reporting that they had treated apartments and 96% family homes in the previous year.

Almost half (49%) of respondents said that bed bug infestations are a seasonal problem occurring most often in the summer. As more people tend to travel and relocate during the summer months, it is possible that a greater number of people unknowingly transport the bugs back home from their travels, or discover them soon after moving. As the listing below shows, the survey found that pest controllers had treated bed bugs just about everywhere – the mark of a true comensual pest!

- Apartments 98%
- Family homes 96%
- Hotels/motels 75%
- College dorms 47%
- Nursing homes 46%
- Office buildings 36%
- The figures are the percentage of pest control companies reporting they had treated for bed bugs in each location type



Schools and day care

centres - 41%

Hospitals – 33%

Transport (train/

bus/taxi) – 21%

Cinemas –10%

Mapping bed bug mobility

From dawn to dusk, bed bugs remain mostly in their harbourages. Understanding their movements after the lights go out can provide useful insights for monitoring and management purposes. In this article, which first appeared in *Pest Control Technology*, the leading American pest management magazine, bed bug experts Michael F Potter, Jennifer R Gordon, Mark H Goodman and Travis Hardin shed some light on what bed bugs get up to at night.

bed bug special



Bed bugs were marked with hobby paint

Like cryptic 'couch potatoes', bed bugs lead rather sedentary lives — at least during the daytime, when inspections and treatments are typically performed. Drawn by aggregating pheromones, bed bug nymphs and adults spend most of their time clustered in hidden harbourages where mating, egg-laying, hatching, moulting, digestion and defecation occur. They venture out in search of blood when hungry, and typically, at night.

Running on empty

Bed bugs are mostly nocturnal, but will adapt to the sleep cycle of their host. For example, if a person works night shifts and sleeps during the day, the bugs will adjust and feed during daylight hours. Hungry bed bugs may feed regardless of the time of day — an occupational hazard experienced at times by service technicians. Hungry bed bugs also tend to move around more than



The bed bugs marked with blue paint were under the reclining chair

satiated bugs, presumably in order to locate a food source. However, if host absence is prolonged (as might occur in a vacant apartment), their search activity may be reduced in order to conserve energy (Romero *et al.* 2010).

Previous studies by our group showed that bed bugs can cover a lot of ground during their nocturnal forays (Haynes et al. 2008). Video recordings of adult bed bugs in laboratory test arenas showed they can travel around five metres in five minutes; even in the absence of host-orienting cues! Given that the hunt for a meal could last for hours, it is understandable that wandering bed bugs can sometimes end up in suitcases and other belongings.

Field study

Recently we had an opportunity to study bed bug movement in a heavily infested house and an apartment. Interceptor-style (pitfall) monitors were placed in several locations, near to and far away from where occupants slept and the bed bugs were observed. Most of the pitfall monitors were placed along skirting boards and in corners of rooms — rather than beneath bed and furniture legs — which is more typical in commercial practice. Three different kinds of monitors were used:

- ClimbUp standard all white Insect Interceptors (Susan McKnight Inc.);
- ClimbUp BG Interceptors having a blackened exterior edge;



The bed bugs marked in red were first found on the sofa







Blackout BedBug Detector all-black monitors offered by Protect-A-Bed.

To further assess bed bug mobility, groups of bugs in various locations were marked with paint. Different colours were used to distinguish where the bugs initially resided versus where they were subsequently found. Tiny dabs of hobby paint were applied to the dorsum of individual bed bugs with a brush. Most of the bugs marked were adults or late-stage nymphs.

Each dwelling was re-inspected a week after the bugs were marked and monitors installed. The number of bed bugs captured in each monitor was recorded along with where marked bugs were found relative to their previous location.

Case study 1

A small house in Frankfort, Kentucky, had one of the worst bed bug problems we have encountered. The infestation was so severe that bugs were living on one of the two occupants. Bed bugs were most noticeable in the living room, where the couple had been sleeping for several months. Before beginning our monitoring, two heavily infested couches and a reclining chair were removed from the living room and placed outdoors by the occupants. Large numbers of bed bugs remained present on living room walls, curtains and other furnishings, including the reclining chair where one individual continued to sleep throughout the study. The other occupant decided to vacate the dwelling.

Fifty-one pitfall-style monitors were placed throughout the home, mostly along skirting boards and in corners of rooms. In some locations, different types of monitors were placed side by side to compare capture efficiency. Groups of bed bugs also were marked in selected locations with different paint colours, to help track subsequent movement.

Bed bugs residing on three sets of curtains

in the living room were marked either with red, green or yellow (see pictures below), while those aggregating on the reclining chair were marked blue.

Bed bugs congregating near the front entry door, along the skirting board and on items on the floor were marked with pink paint, while a small aggregation diagonally across the living room in a corner of the ceiling were marked with white.

Observations

A total of 462 bed bugs were captured in pitfall monitors throughout the home one week after installation (see Figure 1 above). Although more bed bugs were caught in the living room where the occupants slept, many bugs were captured elsewhere — even in the kitchen and bathroom — noteworthy, considering that no bed bugs were spotted in these areas during our initial, visual inspection.

Marked bed bugs were most prevalent in

Far left: Bed bugs initially residing on this curtain were marked with green paint. The yellow one travelled from another set of curtains about 4.5 metres away

Near left: The green and red bugs in this Blackout bed bug monitor station originated from different sets of curtains in the living room







Case study 2



12



their originally documented locations (see Figure 2 on page 20).

Storage

Storage

After one week, half of the bugs marked with green paint (15 out of 30) were found on the same set of living room curtains. Of those marked with red paint, 24% (12 out of 50) were observed on curtains initially receiving red, and 10% of the bugs marked with yellow (2 of 20) were noted on curtains designated by yellow. 10% (5 of 50) of blue-marked bed bugs were spotted a week later on the same reclining chair.

However, several marked bed bugs were also discovered in areas other than where they were previously marked. For example, five red bed bugs and a yellow one were found on curtains marked 'green' - while a blue-marked bug (formerly on the reclining chair) and a pink one (originally on the floor by the front entry), were found on curtains marked 'red.' Other interesting finds included a red-marked bed bug in a pitfall trap in the long vacated bedroom at the other end of the house more than 9 metres

away; and a pink and a red bed bug recovered in monitors on the opposite side of the living room about five metres away. Movement of marked bed bugs in buildings has also been observed by Cooper and Wang (personal communication).

Case study 2

The second evaluation involved an apartment located on the ground level of a four-unit rental property in Lexington, Kentucky.

The apartment was severely infested and had an abundance of clutter. Both occupants slept on sofas in the living room since the bedrooms were filled with boxes and belongings. Neither tenant said they were being bothered or bitten by the bugs and chose to remain in the dwelling. As expected, most bed bugs were noticed in the living room where the occupants slept. Large numbers were present on the two sofas, a reclining chair and the walls and floors.

White and black-sided ClimbUp Insect



Coloured arrows indicate where bed bugs were initially marked and then found one week later

Interceptors were installed side-by-side along skirting boards in 11 different locations of the apartment. Groups of bugs in selected locations also were marked with paint. Bed bugs on one side of the sofa nearest the kitchen were marked with pink paint, while those on the other side of the sofa were marked with yellow. Bugs residing on the wall behind were marked blue. Bed bugs across the room on the other sofa were marked red, on the reclining chair, white and on the wall behind, green.

Observations

A total of 453 bed bugs were captured in pitfalls throughout the apartment after one week (see Figure 3 above). As expected, the majority were caught in the living room where both occupants slept. Bed bugs were also found in monitors elsewhere in the apartment even though none were seen in these areas during the initial inspection. Both black- and white-sided ClimbUps captured similar numbers of bed bugs (17.1 versus 16.3, respectively).





Marked bed bugs were again most prevalent in their originally documented locations (see Figure 4 on page 21). After one week, 25% of those marked with pink paint (25 of 100) and 25% of those marked with yellow paint (16 of 65) were found in their original sofa locations.

Surprisingly, only 3% (3 out of 100) of bluemarked bugs were observed in their original location on the wall behind that sofa. On the other side of the room, 18% (18 out of 100) of red-marked bugs were found in their original location on the other sofa. On the wall behind that sofa and an adjacent reclining chair, 18% (8 of 45) of greenmarked bugs still resided in their original location. On the reclining chair, 45% (30 out of 67) of previously white-marked bugs were recovered on the same furniture.

Several marked bugs were again discovered away from originally marked locations. For example, six blue bugs formerly on the wall nearest the kitchen moved onto the adjacent sofa, while two pink and one yellow bug moved from sofa to wall. On the other side of the room, seven green bugs from the adjacent wall moved onto the sofa whereas a couple of pink bugs moved from one sofa to another — or to the wall on the opposite side of the room.

Four pink and one yellow were found in a pitfall trap on the floor adjacent to the couch where they were originally marked. Three blue bugs from the adjacent wall were also found in that trap. A single red bed bug was spotted in a pitfall behind the sofa, the only one discovered away from its original marked location. No white-marked bed bugs, formerly on the reclining chair were found elsewhere in the apartment.

Lessons learned

These examples clearly reinforce that bed bugs move around during their night-time forays. In each infested dwelling, many bugs were found in pitfall traps away from where occupants slept, and/or were spotted in different areas from where they were previously marked. Similar findings were reported by colleagues at Rutgers University (Wang et al. 2010, Wang and Cooper 2012). It should be noted that both infestations were well established, and that the degree of movement might differ with smaller populations.

Bed bugs congregate near sleeping or stationary hosts, especially during early stages of infestation. As populations grow larger, they often disperse beyond the usual beds, sofas and reclining chairs to other areas of refuge. Why this happens is still under investigation. One theory is that bed bug dispersal is initiated by adult females seeking to avoid repeated, potentially harmful mating attempts by males. Another hypothesis is that dispersal has little to do with 'fleeing' females, and has more to do with refuge availability. Rather, as numbers increase and harbourages near hosts become occupied, bed bugs (comprised of all life stages) gradually form new clusters farther away.

Another question researchers are attempting to answer is whether blood-seeking bed bugs return to their former harbourage locations. In instances where we marked known numbers of bed bugs, between 3% and 50% of them were observed one week later in the same general area. Only a few paint-marked exuviae (shed skins) were recovered from late-stage nymphs that had subsequently moulted. Bed bugs probably feed at least weekly in the presence of a host. Finding many marked bugs the following week in the same general area could reflect a degree of harbourage 'fidelity' after feeding - or not - since we cannot be certain the bugs ever left.

No clear differences were observed between pitfall designs and their capture effectiveness. Blackout traps and black-sided ClimbUp BG traps caught similar numbers of bed bugs in eight paired comparisons (11.1 vs. 13.8, respectively). Black ClimbUps also were similar to white ClimbUps in 15 paired comparisons (17.1 vs. 16.3, respectively).

Clearly more study is needed under different test designs and conditions, but our results give us no reason to recommend one pitfall trap over another based on their efficiency. We did not collect data on capture and retention of different bed bug life stages (including young nymphs). Because our sample sizes were small, further study is needed to determine whether colour affects capture rate under field conditions.



Many bed bugs were captured in pitfall monitors throughout the dwellings

we used was effective at capturing and revealing the presence of bed bugs, including in areas away from the human hosts. This was true even when stations were placed along skirting boards and areas other than beneath the legs of beds and sofas. Consequently, pest managers may want to expand their thinking when using such devices. If conditions preclude installing monitors directly under bed and sofa leas, try placing them adjacent. Also consider placements along skirtings (especially behind sleeping and seating areas), and in corners of rooms. Installation of pitfall devices along hallways and room perimeters (Wang et al. 2010, Wang and Cooper 2012) also may reveal a continued presence of bed bugs in vacant dwellings where removal of furnishings has made visual inspection less reliable.

Pest managers are discovering — often the hard way — that absence of bed bugs during a visual inspection is no guarantee that none are present. The industry has been down this rocky road before with termite inspections. Thorough inspection is advisable given that bed bugs do move about within dwellings...and remember to be careful what you promise.

In the meantime, each pitfall-style monitor

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All photos copyrighted by the authors. Financial support for this study was provided by Rollins Inc. Michael F. Potter is a Provost's Distinguished Service Professor at the University of Kentucky. Jennifer R. Gordon and Mark H. Goodman are Ph.D. students at the same institution. Travis Hardin is service manager of OPC Pest Control in Lexington, Ky.





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Bed bugs and Insecticide resistance

Implications for pest managers

Resistance among bed bugs to the pyrethroids, carbamates and organophosphates is well documented. Frontline pest professionals relying solely on insecticides, especially pyrethroids, can expect failures so what can be done to gain control?

The resurgence

Over the last fifteen years, bed bugs have undergone a dramatic global resurgence. In the United Kingdom, calls to councils concerning bed bugs increased during 2000-2006 by an average of 28.5% per annum. In Australia, a survey of professional pest managers in 2006 revealed that infestations increased by 4,500% since the start of the new millennium. Similar dramatic rises have been seen all around the world.

Bed bug infestations have now occurred almost everywhere that humans frequent, such as cinema complexes, clothing stores, public transportation and vehicles, hospital wards and doctors' waiting rooms, school classrooms, the home, as well as being a major pest in the hotel and lodging industries. Various factors have been postulated as being responsible, but it is widely acknowledge that insecticide resistance is the key trigger for the pests' comeback.

Insecticide resistance

'Resistance' is defined by the Insecticide Resistance Action Committee (<u>www.irac-online.org</u>) as: 'a heritable change in the sensitivity of a pest population that is reflected in the repeated failure of a product to achieve the expected level of control when used according to the label recommendation.'

The first case of failure was reported in 1947 from a naval barracks in Pearl Harbour, Hawaii, and resistance to DDT was confirmed. By the 1960s, bed bugs resistant to DDT were found worldwide.

The development of resistance in one group



A bed bug's cuticle is extremely waxy and can repel liquids; this can reduce the impact of liquid formulations

bed bug special

Kai Dang, David G Lilly & Stephen L Doggett from the Department of Medical Entomology, ICPMR, Westmead Hospital, Westmead, NSW, 2145, Australia provide some practical advice



of insecticide can also confer 'cross resistance' to other insecticides that share similar mode of actions. Both DDT and the pyrethroids target the sodium channels of nerve cells, thus it was not surprising that resistance was subsequently observed with the pyrethroids.

First modern reports in 2006

In the UK, the first modern reports of insecticide resistance in bed bugs were in 2006 by Clive Boase and colleagues, where they found that a dose of insecticide that produced 99% mortality in a susceptible strain, failed to kill two field strains.

In Australia, resistance profiling was undertaken comparing a modern field strain of *C. lectularius* from Sydney with an old susceptible strain (from Bayer, Monheim). The lethal dose to kill the Sydney bugs was around 430,000 times greater for deltamethrin and an extraordinary 1.4 million times greater with permethrin.

Resistance to the carbamates and



organophosphates has also been well documented.

See panel opposite for a run down of resistance mechanisms.

Implications for control

So what does all this insecticide resistance mean to the pest manager?

Simply, that you can expect failures when controlling bed bug infestations if you rely solely on insecticides, particularly the pyrethroids.

However, insecticide formulation does complicate this issue even further. For example, every pyrethroid based aerosol that we have tested will kill bed bugs very quickly when sprayed directly at the insect; why this is, we are unsure. Perhaps the carriers overcome the cuticular resistance, thereby providing better penetration, and the addition of a synergist like piperonyl butoxide (PBO) can overcome P450 resistance. Information such as this may lead to the development of other more effective formulations in the future.

Ineffective as residuals

Yet, when aerosols are applied as a residual, they do almost nothing to control bed bugs and this is true of most pyrethroids; they are simply ineffective as residual products. Thus for example, the use of mattresses and encasements impregnated with older pyrethroids such as permethrin simply makes no sense, and may even contribute to further resistance development.

The pest manager must also be wary of insecticidal manufacturers' claims with efficacy data in product advertisements. Was the insecticide tested on a resistant or susceptible strain? If the strain was resistant, did it have kdr, P450, or cuticular resistance? These are important questions and manufacturers must begin to report on the resistance status of the bed bugs used in their tests.

Even some of the newer insecticides appear



With resistance, most insecticides have little effect on the egg



Despite permethrin dust being applied almost everywhere throughout this bedroom, little control was achieved as the bed bugs were resistant. Bed bugs were even running through the dust and not affected.

to only offer limited benefits. The neonicotinoids provide excellent control when sprayed directly at bed bugs but offer poor residual control. Again, P450 may be contributing to cross resistance with this group. While with the insect growth regulators (IGRs), there are ethical aspects that must be considered; for an IGR to work, your client must be bitten!

This all means that you need to follow a programme of integrated pest management to be successful at bed bug control. It is important to firstly utilise non-chemical means of control to reduce the overall number of bed bugs in the infestation prior to any insecticide treatment.

This could include the disposal of infested items, physical removal via vacuuming, and the use of extremes in temperatures such as steam and/or dry heat.

For residual application, there really is no better product than the silicates such as Diatomaceous Earth (DE). DE has the advantage of having a physical action rather than physiological; it works by absorbing the waxes in the cuticle making the insect susceptible to dehydration, and while it is slow to work, it will kill the bed bugs in time. The other advantage of having a physical action is that resistance is unlikely to develop.

Most importantly, before selecting and adding a product to your bed bug control programme, always check to see if it is recommended in one of the industry codes of practices.

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Resistance mechanisms

There are several ways that insect populations can become resistant and they can exhibit more than one mechanism simultaneously. These mechanisms include; behavioural resistance, reduced cuticular penetration, increased metabolic detoxification and target site insensitivity.

1 Behavioural resistance

Behavioural resistance is the ability of insects to avoid an insecticide through behavioural changes. The best known example is bait aversion in cockroaches. Arguably, bed bugs may have developed behavioural resistance. In a recent study, it was noted that bed bugs avoided resting on the deltamethrin treated filter paper, thereby reducing potential insecticidal contact. However, this behaviour could be simple avoidance due to the 'excito-repellency' nature of pyrethroids; further research is required to confirm if behavioural resistance is occurring.

2 Reduced penetration (cuticular resistance)

Various proteins have been identified from the cuticle ('skin') of bed bugs that reduces the penetration of insecticides into the insect. Additionally, the cuticle itself is extremely waxy; bed bugs are one of the most desiccant resistant insects on earth, and this waxy layer offers further protection by inhibiting insecticides adhering to or penetrating the cuticle.

3 Increased detoxification (metabolic resistance)

Metabolic resistance is basically the breakdown of a toxin (i.e. insecticide) into a less toxic form. Recent studies have indicated that a range of enzymes, notably 'cytochrome P450 monooxygenases' (P450) and 'esterases', are responsible for resistance to the pyrethroids and other insecticide groups. These enzymes are common in modern bed bug strains.

4 Target site insensitivity

This refers to modifications in the insect that prevents the insecticide from binding to the site where it normally targets, rendering it ineffective. There are various types of target insensitivity (only those relevant to bed bugs are mentioned).

4.1 Nerve insensitivity (including knockdown resistance)

Pyrethroid insecticides affect the insect nervous system by stimulating nerve cells to produce repetitive discharges, which eventually causes death. An important resistant mechanism against pyrethroids is called 'knockdown resistance' (abbreviated '*kdr*'), which results from various mutations that prevent the insecticide from acting on the nerve. The two most commonly reported *kdr* mutations in bed bugs are 'V419L' and 'L925I', so named after the amino acid changes on the gene. It appears that these mutations are common in bed bugs around the world.

4.2 Altered acetylcholinesterase

Acetylcholinesterase is an enzyme that controls nerve function by preventing nerves from firing. Many insecticides target this enzyme by switching it off; uncontrolled nerve triggering results in insect death. Altered acetylcholinesterase is associated with resistance to the organophosphates and carbamates, and several studies have identified resistance in bed bugs to these groups. Perhaps bed bugs may have evolved a modified acetylcholinesterase to combat these insecticides.

Thus there are multiple forms of insecticide resistance in bed bugs acting in several layers, all to combat your efforts at controlling their populations.

Therefore when insecticides are applied, such as pyrethroids, bed bugs can hide in tiny cracks and crevices that have missed exposure to avoid the insecticides (potential behavioural resistance).

Once the bed bugs come in contact with insecticides, cuticular proteins reduce the rate of insecticide penetration (reduced penetration). If the insecticides enter the organism, bed bugs will enhance metabolic detoxification to decrease the effect of the insecticide (increased detoxification). Finally, if the insecticides reach the nerve cells, *kdr* mutations will provide another line of defence against the insecticide (target site insensitivity). These are the mechanisms that we presently are aware of and it is likely that other forms will be discovered in the future.

Bed bug product explosion! bed bug special

The 2013 National UK Pest Management survey run jointly by BASF Pest Control Solutions and **Pest** magazine clearly shows that around three quarters of all pest controllers now tackle bed bug infestations to a greater or lesser degree (see page16-18).

Coupled with this increase has come a veritable explosion of new products to monitor, record, zap, freeze, heat or poison this troublesome pest. Many, but not all, of these new products originate in the USA and have found their way to Europe and join the multitude already on sale.

One gripe is that proper scientifically valid efficacy data for many of these products remains sketchy, at best. In the USA, the Environmental Protection Agency (EPA) is trying to bring some sort of order to the table by attempting (still not finalised) to pull together a standard protocol, or guidelines, for the testing of bed bug insecticides. An issue also to be aware of is resistance. In his article on bed bug resistance, (also in this issue - see page 26), Stephen Doggett warns users to be wary of manufacturers' claims regarding efficacy data.

If there is no standard means for testing insecticides, true comparative efficacy data for the variety of monitors - be they passive or active - is likewise lacking! Although maybe there are moves a-foot to tackle this. Be this as it may, it fails to deter manufacturers from producing ever more novel means to manage these pests. On these two pages **Pest** details all those products introduced to the UK market in the last 12 months using information provided by either their manufacturer or distributor.



Bed bug monitors

The First Response overnight monitor is billed as an ideal way to aid inspection and also to check on treatment success. It comes with an outer sticky cardboard catchment envelope. Into this you assemble and place the carbon dioxide generator, having first added a tablespoon of water onto it followed by the heating pad over which you also need to have poured the enclosed pheromone. This done, you fold and seal the trap - having first collected your *Blue Peter* badge for following the instructions correctly!

The 10 Day Active bed bug monitor can detect re-infestations as well as help show 'due diligence' in bed bug management. It uses the same combination of sticky pad, pheromone lure, heat and carbon dioxide as the First Response monitor so providing a longterm or semi-permanent active monitor.

Coming from Canada, the BEAP Bed Bug Eliminator works on similar principles to the First Response and 10 Day Active monitors - notably using carbon dioxide and heat. Its aim is to mimic the human body. It is a small and handy piece of kit, good for placing in beds, furniture etc. Once the carbon dioxide is used up, the trap alone acts as a monitor.

Along more traditional lines, the XLure Bed Bug monitor is a fairly discreet pre-baited clear plastic unit, smaller than a credit card, which can be placed throughout premises to detect the early presence of bed bugs. This monitor, which bears a remarkable likeness to the Bird-X one sold by PestFix, is a solid unit made of clear uncrushable plastic, containing a glue surface for trapping the bed bugs. Incorporated into the glue is an attractant containing an aggregation semio-chemical that mimics the scent of human skin.

Bed bug devices

The use of heat and cold has become part of the battle against these pests. First heat, the Cimex Eradicator is a portable steamer which offers a non-chemical, non-contact, eco-friendly solution for the elimination of bed bugs and other crawling insects. It produces super-heated dry steam up to 180°C which eliminate the adult insects, the larval stages and the eggs by causing thermal shock. It is ideal for use as part of

the integrated management of bed bugs.

BEAP Bed Bug Eliminator uses CO.

A similar machine was introduced by Barrettine Environmental Health in spring 2012.

Second, the Zapp Bug Oven is a portable insulated thermal oven that also kills all life stages of bed bugs (and other insects) and can take up to 0.7 cubic metres of contents. The unit can be filled with infested clothing, luggage, books, household goods as well as electrical goods. Following a 15 minute ramp-up period to get the temperature to the optimum level, treatment on average can take an hour for all bed bug life stages to be killed.

Bed bug monitors

Bed bug

devices

pest 29

The Oven is CE certified with a powerful 1,500W heater, integrated auto cut off antitopple switch and optional timer device. It also contains a digital temperature sensor to determine the internal temperature.

Water soluble laundry bags help control bed bug spread

in use for some years, the manufacturers -Silvandersson from Sweden - have recently further refined the Cryonite delivery system to make it easier and more flexible.

Now cold. Having been

When using Cryonite, carbon dioxide is converted to dry ice or 'snow' which the

machine emits from a specially developed extendable lance onto the target pest. However, in certain situations e.g. hotel bedrooms when treating for bed bugs, this telescopic facility is unnecessary. Silvandersson has therefore developed a lighter and shorter application rifle. At the same time the hoses in the riffle have been redesigned, resulting in significant cost-savings and making the whole machine not only easier to use, but also less expensive.

A physical means to help control the spread of bed bugs are water soluble laundry bags. The idea is that bed bug infested bed linen from infested bedrooms can be safely and securely bagged-up for transit to the laundry room using the tie straps provided.

The bag, still containing the infested linen, is dropped into the washing machine and washed as normal - the bag dissolving in the wash. A high washing temperature -60° C - is recommended so as to kill-off all life stages of the bugs.

Insecticides with insect growth regulators

There were no new bed bug specific insecticides launched over the last 12 months. Two products have very recently added additional uses involving bed bugs to their labels. Quite by chance, maybe, both products contain an insect growth regulator (IGR) - an indication of the role these products now play in the control of resistant bed bugs.

The first, Nylar 4 contains the insect growth regulator (IGR) pyriproxyfen and has its approval extended from use on fleas and cockroaches to now include bed bugs.

Pyriproxyfen is a third generation IGR with a unique mode of

The Cimex Eradicator is a portable steamer

producing super-heated

dry steam

Cryonite uses

dry ice (CO₂) to

kill the bed bugs

The insulated Zapp Bug Oven also heats up the bugs

action, functioning as an analogue of an insect juvenile hormone. Juvenile growth hormones control the development of many parts of the insect's physiology during its life cycle. Growth hormone analogues can interrupt the development of eggs, render pest populations infertile by either damaging the production and vigour of sperm, inhibiting moulting or causing nymphal stages to moult into sexually sterile adults.

Nylar 4 is an oil-in-water emulsion (EW) formulation, is very low odour and is non-flammable.

Hot off the presses comes news that Biopren BFS, following requests from customers, has now achieved approval to extended its bed bug use to include application on mattresses.

Biopren BFS bed bug flea and trigger spray from Hungarian manufacturer, Bábolna Bio, contains 0.27% S-methoprene and 0.18% pyrethrins. This is a novel, up-to-date, ready-to-use formulation, offering long-lasting control of not only bed bugs, but also fleas and other crawling insects in a wide variety of locations.

The natural insecticide content not only flushes-out and knocks-down the hiding insects, whilst the IGR content, like Nylar, prevents the insects developing into adults, so disrupting their life cycle.



Bed bug specific events merge in USA

The US association, the National Pest Management Association (NPMA) is to hold the Global Bed Bug Summit on 5-6 December 2013 at the Sheraton Denver Downtown Hotel in Denver, Colorado. The event is sponsored by BedBug Central.

It will cover all matters bed bug, including an educational conference and exhibition designed to provide advanced technical training as well as management courses related to the business of bed bugs.

This event is a merger of BedBug Central's North American Bed Bug Summit and NPMA's Bed Bug Forum.

"While the audiences for each event were not exactly the same, it is clearly evident that a merger of these events could only serve to benefit the pest management industry," explained NPMA executive vice president, Bob Rosenberg.

Bed bug or bedbug?

How do you write this? Did you realise that the Oxford English Dictionary is now virtually the only recalcitrant left in the world that uses bedbug. Recently the Macquarie Dictionary (the equivalent dictionary in





It could be worse – maybe we should start a (not so) modern trend and write it BedBug!

Inspired by nature New materials to catch bed bugs

Inspired by a traditional Balkan bed bug remedy, researchers have documented how microscopic hairs on kidney bean leaves effectively stab and trap these biting insects.

Scientists at the University of California, Irvine and the University of Kentucky are



now developing materials that mimic the geometry of the leaves. The research was motivated by a centuries-old remedy for bed bugs used in Bulgaria, Serbia and other South East European countries. Kidney bean leaves were strewn on the floor next to beds and seemed to ensnare the blood-seeking pests on their nightly forays.

Through painstaking detective work, the scientists discovered that the creatures are trapped within seconds of stepping on a leaf, their legs impaled by microscopic hooked hairs known botanically as trichomes.

Using the bean leaves as templates, the researchers have micro-fabricated materials that closely resemble them geometrically. The synthetic surfaces snag the bed bugs temporarily but do not yet stop them as effectively as real leaves.

Theoretically, bean leaves could be used for pest control, but they dry out and don't last very long. They also can't easily be applied to locations other than a floor. Synthetic materials could provide a non-toxic alternative.

"Nature is a hard act to follow, but the benefits could be enormous," Dr Michael Potter said. "Imagine if every bed bug inadvertently brought into a dwelling was captured before it had a chance to bite and multiply."

Meanwhile, researchers at Stony Brook University, New York have developed another material that also stops bed bugs in their tracks. This innovative nano-material acts as a man-made web consisting of microfibres 50 times thinner than a human hair which entangle and trap bed bugs and other insects. This patent-pending technology is being commercialised by Fibertrap, a private company that employs non-toxic pest control methods.

Bed bug marketeers hauled-over-the coals for deceptive claims

Two marketers of unproven cedar oil-based remedies for bed bugs and head lice have agreed to enter into settlements with the US Federal Trade Commission (FTC) that prohibit the allegedly deceptive claims, and require pre-approval from the Food and Drug Administration for any future treatment claims about head lice products.

The settlements resolve deceptive advertising charges the FTC filed last year against Dave Glassel and the companies he controlled, including Chemical Free Solutions, alleging that they made overhyped claims that their BEST Yet! line of cedar-oil-based liquid products would treat and prevent bed bug and head lice infestations.

According to the FTC, the defendants falsely claimed that their natural, BEST Yet! bed bug and head lice products were invented for the US army, that their bed bug product was acknowledged by the USA as the number one choice of bio-based pesticides, and that the Environmental Protection Agency had warned consumers to avoid chemical solutions for treating bed bug infestations.

The orders impose a \$4.6 million judgment against Glassel who is facing bankruptcy, and a \$185,206 judgment against Chemical Free Solutions which will be suspended due to the company's inability to pay. If it is later determined that the financial information the company provided the FTC was false, the full judgment amount will become due immediately. The FTC will continue to pursue its case against three remaining defendants.

Interestingly, and reflecting the sentiments expressed on page 28 of this issue, in their statement the FTC has ordered that the defendants are prohibited from making their over-hyped claims unless they have competent and scientific evidence to make the statements. No more need be said!



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Mosquitoes bring both threats & opportunities

There is a growing awareness of rising mosquito numbers and the threat of future increases. Professional pest controllers should be taking note of both the threats and opportunities this brings say Dr Julian Entwhistle and Rob Fryatt of Xenex Associates.



Rob Fryatt, left, with Dr Julian Entwhistle

The time is right for the pest management industry to become more aware of the threats and opportunities of the rising numbers of mosquitoes in the UK and there are some important lessons from the experience in other countries.

The rapid spread of West Nile Virus in the USA at the beginning of this century created opportunities for the pest control industry there. From few companies specialising in mosquito control activity before the first cases, now more than 30% of the pest management companies in the USA are involved in mosquito control work.

To some, these insects may not be well understood and their monitoring and control techniques may be new to others. This article reviews, in brief, the threats and opportunities that increasing numbers of mosquitoes create.

To start with there are 33 species of mosquito in the UK, more than 20 of which bite humans. They have life cycles of as little as two weeks in hot weather. The females typically lay several batches of over 100 eggs at a time, so they can become extremely abundant and troublesome when conditions are in their favour.

According to research by Dr Jolyon Medlock, head of public health entomology at Public Health England and other researchers, 57

Patch makes us invisible to mosquitoes!

Research at the University of California, Riverside has led to the development of the world's first product that blocks the mosquito's ability to efficiently detect carbon



dioxide, its primary method of tracking a human blood meal.

The University lab identified volatile odour molecules that can impair, if not completely disrupt, a mosquito's carbon dioxide detection machinery. This has subsequently been developed by Olfactor Laboratories Inc to produce the Kite Mosquito Patch.

The company said this July that the product marks a significant advancement in the global fight against mosquito-borne diseases such as malaria, West Nile Virus and dengue fever.

The first Kite Mosquito Patches will be tested in Uganda, one of the hardest hit countries in Africa, where hundreds of thousands die annually of malaria. local authorities received complaints about mosquito bites in the ten year period from 1999 to 2009 – a substantial increase over the previous ten years. In addition, there are around 4,000 calls to the NHS Direct helpline about mosquito bites in July and August each year – a figure that increased yet again last summer. So mosquitoes are already significant pests in the UK and the problem is increasing.

The question is how much worse will the problem get and how can the pest management industry prepare for it? To answer this, let's look at the threats mosquitoes pose and the opportunities that may emerge for their control.

Climate change favours mosquitoes

The first threat is due to climate change with warmer temperatures and wetter weather. The warmer temperatures allow greater survival over winter and more generations per year whilst the wetter weather means more go through from egg to adult stage. So climate change alone will continue to favour our resident mosquitoes and increase the problems they bring of nuisance biting in hot and humid summer days.

Climate change will also make the UK more attractive for mosquito species that normally only occur in warmer countries, thereby increasing the risk that more dangerous species will become established.

Disease transmission

The second threat posed by mosquitoes is the transmission of diseases. We tend to think this is only relevant to the tropics where



32 pest

the transmission of malaria by Anopheles mosquitoes still leads to over half a million deaths per year. Whilst dengue fever, transmitted by Aedes aegypti, is responsible for around half a million hospital admissions.

The most likely mosquitoborne disease to cause major public health concern in the UK is West Nile Virus (WNV) - as in the USA. 237 human cases of WNV were reported in southern EU countries in 2012 and the disease is open to being imported via birds which can form a reservoir of infection. The question then is whether native mosquitoes could act as vectors and sustain an epidemic in the UK.



West Nile Virus threat

In 2005 Dr Jolyon Medlock, Prof Keith Snow and Dr Steve Leach documented 14 UK species of mosquito that have been implicated in WNV transmission elsewhere. Many of these species can transmit WNV between birds and humans, so the ingredients are already here for local transmission once WNV enters the country. In 2012 Dr Nick Golding of Oxford



The native Culiseta annulata looks similar to Aedes albopictus and this has led to scare stories about the UK arrival of the Asian tiger mosquito University and other researchers reported on the arrival in East Kent of the main species responsible for WNV transmission in southern Europe, *Culex modestus*.

Following its entry into the USA in 1999, probably through an infected bird, WNV swept quickly from east to west and has since spread into Canada and South America. Last year was the worst in the USA since 2003, with 5,674 cases in 48 states, including 286 deaths. WNV has now been identified in over 40 different mosquito species in the US with *Culex* species the most important.

A competent vector of WNV in southern USA is the Asian tiger mosquito, Aedes albopictus, which often occurs in towns and cities and readily bites humans. It is also capable of transmitting other viruses including chikungunya and dengue fever.

Dr Medlock and others have examined the potential for this mosquito in the UK. They have concluded that conditions would permit it to survive throughout large lowland areas with at least four to five months of adult activity (May-September), and more prolonged in the urban centres around London and the southern coastal ports.

However, all UK birds tested so far have an immunity to WNV and this is often put forward as one of the reasons why the risk of WNV spread in the UK is low. It may enter in an infected bird but the spread would be less rapid, if at all.

Most invasive species globally

Ae Albopictus is the most invasive mosquito species in the world. It originated in the Far East and invaded Africa, Europe, North and South America primarily through eggs transported in used car tyres. As the UK imports up to one million used tyres every year it is quite likely to arrive by this means. Imports of the houseplant Lucky Bamboo can also harbour this mosquito which has now been reported present in 19 European countries.

Comparison of native *Culiseta annulata* with invasive *Aedes albopictus*

	Culiseta annulata (UK native species)	Aedes albopictus (the Asian tiger mosquito)
Body length (not including mouth parts)	6mm to 7mm	4mm to 5mm
Leg length	13mm to 14mm	7mm to 8mm
Wing span	13mm to 15mm	approx 7mm to 8mm

Adapted from the Mosquito Watch Programme website (details provided by the Killgerm Group)



Significant public health threat

There have been several scare stories about the arrival of Ae. *albopictus* in the UK but suspected cases checked by Mosquito Watch (www.cieh.org/policy/npap_mosquito_watc h.html) and other laboratories have all proved to be unfounded so far, due to confusion with the somewhat similar looking native *Culiseta annulata*. The threat of invasion of WNV or chikungunya into the UK is therefore very real and the presence of Ae. *albopictus* in the country would be a significant public health threat.

Invasion by other vectors is also possible.

More extreme scenarios become more likely with climate change. These potentially include the re-emergence of malaria --*Plasmodium vivax*. This was present in the 18th and 19th centuries in the marshlands and estuaries of East Anglia, Essex, Kent and the counties of the south coast of England, transmitted by the native *Anopheles atroparvus*.

In addition, there is potential for survival of Aedes aegypti, the vector of dengue and yellow fever – an outbreak of yellow fever resulting from a ship docked in Cardiff in 1865 caused some 30 cases in local residents. This may seem way back in the past, but the occurrence of locally transmitted cases of dengue fever in France and Croatia in 2010, and the fact that Ae. *albopictus* also transmits dengue, shows that this scenario is not so remote as it may at first seem.

Skills gap in control

The final threat posed by mosquitoes in the UK is the lack of capacity and skills to control them! In spite of the increasing problems, only 11 local authorities state that they undertake mosquito control and active surveillance. Very few regulatory approvals are now held in the UK for professional mosquito insecticides. Control has become largely dependent on environmental management to reduce the areas suitable for the larvae and the deployment of *Bti* larvicide, alongside limited adult mosquito trapping and personal protection measures such as repellents, window screens and mosquito nets.

Although the UK has leading international scientific expertise in mosquito management, through the world renowned London and Liverpool Schools of Tropical Medicine and, in addition, since 2005 a mosquito nuisance reporting scheme for environmental health officers, it is questionable whether there are sufficient skills, experience and capacity at the operational and organisational level to cope with the increasing mosquito problem and the threat of invasion by non-native species and transmission of mosquito-borne diseases in the UK.

Good news

The good news is that many of our major insecticide suppliers have excellent mosquito control experience within their global organisations, accompanied by effective and proven mosquito products, which they could call upon. In addition, our industry colleagues in markets such as Italy have good practical experience in managing and monitoring mosquito outbreaks.

Now is the time to make sure that the UK industry understands the problem, identifies the skills required and is preparing to manage the future threat. After all, mosquitos do not understand or respect the national borders that have allowed us to keep many other potential invaders away!

CIEH calls for action

The Chartered Institute of Environmental Health (CIEH), at its public health conference held in Cardiff on 8-9 May 2013, requested that Government should act on the following recommendations:

- Implement an EU-wide policy on mosquito control. It is necessary to intensify international and European collaboration at legislative and executive levels;
- Notification systems across Europe should be standardised and notifications reported to a central agency;
- Harmonisation of mosquito control practices to reduce harm to the environment. EU guidelines for insecticides should be harmonised between member states;
- Enhanced human and veterinary surveillance activities will assist public health authorities to implement control measures at source;
- The general population, especially in the affected areas, should be informed about the typical presentation of the disease and vector control strategies, particularly in the domestic environment.

Useful CIEH mosquito report

Whist this report was published by the CIEH in May 2009, the 24-page booklet provides a useful overview of mosquitoes in the UK and the problems they pose. Written by Dr Colin Malcolm from the School of Biological & Chemical Sciences at Queen Mary College, University of London, copies can be downloaded from the NPAP publications section of the CIEH website



www.cieh.org/policy/npap_publications.html

Mosquitoes love...

According to an article in the Jackson, Mississippi daily newspaper, the Clarion Ledger there are some things that turn us humans into attractive blood buffets!

Turns out that Blood Type 'O', the most common type, is like a chocolate sundae for mosquitoes. They are twice as likely to land on a Type 'O' carrier than a Type 'A' person. Type 'B' blood is about halfway on this scale.

But the biggest attractant is carbon dioxide and that puts us all on a level playing field - well not quite. The bigger you are the more carbon dioxide you exhale. Pregnant women regardless of their size, produce roughly 27% more carbon dioxide than usual becoming a magnate for mosquitoes.

Fitness fanatics however are also more attractive. Chemicals released when working-out draw mosquitoes like a moth to a flame. It's a Catch-22, if you're not active then you could put on a few pounds and breathe more, which is just as attractive to mosquitoes. The colour of your clothes can also draw them in – in order of attractiveness it's black, blue and red.



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By popular demand – larger Deadline difenacoum

To match the popular 20kg Deadline bromadiolone sack comes the new Deadline 20kg rat & mouse bait based on difenacoum. The product is for use both indoors and outdoors, in dry and damp locations.



It comes specially treated to remain fresh and palatable when used in damp locations.

www.rentokillproducts.com/professional

Hard to-get-at high places

The XL8 is an eight metre telescopic fibre glass extension lance that comes in seven sections. This adjustable telescopic lance can be used at various lengths from two to eight metres depending on requirements. This enables treatment of wasps' nests located high-up, in roofs for example, which can be easily and safely treated without the need to use ladders or access equipment. It can be attached to the popular DR5 duster and the SX Dustmaster

www.pestcontrolonline.com

Film those hard to see spots

The SL video inspection camera is a mini IP67 rated waterproof colour camera with super thin 9mm head and one metre flexible tube. It allows easy visual inspections in restricted areas. It comes with a 2.7 inch colour TFT-LCD monitor with clear picture resolution which allows quick and easy visuals. The camera captures still images and records video to 30 frames per second, explains SX Environmental.

The lens mounted LED lights on the end of the camera allows for inspecting images in zero light up to 1.5 metres. It comes complete in a carry case with 256mb micro SD card, video cable, USB cable, magnet, hook and mirror end





PRODUCTS What's new?

New low-profile bait station



The RTS trap is a new low-profile tamper resistant bait station, designed for use indoors and out. It comes with bait securing rods and can also be used with, or without, glue boards. It sits low to the ground

> and includes a single-locking mechanism and wall adaptor.

Manufactured by Plastdiversity, it comes in black and clear plastic.

www.plastdiversity.com

Further improvement to Bird Free

Always listen to what your customers say. In response, Bird Free has come up with yet more practical improvements for their bird management optical gel

product.

The gel now comes in readyfilled low profile dishes. This cuts out all the messingaround filling dishes, as the pre-loaded dishes can simply be un-packed, opened and



applied. Not only easier, but also much quicker to install explains Bird Free. The low profile dishes at only 8mm high mean they are

even less visible to spot on buildings, once applied.

www.bird-free.com

For use in wet conditions

Recently introduced by PestWest Electronics is the Nemesis Quattro IP. An all stainless-steel industrial EFK with IP24 rating, it can withstand exposure to high humidity, water spraying and corrosive atmospheres. Powerful and energy efficient, it features the new high



efficiency UVA tubes powered by an electronic ballast for optimum fly control performance with low running costs and reduced materials, explains the manufacturer. Ideal for protecting large open industrial areas.

www.pestwest.com

Exclude those rodents

Incorporating stainless-steel fibre technology in a silicone body, Sakarat Rodent Barrier is easy to apply using a conventional caulking gun.

It can be used for sealing gaps, holes, cracks and crevices to prevent ingress by rodents and is fully waterproof with an eight to ten year life expectancy. It is suitable for food environments and is effective within 20 minutes. www.killgerm.com



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d on a £25 call out fee and each WaspBane trap sold at RRP with an rage installation time of 10 minutes (excludes travel) providing an estimated gross profit of £119.67 for three customer visits.





Take the Pest Test

BASIS has made two PROMPT CPD points available if you can demonstrate that you have improved your knowledge, understanding and technical knowhow by passing the **Pest Test** and answering all our questions correctly. So read our articles on bed bugs (pages 16 to 30) and mosquitoes (pages 32 to 34) in this issue of **Pest** and answer the questions below.

Try to answer them all in one sitting and without referring back to the article. Take care as some questions may have more than one correct answer so tick all the answers you believe are correct.

SEND COMPLETED QUESTIONS to: **Pest** Magazine, Foxhill, Stanford on Soar, Loughborough, Leicestershire LE12 5PZ. After your completed **Pest Test** arrives we will mark the questions and, if all answers are correct, we will enter the results directly onto your own PROMPT records held by BASIS.

1 What percentage of UK pest professionals reported an increase in bed bug work over the last year?			
a) 34%	c) 54%		
b) 44%	d) 64%		
2 What washing machine temperature is recommended to kill all stages of bed bugs when laundering infested items?			
a) 40°C	c) 60°C		
b) 50°С	d) 70°C		
3 What does IGR stand for?			
a) Increased growth rate	c) Insect growth rate		
b) Insect growth regulator	d) Inside ground regulation		
4 When was the first case of failure to control bed bugs with DDT reported?			
a) 1927	c) 1947		
b) 1937	d) 1957		
5 What is acetylcholinesterase?			
a) an insecticidal active substance	c) a fungus that grows within an insect		
b) an enzyme that controls nerve function	d) the external protein layer of an insect		
6 Last year, in the USA how many deaths were attributed to West Nile Virus?			
a) 286	c) 486		
b) 386	d) 586		
Name:			
Organisation:			
Tel:			
Email:			
PROMPT account number: 200	0		

Plenty of events this autumn

Autumn is a busy time in the pest control calendar so you might want to get the dates of the events that are of most relevance to you ear-marked in your diary in good time.

First up on Wednesday 9 October, Barrettine and **Pest** publications are to stage what will be their fourth joint event. It will be held at The Hellerby Hall Hotel, Rotherham. The day will consist of a series of talks and a small exhibition by the sponsors: BASF, Bayer, Bell, Rentokil and Suterra.

Topics and speakers announced so far include: Jim Cameron from LAPA on 'Bedbug detection dogs – hire, buy or could your dog be trained?'; Jo Robertson, EHO Stevenage BC with Apodemus as a commensal pest; experiences from a local authorities perspective; BPCA's Simon Forrester representing CEPA on Professionalism and the last chance saloon: Making cowboys a thing of the past; Chris Woodard on Venomous animals - escaped exotics and imported pests; Martyn Belcher discussing the ins and outs of Technology for super sleuthing: cameras, YouTube etc; Alan Buckle on Second Generation Anticoagulant Rodenticide (SGARs) and Helen Riby with the results of the National UK Pest Management Survey 2013.

Further afield if you're planning a trip to Phoenix for the American association's flagship event, PestWorld, then you might like to get your registration and flights booked. Early bird registrations close on 3 September. If you have never been, It's worthwhile attending at least once just for the experience!

Come November of course it's PestTech and the date to remember this year is Thursday 7 November. Once again this NPTA event will be at the National Motorcycle Museum.

Meanwhile, Parasitec is away from home this year and will be in exotic Casablanca from 14 to 16 November. Maybe a good excuse to catch some late autumn sunshine by combining some holiday with a day at the event!



Nomination deadline approaches

Nominations for the best new product 2013 must be with us in the **Pest** office by

31 August, so if you have a favourite; a product which has been introduced since 1 January 2012 and has really helped you in your working life then please get in touch. Email us at editor@pestmagazine.co.uk

The shortlist so far:

- Avishock bird deterrent from Network
- Bait Safe from SX Environmental
- Bed bug monitor from Suterra
- Detex non-tox soft bait from Bell Laboratories
- Evo Ambush bait station from Bell Laboratories
- Formidor ant product from BASF Pest Solutions
- PX17 Microcell pots from Killgerm
- Ratimor difenacoum fresh bait from Killgerm
- Talon Soft rodenticide from Syngenta
- XL 8D Wasp Reach from Lance Lab

Diary dates 2013

2-5 September

7th European Mosquito Association Conference Istanbul, Turkey office@emca-online.e**u**

9-11 September

1st Euroasian Pest Management Conference Russian Academy of Sciences, Moscow www.pestmanagement.su/english

22-27 September

European Vertebrate Pest Management Conference Turku, Finland www.evpmc.org

25 September

Benelux Pest 2013

Edda Huzid golf resort, Voorthuizen, The Netherlands <u>www.beneluxpest.nl</u>

9 October

Pest/Barrettine MINT seminar Hellerby Hall, Rotherham helena@barrettine.co.uk

23-26 October

PestWorld 2013 Phoenix, Arizona, USA www.npmapestworld.org/pestworld2013

6 November

PestTech 2013

National Motorcycle Museum, Birmingham www.pestech.org.uk

13-14 November

Parasitec 2013

Parc des Exposition de l'Office des Change, Casablanca, Morocco <u>www.parasitec.org/</u>

26-28 November

FAOMPA 2013

Seoul, Korea www.faopma2013korea.com

27 November

BCPA Fumigation Conference BPCA office, Pride Park, Derby www.bpca.org.uk

£35k - £38k

Corporate Account Mangers

- Are you a proven account professional with a background in the pest services industry?
- Do you have the ability to develop your own future prospects and to convert these into profitable sales?
- Are you articulate and able to communicate at all levels of our customers' businesses??
- Can you manage your time effectively set your own priorities and balance the multiple demands of account issues, internal information expectations and sales pipeline development?

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- To ensure excellent client retention and overall portfolio growth through development of strong relationships at all levels of the customers' operations.
- To identify, develop, tender and win new business that is both profitable and in line with monthly, quarterly and annual targets. partnership.

You will also need to be comfortable with using standard Microsoft packages (Excel, Word, PowerPoint), flexible and prepared to work evenings and weekends, if necessary.

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 holidays

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To apply, send your CV and a covering letter to kristian.epton@ecolab.com or Kristian Epton, Ecolab, 1 Wernddu Court, Van Road, Caerphilly CF83 3SG





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