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2011 BUGS WITHOUT

BORDERS

{survey}



Defining the Bed Bug Resurgence

Last year we published the findings of a global industry survey confirming that bed bugs are escalating worldwide (*PestWorld*, Sept./Oct. 2010). In 2011, the U.S. pest management community again weighed in on this topic, providing important year-over-year comparisons. Read on to find out if we're winning or losing the bed bug battle... »

Survey Parameters

An online survey was developed consisting of 36 questions, covering topics ranging from frequency of bed bug infestation, to management and business practices. Most of the questions were similar to those in last years' survey in order to permit year-to-year comparisons. Questions were formatted either as open-ended or closed-ended (fixed) responses. Responses to the self-administered online survey were collected from June 2 to July 18, 2011 with a few reminders sent out during the period. Letters requesting participation were emailed and delivered to 4,540 contacts representing 3,882 NPMA member companies. This resulted in 415 completed surveys for a 9% response rate. Respondents worked for companies ranging in size from fewer than 10 individuals to thousands of employees. The majority (69%) represented companies with 25 or fewer employees. The breakdown of respondents by region is shown in Figure 1.

The Upsurge Continues

An astounding 99% of respondents indicated their company treated or was asked to treat for bed bugs in

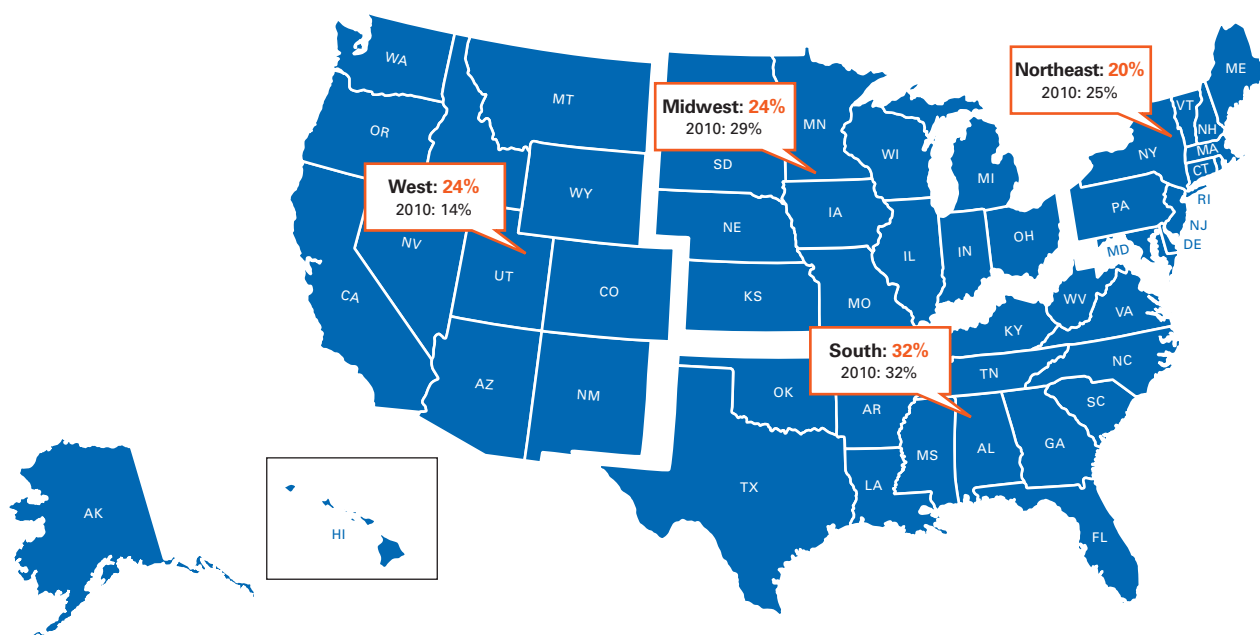
the past year. By comparison, 95% of U.S. respondents said they had encountered bed bugs in the previous (2010) survey (Figure 2). Only one in four respondents (25%) said they were asked to treat for bed bugs six to 10 years ago, and only 11% recalled receiving such calls more than 10 years ago—survey trends that were much the same last year. When asked about the incidence of bed bugs in their region, most (84%) said numbers were increasing, 14% said they were staying about the same, and 2% thought they were decreasing (Figure 3). In last year's survey, 91%, 8% and 1% of respondents, respectively, had these opinions.

Respondents had varied opinions as to why bed bugs are increasing. Most often mentioned were increased travel (by 82% of those surveyed), lack of societal vigilance and awareness (by 66%), increased immigration (62%), changing pest control products and methods (57%), and resistance to available insecticides (mentioned by 50%).

Other factors mentioned as contributing to the resurgence included:

- Lack of knowledge/experience by some pest control firms*

FIGURE 1. Responses by Region



- An inability or unwillingness to contract with a professional, often resulting in unsuccessful treatment
- Denial or lack of reporting by tenants, landlords, businesses, etc., enabling infestations to spread further
- Infested goods being sold in thrift shops, yard sales, and online via Craigslist, eBay, etc.
- More people salvaging discarded items due to the down economy
- Importation of goods from other countries with high bed bug activity
- Increases in corporate relocations (e.g., call center staffing) from countries where bed bugs are prevalent

* Several respondents also mentioned the need for more training within the industry (*for more on this topic, see the section on 'Future Needs'*).

The majority of respondents (62%) reported bed bug infestation to be a year-round occurrence, with no one season being busier than another (Figure 4). However, 25% of those surveyed mentioned an increase in bed bug calls during the summer. Travel, moving, and other activities tend to be high during the summer months, which could increase the chance of transporting bed bugs into residences. During summer, the ambient temperature of some residences tends to be higher, which could result in a faster development time for some populations.

Just About Everywhere

Bed bugs continue to be most common in residences, with over 90% of this year's respondents encountering them in apartments, condominiums and single-family homes. Similar frequencies of bed bugs in residences were also reported the previous year. Perhaps the most striking result in this year's survey is the spread of bed bugs from housing and lodging to less 'conventional' settings. Many of these settings experienced statistically higher, double-digit growth in reported encounters by respondents compared to the previous year.

For example:

- Hotels/motels—80% reported encounters this year, up from 67% a year ago
- College dorms—54%, this year, up from 35% a year ago
- Nursing homes—46%, up from 25%

FIGURE 2. Have you treated or been asked to treat for bed bugs within the past year?

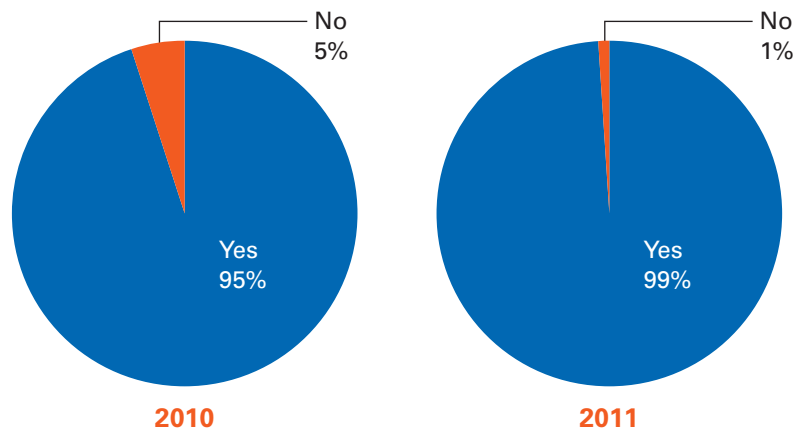


FIGURE 3. Over the past year, do you feel the incidence of bed bugs in your region is ..?

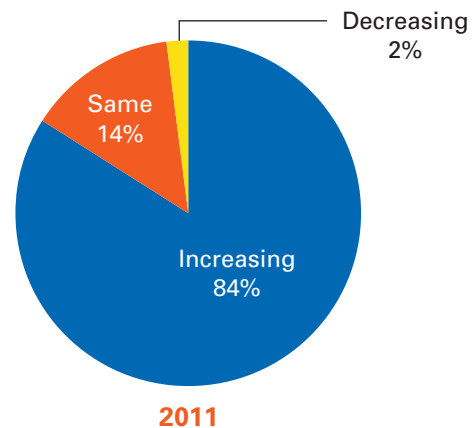
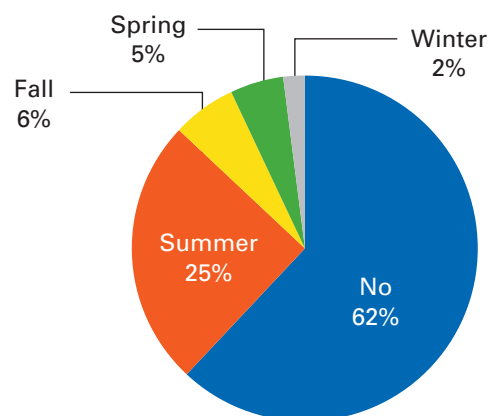


FIGURE 4. Do you receive more bed bug calls at certain times of the year? If yes, which season tends to be the busiest?



- Office buildings—38%, up from 17%
- Schools and day care centers—36%, up from 10%
- Hospitals—31%, up from 12%
- Public transportation—18%, up from 9%
- Movie theaters—17%, up from 4%

Other places respondents reported finding bed bugs in the past year included doctors' offices/out-patient clinics (reported by 23% of respondents), retail stores (by 21%), laundries (9%), libraries (8%), and restaurants (6%)—as well as in summer camps, locker rooms, storage facilities, clothing factories, moving vans, veterinary clinics, semi-truck sleeper cabs, prisons, and police cruisers.

As noted in the prior (2010) survey, finding bed bugs in such varied locations should not be too surprising, considering the bug's long and intimate history with humans. Bed bug encounters in recent years have ranged from hospital delivery rooms to funeral homes, hence impacting people's lives from birth to death.

Whatever It Takes

Nearly all respondents (98%) described bed bug customers as upset and concerned. The most frequent description (by 78% of respondents) was that these clients were "very upset and concerned." These attitudes of bed bug sufferers were virtually unchanged from those expressed in the previous survey (Figure 5).

Because bed bugs are so detested, many householders seem willing to do whatever it takes to be free of them. Almost half of pest managers surveyed (47%) estimated that 25% or more of their customers tried treating their bed bug problem themselves, before calling a professional. Interestingly, this is one number that actually declined from 2010 to

2011... suggesting a growing opinion among "do-it-yourselfers" that it may be better to contact a professional.

Nonetheless, many householders still are employing ineffective and dangerous measures (almost half of all respondents gave examples). Many reported seeing excessive and improper use of insecticides, especially bug bombs and foggers. One respondent, for example, mentioned a customer setting off "25 bed bug bombs at the same time," while another mentioned a client spraying all the beds and couches in his home with chlordane, a pesticide outlawed in the U.S. more than 20 years ago and not used for bed bugs. Others reported householders using agricultural products, some imported from outside the United States. Dozens of respondents also reported extreme over-application of insecticide dusts (diatomaceous earth, boric acid, pyrethroid-based dusts, carbaryl) to floors, furniture, walls, baseboards and bedding, including sheets, blankets and pillows. Diatomaceous earth—a commonly touted "bed bug solution" marketed to consumers—was especially misused to the point where some clients acknowledged having breathing difficulties from over-application. Other industry respondents observed people spraying themselves (clothing and skin) and their pets with household insecticides.

Several respondents reported households resorting to extreme and dangerous measures involving open flames, ovens, and propane and electric heaters, often combined with flammable chemicals. Disturbingly, several respondents mentioned people dousing sofas, chairs and mattresses with kerosene, gasoline, diesel fuel, alcohol, hairspray, wasp spray, lighter fluid, bleach, and ammonia—sometimes in conjunction with matches, lit cigarettes, and even propane torches. As bed bug sufferers become desperate, serious injuries can result from such applications. These worrisome behaviors indicate an urgent need for more public education, and whenever possible, reliance upon professionals.

Controlling Infestations

Once again, the majority of companies consider bed bugs harder to control than other pests (Figure 6). In 2011, 73% of respondents felt bed bugs were the most difficult to control pest. Ants were considered



« Bed bugs are becoming widespread just about everywhere

FIGURE 5. In general, how would you describe the feelings of your customers who have had bed bugs?

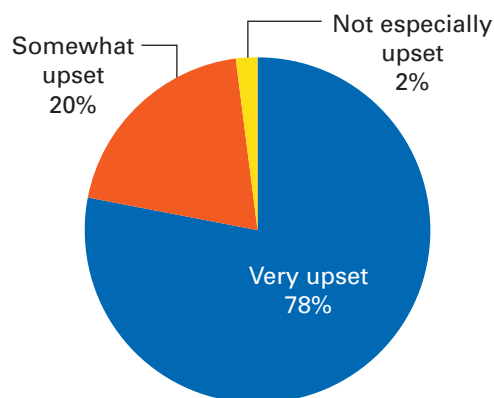
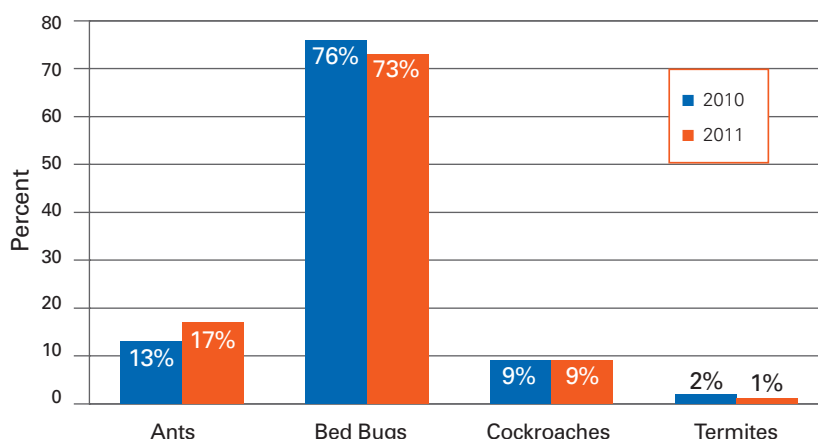
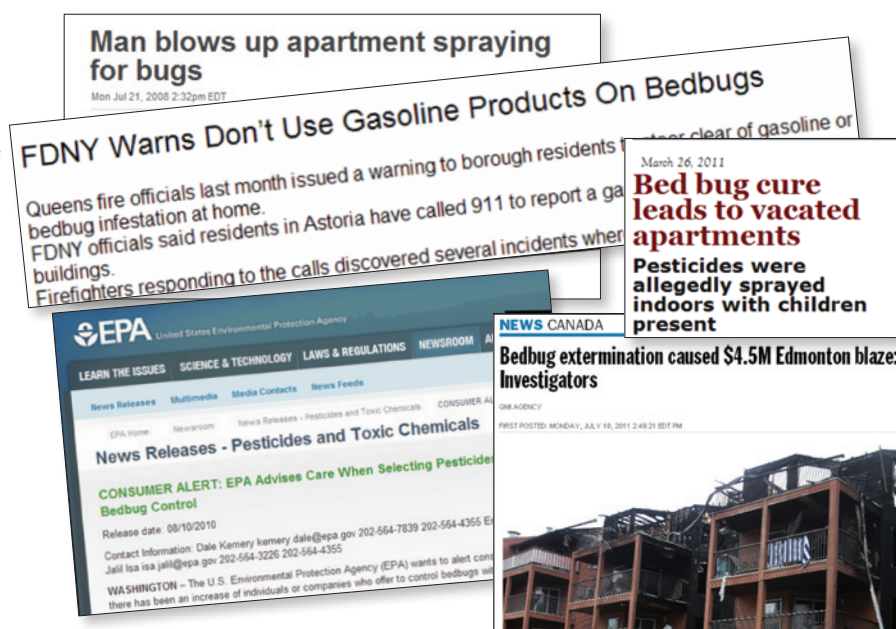


FIGURE 6. Which of the following pests do you consider most difficult to control?



“most difficult” by 17% of respondents, cockroaches by 9%, and termites by only 1%. These statistics reflect the many challenges in managing bed bugs. As reported in last year’s survey, bed bugs were *not* considered as difficult to control in Asia, Mexico, and Central/South America, perhaps in part because organophosphate and carbamate insecticides are still available for use against bed bugs. These compounds generally perform better against populations resistant to pyrethroids, which is becoming a worldwide problem.

The time spent on an initial residential (conventional) bed bug service assuming average levels of infestation and clutter, ranged from 30 minutes to more than five hours (estimated median 2.9 hours). Most respondents (94%) said their company spends more than one hour on the initial service. About a third (34%) said one to two hours were spent, while 60% said more than two hours were typically spent on the initial service. The majority of respondents (79%) indicated two or three services were typically needed to control infestations (mean of 2.7). A previous survey showed that more treatments are usually needed in cluttered environments—a point worth remembering when pricing work and educating customers on the need for cooperation (Potter 2008). When asked “Who performs the preparation work before bed bug service is performed?” 64% said the prep is done by the client, 27% said both client and our company share the responsibility, while 9% said their company alone performs the preparation.



➤ There have been many extreme attempts by householders to control bed bugs, some having serious consequences.

FIGURE 7. Which of the following methods are you currently using to find bed bugs?

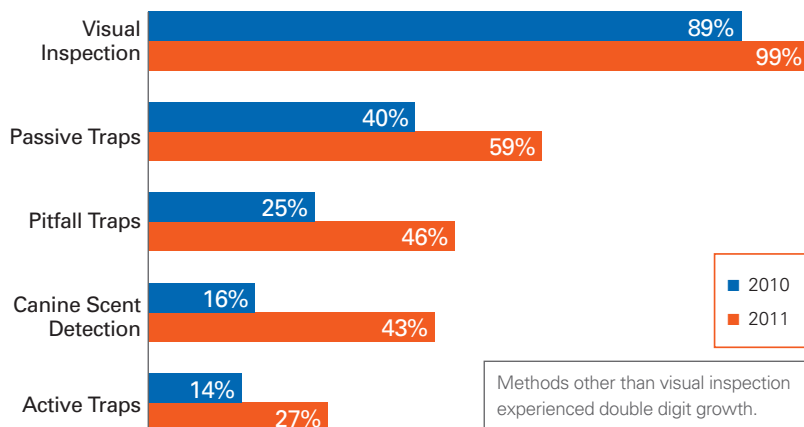
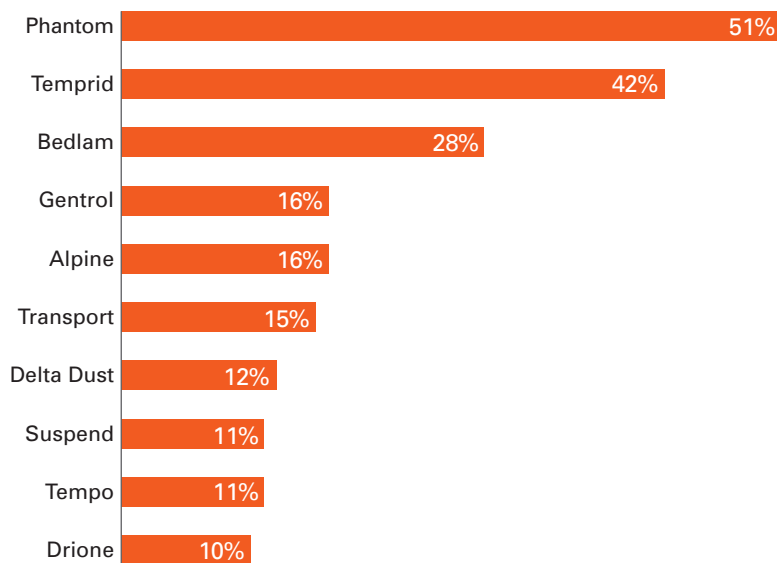


FIGURE 8. Please list the top three insecticides you routinely use for bed bug control. (Ten most mentioned products)



*Other products mentioned by at least 7% of respondents: diatomaceous earth, Tri-Die, Demand, Sterifab, and pyrethrins.

Most companies still rely on visual inspections to locate bed bugs. However, various other detection methods grew from the previous year (Figure 7). More than half of current respondents (59%) mentioned using ‘passive traps’ (glue boards or sticky traps). While glue traps can capture bed bugs, their reliability in detecting infestations, especially at low-levels, is often weaker than for such pests as cockroaches and spiders. Nearly twice as many respondents in 2011—46% versus 25% the previous year—mentioned using ‘pitfall traps’ (dish-shaped traps placed under the legs of beds and sofas). Similar increases (27% versus 14%) were reported for ‘active traps’ using heat and/or carbon dioxide. Especially notable was the large increase in use of bed bug detection dogs owned by the company or sub-contracted through a handler. In 2011, 43% of respondents said their firms had used canines to find bed bugs, versus 17% in 2010.

More than two thirds of respondents (69%) felt that customers are very (22%) or somewhat (47%) interested in preventative inspection services for bed bugs—underscoring the need for detection methods that are effective, efficient, economical, and inconspicuous.

When respondents were asked which methods they normally use to control bed bugs, 99% mentioned insecticides (96% said they used liquids, 91% dusts, 52% aerosols). Two other popular methods were mattress encasements and laundering by clients (both mentioned by 86% of respondents in 2011 versus 76% in 2010). Also mentioned were vacuuming (by 65%), disposal of infested items (by 62%), and steaming (43%). Volumetric heating of rooms/dwellings, or using heat containers, was mentioned by 32% and 20% of respondents, respectively, compared to 17% of those surveyed in 2010. Other measures mentioned by smaller numbers of respondents included spot freezing (by 12%), pesticide-impregnated bed liners (by 4%), and sealing cracks and crevices (<1%).

Using Insecticides

When asked which insecticides they routinely use for bed bug control, Phantom was mentioned by 51% of the respondents (41% liquid, 10% aerosol). Phantom, a non-pyrethroid, was also the most mentioned product in the 2010 survey. In the cur-

{RISKY BUSINESS BY HOMEOWNERS}

- "25 bed bug bombs set off in a house at the same time"
- "Dousing sofas, chairs and mattresses in kerosene"
- "Killing bed bugs with a propane torch and a lit cigarette..."
- "Bathing in rubbing alcohol and spraying themselves regularly with off-the-shelf pesticides"
- "I have a hotel that imported chemicals from India to treat for bed bugs..."
- "Unregistered products from Mexico used everywhere in the house."
- "Vapona strips placed in bedding and inside encasements..."
- "Applying pounds of DE dust to living areas and even sleeping in it"
- "Dust was applied so heavy it looked like snow"
- "Someone sprayed all the beds and couches in the house with chlordane"
- "Setting mattresses and furniture on fire"

For more specifics, refer to page 8.

rent survey, 42% of respondents said they routinely used Temprid, a dual formulation containing a pyrethroid (beta-cyfluthrin) and non-pyrethroid (imidacloprid)—a notable statistic considering that only 3% mentioned it in the previous survey. The 10 products reported to be most utilized for bed bugs are shown in Figure 8.

When pest managers were asked if they were satisfied with the performance of current bed bug insecticides, 18% said "very satisfied," 59% were "somewhat satisfied" and 23% were either "not very" or "not at all satisfied." This represents a modest increase in approval compared to a year ago, when 13% and 55% of respondents, respectively, said they were "very" or "somewhat" satisfied with available insecticides, and 32% were not satisfied (Figure 9).

Respondents were divided about whether they have encountered bed bug populations resistant to insecticides. Though it's debatable whether PMPs can always discern resistance without appropriate testing, half of those surveyed said they "never" (41%) or "seldom" (10%) encounter populations that appear resistant in the field. In commercial practice, resistance to an insecticide can be less obvious when also employing other tactics such as encasements, steam, vacuuming, etc. Moreover, several products (e.g., Bedlam, Sterifab, Kicker, Ex-

citR, miscellaneous aerosols/essential oils) tend to be effective 'contact killers' when resistant bed bugs are sprayed directly. While such populations may be 'immune' to the principal active ingredients (e.g., pyrethroids or pyrethrins), the bugs and sometimes eggs may succumb to solvents, propellants, synergists, or other constituents of the formulation. Furthermore, increasingly popular products such as Phantom, Temprid and Transport often perform better against resistant populations than conventional pyrethroids. When companies "throw everything but the kitchen sink" at infestations, resistance will usually be less apparent—which could be why some firms seemingly never encounter resistant bed bug populations in the field. In the laboratory, studies suggest resistance to pyrethroids is widespread (Zhu et al. 2010).

Treating Beds

In both 2010 and 2011, most respondents (81%) said their company typically treats infested beds with insecticides. Of those surveyed in 2011 that do treat beds, 73% treat *both the mattress and box springs*. Before the resurgence of bed bugs, many professionals would have been hesitant to treat a bed with pesticides. Companies today often find themselves "between a rock and a hard place" deciding when and how to treat such areas.

FIGURE 9. How satisfied are you with the performance of today's bed bug insecticides?

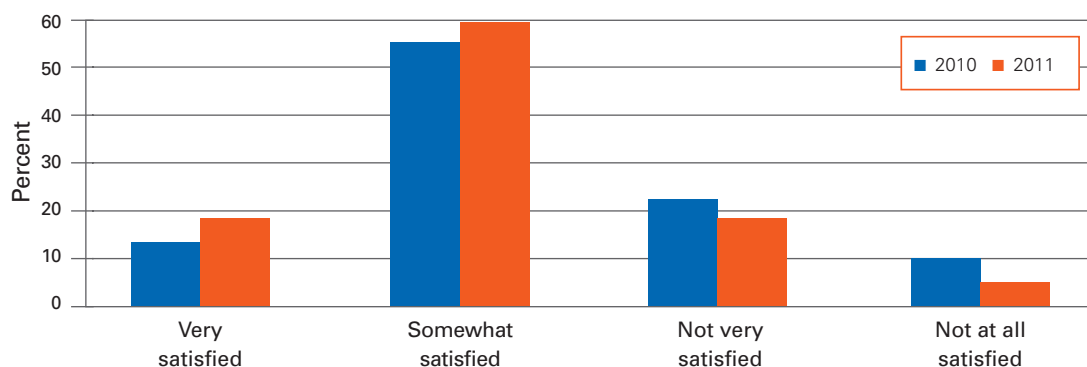


FIGURE 10. What percentage of your company's pest control revenue currently comes from bed bug service work?

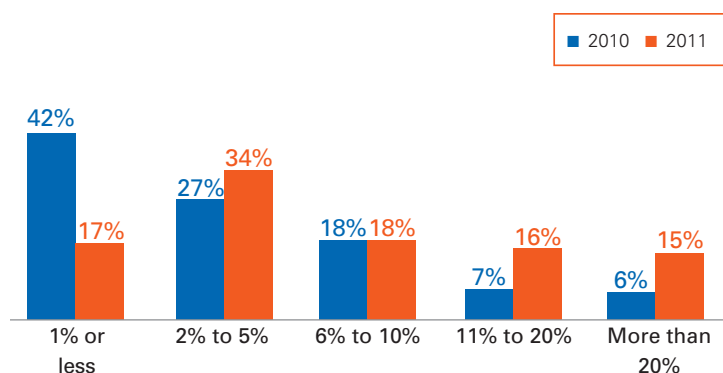
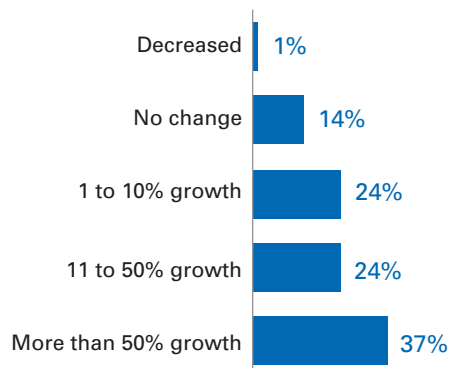


FIGURE 11. By what percentage did your bed bug service work grow between 2009–2010?



Bringing 'Em Home

Bed bugs are proficient hitchhikers and will crawl onto or into just about anything. Consequently, there is also a risk that technicians could accidentally bring some home, to the office, or to another account. More than three fourths (78%) of firms surveyed the previous year (2010) said employees were concerned about bringing bed bugs home. In 2011, 22% indicated that someone in their company *had actually done so*—up from 15% in 2010. Some companies are providing clothes dryers for employees to use at the end of the day to prevent the spread of bed bugs. In tests at the University of Kentucky, as little as five to 10 minutes in a clothes dryer on a medium to high temperature setting killed all bed bug life stages. Other firms have

begun wearing disposable shoe covers to lessen the chance of transporting bugs to other accounts.

Other tips to reduce the risk of transporting bed bugs:

- Avoid brushing up against infested items, which can dislodge bugs or eggs onto clothing—especially when lifting/moving beds and sofas or working in cramped quarters.
- Don't place jackets, hats and gear on beds, sofas and carpeted floors. Instead, place them away from heavily-infested areas and on a hard surface, such as the kitchen table.
- Check shoes (bottom, top, and shoe laces) especially after inspecting badly infested accounts.
- Place uniforms, shoes, etc. in a dryer or washing machine at the end of the work day.



More companies are using non-traditional methods to manage bed bugs, including heat and canines.

State of the Business

Nationwide, bed bugs still comprise a rather modest percentage of the industry's overall revenue. When asked "What percentage of your company's pest control revenue currently comes from bed bugs?" 51% of respondents said five percent or less. Nonetheless, bed bug revenue throughout the country increased from the previous year (Figure 10). In the Northeast, Midwest, and West, 43%, 37% and 32% of respondents, respectively, said more than 10% of their annual revenue came from bed bug services. In the same respective regions, 23%, 17%, and 20% of respondents reported revenues *exceeding 20%*. Bed bug business tended to be slower in the South, where 18% and 5% of firms, respectively, reported the bugs comprising more than 10% and 20% of total pest control revenue. In respect to growth, 85% of respondents indicated their bed bug service work grew between 2009 and 2010. More than a third (37%) reported growth rates exceeding 50% (Figure 11).

The majority of respondents (71%) said their company uses a separate bed bug contract—up from 55% the previous year. Although bed bug litigation to date has mainly implicated proprietors, some attorneys predict that pest control firms will be increasingly named as third-party defendants, or at least asked to share in the payment of insurance claims. Companies concerned about such risks may want to have their attorney or insurance provider review their current contract.

Many respondents mentioned making changes to their bed bug business this year. Almost two thirds

(65%) said they have or would soon sell preventive inspections; 42% have or intend to use heat; 27% mentioned adding canine scent detection teams, and 12% bed bug fumigation services. Another 17% said they have started or intend to start treating for bed bugs. Firms that do not provide this service could risk losing new business and forfeiting existing accounts to others. Another business category of interest is bed bug related retail sales. One firm reported having a 215% increase in retail sales over the previous year.

Best Management Practices (BMPs)

Earlier this year, the National Pest Management Association developed guidelines to help the industry control bed bugs safely and effectively. More than two-thirds of those surveyed (68%) indicated their company is following or plans to follow the guidelines. Most remaining firms (29%) said they either were not familiar with the new BMPs or had not yet made a decision. Only 3% said they do not plan to follow them. When asked if companies have changed the way they service as a result of the BMPs, 25% said they had, 58% said they had not, while 17% were unsure. It will be interesting to see how companies and their clients utilize the document in the future.

Future Needs

The final two questions solicited comments and suggestions about future needs of the industry in general, and in respect to education and training. Based on

the responses, the following list was developed to help structure future priorities.

- More public education and awareness, and sending a clear message that our industry cannot fix this problem alone
- Structuring preventive programs for different facilities. Convincing clients of the need for proactive rather than reactive inspections
- More training on client preparation and gaining cooperation, including a simple video on how to prepare for treatment
- A national conversation/strategy for addressing bed bugs in public housing and the impacts on society as a whole
- Tips to avoid transporting bed bugs from one account to another
- Information listing current and pending legislation pertaining to PMPs as well as responsibilities of clients (landlords, tenants, etc.).
- More advice on contracts and reducing the risk of legal action
- More hands-on training showing inspection and treatment methods
- How different cultures view bed bugs in order to enhance understanding and gain cooperation. Multilingual resource materials.
- Data to support or refute effectiveness of over-the-counter remedies
- Updates on disease potential and other health risks
- Training on potential irritants (everything is now a bed bug bite)
- More training on canine and heat treatment standards/certification
- More training on conventional methods since most cannot afford heat and dogs
- Business accounting/pricing of bed bug services

Closing Thoughts

Complementing last year's global survey, the current study provides further clarity on the state of bed bugs in this country. Nearly every company surveyed tackled bed bugs this past year. Apart from residences, infestations are also becoming more common in hotels, schools, health care, nursing homes, college dorms, office buildings, retail stores, theaters, public transportation etc., thus impacting more of

society. In a growing number of locales, municipal and family budgets are being strained to the point where many can no longer afford a professional. As a consequence, many householders are taking extreme and dangerous measures to control infestations themselves, sometimes with tragic results.

Pest management firms are becoming more experienced with bed bugs. New inspection and treatment tools are being marketed, including better performing insecticides and (for those that can afford them) canine detection and structural heat treatments. Nonetheless, bed bugs continue to be the most challenging pest, by far, in the industry. A big reason is that elimination and prevention requires a committed, cooperative effort among residents, family members, management, public agencies, and pest control professionals. When it comes to bed bugs, there are no 'magic wands', 'silver bullets' or easy fixes.

Companies are profiting from the nationwide resurgence, with many now reporting substantial revenues from bed bug services. The problem has also given the industry a big-time boost in recognition and respect. As professionals, it will be up to us to be good stewards of this newfound sense of purpose. «

Photos ©M.F. Potter

Michael F. Potter and Kenneth F. Haynes are entomology professors at the University of Kentucky, Lexington, Ky. Bob Rosenberg and Missy Henriksen are Senior Vice President and Vice President of Public Affairs, respectively, for the National Pest Management Association, Fairfax, Va. Special thanks to the scores of pest management professionals who participated in the study, helping us all to stay on the pulse of the bed bug problem.

References

- Zhu, F., J. Wigginton, A. Romero, A. Moore, K. Ferguson, R. Palli, M.F. Potter, K.F. Haynes, and S.R. Palli. Widespread distribution of knockdown resistance mutations in the bed bug, *Cimex lectularius* (Hemiptera: Cimicidae), populations in the United States. *Arch. Insect Biochem. Phys.* 73(4):245-257.
- Potter, M.F., B. Rosenberg and M. Henriksen. 2010. Bugs without borders: defining the global bed bug resurgence. *Pest World*. Sept/Oct: 8-20.
- Potter, M.F. 2008. The business of bed bugs. *Pest Management Professional*. 76(1): 24-40.

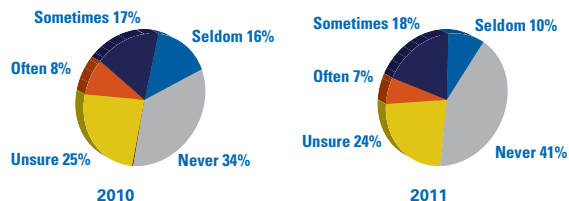


BED BUG INDUSTRY STATS

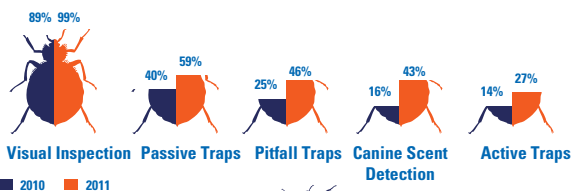
How satisfied are you with the performance of today's bed bug insecticides?



How often have you encountered bed bug populations that appear to be resistant to insecticides?



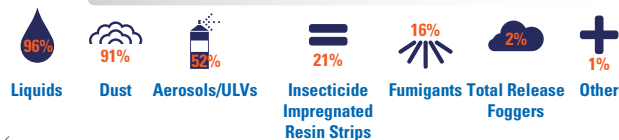
Which of the following methods are you currently using to find bed bugs?



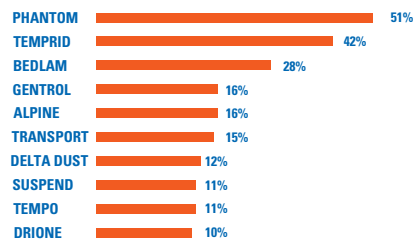
Which of the following methods do you normally use to control bed bugs?



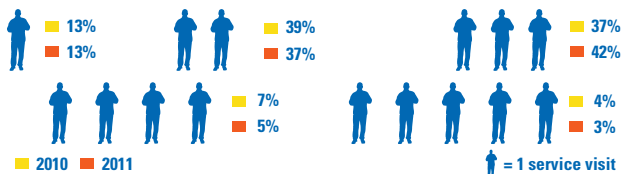
If you use insecticides in bed bug control, which type do you use?



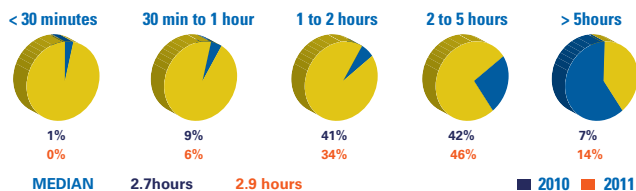
Please list the TOP THREE insecticides you routinely use for bed bug control. (Ten most mentioned products)



On average, about how many service visits does it take to control bed bugs?



About how long does your company spend in treating an average size bed bug infestation initially in a residential setting?



The Professional Pest Management Alliance

Source: 2011 Bugs Without Borders

Survey conducted by the National Pest Management Association and University of Kentucky

Pestworld.org



Published by the National Pest Management Association

For more information on this study, please contact NPMA at
703.352.6762 or e-mail npma@pestworld.org.

