

Critical CONTROL

German cockroach elimination is a critical public health service. Here are some tips to get it right.



German cockroaches (and their nymphs) can be more than just a nuisance.

By **Sydney Crawley**
and **Coby Schal**

Editor's Note: This article is a condensed summary of a book chapter on the public health and veterinary importance of the German cockroach. The chapter from the book, "Biology and Management of the German Cockroach," is written by Coby Schal and Zachary DeVries.

More than just a nuisance, German cockroaches (*Blattella germanica*) threaten global public health in many ways. To start, there are two major health risks that directly impact humans associated with German cockroach infestations: the transmission of pathogenic microbes that cause disease and the production of allergens that trigger allergic reactions and asthma. However, there are additional concerns, including: contamination of the indoor environment, psychological distress in those affected by an infestation,

the risk of fires due to cockroach aggregations in electrical equipment, and, finally, the misuse or over-application of pesticides used to manage these pests can negatively affect human health.

Many national and international public health initiatives recognize that health is a basic human right. Unfortunately, German cockroaches threaten that right for many people around the world. Entomologists and pest management professionals (PMPs) are in a unique position to increase health equity among all people by effectively



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reducing or eliminating German cockroach infestations. In this article, we emphasize the importance of eliminating German cockroach infestations within residential settings for the protection of human health and wellness.

PUBLIC HEALTH IMPACTS. The presence of German cockroaches directly impacts humans, and some practices aimed at removing these pests may indirectly affect humans as well. What follows are examples of each. This list is not exhaustive and for more information, we recommend referencing the sources cited throughout.

Direct Impact: Transmission of Pathogenic Microbes. German cockroaches in the field (e.g., residences) have unique microbes compared to laboratory-reared cockroaches. This means they can acquire bacteria, fungi and viruses from their environment, including organisms that may cause disease. We also know that German cockroaches will excrete these organisms in their feces, further contaminating areas that humans frequent. For example, studies show that German cockroaches harboring *Salmonella* in their gut can deliver an infective dose of these bacteria to a food source. In addition, German cockroaches in residences harbor multiple antibiotic-resistant bacteria, regardless of whether they have had previous

as well as hyperresponsiveness to environmental triggers. Asthma is the most cited cause of hospitalization among children and over 25 million individuals in the U.S. are affected. Poor indoor environmental quality can trigger asthmatic episodes, and German cockroaches (an obligatory indoor pest and a source of inhalant allergens) have been inexorably linked with asthma morbidity. Ten German cockroach allergens have been characterized to date — and more are currently being identified (bit.ly/3C76aXJ). According to a recent study, 63 percent of homes surveyed contained one or more of these allergens. Roughly 10 percent of surveyed homes contained a level of allergens that exceeded the asthma morbidity level. Reducing cockroach allergens in indoor (especially residential) environments is a critical, overlooked (by many members of the global health community) public health need.

Direct Impact: Psychological Stress. In-



German cockroaches in residences can harbor multiple antibiotic-resistant bacteria.

Indirect Impact: Insecticide Exposure. Many individuals affected by German cockroaches engage in DIY control methods, even if a PMP is also providing treatment services. Aerosols, especially total release foggers (TRFs), are attractive to consumers because they are easy to use and offer an overall sense of power/control during a vulnerable time. However, these products are highly flammable, which can lead to fires and explosions, and they

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exposure to these organisms. Although there is no direct evidence connecting German cockroaches to the transmission of pathogens to humans, several reports have documented correlations between cockroach infestations and an uptick in infectious diseases. Clearly, more exploration of this topic is warranted given the potential of cockroaches to vector pathogenic microbes.

Direct Impact: Allergic and Asthmatic Reactions. Asthma is a chronic lung disease that presents as bronchial inflammation leading to breathlessness, wheezing, cough, tightness and/or pain in the chest,

festations of cockroaches come with a social stigma and can cause anxiety, stress, sleeplessness and PTSD-like symptoms for those affected. Surveys show that most individuals affected by cockroaches in public housing are seriously concerned about the infestation and are embarrassed by it. Although literature on the topic is lacking, surveys indicate that as many as 94 percent of those afflicted by a cockroach problem find the issue anxiety-inducing. Study and further characterization of the mental health effects from German cockroach infestation deserves more attention from psychology professionals.



deposit large amounts of active ingredient onto horizontal surfaces. Exposure to these residues can result in negative health effects, including adverse respiratory, gastrointestinal, neurological, ocular, dermatological and cardiovascular symptoms. In addition to overall risk, these products usually fail to control cockroach infestations. PMPs routinely apply residual sprays in residential settings. Although these applications are likely label-compliant, frequent retreatment can result in the accumulation of excessive pesticide residues over time that may pose risk of exposure to vulnerable residents.

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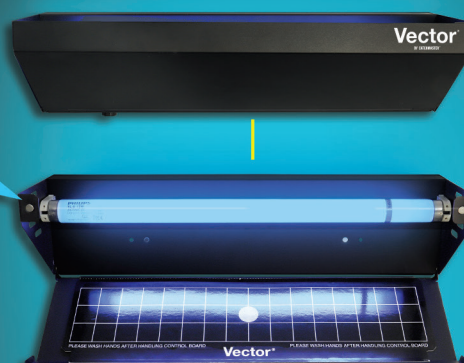
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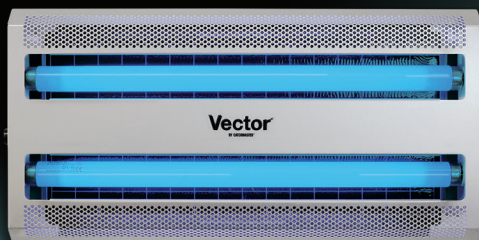


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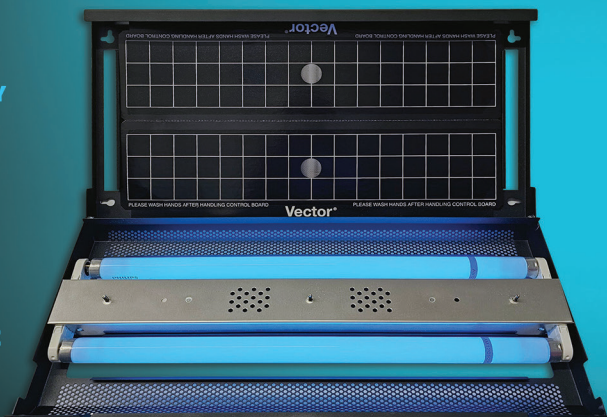


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ANNUAL *Cockroach* CONTROL ISSUE

HOW YOU CAN HELP. Research conducted by urban entomologists and medical professionals across the U.S. confirms that cockroach eradication is the most important factor in allergen abatement in infested homes. In addition, PMPs can reduce customer exposure to insecticide residues through Integrated Pest Management practices. The use of cockroach baits, even without up front "prep" of a structure, can eliminate German cockroach infestations. Traditionally, cockroach management protocols recommend sanitation/exclusion followed by insecticide treatment. However, given that there is less insecticide exposure risk for baits compared to liquid sprays, we recommend PMPs adopt a four-step German cockroach management plan:

1. Place baits to eliminate cockroach infestations.
2. Monitor the cockroach population visually or with traps to confirm that the bait is working and guide the placement of new bait.
3. Remove allergens from the environment through vacuuming and deep cleaning.
4. Prevent reinfestation through cultural practices and environmental interventions that also improve sanitation.

Treatment efficacy always should be verified through the placement of traps and execution of visual inspection to ensure that the number of German cockroaches present declines over time.

Importantly, reliance on ineffective control measures can result in an array of issues that negatively impact the health of customers and their satisfaction with the management program. These outcomes are not ideal for the practitioner or client. For instance, a continued reliance on active ingredients to which German cockroaches evolved high levels of resistance, such as pyrethroids, will only result in higher levels of resistance and increase insecticide exposure risks for customers. As control measures fail and cockroaches evolve further resistance, both PMPs and customers may be compelled to use more product. Customers also may rely on unconventional products or use approved products inappropriately. This will exacerbate both the direct adverse health effects associated with cockroach exposure, and indirect public health impacts resulting from control failures (e.g., greater exposure to insecticide residues).

CONCLUSIONS. The public health impacts of German cockroaches are well studied and thoroughly documented. German cockroaches are accepted by the medical, epidemiological and entomological communities as a threat to human health and safety.

PMPs have a unique opportunity to improve the health of their customers by educating them about the importance of eliminating German cockroaches from their homes. We maintain that the most efficient way to tackle German cockroach infestations is with extensive use of effective baits. To achieve optimal customer health, the goal of *reducing* or *suppressing* the infestation should be replaced with quick and efficient *elimination* of the cockroach population. **PCT**

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