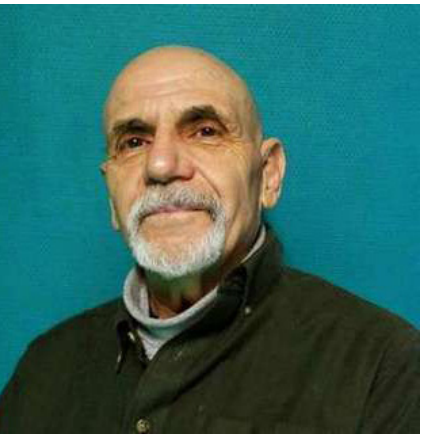
Fall 2025

Minnesota Pest Management Association

MPMA

# Mosquito Genes Linked To Insecticide Resistance Vary In Activity By Time Of Day

*By Ed Ricciuti*



The success of treating mosquitoes with insecticide at one time of day versus another can be as different as night and day—literally. Permethrin-resistant wild *Aedes aegypti* mosquitoes observed during a study in Florida were most susceptible to the insecticide from the witching hour to sunrise. Resistance then rose during the day, when the mosquitoes are most active, peaking around dusk and in the first half of the night.

Conducted by University of Florida (UF) scientists, the research finding has profound import for the pest managers, enabling them to better target pesticide applications, saving money and impact on the environment. "We found that the highest doses of permethrin required to knock down the mosquito were required at 6 p.m. and 10 p.m. These data suggest that permethrin applications made between midnight and dawn, 6 a.m., may be more effective against *Aedes aegypti* as compared to applications made at dusk, approximately 6 p.m.," says Lieutenant Sierra Schluep, co-author of the study, published in February in the *Journal of Medical Entomology*. Schluep is a medical entomology officer in the U.S. Navy's Military Sealift Command and a Ph.D. student in entomology at UF under advisor Eva Buckner, Ph.D., who is senior author on the study.

It seems common sense that the best time to dose mosquitoes with insecticides is when they are most likely to be buzzing and about and biting, but this does not always hold, at least when it comes to this study's experiments with permethrin, one of the two classes of insecticides most used in the United States to combat mosquitoes. Aedes aegypti bites mostly during the day, both indoors and outdoors, and is most active for approximately two hours after sunrise and several hours before sunset. Artificial illumination can extend their activity in the dark. Present on all continents except Antarctica, *Aedes aegypti*, commonly known as the yellow fever mosquito, is a vector for viruses that cause chikungunya, dengue, yellow fever, and Zika. It has been implicated in outbreaks of several locally transmitted diseases in Florida.

What holds for a mosquito species in Florida, however, may not be so for other areas, says Schluep. Various factors, such as geography, can make the genetic profile from sequencing the genome of individuals belonging to a mosquito species as different from those of a Chihuahua and Great Dane. She stresses, therefore, that the results of the study apply only to the yellow fever mosquito in that state.

Even so, she says, there is a caveat. The results of this research could be extended and promote better understanding of other populations of the species.

A significant finding of the research revealed that certain

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## Inside This Issue

## Mosquito Genes, cont.

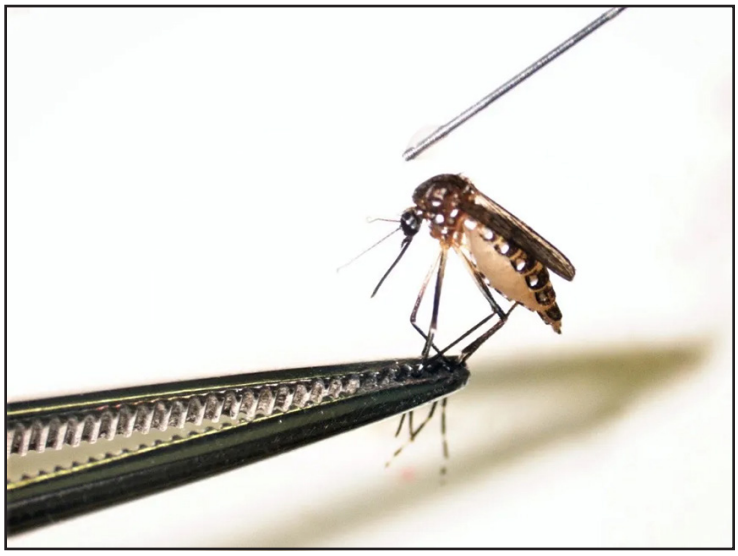
genes that produce enzymes to metabolize and detoxify permethrin also are affected by changes in light over 24 hours. The study focused on only five genes but could be extrapolated beyond those.

"Because of our understanding of these mechanisms and the biology of the mosquito, it is fair to extend this idea beyond those genes and this field population," says Schluep.

The genes began to increase expression, or functioning, after 2 p.m., reaching their highest in the dark between 6 p.m. and 2 a.m. Schluep stresses that only five genes, out of multiple genes involved in the process, were studied. It could be, she says, that when the genes are working hard, detoxification increases. Enzymes might be stockpiled for later use, after the rate of production has slowed.

"A better understanding of time-of-day variation in insecticide resistance mediated by detoxifying enzymes in *Aedes aegypti* could allow for targeted insecticide applications when susceptibility is highest and the upregulation of detoxification enzymes is lowest," she says.

*Originally published in Entomology Today, reprinted with permission.*



*Aedes aegypti* mosquitoes in Florida are most resistant to a common insecticide around dusk but most susceptible between midnight and dawn, a new study finds. A key contributing factor observed by researchers is that five key genes that produce detoxifying enzymes in the mosquitoes are affected by changes in light over 24-hour cycles. Here, a mosquito is treated with a droplet of insecticide in a lab during the study. (Photo courtesy of Sierra Schluep)

## Business Development

# Building A Culture Of Safety In Pest Control Companies

*By Foster Brusca, The Pest Posse*

How important is safety in your pest control business? A strong safety culture is essential for protecting your team, clients, and business reputation. At The Pest Posse, we believe that fostering a culture of safety is paramount to success. This article explores how to build and maintain a culture of safety in your pest control company, ensuring a safe and productive work environment for everyone involved.

### Leadership Commitment to Safety

Building a culture of safety starts with leadership. Company leaders must demonstrate a genuine commitment to safety by setting clear expectations and leading by example. This involves prioritizing safety in all business decisions and providing the necessary resources for safe operations. Leaders should regularly communicate the importance of safety to all employees, emphasizing that it is a core value of the company. By fostering an environment where safety is a priority, leaders can inspire their teams to adopt safe practices and take personal responsibility for their well-being. Leadership commitment is the foundation of a strong safety culture.

### Comprehensive Safety Training

Effective safety training is crucial for equipping

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employees with the knowledge and skills they need to perform their jobs safely. Regularly scheduled training sessions should cover all aspects of pest control safety, including the proper handling and application of pesticides, personal protective equipment (PPE) usage, and emergency response procedures. Comprehensive safety training ensures that all team members are prepared to handle their tasks safely and effectively, reducing the risk of accidents and injuries.

## Encouraging Open Communication

An open and transparent communication culture is essential for identifying and addressing safety concerns. Encourage employees to speak up about potential hazards, near-misses, and unsafe practices without fear of retaliation. Creating a safe space for communication allows for the timely resolution of safety issues and the continuous improvement of safety protocols. Implementing regular safety meetings and providing multiple channels for reporting safety concerns can facilitate open communication. By actively listening to employee feedback and taking corrective actions, companies can create a proactive safety culture where everyone feels responsible for maintaining a safe work environment.

## Regular Safety Audits and Inspections

Conducting regular safety audits and inspections helps identifying potential hazards and ensures compliance with safety standards. These evaluations should cover all aspects of operations, including equipment, work procedures, and safety protocols. Regular audits provide an opportunity to address issues before they result in accidents or injuries.

**"Encourage employees to speak up about potential hazards... without fear."**

Incorporating employee participation in safety audits can enhance effectiveness. Employees have valuable insights into potential risks and can contribute to developing practical solutions. Regular audits and inspections are essential for maintaining a safe and compliant workplace.

## Rewarding Safe Practices

Recognizing and rewarding safe practices can motivate employees to prioritize safety. Implementing a safety incentive program that acknowledges employees who consistently follow safety protocols and contribute to a safe work environment can reinforce the importance of safety. Rewards can range from simple acknowledgments, such as certificates and public recognition, to more substantial incentives like bonuses or extra time off. By celebrating safe practices, companies can reinforce positive behavior and encourage all employees to strive for a safer workplace.

## Implementing Safety Technology

Leveraging technology can significantly enhance safety in pest control operations. Tools such as mobile apps for real-time reporting of safety incidents, GPS tracking for monitoring vehicle usage, and automated reminders for safety training and equipment maintenance streamline safety management. Investing in safety technology demonstrates a commitment to modernizing safety practices and provides employees with the tools they need. Implementing safety technology can improve efficiency, reduce risks, and support a culture of continuous safety improvement.

## Fostering a Supportive Work Environment

A supportive work environment where employees feel valued and respected contributes to a strong safety culture. Providing regular feedback, encouraging teamwork, and addressing any workplace issues promptly can enhance overall morale and commitment to safety. Promoting work-life balance and offering support for employee well-being, such as access to mental health resources, can further strengthen the safety culture. A supportive work environment ensures that employees are engaged, motivated, and dedicated to maintaining a safe workplace.

Building a culture of safety in pest control companies is essential for protecting employees, clients, and the business. By demonstrating leadership commitment, providing comprehensive safety training, encouraging open communication, conducting regular audits, rewarding safe practices, implementing safety technology, and fostering a supportive work environment, companies can create a robust safety culture.

*Foster Brusca is co-owner of The Pest Posse. He can be reached online at info@thepestposse.net. For additional education resources check out The Pest Posse Academy or Pest Posse TV, a pest control forum.*

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# President's Message

Morgan Manderfield

Hello MPMA! As I write this, it certainly is peak season here in Minnesota—which of course means an abundance and variety of pest activity, client calls and, at times, blistering temperatures.

I strongly encourage everyone to take the necessary moments to pause, hydrate, slow down, check on your colleagues, and stay safe!

Amidst the typical bustle of the season, we have been hard at work on some other projects to benefit Association members. We are thrilled to share that the MPMA website has undergone an overhaul to significantly improve both member and visitor experience. The new site rollout is currently underway. In addition to a refreshed look, the website features members-only content plus a searchable directory for prospective clients to find member companies. The directory includes your certifications (e.g. QualityPro and GreenPro) so be sure to login and update your profile.

We are also in the process of reviewing and updating the Association bylaws to reflect the growth and modernization of our wonderful organization. This effort reflects our commitment to holding ourselves to the highest ethical standards. It is an important process that affects the entire organization, and so members are encouraged to take part in it to make their voices heard. Keep an eye out for an invitation to review and vote on proposed changes in the next few months.

Our next Board meeting will be held on Tuesday, October 14 and all members are welcome to attend. I hope to see you there, particularly if you've never participated in an Association meeting before!

# How to Sell a Premium Service That Warrants a Higher Price

*By Todd Leyse, President, Adam's Pest Control*


"I guess you're right … for this price I really shouldn't expect benefits too!" From a 1982 cartoon by Harold Leyse, featuring "Cheap-O Exterminators"

In our industry, anyone can lower their price. It takes no creativity, no discipline, and no business savvy to sell the cheapest service. But when price becomes the only thing that matters, no one wins—not the technician, not the customer, and certainly not the company.

Some years ago, I knew an operator who lost a large account to a competitor. Instead of improving his service or strengthening the relationship, he retaliated by undercutting prices and flipping a dozen of that competitor's accounts. Short-term satisfaction? Maybe. But the long-term result was a price war that left both companies with thinner margins, worn-out staff, and less loyalty all around.

That's not selling—it's trading dollars for stress.

So how do we break that cycle? How do we sell a premium service that warrants a premium price?

**Sell the Outcome, Not the Activity**
Customers don't care about how many bait stations you place or how long the visit takes. They care about feeling safe in their home, compliance in their facility, or not getting that angry call from a tenant. Shift the conversation to what your service means for them, not just what you do.

**Use the Word "Because"**
Psychologists have shown that people are far more likely to accept something when given a reason—even a weak one. "Our price is a little higher because we send certified, full-time professionals who follow up proactively." A premium without context sounds like gouging. A premium with logic feels earned.

**Don't Be Afraid to Walk Away**
If you're constantly justifying your price to someone who only sees pest control as a commodity, you're not in a negotiation—you're in a trap. The most powerful sales tool you have is the ability to say: "We may not be the right fit for you."

**Train Your Team to Project Confidence**
Customers take pricing cues from your team. If a technician or CSR flinches when quoting your rate, the customer will too. Equip your staff with the stories, stats, and conviction they need to explain why your service is worth it—not just what it costs.

**Never Compete on Price Alone**
When your differentiator is price, you've already lost. Compete on training. On innovation. On trust. On safety. On retention. On customer experience. Anything but price.

There will always be a "Cheap-O Exterminator" with a lower bid. Let them race to the bottom. Your job is to rise above—with quality, integrity, and a price that reflects the value you deliver.

I'll leave you with a quote from dad Harold Leyse, "Anyone can sell on price. It takes a salesperson to sell a higher price."

Yellow jacket, paper wasp, bald-faced hornet, blue metallic mud dauber, cicada killer, and carpenter bee.

# Nuisance Wasps and Bees: Biology, Identification, and Management

*Dr. Mohammed El Damir, BCE*

Annually, stinging insects—including various wasps and bees—pose significant public health and safety risks, especially when their nests remain undiscovered near or inside structures. While these insects provide important ecological benefits, their presence near homes, businesses, and high-traffic areas requires prompt, targeted intervention. For pest management professionals (PMPs), effective control depends on thorough knowledge of insect biology, accurate species identification, and, most critically, precise nest location and treatment.

Stinging insects belong to the order Hymenoptera, which includes wasps, bees, and ants. Only females possess stingers—modified ovipositors evolved for defense or prey subjugation. Sting effects range from mild localized pain to severe, life-threatening anaphylaxis in sensitive individuals. Therefore, PMPs must treat all stings seriously and follow strict safety protocols during inspections and treatments.

**Locating the Nest: The Source of Risk**

The primary threat from stinging insects arises from their nests, often hidden in wall voids, attics, rooflines, or underground burrows. Most stings occur when nests are disturbed. Targeting individual flying insects is ineffective; true control requires finding and eliminating the nest.

## Biology and Seasonal Behavior of Key Stinging Insects

**Social Wasps: From Protein Hunters to Sugar Seekers**

Social wasps, such as yellowjackets, shift diet seasonally. Early summer adults hunt protein-rich prey to feed larvae. By late summer and fall, protein needs decrease and adults seek sugars, increasing nuisance near garbage, outdoor dining, and sweet foods, often resulting in aggressive behavior.

**Solitary Wasps: Dedicated Nest Providers**

Solitary wasps, including digger wasps and cicada killers, hunt and paralyze prey to provision individual nest cells. These species overwinter as pupae underground and emerge in spring. Mud daubers build mud nests, overwintering as larvae or pupae inside; adults die in fall, with young emerging the next spring.

**Bees: Consistent Foragers**

Bees maintain a steady diet of nectar and pollen throughout their active season, essential for energy and larval development. They do not display the seasonal dietary shifts typical of wasps.

**Nesting Behavior and Overwintering Strategies of Solitary Species**

Solitary wasps and bees lack a worker caste; each female builds, provisions, and lays eggs in individual nests.

- Ground-nesting solitary wasps excavate small holes that may aggregate over time. Each nest cell contains paralyzed prey and a single egg. Many overwinter as pupae.
- Solitary ground-nesting bees dig burrows provisioned with pollen and nectar ("bee bread"). Overwintering stages vary by species, from larvae to adults awaiting spring.

**Common Species**

- Yellowjackets: Aerial and ground nests; large, aggressive colonies.
- Paper Wasps: Umbrella-shaped nests; less aggressive but defensive.
- Bald-Faced Hornets: Large aerial nests; vigorously defend colonies.
- Mud Daubers: Solitary, mud nests; usually non-aggressive.
- Cicada Killers: Large solitary wasps; generally non-aggressive.
- Bumble Bees: Social, underground or cavity nests; sting if threatened.
- Carpenter bees are solitary wood-boring insects. They are larger than bumble bees and have a smooth, shiny black abdomen. Bumble bees, in contrast, have a fuzzy body with black and yellow stripes.
- Honey Bees: Beneficial pollinators; nest in walls; beekeeper relocation preferred.

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- Digger Bees: Solitary ground nesters; typically non-aggressive.
- Sand Wasps: Solitary, nest in sandy soils; rarely aggressive.

## Management of Stinging Insects

**Social Wasps and Bees**

- Inspection: Identify species and nest type (aerial, concealed, ground). Assess risk based on location and human activity.
- Safety: Although early morning/dusk are ideal treatment times, PMPs often work during business hours. Always wear full PPE (suit, gloves, veil), keep a 6-10 feet distance, avoid loud noises/vibrations, and have clear escape routes.

**Treatment:**

- Aerial/Exposed Nests: Apply fast-acting aerosol or dust directly into entrances with extension tools.
- Wall Voids: Inject residual dust; delay sealing until no activity is observed.
- Ground Nests: Treat entrances with dust or aerosol during calm weather; seal once inactive.
- Honey Bees: Relocation by a beekeeper is preferred. If treatment is necessary, remove all comb and debris to prevent secondary infestations.

**Solitary Wasps and Bees**

- Light Infestations: Apply insecticidal dust directly into burrow entrances.
- Heavy Infestations (25+ holes): Use fast knockdown residual sprays over and beyond nesting areas; seal entrances after inactivity is confirmed.
- Mud Daubers: Remove mud nests by scraping with a paint scraper, taking care not to damage surfaces. Apply residual liquid insecticide around affected areas and entry points to discourage rebuilding.
- Ground-Nesting Bees: Late summer or fall treatments with combined granular and liquid insecticides can reduce spring emergence.

**Safety Protocols**

- Always wear PPE.
- Maintain safe distances; avoid disturbing active nests unnecessarily.
- Avoid treatments during windy or rainy conditions to prevent drift and ensure efficacy.
- Mark treated areas and restrict public access until activity ceases.

**Monitoring**

- Use traps early spring and late summer to monitor queen activity and population levels.
- Place traps away from high-traffic areas.
- Regularly inspect and maintain traps to ensure functionality and avoid attracting other pests.
- Install Insect Light Traps (ILTs) where wasps may overwinter indoors (utility rooms, drop ceilings). Proper installation and periodic checks improve effectiveness.
- Educate clients to recognize early nesting signs, such as frequent insect traffic or new holes.

**Prevention**

- Seal cracks, gaps, and crevices in siding, foundation, fascia, rooflines, soffits, attic vents, and AC line penetrations with durable sealants and fine mesh.
- Screen vents, utility penetrations, and soffit gaps to block access to wall voids.
- Remove abandoned nests to reduce attractants and secondary infestations.
- Seal known entry points even if nests aren't reused, as many species return to previous access sites.
- Eliminate food attractants. Secure garbage, remove sugary drinks, and clear overripe fruit, especially late summer when wasps seek sugars.
- Plan fall treatments carefully due to increased wasp aggression as resources diminish.
- Be aware that some species overwinter indoors and may emerge unexpectedly with warming temperatures.

**Sting Response and Emergency Safety**

- Treat all stings seriously, especially in individuals with allergies.
- Honey Bee Stings: Remove the barbed stinger and venom sac by sideways scraping with a fingernail or blunt edge; avoid pinching to limit venom injection. Honey bees die after stinging, so repellents do not deter attacks.

**If Swarmed:**

- Avoid swatting or rapid movements.
- Do not jump into water—bees can sting exposed areas above the surface.
- Cover your face and vital areas with clothing or arms.
- Move calmly and quickly to shelter.
- Monitor for severe allergic reactions such as difficulty breathing, facial swelling, dizziness, or spreading rash. Seek emergency care immediately if these occur.

## Conclusion

Stinging insects—social and solitary—pose significant health risks near people. Despite their ecological importance, their presence around structures demands informed and targeted management. PMPs succeed through accurate identification, understanding seasonal biology, and applying safe, effective control measures based on nest type and location. Combining biology-driven strategies with practical prevention and treatment protects public safety while minimizing impact on beneficial species.

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# The Key to Overcoming Invasive Pests

*By Dr. Timothy Husen, Technical Services Representative, Syngenta Professional Solutions*

An invasive pest could be any insect that is destructive, or even just a nuisance. It could be a public health threat or something that's just annoying to customers. Regardless, it has moved into an area where it is not normally found.

Often, however, when we use the word "invasive" what we really mean is "seasonal" because we're talking about pests that tend to emerge every year at about the same time. Fall invaders are the ones we think of the most. Examples include brown marmorated stink bugs, western conifer seed bugs, pine seed bugs, spotted lanternflies, and box elder bugs.

One key to treat these and other seasonal invaders is by working backward. Focus your inspection on where invaders are before they become a problem. That is preventive rather than reactive pest control.

Stink bugs or spotted lanternflies, for instance, exist somewhere else right before they become a nuisance to your customers (i.e., on their structures, decks, cars, etc.). Figure out what those insects might be feeding on and where they might be in the landscape.

You might need to rake and turn over mulch. You might need to pry up rocks and look under landscaping features to find where they are, particularly when the insects are small. If you've got something with gradual metamorphosis and can treat on or around the plant they're feeding on, you will have far fewer reach adulthood and be a nuisance later.

Once you have a case under control, focus on patterns and peak trends to keep invaders at bay for the long term. Work like a weather forecaster, anticipating climate shifts in your area and timing seasonal invader pest insect service for the month or two ahead of when that shift triggers peak activity.

# Insecticide Dusts in Bed Bug Management: A Proven Tool for Practical Control

*Provided by Envu*

Insecticide dusts have been used in pest control for centuries. Ancient civilizations applied ashes, minerals, and plant powders to protect grain stores from crawling pests. Today's dust formulations are more advanced, but the principle remains the same: apply a fine powder that insects encounter naturally—and let it do the work.

Though not limited to bed bugs, insecticide dusts are widely used in urban environments against cockroaches, ants, and other crawling pests. They are a key component of Integrated Pest Management (IPM) because they reach deep into harborages that sprays and aerosols may miss. Since the resurgence of bed bugs, a growing body of research has demonstrated the efficacy of dusts against both *Cimex lectularius* (common bed bug) and *Cimex hemipterus* (tropical bed bug), making dusts an essential tool in any bed bug management program.

## How Bed Bugs Encounter Dust

Bed bugs hide in tight spaces—inside box springs, furniture joints, wall voids, and baseboards—emerging at night to feed. As they crawl in search of a host, they move across treated surfaces and unknowingly contact dust particles. Their flat bodies and the tendency to drag their abdomens make them especially effective at picking up dust (See Figure 1). Bed bug cuticles also carry a slight negative electrical charge, while many dusts are positively charged—creating electrostatic attraction that helps particles cling more effectively to the insect.

Once on the insect, the dust begins to work. Desiccants like silica gel damage the waxy outer layer of the exoskeleton, leading to dehydration and death—often within hours. Some commercial dusts combine desiccants with chemical insecticides such as pyrethroids, pyrethrins, neonicotinoids, or butenolides. These multi-action products provide both fast knockdown and long-lasting control. Even a few seconds of contact may be enough to kill. When applied correctly, dust works passively—intercepting bed bugs as they emerge or return to harborages.

## Long-Lasting Protection If Kept Dry

One of the biggest advantages of dusts is their residual power. In dry, undisturbed locations, a single application can remain effective for months or even years. However, dusts lose their potency when exposed to moisture. Bathrooms, kitchens, and other humid or leak-prone areas are not suitable for dust applications. To maximize effectiveness, dust should always be applied in dry, protected spaces.

## Dust That Defies Resistance

Many bed bug populations worldwide have developed resistance to commonly used insecticides—especially pyrethroids—making sprays increasingly unreliable. Desiccant dusts bypass these resistance mechanisms by working through a physical, non-chemical mode of action. Rather than affecting the nervous system, they destroy the insect's waxy cuticle, causing fatal dehydration. Because this mode of action does not depend on biochemical pathways, resistance to desiccants is virtually impossible. This makes desiccant dusts particularly valuable in resilient infestations. When used in dual-action formulations (e.g., silica gel with a pyrethroid or neonicotinoid), the dust increases control by ensuring prolonged contact and facilitating exposure to the chemical ingredient—

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even when resistance to that ingredient is present.

## The Domino Effect: Passive Transfer in Clusters

Another benefit of dusts is their ability to spread through horizontal transfer—from one bed bug to another. This usually occurs when a contaminated bug returns to a harborage and makes contact with others. Since bed bugs tend to cluster closely together, physical contact helps distribute the dust among individuals. Although this effect is less pronounced than in social insects like ants or cockroaches, where grooming and food sharing enhance transfer, it can still play a role in reducing populations. In dense infestations, bed bugs that never directly contacted the treated area may still be exposed through contaminated mates. The effectiveness of this transfer depends on dust formulation, particle adherence, and insect behavior—but under the right conditions, it contributes meaningfully to population suppression.

## Too Much of a Good Thing: How Overapplying Dust Lets Bed Bugs Slip By

More is not always better. Research shows that bed bugs can detect and avoid heavily dusted areas—especially when the application is thick, uneven, or highly visible. Instead of crossing obvious piles, they may find alternate routes, reducing exposure. For optimal results, dust should be applied in thin, even layers—ideally as light as the dust that settles on a television screen. Focus on cracks, crevices, and known harborages rather than open surfaces. Always use a professional duster designed for precise application. Avoid using scoops or spoons, which can create piles that repel bed bugs and waste product. Proper technique maximizes both safety and efficacy.

Diatomaceous earth (DE) has been used for decades in stored product and structural pest control.

## What About Diatomaceous Earth?

Diatomaceous earth (DE) has been used for decades in stored product and structural pest control. While it has shown some laboratory efficacy against bed bugs, field results have been inconsistent. DE often underperforms as a stand-alone treatment, and bed bugs may avoid it—especially if applied too visibly. Some observations even report bed bugs surviving for weeks after contact with DE, sometimes while visibly coated.

One key difference is particle structure and speed of action. DE consists of fossilized diatoms with rigid, abrasive particles that act slowly—sometimes requiring days to kill. In contrast, silica gel is lighter and more refined, allowing for better penetration into fine cracks and crevices—places where bed bugs hide during the day.

## Preventive Use: A Potential Frontier for Dusts

While insecticide dusts are typically used to treat active infestations, there is growing interest in their preventive potential. Applying dust in key harborages—such as headboards, bed frames, wall voids, electrical outlets, and furniture seams—before bed bugs are introduced may offer long-term protection. This strategy could be especially valuable in high-risk settings like hotels, shelters, and multi-unit housing. Although more research is needed to confirm its effectiveness, the long residual activity and low visibility of dusts make them a promising tool for proactive bed bug management.

## Conclusion

When applied correctly, insecticide dusts are a powerful yet underutilized tool in bed bug control. Their residual activity, resistance-busting mode of action, and potential for passive transfer make them uniquely suited for targeting the hidden areas where bed bugs thrive. The key to success lies in thoughtful application: using the right formulation, applying it lightly and precisely, and avoiding moisture-prone areas.

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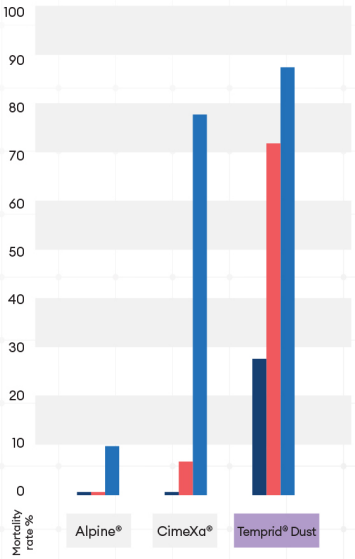


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# How Do Insect Growth Regulators Work?

*By Sandra Kraft and Larry Pinto, Pinto & Associates*

Insect growth regulators (IGRs) are pesticides that don't usually kill insects outright but instead affect the ability of insects to grow and mature normally. IGRs either block the insect's ability to turn into an adult or cause it to change into an adult before it is physically able to reproduce. If immature insects are not able to molt into reproductive adults, the population will eventually die out. Some call IGRs "birth control" for insects.

Some IGRs are juvenoids, man-made chemical mimics of the juvenile growth hormones that occur in an insect's body. Natural hormones control how long an insect remains in each larval or nymphal stage and when it turns into a reproductive adult.

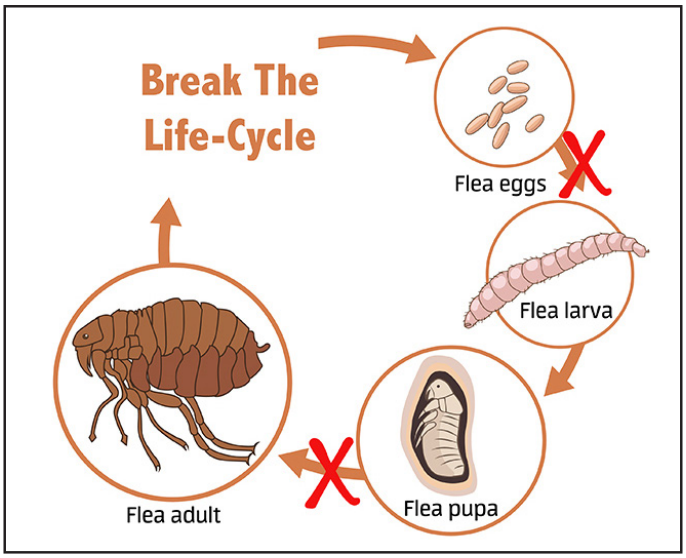
For example, cockroach nymphs that have been exposed to juvenoid IGRs either never molt into adults or they develop into sterile adults that cannot reproduce. Cockroach adults that were exposed to IGRs as nymphs develop short, twisted wings and a darker body color. IGRs also can affect insects that are exposed later, in the adult stage, by blocking the development of viable eggs. Eggs that are exposed to IGRs may not hatch.

Juvenoid IGRs are slow to show effects and have no knockdown. You are not killing individual insects, just preventing future populations. Using an IGR alone, it will take months to achieve control. Although no new young will be produced, most of the current crop of nymphs and adults have to die off naturally before you see results. That's why a standard insecticide is usually applied along with the IGR so customers can see immediate results.

IGRs are especially useful during "clean-outs" or intensive service. Any missed cockroaches or other insects left after the treatment will be affected by the IGR and will not reproduce. IGRs also can be useful against insects that have shown resistance to standard insecticides since IGRs have a different mode of action.

An added benefit to some IGRs is that they stimulate cockroaches to feed. Using an IGR along with a cockroach bait can result in improved bait acceptance as roaches are more likely to feed on the bait.

Other IGRs are chitin synthesis inhibitors. They block the development of chitin (the insect's "skin") so that the insect can't form a new exoskeleton or shed the old one. These affected insects die during molting. Some termite baits contain chitin synthesis inhibitors. The baits are carried back to the termite colony, affecting other worker termites as well.




X indicates where IGRs break the flea life-cycle.
Provided by Control Solutions Inc.

Common insect growth regulators are methoprene used against fleas, ants, stored product pests, mosquitoes and many others; hydroprene used against cockroaches, drain and fruit flies, bed bugs and stored product pests; pyriproxyfen used against fleas and cockroaches; and hexaflumuron, diflubenzuron and noviflumuron used against termites. IGRs are packaged as total release aerosols (foggers), crack and crevice aerosols and emulsifiable concentrates.

Insect growth regulators are non-repellent and have a long residual indoors but most degrade fairly quickly outdoors. You may need to explain to your customers just how IGRs work – that they can expect to see cockroaches or other pests after treatment, but in the long term, these insects will not be able to reproduce. Another advantage to customers is the low toxicity of IGRs to people, pets or other animals.

Use monitoring traps to help determine when to reapply an IGR. Some say if 80% of the trapped insects are showing symptoms of IGR deformities (such as twisted wings in cockroaches), retreatment is not necessary. Less than 80%, it's time to retreat.

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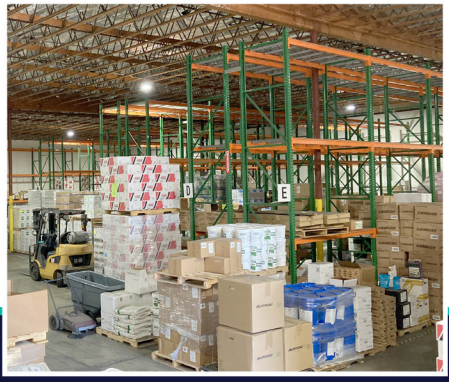

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# MPMA Creates a Buzz at the Great Minnsect Show


The 2025 Great Minnsect Show at the University of Minnesota attracted over 1,000 visitors, all eager to explore the fascinating world of insects. The MPMA booth (shown here before the crowds arrived) was swarming with curious guests! President Morgan Manderfield fielded questions about pest biology and behavior, led engaging educational games, handed out fly swatters and plastic bugs, and showcased the pest management industry in a fun and positive way.

# MPMA Board of Directors

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**Allied Member Liaison**
Rusty Binkley, Rockwell Labs, Ltd.

## MPMA Board Meeting Minutes
## July 15, 2025 at 11:30 a.m.
**via Zoom**

**Present:** Mohammed El Damir, Rob Greer, Nate Heider, Scott Hornemann, Jared Ingalls, Sara Knilans, Morgan Manderfield, Dana Robb, Dannis Warf

**Excused:** Todd Leyse

**Morgan called the meeting to order at 11:32 p.m.**
Attendees introduced themselves.
The April board meeting minutes were approved via email.

**Financials (Todd)**
Todd provided a written report in advance that included PDFs of the Balance Sheet as of 6/30/25 and the Profit and Loss Statement (P&L) 1/1/25-6/30/25. Todd wrote, "Each show year over year (YOY), as well as $$$ change and % change, and on the P&L, it shows the percentage of Income. Of significant note, Outside Contractor (Dana) is way up this year (from $0), and Payroll (Jay) is way down, for obvious reasons. Note: Jay charged extra for things like attending the Minnsect Show and lobbying, so his costs weren't consistent from month to month.

"Overall financial report: MPMA is healthy and doing well, better in 2025 than in 2024. Revenues up 10.22%. Net Income is up a lot. We will have 3-6 more months of expenses before dues start coming in between October and January." A motion was made and passed to accept the report as presented.

**ACTION:** Morgan will check with Dr. Kells to find out whether MPMA owes anything from the conference.

The board reviewed a variety of options that Todd presented for our certificate of deposit. A motion was made and passed to renew the CD for 11 months at 3.76 api, with an additional $9,000 investment from the checking account.

**Minnesota Department of Agriculture (G)**
No report was presented.

**Conference (Dr. Kells)**
No report was presented.
**ACTION:** Dana and Morgan will double-check that Dr. Kells is receiving Dana's emails.

**SPARS Update (Todd/Caroline/Robb)**
No report was presented.

**Website Update (Todd)**
Dana previewed the new site for the board and explained that all work is currently being done by Todd's developer. In the future, she hopes to learn enough to make small changes herself. All members will be able to access their own profiles to make updates. The site is live at one of the URLs we own but not at the other due to some redirection issues with NPMA's website providers who managed the old site. They should be resolved within a few days. Dana will be proofreading the new site this week.
**ACTION:** Dana will send the link and login details to all board members so they can also review.
**ACTION:** Morgan will send Dana a letter to distribute to the members to let them know where they can find our site for now.

*continued on next page*

**Executive Director Report (Dana)**
Dana reported that the fall newsletter deadline is July 15th. The issue will be distributed early next month.

Dana provided a draft of the joint NPMA/MPMA membership form for 2026. A discussion was held regarding a potential state dues increase, as the NPMA will be raising dues this year. It was agreed that we do not have a compelling reason to raise dues. No motion was made. As such, MPMA dues remain the same for the coming year.

**Status of Bylaws review (Morgan)**
A review of the bylaws has begun, with Morgan, Dana, and Todd meeting to draft an update. They have learned that there is quite a bit of detail that needs to be changed, and they are about halfway finished. They hope to have the draft completed by early August. The next step after that will be to share the revisions with the board via email for comment and then set up a meeting to vote.

**Report on Great Minnsect Show (Morgan)**
Morgan staffed the MPMA table and reported that it was a great event. Some of our allied members also had booths. She gave away plastic bugs and fly swatters, only spending about $70 out of the $300 budgeted. The table had an interactive sign with the question "what is a pest?" Attendees asked about pest biology and behavior. Morgan feels that participation at this event helps showcase the pest management industry in a good light. In the future, more volunteers would be better as it was very busy. We don't yet have a date for next year.
**ACTION:** Dana will add this to the agenda for the January board meeting for planning.

**Other Business**
Dana noted that the NPMA has requested a prospect list as they reach out for potential new members.
**ACTION:** Mohammed sent Dana a link to the MN Department of Agriculture website where licensees are listed.

**The meeting was adjourned at 12:08 p.m.**
The next meeting will be held on Tuesday, October 14th - location TBD.

*Respectfully submitted by Dana Robb*