THE ARIZONA RESIDENTS GUIDE TO SCORPION CONTROL

Your all-in-one guide to scorpion control and prevention in your Arizona home.

Table Of Contents

Scorpion Shield

If you're reading this, it would seem that you have a scorpion problem on your hands, and you're looking for answers. You're in the right place. This book is the culmination of years of research, trial and error, fear, frustration, and the decision to ensure that living in the place we love will not be hindered by dangerous pests.

My name is Phil and along with my wife, Rachael, we started a company called Scorpion Shield. We have a son named Ari and a Daughter named Hadley. We are both Physician Assistants and actively practice medicine. I am a partner in a practice with training and years of experience in Emergency Medicine and Racheal currently works in pain management but has training and experience in the Urgent Care setting. The question of how we came to start a pest control company is likely the next one you have, and we will explain soon. We certainly did not anticipate this path but found that through our training in medicine, treating patients in acute care settings, and our own personal life experiences, that we had a unique ability to offer a better understanding of how Arizona residents can feel safer in their homes.

In this book, you will find details of how you can manage scorpions on your own, seal your home, learn about pesticides, and determine good information from bad. Our number one goal is to create a safe home, and most specifically for those at increased risk of adverse effects of scorpion stings - the very young and very old members of our families. We also aim to educate homeowners about scorpions. Many people move to this area from regions where they have never seen a scorpion, let alone inside their home. This realization can be scary and can ruin an otherwise exciting time. But knowledge is key, and learning about scorpions, the dangers they pose, and ways you can help keep them at bay goes much further than any recurring pest control service ever could.

If at any point while reading this book, you have questions that are not adequately answered, or not applicable to your situation, please feel free to send us an email at Scorpionshieldaz@gmail.com, or you can call or text our office at 480-578-9232. You do not have to be a customer, and we are glad to help in any way we can!

SCORPIONSHIELD
PROTECTING YOUR FAMILY

Toy Scorpions

We've all heard stories of scorpion encounters in homes all over the valley. Many natives have had so many encounters, they have simply become desensitized to a scorpion's presence. Most natives have even been stung multiple times. But, should we be ok with cohabitating with these creatures? Obviously, to some extent, we must, but at what point, and at what cost do we say - enough is enough?

In 2018, our family decided it was time to move. Our family was growing and we needed more space, and we found the perfect house in a small, quiet neighborhood in south Chandler. Like nearly every home sale in the Phoenix area, the real estate disclosure form eluded to the minimal presence of scorpions on the property and even stated the previous owner simply treated the home themselves occasionally due to not feeling the need to use a professional exterminator. The previous family had four children, which reassured us that this disclosure information must be true. None-the-less, we still elected to treat the house upon moving in using our realtor recommended pest control company. It was shortly after this when we realized the extent of the problem we had just moved into.

Now, keep in mind, we were not the scorpion experts then that we are today. Our passion and knowledge came at a cost, and our experience was that catalyst. We tend to trust the professionals in cases like this, from the realtor to the pest control company, and even to the homeowner and property disclosure forms. After all, they are legal documents, so why would someone lie? Or maybe, they truly didn't have any idea who they were sharing their home with. Whatever the case was, we were thrust into reality the night our twelve-month-old son nearly died.

The cost of sharing your home

Let's take a step back and find out how this situation all came to be. A quick rewind if you will.

After moving to Arizona from Washington state in 2009, we had no experience with scorpions and minimal experience even with black widows, if we are to add the second most dangerous local pest to the situation. Between our in-law's home, our apartment, and ultimately our first home, we did not encounter a single scorpion in nine years.

Throughout this period we were in undergraduate and graduate school, ultimately leading to the study of medicine. Upon graduation and practice, both of us went into Urgent Care and Emergency Medicine, where we treated countless scorpion envenomation patients. Most people tolerate scorpion stings similarly to a nasty bee sting, but some, on the other hand, find themselves in a precarious situation of pain, involuntary movements, and difficulty breathing.

Prior to the 90s, there was no antivenom to the local Arizona Bark Scorpion. An antivenom drug was developed at ASU by Dr. Herbert L. Stahnke and used widely throughout the state, although never received FDA approval and ultimately became unavailable by 2004. Over the next seven years, there were minimal options for the management of escalating anaphylaxis to scorpion envenomation, which would often amount to palliative care - sedation, and intubation for a period of many hours, to days, while the venom ran its course and was ultimately metabolized out fo the victim's body. Studies were done during this time which led to the approval of the now readily available Anascorp antivenom. However, during these studies, determining the proper dosage and indications of use were widely variable, and an adult male sadly passed away in 2011 despite the use of the antivenom. This patient was under the care of a previous colleague of mine who was a participating physician in that study. Luckily, in the US, this patient was the only casualty. However, in rural Mexico, several hundred people die per year as a result of envenomation and lack of access to acute care and support resources.

Those at the highest risk for adverse effects are young children, elderly adults, immune-compromised or other highly histamine responsive individuals, and those with previous severe reactions. It is considered a medical emergency when these individuals are stung, and although it maintains a low likelihood of severe adverse effects, they should be taken to the nearest Emergency Department for monitoring.

Most symptoms develop within and worsen for up to four hours. The first noticeable symptoms will be pain, numbness, burning, and/or tingling at the site of the sting. Most often, it is not possible to visually identify the site of the sting. Scorpion venom is a neurotoxin, causing voltage-gated channels within your nerves to remain open, firing uncontrollably. This effect cascades along the affected nerve path and will generally track along the affected limb. Occasionally the effect is so strong that it triggers a systemic immune response causing anaphylaxis.

Generally, anaphylaxis symptoms will develop within two hours, but symptoms may continue to progress to full effect up to the previously stated four hours, making the window of monitoring quite long. Anaphylaxis symptoms begin with hypersalivation, nystagmus (eyeball twitching), uncontrollable movements of the body very similar to a seizure, and tongue fasciculations. If any of these symptoms develop, it is essential to seek medical attention immediately. All of the associated symptoms can typically last up to seventy-two hours and there is no significant pain mitigating medications.

False Confidence

We were feeling good, getting settled in, and enjoying ourselves in our new home. It was early November and cooling down outside after a relentless Arizona summer. We had just celebrated our son's first birthday the previous weekend, with many of our Washington family members making the trip down to join in. Everything went off without a hitch.

It had been a little over a month since we moved in, and we were mostly unpacked, at least in an unfinished but unboxed kind of way. We had seen nine scorpions in the month, seven of them alive, five of them in the house, and the other two in the garages. It was somewhat concerning, but we had professional treatment, right? We had no real baseline of what to expect and had yet to consider the cost of negligence.

We wrote it off to the constant shuffle of boxes and bags, stored in the garage, and moved inside. We knew nothing of proportional numbers, seasonal influx, habitat and food source management, or integrative property management strategies, all things we will discuss later on. To us, pest control was pest control, and we paid extra for scorpion control, whatever that meant.

One thing we did know, was that long gone were the days of feeling safe in our home. Walking around in the mornings or evenings barefoot, slipping on our shoes without first shaking them out, and making sure all of our doors and windows remained closed despite the nice weather. None of us had been stung, but we were at the least now acutely aware of the presence of many scorpions, where there was none previously, and we knew our habits had to change.

No Going Back

It was November 11th, 2018, and we were settling down for the night, Ari was playing in the living room, I was doing the dishes and Rachael was nearby. We were discussing the bath time routine and thought it was probably about time to get it started. It was a hit-or-miss situation every night, as I imagine it would be with any one-year-old. We decided to let him play a little longer - an unusual choice for us, being very routine-oriented.

Suddenly, both I and Rachael seemed to have one of those "spider-sense" moments. Maybe it was how Ari moved, or the odd, whisperish shriek he made. It all happened instantly. It was like a telescoping magnifying glass combined with one of those old kaleidoscopes. Everything was instantly zoomed in and spinning around me. The vision of that scorpion falling from our son's hand and crawling around the corner burned into my mind. Expletives immediately flowed from my mouth uncontrollably, Rachael ran to meet Ari, who was running to meet her - I ran over to kill the assailant. Shocked, eyes wide, unsure of how to handle the situation that we have both handled so many times before, only so different now. Ari surprisingly acted normal-ish. Was he actually stung? Maybe it was just a close call that scared him? Our intuition was at odds with our hopes, and a one-year-old has very little to add to confirm one way or the other. Within seconds, but what seemed like forever, he went back over to his toys and made whatever effort a toddler can make to return to normal.

It wasn't long until reality was setting in. He began pacing around the room, not all that different than might be considered normal for a toddler at the end of a busy day, distressed by the simple lack of remaining energy. But it *was* different. It was similar to a frantic search for something mixed with the desire to also immediately stop. He made attempts to distract himself with every toy he came across, only to get back up and return to his aimless agitated wander. I searched the medicine cabinet for Tylenol and Motrin: my medical knowledge giving way to more rudimentary attempts to remedy the situation. We had none. Unusual. The logical and illogical sides of my brain were at odds, in a boxing match, and the outcome was the decision to go to the store to get some, while Rachael would attempt a bath. After all, training tells us anaphylaxis may take hours to set in, and while we were also not completely sure he was actually stung, it made illogical sense to attempt some sort of normalcy. Remember, "Routine-oriented."

The trip to the store took, at most, fifteen minutes. Driving back, pulling into our neighborhood, the phone rings. It's Rachael, calmly panicking. Her attempt at maintaining control in a completely out-of-control scenario. Ari is in the background screaming. It's the type of scream we had never heard before. The combination of fear, pain, confusion, and a hint of nervous system disruption. At this point, it was abundantly clear what was going on, and Rachael had already called poison control, who had then already called the Emergency Department to inform them of our impending arrival.

As we got Ari into his car seat, he was beginning to foam out of his mouth; coughing, choking, struggling to breathe. We were at best, a fifteen-minute drive from the ER, with what seemed like a thousand stoplights between. It was 8 PM. Plenty of people still on the road, unknowingly waiting to get in our way. As I drove the surface streets to the freeway,

attempting to remain somewhat within legal limits, it was a balancing act of risk assessment. The thought passing through my head of "this is our story, this is how my son dies. In the back seat of my truck after being stung by a scorpion." Ultimately yielding to ignore reason - dying in a car crash would be better than living after my son suffocated to death in the back seat.

Arriving at the ER, it was no surprise to anyone there what was going on, and we were taken back immediately. Fortunately, it was the ER in which I had worked for two years, personally knowing and trusting the staff and physicians treating Ari certainly helped the intensity of the situation. A rare privilege, and one that placed into perspective my empathy for concerned patients moving forward, now seeing the situation first hand through their eyes, and laying their trust in the ER staff and physicians. At this point, the foaming, seizure-like convulsions, and inconsolable possession of our son had only worsened. The nurse was unable to place the IV - a nurse I knew well, who had my complete confidence, but this was the final hurdle to overcome. With the quick succession, and deferral to who she believed was more capable of placing an IV in a convulsing toddler, IV access was achieved and three vials of Anascrop antivenom were given.

Anascorp is an antivenom composed of fragments of venom-specific IgG, a binding immunoglobulin that neutralizes the venom toxins and allows the body to metabolize them. The Antivenom is actually produced as a byproduct of the breakdown of equine immunoglobulin from immunized horses. These horses are given immunizations to several other Centruroides species of scorpions, primarily Mexican species, which are very closely related to the Arizona Bark Scorpion. The horses develop an adaptive immunity, allowing them to experience no adverse effects to future envenomation from these scorpions. This is the same method of immune modulation that is achieved through general vaccination against viruses, simply against venom instead. Breakdown of this immunoglobulin into fragments, which are then repurposed as the antivenom, promote the binding and immediate effects that it creates.

Thirty minutes pass with no significant change in symptoms. Anascorp tends to work in this period of time, however, it also may take up to nearly two hours to produce full effects. We didn't know this, and just like this entire scenario, everything we did actually know was immediately deleted from memory. The attending physician returned to the room to check on us, seeming similarly unsure as to why the expected result had not been realized. A brief discussion regarding the use of a fourth vial of Anascorp was had and ultimately accepted. As if we would refrain from anything at this point. But, things finally turn. Literally seconds after the doctor leaves the room to place the order, Ari almost instantly goes from a full-body rigid spasm to a limp noodle. His little body finally getting to relax. Within minutes he was asleep in my arms. The total time from the sting to antivenom effects was about ninety minutes. Far less than the anticipated four-hour window of potential initial symptom onset and progression.

He was observed in her ER for a couple of hours, where he slept for the majority of the time. When he woke up, it was as if he had simply dreamt the whole scenario, completely unaware of what he'd just been through, what *we'd* been through. If only we too, could have experienced amnesia, and simply woken up from a bad dream. But then again, I wouldn't be writing this, and our ignorance would still be bliss.

Arizona Scorpions

There are many species of scorpions in the desert southwest, some of which are very rare and only found in specific regions, while others are extremely common found nearly everywhere. Identifying each type of scorpion is essential as some are nearly harmless, while others, like the Arizona Bark Scorpion, can be deadly. Here, we will discuss each of the most common types of scorpions found around the home, how to identify them and what danger they pose.

The Giant Desert Hairy Scorpion

Let's first discuss the least harmful, but most ominous looking scorpion found around valley homes - The Giant Desert Hairy Scorpion - Hadrurus Arizonensis.

These scorpions can be as large as five and a half inches in length, allowing them to easily pray on other scorpions, lizards, and snakes along with the common diet of insects. They are a burrowing desert scorpion and can range from northern Mexico all the way north to Colorado. They can be easily identified by their hairy appearance and their large pedipalps (pincers). This scorpion may be aggressive, but its sting is very minor, routinely compared to that of a bee sting. The size of the eculeus (the stinger) may actually be what causes the majority of the painful sensation as it is close in size to that of a hypodermic needle. These scorpions are not commonly found in homes due to their size, but they may be seen in desert areas around homes.

The Arizona Striped-tail Scorpion

The Arizona Striped-tail Scorpion - Paravaejovis Springerus - is actually the most common scorpion in Arizona. It is also known as the "devil scorpion" due to its appearance. It has medium-sized pedipalps and large metasoma (tail segments), generally larger than its pedipalps. It is also quickly identified by the linear stripes along the ridges of its tail.

This scorpion has a similar diet like most scorpions, consisting of small insects or other scorpions, and is venomous. However, its venom is not of medical significance to humans and only creates a mild symptom. Often when Arizona residents report being stung by a scorpion and relating it to minor symptoms, it is likely a sting from the *Devil Scorpion.*

These scorpions can range from California to New Mexico and are commonly found under rocks in the desert, but readily enter shoes, blankets, boxes, and other dark and damp areas in and around homes.

The Yellow Ground Scorpion

The Yellow Ground Scorpion - Vaejovis Confusus - is a small burrowing scorpion, very similar to the Striped-Tail and often confused for the Arizona Bark Scorpion. It has a similar appearance for the most part to the Striped-Tail, however, its pedipalps are slender and resemble those of the Bark Scorpion. A distinguishing feature is that the first two segments of its metasoma (tail segments) are wider than they are long. As its name suggests, it is also more yellowish than the Striped-Tail, and less orangish than the Bark Scorpion.

The sting from the Yellow Ground Scorpion will be similar to that of the Striped-Tail, again creating a minimized sense of danger as they are often mistaken for Bark Scorpions. This mild sting sets in motion a dismissal of the true medical significance of actually bark scorpion stings.

The Arizona Bark Scorpion

The bad boy of Arizona Scorpions, The Arizona Bark Scorpion - Centruroides Sculpturatus - is a small, brownish scorpion with the hallmark features of very thin pedipalps and metasoma, a robust-looking body, and a distinguishing feature of resting their coiled tail to the side.

Oddly, the Bark Scorpion is actually more prevalent around our homes than it is in the desert. The reason being, easy access to water and shelter. The most common sites of harborage for the Bark Scorpion are the hollow cinderblock walls surrounding the majority of yards in the valley. These offer dark, damp, cool spaces for scorpions to hide. Secondarily to this, Bark Scorpions are social scorpions. They congregate together and tolerate each other extremely well. They hibernate together and ball together in pseudo-nests to keep warm over the winter. Because of this, it is typically assumed that if for every one Bark Scorpion that you see, there are four more that you don't.

The Bark Scorpion gets its name due to the prevalence of climbing trees and hiding in the bark. They are commonly found in uncut palm tree frons and in wood and debris piles around yards. They are the only scorpions that can scale walls and even walk upside down on the ceilings. This skill set allows them to access our homes in a multitude of ways - through windows, weep screeds, bathroom vents, attic bird blocks, cracks in stucco siding, and any other avenue to vertical entry that would otherwise be inaccessible to other species of scorpions.

Bark Scorpions are commonly found in bathtubs, toilets, and sinks, and this frequently leads to the assumption that they entered through the drains. While Bark Scorpions can enter through plumbing access points, such as under a sink, or where a showerhead exits the wall, they typically fall into these areas from the ceiling. They may enter through plumbing, scale the wall to the ceiling, traverse across the ceiling, and drop. They are unable to climb the smooth surfaces of glass, tile, or ceramic and thus get stuck.

The Bark Scorpion is a hesitant attacker. Their venom is costly to produce and takes time. They are also in need of their venom to subdue their prey, as they cannot do it with their small pedipalps or size alone. They tend to only sting when directly contacted either by stepping on them, grabbing them, or otherwise pressing them against your skin unknowingly, but they may sting when provoked by an overly curious individual or pet.

The Bark Scorpion is the only scorpion of medical significance in North America, causing up to around one thousand deaths per year in Northern Mexico. These deaths are avoided in the US as a result of relatively easy access to emergency medical care, whereas in rural underserved areas this is not the case. Those primarily affected by Bark Scorpion envenomation are young children, the elderly, and immunocompromised individuals. Envenomation can cause a varying degree of symptoms, ranging from mild burning/tingling to full cranial nerve and neuromuscular dysfunction and ultimate anaphylaxis and suppression of life-sustaining vitals. Anascorp antivenom is generally readily available in scorpion endemic areas.

The Arizona Bark Scorpion

Ultraviolet Light

All species of scorpions will fluoresce under black light, except for babies and recently multed adults. This is due to a chemical in the hyaline layer of their shell. Interestingly, this feature remains even after death and has actually been noted in fossils of scorpions, which continue to glow under UV Light.

Blacklight Hunting for scorpions is the fastest and most effective way to eliminate scorpions that are already inhabiting your home and property. This should be done on dark nights between 9pm and 12am.

Scorpion Venom and How It Works

Scorpion venom acts as a neurotoxin, and the venom of greatest concern is that of the Arizona Bark Scorpion.

Bark Scorpion venom is a mixture of enzymes, neurotoxins, serotonin and histamine. The primary pain-causing portion is the neurotoxins. These cause repetitive axonal firing of the affected nerves. Pain may give way to complete inability for a nerve signal to "shut off" and repolarize essentially creates a form of excitatory paralysis. This creates excessive neuromuscular activity and autonomic dysfunction. Autonomic nerve function is what controls subconscious activity, such as breathing, your heartbeat, and digestion - all things we typically take for granted, that become threatened in the presence of scorpion venom.

Serotonin is an important neurotransmitter in our bodies, influencing mood, learning, cognition, memory, and reward. However, too much serotonin can lead to problems. Problems such as elevated blood pressure and heart rate, irritability, shivering, increased reflexes, dilated pupils, diarrhea, confusion, and loss of muscle coordination. These effects exacerbate those produced by the excitatory state created by the neurotoxin.

Histamine is involved in the human immune response and acts as an inflammatory mediator. Most of us know of anti-histamine medications for allergy relief, but exposure to excessive histamine precipitates an anaphylactic response. Your body sees the excess histamine as an indicator that there is a significant allergen or other foreign invader present and mounts a strong immune response. This immune response is what may trigger an anaphylactic reaction, in which the immune response itself is beyond the tolerance of the body.

Envenomation is graded from one to four and assists us in understanding progression and severity, and treating accordingly.

Grade one constitutes local pain and tingling at the site of the sting. This pain will not travel beyond a couple of inches from the site of the sting and will be typically completely tolerable and controlled with medications such as Tylenol or Motrin.

Grade two involves grade one findings with progressing distant travel. This is an instance where pain may radiate from a sting on the hand, all the way up the arm. These cases are still relatively easy to control, with expected relief with OTC pain relievers but in some cases may require stronger prescription pain medication.

Grade three begins to involve cranial nerve dysfunction. The cranial nerves originate from the brain and brainstem, not from the spinal cord. These nerves control sensation and motor control of all aspects of the head and face as well as the autonomic function of the heart, lungs, and digestive tract. This leads to nystagmus of the eyes, hypersalivation, rapid heartbeat, and difficulty breathing

Grade four involves complete cranial nerve dysfunction along with neuromuscular dysfunction, resulting in uncontrollable, seizure-like body movements.

Envenomation symptoms may last up to seventy-two hours, and without antivenom may require sedation, intubation, and life support while the venom is slowly metabolized out of the body.

The Medical Significance of Scorpion Stings

Now that we have a general understanding of the types of scorpions and the effects of their venom, we can evaluate why it is important to take them seriously - particularly for your little ones.

Our family is not native to Arizona. We moved here from Washington State in 2009. We have an elusive Northern Scorpion - *Vejovis boreus* - which many Northwest locals would argue isn't even real, or they may not even know about it, as none of them have probably ever seen one. To us, scorpions were a thing from movies, found in the middle east, and certainly not a threat. General pests like dangerous spiders or disease-spreading cockroaches, flies, or rodents were much higher on the prevention priority list.

Upon moving here, we were immediately fascinated by scorpion presence, and we would search for them while camping, or otherwise outdoors in the evenings. Some friends would report that they had them in their yards and we would find them while hanging out. We never experienced any in or around our homes for the first nine years of living in the Valley. An incredibly lucky outcome in hindsight.

Most Arizona natives seem to accept scorpions and are willing to cohabitate with them. Maybe a result of desensitization through repeat encounters and continued failures at removing them. Whatever the cause, the issues lie in multiple veins.

Scorpions are both nomadic and territorial, depending on the species. Homeowners that are either unaware, or unconcerned with scorpion presence, and that do not take mitigating measures, are potentially seeding their entire neighborhoods. Even the most territorial scorpions will still gradually spread from a central nesting site, such as an untreated, vacant, or cluttered property.

The risk falls onto the unassuming neighbors or the new residents who just purchased a home and are moving from out of state. They may still walk around barefoot, let their children play outside at dusk, or leave items or boxes on patios or in garages overnight before bringing them in.

On the other hand, many Arizona natives report that they have been stung by Bark Scorpions and that it wasn't that bad. This may be the case if they were stung in a highly callus area, or that the scorpion had already recently emptied its venom stores on pray. But more likely it's the case that they were stung by more populous Yellow Ground Scorpion or Striped-Tail Scorpion. This assumption creates a false expectation of the dangerous reality of Bark Scorpion stings and sets up problematic situations moving forward.

The ultimate cost of Bark Scorpion envenomation is both emotional and financial. The pain is the known and expected outcome, the possible anaphylaxis is an unexpected outcome and the tens of thousands of dollars in the cost of antivenom is generally completely unconsidered. Each vial of Anascorp may cost between eight and thirty-two thousand dollars, depending on location and hospital system. The standard initial dose is three vials, leaving an incredible financial responsibility even for the low-end price.

Most insurance companies cover the antivenom in cases of clear cut anaphylaxis, but not for low-grade envenomations. Those without insurance may be left with the entirety of the bill.

This scenario typically doesn't affect those negligent of the potential. Those that know to shake out their shoes every morning, to not walk barefoot, to not leave items outside overnight, or to leave doors open in the evenings, simply as a result of past local experience. Even basic mitigation techniques can avoid stings for long periods of time, although not indefinitely. This issue affects the neighbor kids, the new baby, the elderly woman, or the immune-compromised individual down the street. These are the families that end up hospitalized, dealing with the pain of both their stings and the bill.

The cost of a well-designed, professional scorpion treatment program on a bi-monthly basis costs around $600 per year. It can however be done effectively by homeowners for around $200 per year. We will discuss products and methods shortly, but the point is that prevention is far more valuable than being reactive, and it is far easier to keep the issue at bay before it gets out of hand than trying to remedy an infestation.

Arizona Scorpion Habitat

Scorpions, for the most part, are universally similar in their driving instincts regarding habitat - Dark, Damp, Cool, and full of prey insects. Being primarily found in the desert, these areas tend to be by water, under rocks, burrowed in the dirt, or hidden within a multitude of man-made objects around our homes. Scorpions are found on every continent except Antarctica, so these habitats may vary slightly depending on geography, but the fundamentals are likely to be the same.

Temperature

A common misconception of Arizona scorpions is that they prefer heat, but the reality is the opposite. They thrive in moderate temperatures between 75 degrees and 100 degrees. Less than 75 degrees and scorpions become less active and beyond 100 degrees scorpions seek cooler environments. Arizona is also unique in its daily temperature splits, potentially ranging 50 degrees or more in a single day, and scorpions may seek warmer or cooler harborage even when outside temperatures are still relatively comfortable.

This combination of dramatic temperature swings and a desire for moderate temperatures naturally drives scorpions to seek refuge in our homes, where the temperatures are commonly steady in their desired range. This leads to a potential for year-round scorpion activity, with winter being "indoor scorpion season" and summer being "general scorpion season." This makes it essential to stay diligent regarding scorpion control throughout the year.

Water

Scorpions may not require much water, as they can utilize water very effectively without excess loss through their exoskeleton, but they do require water none-the-less. Beyond required physiological function, water provides cool, damp areas that attract prey insects.

The Bark Scorpion is actually known to be seen at waters edges drinking and seemingly prefers cooler and more water-dense locations over other species, making our homes prime harborage locations. With pools in nearly every yard, irrigation systems watering all around the houses and yards, and irrigation and hose boxes routinely present, there is no lack of potential damp harborage sites. For this reason, the Bark Scorpion is found in much higher proportions in populated areas than in the natural desert landscape.

In general, scorpions of all species, living in the desert landscape will seek refuge under rocks, and make small burrows in the sand to reach cooler areas. They will typically be found on cool sides of hills and near water sources such as rivers and lakes, or common flood zones.

Food

Scorpions can go for significant periods of time without food and have even been known to go up to a year, although several months is probably more common. They are nocturnal hunters and hunt primarily through sensing vibrations. They cannot seek out prey due to poor sight, so prey must be abundant enough to cross paths with a scorpion, at which time they use their pedipalps (pincers) to grab on. The Bark Scorpion will sting its prey to subdue it, but larger and stronger scorpions may not need to sting pray and simply begin eating them alive.

A common misconception is that scorpions cannot be controlled by pesticides, and the only way to manage them is to eliminate their prey. This is not the case, partially for the fact listed above, as scorpions will just wait for prey to return. They also tend to live in cinderblock wall voids, giving them access to neighboring yards where prey may be more abundant. Scorpions will also travel around 35 yards per night in search of food, making it extremely easy to go from one yard to the next, and so on until an adequate food source is found. Ultimately, food sources are a minimal part of scorpion management

Harborage

It is theorized that the fluorescent feature that makes scorpions glow under UV light is also to help them determine daylight vs moonlight, and although not proven, would make sense as to helping scorpions determine when to become active and when to settle down. Scorpions are not intelligent creatures and operate on instinct and basic physiological function. This makes them somewhat predictable in regards to hiding spaces. For example, a scorpion inside a home will always follow an edge, such as a wall. This reduces potential danger by half and often allows for access to the first crack or crevice encountered. Outside, the same concept is true, but rocks, trees, or debris will be utilized along with perimeter cinderblock walls. A scorpion will hide in these areas throughout the day, and emerge in the evenings. They may stay concealed, with only their pincers exposed, waiting for prey. They also wait at the base of walls for other insects to walk past, as they too will tend to follow along these walls for protection.

It is very unusual to see a scorpion in the open, such as in the middle of a room. Scorpions on walls will be easily visible as there are fewer spaces to hide, but the concept would remain the same - find an edge and travel along it, or hide behind something. In the cases that scorpions are seen in the open, particularly after pest control treatments, it generally indicates exposure and subsequent neuro-dysfunction is likely taking place. Although alarming, it is a good sign, as nature would direct scorpions to do the opposite.

Scorpion Control Products

This is not a comprehensive list of scorpion-rated products, and many products may kill scorpions although their label may not list them as a target pest. Here I will explain why along with the products we have found to be the most effective.

In pest control, scorpions fall into the category of "general pest," and are taught in a certification category called "industrial and institutional." This category includes pests such as ants, cockroaches, flies, earwigs, silverfish, spiders, and expands even to rodents and birds. So it's easy to understand why most pest control companies and professionals don't view scorpions as anything special, other than just another nuisance pest in our area.

I'm trained in medicine, and as such consider things quite a bit differently than the general pest control professional. The personal danger is obvious as I have treated countless sting and anaphylactic patients in the ER. The emotional and financial cost, as listed above. The well-being and security of someone in their home, and the overall hygiene of the home. These factors play directly into the products we utilize and how we utilize them.

At the beginning of our research into why multiple pest control companies were not controlling our scorpions, I really didn't have a place to start. So, I went to the product card left after our last service at the time and started googling all the product names on that card. It turned out, that despite my plea for scorpion control each and every time the technician was at our property, the product being applied was not labeled for use against scorpions. As a matter of fact, it was most effectively a mosquito product - we didn't have a mosquito problem. This got me thinking, did the tech know the product indications? Was it the standard practice of the company? Was it a cost-driven choice? Can scorpions be controlled at all with spray products? Despite these questions, the company offered no answers, or simply chose not to disclose them. So back to google I went.

What I found was a general picture of how these pest products are formulated. The derivatives, the additives, the bases. All slightly different, but many quite similar at least at first glance. The majority of general pest control products are derivatives of the chrysanthemum flower, which naturally creates a product called *pyrethrum*. Science takes this product and changes some of the molecular structure, creating a different Isomer, which changes the name to *Pyrethroid*. A similar concept to medications, and to use pain medications as an example - Pure Opium vs Opioid prescriptions. Generally, this serves a certain purpose, and for our sake, we will consider it to be done solely to make the product more effective, although there may be other reasons to do this as well.

Now, to someone trained in medicine, this is starting to sound like pharmacology. Generic vs Trade named drugs, which give way to the same considerations. In medicine oftentimes medications are chosen based on accurate diagnosis, side effect profile, interaction with other current medications, allergies, resistance, and mode of use. More than needs to be considered for pesticides, but not all that different. This comparison gave me clarity in how to pursue a continued understanding of the what, how, and why products were being used. However, technically it's unfair to expect a pest control company to consider things in the way medical professionals do, and the same thought occurred to me at the time. This thought also prompted the consideration of - "could I do this better?"

Pesticides can be scary. They are, after all, poisons designed to kill living creatures. However, long past are the days of DDT and Agent Orange; extremely long-lasting pesticides that are still found in the environments they were originally used. They were extremely effective at their designed tasks, but also at causing harm to humans exposed. Pesticides today are strictly regulated by the EPA and even re-examined after years of approval to again ensure safety with proper application.

Pyrethroids act as neurotoxins to insects, inhibiting nerve signals from being turned off, thereby paralyzing the target pest in all physiological ways. When these chemicals are formulated to have a longer mode of action than the insect's organs can withstand and recover from, they are effective in killing the insect. This is an important consideration, as scorpions are extremely hardy creatures.

Much of the fear associated with pesticides is that they will have similar effects on humans. However, the reality of their design is such that the concentrations in which harm insects are almost always harmless to humans. To place this into a recognizable perspective, a human would have to either bathe in pure concentrate (not mixed with water) or drink pure concentrate in the amount likely equal to full bottles, before death would occur (absolutely DO NOT try this). Symptoms of numbness, tingling, itching, burning of the skin, eyes or face, are far more likely to occur with less exposure to pure concentrate, however, these symptoms are limited and the treatment is symptomatic. Most of these chemicals are broken down in both humans and insects by the enzyme called Cytochrome P450. This enzyme is responsible for a large portion of medication breakdown in humans, acting in the same exact way, to gradually metabolize the chemicals, which are then excreted.

The most interesting concept about our society's views on pesticides, particularly in regards to scorpions, is that scorpion venom is a neurotoxin. This venom acts in nearly the same way as the pyrethroids we use to kill scorpions, yet with an infinitely higher potential for life-threatening responses. Scorpion envenomation causes intense pain, tingling, numbness, burning, hyper-salivation, choking, difficulty breathing, muscle twitching, uncontrollable bodily movements, and may lead to paralysis of certain muscles. On top of this response is the greater response of an anaphylactic reaction, which is generated by histamine release as a result of venom presence. Generally, our ability to break down scorpion venom is very slow, between forty-eight and seventy-two hours, far longer than would be required for the breakdown of pyrethroids if ever exposed at sufficient levels to cause symptoms.

A second concern for many is the effects of these chemicals on smaller mammals, like our pets. This is really no different than the applied concept to humans, only a pet would require proportionately less exposure than a human due to their size variance. This level of exposure is still extremely unlikely to occur outside of storage facilities, as the amount applied is diluted and distributed over an area that would make it nearly impossible for a pet to continuously consume.

All pesticides used by Scorpion Shield are labeled to kill scorpions and use at the appropriate dosing. These are safe for pets and humans when properly handled and applied. Any associated danger lies when the product is still well, immediately after application, and the risk is all but completely eliminated once the product is dry.

All of our choice products have shown no indications of carcinogenicity (causing cancer), teratogenicity (causing birth defects), or neurodegenerative effects associated with chronic exposure. These products however do pass through the breaks milk if nursing mothers have significant skin contact or oral exposure. However, studies have shown that nursing infants have had no neurodegenerative or other secondary effects to breast milk consumption.

Pesticides

When we create an application program, we first must consider the frequency of treatment and the severity of the infestation. Next would be the landscape and the surrounding area, and further, the added integrated management concepts. For those trying to manage scorpions themselves this means before treating, you must choose a consistent frequency in which you plan to treat, you must consider your particular home and landscape as well as the areas directly around you, and things you can do to your home beyond that of just spraying pesticide.

The following are many of the most commonly found pesticides for scorpion control:

Pyrethrin - This is the oldest known pesticide, being used for thousands of years, and is also considered a natural pesticide when not combined with synergists. It is the derivative in which other pyrethroids are formed. It acts similarly but may be considered the weakest option as compared with modern pesticide formulations and synergists.

Bifenthrin - This is a long-lived and proven pyrethroid pesticide for the control of most common pests. It can be found as dust, granules, or spray products. It works relatively quickly but does not hold up well in direct sunlight, making it difficult to use beyond short windows in the Arizona summers.

Deltamethrin - A strong synthetic pyrethroid, this pesticide has been used significantly for the control of mosquitos and bed bugs. However, its use has led to some of these pests developing resistance. In regard to scorpion control, this product comes in several forms and has a moderate active time of around 60 days, depending on application type and the amount of direct sunlight. Most commonly found as dust applications around doors and in voids, but is commonly used in homes interiors as spray applications.

Cyfluthrin - A common and very effective scorpion control pesticide that has one of the longest expected active times of 90 days, in microencapsulated forms. This product is found as a spray dilution for interior and exterior applications, or as a fast knock-down aerosol.

Cypermethrin - A strong and fast-acting spray application pesticide, but one that is also rapidly degraded when applied to exteriors of homes. It is also very toxic to pets, particularly cats. The toxicity and short active time make this product unlikely to offer adequate results.

Lambda-Cyhalothrin - A very common pesticide found in commercial-grade pre-mixed products such as those found at home improvement stores, this product is safe and effective. It is however relatively slow-acting, particularly on armored pests such as scorpions, and will be very dependant on concentration rate and recurring use.

Esfanvelerate - A newer and less common, strong, and fast-acting pesticide used in residual spray applications and as a quick knock-down aerosol.

Piperonyl butoxide - Not a pesticide itself, Piperonyl Butoxide is an added synergist that slows the metabolite breakdown of pyrethroids, making them more effective and longer acting.

This list is by no means comprehensive but does make up some of the most common pesticides one will find when searching for scorpion control measures and some will be found together in combination products.

It is reasonable to feel confident in your home when these products are applied by a licensed professional, or by the homeowner in a matter consistent with labeled direction. We only use products that we would use in our own homes, among our own children and pets, and we do this to mitigate the far greater risk of exposure to scorpion envenomation. Your home should be your safest space, and we mean to create greater safety with the use of these products than would be achieved with the risk of scorpions being present.

Common Scorpion Misconceptions

It's nearly impossible to scroll through Facebook on any given day in an Arizona summer without seeing a post or an ad about scorpion control. It's the nature of living in the scorpion's natural environment and their inherent fear factor. Its also incredibly difficult to manage them, for a variety of reasons, but made worse with the significant spread of misinformation about doing so.

Everyone claims they are scorpion experts, but simply becoming certified to apply pesticides for general pest control does not make someone an expert in scorpion control. It takes years of trial and error, research, testing, and treatment. It also takes a driven mindset and a specific business model. Its time consuming and expensive, and many times riddled with failures before success is found.

1. The only way to eliminate scorpions is to eliminate their food source.

This statement is in, all ways, completely false. If you have a pest control professional and they repeat this statement, fire them. There are two main reasons why this statement is perpetuated and subsequently believed by so many - Product knowledge and cost.

There are several products (as listed above) that are specifically labelled to manage scorpions, and they are tested and researched to achieve that labelled indication. Some pest control professionals may never have been trained in these products, or have not encountered these products in their general treatments, or in areas where they may have worked previously.

The second component is the cost. These products are generally much more expensive and require double the concentration rate needed to control other pests. This effectively doubles the overhead rate, which can have a dramatic impact on profit margins, particularly for small companies or independent operators. This creates an ethics problem that is rarely considered both by customers and even by the applicator themselves.

Some applicators will apply scorpion-rated products at half the required concentration, which allows them to state they are spraying for scorpions, while still effectively controlling their food source, but poorly controlling scorpions themselves.

Other reasons for poor results are poor training, poor customer communications and education, and poor customer involvement. It is imperative that care is taken in the application and that customers must be involved in actively hunting and killing any scorpions they can find on their property each night.

Its important to consider the simplicity of human perception in this situation as well. Scorpions can fit through a crack the size of a credit card, they are nocturnal, they prefer hiding, they can live without food for up to a year, they can live without water for months, they can scale walls, they can walk on ceilings, they can travel from yard to yard, and they can be transported in nearly anything. These traits set up a difficult understanding of how and why scorpions are present in certain areas and at certain times and despite what appear to be effective control measures.

2. Spray products do not work on scorpions because of their armor.

It is true that scorpions' exoskeleton protects them from many types of pesticides, but it does not make them immune. It is also true the scorpions, like spiders, walk slightly above the ground, allowing them to somewhat avoid product microcrystals. However, they do drag their bodies enough to still have contact, they rest their bodies on the ground and squeeze between small spaces allowing contact to multiple areas of their bodies. Their shells make absorption difficult, thus requiring higher concentrations of product and longer periods of exposure.

Secondary to direct exposure, scorpions do not groom themselves as many other pests do, so they do not ingest the product as other pests would. This also leads to a longer tolerance time and longer effective time.

Beyond that, scorpions can live in extremely compromised states for long periods of time, which means that even with proper exposure and subsequent paralysis, the scorpion may metabolize the product out of their system before it can actually kill them. We have witnessed scorpions become paralyzed and flipped for seven days before seemingly returning to life and continuing on their way. This occurs as a result of metabolism continuing despite bodily paralysis. Metabolite inhibitors are sometimes added to products to ensure that this does not happen.

This too is a statement made from an angle of cost, as applying simple dust and granules is far cheaper than applying effective scorpion spray treatments.

3. Scorpion season is only in summer.

Although scorpions are most active in the summer, they do remain active and can be encountered any time of the year. Scorpions prefer temperatures between 75 and 100 degrees. Beyond these temperatures and they begin to search for more temperate areas, such as inside our homes. As a result of this, it is essential to treat scorpions year-round, both inside and outside of your home.

4. Scorpions crawl out of drains.

Scorpions do not generally come out of drains if the drains are properly done and without damage. In certain cases of sinks or drains that are not commonly used, which allows the traps to dry up, as well as having damage somewhere along the line, scorpions may get into the drains and climb out. However, in normal functioning drains, in regular use areas, and without damage, the water maintained in the trap will block a scorpion from traveling past, as well as the PVC being very difficult for a scorpion to vertically climb as a result of its smoothness.

In the cases where people do find scorpions in their sinks, showers, or toilets, the most common way that these scorpions get into these areas is a result of falling from the walls or ceilings. They cannot climb ceramic, metal, glass, or other extremely smooth surfaces. Scorpions will hide in drains if they end up in a sink or shower and appear to emerge from them when the area is disturbed.

Sealing Your Home

Sealing your home is essential. Without doing so you will undoubtedly continue to find scorpions in your home. They may be dead, or dying, as a result of pesticides but they may also appear very alive and healthy when found. Pesticides take time to work, oftentimes may days. Pesticide applications may keep them from living in your home or reproducing in your home, but they will not keep them from entering your home.

We have broken down our sealing priority in tiers. These tiers help to determine the most appropriate focus point and allow for budget considerations. However, the absolute most effective seal is a complete seal and each portion of the following list should be inspected and sealed if possible.

Tier 1 – First priority

Exterior cinderblock walls

Door Sweeps and weatherstripping

Exterior walls

Tier 2 – Second Priority

Plumbing entry

Showerheads

Direct vents (bath/laundry fans)

Central air vents

your home.

Tier 3 - Lowest Priority

Outlet/switch covers

Weep screeds

Driveway cracks

Garage door seals

Garage ventilation grilles

Sealing is done primarily with high-grade caulking. We use DAP brand paintable, 30+ year indoor/outdoor caulking, and have had good results, but choices may vary. Our recommendation is to avoid cheap, watery caulking, as this will be difficult to manage during the application, and you will ultimately use more than a higher grade caulking.

There is, in general, a technique to using caulking without making a complete mess, however, if you don't seem to have that technique just wear old clothes that you are ok with ruining and have lots of paper towels. If you see a hole or crack, fill it. Use your finger to push caulking into gaps and smooth it over. The end goal is to create barrier after barrier, deterring and preventing scorpions from easily moving into your yard and subsequently into

Integrated Pest Management

Integrated Pest Management or IPM is a concept of pest management without pesticides, or with limited use of them. This approach requires work from the homeowner or tenet, and continued diligence, but acts as the final feature in gaining the greatest success in pest reduction. In our case, we are focusing on scorpions, but IPM can by used for any pest.

The main goal with IPM for scorpion control is to reduce pests to a tolerable number. In agriculture, they define success below levels that cause economic injury. In regards to scorpions, we continually work towards fewer and fewer scorpions present in and directly around homes. This is first identified through general sightings, and secondly through blacklight hunting. We consider it tolerable if one to two scorpions are sighted on a perimeter wall nightly. We consider scorpion sightings against the home perimeter or in the interior to be intolerable and would require further addressing.

Hallmarks of IPM are modifications to your home and property. Removing or preventing harborage sites and eliminating food sources. Homes should be kept clean, with clutter contained as much as possible. Items should be stored in clear, sealable containers and never in cardboard boxes. Baseboards should be visible whenever possible, keeping furniture off walls a few inches. All debris such as woodpiles, rock or stone piles, yard debris, or garbage should be removed from the property as soon as possible. Vegetation should be kept from contacting any part of the home and should be kept off the perimeter walls of the yard whenever possible. Irrigation systems should be monitored and standing

water should be addressed if identified. This is the area where controlling scorpion food sources is important, but following these tactics and using regular recurring pesticide applications will often address this issue without any further requirements.

Using sticky traps for monitoring and routine nighttime blacklight hunting is essential to identify any missed harborage sites. If new sites are found, these sites should be addressed appropriately.

Expectations With Scorpion Pest Control

As discussed briefly earlier, there is no way to completely eliminate scorpions. I wish there was. Oftentimes, however, this is not what people want to hear. I was one of them. This creates a difficult situation for both the technician and the homeowner.

Education is key in this scenario, and that begins with the technician. We believe that a technician should be adequately trained to have, at a minimum, a discussion regarding common harborage sites and simple IPM techniques with the customer. It is unreasonable to expect a high level of success without customer involvement. It is also essential for the tech to explain how the applied pesticides work and their timeline. If a customer expects pesticide to immediately kill all present scorpions and the following day they find a live one inside their home, the flaw does not fall onto the customer, it falls onto the technician. This customer is likely to call the company, upset, and assume that the job was done poorly or with the incorrect or inadequate product. Neither of these may be the case, but what was done poorly was customer education.

Our expectations for successful scorpion control are to reduce indoor scorpion sightings to two per year, or less, and outdoor sightings to less than four per week. This may sound concerning, but with proper management techniques in place, these numbers would simply indicate transient scorpions, entering your yard or home recently, and likely to die within a few days. It would not indicate an infestation or high-level presence on the property. After the initial infestation or population is eliminated, further management is directed at keeping new populations from establishing. If these numbers are seen without management techniques in place, it would indicate a different situation and we would apply proportionate expectations of the presence of roughly four times the visualized number of scorpions.

We cannot stress enough the importance of blacklight hunting for scorpions on a regular basis, especially in the summertime. Understanding accurate numbers and reducing populations helps both you as a customer, and us as a company in understanding the effectively controlling the scorpion situation at your home.

THANK YOU

Check Out Scorpion Shield Online
LinkTree