

WHITMIRE MICRO-GEN
PRESCRIPTION TREATMENT®

PT Quarterly

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Occasional Invaders:

what they are and
how to control them



WHITMIRE MICRO-GEN
Prescription Treatment

Making pest management more profitable.

Photo Credit: Steve Sims

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**For more details,
see page 8.**



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Whitmire Micro-Gen is one of the leading manufacturers and suppliers of general insect control products and equipment to the professional pest management industry in the U.S. Whitmire Micro-Gen specializes in the manufacture of aerosols and baits for insect control and develops unique and environmentally friendly fly control equipment.

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features on various topics.

Occasional Invaders – Earwigs, Crickets ...

Historically, PMPs defined occasional invaders as pests living outdoors that seldom invade a structure. By Stoy Hedges

Occasional invaders are pests that do not, or cannot, breed indoors. The most common examples of occasional invaders taught to new professionals are earwigs, crickets, millipedes, centipedes, springtails, ground beetles, etc. Yet, literally any arthropod in the natural environment could fulfill this definition of an occasional invader.

In the U.S., more than 100,000 species of insects, spiders, ticks, mites, etc. might be encountered. Any of these arthropods could conceivably end up in a home. Usually such encounters involve a single specimen or maybe a few. In rare cases, a strange insect might invade a home by the dozens, hundreds or thousands. The following details a few cases of unusual “occasional” invaders.

Thrips

The patrons on an outdoor patio of a restaurant in Texas

began experiencing tiny insect bites during mid-day through the afternoon. The culprits were identified as thrips which are known to bite people, even though they

The most common examples of occasional invaders taught to new professionals are earwigs, crickets, millipedes, centipedes, springtails, ground beetles, etc.

feed only on plant juices. The problem was traced to the flowering shrubs planted around the patio. The insects were carried off the plants by the breeze coming up the hill and onto the patio. Thrips are not that uncommon around structures and are small enough to enter a home through



Photo Credit: Steve Sims

window screens. Finding and treating the plants on which thrips live is the key to solving this problem.

Psyllids

On a number of occasions, I have been asked to identify an insect invading buildings in varying numbers, depending on the case at the time. These insects, called psyllids, resemble tiny cicadas. They are *Homopterans* and are related to aphids and scales. Like thrips, the problem involves outdoor plantings, and the species most involved is usually the hackberry psyllid. Control at the source—the landscape plantings—is generally warranted.

Wasps

Strange wasps can appear at odd times in homes, often during the early spring when the weather is warming. I have identified a number of different solitary wasps belonging to the family *Sphécidae* – even found a few inside homes (including my own). In these cases, the source is usually traced back to the windows where, in gaps along the edge of screens or within the small voids present in some windows, evidence of mud wasp nests can be found. The situation warrants no control efforts as the wasps have already emerged, been seen and killed, or captured by the homeowner. Possibly, exclusion efforts around the windows might prevent the problem for the following year.

Keds

One of the strangest invaders I've encountered are bird keds. Keds are a type of parasitic fly that attack various animals. The female ked is wingless and almost tick-like

Strange wasps can appear at odd times in homes, often during the early spring when the weather is just warming.

in appearance. In the two situations which I was involved, the keds were traced back to abandoned bird nests in the building. Again, no treatments were necessary.

Amphipods


Amphipods are often included in textbooks as occasional invaders, but they are not often encountered. Found in



damp situations, these jumping, terrestrial crustaceans resemble small shrimp and enter buildings at their own peril. They quickly dry out and die and often turn red in color after death. No inside treatments are necessary, but efforts to minimize the excess moisture conditions outside may be needed as well as sealing cracks through which the amphipods entered.

Dobson Flies

Numerous nighttime flying insects can be found inside buildings. Such insects found outside might prompt inquiries from a concerned or curious homeowner. The group prompting the most curiosity is the order *Neuroptera* which contains the dobson flies, alderflies, antlions, and owlflies. Homes near lakes, rivers, and other bodies of water are most likely to encounter such insects attracted to their porch lights. Dobson flies are worrisome, though not dangerous, to the homeowner because they are large (up to 3") and the male is equipped with sickle-like mandibles up to 1½ inches long. Stranger still are the mantid flies, which look like a cross between a miniature preying mantid and a lacewing. Another order of insects, the scorpionflies (*Mecoptera*) have, on occasion, accidentally flown into a home, been captured, and then offered to a professional for identification.

With these cases described above, correct identification was critical to analyzing the situation and putting the customer's mind at ease. Many of these odd "occasional" invaders can be identified using a simple field guide to insects. Others require some entomological training and a taxonomic guide such as *Introduction to the Study of Insects* by Borror, Triplehorn, and Johnson, now in its 6th edition. This valuable book can be purchased from the Entomological Society of America or Bioquip Products (www.bioquip.com). 

Stoy A. Hedges, B.C.E., is Manager of Technical Services at Terminix International in Memphis, Tennessee.

RAY BRANZ



120 YEARS OF EXPERIENCE

It has been a few years since we introduced Whitmire Micro-Gen's customer service and distribution team. So, we will attempt to bring you up-to-date with the industry's top service professionals.

Even with this much experience it is amazing how much we learn from our customers.

19.5 YEARS Ray Branz, Manager

- 5 years, Customer Service Manager – Airline Industry.
- 10 years, Customer Service Manager – Steel Industry.
- 4.5 years, Customer Service Manager – Whitmire Micro-Gen.

21.0 YEARS John Kuda, Supervisor

- 21 years, Distribution – Whitmire Micro-Gen.

38.0 YEARS Charles Gardner, Distribution

- 21.5 years, Distribution and Logistics - United States Military
- 16.5 years, Distribution – Whitmire Micro-Gen.

7.0 YEARS Caruan Kennon, Distribution

- 7 years, Distribution – Whitmire Micro-Gen.

21.5 YEARS

Terri Peil, Customer Service

- 10 years, Customer Service – National Newspaper.
- 10 years, Customer Service Representative – Medical Equipment Industry.
- 1.5 years, Customer Service – Whitmire Micro-Gen.

15.5 YEARS

Maureen Heitman, Customer Service

- 4.5 years, Customer Service Representative – Financial Industry.
- 10 years, Customer Service Representative – Medical Equipment Industry.
- 1 year, Customer Service – Whitmire Micro-Gen.



Left to right: 1st row: Ray Branz, John Kuda, 2nd row: Charles Gardner, Caruan Kennon, Terri Peil, Maureen Heitman.

Remember we are just a phone call away at 800-777-8570. ☎

Ray Branz is Customer Service Manager at Whitmire Micro-Gen.





JOHN FLORES

APPLICATION RATES

Confused over application rates for perimeter spraying? Here are some insights to help determine the appropriate rate for your needs. Calibrating your sprayer is a good starting point.

Most labels recommend the amount of concentrate to be applied per 1,000 sq. ft. So, the first question is “How much water do you spray per 1,000 sq. ft. to deliver the required label rate?” Follow these steps to answer the question.

Calibrate Sprayer

1. Calculate how many seconds it takes to spray one gallon. Fill your rig with water. Take a one gallon bucket and spray water from your rig into the bucket. Use a stopwatch to measure the time it takes to fill the bucket.

2. Calculate how long it takes to spray 1,000 sq. ft. Go to a job site that represents a typical account, this could be your own home, office, etc. Measure 1,000 sq. ft. of a typical

When deciding whether to use a low label rate or high label rate, consider the anticipated pest pressure (both target species and activity levels) during your window of control, environmental conditions, cost and required duration of control.

environment (some bushes, foundation, plantings or whatever is typical for your customer base). Apply water, simulating a thorough perimeter spray within this 1,000 sq. ft. test site. Note the seconds of spray time required to cover the area. Write it down.

3. Determine the number of gallons sprayed in 1,000 sq. ft. Divide the number of seconds it takes to

spray 1,000 sq. ft. by the number of seconds it took to fill the one gallon bucket. This is the number of gallons to spray for 1,000 sq. ft.

For our example, assume:

- It took 300 seconds to spray 1,000 sq. ft.
- It took 60 seconds to spray one gallon.

(continued on page 9)

The following chart provides the percent of cyfluthrin active ingredient in tank mixes of Whitmire Micro-Gen's PT Cy-Kick CS concentrate:

AMOUNT OF PT CY-KICK CS CONCENTRATE								
CONCENTRATE								
% solution	½ oz	1.0 oz	2.0 oz	4.0 oz	5.0 oz	6.0 oz	8.0 oz	16.0 oz
1 gal	0.025%	0.050%	0.100%	x	x	x	x	x
2 gal	0.013%	0.025%	0.050%	x	x	x	x	x
5 gal	0.005%	0.009%	0.019%	0.038%	0.047%	0.056%	x	x
15 gal	x	0.003%	0.006%	0.013%	0.016%	0.019%	0.025%	x
25 gal	x	x	x	0.008%	0.009%	0.011%	0.015%	0.03%
50 gal	x	x	x	0.004%	0.005%	0.006%	0.008%	0.015%
100 gal	x	x	x	0.002%	0.002%	0.003%	0.004%	0.008%

MARY ELLEN WILSON



YEAR-ROUND PEST CONTROL

J&J Exterminating in Lake Charles, Louisiana, faces year-round pressure from various insect pests, thanks to hot and humid conditions. Prescription Treatment® brand Cy-Kick® CS is their solution for year-round pest control.

J&J services thousands of accounts per month from its eight offices throughout Louisiana. Their customers include hospitals, nursing homes and daycare centers, as well as residential customers.

“Our customers call on us to control everything from fire ants to spiders to American and smoky brown cockroaches,” says Byron Hixon, Pest Control Supervisor for J&J Exterminating. “We need products that provide quick knockdown on a variety of pests.”

More Efficient, Cost Effective

“Before we began using PT® Cy-Kick CS, our chemical costs were high,” says Hixon. “Our goal was to find a more efficient, cost-effective product offering the same or better knockdown as our current method.”

When Whitmire Micro-Gen introduced PT Cy-Kick CS in 2002, Hixon began using it on a trial basis. Now more than 80 technicians use it at all J&J locations throughout Louisiana.

Save Money

“Our chemical cost went down con-

siderably and, because PT Cy-Kick CS is microencapsulated, as well as a synthetic pyrethroid, the odor is reduced tremendously,” says Hixon. “That’s very important when you consider the variety of customers we service.”

The extreme weather conditions in Louisiana – the heat index during the summer often reaches 110° – require J&J technicians to use products that hold up well in such conditions.

“We store our treatment chemicals in campers on the back of our trucks,” says Hixon. “PT Cy-Kick CS holds up very well in the heat – it doesn’t separate or layer out the way some products do under the same conditions.”

Hixon likes the fact that PT Cy-Kick CS is a microencapsulated pyrethroid and sees this as a real benefit to his customers.



“Using PT Cy-Kick CS really helps us to keep the best interests of our customers top of mind,” says Hixon. “They want to get rid of their pest problems, but want less exposure to chemicals at the same time. With this product we can meet their needs, as well as save money and time on our end.”

Less Mixing

“With our previous treatment methods, we had to re-spray areas often,” adds Hixon. “Not only do we not have to re-spray, but PT Cy-Kick CS mixes easier than other products we’ve used.”

Hixon knows that PT Cy-Kick CS is a product he and his technicians can count on throughout the year.

“We’re not switching to different products during different seasons,” says Hixon. “PT Cy-Kick CS is a good year-round product that yields good results.”

Mary Ellen Wilson is Communications Specialist at Whitmire Micro-Gen and editor of the Prescription Treatment Quarterly.

“We’re not switching to different products during different seasons. PT Cy-Kick CS is a good year-round product that yields good results.”

– Bryon Hixon, J&J Exterminating



MISSI BACHMAN

PT[®]SYSTEM III[®]ONYX

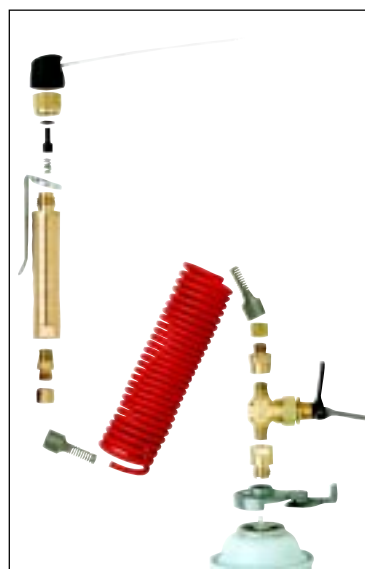
The PT System III Onyx is an IPM tool designed to perform with current and future formulations. Almost 25 years have passed since Whitmire Micro-Gen introduced the original System III to the pest control industry.

This innovative piece of equipment was used within a “systems” approach to pest management and introduced the ideas of “precision pesticide placement” and “crack & crevice[®]” treatments. The System III helped launch the beginning of what is now generally accepted as Integrated Pest Management. The System III tool belt and pouch were heralded as a “symbol of progress” and created the professional image desperately needed in an era of highly commercialized consumer insecticides. As time passed, the elimination of chlorinated solvents like 1, 1, 1-trichloroethane in the early 1990s resulted in changes to the System III.

Staying Ahead

The System III was upgraded in 2000 to be compatible with Whitmire Micro-Gen formulation changes. Whitmire Micro-Gen set into place a series of events that would impact the compatibility of the System III and its pressurized product line. The main event was a valve change in 2001. At the present time, all cans with the old valve should be off your shelves. The new valve opens a window of opportunity for Whitmire Micro-Gen to invest in innovative formulations that would not have been possible with the previous valve.

After extensive field trials, the new System III Onyx, designed to



CONVERSION KIT	FEATURE	BENEFIT
Black Crack & Crevice Actuator	Single pocket	Increased stability during applications. Technician comfort. Consistent insecticide flow. Designed for the System III Onyx and WMG pressurized products.
Double Ring Gun Cap	Wider stem orifice	Increased stability of stem.
Black Stem, Gasket and Spring	Wider stem and gaskets	Increased stability of actuator. Decreased maintenance. Increased technician control.
Double Ring Adaptor	Single pocket	Precision fit on valve stem.
“W” Can Clamp	Reinforced metal	Reduced wear during installation and removal process. Precision fit on valve cup.

be compatible with the shorter valve, is now available. This reliable, long-lasting piece of equipment is specifically designed for current and future formulations with the new valve. The System III Onyx boasts a professional look, built-in IPM practices, better delivery and comfort during applications. Pur-

chase a new System III Onyx from your local distributor or request a conversion kit to upgrade your existing System III to the System III Onyx.

Now through June 30, 2003 Whitmire Micro-Gen is offering FREE System III Onyx conversion kits. To receive FREE conversion kits, call

your local distributor or download a request card from our website at www.wmmg.com.

Do not delay....upgrade your existing System III to the new System III Onyx today! 🐜

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Missi Bachman is Commercial Product Manager at Whitmire Micro-Gen.

NEW EMPLOYEE

Jeff Vannoy Joins Marketing Team

Whitmire Micro-Gen announces the addition of Jeff Vannoy to its structural marketing team as Residential/Termite Marketing Manager. In this position, Jeff will focus on Whitmire Micro-Gen's termite market, expand the perimeter product category and maintain our current leadership position in the ant bait category. He will manage all aspects of these market segments, as well as Whitmire Micro-Gen's flea and wasp product lines.

"We are pleased that Jeff has agreed to join our team and look forward to the contributions his experience and leadership will bring our company," said Jeff Martin, Director of Marketing and Licensing.

Jeff is a graduate of Central Missouri State University's agricultural economics department and has a solid background in both sales and marketing. Previously, he was pest management market manager for Bayer Corporation and was responsible for termite and general insect control product lines. Jeff has earned numerous sales and leadership awards and developed a reputation for building trust and loyalty with customers. 🐜



Jeff Vannoy

APPLICATION RATES

(continued from page 6)

- Thus, $300 \div 60 = 5$ gallons of solution on 1,000 sq. ft.

Determine Amount of Concentrate to be Mixed into Tank

1. Select Rate. When deciding whether to use a low label rate or high label rate, consider the anticipated pest pressure (both target species and activity levels) during your window of control, environmental conditions, cost and required duration of control.

Prescription Treatment® brand Cy-Kick® CS offers perimeter label rates of 4 to 8 oz. per 50 gallons or alternately, a standard low rate of ½ ounce per 1,000 sq. ft. up to a high rate of one ounce per 1,000 sq. ft. We will use ½ ounce per 1,000 sq. ft. in our example.

2. Amount of Concentrate Added to the Tank. Let's

assume you will use a 50 gallon tank. The next question is "How many 1,000 sq. ft. doses of concentrate should be added to 50 gallons of water?" From the information gathered earlier, the answer for this example is 10.

- $50 \text{ gallons water} \div 5 \text{ gallons per } 1,000 \text{ sq. ft.} = 10$ (1,000 sq. ft. sprays).
- $\frac{1}{2} \text{ oz. PT Cy-Kick CS (per } 1,000 \text{ sq. ft. spray)} \times 10$ (1,000 sq. ft. sprays per tank) = 5 oz. PT Cy Kick CS (per tank).
- At the selected rate of ½ ounces of PT® Cy-Kick CS per 1,000 sq. ft. you need to add 5 ounces PT Cy Kick CS concentrate per 50 gallons of water. 🐜

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John Flores is Technical Services Specialist at Whitmire Micro-Gen.

Spider Management - Inspect, Identify and Control

Spiders are one of the most feared creatures on the face of the earth. They evoke fear. By Dr. Mark Lacey

That fear is justified at least in part by spiders' ability to bite. The number of reported spider bites in the United States has increased markedly in recent years. This trend suggests two possible explanations: either spider populations are increasing dramatically or bites were misdiagnosed. The latter is a very possible scenario. Regardless, the pest management professional is regularly called upon to provide spider management.

Spider Species

There are nearly 40,000 species of spiders worldwide and about 3,800 in the U.S. The average person will encounter about 50 different kinds of spiders in his lifetime. Of those, about a dozen spiders are capable of piercing the skin with their fangs.

In North America there are four species of spiders that possess venom potent enough to cause potentially serious injury. These are the black widow (*Latrodectus mactans*), brown recluse (*Loxosceles reclusa*), hobo spider (*Tegenaria agrestis*), and the common yellow sac spider (*Cheiracanthium inclusum*).



Black Widow

The black widow is found in every state. Probably the most well known spider, its bite can send the recipient into unbearable abdominal cramps. Though people are rarely bitten and less than 1% die from a black widow bite, it strikes fear into the bravest of us. The well-

known rhyme that begins with "Welcome to my lair said the spider to the fly..." surely had this species in mind.

Brown Recluse

The brown recluse spider has gained a reputation over the

years as one of North America's truly poisonous spiders. The brown recluse's natural territory is in the southern states, primarily from western Georgia through Texas. Brown recluse spiders have been known to range as far north as Missouri, Indiana, Illinois and Nebraska. However, bites from this species have been reported throughout the country. States reporting brown recluse bites include Maine, Ohio, New Jersey, Delaware, Maryland and numerous other northern locales. While the reclusive nature of this spider may enable it to be transported from its natural habitat to other areas, it is likely that the brown recluse is not responsible for many of the alleged bites that have been reported.



Hobo

The hobo spider occurs only in the northwestern part of the U.S. A fairly common indoor spider, it builds flat sheetwebs



that contain a small hiding tunnel. The tunnel portion is normally constructed inside a hole, crack or crevice. Like the brown recluse and sac spiders, the

hobo spider's venom is cytotoxic in nature and can produce a localized open sore that may take weeks or months to heal.

Yellow Sac

The yellow sac spider is probably the most common spider in North America. Sac spiders are most active at night. It is this nighttime wandering that occasionally brings them into contact with humans. In search of prey, they may find themselves

traveling across our bed and even through our clothes. When we roll over on them we may be bitten. This concurs with the fact that the great majority of "spider bites" are noticed in the morning when we awaken.



Although spiders are extremely beneficial, the presence of the above species in structures normally warrants a thorough pest management program to remove them. What do we do? We use an integrated pest management approach to effectively remove the spiders from the account and to keep them out. Let's take a look at how we develop an effective pest management program for spiders in virtually any account.

As with any IPM program, one directed towards spider management consists of inspection, identification, employment of both non-chemical and chemical control measures, and the evaluation of effectiveness.

Inspection

Armed with sticky traps, a flushing agent, an inspection mirror and any other inspection tool deemed necessary, you are ready to inspect the premises. Inspect to determine where spiders are, how they gain entry and what conditions allow them to exist. Spiders are predators and feed on live prey; so look for their food source. Remember, only about half of the species of spiders build webs, so the absence of webs does not necessarily mean there are no spiders in the account.

Identification

Knowing the type of spider is important when developing your pest management program. Why? This will save you time and money. Until the spider is identified, it will be difficult to determine all of the places where it lives and the contributing conditions for that infestation.

Non-chemical Control Measures

Such measures may range from simply removing a single spider from the premises to major exclusionary measures. Sanitation is most likely the most important non-chemical technique when dealing with most structure-infesting spiders. Removal of actual or potential spider harborages and those used by insects that serve as the spider's food source is the main sanitary concern.

Other non-chemical control measures include exclusion, altering exterior lighting, ventilation and vacuuming. While it is probably impossible to exclude all spiders, effective use of

caulks, seals, screens and weather-stripping can greatly reduce their entry. Switching from insect-attracting mercury vapor lights to sodium vapor lights outdoors will reduce the numbers of insects attracted to the structure and thus spider populations will be lower. Increasing ventilation in attics and crawlspaces will have the same effect. Finally, vacuuming is especially useful in situations where large numbers of spiders and webbing are present because it takes less time to dispose of them in these situations.

Chemical Control Measures

Contrary to popular belief, insecticide applications can play a vital role in spider management programs. Spiders groom themselves and in so doing run their legs through their chelicerae. Any insecticide previously touched will be ingested at this time.

Several types of applications can be used for spider management. These include:

1. Flushing
2. Directed contact treatment
3. Spot treatment
4. Painting
5. Crack & crevice and void treatments
6. Dusting of crawlspaces, attics
7. Space treatments
8. Perimeter treatments
9. Fumigation

Where to apply insecticides and what formulations to use depends on several factors including the type of spider, where it is located, how extensive the infestation and safety. Non-web building spiders such as jumping spiders, wolf spiders and sac spiders can be managed by applying spot treatments to each side of doorways, painting window sills and employing sticky traps. Web builders such as cellar spiders and house spiders can be managed by applying dust or aerosols directly to the webs, using vacuums or brushes to remove both the spiders and their webs. Extensive infestations of medically important species can require more extensive treatments including whole structure fumigation.

Though spiders are one of the most beneficial creatures on earth, they are also one of the most feared. Understanding their lives is an important step in developing an effective management program for these structural invaders. 🕷️

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Dr. Mark S. Lacey is Northeast District Manager at Liphatech.

Millipedes – A Leg Up On Their Peers

Millipedes live in wet-humid areas under decaying leaves and plant debris or cracks and crevices. By Dr. Steven Sims

Most millipedes feed on decaying plant material and make significant contributions to the recycling of organic debris. They become occasional invader pests, and come to our attention when they migrate into buildings. Millipedes are usually found in the lowest level of the house – the basement or garage, but during outbreaks they can be found everywhere. Millipedes are essentially harmless; they don't feed on building structures or furnishings and they cannot bite or sting. They are most active at night, hiding during the day in cracks and other moist locations. Often the first indication of their presence is desiccated bodies of millipedes that mistakenly wandered into the structure and could not find moisture.

Control

In general, controlling millipedes focuses on keeping them outdoors or reducing their numbers at the source. Seal cracks, gaps and other points of entry around windows and doors and in foundation walls. Remove organic matter such

In general, controlling millipedes focuses on keeping millipedes outdoors or reducing their numbers at the source.

as plant mulch and dead leaves against the house and correct damp conditions around the house foundation. Insecticides are often of limited benefit in controlling millipedes because of the protected areas where they originate and the long distances they migrate. In warm weather when millipedes are actively wandering, Prescription Treatment® brand Cy-Kick® CS controlled release cyfluthrin can be applied in a band application treatment around the building to reduce entry. Find and treat the area(s) where the millipedes originate. Thorough application will aid in control, but reliance on

chemical control alone is often unsatisfactory. Woodlands, fallow fields, etc. can produce extremely large numbers of millipedes that think nothing of covering 50 feet or more to get into your house.

Indoor insecticide use is typically futile because millipedes that wander indoors usually die in a short time due to low humidity. It's easiest and most economical to simply vacuum (or sweep) the invaders and discard them.

A Thousand Footed Animal

Millipedes are far more interesting and exciting than the little creatures that make a crunching sound under your bare feet as you walk across the kitchen linoleum. For example, at least 8,000 or more millipede species have been named and, as a group, they occur in most parts of the world. Very few of these are considered to be economically important pests. The word "milli" is Latin for "thousand" and "pede" means foot so, in theory, a millipede ought to be a thousand footed animal. However, this is obviously an exaggeration because no species comes near to this number. *Illacme plenipes* comes closest with an amazing 750 legs (350 pairs). Most millipedes have far less than this though, normally 100 to 300. Millipedes are distinguished from all other Myriapods ("many-legged" ones) because they have two pairs of legs per body segment. This is because each segment is actually two segments fused together. These special segments are called "Diplosegments." Millipedes use their legs to push themselves into the soil, leaf litter or rotting wood.

Leg Movement

The more legs you have, the more you can push so it makes sense to have plenty of legs. How does a millipede coordinate the movement of all these legs? There is an obvious rhythm of sequential waves of stepping movements passing from rear to front. When a millipede is walking, about a dozen legs compose a single wave of lifting and lowering against the surface, then pushing backward. Millipedes don't really need that many body segments though, so the fusing of two segments into one

functional unit while maintaining both pairs of legs, allows millipedes to generate a lot of push without becoming excessively long.

Slow Moving

Even though millipedes lead somewhat cryptic lives, predation still effects their numbers. Because they are slow moving, rapid escape from carnivorous enemies is seldom an option. Some species will curl up into a coil when menaced to protect their legs and ventral surface.

Chemical Defense

Other millipedes have adopted some very effective chemical weaponry. Small pores, openings for internal glands, run laterally along the length of the millipede, two per segment. When a millipede is disturbed, it releases unpleasant substances through these pores, including quinazolinones, benzoquinones, benzaldehyde, aliphatic compounds, terpenoids, and hydrogen cyanide. The hydrogen cyanide emitting species typically employ a “binary” system for producing the compound “on demand.” Mandelonitrile ($C_6H_5CH(OH)CN(s)$) and an enzyme are both stored separately within the body of the millipede. When attacked by a predator, the millipede combines the enzyme with the mandelonitrile and hydrogen cyanide (HCN) is quickly formed and discharged.

One nasty taste experience is enough for most birds, frogs, toads, lizards, snakes and small mammals to exclude millipedes from their lunch menu from that point on. When

threatened, a few kinds of millipedes—to make absolutely sure no predator is going to get them—shoot out a spray of toxic fluid up to 30 cm (~12”) away. These fluids, secreted by large tropical millipedes, can cause painful burning and a severe rash if they contact human skin.

There are few absolutes in nature and sometimes the chemical defenses of a species may work against it or even to the advantage of its attacker. For example, the Madagascar lemur will happily hold a toxic millipede between its lips and then roll it across its skin, as if it were applying ointment. The conventional explanation of this strange behavior is that the millipede poisons effectively fumigate the lemur’s fur, warding off mosquitoes and reducing the number of parasites on its skin. This alone would be a good deal for the lemur, but there is more to this story. The lemur also shows rapturous enjoyment of its skin treatment. It drools, its eyes glaze over and its expression of bliss clearly indicates that the chemicals have a narcotic effect. The resulting drugged stupor can persist for 20 minutes or more. Nor is this phenomenon limited to Madagascar. In another area of the world, South American wedge-capped capuchins also use a millipede, in a similar manner, to keep mosquitoes at bay. They also seem to enter a trance-like state. These animals even make a social occasion of it, sharing a millipede between as many as four capuchins. Please don’t hog the millipede! 🐉

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Clover Mites - Trouble in Commercial Businesses

Clover mites (*Bryobia praetiosa* Koch) are a cosmopolitan species that can be a nuisance. By Dr. Steven Sims

Clover mites can invade homes or apartments in enormous numbers, especially in early spring and late autumn, often overrunning floors, walls, drapes, window sills, furniture, and sometimes even beds and clothing. Clover mites may also become troublesome in commercial establishments such as hospitals, nursing homes, food processing facilities, etc. If crushed, they leave a reddish stain that is quite noticeable on linens, curtains, walls and woodwork. Fortunately, clover mites don't bite humans or animals, transmit disease nor feed on household furnishings or food but they can cause skin irritation in sensitive persons.

Identification

Adult clover mites are about 0.75 – 1.0 mm long (smaller than a pinhead), oval-shaped, reddish-brown to olive to pale orange or sometimes green-brown after feeding. They are members of the order Acarina, family Tetranychidae and are closely related to spider mites. Like most other mite species, clover mites have a single body unit {the Idiosoma} with a head {the Gnathosoma} at one end. Adults and most juvenile forms have eight legs. A diagnostic character of clover mites is that the front pair of legs is very long, at least twice the length of the other legs, and protrudes forward at the head. These front legs



are sometimes mistaken as antennae. Other diagnostic characters, which can be seen under magnification, are the featherlike plates on the body and fan-shaped hairs along the back edge of the body. Mouthparts consist of a pair of leg-like palps and a pair of needle-like stylets (chelicerae) used to pierce plant cell walls, allowing the mite to suck up cell contents.

Life Cycle and Habits

Female clover mites are parthenogenetic and produce viable eggs without mating. This is fortunate for the species because males apparently don't exist in the U.S.A. The female can lay up to 70 smooth, red, spherical eggs which are deposited either in late spring or during late summer and fall. Eggs are placed within the cracks and crevices of foundations, walls, tree bark, debris or rocks on the ground. Fall laid eggs typically undergo a hibernal dormancy and hatch the following spring. Because spring laid eggs hatch and develop best at moderate daytime temperatures (18°C to 24°C) many of these eggs remain in an aestival dormancy during the hot summer months. The mite has five development stages: egg, larva, protonymph, deutonymph and adult. Upon hatching, the bright red six-legged larvae migrate to grasses, clovers and other host plants to feed. Each developmental stage may last two to six days under ideal conditions. The entire life span ranges from one to seven months depending upon weather. All stages are capable of overwintering. In late fall, large numbers of clover mites congregate on foundation walls, outside surfaces and vegetation around homes. As temperatures continue to decline, the mites look for protected hiding places such as under shingles or siding or behind window and door casings. Some mites locate access points and enter houses. While hiding, the mites are in an inactive, dormant state. In the spring, they resume activity, crawling from their hiding places in search of food. Two or more generations are produced each year depending on the latitude. Clover mites are plant feeders only. They feed on sap from grasses, clover, dandelion, shepherd's purse, strawberry and many other plants. Clover mites are especially numerous in lawns with a heavy growth of succulent, well-fertilized grass. They do not cause any permanent harm to turfgrass although heavy feeding gives grass a silvered appearance. Many outbreaks occur in early spring in well-fertilized lawns growing close to the house foundation on the sunny side of the house.

Control Measures - Prevention

Remove grass and weeds from around the perimeter of the house, leaving a bare strip 18" - 24" wide. The south, southwest and east sides of the building are especially important in this regard. The use of pea gravel in the cleared strip provides additional discouragement to the little invaders. Mites will not

readily cross bare, loose soil or gravel compared to covered grassy surfaces. This strip could be planted with ornamentals such as geranium, marigold, salvia, rose, chrysanthemum or evergreen shrubs (juniper, spruce, arborvitae or yew) which are unattractive to clover mites, deterring population buildup


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and migration. The soil around these plantings should be free of grass, weeds and fallen leaves. It is obviously essential to seal cracks, gaps or other points of entry with caulking compound, putty and weather stripping around foundations, windows and doors. Maintain tight fitting screens on windows and doors.

Control Measures - Mechanical

It's tough to control large numbers of clover mites indoors but fortunately most problems are localized around windows and doors. Use a vacuum cleaner with proper attachments to collect live mites without crushing them. To prevent mites from escaping, burn the sweeper bag after collection or double bag and discard after use.

Control Measures - Insecticides

It is best to use a perimeter spray barrier around the outside of the house during mite invasion periods. Spraying should be done during the warmest part of the day when the mites are most active. Outdoors, spray the foundation, exterior walls up to the bottom of the first floor windows, and a band application treatment from the foundation out into the grass. Spray the foundation, walls and the vegetation until it is thoroughly wet, which usually requires two to four gallons per 1,000 square feet, depending on the vegetation height and density. Whitmire Micro-Gen's Prescription Treatment® brand Cy-Kick® CS would be especially suitable for this treatment. Indoors, mites can be eliminated with aerosol or contact sprays of pyrethrins such as PT® 565 Plus XLO® pressurized contact insecticide. Be sure to read the label and follow directions and safety precautions. 

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Microencapsulated Products Control Many Insects

Whitmire Micro-Gen markets two products containing synergized microencapsulated pyrethrum. By Dave Naffziger

These two products are: Prescription Treatment® brand Microcare® CS controlled release pyrethrum and PT® brand Microcare pressurized pyrethrum capsule suspension. For the “old timers” in the industry, these products were originally marketed under the PT 170 X-Clude® label.

These two formulations are unique and offer exciting possibilities for controlling many insects due to their very extensive labels. Both formulations are based on microencapsulated pyrethrum. Since pyrethrum is unstable in the environment the microencapsulation process helps make pyrethrum into a residual product. However, the key to the success of these two products is the “free” pyrethrum on the outside of the capsules, which has the knockdown properties of pyrethrum and the capsule has the residual activity of a synthetic pyrethroid. The formula of PT brand Microcare CS is diluted with water while Microcare pressurized is a ready-to-use product.

Controls Stinging and Biting Insects

One important use of these formulations is to control stinging and biting insects in an outdoor environment. With the outbreak of mosquito-borne diseases, the use of either formula of Microcare to protect outdoor areas occupied by humans and animals has become important to the structural pest management industry. PT brand Microcare CS can be used to protect outdoor areas from biting insects for at least one to two days. The treatment of patios, picnic areas and other outdoor locations with this product results in the



control of insects at the time of treatment and later. Several pest management professionals have successfully used this product for years to create insect-free zones for outdoor events at food establishments, country clubs and schools.

There is no other product available to the industry that offers the unique properties of Microcare. PT Microcare CS can be applied via a power sprayer the day before an event and PT Microcare pressurized can be used anytime to spot treat for localized problems. The immediate kill of exposed insects reduces the population of biting and stinging insects in the treated zone. Insects that enter the treated area are killed by contacting the microencapsulated pyrethrum residual on treated surfaces or are repelled from the area.

Many organizations and residential customers are looking for an insect free zone in their outdoor areas. The use of PT Microcare products outdoors to create insect free zones can be a profitable add-on service for the pest management professional. 🐜

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