

# **Do It Yourself**

***SAFE AND EFFECTIVE***

***PEST MANAGEMENT***

***FOR***

***YOUR HOME, BUSINESS OR SCHOOL***

**Richard “Bugman” Fagerlund**

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## FORWARD

Every year, approximately 5.1 billion pounds of pesticides are used in the United States alone. Pesticides are intentionally toxic substances associated with birth defects, mutations, reproductive effects and cancer. Exposing our families to these pesticides makes them especially vulnerable to loss of brain function, damage to their reproductive systems, childhood leukemia, soft tissue sarcoma, neuroblastoma, Wilms' tumor, Ewing's sarcoma, non-Hodgkins lymphoma, brain cancer, colorectal cancer and testes cancer. Many "inert" ingredients found in pesticides are suspected carcinogens and have been linked to central nervous system disorders, liver and kidney damage, birth defects and many other serious threats to our health. The warning label on Roundup is 10 pages alone! So why do we continue to use them? Is it possible the loss of brain function associated with pesticide use is what is driving our decision to continue using them? 5.1 billion pounds are being dumped on our gardens, lawns, trees, shrubs, and making their way into our rivers, our water supply, our food supply and our bodies. We are slowly poisoning ourselves and our environment.

96% of all fish analyzed in major rivers and streams contain residues of one or several pesticides. 100% of all surface water contains one or more pesticides. Pesticides, and especially herbicides, are contaminating our water supply. Removal is costly and difficult, and not always 100% effective. Pesticides are suspected to be the cause of amphibian declines and mutations as well as the rapid decline of our most important pollinator, the honey bee. With the honey bee threatened, major crops and wildflower populations reliant upon them will no longer exist. No more bees, no more pollination, no more food, no more us! This chain reaction will have a devastating effect upon the world as we know it.

So, why risk harming yourself, your family, your pets and future generations when you can make environmentally-friendly decisions? Fortunately, Richard Fagerlund has compiled a book of tips and tricks you can use that are simple to follow and do. I have read Richard's newspaper column for years and have turned to him for many times over the years for tips and advice online. Richard has been in the pest management industry for over 40 years. His knowledge and experience with conventional pesticides combined with his love for the quality of life for humans, animals and keeping our planet healthy gives him a unique perspective on eco-friendly pest management. He knows what works best and has the background to prove it. By not using harmful pesticides, you not only encourage natural predators such as ladybugs, chalcids, ichneumon wasps, lacewings, lizards, birds, frogs, hoverflies, brachonids and praying mantis to thrive, but you'll also grow in harmony with nature. Knowing your tomatoes are grown free from powerful environmentally destroying chemicals will give you and your family peace of mind. I have worked in the greenhouse industry for over a decade and have recently become an avid home gardener. Having a tool like this book available is invaluable to those concerned about keeping your family safe and keeping the environment free from toxic chemicals.

Organic and natural gardening is no harder and maybe even easier than conventional gardening. We need to educate ourselves, our friends, our family and our neighbors about these methods. It may seem easy to go to the store and buy a jug of chemicals and dump them everywhere, but in the end, we will only be hurting ourselves. Natural pest control is less expensive than purchasing pesticides and is safe for everyone, for wildlife and the environment. We are caretakers of this planet and treating your garden with the most natural methods available will not only benefit you and your family, but also impact future generations. So, put away those chemical insecticides and herbicides and learn how to garden in harmony with nature by using Richard's non-toxic and homemade remedies.

***Ryan Clarke***

## INTRODUCTION

This book is written to help everyone understand the so-called pests in their area and how to control them if they are really pests and not just passing through. The book is written in a scientific format using scientific entomological names for all the pests so anyone can check them out for more information if they want. It is easy for everyone to understand as well. For instance, exterminators often tell people they have little black ants because the ants in their house are small and black. That could be any of several common pests, including *Tapinoma sessile*, *Monomorium minimum* or *Tetramorium caespitum*. I will discuss each ant in detail and tell people how they are different and how they need different methods of control. In some cases I will lump several closely related pests together as their habits are the same. In these cases I will only use the generic name followed by spp., which means several species. For instance, *Crematogaster* spp., means there are several species of acrobat ants that are household pests. Some insect common names make sense, like the harvester ants, which harvest seeds. Others like the acrobat ants are stupid. Ants don't work in circuses. Pavement ants are well named because they live under concrete slabs in a home. Big-headed ants are not well named because 90% of the big-headed ants have normal sized heads! All groups of insects will be followed by their scientific Order name such as Ants (Hymenoptera). Families will also be noted so the reader can see the relationship between different insects. Formicidae is the family of ants. All family names end in "idae". Subfamilies are smaller groups within a family. There are three subfamilies of ants in the book, Formicinae, Myrmicinae and Dolichoderinae. All subfamily names end in "inae". The reader can Google any of the entomological names and find more information on the insect they are interested in.

I want to make the point that most people can recognize and control their own pests without using pesticides and that there are only a few cases when they will need to use an exterminator. There are really good companies in the pest control industry and quite a few more that probably should be in another line of work. This includes the "spray and pray" people who like to spray pesticides and pray it kills something. We need to eliminate this group from using pesticides. There is a section in this book on how to hire a competent pest management company.

There is also sections on Multiple Chemical Sensitivity (MCS) and Invisible Biting Bug Syndrome (IBBS). Both of these problems are very common. Both are completely caused by exposure to pesticides and other chemicals.

What is a pest? A pest is an organism so designated by the pesticide industry to promote the use of their chemicals. In reality, most so-called "pests" are nothing more than nuisances we occasionally encounter in our homes or business. Bed bugs don't carry any diseases and are not dangerous, but they are one of the most profitable "pests" on the planet. In reality, they are nothing more than a nuisance you may end up sleeping with some night. Cockroaches are described by the pesticide industry as being filthy disease-laden bugs that will make you sick. Except in a few cases in ghetto type environments, that is not the case at all. Call your local hospital and ask them how many people they have due to cockroach related diseases. None. Ants are a nuisance in most cases but some species like fire ants can be dangerous and should be considered a pest. Some other species, such as Argentine ants, that have enormous colonies and can overrun a house should also be considered pests. Most species can be controlled with simple baiting solutions. There are other real pests such as certain species of mosquitoes that can carry diseases. Some fleas and ticks can carry diseases. Also some rodents not only carry diseases such as hantavirus, but carry ectoparasites that can cause problems. Termites can do serious damage to your home and some insects will destroy clothing or get into food. These can be considered pests. But most of the so-called "pests" we spray with dangerous pesticides

are really no more than nuisances. We need to look at our household invaders and decide, are they dangerous, or are they simply a nuisance. Then act accordingly. Even in the case of real pests, most can be controlled without dangerous pesticides.

Chances are that no matter what you do, you will see an occasional insect or spider or something else. There are several things you can do to minimize the chances of seeing these intruders. First, proper sanitation is important. Keep debris on your property down to a minimum. This includes dead leaves, mulch, wood, garbage, manure, pet feces, weeds, boxes, grass clippings, and anything else that isn't necessary and that bugs would find attractive. Also, install door sweeps on your outside doors if they do not close tightly. If you can see light under the doors, insects can crawl in. Raise any garbage containers off the ground and place them on concrete pads, bricks or pallets. Routinely clean any gutters you may have. Inspect the outside of your house and seal or caulk any cracks in the foundation or voids around pipes or any other areas which will give bugs access to your house. Of course make sure all of your screens are in good repair. Do not let any branches from nearby trees or shrubs touch your roof. Prune them back if necessary. If you live in an area where cockroaches are prevalent, make sure all of your drains are closed at night. If you don't have a drain cover, you can put a Ziploc bag filled with water on the drain to keep the roaches from coming up and into the house.

My resume is next, so you know my qualifications in writing this book.

## RESUME

The first company I worked for was King Pest Control in Hollywood, Florida. I went to work for them in 1969. We did monthly pest control by spraying baseboards in people's homes. There were no rules or regulations dealing with applying pesticides in those days. I asked my supervisor why we sprayed baseboards and he said it was only to kill time in a customer's house. To make them think they are getting their money's worth. That was the reason to spray baseboards then and it is the reason some companies spray baseboards now. Here is how we did a typical cockroach clean-out in those days.

Pest control was \$5 a month at that time. We charged \$15 for the initial clean-out. When we did a clean-out, the customer was required to empty their kitchen cabinets. Then we went in and sprayed all the cabinets where the food and dishes were kept with chlordane. After that we sprayed all of the baseboards in the house with malathion because it stunk and we wanted the customer to know we weren't using water. Then we fogged the kitchen with an oil-based pyrethrum using a electric fogging machine. The roaches would come out of the cabinets and get stuck in the oil on the counters. After that we dusted the attic with DDT dust and then put heptachlor granules around the perimeter of the house. We told the people the stuff was safe and they could put their food back in the cabinets when they dried. I have no idea how many people we made sick in those days but I do know a lot of people who were in the industry that got cancer at an early age. We didn't use any safety equipment back then and we drove cars with all the chemicals in the back seat. And in those days I smoked cigarettes. It is a wonder I am still alive!

Eventually I got promoted to spraying lawns. We used to spray the lawns with dursban, an organophosphate pesticide. We wore shorts and went barefoot. We were told the pesticides were harmless.

I got promoted again to the termite section. On one occasion, I had to go into a crawl space to do a termite inspection. The house was near a canal. After I made several turns in the crawl space, my flashlight died and I couldn't see the opening or daylight anywhere. I started crawling toward where I

thought the opening was when I heard a low growl. I never heard a noise like that and thought there was a dog under the house with me. I fished out my cigarette lighter (good thing I smoked in those days) and lit it and discovered I almost crawled over six foot alligator sleeping under the house. Needless to say I dropped my lighter and crawled in the opposite direction as fast as I could. It only took a few minutes to see the daylight coming through the crawl space opening. I told the lady I couldn't find any termites, but she had an alligator under the house. Actually I don't know if she had termites as I never finished the inspection. She said the alligator lived under her house when it wasn't in the canal. She just forgot to tell me about it.

In 1975 I moved to Houston, Texas and went to work for Truly Nolen as a salesman. In about two months I was promoted to branch manager. Truly Nolen changed the district areas and Houston became part of the Florida district. I didn't want to go to Florida for meetings so I left Truly Nolen in June of 1977 and we moved to San Antonio where I started working for Orkin as route-man in the hill country of Texas. That was very good work, driving all over a large part of the state, servicing homes and ranches throughout.

In December my wife and I decided to move to New Mexico where she came from. I worked for several small companies in Albuquerque including Pied Piper, Craigs Pest Control, Kill-a-Bug and Pest-B-Gone. None of them worked out as there was no chance for promotion. The owners were all very nice and I liked them, but I wanted to expand myself. I worked for Terminex on two occasions but on both jobs, the management was terrible. I went to work for Orkin in sales and that was very good.

Finally, in 1995, I gave up working for pest control companies and went to work for the University of New Mexico as their pest control specialist. I worked for UNM for 11 years before I finally retired and it was interesting to say the least. I started using least-toxic products and the campus community loved it.

I started my career of writing columns when I was with UNM. I wrote frequent bug articles for the UNM Daily Lobo and then started writing for the Albuquerque Tribune in 1996. Soon I was in all of the Scripps-Howard papers, which owned the Tribune. I quit the Tribune in 2001 and went to the Albuquerque Journal. Lost most of Scripps papers since they owned the Tribune except the San Francisco Chronicle which I continued writing columns for. I also wrote for the Santa Fe New Mexican. I currently write for the Alibi, the Socorro El Defense Chieftain, the Valencia County New-Bulletin, Rio Rancho Observer, the Beacon in Grants, Corrales Comment, New Mexico Mercury and PrimeTime.

I wrote two books while working for UNM and they were both published by UNM Press. The first was "Ask the Bugman", which was based on my columns and was published in 2002. My co-author and illustrator was Johnna Dewberry. My second book, "The Bugman on Bugs", was published in 2004. My co-author and illustrator on this book was also Johnna. Former governor of New Mexico, Gary Johnson wrote the Forward to this book. He wrote:

*"Richard and Johnna have once again delivered a book that is equally entertaining and informative. In this book, Mr. Fagerlund discusses the varioius types of common pests and the ways they are most typically exterminated. However, the problem, according to the "Bugman," is not the pest itself, but the pesticides used to exterminate them. Common pesticides have been proven extremely harmful, if not fatal, to animals and also humans. There must be a stop to the unnecessary use of these dangerous chemicals.*

*Alternatives must also be given for what we use pesticides on. Cotton, for example, attracts nine different kinds of pests; as a result, twenty-nine different pesticides are sprayed. Cotton's alternative, hemp, only attracts two pests, whose removal does not require a pesticide. Hemp, if decriminalized, can help reduce the amount of pesticides deposited into the air, providing a safer environment for both humans and animals.*

*The 'Bugman on Bugs' is more than just an encyclopedia on bugs and chemicals; it is a guide. By eliminating frequent misconceptions and replacing them with facts, Richard and lead the way to a better, healthier planet, where pollution from pesticides is limited."*

I also wrote a few scientific papers on campus. Here are three papers I wrote, two with co-authors on campus and one with an entomologist from the University of Texas, El Paso. The last one about fleas and lice has me as the second author, but I actually conceived the paper and wrote most of it. Since it was published by a government agency and one of their folks, Paulette Ford, was a co-author, they put her as the senior author.

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New records for fleas (Siphonaptera) from New Mexico with notes on plague-carrying species. Southwestern Naturalist. 46: 94-95.

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Fleas and lice of mammals in New Mexico. Gen. Tech. Rep. RMRS-GTR-123. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 57 p.

I specialized in flies during my tenure as an entomologist at UNM. I am still listed as a Dipterist (specialist in flies) in North America. .

I also had the opportunity to teach a couple of classes in entomology in the biology department. They asked me to teach them even though I never attended college myself. I was a Board Certified Entomologist, designated by the Entomological Society of America (ESA). The classes were a success. I asked the students to write critiques of the class and they were all positive.

I retired from UNM in 2006 and became a consultant to help people manage their pests without using toxic pesticides. I came out of retirement for close to a year as I accepted the job as IPM Manager for the City of Santa Fe. I left that job mostly because of traveling. I just do consulting now.

## **COMMON HOUSEHOLD PESTS**

### **Bristletails (Thysanura)**

Silverfish and firebrats are the only two insects from this order that become pests and firebrats are not common in homes. True bristletails (Machilidae) are almost always found outside.

### **Silverfish (Lepismatidae – *Lepisma saccharina*)**

Silverfish are small insects, up to  $\frac{3}{4}$  inch long and silvery in color. They are covered in scales, which will be hard to see with the naked eye, and they have three appendages protruding from their abdomen.

They feed on fungus, sugar and starch products such as flour, glue and paste. They can feed on some synthetic fabrics and cellulose which includes paper, books, photographs and cardboard boxes. They will also feed on dead insects. Silverfish are attracted to moisture so you want to make sure you fix any plumbing leaks as soon as possible. They are frequently found in crawl spaces under a home if it is damp there. You have to make sure no moisture is available for these insects and try to keep items such as paper, books, and food products as far from the floor as possible.

You can trap them by putting some flour in a glass jar and wrapping it with duct tape so they can climb up the sides. They will get in the jar but will not be able to get out. Niban Bait is a good commercial bait for controlling silverfish.

### **Cockroaches (Blattodea)**

First, I have to state that there is some disagreement among entomologists as to the proper name for the order of cockroaches. Sometimes they use Blattaria or Blattoptera. Some even use Dictyoptera.

You can help prevent cockroaches from coming into your home by inspecting all incoming food products, all boxes, and any used furniture or appliances for the presence of cockroaches or their egg capsules. Do not store paper bags anywhere in the kitchen. Seal any holes or crevices around plumbing under sinks and behind toilets. Regularly vacuum and clean floors under the kitchen appliances. Keep all of your drains closed at night to prevent them from coming up from the sewer system. Also, get your attic and crawlspace, if you have one, dusted with food-grade diatomaceous earth.

There are a number of good baits available for controlling cockroaches. You can put equal amounts of baking soda and sugar out in flat containers and they will take it. Make a roach dough by combining  $\frac{1}{2}$  c. powdered sugar and  $\frac{1}{4}$  c. shortening or bacon drippings. Add  $\frac{1}{2}$  c. onions,  $\frac{1}{2}$  c. flour and 8 oz. baking soda. Add enough water to make a dough-like consistency. Make balls of bait and put them wherever you see roaches. However, there is a very good roach bait available commercially. It is Niban Bait and it is made from boric acid. It would probably be easier to get this product and use it if you are in an area where roaches are very common. You can't buy Niban in stores, but it is available online. One good supplier is [www.pestcontrolsupplies.com](http://www.pestcontrolsupplies.com). When using Niban, put it under and behind appliances, around hot water heaters, inside lower cabinets, in the garage and other places roaches will hide.

German roaches, Oriental roaches, Australian and American roaches all originated in North Africa. German and Oriental roaches traveled on Phoenician or Greek vessels to Asia Minor and areas around the Black Sea. Then they moved from Russia to Western Europe and eventually to America. I don't know where or why they got their common names. It is thought the American cockroaches came to America from Africa on slave ships.

### **American cockroaches (Blattidae - *Periplaneta americana*)**

This common roach feeds on a wide variety of plant and animal material and it is commonly found in sewer systems. It will come up the drains at night and enter the living space of a home. It also likes the homes that have crawl spaces under them. In some parts of the country, particularly the southeast,

they frequently live outside. This is the largest of the home-infesting roaches in the country. It will reach a little over 1 ½ inches in length. It is a dark brown with a yellowish band around its thorax (section behind head).

One beneficial aspect of this cockroach is that it will feed on bed bugs. Of course most people don't want roaches in their bed feeding on the bed bugs that are feeding on the humans. Niban Bait is a very good commercial bait that works well on controlling these insects. Other methods of control are discussed above. American roaches are called "Palmetto Bugs" in Florida. They can fly unlike most roaches.

#### **Australian cockroaches (Blattidae - *Periplaneta australasiae*)**

The Australian cockroach is similar to the American cockroach, but is slightly smaller. The yellow markings on the thorax are much more distinct on this roach and it has a yellowish marking on the outer edge of each wing or the "shoulder". It is found from central Florida to east Texas in the south. It has been found in some northern states, but usually in greenhouse environments. They normally infest the attics and crawl spaces of homes and then wander in the living areas for food. I would suggest dusting attics and crawl spaces with food-grade diatomaceous earth. Niban Bait works well with these roaches.

#### **Oriental cockroaches (Blattidae - *Blatta orientalis*)**

Oriental cockroaches or "waterbugs" are found throughout the United States but they aren't seen very often in the southeastern states. They are about an inch long. The female is all black and the male has two brown wing tips, but it cannot fly. These roaches are common in sewer systems and will come up the drains into the homes. They are also common under ground debris outside and love stacks of firewood. These roaches will readily take Niban Bait as well as the homemade baits discussed above.

#### **Turkestan cockroaches (Blattidae - *Blatta lateralis*)**

Turkestan cockroaches are closely related to Oriental roaches. They are about an inch in length with color variations between the male and female. Males are red/brown with pale or white lateral stripes on the ventral side of the wing base. The male also has wings that cover the entire abdomen. Females are dark brown in color with short lateral white dashes at end of the wing. The female wings are very short in comparison to the male and do not cover the entire abdomen. They are common in north Africa and the Middle East and probably came to America with military personnel returning from that area in the 1970s and 1980s. Although they are found in the southwest from California to Texas, they usually do not infest homes. They can be found in sewer systems, water meters, compost piles, potted plants and large cracks in pavements. Niban Bait is a good product for controlling these insects.

#### **Brown-banded cockroaches (Blatellidae - *Supella longipalpa*)**

Brown-banded cockroaches are about a half inch long. Males are light brown while the female has dark brown wings. Both sexes have light colored bands running across the wings. These roaches do not require as much water as German roaches and will often be found in bedrooms and living rooms. The roach baits described above will work on these insects.

#### **German cockroaches (Blatellidae - *Blattella germanica*)**

The German cockroach is the most prolific of the roaches. It is small, dark brown with two distinct black stripes on its thorax. It will feed on almost anything edible and a lot of things we wouldn't consider edible. They go from egg to adult in as little as 45 days and, if left unchecked, can severely infest a home or business. Usually they are most commonly found in kitchens and bathrooms. When



you are controlling German roaches, you should use German Roach Pheromone Traps as well as some of the baits. The traps will attract and catch the roaches. They are available online. One good supplier is [www.pestcontrolsupplies.com](http://www.pestcontrolsupplies.com).

German cockroaches are also believed capable of transmitting *staphylococcus*, *streptococcus* and *coliform* bacteria and are known to be responsible for many allergy and asthma problems. In addition, German cockroaches have been implicated in the increase of asthma and the spread of typhoid, AIDS, dysentery and leprosy organisms. Living roaches, dead roaches, roach feces, saliva, cast skins, cockroach eggs and their decaying body parts all contain allergens, can contaminate the air with aeroallergens and cause allergic reactions in people.

### **Ants (Hymenoptera – Formicidae)**

There are more than 20,000 species of ants around the world and about 570 species in the United States. Of those, about 30 species are common household pests. When discussing ants, we will use three terms that reflect the size of the ants in a colony. If ants are “monomorphic”, it means all the workers are the same size. If they are “bimorphic”, they have two sizes in the colony. The larger ones are major workers and the smaller ones are minor workers. If they have three or more sizes of workers in the colony, they are considered “polymorphic”.

There are several things you can do to prevent ants from entering your home. The first step is exclusion. Go around the outside of your home and inspect it very carefully from an ant's point of view. Ants can sense cool air and aromatic odors emanating from your home and will try to gain access. Check around the house at ground level and look for cracks in the foundation, voids around pipes, areas under stucco, peepholes in bricks and similar areas that ants can use to gain entrance. All these areas need to be sealed, caulked, screened or otherwise altered to prevent ants from using them to get into your home. Check around your windows and doors to make sure they close tightly. If the doors aren't tight, you may have to install door sweeps on them. Check your bushes, shrubs and trees to make sure you don't have any branches touching the roof. Don't stack firewood, bricks or anything else next to your house or ants and other insects may find a good place to nest. If you have bushes or shrubs next to your house, periodically inspect them for aphids, scales and similar bugs as ants are attracted to the honeydew they produce. The ants will get on the plants and eventually find their way into your home. Don't put flagstone or flat boards on the ground too close to your home or some species of ants will nest under them. On the other hand, mound-making ants will generally stay outside. They rarely leave their complicated and efficient homelike in the mound to enter homes. If you don't want the ants making mounds in your yard, you can flood the nests with club soda or with white vinegar or food-grade DE. If you use the DE, mix 4 tablespoons per gallon of water. You can also use 1 gallon of orange juice diluted with 2 gallons of water and a dash of soap. If you prefer, you can also spread dry instant grits on the mound. The ants will eat it and not be able to digest it and die.

You can repel ants with a wide variety of products, including cinnamon, baking soda, Comet Cleanser, cedar oil, medicated baby powder, Tide, talcum powder, chalk, coffee grounds, borax, garlic, broken egg shells, bone meal, black or red pepper, peppermint, paprika, chili powder and mint leaves. If you have ants going into your hummingbird feeder, you can put duct tape, sticky side out, on the wire holding the feeder, to deter them.

The best way to control them when they get in your home is with baits. Different species have different food preferences. Some species will take a wide variety of baits, while others are more fussy. You can use a bait containing half baking soda and half powdered sugar and place it where you see

foraging ants. You can also use instant grits, which they can't digest or use 2 packets of Equal or NutraSweet, which contains aspartame, wherever you see the ants.

If the ants have a preferred food in your home, such as apple sauce, peanut butter, canned cat food, Karo Syrup, jelly or similar products, you can mix in small amounts of boric acid or borax or aspartame. Mix about 2% of any of these products in the food. Make sure you keep these baits away from children and pets. If the ants are dying near the baits, you are making it too strong and need to make a fresh batch with less boric acid or borax.

Here is a recipe for effective, homemade ant baits/traps that use borax. It attracts ants looking for either moisture or food. You will need: 3 c. water, 1 c. sugar, 1 tsp. borax or 2 tsp. food-grade DE or aspartame, 6 small screw-top jars with lids, such as jelly jars covered with masking tape, which will enable the ants to climb up the side. Mix the sugar, water and borax (or food-grade DE or aspartame) in a bowl. Loosely half-fill the jars with cotton balls or pieces of sponge or wadded paper towels. Pour up to ½ cup of the sugary mixture over the cotton balls, saturating them. Make several small holes in the lid. Screw the lids on the jars tightly.

If you smoke, always wear plastic gloves when making ant baits or they will sense the tobacco smoke on the baits and not go to it. Ants do not like cigarette or cigar smoke.

If you are finding ants in a classroom or office building and baits aren't practical, then you can spray all of the foraging ants with Greenbug for Indoors, which is a cedar product and will kill the ants it hits and repel others. Here are a some of the ants most likely to be encountered in your home or yard.

There are three groups (Subfamilies) of ants that have pest (or guest) species. They are Myrmicinae, Dolichodorinae and Formicinae.

### **Big-headed ants (Myrmicinae - *Pheidole* spp.)**

Big-headed ants are bimorphic seed gatherers. The minor workers look like average ants. They gather the seeds and the major workers, with the enlarged heads, break them open. The major workers also defend the colony. These ants usually have small colonies of a couple of hundred individuals. Occasionally they will come in a house and make a nuisance of themselves by their presence. They won't hurt anything. Niban Bait is effective in controlling them.

### **Acrobat ants (Myrmicinae - *Crematogaster* spp.)**

*Crematogaster* are commonly called "acrobat ants". This is a bit silly as they don't do anything acrobatic except occasionally running around on four legs instead of all six. Acrobat ants are small, usually red and black, but there are all black species as well. The abdomen (last segment) appears flat on top when viewed from the side and is spade-shaped when viewed from above. There are two small spines on the thorax (segment between the head and abdomen). Acrobat ants are found over most of the United States. These ants are monomorphic.

Acrobats normally feed on the honeydew secretion of aphids and related insects that infest plants near your home. They may enter your home from the roof if there are any branches touching the house or from the ground. They will get between vigas and latillas in some homes and kick out a lot of loose sawdust. It looks like they are doing damage, but they aren't. They are simply making a mess.

They will readily take sweet baits. You can make a bait with honey or Karo Syrup mixed with 2% boric acid or borax. Terro Ant Bait is also very good.

**Little black ants (Myrmicinae - *Monomorium minimum*)**

This species is commonly called “little black ants”, which is confusing as there are several species of little (small) black ants. *Monomorium minimum* are very small, shiny black ants that are monomorphic. These ants are found throughout the United States and southern Canada. Usually they nest outdoors where they can feed on the honeydew secretion of some insects, but occasionally they infest homes. In a home they will eat whatever is available, including bread, meats, sweets, fruits and vegetables. They will bite to protect themselves. They can be controlled using a bait made from two tablespoons each of peanut butter and jelly mixed with one tablespoon of boric acid or borax. Outside you can treat any nests with Greenbug for Outdoors, which is a cedar product.

**Pharaoh ants (Myrmicinae - *Monomorium pharaonis*)**

This species is commonly called “pharaoh ants”. They were first described in Egypt in 1758, hence their common name. They are very small, yellowish ants that are monomorphic. They got their name because they were originally discovered and described in Egypt in 1758. They are found in many areas of the United States. They will nest in any small, dark voids such as old boxes, empty bags, stacked newspapers, wall voids, under flooring, and/or especially near hot water pipes or heating systems and even an unused salt shaker. Outdoors they will nest under objects on the ground, in potted plants, in stacked firewood or piles of bricks. They are primarily nocturnal and mainly come out to feed at night.

They have very large colonies, often exceeding a quarter of a million ants and a couple of hundred queens. They do not swarm to reproduce as most ants do, but using a system called “budding.” This is where reproductives just crawl off and mate nearby. Colonies of pharaoh ants usually contain many nests and it is essential to control all of them or you will never get rid of them. Never use synthetic pesticides in trying to control these ants as all you will do is cause them to split up and you will make the problem worse. Place baits such as half and half fruit juice and aspartame in soda straws. Cut the straws into one inch segments and put the segments where you have seen the pharaoh ants foraging. You can even tape them to the underside of tables. You can change the baits periodically by mixing peanut oil, sweet syrup, jelly or honey with 3% boric acid or food grade diatomaceous earth. Place the straw filled baits as close to the nests as possible. You can also put strained liver baby food, honey or peanut butter mixed with 2% boric acid or borax in small cups. Treat any cracks and crevices around the outside of the home with Greenbug for Outdoors.

Pharaoh ants are a major pest in hospitals where they have been associated with over 20 disease causing pathogenic organisms and they often enter isolation wards, operating rooms and patient rooms where they feed on blood and blood products and then contaminate sterile areas.

They are not native to the western U. S. and are brought in on commerce. They normally infest apartment complexes, hospitals and large commercial buildings in this area. They rarely infest homes, but it isn't impossible.

**Harvester ants (Myrmicinae - *Pogonomyrmex* spp.)**

This group of ants are commonly called “Harvester ants”. They are comparatively large, 3/16” - 1/2” long, red to dark brown in color and they have a pair of spines on their thorax. They have a stinger and will use it if disturbed. Harvester ants are bimorphic. They make large mounds covered in gravel which retains heat and helps incubate the eggs in the nest below. These ants feed on seeds, which they gather and store for the winter. They spend almost all of their time gathering food for the winter. Occasionally they are distracted such as the colony of Texas harvester ants that live in my driveway. It

is impossible for me to drive into my driveway without running over their mound. For some reason, only they know, they will not move off to the side. They spend a large part of the day rebuilding the mound that was damaged by my tire. I feel sorry for them because they don't have time to forage for food and repair the damage, so I give them several handfuls of oatmeal and chicken feed every couple of days and an occasional apple muffin. The ants appear to like the offering as they gather it up quickly and take it to their storage area. While harvester ants are considered to be aggressive, in reality they are only very defensive.

During mating season, usually in late July or early August, swarmers from a harvester ant colony will fly high in the air. Most of the swarmers are males who would like to mate with the few accompanying females. Large swarms will occasionally fly over urban areas where they are not usually found and then land on the tall buildings in the area in order to rest. Occasionally they will come down chimneys or elevator shafts, much to the consternation of the inhabitants of the building. The good news is that the swarming harvester ants are not able to sting. The bad news is that there are a lot of them and they tend to congregate in large numbers and will be a nuisance. The best product to use to control harvester ants is Niban Bait, a commercial grain-like bait that is made from boric acid.

### **Imported fire ants (Myrmicinae - *Solenopsis invicta*)**

The imported fire ants can be very dangerous. They are polymorphic and reddish-brown to black in color. They have severe stings that can cause blisters and allergic responses to the venom as well as anaphylactic shock. Over 30,000 people a year in this country seek medical attention from the sting of these ants.

Fire ants have successfully invaded many southern states. They have been found in Florida, Georgia, South Carolina, North Carolina, Tennessee, Alabama, Arizona, New Mexico, Mississippi, California, Louisiana, Arkansas, Texas and Oklahoma. Their mounds can be 2 feet in diameter and a foot and a half high. A single colony can contain close to a quarter million ants.

Fire ants will eat both plant and animal products including rodents and some reptiles. They will feed on a wide variety of plants, including strawberries, potatoes and corn. Queens in the colony will need proteins, so when you mix baits for these ants you have to make sure they are protein-based. These ants are attracted to magnetic fields and will get in transformers, air conditioners and other electrical equipment. One good thing about fire ants is that they like to feed on ticks. If you have fire ants in your yard, you won't have ticks. They will also feed on fleas, cockroaches and several species of flies.

When you control these ants, make sure you dust any electrical equipment outside with food-grade diatomaceous earth, Comet cleaner or talcum powder. This will keep the ants out of these areas. For a bait, you can mix boric acid or aspartame with sugar, jelly, honey or pet food. You can flood their nests with one gallon of orange juice mixed with two gallons of water and a cup of dish soap. You can also pour a couple of 2-litre bottles of Coca Cola down the mounds.

### **Thief ants (Myrmicinae - *Solenopsis molesta*)**

Thief ants are very small ants that are related to fire ants, but resemble pharaoh ants. They are less than 1/16<sup>th</sup> of an inch long. The best way to tell them from pharaoh ants is to examine the antennae with a magnifying glass. The club on the end of the antennae has two segments in thief ants and three segments in pharaoh ants. Thief ants get their name from their habit of entering the colonies of other ant species and stealing their food.

These ants are found throughout the United States but are more common in the east and south. Outside

they nest under debris on the ground, or under rocks, boards or logs. In a home, they will nest in wall voids and behind baseboards.

Baits do not work well for these ants as they don't bring enough back to the colony for it to work. If you can find out where they are nesting, you can put some food-grade diatomaceous earth in the void. Cinnamon will repel them from areas you don't want them. You can also spray the ants with Greenbug for Indoors and use Greenbug for Outdoors in all the cracks and crevices around the outside of your home.

### **Pavement ants (*Myrmicinae -Tetramorium caespitum*)**

Pavement ants are small, monomorphic, brown to black ants covered in small stiff hairs. The head and thorax are covered with small grooves that are easy to see. There are two small spines on the thorax. These ants frequently nest under concrete slabs as their name implies. They will also nest under the slab in homes and then enter the home through the expansion joints or where plumbing penetrates the slab. Once inside, they will nest inside of walls or other voids, often close to a heating source for the warmth.

They originated in Europe and are now found throughout much of the U. S., and are major pests in the northeast and midwest. They are also common in areas of California and New Mexico. They can sting and bite if disturbed. Pavement ants feed on the honeydew secretion of aphids and other insects as well as on seeds. They have very large colonies. Pavement ants readily take baits. Mix two tablespoons of peanut butter and jelly or honey with a tablespoon of boric acid or borax. If you can find their nest, you can dust it with food-grade diatomaceous earth or spray it with a cedar product such as Greenbug for Outdoors.

### **Argentine ants (*Dolichoderinae - Linepithema humile*)**

Argentine ants are small, monomorphic and brown in color. They are one of the most successful ants species on the planet. They have huge colonies and when they move into an urban area, they displace any native ant species. Unlike other ants who fight when they encounter other colonies of their same species, Argentine ants will merge and form super-colonies, and in some cases, mega-colonies. There is one mega-colony of Argentine ants in Europe that extends over 3,700 miles and encompasses parts of Spain, Portugal, France and Italy. This mega-colony is estimated to contain hundreds of billions of ants. Argentine ants came to the United States in 1891, landing in New Orleans. Since then they have spread to several other states. They were first found in California in 1905 near Ontario. Three years later they were found in Alameda, East Oakland, San Francisco, San Jose, Los Angeles, Azusa and Upland. The Argentine ant is now found in almost all urban areas of California where it is a major household pest. Besides California and Louisiana, there are records of these ants in Utah, New Mexico, South Dakota, Arkansas, Illinois, Florida, Alabama and Hawaii.

Outdoors I recommend using a very good cedar product called Greenbug for Outdoors. Cedar will repel most ants including Argentine ants. Spray this around your foundation every couple of days for awhile. After a couple of weeks, spray it once a week. Soon you can do it every two or three weeks. It doesn't have the residual power of a pesticide, but it isn't dangerous either. You can also use aromatic cedar mulch which will control them for several months. Also; Remove all mulch (other than aromatic cedar mulch) from around the foundation of the building. Seal all cracks and crevices. Do not let any branches touch the building. If you find the nests outdoors, flood them with orange juice in soapy water. Argentine ant workers have a sweet tooth, so indoors you can use sweet baits. Mix honey or light Karo Syrup with aspartame or 2% boric acid or borax. However, queens also have high protein requirements so you may want to make some peanut butter or fish meal baits with 2% boric acid or borax. Keep all

of these baits away from children and pets.

Populations indoors are usually smaller and less active. Find the most active areas and sprinkle the areas with baking soda, Comet, Tide laundry soap, talcum powder or food grade diatomaceous earth. You should also place any of these materials in any cracks and crevices, wall voids and electrical outlets. If you see trails of ants, you can spray them with bleach or vinegar. Never spray pesticides on the ants as all you will do is kill a few and the rest will go to other areas of the house. Cedar oil repels them and the best commercial product is Greenbug for Outdoors.

### **Pyramid ants (Dolichoderinae - *Dorymyrmex* spp.)**

Pyramid ants are reddish-brown or black and are monomorphic. They have a distinct pyramid-shaped projection on the back of their thorax, hence their name. These small ants rarely come into homes. They usually make many small mounds around the yard and in cracks in sidewalks and on patios. They are found in most of the southern states and in California.

They will readily take a sweet bait such as jelly or honey mixed with aspartame if they do come indoors. Terro bait is a good commercial bait. Outside pour a cup of baking soda on the mounds, wait about a half an hour and pour a cup of vinegar on the mounds. You can also pour a 2-litre bottle of Coca Cola or Club Soda down the mound. Push a stick into the mound entrance and move it around to make the hole larger before pouring the Coca Cola or Club Soda in.

### **Odorous house ants (Dolichoderinae - *Tapinoma sessile*)**

Odorous house ants are small dark reddish-brown to black ants and are monomorphic. They will follow each other in single file when entering a building. Outside they nest under objects such as rocks, boards, or any kind of debris. When they come in the home, they can nest in wall voids. If the house has a crawl space, they will nest in that area and come into the house to forage for food and water. Odorous house ants have multiple queens in a colony and hence, have large colonies.

These ants are found in all of the continental United States and adjoining parts of Canada and Mexico. They are probably the most common ant found in homes, except in areas where Argentine ants live. They do not bite or sting. The body of the odorous house ant is relatively soft and can be easily crushed. When this occurs, a very unpleasant "coconut" odor is apparently released. I can say that in over 40 years I have never sniffed an ant so can't vouch for the smell. An average Odorous House Ant colony will have 10,000 to 40,000 members and several queens. Mating and swarming takes place in the nest and new colonies are formed by budding.

A good bait for controlling these ants indoors is two tablespoons each of peanut butter and jelly mixed with a tablespoon of boric acid or borax. A good commercial bait is Terro Ant Bait which is made from boric acid. Treat areas where they are entering your home with Greenbug for Outdoors, which is a cedar product.

### **Yellow ants (Formicinae - *Acanthomyops* spp.)**

Yellow ants are medium size ants and are yellow in color. They are monomorphic. These ants are found throughout the Midwest and New England and more commonly in the southern states including Texas and New Mexico. They feed on the honeydew secretion of aphids and similar insects. They will nest under debris on the ground around a house and in foundation walls but rarely forage in a home. Treating the areas near the foundation with Greenbug for Outdoors will help control them. If they come in the house, use a sweet bait mixed with aspartame to control them.

### **Carpenter ants (Formicinae - *Camponotus* spp.)**

Carpenter ants are large, polymorphic and are black, reddish-brown, red and black or light brown in color, depending on the species. The thorax is evenly convex when viewed from the side. That differs them from field ants who are also large but have an indented thorax. Field ants are rarely household pests.

Carpenter ants are found throughout the United States. There are a number known species. Five species that are common include *Camponotus pennsylvanicus*, *Camponotus modoc*, *Camponotus herculeanus*, *Camponotus laevigatus* and *Camponotus vicinus*.

Most species are active in the late afternoons and at night. They will nest under the slabs of homes and enter through expansion joints or around plumbing. They are also found in crawl spaces under homes that have them. They will be most common in areas where there is nearby moisture. If there is damp wood available, they will make galleries to make their nests. The galleries will follow the grain of the wood. If left alone, they can hollow out and destroy structural wood. They don't eat the wood, they just carve out areas and create wood segments (frass). If they are in the house, they will forage for any foods available, including pet foods, candies, syrups, sugar and other sweet products. They will also feed on any fruits they encounter and will root through the garbage looking for grease, fat or meat scraps. You can use a bait made from two tablespoons of honey or jelly mixed with a teaspoon of boric acid and place it where the ants are foraging (keep out of the reach of children and pets). You can also put out open packets of Equal (aspartame), which they will take.

To prevent carpenter ants from entering your home, you should remove or repair all damaged wood that has a moisture problem. Make sure your gutters are clean so water doesn't back up and damage the siding or the roof and that no branches are touching the house. Store all firewood off the ground and away from the house. Remove all dead stumps and logs. I also recommend dusting your crawl space, if you have one, with food-grade diatomaceous earth. This can be done with a power duster. If you find a nest you can spray it with a good natural pesticide, not a synthetic one that will do more harm than good.

## **Wasps & Yellowjackets (Hymenoptera)**

There are a number of species of wasps and yellowjackets that you may encounter, but the habits and control methods of most of them is the same. If you can't live with them in your yard, you probably should call a professional as they (wasps and yellowjackets) can be dangerous if disturbed or threatened.

### **Paper wasps (Vespidae; Polistinae - *Polistes* spp.)**

A paper wasp queen is the lone female reproductive, who begins her nest by attaching a thick paper strand to an overhanging structure or protective site. She then builds hollow paper cells by chewing wood or plant fibers (cellulose) mixed with water and shaped with her mouthparts. There are 27 species in North America that are considered semi-social.

When a half dozen cells or so are hanging together facing downward, the Queen lays an egg near the bottom of each one. The little white grubs that hatch from the egg glue their rear ends in the cell and begin receiving nourishment in the form of chewed up bits of caterpillars provided by their mother. The fact that they feed on caterpillars makes paper wasps beneficial insects which you want some place close by, but not necessarily on your house. When they grow large enough to fill the cell cavity, they

break the glued spot and hold on their own by their stuffed fat bodies, hanging head down. Paper wasps are not normally aggressive until you disturb their their nests. The European paper wasp is far more aggressive than our native paper wasp. This wasp first came to the United States in 1981 and has been found on both the east and west coasts and probably occurs all across the country.

From Spring on, the queen continually lays eggs and the female workers feed larvae and expand the comb or nest. Each nest can house a few to several dozen paper wasps. They do not eat the protein (insect) food they gather for the larvae but get their energy from flower nectar. Later in the season, some of the larvae develop into males and others will become next year's queens. The new males and females mate with those of other colonies, and the fertilized females find hiding places under tree bark or in logs and wait out the winter until they can begin their new colony in the spring. The male wasps die in winter; likewise the original nest disintegrates and will not be used again.

Paper wasps nests are often found near doorways and other human activity areas without occupants being stung. Colonies in trees, out buildings, hollow fence posts and other protected places are not as easy to control as those from nests on structures.

### **Yellowjackets (Vespidae; Vespinae - *Vespula* spp.)**

Yellowjackets are often considered serious pests that have to be eliminated from your property. If you have children playing outside or if you are allergic to stings, then they should be removed. In other circumstances, it may not be necessary. When I lived in Corrales about 8 years ago, we were in a mobile home. There were four skunks living under the mobile home. They came out every night and roamed around the neighborhood making a living. In the morning they would come home and sleep under our mobile home. There were some feral cats in the neighborhood as well. I would put cat food out on the porch for the cats at night. Every night a skunk or two would join the cats to eat. Never any animosity at all. One night a raccoon showed up as well, so I put out more food. The raccoon, two skunks and two cats were regulars for supper every night. One day I put some cat food out for a stray cat I saw. The cat didn't come to the food, but several yellowjackets dived right in. I have always seen a few yellowjackets around but didn't pay much attention to them. The next day I put some more cat food out and more yellowjackets came, and they were coming from under the porch. Apparently they had a nest under there the whole time. Pretty soon, when I came home from work around 3 PM, a large number of yellowjackets came out to meet me. They were never aggressive, just flying around waiting for the cat food. I put out four cans every afternoon and the yellowjackets loved it. I would sit on the porch reading the paper and a few would always fly around, land on the chair or on my shoulder, but never stinging me. They spent the summer around the porch, never bothered the dogs or cats or anyone in the yard. I did put a sign on the gate that said "Beware of Yellowjackets" to discourage salespeople.

If yellowjackets are infesting a school or commercial building, then you need to call a professional as they have the proper safety equipment to deal with them.

### **Bed Bugs (Heteroptera) (Cimicidae - *Cimex lectularius*)**

Bed bugs are small, nearly wingless, flattened bugs that are external parasites of humans. There are closely related species that feed on bats, cliff swallows, woodpeckers, raptors, chickens and other types of birds. Bed bugs do not transmit any diseases, but they are probably the most profitable bug in the pest control industry. If you made a list of the 100 most dangerous bugs on the planet, bed bugs wouldn't make the list. If you made a list of the top ten most profitable bugs, they would be at the top of the list. You can control bed bugs yourself in your home or business and you don't need toxic



pesticides to do so.

The first step in controlling bed bugs is to completely inspect the room to determine the extent of the infestation. Place close attention to the sleeping areas. They can be hiding anywhere but they will stay as close to the food source as they can. Small crevices in solid structures, such as the joints in the bed's headboard or between the wall and the baseboard are the bed bugs' refuge of choice. Strip the bed so you can inspect the mattress and box spring. Examine the seams and buttons on the mattress as well as any labels. Bed bugs will hide in all of these areas. Stand the mattress on end if you have to and examine the box spring if there is one. Stand it up and look at the underside, especially along the edges. Also look behind pictures hanging on the wall, between and behind any books or magazines in close proximity to the bed and in any furniture nearby. You may have to turn some of the furniture over and examine the underside. Carefully check anything that is under the bed including storage boxes. If there is any litter under the bed, it should be removed. Also check for dried cast skins (exuviae) from the molting process and fecal matter.

Before you start the treatment, there are a few preparations you should do. Wash all the bedding in hot water (120 + degrees). This will kill any bed bugs in the bedding. Personal items such as stuffed animals, blankets, etc. should be vacuumed and placed in plastic bags for a couple of weeks. If you have a clock, phone, radio or other appliance near the bed, they should be opened and inspected as bed bugs will hide in those places as well. Thoroughly vacuum the entire room including inside closets and dresser drawers. If the infestation is severe, you will have to use a crack and crevice vacuum tool to suck the bugs out from along the edge of the carpet, from behind switch plates which you will have to remove, from all around the bed frame, inside the box spring and inside any furniture in the room. If you see any eggs on the mattress along the seams, you can remove these by picking them up with duct tape and discarding them or brushing them off with a stiff brush. After vacuuming the room or rooms, remove the bag from the vacuum and discard it right away.

Next, use a hair dryer to blow hot air in all the cracks and crevices and along the edge of the carpet and on the furniture to get any bed bugs the vacuuming missed. You want to get as many bed bugs as you can before the final treatment.

Now it is time to treat the bed. Use a flashlight and carefully examine the seams, buttons and any folds in the mattress along with the headboard and footboard if they are present. Check the box spring and frame as well. If you missed any bed bugs with the vacuum or hair dryer, they will be visible. Spray any bed bugs you see with the Greenbug For People (GFP) as well as all cracks and crevices in the bed. Spray the underside of the box spring as well. If you don't see any bed bugs, then spray along the seams and around the folds and all the other areas mentioned. Make sure to use plenty of solution so the sprayed surface is wet. Then put some diatomaceous earth (DE) in a duster and puff it on all the sprayed areas, including under the box spring. The GFP solution will kill any bed bugs in several hours and the DE will prevent any from hiding in these areas in the near future. You can also sprinkle fine powder body bath powder on the mattress and rub it into the fabric.

Now you have to treat all the furniture in the room including night stands, chairs, couches, dressers, etc. Make sure you carefully inspect all the wooden furniture and treat them as you treated the mattress, box spring and bed frame. If any of the furniture, such as bunk beds, have metal framing, treat inside the metal tubing with the GFP and DE.

Finally, you need to make your bed difficult for bed bugs to access. Tape up any tears in the box spring or mattress with duct tape or, better yet, enclose them in a zippered mattress cover used for dust mites.

Put the legs of the bed in plastic food bowls or metal cans and coat the inside with Vaseline. Don't let the bed touch any walls or let the bed covers touch the floor.

If you have a hotel or motel, the process is the same except for the bed legs in food containers and the Vaseline. If you have or had bed bugs in your establishment, then you should treat each room as it becomes vacant. Then you can retreat them every six months or as needed.

You can trap bed bugs by placing a heating pad on the floor with sticky traps around it or you can use duct tape, sticky side up. Put an Alta-Seltzer tablet on a damp sponge on a small plate on the heating pad. The Ala-Seltzer will attract any bed bugs in the area. You can catch mosquitoes and fleas by placing two Ala-Seltzer tablets in a bowl of soapy water. Used on a damp sponge they will attract bed bugs and kissing bugs.

## **Lice (Anoplura)**

### **Head and body lice (Pediculidae – *Pediculus humanus*)**

The three main types of lice that infest humans are the head louse, the body louse and the crab louse. Head lice normally infest the heads of children. Children share these bugs when playing with each other. Body lice will live and breed in clothing and normally infest people who rarely change or wash their clothes. Homeless people frequently get body lice. Crab lice (Pthiridae – *Pthirus pubis*) can infest anyone as they are normally spread by sexual intercourse.

You can safely control head lice with coconut oil or olive oil shampoos or a product called Greenbug for People. Salt water will also kill lice, so if you live near an ocean, a swim would help. You can also put a shower cap on the head and use a hair dryer. The heat from the hair dryer will kill the lice. If you have head lice in a school, all you have to do is wash the floors with hot, soapy water, which will kill any lice, or clean the carpet if the schoolroom is carpeted. Pesticides are not necessary.

Body lice can be controlled by washing the person's clothing and vacuuming any beds or other furniture they may have used. Pesticides aren't necessary. Crab lice can also be controlled with coconut oil or olive oil rubbed into the area where they live. They not only live in the pubic region but can get in armpit hairs and the perianal region as well.

Head and body lice cannot live off the host for more than 48 hours. Crab lice are more dependent on us as they will die in 24 hours if not on their host. Head and body lice will only attack humans. Crab lice aren't as fussy. They will also infest chimpanzees.

## **Fleas (Siphonaptera)**

### **Cat and Dog fleas (Pulicidae - *Ctenocephalides* spp.)**

There are many species of fleas throughout North America, but the ones considered pests most often are dog fleas (*Ctenocephalides canis*) and cat fleas (*Ctenocephalides felis*), as these species will infest homes. Other species carry plague and other diseases, but they will not infest a home in large numbers. Dog and cat fleas prefer parts of the country that are humid. They are not established in the arid southwest, although they occasionally turn up when brought in on a dog that moved here from somewhere else.

We do have approximately 107 species of fleas in New Mexico and about 33 species that carry the plague. Pocket gophers are known to carry 7 species of fleas. None are known to carry the plague. Pack

rats can carry 34 species of fleas. At least 4 are known to carry plague. Deer mice can carry 36 species of fleas and at least 6 are known or suspected of carrying the plague. The various species of squirrels can carry up to 14 species of fleas and at least 8 species can carry the plague and prairie dogs can carry 10 species of fleas. Only two species are known to be vectors of the plague and they kill the prairie dogs, so the prairie dogs can't spread the plague. In other words, if you have a colony of prairie dogs near your property, they will not spread the plague. If plague fleas get involved with the prairie dogs, the animals will die. Ground nesting birds such as quail and chickens can carry sticktight fleas (*Echidnophaga gallinacea*), and they will get on pets. They are usually found around the eyes and ears and hang on tight to your pet. I put diatomaceous earth (DE) on my fingers and rub the fleas and they will drop off. Use food-grade DE only. It is available at most feed stores.

What else can you do you do about fleas? If you have ground squirrels, I would recommend dusting the burrows with diatomaceous earth. The DE will kill any fleas in the burrow but won't hurt the squirrels. The fleas will get off the squirrel after feeding and will land in the DE in the burrow.

I never recommend using Frontline or Advantage for fleas in NM. If we had dog or cat fleas, then it might be okay, but still risky. According to Whole Dog Journal, a monthly dog care and training publication, the active ingredient in Frontline, which is fipronil, may not be safe for pets.

If you have fleas infesting your home, here is what you need to do: Steam clean the carpets. This will remove dried blood, carpet fibers and other debris, diluted excrement, some flea larvae, eggs, pupal cocoons, adults, feces and other food sources. Spray pets with (1 oz. per qt. water) with a natural flea spray available at [www.greenbugallnatural.com](http://www.greenbugallnatural.com).

Put a goose-neck lamp 8" - 10" over a pan of "fizzy" seltzer water with a few drops of dish soap at night. The fleas are attracted to the heat and carbon dioxide and drown. Sprinkle salt where animals lie; salt dehydrates the fleas and they die.

To monitor infestations, slowly walk through suspected areas wearing white knee socks. When the fleas jump on you, you should clearly be able to see them on the socks. Or you can put some white pieces of fabric on the floor and the fleas will jump on them.

You can also dust the carpet with food-grade diatomaceous earth (DE). Also dust bedding, furniture and other areas your pet frequents. Let the DE set for four days and then vacuum it up. Also rub some DE through your pet's fur to the skin, especially on the scalp and tail, behind the neck and in any area where your pet can't bite or scratch. Caution: Diatomaceous earth can dry out your pet's skin, so lightly use it no more than once a month. Borax powder used for boosting cleaning power in laundry can also be used to effectively rid your home of fleas. Borax powder is non-toxic and kills fleas by cutting into their exoskeletons. The powder can be sprinkled onto carpets and floors where flea infestations exist. Apply it to pet bedding and upholstered furniture where pets sleep, in addition to the flooring. Work the borax powder into the surface with a stiff-bristled broom, then vacuum it up. Even though borax powder is non-toxic, use caution when young children and pets are around as it can make them sick.

Outside you can apply nematodes to your yard. You can get nematodes at garden shops where fleas are prevalent. They will reduce the flea population outside by up to 90%.

## **Flies (Diptera)**

Flies are the fourth largest order of insects and there are over 100,000 species. Most of them are beneficial to some degree as they serve as a food source to many animals and even a few plants. Many breed in organic material such as animal manure and help recycle its nutrients to the soil. Others contribute to the decomposition of dead animals. Flies can also be serious pests. Mosquitoes and other biting flies can cause human deaths by spreading such diseases as malaria, dengue fever, encephalitis, yellow fever and many others. Flies are different from other insects in that they only have a single pair of wings.

You certainly don't want any flies around schools, day care centers, hospitals, nursing homes, animal shelters or other areas where they can infect people or animals. If you have a fly problem, a good electric flytrap works well but they are expensive. I use an apple cider vinegar trap at our place. I monitor and identify the flies around my home with a simple flytrap. I cut the top off several plastic water bottles; invert the top into the lower portion forming a funnel. I put about two inches of apple cider vinegar in the bottle with a quarter teaspoon of sugar. Almost all flies, no matter what their normal food preference, will enter the trap. I then pour them out through a sieve, let them dry and identify them. Gallon size milk jugs cut as described above and baited with apple cider vinegar and sugar will catch a lot of flies in a large building or yard.

### **House flies (Muscidae - *Musca domestica*)**

House flies have a gray thorax (part where head is connected and wings are attached) with four dark stripes, and a mottled abdomen (posterior portion). These flies are considered "filth flies" and will feed on excrement, garbage, carcasses, and even human secretions from wounds and mucous membranes. If you accidentally eat the larvae (maggots) in contaminated food, they can survive in your intestine. They can harbor over 100 different pathogenic organisms and are capable of transmitting more than 65 diseases and bacteria that can cause duodenal and stomach ulcers. House flies are the most common fly in the world that is found around homes and areas with livestock.

When you swat a fly remember that it has an unblurred range of vision of only about 1½ feet. You should aim your flyswatter about 1½" behind the fly, because when houseflies take off from a horizontal surface, they jump upward and backward. Set out a saucer filled with bubble soap to attract and kill flies. Adult flies eat only sugar, so make some light Karo Syrup or honey or sugar water with 5% boric acid or borax baits.

I have frequently written about hanging Ziploc bags filled with water around doors and windows. The sun's refractive light is said to disorient flies when the sun's rays are shining through the bags and the flies won't come in the building. From the mail I have received, these bags work very well.

### **Little house flies (Fanniidae - *Fannia canicularia*)**

Little house flies are dull gray with yellow on the upper abdomen and 3 dark longitudinal stripes on the top of the thorax.

These flies resemble house flies but they fly in circles in the middle of a room or on a porch and don't appear to land. They can lay their eggs in any organic material including compost piles, pet feces, dead leaves, etc. They have been known to enter the urinary tract of naked sleeping persons and causing

urinary myiasis. To prevent these flies from appearing, empty and clean all food handling equipment, dishes and garbage containers and daily remove and/or bury all animal droppings, fruit and organic debris inside and/or outside. They do like beer so you can put two packets of aspartame in 2" of beer in an open container to act as a bait for these flies. You can also use a fly swatter with a sticky side to swat them when they are circling.

### **Cluster flies (Calliphoridae - *Pollenia rudis*)**

Cluster flies are about ½ up to ¾ of an inch in size. Slightly larger than the common house flies, they move indoors in the winter in hundreds or even thousands of individuals, hence the name. Unlike house flies, cluster flies are not associated with poor hygiene and poor sanitary conditions. These flies do not carry diseases and other hazards that may affect humans because they do not lay their eggs in human food. They parasitize earthworms in the ground outside. When they invade homes for the winter, they will infest attics, basements, unused rooms, wall voids, ceiling voids and garages.

The best way to deal with cluster flies is to prevent them from coming in. Here are some tips: Check all the obvious entry points. Check your windows and doors for small openings. Cluster flies can squeeze through the sides of doors and windows, so make sure there isn't enough space for them to pass through. Seal or patch cracks and crevices. If you use a screen, make sure there aren't any holes that the insect can go through. Check your cellar door for possible openings too. These are possible entry points because your basement is an ideal undisturbed spot that cluster flies choose to hibernate in. If you have an attic, do the same. Basically, any room or area in your home that is not visited much by any of the people in your home are the ones you should check.

### **Blow flies (Calliphoridae -*Phormia, Phaenicia, Cynomya & Calliphora*)**

Blow flies are larger than house flies and are normally shiny green, blue, bronze or black in color. Blow flies feed on decaying animal matter and if you have them in your house it is an indication of a dead animal in the wall or ceiling. Occasionally the only sign of these flies in an early infestation is when the larvae fall from the ceiling void onto the floor. If you can find and remove the carcass of the dead animal they are feeding on, it will speed up the process of them leaving. If you can't, there isn't much you can do except be patient and wait for the dead animal to dry up. They can also lay their eggs in dog feces or any animal matter with a high protein content, including dry cat food. Common names for the most frequently encountered blow flies are black blow flies, greenbottle flies and bluebottle flies. Greenbottle and bluebottle flies are metallic green or blue in color. Black blow flies have a black sheen. These flies are also used by forensic entomologists to establish the time of death in human fatalities.

### **Flesh flies (Sarcophagidae)**

Flesh flies resemble house flies but differ in only having three stripes on a gray thorax. Some species lay their eggs in foul smelling dead animal matter while others will lay their eggs in open wounds on horses, cattle and other animals. There was a case in Albuquerque several years ago where these flies laid their eggs in the festering wound of a person in a nursing home. One species can lay their eggs in the noses or eyes of humans causing myiasis, which can be serious. Proper sanitation and exclusion is the best way of controlling flesh flies.

### **Fruit flies (Drosophilidae)**

Fruit flies are usually found in the kitchen where they feed and breed on food spilled in out of the way places such as behind or under appliances or similar areas. These small flies have distinctive red eyes, which you can see with a hand lens. They are tan or brown in color and about 1/8" long. They are also

known as pomace flies and vinegar flies. They can be serious pests when found in food handling establishments as they breed in and feed on fruits, vegetables and any moist, decaying organic material. They have been known to cause intestinal problems and diarrhea when fruit containing their larvae are eaten. They will also breed in discarded fruit juice and soft drink cans and in unsecured bottles of wine. They are also very prolific as the female can lay about 500 eggs which will hatch and reach adulthood in as little as eight days.

These little flies are also beneficial as they have been studied in research in genetics. This research became the foundation on which future genetic research was built. The species *Drosophila melanogaster* is the one used in genetic and heredity studies. It is also a very common fly in many homes and businesses.

In your home you can control fruit flies by totally eliminating all breeding material. They are attracted to acetic acid (vinegar), so put some drops on duct tape or glue boards. Or you can just fill a small paper cup with vinegar and the flies will dive in.

### **Hump-backed flies (Phoridae)**

Phorids are small flies, about an 1/8" long and tan to dark brown in color. They have a distinct hump-backed shape thorax, hence their common name. They do not have red eyes as fruit flies do. When these flies are disturbed, they will run along the surface they are on rather than flying away.

These flies breed in any moist organic material including dirty mops, garbage, decaying fruits and vegetables and dead animal matter. They are also known as coffin flies because of their presence where dead bodies are found, including inside of coffins. There are over 220 species of phorid flies in the United States.

You have to eliminate the food source and breeding areas in order to control them in your home or business.

### **Dung flies (Sphaeroceridae)**

Sphaerocerid flies are sometimes called dung flies, but that name probably isn't appropriate. While they will breed in dung, they will also breed in other organic materials and are often found in areas where phorid or drosophilid flies breed. Sphaerocerids can be recognized by the enlarged size of the first tarsal segment on their hind legs. The tarsi are the last five segments on the leg. They are very small, about an 1/8 of an inch and dark-colored. There are over 240 species of sphaerocerids in the United States and they are easily transported around the country as they will frequently breed in decaying material carried in commerce between states.

These flies will breed in organic material spilled in cracks in the floor, unclean trash containers and even the bottom of elevator shafts if it is damp and has decaying organic matter there. They can be a problem in food establishments if there is a lot of spilled food that works its way into floor cracks or expansion joints. The best way to control these flies is to find out where they are breeding and totally eliminate the decaying material from the area.

### **Moth flies (Psychodidae)**

Moth flies are small flies with hairy wings that resemble small moths. They are also called filter flies and drain flies. They are usually found in the bathroom. They will breed in the gunk buildup in drains and will often be found in the tub, on shower curtains or the wall. They are poor fliers and seem to just hop around. The larvae live in gelatinous material in sink and floor drain traps, in sewer treatment

plants and in septic tanks. They will also breed in damp crawl spaces under a house. In a commercial building you can put duct tape sticky side down on drains to see which ones they are breeding in. You need to keep your drains clean to control these flies as they have a very short life cycle. They can go from egg to adult in a little over a week in some areas.

### **Fungus Gnats (Sciaridae)**

Fungus gnats are very small flies with long legs and long antennae and distinctly patterned wings. They are dark brown or black in color. They are generally found in over-watered house plants where the larvae feed on fungus in the potting soil and moist organic material. The best way to control them is to let the plants dry out almost to the point of wilting before re-watering. That will kill the larvae in the soil. Then put an inch of aquarium gravel on the soil to prevent female fungus gnats from laying anymore eggs in the potting soil. You can also place a yellow sticky trap on a stick in the soil to catch the adult gnats.

### **Mosquitoes (Culicidae)**

Mosquitoes are small, slender, biting flies. They have a long, thin mouth part designed for piercing the skin and sucking out blood. They require water to lay their eggs. They are very important disease vectors and can transmit West Nile Virus, Encephalitis and other diseases in the United States. If you have mosquitoes, make sure you wear a good non-DEET mosquito repellent when you go outside. Never use the DEET products that government agencies recommend as DEET (N,N-diethyl-m-toluamine) is a chemical that some people have severe reactions to. It is a fact that DEET works well as long as it is full strength. However, when it begins to weaken, it actually attracts mosquitoes and you have to put more on, which means absorbing more of the chemicals into your system. Most non-DEET products (catnip, citronella, and lemongrass) are effective for two or three hours before having to be reapplied, but they do not contain potentially dangerous chemicals.

Remove all standing or stagnant water if at all possible. This means old tires, barrels, cans, wading pools that aren't being used, bird baths and other items that can hold water. You can apply a light coating of food-grade diatomaceous earth on any water that can't be removed. Eucalyptus oils, garlic extracts and extracts of orange and lemon peels will kill mosquito larvae in the water.

If you have adult mosquitoes in your grass or bushes, you can spray them with Greenbug for Outdoors. Catnip is a very good repellent according to a report from Iowa State University. Other good repellents include lemongrass, basil, birch, mint, rosemary, spearmint and yarrow. Geraniums or basil plants planted near your doors will repel mosquitoes. Citronella and pennyroyal both work but have side affects. Pennyroyal may increase the risk of a miscarriage if you are pregnant and citronella has been known to attract female black bears. Test anything you put on your skin on a small portion first to make sure you aren't allergic to it. Again, never use repellents that contain DEET.

## **Moths (Lepidoptera)**

There are several types of moths that can become household pests. Clothes moths can damage clothing and pantry moths can infest some stored foods. Other moths that come in the house are occasional invaders and won't do any damage.

### **Clothes moths (Tineidae)**

There are two distinct types of clothes moths commonly found in homes. They are both small moths. The webbing clothes moth (*Tineola bisselliella*) is a solid golden brown on the wings, while the

casemaking clothes moth (*Tinea pellionella*) has three black spots on each wing. Casemaking clothes moth larvae construct a small bag from material to protect their body from the environment. They drag the bag or tube wherever they feed.

Clothes moths are occasionally found in closets where they lay their eggs on suitable fabric. The larvae hatch and feed on the fabric doing damage. There are several things you can do to prevent clothes moths. First, keep clothes and other fabrics stored in sealed, plastic bags. Next you can hang some repellents in the closets. Put dried lemon peels, cedar chips, dried rosemary or mint in cheese cloth bags and hang them in the closets. Make sure any carpets in the closet are clean and free of lint or animal hair or any organic debris.

If you already have webbing clothes moths, you should hang one Clothes Moth Pheromone Trap in each closet. It will attract and catch the male moths and stop the breeding process. Don't hang more than one trap or you will confuse the moths and they will just fly around, not sure where to go. The pheromone traps aren't effective against casemaking clothes moths. Dry cleaning all the clothes will kill all the stages of the moths as well as washing all infested clothing in hot, soapy water to kill the larvae and eggs.

### **Indian meal moths (Pyralidae - *Plodia interpunctella*)**

There are several species of pantry moths that can infest your home, but the one most frequently encountered is the Indian meal moth. This moth is small and colorful. The wings are gray toward the body and has dark bands near the tip.

They will feed on a wide variety of dried foods, including cereals, flour, cornmeal, crackers, cake mixes, pasta, dried pet foods, candy, powdered milk, chocolate candy and many other foodstuffs.

The best control is to hang one Flour Moth Pheromone Trap in the area they are infesting. This will attract and catch the male moths and stop the breeding process. Then inspect all open dried foods and toss anything that is infested. Place all non-infested foods in sealed containers or refrigerate them. Completely clean the pantry where the foods are stored to get any larvae that may be crawling around. Then lightly dust the shelves with food-grade diatomaceous earth before putting the foods back.

## **Beetles (Coleoptera)**

There are three groups of beetles that can cause problems in a home. Carpet beetles will damage carpets, clothing, animal fur, feathers and similar products. Stored product beetles will infest many dried foods and wood boring beetles can damage the structure of a home or wooden objects in it.

### **Carpet Beetles (Dermestidae)**

Carpet beetle larvae are small, about 1/4" long and carrot-shaped with long hairs. They will feed on anything organic. The adult beetles are small, round and usually black in color, sometimes with lighter markings.

The best method for controlling carpet beetles is by completely cleaning everything. Steam clean the carpets if possible as well as any upholstered furniture. Make sure you vacuum under all furniture as carpet beetles can survive feeding on dust bunnies. Keep a bottle of Greenbug for Indoors available to directly spray any adults or larvae you find. Make sure you vacuum up all the dead insects as the spines on the carpet beetle larvae can cause problems if they penetrate your pores as they can cause rashes.

Also, adult carpet beetles feed on the nectar in flowers so they don't do any damage beyond breeding



indoors. If you have flowers blooming near your house, you will attract adult carpet beetles. Make sure there aren't any ways for them to get into your house.

### **Flour beetles (Tenebrionidae – *Tribolium* spp.)**

Flour beetles are small, brownish in color and elongate in shape. There are nine species that are potential pests in stored food products. Two species are very common. The confused flour beetle (*Tribolium confusum*) is common in northern regions and the red flour beetle (*Tribolium castaneum*) is more common in southern areas. They feed on barley, beet pulp, breakfast cereals, grains, nuts, wheat, wheat bran, milk chocolate, dried milk and occasionally hides. Good sanitation is key to controlling these beetles. Freezing stored products at -4 degrees for 24 hours will kill all stages, as will heating at 122 degrees for an hour.

### **Drugstore beetles (Anobiidae – *Stegobium paniceum*)**

These beetles have a hood-like thorax which hides the head when viewed from above. They are reddish brown in color and rounded in profile and oval-shaped. They feed on a variety of products including tobacco, seeds, grain, nuts, beans, spices, dried fruits and vegetables, flour, rice, ginger, yeast, herbs, paprika, dry dog and cat food, cocoa, biscuits, raisins, dates, alfalfa, hay, almond hulls, barley, corn meal, rice meal, wheat bran and even rodenticides. They are good at penetrating packaging to get access to food. The same control methods recommended for flour beetles will work on this species.

### **Saw-toothed grain beetles (Silvanidae – *Oryzaephilus surinamensis*)**

Saw-toothed grain beetles small, black, elongate and have six distinct saw-like teeth on each side of the thorax. They are commonly associated with breakfast cereals and is frequently found in corn meal, flour, biscuit mix and processed cereals as well as in alfalfa seed, almonds, baking soda, barley, candy, clover seeds, chocolate, sugar, rice, wheat, cereals, dried fruits, corn, cornmeal, corn starch, flour, garbanzos, hay, honeycomb, milo, mixed feeds, oats, raisins, rice, figs, peas, pecans, dried meat and tobacco. Sanitation and freezing and heating will also work on these beetles.

### **Hide & Larder beetles (Dermestidae – *Dermestes* spp.)**

Dermestid beetles are larger than other stored product beetles, reaching a 1/3 of an inch long. The hide beetle is brown on top and white on the bottom and the larder beetle is brown with a broad cream-colored band across the front of the abdomen. These beetles prefer animal products such as leather goods, hides, skins, dried fish, pet food, bacon, cheese and feathers. They can be a major pest in museums. Sanitation is important and sticky traps can be used on flat surfaces to catch adult and larval dermestid beetles.

### **Weevils (Curculionidae – *Sitophilus* spp.)**

Weevils are easily recognized by their small size and prominent snout. They are very destructive of stored grains in the world. They will feed on chick peas, corn, oats, barley, rye, wheat, kafir, buckwheat and millet. They are frequently found in macaroni and noodles. When you find any of these beetles in your home, inspect all open dried foods and toss anything that is infested. Place all non-infested foods in sealed containers or refrigerate them. Completely clean the pantry where the foods are stored to get any larvae that may be crawling around. Then lightly dust the shelves with food-grade diatomaceous earth before putting the foods back.

### **False powder post beetles (Anobiidae & Bostrichidae)**

There are a number of species of beetles in this family that attack wood. They will attack new and old hardwoods and softwoods, with a 12% moisture content. They are recognized by their hood-like thorax that hides the head when viewed from above. They have a cylindrical body shape and are

reddish-brown to brownish-black in color. They are often found infesting wood joists and sill plates in crawl spaces under homes. Two common species are the deathwatch beetle (*Xestobium rufovillosum*), the furniture beetle (*Anobium punctatum*). The furniture beetle will infest furniture and pine flooring.

Other beetles in these two families include the California deathwatch beetle (*Hadrobregmus gibbicollis*) which occurs along the Pacific Coast. *Xyletinus pelatus* (no common name) is found in the eastern United States and attacks cellar joists and flooring in damp buildings. *Nicobium castaenum* (no common name) is found in Virginia, South Carolina to Louisiana and attacks furniture and pine woodwork. The lead cable borer (*Scobicia declivis*) normally infests dead and seasoning oak and damage can be severe. It is found throughout the west and is most common in California.

The best method of control for all wood-boring beetles is to treat all exposed wood with a sodium borate, which will prevent them from reinfesting the wood after they emerge.

### **Powder post beetles (Bostrichinae; Lyctinae – *Lyctus* spp.)**

Powder post beetles are small, elongate and almost always infest hardwoods. They frequently infest lumber, woodwork, furniture, tool handles, gun stocks and similar items. They produce very fine, powder-like frass when they damage wood. Frass from anobiids and bostrichids is not nearly as fine as these beetles produce. They are second only to termites in destructive capability. There are several destructive species nationwide. The brown powder-post beetle (*Lyctus brunneus*) found in most states and is frequently found infesting imported hardwood products. The western powder-post beetle (*Lyctus cavicollis*) is found throughout the the United States and attacks oak firewood and hickory, orange and eucayptus wood. The European powder-post beetle (*Lyctus linearis*) is found in the eastern United States and attacks hickory, oak, ash, walnut and wild cherry wood. The southern powder-post beetle (*Lyctus planicollis*) is found nationwide but does most of its damage in the southern states. It prefers seasoned or partially seasoned wood of oak, ash and hickory. The white-marked powder-post beetle (*Trogoxylon parallelopipedum*) is a common native species and has the same food preferences the southern powder-post beetle.

### **Long-horned borers (Cerambycidae)**

Only a few species of long-horned beetles are pests of wood in homes. The old house borer (*Hylotrupes bajulus*) is probably the most destructive species in this family of beetles. It is found from Maine to Florida and west to Michigan to Texas. There have been some reports of this beetle in California. They are between ½ and ¾ inches long and are slightly flattened. They are brownish-black in color. Each wing cover has a gray band on it.

They are usually built into a house with wood from storage as adults have been found at lumber mills in seasoned and unseasoned wood. The frass is slightly granular and composed of small, barrel-shaped pellets of digested wood and irregular shaped wood fragments that were not eaten. The larvae can feed on the wood from 2 to 10 years before maturing into adulthood, depending on environmental conditions.

### **Metallic wood borers (Buprestidae)**

The larval form of these beetles are called flat-headed borers, because the exit holes in the wood are oval, not round as in most other wood boring beetle larvae. Only a few species will attack seasoned wood, so they aren't a serious pests. The adult beetles are often brightly colored and metallic. They are boat shaped in appearance. The most destructive species is the golden metallic borer (*Buprestis aurulenta*). The wings are greenish-blue with copper margins. They will attack flooring and woodwork of Douglas fir that isn't finished with paint or varnish. They also feed on pine and spruce

lumber. These beetles are found throughout western United States.

## **Termites (Isoptera)**

There are close to 2500 species of termites described worldwide. If you weighed all of the termites, they would weigh twice as much as all of the humans on the planet. There are over 50 species in the United States, but only a few species of subterranean termites and drywood termites are serious pests.

### **Drywood termites (Kalotermitidae – *Incisitermes* spp.)**

Drywood termites do not need soil contact. They live in dry, sound wood, usually near the surface. They get what moisture they require from the wood they feed on and from the water formed during digestion of that wood. Drywood swarmers generally enter your home at night through unscreened attic or foundation vents or through cracks and crevices between exposed wood. Drywood termites are most commonly recognized by their distinctive fecal pellets (piles) that are often the color of the wood they are feeding upon. The fecal pellets are kicked out of the wood by the nymphs (workers) through “kick holes” that are visible. *Incisitermes minor* is found in much of California where it is a major pest. It is also found in Arizona, Utah and New Mexico. *Incisitermes snyderi*, *Incisitermes schwarzi* and *Kalotermes approximatus* are species found in the southeastern states that are of economic importance because of the damage they are capable of doing.

The best method of control from a professional is with XT-2000 Orange oil. If you live in north-central California, Planet Orange is the best termite control company in the area. If you have a localized infestation that you can reach, then you can inject some Greenbug for Indoors into the kickout holes in the wood. You can also do this with furniture infested by drywood termites.

### **Subterranean termites (Rhinotermitidae)**

Subterranean termites are social insects with very large colonies. They consist of a queen, sexual reproductives, workers and soldiers. The workers are grayish or white and wingless. They are the ones in the colony that forage for food. They also groom the queens, eggs, nymphs and soldiers and build the nest. Workers are the ones who do the damage to the wood. The workers have a mass of unique genera and species of oxymonad, trichomonad, and hypermastigote flagellates (protozoa) in their lower digestive tract and it is these protozoans that enable the termites to digest wood. When the protozoans are killed, the termites will quickly starve and the entire colony will die off as the workers feed the other caste members in the colony through a process call trophallaxis. Trophallaxis is food sharing between members of the same colony and is what makes products such as anti-biotics and borates so effective.

### **Western subterranean termites (*Reticulitermes hesperus*)**

This is the western subterranean termite. It is found from British Columbia south to western Mexico and is very common along the Pacific coastal areas. It occurs as far east as Idaho and Nevada. Their colonies can reach several hundred thousand individuals and the colony has to be about three years old before they can swarm. They do extensive damage and will attack fence posts, utility poles, any wood products on the ground and living plants and trees.

### **Eastern subterranean termites (*Reticulitermes flavipes*)**

The eastern subterranean termite is the most destructive species in this group. It is found throughout the eastern United States and is found as far west as eastern New Mexico. It occurs in spotty areas of Utah and Arizona as well. It has very large colonies numbering ¼ million individuals. They go below

the frost line during extreme cold weather. It builds earth-like shelter tubes over obstacles like the desert subterranean termite.

#### **Arid land subterranean termites (*Reticulitermes tibialis*)**

This is the arid land subterranean termite. It is found in arid desert areas and higher elevations and ranges from Oregon and Montana, south to Mexico and eastward to Missouri, Arkansas and Texas. This is the most common termite in New Mexico. It is the least destructive of the termites in this group, although it can cause considerable damage in some situations.

#### **Desert subterranean termites (*Heterotermes aureus*)**

This is the desert subterranean termite. It is found in desert regions of southern Arizona and California. It is common in the Phoenix area but not as common near Tucson. This termite is very destructive. It will attack sound dry wood, utility poles and posts. It will build earth-like tube shelters over obstacles to get to edible wood. The western subterranean and arid land termites do not build these tube-like shelters.

#### **Subterranean Termite Control**

Over a half million homes are treated every year with toxic pesticides to control these insects. In nature, they are beneficial insects as they break down dead wood and consume it. If it weren't for termites there would be a lot of dead trees laying around. Unfortunately termites can't differentiate a dead tree from the wood in your house. It is all edible to them.

Sodium borates are registered termiticides / insecticides that are safe to use. They will permanently penetrate wood and make it totally inedible for any wood-eating insect. In New Zealand they have required all wood that is put into homes to be treated with a sodium borate before being installed. They did this in 1953 and they do not have a termite industry in that country as termites are never found in homes. Sodium borates are also effective in preventing wood decay fungi and is a good fire retardant. It should be applied to all exposed wood, especially in a crawl space. It is safe as it easily washes off and it is not a skin irritant and there is no risk of absorption through unbroken skin.

Termites will not only die if they feed on wood treated with sodium borates, but they will be killed if they just crawl over it. If adult beetles emerge from wood treated with a sodium borate, they will not die, but they will be prevented from re-infesting the wood. BoraCare is a liquid sodium borate and TimBor is a wettable powder. BoraCare would probably be easier for the homeowner to use. BoraCare and TimBor are not available in stores. You can get them online. One supplier is [www.pestcontrolsupplies.com](http://www.pestcontrolsupplies.com).

A professional termite treatment by a reputable company is a good thing. They can be treated by the homeowner in some cases, but it is a lot of work. It would be best to get it done professionally and get a guarantee. There is a section in the book on how to pick a competent termite control company. Termidor is a very good termiticide and relatively "safe" as pesticides go and it is commonly used by the pest control industry.

### **Scorpions (Scorpiones) & Centipedes (Chilopoda)**

Scorpions and centipedes are two groups of arthropods that nobody wants in their homes. Both of these animals have the capability of stinging (scorpions) you or biting (centipedes) you with painful results. Only one species of scorpion in this country is dangerously venomous. It is the bark scorpion (*Centruroides sculpturatus*) found mostly in Arizona but also southwestern New Mexico. It has killed a

few people in Arizona, but not in the last 40 years. Centipede bites are painful, but not deadly in this country. There are some very large centipedes in Asia that have caused human fatalities, but none in the United States. However, anyone can be allergic to anything, including the bite or sting of an insect or some other arthropod. Even if they bites or stings aren't fatal, they can certainly be painful.

There are over two hundred species of centipedes in the western U. S., but most of them are very small and belong to two suborders. They are the stone centipedes (Lithobiomorpha) and the soil centipedes (Geophilomorpha). Stone centipedes are about an inch long and have 15 pair of legs. Soil centipedes aren't much longer and have upwards of 40 pair of legs. Neither group is capable of biting people. Both are common in yards and feed on small bugs including some pests, so they can be considered beneficial. House centipedes (*Scutigera coleoptrata*) are about an inch long and have 15 pair of very long legs. They are common almost everywhere and are often found in homes. They rarely bite and they do feed on such pests as spiders, bed bugs, termites, cockroaches, ants and silverfish, so they should probably be welcome in the home.

Three species of Scolopendromorpha centipedes are found in the western states. The desert centipede (*Scolopendra polymorpha*) is most common throughout throughout the west with the exception of Washington. It is about three or four inches long. The green centipede (*Scolopendra viridis*) is found in the mountainous areas of New Mexico, Arizona, southeastern Colorado, Utah and extreme southern Nevada. It is only a couple of inches long. The giant desert centipede (*Scolopendra heros*) is found in the southern and eastern portions of New Mexico, much of Arizona and the extreme southeast portion of Colorado. This species can reach a length of 6.5 inches and is capable of killing and eating mice. All of the *Scolopendra* have painful bites but they are not dangerous.

Centipedes and scorpions are usually found in areas of high moisture such as loose bark, in rotting logs, under stones, boards, railroad ties, trash, piles of leaves and grass clippings and similar areas. They are nocturnal or active at night and hide by day in the earth, wandering forth by night to hunt. They occasionally invade structures and will feed on cockroaches, cricket, spiders, etc. Although they may be found anywhere in a building, including beds, the usual places are damp basements, bathrooms, and any crawl space under the home or building. Exclusion to keep them out of structures is most important, and this begins with ensuring that no tree or shrub branches are touching the structure. The branches can be pruned away to eliminate this common pathway. You also can carefully examine the entire exterior, including up to the eaves as scorpions and other pests may crawl up rough surfaces, and you want to permanently fill in any openings found and ensure all vent screens are in place and in good condition. In the yard you can eliminate many potential harborage sites for scorpions and centipedes such as rocks, boards, and other objects resting on the soil. Scorpions will also hide under bark on trees, so these can be can be dusted with food grade diatomaceous earth where loose bark is found.

Firewood should be stacked on racks off the soil and kept outside until immediately ready to burn. Garbage cans should be on racks to elevate them. Grass should be mowed to prevent hiding areas for scorpions. centipedes and other pests and weeds should be eliminated.

If you find a scorpion or centipede in your home, spray it with some Greenbug for Indoors. Don't use synthetic pesticides as they are more dangerous than the scorpion or centipede.

## **Spiders (Arachnida)**

Although most spiders possess venom glands, most are too small to break the skin with their fangs and have no desire to do so. All spiders will bite in self defense if they are handled carelessly, such as

being squeezed. Most bites occur when people roll over in bed on one and get bitten or when they put on their clothes and a spider inside the clothing bites when it is pressed against the skin. I am not saying all spiders are harmless. Black widows are certainly capable of producing a serious bite and any such bite by this spider should be considered a major medical emergency. The brown recluse is also dangerously venomous. Sac spiders and wolf spiders can give serious, though not fatal bites, particularly if you are allergic to any of the components of the venom. Daddy longlegs (aka harvestmen) are not at all dangerous despite their reputation to the contrary. Jumping spiders are interesting to watch but are not dangerous although a large one can bite if mishandled. Most of the small hunting spiders, such as ground spiders are incapable of hurting anyone.

To control spiders around your home if you don't want them, here are a few suggestions. Control the lighting at night that attracts their food, which is flying insects. Keep trash and rubbish out of your yard. If you have firewood, stack it somewhere where there is a lot of sunlight and cover it with black plastic. It will get so hot under there that spiders and other insects / arachnids won't go in the wood. Seal any cracks or crevices around the house that would let hunting spiders inside. If your doors do not close tightly, install door sweeps on them.

Make sure your bed isn't touching the wall. This will make it hard for spiders to get into bed with you. Don't leave clothing on the floor. If you do, completely shake it out before putting it on. If you have a stray spider you need to kill, use a natural product like Greenbug for Indoors.

### **Black widow spiders (Theridiidae – *Latrodectus* spp.)**

There are three main species in the black widow group. The eastern black widow (*Latrodectus mactans*), the western black widow (*Latrodectus hesperus*) and the brown widow (*Latrodectus geometricus*) The eastern black widow is found throughout the east with the exception of Maine, New Hampshire and most of Vermont. The western black widow is found in every state west of central North Dakota south to Texas. The brown widow is found in Florida and Texas and may be expanding into neighboring states. All the female widow spiders have a reddish hourglass-shaped marking on the underside of a shiny black abdomen. The abdomen is brown in the brown widow. Medical: The black widow is feared everywhere although it isn't as dangerous as we are told. The toxic venom is neurotoxic, but the spider injects very little material and the death rate is about 1%. Additionally, the black widow is not inclined to bite unless it is squeezed or defending its egg sac in a web. I pick them up all the time and have never had one try to bite me.

### **False black widows (Theridiidae – *Steatoda grossa*)**

The false black widow is often mistaken for the real black widow. They are about the same size and the same color. The false black widow does not have the red hourglass marking on its abdomen. It usually has a yellowish band across the front portion of its abdomen on top. It originally came from Europe and is found along both coasts, the states that border the Great Lakes and has been found in Colorado, Arizona and New Mexico as well as a few other inland states. It is absolutely harmless and like the real black widow, it is very timid and non-aggressive.

### **Recluse spiders (Sicariidae – *Loxosceles* spp.),**

The brown recluse spider (*Loxosceles reclusa*) is shy, sedentary and builds an irregular web that is often not even recognized as a spiderweb. It has a fiddle-shaped pattern on its cephalothorax. Females lay eggs in flattened egg sacs that are frequently attached to the underside of objects. When they are indoors, they can usually be found in dark places, beneath or behind furniture, in boxes or storage areas, among stored books and papers and similar areas. Outside they live under rocks, boards and other dark areas.

The natural habitat of the brown recluse includes the underside of rocks, loose bark, and crevices in decaying logs. The brown recluse is found from eastern areas of the country west to Texas, Oklahoma and eastern New Mexico. It is frequently transported to different areas of the country in luggage or by commercial vehicles. There are several other species of *Loxosceles* in the southwestern states. None of them have bitten anyone so we don't know if they are potentially dangerous or not. One species introduced into California and Massachusetts, *Loxosceles laeta*, is potentially dangerous. It occasionally comes to the United States in products shipped from South America. Medical: Brown Recluse bites are not painful at the time of the bite. After an hour or so there may be intense pain where bitten. There is usually a dark depressed area at the site of the bite which will turn darker in a day or so. The dead tissue will slough away and the bite area will scar over. Death seldom if ever occurs, but the bite is extremely debilitating and traumatic. If you know you were bitten by a brown recluse, seek medical attention right away.

### **Hobo spiders (Agelenidae – *Tegenaria agrestis*)**

The Hobo Spiders or the aggressive house spiders are in the genus *Tegenaria*. Since 1982, many brown recluse spider bites in the Northwest were shown to actually be hobo spider bites. *Tegenaria agrestis* was first introduced into the ports of Seattle in the late 1920s and has been moving south ever since. It is now found in Washington, Oregon, Idaho, western Montana and much of Utah. They originally came from Europe where they are most common in homes. Generally, these spiders are yellow to pale tan in color with long legs. These spiders occur in highest frequency in July through September and reproduce during this period. Females produce an egg sac that is placed near the opening of the funnel in their webs. Medical: Although the bite of these species is not considered to be as dangerous as that of either the brown recluse or widow spiders, it can cause a similar ulceration or lesions of the skin as the brown recluse and may involve systemic reactions. The venom is a necrotic type that can cause tissue death and sloughing of the skin next to the bite. The wound can require up to 6 months to heal. Dogs and cats are also bitten, with some deaths occurring.

### **Common house spiders (Agelenidae – *Tegenaria domestica*)**

This may be one of the most common spiders found in homes in the country. It is found in every state, most Canadian provinces and virtually all over the world. The cephalothorax (section where legs are attached) is shiny brown with two longitudinal stripes running down the middle. The abdomen is grayish with a series of chevron shaped markings running down the middle to the end. The legs are brownish-gray with black bands. The similar and more aggressive hobo spider does not have bands on its legs. The common house spider is harmless and feeds on a lot of household pest insects, so can be considered beneficial.

### **Orb-weaver spiders (Araneidae)**

Orb-weavers (family Araneidae) are large spiders that make distinct orb-like webs that are often very close to homes. Occasionally the webs are attached to a home. The pumpkin spider, which is large, has two humps and a distinct pattern often scares people. It is common in many areas and is absolutely harmless. You can see on sitting on my face in the photos in the back of the book.

### **Ground spiders (Gnaphosidae)**

Ground spiders (family Gnaphosidae) are very common and are frequently found indoors. They live under debris on the ground outside and often accidentally wander into homes. Most of them are completely harmless. One species, eastern parson spider (*Herpyllus ecclesiasticus*), can give a painful, but not a dangerous bite. Some people suffer allergic reactions to the bite. This spider is about ½ inch long, blackish with a distinctive white or pink pattern on the middle of its back. The marking

resembles an old-style cravat worn by clergy in the 18<sup>th</sup> century. This spider is found almost everywhere east of the Rocky Mountains. A very similar species, the western parson spider (*Herpyllus propinquus*) is found west of the mountains.

### **Sac Spiders (Clubionidae – *Cheiracanthium* spp.)**

Sac spiders are responsible for spider bites in homes more often than most other species. They have a cytotoxic venom, which is the same as the brown recluse, although it isn't as toxic. It is possible many sac spider bites are blamed on the recluse. Two species are referred to as yellow sac spiders due to their similar coloration. They are *Cheiracanthium inclusum* and *C. mildei*. They are light yellowish to a pale yellowish-green, sometimes with a orange-brown stripe on top of the abdomen. They are small, ¼ to 3/8 inches long. Yellow sac spiders are found throughout the country.

Female sac spiders build a silken tube or sac in a protected area, often under furniture. They usually come out at night to hunt and that is when most bites take place. Usually the bite results in a sharp pain, but some people won't feel anything. It is rarely no more painful than a bee sting, but some people can have a bad reaction to it.

### **Jumping spiders (Salticidae)**

Jumping spiders are easily distinguished from other spiders by their four big eyes on the face and four smaller eyes on top of the head. Around the world there are probably more than 5,000 species of jumping spiders. In the U. S. there are at least 40 genera and more than 300 species.

Jumping spiders are charming spiders that look up and watch you. Their excellent vision allows them to hunt and spot their prey from long distances, creeping up then pouncing using their jumping ability.

The most important species of jumping spiders is probably *Phidippus audax* because it can be mistaken for the Black Widow. These spiders are 1/8" - 3/4" long with robust, relatively short legs, are mostly black with white or red markings on the dorsal surface of the abdomen. Another species, *Phidippus formosus* has been reported to bite, but the small amount of venom secreted causes only mild irritation, e.g., localized swelling and sensitivity. They are beneficial because they hunt and pounce on flies and other insect pests and eat them. They like sunny areas and are often found on porches or on walls.

### **Wolf spiders (Lycosidae - *Lycosa* spp)**

Wolf spiders are robust and agile hunting spiders with excellent eyesight. They occasionally enter homes and garages and can be found almost anywhere inside. They are anywhere from ½ inch to 2 inches in length, depending on the species and are hairy, grayish or brown, with various markings on the back. The females are often seen carrying around her egg sac and then her babies on her back. Wolf spiders are not dangerous at all but will bite like any spider if it is squeezed or mishandled.

### **Tarantulas (Theraphosidae)**

Tarantulas are very large hunting spiders. You often see the males crossing the road after a rain. They are looking for females to mate with. Although they are fearsome looking, they are not at all dangerous. A large one can deliver a painful bite if molested, but they are not lethal. I have a photo of a male tarantula on my face in the back of the book.

In the Americas the term "tarantula" refers to any of about 300 species of primitive spiders with poor eyesight. About 30 species occur in the United States. Many are among the largest of all spiders, weighing 2 - 3 oz. and with a 10" leg spread. The term "tarantula" is derived from a city in Italy and



actually belongs to a wolf spider of that area, *Lycosa tarentula*. Immigrants who saw the big American spiders called them tarantulas. Female tarantulas have been known to live up to 25 years in captivity, while males only live for a year after it reaches maturity.

## **Ticks (Acarina)**

Ticks are not insects. They are arachnids belonging to the group – mites. They are bigger than all other mites and they are very important. There are hundreds of species of ticks in the world and they are capable of spreading more than 65 diseases, many of them serious. Lyme disease, Rocky Mountain spotted fever, Colorado tick fever and tularemia are a few. If someone made a list of the top ten most dangerous pests, ticks would be close to the top of the list. For some reason, they receive almost no attention compared to bed bugs which are absolutely harmless. Ticks mostly feed on the blood of warm-blooded animals, but some species feed on reptiles. They can be found in lawns, yards with trees and shrubs and, occasionally, inside homes. They prefer the shaded areas of your yard.

If you find a tick imbedded in your pet or on another person or on yourself, do not yank it off. Gently pull the tick straight off with a pair of tweezers. You can also put some diatomaceous earth on the tick and it will come off by itself. Make sure you save the tick so you can get it identified. You want to know what diseases, if any, it can cause. Mark the date of your bite on a calendar and if you develop unusual symptoms in about two weeks, contact your medical professional.

When you have ticks in your yard, here is how to get control of them. Get a large piece of flannel cloth and tie it to a stick. Drag it through the entire yard slowly and pay particular attention to shady areas. Any ticks he drags the cloth over will get snagged. When you are done, put the cloth in a burn barrel and burn it or in a trash bag and seal it shut and take it to the dump. Then get some food grade diatomaceous earth and spread it all over the shady areas including along the sides of the house. Get some all along the foundation where there is dirt abutting the house. Then get some Vaseline and put some on all the outside window sills. If Vaseline is too messy you can use duct tape sticky side up. It takes 30 to 40 days for tick eggs to hatch, so you should repeat this entire process in a month and then again one month later. If ticks are in your house, you need to treat all the areas where they can hide. This would be behind baseboards, moldings, in furniture and carpets as well as around window sills. You can treat these areas with food-grade diatomaceous earth, baking soda, talcum powder or spray them with Greenbug for Indoors. All of these products will be safe for you and your family and pets but will kill the ticks.

Most of the ticks listed below are only found in the woods and remote areas and won't infest your homes. I am listing them because they can be serious vectors of disease if you should encounter them.

### **Talaje soft ticks (*Ornithodoros talaje*)**

Man, rodents, pigs, cattle, horses. Very painful bite. Found in Arizona & California & Nevada, NM  
Medical: It can transmit tickborne relapsing fever in some areas

### **Herm's soft ticks (*Ornithodoros hermsi*)**

This tick is found in Washington, Oregon, Idaho, California, Nevada, Colorado, Utah and Arizona  
Medical: Primary vector of tickborne relapsing fever spirochetes in the area.

### **Relapsing fever ticks (*Argasidae - Ornithodoros turicata*)**

It feeds on kangaroo rats, rabbits, sheep, cattle, horses, pigs, humans, rattlesnakes and turtles. It is found in New Mexico, Arizona, Colorado, Utah and California.

Medical: May produce intense irritation and swelling at bite site in humans. Also produces relapsing fever spirochetes.

**Pajaorella ticks (Argasidae - *Ornithodoros coriaceus*)**

This tick has a very painful bite. There are many tales about the seriousness of the bite and it is feared like a rattlesnake in parts of Mexico. It feeds on humans, deer and swallows.

**Lone star ticks (Ixodidae - *Amblyomma americanum*)**

The female Lone star tick has star-shaped marking on its back, hence its name.

They are found from Texas, through the south-central midwest states to the east coast.

Medical: Rocky Mountain spotted fever, ehrlichiosis, tularemia and STARI (Southern Tick Associated Rash Illness).

**Gulf coast ticks (Ixodidae - *Amblyomma maculatum*)**

The larvae feed on birds and rodents, while the adults feed on deer and other large mammal. It is found along the Atlantic coast the Gulf of Mexico.

Medical: It can transmit a form of Rocky Mountain spotted fever as well as canine hepatozoonosis

**Rocky Mountain wood ticks (Ixodidae - *Dermacentor andersoni*)**

Rocky Mountain wood tick immatures feed on rodents and rabbits. Adults feed on cattles, sheep, deer, humans and other large mammals. They are found from the western counties of Nebraska and the Black Hills of South Dakota to the Cascade and Sierra Nevada Mountains, and from northern Arizona and northern New Mexico in the United States to British Columbia, Alberta, and Saskatchewan in Canada. Medical: Rocky mountain spotted fever, tick paralysis and tularemia.

**Pacific coast ticks (Ixodidae - *Dermacentor occidentalis*)**

Immatures feed on small mammals, adults feed on larger domestic animals, deer and humans. This tick is found in Oregon and California. Medical: Rocky Mountain spotted fever, tularemia, bovine anaplasmosis, Colorado tick fever, 364D Rickettsiosis.

**American dog ticks (Ixodidae - *Dermacentor variabilis*)**

American dog tick immatures feed on small mammals, preferably rodents. Adults feed on domestic dogs and will readily bite humans. They are found throughout the eastern portion of the country as well as in Idaho, Oregon, Washington and California. Medical: Rocky Mountain spotted fever pathogen and bacterium causing tularemia. It may cause canine paralysis and bovine anaplasmosis and tick paralysis.

**Black-legged ticks (Ixodidae - *Ixodes* spp.)**

The female black-legged tick is red and brown, while the male is much darker. They are also known as deer ticks and bear ticks. Immatures feed on various small mammals, birds and lizards. Adults feed on the large mammals such as deer, elk and bears. They will bite humans. The western black-legged tick (*Ixodes pacificus*) is found in Washington, Oregon, California, Idaho, Nevada and Utah. The eastern black-legged tick (*Ixodes scapularis*) is found throughout much of the eastern United States.

Medical: Both black-legged ticks can transmit Lyme disease as well as anaplasmosis and babesiosis

**Brown dog ticks (Ixodidae - *Rhipicephalus sanguineus*)**

Brown dog ticks are found worldwide, mostly in warmer areas. It is small and reddish-brown in color. Females can lay up to 5000 eggs, depending on the amount of blood consumed. Immatures feed on a variety of animals. Adults feed on domestic dogs and occasionally bite humans.

Medical: In dogs, it can transmit canine ehrlichiosis and canine babesia. It has recently been identified as a reservoir for Rocky Mountain spotted fever in the southwest.

## **PEST-PROOFING A HOUSE OR BUILDING**

The purpose of pest-proofing your home is to help keep cockroaches, ants, scorpions, centipedes, spiders, rodents and other pests out. It will also allow you to not have to hire a pest control company to spray pesticides all around your home or in it. Along with pest proofing your house, you need to remember to keep all of your sink, tub and floor drains closed at night. This will prevent cockroaches from coming up the drains from the sewer system or septic tank. If you don't have a drain cover, you can fill a Ziploc bag with water and place it over the drain. That will keep the roaches out.

You should get some Food-grade Diatomaceous Earth (DE) and Niban Bait. You can get DE from a feed store and Niban online from [www.pestcontrolsupplies.com](http://www.pestcontrolsupplies.com). I will explain below where to put these products.

The first step is installing door sweeps on all outside doors that need them. If you can slide a piece of paper under a door, it needs a door sweep. Also add a door sweep to a door going into the garage.

Don't leave any debris laying around the house. This is a good hiding place for cockroaches, scorpions and centipedes. If you have firewood, stack it away from the house as it will attract black widows.

When you have branches touching the house or roof, it will allow acrobat ants and carpenter ants access. You should trim them back and keep them from touching the roof during the warm months. Also, you should sweep down any spider webs anywhere around the outside of the house.

It is important to seal openings around pipes as to keep roaches out. Even mice will come in an opening like this. Before you seal the hole, inject some DE into the void. This will kill any insects or spiders hiding in there and prevent anything from getting around the seal and entering your home.

When you have pipes going into a crawl space, it would be best to seal them from under the house if possible. There is usually a space between the floor and the bottom of the cabinet and if you seal it from the top, cockroaches may get in under the bottom of the cabinet. It would be a good idea to blow some DE into the void to kill anything in there.

A crawl space door should be opened and all spider webs swept away. Then the wood should be sprayed with water and then dusted with DE, to prevent future spider webs. The entire crawl space should be power dusted with DE as well if possible. This will prevent cockroaches, silverfish, ants, spiders and other pests from living under the house and possibly entering the living area around pipes or other areas. Any crawl space vents around the house that are broken, need to be repaired. This is easy access for rodents and many other pests.

When you get to the garage, you will probably find that the door doesn't close tightly and never will. There are almost always small areas at either side of the door when any insect or rodent can get in. As mentioned earlier, make sure there are door sweeps on the door entering the house. Put Niban Bait in any areas behind storage or shelves where roaches can hide. Niban will last three or four months, so you only need to apply it a couple of times a year. Niban is made from boric acid and is perfectly safe.

This procedure will keep most crawling insects and other arthropods out of your house. Keep anything

that pests can hide in or under away from your house and don't leave outside lights on any longer than necessary as they attract insects. You still may get yellowjackets, wasps, or other pests outside that will require the help of a pest management professional. Check your home every few months to make sure all of the work you did is still in place and effective.

## **Beneficial Insects and other Arthropods**

There are numerous beneficial organisms in every yard and this is the main reason, plus your safety, for not using synthetic pesticides. They can be beneficial in different ways. Some are pollinators and we certainly need them. Others feed on decaying or dead plant or animal matter and they are important as well. The most important for a gardener are the predators who feed on plant pests.

Spiders, predatory mites and centipedes feed on numerous pests. It is hard to think of a centipede as beneficial, but the soil centipedes (Geophilomorpha) and stone centipedes (Lithobiomorpha) are very small centipedes that could not hurt a human or pet, but feed on numerous insects in a yard and many pest insects.

Some beneficial insects include praying mantids (Mantidae), which prey on a lot of insects and even kill and eat black widow spiders.

Ladybird beetles (Coccinellidae), AKA ladybugs, are a major predator of aphids and other small pests. Ground beetles (Carabidae) are large, black beetle that feed on grubs and insect pupae. Many soft-winged flower beetles (Melyridae) are predators on pest species. Rove beetles (Staphylinidae) feed on grubs, insect pupae and root maggots, and in some cases, aphids. There are other beetles that are beneficial. Recently someone sent me a bunch of beetles he had “infesting” his desert willow. It turned out the beetles were soft-winged flower beetles in the genus *Trichochrous* and they were doing good work on the tree helping control real pests. If in doubt about a bug, get it identified, so you don't kill something that is a good bug.

The hover fly (Syrphidae) feeds on nectar in the adult stage, but in some species, the larval stage is a predator of aphids. Some true bugs (Hemiptera) are beneficial, such as assassin bugs (Reduviidae), which hide under leaves and ambush caterpillars. Minute pirate bugs (Anthocoridae) are very small and prey on thrips and other small pests. Some seed bugs (Lygaeidae) are beneficial. The big-eyed bugs (*Geocoris* spp.) will prey on tarnished plant bugs and chinch bugs. Lacewings (Planipennia) are predators of aphids, thrips, spider mites, leafhoppers and other small pests. There are many species of parasitic wasps (Hymenoptera), most quite small, that will parasitize many pest insects and offer good control. There are many beneficial arthropods in our yards and we should try to protect them from pesticides

## **Weed Control**

Here are two recipes for controlling weeds in your yard so you don't have to use dangerous herbicides.

Mix a solution of 80% table vinegar and 20% rubbing alcohol and a dash of dish soap and spray weeds in cracks or along fences. Or you can mix ½ gallon of Apple Cider Vinegar with ¼ cup of salt and a teaspoon of liquid dish soap. This mixture will kill dandelions and other weeds. The soap removes the protective oils from the weeds so the vinegar can work. These recipes are for weeds only, so be careful as they will damage plants you want. You can also use Avenger which is a natural commercial product.

Never use Roundup around schools or commercial buildings as it is not safe at all. Here is some

information Roundup everyone should be aware of. This is a study published in *Entropy* **2013**, *15*, 1416-1463; doi:10.3390/e15041416, which is a peer-reviewed journal that exposes the health hazards of Roundup. The conclusion, below, says it all:

<http://www.mdpi.com/1099-4300/15/4/1416>

#### 14. Conclusion

This paper presents an exhaustive review of the toxic effects of the herbicide, glyphosate, the active ingredient in Roundup®, in humans, and demonstrates how glyphosate's adverse effects on the gut microbiota, in conjunction with its established ability to inhibit the activity of cytochrome P450 enzymes, and its likely impairment of sulfate transport, can remarkably explain a great number of the diseases and conditions that are prevalent in the modern industrialized world. Its effects are insidious, because the long-term effects are often not immediately apparent. The pathologies to which glyphosate could plausibly contribute, through its known biosemiotic effects, include inflammatory bowel disease, obesity, depression, ADHD, autism, Alzheimer's disease, Parkinson's disease, ALS, multiple sclerosis, cancer, cachexia, infertility, and developmental malformations. Glyphosate works synergistically with other factors, such as insufficient sun exposure, dietary deficiencies in critical nutrients such as sulfur and zinc, and synergistic exposure to other xenobiotics whose detoxification is impaired by glyphosate. Given the known toxic effects of glyphosate reviewed here and the plausibility that they are negatively impacting health worldwide, it is imperative for more independent research to take place to validate the ideas presented here, and to take immediate action, if they are verified, to drastically curtail the use of glyphosate in agriculture. Glyphosate is likely to be pervasive in our food supply, and, contrary to being essentially nontoxic, it may in fact be the most biologically disruptive chemical in our environment.

## VERTEBRATES

### Mice (Rodentia - Muscidae)

The deer mouse is one of the most common rodent species found throughout most of the United States. They are 4" - 9" long, are reddish-brown in color with a white chest, white feet, and a bi-colored tail: brown on top and white on bottom. Their natural habitat is in rural and semi-rural areas, where they inhabit fields, pastures, and various types of vegetation found around homes and outbuildings. This mouse commonly invades garages, attics, sheds, wood piles, crawl spaces, as well as general living quarters of homes.

Mice can enter 1/4" openings - or they can be carried inside. They may get in through broken windows, poorly screened attic and foundation vents, openings through any walls created by cable, oil, propane, electric, gas, water and/or sewage services, and through any other openings or cracks or crevices in foundations, walls or roofs. They can also chew holes directly through siding and/or window or door frames.

While house mice (*Mus musculus*) aren't linked to Hantavirus, they are very prolific and very unpleasant to have infesting your home. Under optimum conditions, house mice breed year round. Out-of-doors, house mice may tend toward seasonal breeding, peaking in the spring and fall. Females may produce as many as ten litters (about 50 young) in a year. At very high densities, however, reproduction may nearly cease despite the presence of excess food and cover.

Although mice primarily are active at night, some day activity occurs. Movements of house mice are largely determined by temperature, food, and hiding places.

Mice are very curious and tend to travel over and explore and re-explore their entire territory daily, investigating each change or new object that may be placed there. They are very aggressive. They show no fear of new objects. They dart from place to place, covering the same route over and over again. This behavior can be used to advantage in control programs. Disturbing the environment at the beginning of a control program by moving boxes, shelves, pallets, and other objects can improve the effectiveness of traps, glue boards, and bait. Mice will investigate the changed territory thoroughly. This is why (live catch) traps work so well.

House mice prefer cereals over other items, although they will feed on a wide variety of foods. Mice sometimes search for foods high in fat and protein, such as lard, butter, nuts, bacon, and meat. Sweets, including chocolate, are taken at times. Mice get much of their water from moisture in their food, but they will drink if water is readily available. Mice in buildings catch and eat flies, spiders, centipedes, cockroaches, beetles, millipedes and other arthropods. Outdoors house mice consume a wide variety of weed seeds, grass seeds, various grains and vegetation. In addition they consume many insects and other invertebrates, e.g., slugs, spiders and centipedes. When caught in a live trap, mice trapped later may eat the first, weaker captive(s).

Here are some recommendations for managing mice in your home or business. Keep rodents out of garages, sheds or barns by keeping access to water, food and nesting materials and harborage areas away from them, especially within 100 feet of your occupied buildings. Repair all holes in buildings that would allow rodents entry. Open doors and windows before cleaning areas where rodents have been living. If possible, run an electric fan for at least half an hour to clear out dust. Leave the areas while the fan is on. Disinfect sites where you have seen rodents or their droppings. General-purpose disinfectants will kill the virus. A mixture of three tablespoons of household bleach in a gallon of water can also be used. Spray the area and mop, rather than sweeping or vacuuming. The wetter the area, the better because dampness will keep the dust down. Remember that the territory of mice rarely extends further than 30 feet from the nest, and more often is about 10 feet. If mice are sighted throughout a building, it means that there are numerous discrete locations where you will have to set traps. When using live traps, oatmeal is a very effective bait. On snap traps, a piece of Slim Jim is almost irresistible to mice. It is much more effective than cheese or peanut butter. When you find a mouse in a snap trap, spray it with a disinfectant and put it in a plastic bag before disposing of it.

Never use rodenticides, particularly in schools, for several reasons. First, if a mouse dies where you can't find it you will have an odor problem. Also if the mouse (particularly deer mice) have ectoparasites such as fleas or mites, they will leave the dead carcass and may attack the human occupants of the house. Mice should always be controlled with snap or live traps. If you have a crawl space under your house, you should have it mouse-proofed. Trapping with snap traps or live traps will work for rats as well. Basically the control methods are similar with both animals.

If you live in an area where mice or other rodents like to get under the hood of your vehicle and chew on the wires, then you should read this. The best way (and only way I am aware of) to keep them from under the hood, is to get some cotton balls, soak them in peppermint essential oil, place them in little paper cups and put them in various places under the hood, especially around wiring. Rodents will not go under the hood of a vehicle that smells like peppermint. Much better than rodenticides or traps which rarely work at all in this situation.

## PESTICIDES

*“The EPA's Science Advisory Board concluded in 1990 that, when compared with dozens of other risks, pesticides presented one of the country's more widespread and severe environmental problems.”*

The pesticide industry defends the use of pesticides because pests in the United States kill 100 – 300 people annually. They claim people need to be protected from these hideous pests. There are over 325,000 certified commercial pest control applicators in the United States using pesticides. It is the National Academy of Science's estimate that pesticide poisoning causes over 10,000 cancer deaths every year and creates over 20,000 cancer cases. These figures don't include neurological damage, heart disease, lung damage, birth defects, miscarriages and other chronic exposure deaths.

A nationwide report has found that pesticide use in or near U.S. schools have sickened more than 2,500 children and school employees over a five-year period. The pesticide poisoning has resulted from pesticides being sprayed in schools or on nearby properties, and includes both insecticides and herbicides. Two recent studies have shown that children exposed to pesticides at home or in school are more likely to develop leukemia or lymphoma than children that aren't exposed and that pregnant women exposed to certain pesticides are more likely to have autistic children. Here are the two links:

<http://www.cnn.com/2015/09/14/health/pesticide-exposure-childhood-cancer/index.html>

[http://thechart.blogs.cnn.com/2014/06/24/pesticide-exposure-during-pregnancy-may-increase-autism-risk/?hpt=hp\\_t2](http://thechart.blogs.cnn.com/2014/06/24/pesticide-exposure-during-pregnancy-may-increase-autism-risk/?hpt=hp_t2)

Also, according to an article in *Epidemiology*: 12 (1):20-26, January, 2001, one of the largest studies of pesticides has found that pesticide use around the home can more than double the chance of a child developing neuroblastoma, which is a condition that accounts for about 10% of all childhood tumors. This is a very serious cancer as approximately 60% of children over age 1 who develop neuroblastoma do not live 3 years even when receiving radiation and chemotherapy treatments.

Why are children at more of a risk than adults? There are many reasons. Children put their toys and other objects in their mouth and they often crawl on the ground and come in contact with pesticides. Children often wear fewer clothes resulting in dermal poisoning by many toxicants. Children breathe differently than adults. A one-year old child will breath 50% more air each minute relative to their body weight than adults do. This, of course, gives them the opportunity to inhale more pesticides. Children will pick up pesticides at home, at school, from their food and from being around pets who have been treated for fleas or ticks. If they live in an agricultural community where pesticides are heavily used, children are in even greater danger.

Pesticides are a mixture of chemicals used to kill, repel or otherwise control various pests, including insects, mites, rodents, birds, fish, weeds, fungi and other perceived pests. Pesticides are comprised of a number of different compounds, including the “active ingredient” and “inert ingredients” as well as other contaminants and possible pollutants.

Active ingredients are the only components of the pesticide listed on the label. These are the chemicals that kill and repel the pests. Active ingredients also contain synergists, such as piperonyl butoxide (PBO) to help the pesticide work more effectively. Piperonyl butoxide, a very commonly used synergist, can be toxic to the liver and is a possible human carcinogen. Pesticides that contain

pyrethrin and pyrethroids are pesticide products that most often use piperonyl butoxide.

The inert ingredients are the carrier or sticking agent in the pesticide and may include solvents, stabilizers, surfactants, preservatives, sticking agents, spreading agents or defoamers, depending on the need of the product. Some inert ingredients are more toxic than the active ingredient in the product and often make up the largest percentage of ingredients in a pesticide product.

The *Federal Insecticide, Fungicide and rodenticide Act* (FIFRA) only requires manufacturers to list the active ingredients on the label. They allow the “inert” ingredients to be a trade secret leaving the consumer and the applicator unaware of the possible danger they are exposed to. Many inert ingredients are considered to be “hazardous pollutants”, “extremely hazardous”, “suspected carcinogens” and “occupational hazards.”

Contaminants and other pollutants are byproducts of the manufacturing process and they can often contribute to a pesticide’s toxicity.

The suffix –cide, literally means to kill. Pesticide, suicide, homicide, genocide all have one thing in common - death. Are there any safe pesticides? Emphatically, no there are not. Can pesticides be used safely? Yes they can if they are used by people who are knowledgeable about the pesticide they are using and if they use the product carefully and if they have respect for the environment where the pesticide is going to be placed. Unfortunately, more often than not, the respect portion of the equation is lacking.

Children, the elderly, pregnant women, and those who have allergies, asthma, chemical sensitivities or other immune, respiratory, or neurological impairments are especially vulnerable to the toxic effects of pesticides.

How are pesticides introduced into the body? There are three main points of entry. Inhalation of the fumes of some pesticides is very common and can severely compromise a respiratory system. Pesticides are commonly absorbed by the skin (dermally) and occasionally ingested (orally). In the latter, it is often children who swallow pesticides carelessly left out in the open. Pets will frequently ingest rodenticides carelessly used by a pest control operator or a homeowner.

There can be no doubt that pesticides, including herbicides are associated with a number of public health risks. There are about 110,000 non-fatal human pesticide poisonings each year in the United States. In addition, pesticides have been linked with such human diseases as breast cancer, and extensive exposure can have adverse respiratory and reproductive problems, including asthma and sterility. Other problems can include blurred vision, dermatitis, reduced heart rate and even coma and death. Do all pesticides cause these problems? In fact, the Environmental Protection Agency has identified more than 90 pesticides as possible or suspected carcinogens (cancer causers). For farm workers who are exposed to pesticides more often than most other people, the problems can be severe. They have been diagnosed with excessive rates of certain kinds of cancer, including cancer of the stomach, cancer of the testes, prostate cancer and brain cancer. Female farm workers have an increased rate of cervical cancer.



## Safe Products

Here is a list of some products you find around the house or that you can easily purchase that will help you manage your pest problems. There are many others, but these may be the easiest to find and use.

### Aspartame

Aspartame is the ingredient in Equal and NutraSweet, two artificial sweeteners. I am not sure I would consider this material safe, but we ingest it regularly if we use artificial sweeteners. In the 1970s the FDA refused to approve aspartame for human consumption due to studies linking it to brain tumors and neurological disorders. Some politicians pulled some strings and it was approved by the FDA. You can mix a couple of packets of Equal in a glass of fruit juice to control yellowjackets.

### Baking Soda

Baking soda or sodium bicarbonate is a mined alkaline mineral. When it is eaten by insects it releases carbon dioxide bubbles that are fatal. A paste made from baking soda will also give quick relief to an insect sting. You can sprinkle baking soda around your home inside and out and around pet food dishes. It will repel ants and roaches. If your dog gets sprayed by a skunk, you can bathe him/her in a tub of warm water with a cup of lemon juice and a box of baking soda with a ½ cup of shampoo. That should neutralize the odor

### Beer

Believe it or not, beer is very effective at controlling some pests. If you soak a rag in beer and put it in the middle of your garage floor at night, it will be covered in drunken cockroaches the next morning waiting for you to dispatch them. If you put some saucers of beer out in your yard you will attract snails and slugs who will get drunk and die in the brew. Don't use beer in schools.

### Borax / Boric Acid

Borax is a combination of sodium, boron and oxygen and is mined from the soil. Boric acid is a crystalline material made from borax. 20 Mule Team Borax is very effective in controlling a wide variety of insects.

Boric acid is a powder that removes the waxy coating on the exterior of the insect's body when they crawl over it. The waxy coating is used to retain water and without it the insect quickly dies from dehydration. When mixed in baits it can control ants, cockroaches and some other insects. The insects also ingest the material while grooming and subsequently die. Boric acid will remain effective indefinitely in a dry environment. Boric acid can be mixed with any food the roaches or ants are eating including peanut butter, jelly, sugar, syrup or honey. You can mix it in ground hamburger meat to control wasps.

While boric acid doesn't cause cancer, birth defects, allergies or other ailments that pesticide can cause, it should not be taken internally as it is toxic if eaten. Keep any baits you make out of the reach of children and pets.

### Catnip

Catnip will not only repel insects such as cockroaches, ants, mosquitoes others, but it will prevent rabbits, deer and squirrels from eating plants sprayed with it.

### Diatomaceous Earth

I frequently recommend using diatomaceous earth (DE) for controlling a variety of pests. If you use this product, be sure it is food-grade quality. Diatomaceous earth is mined from the fossilized silica shell remains of microscopic diatoms. Diatoms are animals that are related to crustaceans of today. They produced shells that are now ground up and used as a powder or dust for insect control. Diatomaceous earth absorbs the waxy layer on the surface of insect skins, causing the insect to desiccate (dry out). Diatomaceous earth also effectively controls slugs and snails.

This least-toxic insecticide is considered harmless to humans and is used in stored grains. Mix  $\frac{1}{4}$  cup of food-grade DE in a gallon of vinegar and spray pests with the mix or pour into ant mounds as a drench. You can make a very good pest barrier by applying Tanglefoot or petroleum jelly to the area, e.g., trunks of trees, and then lightly dusting the adhesive with food-grade DE. Do not buy or use DE sold for swimming pool filters. This form is not effective as an insecticide and, when inhaled, can cause silicosis, a deadly lung disease. Diatomaceous earth is abrasive to lung and eyes - so use proper personal protection when using this product.

### **Garlic Oil**

Garlic is very effective in killing and repelling insects. Simmer about a dozen finely chopped cloves of garlic in cooking oil for about an hour, cool, strain it and spray your plants. It will work on many plant pests including whiteflies, thrips, spider mites, grasshoppers, leafhoppers and aphids.

### **Rosemary**

Powdered Rosemary leaves are used as a flea and tick repellent. Simply dust the powder onto the pet or areas where the pet sleeps. Rosemary oil will control lice

### **Salt**

Salt will kill any vegetation and is a good herbicide for killing weeds in a sidewalk, along a fence or similar areas. Salt mixed with water will also kill snails and slugs. Salt will kill many insects and can be used in crawl spaces or other areas to deter termites and cockroaches.

### **Soap**

Soaps can effectively kill insects because of fatty acids in the product that destroy cellular membranes in the bugs. It also produces a coating on the insect that prevents it from breathing through its spiracles. An effective soap spray consists of 40% water, 40% alcohol and 20% dish soap. You can mix 1 cup cooking oil with 1 tablespoon non-detergent liquid soap as an insecticide. Use 1 tablespoon of this mix to each cup of water and you can control aphids, scales, mealybugs and spider mites. It will kill the eggs as well as the adults of these pests. Do not use it if the temperature is over 85 degrees F. as it may damage the plants. Sprinkle or spray Tide laundry soap around the foundation of your home to keep ants out.

### **Sugar**

Sugar is a very popular insect attractant that can be used to control many insects if mixed properly with other ingredients. You can catch wasps and yellowjackets by cutting the top off a 2 litre plastic bottle, invert it inside the bottle to make a funnel and put two or three inches of sugar water mixed with a few drops of soap in the bottle. A good ant bait can be made by soaking paper towels with 2 tablespoons of boric acid, 2 tablespoons of sugar and a cup of water. You can put the paper towels in jars with several holes punched in the lid.

## **Vinegar**

White vinegar is effective against ants. Vinegar, particularly apple cider vinegar will attract and catch fruit flies, fungus gnats and wasps. You can mix 3 parts vinegar with 1 part dishwashing soap to kill weeds. If you have cats wandering in your yard to go potty, you can spray the ground with white vinegar to repel them.

## **Green Bug All Natural Pest Control Products**

There is a very good commercial product available made from cedar. It is very effective. There are several brands out but the one I wholeheartedly recommend is Greenbug. It has several formulations including one for outdoor use, one for indoor use and one for use on people and pets. These are very good products and they are available at [www.greenbugallnatural.com](http://www.greenbugallnatural.com).

## **Essential Oils**

It is possible to repel and control pests using certain essential oils. This is much safer than using standard, synthetic pesticides. You do have to be careful with essential oils as some people have a reaction to them if it is applied to their skin as a repellent. You do not want to use essential oils on any of your pets as they can have bad reactions as well. If you are going to use the oils as an insect repellent on your body, just add a few drops (5 to 10 drops) to an ounce or two of extra virgin coconut oil, jojoba oil, almond oil, sesame oil or avocado oil. You can make a good tick repellent by adding lemongrass oil to water, mix it well and apply the mixture to clothing in unnoticeable areas, such as the inside of the pants legs and socks.

Here are a few essential oils that are good insect repellents: Cedarwood, Eucalyptus, Lavender, Lemongrass, Peppermint, Rosemary, Sage and Spearmint.

When using essential oils, one way to apply them is to use a pistol-grip squirt bottle. Mix a few drops of the oil with some water, shake it up, and start spraying the pests. If you are treating for ants wipe out kitchen cabinets with a damp sponge and 6-8 drops peppermint essential oil. Then place 3-5 drops of the oil on windowsills, doorway cracks, and in the corners of the cabinets under your kitchen sink.

Centipedes, cockroaches, booklice, earwigs, and silverfish can be controlled by placing several drops of peppermint or eucalyptus essential oil in areas that collect moisture, such as damp basements, garages, and cabinets that house plumbing fixtures.

For mice place several sprigs of fresh peppermint between pantry items in your cabinets, or make a solution of 2 cups water and 3 teaspoons of peppermint essential oil and spray wherever you find mouse droppings. You can also soak some cotton balls in peppermint essential oils and place in areas where you don't want mice, inside or outside. If you are getting rodents under the hood of your car and they are chewing on the wires, you can soak some cotton balls in peppermint essential oil, place them in small, paper cups and put them under the hood. It will repel the rodents and keep them out of that area. Remove them when you drive.

## HOW TO PICK A SAFE & EFFECTIVE PEST CONTROL COMPANY

The problem with the pesticide industry is that a large number of pest control operators (PCOs) are poorly trained and not well regulated. Many of them are not familiar with the label or Material Safety Data Sheet (MSDS) of the chemical they are applying.

If a PCO tells you the pesticide he is spraying is perfectly “safe”, you may have a problem. It would be a federal violation to make that kind of statement. If he says it is so safe you can drink it, offer him a glass! If the PCO is spraying your baseboards with a pesticide, it means he doesn't know what he is doing and you need to be concerned. If you see a pest control truck on the street and it has hand sprayers and other small equipment loose in the back so anyone can grab it, stay away from that company. If they haven't got enough sense to lock up their equipment, they are in the wrong business.

I got a letter with some bugs in it from a lady in Alto, NM. She said she had the local exterminator out four times at a cost of over \$1000 to control them and she still had them. He said they were the larvae of some sort of flying beetle. The specimens she sent were actually duff millipedes, a completely harmless little millipede that will shortly die of dehydration once it enters the home. No pesticides were necessary to control it. In fact this fellow tried every pesticide in his truck and failed to control it because he didn't know what it was. The only thing he succeeded in eradicating was the lady's bank account.

There was another instance where one of the major companies treated a home several times for carpet beetles, without success. Actually they mistook duff millipedes for carpet beetle larvae. The misidentification of pests is common in this industry and the results can be devastating in the money spent and the pesticides incorrectly used.

Then there was the fellow who went out to a house and identified the pest as fleas and did a flea job, which consisted of spraying the carpets and furniture and fogging the house. He did it three times and was unsuccessful each time in controlling the bugs. The customer called another company who properly identified the pests as harmless springtails that did not need control. Fortunately, the owners of this house were attorneys and they sued the first guy out of business.

During the outbreak of false chinch bugs in New Mexico a couple of years ago, the pest control companies' phones were ringing off the hook. One lady called one of the largest pest control companies in the country. A salesman went out, identified the pest as Johnson beetles feeding on her Johnson grass and wanted \$450 to control them. She called me to confirm the diagnosis. Of course it was wrong as there is no such thing as Johnson beetles and very few people have Johnson grass growing in their yard. She had false chinch bugs which required no control at all.

There was the case of a pest control company spraying a home for carpenter ants several times because he said he found carpenter ant poop on the floor. The “poop” didn't go away with the spray. Actually they were very small beetles that feed on mold and were present because the homeowner had a plumbing leak that caused some mold. The exterminator couldn't tell a beetle from ant poop.

In another case, a woman called because she had weird worms in her house, particularly on the kitchen floor. The pest control operator came out, identified them as boll weevils, said they would get in the closet and eat her clothes, so she needed the whole house fumigated. The lady was skeptical and got

another opinion. It turns out they were blow fly maggots falling from the ceiling where a dead animal was being consumed. Now the question is; is the PCO a crook scamming this lady or was he just so stupid and uninformed that he really believed his diagnosis? In either case, that is scary.

In a similar case a man was told he had codling moths in his clothes closet. Since codling moths only eat apples, that would only be possible if he had an apple tree in the closet. The customer was smarter than the PCO and didn't let him treat the house.

There was a pest control company power spraying around a school in Chama, NM, when children were standing close by waiting for a bus. One kid got sick and passed out and was rushed to a hospital. He survived, but the company was correctly sued. This company is still in business and has their office in Santa Fe.

Of course who can forget the fellow who just finished up a termite job and had a little bit of the termiticide left in his tank. He offered to spray the family's cat and dog for fleas with the leftover chemicals and wouldn't even charge them.

A lot of the horror stories that I related to you have one thing in common; the inability of the pest control person to properly identify the pests. Many of them use the Spray and Pray method. That is if you spray enough pesticides and pray it kills something, you won't get a callback from the customer.

Never let a company use rodenticides to control mice. The reasons are clear in my book, P (or G). In the majority of cases, you can control your own mice using snap traps or Tin Cats. Rodenticides can kill non-target animals, including pets and if a rodent with a disease such as hantavirus dies and you can't retrieve the body, it can create a health hazard. Don't let them use glue boards either as a mouse will urinate and defecate for hours before it dies and that is how hantavirus is spread.

### **How to Pick a Pest Company (Household Pests)**

I have said many times that most people can control their own pests without using pesticides or a pest control company. Most of this information is available in this book. Of course there are many people who prefer to hire someone for this and that is fine.

Just be careful and get several companies to give you a proposal. First, make sure they can properly identify the pest you have when they inspect your home. If they are true professionals, they will know the scientific name of the pest and give it to you so you can Google it for more information. If the representative that comes to your home or business doesn't recognize your pest and offers to treat your home anyway, do not let him. If they offer to take the bug back to their office for identification, that is fine.

A professional pest management specialist will inspect your home or business, identify any pests and offer to treat the infested areas safely and effectively. Most companies want to make regularly scheduled visits to your home. That is okay as long as they just don't spray pesticides inside your home and call it pest control. It is, in reality, pesticide pollution. They should come to your house periodically and inspect your home or business for pests, for conditions conducive to pests and for possible entrance ways for pests to come into your home. If you have a crawl space under your home, they should go under your house and look for leaks or areas where pests can get into the main portion of your home. They should carefully inspect around the outside and look for wasp nests or other potentially dangerous pests near your home or business. They should even check any spider webs attached to your home to see if swarming termites are in the web. Pesticides should only be applied if

there is a pest present that requires it. In the winter, they can inspect your house as they normally do and then also offer suggestions on how to pest-proof your home or business. Maybe install door sweeps, fix holes around plumbing and even trim branches from trees that are touching your home. This is IPM (Intelligent Pest Management).

Many companies and certainly all the larger ones have a clause in their contract that prohibits you from suing them. The clause reads something like this: *“Any dispute arising out of or relating to this agreement or the services performed under this agreement or tort based on claims for personal or bodily injury or damage to real or personal property shall be finally resolved by arbitration administered under the commercial arbitration rules of the American Arbitration Association.”* In 1995, the U. S. Supreme Court established that mandatory arbitration clauses could be used in contracts between companies and consumers. Since that time, the clause has been widely used by the pest control industry. One of the problems, and there are several, is that it is not free. It could cost the consumer up to \$2,000 up front in order to start the arbitration process. Very few people have that kind of cash lying around. If you are asked to sign a contract with a pest control firm, look for that clause. If it is present, you can cross it out and ask the company representative to initial it. If they refuse, don't sign the contract. There are plenty of pest control operators who do not require contracts to conduct their business.

The true professionals will only use crack and crevice materials in a building, or baits like Niban which works very well. They will treat around the outside using a pin-stream application so they can get the pesticide in cracks and crevices where potential pests hide. They will put Niban bait in water meters as they always have roaches. They will check spider webs they see for signs of swarming termites. In the winter, when there is no pest activity, they will inspect the house and offer to seal any cracks in the foundation, repair any vents, cut back any tree branches touching the roof and other things that can help prevent bugs from entering the house when spring comes around. This makes far more sense than spraying pesticides when the ground is frozen! Some so-called professionals will say Niban doesn't work. Actually it works very well, but since it is made from boric acid and available to the public, they don't want to use it as they think the customer may decide to do it themselves.

A true professional will post a pest control notification if they are going to treat any commercial account with synthetic pesticides, whether it is required or not. They will want to let the public know what they may be exposed to. Many years ago when I was in Houston, I always posted notifications when I was a Truly Nolen manager and it worked great. We had a lot of people call and ask for our service. There is nothing wrong with pesticide notification if you are using a legal product safely and according to the label.

If you do hire a company, ask them to give you a copy of the label and the MSDS of any pesticides they use. Read the label carefully. A professional will wear the proper gear as required by the label when applying pesticides.

## **How to Pick a Termite Company**

The first part of termite control is hiring a competent wood destroying insect inspector to see what kind of pests you may have. Proper identification of the pest is essential if control is going to be successful. They absolutely have to know exactly which species of termites are infesting your home, not just the general description of either “subterranean” or “drywood” termites. Different species have different habits, different size colonies and do varying amounts of damage. If you are going to pay a lot of money to control these pests, you should know exactly what they are. If your inspector doesn't know what they are, then hire someone else. There was a case in Albuquerque where a termite inspector

walked over drywood termite pellets while inspecting the house. He wasn't familiar with drywoods so didn't make a note of them. It was a real estate inspection, so he was liable for missing the drywoods and had to pay for the subsequent fumigation. He went out of business.

In another case, an inspector checked a home in Clovis, NM and didn't find any termites. He didn't realize there were powder post beetles in the ceiling. When the buyer went into the attic, he fell into the kitchen through the ceiling. The inspector was liable as he should have been.

### **Subterranean termites control by professionals**

If you have a home built on a slab and you have had a termite job performed recently, you may want to read this carefully and also make sure your guarantee is still available. Subterranean termites live in the soil and enter homes through the expansion joint between the foundation and the main slab or through a crack in the slab or around plumbing that penetrates the slab. Up until a couple of years ago, a termite crew would drill holes in the slab along the inside of the house and then treat the soil around the outside of the house. The purpose was to prevent termites from entering from the expansion joint or from coming up the outside of the house under the stucco. Recently, two termiticides, Termidor and Premise, have put out labels that allow the outside of the house to be treated as well as the area inside where the termites are active. They no longer have to drill the inside slab which often involves pulling carpet and drilling through tiles.

This all sounds good, right? Not so fast. All the companies I have talked to that do termite work told me that when they drill holes in sidewalks, patios and other concrete areas that are next to the home, they use a sub-slab injector to pump the termiticide into the holes. This is contrary to what the label says and the label is that law. Also it does not effectively protect your house from termites. The Termidor label says:

*Where physical obstructions, such as concrete walkways adjacent to foundation elements, prevent trenching, treatment may be made by rodding alone. When soil type and/or conditions make trenching prohibitive, rodding may be used with rod holes no more than 12 inches apart. Exterior drilling and treatment of sub-soil is necessary for concrete structures adjoining the foundation such as patios, porches and sidewalks, to complete the exterior perimeter treatment zone. For driveways, exterior drilling is necessary only around building supports or wall elements that are permanently and physically located at driveway joints. Rod holes must be spaced so as to achieve a continuous treatment zone and in no case be more than 12 inches apart.*

I think the label is pretty clear that these areas have to be rodded and the termite folks should be making holes large enough to insert their ground rods. Otherwise they aren't going to be able to get the material to the footer as the label specifies. They are basically spraying the top of the ground beneath the concrete slab. If the material would leach down to the footer there wouldn't be any reason to trench and rod, they could just spray the surface around the house.

Treating outside concrete slabs with a sub-slab injector is similar to spraying baseboards, it is for show only and doesn't really do any good. The only way to effectively treat a slab would be with a four foot ground rod inserted into the drilled holes. The purpose of getting the termiticide down to the footer is to prevent termites from coming in contact with it and then climbing up the inside of the footer and entering the home. If you only use a sub-slab injector the termites can and will crawl under the termiticide and be able to enter the home.

When you get a bid for termite control, make sure that the representative has determined the depth of the footer on your house. They cannot calibrate the amount of termiticide they will use if they don't

know that information. If they give you a bid without knowing the depth of the footer, they are using the 4 gallons per 10 linear foot formula. However that formula is for one foot of depth of footer. If the footer is 2 feet deep, then they have to use twice as much termiticide or 8 gallons per 10 linear feet. In other words, they will use the one foot depth formula no matter how deep your footer is if they don't measure it. That is contrary to the label and illegal. If you have to remind them to measure the depth of the footer, then you probably ought to call another company.

### **In Summation;**

If the termite inspector doesn't go into a crawl space and/or attic when inspecting your house, don't let them bid on the work.

If they don't make a clear and thorough graph and fail to give you a copy if they do make one, don't use them.

As mentioned earlier, if the inspector doesn't measure the depth of your footer, then call another company. They can't determine the amount of termiticide they need without that information.

And, if the inspector isn't dressed respectfully, I would recommend calling someone else as he doesn't have respect for his company, the industry or you, his client.

My email address is [askthebugman2013@gmail.com](mailto:askthebugman2013@gmail.com)

You can follow me on Twitter @askthebugman

You can Like my FB page at Ask the Bugman

I have approximately 3800 connections on LinkedIn if you want to join me

My website is [www.askthebugman.com](http://www.askthebugman.com). It gets approximately 90,000 visitors a year.

My mailing address is:

7595 Faith Rd.

Las Cruces, NM 88012

If you have any pests, household or garden, that you need identified, you can send them to me. Put them in a vial or plastic container, pack them in a bubble envelope or box and mail them to me at the address above. I do charge to identify bugs as they often have to be prepared for identification. Please include a check for \$20. Be sure to include an email address so I can contact you with the results.

## **Dasher the Fly**

I drove over 700 miles recently. There is no radio in my truck and if I sing to myself it isn't at all entertaining. Also, I can't get to be entertained by talk radio. So what do I do? Usually just daydream, but this trip I met a fly. As I was coming home on the freeway, I noticed a fly flying around the cab, landing on the steering wheel, my leg and even a couple of times, my nose, which was a bit disconcerting. I opened the window so he could get sucked out, but he went right to the center of the cab. I tried unsuccessfully to swat him. Then it occurred to me. What am I doing? Why would I want to kill this fly? Because he is fly? Because I am an "exterminator" (I hate that word)? He is just flying around waiting to get home so he can get out of the truck and do fly stuff. He isn't deliberately annoying me. If a dog barks, do I kill it? Of course not! If a snake wanders in my yard, do I kill it? No way! Why kill the fly?

Many species of animals feed on other species and that is fine. Very few animals die of old age. However, have you ever seen a lion hang an antelope's head in his den to show how brave he is? Have



you ever seen a roadrunner kill a rattlesnake and then skin it and make it into a headband for his stupid cowboy hat? No. They kill to eat or to defend themselves or their families. They don't kill for pleasure. That is a human trait because we are able to “reason.” Would a monkey or a lion or a chicken or any other species of animal swat a fly simply because it is a fly? I don't think so. We don't like flies because they are bugs and bugs are inherently evil. If you don't believe that, look at the very huge pesticide industry that spends billions of dollars polluting our planet and making people sick so we can kill a few bugs. I have slept in beds knowing bed bugs were present. They happily dined on my body while I slept. I got up and went about my business the next day while the bugs slept in, fat and happy. No harm was done, yet we have created a massive industry to “control” these so-called pests (who don't carry any diseases).

There is one thing that every species of animal on the planet, including man, has in common. We are all here to simply make a living. We are the only species that likes to take advantage of other species and torture them, hunt them, fish for them, spray pesticides for them and God only knows what else. All the other species want to live in peace and be allowed to live their lives as Mother Nature intended. We could learn from them. I learned a lot from little Dasher, the fly (named him Dasher because he likes to hang out on the dashboard). God was obviously in the truck with me that night because not only did I learn some good moral teachings from an insect, I was driving over 150 miles at night with no taillights (which I didn't know weren't working). I could have had a serious accident or a serious citation, but God was with me all the way. When I got home and opened the door, the little fly woke up and joined his buddies outside (or did whatever flies do at night). I learned more from the fly than I ever would have from some radio talk show host.

**I SINCERELY HOPE THIS BOOK IS HELPFUL**

**Richard “Bugman” Fagerlund**