THE BUGMAN'S BUG BOOK

SAFE AND EFFECTIVE

PEST MANAGEMENT

FOR

YOUR HOME AND GARDEN

Richard “Bugman” Fagerlund

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.

There is a lawn and ornamental pest management section as well In this section I will describe the habits of each bug and what they infest. Some control methods will be listed in this section as well. It will some furnish recipes for some pest management solutions. Not all the recipes are scientifically tested, but people have said they work. Scientific testing is important in some areas, but not necessarily pest management. I know that beer and masking tape work in controlling cockroaches and I am pretty sure they have not be tested in any university, but it works.

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 abound 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. Cockroaches are most active from 10 PM to 2 AM.

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

RESUME

I have been in the pest control industry since 1969 when Richard Nixon was president. That is a long time ago. I started working for King Pest Control based in Hollywood, Florida as a route man. I knew nothing about bugs at that time. I probably couldn't tell a cockroach from a caterpillar. My training lasted about 2 days and then I was on my own. I was told to go into the home and spray the baseboards with a pesticide. I was using a B & G sprayer, which is still the one most often used in the industry.

In the early years, I was in sales and service for several companies in Florida. I moved to Texas and became a branch manager for Truly Nolen at their office. We moved to New Mexico where I worked for several more companies over the years, including Orkin and Terminex. I also did pest management at the University of New Mexico for 12 years until I retired. I became a Board Certified Entomologist while on campus. That actually doesn't mean anything, as all you do is take a test and pay a fee. I did teach several graduate courses in entomology in the Dept. of Biology, even though I don't have a degree. The university appreciated the knowledge I accumulated over the years. I also wrote a few scientific papers on campus. Here are several papers I wrote, two with co-authors on campus and one with an entomologist from the University of Texas in 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. The two unpublished manuscripts are listed as references in other works, along with the notation “Available from the author.” I hope nobody wants them because I sure don't have any copies.

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Ford, Paulette L.; Fagerlund, Richard A.; Duszynski, Donald W.; Polechla, Paul J. 2004.
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 listed as a Dipterist (specialist in flies) in North America according to the Entomological Society of America.

When I retired from campus in 2006, I became a pest management consultant. I try to teach people how to do their own pest management, or how to pick a good company if they want one, which is the purpose of this book.

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 ¾ 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 Blatarria 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 ½ c. powdered sugar and ¼ c. shortening or bacon drippings. Add ½ c. onions, ½ 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. 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. The 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 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 in 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 - *Blatella 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.

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 area. 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 $1/16^{th}$ 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 mound 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.

Ghost ants (Dolichoderinae - *Tapinoma melanocephalum*)
Ghost ants are very small, have a black head and thorax and whitish abdomen and legs. They are monomorphic. They are common in Florida and Hawaii and are also found west to Texas. It is not known where they originated from, but they were described from Indonesia and have been found in many parts of the world, including Africa, Australia, New Zealand, Japan, and much of Polynesia

These ants are highly adaptable and can nest outside or in your home. They may have several sub-colonies in one structure They will nest in walls, behind cabinets, behind baseboards and in potted plants. They are very fond of greenhouses. Indoors they prefer sweet foods such as syrups, sugar and cakes. Outside they will feed on dead insects and the honeydew secretion of aphids.

Ghost ants do not swarm. They reproduce by budding as does the pharaoh ants. Budding occurs when one or more reproductive females leave a colony with several workers and find a new location to establish a home. A good bait is two tablespoons each of peanut butter and jelly or honey mixed with one teaspoon of boric acid or borax. You can put the layer of food grade diatomaceous earth on the soil of any potted plants. When you water it will mix in with the soil and remain effective.

White-footed ants (Dolichoderinae - *Technomyrmex difficilis*)
White-footed ants are small, black ants with white tarsi (end of legs). They are monomorphic. These ants are one of the hardest species to control. There are several reasons for this, but the primary reason is their reproductive habits seem to be designed to confuse people. Winged female white-footed ants only live a little over a year after starting a colony. When she passes on she is replaced by a wingless female who mates with a wingless male and who is capable of multiple matings. These wingless reproductive white-footed ants can comprise up to half the colony. In other words, they can reproduce faster than almost any other species of ants as they have so many queens laying eggs almost constantly. Because of their multiple queens constantly reproducing, come colonies can contain up to 3 million individual ants and half of these can be reproductives. The good news is that they don't bite, sting or cause any damage. They are simply a nuisance by their numbers.

These ants are embedded in central Florida and have also been found in South Carolina, Louisiana, California in this country and in Montreal, Quebec, Canada.

White-footed ants feed on the nectar of some plants and the honeydew secretion of aphids and similar insects. They will actually protect these insects from their natural predators. Outdoors white-footed ants can be found under the bark of trees or even in the old galleries of termites in wooden structures. They can also live in compost piles, leaf litter, under rocks and in outdoor furniture. They can move into homes and nest in attics, under roof shingles, in walls, and similar areas. One colony can have several branches or "satellite" colonies in or around a single home.

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.

Crazy ants (Formicinae - *Paratrechina longicornis*)
Crazy ants are black or brown, appear thin and have very long legs. They run around erratically, giving them the name. They are monomorphic. These ants are found along the coasts of California and southern Oregon in the west. They originally came from India. They live in a variety of habitats, including areas that are very dry to areas that are wet. They will nest under wood, in tree cavities, in or under any debris left on the ground for a long time and even in potted plants. They reproduce by budding rather than by swarming.

They feed on a variety of foods, including sweets and even other insects. They particularly like house flies when they can catch them. They will also feed on the honeydew secretion from aphids and scales. Baits should consist of sweets or proteins mixed with about 5% boric acid. They love garbage, so make sure garbage storage areas are as clean as possible. It will help to put food grade diatomaceous earth around the house under any bushes or shrubs. If you can find the nest, spray it with a good natural pesticide such as Greenbug for Outdoors.

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.

I had yellowjackets under the porch where I now live in Algodones. I have been feeding them chicken drumsticks and they have been eating them, even out of my hand and are not at all aggressive. I had no reason to spray poisons to try to kill the yellowjackets. The insecticides that I would have to use would be more deadly then the insects. The yellowjackets in my yard are not pests, they are guests, and that is how I treat them. Unfortunately the chicken I fed them killed them. Chicken contains small amounts of arsenic in some cases and apparently the arsenic killed them. Agencies say the arsenic level isn't high enough to be dangerous, but in my opinion the only level of arsenic that is safe is ZERO arsenic.

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.

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.

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 is has an unblurred range of vision of only abut 1½ feet. You should aim your flyswatter about 1½" behind the fly, because when houseflies take of 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 (Fannidae - *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 our 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 beeetles.

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 (Kalotermidae – *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. Tetracycline is an anti-biotic and effectively kills the protozoans in the termites digestive system and will reduce the colony or eliminate it if it isn't too large.

Western subterranean termites (*Reticulitermes hesperus*)

This is the western subterranean termite. It is found from British Colombia 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.

Formosan subterranean termites (*Coptotermes formosanus*)
Formosan termites are larger than our native subterranean termites. They were introduced from Asia on ships. They are very destructive and attack all kinds of wood and cellulose products. They will also attack living plants when moisture is not available anywhere else. They have been known to hollow a building wall in three months in Hawaii. They can also attack and become established on wooden ship hulls and in this way, be transported from port to port. Evidence of their presence are channels between pieces of wood. Passageways or dirt-colored tubes are usually built on foundations. They do not have to maintain ground contact if adequate moisture is available, so a normal subterranean treatment may not be effective. Colonies are large and contain several hundred thousand individuals.

Formosan termites are established in Hawaii and have been introduced in Texas, Louisiana and South Carolina and have had isolated cases found in California.

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.

There are several products to use when controlling termites. They are sodium borates (TimBor and BoraCare are two brand names), Tetracycline (Terramycin, Sumycin, Tetracyn, Panmycin and Duramycin are brand names) and food-grade diatomaceous earth. Colloidial silver, diluted boric acid or borax and aspartame can also be used.

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. Tetracyclines are often given to livestock to control and treat bacterial infections. You can buy tetracycline at most feed stores.

While a professional termite treatment by a reputable company is a good thing, particularly if you are buying or selling a home, it is entirely possible, in some cases, to treat your home yourself without using a pest control company or toxic pesticides. Termidor is a very good termiticide and relatively "safe" as pesticides go. It is also a General Use pesticide so can be used by anyone. Restricted Use pesticides can only be used by certified professionals. You can get Termidor online if you want to use it. It is available at www.pestcontrolsupplies.com. This method works best if you live in an area where you have arid land subterranean termites as they are not as voracious and you can eliminate them with a spot treatment. If you are dealing with any of the other species, you are probably better off using a professional. When doing it yourself, you will need to drill a couple of holes in the slab near where the infestation is. Then mix some Termidor according to the label and inject it into the holes. Then you should use some Termidor foam and foam the wall where you see the evidence. Termidor foam is also available from the same supplier. As mentioned, this method will work on arid land termites and they are common in New Mexico, parts of Arizona, Utah and Nevada and some other areas. Make sure this is the species in your home before starting this.

If you have eastern, western or desert subs, you can monitor them around your home and possibly wipe out a colony, using tetracycline. Tetracyclines are often given to livestock to control and treat bacterial infections. You can buy tetracycline at most feed stores. Termite workers have intestinal microorganisms containing protozoans in their lower digestive system and these microorganisms contain enzymes that help them digest cellulose. The Tetracycline will kill the protozoans and prevent the termites from being able to digest the cellulose which will eventually, and usually quickly, starve and kill the entire termite colony. I recommend adding boric acid or borax to the solution to make it work even faster. Here is what you need to get started. You need a shovel as you will need to dig several shallow holes (about 4 – 6 ") in the ground about a foot from your foundation. If you have rocks or mulch around the house you will have to move some of it so you can dig. If you have concrete sidewalks all around your house, you will have to dig next to them, although that may slow the termite eradication process down a little.

You will need some flat pieces of cardboard or some paper towels or even a few paper plates. I have used all three and they work well. I dilute a packet of tetracycline, mixed with three tablespoons of boric acid in a half gallon of water. I soak the paper towels / paper plates or the cardboard and then put them in the holes and cover them. Place these tetracycline bait stations around the house. Place one in each corner and one in between each corner about a foot from the foundation.

You will want to check the bait stations about 10 days after putting them in the ground. If you find over 100 worker termites and a dozen or so soldiers, it means the entire colony is involved and will soon be eliminated. This would be a good time to put fresh cardboard / paper towels soaked with tetracycline and boric acid or borax in the ground. Then check the stations bi-weekly and replace if there is activity.

If you have a crawl space under your home, place the cardboard / paper towel / paper plates bait stations in several areas under the house where it is accessible to you. Then, to prevent any termite activity in the future, you can treat along the bottom of the inside foundation wall with diatomaceous earth, borax or salt. Termites will avoid all of these products. They may live in the soil but they won't climb the foundation to get to the wooden sub-floor. Make sure you treat around any support piers as well. Then treat all the exposed wood with a sodium borate (TimBor or BoraCare). That will not only protect the sub-floor from termites but will also prevent wood-boring beetles from infesting the wood. Finally, get a power duster and blow several pounds of food-grade diatomaceous earth under the house on the bare soil. This will prevent termites from building mud tubes out of the ground and into the wood. It will also deter other insects and spiders from living in the crawl space.

If you are building a home and want to treat the soil without using pesticides, you can do it with natural products. You can apply a generous amount of food-grade diatomaceous earth on the ground before the vapor barrier is put down. Put a lot around the outside of the footing and around where the pipes will penetrate the slab. Termites will not travel through soil treated with diatomaceous earth.

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 domestic*a)
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 llive 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 it's back. The marking resembles an old-style cravat worn by clergy in the 18th 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 in 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. Anotherr 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 (Lycoside - *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 if 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 anasplasmosis 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 erhlichiosis and canine babesia. It has recently been identified as a reservoir for Rocky Mountain spotted fever in the southwest.

PEST-PROOFING A HOUSE

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. 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.

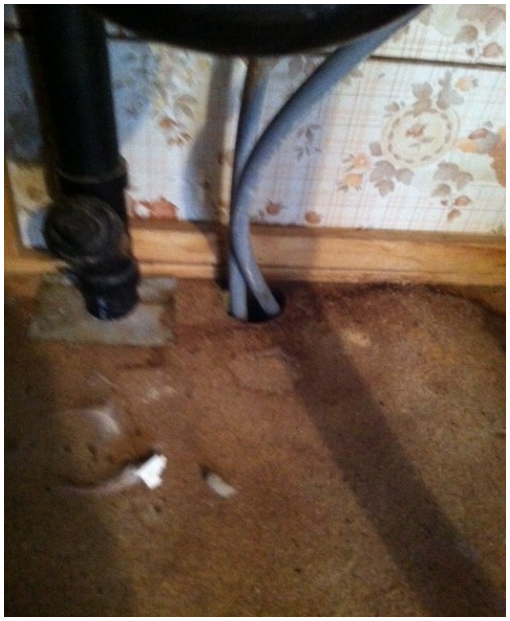
Don't leave any debris laying around the house. This is a good hiding place for cockroaches, scorpions and centipedes. If you have firewood, stack it away from the house as it will attract black widows.

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 a good idea to seal the edges of these vents so ants can't enter

It is important to seal openings around pipes as this one 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.

The area around the drain pipe should be dusted with DE and sealed. This is an easy access for ants to get on the roof and enter the home.

Attic vents should be completely screened as this one is. If there are any openings, rodents, bats, wasps and other unwelcome pests could come in and infest the attic.

The area between the fence and the wall of the house should be sealed on both sides to prevent pests from nesting in the void. Diatomaceous earth should be injected into the void to eliminate 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.

LAWN & ORNAMENTAL PEST MANAGEMENT

Control & Pest Prevention

You can prevent pests in some cases by treating the soil around your garden plants with food-grade diatomaceous earth, ground pepper, talcum powder, Comet Cleanser or Tide laundry soap. Very few insects will crawl through any of those materials.

It is helpful to monitor your plants to see what pests may be present. If you have a night light in the area, that may attract some potential pest beetles and moths, which you might otherwise not know of their presence to they do damage. You can also put yellow sticky traps in various parts of your yards. They will attract various pest insects. I have had good luck using bright yellow, stiff paper and coating it with petroleum jelly. A white bucket filled with water and a cup of liquid soap to destroy the surface tension will also attract some pests and they will drown in the bucket.

Spraying infested plants with a mixture of half water and half isopropyl alcohol, mixed with a dash of dishsoap will also kill many insect pests. Make sure to test this product, and others mentioned, on some leaves of any plants that may be sensitive, so they aren't negatively affected.

It is also a good idea to put pieces of flat boards, about a foot by two feet, on the ground in various places in your garden. Many pests will use these boards to hide and you can find them in the morning and dispose of them.

Here are some other recipes you may want to try. Some of them are recommended for certain pests listed below.

A) If you have mites, try mixing 4 tablespoons of buttermilk with a cup of all-purpose flour and a gallon of water. This mixture will suffocate the mites.

B) Crush 3 oz. of garlic cloves and mix with 1 oz. of mineral oil. Let this mixture stand overnight, then strain. Mix 1 teaspoon of fish oil and one tablespoon of castile soap with a quart of water. Slowly combine the garlic mix with the fish oil mix. Then mix two tablespoons of this mixture with a pint of water in a sprayer. This is also effective on mites.

C) For most insects, you can mix ½ cup of Tabasco sauce with one onion and a half dozen cloves of garlic in a blender with 2 cups of water. Blend the material and let it stand for 24 hours. Then add two more cups of water and a tablespoon of liquid dishwashing soap.

D) It may be easier to mix one tablespoon of a mild dish soap plus one teaspoon of a vegetable cooking oil with one quart of water. This can be sprayed on all plants. Remember to spray both the top and the underside of the leaves.

You can mix 1 cup of flour with ½ cup of salt for caterpillars. Make sure you mist the plants before applying the flour/salt powder.

Some of these remedies are mentioned in the text on certain species, but most of them can be used on all pests, unless otherwise noted.

The PESTS

The list of pests below certainly doesn't include all known garden/lawn pests. I tried to include the ones the homeowner will most likely encounter in their garden. There are certainly some that may show up that aren't on this list. If so, I would recommend treatment methods that would be the same for closely related species.

Mollusks

Snails (Helicidae) & Slugs (Limacidae)

Snails and slugs are terrestrial mollusks. Snails have shells while slugs do not. There are a great many species, but only a few are pests in gardens. They will feed on a wide variety of plants and are most active at night or after rains. They often leave large, jagged holes in the leaves of plants they are feeding on.

The best method of control is to put DE under and around all plants you want to protect as they will not crawl over it. You can also trap them with small pans of beer in the yard. The good news is the beer will also attract and kill any cockroaches in the yard. Never use a commercial snail bait that contains methaldehyde as this is very dangerous to dogs.

Crustaceans

Sowbugs (Porcellionidae) & Pillbugs (Armadillidiidae)
Sowbugs and pillbugs, which are also called woodlice, are crustaceans, not insects. They require a lot of moisture where they live. Sowbugs (*Porcellio laevis*) & Pillbugs (*Armadillium vulgare*) are actually beneficial as they are excellent decomposers. Pillbugs can roll up into a ball when threatened. My son use to call them baseballbugs. Sowbugs cannot roll up into a ball.

They aren't major pests, but will damage bean sprouts. They can be kept away from plants by putting DE on the ground around the base of the plants.

Insects

Springtails (Collembola)

Springtails are very small, wingless insects Some are brown or gray, while other are brightly colored. They have a structure (furcula) on their underside that enables them to jump when suddenly straightened out.

Springtails are probably the most abundant non-social insect on the planet. There are approximately 650 species in the United States alone and they are found in both the Arctic and Antarctic.They can be very common in damp, organic soil where they feed on fungus. Large numbers in any area will show that the soil is healthy. They rarely cause any damage to plants, but will occasionally feed on young shoots. One species, the garden springtail (*Bourletiella hortensis*), is a potential pest in some situations including in houseplants.

Contrary to what some people believe, springtails are not capable of infesting human beings. This is a myth that is often found on the internet.

You can control them by mixing DE with the soil they are in. In houseplants it would be a good idea to dry the soil out to eliminate any mold or fungi that they may be feeding on.

Grasshoppers & Crickets (Orthoptera)

Grasshoppers are primitive insects with a gradual metamorphosis. They lay eggs, which hatch into nymphs. The nymphs molt several times until adulthood is reached and they can reproduce.They vary in size and have enlarged hind legs that enables them to jump.

Grasshoppers (Acrididae)
Grasshoppers are very common and there are numerous species, many of which will get into gardens and feast. They are most troublesome in semiarid areas as they are attracted to the watering of gardens and lawns. They are very common from Montana to Minnesota and south to New Mexico and Texas. This is normally a very dry area.

If you have grasshoppers you can spray your plants with formula **C** or you can mix 2 cups of DE with a gallon of water and spray the plants. Also put dry DE on the ground under and around all plants. If you prefer, you can bury a large can to the top, fill it about a quarter way with water and molasses. The grasshoppers will go in and be unable to get out.

True bugs (Hemiptera)

The insects in this order used to be separated into two orders, Homoptera, which contained the aphids, scale insects and some others, and the Hemiptera, which were the True Bugs. They have recently been joined into a single order, Hemiptera.

Chinch Bugs (Lygaeidae – *Blissus leucopterus*)
Although most of the bugs in this group feed on seeds, some, like the chinch bug, feed on sap. Chinch bugs are common pests in corn, grain, St. Augustine grass, fescue, bentgrass, Kentucky bluegrass and zoyziagrass. They cause brownish circular patches to develop in the grass. Chinch bugs are small, grayish-black insects with white wings. They are found in one form or another in the eastern two-thirds of the U.S. and in southeast Canada. You can tell if chinch bugs are present by pushing a coffee can with both ends removed, about two inches into the soil and filling it with soapy water. If chinch bugs are present, they will float to the top. One good method of controlling them is to soak the areas with a mixture of 2 cups of DE with a gallon of water. Spray all the areas where chinch bugs are present.

Tarnished Plant Bugs (Lygaeidae - *Lygus lineolaris*)
The tarnished plant bugs (*Lygus lineolaris*) is common in the eastern and central states but is found nationwide. It is yellowish in color with black or brown mottling on its body. They are found in most of the eastern and central states. They feed on a wide variety of fruits, vegetables, legumes, and other plants, including alfalfa, cotton, strawberries and most fruit trees. You can use spray formula **D** in garden areas and then wet all the plants and dust them with DE. You can also put small boards, about one foot by two feet in various parts of your garden where potential pests can hide. In the morning, you can turn the boards over and dispose of any hiding pest.

Brown Marmorated Stink Bugs (Pentatomidae - *Halyomorpha halys*)
One of the most serious pests in this family is the brown marmorated stink bug. This bug was introduced from Asia in 1998 and has spread to at least 34 states. They are brownish in color on top and bottom and have gray, whitish, blue, gray and black markings. It is a major pest of a variety of fruits and vegetables, including peaches, apples, cherries, raspberries, pears, green beans and soybeans. They also invade homes in the fall to overwinter in a nice, warm house.

Since this bug is so destructive, the Dept. of Agriculture has developed a pheromone that can be used in a trap. In a garden area, I would recommend dusting all of your plants with DE after misting them.

Harlequin Bugs (Pentatomidae - *Murgantia histrionica*)
Another serious pest is the harlequin bug, which feeds on cabbage and related plants throughout the south where it is very common. The harlequin bug is bright orange with black markings. It is found throughout the south and has been found as far north as New England. The best method of control in the garden is probably to use row covers that cover the plant. Row covers are available in garden shops. Misting your plants and then dusting them with DE will also help.

Squash Bugs (Coreidae - *Anasa tristis*)
Members of this family are large, thick-bodied and dark in color. The membrane of the front wing contains many veins, which is easy to see. Leaf-footed bugs are in this family and occasionally enter homes. They are not garden pests. The main garden pest in this family is the squash bug. This species feeds on squash, cucumbers and pumpkins and is a major pest. It is a good idea to put small, flat boards in the garden where these bugs live. They will hide out under the boards in the daytime, allowing you to find them and dispose of them. This also works for cutworms as they hide during the day. I also recommend misting all the squash or other plants and then dusting them with DE to discourage the bugs. Or you can spray them with spray formula **D**, or Greenbug for Outdoors.

Kissing Bugs (Reduviidae – *Triatoma* spp.)

We need to be aware of kissing bugs, AKA conenose bugs, assassin bugs and Mexican bedbugs. A bite from one of these bugs can result in anaphylaxis in sensitive individuals. There are about 15 species of kissing bugs (genus *Triatoma*) in the U.S. and they are found in the southwestern states. The true kissing bugs from South America will come into bed at night and bite a person on or around their lips. They are attracted to the carbon dioxide we exhale.

Adults are ½ to 1 inch long, brownish-black, broad, flat, but stout-bodied, with 6 reddish-orange spots on each side of the abdomen, above and below. It has an elongated, cone-shaped head, from which it derives its nickname, conenose bug. The beak is slender and tapered and almost bare. Its wings are normally folded across the back while resting or crawling and not usually noticed by the casual observer. These insects will feed on any animal, including humans, but they prefer rodents, particularly packrats in our area. If a packrat has a midden (nest) near your house, the kissing bugs may find their way inside and hide under furniture, between mattresses or in closets during the day. At night, they venture out in search of a blood meal, which may be a sleeping pet or human.

The bite of the kissing bug is painless because its saliva contains an anesthetic. People are usually awakened by itching, swelling, rapid heart beat, or other reactive symptoms caused by the bite and not when they are bitten. A full blood meal requires an average of ten minutes, and the numerous bites the victim sees may be due to a disturbance during feeding, which causes the insect to reinsert its proboscis, the tubular feeding structure. As mentioned earlier, anaphylactic reactions may occur, with weakness, sweating, nausea, abdominal cramping, vaginal bleeding, and vascular collapse. It should be noted that individuals who are bitten often develop a greater sensitivity to the bites. In South and Central America, kissing bugs are vectors of chagas disease. Some people find the bites on their bodies and assume they have bed bugs.

In order to control these insects, you need to inspect your property periodically. During the daytime the kissing bugs seek dark places to hide, so look beneath flower pots and outdoor furniture, especially those that sit nearly flush with the ground. Check your sheds, garage, and under porches. All cracks and openings into buildings should be sealed as completely as possible. Entry into the home does not require a large opening. They are attracted to light, so keep your curtains closed at night so they aren't attracted to your indoor lights. Make sure your doors close tightly and your windows and screens are not loose.

If you find a packrat nest you should remove it. Use a shovel and put the nest material in a trash bag and dispose of it. Then treat the area with a safe product such as Greenbug for Outside. You can also put a light layer of diatomaceous earth over the area. This will not only kill any kissing bugs in the nest, but also any other ectoparasites that may be present. What other ectoparasites do they carry? There are 107 species of fleas in NM and packrats can be host to up to 37 species.

After removing the nests, put some cotton balls soaked in peppermint essential oil in the area to discourage the packrats from rebuilding their nests in the same area. Hopefully they will just leave your property.

Aphids (Aphididae)

Aphids are very small, soft-bodied insects. Some of adults may have wings, others are wingless. The winged forms are produced because of environmental developments such as temperature or moisture. Aphids are sometimes called plantlice and their common names often reflect the plants they prefer. They produce a honeydew secretion that is very popular with ants, particularly *Crematogaster* spp. (nicknamed acrobat ants). Aphids feed on the plants by sucking sap and they can spread viral diseases,

cause galls to form and in some cases, cause the leaves to curl.

One important pest species is the greenbug aphid (*Schizaphis graminum*). This species is a major pest in Kentucky blue grass and and will feed on many other grasses. It also feeds on oats, rice, rye and wheat crops. This aphid also has developed a resistance to several pesticides. It is found throughout the United States and much of Canada. It is also found in South America, Europe, Asia and Africa. You can control greenbugs in lawns by using Greenbug for Outdoors in your irrigation system.

Other common pest aphid species are the green peach aphid (*Myzus persicae*), the cotton aphids (*Aphis gossypii*) and rose aphid (*Macrosiphum rosae*). The green peach aphid feeds on various vegetables including lettuce, spinach, potatoes, tomatoes and others. The cotton aphid feeds on cotton, citrus, asparagus, beans, clover, spinach, strawberries, tomatoes and other food plants as well as begonia, ivy, violets and even weeds. The rose aphid feeds on roses and will also attack house plants.

Many other species of aphids will get on most garden crops. The best control is to routinely spray the plants with a pressure wash to dislodge the aphids which will fall to the ground and become prey for spiders and other predatory arthropods. You can mix two cups of food grade diatomaceous earth in a gallon of water and spray the plants as well. Another good spray consists of ½ water and ½ Listerine mouthwash. This spray will discourage lots of pests on your plants. This mixture is also a very good mosquito repellent.

You can also put some soapy water in a yellow bowl and attract aphids which will drown. They are attracted to the color yellow. You can also trap them by putting petroleum jelly or honey on yellow index cards. You don't want to spray pesticides as you will kill many insects that like to feed on aphids, such as praying mantids, ladybird beetles, green lacewing larvae, Syrphid flies, soldier beetles and some wasps. Spiders, small wrens and other birds feed on aphids and will be endangered by pesticides.

Spittlebugs (Cercopidae)
Spittlebugs are small, hopping insects that are usually brown or gray in color. They are not pests in gardens, but they can damage some grasses, particularly bermudagrass. They also feed on a variety of weeds, shrubs and some trees. They are called spittlebugs because the nymphs are covered in a mass of white spittlelike froth, which provides them with necessary moisture and hides them from predators. The two-lined spittlebugs (*Prosapia bicincta*) is primarily a pest on bermudagrass but also feeds on other woody plants. It is found in the eastern half of the United States.

Spraying the areas where they are found with a solution of 2 cups of DE per gallon of water, should help keep them under control. It would be a good idea to use Greenbug for Outdoors in your irrigation system as well.

Brown Soft Scales (Coccidae - *Coccus hesperidum*)
Female scale insects are oval in shape and usually convex, but some species are flat. They have a hard cuticle that is either smooth or covered with a wax-like material. Most scale insects feed on plants and some are serious pests of crops. They are not a major pest in home gardens, but there is one species that is very common on houseplants. The brown soft scale (*Coccus hesperidum*) is found in houseplants all over the world. It is found on some outside plants in tropical and subtropical areas. If will feed on a variety of flowering plants and ornamental foliage but is particularly fond of ferns.

Because of their scale-like body wall, they can be difficult to treat. If you have plants that are heavily infested, it would be best to discard them. You can remove them individually from plants by swabbing

them with a mixture of alcohol and water or dish soap and water.

Mealybugs (Pseudococcidae)
Mealybugs are basically the same as scales, without the armor. The females and nymphs are covered in a white, soft waxlike substance. They suck the sap out of plants. Some species are pests on houseplants and in greenhouses and some feed on crops such as sugarcane, citrus, grapes, pineapple, gardenias, cacti and others. One species, the rhodesgrass mealybug (*Antonina graminis*), is a pest of several grasses including St. Augustine, bermudagrass, rhodesgrass. fescue and centipedegrass. The longtailed mealybug (*Pseudococcus longispinus*) is a common pest on houseplants.

If you have mealybugs in a greenhouse or on houseplants, you can spray them with spray formula **D.** You can also use a mixture of half water and half alcohol. Check the mix on a few leaves of your plants first.

Whiteflies (Aleyrodidae)
Whiteflies are small, flying insects covered with a white powdery waxlike material that makes them resemble very small moths. The nymphs suck the sap out of host plants. They are not major pests in most gardens, but the greenhouse whitefly (*Trialeurodes vaporariorum*) is very common in greenhouses and is found in some plants in the garden in the southern portion of the country. The sweetpotato whitefly (*Bemisia tabaci*) has a spotty distribution in the United States but feeds on a wide variety of plants, so will eventually be found throughout the country. It will feed on avocados, broccoli, cauliflower, cucumbers, eggplants, green beans, hibiscus, lettuce, poinsettia, pumpkin, soybeans, squash, sweetpotatoes, tomatoes, watermelon, zucchini and many others.

When you control whiteflies, you need to spray formula **D**, or Greenbug for Outdoors. Make sure you spray the underside of the leaves. Also use yellow sticky traps near any plants with whiteflies.

Leafhoppers (Cicadellidae)
Leafhoppers are small, often brightly colored, jumping insects. The feed on the sap of plants and can transmit viruses to the hosts. One species, the beet leafhopper (*Circulifer tenellus*) feeds on beets, sugar beets, tomatoes and other plants. The glassy-winged sharpshooter (*Homalodisca vitripennis*) is a pest on grapes, citrus, oleander and almonds and is occasionally found in home gardens.

You can control leafhoppers by spraying the plants with formula **B** or **C,** or with Greenbug for Outdoors.

Thrips (Thysanoptera)

Thrips are very small, elongated insects that are either wingless or have two pair of wings. Most thrips feed on various plants and some species are serious pests. A few are predaceous on mites and small insects. Various species will feed on grasses, corn, cotton, alfalfa, melons, pears, plums, cherries, beans, cabbage, tobacco, gladiolus, iris and greenhouse plants.
The western flower thrips (*Frankliniella occidentalis*) is a major vector of plant diseases caused by tospoviruses. Some thrips, such as the onion thrips (*Thrips tabaci*) will swarm and bite people.

Thrips are attracted to yellow and blue, so hanging some construction paper those colors with a sticky substance on it will attract thrips and they will get stuck. You can coat the stems of your plants with a sticky substance to prevent thrips from climbing up the plant.

Beetles (Coleoptera)

May and June Beetles (Scarabaeidae – *Phyllophaga* spp.)

White grubs found in lawns usually belong to different species of May and June beetles They feed on the root system of the grasses. There will be irregular patches of yellowing grass where the grubs are active. The adults are reddish-brown in color and are attracted to lights. If you have grubs in the lawn, the best remedy would be to use nematodes, which are available in garden stores. You can also drench all the areas with a spray consisting of 2 cups of DE to a gallon of water.

Japanese Beetles (Scarabaeidae - *Popillia japonica*)

Japanese beetles are large beetles with copper covered wing covers and a greenish head and thorax. Japanese beetles larvae are pests in grasses and are particularly destructive parks, golf courses and pastures. The adults will feed on the foliage, flowers and fruit of many different plants and can cause a lot of damage when they occur in large numbers. Japanese beetles in the adult stage can be handpicked from plants or you can spray them with spray formula **C**, or with Greenbug for Outdoors. You can treat the grubs the same way as you would treat the white grubs above.

Hoplia Beetles (Scarabaeidae - *Hoplia callipyge*)

Hoplia beetles (*Hoplia callipyge*) feed on the young leaves, blossoms and fruit of grapes, peaches, strawberries and almonds as well as other plants. The adults are about ¼ inch long, brownish in color and appears iridescent silvery green in sunlight. Hoplia beetles in the adult stage, like Japanese beetles, can be handpicked from plants or you can spray them with spray formula **C**, or with Greenbug for Outdoors. You can also put a five gallon white bucket full of water in the garden. Put a cup of dish soap in it to break the surface tension. The beetles will be attracted to the white bucket and will drown.

Spotted Cucumber Beetles (Chrysomelidae - *Diabrotica undecimpunctata*)

This species is also nicknamed the southern corn rootworm. Although it prefers corn and cucumbers, it will feed on many other plants. The adult is greenish-yellow with six large black spots on each wing cover. The larvae are wormlike and yellow in color. Misting the plants and dusting the leaves with DE will help control them. Make sure to get on the underside of the leaves. Treating the soil around the plants with DE will also help.

Striped Cucumber Beetles (Chrysomelidae - *Acalymma vittata*)

This beetle has two yellow stripes and three black stripes on its wingcovers. The underside is black. It feeds on squash, muskmelons, cantaloupes, watermelons, pumpkins and squash. Control methods would be the same as for the spotted cucumber beetle.

Asparagus Beetles (Chrysomelidae - *Crioceris asparagi*)

This species is a common pest on asparagus all around the country. The beetle is about a ½ long, metallic blue/black in color with yellow spots on the wing covers. The wing covers also have a reddish band on their border. Dusting the plants with DE after misting and putting DE around the base of the plants on the ground will help control them.

Colorado Potato Beetles (Chrysomelidae - *Leptinotarsa decemlineata*)

The Colorado potato beetle is found over most of the U.S, and is recognized by 10 black stripes on its yellow wing covers. The larvae is reddish in color with two rows of black spots on each side. It is a major pest on potatoes. Spraying the plants with Greenbug for Outdoors or misting and dusting them with DE will help control them.

Elm Leaf Beetles (Chrysomelidae - *Pyrrhlta luteola*)
Although this beetle isn't a garden pest, it does infest elm trees which are very common, and they will enter homes in large numbers when it gets cold out. You have to pest proof your house to keep them out.

Flea Beetles (Chrysomelidae, subfamily Alticinae)
There are a number of flea beetles that feed on the foliage of garden plants. They have the habit of jumping away when disturbed. They are very small beetles, usually uniformly dark in color. Flea beetles can be controlled to some degree when they are sprayed with spray formula **C**, or Greenbug for Outdoors. It would be a good idea to put diatomaceous earth or ground pepper around the base of the plants to discourage larvae and other pests.

Weevils (Curculionidae)

Weevils are small beetles with a long, narrow snout. Some species have are broad-nosed. The feed on plants in the adult and larval stage. This is a very large family of beetles with many species. The larvae of some species cause galls on roots and some species live inside the plant's tissues. Some species feed on flowers, buds, or fruit and a few will burrow into wood. There are a number of pest species. Here are a few of them:

Carrot Weevils (*Listronotus oregonensis*)
The adult carrot weevil is dark brown in color. They will feed on carrots, parsley, celery, dill and parsnips. Most of the damage is done by the larvae to the roots. This weevil is found in the eastern U.S. The best way to prevent them would be to cover the vegetables with floating row covers. You can also put some DE round the base of the plants. This will work with the following weevils as well.

Vegetable Weevils (*Listroderes costirostris obliquus*)
These are small, gray or brown weevils with a V-shaped mark at the tip of its wings. They do not fly. This weevil feeds on carrots, lettuce, turnips, potatoes, tomatoes and other vegetables. The adults feed on the foliage at night while the larvae feed on the root systems.

Sweet Potato Weevils (*Cylas formicarius*)
This weevil is ant-like in appearance. It has a shiny blue-black abdomen and red thorax and legs. The head is the same color as the abdomen. The larvae of this species bores into the vines of sweet potatoes and through the roots, eventually killing the plants. It is found in the southeast states from North Carolina to Florida, west to Texas.

Cabbage Curculios (*Ceutorhynchus rapae*)
This little weevil is black with blueish or yellow hair. It is found throughout the U.S. This weevil is a pest of cabbage, cauliflower, turnip, mustard, horseradish and peppergrass plants. Control methods mentioned above will work.

Bluegrass Billbugs (*Sphenophorus parvulus*)
These are grayish, brown or black weevils who sometimes look mottled because of dried mud sticking to their bodies. They have fine, even pits on their thorax and rows of pits on their abdomen. It is found throughout the U. S., with the exception of Maine and the tip of Florida. This weevil and related species feed on grasses and other plants. You don't want these beetles around if you have chickens or

turkeys. If a chicken or turkey eats one, the beetles will grip the bird's throat or tongue with the spurs on its legs. The bird will be unable to swallow it or its normal food and will starve to death.

Drenching infested areas with a mixture of 2 cups of DE with a gallon of water will help control them. Using an irrigation system with Greenbug would work better. There are many other pest species in this family, including the infamous boll weevil (*Anthonomus grandis grandis*), which is a well known pest of cotton.

Butterflies & Moths (Lepidoptera)

Butterflies and moths come in various sizes and colors. Most are completely harmless, but a few can be pests in the larval (caterpillar) stage. Caterpillars are distinctive as they have three pairs of legs, but also they have prolegs, which are short, fleshy projections on their underside. The prolegs help them climb the plants more effectively. Moths are far more common than butterflies. In North America there are approximately 700 species of butterflies and about 13,000 species of moths.

Cutworms (Noctuidae)

Cutworms and armyworms are pests in lawns and in gardens. They are the larval (caterpillar) stage of the miller moths that we often see gathered around our lights at night. There are several species found throughout the United States that are pests. The larvae are thick-bodied, hairless and marked with stripes. They never have spots as the webworms do. There are many beneficial insects that feed on these caterpillars. Cutworms are mostly nocturnal, hiding in shallow holes or under stones near the host plants. They will also climb fruit trees at night to feed on the leaves. One species, the variegated cutworm (*Peridroma saucia*) feeds on a variety of plants, including grasses, vegetables and ornamental plants. If you suspect you have cutworms, you can put out corn meal. They will eat it but won't be able to digest it and they will die. Also put barriers of diatomaceous earth, talcum powder or Comet around plants you want to protect. Also put Tanglefoot around the trunk of trees to prevent cutworms and other pests from climbing the trees.

Sod Webworms (Pyralidae)

Sod webworms are grass infesting larvae of grass moths. The larvae construct webs and bore into the roots, crowns and stems of grasses. They are found throughout the country. Most of the adult moths are gray or tan in color. They are small in size, about ½ inch long and a wingspan of about an inch. The larvae vary in color from green to brown or gray. Most have small black spots scattered on their body. You will see small, dead, brown areas in the lawn where they are active. You can soak any areas where you see evidence of webworms with a mixture of 2 cups of diatomaceous earth per gallon of water. Also, using Greenbug in an irrigation system will discourage these moths.

Codling Moths (Tortricidae - *Cydia pomonella*)

The codling moth is a small moth that has gray or brown front wings with dark crosslines and a large copper colored patch. The hind wings are light brown with a fringed border. They feed on apple and pear trees.

There are pheromone traps available for these moths, and in a home garden, that may be sufficient. They certainly aren't in an apple orchard. You can also hang a trap and collect codling moths in your yard. Mix ½ cup honey, ½ cup molasses, and 1 tablespoon fresh yeast in 4 1/2 cups of water. Put in gallon jug and hang from tree. The moths will go in and not be able to get out.

Cabbage Whites (Pieridae - *Pieris rapae*)

Imported cabbageworm or, as it is sometimes known, the cabbage white can be a pest on cabbage,

radish, broccoli, kale, Brussels sprouts, cauliflower, collard and horseradish. The butterfly is small with white wings. The front wings have a black marking on the tip. There are also one or two black spots of the front wing and one black spot on the hind wing on the anterior margin of the wing. The larvae are green, smooth and slender. It has 3 faint yellow lines. Spraying infested vegetables with Greenbug for Outdoors will help. Also, dusting the plants with DE or using a mixture of 1 cup of flour with ½ cup of salt. Make sure you mist the plants before applying the DE or flour/salt powder.

Potato Tuberworms (Gelechidae - *Phthorimaea operculella*)
Gelechiid moths are very small and they have narrow hind wings. The larvae feed on many plants that are important, but only a couple will get in a garden. The potato tuberworms(*Phthorimaea operculella*) is a pest in potatoes in the southern half of the country, athough it strays north. The wings of the adult moth are grayish with brownish coloring between the wing veins. There are tiny, dark spots on the front wings. It would help to prevent these tuberworms by treating all of the soil around your plants with DE or ground pepper.

Tomato Pinworms (Gelechidae - *Keiferia lycopersicella*)
The tomato pinworms larvae will mine the leaves of tomatoes and eventually feed on the fruit or stems. The adult moth's front wings are grayish with orange or brown longitudinal stripes. The hind wings are yellowish and heavily fringed. The larvae are yellowish brown early and turn darker as they mature, eventually becoming purple. This moth is found in the southern portion of the country. Treating the plants with Greenbug for Outdoors and dusting the leaves with DE after misting will help control them.

Tomato Hornworms (*Manduca quinquemaculata*) & Tobacco Hornworms (*Manduca sexta*)
Sphinx moths are medium to large in size and are frequently seen hovering around flowers around dusk. They eventually inject their long proboscis into the flowers to get the nectar. The larvae are large, colorful and have a hornlike spinal projection on their rear end, hence their name hornworms. They often have oblique stripes on the sides of their body. Several species of these moths are pests on plants. The tomato hornworm and the tobacco hornworm are both pests on tomatoes, potatoes and tobacco. The spinal projection on the tomato hornworm larva is black and the projection on the tobacco hornworm is red. Handpicking the hornworm caterpillars is probably the most effective method of control.

Fiery Skippers (*Hylephila phyleus*)
Skippers are small to moderate sized butterflies. They are stout bodied and usually have brown or orange wings. One species, the fiery skipper, is a pest in some grasses, particularly bermudagrass, St. Augustinegrass, bentgrass and even weedy grasses such as crabgrass. The adult fiery skipper is orange, yellow and brown in color. The males being yellow/orange and the females brownish. The caterpillars are greenish yellow with a granular appearance. There are small, bare round spots in the lawn where the larvae have eaten the blades. Drenching the area with a solution of 2 cups of DE per gallon of water will be helpful in controlling them.

Flies (Diptera)

Flies are different from other insects in that they have only one pair of wings as opposed to two pairs that other insects have. The second pair of “wings” on flies are reduced to knoblike appendages called halteres. Although there are a very few other insects with only one pair of wings, they all lack halteres, except for flies. Fly larvae (maggots) are legless unlike most other insect larvae. Flies aren't major garden pests, but a few types may be encountered. Many species are predatory or are pollinators so it is good to know which ones you have if you find flies in traps in your garden.

Fungus Gnats (Sciaridae & Mycetophilidae)
Fungus gnats are pests in houseplants. There are several species, so they can vary in color from yellow, reddish, brown or black. They all have the same habit of laying eggs in potting soil. The larvae hatch out and feed on fungus in the soil. The best way to control fungus gnats is to cut back on watering almost until the point of wilting. That will kill the larvae. Then put a one inch layer of aquarium gravel on the potting soil to prevent gnats from laying any more eggs in the soil in the future. You can catch the adults with yellow sticky traps, which are available at garden stores.

Carrot Rust Flies (Psilidae - *Psila rosae*)
The carrot rust flies is found over much of the United States and southern Canada. The brown larvae burrow in and feed on roots of carrots, celery and parsnips. They then work their way up the plant to the crowns.

The best way to protect plants from these flies is to keep DE and ground pepper on the ground around the base of the plants. This will also deter other potential pests.

Root Maggots (Anthomyidae)
Root maggots are the larvae of what are called, anthomyid flies. Adults of most species resemble houseflies. The maggots are stocky and about 1/3 inch long. The adult fly lays eggs at the base of plants. When the maggots emerge, they eat their way downward toward the root system. They can destroy entire plants if left alone. They will infest a wide variety of plants, including onions, cabbage,broccoli, cauliflower, turnips, brussel sprouts, radishes, celery, hedge mustard, corn, peas, barley, wheat, melons, spinach, beets, berries, roses and others. The spinach leafminer (*Pegomya hyoscyami*) is in this group. It mines the leaves of spinach and beets. Some common species are radish maggots (*Hylemya radicum*), Cabbage maggot (*Hylemya brassicae*), Onion maggot (*Hylemya antiqua*), Seedcorn maggots (*Hylemya platura*) and the Raspberry cane maggot (*Pegomya rubivora*).

You can discourage root maggots from laying their eggs near your plants by spreading DE or groud pepper on the ground around the base of your plants.

Mites (Acarina)

Mites are very small, microscopic arachnids, closely related to spiders. There are a great many species and probably a great many unknown species because of their size. There are several groups of mites that are the prominent pests in your yard and garden. The main ones are the spider mites (Tetranychidae). They will infest a wide variety of plants.

Spider Mites (Tetranychidae)
Spider mites are very common pests on a variety of plants. They suck the sap out of their host plants. These mites also spin protective webbing on the plants surfaces. Spruce spider mites (*Oligonychus ununguis*) are considered one of the most destructive species as it will attack a large number of conifer trees, including spruce, arborvitae, pine, hemlock, juniper and Douglas fir. Several other pest species include the carmine spider mites (*Tetranychus telarus*), the Banks grass mites (*Oligonychus pratensis*), the linden spider mites (*Eotetranychus tilliarium*) and the two-spotted spider mites (*Tetranychus urticae*). There are many others as well.

When you have to control spider mites in your garden, try spray formulas **A** and **B** as they are both effective against mites.

Clover Mites (Tetranychidae - *Bryobia praetiosa*)
Clover mites are pests in various grasses and they often enter homes in large numbers as they can be concentrated in the grass next to a building. They are pests of Kentucky bluegrass and perennial ryegrass as well as clover. These mites will invade homes, but they do not bite, transmit any diseases or do any damage. They can be wiped up in a house with a soap and water rag. Treating the grass around the house with a mixture of DE and water will help keep them under control.

Tomato Russet Mites (Eriophyidae - *Aculops lycopersici*
Eriophyid mites are very small. It takes a 20X magnification hand lens to see them. They are not serious pests, but they can cause abnormalities of plant tissues, galls, leaf curling, blisters, rusts and other problems. Some eriophyid mites are host specific, while others will feed on a variety of plants. The tomato russet mite is a pest on tomatos and other plants in the nightshade family Solanaceae. The apple rust mite (*Aculus schlechtendali*) can cause leafcurl and other problems on apple trees. There are many other species.

If you have a severe infestation, you may want to remove your plants or prune the infested part of a tree so the mites don't spread. If not severe, you can spray all the infested areas with Greenbug for Outdoors, which is effective on mites.

Pollen Mites (Erythraeidae -*Balaustium* spp.)
Most mites in this family are predators of other mites or small insects. The pollen mites (Erythraeidae - *Balaustium* spp.) are predators and they also feed on pollen so when we have moderate or high pollen counts, they come out in large numbers. You can see them running around on sidewalks and patios feeding on pollen. They will be found on all surfaces where pollen lands, including lawns. Pollen mites also bite and they can cause a rash. They will also enter homes if there is a lot of pollen next to a house. When you go outside and are being bitten, you may want to spray your patios and sidewalks with a high-pressure hose to wash them off the concrete. You can also spray your grass with spray formula **A**.

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 (Coccinelidae), 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.

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 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.

Gophers (Rodentia - Geomyidae)
Pocket gophers construct burrows under the ground using their strong forelegs, enlarged claws and

even their teeth. Their vision is poor because of their habitat as is their hearing. When the gopher digs, it kicks the dirt behind it with its hind feet. When a lot of loose dirt has accumulated, it turns around and pushes the dirt to the surface using its forepaws and face. The resulting mounds are an indication of their presence in your yard.

Gophers feed on the underground portions of plants, but will occasionally come to the surface and pull green vegetation underground. They live alone in their tunnel system, but males will enter female tunnels during mating season, usually early in the year. Female gophers will have one to seven young at a time. The baby gophers will disperse on the ground when they are mature enough to leave their mother and often fall victim to predators at this time. They usually have only one litter per year.

Actually they are very beneficial animals. A single gopher can move approximately a ton of soil to the surface every year. Their tunnels are constructed and then fill up with dirt as they are abandoned. The old tunnels contain the nests, waste material and partially filled pantries well below the surface where they become important as fertilizer. Soil that has been compacted by cattle trampling, grazing and machinery is benefited by the tunneling process of gophers. In the mountains, snow and rainfall are temporarily held in gopher burrows instead of running across the surface causing soil erosion. The mounds the gophers make also bury vegetation deeper, thus increasing soil quality over time. Additionally, fresh soil in the mounds provides a fresh seeding area for new plants, which may increase the variety of plants on a site. Gophers are also in the food chain and are fed upon by large birds, other mammals and snakes. Other animals such as lizards and toads take refuge in the cool, moist burrows.

As much as I am trying to make the case that gophers have a place in our area, there are times when we have to control them. Poisons are available but I never recommend them. Most of the gopher baits contain strychnine, diphacinone, chlorophacinone, or zinc phosphide. None of these rodenticides are very pleasant and accidents can result with other animals digging them up. These products shouldn’t even be allowed to be sold in stores

A fumigant, aluminum phosphide, is sometimes used to control gophers but it isn’t recommended. Two children were killed by it in Utah when an exterminator used aluminum phosphide in their yard to kill voles.

There are traps available that can be placed in the burrows, but they are not easy to use and have only limited success. I have found that the best method of gopher control is simply asking them to move. You can do this by pouring a foul smelling liquid into their tunnel system. Fish oil emulsion works well and castor oil is also effective. Since gophers generally live alone, once they move, they are not likely to return unless they are forced to move again, so a repellant can be very effective.

When using a repellant, you will have to probe the dirt to find their tunnels. Generally a tunnel will run straight between two mounds and they are normally about 18” below the surface. You can use a metal rod or even a pool cue to probe the dirt. Once you hit the tunnel, the probe will fall through. Then take a long-stem funnel such as used to put oil in cars and place it in the hole created by the probe. Pour the repellant into the funnel and move on to the next tunnel. You can use the same method if you have moles in your yard. Actually for moles, you can uncover the burrow, bury a large can in the ground where the top of the can is level with the mole's burrow. Then put a board over the tunnel so the mole doesn't know there was activity. It will crawl through its burrow and fall into the can. Check the trap every day so the mole doesn't suffer. Take it out and release it somewhere out of your area.

There isn’t any reason to kill them. Gophers and moles, like all organisms, are just trying to make a

living

Prairie Dogs (Rodentia – Scuiridae – *Cynomys* spp.)

Prairie dogs are beautiful animals and they are absolutely harmless. They live in little villages and mind their own business. They do not destroy any crops and do not carry any diseases even though they are constantly blamed for spreading the plague. In reality, plague fleas (genus *Oropsylla*) can live on other animals such as squirrels, pack rats and other rodents and even breed in their burrows. When plague fleas get into prairie dog villages they kill the prairie dogs. If you have a colony of prairie dogs near your home, they are healthy and do not have plague fleas. That is a myth perpetuated by people who do not know any better or who just want to kill them. The people from the GunNut shop also claim they save ranchers and farmers horses and cattle from breaking their legs in prairie dog holes. This is another myth. Horses and cattle both watch where they are walking and can easily avoid prairie dog burrows. It is when they are chased by someone or ridden fast by someone who didn't check the area that an accident will happen. It is not the prairie dogs fault, it is the person chasing or riding the horses too fast in uncharted areas. The gun people are not doing anyone any favors.

They do not cripple horses and cattle as some other people claim. Most horses and cattle watch where they are walking and can easily go around a very visible prairie dog village. If a horse is ridden fast through an unknown area, an accident could happen. It is the responsibility of the horse owner to know where they are going on the horse. It isn't the prairie dogs fault.

Prairie dogs are very smart and can vocalize different sounds, which identify many of the animals that feed on them. They have one of the most sophisticated of all animal languages. They recognize hawks, eagles, coyotes, snakes and, of course, humans. All of the other animals kill them for food, which is the way nature is supposed to work. Humans kill them for fun and profit. Prairie dogs like to socialize and constantly visit other prairie dogs and even groom each other. When two prairie dogs meet they nuzzle and kiss each other. Prairie dogs share their villages with other animals, including some that are federally protected such as the burrowing owl. The owl is protected under the Migratory Bird Treaty Act (MBTA). In 1972, the Raptor Protection Act added all raptors, including eagles, hawks, owls and others to the MBTA. Gunnison's prairie dog, which we have here in NM is also a candidate for the Endangered Species Act as it is getting very rare due to the unmitigated thrill killing of them by people who are absolutely heartless.

If you have prairie dogs on your property and you have to get rid of them, there are organizations that wills humanely relocate them. That is the only method of control I would recommend.

Here is a letter I wrote to Sunport and the FAA regarding prairie dogs at the airport. It was also posted on Facebook.

“My name is Myra and I am a prairie dog. I live in one of the isolated prairie dog villages in Albuquerque. For some reason, many members of your species hates my species. I think it is probably because they don't understand us. We are not dangerous and we do not carry diseases. We simply live in little villages and mind our own business. Some people think we kill trees but that is not true. We do not feed on tree roots unless there is absolutely nothing else to eat. We find most of our food above ground. Other little animals such as gophers will feed on the roots of trees and bushes. Other people think we carry the plague and can spread it to your species. This is also not true. When the fleas that carry the plague invade our villages, we die just as humans do. If our village is full of healthy, fun loving prairie dogs, then I can assure you that the fleas that carry the plague aren't in our village. Unlike some other small animals, we are not a prolific species. I may have four pups a year but

generally only two will survive. We are lucky to be able to maintain a population if we are left alone. For whatever reasons, fear, misunderstanding or just plain meanness, your species likes to persecute us. Recently some friends of mine who lived in a prairie dog village close to a church in northeast Albuquerque had their village covered by the church because the church officials were expanding their parking lot. One church official, when questioned, said he doesn't give a "rat's ass" about prairie dogs. Doesn't he understand that the same Being that created your species created us? Doesn't he understand that all species can live in peace? Why does your species with your superior intelligence find it necessary to destroy other species? Over at Sunport, the people are gassing many of my friends. The gas that they use is very painful and very slow working. My friends will suffer in great pain for as long as 72 hours after being gassed, before they finally, mercifully, die. Other people like to shoot us with high-powered rifles so they can see us "explode" when the bullet rips us apart. Some people like to feed us rat poison. Rat poison destroys our capillaries and we bleed to death internally and very slowly. Is there no limit to your imagination when it comes to destroying not only other species, but your own? We have been gassed, poisoned and shot at to such an extent that we now only represent about 1 % of our original numbers. We are not stupid little animals. We have one of the most sophisticated of all animal languages. We can vocalize different sounds, which identify many of the animals that feed on us. We recognize hawks, owls, eagles, coyotes, snakes and, of course, humans. All of the other animals kill us for food, which is the way nature is supposed to work. You folks do not kill us for any good reasons, except that you can. You may think you are killing us for good reasons, but you really don't understand us or know anything about us. We like to socialize and we constantly visit other prairie dogs and even groom each other. When two prairie dogs meet we nuzzle and kiss each other. If we are in your way and you can't live with us, then hire someone who will help relocate us. We all live on the same planet and we can all live together. We will not infect you with any exotic or domestic diseases. We will not destroy your landscaping and we will not harm your children. We will live our little lives as best we can in an ever-changing world. If you can't relocate us, you can ask us to move. We obviously don't speak the same language, but all you have to do is pour some castor oil or that stinky fish oil emulsion in our burrows and we will happily relocate, hopefully to a place where we won't bother you. If we leave this world, it will not be the same, just as it is not the same when any species becomes extinct. Many other species are dependent on our activities and they will follow our fate. When enough of the animal and plant species become extinct, then your species will soon follow them into oblivion. We were all created to help each other survive on this planet and as long as species are rapidly disappearing, then the future of the planet is pretty bleak. Thank you for taking time to read this letter of introduction to our species. Hopefully we can all get along. I hope the people in the Sunport can learn to get along with us. We are not a threat to them or to anyone else."

There is an excellent non-profit organization in Albuquerque that promotes the well-being of prairie dogs. It is Prairie Dog Pals and it is run by Yvonne Boudreaux and Ed Urbanski. They have been doing a wonderful job for the last ten years or so helping these little angels. Their goal is to preserve the species and its environment and to provide information and education about prairie dogs to the public. They try to ensure their survival by providing them with supplemental feeding in barren areas and capturing and re-locating them where loss of habitat or human conflict threatens their existence.

They want to preserve appropriate areas of land for prairie dogs that naturally exist in the Greater Albuquerque area, to ensure all counties with naturally existing prairie dogs preserve areas of natural habitat for them and to have public lands which are leased to allow prairie dogs and other native wildlife to co-exist with humans and domestic animals. Their website is http://www.prairiedogpals.org/ They can always use donations to continue their excellent work.

Pigeons (Aves - Columbidae)

Someone asked me today if pigeons are hazardous to our health. I told her that alcohol and tobacco cause more death and grief in a single day than all the pigeons on the planet have since the beginning of time. When I look at the pigeon-infested roof of a fast-food restaurant, I can still tell myself that the pigeons on the roof are far less hazardous to human health than the cheeseburgers coming off the grill.

They are frequently called rats with wings. The term "rats with wings" came from a 1980 play, "Stardust Memories" starring Woody Allen. Allen used the term in the movie and apparently someone with a vested interest in misleading the public decided to use it in a campaign to drum up business for pigeon control. The facts are just the opposite. Yes, there are some diseases that can be transmitted by pigeons, but no more so than any other bird, including such popular pets as parakeets, canaries, etc. Consider what some experts have said about pigeons and disease;

"...diseases associated with [pigeons] present little risk to people..." Dr. Michael McNeil, Centers for Disease Control (CDC) in Atlanta .

"The New York City Department of Health has no documented cases of communicable disease transmitted from pigeons to humans." - Dr. Manuel Vargas, New York City Department of Health.

"I am not aware of any reported cases of diseases that were transmitted by pigeons in Mohave County ." - Larry Webert, R.S., Mohave County Environmental Health Division

So much for the health problems caused by pigeons. They do have their attributes. During World War I, pigeons carried thousands of messages that saved many hundreds of lives. In World War II pigeons continued to be used. Radios were frequently not working due to damage or when unfavorable terrain rendered them almost useless. Pigeons continued to fly through enemy fire, and amazingly 95% of them completed their missions. One pigeon in particular, named "Cher Ami" was a World War I Carrier Pigeon, one of 600 birds owned and flown by the U.S. Signal Corps. Cher Ami was originally bred by the British Signal Corps. He was transferred to the Americans after the war on Oct. 27, 1918.

Cher Ami delivered 12 important messages within the American sector at Verdun , France . On his last mission, Cher Ami, shot through the breast by enemy fire, managed to return to his loft. A message capsule was found dangling from the ligaments of one of his legs that had also been shattered by enemy fire. The message he carried was from Major Whittlesey's "Lost Battalion" of the 77th Infantry Division that had been isolated from other American forces. Just a few hours after the message was received, 194 survivors of the battalion were safe behind American lines. Cher Ami was awarded the French "Croix de Guerre" with Palm for his heroic service between the forts of Verdun . He died in 1919 as a result of his battle wounds. Cher Ami was later inducted into the Racing Pigeon Hall of Fame in 1931 and received a gold medal from the Organized Bodies of American Racing Pigeon Fanciers in recognition of his extraordinary service during World War I.

Pigeons continued their valiant service during World War II and the Korean War. The Dickin Medal for Valor, an award only for animals , was given to 31 pigeons in World War II, more than any other animal. (The next closest animals were dogs, with 8 medals).

Pigeons also have religious significance as well. Noah thanked God for them and Christ defended them. Doves are the symbols of love and peace. Are pigeons and doves the same? The dictionary defines doves as . 1. Any of various widely distributed birds of the family Columbidae, which includes the pigeons, having a small head and a characteristic cooing call. 2. A gentle, innocent person. 3. A person who advocates peace, conciliation, or negotiation in preference to confrontation or armed

conflict.

Pigeons deserve the same respect and affection that we give to our companion birds, such as parakeets, parrots, canaries and the rest. When they live on our buildings and deface it, we can remove the birds by excluding them from the area, but we don't need to kill them. The best way to remove pigeons from a building is to trap them and relocate them in an area where they can live and breed without disturbing anyone. When you trap pigeons, you have to pre-bait the area first with whole kernel corn and then set the trap with the corn in it. You will have to check the traps at least once a day. Once you have removed the pigeons, you need to enclose any open areas on the roof such as air conditioning units, with screening to prevent other pigeons from moving in. Before you enclose these areas, you should inspect for nests and remove any that you find. You can also have spikes, wires or repellant gels placed on certain areas of the roof, depending on the design. Normally this is done by a professional pest control company, but you can do it yourself if you like.

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.

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.

A similar study in Cancer: 89: 11, 2000 has shown that children who have been exposed to household insecticides and professional extermination methods within the home are three to seven times more likely to develop non-Hodgkin lymphoma compared to children who have not been exposed to pesticides. These two articles clearly demonstrate why we should never allow pesticides in schools or day-care centers.

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 carcinogenns (cancer causers). For farm workers who are exposed to pesticides more often then 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, prostrate cancer and brain cancer. Female farm workers have an increased rate of cervical cancer.

Our pets can also suffer. An English pointer was treated with a common flea and tick product available in stores. The pesticide, Bio Spot On Flea and Tick Control for Dogs, killed the dog in three months. The veterinarian who treated the dog thought that the pesticide damaged the part of the brain responsible for hunger and thirst. The poor dog was emaciated toward the end of his life. The active ingredient in Bio Spot is permethrin, a synthetic pyrethroid. The chemical is applied to the dog between the shoulder blades or at the base of the tail. The dog's natural oils spread the pesticide over its body making the skin and fur inhospitable to fleas and ticks. These pyrethroid based flea and tick products are approved by the EPA and they are readily available in grocery stores or at pet retailers. They are also linked to thousands of pet poisonings and need to be removed from sale. There are much safer ways to control fleas and ticks on our pets without using these toxic products.

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.

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 ¼ 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 if 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.

Esssential 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 have aphids or thrips on your plants, you can spray the leaves and drive the insects away with no harm to your plant.

Essential oils may be the future of the pest management in homes and our schools, day care centers, hospitals, medical facilities and other public buildings. You can get some essential oils in health food stores or you can get them online. One good supplier is www.mydoterra.com/dewberryhill/. Click on Shop for Products and then on Single Oils and you will see the various types of essential oils they carry.

INVISIBLE BITING BUG SYNDROME (IBBS)

Q:
*I am being eaten alive by mites. I think these teeny-weeny, black/grey specs are bugs. I thought bed bugs but I see no blood anywhere (except on my body, where I scratch myself in the morning. (yes I put cortizone on.)There are no poop and only a few specs about this size 'I" and they are almost invisable. I have to use a lamp and glasses to see them. I also found the running my hand lightly over the bedsheet in the morning allows me to feel white specs this size "," with two or three grey I's. I remove them with scotch tape. How can these teeny bugs do so much harm? What are they? My husband thinks I'm being neurotic - he doesn't have any bites nor itches and sleeps next to me. He laughs at my complaints. I am wearing perfune to bed and spreading baby powder around but no relie*f.

A:
Twenty years ago I would get a call a month about someone with “imaginary” bugs crawling on them. Most pest control people would get these occasional calls as well. We called it Delusional Parasitosis (DP) and recommended a psychologist. About ten years ago the calls increased to one a week or so and now I am getting them almost on a daily basis. This is no longer a psychological problem, but a real physical problem and it is reaching epidemic proportions in this country. I coined the term Invisible Biting Bug Syndrome (IBBS) for this condition. It is also known as Morgellon's Disease (MD).

There are several possible causes of this condition and one of them may be mites. Occasionally people have pigeons or starlings or other birds nesting on their homes. If the birds leave and don't return, the mites that may be in their nest will find their way into your home and will bite the inhabitants. If you have rodents in your house, the same thing will happen if the rodent dies from poisoning or just doesn't come back to their nesting area. The rodent mites will migrate into your living area. The one bug that doesn't affect humans although it is said to do so by some companies is the springtail (Collembola). Springtails feed on decaying vegetation and do not bite or infest humans. To treat for the mites, you should fog your bedroom and any other room you suspect they may be. To fog, utilize 1 quart Greenbug for People for up to 1200 sq ft. Starting at the far side of a room, aim the fogger directly at all potential hiding spots making sure the mist penetrates thoroughly. Pry fabric apart, point into

electrical outlets, blast up under heavy furniture, fog all nooks and crannies as you move your way out of the room. Continue to direct at hiding spaces until there is a dense fog in the room. All mites will quickly die from exposure. Allow the fog to penetrate 4 hours to overnight. Never use synthetic pesticides as they can make matters worse if you react badly to the chemicals. Greenbug is made from cedar and is available online at www.greenbugallnatural.com

Another possibility is follicle mites (*Demodex* spp.) The adult mites are only 0.3–0.4 millimetre (0.012–0.016 in) long, they have a semitransparent, elongated body that consist of two fused segments. Eight short, segmented legs are attached to the first body segment. The body is covered with scales for anchoring itself in the hair follicle, and the mite has pin-like mouth-parts for eating skin cells, hormones and oils (sebum) which accumulate in the hair follicles. The mites can leave the hair follicles and slowly walk around on the skin, at a speed of 8–16 centimetres (3.1–6.3 in) per hour, especially at night, as they try to avoid light. Mating takes place in the follicle opening, and eggs are laid inside the hair follicles or sebaceous glands. The six-legged larvae hatch after three to four days, and the larvae to develop into adults in about seven days. The total lifespan of a *Demodex* mite is several weeks. The dead mites decompose inside the hair follicles or sebaceous glands.

Older people are much more likely to carry the mites; about a third of children and young adults, half of adults, and two-thirds of elderly people are estimated to carry the mites.The lower rate of children may be because children produce much less sebum. It is quite easy to look for one's own *Demodex* mites, by carefully removing an eyelash or eyebrow hair and placing it under a microscope.

The mites are transferred between hosts through contact of hair, eyebrows and of the sebaceous glands on the nose. Different species of animals host different species of *Demodex.*

In the vast majority of cases, the mites go unobserved, without any adverse symptoms, but in certain cases (usually related to a suppressed immune system, caused by stress or illness) mite populations can dramatically increase, resulting in a condition known as “Demodicosis”. It can be characterized by itching, inflammation and other skin disorders. Blepharitis (inflammation of the eyelids) can also be caused by *Demodex* mites. Some evidence links *Demodex* mites to some forms of the skin disease rosacea, possibly due to the bacterium Bacillus oleronius found in the mites.

There are other possible causes of Morgellons. Pollutants in the air can be reacting with skin and flesh cells in some way. Pesticides may be a factor. I asked a group of folks who have MD about this and if they are exposed to pesticides. Many said they were and the few that said they weren’t did admit they go into public buildings such as restaurants. Anyone who goes into any public building that uses pesticides will be exposed. While the active ingredient in the pesticide may break down, there are a number of inert ingredients (usually comprising 98% or more of the pesticide) that may be more resilient in the atmosphere. Pesticides have been linked to Parkinson’s disease as well as some genital abnormalities in babies. It is perfectly logical to come to the conclusion that exposure to pesticides can cause many of the symptoms people who suffer from Morgellons are complaining about.

There is evidence coming out now that Morgellons might be caused from eating genetically modified (GM) foods. Go to http://www.naturalnews.com/023004.html for more information. This is going to require a lot more study, but the implication is that the chemicals in the GM foods can cause your nervous system to send messages to your brain that something is biting you or crawling on your skin. This is certainly not a psychological disorder, but a physical disorder caused by the chemicals. You may want to start eating organic foods and stay away from any GM foods if possible. Realistically it may not be possible to avoid them all as the food makers aren't required to label their foods as genetically modified at the present time. Shop at health food stores whenever possible and avoid any

meat that comes from factory farms as it is loaded with chemicals. Never let pest control person spray pesticides in your home. Around the outside is fine, but not indoors where you will be exposed to it. I am convinced after studying this syndrome for many years that it is caused by chemicals in our bodies, not by bugs or fungi. Many chemicals can interact with our nerves and send false messages to our brains. For instance, some chemicals can tell our brain something is crawling on us or biting us, and then we react by scratching, and worse yet, spraying ourselves with pesticides or chemically loaded skin products, which just exacerbates the problem. Some people describe it as a feeling of bugs or parasites scuttling around beneath their skin, accompanied by open lesions that heal slowly and ooze out blue, black or white fibers that can be several millimeters long. These fibers appear like pliable plastic. They can be as fine as spider silk, yet they are strong enough to distend the skin when pulled and elicit shooting pains when you try to remove them. Some of these fibers have been analyzed and they contain along with other substances, bovine DNA. That means the chemicals causing the fibers probably came from drinking milk or eating beef from chemically fed cattle. Vitaly Citovsky, Professor of Biochemistry and Cell Biology at Stony Brook University in New York, discovered that the fibers also contain the substance Agrobacterium, a genus of gram-negative bacteria capable of genetically transforming not only plants, but also other species, including human cells.

Here is what you need to do to try to solve this problem.

First, never expose yourself to pesticides or insect repellents that contain DEET. These products have a lot of chemicals that can harm you. If you use them, they can destroy your immune system making you susceptible to other products. Don't let pesticides be applied in your home or your workplace and try not to frequent any public building like a restaurant that has recently been treated with pesticides.

Never eat meat from a factory farm. This means almost all meat found in a supermarket or Walmart. If you have to eat meat, eat only meat from small farms or ranches. Never eat vegetables or fruits that have been sprayed with pesticides. If the vegetables and fruits don't say 100% Organic on the label, don't eat them.

Don't eat any food that contains genetically modified organisms (GMOs). One expert, Jeffrey Smith, links GMOs to toxins, allergies, infertility, infant mortality, immune dysfunction, stunted growth, and death.

Don't consume anything that contains aspartame, such as Equal or Nutrasweet. As a result of its unnatural structure, your body processes the amino acids found in aspartame very differently from a steak or a piece of fish. The amino acids in aspartame literally attack your cells, even crossing the blood-brain barrier to attack your brain cells, creating a toxic cellular overstimulation called excitotoxicity. Also wheat, dairy, and soy contain exceptionally high levels of glutamic and aspartic acid, which makes them all potentially excitotoxic. It is quite possible these chemicals are communicating false messages to your brain, indicating biting bugs that aren't there.

Don't eat food out of cans or drink water or other beverages from plastic bottles. The lining of most metal cans has a thin plastic liner that contains bisphenol-A. Bisphenol-A, or BPA, is a chemical thought to increase the risk of infertility, cancer, diabetes, and even heart disease. This chemical is also in plastic bottles. While bisphenol-A may not be directly related to IBBS, it is a chemical that can have a adverse affect on people. There is no reason to weaken your immune system with any chemicals that can be avoided.

Avoid cotton products if at all possible, particularly tampons if you are a woman. In the United States alone, approximately 600 thousand tons of pesticides and chemical fertilizers are applied to cotton fields each season. To bring this fragile plant to harvest, it is heavily sprayed 30 to 40 times a season, in extreme cases, with pesticides so poisonous they gradually render fields barren. Some of this cottonis used to make furniture, mattresses, tampons, swabs, and cotton balls. The average American woman

will use 11,000 pesticide treated tampons or sanitary pads during her lifetime. Use only natural tampons.

Don't use cleaning products such as soaps that contain triclosan or triclocarban. These chemicals are endocrine disrupters. They are widely used in antibacterial soaps, body washes, lip glosses, deodorants, dog shampoos, and even toothpastes. Some brands that contain them are Dial, Colgate, Lever 2000 and Vaseline.

There is no guarantee that avoiding all of these products will solve your problem, but it certainly may help. It may take awhile for the chemicals to be removed from your system, so don't expect an overnight reaction. You may have to give it several months before you see the symptoms of IBBS start to disappear.

In some cases, the symptoms may not go away. There are three possible scenarios to IBBS (or Morgellons). One could be mites in the house. If you treat the house with a non-toxic product such as Greenbug, and the problem doesn't go away, then it is most likely chemically related as stated above. If that doesn't produce results, then it is probably psychological, which is possible in rare cases.

MULTIPLE CHEMICAL SENSITIVITY (MCS)

Joel Paul, a spokesman for the National Pest Control Association, contended in 1988 that many people who claim they are "chemically sensitive" are actually allergic to the pests that the chemical (poison) is supposed to control. Others, he says, have "*delusory parasitosis, a distinct fear of insects. It's a neurotic disorder of people that can never be controlled*." What do you want to bet that this person never got a medical degree?

Multiple Chemical Sensitivity (MCS) is a real disease that affects a large segment of our society. Many more people may not know they have MCS until they are exposed to pesticides or other chemicals. Sharyn Davidson worked for a veterinarian clinic and was exposed to pesticides used on our dogs and cats. This exposure triggered MCS in her. She can describe in her own words her battle with Multiple Chemical Sensitivity.

People with Multiple Chemical Sensitivity (MCS) often refer to themselves as canaries, or biological sentinels, who signal impending danger from toxic exposures. Recent epidemiological research revealed that as many as 16% of the population considers themselves sensitive to some chemicals. MCS has become like a half-ton canary that no one can any longer ignore. Many people with MCS are intolerant of pesticides, solvents, and many other synthetic products that never existed until humans created them.

Some would have you believe that there is nothing wrong with these synthetic products, but that there is something emotionally wrong with those who report reacting to these products. Can thousands and thousands of people who report intolerance to toxic chemicals be suffering from mass psychogenic illness? The opponents of MCS would like you to believe that if designer poisons interfere with the life processes and kill life forms lower on the food chain, why is it a stretch of logic to understand that these same chemicals interfere with the life engendering metabolism of humans and make them ill?

Most people with MCS do not have antibody mediated allergies. Most toxic chemicals are not

allergens. They are chemicals that interfere with the natural metabolic processes. Immune suppressive toxins have been found in the fats of dead whales in Puget Sound and in the fat biopsies of humans with MCS, cancers and other toxic induced disorders. Unlike the highly impacted wildlife, those of us with chemical sensitivity can verbalize the emotional and physiological distress triggered by the many synthetic toxins. These supposedly "safe" synthetic chemicals created by man have reached the top of the food chain and are now creating a health crisis. Although many people appear to tolerate many of these synthetic products, there are many of us who are made ill by them.

Although we don't completely understand the mechanism of MCS, we are getting closer. We would like those who do not experience chemical sensitivity but who understand that the fragile web of our common environment has now been diminished to advocate for research to shed greater understanding of this issue. There can be no resolution of any problem without first acknowledging and understanding the problem. Please become informed about the impact of toxins on the quality of your life. The most important thing we can do is to find understanding through research and explain the mechanism of the disorder so that the problems can be resolved

My chemical sensitivity this past 19 years has been like a bad dream in which the Emperors have all their clothes on but they cannot see, hear or think clearly. In this nightmare, a small canary is yelling wake up Bellingham, dioxins are dangerous!. Wake up Washington State, pesticides are poisons . Wake up America, your canaries are ill! Wake up Earth, toxic chemicals impair life! Are those of us with MCS the only ones who can see, hear, and understand the canary?

Sharyn's case clearly demonstrates that MCS is real. The following article was written by Ann McCampbell.. Ann suffers from Multiple Chemical Sensitivity. She gave me permission to use this information. Ann wrote:

Movies like *Erin Brockovich* and *A Civil Action* depict the true stories of communities whose members became ill after drinking water contaminated with industrial waste. Their struggles clearly show how difficult it is for people to hold corporations responsible for the harm they have caused. Whether individuals are injured by exposures to contaminated air or water, silicone breast implants, cigarettes, or other chemicals, their quest for justice is usually a David versus Goliath battle that pits average citizens against giant corporations.

When confronted with the harm they have caused, corporations typically blame the victims, deny the problem, and try to avoid responsibility for the harm caused. The corporate response to people with multiple chemical sensitivities (MCS) has been no different. People with MCS are made sick from exposures to many common products, such as pesticides, paints, solvents, perfumes, carpets, building materials, and many cleaning and other products. But the manufacturers of these products would rather silence the messenger than acknowledge the message that their products are not safe. To that end, the chemical manufacturing industry has launched an anti-MCS campaign designed to create the illusion of controversy about MCS and cast doubt on its existence.

It is a credit to the chemical industry's public relations efforts that we frequently hear that multiple chemical sensitivities (MCS) is "controversial" or find journalists who feel obligated to report "both sides" of the MCS story, or attempt to give equal weight to those who say MCS exists and those who say it does not. But this is very misleading, since there are *not* two legitimate views of MCS. Rather,

there is a serious, chronic, and often disabling illness that is under attack by the chemical industry.

The manufacturers of pesticides, carpets, perfumes, and other products associated with the cause or exacerbation of chemical sensitivities adamantly want MCS to go away. Even though a significant and growing portion of the population report being chemically sensitive, chemical manufacturers appear to think that if they can just beat on the illness long enough, it will disappear. To that end, they have launched a multipronged attack on MCS that consists of labeling sufferers as "neurotic" and "lazy," doctors who help them as "quacks," scientific studies which support MCS as "flawed," calls for more research as "unnecessary," laboratory tests that document physiologic damage in people with MCS as "unreliable," government assistance programs helping those with MCS as "abused," and anyone sympathetic to people with MCS as "cruel" for reinforcing patients' "beliefs" that they are sick. They also have been influential in blocking the admission of MCS testimony in lawsuits through their apparent influence on judges.

Like the tobacco industry, the chemical industry often uses non-profit front groups with pleasant sounding names, neutral-appearing third party spokespeople, and science-for-hire studies to try to convince others of the safety of their products. This helps promote the appearance of scientific objectivity, hide the biased and bottom-line driven agenda of the chemical industry, and create the illusion of scientific "controversy" regarding MCS. But whether anti-MCS statements are made by doctors, researchers, reporters, pest control operators, private organizations, or government officials, make no mistake about it – the anti-MCS movement is driven by chemical manufacturers. This is the real story of MCS.

HOW TO PICK A SAFE & EFFECTIVE PEST CONTROL COMPANY

Scary Pest Control

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.

One of the most egregious incidents of pesticide misbehavior occurred in Mississippi in 1996. Two unlicensed and untrained boneheads sprayed 300 homes and businesses with methyl parathion, an agricultural pesticide intended for outdoor use only. There were complaints of foul odors, staining of walls and carpets and pets dying for no apparent reason. Many residents fell sick with flu-like symptoms. These so-called "pest management professionals" sprayed the walls and floor with this pesticide. Tests confirmed that the levels of contamination were at least five times the level that requires immediate evacuation of humans and animals. Hundreds of families were evacuated from their homes and several businesses had to be shut down until all the sites were decontaminated. This episode of pest control negligence cost the taxpayers of Mississippi over $50 million and put thousands of people in a very serious situation. Fortunately the people who perpetuated this act were tried and

convicted for their crimes. Methyl parathion had a DANGER label and is no longer permitted to be used in the U. S. It was used as a foliar spray on cotton as well as an insecticide and miticide on many other plants.

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.

Consider the story of the Immovable Secretarial Object and the Irresistible Pesticide Man. She wouldn't get up from her desk when he arrived to spray the office. ("*He wasn't very nice about it. He just said, 'Lady, you have to get up for a minute. If he had asked me instead I would have moved...*"). He sprayed anyway, "around" her feet. She was wearing sandals and ended up at the emergency room with welts on her toes, being one of the increasing numbers of the population that is allergic to synthetic pyrethroids. Along the same line, my sister Linda, in Florida, told me their company exterminator came in the office and sprayed the baseboards and then sprayed all of their chairs! Was he spraying for some kind of butt bug? No one knows why as my sister ran him off and told him never to return.

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.

If you have pets, you should never use pesticides of any kind or use an exterminating service that sprays pesticides in the house. Recently a lady called me and told me she hired a pest control company to eradicate some crickets from her home. Rather than use bait, which would be safe if properly applied, the PCO sprayed the baseboards. He ended up killing $2500 worth of her son's snakes, yet didn't kill any crickets. She successfully sued the company.

In another case a pest control (non)-professional sprayed the baseboards in a pet shop. The pesticide was sucked up into all the aquariums and he killed all the fish in the store.

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.

In another incident reported in *Proceedings, Association of Avian Veterinarians,* an organophosphate chlorpyrifos was used in a home where pet birds were bred and raised for six years. The target pests were cockroaches but after five applications, fledglings began to die off, followed by a cessation of egg production. Finally the adults deteriorated and died. The owner realized that this tragedy meant he was also in danger and that was the basis of his lawsuit against the pest control company. The final report read: "The case was settled to cover the cost of the birds and for creating a health hazard for the occupant of the house."

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.

In a case in California in 2001, a person who is now a pesticide lobbyist, treated a warehouse with pesticides and didn't post notification. Six policemen responded to a call and had to enter the warehouse. All of them got sick and had to go to the hospital. They all survived, but the pesticide lobbyist was fined $1000. This fellow is still on the discussion boards telling everyone how safe pesticides are for bees and how dangerous automobiles are, as, according to him, they kill more bees than chemicals.

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.

Aluminum phosphide is an inorganic phosphide used to control insects and rodents in a variety of settings. While it is used primarily as a grain fumigant, it is also used as an outdoor fumigant for burrowing rodents and moles. This product is frequently misused. In one case that recently took place in Los Lunas, New Mexico, a pest control company fumigated a colony of prairie dogs on church property. They didn't follow normal procedure and inspect the burrows for burrowing owls, which are federally protected under the Migratory Bird Treaty Act and the Raptor Protection Act. A witness to the

fumigation told the pest control person that owls were present in the burrows, but he continued gassing them anyway.

This fellow was reported to the proper authorities, but because of lack of physical evidence (dead birds, feathers, feces, etc.), he was not prosecuted but he was severely warned. I wrote to the church to get their rationale for hiring this fellow to gas the prairie dogs. If you have a healthy prairie dog colony nearby, it is plague free. This pastor's fear of prairie dogs, plus the incompetence of the pest control person lead to the gassing of federally protected birds if the witness was correct and there is no reason to think he wasn't.

Unfortunately, in New Mexico, you do not need a fumigation license to gas burrowing rodents with a fumigant. You would need such a license to fumigate a building, a truck or a vault, but for some reason, burrows don't count. It is clear the fellow that fumigated the burrows wasn't competent and shouldn't have been allowed to use the product. The odd thing is that this company specializes in the control of mammal pests judging by its name. They should change their name to Scary Pest Control.

How toxic is aluminum phosphide? It is highly toxic when ingested or through inhalation of the gas. Symptoms of mild to moderate acute aluminum phosphide toxicity include nausea, abdominal pain, tightness in chest, excitement, restlessness, agitation and chills. Symptoms of more severe toxicity include, diarrhea, difficulty breathing, pulmonary edema, respiratory failure, rapid pulse, and hypotension (low blood pressure), dizziness and/or death. Recently two children in a house in Utah were killed by aluminum phosphide that an exterminator used in their yard to control voles. The owner of the company apologized for the mishap.

Recently there was an article in a NM paper about how a pest control company injects pesticides into the walls of homes to control all the pests that hide in the walls. Someone asked me if this was something they should consider. The answer is NO.

First, there are very few pests that nest in our walls. Some ants will come in from the outside and if they find ample food and water in the home, they may nest in a wall. This would include odorous house ants (*Tapinoma sessile*), little black ants (*Monomorium minimum*) and one or two other species. All you have to do is get the ants properly identified and then put out a bait they like. They will take it back into the wall and kill the queen and colony. Pesticides aren't necessary. Who else nests in walls? German roaches in urban/ghetto areas may nest in walls, but the American and Oriental roaches we have here in NM prefer areas with access to water. A wall would be too dry for them to nest. Centipedes, scorpions, spiders and other pests may get into a wall, but they won't stay there very long. The only real pest that you will find in walls are subterranean termites, and the treatment method they use won't affect them. It may be possible to get a wasp nest in a wall, and if that is the case, this method may help. However it wouldn't be necessary to treat all the walls in the house.

Why else is this a bad idea? If there were bugs in the walls they could get into your house. If the bugs could get into your house, so will the pesticides. Do you really want someone pumping pesticides in your walls that will come into your home and threaten the health of your family and pets? Nobody may get sick right away, but the pesticides can build up in your body or your children's bodies and comprise your health.

So why would anyone want to pump pesticides into your walls if there aren't any pests there? The answer is the same as why we sprayed baseboards in homes for many years. It is perceived value. The

industry sprayed baseboards to supposedly kill all the bugs that ran along the baseboard. Of course very few bugs actually ran along the baseboard. The real reason that baseboards were sprayed was to kill time in the customer's home to make it look like they were getting their money's worth. Most companies don't spray baseboards anymore, although a few still do. Power spraying the perimeter of a house was also widely used, but now is frowned upon as it has no real value and they tend to kill more beneficial insects than pests. It is particularly silly when the pest company sprays around your home in the middle of winter.

If baseboard spraying, power spraying and pumping pesticides into walls isn't effective pest control, then what is? In reality, pesticides should never be used in a home unless you have an infestation of a pest. In many cases, pesticides aren't necessary then. If someone wants to spray your baseboards or pump pesticides into your walls, ask them to sign a paper stating that they will accept financial responsibility if anyone in your family or your pets get sick from the pesticides. If they agree to that (and they won't), then you can consider it.

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.

There are basically three degrees of professionalism in the industry. There are the "antiquated" companies, who still go in homes and spray baseboards even though they have no idea what kind of pest the customer has or even if they have a pest. Mostly it is old-timers who still do this and it will eventually disappear. In the antiquated companies in the industry, all they know is they kill roaches and ants. One supervisor told me many years ago that there were only two kinds of ants, inside ants and outside ants! He was the service manager! That company didn't do well over the years. Other antiquated companies recognize sugar ants, grease ants and piss ants.

The next level of professionalism is the "mediocre" group of companies. They all have the same habits and follow the same routines, regardless of how unprofessional it may be. This is usually a result of lack of training. The folks start companies and develop their methods based on what they did in previous companies they worked for, even if those methods are no long viable. While this may work for many customers and is easy to do, it still puts them behind the true "Professionals", who take this industry very seriously. Professionalism at the highest degree should be the mission of every company, but it is not even close.

The most common level of knowledge is represented in the mediocre companies around the country. They use common names for insects that make no sense. They refer to "crazy" ants. Why are they crazy? Have they been to an insect psychiatrist? They are called crazy ants because they run around in circles. Lots of ants do that. My kids did that. It is a ridiculous name. "Acrobat" ants do not swing from chandeliers in the customer's house and pavement ants don't live exclusively under pavement. I have never sniffed an "odorous" house ant, so don't know if they smell funny, but I am told they do. I have never met a customer with an ant problem who has squished and sniffed their ants. Of the 48 species of "field" ants that live in NM, only two of them actually live in fields! We have "carpet" beetles in homes without carpets. It goes on and on. Every company should strive to reach the upper level of competency and achieve true professionalism in the industry when it comes to technical knowledge and use the scientific names of the pests.

The antiquated companies will treat the baseboards of their customer's homes. Period. The mediocre companies will spray pesticides inside and out in a general manner, and will spray pesticides in the dead of winter when bugs are hibernating. This is, of course, for show only, except all they are showing is their lack of technical knowledge.

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. The mediocres will sometimes not wear the safety gear as they don't want you to think their products are dangerous.

In Summation:
If they aren't wearing a uniform or neatly dressed, ask for identification and to see a copy of their license. Only amateurs would come to your home dressed in T-shirts or shorts.

If they don't thoroughly inspect your home, inside and outside and under it if you have a crawl space, then call someone else.

If they say they will spray your home regularly inside send them on their way. You are looking for safe and effective pest management, not pesticide pollution.

If they don't recognize your pest to species or otherwise seem like they aren't aware of what they are doing, send them on your way. Some companies hire car salesman and other types of salesmen to sell pest control and that is not professional. Everyone in the company, salespeople, service technicians and managers should be properly trained in all aspects of pest management.

Choose your pest management professional carefully. Use the same criteria you would use in choosing a doctor or any other professional.

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 libel for missing the drywoods

and had to pay for the subsequent fumigation. He went out of business and the last I heard he was in Alaska panning for gold. Hope he is better at that then he was at inspecting homes for termites.

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 libel as he should have been.

In a similar case, a company inspected a wooden cabin in Cimarron, NM and didn't find termites. He didn't see all of the bostrichid beetles on the window sills and ended up paying for a fumigation.

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 termiticde 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.

Drywood termite control by professionals

Drywood termites are a major wood destroying insect that cost consumers many millions of dollars in damage and control. One estimate suggested Californians alone spend $250 million dollars a year on this insect.

For many years the primary method of controlling drywood termites was to use sulfuryl fluoride (Vikane) as a fumigant. The house had to be wrapped and sealed and the gas injected. It was and still is a major inconvenience for homeowners as they had to do a lot to prepare for the fumigation as well as stay out of the house overnight. It was thought that once the house was cleared that the fumigant would dissipate harmlessly into the atmosphere. A recent study by the University of California at Irvine has destroyed that myth. It turns out that sulfuryl fluoride is a major greenhouse gas that can last about 30 years in the atmosphere and may last up to 100 years. This study can be found at (http://www.sciencedaily.com/releases/2009/01/090121144059.htm). Another study by the Scripps Institute of Oceanography confirms Irvine's findings. It can be found at (http://scrippsnews.ucsd.edu/Releases/?releaseID=965. The Scripps study says researchers calculated that one kilogram of sulfuryl fluoride emitted into the atmosphere has a global warming potential approximately 4,800 times greater than one kilogram of carbon dioxide. That is pretty impressive. With the amount of carbon dioxide in the atmosphere now and helping cause global warming,

Also homes and commercial buildings are built differently now than when sulfuryl fluoride was in its prime. The homes made today are constructed much tighter to control energy and that can impede the flow of gas throughout the building leaving some areas untreated. This is one reason why fumigation has a higher re-infestation rate than orange oil treatments.

Vikane is the trade name for sulfuryl fluoride gas. Vikane is extremely hazardous and carries the skull + crossbones poison label.

There are some incidents worth mentioning. The San Diego Union-Tribune, on March 10, 2005 reported that a 39 year old woman was in a tented building that was fumigated with sulfuryl flouride. She screamed for help and was removed from the building but she died.

In another case two families (eleven people in total) in an adjacent house to the fumigation were not evacuated in advance of the fumigation and had no reason to suspect anything was amiss as sulfuryl fluoride, the highly toxic gas used, is odorless and colorless. The only person to have remained at home throughout the duration of the fumigation started to feel ill by the evening, experiencing nausea, vomiting, diarrhea, and itchiness. The 39 year old father of three was admitted to hospital the following day but after three hours stopped breathing and died of heart failure shortly after. The remaining ten people who had been in the adjacent building all experienced symptoms of poisoning.

Finally two fatalities occurred when the owners of a home re-entered after the dwelling had been

fumigated with 250 pounds of sulfuryl fluoride. The concentration to which the occupants were exposed was not determined. The man died within 24 hours, and the woman expired 6 days after exposure. Signs of intoxication included severe dyspnea, cough, generalized seizure, cardiopulmonary arrest (in the man), and weakness, anorexia, nausea, repeated vomiting, and hypoxemia.

These three incidents occurred over a number of years and only one was in California. However, the common denominator in all incidents was the use of sulfuryl flouride to control drywood termites or a wood boring beetle. Sure the incidents are rare, but why would anyone want to take a chance on having their family exposed to this kind of extremely dangerous product when safer and effective alternatives are available? To me it amazing that the use of sulfuryl flouride is even permitted in California or anywhere else.

If you are still having trouble making up your mind, please read this letter I was given by a newspaper. The fellow who wrote the letter is the manager of a national pest control company. He wrote the letter to a colleague and copied it to the paper. I assume he wanted it printed. I was going to run it in my column but the paper didn't want to because the letter is so incoherent. They were right of course. However, I believe it is necessary for anyone thinking of having their house fumigated to read it. It is so poorly written it is funny (and scary). I won't mention the writer's name or the name of his company. Here is the letter with my comment following it:

"I believe when the hype dies down, and in a few years the swarms come again; it will be different, We even use traditional methods very well - Termidor etc; of course I could use a little Orange Mist Spray : Aerosol with citrus odor along with ProCitra-DL a botanical-based insecticide but why when Termidor is doing all the work.....That is what some companies do they use Termidor or a non repellent, along with the Orange Oil.

How can one kill all infestations That are hidden ?? I am just honest and sell with integrity and don't worry. But this false and misleading concept must stop. It is even in the Rules ad Regs at the (Structural Pest Control Board) SPCB and they have not fined anyone or have they? I think People That write these articles should also do their own research, maybe the fume industry can use the press to their advantage??

There is a time and place for a local treatment and a time and place for a fumigation with Vikane, the consumers read and hear this and if t is out of sight it is out of mind. What about behind the walls that a humane being cannot reach? Lets say a 5 Story building with lots of hidden wood ? with sub floors, roof sheathing and it is all buttoned up how do you kill anything with Orange Oil"

My comments: That letter is hard to follow. I am not sure what the writer means in the first paragraph as it is pretty much incomprehensible. If a homeowner has subterranean and drywood termites the company would use Termidor and orange oil. That makes sense so I do not know what point he is trying to make.

The next paragraph is more serious. The fumigation industry has been trying to put the orange oil industry out of business and they even had a regulation put in place that prohibits the orange oil folks from comparing orange oil treatment to fumigation or from saying that orange oil is a viable alternative. They obviously want the SPCB to become more involved in protecting their industry. Of course that regulation is nonsense as orange oil is a perfectly acceptable alternative to fumigation.

The last paragraph is characteristic of the misinformation they put out. A good orange oil treatment

will work in a five story building. Imagine the cost of tenting and fumigating such a building. I showed this letter to one of the orange oil companies in California. The owner told me that when they treat such buildings, they inspect everywhere. He said: *"The inspection on a 40,000 sq. ft. commercial building we treated took 8 hours and a 200 unit apartment complex took 3 days! Essentially, an effective and complete inspection relies on a very experienced inspector who knows what to look for and where to look. With re-infestation rates running at a quarter of the industry average, we are clearly able to both find every infestation and eliminate it".* Imagine the hassle of tenting and fumigating a 200 unit apartment complex and uprooting all those people.

Finally it is pretty clear that this fellow is a spokesperson for the fumigation industry (maybe self-appointed). If he represents the fumigation industry then there is nothing I have written or could write to make that industry look worse. How can you trust an industry that is supposed to check your home prior to fumigating it and then check it afterward to make sure it is safe if they can't even run spelling and grammar check before sending a letter to a newspaper?

There have been other methods of control tried but most only allow spot treatments. Microwaves, heat, cold and electro guns are a few. Heat has actually progressed to where it is considered sufficient to control termites in the entire house. There is a lot of preparation needed for heat treatment and the time and labor cost is reflected in your bill for the treatment. It takes six to eight hours to heat a piece of wood internally to 125° Fahrenheit. In addition, the pretreatment preparation required of the homeowner is extensive and, if not completed properly, heat can be extremely damaging to property, such as plastics, electronics, and many other items. and there was at least one instance of a house exploding because of the heat and propane gas. I can't recommend this treatment.

Approximately a dozen years ago orange oil became a player in the termite control game and a very good player indeed. While there are several kinds of orange oil available to the pest control professional, one brand, XT-2000 stands out. It is the only orange oil formulation that can be used to treat entire homes. The others are only good for spot treatments. Orange oil is unique in that the capillary action of the product works in many ways like fumigation, but without the same risks! XT-2000 Orange Oil moves through wood like a gas, along the path of least resistance, filling up the treated piece of wood until the termites have no place to hide. Unlike fumigation, XT-2000 Orange Oil treatments are specifically targeted to the area of infestation, so you do not need to move out of your home during the treatment. Because of sophisticated optical equipment such as the borescope, inspectors have the ability to located otherwise hidden termite problems and treat them. Since orange oil has come on the scene, over 500,000 buildings have been treated. This includes homes, churches, schools, apartment complexes,81 and assorted commercial buildings. There has been a very low callback rate with this treatment which demonstrates the effectiveness of the orange oil.

As for XT-2000, the company that distributes it is very selective as to where it goes. Any company that wants to use it has to go through a vigorous training program first and have annual training updates. Very few pest control products are as vigorously controlled by private industry.

Years ago we had DDT, chlordane, aldrin, dieldrin and many other pesticides that were thought to be ideal in how they controlled pests. I have used all of those products myself and I have fumigated many homes with sulfuryl fluoride. As time went by these products were determined to be far more detrimental to use than previously thought and they were eventually removed from use. Sulfuryl fluoride is in that category. It has been used in thousands of fumigations, most of them successfully, but we now know that sulfuryl fluoride is a serious greenhouse gas as noted earlier. The chemical's annual use in California creates emissions equivalent to the carbon dioxide produced by 1 million cars

and California accounts for 60% of the sulfuryl fluoride used in the world.

Another important fact about sulfuryl fluoride is that when it breaks down it leaves fluoride in the soil, your home and on your food. Flouride has been linked to a number of deaths, particularly to children and the elderly. Inhaled fluoride has been implicated in acute respiratory failure.

It is about time that Dow Chemical pulls Vikane off the market. Dow is not a bad company. They have a lot of very good products and services, yet like any company they have made mistakes. They would be doing their customers, society and the environment a service by removing sulfuryl fluoride from use and putting it in the museum alongside DDT, chlordane and the others. Sulfuryl fluoride is the past in drywood termite control using orange oil is the future.

I got the following letter from a reader. It demonstrates that the fumigation industry is not to be trusted:

"*When we bought our house and while it was still empty we had the fumigation done. As a first time homeowner and because I worked near our new home I stopped by often to see how things were going. We also had the wood floors redone, etc. So I stopped by one day and there was a small pickup truck from the pest control company out front. The tent was taken down and had been down for a while. I went in the house and there was a guy from the pest control with a little pouch on his side. He hadn't heard me come in since all the doors and windows were open.*

Before I said anything I saw him reach into the pouch and toss something on the floor. He was startled when I asked him what he was doing. I'll tell you what he was doing. In his pouch he had an assortment of dead bugs. He was throwing them here and there! He left quickly after trying to tell me the house wasn't safe to occupy. I told him "B S". My guess is that they didn't use any Vikane or anything else. They just did the bare minimum"

If you think you have drywood termites, find a company that uses orange oil to inspect your home and treat it. It is much safer and more effective than fumigating your home.

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.

Never let a company, no matter how "nice" the representative may be, fumigate your house with sulfuryl flouride. It is not safe, it is a major greenhouse gas contributor and it puts more carbon dioxide into the atmosphere than automobiles. Go with XT-2000. It is safe, it is effective and it is environmentally friendly.

The Good Companies

Obviously I don't know all the companies in the country. Not even close. The few companies I mention below I do know personally. I get emails from all over the country and I have a long list of companies I get complaints aboiut, but very few people contact me and tell me how good a company is. There are undoubtedly many other good companies, but the best way to determine who they are is to follow the suggestions in the chapter that covers picking good companies. It wouldn't hurt to ask for and check references of anyone you call.

Preventive Pest Control - www.preventivepestcontrol.com
Preventive is owned by Greg Hunt and Kevin Oleson and they are very good people. They have branches in California, Arizona, Utah, Nevada, New Mexico and Texas. I would like to see them expand to every state in the union, but that probably won't happen. Not that many bugs in North Dakota. Wherever they are, they set the standard for ethics and competency in the industry. There are very few companies in this country that put the customer first and profit second, and Preventive is one of them. Almost every other company first looks at the status of their bank accounts and then controls the pests. I mean they will charge exorbitant amounts of money to control some pests simply because they can. Many companies get hundreds of dollars for treating a room for bed bugs. Many companies charge thousands of dollars for a termite job worth a fraction of that. Many companies won't even do a job because it wouldn't be profitable. Preventive Pest Control isn't like that. They will donate their service in some instances. I know of a non-profit organization that had termites in Bernalillo, NM and Chesley, the local Preventive manager told me they wouldn't mind helping these folks out for free if

necessary. I don't know very many pest control companies that would do that. I have known Greg, Kevin, Allen, Chesley, Nathan, Stu and many other of their employees over the years and to a person, they have exceptional human values. If you have a pest problem and you don't want to do it yourself and there is a Preventive branch near you, you absolutely can't go wrong.

XT2000 Inc. and XT2000 Termite - www.xt2000.com
I have, in my pest control career, fumigated many homes with sulfuryl flouride (Vikane) for controlling drywood termites. It was extremely hard work both for the pest control company and the homeowners. They had to move out of the house for a few days, find lodging, pay for meals, board their pets, and often had to replace food left out. There was frequent damage to shrubbery around the house from tenting the house. There was no viable alternative in those days. About a dozen years ago, Michael Folkins of San Diego, California developed an product that was not only effective against drywood termites and wood boring beetles, it was absolutely safe. You didn't have to leave your house, board your pet or worry about the landscaping. He developed XT-2000 Orange Oil which is 95% orange oil (also known as d-limonene). It is derived from the rind of the orange. You can't get any more organic than that. XT-2000 Orange Oil will quickly kill drywood termites on contact and will kill their eggs as well as it travels through the wood very effectively. Over 100,000 homes and businesses have been treated with XT-2000 Orange Oil since Michael developed it. It is much safer and much more effective than sulfuryl flouride and you get a guarantee that is just as good as any.

Not only is XT-2000 widely used in California and some other states, but it is starting to be recognized in other parts of the world. Recently a termite epidemic was sweeping through the Azores Islands. These islands are about 900 miles off the coast of Portugal in the Atlantic Ocean, and they have termites also. An entire city was being attacked by drywood termites on the island of Terceira. They didn't want to tent and fumigate because of the close proximity of the buildings to each other. They contacted Michael at XT-2000 Inc. and he and his crew successfully treated five sites in the city, including three homes and two museums. There has been no reinfestations in any of the buildings treated.

It is not only effective in homes and commercial buildings, it is very effective in condominiums and apartment complexes. Think of the cost and incovenience of moving multiple people out of a building before you can fumigate it. That isn't necessary when XT-2000 Orange Oil is used. XT-2000 is perfectly safe. It has an FDA GRAS rating (Generally Regarded as Safe). While it is safe for people it is dangerous for insects. D-limonene has been used to kill insects since 1958.

When you fumigate with sulfuryl flouride you will have an invisible residue of flouride on everything in your house. Sulfuryl flouride is also a major greenhouse gas. XT-2000 will leave your house smelling like oranges and it won't disturb the atmosphere in any way.

Michael Folkins continues to contribute to the well-being of our planet by promoting XT-2000. He also makes sure that anyone who uses it is completely certified in how to apply it. His wife Anna runs Xtermite, Inc., their termite treatment company in San Diego. The two of them are doing a great job of effectively controlling drywood termites, maintaining the safety of the public and protecting our environment. I am very happy to be associated with them and the other companies that are certified to use XT-2000.

Planet Orange - www.planetorange.com
Planet Orange is owned by Nathan Cocozza, Mathew Warwick and Nathan Vogel. They started in 2006 and it is the largest company in California that uses XT-2000. They service the San Francisco Bay Area and much of north-central California.

When I meet new companies I have no problem recommending them if I agree with how they service accounts. Then if I get complaints, I will no longer recommend them. I have been recommending Planet Orange since the summer of 2008. In the time since then I have never received a complaint on their service. I have received hundreds of compliments on how professional their personnel are, so I will continue to recommend them. I never met them in person, although I would like to, but I do know from the general public that they are absolutely honest and competent. That is very rare in the pest control industry. This company has the capability, morally and ethically, to dominate the drywood termite industry in any state they choose to do business. I look forward to seeing their branches in Florida and Hawaii along with the rest of California. The folks in those areas will be truly blessed. I don't know if they are going to expand like that, but we can only hope.

Orkin - www.orkin.com
I have worked for Orkin a couple of times. I was a technician in the Hill Country of Texas and as a salesman in Albuquerque. The manager in Albuquerque at the time was Joe Harlow and he was an excellent manager. Orkin is a good company and the main reason I mention them here is that they pulled all of the B & G sprayers out of all their branches. They restrict their use of pesticides indoors to crack and crevices treatments with aerosols. This is much safer than spraying pesticides with a B & G. Also, they pulled all of the sub-slab injectors from all of their branches and just use the ground rod when treating for termites. This is much more effective and I would like to see all termite control companies do this.

ABC Pest Management - www.pestcontrolsupplies.com
ABC is a small company in Albuquerque, NM. The owner, Colin Fitzgerald, is a very concientious and honest person. Along with his pest control company, he sells pest control products to the public,

including Niban Bait which I recommend all of the time.

Holdfast Enviro Pest Solutions - www.holdfastpestsolutions.com.
Josh McCloud owns this very good company. They are based in Missoula, Montana and serve most of the western half of the state. Josh is very conscientious about practicing safe and effective pest management.

Greenbug – www.greenbugallnatural.com
Greenbug isn't a pest control company in the strict sense, but they provide excellent products made from cedar that are very safe to use and very effective in controlling pests. They are based in South Carolina. I recommend using their products in controlling bed bugs. I have never had a call back and Greenbug is absolutely safe, unlike the pesticides frequently used in bed bug control.

I can't promise that the companies I recommend do all of the things I suggested you look for, but they are all honorable people and I am sure they will work with you. There are no perfect companies in this industry. I would say a small percentage of the companies are antiquated, as defined earlier. Most companies are in the mediocre arena and some are true professionals, certainly in their attitude. The companies above are all in the true professionalism category.

My email address is askthebugman2013@gmail.com
You can follow me on Twitter @askthebugman
You can Like my FB at Ask the Bugman
I have approximately 2100 connections on LinkedIn if you want to join me

My mailing address is:
6804 4th St. NW, #134
Los Ranchos, NM 87107

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. Be sure to include an email address so I can contact you with the results. Also, please include $10 for this service as it does take time in most cases. If you are a member of the Bug Club, there is no charge for insect identification.

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?

Think about it. God created all of us, every species, with one thing in mind – Love. He did not create us so we can fight each other, argue with each other, barbecue each other, or swat flies! His purpose was for us to Love and Respect each other and that includes every species. Would Jesus ever hunt or attend a bullfight or stomp on a bug or swat a fly? I don't think so.

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 God 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