SAFE & EFFECTIVE PEST MANAGEMENT

OF

GARDEN, LAWN & HOUSEPLANT PESTS

Richard “Bugman” Fagerlund

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FORWARD

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

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

So, why risk harming yourself, your family, your pets and future generations when you can make environmentally-friendly decisions? Fortunately, Richard Fagerlund has compiled a book of tips and tricks you can use that are simple to follow and do. I have read Richard's newspaper column for years and have turned to him for many times over the years for tips and advice online. Richard has been in the pest management industry for over 40 years. His knowledge and experience with conventional pesticides combined with his love for the quality of life for humans, animals and keeping our planet healthy gives him a unique perspective on eco-friendly pest management. He knows what works best and has the background to prove it.

By not using harmful pesticides, you not only encourage natural predators such as ladybugs, chalcids, ichneumon wasps, lacewings, lizards, birds, frogs, hoverflies, brachonids and praying mantis to thrive, but you'll also grow in harmony with nature. Knowing your tomatoes are grown free from powerful environmentally destroying chemicals will give you and your family peace of mind. I have worked in the greenhouse industry for over a decade and have recently become an avid home gardener. Having a tool like this book available is invaluable to those concerned about keeping your family safe and keeping the environment free from toxic chemicals.

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

Ryan Clarke

INTRODUCTION
This is the third booklet in my series of safe and effective pest management methods for controlling
pests without using pesticides. Like the two previous ones, this one will be free for the asking.
Because lawn and gardens are complex priorities, I will focus solely on pests and their control. There
are experts on fertilizing, watering, trimming, etc. of gardens and lawns that are available. I want to
stay on my subject – pests and pest management without endangering our health, our children's health,
our pet's health and without polluting the environment. This booklet is not a cure all. Its sole purpose is
to help you control garden, lawn and houseplant pests safely and effectively. There are times when the
info you need may not be in this booklet. Hopefully it will help in most situations.

The first section will list the most common lawn and garden plants in the country. Each one will list
the pest bugs they most often get. There are many pests that attack almost all plants and they will be
listed first. Aphids, for instance, are on almost all plants that we grow. There are many others as well.
The other bugs listed are more restricted in what they attack. Once you determine what you suspect
is bothering some of your plants, you can go to the second part, which lists all the pests. This section
will describe the habits of each bug and what they infest. Some control methods will be listed in this
section as well. I will be mentioning diatomaceous earth in various places and will abbreviate it as DE.
When using DE, I always recommend using food grade only. It is available in most feed stores. I will
also occasionally recommend using Greenbug for Outdoors. This is a product made from cedar that
will kill most insects. It is available online from www.greenbugallnatural.com. I will also mention
ground pepper, which you can put around plants to repel pests.

Later in the book there will be more on control. 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 will also use scientific names in the booklet, so you can Google any pest if you want to get more
information. Common names (or, as I call them, nicknames) are useless, as they are not used
everywhere and many bugs share the same nickname. Another reason for using scientific names is
because there are no photos in the book. Since it is being given away free, I have to keep it as simple
as I can. The reader can Google a scientific name and find a lot of pictures of the pest in question.

Also, if you need some garden or household pests identified, I will be happy to do it for you. Put them
in a vial or small plastic container, pack them in a bubble envelope or box and mail them to me. Be
sure to include your email address so I can contact you with the results. I charge $10 for this service as
it often does take some time. My mailing address is 6804 4th St. NW, #134, Los Ranchos, NM 87107.
I want to dedicate this book to a very good friend, Heather Hunt. Heather is a wonderful person. Her husband, Greg Hunt, is the owner of Preventive Pest Control, one of the very few pest control companies that I recommend. Heather and Greg are both wonderful people.

I want to thank my best friend, Karen McSorley, for drawing the aphid on the cover page.

**Types of Lawn Grasses**

Many of the grasses below are likely to attract the following pests; Aphids, sod webworms, armyworms, cutworms and white grubs. Some other pests you may have in your lawn are listed.

**Annual bluegrass**  
Annual bluegrass weevil

**Bentgrass**  
Chinch bugs, Fiery skippers, Frit flies

**Bermudagrass**  
Bermudagrass mites, Banks grass mites, Two-lined spittlebugs, Billbugs. Fiery skippers

**Buffalograss**  
Chinch bugs

**Kentucky bluegrass**  
Clover mites, Banks grass mites, Chinch bugs, Billbugs, Frit flies

**Perennial ryegrass**  
Clover mites, Chinch bugs

**Red fescue**  
Chinch bugs

**St. Augustinegrass**  
Banks grass mites, Chinch bugs,

**Tall fescue**  
Billbugs

**Zoysiagrass**  
Chinch bugs,

Probably the best treatment for lawn pests would be using Greenbug for Outdoors in an irrigation system. You can go to Greenbug’s website for more information on this sytem. It is at www.greenbugallnatural.com. Treating infested areas with a mixture of diatomaceous water and water will also help. Mix two cups of food-grade diatomaceous earth with a gallon of water and soak infested areas.

Of course, proper watering, cutting and maintenance of a lawn is very important in limiting pest activity.
**Types of Garden Plants**

The following pests may be found on any and all types of plants; Aphids, scales, thrips, cutworms, caterpillars, snails, slugs, spider mites and seedcorn maggots.

**Apples**
- Codling moths and Lygus bugs get on apples. The boxelder bugs, which normally infest boxelder trees will also get on some apple trees.

**Asparagus**
- Asparagus beetles feed on asparagus.

**Beans**
- Weevils, seedcorn maggots and cucumber beetles will infest beans.

**Broccoli, Brussel Sprouts, Cabbage, Cauliflower**
- These plants will get beet armyworms, cabbage maggots, flea beetles, harlequin bugs and the imported cabbageworm.

**Cantaloupe**
- Canteloupe will get squash bugs, cucumber beetles, flea beetles and brown marmorate stink bugs.

**Carrots**
- You may find carrot rust flies, flea beetles and vegetable weevils on carrots.

**Cucumbers**
- You may find cucumber beetles, flea beetles, squash bugs and stink bugs on cucumber.

**Eggplant**
- Eggplants may get cucumber beetles, flea beetles, hornworms, lygus bugs and spittlebugs.

**Grapes**
- Grapes will get boxelder bugs, glassy-winged sharpshooter, hoplia beetles and Sphinx moth larvae.

**Lettuce**
- Flea beetles and vegetable weevils can be found on lettuce.

**Onions**
- Bulb mites and onion maggots can be found on onions.

**Peas**
- Cucumber beetles and weevils can be found on peas.

**Peppers**
- Cucumber beetles, flea beetles, hornworms and lygus bugs can be found on peppers.
Potatoes
   You can find the potato tuberworm infesting potatoes.

Pumpkins, Squash
   These plants will get cucumber beetles, squash bugs and stink bugs.

Strawberries
   Strawberries can get hoplia beetles, lygus bugs, and the spotted wing fruit flies.

Tomatoes
   Tomatoes can get hornworms, tomato pinworms, lygus bugs, potato tuberworms, stink bugs, tomato russet mites and vegetable weevils.

Watermelon
   You can find cucumber beetles, squash bugs and stink bugs on watermelon.

Houseplants
   Various species of houseplants will get brown soft scale, fungus gnats , aphids, mealybugs, whiteflies, garden springtails and the two-spotted spider mites.

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 (Armadilliidae)

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 (Armadillo 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 others 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. This 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 enable 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 zoysiagrass. 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.
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 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. It 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, rescue and centipede grass. 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.

Thrips (Thripidae)
This family of thrips contain the most pest species. 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)
Beetles are the largest group of insects in the world. In the United States alone, there are approximately 28,000 species. Fortunately most of these species are not pests and many are beneficial. Only a few families of beetles are pests in our gardens and lawns.

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 - *Pyrrhita 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. Information on pest proofing homes is available in my previous book, “Pests (or Guests) & How to Manage them Safely and Effectively”. That book is also free to anyone who wants it. It is available on my website at [www.askthebugman.wordpress.com](http://www.askthebugman.wordpress.com)

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 (Torticidae - *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, although 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 ground 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 tilliardium*) 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 tomatoes 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**.
Mammals

Gophers (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, diphenacinone, 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 repellent can be very effective.

When using a repellent, 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 repellent 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

**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. They will damage plants you want.

NEWSLETTER

Johnna Dewberry and I publish a monthly newsletter that covers non-toxic pest management issues and natural living recommendations. You can subscribe on my website at www.askthebugman.wordpress.com if you would like to receive it. You should also visit Johnna's website at www.urbandewberry.com. It is a very informative website about natural living.

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 1400 connections on LinkedIn if you want to join me

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

As mentioned earlier, 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.