

Bioicide



Understanding And Applying Measures To Safely Rid Garden Landscapes Of These Pests

- **FUNGUS**
- **WEEDS**
- **INSECTS**
- **ANIMALS**





The Garden Guy respects and supports all logical efforts to . . . reduce the use of paper, and the avoidable impact on our Country's landfills.

About The Author



Through my many years, I have perfected my gardening skills and expanded my knowledge and experience as a gardening instructor, speaker, author, certified nursery consultant, and most recently blogger.

I was introduced to gardening at the very early age of 8. I lived across the street from a man who gardened his little slice of heaven on about 5 acres of semi-rural property in No. California. Mr. May had everything from honeybees to an orchard, and was very accommodating to the little boy from across the street. I spent hours shadowing Mr. May around his place, asking questions, making mental notes and scurrying across the street to try my hand in my parent's anemic yard. Eventually I got so good at applying Mr. May's know-how that I won the consent of my Mother to tend her flower beds; and my Dad gave me a vegetable garden plot in the corner of our backyard. I didn't know then that I was attracted to the science of the whole thing, but I could see the results and was very proud of the increase in blooms for my Mom, and the vegetable production that even I could appreciate as abundant. I was hooked.

High school and college left little time or opportunity to get in the dirt. But, I was rewarded and further encouraged by my zoology and botany classes and next tried my hand at tending a garden underneath the high porch and stairs of our apartment in No. New Jersey. It all came back to me and when we finally had our first home I had my first garden plot as an adult. Some early setbacks and a hankering to be more at-one with the earth, led me to the disciplines and sacrifices of French Bio-Intensive Organic Gardening. Yeah, I wore wing tips to work, but I had Birkenstocks in my heart as a young man in the late 70s.

Today, I live on a "rock" in Rocklin, CA and my active gardening is restricted to raised beds (even my lawn is a raised bed) and patio containers. But, I do keep up with the latest trends in gardening, the irreversible encroachment of the Government on our garden culture; and most importantly, those new to the pleasures of gardening. As a nursery consultant in the Garden Center of the world's leading home improvement store chain, I have even gained a faithful following of young adults with first home responsibilities and opportunities: and retired men and women who now have the time, focus, and inclination to finally develop a better understanding of gardening and hopes for its rewards.

Nearly every backyard patio has a charcoal or gas grill. My most recent experience in backyard cooking has been the introduction of the **Traeger Smoker / Grill** into the lives of myself, family and friends. If you're interested in learning more about this "life changing" form of backyard BBQ and grilling, take a peek at my [Traeger QuickGuide](#).



Biocide

Many home gardeners seek to, or regularly commit BIOCIDE. Biocide is an attack, usually meant to kill some pest that has invaded their garden landscape and threatens the health of their plants and/or their produce.

Biocide is performed by the introduction of a chemical substance, or a microorganism, to the plants, or their environment. The Garden Guy comes in contact with many home gardeners who wish to perform biocide by destroying, deterring, or controlling harmful Garden Pests even without sufficient knowledge to appreciate what this may mean to themselves, their families, pets, and the plants they seek to protect.

Too many home gardeners are quick to “nuke” their garden environments to rapidly and completely rid them of “bad” insects. However, a better understanding can enlighten new, or even careless gardeners to the effects unbridled biocide can have, but especially the balance in a healthy home garden created by the life cycles of “good” insects.

This biocide combat is filled with emotions, conflicts, opinions, and selections, good and bad, used to defeat the invaders.

Knowledge, Care, and Caution will give the informed home gardener what they need to triumph over their attackers.

The arsenal of Biocide is broad and, in most cases, lethal toward intended targets in the home garden. This arsenal includes:

- **INSECTICIDES**
- **FUNGICIDES**
- **HERBICIDES**
- **RODENTICIDES**

many of which can be found in the chemical section of your favorite garden center.



APHIDS

One of the earliest and most persistent of the “bad” bugs to invade the average garden.



HONEY BEE

One of the first innocent creatures to face the ill effects of a garden that has been “nuked”.



LADY BUG BEETLE

A fierce garden predator and “good” bug feeding voraciously on aphids.

Range of Impact

The bulk of this guide is focused on chemical and organic formulas in products designed to kill or deter insect and fungal pests. Because they are formula based, each has a degree of potential power which can be gaged on a sliding scale. The scale of potential lethality is important, because it is wise to know and recognize these parameters when choosing a fungicide that is just adequate to do the job.



Safe to use around Honeybees, Butterflies, and Hummingbirds.



Generally, it does not take a sledgehammer to kill a tiny aphid. They can be killed with a mere drop of some essential oil mixture, or strong jet of water. They will still be dead, however these “weaker” methods will have far fewer adverse effects on the environment surrounding the aphid; not the least of which is any lingering residue that could go on to

- 1) harm plant food potentials for humans,
- 2) destroy the beneficial “good” insects.

living and working in the kill zone. Your choice in selecting the strength of killing agent will definitely have consequences.

There was a time when the Garden Guy’s immediate choice for controlling aphids was to shake a systemic insecticide around the plant being attacked and water it in. The dissolved ingredients would be drawn into the plant as moisture and the poison would reside in the cell tissues of the plant. When the aphid sucked on the plant it would receive a lethal dose of poison. It was the perfect solution . . . until researchers discovered the plant tissue included the parts of a flower. As honey bees rummaged around a flower collecting nectar they would absorb enough of the poison to become disoriented, and perished without the supporting of their hive !

For this reason, the shortcut benefits of systemics have become highly suspect and demand a complete rethinking of the range of lethality need to kill or deter only the harmful insects.



We MUST Protect Our Remaining Honeybees And Other Pollinators !

We would be a most sorry world were it not for nature’s pollinators.

The Honeybee is our most precious pollinating partner.

Most insecticides are toxic to bees, and other pollinators, Application of chemical insecticides should be avoided particularly during the blossoming time for plants or trees.

Please be extra careful as the world’s bee population is in grave danger !

Insects

Our gardens would be pretty stark, if not for the array of “good” and “bad” insects found in and around our flowers, shrubs and trees.

A healthy yard or garden has a suitable ratio of good to bad insects. This balance ensures that there will be an insect population ready to till the soil, consume and digest decaying plant matter and most importantly amass sufficient pollinators to help ensure the future of each plant species.

Gardeners I meet often lament the failure of their fruiting blossoms to set fruit. Too often the lack of insects to need to help with pollenization can be traced back to them or a neighbor nuking their yards to make certain their yard is “safe” from insects !

I take great care to counsel these homeowners and help tame their inclinations toward blindly committing a broad form of Biocide.

HOW INSECTS DIE

In nature, insects die from lack of food and water, or from being eaten by a predator. Gardeners can be one of these predators when we seek to eliminate insects from our yards and gardens.

Generally, insects can be killed by humans because they have three vulnerable places where poisons can enter their body:

1. **ORAL** - what they eat has been poisoned
2. **DERMAL** - poisons pass through their sides
3. **RESPIRATORY** - they breathe in the poison

Three mechanisms have been developed to take advantage of these vulnerabilities:

LIQUID POISON SPRAYS

POWDERED POISON DUSTS

SYSTEMIC POISONS.



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Insecticide

Insecticides are substances used to control insect infestations by killing insects in their egg, larval, and/or adult stages of development. Insecticides have advanced through the 20th Century, into the 21st Century following the progression of chemical science and informed focus on “organic” solutions to controlling insects. As responsible stewards of our backyard ecosystems, we can, with a little knowledge, have a positive impact on the greater ecosystem that surrounds us all.

Insecticides have the potential to greatly impact, even alter, ecosystems. These impacts can effect humans, domestic and wild animals . . . but, especially the “good” insects that silently stalk our yards and gardens eagerly consuming “bad” insects that can cause serious damage to flowers, shrubs, trees and their produce.

Insecticides can be divided into two main categories:

CONTACT - insecticides in liquids, or dusts, which settle directly on the insects; or the insect crawls through some significant accumulation of the applied insecticide. Contact formulas can be as simple and low impact as insecticidal soap solution made from pure soap; up to, and including, a high impact formula such as the high powered Malathion concentrates.

SYSTEMIC - insecticides distributed though the tissues of the plant to be protected. Most insects that suck or chew on these tissues are poisoned by a chemical agent. Applied systemically these chemicals remain in the tissue of the plant, its flowers, and its fruits. One of the oldest players in the systemic insecticide game is Bayer Advanced Systemic Rose & Flower Care. This high impact systemic comes is a liquid concentrate, mixed for drenching applications; and a ready to use granular formula watered in by rain and irrigation. Because this chemical travels into the developing flower blossom - *blossoms can cause harm to honeybees !*



PURE CASTILE SOAP
Contact - Low Impact



NATURE'S CARE
Contact - Mid Impact



ROSE & FLOWER
Systemic - High Impact

Control Bad Insects - *Caterpillars*

Caterpillars are the larval stage of soon to be adult flying insects. It is in this stage that caterpillars do the most damage, chewing holes in leaves, or in extreme cases - consuming the leaves to a bare stem. The best way to avoid disappointments caterpillars can bring to your garden is to anticipate problems -and be prepared to fend them off, or avoid them altogether. Listed in this guide are several of the most common problems and their advised solutions. Whenever you find holes in any plant leaves, immediately suspect the presence of one or more caterpillars. The worst . . . the dreaded Hornworm.

Tomato Hornworm

OMG! If you are not vigilante, you can lose your entire tomato crop - literally overnight- to this giant pest. The Tomato Hornworm is the larva (caterpillar) born from the eggs of a huge, unwanted visitor, the Hornworm Moth.

SOLUTION: In late May, begin to carefully examine your vines EVERY DAY, as early in the day as possible. When you find these big bad boys (some nearly as big as a your middle finger) they will be immediately adjacent to leaves they have just finished stripping. And I mean stripped ! These big buggers leave only the naked stem on your prized tomato plant. Prevention starts with keeping an eye out for the pupae egg case of the critters when you prepare your soil in the late fall or early winter. It is a hard, brownish spindle shaped case about 2.5 inches long. Destroy those you find !

Early in the Spring purchase a bottle of **BT (bacillus thuringienis)** concentrate. BT is a living organism you will mix and spray over your entire tomato vine. When the worm eats the treated leaf, the BT gets in their gut and kills the worm. You will find dead worms shriveled up right on the vine. As with all controls, be careful to wear gloves, long sleeves and DO NOT breath in the spray.

Remember too, BT is a living organism. So store it, with the top on tight, on the door of your refrigerator. This way, your little army of worm fighters will remain suspended until you need to whip up a new batch of spray to ward off the next caterpillar invasion anywhere in your yard or garden.



Hornworm Moth and chrysalis egg case.



BT is the natural way to easily control leaf chewing caterpillars. **BT DOES NOT KILL BEES** and other important pollinators, or earthworms. The usual rinsing of picked vegetables makes this a safe and natural defense.



Fungi

Fungi are organisms, born from spores, that live in garden soil and plant parts. As spores, these plant diseases wait to be transferred to plants by wind, rain splatter, human and animal activities. Some even enter the plant's system through its roots. Unlike insects, fungi can be nearly microscopic in size. Some are so small they can only be detected by the pin prick size damage the initially surrounds them.

Damage caused by fungal infections can include spots and wilt on leaves, scabs and knots on stems and the collapse of roots; plus, partial or total spoilage of ripe fruits. The most common fungal infections found in the home garden are leaf spotting and curl, scabs, wilt, rust, blights, galls, smut, lesions and cankers.

Because the average home gardener will encounter fungal infections on their roses, we will address them first as an example of defending against and defeating fungi common to roses. The prime culprits will be black spot, rust, and powdery mildew. Roses share these common threats with their neighbors in the garden so this will prove a valuable lesson when dealing with fungi.

The spores of these fungi lurk in the soil and leaf and flower litter from the previous season carelessly left to accumulate on the ground below or near the rose bush. They wait for the perfect storm of temperature and humidity delivered by the warmth of spring to bloom into an infection waiting to find their way onto the leaves of an unprotected rose bush.

Spores will be born on the plant parts the fungi has infected. This plant debris is a ticking time bomb ! In addition to the damage caused by the fungi, destroyed tissues can give entrance to other related plant diseases. So, your first defense is to routinely remove fallen leaves and flower petals from under the rose bush and put them in the trash - NOT your compost pile. If you are a good steward of your landscape and still encounter fungal infections there are additional remedies available.



BLACK SPOT



RUST



POWDERY MILDEW

Depending on conditions, your Rose bush can be hit with any, or all, of these common fungal infections at anytime during the season. Keep a resolute eye out for the earliest signs that they have taken up residence in your rose garden, and or, surrounding landscape.

Fungicide

Fungus is perhaps the easiest pest to defend against in your garden. Because fungi are plant like organisms and depend on moisture to thrive and multiply, they must have a consistent abundance of moisture to survive. Think: black mold in a poorly ventilated bathroom. Beyond its source, fungi spores are spread by wind, splashing rain, insects, and animals, and careless or uninformed humans.

Aside from a dedication to keeping a well groomed garden, free of spore harboring litter,;a regimen of chemical treatment on targeted plants, including your prized roses, can help to keep the fungal infections at bay.

Fungicides can range from low to high along the impact scale depending on the concoction you choose to combat various fungi. Here, the Garden Guy will offer a range of spray and dust products formulated to prevent and/or control fungal infections.

Once a week, take a cup of coffee and slowly walk through your yard and garden to survey for unexpected accumulations of moisture, piles of litter from fallen leaves or flower blossoms. Randomly check stems and leaves of flowering plants.

The active ingredient (AI) determines the impact these sprays will have on you garden environment.

Nature's Care

AI: Copper Soap (Fatty Acid Compound)

Organocide 3-in-1

AI: Copper Soap (Fatty Acid Mix)

IMMUNOX

AI: Myclobutanil*

Use fungicides only as directed and with the cautions indicated on the container.

:* Myclobutanil not likely a carcinogen, but should be avoided by women who are pregnant, or seeking to be pregnant.



NATURE CARE
Contact - Low Impact



ORGANOCIDE
Contact - Low Impact



IMMUNOX
Contact - High Impact

Rodenticide

Mice

Mice are small common rodents that often migrate from local fields into barns, shed and homes. They are small, 2-3 inches with a short tail. Their droppings are the size of rice. If they have invaded your home, they have come in to come in to food and/or shelter to birth their young.

Rats

Rats are larger rodents. The common Brown, or Norwegian Rat (a cousin of the domesticated white lab rat), is 5-7 inches with a significantly longer tail than a mouse, and very thick at its base. Their droppings are the size of raisins. Like mice, rats invade your spaces with the intent of taking up residence in your home where they might find food and shelter for raising their young.

Don't let rodents get the upper hand. You could quickly loose the battle. Rodents, especially brown rats are baby making machines. Fertile females can mate all day long and continually drop a new litter every 21-26 days.

Control

Control of rodents begins with the elimination of any access to the buildings on your property - especially where food for humans or pets is stored. Locating the rodents entrance(s) will take a bit of sleuthing. Think like a mouse as they can squeeze through even the tiniest holes in walls, roofs, masonry foundations, and damaged windows or doors.

Next, eliminate access to any food that might reward the unwanted rodents invading your home or business. This includes stored nuts, seeds, and especially pet foods set out where rodents can feast. If pet food is set out, make certain it is completely eaten by your pet before nightfall when rodents begin to roam, if not eaten completely by your pet . . . bring the remainder inside for the night.



COMMON MOUSE

Smaller than a Rat.
Thin tail. Eyes and ears exaggerated in relationship to THE body.



BROWN RAT

Much larger than a Mouse.
Heavy, thick tail.
Strong, front legs.

Continued

Rodenticide (Continued)

Bait Poisons

If poison baits can be kept away from **PETS and CHILDREN**; and, you are not concerned about where the rodent dies . . . then poisons may be your control of choice. All packages contain a quantity of **POISON** baits and a container to house the bait.



POISON BAIT Warning:

Keep away from **CHILDREN & PETS.**

Organic Baits

If poison baits are too dangerous for your situation, then you can consider a safer organic bait. **Rat X and Mouse X** are the leading Non-Toxic rodent controls. The ingredients block the rodents passage from stomach to bowel, and they dehydrate, fall into coma and die. Proven safe around pets and children. Note: for Rat X to be most effective, it must remain **DRY**; and, all sources of food should be eliminated from the area to be controlled.



RAT X Organic Bait

100% Corn Gluten.
Safe around Pets
and Children.

Traps

If poison baits and organic controls are, in your situation, likely to leave rodents dying and decomposing in a place not of your choosing . . . then the immediate dispatch of the rodent in a mechanical trap may be your better choice. By far, the **TOMCAT SECURE KILL Snap Trap** is the leader in mechanical traps. They are completely safe while baiting (Reeses Peanut butter Cup is a proven bait) and easy to apply to the bait well.



TAKE CARE TO SET MECHANICAL SNAP TRAPS IN AREAS WHERE PETS AND CHILDREN CANNOT BE INJURED.

TOMCAT SECURE KILL traps are available in Rat and Mouse sizes, easily emptied and ready to work again with simple simple and easy reset.

TOMCAT SECURE KILL

The leader in mechanical rodent traps. Available in **RAT** and **MOUSE** sizes.

Garden Guardians

There are many creatures we can recruit to help us guard our yards and gardens. Some will find their way into a healthy setting. Others, can be enticed to join our campaign of prudent gardening approaches.

Wild Birds

Wild birds can be attracted to your yard and garden. Shelter (trees and large shrubs), food (seeds and nuts, especially in cold months) and clean water (for drinking and bathing) are all invitations for birds to regularly visit or take up residence on your property.



Wild Birds

Garden Spiders

If you have not nuked your yard, large garden spiders will find their way into your landscape. Their large ornate webs are easy to spot and are usually attended by a single spider that specializes in catching insects for his regular meals. Never kill these garden sentinal and try not to disturb their webs.



Garden Spiders

Nonpoisonous Snakes & Lizards

There are just two kinds of snakes they can visit your yard and gardens - Poisonous and nonpoisonous. Learn which is which in your area and prepare to deal with both when you discover them. Poisonous snakes should be dealt with immediately and with the help of a professional snake wrangler. If the snake is poisonous, Google Rattlesnake Control and contact them while you still have the snake in sight. They will remove the poisonous snake without harming it.



**Snakes & Lizards
(Non-Poisonous)**

Nonpoisonous snakes and lizards will be patrolling our yards and gardens if you have not nuked your yard and they are not harmed or discouraged when discovered. Lizards will eat their weight in insects every day. Beneficial snakes will help to rid your gardens of rats and mice you don't even see. Keep a cool head and don't panic . . . these are your allies !

The Wild Birds, Garden Spiders, Non-Poisonous Snakes, and Toads are valuable assets in policing your yard and gardens for detrimental insects and rodents.

Garden Ninjas

A well managed yard, and especially lawns, can mean **LESS** harmful insects and **MORE** beneficial insects. This is easily accomplished with an annual springtime application of

BENEFICIAL NEMATODES (BNs)

throughout your lawns and garden beds.

- Kill over 230 known pests in the soil for up to 18 months.
- Sure to kill White Grubs, Japanese Beetles, Fleas, Flies and Gnats in their larval stage; plus, Queen Ants in their egg chamber.

This **100% NATURAL CONTROL** promises these benefits.

- Safe for people and pets.
- Harmful insects do not build up resistance.
- Long lasting seasonal control.
- Harmless to beneficial insects, Earthworms Honeybees, Lady Bugs and Pond Fish.

ATTENTION PET OWNERS

Your annual springtime application of BNs can help control **FLEAS** and **FLIES**. BNs feed on fly and flea larva in your lawns, beds, and the soil of pet enclosures - all season long.

SPRING - BEST TIME TO RELEASE BNs

Apply your fresh supply of BNs early in the cool of Spring. Their getting established before the heat of summer will help ensure a sufficient BNs population to do the job. If you must re-lease in the warmer months, do so before the sun rises or after it sets in the evening.

Beneficial Nematode - BN "spawn" will be alive in their packaging. the nearly microscopic spawn are easily mixed with warm water and sprayed on lawns, garden beds and pet enclosures.

BNs . . . No fuss ! No Muss !



Tiny Nematode Ninjas Invading A Insect Larva.



BNs Spawn Easily Applied With A Hose-End Sprayer.



No Harm To Honeybees, Earthworms, and Pond Fish.

Herbicides

Herbicides are employed to kill unwanted grasses and weeds in your yard and garden. These killing agents are divided into two distinct types of formulas - Non-Selective and Selective. Non-selective herbicides kill the broadest range of living plants. Selective herbicides are formulated to attack specific varieties of weeds, usually without risk to the lawn grasses in which the weeds are found.

Roundup is the most famous (or infamous depending on your understanding) of the Non-selective glyphosate based herbicides. Roundup continues to get a bad rap from those who haven't done their homework. Here's a little background to give you the courage to use this product without reservation. If you have a pet that eats grass and weeds, choose another product in this guide.

Glyphosate (GBH) is a chemical compound used in ever increasing applications since 1970. Worldwide studies of glyphosate exposure in humans and animals is mixed - from unlikely to cause genetic damage or be a carcinogenic threat to humans [European Food Safety Authority] - to likely to be carcinogenic to humans [World Health Organization].

Glyphosate is a chemical compound synthesized from the bonding of two natural substances glycine (an amino acid) + phosphorate (hydrolized phosphorus trichloride with formaldehyde) hence **glycine phosphonate = glyphosate**.

Glyphosate is a systemic solution, sold in concentrate or mixed ready to use, which when sprayed on plants, is absorbed and distributed through the plants tissues including leaves, stems and roots. Its introduction disrupts the plants normal function and in most cases causes the target plant to die. Glyphosate is safe when used as directed. Wear gloves and long sleeves and a mask when applying. Apply on a windless day to avoid misdirection or over-spray. Glyphosate is proven to kill living stumps when used full strength. See the Killing Stumps page in this guide.



ROUNDUP® is a NON-SELECTIVE HERBICIDE

50% Glyphosate

Super Concentrated Roundup is available in one gallon and 1/2 gallon containers.

18% Glyphosate

Concentrated Roundup is sold in 16 oz, and



Ortho Weed B Gone is a SELECTIVE HERBICIDE

Available in Concentrates and mixed-ready to use from Ortho. It's a very effective weed fighter formulated to kill crabgrass and other weeds without harming your lawn.

Snails & Slugs

These slimy little pests are not insects. They are distant cousins of the abalone and conches of the world's oceans. This branch of the family_____became terrestrial, and if not controlled, will burden your yard and garden will irreparable harm. They live in those parts of your landscape where there is shade, moisture and a ready supply of food. That "food" is everything from your prized flowering plants to the leafy greens in your vegetable garden.

You can suspect these little beasts if you discover dried slime trails across your concrete walks early in the morning. Snails and slugs are nocturnal feeders, surviving the heat of the sun by taking shelter in the deepest moist recesses of your yard. Another tell tale sign can be leaves that were eaten (usually from the edge) overnight.

Snails and slugs are ideal candidates for **VERY LOW IMPACT** controls. **Sluggo®** has been counted on by gardeners for decades and remains a top choice for an organic snail and slug bait.

By all accounts, Sluggo® whose active ingredient is Iron Phosphate is safe to use around people and pets. Best of all, you only need to put out a pinch of pellets around your prized plants. It only takes one pellet to kill one of these critters.

And here's a bonus: What every Sluggo® the little buggers miss will eventually enter the soil as an organic fertilizer. And, a 2.5 pound container of Sluggo® should last you for years if you keep the lid screwed on tight !

Finally, and this is so important, **honey bees, butterflies, and hummingbirds will not be affected** by your applications of Sluggo®.



Common Garden Snail

Easily identified by its attached shell. With effective controls you'll likely find clutches of dry shells in the snail nest where they have gone to die after eating their full of Iron Phosphate.



Common Garden Slug

Close cousin of the Garden Snail Same eyes and mouth, but NO shell.



Sluggo® the world's leading **ORGANIC CONTROL** for Snails and Slugs.

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18% Glyphosate

Concentrated Roundup is sold in 16 oz, and 32 oz.



Ortho Weed B Gone is a SELECTIVE HERBICIDE

Available in Concentrates and mixed-ready to use from Ortho. It's a very effective weed fighter formulated to kill crabgrass and other weeds without harming your lawn.