PESTICIDES FOR PESKY WEEDS AND INSECTS

The following three articles address ways to fight your yearly battle with weeds and insects; however, their goal is to address environmentally safe methods to control these pests before resorting to chemical alternatives.

The first article summarizes pest management with tips on how to solve the problem, while the second article is more in depth on handling insect problems, and the third article is focused on controlling weeds.

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ADOPT A HOLISTIC APPROACH TO PEST MANAGEMENT
(from *Green Scaping-The Easy Way to a Greener, Healthier Yard*)

Pesticides (including weed and bug killers) can be effective tools for controlling pests such as insects, weeds and diseases. Be sure you need a pesticide before you use it. On-going pest problems are often a sign that your lawn or garden is not getting what it needs to stay healthy. You need to correct the underlying problem to reduce the chance of pests reappearing. Remember, a holistic — or integrated pest management — approach is the most effective way to manage pests. Here's how:

Start with prevention.

- Maintain healthy soil with compost and mulch.
- Select pest-resistant plants and put them in the sun/shade and soil conditions they like.
- Use a variety of plants so, if pests attack, your whole garden isn't at risk.
- Mow higher. Most grasses should be mowed to a height of two to three inches. Taller grass has more leaf surface and deeper roots and eventually chokes out many weeds.
- Clean out diseased plants so disease doesn't spread.
- Pull weeds before they go to seed and spread.
- Remove dead plants to reduce hiding places for insect pests.

Identify the problem before you spray, squash or stomp.

Whether it's a bug, disease or weed, you need to identify it to know how to effectively manage it. The cause of ailing plants or grass may not be pests or disease but incorrect mowing or pruning, improper watering or other easily corrected practices. That scary bug could actually be a beneficial "good bug" that eats problem pests.

Accept a little damage — give nature time to work.

Accept a few pests, as long as they are not harmful to the long-term effects of the landscape. Natural predators often bring pests under control, but they need time to work. Monitor your landscape to spot signs of pests but don't spray at the first sign of damage — nature may control it for you or plants may outgrow the damage.

If a pest or weed problem develops, use an integrated approach to solve the problem.

Physical controls like traps, barriers, fabric row covers or plants that repel pests can work for some pests.

- Use a little "elbow grease." Long-handled weed pullers pop dandelions and other weeds out easily.
- Mulching, not to exceed three inches, reduces weeds in garden beds.
- Use "crop rotation" techniques by changing the planting location for annuals to minimize their susceptibility to pests and disease.

Replace problem plants with pest-resistant ones for a healthier, care-free yard.

If a plant, even a tree, has insect, pest or disease problems every year, consider replacing it with a more tolerant or resistant variety or another type of plant that doesn't have these problems.

Use pesticides responsibly.

Carefully read and follow pesticide product label instructions. Avoid overuse of pesticides. When you have a small problem area, treat just that area, not the entire yard.

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BENEFICIAL INSECTS: CONTROLLING GARDEN PESTS NATURALLY
GARDEN TIPS FROM KNOX COUNTY MASTER GARDENERS

Often the first reaction on seeing a bug is to get rid of it. However, only a small percentage of insects are harmful to people, homes, or gardens. Some actually benefit us by helping to control harmful pests or by pollinating crops. Beneficial insects can control pests in two ways. Predators (which can be adults but are most often larvae) feed on pests. Parasitic insects or parasitoids lay eggs on or inside the body of a pest. These eggs then hatch and feed on the host. Some insects are generalists and will prey on a wide variety of insects, both wanted and unwanted, while others require a more specific food source.

Most insecticides are broad spectrum - they kill many types of insects, beneficial as well as harmful. With time and overuse, pests can build up resistance to these chemicals. Insecticides can also be harmful to humans, pets, and the environment. By encouraging beneficial insects to take up residence in your yard and help control pests, you can create a balanced system that is self-sustaining once established.

When trying to reduce the use of pesticides by relying on beneficial insects, it's necessary to accept a certain level of pests. Beneficials won't eliminate every pest - if they did they would either starve or leave in search of another food source. It also takes time to build up beneficial populations and pest levels may actually increase at first. If the damage level is still unacceptable, there are other non-chemical methods that can be used to minimize damage and protect certain plants.

Attracting Beneficial Insects

An insect's life cycle can be complete, with adults laying eggs that hatch into larvae that eventually form cocoons or pupa and emerge as adults; or incomplete, when the eggs hatch into nymphs, or smaller versions of the adults. To keep beneficial insects in your yard, it's necessary to create a habitat that supports them all year long and at all stages of their life cycle. Most need to feed on something other than insects at some point in their life, so it's necessary to provide alternate food sources as well as shelter and water.

Flowers provide pollen and nectar for adults. Many prefer plants with clusters of small flowers. Native plants are a good source. Hybridized varieties or varieties with double flowers are less attractive. Use a variety of flowering plants with different bloom times, colors, forms, and heights to attract a variety of beneficial insects, and place near the plants you are trying to protect.

To protect a vegetable garden, you can place clusters or rows within the garden or plant a wide border around the outside. Plants don't have to be massed to be effective - tuck in a few wherever you have room.

Insects need shelter from heat, cold, and wind. Mulch, leaf litter, dormant ornamental grasses and perennials, groundcovers, hedgerows, and flowerbeds all provide protection. If possible, provide a few undisturbed "wild" areas that are not mowed or tilled. Leave spent plants in the garden until spring if there are no disease or pest problems.

Provide shallow containers filled with water and a few rocks and sticks for insects to perch on. Change water every 2-3 days. The native cup plant has leaves that hold water after a rain, providing a water source for insects.

Many insecticides kill both good and bad bugs. Avoid their use if possible and, if necessary, choose a product that will do the least possible harm to beneficial insects.

Recommended Plants

There are many plants that will attract beneficial insects. A few include:

Aster family - aster, bachelor's button, black -eyed Susan, coneflower, cosmos, golden marguerite, goldenrod, sunflower, yarrow, zinnia

Carrot family - angelica, cilantro, dill, fennel, lovage, parsley, Queen Anne's lace

Mint family - anise hyssop, basil, lavender, mint, oregano, rosemary (Note that herbs must be allowed to flower to attract beneficial insects.)

Others - alfalfa, borage, buckwheat, chives, clover, comfrey, melons and squash, mustard, sweet alyssum, and any fruit-bearing tree, cane, or shrub

A Few Beneficial Insects

It can be fun and useful to try to identify some of the beneficial insects. Some are very tiny or active only at night. You may not see all of them but they are hard at work in your garden. Get a good book or look for photos available online. Here are just a few examples.

Lady beetles (ladybugs) - many species. Feed on small soft-bodied insects such as aphids, mealybugs, and spider mites. Both adults and larvae eat pests.

Lacewings - larva called aphid lion. Prey on a wide variety of small insects.

Parasitic wasps - many kinds and sizes. Eggs injected inside or laid on host which provides food for larvae. Prey on caterpillars, flies, beetle larvae, leaf miners, true bugs, aphids, and others.

Ground beetles - hide under stones, boards, and mulch during day. By night, prey on root maggots, cutworms, and snail and slug eggs.

Praying mantis - a large insect which camouflages itself among garden plants. Will eat anything, including large pests, beneficial insects, and each other.

Syrphid fly - also called hover fly and flower fly. Black and yellow striped body - often mistaken for bees or yellow jackets but do not sting. Larvae feed on aphids and other small soft-bodied insects.

Tachanid fly - parasitoid. Lays eggs on cutworms, caterpillars, corn borers, stink bugs and others. Help control tent caterpillar and army worm outbreaks.

Spiders & Predatory Mites - though technically not insects, these help control many types of insects.

Predatory bugs - many kinds (ambush, assassin, big-eyed, damsel, minute pirate, predatory stink and shield bugs, and others). Attack soft - bodied insects.

Other Control Methods

In addition to beneficial insects, there are many other chemical -free options for controlling pests in the garden.

• Choose pest -resistant plants, rotate crops, and keep plants healthy and strong.
• Interplant fruits, vegetables, herbs, and flowers throughout the garden. Pests are more likely to find a mass planting of their favorite food.
• Use trap crops to attract pests away from desirable plants. These plants can then be destroyed or left to maintain a pest population for the beneficials.
• Use physical barriers such as row covers.
• Use mechanical control methods - a sharp spray of water will knock aphids or other small insects off plants. Larger insects can be hand-picked.
• Horticultural oils and insecticidal soaps may be less harmful to beneficial insects than other pesticides.

With a little patience and tolerance, your yard and garden can be safe, productive, and beautiful. A healthy garden is filled with bugs and there will always be a few pests but, if you let nature take its course, the good bugs can keep the bad bugs from taking over.

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MANAGING WEEDS IN LAWNS

Quick facts

- Identifying weeds and understanding why they're growing where they are is key to controlling them.
- Try to tolerate a few weeds as long as your lawn is generally healthy.
- Some non-chemical cultural practices favor desirable grasses over weeds.
- If you do use chemicals, different lawn situations may need different types of herbicides.
- When using herbicides, follow the label directions exactly as printed on the product container.

A weed is described as "a plant out of place." What may be a hated weed invader for some, might be a tolerable ground cover to someone else.

While sustainable lawns may have some weedy plants in them, having well-adapted grass varieties will help keep weeds to a minimum.

- A few weeds in a lawn are not a serious threat to lawn health.
- You can adjust cultural practices to keep plants healthy when controlling weeds with reduced or no use of herbicides.
- Find out the reasons behind increased weed growth before using an herbicide to kill weeds. Killing weeds without correcting underlying problems only invites continued and often increased weed invasion.
- Promote plant health to create a vigorous lawn that can prevent any serious weed problems from taking over.
- Knowing which weeds are invading your lawn is important when deciding whether or not control measures are needed and when they need to be carried out. It is also important in determining the most appropriate herbicide product to use, if needed.

A weed control plan will result in the desired level of control while posing minimum human or environmental risks.

These steps are one example of a simple weed control plan:

- Identify the weed.
- Determine whether or not control measures are needed.
- Determine whether or not chemical control measures are needed.
- Determine the most appropriate herbicide product to use, if needed.
- Determine when chemical control measures need to be carried out.

Weed identification

You need to correctly identify weeds in your lawn in order to effectively control them. It is not necessary to identify every potential weedy plant in a yard or garden. Focus on the ones that are the most troublesome or taking over the largest area.

For additional help in weed identification contact your local county Extension office or visit **Is this plant a weed?**

Monocot and dicot weed leaf classes

Lawn weeds may be divided into two classes based on the way in which they emerge from the seed. The identification process begins by placing the plant into one of two broad classifications: monocot or dicot.

The term cotyledon refers to the first leaf-like structure (seed leaf) visible after the seed has emerged from the ground.

- Monocots emerge with a single seed leaf (monocotyledon).
    - Cotyledons of monocots are often quite similar to future true leaves.
    - Most monocot weeds found in turf are termed weedy grasses.
    - Examples include crabgrass, annual bluegrass, tall fescue and quackgrass.
- Dicots emerge with two seed leaves (dicotyledon).
    - In most instances, cotyledons of dicots bear little resemblance to the normal true leaves of the plant.
    - Dicots are broadleaf weeds.
    - Examples include such plants as dandelion, clover, ground ivy (creeping Charlie), knotweed and plantain.

Perennial, biennial, and annual weeds

Grassy weeds and broadleaf weeds are divided into groups according to how long they live.

Perennial weeds

Perennial weeds have a lifespan of more than two years. New seeds may be produced every year.

Perennial broadleaf lawn weeds:

- Canada thistle
- Dandelion
- Ground ivy (Creeping Charlie)
- Plantain
- White clover

Perennial grassy lawn weeds:

- Quackgrass
- Reed canary grass
- Smooth brome
- Tall fescue

Creeping bentgrass, annual bluegrass and rough bluegrass (*Poa trivialis*) can become weeds in well-watered and fertilized home lawns even though they may be considered turfgrasses in some situations.

Biennial weeds

Biennial weeds have a life span of two years. They store food reserves in the leaves and roots the first year, and produce flowers and seed the second. Examples include mullein and burdock.

Annual weeds

Annual weeds germinate from seed, grow, flower and produce seed in less than one year.

- Summer annuals germinate in the spring and mature in the fall.
    - Examples include prostrate knotweed, prostrate spurge, crabgrass and yellow foxtail.
- Winter annuals germinate in fall or late winter and mature in late spring.
    - Examples include shepherd's purse, yellow rocket (sometimes known as winter cress), pennycress (mustard family) and downy brome (grass family).

Annual broadleaf lawn weeds:

- Black medic
- Prostrate knotweed
- Spotted spurge

Annual grassy lawn weeds:

- Barnyard grass
- Large and smooth crabgrasses
- Longspine sandbur
- Yellow foxtail

Cultural control methods

You can often control lawn weeds by altering your cultural practices to favor the grass plants rather than the weeds.

Cultural controls may include:

- Raising or lowering mowing height.
- Changing how often you mow.
- Lengthening or shortening time between watering.
- Increasing or decreasing how much and how often you apply fertilizer.
- Aerating the soil by allowing air, water and nutrients to reach the grass roots.

Hand-weeding or pulling weeds is also an effective way to get rid of weeds from small lawn areas. The best time to pull weeds is after a good rain or thorough watering.

Hand-weeding is low-cost but labor intensive. It avoids needlessly applying herbicides over the whole lawn for only a few weeds.

There are several tools on the market that will help when you're hand-pulling weeds.

Even with the best cultural control practices, you may need to use a chemical herbicide to control a certain weed or weed population. A combination of proper cultural practices and careful use of herbicides is a good approach to controlling lawn weeds effectively.

Using herbicides

CAUTION: Mention of a pesticide or use of a pesticide label is for educational purposes only. Always follow the pesticide label directions attached to the pesticide container you are using. Remember, the label is the law.

Preemergence herbicides

Preemergence herbicides affect germinating (sprouting) seeds of weeds. They are most effective against annual weeds that come back from seed every year.

- A preemergence herbicide does not kill the seed prior to germination.
- When the seed starts to grow and sprout, the herbicide kills the newly emerging root, shoot or both.
    - This happens before the weed seedling emerges from the ground.
    - If the seed does not germinate it will not be affected by the herbicide.
- To be effective, apply preemergence herbicides before you expect weed seeds to germinate.
    - For control of annual summer grasses such as crabgrass, apply preemergence herbicides between May 1 and May 15.
    - You can also apply them once soil temperatures in the top one-inch or so are consistently in the 50 to 55 °F range measured early in the day.

Postemergence herbicides

Postemergence herbicides are used to kill weeds after the weeds are visible and growing. Postemergence herbicides are usually most effective when absorbed through the leaves.

- When used according to label instructions, either liquid sprays or granular applications are effective.
- Postemergence herbicides are most effective if applied when weeds are young and growing vigorously.
- They are also very effective in the fall when perennial weeds are storing food in their roots for the next year.

Selective postemergence herbicides

Selective postemergence herbicides can control annual, biennial or perennial broadleaf weeds in a lawn without harming the lawn grasses.

- These types of herbicides cannot tell one broadleaf plant from another. They can severely damage or kill nearby trees, shrubs, flowers and vegetables if those plants are exposed.
- They must be used with great care in landscapes where trees, shrubs and flowers may be growing and may have roots intermingled with those of the grass plants.

Nonselective postemergence herbicides

Nonselective postemergence herbicides kill most green plants, both desirable and undesirable.

- These herbicides are used to control perennial grassy weeds that are not affected by selective herbicides.
- Spot treat infested areas using only enough product to wet the foliage.
- It is not necessary to drench the area thoroughly to achieve satisfactory control.

Responsible herbicide application

Follow the label directions exactly as printed on the product container. The label provides necessary information regarding proper product application, including required personal protective gear and how to dispose of containers.

Always consult the product label for information about:

- Preferred air temperatures for application.
- Wind restrictions related to application.
- How much time is needed following application before it will not be affected by rainfall.
- When it is safe to reenter the treated area.

Labels are legal documents that are enforceable by law should the product be used in a manner inconsistent with directions. As with fertilizers, extreme care must be taken to prevent the direct application of herbicides into surface water areas.

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Application timing

Proper timing of herbicide application is important to minimize harm to the environment while effectively eliminating weeds. When weeds are large and mature, greater amounts of herbicide are usually needed and, even then, may not be effective.

For example, it is relatively easy to control small, first-year dandelions with a minimal amount of herbicide. Larger, older dandelions have a greater ability to outgrow and recover from small doses of herbicides. Where appropriate, small dandelion rosettes can be effectively hand-removed and eliminated if most of the root system is removed.

Control weeds in fall for best results

Fall is the best time to control perennial broadleaf weeds.

- Mid-September through mid-October these plants are storing energy for winter, actively growing and will readily take up the herbicide.
- A one-time, relatively low rate of application of an appropriate herbicide usually will be effective.
- Since most other plants are either going dormant for the winter or have been removed from the garden and flowerbeds, there is less chance for off-target plant injury.

Perennial grassy weeds are usually cool season grasses that are best controlled in the fall. They can also be controlled at other times of the year when they are actively growing.

For some weeds, repeated applications at 10 to 20 day intervals may be required for control. Again, always follow label instructions for length of interval between applications.

Postemergence herbicides

- Selective postemergence herbicides may be applied any time the cool season perennial broadleaf weeds are actively growing.
    - For the most effective control, apply in early fall (September 15 - October 15) or in spring (late April - early June).
    - Fall is preferred over spring due to greater penetration of the herbicide down into the roots and the reduced possibility of damage to flowers and other vegetation.
- Do not thoroughly drench an area with postemergent broadleaf herbicide solution.

- This may be wasteful of water and herbicides.
- It will move the herbicide beyond the plants and into the soil where it may leach or affect non-target plants.
- Spray only to wet the leaves.

Post-application watering

Preemergent herbicides used for controlling crabgrass and other annual weedy plants must be watered into the soil to be effective. They affect the seed as it begins to germinate, but before the plant emerges from the ground.

Depending on the soil type, apply one-fourth to one-half inch of water after applying these products. This moves the material into the surface soil so it will be much less likely to be carried away in runoff.

For all weed control products, always follow label directions for how long after application the product will stay on the foliage even if rainfall or irrigation occurs. In some products, this period can be as little as two hours.

References:

United States Environmental Protection Agency. (June 2006). *Green Scaping-The Easy Way to a Greener, Healthier Yard*. Retrieved from https://www.epa.gov/sites/default/files/2014-04/documents/greenscaping_-_the_easy_way_to_a_greener_healthier_yard.pdf on January 19, 2023.

University of Illinois Extension, Knox County Master Gardeners. (August 2013). *Beneficial Insects: Controlling Garden Pests Naturally*. Retrieved from controllingpestsnaturally.pdf (illinois.edu) on January 19, 2023.

University of Minnesota Extension. (Reviewed 2018). *Managing Weeds in Lawns*. Retrieved from https://extension.umn.edu/lawn-care/lawn-weeds#post-application-watering-1536714 on January 21, 2023.