HOMEOWNER'S GUIDE TO:

Alternative Pesticide Management for the Lawn and Garden

XCM-221

A pest-free lawn and garden may sound ideal, but is it really? Maintaining the perfect urban landscape may result in a reliance on pesticides that can lead to environmental and human health problems.

Many homeowners are looking for alternative ways to control pests in gardens and landscapes.

Fortunately, there are many biological processes that work to keep pests in a natural balance. The "ideal" garden is one with vigorous plants and protected natural enemies of certain annoying pests. The conventional approach – applying pesticides routinely, or at the first sign of any pest – is replaced with a lower input emphasis on nature at its best.

It is not the answer to all problems every time. But when it works, it is an ideal way to address pest problems while helping protect our water supplies and environment.

Principles of this alternative approach include:

- Learning more about plants and their pests
- Selecting landscape and garden plant varieties that are resistant to pests
- Rotating annual garden plants to reduce the buildup of pests
- Inspecting plants frequently for the presence both of pests and beneficial organisms
- Determining if control measures are really necessary before taking action.
- Selecting methods that are least disruptive to natural controls and least hazardous to the environment.

As you experiment with alternative methods of pest control, it's a good idea to keep a record of your observations and the results of your treatments for future reference.

CULTURAL PEST CONTROL METHODS

Cultural methods seek to create the optimum growing conditions for plants and natural predators, and unfavorable conditions for pests.

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Learn to identify specific insects before determining control. (Insect populations can include beneficial insects that you may not want to kill.)

Some things to remember in managing a garden:

- Select well-adapted, disease-resistant plant varieties.
- Choose the right plants for the location and soil conditions.
- Buy healthy and pest-free transplants.
- Avoid under- or over-watering, since both make plants vulnerable to insects and disease.
- Improve the soil by adding organic amendments. A soil analysis helps to evaluate soil type and fertility. Soil testing kits can be ordered by visiting soiltestinglab.colostate.edu.
- Change the location of annual plants from year to year to disrupt the life cycle of pests.
- Remove infested plant residue from your garden in the fall, so that pests do not over-winter there.
- Incorporate a wide variety of plants to disperse potential pest problems and to provide diverse habitat for beneficial insects.
- Keep your vegetable garden clean of rocks, wood, and debris that provide hiding places for slugs or damaging insects.

Some things to consider when managing your lawn:

- Plant native grasses or hardy strains of turf- type tall fescue, blue grama, wheatgrass, or buffalograss instead of Kentucky blue grass.
- Maintain a healthy lawn with good watering practices: water as needed, and turn off automatic sprinkler systems after a rain or during cool cloudy weather.
- Fertilize your lawn only as needed to promote a vigorously growing turf that will compete well with weeds. A soil test is one way to know what nutrients your lawn needs.
- Maintain a mowing height no less than 2½ to 3 inches, and leave the clippings on the lawn so that nutrients are recycled.
- Core aerate the lawn once or twice a year.
- Use groundcovers, mulch, or beds instead of grass in difficult areas such as sloped ground or shady spots.

MECHANICAL PEST CONTROL METHODS

Mechanical pest management options rely on physical methods of destroying pests and include:

- Hand weeding
- Using a hoe or tiller rather than a herbicide
- Hand-picking insects off plants
- Hosing down plants to dislodge insects
- Pruning diseased or insect-infested woody plants
- Using mulches to reduce erosion and weeds and to conserve moisture

BIOLOGICAL PEST CONTROL METHODS

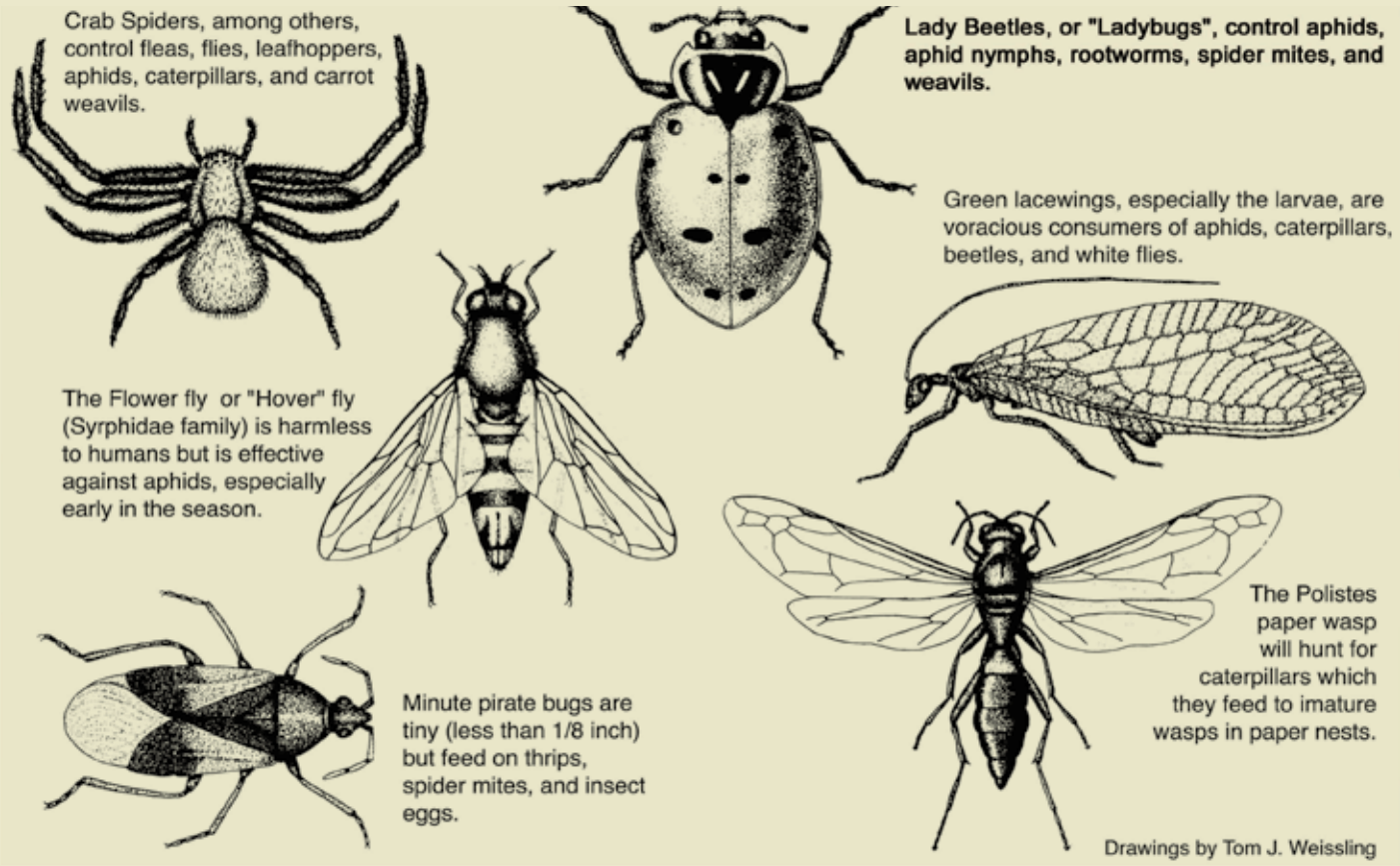
Beneficial organisms such as certain insects or fungi can help control pests naturally, or they may be purposely introduced.

The main categories of these “beneficials” include:

Predators – include lady beetles, spiders, green lacewings, syrphid flies, damsel bugs, minute pirate bugs, ground beetles, and predatory mites. Larger animals such as birds, frogs, and garden snakes also prey on pest insects.

Xeriscape design, photo by Grant Reid.

BENEFICIAL INSECTS AND THE PESTS THEY CONTROL



Parasites – include the tachinid fly and braconid wasp that lay eggs on or inside insect pests.

Pathogens – fungi, bacteria, and viruses that infect pests much in the same way they infect people or other animals.

Some garden stores and catalogs carry beneficials, such as lady beetles. Conserving beneficials already in your garden is likely more cost-effective, and frequently is more successful. Pesticides often kill these natural garden friends.

To encourage beneficials in your yard:

- Plant a diverse landscape that provides a variety of habitats and food sources.
- Learn to distinguish beneficial insects from pests.
- Minimize pesticide applications.

These natural controls often work more slowly than pesticides, and they require a food supply that could be the very pest you'd prefer to be gone. However, they are nature's way of handling high populations of pests, they don't contaminate our water supplies, and they can lend beauty to a garden.

WHAT TO PLANT TO ATTRACT BENEFICIAL INSECTS

- **Herbs belonging to the mint family:** lemon balm, pennyroyal, thyme, and spearmint
- **Plants belonging to the carrot family:** dill and parsley
- **Vegetables belonging to the cabbage family:** radishes, mustard, and broccoli (if allowed to flower)
- **Queen Anne's lace,** also known as wild carrot, will serve as a nectar plant for parasitic wasps.
- **Aster, Asclepias (butterfly plant), cosmos, beebalm (monarda), Russian sage, Cleome, and purple cornflower** attract butterflies and bees.

CHEMICAL PEST CONTROL METHODS

There are some naturally occurring chemicals that are classified as pesticides but nevertheless can be used in the context of "organic gardening." In general, these compounds tend to be less harmful to beneficial insects, and they often break down more rapidly than synthetic pesticides.

Reduced risk pesticides include microbial insecticides, botanical pesticides, mineral-based pesticides, and synthetic organic compounds (oils, soaps, and detergents) produced from petroleum distillates. These chemicals are available in some garden stores, but may have to be requested specifically. Some of these products are listed in Table 1.

Please note that these products are still classified as pesticides and should not be used indiscriminately. They are best incorporated into a management program that uses all available cultural, mechanical, and biological control methods.

Finally, it is a mistake to assume that naturally occurring chemicals are non-toxic. Some of these are more toxic to humans then synthetic pesticides. As with all chemicals, always read the label instructions prior to using these alternatives. Under certain conditions, some of these chemicals can cause injury to plants and animals.

Table 1. Alternative Pesticides for Lawn and Garden Use*

ALTERNATIVE CONTROL	CONTROLS	NOTES
Bacillus thuringiensis (BT, Dipel)	Caterpillars	Non-toxic to mammals
Avermectin-B (Avid)	Mites, leafminers, psyllids	
Sabadilla (Red devil)	Leaf hopper, caterpillars, squash bugs, et al.	Low toxicity, fast knockdown short residual, may irritate
Neem (Margosan-O)	Leaf miners, loopers, mealy bugs, thrips, whitefly; some fungicidal activity	Slow kill
Sulfur	Fungicidal activity on powdery mildew, rust, some blights insecticidal activity on psyllids, mites, thrips	Plant injury possible, especially at high temperatures
Lime sulfur	Dormant spray for diseases such as blight, anthracose, powdery mildew	Bad-smelling; may irritate
Bordeaux mixture	Acts as a fungicide, controls bacterial leaf spot; repels many insects	Some cannot be used on certified "organic" produce
Diatomaceous earth	Flea beetles, squash bugs, slugs	Dust can cause lung and eye irritation. Avoid inhalation and eye contact.
Insecticidal soap (Safer's soap)	Aphids, certain scales, mealy bugs, psyllids, mites, thrips, white fly	Non-toxic to mammals; plant injury possible
Dormant oils	Aphids, mites, and certain scales that over-winter on woody plants	Non-toxic to mammals; possible plant injury
Summer oils	Aphids, mites, scales, thrips and their eggs	Plant injury possible

*For more information, see the following factsheets from Colorado State University Extension at ext.colostate.edu: Bacillus thuringiensis, 5.556; Insect Control: Horticultural Oils, 5.569; Insect Control: Soaps and Detergents, 5.547; Insect Parasitic Nematodes, 5.573.

ALTERNATIVE PEST MANAGEMENT METHODS

INSECTS:

- Keep your garden free of infested plant residue and other debris.
- Prune out insect-infested parts of plants. Hand pick bugs off garden plants.
- Encourage biological controls by planting flowers that provide nectar, pollen, and habitat for friendly predators.
- Avoid broad spectrum insecticides.
- Use insecticidal soaps, oils, and botanicals as appropriate.
- Dislodge unwanted insects from woody plants using a stream of water.
- Accept some insect activity as part of a natural landscape.

SLUGS:

- Put beer in shallow containers or saucers to attract and drown slugs.
- Place an overturned clay pot near plants where slugs feed. Check frequently for collected slugs.

WEEDS:

- Crowd out weeds with a healthy lawn.
- Use mulches and non-plastic landscape fabric.
- Hand pull, mow, or hoe weeds.
- Accept some weeds in your lawn as part of a natural landscape.

DISEASES:

- Look for healthy transplantsof well-adapted, disease-resistant varieties.
- Rotate your annuals each year.
- Avoid over- or under-watering.
- Thin crowded plantings to improve air circulation.
- Remove and destroy infected plants from your garden and landscape.

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For more information on protecting water quality and the environment around your home, please see the other Homeowner's Guides:
XCM-219, Household Water Conservation
XCM-220, Pesticide Use Around the Home and Garden
XCM-222, Fertilizing Your Lawn and Garden
XCM-223, Protecting Water Quality and the Environment

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