grow smart, grow safe

A Consumer Guide to Lawn and Garden Products

550 Products Reviewed

Pest Controls and Fertilizers

Where to Buy Least-Hazardous Products

Fifth Edition

by Philip Dickey, Washington Toxics Coalition

WASHINGTON TOXICS COALITION

King County

as part of the **Local Hazardous Waste Management Program in King County**

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Why this guide?

Lawn and garden pesticides include some of the most hazardous products in the home. Products that you use to kill insects, weeds, and plant diseases may also be toxic to children, pets, birds, fish, and beneficial insects such as bees and lady bugs. Fertilizers, too, can harm water quality when they run off into streams and other water bodies.

Scientific studies routinely find widely used insect and weed killers in Puget Sound streams. These pesticides wash off of yards when it rains and are carried to streams, sometimes in amounts that can harm salmon or the aquatic animals that provide their food. In addition, pesticides used on home landscapes may be carried inside the home on shoes and lodge in house dust, where they may be ingested by young children (see Health Hazards to Children for more information).

Hazardous pesticides are not necessary to maintain an attractive landscape in the Pacific Northwest. Non-chemical methods and less-hazardous products are available. This guide will help you find the lawn and garden products that are the least hazardous to you, your family, and the environment. Increased demand for such products will help encourage manufacturers to make their products safer and more environmentally sound.

How do I use this guide?

This guide will help you make decisions about pesticides and fertilizers. Part of the decision-making process is determining whether or not pesticides are needed. You can take a number of steps to reduce or eliminate the need for pesticides. Examples include planting the right plant in the right place, building good soil to help keep plants healthy, and deciding that a few bugs or weeds are acceptable in your yard.

Products are grouped by use, such as Slug and Snail Controls, as listed in the table of contents. Here is how to read a typical table of pest control product ratings.

Products are listed in order by their average score.

(See page 4 for an explanation of the score).

Products with the highest ratings are at the top of the table.

Products with the lowest ratings are at the bottom of the table; table may continue on the next page.

Question marks: In most cases, the presence of "inert" ingredients prevented us from completing the evaluation of chronic health hazards, so a question mark appears for that rating. Question marks may also appear in other ratings when adequate data were not available for other reasons. (See discussion of “Inert” or “Unknown” ingredients on page 10.)

Product type | **Health and Environmental ratings**

Slug and Snail Controls

Spot application of a pesticide is almost always safer than broadcast application of the same product or a similar one.

Product Name	Score	Short-term health hazard	Long-term health hazard	Hazard to aquatic life	Hazard to birds, bees, or pets	Half-life in soil	Water pollution hazard	Active Ingredients
Slug Bar™	3.00	○	○	○	○	○	○	beer trap
Slug Saloon™	3.00	○	○	○	○	○	○	beer trap
The Pit	3.00	○	○	○	○	○	○	beer trap
Snail Barr™	3.00	○	○	○	○	NA	○	copper barrier
Slug & Snail deFence™	3.00	○	○	○	○	NA	?	sodium chloride, polyethylene
Escar-go!™ (G)	3.00	○	?	○	○	NA	○	iron phosphate
Schultz™ Garden Safe™ Slug & Snail Bait (G)	3.00	○	?	○	○	NA	○	iron phosphate
Sluggo™ (G)	3.00	○	?	○	○	NA	○	iron phosphate
Worry Free™ Slug and Snail Bait (G)	3.00	○	?	○	○	NA	○	iron phosphate
Corry's™ Liquid Slug & Snail Control (R)	2.17	○	◐	○	●	◐	◐	metaldehyde
Corry's™ Slug & Snail Death (G)	2.17	○	◐	○	●	◐	◐	metaldehyde
Corry's™ Slug & Snail Death 3.25 (G)	2.17	○	◐	○	●	◐	◐	metaldehyde
Corry's™ Slug & Snail Pellets (G)	2.17	○	◐	○	●	◐	◐	metaldehyde
Deadline™ Force II™ (G)	2.17	○	◐	○	●	◐	◐	metaldehyde
Deadline™ RainTough™ (G)	2.17	○	◐	○	●	◐	◐	metaldehyde
Lilly Miller™ Slug & Snail Spray (RTS)	2.17	○	◐	○	●	◐	◐	metaldehyde

How are the products rated?

We have evaluated each product on the basis of a set of objective criteria that have been reviewed by a range of experts from universities, government agencies, and non-profit organizations.

There are six criteria for pesticide products and one for fertilizers.

For pesticides, the ratings are based on:

1. short-term health hazard
2. long-term health hazard
3. hazard to aquatic life
4. hazard to birds, bees, or pets
5. half-life in soil
6. water pollution hazard

Fertilizer products were evaluated only for the amount and type of nutrients because these are the factors most important in product choice. Very little toxicity information is available for fertilizers.

Experts disagree on the best way to compare products. Our rating system takes a precautionary approach by identifying potential hazards to help you avoid them. Seattle and King County governments use criteria similar to these to decide which products to use on their own landscapes. The ratings do not take into account protection provided by the product label instructions or packaging. Our ratings are indicators of concern, but they do not predict the actual risk, or likelihood, that harm will occur from using a product. Risk depends on how much of each ingredient is in a product, how much product is used, whether safety precautions are followed, and a host of other factors that are beyond the scope of this book. The U.S. Environmental Protection Agency (EPA) and product manufacturers maintain that the risks from legally sold pesticides are not unreasonable if used properly, but many cases of harm from pesticides are well documented and others are debated. The risks of pesticides are difficult to estimate accurately and vary greatly among different products.

One of three ratings is possible in each category. The ratings are indicated by shaded circles (see key on page 6). An average score calculated from these ratings is used to rank products in the tables, with higher scores at the top. Products receiving the same score are ranked on the basis of application method, availability of information, and alphabetical order. Differences between products with similar scores may not be meaningful. In looking at the ratings, you should look beyond just the average score and think about which aspects of product safety are most important to you. Overall, we think that products with the highest ratings are likely to be safer to use than those with much lower ratings.

Safe and effective pest control may require a mix of tactics and products. We cannot offer any hard and fast rules about which products to buy, but we think you should give priority to products with better ratings in this guide.

The evaluations used information from product labels, Material Safety Data Sheets, and a variety of toxicology references. The rating criteria relied heavily on federally mandated product labeling requirements and well-established environmental benchmarks. These ratings are the opinion of the author, subject to the limitations listed on the inside back cover.

Most products included in this book were found on shelves at local stores, and a few are only available by mail order. Products may remain listed after being discontinued by manufacturers. We retain some older products so that you can look up products you may already own.

Packaging

Environmental impacts of manufacturing and packaging were beyond the scope of this project. We suggest that you:

1. Buy a size that contains only as much as you need for a particular job. That way, you avoid storing hazardous products or accumulating hazardous wastes.

2. Buy ready-to-use products rather than concentrates. Concentrates usually are more hazardous, and mixing can expose you to the pesticide.

How well do these products work?

Though the rating system may appear to be somewhat similar, this guide is not designed to serve the same function as *Consumer Reports* magazine. We did not evaluate how well the products work. You must decide for yourself if the products perform well enough. Lawn and garden pesticides are not required to undergo testing for their effectiveness against labeled pests. Your results will vary depending on your particular situation and the mix of tactics you employ.

Judge your results in terms of reducing pest populations below damaging levels rather than killing all pests. If you try to kill all the pests and weeds in your yard, overuse of chemicals may also kill the beneficial insects that help keep pests under control. Instead, focus most of your efforts on selecting plants that do well in our climate, and then give them what they need to thrive. Similarly, your weed problems will be less if you grow healthy turf, regularly mulch landscape beds well, and remove weeds before they produce seeds. Don't rely on chemicals to do it all. Never use more pesticide or fertilizer than the label recommends. Over-application is illegal, unsafe, and may even be less effective than recommended usage.

Note also that some alternative pest control products may not provide the quick kill that toxic chemicals do. Organic or slow-release fertilizers may also work more slowly than water-soluble "plant foods," but they do not have to be applied as often.

What do the ratings mean?

- ○ Lowest toxicity or environmental hazards. Follow label precautions for safest possible use of product.
- ◐ Moderate toxicity or environmental hazards. Choose product with a higher rating or pay particular attention to how you will prevent the possible harm indicated by this rating.
- ● Highest hazard level. Avoid or consider as a last resort, especially if product received several of these ratings.
- ? Not enough information available for rating. NA Not applicable.

Short-Term Health Hazards (based on full product formulation)

This rating considers human health hazards from eating, drinking, or breathing a product or getting it on your skin or in your eyes. Ratings are based on U.S. Environmental Protection Agency toxicity categories for pesticides.

- ○ Non-toxic to moderately toxic or irritating to skin or eyes. Signal word CAUTION on label.
- ◐ Very toxic or severe-but-reversible skin or eye irritant. Signal word WARNING on label.
- ● Extremely toxic or corrosive (causes skin or eye burns). Signal word DANGER on label.

Long-Term Health Hazards

This rating indicates ingredients that one or more government agencies have listed as causing cancer, reproductive toxicity, or other delayed health effects. Rating is based on the scientific certainty that the chemical CAN cause these effects rather than the likelihood that they WILL occur from limited exposures.

- ○ All ingredients are known. Product contains no ingredient listed as a known or suspected human carcinogen (chemical that causes cancer), or reproductive or developmental toxicant.
- ◐ Contains possible carcinogen or ingredient that has been associated with long-term health effects in exposed populations.
- ● Contains known, likely, or probable human carcinogen or listed reproductive or developmental toxicant as an ingredient.

Toxicity to Aquatic Organisms

- ○ Product presents no hazard to aquatic organisms or label contains no aquatic toxicity warnings.
- ◐ Product label warns of toxicity to fish or other aquatic life.
- ● Product label warns of high toxicity to fish or other aquatic life.

Toxicity to Birds, Insects, or Pets (selectivity of active ingredients)

- ○ Practically non-toxic to birds, bees, and other beneficials. No label warnings of toxicity to wildlife.
- ◐ Product label warns of toxicity to birds, insects, or pets, or product is known to be a broad-spectrum insecticide.
- ● Product label warns of high toxicity to birds, insects, wildlife, or pets.

Environmental Persistence (time for 50% of active ingredient[s] to degrade in average soil)

- ○ Less than 30 days
- ◐ 30 - 99 days
- ● 100 days or more

Water Pollution Hazard (active ingredient only)

This rating indicates ingredients that can move with rain or irrigation water. NOTE: The risk of pesticide runoff is also strongly dependent on site conditions.

- ○ Low to extremely low mobility in soil
- ◐ Moderate mobility
- ● High to very high mobility

Hazards of Pesticides

Exposure and Health Hazards

If you use pesticides, you can be exposed to them in many ways:

1. direct skin or eye contact
2. inhaling dust or mist while mixing or applying
3. contact with treated plants or soil
4. tracking pesticides into the home on shoes

Certainly reading and following label directions can help reduce the risks of pesticide exposure, but they cannot eliminate them. Only avoiding pesticides can do that.

Special Hazards to Children

In 2004, poison centers in the United States responded to 102,754 incidents related to pesticides (not including disinfectants). Of those, about half involved children under the age of six. In all, 19,168 people were treated in health care facilities for pesticide exposures. There were 3,072 incidents resulting in moderate or major health outcomes, and there were 8 deaths.

Children are especially sensitive to pesticides and have the highest exposures. Pound for pound, exposure packs a bigger punch to children's growing bodies and developing nervous systems, hormonal systems, and organs. Families with small children should make a special effort to avoid pesticides as much as possible, and to take extra care that children are not present or have access to treated landscapes if pesticides are used. Kids playing on pesticide-treated yards face the most obvious exposures, but indoor exposures occur, too. Pesticides are tracked into the home, where they can lodge in carpet dust and be ingested by toddlers who play on the floor and put their fingers into their mouths. A recent University of Washington study found that nearly all Seattle-area toddlers tested had remnants of toxic insecticides in their bodies, and they also had higher levels if parents used pesticides on their landscapes.

Danger to Pets

Many pesticide products are toxic to dogs, cats, and other pets. Slug bait containing metaldehyde poses special risks, however, because it is attractive to dogs, which may eat enough to be killed or seriously injured. Dogs seeing slug bait spread on the ground may think that they are being fed. Remember that animals with access to treated landscapes may pick up pesticide residues on their paws and fur. They can then ingest that material or bring it into the house.

Cancer Hazards

A number of pesticide products contain ingredients that have been listed as potential carcinogens (cancer-causing chemicals) by at least one government agency. Generally, these products are indicated in this booklet by the rating ◐ or ● under long-term health hazard. Although the tests are done on laboratory animals exposed to high doses of the chemicals,

the listing agencies consider carefully the relevance for humans. Exposure to even small doses of a carcinogen may still cause cancer in a few individuals.

Some health studies have found increased risk of cancers in members of families where pesticides were used regularly. Children exposed to carcinogens have more time to develop cancer than adults do. Although these studies do not conclusively prove that the cancers were caused by these pesticides and some results are contradictory, the studies are worrisome and provide another reason to minimize the use of household pesticides, especially on an ongoing basis.

Water Pollution

Many insecticides and herbicides are toxic or highly toxic to fish and other aquatic organisms, and fertilizers can also reduce water quality. These organisms can be exposed to pesticides and fertilizers through runoff into streams near where the products were used. Monitoring studies in the Puget Sound region frequently find pesticides and fertilizer nutrients in area waterways. The insecticides carbaryl and malathion have been found at levels that exceed standards set to protect aquatic life and may pose a long-term risk to fish. Research from urban areas in California has found toxic levels of other insecticides in stream sediment. The pesticides most often found in water are those most widely used in the region. As our area's population grows, pesticide levels will likely increase unless safer and less-toxic alternatives become more widely used.

The pesticide mobility ratings in this guide will help you see which products are most likely to move away from where they are used and contaminate water. Even products resistant to soil mobility can contaminate water if soil erosion occurs, such as during heavy rains. Pesticide and fertilizer runoff are strongly dependent on site conditions as well as chemical properties. For more information on pesticides and water quality, please see page 22.

Toxicity to Birds and Bees

Some insecticides are toxic to birds, and most are toxic to bees and other beneficial insects. Diazinon, a once-popular consumer insecticide, is no longer available for home use, partly because of its toxicity to birds and its widespread pollution of water. Diazinon has been replaced by newer insecticides that are less toxic to birds but still toxic to bees and fish.

A number of products can kill bees directly or when they land on treated plants. Pesticide residues on foraging bees can be carried back to the hive and kill the entire colony.

Many insects help control pests and if we kill them it will become harder to manage the pests. Many pesticides are as likely to kill the beneficial insects as the pests, potentially increasing pest populations after spraying. Beneficial insects often take longer to rebuild their populations than the pests do, which can create a "bounce-back" population explosion of the pest insects.

Persistence of Chemicals

The longer a pesticide remains in the environment, the more likely it is to end up where it is not wanted and do damage. Most modern pesticides have shorter lifetimes than older products like DDT, which are still in our environment and our bodies after 50 years. People may think that modern pesticides are gone after a day or two, or are benign as soon as they have dried. This is incorrect. Typically half-lives (the time for half the product to break down) in soil range from days to weeks, and a few have half-lives up to a year or more. Some residues remain even after many half-lives have passed.

Hormone Disruption

In recent years, it has been shown that many synthetic chemicals (and some naturally occurring ones) can interfere with the hormone system of many animals including humans, potentially affecting reproduction and development. Included among these chemicals are a number of pesticides. It is not yet known to what extent observed human and wildlife health problems may be caused by hormone-disrupting chemicals. In 1996, the federal government required that in the future pesticides be routinely tested for hormone-disruption potential, but as of 2006 that testing has not yet begun.

Many prominent scientists have called for the need to reduce human and wildlife exposure to hormone disrupting chemicals. Because of the many unanswered questions and the large amount of research underway and still needed, we have elected not to incorporate hormone disruption into the product ratings until authoritative and up-to-date lists are available.

"Inert" or "Unknown" Ingredients

Pesticides contain both "active" ingredients and so-called "inert" ingredients. On newer product labels, "inert" ingredients may be identified as "other" ingredients. Active ingredients kill pests. The inert ingredients make up everything else—often well over 90% of a product. Inert ingredients include solvents, detergents, or other chemicals that make the product work more effectively. Although water is often an inert ingredient, inert ingredients also include hazardous chemicals, sometimes more hazardous than the listed active ingredients.

In addition, inert ingredients are nearly always considered "trade secrets" and are not disclosed on product labels. Inert ingredients are not as thoroughly tested for safety as active ingredients, even though they usually make up most of the product. **Don't assume that a high percentage of inert ingredients means the product is not hazardous.**

One of the advantages of using the non-chemical methods listed in this guide is reduced exposure to unknown "inert" ingredients.

Back to the Basics

The development of modern pesticides and fertilizers over the past 50 years has offered a new way of gardening. Advertisements promise lush gardens and lawns, free of pests and diseases.

Our reliance on chemicals has made it possible to grow plants that once would have been overcome by local insects or diseases if left to fend for themselves. Now, plants can be chosen only on the basis of how they look, not how well they perform in the landscape, as long as we keep the insecticides and fungicides handy. Weeds can be banished from lawns and garden beds by repeated herbicide applications.

What is being lost in this transition? Perhaps learning how good garden design and plant choice can prevent pest, disease, and weed problems. Perhaps the understanding that most insects are either harmless or actually beneficial. Perhaps the satisfaction of building healthy soil and seeing how the plants are nurtured by it.

In a study of over 4,000 members of the American Horticultural Association, researchers found that gardening satisfaction was highest for people who didn't use chemicals. The researchers believe this finding reflects a "feeling of partnership with the larger forces of nature." It's your choice: do you want to fight nature or work with nature?

This is not to say that using a pesticide is never appropriate. Some are benign and can be helpful on occasion. But if you use them frequently and for the same problems, you should ask why. Experienced gardeners have three secrets: build good soil, select the right plant for the site, and tolerate a few pests and weeds. Get these right and you might be surprised at the results.

1

Insect Controls

Before you choose a product to control insects on a plant, consider this: You may avoid or minimize pest problems if you select and maintain plants carefully. A healthy plant, selected for its suitability to your yard, is less likely to succumb to pest damage.

Prevention

- **Plant a variety of species,** using pest-resistant varieties and those that attract beneficial insects and birds. If a plant doesn't do well in the landscape, replace it with one better suited to your yard.
- **Build good soil with compost** and give plants the sun, water, and nutrients they need. Improper siting and care can make plants more vulnerable to pests and diseases.
- **Keep garden pathways clear** of weeds and other objects that may harbor pests, such as slugs.

Observation

- **Monitor your plants over time** to identify plants that are struggling and find out what insect (or disease) might be the cause. The insect you see near a damaged leaf may actually be a beneficial insect that devours pests. If you're unsure of what you are seeing, consult your local nursery, a gardening book, or the Internet. Some good information sources are listed on pages 55-56.
- **Be realistic.** Don't expect to kill all pests or have picture-perfect plants all the time. Low levels of pests keep beneficial species, such as birds and predator insects, in your yard and actively controlling pest populations. Some pests, and some damage, will always exist in your garden.
- **Most insects in your garden are actually helpful.** For photos and descriptions of beneficial insects, visit *http://www.govlink.org/hazwaste/house/yard/problems/goodbugs.cfm* or *http://www.co.clark.wa.us/recycle/documents/Bugbook2.pdf.*

Control Options

- **Physical and cultural controls,** such as traps, barriers, and hand-picking insects, are the least-hazardous methods. These should be used even if they cannot solve the problem completely, because they will help to reduce the need for more intrusive methods.
- **Biological controls** are natural predators that eat, infect, or otherwise destroy pests. Attract birds and beneficial insects to your garden, then protect them by avoiding toxic chemicals. Another option is to purchase predators such as lacewings or parasitic wasps. Other examples include *Bacillus thuringiensis* (B.t.), a natural bacterial toxin that controls caterpillars, and beneficial nematodes, tiny worms that control soil-dwelling pests such as crane flies.
- **Chemical controls** may sometimes be necessary, but they should be considered your last resort. Try to find those that are least toxic and least damaging to the environment. The ratings in this book are designed to help you do that. Note that many insecticides are broadly toxic to bees, birds, and fish.

Evaluation

Last but not least: evaluate how well your selected control method worked, and decide if you need to take other steps to bring the problem under control.

Insect Controls

Spot application of a pesticide is almost always safer than broadcast application of the same product or a similar one.

Product Name	Score	Short-term health hazard	Long-term health hazard	Hazard to aquatic life	Hazard to birds, bees, or pets	Half-life in soil	Water pollution hazard	Active Ingredients
Orcon™ Beneficial Nematodes	3.00	○	○	○	○	NA	NA	live nematodes
Orcon™ Green Lacewings	3.00	○	○	○	○	NA	NA	live lacewings
Safer™ Deluxe Yellowjack/Wasp™ Trap	3.00	○	○	○	○	NA	○	food bait
Safer™ Gypsy Moth Trap	3.00	○	○	○	○	NA	○	pheromone bait
Safer™ Sticky Whitefly Trap	3.00	○	○	○	○	NA	○	sticky glue
Sterling Rescue!™ Yellowjacket Trap	3.00	○	○	○	○	NA	○	food bait
Tanglefoot™ Codling Moth Trap	3.00	○	○	○	○	NA	○	pheromone bait
Tanglefoot™ Red Sphere Traps	3.00	○	○	○	○	NA	○	sticky glue
Tangle-Trap™ Whitefly/Aphid Trap	3.00	○	○	○	○	NA	○	sticky glue
Victor™ Yellowjacket Magnet™ Bag Trap	3.00	○	○	○	○	NA	○	food bait
Victor™ Yellowjacket Traps Disposable	3.00	○	○	○	○	NA	○	food bait
Concern™ Pesticide Spray Oil (C)	3.00	○	○	○	○	○	○	canola oil
Garlic Barrier™ Insect Repellent (C)	3.00	○	○	○	○	○	○	garlic water
Oil-Away™ Supreme Insecticidal spray (C)	3.00	○	○	○	○	○	○	cottonseed oil
Tree Tanglefoot™ Pest Barrier	3.00	○	○	○	○	?	○	castor oil, natural gum resins, vegetable wax

(C) *concentrate* (R) *ready to use* (RTS) *ready to spray* (G) *granules* (A) *aerosol*

○ *lowest hazard* ◐ *moderate hazard* ● *highest hazard* *NA not applicable* **?** *not enough info*

continued on next page

Insect Controls

continued

Product Name	Score	Short-term health hazard	Long-term health hazard	Hazard to aquatic life	Hazard to birds, bees, or pets	Half-life in soil	Water pollution hazard	Active Ingredients
Bonide™ B.t. (Thuricide™) (C)	3.00	○	?	○	○	○	○	Bacillus thuringiensis
Concern™ Diatomaceous Earth (G)	3.00	○	?	○	○	NA	○	silicon dioxide
Dipel 150 Dust for Vegetables (G)	3.00	○	?	○	○	○	○	Bacillus thuringiensis
Lilly Miller™ Vegol™ Growing Season Spray Oil (C)	3.00	○	?	○	○	○	○	canola oil
Lilly Miller™ Vegol™ Year-Round Pesticidal Oil (C or R)	3.00	○	?	○	○	○	○	canola oil
Mosquito Dunks™	3.00	○	?	○	○	○	○	Bacillus thuringiensis
Nosquito™ Mosquito Attractant	3.00	○	?	○	○	NA	NA	1-octen-3-ol
Safer™ Caterpillar Killer (R)	3.00	○	?	○	○	○	○	Bacillus thuringiensis
Safer™ Caterpiller Killer (C)	3.00	○	?	○	○	○	○	Bacillus thuringiensis
Safer™ Diatomaceous Earth Ant & Crawling Insect Killer (G)	3.00	○	?	○	○	NA	○	silicon dioxide
Safer™ Vegetable Insect Attack Dust (G)	3.00	○	?	○	○	○	○	Bacillus thuringiensis
EcoEXEMPT™ D (G)	2.83	○	○	○	◐	○	?	2-phenethyl propionate, eugenol
EcoEXEMPT™ G Granular Insecticide	2.83	○	○	○	◐	○	?	eugenol, thyme oil
EcoEXEMPT™ JET Wasp & Hornet Aerosol	2.83	○	○	○	◐	○	?	eugenol, sesame oil
Green Light™ Bioganic Lawn & Garden Spray (R)	2.83	○	○*	○	◐	○	○	thyme oil, clove oil, sesame oil
Green Light™ Bioganic Organic Insect Control (C)	2.83	○	○*	○	◐	○	○	thyme oil, clove oil, sesame oil
Safer™ Insect Killing Soap (R)	2.83	○	○	◐	○	○	○	potassium soap
Bonide™ All Seasons Horticultural Spray Oil (R)	2.80	○	?	◐	○	○	○	petroleum oil
Bonide™ All Seasons Horticultural Spray Oil (C)	2.80	○	?	◐	○	○	○	petroleum oil
Bug-A-Tak™ Organic Insect Killer (R)	2.80	?	○	○	◐	○	○	eugenol, 2-phenethyl propionate, peppermint oil
Bug-A-Tak™ Organic Insect Killer (C)	2.80	?	○	○	◐	○	○	eugenol, 2-phenethyl propionate, peppermint oil
Concern™ Insect Killing Soap (R)	2.80	○	?	◐	○	○	○	potassium soap
Concern™ Insect Killing Soap (C)	2.80	○	?	◐	○	○	○	potassium soap
EcoEXEMPT™ IC2 Insecticide Concentrate	2.80	○	○	?	◐	○	○	rosemary oil, peppermint oil
Lilly Miller™ Dormant Spray for Insects (C)	2.80	○	?	◐	○	○	○	petroleum oil
Lilly Miller™ Superior Spray Oil (C)	2.80	○	?	◐	○	○	○	petroleum oil
Ortho™ Volck™ Oil Spray (C)	2.80	○	?	◐	○	○	○	mineral oil
Safer™ BioNEEM™ (C)	2.80	○	?	○	◐	○	○	azadirachtin
Safer™ Rose & Flower Insect Killer (R)	2.80	○	?	◐	○	○	○	potassium soap
Schultz™ Garden Safe™ Insecticidal Soap (R)	2.80	○	?	◐	○	○	○	potassium soap

**Some natural clove oils (and other essential oils) may contain small amounts of methyl eugenol, which is considered a carcinogen but is widely found in foods.*

(C) *concentrate* (R) *ready to use* (RTS) *ready to spray* (G) *granules* (A) *aerosol*

○ *lowest hazard* ◐ *moderate hazard* ● *highest hazard* *NA not applicable* **?** *not enough info*

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Insect Controls

continued

Product Name	Score	Short-term health hazard	Long-term health hazard	Hazard to aquatic life	Hazard to birds, bees, or pets	Half-life in soil	Water pollution hazard	Active Ingredients
Victor™ Poison-Free™ Flying Insect Killer (A)	2.80	○	○	?	◐	○	○	mint oil
Victor™ Poison-Free™ Wasp & Hornet Killer (A)	2.80	○	○	?	◐	○	○	mint oil
Bonide™ Hot Pepper Wax™ (R)	2.75	○	?	◐	○	○	?	capsaicin
Hot Pepper Wax™ Insect Repellent (R)	2.75	○	?	◐	○	○	?	capsaicin
Raid™ Earth Options™ Wasp & Hornet Killer(A)	2.75	○	?	○	◐	○	○	eugenol, phenylethyl propionate
Safer™ Insect Killing Soap (C)	2.67	◐	○	◐	○	○	○	potassium soap
Lilly Miller™ Systemic Rose & Flower Care (G)	2.67	○	◐	○	◐	○	○	acephate
Bon-Neem™ Insecticidal Soap (R)	2.60	○	?	◐	◐	○	○	potassium soap of neem oil
Bug Stop™ Indoor & Outdoor Home Insect Killer (R)	2.60	○	?	◐	◐	○	○	tralomethrin
Concern™ Insect Killing Soap Derived from NEEM (R)	2.60	○	?	◐	◐	○	○	fatty acid soap from neem oil
Organica™ K+Neem™ Insecticidal Soap (R)	2.60	○	?	◐	◐	○	○	fatty acid soap from neem oil
Spectracide™ Wasp & Hornet Killer2 (A)	2.60	○	?	◐	◐	○	○	prallethrin, tralomethrin
Concern™ Multi-Purpose Insect Killer (R)	2.50	○	◐	◐	◐	○	○	pyrethrins, piperonyl butoxide
Lilly Miller™ Multi-Purpose Insect Spray (R)	2.50	○	◐	◐	◐	○	○	pyrethrins, piperonyl butoxide
Safer™ Tomato and Vegetable Insect Killer (R)	2.50	○	◐	◐	◐	○	○	pyrethrins, potassium soap
Safer™ Yard & Garden Insect Killer (R)	2.50	○	◐	◐	◐	○	○	pyrethrins, potassium soap
Garden Safe™ Fruit & Vegetable Insect Spray (R)	2.50	○	◐	◐	◐	○	○	pyrethrins, canola oil
Garden Safe™ Houseplant & Garden Insect Spray (R)	2.50	○	◐	◐	◐	○	○	pyrethrins, canola oil
Garden Safe™ Rose & Flower Insect Spray (R)	2.50	○	◐	◐	◐	○	○	pyrethrins, canola oil
Schultz™ Fruit and Vegetable Spray (R)	2.50	○	◐	◐	◐	○	○	pyrethrins, piperonyl butoxide
Schultz™ Houseplant & Garden Insect Spray (R)	2.50	○	◐	◐	◐	○	○	pyrethrins, piperonyl butoxide
Schultz™ Rose & Flower Insect Spray (R)	2.50	○	◐	◐	◐	○	○	pyrethrins, piperonyl butoxide
Bayer Advanced Lawn™ PowerForce™ Multi Insect Killer (G)	2.40	○	?	◐	◐	◐	○	cyfluthrin
Bonide™ Delta Eight™ Insect Control (G)	2.40	○	?	●	◐	○	○	deltamethrin
Bonide™ Rotenone 5% Insect Control (R)	2.40	○	?	●	◐	○	○	rotenone
Bon-Neem™ Insecticidal Soap (C)	2.40	◐	?	◐	◐	○	○	potassium soap of neem oil
Bug Stop™ Indoor & Outdoor Home Insect Killer (R)	2.40	○	?	◐	◐	◐	○	lambda cyhalothrin
Bull's-Eye™ Bioinsecticide (C)	2.40	○	?	◐	●	○	○	spinosad
Concern™ Insect Killing Soap Derived from NEEM (C)	2.40	◐	?	◐	◐	○	○	fatty acid soap from neem oil

(C) *concentrate* (R) *ready to use* (RTS) *ready to spray* (G) *granules* (A) *aerosol*

○ *lowest hazard* ◐ *moderate hazard* ● *highest hazard* *NA not applicable* **?** *not enough info*

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Insect Controls

continued

Product Name	Score	Short-term health hazard	Long-term health hazard	Hazard to aquatic life	Hazard to birds, bees, or pets	Half-life in soil	Water pollution hazard	Active Ingredients
Green Light™ Ronenone Insect Dust	2.40	○	?	●	◐	○	○	ronenone
Organica™ K+Neem™ Insecticidal Soap (C)	2.40	◐	?	◐	◐	○	○	fatty acid soap from neem oil
Ortho™ Basic Solutions™ Malathion Insect Killer (RTS)	2.40	○	?	◐	●	○	○	malathion
Ortho™ Malathion Plus™ Insect Spray (C)	2.40	○	?	◐	●	○	○	malathion
Ortho™ Mosquito-B-Gon™ Tree & Shrub Spray (C)	2.40	○	?	◐	●	○	○	malathion
Spectracide™ Malathion Insect Spray (C)	2.40	○	?	◐	●	○	○	malathion
Bonide™ Liquid Rotenone & Pyrethrins	2.33	○	◐	●	◐	○	○	rotenone, pyrethrins
Monterey Bug Buster-O™ (C)	2.33	○	◐	●	◐	○	○	pyrethrins
Ortho™ Basic Solutions™ Lawn & Garden Insect Killer (G)	2.33	○	◐	●	◐	○	○	bifenthrin
Ortho™ Basic Solutions™ Wasp & Hornet Killer (A)	2.33	○	◐	◐	◐	◐	○	tetramethrin, phenothrin
Ortho™ Bug-B-Gon™ Max™ Insect Killer for Lawns (G)	2.33	○	◐	●	◐	◐	○	bifenthrin
Ortho™ Bug-B-Gon™ Multi-Purpose Garden Dust1	2.33	○	◐	◐	◐	◐	○	permethrin
Ortho™ Hornet & Wasp Killer4 (A)	2.33	○	◐	◐	◐	◐	○	tetramethrin, phenothrin
Ortho™ Hornet & Wasp Killer5 (A)	2.33	○	◐	◐	◐	◐	○	tetramethrin, phenothrin
Spectracide™ PRO Wasp & Hornet Killer (A)	2.33	○	◐	◐	◐	◐	○	tralomethrin, permethrin
Ortho™ Houseplant & Garden Insect Killer (R)	2.33	○	◐	●	◐	○	○	bifenthrin
Ortho™ Rose & Flower Insect Killer1 (R)	2.33	○	◐	●	◐	○	○	bifenthrin
Ortho™ Mosquito-B-Gon™ Area Repellent	2.33	○	◐	◐	◐	◐	○	permethrin, tetramethrin
Ortho™ Orthene™ Systemic Insect Control (C)	2.33	◐	◐	○	●	○	○	acephate
Raid™ Yard Guard™ (A)	2.33	○	◐	◐	◐	◐	○	permethrin, d trans allethrin
Scotts™ Lawn Pro™ Super Turf Builder™ with Summer Guard™ (G)	2.33	○	◐	●	◐	○	○	bifenthrin
Scotts™ Turf Builder™ with Summer Guard™ (G)	2.33	○	◐	●	◐	○	○	bifenthrin
Bayer Advanced Garden™ 2-in-1 Rose & Flower Care Granules	2.20	◐	?	◐	◐	◐	○	disulfoton
Bayer Advanced Garden™ PowerForce™ Multi Insect Killer (R)	2.20	○	?	◐	●	◐	○	cyfluthrin
Bayer Advanced Garden™ Tree & Shrub Insect Control (C)	2.20	○	?	◐	◐	◐	◐	imidacloprid
Bayer Advanced Lawn™ Complete Insect Killer (G)	2.20	○	?	◐	◐	◐	◐	imidacloprid, beta cyfluthrin
Ortho™ Bug-B-Gon™ Garden & Landscape Insect Killer (R)	2.20	○	?	●	◐	◐	○	esfenvalerate
Ortho™ Bug-B-Gon™ Max™ Lawn & Garden Insect Killer (RTS)	2.20	○	?	●	◐	◐	○	esfenvalerate
Ortho™ Bug-B-Gon™ Multi-Purpose Insect Killer (R)	2.20	○	?	●	◐	◐	○	esfenvalerate

(C) *concentrate* (R) *ready to use* (RTS) *ready to spray* (G) *granules* (A) *aerosol*

○ *lowest hazard* ◐ *moderate hazard* ● *highest hazard* *NA not applicable* **?** *not enough info*

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Insect Controls

continued

Product Name	Score	Short-term health hazard	Long-term health hazard	Hazard to aquatic life	Hazard to birds, bees, or pets	Half-life in soil	Water pollution hazard	Active Ingredients
Triazicide™ Lawn & Garden Insect Killer (R)	2.20	○	?	●	◐	◐	○	lambda cyhalothrin
Triazicide™ Soil & turf Insect Killer Granules	2.20	○	?	●	◐	◐	○	lambda cyhalothrin
Vigoro™ Ultra Turf™ Summer Fertilizer Plus Insect Control (G)	2.20	○	?	●	◐	◐	○	lambda cyhalothrin
Raid™ Wasp & Hornet Killer 271 (A)	2.17	○	◐	●	◐	◐	○	tetramethrin, permethrin
Bonide™ Eight™ Garden & Home Insect Killer (R)	2.17	○	◐	●	◐	◐	○	permethrin
Lilly Miller™ Rhododendron Rose & Flower Dust	2.17	○	◐	●	◐	◐	○	permethrin
Ortho™ Home Defense™ Max™ Perimeter & Indoor Insect Killer (R)	2.17	○	◐	●	●	○	○	bifenthrin
Raid™ House & Garden Bug Killer Formula 7 (A)	2.17	○	◐	●	◐	◐	○	d-cis/trans allethrin, cyclopropane carboxylate
Spectracide™ Bug Stop™ Insect Control Granules	2.17	○	◐	●	◐	◐	○	permethrin
Bayer Advanced Garden™ PowerForce™ Multi Insect Killer (C)	2.00	○	?	●	●	◐	○	cyfluthrin
Bayer Advanced Lawn™ Season-Long Grub Control (G)	2.00	○	?	●	◐	◐	◐	imidacloprid
Bonide™ Eight™ Vegetable, Fruit & Flower (R)	2.00	○	◐	●	●	◐	○	permethrin
Bonide™ Eight™ Yard & Garden Insect Killer (R)	2.00	○	◐	●	●	◐	○	permethrin
Garden Tech™ Sevin™ Ready to Spray Bug Killer (RTS)	2.00	○	●	●	●	○	○	carbaryl
Garden Tech™ Sevin™ Ready to Use Bug Killer (R)	2.00	○	●	●	●	○	○	carbaryl
Garden Tech™ Sevin™ -5 (G)	2.00	○	●	●	●	○	○	carbaryl
Garden Tech™ Sevin™ -10 (G)	2.00	○	●	●	●	○	○	carbaryl
Lilly Miller™ Multi-Purpose Insect Spray (C)	2.00	○	◐	●	●	◐	○	permethrin
Lilly Miller™ Grasshopper, Earwig, Cutworm & Sowbug Bait (G)	2.00	○	●	●	●	○	○	carbaryl
Monterey Bug Buster™ (C)	2.00	◐	?	●	◐	◐	○	esfenvalerate
Ortho™ Bug-B-Gon™ Max™ Lawn & Garden Insect Killer (C)	2.00	◐	?	●	◐	◐	○	esfenvalerate
Ortho™ Mosquito-B-Gon™ (RTS)	2.00	○	◐	●	●	◐	○	permethrin
Spectracide™ Bug Stop™ (RTS)	2.00	○	◐	●	●	◐	○	permethrin
Triazicide™ Soil & Turf Insect Killer (C)	2.00	○	?	●	●	◐	○	lambda cyhalothrin
Ortho™ Systemic Insect Killer (formerly Isotox™) (C)	1.83	●	◐	◐	●	◐	○	acephate, fenbutatin oxide
Bayer Advanced Garden™ Rose & Flower Insect Killer (R)	1.80	○	?	●	●	◐	◐	cyfluthrin, imidacloprid
Bayer Advanced Garden™ Rose & Flower Insect Killer (C)	1.80	○	?	●	●	◐	◐	cyfluthrin, imidacloprid
Bayer Advanced Lawn™ Complete Insect Killer for Soil & Turf (RTS)	1.80	○	?	●	●	◐	◐	imidacloprid, beta-cyfluthrin
Bayer Advanced Lawn™ Season-Long Grub Control (RTS)	1.80	○	?	●	●	◐	◐	imidacloprid

(C) *concentrate* (R) *ready to use* (RTS) *ready to spray* (G) *granules* (A) *aerosol*
○ *lowest hazard* ◐ *moderate hazard* ● *highest hazard* *NA not applicable* **?** *not enough info*

2

Slug and Snail Controls

Slugs are the bane of many Northwest gardens, and snails are becoming more of a problem, too. If you have trouble with slugs in your garden, you'll probably need more than one control method. Start with prevention methods, and use chemicals as a last resort.

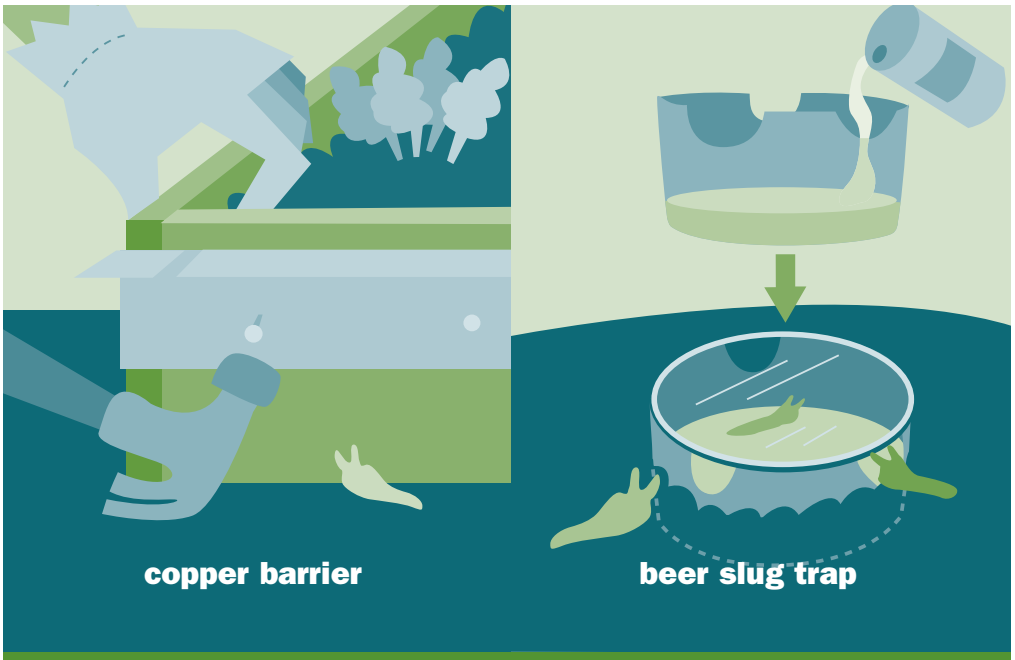
Most chemical controls for slugs contain metaldehyde, a chemical that is dangerous to pets, especially dogs because they may eat large amounts. Slug and snail baits containing the pesticide carbaryl in addition to metaldehyde are significantly more toxic to beneficial insects and fish. Slug baits pose fewer exposure hazards if they are used in a tamper-proof bait station rather than spread on the ground, but do not use flimsy containers that curious children or dogs could easily open. The least-hazardous slug and snail control products include traps and barriers, copper being the most effective barrier. Iron phosphate slug and snail control products are chemically based but less hazardous than metaldehyde baits.

Prevention is the first step in controlling slugs.

- Reduce slug habitat by keeping the garden clean and free of debris. Slugs like to hide under pots, boards, and other objects. Be prompt about cleaning up material that you prune or pull out. Keep pathways clear of overgrown foliage. Avoid heavy ground covers and mulches near susceptible crops.
- Select plants that slugs don't like to eat and avoid plants that slugs really like. Compile your own list from observing your garden over time. It also may help to keep transplants indoors until they are large enough to resist damage.

Control Options

- **Remove and destroy any slugs you see.** This is best done after dark when slugs are active. A flashlight is essential, and dropping the slugs into a jar of soapy water will kill them immediately. Slug hunting is especially fruitful in the fall, when stomping on or crushing pearly clusters of eggs can eliminate hundreds of future slugs in seconds.
- **Use barriers around most-susceptible plants.** Copper barriers are most effective, but many people report some success with pea gravel, ground oyster shell, egg shells, and other materials. Copper barriers can be attached to raised beds as shown below.
- **Place traps** filled with beer or a yeast and water mixture at strategic places where slug damage is worst (see illustration). Traps should be covered to keep out rain. Remove dead slugs and replenish bait frequently.
- **Iron phosphate baits** (e.g. Sluggo, Worry Free) are generally less toxic than those containing metaldehyde.
- **If you decide you must use a chemical product, bait stations** can reduce exposure to dogs, birds, and children. Iron phosphate baits are designed for broadcast use and may not be effective in bait stations. Be sure bait stations cannot be opened by children or pets.
- For more information on least-toxic pest control, see the resources section on pages 53-56.



Copper makes the most effective barrier. Beer traps should be covered to keep out rain.

Slug and Snail Controls

Spot application of a pesticide is almost always safer than broadcast application of the same product or a similar one.

Product Name	Score	Short-term health hazard	Long-term health hazard	Hazard to aquatic life	Hazard to birds, bees, or pets	Half-life in soil	Water pollution hazard	Active Ingredients
Slug Bar™	3.00	○	○	○	○	○	○	beer trap
Slug Saloon™	3.00	○	○	○	○	○	○	beer trap
The Pit	3.00	○	○	○	○	○	○	beer trap
Snail Barr™	3.00	○	○	○	○	NA	○	copper barrier
Slug & Snail deFence™	3.00	○	○	○	○	NA	?	sodium chloride, polyethylene
Escar-go!™ (G)	3.00	○	?	○	○	NA	○	iron phosphate
Schultz™ Garden Safe™ Slug & Snail Bait (G)	3.00	○	?	○	○	NA	○	iron phosphate
Sluggo™ (G)	3.00	○	?	○	○	NA	○	iron phosphate
Worry Free™ Slug and Snail Bait (G)	3.00	○	?	○	○	NA	○	iron phosphate
Corry's™ Liquid Slug & Snail Control (R)	2.17	○	◐	○	●	◐	◐	metaldehyde
Corry's™ Slug & Snail Death (G)	2.17	○	◐	○	●	◐	◐	metaldehyde
Corry's™ Slug & Snail Death 3.25 (G)	2.17	○	◐	○	●	◐	◐	metaldehyde
Corry's™ Slug & Snail Pellets (G)	2.17	○	◐	○	●	◐	◐	metaldehyde
Deadline™ Force II™ (G)	2.17	○	◐	○	●	◐	◐	metaldehyde
Deadline™ RainTough™ (G)	2.17	○	◐	○	●	◐	◐	metaldehyde
Lilly Miller™ Slug & Snail Spray (RTS)	2.17	○	◐	○	●	◐	◐	metaldehyde
Lilly Miller™ Slug & Snail Bait (G)	2.17	○	◐	○	●	◐	◐	metaldehyde
Lilly Miller™ Snail & Slug Mini Pellets (G)	2.17	○	◐	○	●	◐	◐	metaldehyde
Vigoro™ Slug and Snail Meal2 (G)	2.17	○	◐	○	●	◐	◐	metaldehyde
Lilly Miller™ Slug & Snail Spray (RTU)	2.00	◐	◐	○	●	◐	◐	metaldehyde
Ortho™ Bug-Geta™ Snail and Slug Killer1 (G)	2.00	◐	◐	○	●	◐	◐	metaldehyde
Cooke™ Slug & Snail Granules	1.67	○	●	●	●	◐	◐	metaldehyde, carbaryl
Corry's™ Slug, Snail, & Insect Killer (G)	1.67	○	●	●	●	◐	◐	metaldehyde, carbaryl
Deadline™ Insect Killer	1.67	○	●	●	●	◐	◐	metaldehyde, carbaryl
Lilly Miller™ Go-West Meal (G)	1.67	○	●	●	●	◐	◐	metaldehyde, carbaryl
Lilly Miller™ Snail, Slug & Bug Killer Bait (G)	1.67	○	●	●	●	◐	◐	metaldehyde, carbaryl
Ortho™ Bug-Geta Plus™ Snail, Slug, & Insect Killer (G)	1.67	○	●	●	●	◐	◐	metaldehyde, carbaryl

note: Primary hazard from metaldehyde-based slug/snail baits is to dogs. Products that also contain carbaryl are highly toxic to birds, beneficial insects, and aquatic species. Risks to pets from slug and snail killers can be reduced (but not eliminated) by scattering product thinly without clumps or piles, confining pets during application, keeping dogs away from product container, and using products in tamper-proof bait stations such as Terminator Turtle.

(C) *concentrate* (R) *ready to use* (RTS) *ready to spray* (G) *granules* (A) *aerosol*

○ *lowest hazard* ◐ *moderate hazard* ● *highest hazard* *NA not applicable* **?** *not enough info*

Pesticides and Water Quality

Even if your yard is far from any body of water, the pesticides or fertilizers you use may run off your landscape and end up in the water. In most of Seattle and King County, water that flows into storm drains is not treated but is discharged directly to the nearest stream, lake, or Puget Sound. Since many pesticides are highly toxic to fish or other aquatic life, even a very small amount can be harmful. Fertilizer runoff encourages the growth of algae or aquatic weeds that damage water quality and interfere with recreational uses.

Monitoring by the U.S. Geological Survey and the Washington State Department of Ecology has found 23 different pesticides in small streams around Puget Sound. More pesticides were found in urban streams than in agricultural streams, probably resulting from use on residential lawns and gardens, parks, golf courses, and roadsides. The pesticides most often found include those most often used on home landscapes, such as the insecticides carbaryl and malathion and the herbicide components of "weed and feed" products. More recent testing in urban areas in California has found toxic levels of newer insecticides such as bifenthrin and cyfluthrin in stream bottoms, and the same thing is probably happening in Washington. These insecticides are increasing in use as replacements for diazinon and chlorpyrifos (Dursban™), which have been taken off the market for home use. Levels of the insecticide carbaryl in some Seattle-area streams have also increased since diazinon went off the market.

The mobility ratings in this guide give you some idea of how likely a particular pesticide is to run off of your landscape with rain or lawn watering. Soil quality and slope, vegetation cover, and weather will also affect runoff. Even chemicals with low mobility ratings will still run off in a heavy rain.

To protect water quality, try to avoid pesticides as much as possible, particularly those that are highly mobile. Never apply more pesticide than the label indicates, and never apply when it is raining or about to rain. Finally, never dispose of unwanted pesticides down the drain or in the trash. Use them up according to label directions or take them to a hazardous waste collection site.

To reduce fertilizer runoff, choose slow-release fertilizers for most uses and never use more than recommended on the label.

notes

3

Disease Controls

Our damp Northwest climate provides a great environment for powdery mildew, black spot, and other diseases. Roses are especially vulnerable. Chemicals used for controlling plant diseases are often quite hazardous to humans. So start with prevention techniques before resorting to chemicals.

Prevention

- **Choose disease-resistant plants.** See a short list of disease-resistant rose varieties on page 26. Other lists of appropriate plants for our region include:
  Great Plant Picks: *www.greatplantpicks.org*
  Choosing Good Roses for Puget Sound: *http://gardening.wsu.edu/column/02-27-00.htm*
- **Plant roses where they get plenty of sun** - at least six hours a day - and good air circulation. Remove all leaves up to 1 to 1-1/2 feet off the ground to prevent black spot or mildew spores from splashing on them.
- **Don't over-fertilize vegetable crops** with nitrogen. Space plants for good air circulation.
- **Rotate annual crops** every year if possible to avoid soil-borne diseases.

Control Options

- **Remove and dispose** of diseased leaves. Do not put diseased material or weeds with seeds in home compost bins.
- **Use a drip-watering system** instead of a regular sprinkler. Sprinklers splash water from the ground and from affected plants and help spread powdery mildew.
- **The baking soda fungicide** on page 26 can help control powdery mildew. Commercial products based on potassium bicarbonate are similar.
- **Products based on sulfur or neem oil** are less toxic than other formulations. Consider using a sulfur-based dormant spray for black spot, powdery mildew, and rust.
- **Treat problems individually** instead of using products that combine ingredients for insects, diseases, and fertilization.
- **See pages 53-56 for information sources** on least-toxic pest and disease control.

Disease Controls

Spot application of a pesticide is almost always safer than broadcast application of the same product or a similar one.

Product Name	Score	Short-term health hazard	Long-term health hazard	Hazard to aquatic life	Hazard to birds, bees, or pets	Half-life in soil	Water pollution hazard	Active Ingredients
The following products are primarily for disease control. However products containing neem oil also may control some insects. Consult label for more information.								
Cornell Formula baking soda fungicide (see p. 26)	3.00	○	○	○	○	NA	?	sodium bicarbonate
Bonide™ Bulb Dust (G)	3.00	?	○	○	○	○	○	cedar oil, garlic powder, dried blood
Bonide™ Remedy (C)	3.00	○	?	○	○	NA	?	potassium bicarbonate
Green Light™ Wettable Dusting Sulfur (C)	3.00	○	?	○	○	NA	○	sulfur
Green Guard™ Plant Growth Enhancer (C)	3.00	○	?	○	○	○	?	harpin protein
Lilly Miller™ Multi-Purpose Fungicide (R)	3.00	○	?	○	○	NA	○	sulfur
Messenger™ STS (C)	3.00	○	?	○	○	○	?	harpin protein
Monterey E-rase™ (R)	3.00	○	?	○	○	○	○	jojoba oil
Safer™ Garden Fungicide (R)	3.00	○	?	○	○	NA	○	sulfur
Safer™ Garden Fungicide (C)	3.00	○	?	○	○	NA	○	sulfur
Serenade™ Solutions™ Biofungicide (C)	3.00	○	?	○	○	○	○	Bacillus subtilis
SoilGard™ Microbial Fungicide (C)	3.00	○	?	○	○	○	○	Gliocladium virens spores
Concern™ Garden Defense Multi-Purpose Spray (R)	2.80	○	?	○	◐	○	○	neem oil
Concern™ Garden Defense Multi-Purpose Spray (C)	2.80	○	?	○	◐	○	○	neem oil
Green Light™ Neem Concentrate	2.80	○	?	○	◐	○	○	neem oil
Green Light™ Powdery Mildew Killer (R)	2.80	○	?	○	◐	○	○	neem oil
Green Light™ Rose Defense™ (C)	2.80	○	?	○	◐	○	○	neem oil
Green Light™ Tomato & Vegetable Spray (R)	2.80	○	?	○	◐	○	○	neem oil
Monterey Aliette™ (C)	2.80	○	?	◐	○	○	○	fosetyl aluminum
Safer™ 3-in-1 Garden Spray with NEEM Oil (C)	2.80	○	?	○	◐	○	○	neem oil
Garden Safe™ Fungicide3 (R)	2.80	○	?	○	◐	○	○	neem oil
Garden Safe™ Fungicide3 (C)	2.80	○	?	○	◐	○	○	neem oil
Shield-All II™ Organic Fungicide (C)	2.80	○	?	○	◐	○	○	neem oil
Bonide™ Sulfur Plant Fungicide (R)	2.75	○	?	◐	○	NA	○	sulfur
Green Light™ Systemic Fungicide (C)	2.67	○	●	○	○	○	○	thiophanate-methyl
Bonide™ Liquid Copper (C)	2.60	○	◐	◐	○	NA	○	copper salts of fatty acids
Concern™ Copper Soap Fungicide (R)	2.60	○	◐	◐	○	NA	○	copper octanoate
Cooke™ Kop-R-Spray Fungicide (C)	2.60	○	◐	◐	○	NA	○	metallic copper
Green Light™ Fruit, Nut, and Vegetable Spray (C)	2.60	○	?	◐	◐	○	○	neem oil
Lilly Miller™ Cueva™ Copper Soap Fungicide (R)	2.60	○	◐	◐	○	NA	○	copper octanoate
Soap-Shield™ Fungicidal Soap (C)	2.60	○	◐	◐	○	NA	○	copper soap
Bayer Advanced Lawn™ Fungus Control for Lawns (G)	2.50	○	●	○	○	○	◐	triadimefon (Bayleton)
Green Light™ Fung-Away (C)	2.50	○	●	○	○	○	◐	triadimefon (Bayleton)

(C) *concentrate* (R) *ready to use* (RTS) *ready to spray* (G) *granules* (A) *aerosol*

○ *lowest hazard* ◐ *moderate hazard* ● *highest hazard* *NA not applicable* **?** *not enough info*

continued on next page

Disease Controls

continued

Product Name	Score	Short-term health hazard	Long-term health hazard	Hazard to aquatic life	Hazard to birds, bees, or pets	Half-life in soil	Water pollution hazard	Active Ingredients
Green Light™ Fung-Away™ Systemic Lawn Fungicide (G)	2.50	○	●	○	○	○	◐	triadimefon (Bayleton)
Green Light™ Fung-AwayII™ (C)	2.50	○	●	◐	○	○	○	thiophanate-methyl
Scotts™ Lawn Fungus Control (G)	2.50	○	●	◐	○	○	○	thiophanate-methyl
Bonide™ Copper Bordeaux Modern Replacement (G)	2.40	○	◐	●	○	NA	○	copper
Lilly Miller™ Microcop™ (C)	2.40	◐	◐	◐	○	NA	○	basic copper sulfate
Lilly Miller™ Dormant Spray for Disease (C)	2.33	●	?	○	○	NA	?	calcium polysulfide
Spectracide™ Immunox™ Multi-Purpose Fungicide (C)	2.33	○	●	○	○	◐	◐	myclobutanil
Spectracide™ Immunox™ Lawn Disease Control Systemic Fungicide (C)	2.33	○	●	○	○	◐	◐	myclobutanil
Bayer Advanced Garden™ Disease Control for Roses, Flowers & Shrubs (C)	2.17	○	◐	◐	○	●	◐	tebuconazole
Green Light™ Broad Spectrum Mancozeb (C)	2.17	○	●	◐	○	◐	◐	mancozeb
Ortho™ Garden Disease Control (C)	2.17	◐	●	◐	○	◐	○	chlorothalonil
Ortho™ RosePride™ Rose & Shrub Disease Control (Funginex™) (C)	2.17	●	●	○	○	○	◐	triforine
Spectracide™ Immunox™ Lawn Disease Control Granules	2.17	○	●	◐	○	◐	◐	myclobutanil
Ortho™ Lawn Disease Control (RTS)	2.00	◐	◐	◐	○	●	◐	propiconazole
The following products contain ingredients for both disease and insect control.								
Safer™ 3-in-1 Garden Spray (R)	2.75	○	?	◐	○	NA	○	potassium soap, sulfur
Safer™ 3-in-1 Garden Spray (C)	2.75	○	?	◐	○	NA	○	potassium soap, sulfur
Green Light™ Rose Defense™ II (R)	2.50	○	◐	◐	◐	○	○	neem oil, pyrethrins
Bayer Advanced Garden™ All in One Rose & Flower Care (G)	2.00	○	◐	◐	◐	●	◐	tebuconazole, imidacloprid
Bonide™ Fruit Tree Spray (C)	2.00	◐	●	◐	●	○	○	captan, malathion, carbaryl
Bonide™ Oil & Lime Sulfur Spray (C)	2.00	●	?	◐	◐	○	?	calcium polysulfide, horticultural spray oil
Immunox™ 3-in-1 Insect & Disease Control + Fertilizer (R)	2.00	○	●	◐	◐	◐	◐	myclobutanil, permethrin
Immunox™ Plus Insect & Disease Control (C)	2.00	○	●	◐	◐	◐	◐	myclobutanil, permethrin
Green Light™ Rose & Flower Dust	1.67	●	●	◐	●	◐	○	malathion, methoxychlor, captan
Ortho™ Orthenex™ Insect & Disease Control (aerosol)	1.67	◐	●	●	◐	◐	◐	acephate, triforine, resmethrin
Ortho™ Orthenex™ Garden Insect & Disease Control (C)	1.50	●	●	◐	●	◐	◐	acephate, triforine, fenbutatin oxide

(C) *concentrate* (R) *ready to use* (RTS) *ready to spray* (G) *granules* (A) *aerosol*

○ *lowest hazard* ◐ *moderate hazard* ● *highest hazard* *NA not applicable* **?** *not enough info*

Baking Soda Fungicide

Mix and keep in a labeled container:

1 teaspoon baking soda

a few drops of dishwashing liquid

1 quart of water

This recipe can help control powdery mildew on garden plants such as roses. Although the recipe has not received EPA registration,* there is a considerable body of scientific evidence and field experience showing that it is reasonably effective if applied weekly in the spring before disease symptoms appear. To avoid unnecessary use, only treat if previous experience shows that mildew is almost certain to develop. Reportedly this mixture is not effective on black spot.

A Short List of Disease-Resistant Rose Varieties

Name	Type	Characteristics
'Cecile Brunner'	polyantha	multiple pale pink flowers
'Queen Elizabeth'	hybrid tea	large deep pink flowers
'Sexy Rexy'	floribunda	striking big pink flowers
'Souvenir de la Malmaison'	old rose	shrubby, pink flowers
Rosa rugosa	shrub	magenta or white flowers edible fruit
'Altissimo'	climber	deep red
'Europeana'	floribunda	dark red
'Fantin la Tour'		lavender
'Fragrant Cloud'		red-orange
'Just Joey'	hybrid tea	big peach-colored blooms
'Climbing America'	climber	orange
'Iceberg'	floribunda	vigorous white blooms
'Pascali'	hybrid tea	pristine white

* A commercial fungicide using potassium bicarbonate, similar to baking soda, is now available. See Bonide Remedy in the table of Disease Controls.

4

Weed Controls

Plants we define as weeds will always be part of our landscapes. Be realistic: don't attempt to eliminate all weeds (except for designated noxious weeds that must be controlled). Eradication often involves frequent use of weed killers that may harm human health and the environment. Instead, manage weeds in a way that minimizes their impact.

Prevention

- **Improve the soil** by adding compost, manure, or mulch. Plants will grow better in soil that contains more organic matter, and healthy plants will help crowd out weeds. Weeds will also be easier to remove from soil that is not compacted.
- **Use mulch** to help control weeds in garden beds. When an area is cleared of weeds, apply a layer of mulch (see table on page 28) to provide a barrier while plants are getting established.
- **Design your garden for long-term weed control.** Aim for a landscape covered with desirable plantings that form a multi-layered groundcover that will crowd out weeds.

Control Options

Weed barriers

- **Landscaping fabrics** have limited usefulness under bark mulches in areas that will not be cultivated. They help keep some weeds from pushing up underneath, but do not prevent blown-in seeds from sprouting on top. Bark tends to slip around on top of the fabric. Less effective than cardboard (see below).
- **Cardboard sheets** (use old boxes) may be used under compost to establish new garden beds or under gravel, stone, or wood chip paths.

Mulches

- **Mulches are used** around landscape plants and in garden beds to conserve moisture and reduce weeds. Place mulch over landscape as indicated below.

Plant	Best Mulches	Mulch Thickness
Annuals or herbaceous perennials	compost, dry grass clippings, leaves	1-2 inches
Shrubs and trees	coarse wood chips or bark	2-4 inches

Add new layers from time to time as mulch naturally decomposes. Keep mulch away from stems and crowns of plants. Chips from tree companies are usually free. They are coarse, last a long time, and make a good weed barrier. Their appearance may be a bit untidy. Don't incorporate sawdust, bark, or wood chips into the soil; spread them on top.

Weeding Tools

Use tools, rather than chemical herbicides, to control weeds. This will remove the potential for harm to valuable plantings and water quality. Buy a tool that is sturdy and well-designed for the job. How well mechanical removal works depends upon the size of the area and the severity of the weed problem.

Cultivators

- Cultivators have curved tines that loosen and aerate soil and dislodge small weeds, which die because their roots have been disturbed. These tools probably work best when the weeds are small.
- Choose how many tines you need based on how closely spaced the plants are. Combination cultivator-hoes are available.
- Use cultivators several times each gardening season to remove newly sprouted weeds. Always try to remove weeds before they set seed.

Hoes

- Hoes may be more effective than cultivators when weeds are larger. Hoes chop weeds, removing the leaves and the top part of the stem.
- Newer designs are more effective and easier to use than the traditional garden hoe. Scuffle hoes, oscillating hoes, stirrup hoes, and collinear hoes all have blades that move horizontally, chopping weeds under the soil. Most have long handles to reduce the effort involved.

Weed pullers

- Weed pullers are designed to remove weeds with long taproots, such as dandelions. You will have better success in moist soil; irrigate the lawn or weedy area if necessary. Reseed the holes with grass seed to prevent weeds from sprouting
- Long-handled weed pullers require less effort because you can work standing up. Some have a pincer that grabs the root and pops it out. Others have a v-shape to catch and hold the root.
- The hori-hori, a short and stout-bladed tool of Japanese origin, is effective for removing weeds in beds and along the edge of pavers and walkways.

Weed Killers

- Chemical herbicides, including weed and feed, are considered pesticides. They should be considered the last resort rather than the first choice in solving a weed problem. If you have an ongoing weed problem, you probably have a design or maintenance problem that should be addressed before resorting to repeated chemical use. If chemicals are used, they should be selected to spot-treat individual weeds rather than sprayed over an entire lawn or landscape.

Never buy an herbicide without understanding what its effect will be. An incorrect choice can mean poor weed control, damage to valuable plantings, or increased risk of water pollution. Many herbicides are toxic to fish and may run off of treated areas.

Herbicides are classified as either pre-emergent or post-emergent. Pre-emergent herbicides prevent weed seeds from growing but have little or no effect on existing weeds. Post-emergent weed killers are used to control existing weeds. Some will kill everything they touch, while others are selective in action, such as killing only broad-leafed weeds but not affecting grass. If you purchase an herbicide, be sure you understand what its action will be.

- See pages 53-56 for sources of information on least-toxic pest and weed control.

Acid-based Herbicides

You may have noticed that ordinary household vinegar poured on weeds burns the leaves, causing them to shrivel and die. Several companies now market herbicides based on acetic acid (vinegar), citric acid (found in lemons), or other acids. These commercial products probably will work somewhat better than plain household vinegar because they have just the right amount of acid, combined with a detergent or soap to make the product stick to plant leaves longer, and possibly other ingredients as well. Acid-based herbicides can be useful in several ways, but you need to understand how they work, and you should be very careful not to get them in your eyes.

The ingredients in acid weed killers are generally benign substances that are found in food products, but the acids can be concentrated enough to cause severe irritation or even damage to eyes from accidental contact. You can use the "short-term health hazard" rating in this guide to compare the eye hazard of these products. The ready-to-use product has a much lower concentration of acid and does not need to be diluted. Be very careful when using these products. Read the label and follow all directions.

Best Uses for Acid-based Herbicides

Single applications of these herbicides burn the top growth of weeds but do not kill the roots. They also are non-selective, so they will kill or damage any plants they touch, including grass. They are especially useful for killing or controlling weeds in gravel areas, in sidewalk cracks or between pavers, and even in garden beds if you are very careful to avoid desirable plants. Hand weeding is easy in garden beds, however, and doesn't leave unsightly dead weeds behind. Because these contact herbicides are not taken up into the plant, you need to be careful to coat leaf surfaces well, but avoid using so much that excess runs off. Acid-based herbicides can kill perennial weeds if used repeatedly, but they are more likely to kill annuals with a single treatment.

Moss Control

The pesticide used in the largest quantities in the Seattle/King County area is moss killer. Although moss killers are generally not as harmful as other pesticides, they can still run off into streams, especially when used on roofs, sidewalks, decks, and driveways. In addition, some products are corrosive to eyes. Moss grows both in lawns and on structures. It is not harmful in lawns, but many people don't like the way it looks. Moss can damage roofs, however, and it can be a safety hazard on sidewalks, decks, and driveways.

Moss in Lawns

Moss is a native plant that grows well in Northwest conditions and can be tolerated in turf. If you want to remove it, however, consider this: if you do not correct the conditions that favor moss, it will return. Moss likes shade, moisture, and acid soil. Grass, on the other hand, prefers sun, drier conditions, and more alkaline soil. So if you want grass, open up tree canopies to let in more sunlight, correct drainage problems, and lime the soil as needed. Rake out the moss during the summer when it is dry and reseed the lawn in the fall. It is helpful to aerate and use a slow-release fertilizer when you reseed. If you decide to use a moss control product, choose one of the less-toxic ones as shown in the tables. Choices include soaps, acid-based products, or iron sulfate.

Moss on Structures

Remove as much of the moss growth as possible mechanically. On sidewalks, decks, and driveways, a shovel, rake, or heavy wire brush can be useful. Power washing is also an option. Do this when the moss is dried out and easy to remove.

On roofs, you have to be very careful not to damage shingles or get water up under them. Power washing is not recommended here. Use (or hire someone to use) hand tools to remove as much moss as possible. This is easier to do if it is done in the summer and on a regular basis rather than waiting for a thick accumulation. A leaf blower or gentle rake can be helpful.

If you decide you need to use a chemical treatment, your choices are a zinc-based product, an acid-based product, or a potassium soap-based product. With all three, you want to avoid allowing product or contaminated rinse water to run off into a storm drain or into the street. Soap products are nice because they clean at the same time. For long-term prevention, you can install zinc flashing or strips in horizontal strips across the roof. Check roofing stores or the Internet for photos and product names.

In areas where moss accumulates heavily, prune back branches, especially those overhanging the roof, to open areas up and allow more light.

Weed Controls

Spot application of a pesticide is almost always safer than broadcast application of the same product or a similar one.

Product Name	Score	Short-term health hazard	Long-term health hazard	Hazard to aquatic life	Hazard to birds, bees, or pets	Half-life in soil	Water pollution hazard	Active Ingredients
Pre-emergence Weed Controls These products are used before weeds appear. They have no effect on existing weeds.								
Dalen™ Landscaping Fabrics (several kinds)	3.00	○	○	○	○	NA	○	fabric barrier
DeWitt™ Weed Barrier	3.00	○	○	○	○	NA	○	fabric barrier
Fabrico™ Landscaping Fabric	3.00	○	○	○	○	NA	○	fabric barrier
Weed-X™ Porous Landscaping Fabric	3.00	○	○	○	○	NA	○	fabric barrier
Concern™ Weed Prevention Plus (G)	3.00	○	○	○	○	?	?	corn gluten
Concern™ Weed Prevention Plus 8-2-4 (G)	3.00	○	○	○	○	?	?	corn gluten
Concern™ Weed Prevention Plus No Phosphate (G)	3.00	○	○	○	○	?	?	corn gluten
Walt's Organic Weed Stopper Plus (G)	3.00	○	○	○	○	?	?	corn gluten
WOW!™ Pre-emergence Weed Control (G)	3.00	○	○	○	○	?	?	corn gluten
Monterey Weed Impede™ (C)	2.83	○	◐	○	○	○	○	oryzalin
Green Light™ Amaze™ (G)	2.67	○	◐	○	○	◐	○	benefin, oryzalin
Lilly Miller™ Casoron™ Granules	2.50	○	◐	○	○	◐	◐	dichlobenil
Lilly Miller™ Noxall™ Vegetation Killer(G)	2.50	○	◐	○	○	◐	◐	dichlobenil
Ortho™ Casoron™ Granules2	2.50	○	◐	○	○	◐	◐	dichlobenil
Miracle-Gro™ Garden Weed Preventer (G)	2.33	○	◐	●	○	◐	○	trifluralin
Miracle-Gro™ Garden Weed Preventer & Plant Food (G)	2.33	○	◐	●	○	◐	○	trifluralin
Preen™ Garden Weed Preventer (G)	2.33	○	◐	●	○	◐	○	trifluralin
Preen™ Garden Weed Preventer Plus Fertilizer (G)	2.33	○	◐	●	○	◐	○	trifluralin
Post-emergence Weed Controls, Selective These products are used on existing weeds. They kill broadleaf weeds but generally have no effect on grass.								
Whitney Farms™ Moss Control Lawn Food with Natural Ingredients (G)	3.00	○	○	○	○	NA	○	ferrous sulfate monohydrate
Lilly Miller™ Super Rich™ Moss Control Lawn Food (G)	3.00	○	?	○	○	NA	○	ferrous sulfate monohydrate
Lilly Miller™ Moss-Out! Lawn Granules	3.00	○	?	○	○	NA	○	ferrous sulfate monohydrate
Lilly Miller™ Moss-Out! Plus Fertilizer for Lawns (G)	3.00	○	?	○	○	NA	○	ferrous sulfate monohydrate
Lilly Miller™ Moss-Out! Spot Treater for Lawns & Flower Beds Dry Formula	3.00	○	?	○	○	NA	○	ferrous sulfate monohydrate
NuLife™ Rid Moss™ 7-0-0 (G)	3.00	○	?	○	○	NA	○	iron sulfate
Ortho™ Moss-B-Gon™ Granules for Lawns	3.00	○	?	○	○	NA	○	ferrous sulfate monohydrate
Scotts™ Turf Builder™ with Moss Control (G)	3.00	○	?	○	○	NA	○	ferrous sulfate monohydrate

(C) *concentrate* (R) *ready to use* (RTS) *ready to spray* (G) *granules* (A) *aerosol*

○ *lowest hazard* ◐ *moderate hazard* ● *highest hazard* *NA not applicable* ? *not enough info*

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Weed Controls

continued

Product Name	Score	Short-term health hazard	Long-term health hazard	Hazard to aquatic life	Hazard to birds, bees, or pets	Half-life in soil	Water pollution hazard	Active Ingredients
Post-emergence Weed Controls, Selective - *Continued*								
These products are used on existing weeds. They kill broadleaf weeds but generally have no effect on grass.								
Vigoro™ UltraTurf™ Moss Control Plus Fertilizer (G)	3.00	○	?	○	○	NA	○	ferrous sulfate monohydrate
Ortho™ Grass-B-Gon™ Grass Killer for Lanscapes (R)	2.67	○	●	○	○	○	○	fluazifop-p-butyl
Monterey Grass Getter™ (C)	2.60	◐	?	◐	○	○	○	sethoxydim
Lilly Miller™ Moss-Out!™ Granules	2.50	●	?	○	○	NA	○	ferrous sulfate monohydrate
Miracle-Gro™ Lawn Fertilizer Plus Crabgrass Preventer (G)	2.50	○	◐	◐	○	◐	○	pendimethalin
Scotts™ Turf Builder™ Plus Halts (G)	2.50	○	◐	◐	○	◐	○	pendimethalin
Webfoot™ Lawn Food Plus Moss Control (G)	2.50	●	?	○	○	NA	○	iron sulfate
Bayer Advanced Garden™ PowerForce™ Brush Killer Plus (C)	2.40	○	?	○	○	◐	●	triclopyr amine
Green Light™ Cut Vine & Stump Killer (R)	2.40	○	?	○	○	◐	●	triclopyr amine
Lilly Miller™ Blackberry & Brush Killer (C)	2.40	○	?	○	○	◐	●	triclopyr amine
Lilly Miller™ Brush, Blackberry & Vine Killer (R)	2.40	○	?	○	○	◐	●	triclopyr amine
Lilly Miller™ Hose 'n Go™ Blackberry & Brush Killer	2.40	○	?	○	○	◐	●	triclopyr amine
Ortho™ Brush-B-Gon™ Poison Ivy Killer2 (R)	2.40	○	?	○	○	◐	●	triclopyr amine
Ortho™ Brush-B-Gon™ Poison Ivy Killer2 (C)	2.40	○	?	○	○	◐	●	triclopyr amine
Ortho™ Weed-B-Gon™ Chickweed, Clover, & Oxalis Killer (C)	2.40	○	?	○	○	◐	●	triclopyr amine
Bonide™ Weed Beater™ Lawn Spot Weeder (R)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP, dicamba
Bonide™ Weed Beater™ Lawn Weed Killer (R)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP, dicamba
Bonide™ Weed Beater™ Lawn Weed Killer Ready to Spray	2.33	○	◐	◐	○	○	●	2,4-D, MCPP, dicamba
Lilly Miller™ Lawn Weed Killer (R)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP, dicamba
Lilly Miller™ Lawn Weed Liller (C)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP, dicamba
Ortho™ Basic Solutions™ Lawn Weed Killer1 (C)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP, dichlorprop-p
Ortho™ Weed-B-Gon Max™ (R)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP, dicamba
Ortho™ Weed-B-Gon™ (C)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP-p, dicamba
Ortho™ Weed-B-Gon™ Crabgrass Killer (C)	2.33	○	●	○	○	●	○	calcium acid methanearsonate
Ortho™ Weed-B-Gone™ Lawn Weed Killer (R)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP
Ortho™ Weed-B-Gone™ Lawn Weed Killer Lock 'n Spray	2.33	○	◐	◐	○	○	●	2,4-D, MCPP, dicamba
Safer™ Weed-Away (R)	2.33	○	◐	◐	○	○	●	MCPA, MCPP, dicamba
Spectracide™ Brush Killer (C)	2.33	◐	◐	◐	○	○	◐	2,4-D, dichlorprop, dicamba
Spectracide™ Weed Stop™ 2X for Lawns (R)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP-p, dicamba

(C) *concentrate* (R) *ready to use* (RTS) *ready to spray* (G) *granules* (A) *aerosol*
○ *lowest hazard* ◐ *moderate hazard* ● *highest hazard* *NA not applicable* **?** *not enough info*

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Weed Controls

continued

Product Name	Score	Short-term health hazard	Long-term health hazard	Hazard to aquatic life	Hazard to birds, bees, or pets	Half-life in soil	Water pollution hazard	Active Ingredients
Post-emergence Weed Controls, Selective - *Continued* These products are used on existing weeds. They kill broadleaf weeds but generally have no effect on grass.								
Spectracide™ Weed Stop™ 2X for Lawns (C)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP-p, dicamba
Spectracide™ Weed Stop™ Weed Killer (R)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP-p, dicamba
Spectracide™ Weed Stop™ Weed Killer (C)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP-p, dicamba
Bayer Advanced Lawn™ Winterizer Fertilizer and Weed Control (G)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP-p, dicamba
GreenSweep™ Weed and Feed (RTS)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP, dichlorprop
Lilly Miller™ Hose 'n Go™ Weed & Feed	2.33	○	◐	◐	○	○	●	2,4-D, MCPA, dicamba
Lilly Miller™ Rapid Green™ Weed & Feed (G)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP, dicamba
Lilly Miller™ Super Rich™ Feed & Weed Lawn Food (G)	2.33	○	◐	◐	○	○	●	2,4-D, 2,4-DP, dicamba
Lilly Miller™ Ultragreen™ Pro Weed & Feed (G)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP, dicamba
Lilly Miller™ Ultragreen™ Weed & Feed with Trimec (G)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP, dicamba
Lilly Miller™ Super Ultragreen™ Weed & Feed (G)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP, dicamba
Miracle-Gro™ Lawn Fertilizer Plus Weed Control (G)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP-p, dicamba
Scotts™ Lawn Pro™ Super Turf Builder™ with Plus 2™ (G)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP
Scotts™ Liquid Turf Builder™ with Plus 2™ Weed Control (G)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP, dichlorprop
Scotts™ Winterizer with Plus2™ Weed Control (G)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP
Scotts™ Turf Builder™ Plus 2™ Weed Control (G)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP
Sta-Green™ Winterizer Weed & Feed (G)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP-p, dicamba
Vigoro™ UltraTurf™ Weed & Feed (G)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP, dichlorprop
Webfoot™ Weed & Feed (G)	2.33	○	◐	◐	○	○	●	2,4-D, MCPP-p, dicamba
Lilly Miller™ Moss Out!™ Spot Treater for Lawns & Flower Beds (R)	2.25	●	?	◐	○	NA	○	ferric sulfate
Lilly Miller™ Moss Out!™ for Lawns (C)	2.25	●	?	◐	○	NA	○	ferrous sulfate anhydrous
Lilly Miller™ Ultragreen™ Crabgrass Control & Lawn Food (G)	2.17	◐	◐	●	○	◐	○	benefin, trifluralin
Ortho™ Weed-B-Gon™ Crabgrass Killer for Lawns (R)	2.17	○	●	◐	○	●	○	calcium acid methanearsonate
Ortho™ Weed-B-Gon™ Max™ (RTS)	2.17	◐	◐	○	○	◐	●	MCPA, triclopyr amine, dicamba
Ortho™ Weed-B-Gone™ Ready Spray	2.17	◐	◐	◐	○	○	●	2,4-D, MCPP
Bayer Advanced Lawn™ All in One Weed Killer (R)	1.83	○	●	◐	○	●	●	MSMA,* 2,4-D, MCPP-p, dicamba
Bayer Advanced Lawn™ All in One Weed Killer for Lawns (R)	1.83	○	●	◐	○	●	●	MSMA,* 2,4-D, MCPP-p, dicamba
Bayer Advanced Lawn™ All in One Weed Killer for Lawns (C)	1.83	○	●	◐	○	●	●	MSMA,* 2,4-D, MCPP-p, dicamba

**MSMA = monosodium methanearsonate*

(C) *concentrate* (R) *ready to use* (RTS) *ready to spray* (G) *granules* (A) *aerosol*

○ *lowest hazard* ◐ *moderate hazard* ● *highest hazard* *NA not applicable* **?** *not enough info*

continued on next page

Weed Controls

continued

Product Name	Score	Short-term health hazard	Long-term health hazard	Hazard to aquatic life	Hazard to birds, bees, or pets	Half-life in soil	Water pollution hazard	Active Ingredients
Post-emergence Weed Controls, Non-selective These products are used on existing weeds. They will kill or damage all plants, including grass.								
Weeding Tools (any)	3.00	○	○	○	○	NA	○	
Perfectly Natural™ Weed & Grass Killer (RTU)	3.00	?	○*	○	?	○	?	clove oil, vinegar, lecithin
Weed-A-Tak™ Organic Weed & Grass Killer (R)	3.00	?	○	○	?	○	?	eugenol, 2-phenethyl propionate, corn gluten
Weed-A-Tak™ Organic Weed & Grass Killer (C)	3.00	?	○	○	?	○	?	2-phenethyl propionate, thyme oil, castor oil
Bayer Advanced Garden™ PowerForce™ Grass & Weed Killer (R)	2.80	○	?	○	○	◐	○	glyphosate
BurnOutII™ (R)	2.80	◐	○*	○	○	○	?	clove oil, sodium lauryl sulfate
Green Light™ Com-Pleet™ Systemic Grass & Weed Killer (R)	2.80	○	?	○	○	◐	○	glyphosate
Green Light™ Com-Pleet™ Systemic Grass & Weed Killer (C)	2.80	○	?	○	○	◐	○	glyphosate
Ortho™ Basic Solutions™ Weed & Grass Killer (R)	2.80	○	?	○	○	◐	○	glyphosate
Ortho™ Basic Solutions™ Weed & Grass Killer (C)	2.80	○	?	○	○	◐	○	glyphosate
RoundUp™ Brush Killer (C)	2.80	○	?	○	○	◐	○	glyphosate
Roundup™ Ready to Use Weed & Grass Killer	2.80	○	?	○	○	◐	○	glyphosate
RoundUp™ Concentrate Weed and Grass Killer	2.80	○	?	○	○	◐	○	glyphosate
RoundUp™ Weed & Grass Killer RTU Plus	2.80	○	?	○	○	◐	○	glyphosate, pelargonic acid
RoundUp™ Weed & Grass Killer Super Concentrate	2.80	○	?	○	○	◐	○	glyphosate
Blackberry & Brush Block™ (C)	2.75	◐	○	?	○	○	?	citric acid
Concern™ Fast Acting Weed Killer™ (R)	2.75	○	?	◐	○	○	?	ammoniated soap
Nature's Glory™ (R)	2.75	◐	?	○	○	○	?	acetic acid
Ortho™ Season Long Grass & Weed Killer (R)	2.67	○	◐	○	○	◐	○	glyphosate, sod. salt of oxyflorofen
Bayer Advanced™ 2-in-1 Moss & Algae Killer (C)	2.60	◐	?	◐	○	○	○	potassium soap
BurnOutII™ (C)	2.60	●	○*	○	○	○	?	clove oil, sodium lauryl sulfate
Moss-Aside™ Moss Killer (C)	2.60	◐	?	◐	○	○	○	potassium soap
RoundUp™ RTU Exntnded Control Weed & Grass Killer Plus Weed Preventer	2.60	○	?	○	○	◐	◐	glyphosate, imazapic
Safer™ Moss and Algae Killer (C)	2.60	◐	?	◐	○	○	○	potassium soap
Nature's Glory™ (C)	2.50	●	?	○	○	○	?	acetic acid
Ortho™ Groundclear™ Triox™ Total Vegetation Killer (C)	2.40	◐	?	○	○	◐	◐	glyphosate, imazypyr

**Some natural clove oils (and other essential oils) may contain small amounts of methyl eugenol, which is considered a carcinogen but is widely found in foods.*

(C) *concentrate* (R) *ready to use* (RTS) *ready to spray* (G) *granules* (A) *aerosol*

○ *lowest hazard* ◐ *moderate hazard* ● *highest hazard* *NA not applicable* **?** *not enough info*

continued on next page

Weed Controls

continued

Product Name	Score	Short-term health hazard	Long-term health hazard	Hazard to aquatic life	Hazard to birds, bees, or pets	Half-life in soil	Water pollution hazard	Active Ingredients
Post-emergence Weed Controls, Non-selective These products are used on existing weeds. They will kill or damage all plants, including grass.								
RoundUp™ RTU Extended Control	2.40	○	?	○	○	●	◐	glyphosate, dithiopyr
RoundUp™ Extended Control (C)	2.40	○	?	○	○	●	◐	glyphosate, imazapic, diquat dibromide
RoundUp™ Concentrate Plus Weed & Grass Killer Plus	2.40	○	?	◐	○	●	○	glyphosate, diquat dibromide
RoundUp™ Poison Ivy & Tough Brush Killer Plus (R)	2.40	○	?	○	○	◐	●	glyphosate, triclopyr amine
RoundUp™ Poison Ivy & Tough Brush Killer Plus (C)	2.40	○	?	○	○	◐	●	glyphosate, triclopyr amine
Monterey Weed-Hoe™ Weed Killer (C)	2.33	○	●	○	○	●	○	monosodium methanearsonate
Triple Strike™ Grass & Weed Killer (R)	2.33	○	●	○	○	●	○	diquat dibromide, fluazifop-butyl, dicamba,
Triple Strike™ Grass & Weed Killer (C)	2.33	○	●	○	○	●	○	diquat dibromide, fluazifop-butyl, dicamba
Spectracide™ SeasonPlus™ Grass and Weed Killer plus Preventer (R)	2.20	○	?	○	○	●	●	prometon, diquat dibromide
Spectracide™ Total Vegetation Killer (C)	2.20	○	?	○	○	●	●	prometon, diquat dibromide
Ortho™ Basic Solutions™ Total Vegetation Killer (C)	2.00	◐	?	○	○	●	●	prometon
Spectracide™ Triple Strike™ Grass-Weed-Root Killer (R)	2.00	○	●	○	○	●	●	diquat dibromide, fluazifop-p-butyl, dicamba
Spectracide™ Triple Strike™ Grass-Weed-Root Killer (C)	2.00	○	●	○	○	●	●	diquat dibromide, fluazifop-p-butyl, dicamba

(C) *concentrate* (R) *ready to use* (RTS) *ready to spray* (G) *granules* (A) *aerosol*

○ *lowest hazard* ◐ *moderate hazard* ● *highest hazard* *NA not applicable* **?** *not enough info*

About Weed and Feed

Many lawn fertilizers also include weed killers such as 2,4-D, MCPP-p, and dicamba. Like other herbicides, these products are considered pesticides. These "weed and feed" products encourage the unnecessary or excessive use of weed killer by spreading it over the entire lawn with the fertilizer, whether or not weeds are present. Surveys indicate that some Seattle-area gardeners make multiple applications of weed and feed products each year. The herbicides in these products tend to move with water and have been found in many Puget Sound streams. It is better to keep the fertilizing and weeding processes separate so that you can treat weeds only when and where necessary. Mechanical removal is preferred. If chemical treatment is necessary, spot treat individual weeds to reduce chemical use.

A new kind of "weed and feed" is now available. These new products are not a mixture of fertilizer and weed killer. Instead, they are made of corn gluten meal, a natural product of corn processing that inhibits the growth of weed seeds naturally and then breaks down into useful plant nutrients. The U.S. Environmental Protection Agency does not require corn gluten herbicides to be registered like other pesticides because they consider them to be very low risk.

Unlike traditional weed and feed products, the corn-based products have no effect at all on existing weeds, only on seeds. Our rainy climate makes corn gluten tricky to use effectively. Nevertheless, some Northwest landscaping professionals report success with the product, especially when used in the early fall and on a regular basis. It is best to water the gluten product in and then let it dry out. Optimal weed control with gluten-based products may take regular applications over several years.

5

Mammal Controls

Four-legged animals, including dogs and cats, squirrels, deer, and moles, sometimes cause damage or annoyance in gardens and lawns. Most of the products listed in this section are intended to be repellents rather than poisons, the exception being some mole-control products. Chemical repellents can be useful and most are not hazardous, but they are unlikely to be a complete solution and will have to be applied repeatedly. In many cases, the mechanical methods described below will be sufficient.

Moles

Moles and some other burrowing animals cause annoyance by leaving mounds of soil in turf areas and by occasionally damaging other small garden plants. Controlling mole damage is difficult, and there is no single method that is safe, convenient, and widely accepted as effective.

First, be sure you really have moles and not pocket gophers or other species because control methods are different and lethal trapping may be illegal for some animals. Second, consider reducing lawn area to minimize the need for control. Rake out mole hills and reseed if necessary. Techniques that may be helpful include flattening surface ridges with your foot, flooding tunnels, and getting a dog. The effectiveness of poisons is variable, and poisons can also kill other wildlife. Noise-emitting devices may be ineffective.

Castor-oil treatment of lawns has been tested with some success, but reports from users are sometimes conflicting. Commercial products are available (see table on page 39), and homemade mixtures are sometimes recommended. The idea is that the castor oil coats earthworms and insects that moles eat, making them unpalatable to the moles.

Trapping is reported to be the most effective mole control, but it is tricky to do correctly, and lethal traps are potentially hazardous to users. NOTE: A permit from the Department of

Fish and Wildlife is required to use lethal traps for moles in Washington (WDFW). Contact WDFW to get the proper form.

Using insecticides to kill grubs or earthworms solely to control moles is illegal because it is not a labeled use and is ultimately harmful, as earthworms are beneficial to soil quality.

For more information, see the Washington Department of Fish and Wildlife's excellent publication on moles in their Living with Wildlife series *(http://wdfw.wa.gov/wlm/living/moles.htm).*

Dogs, Cats, and Squirrels

These animals damage gardens by scratching or digging. Most susceptible are freshly tilled and planted beds, and squirrels will also dig up and eat small bulbs. Cover newly seeded areas or transplants with a mesh screen such as chicken wire until plants are large enough to withstand digging.

Deer

Deer will eat a large assortment of garden plants, especially at times of the year when other food is scarce. They can also damage shrubs and small trees by rubbing against them and by chewing on branches. The most effective control is a fence around the garden or yard, but fencing is not always possible or attractive. A deer fence needs to be eight feet high unless slanted outward, electrified, or constructed of solid boards so that animals cannot see over it. Before spending the time and money to construct a fence, investigate various designs to choose one that will work well and look good. Individual plants or trees can be protected by strong wire cylinders 8 feet high around them.

Many tactics to deter deer have been suggested, but most will only work until deer get used to them. One that has been successful is to rig sprinklers or irrigation heads to be triggered by a motion detector.

For more information, the Washington Department of Fish and Wildlife has an excellent and very thorough fact sheet in its Living with Wildlife series, including fence examples, an extensive list of deer-resistant plants, and other useful information. Go to *http://wdfw.wa.gov/wlm/living/deer.htm* or use your favorite search engine to locate it.

Mammal Controls

Spot application of a pesticide is almost always safer than broadcast application of the same product or a similar one.

Product Name	Score	Short-term health hazard	Long-term health hazard	Hazard to aquatic life	Hazard to birds, bees, or pets	Half-life in soil	Water pollution hazard	Active Ingredients
Dalen™ Bird-Ex™ Protective Netting	3.00	○	○	○	○	NA	○	fabric netting
Dalen™ Deer-Ex™ Protective Netting	3.00	○	○	○	○	NA	○	fabric netting
Ross Garden Netting	3.00	○	○	○	○	NA	○	fabric netting
chicken wire or screening	3.00	○*	○	○	○	NA	○	steel mesh
Victor Live Catch! Mole Trap	3.00	○	○	○	○	NA	○	live trap
Deer A-Tak™ Organic Deer Repellent	3.00	?	○	?	○	○	○	rosemary oil, cinnamon oil, thyme oil
Lilly Miller™ Hose 'n Go™ Mole Repellent (RTS)	3.00	○	○	?	○	?	?	castor oil
Liquid Fence™ Deer & Rabbit Repellent (C)	3.00	○	○	?	○	○	○	garlic, potassium sorbate, sodium lauryl sulfate
Liquid Fence™ Mole & Vole Repellent (C)	3.00	○	○	?	○	?	?	castor oil
Liquid Fence™ Dog & Cat Repellent (R)	3.00	○	○	?	○	○	○	cinnamon, citronella oil, eugenol, garlic, geraniol
Liquid Fence™ Deer & Rabbit Repellent(R)	3.00	○	○	?	○	○	○	garlic, potassium sorbate, sodium lauryl sulfate
Uncle Ian's Mole & Gopher Repellent (R)	3.00	○	○	○	○	?	?	blood meal
Victor™ Out o' Sight™ Mole Trap	3.00	○**	○	○	○***	NA	○	lethal trap
Grant's™ Dog & Cat Repellent (G)	3.00	○	?	○	○	?	?	methyl nonyl ketone
Havahart™ Critter Ridder™ (G)	3.00	○	?	○	○	○	?	oil of black pepper, piperine, capsaicin
Havahart™ Deer Off™ Deer, Rabbit & Squirrel Repellent (R)	3.00	○	?	○	○	○	?	putrescent whole egg solids, capsaicin, garlic
Havahart™ Dog & Cat Get Away™ (R)	3.00	○	?	○	○	?	?	allyl isothiocyanate, capsicum
Weitech™ Mole & Gopher Repeller	3.00	○	?	○	○	NA	○	electronic device
Hinder Deer and Rabbit Repellent (R)	2.75	○	?	◐	○	○	?	ammonium salts of fatty acids
Bonide™ Moletox II (R)	2.50	○	?	◐	◐	○	?	zinc phosphide
Grant's™ Mole & Gopher Bait	2.50	○	?	◐	◐	○	?	zinc phosphide
Bonide™ Moletox™ Baited Gel	2.40	○	●	○	◐	?	○	warfarin
Hinder Deer and Rabbit Repellent (C)	2.25	●	?	◐	○	○	?	ammonium salts of fatty acids

**not toxic, but sharp wires may be hazardous*

***not toxic, but setting traps can be hazardous*

****permit is required for lethal trapping in Washington, see text*

○ *lowest hazard*

◐ *moderate hazard*

● *highest hazard*

NA *not applicable*

? not enough info

(C) *concentrate*

(R) *ready to use*

(RTS) *ready to spray*

(G) *granules*

(A) *aerosol*

6

Lawn Fertilizers

The product listings on the next page include only fertilizers that do not contain herbicides, insecticides, or fungicides. Pesticide/fertilizer mixtures are considered pesticides and are discussed in chapter 4, beginning on page 27.

The top-listed products have most of their nitrogen in slow-release form. Such products promote slow, steady turf growth, while reducing the possibility that excess nutrients will run off and contaminate surface water. Products with little or no slow-release nitrogen are ranked lower in the table.

For the Pacific Northwest, Cooperative Extension recommends lawn fertilizers with N-P-K ratios of 3-1-2 or multiples, such as 6-2-4. So-called "quick greening" products with very high N values and all of the nitrogen in soluble form are not recommended. You can reduce your need for lawn fertilizer by up to 1/3 by leaving grass clippings on the lawn.

About Fertilizers

Plants need food to grow. They make this food from nutrients such as nitrogen (N), phosphorus (P), potassium (K), and a variety of micronutrients. Some of these nutrients are supplied by the soil, but often additional fertilizer is required, especially for food crops and for exotic plants. If you provide the right amount of fertilizer, the plants can use it all. If you provide too much, the excess fertilizer can pollute our waterways.

Any fertilizer containing nitrogen or phosphorus can become a water pollutant if overapplied, but those with highly soluble or quick-release nutrients require special care. Water-soluble fertilizers are used frequently but in tiny amounts. Unless measured and applied very precisely, they are more likely to run off into surface and ground water, triggering plant growth and depleting oxygen in the water that fish need to survive. For that reason, products with the most slow-release nutrients are ranked at the top of the tables.

Never apply more fertilizer than needed. Read label recommendations to determine how much you should use. Plants need the most nutrients when they are growing most actively, typically in the spring or summer. Avoid fertilizing as plants are about to go dormant in the fall. (An exception is lawns, which need fertilizer in the fall.) Turf that is regularly over-fertilized can be more susceptible to disease and other problems, which may lead to additional pesticide use.

Choose a fertilizer that is best suited to the type of plants you are growing. Balanced fertilizers with an N-P-K rating of 3-1-2 (or any multiple, such as 6-2-4) are best for lawns in the Pacific Northwest. Do not exceed this amount of phosphorus (except on a brand-new lawn), and test your soil to see if any phosphorus is needed at all. Bulbs need fertilizers with more phosphorus, such as 4-6-4. Container plants or houseplants benefit from a soluble plant food, but in the garden it's generally better to use a slow-release product. (Note: If you have potted plants on a deck or porch that drains to a waterway or storm drain, put saucers under the pots to prevent excess fertilizer from running off.)

Compost is not really a fertilizer, but it provides some nutrients and is very beneficial to soil quality. Micro-organisms in compost help fight plant diseases. Compost provides organic matter that improves soil structure, feeds earthworms and other soil creatures, and helps retain water and nutrients. Using compost is a form of recycling, too. Compost can be mixed into the soil or a thin layer can be added on top as mulch (raked into lawn) to restore an old lawn.

Compost Tea

Compost tea is a brew of the soluble elements in compost, made by steeping dry compost in water. Many techniques and devices are available for making and applying compost tea, and results will vary greatly depending on the quality of the original compost and the technique used to make the tea. Compost tea can contain both nutrients and beneficial microorganisms. It can be applied as a soil drench or sprayed on leaves. It is said to reduce certain plant diseases and be generally beneficial for plant health.

Opinions vary on the value of using compost tea, although some professionals are now using it with reported success. There is considerable anecdotal information but rigorous research is still not plentiful. Inconsistency of results may be due to variations in tea quality; differences in techniques, conditions, or timing; and lack of quantitative analysis. Despite these limitations, the use of compost tea appears to hold great promise and is worth trying.

Compost tea is now available at some local nurseries or landscape companies. You can also make it yourself. Because the tea contains living organisms, many of which require oxygen to survive, compost tea must be used very soon after brewing is completed.

continued

Lawn Fertilizers

Product Name	% slow release	N-P-K (nitrogen-phosphorus-potassium)
Lilly Miller™ Fall & Winter Lawn Food	90%	4-2-8
Worry Free™ Fall & Winter Lawn Food	90%	4-2-8
Worry Free™ Spring & Summer Lawn Food	90%	5-2-4
Ringer™ All Natural Lawn Restore™	76%	10-2-6
Ringer™ All Natural Lawn Restore™ Zero Phosphorus	76%	10-6-0
Whitney Farms™ Lawn Food	75%	8-2-4
Down to Earth™ Bio-Turf	67%	9-3-5
Scotts™ Liquid Turf Builder™	56%	29-2-3
Lilly Miller™ Super Rich™ Lawn Food	35%	15-5-10
Lilly Miller™ Super Rich™ Fall & Winter Lawn Food	35%	16-4-12
Terosa The Ultimate Lawn Food	30%	5-8-2
Scotts™ Lawn Pro™ Super Turf Builder™	29%	30-3-3
Scotts™ Turf Builder™ Lawn Fertilizer with 2% Iron	27%	27-3-4
Scotts™ Starter Fertilizer	26%	20-27-5
Lilly Miller™ Ultragreen™ Lawn Food	25%	28-2-3
Lilly Miller™ Super Ultragreen™ Lawn Food	25%	28-3-4
Lilly Miller™ Ultragreen™ Fall & Winter Lawn Food	25%	18-4-12
Lilly Miller™ Ultragreen™ Pro Lawn Food	25%	26-3-4
Premium Vigoro™ Starter Fertilizer	24%	20-27-7
Lilly Miller™ Seed & Sod Starter	4%	18-16-10
Scotts™ Winterizer Fall Lawn Fertilizer	3%	22-3-14
Lilly Miller™ Rapid Green™ Lawn Food	0%	20-2-5
Miracle-Gro™ Water Soluble Lawn Food	0%	36-6-6
Schultz™ Water Soluble Lawn Food	0%	40-4-4
Vigoro™ UltraTurf™ Fertilizer	0%	29-3-4

N-P-K means % nitrogen-% phosphorus-% potassium

% slow release means % of nitrogen (or phosphorus) that does not readily dissolve in water

Recipe for Making Your Own Organic Fertilizer

4 parts seedmeal (such as cotton seed meal) or fishmeal

1 part agricultural lime or dolomite

1 part rock phosphate or 1/2 part bonemeal

1/2 part kelpmeal

(all measurements by volume)

Measure all ingredients with a scoop or measuring cup and place in a large bucket. Mix well by stirring. (Avoid breathing the dust while you do this.) Fertilizer can be used in the garden or on the lawn. It can also be placed directly beneath seeds or seedlings or used as a side dressing for vegetables. —*Recipe from the Territorial Seed Catalog*

These ingredients can be found at most garden stores. If they are purchased in bulk, this fertilizer can be much cheaper than commercial organic fertilizer.

7

Soil Amendments and Special-Purpose Fertilizers

This list includes products that supply some important nutrients or improve soil but are not generally considered complete fertilizers. Their use is either designed for special purposes or they are normally used in combination with other products. Consult a good garden reference for best use of these materials. You may want to test your soil to find out what amendments it needs.

Compost and manure are especially important because they add organic matter to the soil, helping to hold water and support the soil micro-organisms. Compost can reduce the need for additional fertilizer.

Soil Amendments

Product Name	% slow release	N-P-K (nitrogen-phosphorus-potassium)
Dr. Earth™ Blood Meal	100%	13-0-0
Dr. Earth™ Bone Meal	100%	3-15-0
Dr. Earth™ Cottonseed Meal	100%	5-2-1
Dr. Earth™ Feather Meal	100%	12-0-0
Dr. Earth™ Fish Bone Meal	100%	3-18-0
Lilly Miller™ Bone Meal	100%	6-12-0
Miracle-Gro™ Organic Choice™ Blood Meal	100%	12-0-0
Miracle-Gro™ Organic Choice™ Bone Meal	100%	6-9-0
Premium Vigoro™ Blood Meal	100%	12-0-0

N-P-K means % nitrogen-% phosphorus-% potassium

% slow release means % of nitrogen (or phosphorus) that does not readily dissolve in water

continued on next page

Soil Amendments

continued

Product Name	% slow release	N-P-K (nitrogen-phosphorus-potassium)
Premium Vigoro™ Bone Meal	100%	1-11-0
Scotts™ Natural Bone Meal	100%	6-12-0
Whitney Farms™ Alfalfa Meal	100%	2-0.5-2
Whitney Farms™ Blood Meal	100%	13-0-0
Whitney Farms™ Bone Meal	100%	3-15-0
Whitney Farms™ Compost Maker Plus	100%	4-4-2
Whitney Farms™ Cottonseed Meal	100%	6-2-1
Whitney Farms™ Kelp Meal	100%	1-0.1-2
Cedar Grove Compost	94-98%	1.5-.5-.7
Walt's Kelp Meal	98%	4-1-9
Milorganite™ Fertilizer	92%	6-2-0
Walt's Fish Meal	90%	10-6-0
Walt's Kelp Meal	88%	4-1-8
Walt's Cotton Seed Meal	85%	4-3-6
Lilly Miller™ Compost Maker	75%	4-4-2
Walt's Fish Bone Meal	75%	4-17-1
GroCo™	70%	1-1-0.1
Walt's Alfalfa Meal	70%	1-1-8
Composted steer manure	>50%	0.5-0.5-0.5
Whitney Farms™ Bat Guano	50%	10-3-1
Walt's Crab Meal	40%	2-1-11
Greenacres™ Ammonium Sulfate	0%	21-0-0
Lilly Miller™ Iron Safe™	0%	4-0-0
Maxicrop™ Original Liquified Seaweed	0%	0.1-0-1
Miracle-Gro™ Azalea Camelia & Rhododendron Plant Food	0%	30-10-10
Peters™ Professional Strong Start™ Plant Food	0%	4-16-8
Vigoro™ Ammonium Sulfate	0%	21-0-0

N-P-K means % nitrogen-% phosphorus-% potassium

% slow release means % of nitrogen (or phosphorus) that does not readily dissolve in water

continued on next page

Soil Amendments

continued

Product Name	% slow release	N-P-K (nitrogen-phosphorus-potassium)
The following products have not been tested for solubility and/or nutrient content.		
Walt's Agricultural Limestone Flour	?	?
Walt's Dolomitic Limestone Granules	?	?
Walt's Agricultural Limestone Grit	?	?
Walt's Black Bark Mulch	?	?
Walt's Canola Meal	?	5-0-0
Walt's Dolomitie Limestone Grit	?	?
Walt's Florida Rock Phosphate	?	?
Walt's Gypsum	?	?
Walt's Montana Rock Phosphate	?	?
Walt's Sulfate of Potash	?	?
The following products do not contain nitrogen and were not evaluated for solubility of nutrients.		
Greenacres™ Dolomite Lime	NA	0-0-0
Hyponex™ Gypsum	NA	0-0-0
Lilly Miller™ Ammonium Sulfate	NA	21-0-0
Lilly Miller™ Garden Gypsum	NA	0-0-0
Lilly Miller™ Garden Lime	NA	0-0-0
Lilly Miller™ Superphosphate	NA	0-45-0
Walt's Greensand	NA	0-0-3
Whitney Farms™ Granulated Sulfur	NA	0-0-0
Whitney Farms™ Jersey Greensand	NA	0-0-3
Whitney Farms™ Rock Phosphate	NA	0-3-0
Whitney Farms™ Sul-Po-Mag	NA	0-0-22

N-P-K means % nitrogen-% phosphorus-% potassium

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8

General or Multi-Purpose Fertilizers

These fertilizers are designed for general garden or container plant use and most are considered complete fertilizers because they can be used alone. Near the top of the list are products based on insoluble nutrients such as bone meal. The highly soluble, liquid plant foods are best suited for container plants and indoor plants where water pollution from fertilizer runoff is not an issue. They may also be helpful in getting transplants established. For more information on how to use fertilizers, see "About Fertilizers" on page 41.

General Purpose Fertilizers

Product Name	% slow release	N-P-K (nitrogen-phosphorus-potassium)
Down to Earth™ Fish Bone Meal	100%	3-16-0
Dr. Earth™ Fish Meal	100%	9-4-1
Dr. Earth™ Organic 3™ Rose & Flower Fertilizer	100%	5-7-2
Dr. Earth™ Organic 5™ Tomato, Vegetable & Herb Fertilizer	100%	5-7-3
Dr. Earth™ Organic 7™ All Purpose Fertilizer	100%	4-4-4
Dynamite™ Plant Food 13-13-13	100%	13-13-13
Dynamite™ Plant Food 18-6-8	100%	18-6-8
Homemade organic fertilizer (see p. 44)	100%	3-2-6
Whitney Farms™ All Natural Plant Food	100%	5-1-5
Whitney Farms™ All-Purpose Fertilizer	100%	5-5-5
Whitney Farms™ Azalea, Camellia & Rhod Food	100%	5-5-3
Whitney Farms™ Bulb Food	100%	4-6-4

N-P-K means % nitrogen-% phosphorus-% potassium

% slow release means % of nitrogen (or phosphorus) that does not readily dissolve in water

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General Purpose Fertilizers

continued

Product Name	% slow release	N-P-K (nitrogen-phosphorus-potassium)
Whitney Farms™ Life Link All Purpose Plant Food	100%	5-5-5
Whitney Farms™ Life Link Azalea Camelia & Rhododendron Food	100%	5-5-5
Whitney Farms™ Life Link Rose & Flower Food	100%	4-6-2
Whitney Farms™ Life Link Smart Start Transplanting Fertilizer	100%	4-5-3
Whitney Farms™ Life Link Tomato & Vegetable Food	100%	4-5-3
Whitney Farms™ Rose & Flower Food	100%	4-6-2
Whitney Farms™ Smart Start Transplantng Fertilizer	100%	2-4-2
RainGrow™ 4-2-3 All Purpose Organic Fertilizer	99%	4-2-3
Alaska™ Sprayable All-Purpose Plant Food	94%	9-4-4
Alaska™ All Purpose Plant Food	93%	7-2-2
Walt's Rainy Pacific NW Blend	93%	7-4-9
Alaska™ Fish Fertilizer (liquid)	90%	5-1-1
Down to Earth™ All Purpose Mix	90%	4-6-2
Lilly Miller™ Multicote™ Outdoor-Indoor Plant Food	90%	18-6-2
Lilly Miller™ Multicote™ Rose & Flower Food	90%	14-14-16
Sta-Green™ All-Purpose Slow Release Plant Food	90%	19-6-12
Vigoro™ Timed-Release Flower & Vegetable Plant food	90%	17-17-17
Vigoro™ Timed-Release All Purpose Plant Food	90%	19-6-12
Whitney Farms™ Vegetable Food	90%	4-5-3
Walt's Vegan Container Plant Food	88%	4-4-4
Concern™ Vitalize™ All-Purpose Plant Food	86%	7-5-5
Osmocote™ Vegetable & Bedding Food	86%	14-14-14
Alaska™ All-Purpose™ Fertilizer	85%	7-7-2
Osmocote™ Outdoor/Indoor Plant Food	84%	19-6-12
Down to Earth™ Vegan Mix	83%	3-2-2
Miracle-Gro™ Shake 'n Feed™ Azalea, Camelia, & Rhododendron	80%	8-4-4
Osmocote™ Azalea, Camelia, & Rhodendron Food	80%	9-6-6
Peters™ Professional Season Long All Purpose Plant Food	80%	15-13-13
Schultz™ MultiCote™ All Purpose Outdoor	78%	17-17-17
Alaska™ Dry Pure Fish Fertilizer	75%	8-5-1
Down to Earth™ Rose & Flower Mix	75%	4-8-4
Whitney Farms™ Smart Start Plant Food Packets	72%	9-3-5
Down to Earth™ Bio-Fish	71%	7-7-2
Down to Earth™ Soybean Meal	71%	7-2-1
Alaska™ Rose, Flower, & Bulb Fertilizer	70%	5-7-3
Alaska™ Rhody, Azalea, Camellia, & Tree Fertilizer	70%	5-8-3
Down to Earth™ Acid Mix	70%	4-3-6
Miracle-Gro™ Shake 'n Feed™ All Purpose Slow Release Plant Food	70%	10-10-10

N-P-K means % nitrogen-% phosphorus-% potassium

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General Purpose Fertilizers

continued

Product Name	% slow release	N-P-K (nitrogen-phosphorus-potassium)
Miracle-Gro™ Shake 'n Feed™ Bloom Booster™ Flower Food	70%	10-16-10
Alaska™ Vegetable, Tomato & Berry Fertilizer	67%	4-6-6
Miracle-Gro™ Shake 'n Feed™ Rose Slow-Release Plant Food	67%	9-18-9
Sta-Green™ Nursery Special™ Plant Food	67%	12-6-6
Down to Earth™ Tree & Shrub Mix	66%	4-2-2
Down to Earth™ Transplant Mix	63%	4-3-3
Lilly Miller™ Bulb & Bloom Food	62%	4-10-10
Miracle-Gro™ Organic Choice™ Garden Fertilizer	60%	3-2-3
Perfectly Natural™ Tree and Shrub Fertilizer	60%	5-2-2
Walt's EarthNut Blend (bulb fertilizer)	60%	1-7-0
Scotts™ Rose & Bloom Continuous-Release Plant Food	55%	12-4-8
Scotts™ All Purpose Flower & Vegetable Continuous Release Plant Food	53%	10-10-10
Premium Vigoro™ Tomato & Vegetable Food	52%	12-10-5
Premium Vigoro™ Azalea Camellia Rhododendron	51%	15-7-7
Bayer Advanced Garden™ Triple Action All Purpose Plant Food	51%	18-9-18
Premium Vigoro™ Rose Food	51%	5-5-13
Lilly Miller™ Morcrop Tomato & Vegetable Food	50%	5-10-10
Lilly Miller™ Tomato & Vegetable Food	50%	5-10-10
Lilly Miller™ Rose & Flower Food	48%	5-8-4
Scotts™ Evergreen, Flowering Tree & Shrub Continuous Release Plant Food	47%	11-7-7
Schultz™ MultiCote™ Azalea Camellia & Rhododendron	43%	14-12-12
Perfectly Natural™ Winter Prep Lawn Fertilizer	39%	9-1-4
Lilly Miller™ Rhododendron, Evergreen, & Azalea Food	28%	10-5-4
Lilly Miller™ Azalea Camellia & Rhody Food	28%	10-5-4
Perfectly Natural™ Green Up Lawn Fertilizer	26%	12-0-4
Bayer Advanced Garden™ Azalea, Camellia, & Rhododendron Food	22%	16-2-3
Colorburst Flowering Plant Food	22%	15-30-15
Bayer Advanced Garden™ Tree & Shrub Food	21%	21-3-10
Down to Earth™ All Purpose Liquid Fertilizer	20%	5-5-5
Lilly Miller™ All Purpose Planting & Growing Food	20%	10-10-10
Perfectly Natural™ Garden & Flower Fertilizer	17%	3-3-6
Holland Bulb Booster™ Fertilizer	0%	9-9-6
Lilly Miller™ 16-16-16 Lawn & Garden Food	0%	16-16-16
Lilly Miller™ Vita Start™ liquid	0%	3-8-4
Liquinox™ Fish Emulsion	0%	5-1-1
Liquinox™ Grow All Purpose Liquid Fertilizer	0%	10-10-5
Miracid™ Plant Food	0%	30-10-10
Miracid™ Professional Water-Soluble Fertilizer	0%	21-7-7

N-P-K means % nitrogen-% phosphorus-% potassium

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continued on next page

General Purpose Fertilizers

continued

Product Name	% slow release	N-P-K (nitrogen-phosphorus-potassium)
Miracle-Gro™ All Purpose Plant Food	0%	15-30-15
Miracle-Gro™ All Purpose Plant Food	0%	24-8-16
Miracle-Gro™ Liquid All Purpose Plant Food	0%	12-4-8
Miracle-Gro™ Quick Start Transplant Starter	0%	4-12-4
Miracle-Gro™ Tomato & Plant Food	0%	18-18-21
Miracle-Gro™ Water Soluble Bloom Booster™ Flower Food	0%	10-52-10
Miracle-Gro™ Water Soluble Rose Food	0%	18-24-16
Perfectly Natural™ Tomato Fertilizer	0%	1-2-10
Peters™ Professional All Purpose Plant Food	0%	10-10-5
Peters™ Professional Super Blossom Booster	0%	10-50-10
Peters™ Professional All Purpose Plant Food	0%	20-20-20
Schultz™ Azalea Camellia & Rhododendron Plant Food	0%	30-10-10
Schultz™ Expert Gardener™ Tomato Food	0%	9-10-15
Schultz™ Expert Gardener™ Rose Food	0%	10-12-12
Schultz™ All Purpose Plus Water Soluble Plant Food	0%	20-30-20
Sta-Green™ Granular Rose Food	0%	15-5-3
Sta-Green™ Tomato Vegetable Granular Plant Food	0%	12-10-5
Ultra Vigoro™ All-Purpose Plant Food	0%	12-5-7
Vigoro™ All Purpose Fertilizer	0%	16-16-16
Vigoro™ All-Purpose Plant Food	0%	10-10-10
Vigoro™ Azalea Camellia Rhododendron Plant Food 10-8-8 Plus Minors	0%	10-8-8
Vigoro™ Bloom Builder™ Plant Food	0%	10-52-10
Vigoro™ Water Soluble All Purpose Plant Food	0%	15-30-15
Vigoro™ Water Soluble Azalea Camellia Rhododendron Plant Food	0%	30-10-10
This product has not been tested for solubility of nutrients.		
Walt's Organic Garden Blend	?	6-2-4
The following products do not contain nitrogen or and were not evaluated for solubility of nutrients.		
Alaska™ Morbloom (liquid)	NA	0-10-10
Lilly Miller™ Vita Bloom™ (Granules or Liquid)	NA	0-10-10
Liquinox ™ Bloom	NA	0-10-10

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Resources

These pages will help you find answers to questions about where to buy less-hazardous lawn and garden products, where to get more information about gardening and pest control, and how to safely dispose of leftover or unwanted pesticides.

Where to Buy It: A Guide to Sources of Safer Alternatives

Less-hazardous lawn and garden products are becoming more widely available. Many of the products at the top of the lists in this guide can be found in local garden stores and hardware stores. If you don't see it, ask for it. Stores will stock more of these products if they see that people want to buy them.

The garden stores listed below all sell compost and other plant health care products, plus less-toxic products in some or all of the categories listed in this book. Visit them for products that will help prevent and control insects, slugs, diseases, weeds and other garden problems—without causing harm to health and the environment.

City People's Garden Store
2939 E. Madison
Seattle, WA 98112
206-324-0737

Classic Nursery & Landscape Co.
12526 Avondale Road NE
Redmond, WA 98052
425-885-5678

Fremont Gardens
4001 Leary Way NW
Seattle, WA 98107
206-781-8283

Furney's Nursery
21215 Pacific Hwy. S.
Des Moines, WA 98198
206-878-8761

Hayes Nursery
12504 Issaquah-Hobart Road
Issaquah, WA 98027
425-391-4166

Herr Backyard Garden Center
107 SW 160th
Burien, WA
206-242-2014

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Molbak's
13625 NE 175th
Woodinville, WA 98072
425-483-5000

The Nursery at Mount Si
42328 SE 108th St.
North Bend, WA 98045
425-831-2274

Oriental Garden Center
30650 Pacific Hwy S.
Federal Way, WA 98003
253-839-1639

Seasons Nursery and Gifts
1051 N 35th St
Seattle, WA 98103
206-632-1760

Squak Mt. Nursery
7600 Renton Issaquah Rd SE
Issaquah, WA 98027
425-392-1025

Sky Nursery
18528 Aurora Ave N
Shoreline, WA 98133
206-546-4851

Swansons Nursery
9701 15th Avenue NW
Seattle, WA 98117
206-782-2543

Thunder Mountain Farm
40622 196th Ave SE
Enumclaw, WA 98022
360-802-9329

Village Green Perennial Nursery
10223 26th Ave SW
Seattle, WA 98146
206-767-7735

Weber's Nursery
17006 SE Wax Road
Covington, WA 98042
253-631-1048

West Seattle Nursery
5275 California Avenue SW
Seattle, WA 98136
206-935-9276

Mail Order Sources

Integrated Fertility Management
1422 N. Miller Street
Wenatchee, WA 98801
509-662-3179
www.agricology.com

Gardens Alive!
5100 Schenley Place
Lawrenceburg, IN 47025
513-354-1483
www.gardensalive.com

Territorial Seed Company
20 Palmer Avenue
P.O. Box 158
Cottage Grove, OR 97424
800-626-0866
www.territorial-seed.com

For More Information

Practical information about least-toxic pest control, including photos of pests and beneficial insects, is available at the Local Hazardous Waste Management Program web site at *http://www.govlink.org/hazwaste/house/.*

Fact sheets on least-toxic pest control including aphids, slugs, tent caterpillars, and weeds, are available on the Washington Toxics Coalition web site at *www.watoxics.org* or call 206-632-1545.

Other web sites that may be useful:
WSU Cooperative Extension, Gardening in Western Washington, *http://gardening.wsu.edu/text/links.htm*
WSU HortSense *http://pep.wsu.edu/HortSense/*
University of California Statewide Integrated Pest Management Project *http://axp.ipm.ucdavis.edu/*
Integrated Pest Management Information Service *www.efn.org/~ipmpa/invpests.html*

Books on pest identification and least-toxic pest and disease control:
Color Handbook of Garden Insects, Rodale Press
Insects and Gardens, Timber Press
Pests of the Garden and Small Farm, University of California
Pests of Landscape Trees and Shrubs, University of California

Publications on gardening and insect control:
WSU Cooperative Extension, King County 206-296-3900 or 800-325-6165 ext.6-3900

Recorded tapes on gardening and pest control:
WSU Cooperative Extension, King County 206-296-DIAL (296-3425)

The following services are available only to Seattle and King County Residents:

Natural lawn and garden care and composting:
The Natural Lawn & Garden Hotline 206-633-0224, info@lawnandgardenhotline.org

Disposal of pesticides and other hazardous products:
Household Hazards Line 206-296-4692 or 888-ToxicEd (888-869-4233)

Small business hazardous waste:
Business Waste Line 206-296-3976

Classes on non-toxic pest control for landscape professionals:
Green Gardening Program 206-343-9759, x 101

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Poisoning emergencies:
Washington Poison Center 800-222-1222

Reducing exposure to household toxics:
Master Home Environmentalist Program, American Lung Association
206-441-5100 or *www.alaw.org/air_quality/master_home_environmentalist/*

Disposal of Pesticides and Fertilizers

Many lawn and garden products can be harmful if improperly disposed of when no longer wanted. By switching to less-hazardous products, you can help to reduce the expense of hazardous waste collection.

Pesticide Disposal

Never place unused or partially used pesticides in the garbage or rinse them down the drain. Some older pesticide labels say that these products can be disposed of in the trash, but this practice is not recommended and newer labels no longer suggest it. In Seattle/King County, you can take pesticides to a household hazardous waste collection site (see below). All counties in the state have hazardous waste collection programs for unwanted pesticides. Call your county health department, public works department, or solid waste agency. Note that weed killers and weed and feed products are considered pesticides. Empty pesticide containers can go in the trash.

Pesticides that are still registered for use can be used up as directed, if you wish to do so. However, don't go on a spraying spree just to get rid of things in the garage. If you don't think that you will use a pesticide again, take it to a household hazardous waste collection site.

Some pesticides, such as DDT and penta, have been banned for consumer use. Check the box entitled "Cancelled or Restricted Pesticides" on the next page. If you have any of these products, don't use them; take them to a collection site.

Fertilizer Disposal

The best thing to do with unwanted fertilizers is to use them up as directed or give them to someone who can, perhaps a neighbor. Weed and feed products contain pesticides and should be taken to a household hazardous waste collection site.

Household Hazardous Waste Collection Sites in Seattle and King County

The Household Hazardous Wastemobile travels to various sites in King County each year to accept wastes. In addition to the mobile facility, there are three fixed collection sites: the south Seattle Recycling and Disposal Station, the north Seattle site, and the Factoria Locker. All the sites are funded through your garbage and sewer bills. There is no charge at the sites themselves.

For disposal site hours, locations, and appointments call the Household Hazards Line (M-F, except holidays,9:00-4:30) at 206-296-4692 or 888-ToxicEd/888-869-4233. Visit http://www.govlink.org/hazwaste/house/disposal/for disposal site information.

Cancelled or Restricted Pesticides

The pesticides listed below have been cancelled by the U.S. Environmental Protection Agency and should not be used by consumers. If you have any products containing these ingredients in your home, don't use them. Take them to a household hazardous waste collection site.

- 2,4,5-T
- Aldrin
- Chlordane
- Creosote
- DDT
- Dieldrin
- Kepone
- Lead Arsenate
- Lindane (a few uses remain, such as lice shampoo)
- Mirex
- Pentachlorophenol ("penta")
- Silvex
- Toxaphene

Two other pesticides have recently been phased out for consumer use:

Chlorpyrifos (Dursban) - not sold after the end of 2001.

Diazinon - not sold after the end of 2004.

Although existing supplies of these two products can be legally used after the dates listed above, we suggest that instead you take them to a household hazardous waste collection site.

Products containing the active ingredient clopyralid are restricted in Washington and some other states. These products may not be used by consumers.

Disclaimers

The ratings in this publication represent the opinion of the author, subject to the following conditions:

1. Product ratings are based upon available information. Products may contain ingredients or contaminants unknown to us, whose presence, if known, would change the product's ratings. **2.** Safety of a product depends to a great extent upon how it is used. Since individuals may exercise different safety precautions, a high rating is not a guarantee of a product's safety, just as a low rating does not necessarily imply that use will cause harm or damage. **3.** These ratings are presented as an informational service. A high rating does not constitute an endorsement of a particular product. Washington Toxics Coalition makes no guarantees as to the safety or efficacy of any product and assumes no responsibility or liability for any injury or damage which may result from using any such product. WTC does not solicit or accept monetary contributions from manufacturers of the products listed in this publication. **4.** These ratings may not be used for advertising or any other commercial purpose.

WASHINGTON TOXICS COALITION

King County

as part of the **Local Hazardous Waste Management Program in King County**

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