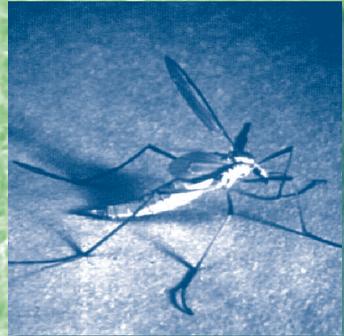
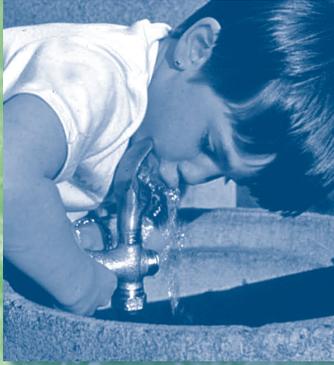


The Common Sense Gardening Guide to Natural Lawn Care

Inside you'll find information on natural lawn care, lawn disease, crane flies, weeds, and more.



Prepared by the Thurston County Local Hazardous Waste Program. A joint effort of Thurston County Public Health and Social Services Department, Environmental Health Division; Thurston County Water and Waste Management Department; the cities of Thurston County; and the Washington Department of Ecology.

Introduction

This Common Sense Gardening Guide offers practical advice for maintaining an attractive and healthy lawn “the natural way,” while reducing the use of pesticides, synthetic fertilizers, and water.

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Acknowledgements

This guide was developed and produced by the Thurston County Hazardous Waste Program, based on information from scientific literature and discussions with turf professionals around the Northwest. Primary sources of information for this guide were the Washington State University Extension Bulletins; the Natural Lawn Care Guide for Western Washington, written by David McDonald, Seattle Public Utilities; Washington Toxics Coalition fact sheets; the Seattle Public Utilities Report *Ecologically Sound Lawn Care for the Pacific Northwest*, written by David McDonald, 1999; Common-Sense Pest Control by Olkowski, Daar and Olkowski; the Employee Training Manual for Advanced Horticultural Management—Lawns, by the Washington Association of Landscape Professionals in cooperation with the King County Hazardous Waste Program and Seattle Public Utilities; the 1992 Thurston County Common Sense Gardening Guides; publications produced by the King County Local Hazardous Waste Program; and publications produced by the Northwest Coalition for Alternatives to Pesticides.

There is a wide range of scientific evidence and some disagreement about the possible effects of turf chemicals on soil, people, pets, and the environment. The guidelines included here represent the best advice based on available information. We encourage you to learn more. Please give us a call at **360-754-4111**; **TDD 360-754-2933** for more information, and/or contact your local landscape professional, or contact **Washington State University Thurston County Extension** at **360-786-5445, ext. 7908**.

Why change to NATURAL LAWN CARE?

You can grow attractive, healthy lawns and use less water, pesticides and fertilizers. Every time you plant, water, fertilize or control pests in your garden, you can choose methods that protect your health and the health of our environment and aid in the recovery of our salmon runs.

“Lawn and garden chemicals are some of the most hazardous products in the home.”

- Here in Thurston County we depend on groundwater for our drinking water. Most of this water lies beneath coarse gravelly soils that provide little protection from contamination.
- In the summer, 40-50 percent of our water use goes to lawns and gardens, when water supplies are lowest, and when people, wildlife and salmon need it the most.
- Scientists testing urban streams in western Washington found 23 pesticides. The most frequently detected pesticide in streams was 2,4-D, an ingredient in most “weed and feed” products. Other commonly detected and heavily used pesticides were the herbicide dicamba and the insecticide diazinon — *USGS Fact Sheet*, April 1997.
- A comprehensive review of research on pesticides effects on human health “found consistent links to serious illnesses such as cancer, reproductive problems, and neurological diseases, among others. The study also shows that children are particularly vulnerable to pesticides.” — *Pesticides Literature Review* Ontario College of Family Physicians, April 2004.
- Many lawn and garden products can be harmful if disposed of improperly. Proper disposal is available at HazoHouse, Thurston County’s household hazardous waste facility. Although there’s no charge to use HazoHouse, the county’s cost for hazardous waste disposal is high. By switching to less-hazardous products, you can help to reduce hazardous waste disposal costs.



Left: Toxic lawn and garden products and 55 gallon drums at HazoHouse

Right: “Dump No Waste Protect Your Groundwater” stencil near storm drain in Thurston County



The first step to a healthy lawn:

Build a HEALTHY SOIL

The key to a healthy lawn is healthy soil, a soil rich in organic matter and teeming with microorganisms and earthworms. Good soil helps plants nurture themselves. Roots flourish in healthy soil, and can find and use the nutrients needed to grow strong and resilient plants.

What makes a healthy soil? Healthy soil is an intricate mix of tiny rock particles, organic matter, water, air, microorganisms and other tiny animals. Plants grown in poor, compacted soil that is low in nutrients are weak and become stressed by nutrient deficiencies. As a result, the plants become easy prey for pests and diseases.

To restore hard, compacted, nutrient-poor soils, till in compost. Our native forest soils hold and return to groundwater up to 35 percent of our annual rainfall. In suburban areas, where most of the forest has been removed, the soils hold and recharge less than 16 percent of the rainfall. Tilling two to four inches of compost into the top six to eight inches of soil greatly improves the soil's ability to hold water and slowly return it to groundwater. Here are some other benefits of adding compost to your soil:

- 🌱 Compost helps to reduce stormwater runoff.
- 🌱 Compost improves soil fertility and plant pest resistance.
- 🌱 Compost greatly reduces the need for pesticides or synthetic fertilizers.
- 🌱 Compost helps filter and break down pesticides or soluble (carried in water) fertilizers, and helps keep them from reaching streams.

To make sure that your soil is healthy and balanced, learn about its characteristics and fertility levels. Contact the **Thurston Conservation District** at **360-754-3588** for a soil test measuring pH, phosphorous, potassium, soluble nitrogen, and other nutrients.

Lawns are dynamic ecosystems; communities of plants, soil and microbes; insects and earthworms and the birds that feed on them; and the humans who mow, water, fertilize and play on the lawn.

— David McDonald
Seattle Public Utilities

35%



Left: Native forest soils hold and recharge 35% of our annual rainfall.

Right: Suburban area soils hold and recharge only 16% of our annual rainfall.

To restore hard, compacted, nutrient-poor soils, till in **compost**.

16%

The second step to a healthy lawn:

Select GRASS SEEDS adapted for WESTERN WASHINGTON

Selecting the right grass seed is essential for a healthy lawn. One of the most common and adaptable seed mixes for use



in the Puget Sound region is a rye/fescue blend. A mixture of species and varieties such as rye/fescue better adapts to changing conditions than can a single grass variety. The following are descriptions of grass seed varieties sold locally.

Low-maintenance Eco-lawn mixes have a variety of grass seeds plus English daisies and clover



STEP

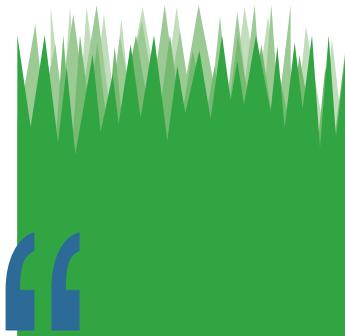
Type	Sun/shade	Water needs	Fertilizer needs	Disease, thatch and wear	Drought injury
Perennial ryegrass	Full sun	High	High	Tough – takes heavy wear	High
Fine fescues (hard and chewing types)	Shade tolerant	Medium	Low	Slow recovery from heavy wear	Low
Colonial bentgrass	Full sun	High	High	Disease and thatch prone	Medium
Turftype fescue	Sun or shade	High*	Low	Tough in deep soil	Low
Kentucky bluegrass	Sun	High	High	Disease prone	Medium
“Eco-Lawn” type grass and flower mix	Depends on variety	Very low, once established	None, after established	Not prone to disease or thatch. Does not take heavy wear as well as grass only lawn.	Low

Adapted from City of Bellevue Utilities

* Turftype fescues will root deeply in deep soils, allowing them to be more drought tolerant.

Check with a seed-seller, lawn-care expert or the Master Gardeners at the WSU Thurston County Extension at **(360) 786-5445, extension 7908** for named varieties that are best for your conditions.





The frequent use of synthetic quick-release fertilizers contributes to thatch build-up. High levels of synthetic fertilizers may decrease the number of beneficial organisms.



—Lawn Care Environmental fact sheet, U.S. EPA, 1990



Once your healthy lawn is established, follow these **Natural Lawn Care Tips** that work

These tips will help you to continue building a fertile soil and a vigorous, deep-rooted lawn. A healthy lawn resists disease, out-competes most weeds, and is drought tolerant. A healthy lawn also reduces reliance on chemicals and requires less work.

1 **Cut it High, Let it Lie.**

- 🌱 Set mowing heights up to two inches for most lawns (three-quarters to one inch for bentgrass lawns) to develop deeper roots and crowd out disease.
- 🌱 Regular mowing maintains a healthy balance of root and leaf growth. Cutting too much at once stresses the grass, so remove only one third of the grass length at each mowing. Try to mow weekly (or twice a week if you can) in spring.
- 🌱 Leave the clippings on the lawn; this is called mulch mowing and can provide one quarter to one half of the nitrogen your lawn needs in a year. Mulch mowing does not contribute to thatch build-up; thatch is composed mainly of fibrous stems and roots.
- 🌱 You can mulch mow with a mulching mower, a regular power mower, or push mower. A mulching mower chops the grass finely and blows it down into the turf. Mulching mowers now cost no more than other mowers of comparable quality. For more information see Consumer Reports for performance ratings of residential mulch mowers.
- 🌱 Keep the blade sharp. A dull blade rips the grass, making it more susceptible to disease and pests. Mow when the grass is dry.

2 **Fertilize moderately with a “natural” or “slow-release” fertilizer.**

- 🌱 Natural fertilizers are made from plant, mineral or animal by-products such as bonemeals, fishmeals, composted manure, dolomitic/limestone, or rock phosphate. Many “slow-release” synthetic fertilizers are sulfur or polymer coated urea. The product label should specify at least 50% water insoluble nitrogen. By releasing nutrients slowly, natural and slow-release fertilizers allow the grass to absorb nutrients more efficiently. Less fertilizer is wasted by leaching into groundwater or running off into streams.
- 🌱 Soils west of the Cascades are often low in calcium. If a soil test shows a calcium deficiency or acid conditions (pH less than 5), apply lime in the spring or fall.
- 🌱 Washington State University (WSU) recommends fertilizer with a ratio of 3-1-2, for a total of four pounds of nitrogen per 1,000 square feet of lawn per year. Mulch mowing can supply a quarter to one half of the lawn’s nitrogen needs.

🌱 Divide applications into three or four sessions, with the strongest in September, to build a vigorous root system. Do not fertilize from December to February, as the grass is growing slowly. Fertilizing too early will stress the grass by encouraging overly rapid plant growth.

3 **Avoid fertilizers combined with weed or insect control.**

🌱 Using fertilizer combination products spreads pesticides over a large area, even though weeds may not be widespread and insect pests may not be present. In fact, some lawn insect pests common in other parts of the country are not present in the northwest. See page 13 for information about craneflies; page 17 for moss and weeds.

🌱 The fertilizer in combination products is usually a quick-release fertilizer, which zaps the lawn with nitrogen.

🌱 These products may damage soil and lawn health, wash into local streams and creeks, and leach into our groundwater.

🌱 Lawn pesticides are often carried into the home on shoes where they may collect in house dust and be ingested by young children.

🌱 Repeated studies show that the most effective way to crowd out weeds and reduce pest damage is through proper fertilization, irrigation, and mowing.



4 **Water deeply but infrequently.**

🌱 Grasses do better when the whole root zone is wetted and then allowed to partially dry out between waterings. Shallow watering causes shallow rooting.

🌱 Water slowly, or start and stop, so that water doesn't run off. Watering too quickly or over-watering can wash pesticides into storm drains, leach nutrients from the soil, waste water, and promote lawn disease.

🌱 Aerate (see next page) if water runs off, pools up or doesn't penetrate, even with slow irrigation. This may be caused by soil compaction or from thatch buildup.

🌱 Water early or late, not in the heat of the day; early morning is the best time. Let the weather be your guide — use less water in late spring and early fall.

Despite our rainy winters, we get less rainfall than Tucson, AZ during the summer months.



—*Saving Water Partnership, Seattle and participating local water utilities*





🌱 Healthy lawns need no more than one inch of water per week, including rainfall. Sidewalks and patios don't need any. To measure, set empty tuna cans or water gauges on the lawn when watering. Time how long it takes to fill the cans or gauges to a depth of one inch. This is the amount of time that you should water each week.

🌱 Soils with more clay hold water and dry out slowly, and so need less frequent water. Sandy soils drain quickly, and may need to

“

Earthworms are the best, easiest lawn improvement tool that you can get.

”

—Rodale Press

be watered two or three times a week for a total of one inch.

🌱 Consider letting the lawn go dormant in the summer. Watering deeply but slowly once each rainless month will help support a dormant lawn. Avoid heavy traffic on a dormant lawn, or regularly water high-use areas to prevent damage. When the rains return in the fall

overseed any thin areas to thicken the lawn and help crowd out weeds.

Note: perennial ryegrass lawns on sandy soil will not survive if allowed to dry out completely. **Bonus: keeping your lawn on the dry side discourages crane fly larvae.**

5 Improve poor lawns: aerate, de-thatch and over seed. Or consider fixing the soil and replanting.

🌱 Annually aerate hard, compacted soil in April/May or September. Aeration fosters grass growth by allowing air and water to penetrate through the thatch layer to the root zone. For best results rent an aerator, or hire a professional. The soil should be moist and the cores pulled should be about three inches long. For best results, make two or more passes and then rake or mow to break up the cores. After aerating, topdress by putting one fourth to one half an inch of well-screened, Grade A (weed free) compost on top of the soil. Rake so that the grass stands up through it.

🌱 If your soil is deeply compacted (more than two inches), hire a landscape professional who has an aerator that will penetrate six to eight inches. Be careful of buried irrigation or gas lines when aerating to these depths.

🌱 By moving through the soil, earthworms and other soil animals allow water and air to penetrate, recycling thatch back into nutrients that grass can use. The frequent use of some insecticides, fungicides, and synthetic fertilizers can reduce the number of earthworms and microbes, thus contributing to thatch build-up over time.

- Over watering contributes to thatch build-up. Thatch more than one-half inch thick prevents air, water and fertilizers from reaching the soil. To help solve thatch problems, rent a power dethatcher and make several passes over the lawn.
- After aerating or dethatching, overseed with a perennial rye/fine fescue mix designed for Pacific Northwest conditions. Use one half the seeding rate recommended on the package. Water lightly early in the day. A light application of “starter” fertilizer can help the seeds grow quickly and crowd out weeds.

6 Consider lawn alternatives, especially on steep slopes, in shady areas, or near streams and lakes.

- Grass grows best on well-drained soil in full sun or partial shade. Steep slopes are difficult to mow and water.
- Change the current concept of lawn. Consider replacing some or all of your lawn with an attractive alternative. Use a seed mix that combines low-growing perennial ryegrass with herbaceous plants such as roman chamomile, yarrow, sweet alyssum, and strawberry clover.
- Leave a buffer of natural vegetation along streams and lakes to filter pollutants, shade the stream, and protect fish and other wildlife. Include native groundcovers, shrubs, and trees. Avoid the use of pesticides or quick-release fertilizers near streams, ditches, wetlands, or shorelines.
- Consider planting hardy groundcovers, enlarging a flowerbed, or planting native plants. To eliminate a section of lawn, cover it with sheets of cardboard, newspaper, or weed cloth. Then pile several inches of compost, manure, or other material on top. This will kill the lawn, readying the area for replanting. Reducing the size of your lawn can save you time and money on fertilizer and water bills.



According to EPA figures, a gasoline-powered lawn mower emits eleven times the air pollution of a new car for each hour of operation.

LAWN DISEASES in Thurston County

A plant disease is defined as an irritation that disturbs the plant's normal functions, such as water intake or plant growth. Disease symptoms can be variable and subtle, so they are tricky to diagnose and sometimes easy to miss until the problem is quite severe. Fortunately, the most common lawn diseases in Thurston County can be avoided with proper lawn care practices. Lawns are more susceptible to disease when:

- 🌱 The lawn is mowed short. This stresses the grass and encourages disease to move down to attack grass roots and crowns.
- 🌱 The inappropriate grass species for the site, or just one type of grass is planted. Planting an appropriate mixture or blend of grasses will prevent diseases from sweeping through a lawn.
- 🌱 Too much water is applied, or watering is light, frequent, and most often at night. Watering at night allows water to remain on grass blades for a long period of time, providing disease spores with enough water for germination.
- 🌱 Too little or too much fertilizer is applied, particularly if the area is shady.
- 🌱 The soil is compacted. This results in poor drainage and thatch build-up of more than one half an inch. Excess thatch harbors disease organisms and insects.
- 🌱 Fungicides, insecticides, and herbicides are used excessively.

Damage caused from dog urine is often mistaken for lawn disease. To detect dog urine, look for brown circular spots, a few inches in diameter. Place a small sample of grass and two inches of soil in a plastic bag and place in the sun for a few hours. Any released ammonia can easily be detected by opening the bag and sniffing cautiously. Watering heavily will aid recovery.

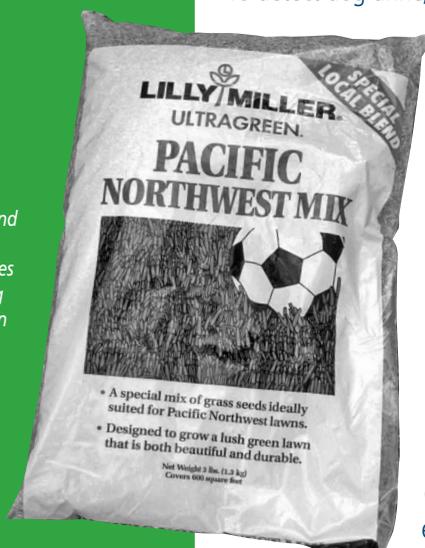
You'll be better prepared to control any problems that arise by keeping track of the conditions that favor diseases and by learning to identify symptoms of the most common diseases. Damage caused from drought, scalping from mowing too short, or herbicide or fertilizer burn is often mistaken for lawn disease. For help identifying specific lawn diseases, please call **WSU Thurston County Extension**

Master Gardener Clinic at 360-786-5445 ext. 7908.

“Diseases are just a plant's way of trying to tell you something is not right.”

—Rodale Press

Planting an appropriate mixture or blend of grasses will prevent diseases from sweeping through a lawn



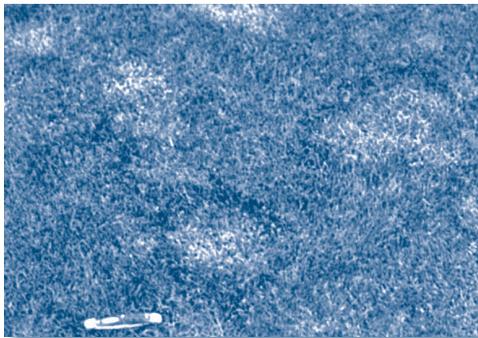
Introducing the most common lawn diseases in Thurston County: **Fusarium Patch, Leaf Spot/Brown Blight, and Red Thread**

Fusarium (Microdochium) Patch

Symptoms: Fusarium patch is most serious in bentgrass or Kentucky bluegrass but may also occur in ryegrass. Infected lawns develop spots of reddish-brown grass, two to six inches in diameter. The spots later turn tan and finally yellow. Roots rot and may be covered with pink mold. Symptoms of fusarium patch occur in the cold and wet periods of March to May and from late September to December in 50 to 60 degree weather.

Prevention/Treatment:

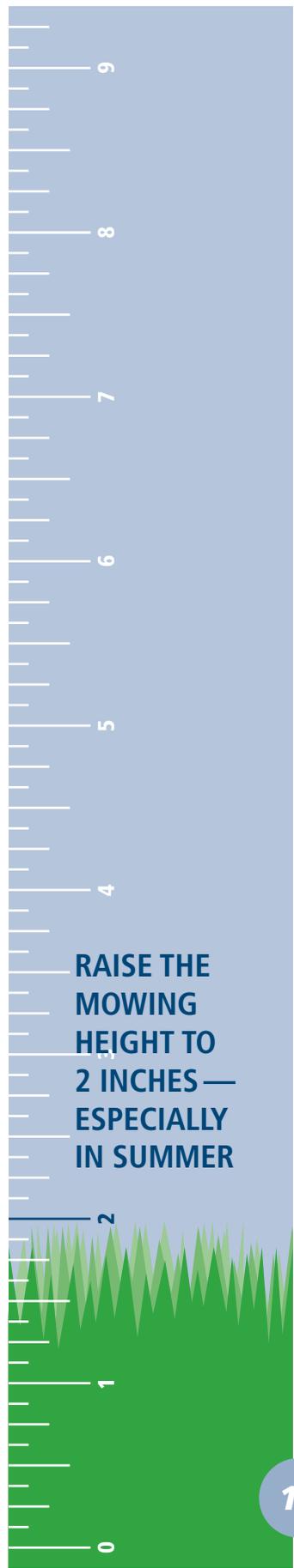
- 🌱 Aerate to provide good air circulation and soil drainage, and to keep thatch to a minimum. Topdress lightly and overseed with fusarium patch-resistant cultivars.
- 🌱 Apply one to two inches of water each week except during the wet and cold season.
- 🌱 Raise the mowing height to two inches, especially in summer, except for bentgrasses, which are best mowed at three-quarters of an inch. Mow frequently and remove grass clippings.
- 🌱 Fertilize lightly in April/May or in September with a balanced fertilizer (6-1-4 is recommended.) Higher nitrogen levels mean higher potential for this disease, especially when a heavy amount is applied in fall.
- 🌱 According to WSU Extension, sulfur applications have dramatically reduced fusarium patch in western Washington. Apply only one pound of sulfur/1000 square feet per application. Repeat two or three times in the fall.
- 🌱 As additional protection after mowing an infected area, spray the underside of the mower, other mechanical equipment, and the soles of your shoes with a one-to-ten ratio of bleach to water.



Fusarium patch. ideal environment results in circular spots and patches. Photo from Diseases of Turfgrass, courtesy of Washington State University Cooperative Extension and U.S. Department of Agriculture

Leaf Spot/Brown Blight

Symptoms: Early symptoms appear as small, dark, water-soaked spots on leaf blades. As the spots grow, the centers become straw-colored with reddish-brown to black borders. The entire grass blade can be affected, appearing dry and straw-colored. If the disease is severe, the whole plant is affected, and the fungus may also rot the crown, stolons, and roots. This causes thin or dead areas of turf. Leaf



infections are most common during the spring and fall. The dying out phase from crown and root rot occurs more often during the summer.

Prevention/Treatment:

- 🌱 Water thoroughly in the morning. Let your lawn dry out between waterings, as leaf spot fungus lives in the thatch.
- 🌱 Leaf spot is most serious in Kentucky bluegrass. Overseed Kentucky bluegrass lawns with a mix of resistant grasses such as fine fescues or perennial ryegrass.
- 🌱 Apply slow-release fertilizers sparingly.
- 🌱 Mow your lawn to a height of two inches. Reduce the spread of disease by keeping your mower blade sharp, mowing the healthy area first and collecting the clippings. Disinfect the soles of your shoes, the underside of your lawn mower and other equipment with a one-to-ten ratio of bleach to water after mowing the infected area.
- 🌱 Open up shaded areas to provide ample light and good air movement for your lawn, or plant a shade-loving groundcover.



Red threads emerging from leaf tips. Photo by Ward Stienstra, courtesy of University of Minnesota

Red Thread

Symptoms: The lawn appears to have scorched patches or pinkish gelatinous masses. If the symptoms appear in patches, they may vary from two to twenty-four inches in diameter. A close look at the leaf blades may reveal fine fungal threads growing out of the tips. Red thread tends to be worse in the fall, winter and early spring. It generally disappears as the weather

becomes warmer and drier, and when the grass is actively growing.

Prevention/Treatment:

- 🌱 Red thread is most often found on undernourished turf, especially in lawns deficient in nitrogen. Apply an organic fertilizer in a readily available form, such as seaweed extract. Adequate amounts of potash and phosphorous are also important. Calcium deficient soils are more susceptible to red thread, so the liming of acid soils is also important. Follow a soil test recommendation, as too much lime can actually promote fusarium patch.
- 🌱 Mow regularly to remove the infected leaf tips. Bag clippings instead of mulching until grass grows out of red thread.
- 🌱 Water regularly and thoroughly.
- 🌱 Reduce the spread of disease by keeping your lawn mower blade sharp, mow healthy areas first, and collect the clippings to prevent the spread of disease. Also disinfect the soles of your shoes, the underside of your lawn mower, and other equipment with a one-to-ten ratio of bleach to water after mowing the infected area.

CRANE FLIES in Lawns

In western Washington, one insect creates turf-damaging problems that may require treatment, the European crane fly (*Tipula paludosa*). As adults they resemble giant mosquitoes, but the crane fly does not sting, bite, damage structures, or pose any threat to humans and pets.

Rumors about crane flies may cause gardeners to overreact, but significant damage occurs only when larvae densities are above 25 to 50 per square foot. Well established, vigorous lawns have been known to have 50 larvae per square foot without showing damage. Birds and a dry autumn will often keep crane flies below damaging numbers. More than 100 species of birds feed on crane fly larvae; starlings love them and can greatly reduce populations. Another natural enemy of crane fly larvae is the ground beetle.

The common crane fly (*T. oleracea*) is a fairly new pest and is considered to be a problem in our area, but has not been widely seen yet. This species has two generations per year. Adults emerge in March/April and September. To determine if you need to take action, monitor in fall and late winter when this species' larvae are active.

Life cycle of the European crane fly

Crane fly infestations occur primarily in damp locations with abundant vegetation. Adult European crane flies emerge from lawns in mid-August to late September, mate, lay eggs in the soil and die in a few days. The eggs require moist conditions for survival and will die if the soil dries out. In the fall, gray-brown, worm-like larvae hatch and develop a tough skin, and are sometimes referred to as "leatherjackets." During the day, they feed on roots within one and a half inches of the surface, while on moist nights or wet, cloudy days they feed closer to the surface or emerge to feed on root crowns. During cold winters, they go dormant, although in warm winters they may stay active through January. In late February to April, they feed heavily again. They stop feeding in May and are inactive in the soil until they emerge as adults in August. Then the cycle begins again. **You cannot control European crane flies by applying pesticides in the late spring or summer, as the adults will not damage a lawn; it is the larval stage that causes damage.**

“

More than 100 species of birds feed on crane fly larvae.

”





< 25 = no treatment necessary

25 = increase to nutrients;
50 = monitor every 2 weeks

> 50 = possible significant damage/
treatment is appropriate

Do you have a **European crane fly problem?**

Outbreaks of crane fly are inconsistent from year to year. The timing of their life cycle is dependent on weather, especially on temperature. Monitoring is essential to determine if you have a problem, and monitoring before damage becomes apparent is the only way to prevent lawn damage.

European crane fly damage appears as sparse or brown areas on the lawn in May or June, after the larvae have stopped feeding. These thin areas are susceptible to weed invasion. **At this point, the damage is already done, and applying pesticides is not useful.** Common crane fly damage appears in January or February. The first year of invasion is usually the worst. If the lawn is healthy, crane flies are only a problem for a year or two before natural enemies keep populations under control.

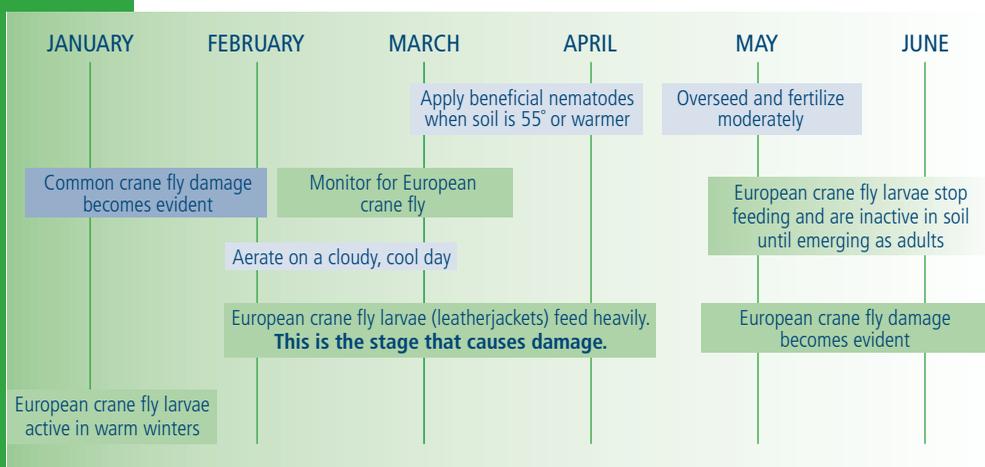
Monitoring

To determine the number of larvae, survey the lawn in early spring when the grass begins to grow (February to March) or when the weather is consistently warm. This is when larvae become active. Randomly select several 6 inch by 6 inch areas in the lawn. Cut to two inches deep and turn over onto a tarp. Tear the samples apart, especially the thatch layer. Count the grayish-brown, three-quarter to one inch long larvae. (Later, repair the damage you do taking the samples by filling in holes with soil and seed.)

Larvae will usually be found at the base of the grass layer or very close to the top of the soil. Multiply the number of larvae in each sample by four. This gives you the number of larvae per square foot. Use the



European crane fly larvae (leatherjackets)



average to make decisions about the lawn. If there are less than 25 grubs per square foot, no treatment is necessary. For levels between 25 and 50 per square foot, increase nutrient levels and continue to monitor every two weeks. If levels exceed 50 grubs per square foot, damage may be significant and treatment is appropriate.

How to control crane fly

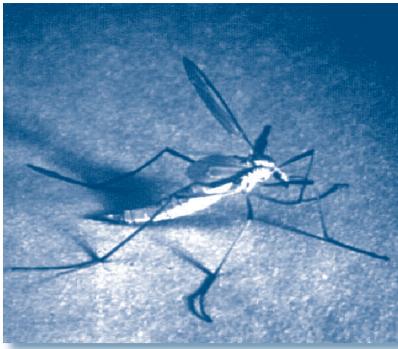
Cultural, physical, and biological controls are available to effectively control crane fly populations. The goal should be to control populations at a tolerable level instead of trying to eliminate them.

Cultural/physical controls

Aeration in spring may help to reduce crane fly populations. Pick a cloudy, cool day when the larvae will be surface feeding to aerate. Overseed and fertilize moderately in May to fill in damaged areas. Maintain proper drainage and reduce watering, especially in August and September, as European crane fly eggs are killed if the soil around them dries out. Deep, infrequent watering will also promote healthy root growth and plant establishment. Supplement your mulch mowing with a spring and fall fertilization using a natural, organic, or slow-release fertilizer.

Biological controls

Attract birds to your yard. Over one hundred species of birds feed on crane fly larvae. Birds can drastically reduce the population of crane flies in a short time. Maintaining a bird-bath or feeder, especially in the winter and spring months, may be all you need to encourage birds into your yard.



Adult European crane fly

“If the lawn is healthy, crane flies are only a problem for a year or two before natural enemies keep populations under control.”

JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER

Reduce watering to kill European crane fly eggs in soil

Apply beneficial nematodes when soil is 55° or warmer

Adult European crane flies emerge from lawn to mate and lay eggs in the soil

European crane fly larvae hatch and begin to feed

European crane fly larvae dormant in cold winters



Following treatment of any type, reseed thin or damaged lawn areas. Be sure to provide adequate water and with fertilizer to help damaged areas recover.

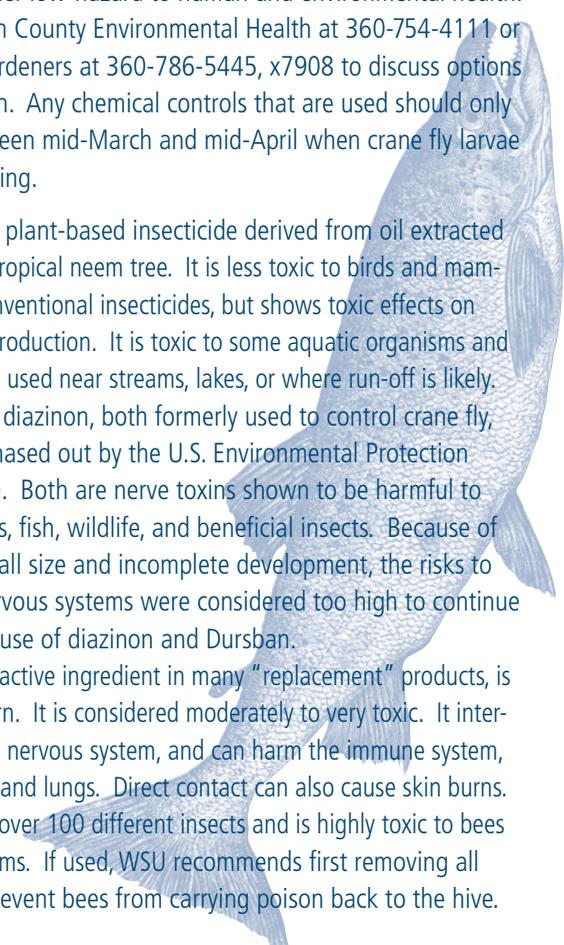
Predacious ground beetles feed on crane fly larvae, slugs, and many other pests. They are probably already present in your yard. There are several species, but the beetles are generally large, dark or iridescent blue-green, and move quickly. Reducing or eliminating the use of pesticides in your yard will help protect these and other beneficial insects.

Beneficial nematodes are available at local nurseries under many trade names. Studies show that nematodes can reduce larval populations and may drop them below damaging numbers. Apply as directed in spring when soil temperatures are at least 55 degrees. Heavy thatch, greater than two inches, prevents nematodes from reaching the soil and the leatherjackets. If thatch is a problem, refer to directions on page 8 to reduce thatch build up.

Chemical controls—the last resort

First, determine if there are damaging numbers of crane fly. Second, try non-chemical control methods as outlined above. Finally, if it is determined that a crane fly infestation is still causing too much damage, chemical controls could be considered as a last resort. Since 2001, Master Gardeners in Whatcom County surveyed over 300 lawns looking for crane fly infestations. They found no crane fly populations high enough to require any need for control.

At this time, Thurston County has not found any chemical control for crane fly which passes our environmental health review and which we consider low-hazard to human and environmental health. Contact Thurston County Environmental Health at 360-754-4111 or WSU Master Gardeners at 360-786-5445, x7908 to discuss options for your situation. Any chemical controls that are used should only be applied between mid-March and mid-April when crane fly larvae are actively feeding.

- 🌿 Neem oil is a plant-based insecticide derived from oil extracted from the subtropical neem tree. It is less toxic to birds and mammals than conventional insecticides, but shows toxic effects on male sperm production. It is toxic to some aquatic organisms and should not be used near streams, lakes, or where run-off is likely.
 - 🌿 Dursban and diazinon, both formerly used to control crane fly, have been phased out by the U.S. Environmental Protection Agency (EPA). Both are nerve toxins shown to be harmful to humans, birds, fish, wildlife, and beneficial insects. Because of children's small size and incomplete development, the risks to children's nervous systems were considered too high to continue allowing the use of diazinon and Dursban.
 - 🌿 Carbaryl, the active ingredient in many "replacement" products, is also of concern. It is considered moderately to very toxic. It interferes with the nervous system, and can harm the immune system, kidneys, liver, and lungs. Direct contact can also cause skin burns. Carbaryl kills over 100 different insects and is highly toxic to bees and earthworms. If used, WSU recommends first removing all blooms, to prevent bees from carrying poison back to the hive.
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🌱 Always read pesticide labels carefully. Pay particular attention to safety instructions. Follow the label directions for use and storage. Take unwanted leftovers to HazoHouse (see back page).

Following treatment of any type, monitor the area for several weeks to determine the effectiveness. Reseed thin or damaged lawn areas. Be sure to provide adequate water and light fertilizer to help damaged areas recover.

Weeds, Moss and Clover

Vigorously growing grass can out-compete most broadleaf weeds and many weedy grasses. Weeds thrive in conditions in which grass is unable to compete: shady spots, yards with compacted soils, under-fertilized areas, or areas that are too wet or too dry. Large numbers of weeds are a symptom of a deeper problem – the wrong grass, compacted soil or bad mowing practices. Fix the problem and you will rid your lawn of most weeds. Herbicides only provide temporary relief because they don't prevent the weeds from returning. Unless the conditions that favor the weeds are changed, the weeds will return – promoting the use of herbicides year after year.

Improve lawn health through proper fertilization, irrigation, and mowing. Annually aerate your lawn and overseed weak areas, especially those in the shade. See pages 6-8 for lawn care tips. This will help create a thick, dense grass that can inhibit many broadleaf weeds by shading and crowding them out.

Keeping a lawn 100 percent weed-free is not possible. Even high quality golf courses have some weeds! Most people accept a neatly mowed lawn with 10 to 20 percent weeds without even noticing the weeds. A lawn with up to 30 percent weeds can be maintained and improved with cultural controls. If weeds are covering over 30 percent of the lawn some professionals recommend spot treatment. Always follow-up hand weeding or spot-spraying with overseeding: never leave bare ground open for weeds to sprout. If the lawn is over 50 percent weeds, many professionals suggest either starting over with soil amendments and a new lawn or working on gradual improvements over several years.

Clover

Clover was once included in grass seed mixtures because it is a broad-leaved plant that is green year-round, fixes nitrogen and improves the soil. As clover-selective herbicides were developed, clover became a 'weed.' If a family member is allergic to bee stings, you may want to mow clover often to remove the blooms. Otherwise, enjoy the clover – it is an all natural nitrogen factory for your yard.

Moles

Moles are native to the Pacific Northwest and are primarily beneficial creatures. They improve the soil through aeration, they mix soils, and they eat many insect pests. Grass damaged by moles usually recovers quickly, tamp soil down and overseed. Moles rarely stay in lawns for long periods. If their damage becomes intolerable, the most successful method of getting rid of moles is to hire an experienced trapper. The trapper may catch live moles in pit traps and release them away from garden areas. Sissor traps, while effective, are not currently legal to use in Washington.

Use the weed chart to learn which conditions encourage specific weed species and what you can do to grow healthier, weed-resistant lawns.

Weed name/type	Stress indicators	Control options
Annual Bluegrass cool season annual	low fertility, high moisture, soil compaction causing poor drainage, low mowing	raise mowing height to 2"; collect lawn clippings when seed heads are present; dig out clumps; overseed thin areas with resistant grass seeds; water less often
Buttercup cool season perennial	poor drainage, low calcium, excessive moisture, shade, compacted soils	aerate-topdress-overseed; pull and dig; fertilize consistently with a slow-release fertilizer
Chickweed cool season annual	low nitrogen, thin grass, compacted soils causing poor drainage	control by cutting and pulling before seeds form; aerate and fertilize consistently with a slow-release fertilizer
Clover cool season perennial	low fertility, drought, compacted soils	aerate-topdress-overseed; control by cutting and pulling in spring, fertilize consistently with a slow-release fertilizer
Crabgrass warm season annual	soil compaction, low fertility, drought, thin grass, hotspots	aerate, water and fertilize consistently with a slow-release fertilizer; raise mowing height to 2"
Dandelion cool season perennial	thin grass, low mowing, low nutrients, drought	pull in early spring and while flowering, water deeply and fertilize consistently with a slow-release fertilizer; raise mowing height to 2"
English Daisy cool season perennial	low fertility, low pH, compacted soils causing poor drainage	aerate-topdress-overseed; pull and dig out weeds; fertilize consistently with a slow-release fertilizer
Moss cool season perennial	low fertility, low pH, drought, compacted soils causing poor drainage, heavy shade	aerate-topdress-overseed; water and fertilize consistently with a slow-release fertilizer; replace with groundcover if area is too shady for grass
Plantain cool season perennial	thin grass, low fertility, low mowing	raise mowing height to 2"; collect lawn clippings to remove seed heads; fertilize consistently with a slow-release fertilizer; aerate-topdress-overseed and dig out
Prostrate Knotweed cool season annual	compacted soils with heavy foot traffic, drought, thin grass	aerate-topdress-overseed; control by pulling, cutting in summer
Purslane warm season annual	excessive fertilizers, poor drainage, shade, thin grass	aerate-topdress-overseed; pull or hoe, water deeply but infrequently, fertilize lightly with a slow-release fertilizer
Red Sorrel cool season annual/perennial	poor drainage, low fertility, tolerates acidity	aerate-topdress-overseed; control by pulling; fertilize consistently with a slow-release fertilizer
Speedwell (Veronica) cool season perennial	low fertility, poor drainage, thatch and thin grass, shade	aerate-topdress-overseed; fertilize lawn consistently with a slow-release fertilizer; reduce shade
Thistles cool season annual/perennial	low fertility, drought, heavy clay soils, compaction	repeatedly pull with a weed popper removing as much taproot as possible; fertilize consistently

Moss

According to Marianne Binetti, a well-known Pacific Northwest horticulturalist, "Moss is not the monster we make it to be. Moss is opportunistic, colonizing areas that are too wet, too shaded, acidic, or so low in fertility that nothing else grows well." While iron compounds will weaken the moss and turn it black, only changing the conditions will prevent moss. Improve drainage by aerating the soil and adding sand. Add compost or fertilizer to improve the fertility, limb up low branches to increase sunlight and add soil to low spots where dampness and moss collect. Another solution is to integrate the moss into a quiet garden setting – perhaps adding a boulder, bench or garden art.

There are even nurseries that specialize in moss gardens!



Stalking the wild dandelion: a young gardener shows how it's done with a long-handled weeder. Just step to press it in...

Weed Control

Physical controls:

- Remove problem weeds by hand before they seed. Long-handled pincer-type weed pullers eliminate the need to stoop or work on your hand and knees. They are designed for weeds with long tap roots, such as dandelions, and work best in moist soil. A knife or trowel are also effective weeding tools.
- Heat: Hot, almost boiling water poured on plants can kill or weaken them. This is non-selective – it will harm the weed plus the nearby plants. Grasses tend to be more resistant to heat than many broadleaf plants because of the protective sheath.
- If removing weeds leaves bare spots in the lawn, reseed immediately to prevent weed seeds from sprouting. Make reseeding easier by carrying a small can of seeds around when you weed. Sprinkle seeds in the holes left by removing the dandelions.

Chemical controls – the last resort:

- Identify the weed to be sure you are using a product which will be effective. An incorrect choice can mean poor weed control, risk to personal health, damage to valuable plantings, or an increased risk of water pollution. Many herbicides are toxic to fish and may wash off treated areas.
- Always read the label carefully before using any pesticide. Be sure to follow all label warnings, wear proper protective clothing, and keep children and pets off the lawn for at least as long as the label specifies. Reading and following label directions can help reduce the risks of pesticide exposure, but cannot eliminate them – only avoiding pesticides can do that.
- Herbicides are classified as either pre-emergent or post-emergent. Pre-emergent herbicides prevent weed seeds from growing, but have little 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, for example, they kill only broadleaf weeds but do not affect grass.
- Spot spray problem weeds with a low-toxic herbicide at the right time of year for that weed. Call Thurston County Environmental Health at 360-754-4111 or WSU Master Gardeners at 360-786-5445, x7908 for help identifying the least-toxic pesticide for your situation.



...and then pop the weed out.



By changing our perspective about landscapes and by landscaping nature's way, we not only solve weed problems, thus reducing herbicide use, and restore life in all its beauty to urban landscapes, but we reduce maintenance costs, conserve natural resources, increase biological diversity and benefit wildlife.



—D. Harken,
Landscape Restoration Handbook

For More Information

Common Sense Gardening

The Common Sense Gardening program seeks to reduce reliance on pesticides and synthetic fertilizers and help create low-water use landscapes. Other guides about common sense gardening are available at participating nurseries, or by calling **Thurston County** at **360-754-4111** or **TDD 360-754-2933**. You can also contact the **Master Gardener Clinic, WSU Extension** at **360-786-5445, ext. 7908**, Monday through Friday, 9:00 am to 1:00 pm.

Safely dispose of unwanted pesticides at **HazoHouse**, Thurston County's household hazardous waste collection center. Call the **Thurston County Wasteline** at **360-786-5494**, press **3** for more information, or visit www.co.thurston.wa.us/wwm. Landscaping professionals, property managers and other businesses can call **360-786-5457** for information on business disposal of hazardous waste.

By conserving water, reducing reliance on pesticides and synthetic fertilizers, and safely disposing of unwanted hazardous products, common sense gardeners protect public health, our drinking water, and other precious waterways.

Websites

Pesticide information: EXTTOXNET sponsored by a consortium of several universities
<http://ace.orst.edu/info/exttoxnet>

WSU Extension Gardening in Western Washington:
<http://gardening.wsu.edu>

Washington Toxics Coalition (a non-profit organization): www.watoxics.org

Ecologically Sound Lawncare for the Pacific Northwest:
www.ci.seattle.wa.us/util/lawncare/lawnreport.htm

Telephone Assistance

National Pesticide Information Center is a toll-free telephone service that provides pesticide information. It is a cooperative venture between Oregon State University and the EPA.

1-800-858-7378

Recommended Reading

Building a Healthy Lawn, by Stuart Franklin, Garden Way Publishing, Pownal, VT, 1988

The Chemical-Free Lawn, by Warren Schultz, Rodale Press, Emmaus, PA, 1989

Diseases of Turfgrass, Washington State University Co-op Extension Bulletin #713, by Ralph S. Byther, Charles J. Gould, and Roy L. Goss

Ecologically Sound Lawn Care for the Pacific Northwest, by David McDonald, Seattle Public Utilities, Seattle, WA, 1999

Grow Smart, Grow Safe: A Consumers Guide to Lawn and Garden Products; Washington Toxics Coalition, 2006

Least Toxic Pest Management for Lawns, Bio-Integral Resource Center, Sheila Daar, ed., Berkeley, CA, 1992

Rodale's Successful Organic Gardening: Controlling Weeds, by E. Hynes, Rodale Press, Emmaus, PA

Weeds of the West, published by The Western Society of Weed Science, ISBN 0941570-13-4

The Wild Lawn Handbook, by Stevie Daniels, Prentice Hall-MacMillan, NY, 1995

For more information about Common Sense Gardening or to request this guide in an alternative format, please contact us at:

Thurston County Public Health and Social Services
Department, Environmental Health Division
2000 Lakeridge Dr. SW, Olympia, WA 98502
Phone: 360-754-4111 or TDD 360-754-2933
www.co.thurston.wa.us/health/ehcsg



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