

William T. Kemper Center for Home Gardening

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A Visual Guide to a Healthy Cool-season Lawn

Many factors can result in dead or thin spots in a cool-season lawn. Resist the first reaction many gardeners have of wanting to spray for a disease. Before you make this mistake, consider the many other causes. Following are the most common causes. Click the links (colored text) for more detailed information, control measures and more images. Click the images to enlarge them.

Regardless of cause, thinning and dead areas will have to be replanted or renovated in fall (preferable) or spring.

See ["How do I renovate my cool-season lawn?"](#) or ["How should I repair bare spots in my cool-season lawn?"](#)



Grass plots in early November: From left warm-season grasses (zoysia & buffalo grass) then cool-season grasses (tall fescues)

What are cool-season grasses?

Cool-season grasses include fine fescues, tall fescues, Kentucky bluegrass, and perennial ryegrass. They grow best in the moderate temperatures of spring and fall. In the St. Louis area they slow down or may go dormant (turn brown) in summer. Warm-season grasses, such as, zoysia and buffalo grass are brown mid-October to mid- to late-May.



Zoysia (browning patch) growing in a fescue lawn in early October and starting to go dormant

Warm-season grass growing in a cool-season lawn

Warm season grasses such as zoysia and Bermuda, can easily invade cool-season lawns. These grasses are most evident from fall through late spring when they appear as brown patches in an otherwise green lawn. During summer when green and growing they are less noticeable.

See ["How do I kill zoysia grass or Bermuda grass in my fescue lawn?"](#)



Heat and drought stress

Heat and drought are two of the most common reasons why cool-season lawns turn brown (tan) in summer because they may go dormant in these conditions. Kentucky bluegrass and fine fescues (creeping red fescue and hard fescue) are the first to go dormant followed by the more tolerant tall fescue and perennial ryegrass. In a lawn with a mixture of grasses (most lawns) the result is a patchy or thinning appearance as grasses go dormant at different times. Dormant lawns green-up when early fall rains and cooler temperatures arrive. Irrigated lawns are less apt to go dormant but run the increased risk of disease and insect problems.

See *"When and how should I water my cool-season lawn?"*



In a lawn of mixed grasses, the more heat sensitive grasses will go dormant first.



Dormant grass on July 20

Is it dead or just dormant?

Determining if a patch of grass is dead or just dormant can be difficult. A close examination is required. Dormant grass will be firm at the base and resist a gentle tug. Dead grass will be shriveled with dead roots. It can be uprooted easily and will have dead, non-functioning roots. Dormant grass can resume growth; dead will not.

See *"How do I care for my dormant cool-season lawn."*



Same dormant grass on October 12 after rain



Patches of dormant grass resprouting in September after a good rain. Some grasses died.



Dry slopes

Sunny, south or west-facing slopes are difficult locations for cool-season grasses. Grasses may go dormant or be killed by heat and drought. These sites are also difficult to irrigate. Long, slow watering is needed to facilitate water uptake and prevent runoff. Very frequent watering is needed in the heat of summer.



Thin grass in shade

Shade and tree competition

Grass growing in shade under or close to trees can experience tremendous competition for ample light and moisture. It will be thin and never as lush and green as grass growing in full sun. Some grasses, such as the fine fescues (red, hard, sheep, spreading, creeping and chewing), are more tolerant of shade, but may still be unable to compete against tough, shade-loving weeds, such as, violets and nimblewill, especially in deep shade. Watering can help the dry situation but wet conditions can result in increased disease problems, such as, necrotic ring spot or pythium blight.

Research has shown that the roots of some trees, for example silver maple, produce a chemical that retards growth of Kentucky bluegrass. The most significant factors for most grass situations, however, is more likely competition for sun, water and nutrients.

See *"What lawn grasses will grow in the shade?"*



Very thin grass in dense shade



Nimblewill and violets growing in deep shade (see above photo) where lawn grasses struggle.



Note tire track

Compaction

Grass will not grow well in soil that has been compacted by vehicles or foot traffic. Small areas can be dug with a spading fork or rototilled to a depth of 8-10 inches to loosen the soil. Large areas or the complete lawn can be core aerified in fall to help alleviate the compaction and then reseeded at the proper time (around Labor Day in the St. Louis area).

See ["What is core aerification and when should I do it?"](#)



Dollar spot fungus noticed early when it can be identified.

Fungal Diseases of Cool-season Lawns

Cool-season grasses are susceptible to a number of fungal diseases. Some exhibit distinctive patterns in the lawn or spots (lesions) on the leaf blades that aid in their identification. A very close examination of dying (not dead!) leaf blades is needed to verify which, if any, disease is present.

Diseases occur when very specific environmental conditions of temperature and moisture are present. Many diseases run their course before a homeowner can act, making the application of a fungicide of little or no value. Changes in environmental conditions or management practices can also halt a disease.

See ["Fungal Diseases of Cool-season Lawns"](#)



Ants aerate the soil and break down organic matter

Insects

Feeding activity of certain insects, such as, grubs (see below), can cause dead areas in lawns. Holes or scratched or torn areas of turf can be the result of birds and other animals scavenging for insects in the soil. Most problem insects are large enough to be seen and identified with a **close, proper, and thorough examination**. Get down on your hands and knees and look closely, keeping in mind that healthy soils contain many harmless or beneficial insects that should not be killed.

See ["How to check for insects in my lawn?"](#) and University of Missouri Extension's ["IPM 1020: Turfgrass and Insects."](#)

Cicada on the right; cicada killer wasp on the left
As ground-dwelling insects, both are harmless



Grubs

Grubs are the immature form of beetles. They can be a significant problem in irrigated lawns if their population is high. Symptoms of grub problems are gradual thinning and weakening of the lawn followed by small patches of dead or wilting grass even in the presence of adequate soil moisture. Kentucky bluegrass is especially susceptible. Damage is often most evident in August and September. When severe, you can tug at the lawn and easily pull it up like pulling up a piece of carpet. Treatment is advised if 10 or more grubs are found per square foot.

See *"Grubs in Lawns."*



Grass peeled off to reveal grubs



Standing water caused the grass to rot.

Improper watering

Improper watering may result in many problems for your lawn. Root rots (as in the image at left) are obvious but many other problems may not be as obvious. Shallow rooting, increased disease, and attractiveness to grubs are a few of the other problems improper watering can cause.

See *"When and how should I water my lawn?"*



Fertilizer burn from trying to turn a corner without turning off the spreader

Improper fertilization

Careless fertilizing can result in brown spot or streaks. Over application of nitrogen in spring results in excessive top growth and poor root development. It can also result in lush top growth that is more susceptible to disease, insects and summer drought. In general, slow release fertilizers are best. Fall fertilizing is preferred.

See *"When and how do I fertilize my cool-season lawn?"*



Fertilized lawn on the left
Unfertilized lawn on the right

Nutrient deficiencies

Grasses need both macronutrients and micronutrients. Macronutrients are nitrogen, phosphorus potassium, calcium, magnesium and sulfur. There are many micronutrients, including iron. Nitrogen is required in the greatest amounts and is present in all lawn fertilizers and may be all that needs to be applied. In the St. Louis area, soils usually contain sufficient quantities of all macronutrients except nitrogen and sometimes potassium and usually contains all micronutrients, except iron. A deficiency is more likely if grass clippings are routinely bagged or removed. Only a complete soil test can determine if a nutrient deficiency exists.

A basic soil test will measure the soil pH which should be 6.0 to 6.8 for healthy growth. When the soil pH is out of this range the grass will be yellowish green. A basic soil test also measures the percentage of organic matter in the soil, which ideally should be from 5% to 20%. Soils in this area are usually deficient in organic matter. Using organic fertilizers will help remedy this.

See *"How do I test my soil?"* and *"Soil testing and sample collection,"* and *"When and how do I fertilize my cool-season lawn?"*



Liming

Lawns in the St. Louis area should never be limed unless a soil test indicates that the pH is below 6.0. Lime increases the pH of the soil, making it sweeter or more alkaline. The pH of most soils in the St. Louis area hovers around neutral (7.0) or above, because the soil sits on limestone bedrock and is rich in naturally occurring lime. If more is added unnecessarily, the soil can become too sweet (alkaline) to grow grass and many other plants, including many trees, because plants cannot take up nutrients if the pH is out of range. A pH between 6.0 and 6.5 (slightly acid) is a good compromise for most plants grown in this area.

See *"How do I lime my lawn?"*



Spreading grass seed too sparsely leaves space for weeds, such as, chickweed and henbit to fill the gaps

Planting too thick or too thin

It is tempting to spread grass seed liberally and get a lush stand of thick young plants. Doing so, however, is detrimental to the long-term survival of your grass seedlings. Competition between the small plants results in many weak plants with reduced root systems. Overly thick grass also impedes air movement through the blades of grass creating the perfect conditions for disease development. Conversely, skimping on seed will result in thin turf where weeds will proliferate. For a healthy lawn, follow recommended planting rates and get the right number of plants per square foot.

See *"When and how do I seed a cool-season lawn and what should I sow?"*



Seed fails to germinate

The best time to sow grass seed is between September 1 and October 15, and the closer to Labor Day the better. The second best time is in March. Planting at other times will usually lead to complete crop failure, because seeds will only germinate and seedlings will only thrive when conditions are right.

See ["When and how do I seed a cool-season lawn and what should I sow?"](#)



Mowing grass too short (right) reduces drought tolerance and allows weeds to take over

Improper mowing

Improper mowing can take many forms from a dull mower blade to scalping. A dull mower blade can give your grass a tan or brownish appearance from the dead, frayed grass blades. Scalping (cutting the grass too short) makes the lawn look brown by removing too much leaf surface and increasing the soil temperature by exposing it to more direct sun. Increased heat and drying can force the grass into dormancy or kill it outright.

See ["How often and how high should I mow my cool-season lawn?"](#)



Pile of grass clippings that will kill the grass underneath unless removed

Grass clippings

Grass clippings are not **thatch** and will not add to the thatch layer. If possible use a mulching mower and leave the grass clippings to decompose. Doing so will substantially reduce the amount of fertilizer needed for a healthy lawn. Bag or remove clippings when clippings pile up and mat.

See ["Should I collect my grass clippings?"](#)



University of Missouri Extension Guide G6708
"Thatch—Enemy of Lawns"

Thatch

Thatch is a layer of living and dead grass crowns, roots, lower shoots and other organic debris at the soil surface. It appears as a layer of brown, tightly compressed, peat moss-like material. It is not the result of leaving grass clippings on a lawn. It is rarely a problem in fescue lawns but can build-up in Kentucky bluegrass lawns in cooler, northern parts of the country where Kentucky bluegrass grows more vigorously. A layer thicker than ½ inch can invite insect and disease problems.

See ["What is lawn thatch and how do I check for it?"](#)



Mushrooms in the lawn

Mushrooms are common occurrences during rainy weather. They live off decaying organic matter in the soil, often decaying tree roots, and are not harmful to the lawn. They will disappear as they age, can be collected and composted, knocked down with a rake or hoe, or mowed over with your lawnmower. Never collect and eat unless you are an expert in their identification.



Hole in lawn possibly caused by foraging birds

Holes or torn up turf in the lawn

Small holes in the lawn can have a number of causes: birds foraging for insects, cicadas emerging from underground, earthworms surfacing, and other harmless insects emerging from the soil. Treatment is generally unwarranted unless a **close, proper, and thorough examination** reveals high numbers of grubs (discussed above).

Larger holes may be caused by **animals**, such as, moles, voles, gophers, or rabbits. Torn or scratched up turf usually indicates that an animal has been foraging for insects. Skunks are often the culprits, but other animals may also be to blame, such as, raccoons, squirrels, armadillos, or rabbits. A thorough search for grubs (discussed above) is indicated, but the grubs may no longer be present due to the foraging animal.



Torn up lawn possibly caused by a foraging animal, such as, a skunk

Earthworm castings

As earthworms move through the soil they often leave small piles or castings in the lawn. The castings and earthworms are harmless and actually beneficial for the soil as they help aerate and fertilize the lawn.

See "[Earthworms.](#)"





Moles

Moles are known for unsightly tunneling (bottom image) and uprooting favorite plants. Moles are insectivores, and rarely consume plant material.

See "[Moles.](#)"



Mole tunnels in lawn



Voles and mice

Voles, also commonly called meadow mice, are seldom seen though the damage they do to plants is a common sight. They are often responsible for damage attributed to moles. Voles flourish in grassy and weedy areas (including our gardens), creating systems of pathways 1 to 2 inches wide that often are protected by overhanging vegetation (bottom image). Droppings and fresh bits of plants show that a run is being used. Voles or meadow mice also build underground tunnels and may use mole or mouse tunnels as well.

See "[Voles and mice.](#)"



Vole runs are paths of trampled grass



Pocket gopher mound

Pocket gophers

Pocket gophers are animals that tunnel underground and mound soil in the lawn. Unlike moles, they do not construct surface tunnels. Instead, they construct many mounds of finely sifted soil. They are more of a problem in rural areas than in cities. Besides leaving piles of soil and making mowing difficult, they kill areas of grass and chew the roots and trunks of young trees just below soil level, killing the trees. Problem animals should be trapped using a trap designed for gophers. As they have different feeding habits than moles, mole traps will not catch gophers.



Grass trampled and killed by pacing dog

Dogs

The most common complaint from dog owners is brown urine spots on the lawn; however, there are also other problems including chewing, digging and run paths.

See *"Dogs."*



Weeds

A weed can be any plant that is growing in a lawn, even grass of a species other than the one that is preferred.

See *"How do I control weeds in my lawn?"* and *"Common weeds of the St. Louis area."*