

Residential Lawn Care in Eastern WA & OR:

Craig A. Stahl

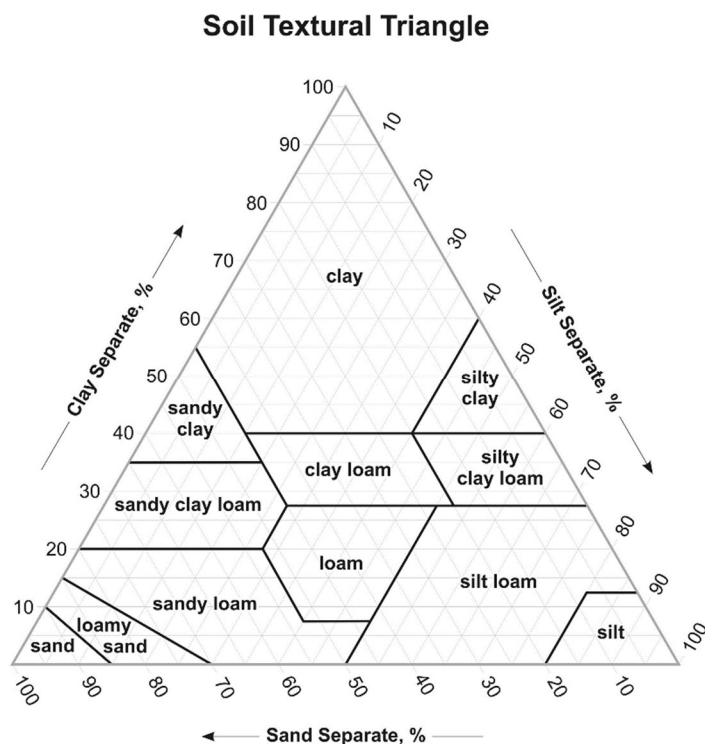
Every few years we are informed that our water supply for irrigation is below normal and we need to conserve water. I like to keep my lawn soft and green without drying out. Understanding some basics of lawn care can help keep things growing while reducing water waste. Unfortunately, there is no one-size-fits-all approach that works in every situation. Much of the information that you find online is written while trying to sell a product. Other information is geared toward professional turf managers for golf courses or sports fields. Professional turf managers are constrained by the needs of the sport. Much of information is not applicable to the residential lawn.

Soil Basics

Soil is classified in two ways: particle size & chemical composition.

The USDA Textural Classification describes particle size

https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/kthru6/?cid=nrcs142p2_054311



Knowing soil particle size is important for water management. Sand has the largest particle size and water flows through it rapidly. Clay has the smallest particle size and water management can be more of a challenge as it tends to pool and runoff.

The second major component of soil is the chemical makeup. Soil is comprised of weathered rocks and organic matter. In the Columbia Basin our unique geological past has created a patchwork of many different soil-types. The chemical makeup of the soil effects the nutrient availability and the water management techniques needed.

Running a soil test using a Certified Laboratory is always recommended as a first step in taking care of lawns. It's the most basic information needed to make

informed decisions on the best practices for your unique situation. Contact your local extension agent for assistance in choosing the best laboratory to have the test completed and interpreting the results.

One thing that a soil test does not report is the porosity of the soil. Porosity is the three-dimensional structure of the soil with gaps and holes for water and air to flow. The amount of porosity depends upon the soil texture, chemical make-up, and organisms that change the structure around it.

Understanding porosity is critical for keeping the right balance of water/air for your turf to be healthy. Practices like aeration increase the porosity of the soil by mechanical means. The addition of organic matter and cultivating a healthy microbiome in the lawn is much more effective.

Choosing the Right Grass Seed:

The Seed Tag

The seed tag contains all the information that you need to make an educated decision on purchasing seed. What is printed on the tag is mandated by state and federal laws. Do NOT buy grass seed that does not have a seed tag clearly labeling what is in the bag.

HARDY LAWN Lawn Seed Mixture			
Pure Seed	Variety/Kind	Germination	Origin
30.24%	Program Perennial Ryegrass	90%	OR
19.57%	Kelly Kentucky Bluegrass	83%	OR
17.79%	Kenblue Kentucky Bluegrass	80%	WA
14.69%	Boreal Creeping Red Fescue	85%	CAN
14.32%	Gulf Annual Ryegrass	90%	OR
0.05%	Other Crop Seed	Lot No. 99101234 TESTED: 01-2009 SELL BY: 10-2009 In FL, & LA SELL BY: 08-2009 In IL, MT, NE, SD, WI, & WY SELL BY: 01-2010 In AK, AZ, CA, CO, ID, MN, ND, NH, NV, NY, OH, OR, PA, UT, VT, WA and DC SELL BY: 04-2010	
3.31%	Inert Matter		
0.03%	Weed Seed		
Noxious Weed Seeds: None Found			

Here is an example of a very common seed blend. The name “Hardy Lawn” is a branding that is not regulated. Seed companies can sell many different blends under the exact same name. Some seed companies take efforts to make sure that any changes to the blend they make perform equal too or better than the previous blends. Other seed companies rely on whatever in the market is cheaper.

Pure seed – This is the amount of that seed subtracting, other crop seed, inert matter, and weed seed by weight.

Variety/Kind – This is a combination of the Variety & the common name for the species. The first section is the variety, followed by the common species name. For example

Variety: **Kelly** Common Name: **Kentucky Bluegrass**.

Companies can choose to omit declaring a variety. They can choose to only list of the common name of the species or print **VNS** standing for “Variety Not Specified”.

Germination – Germination are the results of the laboratory test completed by placing 400 seeds onto a damp paper towel at a controlled standard temperature. In grass seed anything under 85% germination is considered very poor quality seed. 90% or better is more normal.

Origin - This is the state or country where the seed was produced . In the tag above these lots were produced in Oregon, Washington & Canada.

Other Crop Seed- This is a catch all term for other species not targeted. This is often from contamination during harvest and milling. For example this could be some forage species like Orchard Grass (*Dactylus glomerta*)

Inert Matter: Most often this is chaff or other parts of the plant that the cleaning and milling equipment was unable to remove. This number can be very high if the seed is coated as part of a seed treatment process.

Weed Seed: These are known weed seed contamination that is in the bag. These are weedy plants that are not on the noxious weed list.

Noxious Weed Seeds: This is labeled for location of where it is intended to be sold. Different locations have different Noxious Weed lists.

Lot Number: Often small and hidden, this is the most important piece of information on the tag. International, federal, and state rules mandate that seed companies keep records to trace the full history of the seed in the bag from the Lot number. If you have any issues with the seed the Lot # is what you need.

Tested: This refers to the month the last Germination test was completed.

Sell By: Seed companies then have a set amount of time to sell the seed before the test is considered expired. These vary by state and the type of sale. The different sell by dates listed represent a sample of the different rules. This does not mean the seed is dead, it means it needs to be retested to ensure it's performance.

Coating: No topic is more inaccurately represented in marketing material than coating. Coating is the use of clays, carbonates, and polymers to cover the seed surface. Originally this process was developed for small seeded species like timothy grass, onions, etc. to be more accurately seeded by planters. On the seed tag, the % of coating is by weight. In grass seed the most common % of coating is 50%.

The primary purpose of coating grass seed originally was profit. It allowed seed companies put 50% less seed in a bag but still sell it at the same price.

Seed coating alone does NOT improve germination rates or water management. In fact, in most cases it inhibits germination and kills weaker seeds. The polymers and clays used inhibit the CO₂/O₂ gas exchange with the seed. Seed with lower vigor can often suffocate before breaking the seed coating.

Now for the twist: Seed coating plus other additives can dramatically improve seedling survival and growth rates. This is because the coating offers an ideal mechanism of delivery for fungicides, insecticides, microbial additives, and micronutrients. This can increase the number of successful seedlings growing into plants by 20-50%. When using seed with coated + additives increase your planting rate by at least 25% on a weight basis.

Grass Species

Below are the most common species in blends for temperate climates. There are many more species available to meet unique environmental conditions.

Common Name	Scientific name	Price	Conditions adapted to	Seeds/lb
Kentucky Bluegrass	<i>Poa pratensis</i>	Highest	Full sun, high traffic areas	1,300,000
Perennial Ryegrass	<i>Lolium perenne</i>	Moderate	Full sun to partial shade,	250,000
Annual Ryegrass	<i>Lolium multiflorum</i>	Cheapest	Full sun to partial shade,	200,000
Tall Fescue	<i>Festuca arundinacea</i>	Moderate	Full sun, High traffic,	200,000
Creeping Red Fescue	<i>Festuca rubra</i>	Moderate	Partial to full shade	400,000
Chewing Fescue	<i>Festuca rubra subsp. Commutate</i>	Moderate	Partial to full shade	400,000

When evaluating a seed tag it's important to know that the blend % is by weight. Different species can have vastly different seed sizes. When you take the seed size into account it can change how you manage the established lawn. For example, a blend of:

50% Kentucky Bluegrass = $1,300,000 \times 50\% = 650,000$ seeds/lb

50% Perennial Ryegrass = $250,000 \times 50\% = 125,000$ seeds/lb

The blend has an average seed count of 775,000 seeds/lb, 84% of those seeds are Kentucky Bluegrass & 16% of the seeds are Perennial Ryegrass. The resulting lawn established from this blend is a mostly Kentucky Bluegrass.

Each grass species has their own unique environments of adaptation. Planting the right species for the location can make lawn care much easier.

Common Name	Advantages	Limitations
Kentucky Bluegrass	Color, texture, takes traffic exceptionally well	Saturated soils, slow emergence from dormancy
Perennial Ryegrass	Fast color in spring, excellent recovery from damage	Persistence under traffic, color can be lighter green.
Annual Ryegrass	Very fast growing. Often put in blends to get fast establishment	Annual that does not persist well.
Tall Fescue	Lighter overall color, deeper roots, tolerates drought better.	Tends to have more rapid growth. Can have stiffer grass blades.
Creeping Red Fescue	Shade tolerance, fine leaves and soft texture, spreading habit	Can become weedy around edges
Chewing Fescue	Shade tolerance, fine leaves and soft texture, bunch type habit	Does not recover from damage well.

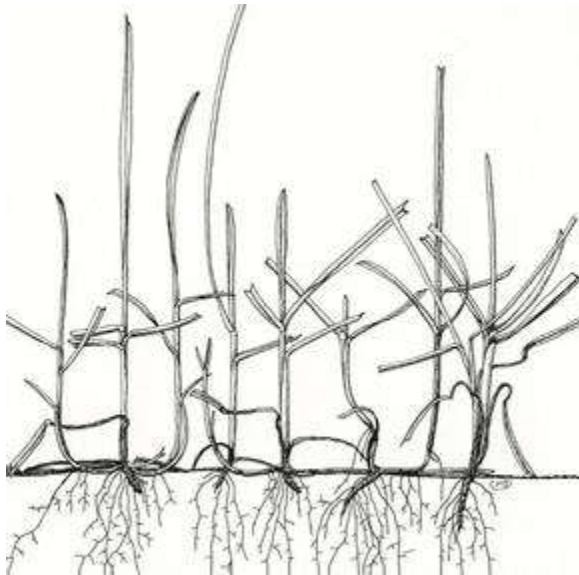
Grass Varieties.

Each grass species has many different commercial varieties available. These varieties can vary widely in color, diseases resistance, color, texture, and overall performance. Doing some basic research into the varieties listed on the seed tag can prevent many issues in the long term. The National Turfgrass Evaluation Program is a centralized program that evaluates hundreds of varieties. <https://ntep.org/>

The industry has also attempted to identify varieties that are better adapted to low input conditions. These are being marketed as A-List. These varieties are chosen for their ability to withstand lower inputs and with better survivability. <https://a-listturf.org/>

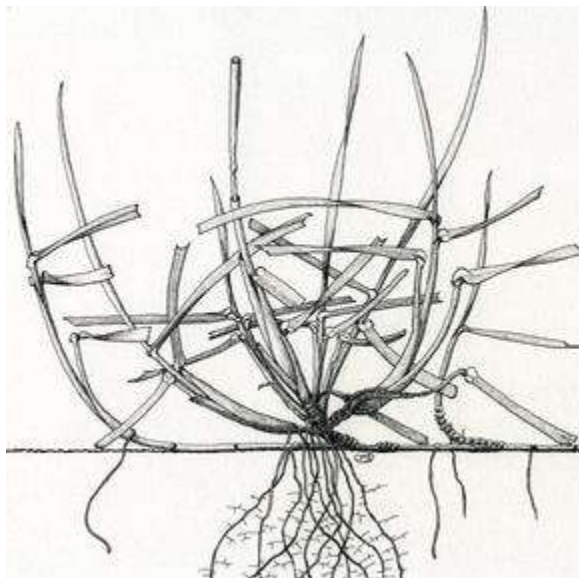
Plant Physiology.

The plant habit of the different turfgrass species can be quite different. Knowing the structure of the turf grass can help you determine mowing height, nutritional needs, as well as picking the right species for the right locations. Below is a few examples of the growth habits of different species. If you want to see more examples visit this webpage. <http://ipm.ucanr.edu/TOOLS/TURF/TURFSPECIES/index.html>



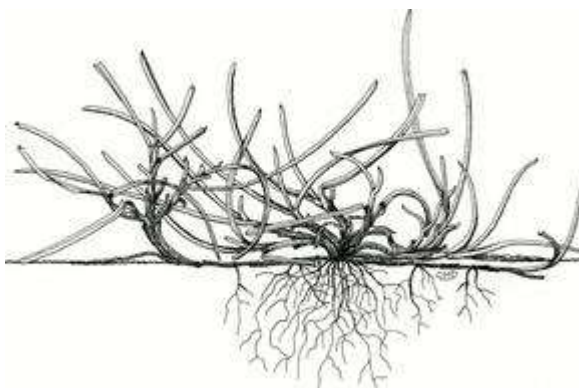
This is an illustration of Kentucky Bluegrass. The roots of Kentucky Bluegrass are quite shallow. They also tend to be proportional to the amount leaves and stems that are above the surface

<http://ipm.ucanr.edu/TOOLS/TURF/TURFSPECIES/kenblue.html>



This is an illustration of a tall fescue plant. As you can see the tall fescue is a much larger overall plant with a deeper larger root structure. The deeper root structure allows for the turf to use water from a larger profile in the soil.

<http://ipm.ucanr.edu/TOOLS/TURF/TURFSPECIES/tallfesc.html>



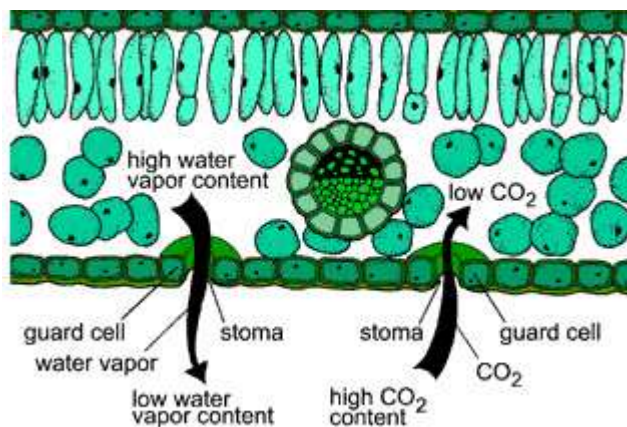
This is an illustration of Creeping Red Fescue. You'll notice that it spreads by stolon off to the sides. This creates new young plants that slowly cover larger areas. This plant is adapted to shade conditions and even in low initial quantities will quickly become the dominant species in high shade areas.

<http://ipm.ucanr.edu/TOOLS/TURF/TURFSPECIES/redfes.html>

Photosynthesis, water, & CO₂

Plants as part of the process of photosynthesis need to breathe in CO₂ during the day. For this they have specialized structures on the underside of their leaves called stomata. These are little holes that allow CO₂ to enter the leaf area. They also allow water to escape and evaporate into the atmosphere. Plants can open and close them as needed. Cool season grasses that we use in our lawns in temperate areas do not have any way of storing CO₂. In order to photosynthesize their stomata's need to be open.

The plant is constantly opening and closing its stomata depending upon the availability of water & light. Under high temperatures in the middle of the summer these grasses tend to have their stomata closed for most of the day.



The rate that the plant loses water is a combination of temperature and the relative humidity directly around the leaf. Scientists refer to this as the vapor-pressure deficit (VPD) of the plant. Wind is the single most influential component of the VPD of the plant. Wind removes the water vapor from directly around the plant. This increases the gradient between the relative humidity inside the leaf and the air surrounding the leaf.

<http://projects.ncsu.edu/project/bio181de/Lab/transport/transport1b.html>

The next one is pretty obvious but very important for our lawns. The amount of photosynthates a plant produces is directly proportional to the amount of leaf area exposed to light. So a 2" blade of grass produces more photosynthates than a 1" blade of grass. If it produces more photosynthates the plant has more energy and supplies to grow. More leaf area usually equates to a larger and deeper root system and more energy to fight off disease and pests.

Plant Nutrition.

The largest mistake that is made in residential lawns is blindly applying fertilizer without performing a soil test. Over fertilizing leads to runoff issues cause serious damage to the environment. This is such a serious issue that in Washington State phosphate cannot be applied to a lawn without a soil test. Under fertilizing leads to lawns that are weak, susceptible to disease and insects, and go into dormancy very quickly when stressed with water. Contact your local extension agent or agronomist to evaluate your soil test and make a recommendation for fertilizer application. As a general rule, slow release fertilizers tend to be safer to use and are more efficient at keeping the nutrients in the small zone of the turfgrass roots during the growing season. Fast release fertilizers can burn the grass if applied incorrectly and leach out of the rootzone without being used by the plants.

In the PNW fertilizer should be applied twice per year. Once in the early spring and once in the early fall. Cooler temperatures are when our cool season turfgrasses growth the best and need nutrients available.

Decomposition

Decomposition may seem like a strange topic for a lawn care but it is important to understand its role in a healthy lawn. One of the major issues with lawns is the formation of thatch. Thatch is the buildup of roots, stems, and stolons that are high in lignin. Leaves from lawn clippings do not add to thatch formation being low in lignin and rapidly broken down. Lignin gives strength and durability to the plants cell wall. It also is resistant to decomposition. If the rate of decomposition is below the rate of thatch formation it builds up. If the thatch layer builds up too high it can harbor disease and impede water and air movement to the roots. Anything that inhibits the decomposition rate can lead to the production of thatch. Some of these can include acidic soils, sandy soil, pesticide application (fungicides & insecticides), water management, & nutrient balance. Some species of grass produce more thatch than others as well. Bluegrass and Creeping Red Fescue produce the most thatch.

Promoting a healthy active soil biome can completely eliminate thatch formation. Slow release fertilizers, avoiding, using insecticides, fungicides, application of humic acids or compost all promote microbial activity. Earthworms and beneficial insects should be plentiful in a healthy lawn.

General Guidelines for Caring for a Lawn

There is a lot of confusion over caring for a lawn if you search online. How you care for a lawn depends upon the species of lawn, the climate where you live, your soil type, and your expectations.

Watering:

This is the most common area where mistakes are made. How much and when you water depends on the soil type you have and species of lawn. Sandy soils should be watered no more than 3 days per week. Heavy clay soils should only be watered once or twice weekly. Under no circumstances should a lawn be watered daily!

In arid environments with low humidity, you should always water at night. In wetter areas with higher humidity, you should water in the morning. An easy way to tell when to water is by the morning dew. If you get morning dew every morning, you should be watering in the morning. If you rarely see morning dew then always water at night.

When watering your lawn avoiding run-off is very important. Run-off occurs when water being applied to the surface of the soil is greater than the rate of water being absorbed into the soil. The best way to avoid runoff is to split up your watering times through the day. Instead of running your sprinklers once with 15 minutes on each span, split it up into three 5-minute runs with an hour or two between each cycle. This gives the water time to penetrate deeper into the soil avoiding runoff.

Mowing:

You should always ensure that the blades are sharp on your mower. A sharp blade cuts the grass straight across making a straight clean cut that is easy for the plant to heal. A dull blade makes a jagged cut that is difficult for the plant to heal. This causes the tip of the grass blade to brown and dieback. This jagged edge is an avenue for diseases to attack the plant.

The height that you mow the grass greatly effects the health of the lawn. Cutting the lawn too short is a very common issue. As a general rule, the warmer the temperatures are, the higher you need to cut the lawn. The shortest you should cut a cool season grass is 2". This should only be done in the early spring or late fall. During the height of the summer when temperatures are hot, 4.5-5" is the optimal height.

A healthy lawn requires frequent, consistent mowing. The lawn should be mowed when it has grown 1-1.5". This usually means 2x per week during the rapid growing periods. Letting the lawn grow too long between cuttings can damage the plant as the plant gets larger the growing tip moves higher. Cutting 4+\" off of the lawn usually damages the growing tip leaving a brown \"scalped\" spot behind. It can take several weeks for a damaged plant to recover from scalping.

Mulching vs. Bagging lawn clippings: Mulching is hands down better for the lawn than bagging. If done correctly it can eliminate the need for aeration and/or dethatching completely. It can also improve the nutrient availability to the plants, increase water penetration into the soil, decrease evaporation, decrease runoff, decrease weeds, and reduce labor. If done incorrectly, it's an ugly clumpy mess that kills the grass.

Correctly mulching has a few simple rules:

1. Never attempt to mulch more than 1\" of clippings.
2. Cut the grass at the right height for the season.
3. Use a sharp mower blade.
4. Don't try to mow too fast.
5. Cut the grass when it is dry (preferably the day before watering).

Break any of these rules and you'll be left with clumps of grass clippings all over your lawn.

Bagging has its place however. In the fall when decreasing the height of the lawn in preparation for winter, bagging is recommended. Bagging dry leaves is also easy and fast to do if they are not too thick.

Aeration and Dethatching:

Aeration and dethatching are mechanical solutions to suboptimal lawn care practices. Golf Courses and Sports fields are limited on how they care for the grass by the sport being played on them. Aeration and dethatching is a necessity for them to counteract compaction and thatch formation. In a properly maintained residential lawn you should never need to do either of these.

Aeration and dethatching in residential areas can be done if suboptimal lawn care practices have been done previously. It's very important to be aware that both of these processes kill plants. You should always plan on overseeding immediately after doing either. If you don't overseed the lawn, weeds can easily fill the gaps where plants have been killed.

Overseeding:

Overseeding is the spreading of new seeds over an established lawn. Overseeding should be done on a routine basis. Over time every lawn loses plants and thins. Overseeding can greatly help the look and feel of the lawn. It can also reduce weed pressure. Overseeding is best done in late summer to early fall. This is the natural time for the cool season grasses to germinate and grow. If overseeded in the fall only a ½ seeding rate needs to be done. If done in the spring a ¾ rate of seeding needs to be done.

Use top quality seed with premium varieties in the blend. Read the tag carefully and research the varieties in the blend.

How to overseed: Plan on overseeding with at least 4 weeks of irrigation left in the season. For most of the districts this is early September. Cut the existing grass down to 2" and bag off the clippings. Spread the seed uniformly across the lawn and a bit heavier in any gaps or thin spots. Running a rake over the lawn can help the seeds come in contact with the soil. Water in very short burst daily to keep the soil constantly damp for 10 days. Then return to normal watering. Mow when lawn grows above 4" tall (mulching is highly recommended).

Biologicals:

The use of biologicals in turf has a very long history.

The first biologicals sold with grass seed was endophytes. Endophytes are symbiotic fungi that is transferred via seed from parent to offspring. Endophytes produce toxins that reduce damage from insects and pathogenic fungi. It can even cause a reduced fecundity in mammals (rodents especially). The only problem with endophytes in seed is they are delicate. The seed must be stored under refrigerated conditions and used within 6 months of harvesting or else the endophyte does not survive.

Since then, many other biologicals have come on the market. As they are mostly living organisms interacting with the environment their performance is unpredictable. Some can be highly effective one time and do nothing the next time you attempt to use them.

The key is to store them properly, use them as labeled, and be prepared for them to fail... repeatedly. If you keep at it and figure out all the nuances you can achieve some measure of effectiveness.

Diseases:

There are many diseases that can affect lawns. Some cause only cosmetic damage and can be safely ignored. Others diseases can easily kill the grass like snow mold and turf necrotic ringspot.

Snow Mold – This can be either Gray or Pink snow mold. Both begin sporulating in the fall and grow in grass buried in snow. If you have a history of snowmold on your lawn there are a few things you can do to reduce it's impact.

Promote an active soil microbiome. High soil microbial activity is linked to a reduction in pathogenic fungi. On your last mowing of the season cut the grass to 2" in height and bag the clippings. This removes the amount of dead material for the fungi to grow on under the snow. When the snow melts, immediately rake over the lawn to break up the matted dormant grass. This allows the surface of the soil to dry out and stop the fungal growth.



Fungicides can be used to help control snow mold but with caution. The fungicides kill the pathogenic fungi but also the beneficial ones. This can lead to other issues as the microbial activity in the soil decreases.

<https://www.extension.purdue.edu/extmedia/bp/bp-101-w.pdf>

Turf Necrotic Ring Spot - This is a fungal disease that causes rings and lines to form in the grass. Bluegrass is the most susceptible to this species with the other species of grasses being less impacted. Perennial ryegrass is reported to be immune from this disease.



https://extension.usu.edu/pests/ipm/notes_orb/list-turf/necrotic-ring-spot

The best solution to this disease is to overseed with a blend of other species. Perennial ryegrass and turf type tall fescue are not affected by this disease. In a blend even though the disease may be present in the lawn, its effects will not be as noticeable.

Optimal lawn care practices also greatly reduce the incidence of this disease. The use of slow release fertilizers, higher mowing height, and reduction in thatch formation all are shown to help prevent this disease.

Fungicides may be required if a severe enough infection is encountered.

Rust - Rust is a bright orange fungus in the genus *Puccinia* that attacks some species/varieties of grasses. It usually shows up in the late summer/fall and makes your shoes bright orange when you walk across the grass. The best solution to the disease is to overseed with a rust resistant cultivar. Plants that are highly susceptible to the disease die off and the new resistant cultivar will take its place. After 2-3 years of overseeding the disease expression will decrease dramatically.



<https://extension.psu.edu/turfgrass-diseases-rust-diseases-causal-fungi-puccinia-spp>

Powdery Mildew - The frosted lawn look- This white fungus in the genus *Blumeria* likes shady areas and bluegrass. It is generally cosmetic only in our area and can safely be ignored. Overseeding with resistant cultivars can decrease its yearly appearance. Bluegrass is generally the most susceptible species.



<https://extension.psu.edu/turfgrass-diseases-powdery-mildew-causal-fungus-blumeria-graminis-formerly-erysiphe-graminis>

Weeds:

The first step to managing weeds is to positively identify the species. Repeated sprays of the wrong pesticide is a waste of money, effort and time. With smartphones today identifying many weeds has gotten much easier. Several apps allow the user to snap a picture of the weed and upload them to the app. The app then searches and finds potential species. These apps work very well on broadleaf species but grasses or sedges are difficult for them to identify. There are many thousands of species of common weeds so I'll focus on only a few commonly misidentified ones in the grass family.



Bermuda Grass: Bermuda grass was originally planted in many parks in the area by the Army Corp of Engineers. This grass is an extremely tough perennial that spreads by stolons or tiny seeds. It is drought tolerant, resistant to many herbicides, and extremely difficult to eliminate once it becomes established. It is easily identified by the long rapidly spreading stolons. It is often confused with crabgrass.

Dallisgrass This is a clumping perennial that spreads via very tiny seeds. It stays green all year long, has wide grass blades and constantly sends up stalks for seed heads. It forms rhizomes underground so digging the plant out can be difficult. The plant will come back up from even a small portion of the rhizome missed. There are several herbicides that can selectively kill this plant. Multiple applications are usually required to kill the rhizome once it is established. Very commonly confused with crabgrass.



Crabgrass This is a warm weather annual with a very short lifecycle. Crabgrass seeds germinate when soil temps climb above 55F. This light green grass grows very rapidly sending out many flowers that produce thousands of tiny seeds each. Control of crabgrass is relatively easy. Since it is an annual a timely application of a pre-emergent herbicide (stops seeds from growing) can eliminate this weed. Mowing your lawn at 4" can also shade out any young seedling that do germinate. Manual removal is highly effective as this is a fast growing annual with a smaller root system. Spot spraying herbicides is also highly effective.



<https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=27543>

Annual Bluegrass - Annual bluegrass is a light green annual or perennial grass that is often found in cheaper lawn seed mixes. In a lawn it produces a very short seed head often less than 3" tall. These plants continuously produce seeds all summer long. The seeds germinate in the fall and winter and begin blooming again in early spring. Control of this is extremely difficult and for most residential lawns close to impossible. Consistent overseeding with a high quality turf blend can reduce the amount of annual bluegrass in the lawn but complete elimination once established is close to impossible.



<http://ipm.ucanr.edu/PMG/PESTNOTES/pn7464.html>

Clover – The most common species of clover found in lawns is dutch clover/white clover (*Trifolium repens*). This is a perennial clover that tends to form clumps in weaker areas of lawn. It depends on the person if this is a weed or not. A dwarf form of the clover is included with grass seed blends for low maintenance lawns. The amount of white clover in a lawn can easily be reduced by overseeding and application of fertilizer. Cutting at 4.5-5" also shades out this species and reduces the numbers.



Oxalis – Oxalis leaves are very similar to clover but it's much more persistent. The leaves are often reddish colored and the flowers are bright yellow. These are a perennial species spread by an exploding seed pod that flings sticky seeds more than 10' from the plant. Control of this species can be a challenge. I found that a combination of overseeding, spot spraying with herbicide and cutting at the maximum mower height quickly eliminates this species.