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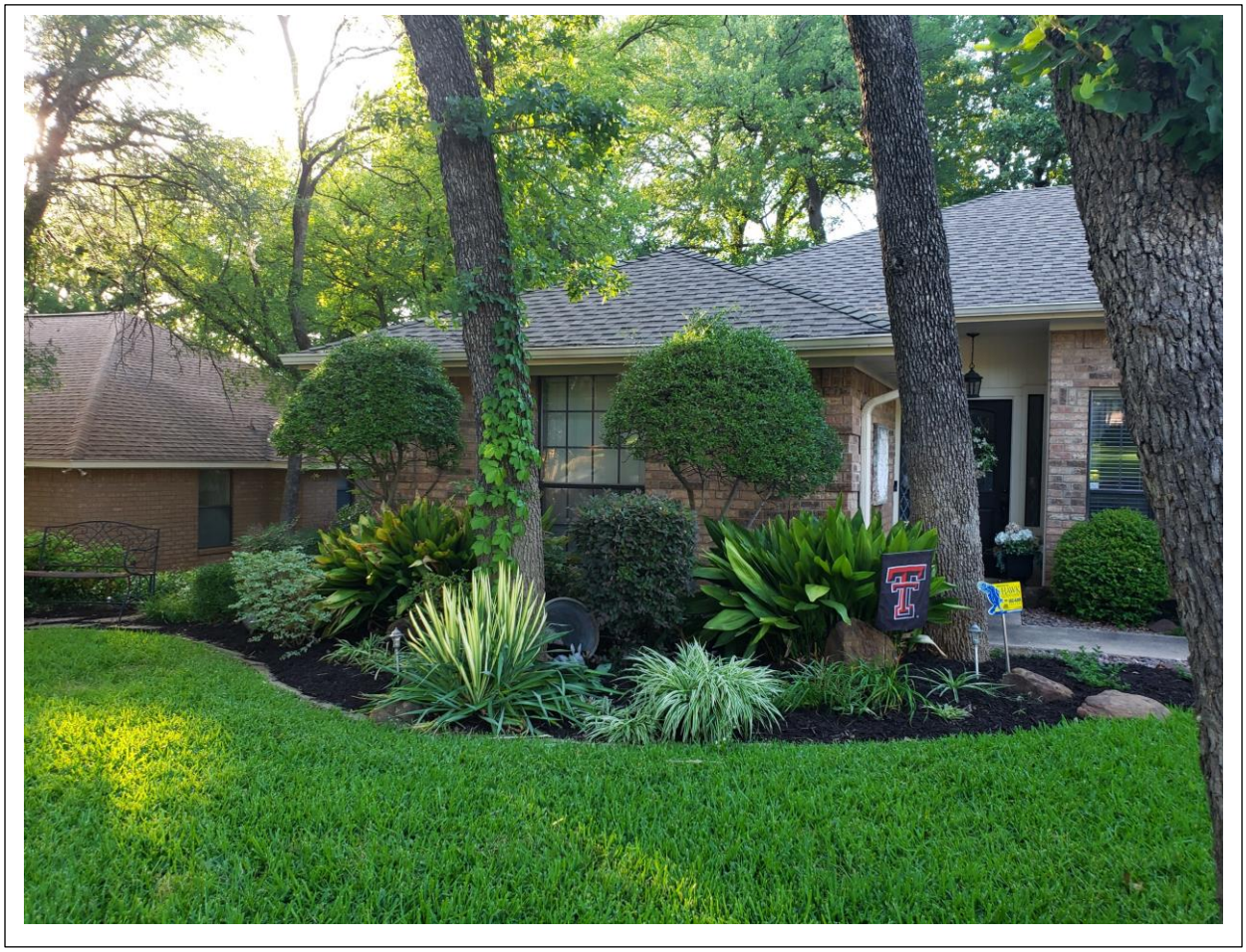
MARSHALL GRAIN CO.

The Ultimate Organic Lawn Care Guide for North Texas



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CHAPTER 1: INTRODUCTION

If you have been hesitating to make the switch to natural, sustainable lawn-care practices, or if you have begun using organic products and want to know more about how to maintain your turf the natural way, this primer is for you. We've combined our decades of knowledge and experience in organic practices into this comprehensive guide to organic lawn care.

Despite rapidly growing interest in switching to natural methods, many people still perceive the goal, of a more sustainable lawn with less use of synthetic pesticides and fertilizers, as more complicated than organic lawn-care practices. Really, they are simply two different systems, with one being no more complicated than the other.

Adherents to both methods will tell you that everything depends on having healthy soil. So what is that? Healthy soil is a diverse ecosystem chock full of earthworms, as well as billions of microscopic bacteria, fungi, nematodes, and other microorganisms, which help to break down things like grass clippings, leaves, seeds, dead insects, and other organic materials so that they can be useful to your lawn and plants.

However, chemical fertilizers, pesticides and herbicides kill off these many beneficial micro-organisms, so you lose valuable allies in the war against pests. The result is that you are left with a deficient soil, which often result in higher rates of disease and insect problems, more weeds, and poorly performing stands of grass.

What's worse, these chemicals build up in your soil over time and make it progressively more difficult for your lawn to remain healthy and cope with stresses such as insect invasions and drought. Some are so harmful that even proponents of synthetic products will not use them. For example, chemical "weed and feed" products will actually harm your trees.

Organically treated lawns, on the other hand, become easier to care for over time, requiring less water, less fertilizer and fewer other inputs such as top dressings of compost. Being organic offers many eco-friendly benefits:

- Saves you time and money by reducing the amount of product to be applied and reducing the frequency of application
- Reduces your family's exposure to toxic chemicals
- Reduces pollution of our ground water
- Reduces your water bill
- Helps protect pollinators and other wildlife

- You are helping to make the earth more eco-friendly

4 Steps to Making the Switch
If you're still thinking it's too hard to switch, keep in mind that it's not necessary to convert in one single giant step. Baby steps are just fine. You can work toward becoming organic a bit at a time to make it easier and more manageable. Even if you are not able to convert 100% to organic methods, you'll still be helping the environment — and yourself — by using organic products where possible.

Along with this guide, you've also got us! Bring your questions to Marshall Grain and let our staff of experts help you with all your organic gardening needs.

Step1. Stop the Slaughter!
The first thing to do is stop using chemicals. In most cases, there is a safer, non-toxic alternative available to do the job instead.

When your soil is in proper balance, harmful insects are controlled by their beneficial counterparts. For every unwanted pest in your yard there is a beneficial garden sentry ready to help you. For instance, birds love to eat armyworms (also called sod worms) that can destroy your lawn. And beneficial nematodes (microscopic soil dwellers) are a natural enemy of grubs, fleas and fire ants that breed in your soil.

When nature alone isn't sufficient, consider using a repellent rather than a pesticide to avoid killing off someone else's food source. For example, garlic oil, available as a spray, effectively repels many insects and even some small mammals, while also helping to control fungus.

Step 2. Use Organic Fertilizer
If you have been applying synthetic products to your garden, it may take a few months for the effects of these to wear off and for the new organic methods to become effective. We recommend that you wait at least two months for your garden to heal itself and then apply a high-quality organic fertilizer. We have several excellent brands to choose from.

This will provide some basic nourishment for the microorganisms in your soil as your garden recovers. Follow up your initial treatment with regular applications of an organic fertilizer two to four times yearly. The best times to fertilize are in the Spring and the Fall.

Step 3. Enrich Your Soil
You can further restore and enrich your soil by top dressing your lawn with compost, lava sand, greensand and horticultural molasses. (more on these products later!)

Step 4. Control Weeds Naturally
Weeds are the bane of every homeowner, and the best way to prevent them is to have a healthy, lush organic lawn. You can also prevent them by using Corn Gluten Meal as an organic pre-

emergent herbicide. For those weeds that sneak in anyway, there are several organic post-emergent options, which we will discuss later in this guide.

CHAPTER 2: NEW LAWNS

The best time to do put in a new St. Augustine or Bermuda lawn or to renovate an existing one is in the spring when the weather is consistently warm and there is no further chance of a freeze. Some types of grasses can be installed in the fall. There are essentially three ways you can go:

- Lay new sod
- Re-seed an existing lawn
- Fill in bare patches with grass plugs

Which method you use depends on the size of the job and the type of grass you plan to install.

Before you attempt any of the options below, however, it's a good idea to improve the area to be planted by composting. For new lawns, you should work your compost and any other soil amendments into the soil at least 6 inches prior to planting. For existing lawns, enrich the soil by putting down a 1/2 -inch to 1-inch layer of compost on top of the area to be planted.

Laying Sod

The easiest way to build a new lawn is by laying sod. For St. Augustine owners, this is really the only way. Bermuda, Buffalo, Zoysia and many other grasses can be started from seed, however, this is not an option with St. Augustine because it doesn't propagate from seed in North Texas. Marshall Grain carries St. Augustine and occasionally other types of sod in pre-cut squares that can be arranged easily to fit any configuration. Each "square" is approximately 16 x 24 inches. (OK, so they're not exactly square.)

Reseeding Existing Lawns

Lawns can wear out, like old clothes, from excessive traffic, damage from construction, or attacks from pests or disease. As noted above, St. Augustine cannot be started from seed in North Texas. Bermuda is the easiest to start from seed. Buffalo Grass is harder.

1. Before sowing your seeds, rake the area to "scarify" the soil and remove any weeds and remaining grass.
2. Apply a ½ inch or so of compost on top.
3. Sow your seeds by hand or with a spreader. Immediately after sowing, water them gently with a solution of liquid seaweed — a natural seed starter and root stimulator.
4. Keep the seeds moist with daily watering for at least 3 weeks or so until the seeds have fully germinated and taken root.

Installing Plugs

For St. Augustine owners, plugs are an alternative to laying the larger squares. They're perfect for smaller areas.

Note: St. Augustine lawns are highly susceptible to fungal problems and diseases, such as Brown Patch and Take All Root Rot. If your lawn has been affected by fugus, make sure you have treated the area with a product appropriate for that fungus you plant new grass. Once your soil is healthy again, you can repair the damaged areas by planting St. Augustine plugs or laying sod.

CHAPTER 3: CHOOSING THE RIGHT LAWN GRASS

If you're confused about which type of grass to plant, or if you want to enjoy a green lawn green all year long, you're not alone. Getting grass to grow in our North Texas climate is not as easy as you might think. Whether you want to enhance an established lawn, or put in a new one, there are a number of options to consider. With some basic knowledge, you can select the best type of turf for your needs.

Climate

Grasses can be divided into cool season and warm season varieties. In general if a grass performs well in hot temperatures, it won't flourish in cold weather, and vice versa. This presents an obvious problem for North Texans. Since we experience both extreme heat in the summer and freezing temperatures in the winter, no single type of turf will remain green all year round.

Along with temperature, there's the question of shade. Shade not only helps to lower the surrounding air temperature, but it also blocks sunlight. Grasses vary in the amount of sunlight and shade needed to sustain growth. If your lawn receives too much shade, you simply will never establish it in that area. One solution is to have a mixed lawn. That is, to plant a different variety of grass in each area or each season. Many people, for example, plant a mixture of Bermuda — a warm season grass — and rye — a cool season variety — in order to extend the green season. Likewise, you can plant one type of grass in sunny areas and another in shady spots to accommodate the reduced sunlight.

Choices for North Texas

With so many challenges, we can narrow down the best choices for North Texas to only a few varieties: Bermuda, St. Augustine, Buffalo, Rye, Fescue, and Zoysia.

Bermuda

Bermuda is by far the most popular turf grass in North Texas. It has many of the characteristics that most of us want. This sun-loving, warm-season lawn or pasture grass can be easily planted from sod or seed, and it's durable, requiring only a moderate amount of maintenance and mowing. It forms a dark green turf that is highly drought resistant, low growing, fast repairing, has fair salt tolerance, grows in a variety of soils, and can be mowed easily. Persistent and aggressive, Bermuda is very hard to kill once it's established. Lawns planted with it can attain

full lawn coverage in one year. It is not uncommon for seeded Bermuda lawns to be established within 90 days.

On the negative side, Bermuda is highly invasive and will inevitably show up in your flowerbeds and vegetable garden areas. It never gets as thick as St. Augustine, so it is not as good at choking out weeds, and it is not very shade tolerant. It also does not like the cold. In tropical areas, it will retain a beautiful green color all year round, however it will go dormant when temperatures drop below 60 degrees, so if you plan to start it from seed, you need to wait until your soil temperature is above 65 degrees F. To avoid having a brown lawn through the winter, many North Texans like to overseed their Bermuda lawns with a cool season grass, such as annual rye.

St. Augustine

St. Augustine is the other popular permanent lawn grass for the Dallas-Fort Worth area. Many people prefer its color and texture to Bermuda. It is also popular for its tolerance of moderate shade, making it as good or better than other warm season grasses for shaded sites. However, deeper shade causes it to get thin. St. Augustine also stands up slightly better to both heat and cold: It will tolerate temperatures about 10° lower than Bermuda. Its biggest drawback is that it cannot be propagated from seed and can only be established from sod. It is also more susceptible to diseases such as Take All Root Rot and Brown Patch.

Buffalo Grass

Buffalo grass is named for the great herds of bison that this turf used to support. Perhaps the only truly native grass in the Southern U.S., it favors our heavy clay soil and tolerates both prolonged droughts and high temperatures very well. It is best adapted to low rainfall or places that receive thorough, but infrequent irrigation. Buffalo grass is recognized by its fine curly texture, relatively thin turf and soft blue-green color. Much shorter than Bermuda, Buffalo grows to only about 8 to 10 inches tall and therefore, is easier to mow and is often used as a “pocket prairie” grass where mowing is not necessary. As a native grass, it is very resistant to diseases and insects.

Because it does not spread by underground rhizomes as either Bermuda or St. Augustine, Buffalo grass is easily removed from flower beds and gardens.

Its biggest disadvantage is that it is fragile. Buffalo grass is only recommended for low maintenance, low traffic areas because it gets worn down easily. It doesn’t do well in shade and it is easily crowded out by more aggressive types such as Bermuda. In suburban settings it is not uncommon for Buffalo grass lawns to be crowded out by your neighbors’ St. Augustine or Bermuda.

April and May are the best months to plant Buffalo grass, and with irrigation, the planting date can be extended into July and August. Buffalo grass seed can also be sown in the fall along with other grasses, however maximum germination does not occur until the following spring. You may also find that the germination rate is low -------- only a portion of your Seeds won’t necessarily germinate the first year, meaning that it can take several years for your lawn to completely fill in.

Annual Rye

Rye is a cool season grass that dies as soon as temperatures warm up in the spring. Seeding it is about as easy as it gets. It germinates quickly and grows fast, and does well in nearly any type of soil, making it suitable for lawns and pastures. Rye is also highly resistant to both diseases and insects.

Known as a "throw and grow" grass you can sow without the hassle of tilling, scarifying or digging into the soil. This makes it ideal for over-seeding warm season grasses that go dormant in the fall and winter. If the weather helps out by raining just before sowing then you practically have it made. Otherwise watering the yard and applying fertilizer before or after sowing are all that is required.

Because annual rye is fast growing, it needs more frequent mowing.

Fescue to the Rescue
Fescue is essentially a cool season grass that is shade tolerant. It is also very drought resistance and stays green all year. Yes, we said it stays green all year! Rather than turning brown like Bermuda, Fescue merely fades to a paler green color when it is dormant. This fact makes it more acceptable as a lawn grass. Its tolerance for shade means it won't grow in the full Texas sun but it does much better than most grasses under trees.

Fescue has a dense root system, which is what makes it so drought tolerant. A tough grass that can endure heavy foot traffic and wear, it emerges early and grows fast for a beautiful lawn with low maintenance. Its upright growth means that Fescue will not form thatches.

Zoysia Grass
Zoysia is much easier to establish it from seed rather than from sod. However, it is much slower to get started compared to other grasses. Seeding with Zoysia can take six months or longer to completely fill in. Known for its ability to crowd out weeds, it has also been proven to require as much as 10 fewer mowings in a growing season that Bermuda grass. Under drought conditions, it can live on as little as *2 inches of water per month*. It tolerates cold and shade better than Bermuda and endures heat and humidity better than Fescue. But as they say, patience is a virtue. Once the turf is matured, you will have a long lasting, low maintenance, extremely drought tolerant lawn.

If you still aren't sure what to do about your lawn, come in and talk to one of our lawn and garden experts. Our friendly and knowledgeable staff is ready and waiting to help you find the right solution to your problem. And once you've got your lawn established, we'll be there to help you keep it healthy all year long, no matter what problems you encounter along the way.

CHAPTER 4: 7 RULES FOR KEEPING YOUR LAWN HEALTHY

By Lucy Harrell, Texas Certified Nursery Professional, and a specialist on demanding environments.

What is a healthy lawn? One that covers the soil like a thick carpet. Yet most of us only dream about having a lawn like that. If your turf is failing to live up to its full potential, it's likely that you need to address one or more of these seven crucial areas.

1: Is it a good variety of lawn grass for this climate?
As discussed in the previous section, there are a number of good lawn choices for North Texas. Our 7 rules for a healthy lawn apply to any of these.

2: Does it receive the correct amount of sun or shade?
Fescue tolerates more shade than most other lawn grasses, so it can stay healthy even after trees grow and bring shade into the area. St. Augustine tolerates light shade (5-6 hours of direct exposure), while Bermuda grass needs lots of sun — more than 6 hours of direct exposure.

3: Is it watered correctly and is the coverage even?
Most of us tend to over water versus under water. Over watering is much more harmful to your lawn and garden. It can actually kill them! Saint Augustine is especially susceptible to fungal problems, which usually begin with over watering or heavy rainfall. Proper watering will strengthen your roots and condition them to better deal with drought conditions. You'll also save money on your water bill. **See our 3 Top Watering Mistakes**

Your soil should be allowed to dry out and let air into that space before watering again. Roots need air as well as water (keep in mind that these elements are sharing the same space in the soil). Chronically over-watered soil has no way to allow air in. Water logged soils encourage disease and eventually can cause the lawn to die.

Water coverage should be even. Uneven coverage is another all too common problem we encounter. If we notice that a spot is looking dry, most of us respond by watering the entire lawn more often instead of adding water to the dry spot. This is often how chronic over-watering gets started. Don't fall into that trap. Take the time to adjust your sprinklers to get even coverage.

Your lawn should be on a watering schedule that provides enough moisture to get the soil wet down to at least 6 inches deep at the time of watering. This requires that you water long enough to apply one inch of water, 1 time per week, *including rainfall.*

The best way to measure the amount of water applied is to save up some empty cans (tuna cans or cat food cans work best). Place these around your yard then turn on your sprinklers. Time how long it takes for one inch of water to build up in your cans. This works for oscillating sprinklers too. Once you know that number, you can set your irrigation system accordingly. Remember to adjust them for rainfall. Texas A&M offers a detailed watering guide for Texas landscapes.

4: Do you need to enrich the soil?
If you've ever watched the rain fall on a Texas yard, you've probably noticed that more water runs off onto the streets and sidewalks than what penetrates the ground. This is partly because the rain is often falling faster than it can soak in. However, it can also be due to soil compaction.

Especially if you live in an area with heavy clay soil, it can be difficult for the water to penetrate through the clay.

If this is the case, improve your soil as much as possible by aerating and adding soil conditioners as needed. To aerate, just use a pitch fork. Or go whole hog and rent an aerating machine. Opening up your soil allows moisture and organic matter to penetrate more deeply into the ground.

After you aerate, top dress your lawn with a high-quality organic compost. You may also want to use Lava Sand, Texas Greensand and other soil amendments to help open up your soil and increase microbial activity required to break down organic matter. Apply them 2 - 4 times a year. Unlike some soil amendments, these can be applied as a top dressing in a fertilizer spreader, making it pretty much a "no-brainer." (Read about our Top 5 Soil Amendments.)

5: Is the area graded properly to allow good drainage?
If your lawn has low spots where water stands after a rain or after watering, you could be inviting problems. Low spots are usually where roots rot and fungal problems start. This is an important and easy thing to take care of. Simply fill in those spots with topsoil to make the areas level. It's best to do this in early spring because they will be quickly be covered by grass as soon as the warm weather starts your lawn growing again. Any bare spots should be covered lightly with Corn Gluten Meal to keep weed seeds from settling in on those areas. Wet the Corn Gluten Meal lightly to keep it from blowing away and help it bond with the soil.

6: It is fertilized with a good organic product?
Our basic lawn care calendar (see below) will help you build up your soil to a point where regular fertilizations will no longer be necessary. Within one to three years you will realize that your program has been built and you can stop fertilizing as often. Use only the products that you need and don't over-do it.

7: It is mowed and maintained at the proper height?
Saint Augustine should be kept at a height of 2.5 to 3 inches. Bermuda should be kept at 2 to 2.5 inches. You should try to maintain this height without ever cutting off more than 1/3 of the height of the grass blade.

This is important because all the nutrients in your lawn are stored in the top (green) portion of the blade. Cutting the grass blade too drastically robs your lawn of nutrients and shade.

Secondly, cutting too much of the grass blade off at once allows the part of the blade that has been shaded from sunlight to be suddenly exposed to hot sun. Have you ever mowed so short that the next day the lawn turned brown or looked really sad and wondered what happened? Now you know! The higher mowing height allows the grass to shade the soil, which reduces heat stress. The reduced stress also means your lawn will use less water and it will be harder for weed seeds to settle in.

CHAPTER 5: ORGANIC WEED PREVENTION

Any weed expert will tell you that the best way to keep weeds out of your lawn and flowerbeds is to never let them get started. Keeping your turf thick and healthy, and mulching flowerbeds does a lot to help prevent weeds. The other key is regular applications of a pre-emergent herbicide.

But even healthy lawns that have been treated with a pre-emergent can get weeds. So organic gardeners also need to familiarize themselves with post-emergent organic products. In this section, we look at organic choices in both categories.

Pre-Emergent Control — Corn Gluten Meal Works!
A happy accident back in 1986 led researchers at Iowa State University to discover that Corn Gluten Meal prevents seed germination. Since then, lots of research has been done on whether Corn Gluten Meal is, in fact, an effective weed control, and the answer is a resounding "YES!"

There are some tricks, though. Here's an overview of what it is and how it works, along with the secrets to getting the most out of it.

Corn Gluten Meal is a by-product of the corn milling process. Long before it became famous as a weed suppressant, it was used as a supplement in hog feed. Corn Gluten Meal is 100% organic, and entirely edible, which means it is completely safe to use around pets and children.

Unprocessed Corn Gluten Meal has a very fine, powdery texture. It can be broadcast by hand or by a fertilizer spreader. It will look like a layer of pollen on the soil. Apply to lawns, or directly on bare earth, or around new plantings.

You will also find granulated (spreadable) Corn Gluten. The more powdery meal is much more effective for weed suppression than granulated Corn Gluten, but both make excellent all-nitrogen (9-0-0) fertilizers.

Applying the Product
Either product can be distributed using any type of fertilizer spreader. The meal can be a bit messy to apply, especially on windy days. The granules are easier to spread, but they don't cover the ground as well, which reduces the product's effectiveness for weed control. For maximum effectiveness, the meal is the best choice for your lawn. On the other hand, the granules can be mixed with water into a paste to use as a patch for localized weed suppression. The patch will keep weeds from sprouting up between plants.

Both types of Corn Gluten contain 9% nitrogen by weight (i.e., 100 lbs of corn gluten contains 9 lbs of nitrogen) to help make your lawn greener, so it's a great organic fertilizer, plus it adds organic material for increasing microbial activity. Thanks to this dual function, many people refer to it as an organic "weed and feed" product.

No Other Organic Pre-Emergent
For now at least, Corn Gluten Meal is the only organic pre-emergent available. **American Lawns** explains how it works as an herbicide. Turns out that it has some naturally occurring chemicals called peptides that actually inhibit root formation of a seed at the time of germination.

One application of Corn Gluten Meal keeps working to suppress seed germination for 4 to 6 weeks. (Heavy soils, extended rainy weather, and hot spells may require additional applications. It works on all types of seeds — and only on seeds. It does not harm existing plants. When used correctly, over time you will have fewer broad leaf and grassy weeds, including Crabgrass, Dandelions, Clover, Henbit, and many others. But because it is non-selective, you should avoid applying it in areas where desirable plants might be germinating. If you plan to over-seed your lawn, start flowers, or grow vegetables from seed, be sure to wait at least 6 weeks after applying it.

Timing Is Crucial
Timing is critical for both organic and synthetic chemical pre-emergents. Weeds don't have calendars. They sprout as soon as the weather is right. Sunny days and overnight temperatures in the mid-50's generally begin the cycle of germinating and re-seeding. This applies no matter what the season. In North Texas, weed seeds can germinate throughout the fall and even in winter if temperatures are favorable.

Watch for Dandelions In the springtime, the easiest way to tell when it's time to apply Corn Gluten, is to watch for dandelions. As soon as you see your first dandelion, put it out. Don't wait!

In North Texas, weed sprouting season usually starts around mid-February and continues throughout the growing season. The process slows down considerably during the heat of summer, but then picks up again when temperatures cool in the fall.

The seedling stage of a weed can last 8 to 15 weeks, depending on temperature and growing conditions. Since they are usually well-hidden within your lawn, this means that the weeds you see in the springtime actually germinated in the fall. Likewise, seeds that germinate in the spring don't become visible until fall. All this boils down to the need to treat *at least twice per year* – once in the spring and once in the fall. Depending on weather conditions, you may want to make a second or even third application.

Apply Corn Gluten at a rate of 20 lbs per 1000 square feet to make sure you get sufficient coverage. When applied consistently, at that rate, Corn Gluten Meal will reduce lawn weeds by as much as 60% in the first year and by up to 93% when used regularly over time. The longer you use it, the better your lawn will look!

Too Much of a Good Thing
One problem with Corn Gluten Meal can be too much water. Some is helpful, but too much can spoil the job.

Corn Gluten Meal needs to be watered in within 5 days of application. If no rain occurs within that window, you should water it in with 1/4 inch of water. On the other hand, heavy rain or excessive irrigation will wash it away before it can dissolve into the soil. This means that the watering-in process must also be followed by a dry period of a day or two to prevent the seedling

from growing another root. If heavy rain is predicted, it may be best to wait for drier weather before putting it down.

If no rainfall is forecast, you may prefer to water your lawn before you apply Corn Gluten Meal — especially if you plan to use a broadcast spreader. Being a fine powder, Corn Gluten Meal easily blows around, getting on you and everything else in your yard. Broadcast spreaders cause the powder to fly out to the sides, rather than just dropping straight to the ground, which encourages more mess. Windy days are also problematic. Watering lightly first will help keep the dust to a minimum and make it stick to the lawn immediately.

Corn Gluten Meal Facts

- The only 100% organic pre-emergent herbicide available
- Safe for people and pets
- Inhibits root formation at the time of seed germination
- Works on all types of seeds
- Timing is critical. Application must be synchronized with weed germination
- Must be watered in by rainfall or irrigation within 5 days of application to activate
- Too much rainfall or hot spells can reduce effectiveness
- Must be applied at least 2x yearly in spring and fall
- Effects last for 4 to 6 weeks
- Provides a slow-release 9% nitrogen source
- Apply 20 lbs per 1,000 square feet of lawn
- Effectiveness improves over time
- Corn Gluten Meal only works on seeds. It will not harm existing plants.
- Adds nitrogen and organic matter to the soil, which increases microbial activity

If you've followed these guidelines and used Corn Gluten Meal consistently, you can expect weed suppression equal to or better than a chemical pre-emergent. And you will rest easier knowing that your garden is a safer place for you and your family to enjoy.

Post Emergent Weed Control Products

20% Horticultural Vinegar
Nothing kills weeds faster than 20% Horticultural Vinegar. This non-selective acid burns weeds back to the roots. Use full strength on all types of weeds. You can increase its effectiveness by adding a small amount of natural Orange Oil to each gallon of 20% Vinegar. Orange oil is also commonly used as an organic herbicide. Together they make a potent weed killer. Everyday dishwashing liquid can serve as a surfactant, which makes your mixture adhere to weeds.

Pick any sunny day and spray the crown of each weed thoroughly. In a few hours, you'll have dead weeds!

Here's our special recipe:

Note: Use with care. Avoid contact with skin and eyes. Horticultural Vinegar can harm other plants, including your lawn, if it contacts the foliage.

Ingredients:

- 20% Horticultural Vinegar
- Orange Oil
- Dishwashing Liquid
- Tank Sprayer or hand-held sprayer

Directions:
Pour 1 gallon of 20% Horticultural Vinegar in a tank sprayer. Always use at full strength when applying for weed control. Do not dilute with water!

- Add one ounce of Orange Oil.
- Add 2 – 3 drops of dishwashing liquid.
- Shake/mix thoroughly.
- Spray the crown of each weed until saturated.

Pulverize
Pulverize is one a growing list of organic post-emergent weed control products. It is available in three formulas: Green: Safe for lawns; Blue: Weed & Grass Killer; and Orange: Weed & Brush Killer.

One advantage of using Pulverize is that it works better in shaded areas than horticultural vinegar, which requires sunlight to perform well.

Puregro Weed Crush
Another non-selective option is Puregro's Weed Crush. Weed Crush is a relative newcomer to the organic weed control market, but has won the recommendation of local organic landscape expert, Howard Garrett, also known as "The Dirt Doctor."

Weed Crush is a general-purpose vegetation killer that knocks out both grasses and weeds. It acts through contact and protects the soil, flora, and fauna -- meaning it will not be toxic to humans or animals.

Since it is non-selective, you need to be careful not to get any over-spray on your turf.

AgraLawn Crabgrass Killer
Crabgrass and other grassy weeds are difficult to kill without also harming your lawn. For this job, it's best to call in a specialist. Also recommend by The Dirt Doctor, AgraLawn uses

cinnamon bark, which is fast-acting, but will not harm common lawns like St. Augustine and Bermuda. AgraLawn also kills Crabgrass, Basketgrass, Chickweed, Clover Sticker burrs, Goat head weeds, Dollar weed (Pennywort), Dallis grass, and other similar weeds.

AgraLawn is intended to be used as a spot treatment. The area to be treated must be wet or it will not work. For best results, apply it during the morning while morning dew is present, or wet the affected area with a hose, irrigation or spray bottle.

When used properly, AgraLawn Crabgrass Killer causes very little reaction or yellowing to St. Augustine lawns.

CHAPTER 6: CRABBY ABOUT CRABGRASS

Crabgrass is an annual grassy weed that thrives in warm weather and can appear anytime from spring through fall. Identifying Crabgrass can be difficult because it looks like many other grassy weeds, but there is a strategy for getting rid of it, as we explain below.

Once Crabgrass germinates, it rapidly dominates your lawn, notes Texas A&M AgriLife Extension. Crabgrass is a vigorous plant that grows faster than lawn grasses like St. Augustine and Bermuda. It also grows better under stressful conditions, such as drought, heat and low fertility, that cause your lawn to suffer.

It's important to note that there are several factors that can exacerbate the spread of crabgrass, including soil compaction; light, frequent watering; and lack of fresh organic matter in the soil. Also, close-mowed lawns tend to open up space for weeds like crabgrass to invade. Crabgrass typically begins in these "weak" areas first and then spreads quickly to the rest of your lawn.

So your first job is to make sure you're not making the problem worse. Make sure you are following our 7 Rules for a Healthy Lawn discussed above. Then use AgraLawn Crabgrass Killer.

CHAPTER 7: HOW TO CHECK FOR CHINCH BUGS

If you've been watching your lawn develop brown patches over the summer, those dead spots are likely caused by one of three things: lack of water; Take All Root Rot (TARR); or chinch bugs.

Process of Elimination

Dead spots like these could be caused by lack of water, Take All Root Rot (TARR), or chinch bugs.
Fortunately, it's easy to tell which of problem you've got. First make sure your sprinklers are working properly and watering evenly, and, if necessary, have them repaired.

TARR is a fungus that generally gets started due to excess moisture. Again, this could be brought on by over-watering, but an exceptionally hot, dry summer means it is probably chinch bugs.

What's a Chinch Bug?
Chinch bugs thrive in the heat and sun, and particularly enjoy feeding on St. Augustine lawns, although they are also happy to kill Bermuda, Bahia, Zoysia and other grasses. They spread fast across your lawn using their sucking mouthparts to remove sap from the base (crown) and stolons of plants and inject a toxic substance that prevents the plant from transporting water. The Texas A&M AgriLife extension Field Guide to Common Texas Insects offers details on chinch bugs and their life cycle.

The Chinch Bug Test
It is very difficult to know for certain that you have chinch bugs other than by looking at the damage to your lawn. Chinch bugs are tiny creatures that disappear easily into your lawn. They will most likely be found around the edges of the damaged area — not in the places that are already dead.

One way to look for them is to use the "coffee can test." Although this method does not "prove" whether chinch bugs are present, finding them will confirm that they're there.

1. Grab a coffee can, soup can or other metal can and open it at both ends. (A larger can is better, as it is easier to see and it gives you a larger sample area.)
2. Choose a spot along the edges of the damaged area, rather than in the middle of a dead spot. The bugs are likely to be most active where there is still healthy lawn to be consumed.
3. Work one end of your can down into the soil through the grass as far as you can. It's important to get a good seal so that the can will hold water during the test.
4. Fill the can with water. It's a good idea to keep your hose handy in case you need to add more liquid. Any chinch bugs trapped inside the can will float to the top. Look for very tiny bugs. The nymphs are especially hard to see and even the adults are less than ¼ inch long.

The Solution
Once you know you have them, it is easy to get rid of them. Marshall Grain's recommended organic solution is to treat your lawn with PermaGuard, which is 100% organic diatomaceous earth (DE) with pyrethrin.

Lightly dust your lawn with the PermaGuard — about 1 lb per 1,000 square feet is all you need. You can cast it out by hand or gently shake it out of the bag as you walk your lawn area. The pyrethrin works quickly to kill insects on contact while the DE will keep on working until it washes away.

Keep in mind that chinch bugs can re-invade from neighboring yards. Also remember that a single application of Perma-Guard may not kill off all your chinch bugs. This means they can return, so be prepared to treat again.

Recovery
The brown spots are probably dead, so the grass will need to grow in from the healthy areas. Depending on how badly damaged your lawn is, it could take some time to recover, so have

patience. You can speed up the recovery process by replanting the dead areas with grass plugs, or by laying fresh sod, however, these will also take some time to become established.

Eventually your lawn should recover and reestablish itself in the areas the chinch bugs have left bare and you can go back to enjoying a nice green lawn.

CHAPTER 8: ARMYWORMS

September of 2018 witnessed plague of Armyworms marching across North Texas lawns. They are usually more noticeable in the fall, but when rains occur early in the season, they seem to come out in huge numbers. And they can devour your entire lawn in a very short period of time. Texas A&M's Aggie Turf site notes that it is important to treat as soon as possible to avoid further injury.

These pests – also called "sod worms" – thrive mainlu on Bermuda, but will consume St. Augustine, and Fescue grasses, too. They eat the blades down to the ground and leaving you with a dead lawn. (Interestingly they don't like Zoysia, so if you have this type of grass you should escape the devastation.)

The Armyworm is a caterpillar that develops into the Armyworm Moth. A few Armyworms don't usually do much harm. It's actually pretty common to have a few in our lawns most of the time. Armyworm eggs and larvae are also sometimes transported from one part of the state to another on grass sod intended for residential and commercial turf, or they can migrate here from warmer areas to our south.

Several different species inhabit North Texas, so yours may look slightly different from your neighbors, but there's no question they are a problem.

What To Use

Fortunately, there are very effective organic solutions available. One of these is Thuricide. Thuricide is a highly specialized bacterium called Baccillus Thuringiensis kurstaki (BTk). It is a soil-borne bacterium that only affects caterpillars. Once the Armyworm larvae ingests the BTk, the bacteria works to stop feeding until death occurs. It does not affect birds or beneficial insects (bees, green lacewing, ladybugs, etc.) when used as directed.

Another more generalized product is Spinosad. Spinosad is also a natural substance produced by another bacterium in the soil that can be toxic to insects. Spinosad affects the nervous system of insects that eat or touch it. It causes their muscles to twitch uncontrollably, which leads to paralysis and ultimately their death, typically within one to two days. Spinosad is used to control a wide variety of other pests as well including thrips, leafminers, spider mites, mosquitoes, ants, and fruit flies.

Both products need to be reapplied every 7 to 10 days, or after a rain. Because they are both live bacteria, mix only enough for a single treatment.

Instructions for Baccillus Thuringiensis

- Mix 2 oz. per 3 gallons of water, which makes enough to treat up to 1,000 square feet
- Apply to all plant foliage
- Repeat applications weekly to maintain control of pest insects

Instructions for Spinosad

- Mix 2 oz. (4 Tbsp.) per 1 gallon of water
- Apply uniformly to both upper and lower surfaces of plant foliage

Armyworms are prolific and responsive to favorable conditions. Each generation of eggs hatches in 5-10 days, and the tiny caterpillars grow fat as they feed. When full grown, they burrow into the soil to pupate, then emerge as adult moths. The adults mate and lay eggs, thus starting the life cycle over again.

Anywhere from three to six generations hatch out each season. Just when you think you've gotten rid of them another generation is preparing to leave the soil to replace them! And most North Texas winters are warm enough to allow Armyworms to overwinter as eggs and pupae beneath the soil.

Your fall lawn care program should include taking a close look at your turf to inspect for this devastating pest. Then be prepared to take quick action to prevent them from ruining your beautiful lawn.