



Turfgrass Management for the Texas Panhandle

Grass types
Establishment
Lawn Care
Weed Control
Insects and Diseases
Renovation



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Turfgrass Management for the Texas Panhandle

Congratulations! You live in an area of Texas that allows you to grow both warm season grasses and cool season grasses.

Lawns benefit the landscape economically and environmentally, as well as being a frame of beauty with the home as the focal point.

The first step toward selecting a grass for your lawn is knowing your needs. Think about how much time, water, fertilizer and effort that you are willing to put into the lawn. You must then select a grass that is adapted to your area.

Environmental conditions and management practices are tied together to determine which turfgrass is best adapted for your site. Remember that management practices can have an overriding influence on turfgrass selection. If you are looking for a grass that you do not want to water or mow frequently, choose a grass that meets low maintenance requirements, like buffalograss. On the other hand, high level maintenance grasses like bermuda, zoysia, fescue, Kentucky bluegrass and perennial ryegrass require frequent watering, at least weekly mowing, multiple applications of fertilizer and occasional pest control.

To identify grasses that will do best under your environmental conditions and maintenance requirements, refer to the table on page 9.

Once you have chosen the best adapted turfgrass for your site, select a variety from within the grasses suitable for our area. We will look at a few of the popular ones.

Grass Description

Bermudagrass - warm season

Numex Sahara is a new seed propagated bermudagrass released in 1987. Its advantages over common bermuda include finer leaf texture, better density, higher quality, less winterkill and more drought tolerance. Plant at the rate of 0.5 to 1.0 pound per 1,000 square feet.

Hybrid Bermudagrass - warm season

Most of these hybrids have been developed for a specific purpose. All varieties must be established by sod or sprigging. Fine textured cultivars include Texturf 10, Tifgreen, Tifway and Sunturf. Those with superior cold tolerance are Midway, Midiron and U-3. Sprig in the late spring when soil temperature is above 70°F. Broadcast sprigs at the rate of 5 bushels per 1,000 square feet.

Zoysiagrass - warm season

Improved zoysiagrass must be established from sprigs or sod. The main disadvantage is that it is very slow to establish. Meyer is a cultivar that has a medium leaf texture with good cold hardiness. Sprig 2 inches apart in 6-inch rows during late spring and early summer.

Buffalograss - warm season

A native throughout the short grass region of the Great Plains, buffalograss spreads rapidly by stolons and forms a dense sod. It has excellent cold and drought tolerance. Plant 3 to 4 pounds of seed per 1,000 square feet. Treated seed that has been chilled at 5 to 10°F for 6 to 8 weeks will have a germination rate of 80 to 90 percent compared to 20 percent for untreated seed.

Prairie buffalograss is a new variety recently developed by The Texas Agricultural Experiment Station. The variety consists of only female plants, thus eliminating the unsightliness of seedheads. Prairie buffalograss is propagated from sod, sprigs or plugs, but not seed.

Tall Fescue - cool season

A bunch-type grass that grows vigorously during the fall and spring, this is a good transition zone grass that will retain some green all year long. It tolerates heat and grows well under deciduous trees. Several new cultivars have been developed that are medium-fine texture and have improved density. These include Olympic, Rebel, Hounddog, Adventure

and Falcon. (A blend of Apache, Olympic and Bonanza is grown locally.) The best time to seed is from September 1 to October 15. It can be seeded in March and April but there is the risk of stand loss due to summer heat. Seed at the rate of 8 to 10 pounds per 1,000 square feet.

Kentucky bluegrass - cool season

A bunch grass that spreads by tillers and rhizomes, Kentucky bluegrass is a fine textured grass that is popular where it is adapted. Its weaknesses include being disease prone, and having sensitivity to summer heat, high water requirement, medium to high fertilizer requirement and poor shade tolerance. (These are some of the reasons that the new, improved tall fescue varieties are used rather than Kentucky bluegrass.) Kentucky bluegrass can be established from seed or sod. A blend of Challenger, Midnight and Merit is grown locally. Other good cultivars include Amazon, Baron, Glade, Eclipse and Touchdown.

Mixtures

Another factor to consider is whether to use a single variety, a mixture or a blend. Mixtures contain seed from two or more types of grasses. This allows the strength of one grass type to compensate for the weakness of another. Blends are a combination of varieties from one species of grass. As mentioned earlier, those cool season grasses grown locally for commercial use are blends. Blends usually produce a lawn with improved disease resistance while exhibiting the varietal characteristics that you want. Using blends or mixtures helps the turfgrass compete under a broader range of conditions and better resist disease and insect infestation.

Now that you have selected your "perfect" turfgrass, it is time to get to work.

Lawn Establishment

First, to get the most out of your time and labor, write down a logical order of things that need to be done before you establish your lawn. Pre-seeding checklist:

- 1) Remove debris such as rocks, lumber, concrete, etc.
- 2) Add organic matter such as manure, sawdust or compost to improve soil structure. Many soils in this area are

a heavy clay and lack organic matter. Mix 1 inch of organic matter into the top 3 to 4 inches of soil along with 5 pounds of ammonium sulfate per 1,000 square feet.

- 3) Grade the seedbed to provide drainage away from the house, walks and driveway. A fall of 6 to 8 inches for every 40 to 50 surface feet is adequate. Any soil added should be of a loam or sandy loam texture.
- 4) Water, to pack the soil and form a firm seed bed.
- 5) Rake the surface to remove any large clods and fill depressions that might develop.

Now you are ready to seed, sprig or sod your lawn.

Seeding

In order to get a uniform seed cover, use a spreader rather than spreading the seed by hand. Divide the seed into two equal lots, and seed the second lot at right angles to the first covering.

Rake the seeded area lightly to ensure seed-soil contact. The seed needs to be planted at a depth of 1/8 to 1/4 inch depending on seed size. If you have access to a roller, roll the area. Adding a light mulch will help protect young seedlings or prevent soil erosion on slopes. When mulching, make sure that there is some exposure of the soil. The last step, one of the most important, is proper watering. The first watering should soak the soil to a depth of 5 to 6 inches; be careful not to float your seed away. Next, keep the top layer of soil wet until the grass comes up. This may mean a light sprinkling four times a day. Avoid standing water, but keep the surface moist.

Sprigging

Sprigging is planting individual sprigs at spaced intervals, or one can broadcast the stolons or rhizomes over an area for a quicker and more uniform cover. Sprigging should be done in the spring when the soil temperature reaches about 70°F; sprigging can be successful up through the first of August. The proper distance between sprigs depends on the grass species and how fast you want a cover. Bermudagrass sprigged by broadcasting 3 to 5 bushels per 1,000 square feet will cover in

about 2 months. When sprigging, have the soil slightly moist and do not let the sprigs dry out. Keep the soil moist until the sprigs have become established.

Sodding

Although this method is more costly, it provides an instant lawn. Sod is grown commercially and sold in strips. You can install a sod lawn almost anytime, weather permitting. Late summer, early fall and early spring are the best sodding times for the area. A smooth surface is very important. The sod will be delivered on pallets to your site. Lay the sod as soon as possible. If you are delayed, be sure to keep the soil on the outer pieces moist. Water the soil a few days before laying the sod.

Lay the sod in rows, staggering the seams. Roll and water immediately after completing a section. Keep the sod from drying out. After the sod is installed, water the lawn thoroughly. Try to get the soil wet to a depth of 6 inches. If the surface is rough, the lawn can be top-dressed with a sandy loam topsoil. The edges of the sod along sidewalks and driveways will be the first areas to dry out. You may have to spot water these areas every day until they root down.

Care After Establishment

Lawns that are properly mowed, watered and fertilized will have fewer weed and disease problems. Develop a balanced maintenance program that fits your activities. If you are not going to mow often, then water and fertilize sparingly.

A program that fits this criteria is the "Don't Bag It Lawn Care Plan." The plan promotes proper mowing, watering and fertilization that results in a green, healthy lawn, using less time and energy to maintain.

Mowing Plan

Proper mowing cannot be over-emphasized. Mow every 5 to 6 days so that no more than 1/3 of the leaf is removed at any one time. Leave the grass clippings on the lawn to be recycled into the soil. Analysis of grass clippings tested in Potter County contained more than 3 percent nitrogen, almost 1/2 percent phosphorus and more than 2 percent potassium as well as lesser amounts of other essential plant nutrients. These clippings are about

85 percent, water and the dry matter is between 20 to 30 percent protein. This means that bacteria and fungi will decompose the clippings rapidly.

With proper mowing, these nutrients can be recycled into your soil. These clippings do not contribute to thatch. Thatch is the result of fast growing tissues high in lignin such as roots, rhizomes, stolons and crowns. Mowing height is determined by the type of turfgrass. Proper mower settings and grass heights are given in the following chart. When lawns are grown in heavy shade, or during the heat of the summer, the mowing height shown in the chart should be raised by 1/2 inch.

TYPE OF GRASS	MOWER SETTING	GRASS HEIGHT
Common Bermuda	1½"	2¼"
"TIF" Bermuda	1"	3"
Buffalo	2"	3"
Tall Fescue	2½"	3¾"
Zoysia	2"	3"
Bluegrass	2½"	3¾"

Watering

All the turfgrasses grown here, even buffalo, will require regular watering if you want a green turf. Watering is certainly one of the basic practices used in landscape maintenance. It has been estimated in Texas that over 30 percent of municipal water consumption is for watering lawns. Concern over impending water shortages is a real issue that must be recognized.

Buffalo requires the least amount of water followed by bermuda, zoysia, tall fescue and Kentucky bluegrass.

Several factors affect water use by lawns, including grass species, soil type and fertilization.

In this area, we have variations of sandy and clay soils. Sandy soils are coarse-textured soils that absorb water rapidly, but retain less moisture. Therefore, they require more fre-

quent watering with less water per application. On the other hand, clay soils absorb water slowly and hold more water, so water application rates should be lower and extend over a longer period of time with fewer waterings required.

Over-fertilization and close mowing will also increase the amount and frequency of watering. Taller grass will maintain a deeper root system than grass mowed too short.

Compaction of soil high in clay content is another factor that prohibits water movement into the root zone. Aeration once or twice a year will help. Over-fertilization can cause thatch buildup which will reduce penetration and increase water runoff.

Water your lawn when the soil begins to dry out and the grass begins to discolor and wilt. At this stage, most grasses change from a bright green to a dull blue-green color. Also, if you walk on your lawn and the impressions of your footprints remain visible for a short time, then it is time to water.

The best time to water is early morning to take advantage of less wind and milder temperatures. This will allow the lawn to dry so that it does not stay wet all night which encourages disease development.

Try to water the soil to a depth of 6 inches. You can check this by inserting a screwdriver into the soil, noting resistance. On our clay soils, do not apply so much water at one time that you get run-off. You may have to stop watering for a period of time and start again. Turfgrasses, especially the cool season grasses, require an occasional watering during the winter. This is often overlooked by homeowners and can lead to a thin turf when the grass begins to grow in the spring. Water management is required for effective and efficient water use. There is no set rule for every situation. Consider all your variables, certain guidelines and your knowledge of our climate, and you can develop a good watering program for your lawn.

Fertilizing

Sixteen elements are essential to plant growth. From the air and water, plants absorb hydrogen, oxygen and carbon. Others such as nitrogen, phosphorus and potassium may have to be added to our lawns in order to have

balanced nutrition that results in a healthy, green lawn.

What fertilizer do we use? The amount and kind will depend on soil test results, grass species, environmental condition and mowing practices. A soil test is essential to sound fertilizer use. A soil test kit can be obtained from any county Extension agent's office. Our soil testing lab in this area is located at Lubbock.

Many people in this area have been applying fertilizer on their lawns and gardens that contains high amounts of phosphorus. Excessive phosphorus can cause a problem with iron. Most of our soil analyses indicate that soil phosphorus is becoming excessive. You should discontinue use of commercial fertilizer containing phosphorus or manure for 3 to 4 years. If grass yellowing occurs, apply 4 pounds of iron sulfate per 1,000 square feet of area. Excessive nitrogen will increase mowing frequency, water requirements, thatch buildup and susceptibility to insects and disease.

A good fertilization program includes a formulation that meets the requirements of your lawn in a timely manner.

Grass species differ in their fertilizer requirements in amount applied and time of application.

Application Dates

- Tall fescue, bluegrass
March 15, May 15, September 1 and November 1 (1/2 rate)
- Zoysia
May 15, July 1 and August 15
- Common bermuda
May 15, July 1 and August 15
- "TIF" bermuda
May 1, June 15 and August 15
- Buffalograss
June 1 and September 1

Environmental conditions such as shade, soil type and climate have an influence on fertilizer requirements. Shaded areas should not receive as much fertilizer as full sunlight areas. Grass growing in shade has a weaker root system, and too much fertilizer tends to make the grass more tender and susceptible to injury.

Nitrogen will move faster through sandy soils than clay so more frequent applications will be necessary.

For slow, even growth, use a fertilizer that has at least 1/2 of its nitrogen in a slow release or slowly soluble form, such as sulfur coated urea or urea formaldehyde. Highly soluble or quick release forms of nitrogen, such as ammonium sulfate or urea, tend to produce lush high growth rates for short periods.

Cool season grass will need 2 to 3 pounds of nitrogen per 1,000 square feet per season; bermudagrass, between 3 to 4 pounds of nitrogen per 1,000 square feet; buffalograss, 2 pounds of nitrogen per 1,000 square feet per season. Divide fertilizer into two lots. Apply one lot lengthwise and the other crosswise over the lawn. This will produce uniform distribution and prevent streaking in the lawn. Even though our soils are high in potassium, research has shown that by adding potash to the lawn in the fall, the grass will show greater survival during winters that are unusually cold. Add 2 pounds of potassium per 1,000 square feet in September along with your nitrogen application. Iron chlorosis can be corrected by applying iron sulfate or iron chelates. Also, it is a good idea to add iron to lawns that have a large number of trees.

Weed Control

Recommended herbicides for specific weeds in turfgrass may be found in Table 2 on page 10.

Most lawn weeds can be controlled by mowing at the proper height, fertilizing adequately and watering sensibly. This will result in a dense, healthy lawn that will minimize weed competition. Do not use chemical weed control on newly seeded lawns until after the lawn is established and has grown enough to have been mowed twice.

Homeowners need to be concerned about injuries to trees and shrubs that can be caused by herbicides used for weed control in turfgrass. Several chemicals that have a wide margin of safety to trees and shrubs can be used for grassy weed control.

Chemicals that pose the greatest threat to trees and shrubs are used for broad leaf weed control. These products include 2,4-D, and

dicamba. Symptoms of herbicide damage include leaf cupping, changes in leaf texture, stem twisting and abnormal leaf size and shape. Symptoms of atrazine herbicide injury to ornamental plants include interveinal chlorosis (yellowing) on new growth followed by necrotic (dead) tissue on leaf margins and between leaf veins. Sometimes this leads to complete defoliation of plants.

Most trees and shrubs that are affected by these chemicals because of accidental treatment will recover in 2 to 3 years. One of the most common herbicide injuries results from the misuse of weed and feed products. When using herbicides, it is important to read and follow the instructions on the label. Remember that wind and high temperatures can cause chemicals to drift off target.

Insects

There are several kinds of insects that live in a typical lawn. Many insects are beneficial and aid in the decomposition of organic matter, improve soil structure and are predators of harmful insects. This is one reason why the homeowner must avoid excessive use of insecticides and treat with pesticides only when pest population requires control. Another reason is that after many years of using the same chemicals, some insects have developed resistance to the insecticide.

We are fortunate that few insects damage the grass in this area. The insect that causes the most damage is the white grub, the larvae of the June beetle.

White Grub

White grub infestations are characterized by irregular patches of brown grass that roll back easily. Grubs kill the grass by feeding on the roots. If four or more grubs are found per square foot, treatment is justified. Grubs are the larval stage of the June beetle. They are whitish or grayish in color, and have brown heads and dark hindparts. The most effective time to treat grubs in this area is during mid-July to mid-August while grubs are small and actively feeding on the roots. Sometimes, a spring treatment may be necessary, but this should be followed with a late summer treatment. For a spring treatment to be effective, a rising soil temperature plus good soil moisture is needed for grubs to be up in the root zone.

Chemicals approved for grub control include Dursban, Sevin (ask about SL), Dylox/Proxol, Diazinon, Ficam/Turcam, Triumph and Oftanol. Thatch accumulation of 1/2 inch or more will tend to tie up insecticides, reducing their effectiveness in white grub control (see section on thatch accumulation).

After application, the insecticide should be promptly irrigated with sufficient water to carry the insecticide into the soil where the white grubs live.

Sod Webworms, Cutworms and Armyworms

Other insects that occasionally cause problems in our lawns are: sod webworms, cutworms and armyworms. These larvae feed on grass leaves. Both sod webworms and cutworms feed at night around a small burrow or tunnel in the turf. Silken threads can be seen covering the tunnel of the sod webworm.

The fall armyworm larvae is about 1 1/2 inches long at maturity, light green to almost black in color with light body stripes and an inverted "Y" on the head. They feed mostly at night.

Control methods for sod webworms, armyworms and cutworms include *Bacillus thuringiensis* (except sod webworms), Dursban, Diazinon, Sevin, Triumph, Tempo and Orthene.

Chinch Bugs

Chinch bugs attack both cool and warm season turfgrasses. The adult chinch bug is about 1/8 inch long, and black with white patches on its wings which fold over the back. Symptoms include yellow or wilted patches usually appearing during July and August when the turf is under moisture stress. Chemical control includes Dursban, Triumph, Diazinon and Sevin.

Disease and Cultural Problems

To diagnose a plant disease, it is necessary to first determine whether the disease is caused by a pathogen, an environmental factor or cultural practice. Environmental and cultural factors which should first be considered are:

- toxic substances in the soil;
- lack of essential nutrients, water or oxygen;

- excessive soil temperature;
- shading;
- soil compaction;
- competition from tree roots;
- improper watering
- improper mowing height.

These are some factors that cause symptoms similar to a disease or can promote the development of a disease. This is why it is often difficult to diagnose a lawn problem as a disease, or a cultural or environmental problem.

Most diseases that damage home lawns can be prevented with proper lawn management. For a plant disease to occur, three factors must be present: a susceptible host, a pathogen in high numbers and a set of environmental conditions within a favorable range. In many cases, the homeowner can break the disease cycle either through cultural practices or with the use of fungicides.

Thatch is one of the most important factors to determine the frequency of disease in the home lawn. Movement of air, water and fertilizer is restricted by thatch. Excessive nitrogen in fertilizer contributes to most thatch problems. Over-fertilizing and under-fertilizing can make the lawn more susceptible to disease. Thus, timing of fertilizing is critical. Follow the growth cycle chart when fertilizing. Watering practices are also important to disease development. Water deeply and infrequently. Allow the grass to go through the night as dry as possible.

To help prevent diseases, follow the guidelines given for selecting a cultivar, mowing, watering, fertilizing and thatch control.

Common diseases in this area include:

Brown Patch

Large, irregular, circular areas several feet in diameter distinguish it from other diseases. Patches have a brown to gray smoke ring appearance. Chemical control includes Chipco 26019, Daconil 2787, Fore, Tersan 1991, Tersan LSR and Terraclor.

Seedling Disease

Seedling disease is a disease complex that causes damping-off, fading out or seedling blight, usually in warm falls. Plant seeds treated with Captan, Apron or Koban.

Leaf Spot (*Helminthosporium*)

Small purple spots appear on leaves, stems or crowns in bermudagrass. Chemical control includes Daconil 2787, Chipco 26019, Fore and Tersan LSR.

Fairy Ring

This disease appears as rings of dark green grass surrounding areas of dead or light-colored grass. Mushrooms usually develop in a circle outside of the dark green or brown ring during heavy rainfall periods or irrigation. The fungus feeds on organic matter. The ring of brown or dead grass is caused by lowering soil moisture where the fungus is concentrated. Control includes aerating the soil and drenching the infected area with a fungicide. Control is difficult. Regular mowing will remove the mushrooms.

Dollar Spot

Symptoms are small dead spots (size of a silver dollar), straw-colored, with a sunken appearance. Low nitrogen increases the severity of dollar spot. Control includes application of soluble nitrogen and fungicides such as Chipco 26019, Daconil 2787, Fore and Tersan 1991.

Rust

Orange colored pustules can be found on the leaf resulting in yellow patches in the lawn. Chemical control includes Bayleton, Dyrene and Tersan LSR.

Powdery Mildew

Grass will have light patches of dusty, white or gray growth on blades. The lowest leaves may become completely covered. It is common in shady areas. Chemical control includes Bayleton, Dyrene and Tersan LSR.

Fusarium Blight

Diseased areas appear 1 to 12 inches in diameter. The area can be pale yellow to tan, later turning to whitish-gray. Affected areas develop a pinkish color around the edge. Chemical control includes Bayleton, Chipco 26019, Fore, Fungo 50 and Tersan 1991.

Slime Molds

Light to dark gray fruiting bodies appear on grass blades. Grass may appear to be covered with soot. Control includes mowing and watering. Do not use fungicides.

Spring Dead Spot of Bermudagrass

Symptoms first appear as circular dead areas (6 to 24 inches) in the spring when the rest of the turf is turning green. Control includes removing thatch. Remove the old dead grass to the soil surface. Aerification and an application of sulfur can enhance growth of the grass. Chemical control includes an application of Rubigan at 4 to 6 ounces per 1,000 square feet in September.

Non-Pathogenic Diseases

These include iron chlorosis, soil compaction, dog urine, injury, fertilizer burn and herbicide injury.

Other Lawn Problems

Thatch Accumulation

Thatch is an accumulation of living and dead plant tissues between the soil and the green leaves of grass. Thatch is not entirely bad. One-half inch or less of thatch is desirable because it reduces soil compaction, increases wear tolerance and conserves soil moisture. Problems may arise if thatch accumulation gets beyond 1/2 inch. Too much thatch will reduce water infiltration, tie up pesticides, encourage insects and disease infestations and contribute to a shallow-rooted turf.

Thatch is caused by the fast growth of tissues high in lignin such as roots, rhizomes, stolons and crowns. Also, excess tree leaves will add to the problem. Grass clippings, providing the lawn is mowed frequently, will not greatly contribute to thatch accumulation. The leaf blades are high in water, cellulose and protein and are rapidly decomposed by soil microbes. To prevent a thatch problem: do not over-fertilize with nitrogen; water thoroughly and infrequently; mow frequently and at the proper height; and use pesticides only when necessary.

Other practices to control thatch include vertical mowing, aeration with hollow tines and top dressing with soil or soil mixture.

Shade

Grasses must have some direct sunlight for normal development and growth. Trees decrease available light and tree roots compete with grass for soil moisture and nutrients. Trees create an environment of high humidity and reduced wind movement that favor disease development. If you are landscaping a new yard, consider the type of trees you plan to use (evergreen or deciduous). Deciduous trees will be more compatible with grass than evergreen trees that exclude sunlight year round.

Grass responds to excessive shade by producing a weak plant that is susceptible to environmental stress and disease. Plant only those turfgrasses considered to have good shade tolerance like fine leaved fescues and tall fescue.

Several management techniques can be used to enhance the health of grass growing in shade: mowing at a higher setting than grass in full sun; frequent mowing; heavy and infrequent watering; and watering in early morning to allow grass to dry before night. Fertilizer application of nitrogen should be in early spring and fall, as should disease control and the use of preventative fungicides. Low growing shrubs and tree limbs may have to be selectively pruned to allow more light. If these methods do not result in an acceptable turf, consider using ground covers or non-living materials in shaded areas.

Turf Renovation

Most lawns will need some amount of renovation each year. Our winters can be severe and this increases the need for renovation. Renovation should be an annual operation that includes de-thatching, aeration, weed control, fertilizing and sometimes re-planting.

Common problems that cause deterioration include weeds, low fertility, poor drainage, shade, thatch and insects or diseases. To do a

good job of renovating a lawn, identify the conditions that are causing the turf to deteriorate.

Early spring is a good time to start renovation. The first step should be weed control. There are many good pre-emergence herbicides available. If you have a warm season grass like bermuda, you can kill the actively growing weeds using glyphosate (Roundup) while the grass is dormant. After the grass turns green, heavily thatched lawns should be de-thatched. Aeration, using a hollow-spoon aerator, is another important practice. This will allow grass roots to penetrate the thatch layers. Last, fertilize to soil test recommendations.

Special equipment will be needed for some of these operations. You may want to consider using a commercial lawn service company for the specialty jobs.

The Future

It is estimated that 25 to 35 million acres in the United States are planted with turfgrasses. With all this turfgrass, we still do not have an effective pre-emergent herbicide for dandelion or a cure-all for bindweed. However, much research is being done by the turfgrass industry. It takes about 10 years and an investment of \$30 million to bring a new product to the market.

A new grass mixture developed by the Agricultural Research Service is now reaching the commercial market. It is a mixture of zoysiagrass and a fine textured variety of tall fescue. It has the advantage of zoysiagrass which is low maintenance and stays deep green through summer heat and drought. The cool season tall fescue turns green at lower temperatures and stays green longer in the fall. The mixture looks promising for a transition zone lawn that can stay green most of the year.

Enjoy your lawn. A well-maintained lawn can increase the sale of a home by 15 percent. Lawns produce oxygen, serve as a hard-working air conditioning system, reduce noise, reduce rainfall run-off and provide an attractive, enjoyable recreational area.

Table 1. Characteristics of Grasses Recommended for the Texas Panhandle.

DROUGHT TOLERANCE	HIGH TEMPERATURE TOLERANCE
<p>TOLERANT</p> <p style="text-align: center;">↓</p> <p>Buffalograss Common Bermudagrass Improved Bermudagrass Zoysiagrass Tall Fescue Kentucky Bluegrass</p> <p>INTOLERANT</p>	<p>TOLERANT</p> <p style="text-align: center;">↓</p> <p>Buffalograss Zoysiagrass Improved Bermudagrass Common Bermudagrass Tall Fescue Kentucky Bluegrass</p> <p>INTOLERANT</p>
COLD TOLERANCE	FERTILIZER REQUIREMENTS
<p>TOLERANT</p> <p style="text-align: center;">↓</p> <p>Buffalograss Kentucky Bluegrass Tall Fescue Zoysiagrass Common Bermudagrass Improved Bermudagrass</p> <p>INTOLERANT</p>	<p>LEAST</p> <p style="text-align: center;">↓</p> <p>Buffalograss Zoysiagrass Tall Fescue Kentucky Bluegrass Common Bermudagrass Improved Bermudagrass</p> <p>MOST</p>
SHADE TOLERANCE	WEARABILITY
<p>TOLERANT</p> <p style="text-align: center;">↓</p> <p>Fine Fescue Tall Fescue Kentucky Bluegrass Zoysiagrass Common Bermudagrass Buffalograss</p> <p>INTOLERANT</p>	<p>HIGH</p> <p style="text-align: center;">↓</p> <p>Zoysiagrass Improved Bermudagrass Common Bermudagrass Buffalograss Tall Fescue Kentucky Bluegrass</p> <p>LOW</p>

Table 2. Common Turfgrass Weeds and Suggested Chemical Controls

Weed	Growth Habit	Chemical Control (see Table 3)	
		Bermudagrass	Bluegrass and Fescue
Bindweed	Warm S. Perennial	1,2,3,4,6	1,2,3,4,5,6
Black Medic	Warm S. Annual	2,3,4,6,8	2,3,4,5,6
Burclover	Cool S. Annual	1,2,3,4,6,8	1,2,3,4,6
Common Chickweed	Cool S. Annual	2,3,4,6,7,8,10,11,18,19,25	2,3,4,5,6,7,10,11,18,19
Dandelion	Cool S. Perennial	1,2,3,4,6,8,20	1,2,3,4,5,6
Dichondra	Warm S. Perennial	1,2,3,4,6,8	1,2,3,4,6
Dock	Cool S. Perennial	1,2,3,4,6	1,2,3,4,5,6
Goathead (puncture vine)	Warm S. Annual	1,3,4,6	1,3,4,6
Henbit	Cool S. Annual	3,4,6,14,15,18,19,25	3,4,5,6,15,18,19
Mallow	Warm S. Annual	2,3,4,6,18,23	2,3,4,5,6,18,23
Mouseear Chickweed	Cool S. Perennial	2,3,4,7,18	2,3,4,18
Nightshade	Warm S. Perennial	3,4,6	3,4,5,6
Oxalis (yellow woodsorrel)	Warm S. Annual	2,3,4,6,7,8,13,15,18,19	2,3,4,5,6,7,13,15,18,19
Pepperweed	Cool S. Annual	1,2,3,4,6,20	1,2,3,4,5,6
Plantain	Cool S. Perennial	1,2,3	1,2,3,5
Prostrate Knotweed	Warm S. Annual	2,3,4,6,8,11,14,15,18,25	2,3,4,6,11,15,18
Prostrate Pigweed	Warm S. Annual	1,4,6,8,9,18	1,4,6,18
Purslane	Warm S. Annual	3,4,6,8,9,10,11,18,25	3,4,6,10,11,18
Shepherd's Purse	Cool S. Annual	1,2,3,4,6,18,19,20	1,2,3,4,6,18,19
Sow Thistle	Warm S. Perennial	1,2,3,4,6,18	1,2,3,4,5,6,18
Spurge, Prostrate	Warm S. Annual	2,3,4,6,8,14,15,18,19,25,26	2,3,4,5,6,15,18,19,26
White Clover	Cool S. Annual	2,3,4,6,18	2,3,4,5,6,18
Wild Onion and Garlic	Cool S. Perennial	1,4,6,21	1,4,6
Annual Bluegrass	Cool S. Annual	8-16,18,19,21,25,26	10,11,12,13,15,18,19,26
Crabgrass	Warm S. Annual	7-19,25,26	10,11,12,13,15,18,19,26
Goosegrass	Warm S. Annual	7-19,25,26	10,11,12,13,15,18,19,26
Little Barley	Warm/Cool S. Annual	8,9	None
Purple Nutsedge	Warm S. Perennial	7,20,21	None
Yellow Nutsedge	Warm S. Perennial	7,17,20,21,22	22
Rescuegrass	Cool S. Annual	8-17,25,26	10,11,12,13,15,26
Sandbur	Warm S. Annual	7,9,14,21,25	10,13
Foxtail	Warm S. Annual	8,10,11,12,14,15,25,26	10,11,12,15,26

Note: The information given herein is for educational purposes only. Reference to commercial products or trade names is made with the understanding that no discrimination or endorsement is intended.

Follow manufacturer's recommendations and precautions on all product labels.

Table 3. Partial List of Turf Weed Control Herbicides.

Common Name*	Application Time	Trade Names (Partial List)
1. 2,4-D Amine*	Post	Dacamine 4D; Weedar 64; Hi-Yield 2,4-D Amine; numerous mixtures with MCPP and/or dicamba
2. Mecoprop (MCP)*	Post	Ortho Weed-B-Gon Lawn Weed Killer; 2 Plus 2; Chipco Turf Kleen; numerous mixtures with 2,4-D and/or dicamba
3. Trimec*	Post	Greenlight's Wipeout; Ortho Chickweed, Spurge and Oxalis Killer; Gordon's Trimec; Lesco's Three-Way
4. Dicamba*	Post	Banvel; numerous mixtures with 2,4-D and/or MCPP
5. Triclopyr*	Post	Turflon II Amine; Turflon D
6. Dicloroprop*	Post	Weedone DPC Herbicide
7. Organic Arsenicals (MSMA, DSMA, CMA, AMA)	Post	Daconate 6; Bueno 6; Ortho Crabgrass Killer; Chipco DSMA Liquid
8. Atrazine*	Pre and Post	AAtrex 4L; Purge
9. Simazine	Pre	Princep 4G
10. DCPA	Pre	Dacthal W-75 Turf Herbicide
11. Benefin	Pre	Balan 2.5G
12. Bensulide	Pre	Betasan 3.6G; Lescosan 7G
13. Oxadiazon	Pre	Chipco Ronstar 2G
14. Oryzalin	Pre	Surflan AS
15. Pendimethalin	Pre	Lesco Pre-M 60DG; Scott's Halts Crabgrass Preventer
16. Napropamide	Pre	Devrinol 2G
17. Metolachlor	Pre	Pennant 5G
18. Isoxaben	Pre	Gallery 75 Dry Flowable
19. Dithiopyr	Pre and Post	Dimension Turf Herbicide
20. Glyphosate	Post	Roundup; Ortho Kleenup Systemic Weed and Grass Killer (apply prior to bermudagrass green up)
21. Imazaquin	Post	Image
22. Bentazon	Post	Basagran
23. Chlorsulfuron	Post	LESCO TFC
24. Metsulfuron methyl	Post	DMC Weed Control
25. Benefin + Oryzalin	Pre	XL
26. Benefin + Trifluralin	Pre	Green Gold Preemergence Crabgrass Control, Team

* State Limited Use or Restricted Use Products. (Must have a Texas Department of Agriculture private applicator license or a SPCB commercial license to purchase these products.)

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Follow manufacturer's recommendations and precautions on all product labels.

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