

# **Lawns on Guam**

## **How to Grow and Maintain Beautiful Turf**

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Lawns provide a smooth carpet around your home or business. They add beauty, reduce heat and dust, muffle noise, and provide a good play area for children and adults alike. And, best of all, an attractive lawn can substantially increase the value of your home.

Establishing and maintaining an attractive lawn requires some knowledge, some effort and some money. With a basic understanding of lawn care, homeowners can make good choices from among the turf varieties available and how to properly establish and maintain their lawn.

This publication will help you select a suitable turf grass for your particular situation and offer you suggestions on how to keep it vibrant.

### **Turf Selection**

Selection of an appropriate turfgrass is the first step in establishing your lawn. Homeowners should consider these factors:

- your land's soil quality,
- the amount of shade present there,
- the type of use for your lawn, such as heavy foot traffic or vehicular traffic,
- your budget,
- and the amount of time you are willing to spend on turf maintenance.

No one grass is best for all situations. There are two basic types of grass: cool-season grass and warm-season grass. Guam is certainly a warm-season zone, so planting a cool-season grass on Guam is not appropriate. Be careful because some local stores sell cool-season grass seeds. Such seeds will germinate but the seedlings won't survive competition from weeds and heat. They will die in a few months. Only warm-season grasses can be planted successfully on Guam. Some can be grown from seeds. All of them can be vegetatively propagated or, in other words, grown by planting pieces of grass stem.

Choose a tough, wear-tolerant grass, such as zoysiagrass or bermudagrass, for areas with foot or vehicular traffic. Select a shade-tolerant grass, such as St. Augustinegrass, if trees dominate your yard.

Also, take into consideration the amount of time, effort and money you are willing to spend on maintaining your turf grass. High maintenance turf grasses might be prettier but they are less tolerant of mismanagement. Table 1 will help you select an appropriate grass for your situation.

**Table 1. Characteristics of principle lawns grasses on Guam.**

Lawngrass	Adaptation			
	Shade	Heat	Drought	Wear
Bermuda grass (common)*	very poor	very good	excellent	excellent
Bermuda grass (hybrid)	very poor	very good	excellent	excellent
Centipede grass *	fair	good	good	poor
St. Augustine grass	very good	good	good	poor
Zoysia grass **	fair	very good	excellent	good
	Maintenance			
	Cutting height	Fertilizer	Mowing frequency	Rate of establishment
Bermuda grass (common)*	1”	high	med-high	fast
Bermuda grass (hybrid)	3/4”	very high	high	fast
Centipede grass *	1”	very low	low	slow
St. Augustine grass	2-3”	medium	med-high	moderate
Zoysia grass **	3/4”	med-low	high	very slow

\* all varieties can be seeded

\*\* only some varieties can be seeded

### **Bermuda grass (*Cynodon* spp.)**

Bermudagrass grows in all but poorly drained soils and in shady areas. It tolerates drought conditions well. It must be fertilized well, mowed low and often, and planted in full sun. It grows vigorously, establishes quickly, and recovers rapidly from injury.

Common bermudagrass can be planted from seeds or grown vegetatively. If it's not mowed frequently, this grass will develop unsightly seedheads. Despite this, it produces a good quality turf.

Hybrid bermudagrass is commonly found on the best golf courses. It is a high quality turf which requires a high level of maintenance. It must be vegetatively propagated and is recommended only for those homeowners who are willing to spend a considerable amount of time working on their lawns. This grass also needs frequent fertilization and close mowing to keep it attractive. If poorly managed, it becomes susceptible to disease, insects and other ailments.

### **Zoysia grass (*Zoysia* spp.)**

Many varieties of zoysia, also called Japanese lawn grass, can be grown on Guam but only a few are currently available.

Besides the zoysia grass common on Guam, imported varieties grow well here. *Emerald* is a low growing, dark green hybrid with a very fine texture and a high shoot density. It is among the prettiest zoysia varieties available locally, but it does require high maintenance. It's a good turf for commercial areas such as in front of hotels or banks.

Zoysia grass forms excellent turf once established and properly maintained. For best appearance, cut zoysia grass with a sharp mower and water frequently during the dry season. It grows well both in full sun and partial shade but it might thin out in dense shade. Most zoysia grasses grow slowly and it may take a year to establish a lawn. Read the Soil Preparation section to learn more about establishing zoysia grass by using plugs and sprigs.

### **St. Augustine grass (*Stenotaphrum secundatum*)**

St. Augustinegrass is the most popular residential lawn grass in the southern United States. This dense turf has an attractive dark green color with coarse leaves. It spreads by way of long above-ground runners called stolons. The grass requires moderate fertilization, weekly mowing and watering during dry periods.

Despite its aggressive growth, St. Augustinegrass is easy to control around flower beds and similar landscaped areas. It can only be propagated vegetatively since it doesn't produce seeds. St. Augustinegrass will tolerate shade and full sun. Although this turf is not yet commercially available on island, the University of Guam is currently working to promote its availability.

### **Centipede grass (*Eremochloa ophiuroides*)**

Centipedegrass is a slow growing, light green turf grass with coarse leaves. It can adapt to infertile soils and will grow in both shade and sun. It can be grown from seed and requires little fertilization, infrequent mowing, and tends not to crowd flower beds and other landscaped areas. Centipede grass is well suited to the acidic soils found in southern Guam. It is sensitive to heavy foot traffic and will not tolerate vehicular traffic. Centipede grass is less tolerant to drought than bermuda or zoysia grass.

### **Lawn Establishment**

There are three steps to follow when establishing turfgrass:

- soil preparation,
- planting,
- post-planting care and maintenance.

### **Soil preparation**

Without doubt, soil preparation is the most important - and most laborious - step in establishing a healthy lawn. Without proper soil preparation, most lawns will eventually fail (for example, they will be infested by weeds or insects, or injured by stress). Prepare your soil in the same manner regardless if you plan to seed sprig or sod. Here are the basic steps for proper soil preparation.

You can establish your lawn any time of the year, but try to avoid the peak of the rainy season when the soil is too wet and the peak of the dry season especially if you do not have adequate irrigation.

1. A soil test will tell you the status of plant nutrients in your soil. The College of Agriculture and Life Sciences at the University of Guam can analyze soil samples for you for a low fee. Contact an extension agent at 735-2080 for more information. Follow the test's recommendations when fertilizing or liming your soil to bring it up to its optimum strength.
2. Clear your planting site and remove debris, tree stumps and rocks larger than 2 inches in diameter.
3. If rough grading of your site is required, remove the topsoil and stock pile it. Distribute it later after grading is completed. Grade the site to assure a 2 percent slope (a fall of 2 feet in elevation for every 100 feet) away from buildings. Avoid depressions in the terrain if they don't have adequate drainage. At this stage, you might also consider installing underground irrigation lines and underground drainage if the terrain doesn't allow for natural drainage.

Once grading is complete, return the topsoil to the site and distribute it evenly. If the site had no topsoil or if the topsoil is very poor, add about 6 inches of topsoil to the site.

4. Chances are your soil will need fertilization. Using the results of a soil test as a guide, thoroughly mix into the top 6 to 8 inches of your soil the indicated amounts of phosphorus, potassium and nitrogen, using a rototiller or disk.

In case your soil was not analyzed by a lab, use the following rule of thumb: If your soil is alkaline, such as that found in northern Guam, use 5 to 10 pounds of phosphorus, 2 pounds of potassium, and 2 pounds of nitrogen for every 1000 square feet. Refer to Table 2 to find the quantities needed of most popular fertilizers. If your soil is acidic, mix in 5 pounds of phosphorus, 2 pounds of potassium, 2 pounds of nitrogen and 75 pounds of ground limestone for every 1000 square feet. For more information, refer to the section on fertilizer.

5. To complete the soil preparation, rake the site to create a smooth, level grade. Remove any remaining big rocks, water the soil and allow it to settle for 1 day. Hand rake the site again if necessary to break up any clods larger than a golf ball.

## Planting

Warm-season grasses can be established by planting vegetative plant parts. Some varieties of bermudagrass, zoysiagrass and most varieties of centipedegrass can be grown from seed. there are several ways to establish turf vegetatively: sodding, broadcasting and plugging.

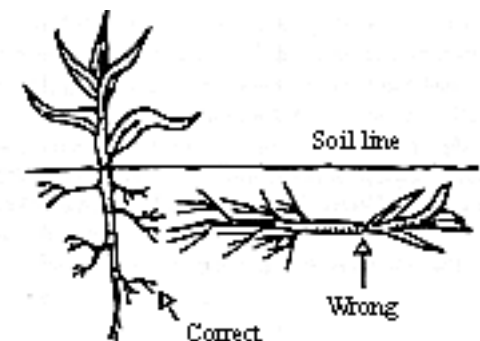
## Sodding

The quickest, easiest but the most expensive way to establish your lawn is by sodding. Sod is cut into blocks, usually 12 inches by 24 inches in size. These pieces are placed side-by-side on the prepared soil in a brick-like pattern. Sod should be pressed into the soil by a roller or by stepping on it. Water the sodded area well for the first two weeks.

## Broadcasting

Another quick way to establish a lawn is by broadcasting plant material onto the soil surface. To prepare sprigs (cut stems), chop the sod into small pieces, and separate into individual stimes. If you use zoysiagrass, you may place pieces of sod on a hard surface and run over them once with a lawn mower. Rake the sprigs, or remove them from the mower bag (if your mower uses a catcher bag), and spread them over the soil surface as soon as possible to keep them from drying out. Do not bury the sprigs completely. Water the sprigs immediately after spreading them. Try to work on a cloudy day to escape the sun's heat.

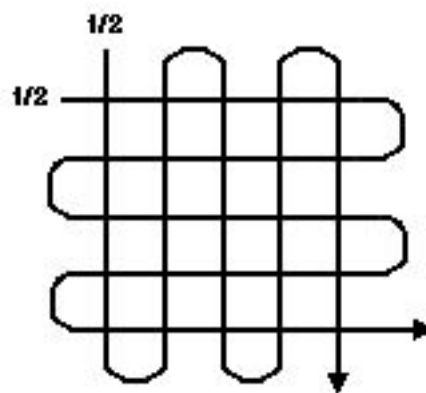
For most types of grass, 3 to 5 bushels should be plenty to cover a 1000 square foot area. For extra fast establishment, spread 8 to 10 bushels over a 1000 square foot area.



Broadcasted sprigs should not be completely buried.

## Seeding

Seeding is the easiest way to plant a lawn. However, not all warm-season grasses can be grown from seed. For example, growing zoysiagrass from seeds is difficult. Because zoysiagrass grows slowly, it is easily overtaken by aggressive weeds, especially in soil where weeds were a previous problem. On the other hand, growing bermudagrass from seed is relatively easy because this grass can out-compete the weeds that germinate at the same time. Centipede grass fall in-between these two turf grasses in ease of germination from seed. St. Augustinegrass can only be propagated vegetatively because it does not produce seeds.



When seeding, divide the grass seeds into two portions, then distribute as shown: half in rows left to right and half in rows running up and down.

For best results, follow the directions printed on seed bags referring to the amount of grass seed to be sown in a defined area. For a more uniform application of seed, you may use a fertilizer spreader but make sure you mix the grass seeds with sand or dry soil; the grass seeds are so small that they will fall through the spreader grate if not mixed with sand.

## Care After Planting

Newly planted turf areas are delicate. They need to be given frequent and regular light waterings to keep them from drying out. As the seedlings develop or as the sprigs or sod begin to take root and grow (in about 2 to 3 weeks), reduce the frequency of the waterings but increase the amount.

Mow your grass for the first time when it is about 1 1/2 times the recommended mowing height. For example, if the recommended mowing height is 2 inches, mow when the grass is 3 inches tall. Do the same in subsequent mowings. Make sure you never cut the grass below one-third of its height. If you do so, you weaken the grass and increase chances for weed infestation.

Don't mow young grass when it's wet or the soil is soft, as it is after heavy rain. After 2 or 3 mowings, apply a nitrogen fertilizer at the rate of 1 pound for every 1000 square feet. Table 2 offers more information on fertilizer amounts.

Newly planted turf areas can easily become weed infested. Most weeds can be eliminated by regular mowing and proper maintenance. If chemical weed control is necessary, refer to the section of Chemical Weed Control.

## Maintenance

The beauty of an established lawn depends on the care given to it. An effective care program includes fertilization, watering, mowing and other cultivation practices. No one practice is more important than the others; they all interact with each other. It's the total care given to a lawn that gives it that healthy exuberance.

## Fertilization

Grasses, like all other plants, require nutrients to grow. Unfortunately, Guam's soils are usually too poor to supply enough nutrients to grow a healthy lawn. It's up to you to give your lawn a helping hand by fertilizing it regularly.

For plants, the three nutrients required in the largest quantities are nitrogen (N), phosphorus (P), and potassium (K). Nitrogen gives grass a nice dark color and helps it to grow quickly. Phosphorus helps with establishment and good root growth. Potassium helps plants fight off disease and helps them resist drought, heat and traffic injury.

Generally, nitrogen is required in the largest amounts, potassium a little less (about 30 to 40 percent less), and phosphorus least of all (usually about 1/3 as much as nitrogen). Lawns grown on sandy soils are subject to nutrient are more easily leached in sandy soils thus requiring more frequent applications. Also, if you routinely remove lawn clippings after mowing your lawn, then increase fertilization amounts by 30 percent.

Fertilizers, whether sold in bags, boxes or bottles, are labeled with three numbers corresponding to the concentrations of nitrogen (N), phosphorus (P) and potassium (K). The elements are always in that order. A fertilizer bearing the numbers 12-4-8 means that, by weight, it is 12 percent N, 4 percent P and 8 percent K. A fertilizer with the numbers 24-8-16 contains, by weight, 24 percent N, 8 percent P and 16 percent potassium.

In the above example, the second fertilizer is twice as concentrated as the first. To achieve the same fertilization effect, apply half as much of the second fertilizer.

When growing turf grass, homeowners need to pay the most attention to the amount of nitrogen - the first number on the fertilizer container. The levels of phosphorus and potassium in most fertilizers are usually adequate for good grass growth.

In general, lawns on Guam should receive a dose of fertilizer every other month. Bermudagrass needs the most fertilizer; centipedegrass the least.

Apply fertilizers using a mechanical spreader. Hand application, even when done carefully, tends to be uneven and will result in a patchy lawn. Don't apply fertilizers when the grass is wet or you run the risk of "burning" your turf with the fertilizer. If your turf grass appears yellowish despite fertilization, it may be suffering from iron deficiency. If so, applying a fertilizer containing iron may be helpful.

Do not overapply fertilizers. Excessive feeding reduces turf grass health.

**Table 2. Fertilizer Requirements for the most popular turf grasses (lb/1000 ft<sup>2</sup>)**

	Required Nitrogen	Fertilizer 12-4-8	Fertilizer 24-8-16
Bermuda grass	1-2 lb/1000 ft <sup>2</sup>	8-16 lb/1000 ft <sup>2</sup>	4-8 lb/1000 ft <sup>2</sup>
Zoysia grass	0.5 lb/1000 ft <sup>2</sup>	4 lb/1000 ft <sup>2</sup>	2 lb/1000 ft <sup>2</sup>
St. Augustine grass	0.5 lb/1000 ft <sup>2</sup>	4 lb/1000 ft <sup>2</sup>	2 lb/1000 ft <sup>2</sup>
Centipede grass	0.25 lb/1000 ft <sup>2</sup>	2 lb/1000 ft <sup>2</sup>	1 lb/1000 ft <sup>2</sup>

## **Watering**

How much water a lawn needs is influenced by many factors. The most important ones are soil, type of grass, its level of management, the frequency of rain, recent temperatures, and wind.

The best time to water is before your grass wilts. Wilted grass appears bluish green and footprints on the turf are still visible 10 or 15 minutes after you've walked on the grass.

The worst time to water is also the most popular among homeowners. When grass is watered in the late afternoon, the water remains on the grass until sunrise. This long period of moisture can encourage turf diseases to establish and spread. The longer turf remains wet, the higher the chances for turf diseases to develop.

Lawns can also suffer from light and shallow watering. Frequent shallow watering results in shallow and weak root system. Roots grow only where the soil is moist; if only the soil surface is moist, the roots will not seek out water and nutrients deeper in the soil. Turf grasses with weak root systems are susceptible to all kinds of stresses, especially drought, and they are usually unable to compete with weeds. In the dry season, most of the lawns on Guam will require 0.5 - 1.0 inch of water every third day. Increase the frequency of watering if the soil is only a few inches thick or the location is extremely windy. In the rainy season, watering is seldom needed.

## **Mowing**

The appearance of the lawn can be greatly improved through proper mowing. Grass should be kept at the best height for its optimum growth and stress resistance, as outlined in Table 1.

As a general rule, grass should be mowed often enough so that no more than one-third of the plant is removed by mowing. For example, if bermudagrass is cut to 2 inches, it should be mowed when it reaches three inches tall.

The most damaging mowing practice is the scalping or close shearing of the lawn, especially where 50 percent or more of the plant is removed. Such harsh cuts upset the balance between the grass leaves and grass roots and cause a shock to the plant. For 7 to 10 days after such a mowing, the plant literally fights for its life and cannot compete with weeds or diseases. If such shavings happen frequently, the lawn can become infested by weeds and will eventually fail.

When shopping for a lawn mower, homeowners have quite a selection. For example, should you buy a mower with an attached bag to collect the clippings? In general, clippings should be collected only when they interfere with the appearance of the lawn. Clippings left on the lawn return around 30 percent of the fertilizer back to the soil.

Mulching mowers are becoming popular. This type of mower incorporates clippings into the lawn, making them invisible. A mulching mower is often the best choice for homeowners. Most of us are not that eager to work hard on our lawns in Guam's humid weather and a self-propelled mulching mower can change a sweaty mowing job to an easy walk.

## Cultivation

If you're interested in growing perfect turf grass, you should be aware of vertical mowing, core aeration and top dressing.

Vertical mowing removes dead brown grass, speeds up its decomposition and smooths the surface. All these practices promote root growth and improve the health of the turf. Core aeration and vertical mowing require expensive machinery and there are no lawn maintenance companies as yet on island to provide these services for the general public.

There is one, somewhat risky technique homeowners can use to rid fluffy lawns (such as zoysia grass) of the large amounts of brown tissue that tends to accumulate on the soil surface. To correct the problem, scalp your lawn to 1 inch above the soil. One week prior to scalping, apply fertilizer at a 50 percent higher rate than you normally would and make sure your soil is moist, but not necessarily wet. After scalping, top dressing with sand or fine soil (1/4 - 1/2 inch) would be helpful.

## Weed Control

Weeds are a major problem in most home lawns. Many weeds can quickly dominate a lawn unless you act quickly and control them regularly.

There are three primary methods of controlling weeds in a home lawn. Each method when used alone will not usually control all of the weeds. To consistently control all of the weeds, a homeowner must use a combination of all three methods.

### *Cultural practices*

Weeds do not easily invade turfgrass that is properly fertilized, watered, and mowed at the correct height and frequency. Weeds mostly appear in the bare spots or when the grass is thin. Refer to the previous sections discussing cultural practices. By following them, you will promote vigorous growth; that, in turn, is a strong defense against weeds.

### *Mechanical methods*

Most of the broadleaf weeds do not tolerate frequent mowing. Do not ignore mowing recommendations. Not only does mowing improve grass growth and appearance, it is also important for weed control. Weeding by hand is effective; however, it is time consuming and is recommended only for a very small lawn.

### *Herbicide usage*

Mechanical and cultural methods of weed control often needs to be supplemented by herbicides. An herbicide is a chemical used to control the growth and development of a weed. Herbicides are safe when used according to the procedures printed on the label. **Never ignore the label information. Read the label carefully and make sure you understand and follow what it says.**

No one herbicide is the best one to use in all situations. Many different herbicides are sold in local stores and they are all slightly different. As a homeowner, you only need to be familiar with just a handful.

## **Types of Herbicides**

### *Selective*

Selective herbicides kill certain plants but leave others unharmed. Most herbicides used on home lawns are selective herbicides.

### *Non-selective*

Non-selective herbicides kill all the plants indiscriminately. They are mostly used along driveways, sidewalks and walls. Roundup is a popular non-selective herbicide.

### *Pre-emergence*

Pre-emergence herbicides remain active in the soil for several months. They prevent the emergence for new weed seeds, but do not kill weeds that are already growing.

### *Post-emergence*

Post-emergence selective herbicides are the most popular among homeowners. They are active for a short time, from several hours to a few days. They kill growing weeds but unfortunately injure grass as well.

Bermudagrass and zoysiagrass have fairly good resistance to post-emergence herbicides. The most susceptible are St. Augustinegrass and centipedegrass.

Recommendations listed on herbicide labels might not be the most accurate for Guam's conditions. For example, chemical manufacturers often recommend applying herbicides in the spring and fall when grass is either breaking winter dormancy or just beginning to go dormant. On Guam, grass is always actively growing so the chances are much higher that you could injure your lawn by incorrectly applying herbicides.

As a general rule, apply half the recommended rate and repeat the application 2 times in weekly intervals. If your turf begins to discolor, stop the applications and wait until your grass recovers before repeating the applications.

**Never** apply more than the recommended rate. The old saying "If a little is good, more is better" does not apply to herbicides.

Unless you accurately know the square footage of your lawn, it's difficult to determine the correct amount of herbicide you'll need. It's easy to measure your lawn to determine its area. For example, if your lawn is 35 feet wide by 50 feet long (35 x 50), you have a 1750 square foot lawn.

Once you know the square footage, it's easy to determine the amount of herbicide required.

### **Example:**

If the recommended application rate is 2 ounces in 1 gallon of water for every 1000 square feet, how much herbicide would you mix to cover your 1750 square foot lawn?

**Answer (for ounces of herbicide needed)**

If 2 oz. covers 1000 square feet, then  $x$  oz. covers 1750 square feet.

$$x = (2 \times 1750 \text{ square feet}) / 1000$$

$$x = 3.5 \text{ oz.}$$

**Answer (for gallons of water needed)**

If 1 gallon covers 1000 square feet, then  $y$  gallons cover 1750 square feet.

$$y = 1750 / 1000$$

$$y = 1.75 \text{ gallons}$$

You would mix 3.5 oz. of herbicide with 1.75 gallons of water and apply it as directed.

A visit to any nursery or garden shop will reveal the large number of herbicides available on the market. Because of trademark regulations, different manufactureres often sell the same chemical under different names and at different concentrations.

When shopping for herbicides, read labels and not the active ingredients. For example:

- \* triclopyr (commonly sold as TURFLON) is effective against most of the broadleaf weeds. When used at low recommended rates, it does not cause serious discoloration of bermudagrass and zoysiagrass.
- \* 2,4 D (commonly sold as WEED-B-GON) has similar characteristics as triclopyr, but is generally less effective.
- \* MSMA + 2,4 D + dicamba (commonly sold as TRIMEC Plus) is effective against many broadleaf weeds and many grassy (narrowleaf) weeds. Use only on well-growing bermudagrass or zoysiagrass. Use the minimum recommended rate. Repeat the application 2 to 3 times in 7 to 10 day intervals. Expect some discoloration of your grass.
- \* glyphosate (commonly sold as ROUNDUP, KLEERAWAY or SHOOTOUT) is highly effective for irradiation of all plants. One application at the recommended rate kills all vegetation, including grass.

**Insect Control**

Insects flourish in the tropics and can periodically invade your lawn in astounding numbers. They often appear suddenly, in 1 or 2 days, and, if overlooked, can eat your entire lawn down to stubble in 2 to 3 days.

If you notice caterpillars on your grass, react immediately and spray it with insecticide. Two insecticides that are effective in Guam against caterpillars (armyworms and southern webworms) are SEVIN (carbaryl) and DURSBAN (chlorpyrifos). Spray these insecticides according to recommendations printed on the label.

For specific recommendations, contact the Guam Cooperative Extension.

**Disease Control**

A properly managed lawn is usually disease free. Turf diseases, however, may sometimes develop during the rainy season when the grass stays moist for long periods of time. Before the disease can be controlled, it must first be diagnosed. Contact the Guam Cooperative Extension for advice.