

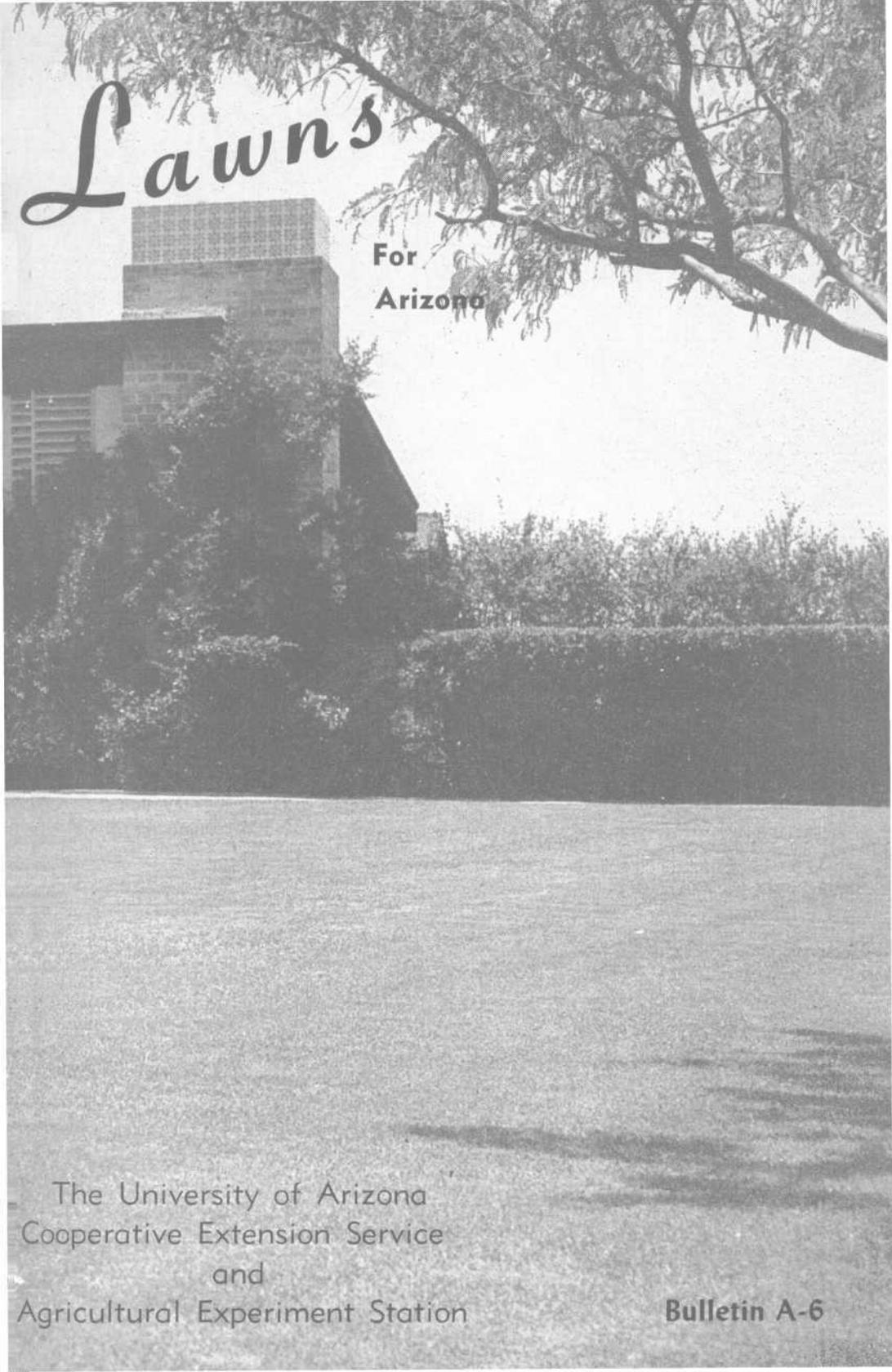
College of Agriculture and Life Sciences Extension Publications

The Extension Publications collections in the UA Campus Repository are comprised of both current and historical agricultural extension documents from the College of Agriculture and Life Sciences at the University of Arizona.

This item is archived to preserve the historical record. This item may contain outdated information and is not intended to be used as current best practice.

Current extension publications can be found in both the UA Campus Repository, and on the CALS Publications website, <http://cals.arizona.edu/pubs/>

If you have questions about any materials from the College of Agriculture and Life Sciences collections, please contact CALS Publications by sending an email to: pubs@cals.arizona.edu

A black and white photograph of a lawn. In the background, there is a large, multi-story building with a grid-like facade. A large tree with dense foliage is in the upper right corner, with its branches extending over the lawn. The sky is bright and clear.

Lawns

For
Arizona

The University of Arizona
Cooperative Extension Service
and
Agricultural Experiment Station

Bulletin A-6

Note: This publication replaces the former Extension Service Circular No. 135 under the same title. Other publications in which you may be interested include:

- Circular 130—Arizona Home Gardening
- Circular 122—Control Garden Insects
- Circular 213—Home Storage of Vegetables
- Circular 237—Planting and Pruning Roses
- Circular 242—Flowers for Northern Arizona
- Circular 243—Flowers for Southern Arizona
- Circular 264—Bulbs for Northern Arizona
- Circular 199—Control Insects of Flowers, Shrubs and Shade Trees
- Bulletin A-7—Indoor Gardening
- Bulletin A-8—Pruning Hedges, Shrubs and Trees

Copies of these and other publications are available to you at your local County Extension Agent's office.

Acknowledgment

The authors acknowledge with thanks assistance in the preparation of this bulletin from the Department of Plant Pathology and Entomology; from Ivan J. Shields, extension plant pathologist; J. N. Roney, extension entomologist; and Joseph S. Folkner, assistant horticulturist in the Department of Horticulture.

Contents

	<i>Page</i>
Selecting A Lawn	3
Warm Season Grasses	4
Cool Season Grasses	6
Preparing The Seedbed	9
Seeding & Sprigging	11
Maintenance Of New Lawns	13
Maintenance Of Established Lawns	14
Planting Winter Grass In Bermuda Sod	17
Renovation Of Old Turf	17
Weeds	18
Diseases	19
Insects	19

The University of Arizona



75th Anniversary

*The University of Arizona
College of Agriculture
Cooperative Extension Service
J. W. Pou, Director*

Cooperative extension work in agriculture and home economics, The University of Arizona College of Agriculture and the United States Department of Agriculture cooperating. Distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914.

15M — Revised November 1960 — Bulletin A-6.

Lawns

For Arizona

By
Harvey F. Tate
Horticulturist
Cooperative Extension Service

And
Steve Fazio
Assistant Horticulturist
Agricultural Experiment Station

The University of Arizona

YOUR lawn is most important in providing appropriate and attractive landscaping of your home. It forms a soft carpet for recreational activities, and also serves a useful purpose in reducing the amount of dust and mud around the house.

No matter how modest in size your home may be, a well-kept lawn gives the property a look of

tidy spaciousness.

So far, the ideal grass which will meet all conditions, has not been found. The best thing to do is to plant those grasses which are best adapted to your area of the state.

This bulletin was prepared to provide you with the cultural information necessary to start and maintain a good lawn.

Selecting A Lawn

The selection of a lawn for the home grounds depends upon several factors. Consider the merits of each grass variety for any given area before making a final decision.

Temperature

Each lawn variety has a rather exacting temperature preference. This should be the basis for select-

ing a lawn for the high or low elevations.

Location

Lawns vary in their ability to grow in shady or partially shaded areas. A specific shade tolerant variety can be used under trees or similar areas, and another variety for open, sunny locations.

Use

Lawns for play areas should be capable of withstanding hard use and not be of a slippery nature. Less durable varieties can be substituted where a green cover is needed only for appearance.

Annual or Perennial

Some homeowners prefer a one-season grass to minimize maintenance costs during their absence in summer or winter. Others prefer perennial types. You must decide which is best for you.

Disease Resistance

Disease resistance of lawns is variable with varieties. Nematode-infested soils can be planted to immune varieties.

Hayfever?

Hayfever sufferers should select those varieties of grasses free of pollen-producing seedstalks.

Type

Lawns are classified into two groups relative to their temperature preference.

Cool-season grasses thrive best under cool growing conditions and will survive at temperatures below freezing. These grasses are recommended for lawns in the high elevations where temperatures permit optimum growth during the summer.

Warm-season grasses grow best under high-temperature conditions, which exist in the low elevations during the summer months.

These lawns are not tolerant of frost and will go dormant under continuous freezing conditions. They emerge again in the spring when temperature conditions are favorable.

During their dormant period in winter the Bermudas can be overseeded with annual cool-season grasses for a green turf during the winter months.

Warm-Season Grasses

The warm-season grasses (green in summer, brown in winter) are best adapted to southern Arizona and the lower valleys of the middle and eastern sections of the state. They furnish a green lawn during the late spring, summer, and early fall months.

In these areas, the homeowner wishing a winter lawn will have to overseed the summer grasses with an annual cool-season grass adapted to cool, winter temperatures.

Bermudas

(Cynodon species)

Common Bermuda is a very rugged grass, adapted to high temperature conditions. It will grow and spread rapidly on most types of soil. It remains green during the warm months of the year and turns brown in cold weather.

An established sod of Bermuda will stand much drought and abuse. In warm weather it responds rapidly to fertilization and irrigation.

In the warm valleys, Bermuda is the basic lawn grass and will often invade other lawn varieties. When given proper care and kept in vigorous growing condition it makes a fine lawn and will withstand wear and use as a play area.

Bermuda does not grow well in shade.

Bermuda grass can be overseeded in the late fall, after it is dormant, with annual Rye grass to give a green lawn during the winter months. Bermuda grass will emerge again to give a green lawn without reseeding, since it is a perennial type grass.

Bermuda grass can be started from seed, sprigs, or plugs. It can be planted from April 1 to August 1.

In the warm areas, planting is done by April 1, but it should be delayed until May 15 for areas higher than the Salt River Valley. Planting after the first of August will not allow sufficient time for plants to become fully developed by time.

Planting Rate: 1 pound hulled seed per 300 square feet.

U-3 Bermuda

U-3 Bermuda has not been widely planted in Arizona. It is more cold tolerant than common Bermuda and will remain green slightly longer in fall than common Bermuda. It is established by use of sprigs and/or plugs.

Tiffine

Tiffine is a fine-textured hybrid Bermuda. It grows best in full sun. Since it is a hybrid, it must be started from sprigs. In good soil it

spreads rather rapidly and produces a good sod in one season.

Sprigs should be set out 12 to 15 inches apart, April to August.

Sunturf

Sunturf is another fine-textured hybrid Bermuda grass that was formerly called "Magennis grass". It has a dark green color. It is not as disease resistant as the common, or U-3 Bermudas.

Start by sprigging, April to August.

Tifgreen

Tifgreen is a fine-textured Bermuda and has been rated superior to Tiffine. It produces leaf blades which extend from tip to the base of each stem. This characteristic imparts a green color to the lower portion after frost burns the top leaf blades. It is well adapted to areas where common Bermuda is grown.

Start by sprigging, April to August.

Planting Rate: One square yard will sprig from 1000 to 2000 square feet.

St. Augustine

(Stenotaphium secundatum)

St. Augustine grass is a broad-leaved grass, yellow-green in color. The stems or runners are rather coarse. It quickly builds a thick sod. It is well adapted to sun or shade and makes a good lawn under trees.

Since it rarely produces seed, it must be started by sprigging or plugging in the spring. Set the sprigs or plugs 12 to 15 inches apart.

It should be started from April 15 to July 15.

Planting Rate: One square yard will sprig from 400 to 800 square feet.

Zoysias

Zoysia is a low creeping grass and is adapted to areas where Bermuda is grown.

The three most common types of Zoysia are: **Matrella (Flawn)**, **Meyer**, and **Emerald**. At present no accurate comparison can be made between these varieties.

All three varieties seem to be well adapted to climatic conditions in southern Arizona. However, **Emerald** and **Matrella** are finer textured than **Meyer**. **Meyer** is the most common one grown in Arizona.

Zoysia grass is dark green in

color and produces a dense, carpet-like sod. It grows well in full sun or in part shade and usually starts sooner than Bermuda in the spring and remains greener slightly longer in the fall. Sometimes **Zoysia** may become yellowish green. This can be corrected by spraying with iron sulfate or chelated iron.

It is best not to overseed established **Zoysia** sod with Rye grass for a winter cover. Much of the **Zoysia** sod may be killed by this practice.

Zoysia makes an attractive lawn. It has to be propagated from small sprigs or plugs, usually about 2 inches in diameter, and set in the seed bed at 12-inch spacings. A period of at least two growing seasons is usually required to get full lawn coverage.

Planting Rate: One square yard will sprig from 1000 to 2000 square feet.

Cool-Season Grasses

Cool-season lawn grasses are best adapted for lawns in the middle and higher elevations of the state. Some of these varieties are used as winter lawns in the warmer areas of the state where they are generally overseeded into existing Bermuda sod.

All of these grasses are perennial, except the Domestic Rye grass, which is an annual. They remain green practically all year in the lower elevations.

Kentucky Blue Grass

(*Poa pratensis*)

Kentucky Blue grass is the most common lawn grass in the cool sections of the state. It has wide blades and a deep green color.

There are two strains: **Kentucky** and **Merion**. **Kentucky** has been planted widely and is well adapted to the areas with cool summer temperatures.

Merion is a new strain and is being tried in many sections. It is supposedly more drought and heat resistant than **Kentucky Blue**, and will withstand more abuse and wear, but it is subject to some leaf diseases in the lower elevations.

Merion seed is rather expensive on a per-pound basis, but it will seed a much larger area than a pound of **Kentucky Blue** grass. It is slow in developing a thick sod.

Either one of the **Blue** grasses can be used as lawn grasses in the warm areas of the state for use in shady places. It should never be

over-seeded with Rye grass.

Seed Blue grasses in the early fall. In northern Arizona, the best time to seed Blue grass is from July 15 to September 15.

By taking advantage of the rainy season of the year, the grass will have time to become established before severe cold weather. Also, annual weeds will be germinated and can be killed before the lawn is seeded.

In the spring, dry winds and blowing dust make it difficult to establish a good stand of Blue grass.

Seeding Rate: 1 pound to 300 square feet.

Fescues

(*Festuca species*)

In Arizona, the **Fescues** are used mainly in lawn mixtures, although there are special cases where they might be used alone as a lawn grass.

Chewing Fescue

Chewing fescue has a wire-like leaf and does not stool out as rapidly as Creeping fescue. It needs a fairly well drained soil, not too high in fertility. It is fairly tolerant to droughty conditions.

Fescue must be kept mowed regularly or it will become difficult to cut. It is best used in a grass mixture (15 to 20 percent) rather than alone. Chewing fescues have a low nutritional requirement and will form a sod under heavy shade.

Use 15 to 20 percent by weight in lawn mixture.

Creeping Fescue

Creeping fescue forms a fine turf of wire-like leaves. It spreads by underground rhizomes, which develop into a thick sod.

This variety does very well in shady areas and, in Arizona, is best used in mixtures for the northern sections of the state. It does fairly well on medium soil and stands lack of water as well as any other grass.

Creeping fescue stands up well under traffic.

There are several new strains of Creeping fescue, but the seed is scarce and expensive. These new strains have not been tried out under Arizona conditions.

Use 15 to 20 percent by weight in lawn mixtures.

Domestic Rye

(*Lolium multiflorum*)

Domestic Rye grass is a very hardy grass that makes a beautiful green lawn during the winter and spring months in all but the colder sections of the state. When seeded in September and October it makes a rapid growth and establishes itself in 4 to 5 weeks.

Rye does well in sun or partial shade in elevations below 4000 feet. It makes a beautiful lawn during the winter, but dries out by the last of May or June, and must be re-seeded each fall.

Rye grass is used to seed into Bermuda sods, but should not be used on Blue grass or Fescue.

Planting dates are: Bare ground—September 15 to November 15. Top-seeding into established sod—October 1 to November 15.

Seeding Rate: 1 to 1½ pounds per 100 square feet.

Perennial Rye

(*Lolium perenne*)

Perennial Rye grass is very similar to the annual Rye grass and is

handled in the same manner. Generally it does not make a perennial lawn. It becomes "clumpy" after the first season.

Planting season is the same as for domestic Rye grass.

Bent Grasses

The **Bent** grasses are not well adapted for home-lawn use in southern Arizona. Bent grasses like a cool-moist climate and need frequent waterings. They are subject to diseases in areas with high summer temperatures if they are not sprayed with fungicides at frequent intervals.

Grass Mixtures

For cool-season lawns, Blue grass should be the basic grass in the mixture. It has proved itself under a wide variety of conditions.

Each kind of grass is included in a mixture for a specific purpose. The fescues and Merion, added to Blue grass mixture, make a sod that will stand more traffic, while Bent grass thickens the turf of such a mixture.

Since Blue grass is the basic grass for cool season lawns, any mixture should contain from 60% to 75% Blue grass. A good mixture is 70% Blue grass, 15% Creeping Red fescue and 15% Chewing fescue.

Clover is very seldom recommended any more in grass mixtures for Arizona. It makes a "slippery" lawn to play on and will stain clothing. Often the clover tends to become unevenly distributed and crowds out lawn grasses, thus making a spotted lawn.

In purchasing lawn mixtures, be sure to read the label carefully and note the varieties of grasses included. The highest percentage should be Kentucky Blue grass.

Do not buy a permanent lawn mixture that contains a high percentage of annual grasses or coarse perennial grasses such as orchard or timothy.

Seeding Rate: In general, grass mixtures are sown at the rate of 3 to 4 pounds per 1000 square feet.

Lippia

(*Lippia canesiens*)

Lippia is a fast growing plant which makes a good ground cover in one season. The leaves are about one inch long and one-fourth inch in width, light green in color.

Lippia will compete with Bermuda if it is watered and well fertilized during the winter and spring months. It thrives best in hot locations and will stand some wear.

In the spring, Lippia is covered with small rose-colored flowers which attract bees and can be objectionable if children play in the area. In winter, the leaves will take on a brown or bronze color when the temperature goes several degrees below freezing. It will be killed out at about 5 degrees above zero.

Plant by sprigging from April 1 to July 15.

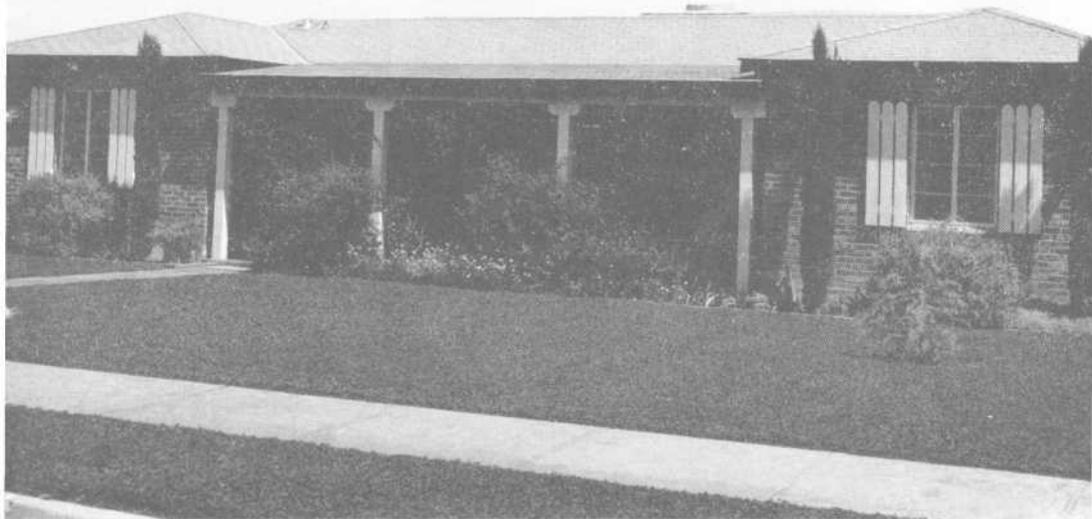
Planting Rate: One square yard will sprig 1000 to 2000 square feet.

Dichondra

(*Dichondra repens*)

Dichondra is a creeping ground cover that fills in fairly rapidly in good soil. It has a dark green, small clover-like leaf, and needs very little mowing. It grows well in full sun or partial shade.

Dichondra must be grown on a sandy loam or a well-drained soil. It takes a full growing season or more to establish a smooth lawn.



This White Dutch Clover lawn was well planted and cared for.

This lawn will not stand a lot of hard wear.

Plant by plugs or seed. Plugs are planted 12 to 15 inches apart.

Planting Rate: One square yard will plug about 1000 square feet. Seed may be sown at the rate of 4 to 6 ounces per 1000 square feet.

White Dutch Clover (*Trifolium repens*)

White Dutch clover is a lawn cover of the legume family. It is sometimes used in lawn mixtures, but is better used alone in an area that will have only limited use.

White Dutch clover is adapted to all areas. In the cooler sections it grows best in full sun, but may be injured by freezing temperature in the winter.

In the middle elevations it makes a green lawn cover the year around in full sun or partial shade.

White Dutch clover is not adapted in the lowest elevations.

Clover does not require a rich soil, but some nitrogen and phosphorous fertilizer should be applied before seeding. White Dutch clover will not stand the wear and traffic of a play area and is slippery underfoot.

Clover used in a mixture with grasses may tend to grow in patches and makes a lawn of uneven texture.

Planting dates are: Northern Arizona—August 15 to September 15; Southern Arizona—September 15 to November 1.

Seeding Rate: 1 pound to 300 square feet.

Preparing The Seedbed

In preparing the lawn seedbed, keep in mind that it is a long-time venture. Good seedbed prepara-

tion (spading, manuring, leveling) is essential in maintaining a vigorous lawn over a period of years.

The old adage, "Haste makes waste", is especially true where the soil is merely loosened with a rake and the seed applied. The results obtained from such practices are usually disappointing.

Know Your Soil

You should know, in general, the kinds of soil you are working with for a lawn.

Sandy, coarse or gravelly soils are usually low in organic matter and fertility. They take water rapidly.

The sandy-loam and clay-loam soils are usually more fertile and have a greater water-holding capacity.

Need Organic Matter

Most soils in Arizona are low in organic matter and many are low in nitrates, and phosphates. Some alkali is found in most of the soils, and in some areas the content is high enough to present problems in growing a lawn.

Clay soils require large quantities of organic matter or sand to make them easier to work and to prevent the soil particles from sticking together. Barnyard manure and other rotting organic materials create an ideal condition for better air and water penetration.

If the soil is hard and dry, sprinkle or irrigate to a depth of 12 inches. Let the soil dry until it is workable. Never work soil when it is wet enough to stick to tools.

Spade 3 to 4 inches of unscreened barnyard manure or other organic matter into the soil. If the cost of manure is prohibitive, substitute some other type of organic matter for part of the soil. Well-rotted leaves or grass clippings are good to mix with the manure. Water the soil thoroughly, and then level

when workable.

Sandy soils tend to lose mineral nutrients rather rapidly. Therefore, they require abundant organic matter to supply plant food and retain moisture. Extremely sandy soils can be improved by the addition of a clay soil.

Apply 3 to 4 inches of unscreened barnyard manure. If the soil is extremely sandy, add 2 to 4 inches of clay soil. Spade, level and water.

Treat for Caliche

In some areas, caliche soils are a problem and require special care. Caliche soils are low in organic matter and require large amounts of manure or other organic matter to improve their texture.

Remove large chunks of caliche by raking. In severe cases it may be necessary to remove the soil to a depth of 8 to 12 inches and replace it with topsoil. Spread 3 to 4 inches of unscreened barnyard manure over the seedbed and spade 8 to 10 inches deep. Water and level.

After the seedbed has been prepared, watering will settle the soil and show up any sunken spots. Such spots should be filled and leveled before seeding.

Prepare For Planting

Delay planting for at least 10 days to 2 weeks in order to allow sufficient time for weed seed to germinate. Weeds can be hoed, pulled or sprayed with 2,4-D during this waiting period.

Final preparation of the seedbed that has been manured, spaded, leveled and weeded consists of pulverizing the soil with a steel garden rake to a depth of $\frac{1}{2}$ to 1 inch. This will break up any crusted soil which might hinder seed germination and early growth.

Seeding And Sprigging Lawns

Purchase Good Seed

Grass seed should be purchased from reliable seed dealers in order to obtain seed of high germination, free from noxious weeds, and true to variety name. The cost of seed from such firms may be slightly higher, but it would be false economy to buy seed at a few cents per pound less and receive an inferior grade.

Read the label on the box or the tag on the bag to be sure of its purity.

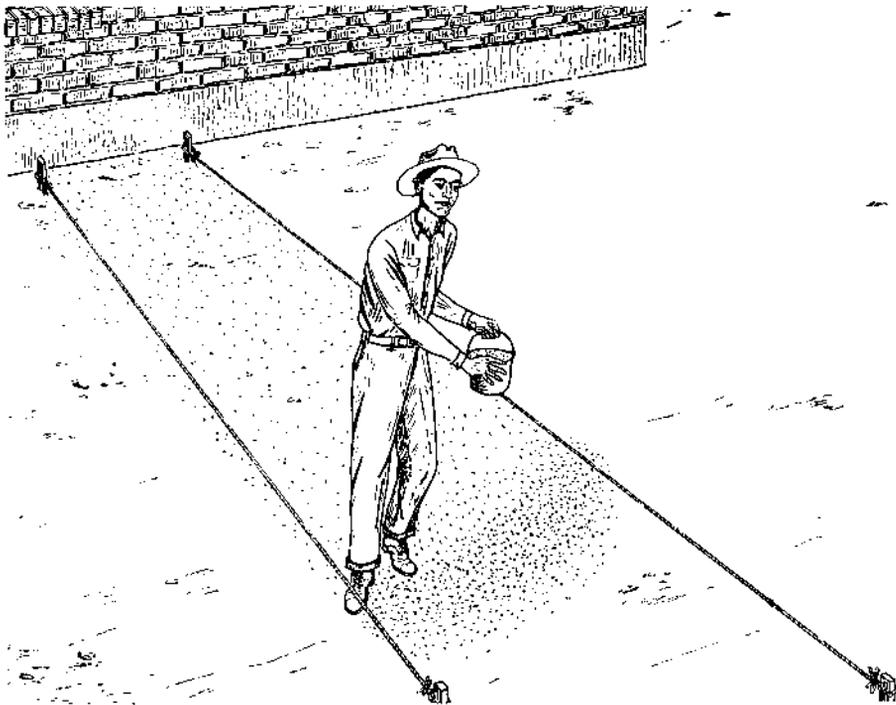
Sow Seed Carefully

In distributing the seed, swing the arm from left to right, or vice

versa, allowing the seed to slip out of the hand when the arm is in motion. This method gives an even distribution of the seed, whereas dropping the seed without swinging the arm will cause the seed to fall in small piles. This is not only wasteful, but causes the grass to come up in irregular spots.

A small bucket is an aid in seeding. Paper bags or cloth sacks are awkward to handle. Fine seed is often mixed with fine sand to increase bulk and make seeding more uniform. Seeding of a large area may be done with a cyclone-type seeder.

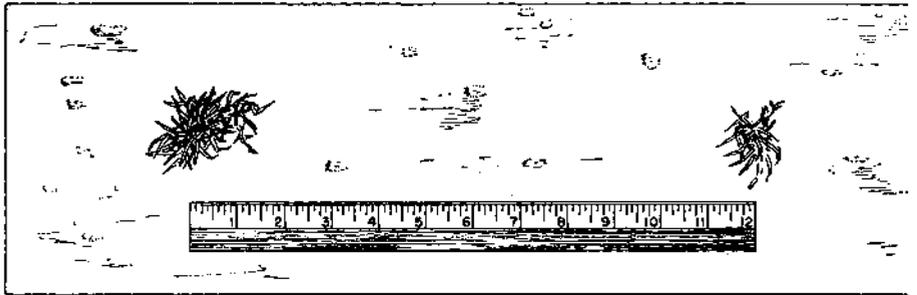
Scatter seed over a measured area. On the return trip toward the house overlap the edges to insure good coverage.





Apply an even coating of manure over the seed. Use a swinging motion of the shovel in order to insure even distribution.

You may use sprigs of some grasses to start a new lawn. Top picture shows correct spacing; bottom, lawn two months after being set out.



Cover the Seed

Apply a thin layer of composted, pulverized manure, free from weed seed, over the seed as a mulch and fertilizer. Cover the seed $\frac{1}{4}$ to $\frac{1}{2}$ inches in depth. One cubic yard of manure is sufficient to cover 1000 square feet of seed bed.

Avoid scattering manure at close range, as this will tend to move the seed out of its desired place. A swinging motion of the shovel in the same manner as for distributing seed will place an even coating of manure over the area.

Here's How to Do Sprigging and Plugging

Grasses and lawn covers propagated vegetatively can be set in prepared seedbeds either by sprigging or by the use of plugs.

Wash the soil from the sod to be used for sprigging, and separate

the stolens or runners. These may be in sections 3 inches to 6 inches in length.

Before planting the sprigs, the seedbed is measured off into 12 to 15 inch rows for Bermudas and St. Augustine, and 8 inches or less for Zoysias. The marked rows are then dug 2 inches deep, with the edge of a hoe or garden mattock.

Pieces of green sprigs are then placed in the trench at intervals of 6 inches or less, leaving some of the leaf surface exposed. Thoroughly cover the root system.

Tests have shown that sprigging will often result in coverage in a shorter time than plugging.

Plugs are pieces of sod about 2 inches in diameter. Plant them 12 inches apart.

If a mulch is desired to conserve moisture, use either peat moss or processed sewage sludge which is free from weeds or other grasses.

Maintenance Of New Lawns

Mowing

Grass and clover lawns should not be mowed until the leaves are about $1\frac{1}{4}$ to 2 inches in height.

Dichondra and Lippia should be clipped if they get over 2 inches in height. This gives the roots time to develop and become firmly established.



Banks or terraces need to be rounded with a gentle slope to make mowing less difficult. Watering is done with sprinklers.



Sprigged lawns should be mowed when the new growth is about 1 to 1½ inches in height. This will encourage the development and spreading of runners and underground stolens.

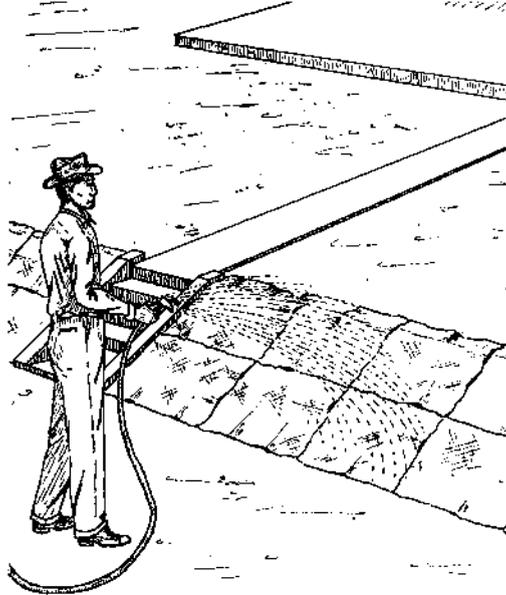
If clippings are heavy they should be removed to prevent molding and scalding the grass. Most well cared for lawns grow rapidly and require rather frequent mowings. One or two mowings a week will be sufficient to keep most lawns at their proper height.

Watering

Give newly planted lawns one or two light waterings daily until the seeds germinate and growth starts. Never allow surface soil to dry after seed starts to germinate.

New sprigs must be kept moist until growth starts. Sprinkle evenly and lightly. A strong spray from the hose will wash the seed or sprigs out of place, causing an uneven stand of grass.

After all the seed has germinated, an application of water every 2 or 3 days will keep the lawn in a good



Cover newly seeded steep banks with burlap sacks to prevent soil and seeds from being washed away. Sprinkle to irrigate. Remove sacks shortly after seeds have germinated.

growing condition. Occasionally during hot dry weather, more frequent watering may be necessary to prevent the young grass from wilting.

Maintenance Of Established Lawns

Mowing

Mowing requirements for an established lawn will depend on the variety of grass, climatic conditions, and time of year. All home lawn grasses should be clipped at least once a week during the rapid growing season. *Dichondra* and *Lippia* do not need cutting as often as grasses.

The height of the roller attached to the mower can be easily adjusted to regulate the height of cutting.

Before growth starts in the spring, common Bermuda should be clipped to about ¾ inches. This close mowing will remove dead leaves, runners and stems and will allow new growth to develop quickly.

As the season progresses, the height of the cutter bar should be raised about ¼ inch every month or six weeks until the end of the summer season when the turf is 1¼ to 1½ inches high. A thick turf makes an excellent play area during winter and spring.

For the fine-textured strains of Bermuda, set the mower to cut at a height of $\frac{1}{2}$ to $\frac{3}{4}$ inches in the spring. This will encourage quick spreading and density of the lawn. After several weeks, reset the mower to cut one inch high for the remainder of the season.

Blue grass, Fescues and grass mixtures are kept clipped to a height of $1\frac{1}{2}$ to 2 inches.

The cutting blade of the mower should be kept sharp all the time to mow evenly and cut without crushing the leaf blades. Many power and hand tools are available for edging the lawn. A trim, neat edge helps to make an attractive lawn.

Watering

Watering the established lawn depends on the variety, climatic and soil conditions, so no one definite rule can be applied. Shallow soils (less than 12 inches in depth) cannot store as much water as the deeper soils. The interval between waterings will vary with the depth of the soil.

Light waterings are not recommended as this causes the roots to develop near the surface of the ground and the lawn tends to wilt rapidly during hot dry days. Heavy applications of water stimulate deeper root penetration. Thus less water is used over a period of time.

Flood irrigating every 7 to 10 days should keep the lawn well supplied, if the lawn shows no signs of wilting. A heavy watering with a garden hose every 4 to 6 days will keep the lawn in excellent condition.

Lawns that go into a dormant condition during winter months should be watered to prevent the underground parts from drying

out. The frequency of irrigation will depend upon climatic and soil conditions. The intervals of watering extend from 4 to 8 weeks during the dormant period, depending on the amount of rainfall during that period.

Sprinkler systems are becoming more popular. Plastic, galvanized and copper pipe materials are being used.

The simplest kind of a sprinkler system for the home owner is a portable sprinkler which is attached to a garden hose and can be moved around the yard. Many homeowners are installing underground systems having small sprinkler heads set flush with the lawn. The system is controlled by a set of valves.

Several important factors should be carefully considered before making the installation. Some are: type of system, water pressure, kind of heads, height of heads, and kind and size of pipe to use. The system should be easy to operate, fit into the family budget, and efficiently moisten the lawn area.

Consult a sprinkler installation company before attempting to do the job yourself. The thoroughness and completeness of installation will save money later on.

Fertilizing

Like all living plants, grass needs nourishment to grow and maintain its attractive color. The necessary plant foods can be supplied through the use of organic manures, concentrated mineral types of fertilizers, and mixed fertilizers.

Organic Fertilizers

Barnyard manures are good for their mulching effect plus the benefits of the slow release of nutrients.

If barnyard manures are available and the cost is reasonable, a yearly application during the spring months will aid the grass in maintaining a healthy color and vigorous growth.

Barnyard manure should be of the composted type as composting destroys most of the weed seeds that are usually found in barnyard manure. Manure from pen-fed livestock usually contains few weed seeds.

Broadleaf ground covers such as clover, dichondra and lippia are often injured by using barnyard manures for a top dressing. It is best to use liquid fertilizers or types specifically recommended for these lawn covers.

Rates of Application

Barnyard manure (pulverized): 1 cubic yard per 1000 square feet of lawn.

Poultry manure: (composted) $\frac{1}{3}$ to $\frac{1}{2}$ cubic yards per 1000 square feet.

Sheep manure: (well rotted) $\frac{1}{2}$ yard per 1000 square feet.

Processed sewage: 30 pounds per 1000 square feet.

Inorganic Fertilizers

Inorganic fertilizers furnish plant foods that are readily taken up by the plant and their effect is visible in a very short time. Take care in using these fertilizers, for burning may occur when too much is applied, or if the fertilizer is distributed unevenly.

When applying the fertilizer by hand, spread it as evenly as possible, using the swinging motion of the arm as was done in seeding.

The grass should be dry before applying mineral fertilizers. The concentrated mineral spread over

the wet lawn will dissolve and burn the leaves before it can be washed into the root zone.

Tests conducted with Bermuda grass have indicated that an application of nitrogen fertilizer applied just prior to the frost season and again in early March has given excellent results. During the summer months additional applications can be made if the lawn begins to yellow. This method of fertilizing has prevented the invasion of weeds due to the thickness and vigor of the turf.

Rates of Application

Ammonium sulfate: Contains 21 percent nitrogen. 5 to 10 pounds per 1000 square feet.

Ammonium nitrate: Contains 33.5 percent nitrogen. 3 to 5 pounds per 1000 square feet.

Ammonium phosphate: Contains 16% nitrogen, 20% phosphorus. 5 to 10 pounds per 1000 square feet.

Feed the lawn 3 or 4 times during the growing season to maintain a good green turf.

Mixed Fertilizers

Mixed fertilizers contain concentrated minerals salts, together with varying amounts of organic matter and sometimes trace elements. They are sold in cartons or paper bags and the percentage of the nutrients is printed on the container.

The slow release of nutrients from the organic matter gives a slower and more lasting effect than the straight mineral types.

Rates of Application

10-20-0: 8 to 12 lbs. per 1000 sq. ft.

8-12-0: 10 to 15 lbs. per 1000 sq. ft.

6-10-4: 15 to 25 lbs. per 1000 sq. ft.

Explanation of Formula

Example: 6 parts nitrogen, 10 parts phosphate, 4 parts potassium per 100 pounds of fertilizer.

Planting Winter Grass In Bermuda Sod

Warm-season grasses do not tolerate continuous frost conditions during the winter months. After the first frost they usually brown over and remain in a dormant condition until early spring.

After Bermuda has become dormant it can be overseeded with Domestic Rye grass during late fall for use as a green winter lawn. Rye grass dies out in late spring during high temperature periods, thus allowing the warm season grass to emerge without competition from the Rye.

Warm-season grasses should be thinned prior to overseeding in order for the Rye or other cool-season grass seed to come into contact with the soil. Thinning can be done either by hand or with a mechanical renovator.

If the lawn area is small, a steel garden rake or grass rake, or other appropriate equipment can be pulled through the sod to break

up the runners. These are then mowed as close to the ground as possible and the clippings removed.

It may be necessary to repeat this operation several times to expose the soil.

The use of a mechanical renovator is more practical for large areas. This equipment can be rented on an hourly basis from nurseries or equipment-rental companies.

Water the area to be renovated several days ahead to moisten the soil, prevent dust, and to make the soil easier to work. After the area has been renovated rake it to remove clippings and to level the surface prior to seeding.

CAUTION: Do not renovate Zoysia.

Seeding and the application of manure mulch will be done in the same manner as for newly planted seedbeds.

Renovation Of Old Turf

Sometimes a lawn becomes poor and run down. The grass stand thins out and weeds begin to invade the turf.

In such cases, make a close analysis to find out the cause or causes and then determine whether to revive the old turf or rework it entirely.

The decline may be due to several factors such as:

1. Poor soil—lack of fertility.
2. Lack of water.
3. Soil composition.
4. Too close clipping.
5. Invasion of weeds.
6. Diseases and insects.
7. High soil alkalinity.

The turf may become thin and die out in heavily used areas, in partly shaded areas, and where there is competition with large trees and shrubs. Often reseeding is not necessary. Good care and maintenance will re-establish the lawn in one season.

Fertilize the lawn several times during the season—feed lightly and often. After spreading the fertilizer, be sure that the entire lawn area is watered evenly.

Follow a regular irrigation schedule. The soil should be moistened at least 8 to 12 inches deep.

Surface compaction can be overcome by slowly soaking the soil

to get deep penetration, stimulating the grass with fertilizer and a mulch, and by not mowing too closely. Very hard spots can be loosened with a pick or aerifier to open the soil.

Allowing grass to grow tall and then cutting very short will weaken the stand and may kill it out in spots. Establish a mowing schedule for the lawn, and it will give the best growth of the grass all

during the season.

Too close clipping will allow weeds to come up in the weakened turf. These will give serious competition until controlled.

In severe cases of neglect, it may be necessary to spade up the old lawn, add barnyard manure and fertilizer, and then reseed to establish a new lawn.

Use shade-tolerant grasses or ground covers in shady areas.

Weeds

Weeds can defeat all efforts to maintain a beautiful lawn if they are not eradicated or controlled. A well fertilized, watered, and regularly mowed lawn is the best control of lawn weeds, since a dense sod will prevent the invasion of weeds.

The use of chemical sprays has been effective in eradicating broadleaf weeds growing in lawns. The type of chemical and time of application will determine the effectiveness of killing weeds.

Compounds containing 2,4-D; 2,4,5-T; or a combination of both, control many broadleaf weeds but are usually ineffective against weeds classified as true grasses. Identification of weeds will better enable the gardner to select the proper chemical to apply and the concentration for best control. **Be sure to follow the directions on the container.**

Apply spray to young, actively growing weeds with a good top growth. Completely cover the leaf surface with a minimum of drip to the soil.

Slow Death!

The effect of the chemical in killing weeds is usually slow compared to oil-type sprays or arsen-

icals. The chemical is absorbed through the leaf surface and translocated to all parts of the plant, causing the plants to become distorted, yellow and to eventually die.

Highly resistant weeds may require 2 to 3 additional sprays to completely kill the entire plant.

Avoid using these sprays near shrubbery or flowers. Reports have been received from persons telling of damage to shrubbery and flowers caused by accidental spraying.

Spray only on windless days, as the chemical may be blown many feet, causing extensive damage to ornamentals.

Use Separate Sprayer

2,4-D and 2,4,5-T are difficult to wash out of the sprayer, so it is best to keep a separate sprayer for weed control. Use only the Amine forms of these weed sprays.

Common Weeds

Some common lawn weeds, in the order of their importance are:

- Crabgrass (water grass)
- Euphorbia, or spurge
- Common Bermuda (when growing in any other lawn)
- Alternanthera

Wild celery (wild carrot)
 Nut grass
 Puncture vine
 Dandelion
 Clovers
 Oxalis (wood sorrel)

Easy
 Puncture vine
 Dandelion
 Clovers
Moderately Easy
 Wild Celery
 Euphorbia (add soap or detergent to spray)
 Oxalis (wood sorrel)
Difficult
 Crab grass
 Alternanthera
 Nut grass

Ease of Control

The ease with which these weeds can be controlled with chemical (2, 4-D type) treatment is as follows:

Diseases

During the summer months when humidity and temperatures are favorable, certain lawn diseases are more evident than at any other time of the year. These diseases are usually more severe on the Bent and other cool-season grasses being grown as a year-around lawn in the lower elevations.

Brown Patch

Brown patch is a fungus disease which causes circular brown-colored spots, and severe infestations may completely kill out the entire lawn area. First symptom of the disease is an oily appearance of the foliage, followed by wilting and browning.

Control: Brown patch is controlled by spraying the entire lawn area with Tersan or bichloride of mercury and calomel when the symptoms are first noticed.

Curvularia

Curvularia causes damage similar to brown patch in that it causes browning of the leaf blades and eventually kills the entire lawn if not controlled.

Control: Captan is best used as a preventative. Apply as a spray at beginning of hot weather and repeat at monthly intervals.

Root-Knot Nematodes

Nematodes are microscopic worms that infest the roots of dichondra, lippia and clover. The presence of these worms in the roots prevents the movement of water to the foliage, which eventually kills the entire plant.

Infection may begin in one area of the lawn and eventually spread over the entire area.

Control of nematodes in an established lawn is difficult. Spot treatments with nematocides may check the spread of nematodes.

Insects

Ground Pearls

These insects have been found on the roots of Bermuda grass

and are capable of causing extensive damage. Infestation appears to be more pronounced on Ber-

muda lawns which have ben im-
properly watered and fertilized.
Infected areas will wilt, become
thin, and eventually die.

Examination of the roots will
often reveal the pearls, varying
from the size of a match head to
a small pinhead. The color is a
yellowish white, with a pearly lus-
ter. The pearls are the larva which
feed on the roots of Bermuda grass.

Regular watering at intervals of
not longer than a week, and the
use of a nitrogen fertilizer will
help to keep the grass growing a-
head of most of the damage.

Eriophyid Mites

Eriophyid mites, not yet defi-
nitely identified, were found in
Bermuda lawns in the Phoenix
area first in August 1959. The mite
was causing tufting or rosetting of
the grass in the lawns.

Control: Dusting sulfur dusted
over the lawn at the rate of 2
pounds per 1000 square feet has
given almost 100 percent control.
Good irrigation practices, along
with good fertilization, have also
produced much better lawns.

Rhodes Grass Scale

This scale insect is actually a
mealy bug and has become very
prevalent in many lawns of Ber-
muda, St. Augustine, Tifgreen, Tif-
fine and Dichondra. It is small, glo-
bular shaped, and covered with
white cottony material. The in-
sects are usually located at the
crown or nodes of the plants.

Control: Best controls have been
secured during the time when
crawlers or young are present.
Spray with malathion. Use 2 tea-
spoons of 57 percent emulsion in
one gallon of water. More than one
application may be necessary.

Bermuda Grass Or Ruths Scale

This small armored type of scale
is found on Bermuda grass plants
and is usually at the nodes. The
scale seldom causes any great dam-
age to the plants.

Control: During June, July and
August when the crawlers are
present, a spray of malathion will
control these young. Usually lawns
that are well fertilized and wa-
tered are not injured by this scale
insect.

White Grubs

Damage to Bermuda lawns is of-
ten caused by the feeding of white
grubs on the roots. The top por-
tion of the lawn dries out and the
dead leaves can be pulled up easily
by hand.

Control: Apply 5 pounds of 10%
chlordane dust per 1000 square ft.
Work into the soil with a rake for
best results. Apply chlordane be-
fore irrigation or sprinkling.

Leafhoppers

Several species of leafhoppers
cause graying of lawns and some-
times may cause considerable in-
jury.

Control: Dust with 10% DDT or
5% Malathion at the rate of 1 lb.
per 100 square feet.

Ants

Ants often infest a lawn and kill
the grass surrounding the mounds.

Control: Though complete con-
trol is often difficult, many colonies
can be reduced or eliminated by
using 10% chlordane powder or
2% dieldrin. A narrow band of
either powder placed 3 to 4 inches
away from the center of the nest
entrance will usually cause death
to the entire colony.