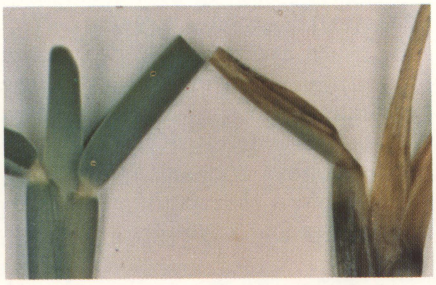
L-1372

Brownpatch, a fungus disease, St. Augustine turf.

Closeup of bermuda grass turf mowed with a dull mower (note frayed leaf blades).

A lawn infected with St. Augustine decline.



St. Augustine grass tillers, healthy vs. brownpatch infected.

LAWN CARE

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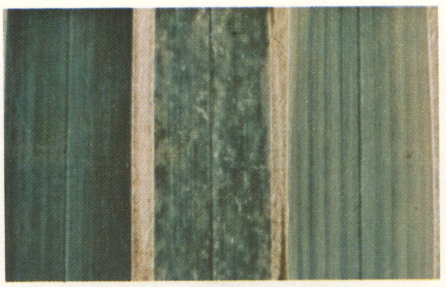


St. Augustine grass leaf blades from healthy, S.A.D. Infected (Center) and iron deficient turf (Right).

Lawn culture originally was considered an art rather than a science. Many lawn cultural practices evolved through experience and observation and were passed from generation to generation. Most of the scientific developments in turfgrass culture such as new grass varieties, specialty fertilizers, persticides and equipment have been developed in the past decade. Grasses, chemicals and equipment are continually changing to meet the needs of the turf manager. Through experience and observation, trial and error, or research and demonstration, basic principles have been developed for lawn culture whether it be for ornamental, functional or recreational use.

Mowing Affects Growth

Density, texture, color, root growth and other measures of turf quality are influenced by mowing. Grass species and varieties differ in their mowing requirements. Bermudagrass should be mowed shorter than St. Augustine grass because rhizomes and leaf production in bermudagrass are stimulated by closer mowing. St. Augustine turf becomes quite stemmy if mowed too close because it does not have rhizomes and the stems are much larger than those of bermudagrass.

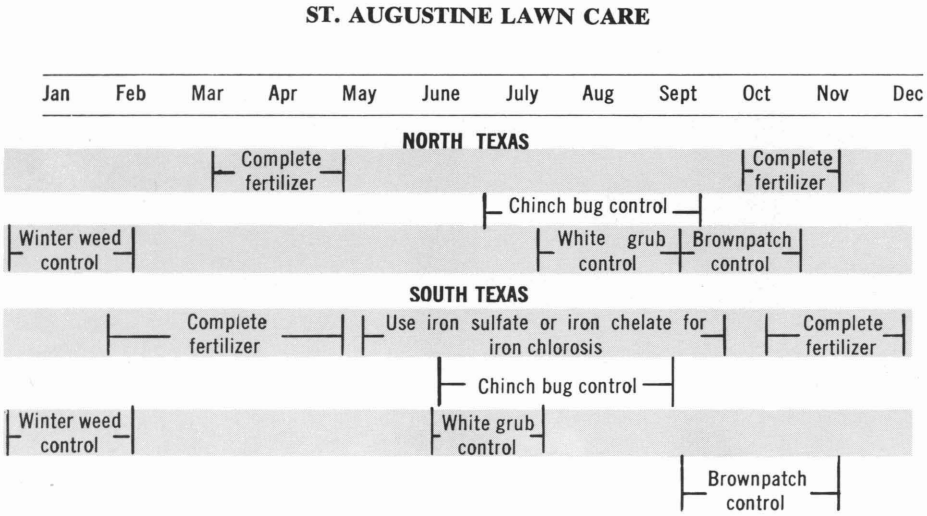
The depth of the root system of a turfgrass is proportional to the mowing height. The shorter the mowing height, the shorter the root system. Thus, unless the use of the turf area dictates the mowing height, such as a putting or bowling green, the grass should be mowed as high as practical. For example, common bermudgrass should be mowed at 1 to 1½ inches high and St. Augustine grass at 2 to 2½ inches. Also, grasses growing in partial or dense shade should be mowed higher than those grown in full sunlight.

Mowing frequency is another factor that affects turf appearance. When a turf is mowed frequently, only a small percentage of the leaf area is removed each time. As a general rule, the shorter the mowing height, the more often the grass should be mowed. For instance, berumdagrass mowed at ½ inch requires three or more mowings per week, while grass mowed at 1 inch requires mowing every 5 days. St. Augustine grass mowed at 2 inches requires mowing at 7 to 10 day intervals. Another general guideline is to remove no more than 30 to 40 percent of the growth at any single mowing.

Grass clippings contribute valuable plant nutrients and organic matter to the soil when left to decompose in the turf. Removing these clippings depletes the soil of nutrients and organic matter. However, if the mowing frequency is not adequate, large amounts of clippings will remain on the surface after mowing and should be removed for appearance and to prevent smothering the grass. Mowing height and frequency should be timed so that the grass clippings may be left to decompose.

Watering Needed in Most Areas

Watering is essential to maintain a green turf in most areas of Texas. Thorough and infrequent watering is the best practice. Lawns watered thoroughly and infrequently devel-



op a deeper root system and have a lower water use rate than lawns watered lightly and frequently.

Lawns with a thatch layer present a special watering problem. Dry thatch resists water and causes localized dry spots. Water tends to run off heavily thatched turf rather than move into the soil. Under these conditions light, frequent watering may be necessary to prevent excessive run-off.

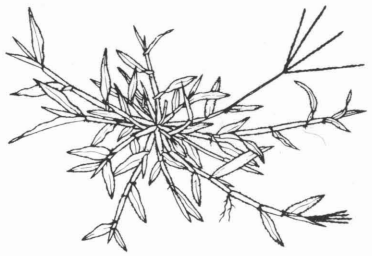
Fertilize According to Soil Test Results

Nitrogen is the nutrient required in the largest amount by turfgrasses. Turfgrasses respond to nitrogen in a number of ways, including density, darker green color, greater drought resistance, faster recovery rate and greater traffic tolerance. However, too much nitrogen fertilization can lead to problems such as thatch accumulation, increased insect and disease susceptibility and excessive mowing requirements.

As a general guideline St. Augustine grass requires 3 to 4 pounds of nitrogen per 1,000 square feet per year to maintain desirable color and density. Most of the nitrogen should be applied in the spring and late fall. Fall fertilization should consist of a complete fertilizer or should conform to soil test recommendations. Bermudagrass requires 4 to 6 pounds of nitrogen per year to maintain color and density. Again, spring and fall applications should be the heaviest (2 pounds per 1,000 square feet per application) with applications of 1 pound per 1,000 at 60-day intervals if a darker color is desired. These guidelines assume that grass clippings are not removed following each mowing. If clippings are removed, higher fertilization rates will be required.

Healthy Turf Discourages Weeds

A vigorous turf is the best control for weeds. Broad-leaved weeds and weedy grasses usually are not a problem when a well-adapted turfgrass is properly established, fertilized, mowed and watered. Weeds will invade thin, weak stands of grass. Killing weeds with chemicals will not keep them out unless followed by management practices that encourage the grass to grow



CRABGRASS

vigorously enough to compete favorably with the weeds.

Regular, frequent mowing controls many common turf weeds, but herbicides are suggested for use in many turf weed situations.

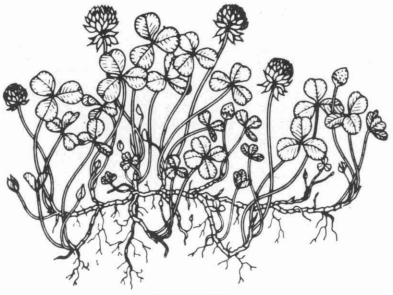
Effective and safe use of herbicides is dependent on a number of considerations: (1) identification of the weeds to be controlled; (2) selection of an approved herbicide that is effective on such weeds; (3) consideration of possible damage to the turfgrass, trees, shrubs and other plants; (4) application at the proper rate, time and method and (5) observing label precautions for use.

Herbicides to control weeds after growth has begun (postemergence) should be applied when weeds are immature and growing rapidly. Treatments usually are not effective when applied to weeds that are maturing or growing slowly because of drought or approaching maturity. Herbicides suggested for preemergence control of weeds must be applied before the annual weed seed germinate and begin growth.

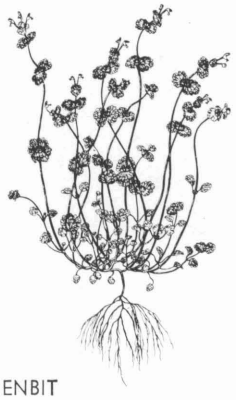
CHICKWEED

DALLISGRASS

DANDELION



CLOVER



HENBIT

(Reprinted from *Texas Horticulturist*, Vol. 1, No. 4, Winter 1975.)

Cultivation Takes Many Forms

To alleviate compaction and increase the movement of air and water into the soil, mechanical aeration may be necessary. Coring, spiking and grooving equipment is available for aeration of compacted lawns. Aeration in the spring and fall to correspond with fertilization dates would be ideal from the viewpoint of root development, thatch decomposition and water infiltration. However, if traffic is limited, annual or less frequent, aeration may be satisfactory.

Chemical aerators such as wetting agents may be practical in special circumstances. For example, water infiltration in a turf with a heavy thatch layer may be increased by a wetting agent, since a dry thatch layer is difficult to wet. Also gypsum may improve aeration in a soil that has developed a high sodium content as a result of poor-quality irrigation water. However, these materials are effective only when these conditions exist.

Mechanical dethatching of a turf with vertical mowing units or by scalping the turf each spring is also an effective cultivating practice. The material brought to the surface by the vertical mower should be removed from the turf. Scalping the turf by lowering the mowing unit by ½ to 1 inch at the first mowing in the spring and removing the residue also is an effective method of dethatching.

Topdressing with a soil or a soil mixture is another effective method of cultivation. A sandy loam soil or a soil-organic mixture should be used for topdressing a turf. Generally ¾ to 1 cubic yard of topdressing per 1,000 square feet is recommended.

Pests Must Be Controlled

Preventive maintenance to include recommended cultural practices will minimize pest problems. Likewise, the use of recommended fungicides, insecticides and preemerge herbicides before development of diseases, insects and weeds can prevent many pest problems. However, even with the best management, pests can become a problem because of certain environmen-

Table 1. Chemical Control of Insects*

Insect	Insecticdes	Remarks
Armyworms, cutworms and sod webworms	carbaryl (Sevin), chlordane, diazinon, trichlorfon (Dylox)	Evening applications are preferred. Do not water or mow lawn for 48 hours.
Chinch bugs	Aspon, carbophenothion (Trithion), diazinon, ethion	Apply when damage appears. Water before and after treatment with granular materials.
White grub	chlordane, diazinon	Drench with water after treatment. Treat in June in South Texas, late July and early August in North Texas. Chlordane resistance is common in Texas and control may be poor.
Bermudagrass mites	carbophenothion, diazinon, dicofol (Kelthane), ethion	Use spray formulations and wet grass thoroughly using 3 to 5 gallons water per 1,000 square feet.
Ants	chlordane, diazinon, (Mirex for fire ants and Texas leaf-cutting ants)	Spot treat mounds or nesting areas.
Chiggers (redbugs)	chlordane, lindane, sulfur, toxaphene	Repellants are effective and more practical when visiting parks and other recreational areas.

*Follow label instructions and precautions.

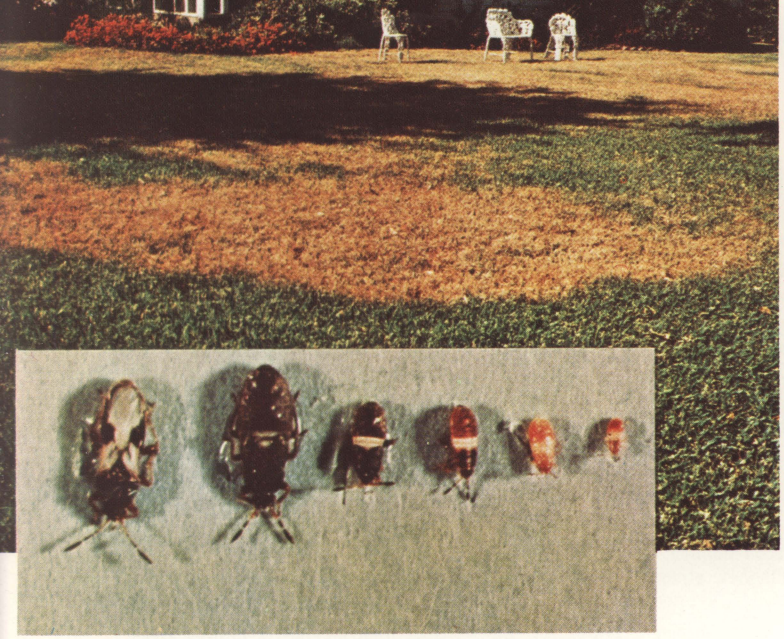
Table 2. Chemical Control of Turfgrass Diseases

Disease	Fungicide*	Remarks
Brownpatch	benomyl, chlorothalonil (Daconil), cyclohezamide + Thiram (Acti-dione Thiram), maneb + zinc ion (Fore), PCNB (Terraclor)	Begin treatment in early fall on St. Augustine grass.
Helminthosporium	captan, chlorothalonil, cyclohexamide + Thiram, Dyrene, maneb + zinc ion	Several applications at 7-day intervals required for control.
Gray Leafspot	chlorothalonil, Dyrene, maneb + zinc ion	Same as above.
Dollar Spot	benomyl, chlorothalonil, Dyrene	Same as above.
Pythium Blight	chloroneb (Tersan SP), Dexon, terrazole (Koban)	Same as above.
Rust	cyclohexamide (Acti-dione), maneb + zinc ion	Same as above.

*Trade names are capitalized.

Table 3. Chemcial Weed Control in Turfgrasses

Weeds	Herbicide	Remarks
Broad-leaved weeds: clover, chickweed, dandelion, dichondra, dock, henbit, wild onion, sow thistle	MCPP, silvex,'* 2-4-D*	*Do not use on St. Augustine grass.
	cacodylic acid, endothall	Use **only** on dormant turfgrasses.
Annual grasses:	cacodylic acid	Use only on dormant turfgrasses.
Winter annuals: annual bluegrass, rescuegrass, ryegrass	benefin (Balan), bensulide, DCPA (Dacthal), diphenamid (Enide)	Apply in early fall before weed germination.
Summer annuals: crabgrass, goosegrass, sandbur	benefin, bensulide, DCPA, diphenamid	Apply in early spring before weed germination.
	DSMA, MSMA	Apply after weeds germinate. Do not use in St. Augustine grass or centipede.
Perennial grasses: dallisgrass, carpetgrass	DSMA, MSMA	Do not use on St. Augustine grass. Spot treat dallisgrass in St. Augustine grass. Repeat applications in 10-14 days.
Poison ivy	Ammonium sulfamate, silvex.	Spot treat. Wet foliage thoroughly.



Chinch bug damage in a St. Augustine lawn. Chinch bugs from immature stages to adult. (Right to Left)

White Grub Damage. White grub found feeding two inches below a St. Augustine grass turf.

tal conditions. For example, prolonged summer drouths favor leafspot diseases, chinch bugs and white grub, while cool and wet conditions in early fall favor occurrences of brownpatch and armyworms.

When preventive measures do not check the development of pests, a control pesticide is recommended.

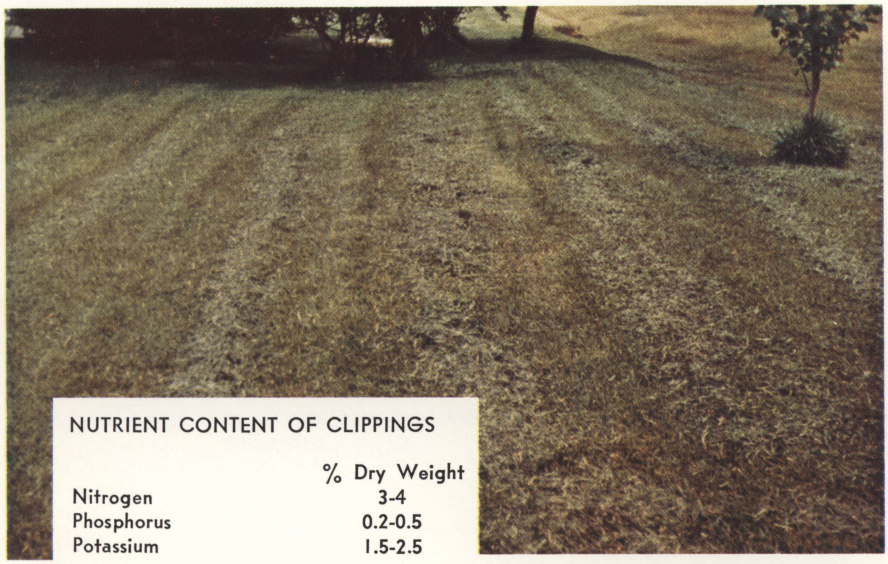
Insects Pose Problems

Insecticides should be used when insect populations reach levels that damage the turf. Since most insects have a weak link during their life cycle, timing of application of the insecticide is as important as the choice of chemical. Effective control also is dependent upon insuring contact between the insect and the insecticide. Thus, soil-inhabiting insects such as white grub require drenching the insecticide into the soil; foliage-feeding insects such as sod-webworms and armyworms require foliar applications with no irrigation for at least 24 hours. Chinch bugs are intermediate in that they inhabit the thatch layer. Effective control of chinch bugs requires drenching of the turf before applying the insecticide, followed by a light irrigation to wash the insecticide into the thatch layer.

No single insecticide controls all insect pests found in turf. Identify the specific insect before attempting control. Learn to recognize early signs of injury from insects to avoid excessive turf damage.

When using insecticides, keep in mind:

- Most insecticides are toxic to pests as well as beneficial insects.
- Residue hazards may result from drift or run-off to adjoining areas.
- Overdosages and frequent use of insecticides may result in pest resistance.
- Use only approved and recommended insecticides.
- Read and follow label instructions carefully.



NUTRIENT CONTENT OF CLIPPINGS

	% Dry Weight
Nitrogen	3-4
Phosphorus	0.2-0.5
Potassium	1.5-2.5

Disease-causing Fungi Attack Grasses

Most turfgrass diseases are caused by fungi that live on dead and decaying organic matter in the soil or in the thatch layer. When favorable moisture and temperature conditions occur, the fungi may attack the living tissue of turfgrasses. These fungi exist in all soils that have not been sterilized and only require a host plant (lawn) and a favorable environment to develop their characteristic disease symptoms. At this stage, disease control requires early diagnosis of symptoms together with the use of an effective fungicide.

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