SCSC-PU-279
September 2025

Zoysiagrass Lawn Management Guide

P. Agustin Boeri[1], Ambika Chandra[2], Manuel R. S. Chavarria[1], Chrissie A. Segars[3], and Rebecca Grubbs-Bowling[4]

Introduction

Zoysiagrasses (*Zoysia spp.*) have gained popularity for use in residential lawns, parks, commercial landscapes, and golf courses due to their unique characteristics, including **shade tolerance and low maintenance requirements** (Fig. 1) (Patton et al., 2017). This turfgrass differs from bermudagrass (*Cynodon dactylon* and *C. dactylon* × *C. transvaalensis*) and St. Augustinegrass (*Stenotaphrum secundatum*) in having a denser canopy, a slower growth rate, pointed leaves that roll during dormancy or under water stress, and tissues rich in fiber, hemicellulose, and lignin. It is these traits that underlie zoysiagrass's notable qualities, including reduced fertilizer needs, less frequent mowing requirements, and resistance to weed colonization. This guide will provide detailed instructions on how to properly care for zoysiagrass in lawns and public spaces.

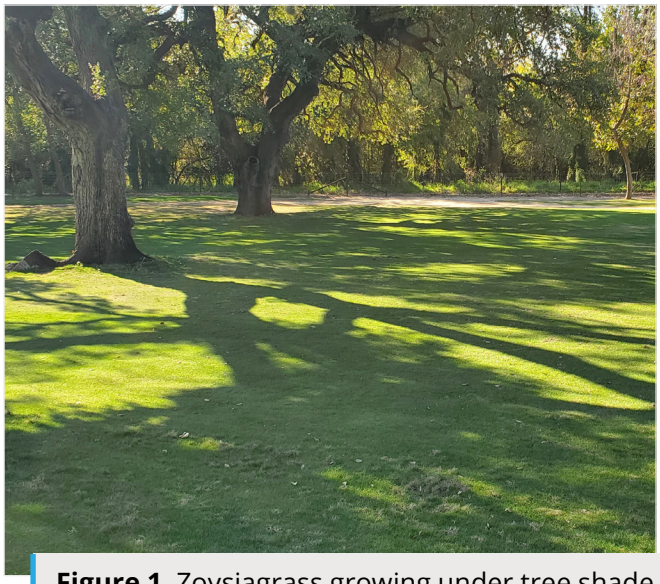

Figure 1. Zoysiagrass growing under tree shade.

Establishment

Warm-season turfgrasses, including zoysiagrass, should be planted late spring or early summer when actively growing (air temperatures between 80 to 95°F) to promote quick and successful establishment. In most of Texas, this time of the year will often offer greater natural precipitation to aid in establishment compared with drier months in the late summer. Natural precipitation and lower evapotranspiration (ET) rates will also reduce irrigation needs. Zoysiagrass can be slower to establish than some other warm-season turfgrass species. Therefore, it is important to plant zoysiagrass early to allow sufficient time for establishment prior to dormancy. While it could be achieved, late fall sodding or seeding can reduce the establishment success rate. Similarly, dormant sodding can lead to winter kill in northern Texas. Zoysiagrass will take longer to establish from sprigs or plugs.

Turfgrass breeding efforts from university and private programs have led to the release

[1] Assistant Professor and Extension Turfgrass Specialist – Texas A&M AgriLife Extension Service
[2] Professor in Turfgrass Breeding and Assistant Director – Texas A&M AgriLife Research
[3] West Research Scientist, PBI Gordon Corporation
[4] Assistant Professor and Extension Specialist for Turfgrass Science and Management – University of Tennessee

of numerous improved zoysiagrass cultivars. These are primarily established vegetatively using sod, sprigs, and plugs. Sod will allow for the most immediate coverage of an area, while sprigs and plugs may require several months to establish, depending on the time of planting and environmental conditions. There are a few varieties of zoysiagrass that can be planted as seed, including Zenith and Compadre. Seed should also be planted in the late spring or early summer for best results. For more information, refer to the *Zoysiagrass Selection Guide, SCSC-PU-272*[1].

Proper soil preparation is critical for establishing healthy turfgrass, whether from sod or seed, but it is especially important when seeding. Unlike sod, which provides immediate ground cover, seed requires optimal conditions to germinate and develop a strong root system. Preparing the soil by removing debris, correcting pH, improving drainage, and incorporating organic matter ensures good seed-to-soil contact and supports uniform growth. While sod can sometimes overcome minor soil issues, poor preparation for seeding can lead to weak establishment, uneven coverage, and increased weed invasion. Therefore, thorough soil preparation is essential for long-term turfgrass success.

Mowing

The objective of mowing turfgrass is to promote dense lateral growth without removing excessive aboveground vegetation (Patton, 2025). This is accomplished by mowing at the appropriate height and frequency using a well-maintained mower. Zoysiagrass typically requires less frequent mowing than other turfgrass species, resulting in savings on labor and fuel (Law et al., 2016). Keeping mower blades sharp is essential for maintaining a healthy zoysiagrass stand. However, zoysiagrasses are harder to mow than some other turf species, which can lead to faster wear on mowing equipment. This necessitates more frequent sharpening or replacement of mower blades. For many fine-textured zoysiagrasses (e.g., *Zoysia matrella* or *Z. matrella* × *Z. japonica*), the clean, "scissor-like" cut produced by a reel mower is often more effective in maintaining high turf quality than the cut from traditional rotary mowers.

Mowing Height

A mowing height of between **1 and 2.5 inches** is generally recommended for a coarse-textured zoysiagrass lawn. Fine-textured zoysiagrasses should be mowed between 1 to 2 inches. A taller mowing height, without surpassing the maximum recommended, can increase root depth and the overall root area, improving tolerance to stresses. Lower mowing heights will also require more frequent mowing. While some fine-textured zoysiagrasses will perform well at mowing less than 1 inch, this is generally not recommended for home lawns. Turfgrass mowed at less than 1 inch may require the use of a reel mower to maintain acceptable turfgrass quality.

Mowing Frequency

Mowing frequency is primarily determined by the rate of growth and the **1/3 Rule**. Ideally, no more than 1/3 of the total canopy height should be removed at any one time to prevent scalping. Scalping will not only affect turfgrass health and quality but also expose the soil, allowing for weed emergence and growth. If left on the ground, the turfgrass clipping produced from scalping could kill the turfgrass beneath and contribute to thatch build-up. In general, zoysiagrasses grow more slowly than other turfgrass species, requiring less frequent mowing. However, they also recover more slowly from damage (e.g., scalping) than other turfgrass species. Mowing frequency will likely fluctuate throughout the year in response to changes in environmental conditions (light, temperature, precipitation) as well as water and fertilizer inputs. For more information on proper mowing habits, refer to *Mowing Recommendations for Warm-Season Turfgrasses, SCSC-PU-178*[2].

Irrigation

Zoysiagrasses will generally benefit from an appropriate amount of supplemental irrigation. Zoysiagrass roots can reach between 1.5 to 2.6 feet under unrestricted soil profiles (Fig. 2) (Boeri et al., 2021; Zhang et al., 2018). **Deep and infrequent irrigation** applied before drought periods promotes the development of deeper and more expansive root systems and carbohydrate accumulation (Gomez-Armayones et al., 2018).

[1] https://agrilifelearn.tamu.edu/s/product/zoysiagrass-selection-guide/01tKY000000H35SYAS
[2] https://agrilifelearn.tamu.edu/s/product/mowing-recommendations-for-warmseason-turfgrasses/01t4x000004OUiyAAG

Figure 2. "Empire" zoysiagrass root system when grown in calcinated clay (utilized for root studies) under greenhouse conditions (Boeri et al., 2021).

This practice allows turfgrass to adapt to drought stress. **Early morning watering** is generally the most appropriate time of day to irrigate.

In finer soils with greater clay percentages, established turfgrass will generally not need to be irrigated more than **two times per week** during warmer months of the year. Waterlogging and runoff are often observed in fine-textured or compacted soils with low water infiltration rates. **Cycle and soak** can be utilized to improve water infiltration by "pulsing" water in the soil more gradually. When programming irrigation, each station could be watered using two to three short cycles instead of one long cycle by setting several start times. Adjustments should be made during weeks when precipitation is sufficient to meet partial or total water requirements.

Irrigation for zoysiagrass can be managed using several strategies. One method is visual inspection—monitoring for signs of drought stress, such as wilting leaves and a blue-gray coloration across the lawn. These symptoms indicate that irrigation is needed. Once applied, irrigation should be repeated when drought symptoms reappear. Zoysiagrass typically wilts earlier than other turfgrasses and will enter dormancy under prolonged drought. While zoysiagrass will generally recover after rainfall or irrigation in healthy soils, it may struggle under compacted or restricted soil profiles (Fig. 3) (Chalmers et al., 2008).

An alternative approach is to follow evapotranspiration (ET)-based irrigation (e.g., *Texas ET Network*[3]. These recommendations use reference evapotranspiration (ETo), which estimates water loss from a cool-season grass. Because warm-season grasses like zoysiagrass have lower water needs, acceptable turf quality can usually be maintained with a crop coefficient (Kc) of 60 percent ETo. Irrigation levels can be selected based on consumer preferences, soil types, lawn age, drought periods, and unique site conditions such as shade or shallow soils.

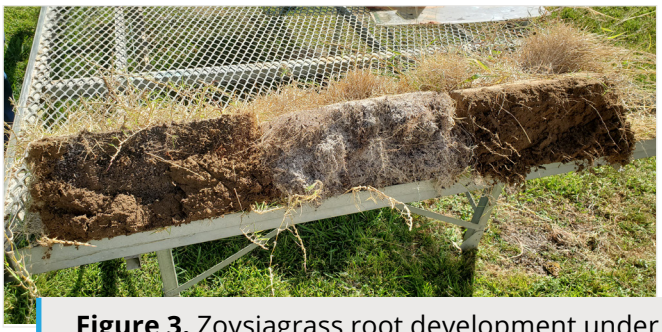

Figure 3. Zoysiagrass root development under different soil types. Left: Compacted soil profile, which restricts root growth. Center: Soil mixture of sand and peat moss, promoting fine root development. Right: Native sandy loam soil, supporting deep root development.

A study conducted in 2023 and 2024 at the Dallas AgriLife Research and Education Center concluded that Palisades zoysiagrass can be maintained at acceptable levels at 48 percent ETo. The study also highlighted that even Palisades would go dormant at 40 percent and 32 percent ETo; this cultivar will recover after irrigation or precipitation is resumed. The study was conducted under agricultural clay soils (Vertisol soil with Austin silty clay type). Coarser soils (i.e., higher percentage of sand) or soil in new constructions would increase the irrigation amounts and frequency.

[3] https://texaset.tamu.edu/

During transition seasons like spring and fall, turfgrass watering needs will be reduced, and natural rainfall will generally meet their water needs (Wherley et al., 2015). At this time, automated irrigation can generally be turned off in favor of manual watering on an as-needed basis. Excessive watering during spring and fall can be wasteful and can increase susceptibility to select turfgrass diseases. In general, water should be turned off in winter months when warm-season turfgrasses enter dormancy. Exceptions to this reduction include southern parts of Texas, where warm-season turfgrasses may not go fully dormant, western parts of Texas with extremely dry soil conditions, sandy soils that are well-drained, and newly planted areas.

Irrigation and water-related resources:

- *Landscape Irrigation Efficiency, AGEN-PU-219*[4]
- *Texas Commission on Environmental Quality irrigation inspections and audits*[5]

Fertilization

The first step before considering fertilizers is to meet the fundamental needs of the plant, including air (healthy soils contain pore spaces that allow for gas exchange and root development), water (a proper amount), and temperature (which regulates turfgrass growth and dormancy). The second step is to perform a soil test every 1 to 3 years, which can be performed by the *Texas A&M AgriLife Extension Soil, Water and Forage Testing Laboratory*[6]. All nutrients should be applied based on your soil test results, except for nitrogen (N). Nitrogen is generally applied based on turfgrass species, soil properties (sandy versus clay), environmental characteristics (e.g., rainfall and temperature), and use intensity (recreational versus sports). Soil tests can also reveal other useful information, including pH, salinity, and organic matter, which will affect nutrient availability.

Nitrogen: Many turfgrass nutrient management programs are centered on N, as it is the nutrient used in the greatest abundance by all plants. Zoysiagrass generally requires less N fertilization than other warm-season turfgrass species like bermudagrass or St. Augustinegrass. However, some supplemental nitrogen may be beneficial in supporting desired turfgrass growth, especially during establishment. Over-application of nitrogen fertilizer can be harmful to turfgrass health and can lead to an increase in nutrient pollution, affecting water and air quality.

In general, supplemental nitrogen requirements for established zoysiagrass can be met by applying between **1 and 3 pounds (lb) of N per 1,000 feet (ft)^2** annually. These rates will also vary according to the length of the growing season (North versus South Texas), soil type, and cultivar. Greater rates may be required during the establishment of seed and plugs, but steps should be taken to prevent over-application and nutrient losses. In general, fertilizer should be applied when turfgrass is actively growing and able to take up and utilize the applied nutrients. Because of this, it is generally recommended that the first fertilizer application be made once the turfgrass has been mowed at least twice in the spring, as this indicates new growth. To prevent over-application of N in the late fall, the final application should typically be made at least 4 to 6 weeks prior to the historic first frost date for the county. Some exceptions around timing can be made when using organic or slow-release nutrient sources, as these types of fertilizers will release nutrients more gradually and may offer more benefits when applied earlier than quick-release products.

Follow product recommendations for appropriate application rates. Most quick-release nitrogen sources (e.g., urea) should be applied at rates of no more than 1 lb of N per 1,000 ft^2. Applying at a reduced rate (0.5 lb N/1,000 ft^2) may prevent burning or injury to the turfgrass and may aid in nutrient-use efficiency. To reduce injury and gaseous losses of applied N fertilizer, follow label instructions regarding watering. Slow-release products may have alternative recommendations and can often be applied at a higher rate than soluble, quick-release products.

[4] https://agrilifelearn.tamu.edu/s/product/landscape-irrigation-efficiency/01t4x000007zTaLAAU
[5] https://www.tceq.texas.gov/
[6] https://soiltesting.tamu.edu/

Cultivation

Zoysiagrasses can be particularly prone to excessive thatch accumulation, which gives the turfgrass a "puffy" appearance (Fig. 4). Thatch is generally defined as the intermingling of living (roots, rhizomes, and stolons) and dead material between turfgrass roots and shoots. Excess thatch (greater than 0.5 inch in thickness) can lead to issues with water movement, scalping, and negative effects on turfgrass quality, as well as an increase in turfgrass pest activity. Warmer climates in southern Texas and higher N fertilizer and irrigation rates will increase thatch accumulation. Older lawns may require dethatching to maintain an acceptable turfgrass quality. Fine-textured zoysiagrasses (*Z. matrella*) may require more frequent dethatching than coarse-textured zoysiagrasses (*Z. japonica*).

There are several cultivation practices that may be used to manage thatch build-up. Always check for irrigation lines/heads, wire, rocks, etc., that may break or damage equipment. These practices are mechanically disruptive and inflict temporary injury on your turf. Avoid cultivation practices during extreme weather conditions like frosts, high heat, or drought. These practices should be implemented in the **spring and early summer months** when turfgrass is actively growing and able to recover quickly. Adequate irrigation and fertilization following cultivation can also help to ensure a more rapid recovery.

Figure 4. Zoysiagrass with excessive canopy density.

Verticutting or vertical mowing is used to slice into turfgrass vertically to remove thatch and other debris (Fig. 5). Depending on the size of the area and the extent of thatch accumulation, this process can be fairly labor-intensive. Once you have finished verticutting, debris must be removed. If more debris is present than can be managed with a vacuum bagger, sometimes this is best achieved with the use of a leaf rake, shovel, and wheelbarrow. Following verticutting with a light topdressing can be beneficial as well. The topdressing material will depend on the soil type and lawn needs. Verticutting generally does not penetrate deeply enough in the soil to have a significant effect on compacted soils.

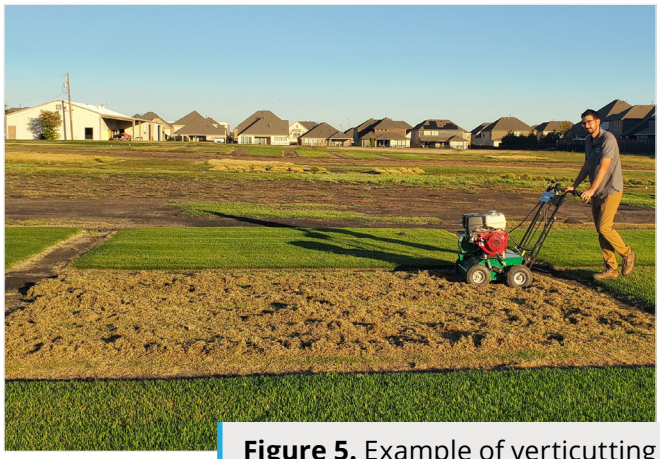

Figure 5. Example of verticutting in fine-textured zoysiagrass.

Aerification is the primary practice utilized to alleviate **soil compaction**. Compaction occurs when soils become extremely compressed, limiting the amount of pore space, air availability, and water infiltration. Aerification creates channels in the root zone that increase air and water movement, facilitating root growth. Increased oxygen in the soil also increases microbial activity and organic matter decomposition. This practice can be complemented with fine compost or sand topdressing to improve soil health. Core aerification, or the removal of plugs, can sometimes offer more benefit when alleviating compaction—particularly in soils with a higher clay content. Solid tine aerification (spikes) may be beneficial in sandy soils. The most common core aerifiers will go to a depth of approximately 3 to 4 inches.

Integrated Pest Management

When dealing with turfgrass pest issues, it is important to implement an **integrated pest management (IPM)** program. This includes a proper selection of preventative, mechanical, cultural, and chemical control practices to maintain a healthy stand of turfgrass (*Weed, Insect, and Disease Control in Turfgrass, SCSC-PU-225*[7]). Appropriate mowing, irrigation, cultivation, and fertilization practices are key to supporting healthy turfgrass growth and reducing overall weed pressure.

Weed Management

The best defense against weeds is a healthy, dense stand of turfgrass. When well-maintained, zoysiagrass forms a very dense canopy that naturally suppresses weed colonization by competing for space and resources available for weed seeds to germinate and grow. However, damage from scalping, disease, heavy traffic, or other stressors, especially during peak weed germination periods, can compromise this benefit. Because zoysiagrass is a slow-growing turfgrass, it may take longer to recover and fill in bare areas, making proper maintenance critical to maintaining its natural weed-suppressing ability.

For information on herbicide use and selection, please refer to:

- *Preemergence Herbicides for the Home Lawn*[8]
- *A Homeowner's Guide to Herbicide Selection for Warm-Season Turfgrass Lawns, SCSC-PU-180*[9]

Disease Management

Prevention is the most effective strategy for managing turfgrass diseases. Once disease symptoms have appeared and damage has occurred, curative fungicide treatment will have limited results. Cultural practices play a crucial role in reducing disease risk. Minimizing leaf wetness periods, for instance, can significantly hinder pathogen development, and this can be supported by watering early in the morning to allow foliage to dry during the day. Ensuring proper soil drainage and removing excess thatch helps reduce moisture accumulation in the turf canopy, creating less favorable conditions for pathogens. Additionally, maintaining the proper mowing height and balancing soil fertility levels promotes healthy turf that is more resistant to infection. When environmental conditions are conducive to disease development, preventive fungicide applications may be warranted to suppress the pathogen before symptoms become visible. Below are the most common zoysiagrass diseases in Texas's lawns and public spaces.

Large Patch *(Rhizoctonia solani)*: The first symptom of the disease typically appears as circular, discolored patches on the turf (Kreinberg et al., 2025). These patches often have orange or yellow outer borders, indicating newly infected leaves that are beginning to die (Fig. 6). Affected shoots can be easily pulled from the sheath at the point where they attach to the stolons, a sign of weakened tissue. Upon closer inspection, diseased stems and sheaths exhibit dark brown lesions, confirming the presence of infection.

Figure 6. Large patch in zoysiagrass.

While the disease is most active in the fall, symptoms are often more visible in the spring as the grass is coming out of dormancy. Preventative fungicides are often the most effective at controlling this disease and can be applied at roughly the same time as a fall preemergence herbicide when soil temperatures decline to 70°F for 5 consecutive days. For a preventative spring application, best control is achieved before soil temperatures reach around 65°F.

[7] https://aggieturf.tamu.edu/wp-content/uploads/sites/24/SC039_turfgrass_final.pdf
[8] https://aggieturf.tamu.edu/wp-content/uploads/sites/24/Preemergence-Herbicide-Guide-4.pdf
[9] https://agrilifelearn.tamu.edu/s/product/a-homeowners-guide-to-herbicide-selection-for-warmseason-turfgrass-lawns/01t4x000004OUj0AAG

The pathogen survives unfavorable conditions by oversummering and overwintering as a saprophyte in the soil and thatch. This persistence enables recurring infections and patch development in the same areas year after year. Disease patches frequently reappear in the same locations as in previous seasons and may expand to adjacent areas. New infection centers can also develop due to factors such as foot traffic and the movement of infected material during core cultivation.

Take-all Root Rot (TARR) *(Gaeumannomyces graminis* var. *graminis)*: TARR is a crown and root rot disease that interferes with the turfgrass plant's ability to absorb water and nutrients, making it more susceptible to drought stress. While activity can occur year-round, symptoms are most prominent as turfgrass emerges from dormancy in the spring and early summer. Early signs include chlorotic leaves that eventually brown and wilt, followed by thinning turf and the formation of irregularly shaped brown patches ranging from 1 to 20 feet in diameter. Infected roots are typically short, blackened, and rotten, and stolons can often be lifted easily from the soil due to the weakened root system.

Although the disease does not spread readily through equipment, minimizing the movement of infected plant material is a sound management practice. Take-all root rot is favored by alkaline soils (pH above 6.5) and poor drainage. Management strategies include acidifying the soil with amendments such as compost, peat moss, or sulfur-containing products like manganese sulfate ($MnSO_4$), often applied through topdressing, aerification, or vertical mowing. To further reduce disease pressure, avoid excessive nitrogen fertilization in the fall, irrigation during winter and early spring, lime applications, and herbicide use during active disease periods.

Yellow Tuft *(Sclerophthora macrospora)*: Also known as downy mildew, this disease is caused by an oomycete—a water mold in the Oomycota class. It presents as small, yellow spots scattered across the turf stand. In zoysiagrass, it leads to chlorosis and excessive tillering. Yellow tuft is most active during cool, wet weather and is commonly found in poorly drained or excessively irrigated areas. Research has shown that three preventive applications of mefenoxam, applied every 2 weeks, can significantly reduce disease severity (Chahal & Hutchens, 2024).

For proper disease identification, samples can be submitted to the *Texas Plant Disease Diagnostic Lab*[10].

Insect Management

Zoysiagrass tends to be less susceptible to certain insect pests such as fall armyworms. However, under favorable environmental conditions, these pests can still pose a threat. Routine scouting and monitoring throughout the growing season are essential for early detection and effective management. Accurate diagnosis of insect-related damage is critical before implementing any control measures, as misidentification may lead to ineffective treatment or unnecessary pesticide use.

Conclusion

Zoysiagrasses are an increasingly popular turfgrass choice for lawns and public spaces due to their dense canopy, low maintenance needs, and natural resistance to weed invasion. Their successful establishment depends on proper site preparation and timely planting during active growth periods. Routine management—including mowing at proper heights and frequencies, applying irrigation based on plant needs, and fertilizing according to soil tests—ensures healthy growth and minimizes stress. Cultivation practices like aerification and verticutting help address soil compaction and thatch build-up, respectively. An IPM program, which combines cultural, mechanical, and chemical strategies, is essential for reducing weed, disease, and insect pressures. With proper care, zoysiagrass can provide durable, attractive turfgrass for a range of landscape applications.

[10] https://plantclinic.tamu.edu/

References

Boeri, P. A., Unruh, J. B., Kenworthy, K. E., Trenholm, L. E., & Rios, E. F. (2021). Aboveground and belowground traits of turf-type bahiagrass (*Paspalum notatum* Flügge) genotypes under simulated drought. *International Turfgrass Society Research Journal, 14*(1).

Chahal, S. S., & Hutchens, W. J. (2024). *Evaluating fungicide selection and application timings for control of 'yellow tuft' disease on zoysiagrass.* ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX.

Chalmers, D. R., Steinke, K., White, R., Thomas, J., & Fipps, G. (2008). *Evaluation of sixty-day drought survival in San Antonio of established turfgrass species and cultivars.* Texas A&M AgriLife Extension Service.

Gomez-Armayones, C., Kvalbein, A., Aamlid, T. S., & Knox, J. W. (2018). Assessing evidence on the agronomic and environmental impacts of turfgrass irrigation management. *Journal of Agronomy and Crop Science, 204*(4), 333–346.

Kreinberg, S. T., Kerns, J. P., Miller, G. L., Richardson, M. D., Spurlock, T. N., & Hutchens, W. J. (2025). Review of the biology and management of large patch of warm-season turfgrasses. *Crop Science, 65*(2), e70055.

Law, Q. D., Bigelow, C. A., & Patton, A. J. (2016). Selecting turfgrasses and mowing practices that reduce mowing requirements. *Crop Science, 56*(6), 3318–3327.

Patton, A. J. (2025). Why mow?: A review of the resulting ecosystem services and disservices from mowing turfgrass. *Crop Science, 65*(1), e21376.

Patton, A. J., Schwartz, B. M., & Kenworthy, K. E. (2017). Zoysiagrass (*Zoysia* spp.) history, utilization, and improvement in the United States: A review. *Crop Science, 57*(S1), S-37–S-72.

Swanson, C., & Fipps, G. (2023). *Landscape irrigation efficiency* [Publication No. AGEN-PU-219]. Texas A&M AgriLife Extension Service. https://agrilifelearn.tamu.edu/s/product/landscape-irrigation-efficiency/01t4x000007zTaLAAU

Wherley, B., Dukes, M. D., Cathey, S., Miller, G., & Sinclair, T. (2015). Consumptive water use and crop coefficients for warm-season turfgrass species in the southeastern United States. *Agricultural Water Management, 156*, 10–18.

Zhang, J., Poudel, B., Kenworthy, K., Unruh, J. B., Rowland, D., Erickson, J. E., & Kruse, J. (2018). Drought responses of above-ground and below-ground characteristics in warm-season turfgrass. *Journal of Agronomy and Crop Science, 205*(4), 1–12.