Cooperative Extension Service
C/T/A/H/R
College of Tropical Agriculture & Human Resources
University of Hawaii at Manoa

Turf Management
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TM-4

Adaptation of Turfgrasses in Hawaii

Turfgrass is a basic component of most landscapes. In addition to adding to the aesthetic value of the landscape, turf performs many other functions. It stabilizes the soil and prevents erosion by wind and water, reduces tracking of mud and dust into the home, cools the surroundings, reduces glare and noise, and serves as a recreational area.

Although many people consider lawn care a chore, others enjoy the outdoor activity and obtain satisfaction from maintaining an attractive lawn. If the turfgrass chosen is well adapted and properly established, lawn care is much more likely to be a pleasure. If the grass planted is not adapted to the particular situation, it is likely that no amount of care will produce a satisfactory turf. The major turfgrasses grown in Hawaii have wide difference in their ranges of adaptation. Knowing about the adaptation characteristics of lawn grasses helps homeowners and professional landscapers make the right choice for a particular site.

Certain adaptations are basic to survival of a grass species under specific environmental conditions and cannot be violated. Other characteristics such as color, texture, and density are a matter of personal preference.

Only "warm-season grasses" (sometimes called "tropical grasses") are suitable for lawns in Hawaii. Beware of the cool-season grass seed found in stores, often sold as "shady lawn mixture" and sometimes claimed to be particularly adapted to Hawaii. These mixtures of bluegrasses, fescues, ryegrasses, and bentgrasses will provide temporary cover, but they die after about two months of summer weather. Cool-season grasses are occasionally used at lower elevations in Hawaii for quickly providing an erosion-control cover while more permanent but slower growing plants get established. In some plantings of warm-season grasses for lawns, it can be helpful to mix a small amount of seed (10% by weight) of annual or perennial ryegrass with the warm-season grass seed. Because of its rapid germination and seedling vigor, ryegrass establishes quickly to protect the soil. It soon dies out as the warm-season grass takes over (be careful not to use too much ryegrass, or the warm-season grass may be crowded out).

In the following sections, the adaptation of common turfgrasses to various site and management situations in Hawaii is indicated. Indentations indicate the differences among the grasses; there are no apparent differences between grasses at the same indent level.

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Turfgrasses for Hawaii

common name	botanical name
bermudagrass*	*Cynodon dactylon*
bermudagrass (hybrids)	*Cynodon* spp.
buffalograss	*Buchloe dactyloides*
carpetgrass	*Axonopus affinis*
centipedegrass	*Eremochloa ophiuroides*
seashore paspalum	*Paspalum vaginatum*
St. Augustinegrass	*Stenotaphrum secundatum*
zoysiagrass	*Zoysia tenifolia, Z. matrella, Z. japonica*

*common and improved-common selections

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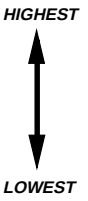
Shade adaptation

Landscape plantings include shrubs and trees of various size. Small trees often become large trees in a short time. For this reason, shade adaptation is a primary consideration in choosing a turfgrass, especially on windward sides of the islands.

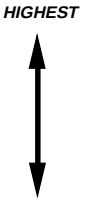
All turfgrasses grow better in full sunlight. Some grasses are able to grow in fairly dense shade, while others are intolerant of even light shade. None will grow in extremely dense shade such as that under large banyan trees. Much can be done to reduce the degree of shading of trees by selective thinning the canopy to allow penetration of light from above and by removing low limbs to allow penetration of light from the sides.



St. Augustinegrass
- zoysiagrasses
  - carpetgrassss
  - centipedegrass
  - seashore paspalum
    - bermudagrasses
    - buffalograss

Salt tolerance

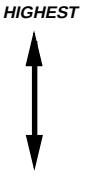
Many areas in Hawaii are exposed to salt spray, located over shallow water tables with high salt content, or irrigated with brackish water. Salt tolerance is therefore of great importance in these areas. Fortunately, there are several grasses that have a good degree of tolerance of salinity. If a shallow salt water table or poor-quality irrigation water is the problem, however, salinity may build up to levels that are higher than even the most tolerant turfgrasses can survive. Periodic leaching with fresh water is necessary to flush the salt from the surface soil in these areas.



seashore paspalum
- St. Augustinegrass
- *Zoysia japonica*
- bermudagrasses
  - buffalograss
  - carpetgrass
  - *Zoysia matrella*
  - centipedegrass

Drought tolerance

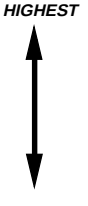
Drought tolerance is the ability of plants to survive extended periods of moisture stress. Many people believe that grasses that are drought tolerant require less water. This is not true if the grasses are to be maintained in an attractive condition. The water-use rates of the various warm-season grasses do not differ greatly. Drought tolerance does become important, however, during periods of water-use restrictions. On Oahu, Maui, and elsewhere in Hawaii, water-use restrictions are becoming more of a reality.



buffalograss
- bermudagrasses
- zoysiagrasses
  - St. Augustinegrass
  - seashore paspalum
  - centipedegrass
  - carpetgrass

Turf density

A dense turf discourages weed invasion and is more attractive. Turf density depends on the growth habit and internode length of the turfgrass. Grasses that have short internodes and spread by rhizomes and stolons provide the densest turf.

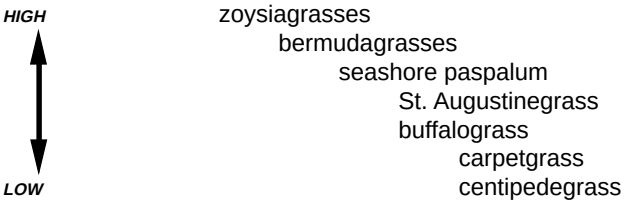


hybrid bermudagrasses
- zoysiagrasses
- seashore paspalum
  - common bermudagrasses
  - buffalograss
  - centipedegrass
  - carpetgrass
    - St. Augustinegrass

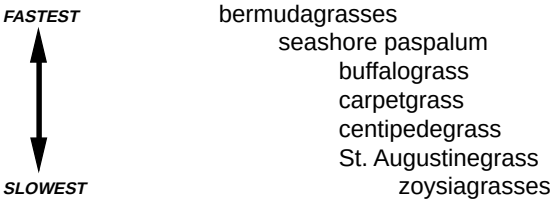
Wear tolerance

A turfgrass' tolerance of wear from traffic is very important for areas subjected to hard use, such as athletic fields. Home lawns are usually not likely to receive intensive use, although families with many children (or pets) who use the lawn for active games may require a wear-tolerant grass. The recovery from injury induced by wear is of more importance than the actual wear resistance of the grass. Zoysiagrasses, for example, are very tough and fibrous and resists wear better than any of the warm-season grasses. However, they are not recommended for use on intensive-use turf areas because of their slow recovery from wear damage.

Resistance to wear

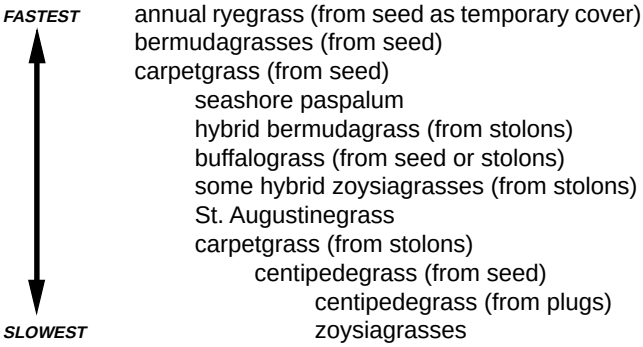


Recovery from wear



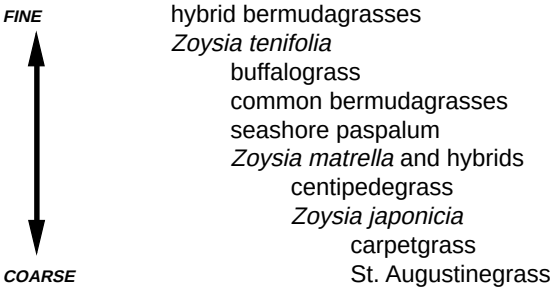
Establishment rate

The rate of establishment of turfgrasses is important, especially in areas subject to erosion. Ryegrass may be used to provide rapid cover until slower growing grasses are established. Most turfgrasses suitable for Hawaii must be established vegetatively from plugs, sod, or stolons. Some grasses may be seeded: common and "improved common" bermudagrass, carpetgrass, common buffalograss, and centipedegrass.



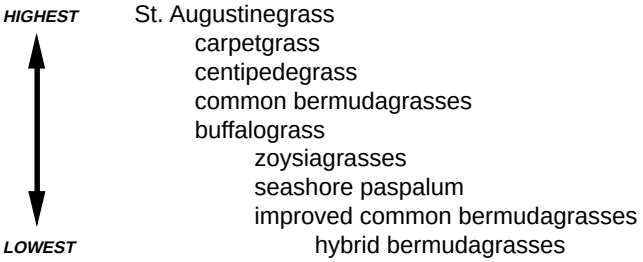
Leaf texture

Texture of lawn grasses depends on the width of the leaf blade. Finer textured grasses have narrow leaves and are generally more attractive if well maintained. The texture of most lawn grasses becomes finer with closer and more frequent mowing.



Mowing height

Grasses grown for special purposes, such as golf greens or bowling greens, must be mowed very low. Others may be mowed at higher cuts.



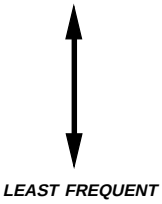
Maintenance requirements

Grasses differ greatly in their maintenance requirements (including fertilizer needs, susceptibility to pests, mowing frequency, irrigation requirement, and thatch control). As a general rule, fine textured grasses require a higher level of maintenance. Under low maintenance, coarse, taller growing grasses will be more attractive. The level of maintenance of the grass should be one of the first considerations in selection of a turfgrass for a given area. Homeowners sometimes tire of lawn maintenance after a few years, and lawns are allowed to deteriorate. Choice of grasses requiring lower maintenance would provide an attractive lawn with less effort.

hybrid bermudagrasses
seashore paspalum
zoysiagrasses
buffalograss
common bermudagrasses
St. Augustinegrass
carpetgrass
centipedegrass

Mowing frequency

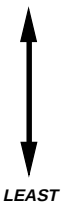
The time between mowings depends on the desired height of the grass. Golf greens kept at ¼ inch or less are mowed daily. Roadside grass maintained at 4–6 inches is mowed three or four times per year. Mowing frequency for the average, well maintained home lawn is usually between these two extremes.



hybrid bermudagrasses
seashore paspalum
zoysiagrasses
St. Augustinegrass
common bermudagrasses
carpetgrass
buffalograss
centipedegrass

Nitrogen requirements

Nitrogen fertilizer is required at regular intervals to maintain a quality lawn. The amount of nitrogen applied during the year depends on the quality expectations of the owner, the availability of water or irrigation, the quality of the soil, and the species of grass.



hybrid bermudagrasses
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seashore paspalum
zoysiagrasses
St. Augustinegrass
buffalograss
carpetgrass
centipedegrass

Other CTAHR publications on turfgrasses and lawn care can be ordered by calling 808-956-7046 or sending email to ctahrpub@hawaii.edu. They can also be obtained from the CTAHR website at <www.ctahr.hawaii.edu>. Related titles include:

St. Augustinegrass (TM-3)
'Sunturf' bermudagrass (TM-2)
Seashore paspalum (TM-1)
Common lawn grasses for Hawaii (II-22)
Testing your soil: why and how to take a soil-test sample (AS-4)
Chemical weed control recommendations for turfgrasses in Hawaii (II-20)
Nutgrass control in the lawn, landscape, and garden (L-9)