

BENTGRASS CULTIVAR MORPHOLOGY AND MANAGEMENT**James Beard****International Sports Turf Institute****College Station, Texas****Cultural System for Mature Bentgrass (*Agrostis* spp.) Dominant Putting Greens:**

Mowing Height	0.10 to 0.19 or 1/10 to 3/16 inch (2.5-4.8 mm); should use the lower cutting height of 1/8 inch (3.2 mm) or less for the high-density cultivars.
Mowing Frequency	From 6 to 7 days per week.
Mowing Pattern	Alter at each mowing in each of 4 directions.
Clippings	Removed.
Turf Grain Control	Use a groomer, V-groove, comb, or brush attachment on the greensmower as needed to prevent turf grain formation. Use of the groomer 1 to 3 times a week has been effective. Light vertical cutting may be required once per week for several weeks if a serious turf grain problem has developed.
Fertilization:	Nitrogen (N) Apply 0.3 to 0.7 lb N/1,000 sq ft (0.15 - 0.35 kg/100 m²) per growing month. Use 0.1 to 0.3 lb N/1,000 sq ft (0.05-0.15 kg/100 m²) per 10 to 15 growing days for a water-soluble, quick-release carrier or 0.3 to 0.7 lb N/1,000 sq ft (0.15-0.35 kg/100 m²) per 20 to 30 growing days for a controlled-release carrier. Minimize N fertilization during summer heat stress. Can use the lower nitrogen rate on the very high-density cultivars. Phosphorus (P) Apply at a rate based on a chemical soil test. Spring or autumn timing is best. Usually applied as part of a complete analysis fertilizer. Potassium (K) Apply at a rate based on a chemical soil test for fine-textured clay soils, plus K₂O at 75 to 100% of the nitrogen rate applied. Coarse-textured root zones may require 3 to 5 lb K₂O/1,000 sq ft (1.5-2.5 kg/100 m²) per year, usually split into 4 to 6 applications over the growing season. Iron (Fe) Apply 1 to 2 oz of iron carrier/1,000 sq ft (30- 60 g/100 m²) per growing month, usually split into 4 to 6 applications over the growing season. Other Nutrients Apply if a specific nutrient deficiency is diagnosed; an infrequent occurrence.
pH Correction	Maintain a pH between 5.5 and 6.5. Apply limestone or sulfur-based materials as needed based on an annual chemical soil test, if possible.
Irrigation	Replace lost moisture through the full depth of the root zone with each irrigation; schedule prior to development of visual wilt symptoms. Midday syringing may be needed to prevent wilt, timing being based on footprint symptom development. Be careful to not over-water.
Canopy Biomass Management	Punch cultivate weekly with 0.25 inch (6.4 mm), solid, high-density mini-tines to a 2-inch (50 mm) depth, especially on the very high-density cultivars.

Topdressing	Apply 2 to 6 times per year as needed for smoothing and thatch control. A minimum of twice per year suggested, with spring and autumn applications of 0.2 to 0.4 cu yd/1,000 sq ft (0.14-0.28 m ³ /100 m ²). Use as a follow-up to turf cultivation whenever possible at a higher application rate. May be applied as often as every 2 to 3 weeks during periods of active shoot growth at a rate of 0.1 cu yd/1,000 sq ft (0.07 m ³ /100 m ²).
Turf Cultivation	Use 1 to 6 times per year on mature putting greens. Core, slice, and/or water inject a minimum of twice yearly in late spring and early autumn. Higher frequencies and/or deep coring are needed on intensively trafficked greens grown on fine-textured silt or clay soil. Avoid turf cultivation during heat stress, if possible.
Spiking	Practice as needed to correct a developing surface soil compaction or impermeability problem, and to minimize the formation of a surface organic layer on new high-sand root zones. May also be used on a weekly basis during midsummer stress to enhance shoot and root rejuvenation.
Weed Control	Control broadleaves in the spring and autumn as they appear. Use MCPP and/or dicamba carefully at light rates. Avoid phenoxy herbicides, <i>eg.</i> 2,4-D, because of potential phytotoxicity. Use selected preemergence and postemergence weedy-grass herbicides with great caution due to potential phytotoxicity to certain bentgrasses. Manual removal often is the best approach for a scattered weed population.
Disease Control	Make a corrective fungicide treatment as injury symptoms appear or practice a preventive program, depending on the disease problem. A preventive program usually is used for warm-weather diseases in humid climates, including alternating among several classes of effective fungicides. Where winter diseases, such as snow molds, are a problem, a preventive fungicide program usually is needed.
Insect Control	Apply the appropriate biological or insecticide control as needed to correct a developing insect problem, or when anticipated.
Drainage	Adequate drainage is essential for healthy bentgrass putting greens that are subject to intense traffic. Use of a well-drained, medium-textured, high-sand root zone is particularly critical on greens in transitional and warm climates that are near the limit of bentgrass adaptation.