

# Penncross Creeping Bentgrass



Penncross has set the bentgrass standards since 1955. It has a medium green coloration, and has rapid establishment. It is known for its aggressive, lateral growth habit and wide range of adaptability. Penncross has excellent resistance to Dollar Spot as well as other diseases.

## FEATURES:

- Strong seedling vigor
- Aggressive growth
- Good wear tolerance
- Medium dark green color
- Good dollar spot resistance



## PERFORMANCE:

Penncross has set a new high standard for tees, fairways and more greens. With the addition of more than 400 golf courses every year, and today's sophisticated golfers watching more televised tournaments, reading countless golfing publications and playing more and more rounds, the awareness of, and demand for, Penncross continues on and on.

## SEEDING:

Penncross should be seeded at 1-2 lbs/1000 sq ft. in 2 perpendicular directions and worked into the soil with a sand rake in an up position followed by packing.



## ADAPTATION:

Early Penncross greens were established as far North as Anchorage, Alaska and Alberta, Canada as well as the warmer climate of Costa Rica, Spain, and Morocco. Now, the sun never sets on a Penncross green. Golfers in Australia, Asia, Africa and through out Europe have the same putting advantage as U.S. players, and world travelers feel at home at courses in remote destinations.

# PENNCROSS CREEPING BENTGRASS



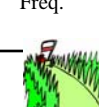

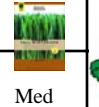
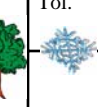
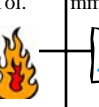




## DESCRIPTION

Penncross competes with *Poa annua* on putting greens, tees and fairways. Penncross's breeding began with 156 vegetatively propagated bentgrasses later reduced to 21. These were crossed for turf performance and the components were tested under a wide variety of locations in the US and Canada. Results show that Penncross has wide adaptability, tight, upright growth characteristics and fine leaf texture.

## APPLICATION

Developed exclusively for LHC lawn surfaces, golf course greens, tees and fairways, croquet and tennis courts and bowling tops because it produces one of the smoothest putting surfaces available, even in the most intense heat. Penncross is also used as a component in winter overseed blends and mixtures containing improved *Poa trivialis*, red top, velvet and colonial bentgrass.

## Turf Maintenance Characteristics

Growth Habit	Estab. Rate days	LHC Tol. 1/2"	Mowing Freq.	Traffic Tol.	Thatch Prod.	Comp. Mix	N. Reg.	Shade Tol.	Cold Tol.	Drought Tol.	ET rate mm/day	Endo-phyte	Salinity Tol. mmhos
 Bunch	 Med 14-21	 Excel- lent	 Daily	 Excellent	High	Poor	 Med 4-6 lbs*	 Fair	 Good	 Poor- Fair	 High >10	No	 15 Good

*LHC=low height of cut, ET=evapotranspiration, N=nitrogen \*per 1,000 sq. ft; rates may increase or decrease based on location, soil type, irrigation practices, desired turf quality, humidity & other abiotic and biotic factors.*

## PERFORMANCE

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## DENSITY

Penncross was developed in cooperation with turf scientists at Pennsylvania State University for improved turf quality, high shoot density and improved disease resistance. Studies indicate that tiller density of Penncross is similar to high shoot density varieties such as Crenshaw, SR 1020 and viper which exhibit 1400-1600 shoots per decimeter<sup>2</sup> which prefers frequent and low mowing heights (150,000 thousands) for optimal turf performance.

## CULTURAL PRACTICES (New Green)

**Soil Preparation:** Build root zone to USGA specification with all root zone material blended off-site to insure homogeneity.

**Seeding:** Seed @ .5-1.5 lbs/1,000 sq. ft. In two perpendicular directions and work seed into soil with sand rake in up position. Pack soil with roller or Sand Pro® tires which provide an excellent micro-environment for proper grow-in.

**Irrigation:** Water sufficiently to keep root zone moist at all times. This may require 2-7 sets per day during grow-in. Irrigation should be monitored from control site and/or hand watered during grow-in. Once established bentgrass has a high ET rate and is generally considered a high user of water. Excessive irrigation artificially cools soils and may lead to *Poa annua* encroachment. "Syringing" or water cooling is recommended in hot dry or humid conditions where ET rates exceed root rhizosphere water uptake.

<b>Comparative Shoot Density (Agrostis supp.)</b>		
Entry	Range in shoot density per decimeter <sup>2</sup>	Relative Shoot Density
Kingpin A-4, L-93	2,200-2,600	Very High
<b>Penncross Viper, SR1020</b>	<b>1,400-1,600</b>	<b>High</b>
Cobra, Penncross	1,000-1,100	Moderate
National, Emerald	800-900	Low
Seaside	600-700	Very Low

**Fertilization:** Leaching of soluble fertilizer prior to proper root, soil profile and microflora development dictated elevated rates of nitrogen during early grow-in. Generally, creeping bentgrass requires 4-10 lbs. N/1000 sq ft. annually with high range (8-10) during first year grow-in and the low range (4-6) post grow-in. During hot summer periods N fertility should be “spoon fed” in ¼ to 1/8 lb increments to reduce succulent growth and decrease incidence of warm season related disease potential. Availability and amount of nutrients applied are radically different across professional turf environments and course environments. Phosphorus levels generally range in the 2-5 lbs. PO/1000 sq ft. with reduced levels to discourage *Poa annua* invasion. Potassium is often utilized to encourage strong cell wall development while reducing high N levels to discourage succulent tissue growth. Potassium levels range in the 8-12 lbs KO/1000 sq ft. on new and existing golf course greens.

**Mowing:** The first mowing should be made 14-21 days following germination at 7/32 to 1/2 inch and lowered 1/16 to 1/32 of an inch per week. Conditions may differ across environments. 100% coverage can be attained in 30-90 days depending upon environment and grow-in conditions. Once fully established greens should be mowed 3-6 days a week.

**pH and Iron:** Creeping bentgrass prefers a pH of 5.5 to 6.0 for optimal growth. Consider applications of mini-prill limestone applied in spring and fall. Low pH encourages *Poa annua* encroachment. This product also provides a good source of calcium and magnesium which is often limited in new sand based greens. Iron should be provided. Chelated iron products are available when soil pH is higher than recommended for creeping bentgrass. For deeper turf color consider iron in lieu of higher N rates.

**Top dressing:** To obtain a smooth surface following seeding it is essential to top dress. Frequency and volume is dependent on particular environment and grow-in conditions. Incorporate with non-abrasive mat and do not over top dress as you will inhibit shoot growth. Open non-germinating areas on greens can be top dressed and reseeded as needed.

**When to open for play:** Generally, sand based greens can be opened for play in 5-9 months depending upon environment, grow-in conditions and management requirements. If play begins in 5 months or less, summer openings should be discouraged. The juvenile nature of new creeping bentgrass and summer induced stress may provide opportunities for improper establishment and problematic greens in the long run. Fall conditions are best when play is on the decline and conditions are conducive to creeping bentgrass growth (shortening day length and decreasing soil temperatures).

**Verticutting:** Successful thatch layer development is a key to successful green formation. Verticutting and general disruption of the soil/thatch interface should be minimized. Under less than optimal growing conditions this often encourages *Poa annua* encroachment. If verticutting is required it should be done lightly every 3-5 weeks during the growing season.

**Aeration:** Management of excessive thatch layer is also critical to long term performance of golf course greens. Generally 2 core aeration are recommended during the year (spring and fall) followed by top dressing. This helps reduce localized dry spot (hydrophobic soil/thatch interface). Water injection can be employed during summer induced stress with favorable results. Reducing N rates and utilization of slower nutrient release sources or “spoon feeding” will also keep thatch levels manageable.

**Disease control:** Some of the prevalent diseases that afflict golf course greens are warm season induced such as Pythium blight, *Pythium* spp.; brown patch, *Rhizoctonia* spp.; and *Poa* or summer patch, *Manaportha poae*. Cool weather disease such as dollar spot, *Lanzia and Loellerodiscus* spp.; pink snowmold, *Gerlachia nivalis*; and gray snowmold, *Typhula* incarnate are common. A successful disease control program will be one of preventative maintenance utilizing both systemic and contact fungicides. Contact fungicides are used to treat heavily infected areas in a curative approach as well as spot treatments as outbreaks occur. Alternating systemics and contacts to vary active ingredient load and discourage chemical resistance by indigenous disease organisms is recommended.

**Weed Control:** During establishment weed control is critical. Low level weed contamination may require only selective hand weeding. Significant weed encroachment may require low rates of herbicides such as Trimec, Dicamba and MCPP. Selective growth regulators such as Fluoprimidol (Cutless) and paclobutrazol (TGR) have been useful in reducing *Poa annua* encroachment on new and established greens. Ethofumesate (Progress) has been a good pre-emergent early post-emergent controller of many annual grassy weeds including *Poa annua*. Always follow the label and manufacturer’s recommendations.

## OVERSEEDING/RESEEDING

Interseeding of existing bentgrass or *Poa annua* greens, tees or fairways is strongly recommended. Sowing should be done when conditions are most favorable to bentgrass establishment. High soil temperature, low humidity with increasing photoperiod and soil temperature are optimal conditions during spring. In fall, sow early when soil temperature is elevated and proper late season stolonization can be maximized. Consider utilization of growth regulator such as Primo® to reduce existing crop competition. This will expedite establishment of seedling bentgrass under high plant population competition.

\*All reference to pesticides, herbicides and fungicides whether a generic or named product is for general informational purposes only. Text reference is not intended as an endorsement nor does omission imply criticism. Always read and follow labeled instructions.



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