



Viper

CREEPING BENTGRASS

TURF MAINTENANCE CHARACTERISTICS

Growth Habit	Estab. Rate Days	LHC Tol. 1/2"	Mowing Freq.	Traffic Tol. (Brinkman)	Thatch Prod.	Comp. Mix	N Req.	Shade Tol.	Cold Tol.	Drought Tol.	ET Rate mm/day	Endophyte	Salinity Tol. mmhos
Stolons	Med. 14-21	Excellent	Daily	Good	High	Poor	Low-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 and other abiotic and biotic factors.

BREEDER

Cebeco International Seeds, Inc. / NJAES

DESCRIPTION

Viper is an elite creeping bentgrass that produces a semi-erect, non-grainy, uniform and very dark green LHC putting surface. Viper is a winter and summer active variety in contrast to the "Southern adapted" creeping bentgrasses that require excessive heat units for proper tillering during spring green-up.

APPLICATION

Developed exclusively for LHC lawn surfaces; golf course greens, tees and fairways; croquet and tennis courts and bowling tops. Viper is also used as a minor component in winter overseed mixtures containing improved *Poa trivialis*.

PERFORMANCE

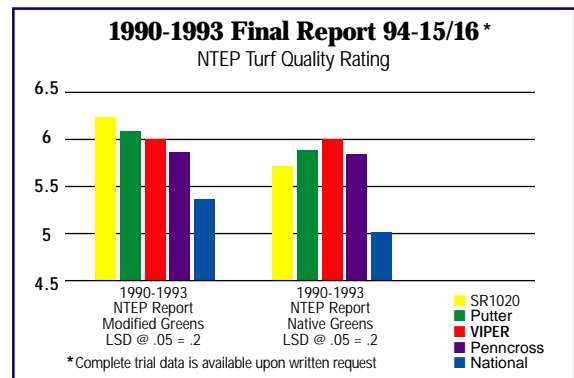
Viper has been tested extensively in the US, Australia and Japan with excellent results. Statistically rated first in turf quality ratings in 1993 NTEP Summary Report in Native Soil Greens Test at 36 US locations for over four years. Ranked 2nd in similar trials conducted on Modified Soil Greens across the US. Viper exhibits resistance to dollar spot and moderate resistance to brown patch.

DENSITY

Viper resulted from a breeding project to increase shoot density per unit area over the parental material, Cobra. Studies indicate that tiller density of Viper is similar to high shoot density varieties such as Crenshaw and SR 1020 which range in the 1,500 shoots per decimeter². However, Viper does not exhibit the shoot density of the new improved bentgrass varieties such as A-1, G-2, G-6 and A-4. Viper does not require 5/32" or less height of cut to eliminate potential for scalping or excessive thatch accumulation.

CULTURAL PRACTICES (New Green)

- **Soil preparation:** Build root zone to USGA specifications 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 medium with roller or sand Pro tires which provide an excellent micro-environment for proper grow-in.



Comparative Shoot Density
Agrostis spp.

Entry	Range in shoot density per decimeter ²	Relative shoot density
G-2, G-6 A-1, A-4	2,200-2,600	Very high
VIPER Crenshaw SR 1020	1,400-1,600	High
Cobra Pennncross	1,000-1,100	Moderate
National Emerald	800-900	Low
Seaside	600-700	Very Low

- **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. "Syrringing" or water cooling is recommended in hot dry or humid conditions where ET rates exceed root rhizosphere water uptake.
- **Fertilizer:** Leaching of soluble fertilizer prior to proper root, soil profile and microflora development dictates elevated rates of nitrogen during early grow-in. Generally, creeping bentgrass requires 4-10 lbs. N/1,000 sq. ft. annually with the 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 ½ 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 golf course environments. Phosphorus levels generally range in the 2-5 lbs. P₂O₅/1,000 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. K₂O/1,000 sq. ft. on new and existing golf course greens.
- **Mowing:** The first mowing should be made 14-21 days following germination at ⅜ to ½ inch and lowered ⅙ to ⅓ of an inch per week. Conditions may differ across environments. 100% coverage can be attained in 30 to 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 optimum 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 two (2) core aerations 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. Dropping of 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, *Magnaporthe poae*. Cool weather disease such as dollar spot, *Lanzia* and *Loellerodiscus spp.*; pink snowmold, *Gerlachia nivalis*; and gray snowmold, *Typhula incarnata* 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, 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 (Prograss) 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 tillering 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.

Any and all reference to pesticides, herbicides and fungicides, whether generic or named products, is for general informational purposes only. Text reference is not intended as an endorsement, nor does omission imply criticism. Always read and follow label directions.



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