

The Problems of Puffiness In Putting Greens

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ON OCCASIONS, bentgrass and *Poa annua* greens develop soft, puffy qualities that tend to ridge or buckle into a slightly higher position than established by the mower. The loose, dense, poorly rooted growth makes a poor putting surface. This slight unevenness occasionally enables the mower to grab chunks of the soft, puffy turf and it scalps or gouges the surface. This produces a poor green. Thick, vigorous growth, poor roots, and possibly certain mowing practices are probably the causes.

Generous watering, nitrogen, and ideal weather conditions seem logical causes of this puffiness. A nitrogen study on bentgrass, conducted for other purposes, developed this characteristic in varying amounts after a period of four years of treatments. The mixed turf of Penncross/Seaside was mowed with a heavier type single-unit green mower at 1/4-inch cut three times a week. Rainfall from March through September ranged from 2.4 to 4.9 inches per month. During continued dryness, 1/2 inch of water was applied three times per week. Cultivation and topdressing were used annually. Fungicides were applied at approximately two- to three-week intervals; this program prevented severe disease injury.

Results of puffiness ratings were made on the nitrogen plots over a five-year period and were replicated three times. These are given in Tables 1 and 2.

In Table 1, note that with the two sources of nitrogen, an annual rate of eight pounds nitrogen per 1000 square feet showed more than twice the amount of puffiness observed with four pounds nitrogen per year. Steady or cool-season fertilization appeared to cause more puffiness than warm-weather applications. Significant amounts of mower scalping had developed by the ninth year. Again, the problem was more severe with the higher rates of nitrogen and appeared to be associated with greater nitrogen stimulation.

Puffiness ratings are given for three nitrogen sources at eight pounds of nitrogen (Table 2). Activated sludge that also supplies phosphorus and some trace nutrients caused less puffiness than the nitrogen treatments with urea and appeared to give less than urea-formaldehyde. Nitrogen applications in cool weather increased puffiness. Mower scalping ratings had their lowest reading on the activated sludge plots in warm weather.

General comments on puffiness of bentgrass turf might be summarized as follows:

1. In test plots, expression of puffiness occurred with more vigorous growth from more generous nitrogen use.
2. Puffiness led to mower injury as the turf aged. This result is logical. Older bentgrass plants tend to have

weak roots, as their proneness to desiccation or summer injury has often indicated.

3. The ingredients for puffiness on greens appear to be thick topgrowth and weak roots. Such factors as cool, ideal growing weather, generous nitrogen and weak growth of older plants are suggested by both the test results and by our observations. This does not preclude involvement of other factors such as abundant soil moisture.

4. The test results did not permit evaluation on cutting height influence. It is expected that closer mowing does not permit as much puffiness as higher mowing or at least it is less noticeable. Yet, it seems high nitrogen and aged turf plants encourage this condition even in very closely cut turf.

5. Future development of improved bentgrass types should include varieties

"Teased" Poa annua from a putting green.



that are less prone to puffy greens surfaces.

Suggestions for greens troubled with puffiness are:

- Use minimal amounts of nitrogen, particularly just before and during cool, ideal growing weather.
- Practice frequent, light vertical mowing during the "puffy season."

Light vertical mowing is emphasized — just a touch to the grass blade.

• Light topdressings (and perhaps cultivation) to rejuvenate the turf. This will reduce puffiness and produce better putting conditions. Furthermore, the use of minimal nitrogen complements our recommendations for reducing injury from disease and temperature extremes.

News Notes For Early Summer

Bill Bengeyfield Named Green Section National Director

William H. Bengeyfield, who joined the USGA Staff in 1954, was named National Director for the Green Section on February 1, 1982. He served for 26 years as Western Director and 15 years of that as Editor of the GREEN SECTION RECORD. He replaces Alexander M. Radko, who retired November 30, 1981, after 35 years of service.

In his new duties, Bengeyfield will supervise the USGA's 12-man Green Section staff, continue to serve as Editor of the RECORD and have overall responsibilities for course preparations at USGA Championships. He will also participate in the activities of the new USGA Turfgrass Research Advisory Committee.

Bengeyfield returns to Green Section work after an absence of four years. In 1978, he became Director of Golf Course and Grounds Maintenance at the 36-hole golf and recreation complex at Industry Hills, California. He retains his affiliation at Industry Hills.

Bill Brewer Resigns

Since 1976, William S. Brewer, Jr., has been a Green Section senior agronomist for the Northeastern Region. He announced his resignation in early February. In following new pursuits, the entire staff wishes him well.

A New Agronomist and New Green Section Office in Florida

Steve M. Batten, master's degree graduate of Oklahoma State University, joined the USGA Green Section staff in February, 1982. Prior to his Green Section assignment, Steve worked at Texas A&M University as research associate for Dr. James B. Beard. Not only did his work include extensive turfgrass weed research and cultivar evaluation, but he was also project leader for turfgrass research for the state of Texas. An excellent artist, Steve has been illustrator of three turfgrass books, including the latest one sponsored by the USGA. He has been involved in golf course maintenance or turf research for the past 20 years.

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TABLE 1.
Effect of Nitrogen Rate on Puffiness and
Mower Scalping of Bentgrass Turf

Nitrogen Source	Season of Application (1)	Nitrogen Rate lbs/M/year	Average of Five Ratings from 1964 thru 1969 (%)	Mower Scalping 9th year (2) (%)
urea	steady	8	18	16
urea	steady	4	8	4
urea	cool	8	22	19
urea	cool	4	7	8
activated sludge	steady	8	9	11
activated sludge	steady	4	3	1
activated sludge	warm	8	6	4
activated sludge	warm	4	2	2

(1) Repeat applications in the respective seasons.

(2) Average of 2 ratings with accumulated mower damage in the 9th year.

TABLE 2.
Effect of Nitrogen Source on Puffiness and
Mower Scalping of Bentgrass

Nitrogen Source	Season of Application (1)	Average of Five Puffiness Ratings (%)	Mower Scalping (%)
activated sludge	steady	9	11
activated sludge	warm	6	4
urea	steady	18	16
urea	cool	22	19
ureaform	steady	7	14
ureaform	cool	13	15
ureaform	warm	9	12
ureaform	March	13	11
ureaform	September	6	13

(1) Repeat applications totaled 8 lbs. N/M/year — except the March and September ureaform treatments, which were single application.