

# SEEDING RATE: IT'S EFFECT ON DISEASE AND WEED ENCROACHMENT

By A. Douglas Brede



Difference in broadleaf weed encroachment. Turf on right of stake was seeded with Kentucky bluegrass at three pounds per 1,000 square feet. The area to the left was seeded at less than one pound.

Seeding rate recommendations—the figures listed in most turfgrass textbooks—have been developed over the years by “seat of the pants” observation by turfgrass experts and authors. Until the late 1970s, little was known as to why these rates were best.

New research from several United States universities has shown that, under certain circumstances, deviations from these recommended rates are not only allowable, but oftentimes advisable. By knowing when to deviate from these rates, the educated turfgrass manager can make better decisions on a case-by-case basis of when and where to use higher or lower rates than are published.

I began a study in 1976 at Pennsylvania State University to scientifically investigate the effects of the seeding rate on the maturation of a turf stand and development of weeds and diseases.

Specifically, we wanted to answer several questions: How long are the effects of seeding rate felt on the turfgrass stand? Is seeding rate of a transitory nature, exerting effects on the stand during only the first six months? Can higher seeding rates be used to effectively compete against annual bluegrass? Do certain cutting heights

“prefer” certain seeding rates? And, What effect does turfgrass variety have on seeding rate? Kentucky bluegrass was chosen for this study.

I evaluated the progress of this experiment for five years after planting. On regular intervals we sampled the shoot density of the plots. We found that even 41 months after planting (nearly four years later), we were able to detect statistically significant differences among the four seeding rates in shoot density. It wasn't until nearly five years after the trial was established that we were no longer able to detect seeding rate effects on shoot density.

We also found that it is desirable to use higher seeding rates with lower cutting heights. This is because lower cutting heights require more plants per square foot to maintain 100 percent ground cover than does a higher cut stand.

The one pound of bluegrass seed per thousand square feet listed in many older turfgrass textbooks may have been appropriate when we were mowing Kentucky bluegrass at three inches height. Our research indicated that seeding rate should be doubled for every halving of the cutting height.

For instance, while one pound might be

acceptable for a three-inch cut, a two-pound rate might be better for an inch and a half, and a four-pound rate for a three-quarter-inch intended mowing height. This provides the desired shoot density of the stand without the usual “equilibration” period.

The effect of Kentucky bluegrass seeding rate on encroachment of annual bluegrass is quite profound. Using a low seeding rate or a weak cultivar will “open the door” for invasion of annual bluegrass. This invasion can occur simultaneously with emergence of the Kentucky bluegrass or may happen within the first six months or a year after planting, due to a thin stand. Any time we do not have complete ground coverage of a turf stand, annual bluegrass being an opportunistic weed can take over.

Seeding rates of three to four pounds of Kentucky bluegrass per 1,000 square feet were desirable where annual bluegrass seed was prevalent in the soil. Vigorous cultivars were also more desirable for use in competing with annual bluegrass.

But you can get too much of a good thing. Going too far on the other extreme (seeding too heavily) may bring about added disease problems. We found that incidence of leafspot and Fusarium blight complex was directly related to seeding rate.

Seeding rates above 3.5 pounds Kentucky bluegrass seed per thousand square feet increased the risk of disease during the establishment phase. Once a dense stand was hit with disease, however, the shoot density was lowered by the disease, and the stand subsequently had fewer disease problems.

Where we prolonged the high-shoot density by means of fungicides, the stand was at a greater risk of disease damage during times when fungicides were skipped or withheld.

Ideal rates for seeding Kentucky bluegrass are two to three pounds of seed per thousand square feet. One pound or less would be considered too light, and greater than five pounds, excessive. Perennial ryegrass is best used at four to eight pounds per thousand square feet, with two pounds or less being too light, and greater than ten being excessive (except for over-seeding).

Tall fescue benefits from a stouter seeding rate of six to ten pounds of seed per thousand square feet. Skimping on tall fescue seed is undesirable since tall fescue has no runners. Seeding at less than six pounds per thousand square feet is considered too light, whereas seeding at greater than 15 pounds of seed per thousand square feet would be excessive.

*Editor's Note: A. Douglas Brede, Ph.D. is a research director. This article is an excerpt from a paper presented at the 1988 annual meeting of the Northwest Turfgrass Association in Spokane, WA.*