

Conversion of Ryegrass Fairways to Bluegrass: Impossible Dream?

Colorado State University research suggests converting perennial ryegrass fairways to Kentucky bluegrass is a long shot.

BY TONY KOSKI, PH.D., AND JAMES NEWBERRY

Until recently, Kentucky bluegrass and creeping bentgrass (along with annual bluegrass) were the standard grasses for northern, cool-season zone golf course fairways. The use of perennial ryegrass for new fairways has become increasingly common in the last 10–15 years.¹ Further, ryegrass had become a favorite overseeding species for older bluegrass fairways — resulting in the rapid conversion of those fairways to nearly 100% ryegrass.

Perennial ryegrass is easy to establish, can be mowed easily at heights less than one inch, forms little thatch, and allows the safe use of ethofumesate (Prograss) for annual bluegrass control. However, the problem of gray leaf spot on perennial ryegrass has caused superintendents to reexamine its use in some areas of the country. The recent development of Kentucky bluegrass cultivars tolerant of mowing heights in the $\frac{1}{2}$ -inch to $\frac{3}{4}$ -inch range has created interest in the use of bluegrass for high-maintenance fairways where ryegrass use has encountered problems.^{1,2}

SO WHERE'S THE PROBLEM?

If one could convert fairways to perennial ryegrass so quickly via overseeding, it stands to reason that conversion to Kentucky bluegrass could be accomplished just as easily — especially when using the new cultivars that performed well under low mowing. However, observations of fairways where bluegrass overseeding had been attempted revealed little or no bluegrass — except in those areas where the ryegrass had



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been thinned or killed by disease or winter injury.

A review of the research literature showed that no one had studied overseeding into ryegrass to any extent. Considerable work had examined conversion programs for *Poa annua* fairways, as well as the introduction of new bentgrass cultivars into older bentgrass greens.^{4,5,6} A general conclusion was that conversion (in fairways, for example) to ryegrass via overseeding was relatively easy to accomplish and conversion of older greens to newer bentgrass cultivars was a difficult process — unless the existing bentgrass was intentionally thinned by aggressive cultivation practices prior to seeding. Anecdotal evidence seemed to indicate the same for conversion from ryegrass to bluegrass:

it was usually unsuccessful unless the ryegrass had been significantly thinned prior to seeding.

In the spring of 2000, a study was begun by James Newberry, a graduate student at Colorado State University, to test the effectiveness of different seeding strategies for introducing Kentucky bluegrass into perennial ryegrass fairways.

THE ON-COURSE C.S.U. STUDY

Sponsored by the Golf Course Superintendents Association of America and the Rocky Mountain Golf Course Superintendents Association, a field study was begun in June 2000 at two Denver-area golf courses: Fox Hollow at Lakewood (Bruce Nelson, CGCS,

and Mark Krick) and Rolling Hills Country Club (Bob Kinder, CGCS). The intent was to do a replicated experiment, but using equipment and techniques used by the golf course superintendent. Further, the study areas were in play and maintained identically to the rest of the golf course. Seed was supplied by Jacklin Seed, while Colorado Golf and Turf furnished the Bunton slit-seeder and tractor.

In Year 1, plots were seeded with either 3 or 6 pounds of Award Kentucky bluegrass seed per 1,000 square feet in spring and fall (6 and 12 pounds of seed per 1,000 square feet per year), or in spring/summer/fall (total of 9 or 18 pounds of seed per 1,000 square feet per year). In half of the plots, the plant growth regulator (PGR) Primo (trinexapac ethyl) was applied one week prior to seeding at a rate of 22 ounces per acre. Data were collected every two weeks, including plot quality and species composition.

In Year 2, new plots were started adjacent to the previous year's study, using the same treatments described above. However, the Year 1 plots were also overseeded again to evaluate the cumulative effect of multiple-year seeding. In Year 3, plots were seeded a final time in the spring.

UNIMPRESSIVE RESULTS

Despite cumulative seeding rates as high as 42 pounds of seed per 1,000 square feet over a 2½-year period, no Kentucky bluegrass could be found in the intact areas of any of the plots. In fact, the only bluegrass to be found was in divoted areas that had been overseeded when the divots were still open. It was obvious that slit-seeding Kentucky bluegrass into healthy perennial ryegrass fairway turf, even with the use of a PGR to suppress ryegrass growth, was a totally ineffective method for introducing, much less converting, bluegrass into these fairways.

It should be noted that we did see bluegrass seed germination in the fairways. Within a couple of weeks of seed-

ing, bluegrass seeds were germinating in the seeder slits (approximately ¼-inch depth). And some seedlings, although spindly and weak, did emerge from the slits. But the seedlings did not mature into healthy adult plants.

Though discouraging, the results were not totally unexpected. Observations over the years by turf extension specialists, USGA agronomists, and many golf course superintendents have noted the general futility of overseeding bluegrass into established ryegrass turf.



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SO WHAT IS THE PROBLEM?

Although there is little research (at least with ryegrass) to provide answers to this question, it would appear that the poor/non-existent bluegrass establishment results from the fact that either perennial ryegrass is an extremely competitive plant that allows little opportunity for bluegrass (especially a seedling) to become established, or perennial ryegrass is allelopathic, producing chemicals that suppress and kill bluegrass seedlings. While there is some evidence in the research literature to indicate possible allelopathy in ryegrass, there is a good amount of disagreement among scientists on the subject.

On the other hand, research published by Dr. Doug Brede in the early

1980s supports the theory that perennial ryegrass is an extremely competitive plant when mixed with a less-competitive one, like bluegrass.^{1,2} Although his work examined ryegrass and bluegrass in seedling mixtures, one could logically conclude that a mature stand of perennial ryegrass is an even more effective competitor against seedling bluegrass plants.

The results of this study, along with anecdotal field observations by agronomists and superintendents over the years, would suggest that the overseeding (via slit-seeding) of perennial ryegrass fairways with any amount of bluegrass is a futile practice. The results of another C.S.U. study, along with recent superintendent trials, would indicate that some level of success might be attained when overseeding is done in conjunction with core cultivation. The larger opening may provide some space in which the young bluegrass seedlings can mature and develop.

LITERATURE CITED

1. Brede, A. D., and J. M. Duich. 1984. Initial mowing of Kentucky bluegrass / perennial ryegrass seedling turf mixtures. *Agron. J.* 76(5):711-714.
2. Brede, A. D., and J. M. Duich. 1984. Establishment characteristics of Kentucky bluegrass / perennial ryegrass turf mixtures as affected by seeding rate and ratio. *Agron. J.* 76(6):875-879.
3. Carrow, R. N., and J. Troll. 1977. Cutting height and nitrogen effects on improved perennial ryegrass in monostand and polystand communities. *Agron. J.* 69(1):5-10.
4. Cattani, D. J., and J. N. Nowak. 2001. Interseeding in creeping bentgrass: a viable option or wishful thinking? *Golf Course Management* 69(8):49-54.
5. Rossi, F. 1999. Interseeding bentgrass into established turf. *Golf Course Management* 67(8):53-56.
6. Sweeney, P., and K. Danneberger. 1998. Introducing a new creeping bentgrass cultivar through interseeding: does it work? *USGA Green Section Record* 36(5):1-4.

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