

Creeping Bentgrass Fairway Divot Recovery as Affected by Irrigation Frequency, Cultivar and Divot Mixture Seed Additions: 2003

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Objective:

To determine the effect of irrigation frequency, single creeping bentgrass cultivar or blend, and seed additions on divot recovery of a simulated golf course fairway.

Rationale:

For golf course superintendents, maintaining maximum turf cover on tees and fairways is difficult during the peak use season due to the severe damage created by frequent devoting from golf clubs. Rapid divot recovery requires a healthy, vigorously growing turfgrass plant and good management skills. Many golf courses spend considerable time and effort on management practices like divot filling, adding seed to divot mixtures and fertilizing to speed divot recovery. Furthermore, it has been reported that older bentgrass cultivars like 'Pennncross', which possess a more prostrate growth habit, may recover from divots more quickly than the recently introduced and widely planted upright growing cultivars like 'L-93'. Under fairway conditions, many golf course managers employ a deep and infrequent irrigation strategy to discourage annual bluegrass invasion and to improve playing conditions, which enhances ball roll. While this strategy may be an effective cultural weed control it may negatively impact bentgrass lateral growth rates and also affect seedling survival in the sand/seed mixtures often used to encourage divot recovery.

How it was done:

This experiment was conducted during the 2003 growing season at the W.H. Daniel Turfgrass Research and Diagnostic Center, West Lafayette, IN. In August 2002, 24 creeping bentgrass sub-plots (10 x 10 ft) consisting of either L-93, Pennncross, or a 50%/50% Pennncross/L-93 blend, were seeded at 1 lb. of pure live seed per 1000 ft² in two independently controlled irrigation blocks (70 ft x 70 ft) which would be used to deliver the two irrigation regimes: frequent (daily with 0.2 inches of irrigation) or infrequently (every 3-4 days) in the absence of rainfall. The plots were mowed three times per week, with clippings removed, at a height of ½ inch. The area was fertilized throughout the season with approximately 3.5 lbs. of actual nitrogen in the form of slow release methylene urea, and urea. Fungicides to control dollar spot were applied on a curative basis using several contact fungicides.

A radial divot extraction device (Figure 1) was used to create divots once per week from 4 June, 2003 to 4 September, 2003. After the vegetative divot material was removed, the resultant voids were backfilled with a sand:soil mixture (8:2 v/v) with or without seed (L-93, Pennncross, or Pennncross/L-93 seed, 5% v/v). Divot recovery was determined each week using a digital camera mounted from a fixed height (9 inches) on a camera stand with a uniformly sized opening in the base that was nearly the same length and width of the original divots (Figure 2). The digital images were analyzed using Sigma Scan digital imaging software which quantified the percentage green cover in the camera stand opening.

Results:

Divot recovery across all treatments was affected by divot removal date. For example the divots removed on 4 June took approximately 5 and 5.8 weeks to reach 75 and 90 % cover, respectively (Figure 3). By contrast divots taken on 13 August or 4 Sept. took nearly 9 weeks to reach 90 % cover. This more rapid coverage of the divots removed earlier in the season indicates that perhaps the bentgrass was possibly healthier or the environmental conditions were more conducive to faster divot recovery.

Irrigation frequency had no apparent effect on divot recovery (Figure 4). Although this was not anticipated at the beginning of this study it is possible that the unusually wet summer conditions experienced in North Central Indiana had a strong impact on this factor of the experiment. As expected, the addition of seed (5 % v/v) to the sand/soil divot mixture improved divot recovery by nearly one week for both the 75 % and 90 % coverage ratings (Figure 5).

Among cultivars without seed added to the divot mixture, there were noticeable cultivar effects. At the 75 % recovery value, 'Penncross' took nearly six weeks, whereas, 'L-93' took almost 7 weeks (Figure 6). At the 90 % recovery value 'Penncross' took almost 7.5 weeks and 'L-93' took 8.5 weeks. The blend of the two cultivars performed much like that of 'Penncross', and provided similar recovery rates. There was no apparent difference between either cultivar or the blend when seed was added to the divot mixtures. This study will continue in 2004 and further understanding of the factors affecting divot recovery can be determined.



Figure 1: Radial divot extraction device.



Figure 2: Camera stand with opening the size of original divot.

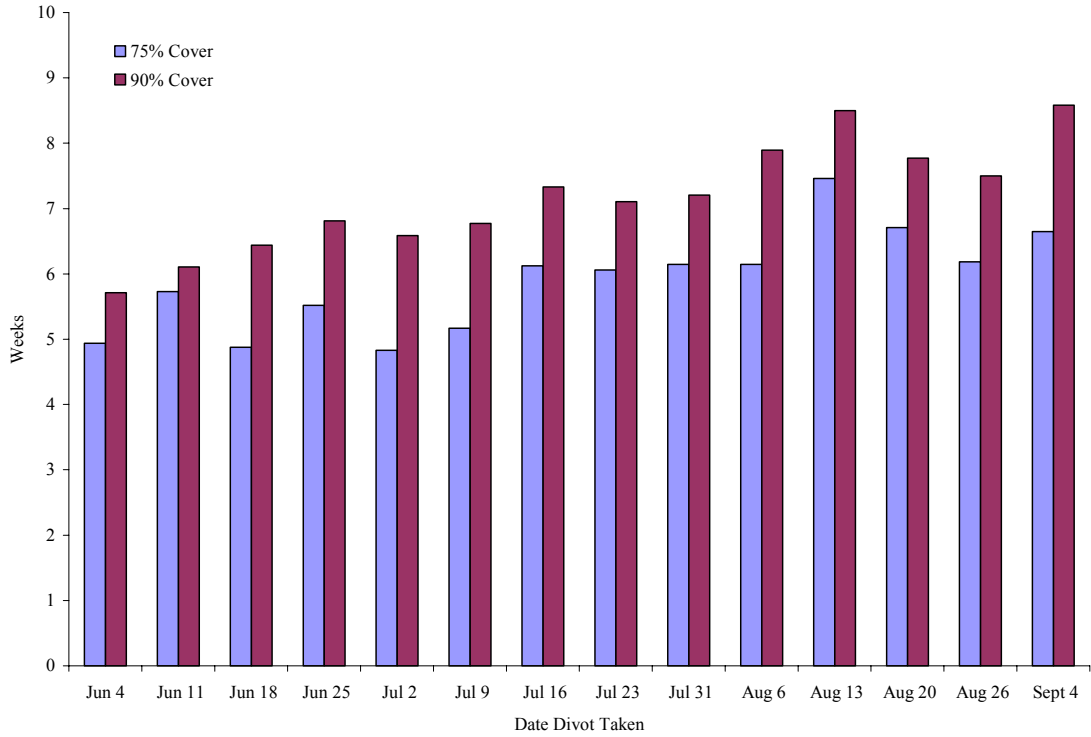


Figure 3. Average number of weeks to 75% and 90% cover from time divot was taken.

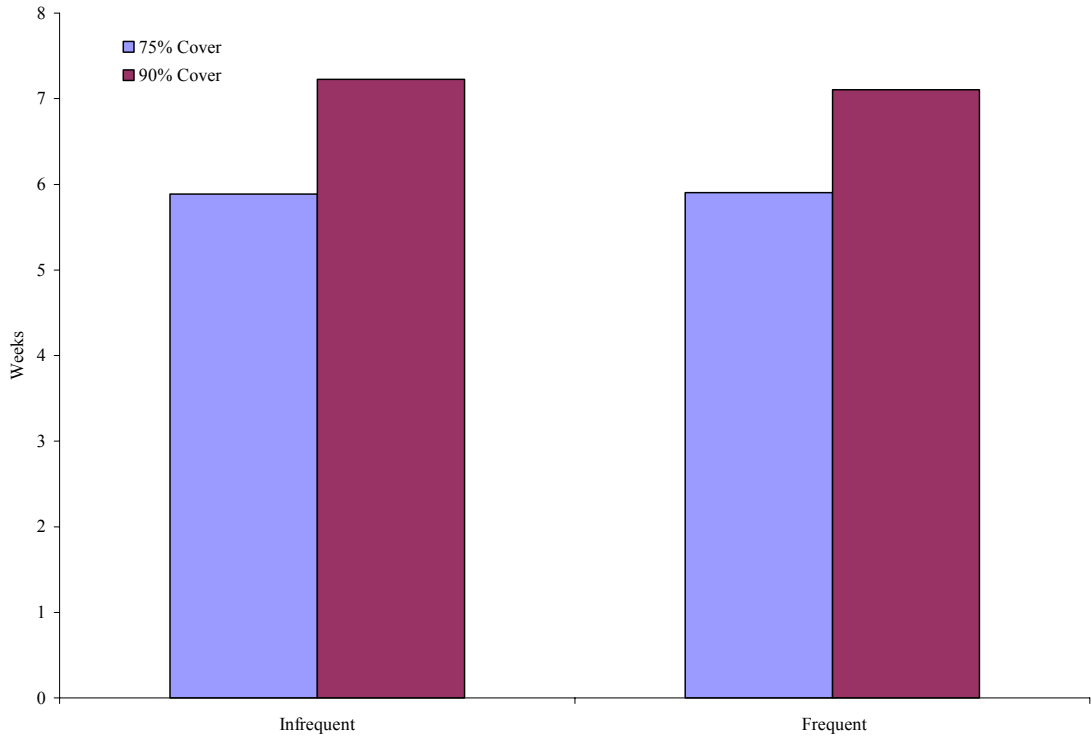


Figure 4. Average number of weeks to 75% and 90% cover across all divots by frequency of irrigation.

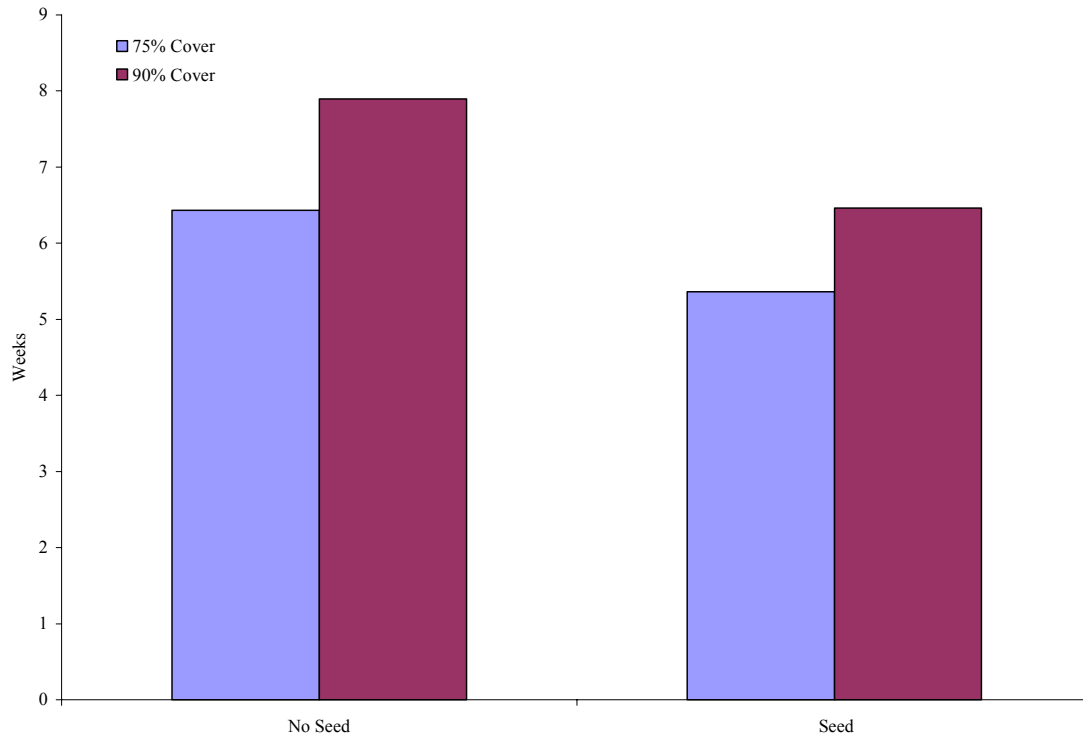


Figure 5. Average number of weeks to 75% and 90% cover for seed vs non seeded treatments arranged over cultivar and irrigation (no seed-seed).

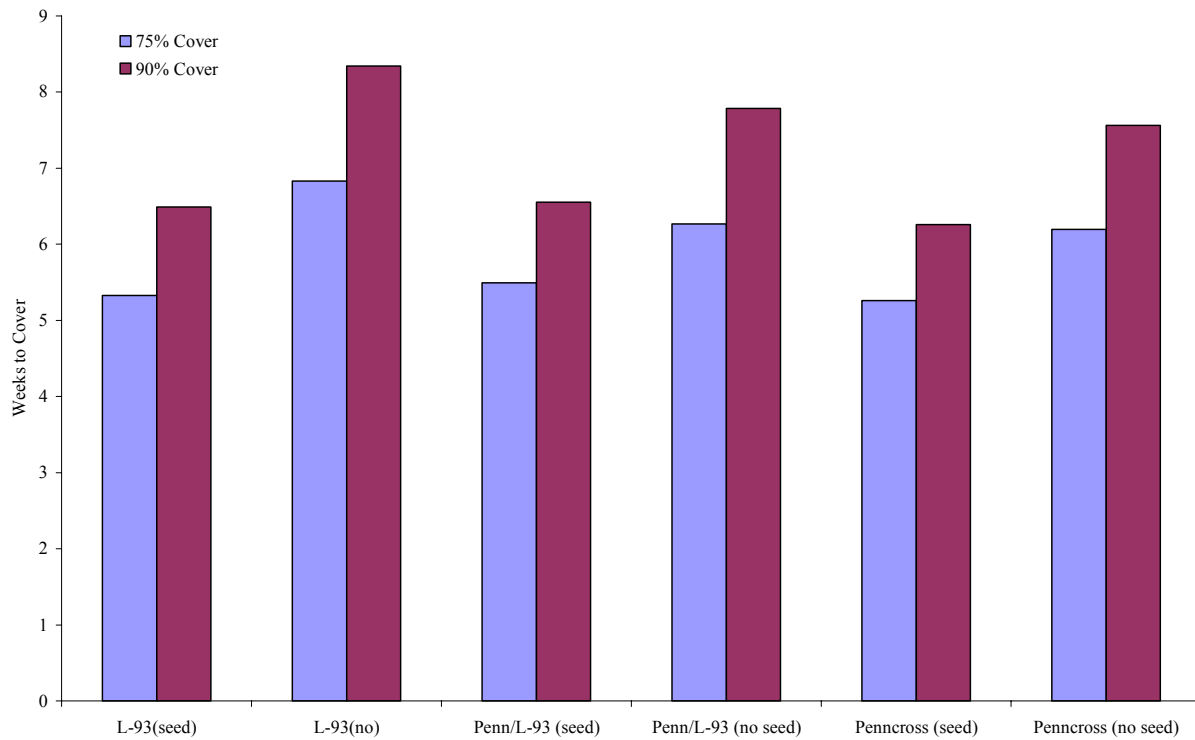


Figure 6. Comparison of cultivar and seeding treatments as measured by time to 75% and 90% cover.