

## Cultivation with the HydroJect®

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Golf course superintendents have been reaping the benefits of core cultivation for many decades. One objection often raised concerning this management practice is that the putting green surface is opened up to a point where favorable conditions for germination of *Poa annua* occur around aerifier holes. The relationship between the extent and timing of core cultivation and the amount of *Poa annua* that invades a creeping bentgrass putting green has been under substantial debate. The HydroJect® is one tool for putting green aerification that causes considerably less surface disruption than other aerification equipment and leaves minimal open space for weed seed germination. It is therefore suggested that the HydroJect® may reduce the possibility of annual bluegrass encroachment into a creeping bentgrass putting green.

A study was initiated in June, 1994 on a 14-year old creeping bentgrass green to determine how the timing and extent of core cultivation and HydroJect® treatments affect *Poa annua* encroachment. The experimental area is mowed at 3/16" and maintained under typical putting green management practices. Treatments include three frequencies of HydroJect® aerification (weekly, biweekly and monthly), two frequencies of core cultivation (twice per year and three times per year), two combination treatments of HydroJect® aerification and core cultivation, and a check. The experimental area was laid out in the following fashion:

Cultivation Study

NW							
1	3	5	4	2	6	7	4
7	4	5	3	2	5	6	8
2	1	4	8	3	7	6	1
1	5	2	8	3	6	7	8

1. Check
2. Hydroject® weekly
3. Hydroject® biweekly
4. Hydroject® monthly
5. Core cultivate sp, fall, & Hydroject® biweekly
6. Core cultivate spring and fall
7. Core cultivate spring, summer, and fall
8. Core cultivate sp & fl (2"x1") & Hydroject®

Core cultivations are performed in June and October with a Jacobsen aerifier using 3/8" hollow tines set at 3" by 2"

spacing. An August cultivation is also included for treatment #7. HydroJect® treatments are applied using the '3000' model beginning in June and ending in late September.

There were no significant increases in *Poa annua* encroachment for any of the treatments during the last two growing seasons. A rigorous compaction treatment was initiated this spring to encourage *Poa annua* invasion into the experimental area. Plots receiving HydroJect® treatments have had significantly faster putting green speeds (see Table 1), reduced earthworm castings (see Table 2) and upon visual inspection, have had increased root vigor, especially at lower soil depths. However, increases in root weight density and root length density have not been quantified in the laboratory for HydroJect® treatments.

**Table 1.** Stimpmeter readings before and after HydroJect treatment of bentgrass putting green. 1995.

	25-May	1-Jun	8-Jun meters	15-Jun	22-Jun
before treatment	1.76 a*	2.01 a	2.22 a	2.13 a	2.10 a
after treatment	1.98 b	2.13 b	2.30.a	2.26 b	2.24 b
increase	0.22	0.12	0.09	0.13	0.14

\* Within each column, numbers with the same letter are not different at the 0.05 level of probability.

**Table 2.** Effect of cultivation treatment on earthworm casting

Treatment	10/13/94	9/6/95
	<i>mean earthworm casts per plot</i>	
Control	72 a*	103 ab
Core Cultivate 2X/year	64 ab	151 a
Core Cultivate 3X/year	84 a	135 a
Core Cultivate 2"X1" 2X/year and HydroJect Biweekly	59 abc	115 ab
Core Cultivate 2X/year and HydroJect Biweekly	39 bc	98 ab
HydroJect Monthly	46 bc	99 ab
HydroJect Biweekly	42 bc	58 b
HydroJect Weekly	37 c	51 b

\* means sharing a letter are not statistically different ( $P < 0.05$ )