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Snow Mold, Quality, and Color Ratings Recorded on April 10th, 2011 at Sentryworld GC

	Treatment	Rate	Timing[a]	Dis Severity[b]	Quality[c]	Color[d]
1	Non treated Control			74.8 a-e	2.3 l-o	0.437 ABC
6	V-10190	0.7 FL OZ/M	Late	88.8 abc	1.8 no	0.415 C
7	Tourney	0.37 OZ/M	Late	7.5 rst	5.5 d-h	0.614 b-k
	3336 Plus	4.0 FL OZ/M	Late			
8	Velista	0.7 OZ/M	Late	42.5 j-n	3.8 ijk	0.532 p-w
9	Velista	0.7 OZ/M	Late	6.8 rst	5.8 c-g	0.600 b-o
	Daconil Ultrex	5.0 OZ/M	Late			
	Chipco 26GT	4.0 FL OZ/M	Late			
10	Velista	0.7 OZ/M	Late	3.0 st	6.5 a-e	0.613 b-k
	Daconil Ultrex	5.0 OZ/M	Late			
	Heritage	0.7 OZ/M	Late			
11	Velista	0.7 OZ/M	Late	3.8 st	6.3 a-f	0.603 b-o
	Daconil Ultrex	5.0 OZ/M	Late			
	Banner MAXX	2 FL OZ/M	Late			
12	Velista	0.7 OZ/M	Late	3.5 st	6.0 b-f	0.608 b-m
	Daconil Ultrex	5.0 OZ/M	Late			
	3336 Plus	2.0 FL OZ/M	Late			
13	Velista	0.7 OZ/M	Late	7.5 rst	6.0 b-f	0.596 c-o
	Daconil Ultrex	5.0 OZ/M	Late			
14	Velista	0.7 OZ/M	Late	2.5 st	6.5 a-e	0.597 b-o
	Medallion	0.25 OZ/M	Late			
	Banner MAXX	2.0 FL OZ/M	Late			
15	Insignia SC	0.7 FL OZ/M	Late	3.0 st	6.3 a-f	0.615 b-k
	Trinity	1.0 FL OZ/M	Late			
	Daconil Ultrex	3.2 OZ/M	Late			
16	Insignia SC	0.54 FL OZ/M	Late	3.8 st	6.3 a-f	0.603 b-o
	Trinity	1.0 FL OZ/M	Late			
	Daconil Ultrex	3.2 OZ/M	Late			
17	Curalan EG	1.0 OZ/M	Early	0.5 t	6.8 a-d	0.606 b-n
	Daconil Ultrex	3.2 OZ/M	Early			
	Insignia SC	0.54 FL OZ/M	Late			
	Trinity	1.0 FL OZ/M	Late			
	Daconil Ultrex	3.2 OZ/M	Late			
18	Honor	0.84 OZ/M	Late	0.0 t	6.8 a-d	0.600 b-o
	Trinity	1.0 FL OZ/M	Late			
	Daconil Ultrex	3.2 OZ/M	Late			
19	Interface	5.0 FL OZ/M	Late	13.8 p-t	5.5 d-h	0.578 i-s
20	Interface	4.0 FL OZ/M	Late	4.3 st	6.3 a-f	0.596 c-p
	Daconil Ultrex	3.2 OZ/M	Late			
21	Interface	6.0 FL OZ/M	Late	1.8 st	6.5 a-e	0.613 b-l
	Triton FLO	0.85 FL OZ/M	Late			
22	Interface	5.0 FL OZ/M	Late	0.0 t	7 abc	0.639 a-i
	Triton FLO	0.85 FL OZ/M	Late			
23	Interface	4.0 FL OZ/M	Late	0.0 t	7.3 ab	0.630 a-j
	Triton FLO	0.85 FL OZ/M	Late			

Means followed by same letter do not significantly differ (P=.05, Waller-Duncan)

[a]Early and late fungicide treatments were applied on Oct. 19th, 2010 and Nov. 23rd, 2010, respectively

[b]Mean % diseased area

[c]Quality was visually rated on a scale of 1-9 where 1 = completely dead, 6 = acceptable, 9 = dark green

[d]Color was rated using a GreenSeeker NDVI Turf Color Meter from Ntech Industries®

Snow Mold, Quality, and Color Ratings Recorded on April 10th, 2011 at Sentryworld GC

Treatment	Rate	Timing[a]	Dis severity[b]	Quality[c]	Color[d]
24 Interface	3.0 FL OZ/M	Late	6.0 st	5.8 c-g	0.600 b-o
Triton FLO	0.5 FL OZ/M	Late			
25 Reserve	4.5 FL OZ/M	Late	3.0 st	6.3 a-f	0.597 c-o
Compass	0.25 OZ/M	Late			
26 Reserve	4.5 FL OZ/M	Late	0.5 t	6.8 a-d	0.610 b-m
Interface	4.0 FL OZ/M	Late			
27 Tartan	2.0 FL OZ/M	Late	7.5 rst	5.8 c-g	0.622 a-k
Daconil Ultrex	5.0 OZ/M	Late			
28 QP TM/C	6.0 OZ/M	Late	0.0 t	6.5 a-e	0.602 b-o
QP Ipro	4.0 FL OZ/M	Late			
QP Propiconazole	2.0 FL OZ/M	Late			
29 QP 642	11.75 FL OZ/M	Late	2.5 st	6.5 a-e	0.598 b-o
30 QP Chlorothalonil	2.66 FL OZ/M	Late	1.3 t	6.8 a-d	0.630 a-j
QP Ipro	4.0 FL OZ/M	Late			
QP Tebuconazole	0.69 FL OZ/M	Late			
31 QP Chlorothalonil	4.76 FL OZ/M	Late	3.0 st	6.0 b-f	0.605 b-o
QP Ipro	2.23 FL OZ/M	Late			
QP Fludioxonil	0.36 FL OZ/M	Late			
32 GWN-9803	0.5 FL OZ/M	Early/Late	67.5 c-i	2.5 k-n	0.479 v-B
GWN-6526	0.25% v/v	Early/Late			
33 GWN-9803	1.0 FL OZ/M	Early/Late	63.8 d-j	2.8 k-n	0.477 w-C
GWN-6526	0.25% v/v	Early/Late			
34 GWN-9803	2.0 OZ/M	Early/Late	70.5 a-g	2.3 l-o	0.453 x-C
GWN-6526	0.25% v/v	Early/Late			
35 NB37440	0.4 FL OZ/M	Late	75.0 a-e	2.0 mno	0.419 BC
36 NB37440	0.82 FL OZ/M	Late	35.0 l-p	4.3 hij	0.550 l-u
37 NB36137	0.45 OZ/M	Late	47.5 h-m	3.5 jkl	0.505 t-z
38 NB36137	0.9 OZ/M	Late	82.5 a-d	2.0 mno	0.445 y-C
39 NB36693	1.2 OZ/M	Late	82.3 a-d	2.0 mno	0.446 y-C
40 NB36693	2.4 OZ/M	Late	72.5 a-f	2.3 l-o	0.457 x-C
41 Civitas		Late	18.8 o-t	5.0 f-i	0.643 a-h
Mix		Late			
1		Late			
		Late			
42 Civitas		Early	32.5 l-q	4.5 g-j	0.586 f-q
Mix		Late			
2		Late			
43 Civitas		Early	8.8 rst	5.8 c-g	0.643 a-h
Mix		Late			
3		Late			
		Late			
44 Civitas		Late	7.5 rst	5.5 d-h	0.658 abc
Mix		Late			
4		Late			

Means followed by same letter do not significantly differ (P=.05, Waller-Duncan)

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Snow Mold, Quality, and Color Ratings Recorded on April 10th, 2011 at Sentryworld GC

Treatment	Rate	Timing[a]	Dis severity[b]	Quality[c]	Color[d]
45 Civitas Mix 5		Late Late Late Late	1.3 t	7.0 abc	0.652 a-e
46 Civitas Mix 6		Late Late Late Late	20.0 o-t	5.5 d-h	0.606 b-n
47 Civitas Mix 7		Late Late	80.0 a-e	2.3 l-o	0.487 u-A
48 Civitas Mix 8		Late Late	75.0 a-e	2.8 k-n	0.568 j-t
49 Civitas Mix 9		Early Late Late Late Late	6.3 st	6.8 a-d	0.590 d-p
50 Civitas Mix 10		Early Late Late Late	11.3 q-t	5.5 d-h	0.629 a-j
51 Civitas Mix 11		Late Late Late	10.0 rst	6.3 a-f	0.654 a-d
52 Civitas Mix 12		Late Late Late	2.5 st	6.5 a-e	0.660 ab
53 Civitas Mix 13		Late Late Late	0.0 t	7.0 abc	0.649 a-f
54 Civitas Mix 14		Late Late Late	1.8 st	6.8 a-d	0.647 a-g
55 Civitas Mix 15		Late Late Late	0.0 t	7.5 a	0.679 a
56 1367-A	12.0 FL OZ/M	Early/Late	91.3 ab	1.0 o	0.431 ABC
57 1367-A	24.0 FL OZ/M	Early/Late	92.5 a	1.0 o	0.452 y-C
58 1367-B	6.0 FL OZ/M	Early/Late	69.5 b-h	2.5 k-n	0.507 t-y
59 1367-B	12.0 FL OZ/M	Early/Late	90.8 ab	1.0 o	0.452 y-C
60 1367-C	6.0 FL OZ/M	Early/Late	70.5 a-g	2.8 k-n	0.443 z-C
61 1367-C	12.0 FL OZ/M	Early/Late	77.3 a-e	2.0 mno	0.472 w-C
62 1367-D	6.0 FL OZ/M	Early/Late	58.5 e-k	3.3 j-m	0.525 q-w
63 1367-D	12.0 FL OZ/M	Early/Late	46.0 i-n	3.3 j-m	0.521 r-w

Means followed by same letter do not significantly differ (P=.05, Waller-Duncan)

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Snow Mold, Quality, and Color Ratings Recorded on April 10th, 2011 at Sentryworld GC

Treatment	Rate	Timing[a]	Dis severity[b]	Quality[c]	Color[d]
64 Instrata	5.0 FL OZ/M	Late	8.0 rst	5.8 c-g	0.580 r-w
65 Instrata	7.0 FL OZ/M	Late	0.5 t	6.8 a-d	0.606 b-n
66 Instrata	9.0 FL OZ/M	Late	3.8 st	6.3 a-f	0.603 b-o
67 Instrata	9.3 FL OZ/M	Late	0.0 t	6.8 a-d	0.585 g-q
68 Instrata	5.5 FL OZ/M	Early/Late	1.3 t	6.8 a-d	0.620 a-k
69 Concert	5.0 FL OZ/M	Late	17.5 o-t	5.0 f-i	0.588 e-q
Renown	2.5 FL OZ/M	Late			
70 Concert	8.5 FL OZ/M	Late	6.3 st	6.0 b-f	0.585 g-q
Banner MAXX	1.0 FL OZ/M	Late			
71 Concert	8.5 FL OZ/M	Late	0.0 t	6.8 a-d	0.617 a-k
Medallion	0.25 OZ/M	Late			
72 Concert	8.5 FL OZ/M	Late	3.8 st	6.3 a-f	0.626 a-k
Chipco 26GT	4.0 FL OZ/M	Early			
73 Concert	8.5 FL OZ/M	Late	4.3 st	6.0 b-f	0.587 f-q
74 Headway G	4.0 LB/M	Late	76.3 a-e	1.8 no	0.474 w-C
81 Torque	0.6 FL OZ/M	Late	2.5 st	6.5 a-e	0.614 b-k
26/36	4.0 FL OZ/M	Late			
82 Torque	0.9 FL OZ/M	Late	0.0 t	7.0 abc	0.618 a-k
26/36	4.0 FL OZ/M	Late			
83 Torque	0.6 FL OZ/M	Late	1.8 st	6.5 a-e	0.615 b-k
26/36	4.0 FL OZ/M	Late			
Spectro	3.67 FL OZ/M	Late			
84 Torque	0.9 FL OZ/M	Late	0.0 t	7.0 abc	0.608 b-n
26/36	4.00 FL OZ/M	Late			
Spectro	3.7 OZ/M	Late			
85 Torque	0.6 FL OZ/M	Late	0.0 t	7.3 abc	0.636 a-i
Affirm	0.9 FL OZ/M	Late			
86 Torque	0.6 FL OZ/M	Late	0.0 t	7.0 abc	0.605 b-n
Affirm	0.9 FL OZ/M	Late			
Spectro	3.7 OZ/M	Late			
87 Chipco 26GT	4.0 FL OZ/M	Late	28.8 m-r	4.5 g-j	0.564 k-t
Daconil Wstik	5.5 FL OZ/M	Late			
88 Endorse	4.0 OZ/M	Late	61.3 d-j	3.3 j-m	0.548 m-u
89 Segway	0.75 FL OZ/M	Late	76.3 a-e	2.0 mno	0.419 BC
90 Endorse	3.0 OZ/M	Late	50.0 g-m	3.5 jkl	0.544 n-u
Segway	0.45 FL OZ/M	Late			

Means followed by same letter do not significantly differ (P=.05, Waller-Duncan)

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What's Your Irrigation Distribution Uniformity?

By Dr. Doug Soldat, Department of Soil Science, University of Wisconsin -Madison

Michael Voigt reminds us of the importance of irrigation audits in the June 2011 issue of *Golf Course Management* (You Can't Manage What You Don't Measure). An irrigation audit primarily involves measuring the distribution uniformity (DU) and then acting on the results to improve the DU and saving money, decreasing water use, and improving turf quality all at once.

Irrigation DU is quantified by placing flat-bottomed, straight-sided water collection containers at regular intervals (every 6-10 ft.) on an irrigated area (putting green, tee complex, section of fairway, etc.). The irrigation is run for a set time and the amount of water in the collection vessels is measured. The DU is calculated by simply taking the average of the lowest 25% of the readings and dividing by the overall average. A simple example is shown below. Ideally, you'll have many more than eight measurements.

Each Collection Container Has A Water Amount.

1. 0.20 inches
2. 0.26 inches
3. 0.28 inches
4. 0.33 inches
5. 0.33 inches
6. 0.42 inches
7. 0.54 inches
8. 0.63 inches

Distribution Uniformity Formula

Average of lowest 25% = 0.23 inches

Overall average = 0.374 inches

Distribution uniformity (DU) = 0.23 ÷ 0.374 = 0.615 or 61.5%

A DU of 80 is considered about as good as it gets, and anything below 60 is generally frowned upon for golf turf. The DU is used to adjust run times, as more irrigation needs to be applied to the entire area to make sure the lowest 25% doesn't get too dry. This obviously means that the other 75% is over-irrigated to compensate for the lowest 25%. While this makes perfect sense on paper, there is usually more than meets the eye.

Recently at the O.J. Noer Facility, we learned that striving for a high DU is too simplistic at best, and can even do more harm than good in certain situations. We built a USGA-style sand green with a 1% surface slope in 2008. After a while, we noticed that the downslope side was constantly wetter than the upslope areas and finally mapped it with our GPS-equipped soil moisture probe (See Figure 1) in June of this year.

In fact, on the day in June when we made the map in Figure 1, the upslope moisture was around 15% while the downslope moisture was around 35%. Next, we tested the DU and found that it was 80%. So despite nearly perfect irrigation coverage the moisture uniformity in the soil was horrible.


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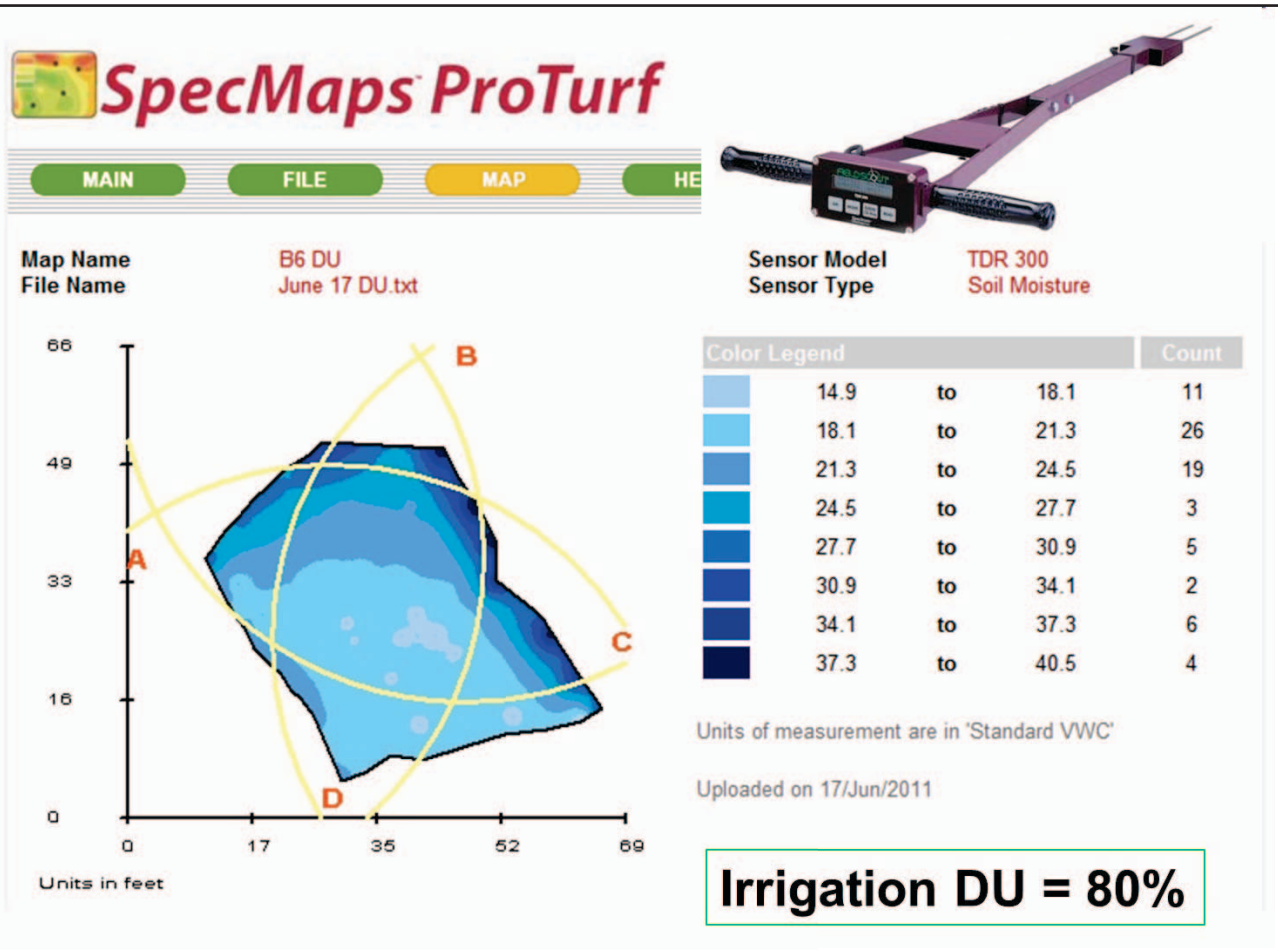

Figure 1. Soil moisture content of a USGA green with a 1% slope that slopes from "D" to "B". The letters are approximate locations of the irrigation heads and the yellow lines approximate their throw pattern. The "B" end was constantly wetter than the "D" side, despite nearly perfect irrigation distribution uniformity. This map was created with our GPS-enabled soil moisture probe and online mapping software.

Coming Events!

Fri Oct 7th and Sat Oct 8th - WGCSA Couples Weekend @ Minocqua CC, Minocqua, WI (w/NGLGCSA)

Monday October 3rd - WTA Fundraiser @ Oconomowoc GC, Oconomowoc, WI

Tuesday October 25th - WGCSA Assistants Fall Wrap Up Meeting @ OJ Noer Research Facility, Madison

Tues Nov 15th & Wed Nov 16th - WGCSA Golf Turf Symposium @ American Club, Kohler

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So, we made an adjustment and capped off the irrigation head at the downslope side. We came back about a month later, measured the soil moisture and measured the irrigation DU with only three heads operating (See Figure 2). The DU was now only 12%, but the moisture content of the soil was visibly more uniform. Interestingly, the wettest point on the green remained the downslope area nearest the head that was capped off. This is likely because of rainfall events, and subsurface flow/drainage from the higher points in the soil to the lower spots.

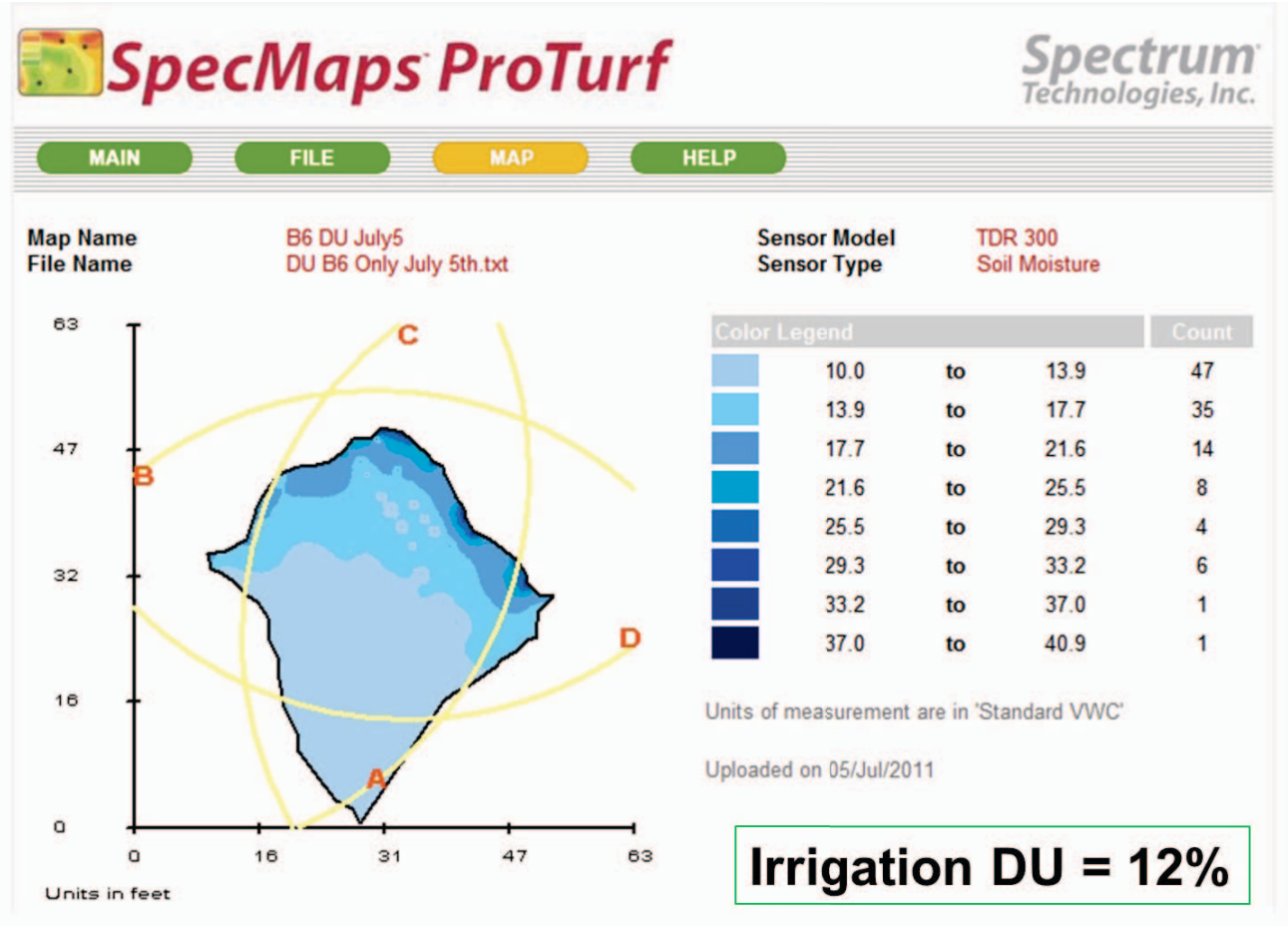

Figure 2. Soil moisture content of the same putting green shown in Figure 1 with the irrigation head at point "C" turned off for a month (downslope side). The irrigation DU was ridiculously low by any standard, yet the soil moisture distribution is visibly more uniform than shown in Figure 1. Interestingly, the wettest point on the green is nearest to the head that was turned off. This is because of rainfall and also subsurface drainage from higher points of the green.

Clearly, irrigation DU is only a tiny piece of the water management puzzle. By ignoring the actual water content patterns in the soil, achieving a high DU is a meaningless activity. In fact, in this example the turf manager should be striving towards a lower DU, as a means to improve the moisture distribution of the green.

Soils are not flat, uniform bodies. They are highly varied and have different drainage rates, particle distributions, and slopes, among other things. Remember, you are growing plants in the soil and the goal should be to have even moisture distribution in the soil, not necessarily coming out of the irrigation heads.