



Mavis Consulting, Ltd Newsletter

Turf & Soil Fertility Specialist

March 2013

How Effective is Your Sand Top-dressing Program (Part 2)?

The question remains whether or not greens can be effectively top-dressed with very coarse (1 mm) or even coarse sand particles (0.5 mm) during regular top-dressing. Based on the data collected over the last three years, the majority of these particles (especially 0.5 mm) **are not removed** when mowing during this study.

The same sand sources as previous years were utilized at both courses, but the sand was dried on-site at ECC and applied with walk spreaders (See Table 1). Practices utilized following top-dressing were modified at MCC during the second data collection (See Table 2).

Surprisingly, the data collected in 2012 from ECC indicates that a higher percentage of sand is removed (11% vs. 6.5%) if utilizing dried sand even with a slightly higher height of cut (.12 vs .115). This

The first set of data collected in 2012 from MCC indicates that 0.5" of rain after top-dressing and skipping a day of mowing significantly reduced the amount of sand removed during the first mowing (as expected). The second set of data from MCC in 2012 also indicates that rolling for two days without mowing after top-dressing and raising mowing height from .12 to .13 significantly reduced the amount of sand removed during the first mowing.

As before sand based greens would ideally be top-dressed with the same sand utilized for construction (as long as it is desirable). Utilizing a finer sand may result in less surface disruption and mower wear, but is it going to produce a desirable root-zone as it accumulates in the profile? Also, top-dressing with a finer material than the root-zone is composed of, may result in significant turf loss. This also applies to those soil based greens that have been top-dressed for years and contain a 2-3" layer of nearly pure sand. A physical analysis of the root-zone sand may be needed in order to determine if a desirable root-zone is being formed. It is unknown whether or not there will be negative consequences for top-dressing with a finer sand throughout the year and filling aeration holes with a coarser sand when aerating only.

Purpose of Study:

To determine what sand particles are being removed when mowing and how much is being removed when utilizing a medium to coarse USGA top-dressing sand

Procedure:

Sample Collection

1. collect all clippings from mower buckets after each mowing for 4 days after top-dressing (example: top-dress greens Monday, collect clippings Tuesday through Friday)
2. place all clippings from one day into clean loader bucket
3. fill bucket with water so that clippings float and sand sinks
4. gradually tip loader bucket until only clippings fall out
 - a. repeat until little to no clippings remain in sand

- b. may work best if stir end of hose into the sand to increase clipping removal
- 5. dump excess water when only sand is left and no tissues float
- 6. allow sand to dry in loader bucket if possible before placing on clean surface or container and stored inside

Sample Measuring:

1. Each pile of sand was weighed in 5 gallon increments with partial 5 gallon quantities calculated by average pile weight
2. Each pile of sand was thoroughly mixed and divided until a 1 gallon sample remained according to USGA guidelines for quality control sampling (http://www.usga.org/course_care/articles/construction/greens/Quality-Control-Sampling-of-Sand-and-Rootzone-Mixture-Stockpiles/)
3. Sample was submitted to Brookside Laboratories, Inc (USGA/A2LA Accredited) for testing

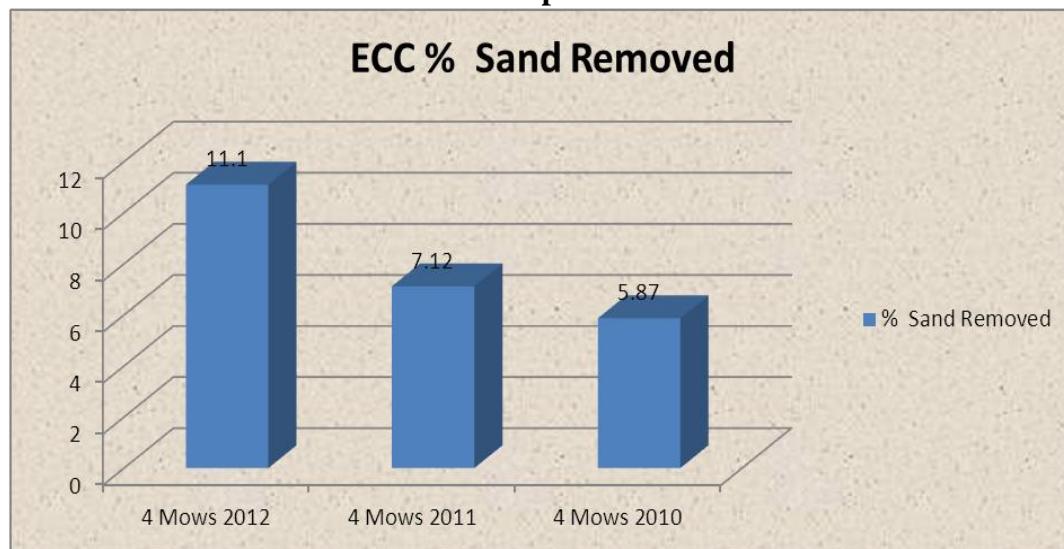
Results:

Sand Quantity Measurements: Two different top-dressing sands and golf courses have been utilized to conduct the research. Both courses Elcona Country Club and Meadowbrook Country Club utilize similar top-dressing sands (medium to coarse USGA sand). These top-dressing sands are identified in Tables 4 and 5 as Country Stone and Osburn HP.

Surprisingly, the data collected in 2012 from ECC indicates that a higher percentage of sand is removed (Graph 1.) if utilizing dried sand even with a slightly higher height of cut (.12 vs .115).

The average amount of sand removed from ECC is roughly 8% after four mowings even with the increase to 11% this year when utilizing dry sand.

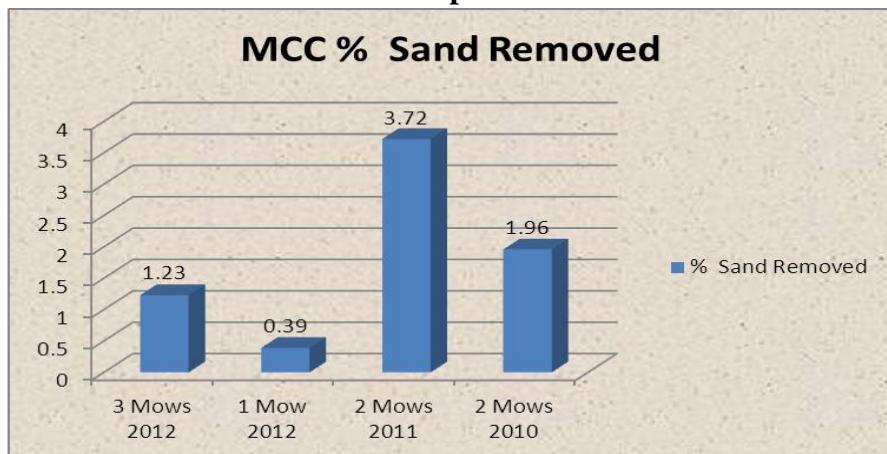
Graph 1.



The first set of data (3 mows) collected in 2012 from MCC indicates that 0.5" of rain after top-dressing and skipping a day of mowing significantly reduced the amount of sand removed during the first mowing (as expected). The second set of data (1 mow) from MCC in 2012 also indicates that rolling for two days without mowing after top-dressing and raising mowing height from .12 to .13 significantly reduced the amount of sand removed during the first mowing.

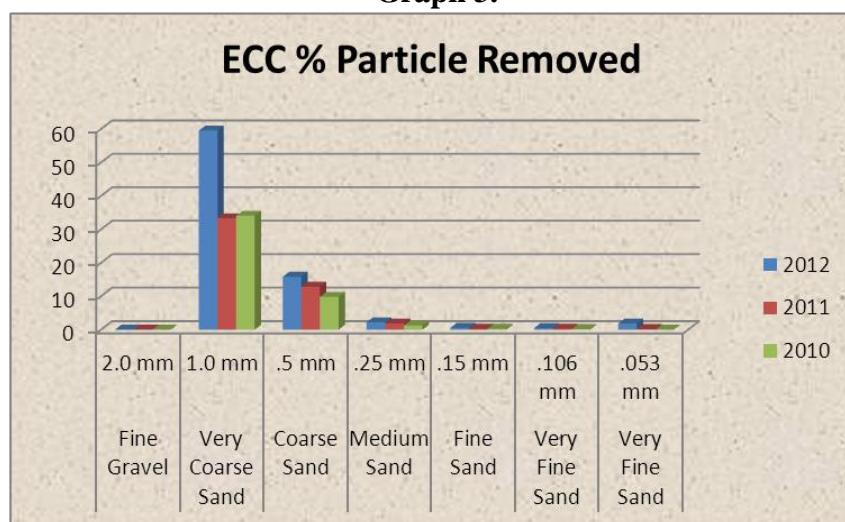
The total amount of sand removed from MCC is significantly less than ECC partially due to the reduced collections, but the varied cultural practices and rain appear to significantly impact the amount being collected even when compared to previous years (Graph 2.).

Graph 2.

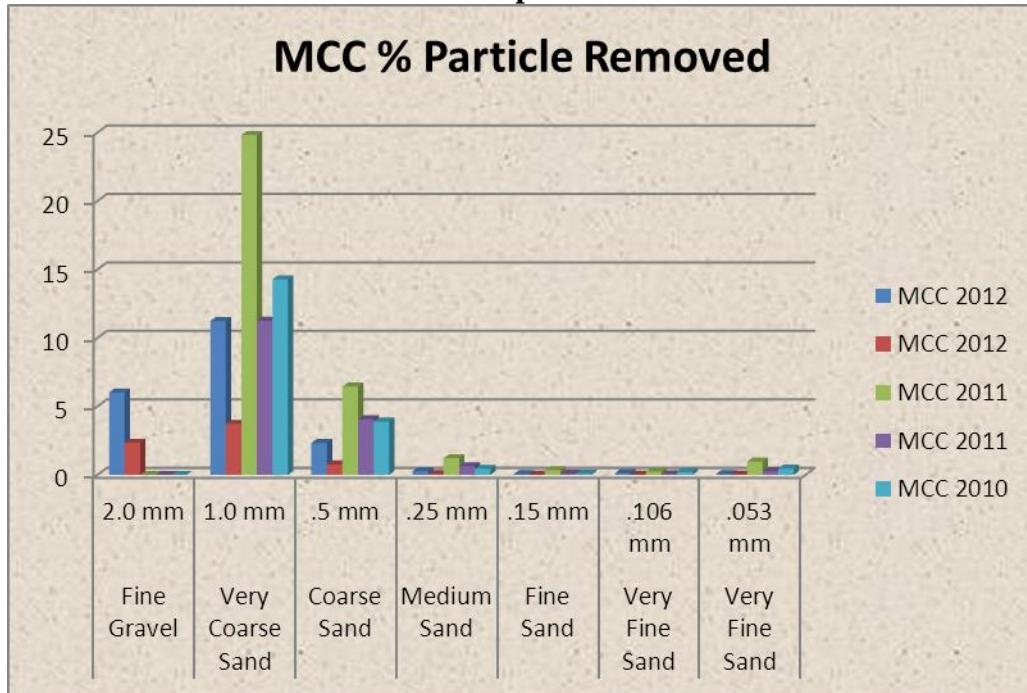


In all, the data indicates that at least 89% of the medium to coarse USGA sand applied is not removed after four mowings. Furthermore more than 80% of the Coarse sand particles (0.5mm) are not removed during the first four mowings (Graph 3.). When using dry sand, there was a significant increase in the percentage of Very Coarse Sand (1mm) removed, but previous years indicated that more than 60% was not removed. Fortunately these top-dressing sands contained no more than 7.7% Very Coarse Sand, and this is not a significant amount of the sand actually being applied.

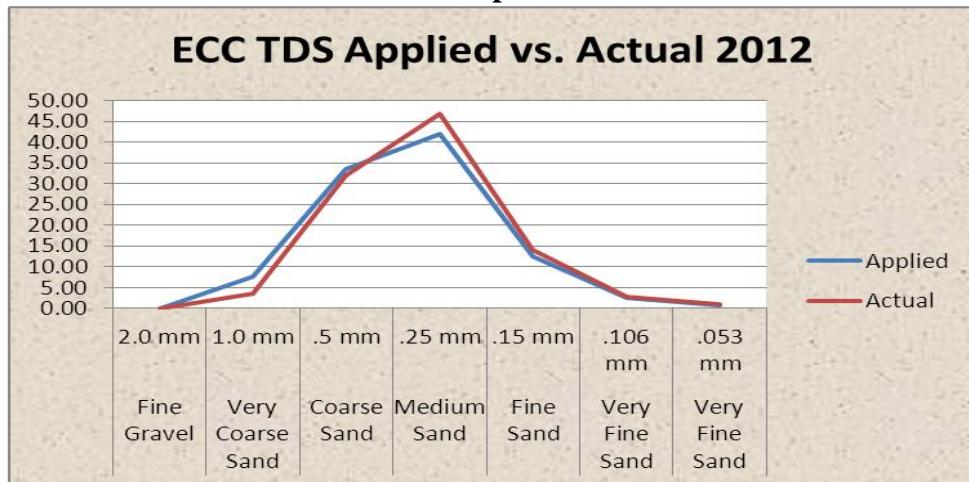
Graph 3.



Graph 4.



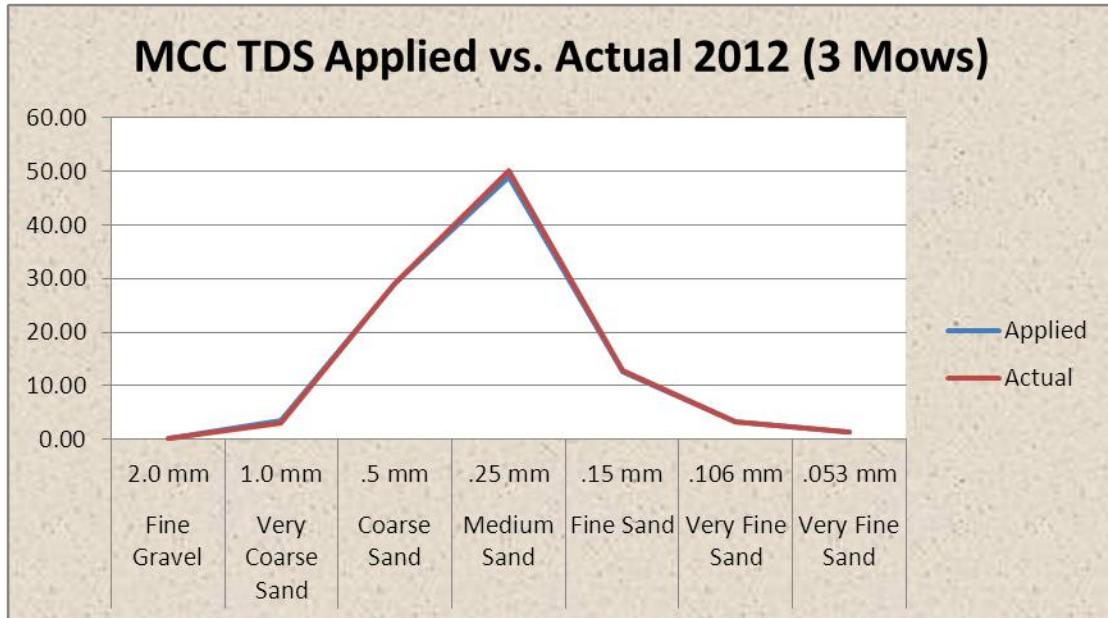
Graph 5.



Graph 5. demonstrates what the difference between the applied top-dressing sand and the calculated actual that was not removed. As you can see the applied sand contains slightly more 1 mm and 0.5 mm particles. The actual percentages are listed below.

| Sand Fractions | Applied | Actual |
|------------------|---------|--------|
| Fine Gravel | 2.0 mm | 0.00 |
| Very Coarse Sand | 1.0 mm | 7.70 |
| Coarse Sand | .5 mm | 33.40 |
| Medium Sand | .25 mm | 42.10 |
| Fine Sand | .15 mm | 12.40 |
| Very Fine Sand | .106 mm | 2.50 |
| Very Fine Sand | .053 mm | 0.80 |

Graph 6.



Graph 5. demonstrates what the difference between the applied top-dressing sand and the calculated actual that was not removed at MCC during the 3 mow collection. Due to the minimal removal, these sands are nearly identical. The actual percentages are listed below.

| Sand Fractions | Applied | Actual |
|------------------|---------|--------|
| Fine Gravel | 0.10 | 0.10 |
| Very Coarse Sand | 3.40 | 3.09 |
| Coarse Sand | 29.20 | 29.20 |
| Medium Sand | 49.00 | 50.02 |
| Fine Sand | 12.60 | 12.89 |
| Very Fine Sand | 3.20 | 3.27 |
| Very Fine Sand | 1.40 | 1.43 |

Table 1. (ECC Course Information)

| Golf Course | Elcona CC-2012 | Elcona CC-2011 | Elcona CC-2010 |
|---------------------------|---|---|---|
| mowing height | 0.12 | 0.115 | 0.115 |
| sand source | Country Stone (Dried) | Country Stone | Country Stone |
| total yards applied | 1.53 | 4.0 | 4.0 |
| square footage of greens | 95741 | 95741 | 95741 |
| mower | Toro 1000 | Toro 1000 | Toro 1000 |
| top-dresser | Lesco Rotary wide open | Dakota 410 | Dakota 410 |
| turf type | Annual Bluegrass | Annual Bluegrass | Annual Bluegrass |
| mowing 1 (gallons) | 17.400 | 37.700 | 24.000 |
| yards3 | 0.086 | 0.187 | 0.119 |
| mowing 2 (gallons) | 8.220 | 12.160 | 10.160 |
| yards3 | 0.041 | 0.060 | 0.050 |
| mowing 3 (gallons) | 5.000 | 4.150 | 6.900 |
| yards3 | 0.025 | 0.021 | 0.034 |
| mowing 4 (gallons) | 3.220 | 3.090 | 6.150 |
| yards3 | 0.016 | 0.015 | 0.030 |
| mowing 5 (gallons) | | | |
| yards3 | | | |
| Total Gallons | 33.840 | 57.100 | 47.210 |
| Total Yards | 0.168 | 0.283 | 0.234 |
| % removed | 10.95% | 7.07% | 5.84% |
| Cultural practices before | mow | mow | mow |
| Cultural practices after | drag w/ coco mat water 10 min mow daily roll 5 days / week not rolled until two days after TD | drag w/ coco mat water 10 min mow daily roll 5 days / week not rolled until two days after TD | drag w/ coco mat water 10 min mow daily roll 5 days / week not rolled until two days after TD |
| Thanks to | Greg Shaffer, Rick | Greg Shaffer, Cody | Greg Shaffer, Wade |

Table 2. (MCC Course Information)

| Golf Course | MCC - 2012 October | MCC - 2012 | MCC - 2011 | MCC - 2010 |
|---------------------------|---|--|--|--|
| mowing height | 0.13 | 0.12 | 0.12 | 0.12 |
| sand source | Osburn, HP | Osburn, HP | Osburn, HP | Osburn, HP |
| total yards applied | 9.3 | 7.5 | 7.3 | 7.3 |
| square footage of greens | 110000 | 110000 | 110000 | 110000 |
| mower | Jacobsen Triplex (solid roller) | Jacobsen Triplex (solid roller) | Jacobsen Triplex (solid roller) | Jacobsen Triplex (solid roller) |
| top-dresser | Turfco sp1530 | Turfco sp1530 | Turfco sp1530 | Turfco sp1530 |
| turf type | Annual Bluegrass | Annual Bluegrass | Annual Bluegrass | Annual Bluegrass |
| mowing 1 (gallons) | 7.33 | 8.23 | 45 | 19 |
| yards3 | 0.036 | 0.041 | 0.223 | 0.094 |
| mowing 2 (gallons) | | 5 | 9.56 | 9.6 |
| yards3 | 0.000 | 0.025 | 0.047 | 0.048 |
| mowing 3 (gallons) | | 5.000 | | |
| yards3 | 0.000 | 0.025 | | |
| mowing 4 (gallons) | | | | |
| yards3 | | | | |
| mowing 5 (gallons) | | | | |
| yards3 | | | | |
| Total Gallons | 7.330 | 18.230 | 54.560 | 28.600 |
| Total Yards | 0.036 | 0.090 | 0.270 | 0.142 |
| % removed | 0.39% | 1.20% | 3.70% | 1.94% |
| Cultural practices before | single verti-cut | single verti-cut | single verti-cut 1/16" | single verti-cut |
| Cultural practices after | rolled (speed roller) 2 days no mow for 2 days | brushed rosebud in backpack blow rolled (speed roller) Rained 0.47" before first mow | brushed backpack blow rosebud in rolled (speed roller) first mowing was next day | brushed rosebud in backpack blow rolled (speed roller) *both mowings same day TD |
| Thanks to | Mike Edgerton | Mike Edgerton | Mike Edgerton, Andy O'Haver | Mike Edgerton, Brian Hilfinger |

Conclusions:

Surprisingly, the data collected in 2012 from ECC indicates that a higher percentage of sand is removed (11% vs. 6.5%) if utilizing dried sand even with a slightly higher height of cut (.12 vs .115). This will hopefully be repeated again in 2013.

The first set of data collected in 2012 from MCC indicates that 0.5" of rain after top-dressing and skipping a day of mowing significantly reduced the amount of sand removed during the first mowing (as expected). The second set of data from MCC in 2012 also indicates that rolling for two days without mowing after top-dressing and raising mowing height from .12 to .13 significantly reduced the amount of sand removed during the first mowing.

As before, the data indicates that a medium to coarse USGA sand can be effectively utilized for sand top-dressing Poa/Bent greens.

This study is to be continued utilizing varying cultural practices, top-dressing sands, varieties of turf, and possibly even more mowing collections. The plan is also to collect the last mowing prior to top-dressing.

Cooperative Effort With:

Many thanks to Greg Shaffer GCS at Elcona Country Club and Mike Edgerton GCS at Meadowbrook Country Club and their staff for their efforts in collecting and storing the sand. Thank you to the Brookside Consultants of Ohio for funding the laboratory testing and to the staff at Brookside Laboratories for their excellent service.