The inevitable consequences of regular rootzone measurements

Micah Woods

December 7, 2023

Asian Turfgrass Center
www.asianturfgrass.com

PACE Turf
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Anvaya Cove, Bataan

Continuous improvement system

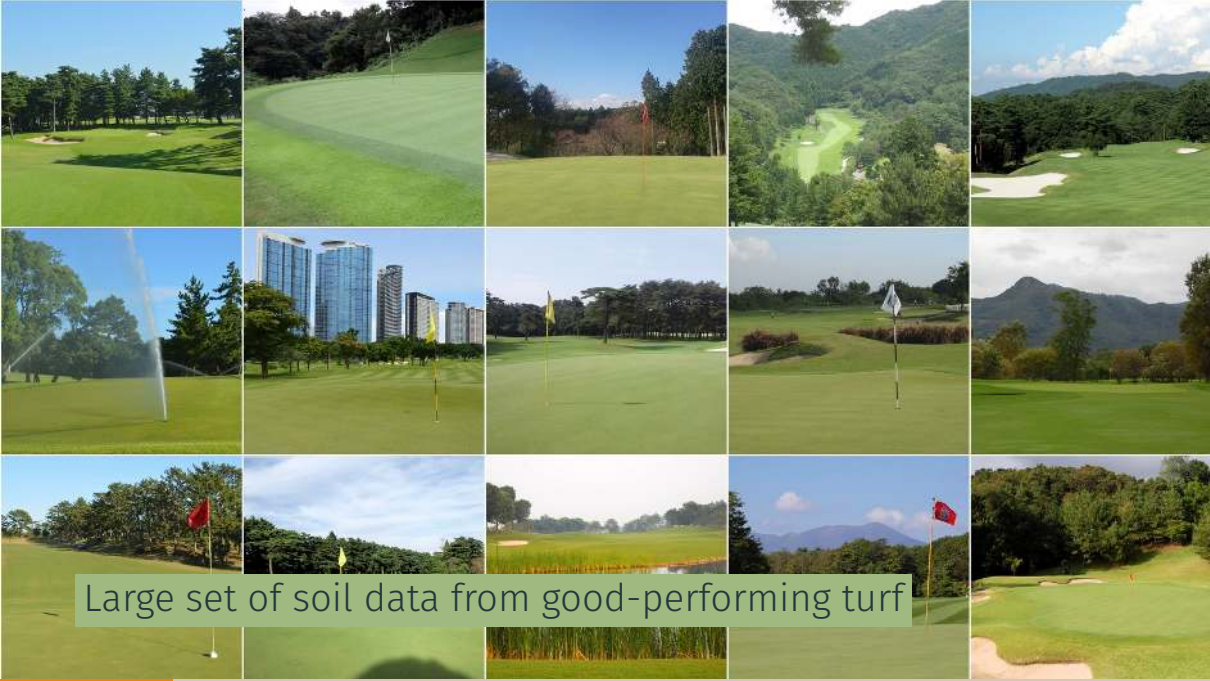
1. Measure soil nutrients, then adjust (#MLSN)

Continuous improvement system

1. Measure soil nutrients, then adjust (#MLSN)
2. Measure soil organic matter, then adjust (#OM246)

Measure soil nutrients, then adjust


decreasing levels of soil K


Large set of soil data from good-performing turf

Use three numbers

1. Expected plant use for the recommendation time period
2. The minimum to keep untouched in the soil
3. The soil test result right now

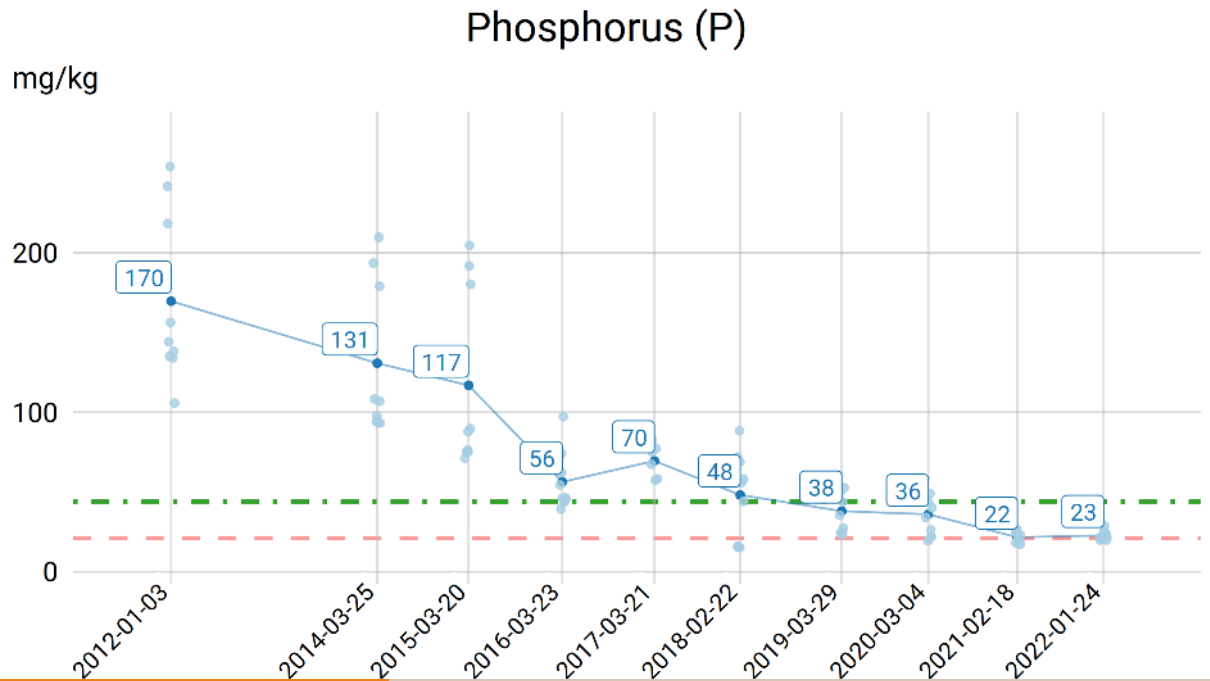

Soil test potassium on greens
Soil test K, mg/kg
80
60
40
20
0
MLSN minimum for K
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Year
Potassium applied to greens
K applied, g/m^2
8
6
4
2
0
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Year


Soil test phosphorus on greens
Soil test P, mg/kg
200
150
100
50
0
MLSN minimum for P
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Year
Phosphorus applied to greens
P applied, g/m²
0.8
0.6
0.4
0.2
0.0
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Year

Total applied in 10 years

Potassium 51 g/m^2 (10.2 lbs/1000 ft^2)

Phosphorus 1.1 g/m^2 (0.2 lbs/1000 ft^2)


Phosphorus (P)
mg/kg
200
100
0
170
131
117
56
70
48
38
36
22
23
2012-01-03
2014-03-25
2015-03-20
2016-03-23
2017-03-21
2018-02-22
2019-03-29
2020-03-04
2021-02-18
2022-01-24

Measure soil organic matter, then adjust

The definition of soil organic matter

soil organic matter: The organic fraction of the soil exclusive of undecayed plant and animal residues. See also humus.

humus: the well decomposed, more or less stable part of the organic matter in mineral soils.

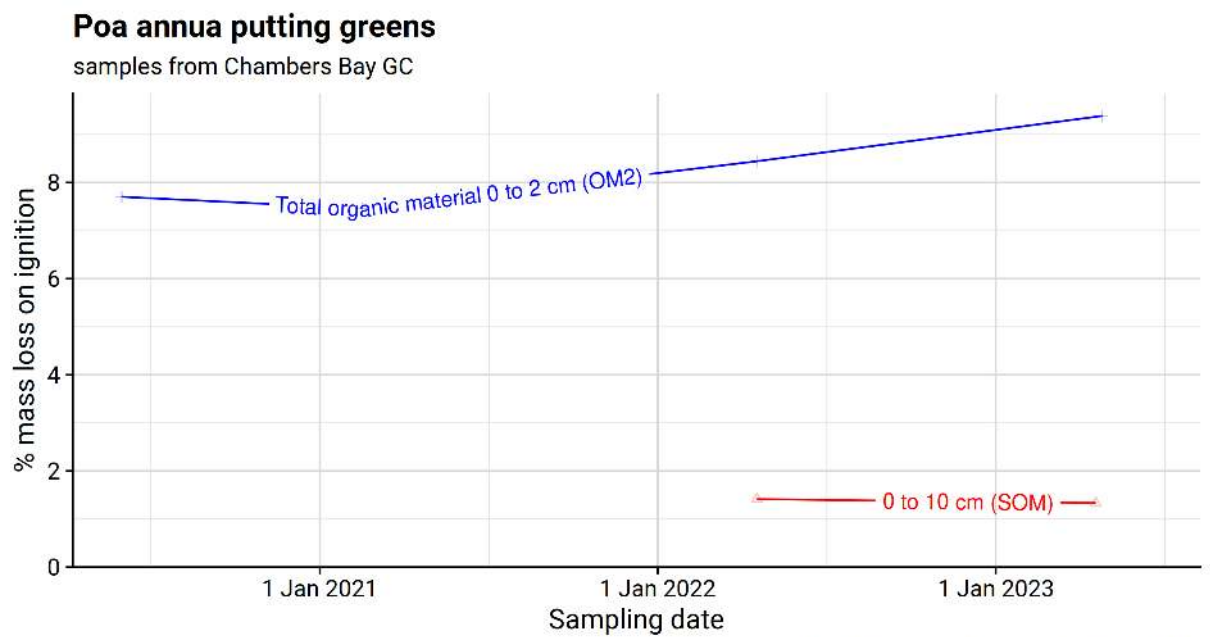
Total organic material

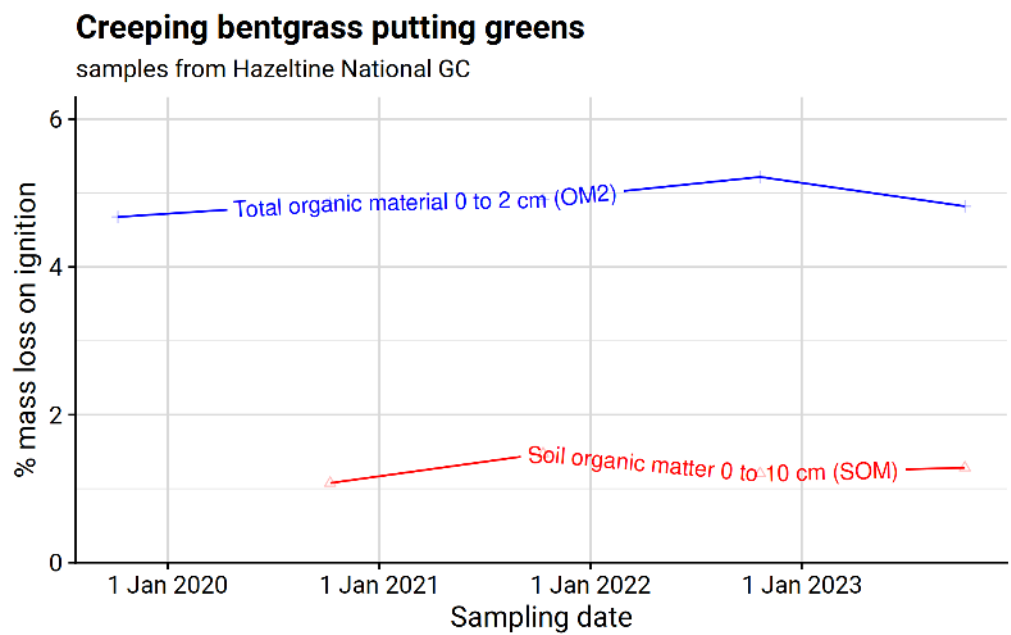
total organic material: organic material in a soil sample that has not passed through a sieve. This test is conducted on the sample as it is received at the laboratory, with no removal of living or dead plant material prior to testing.

Keya GC, Fukuoka


Bangsai CC, Thailand

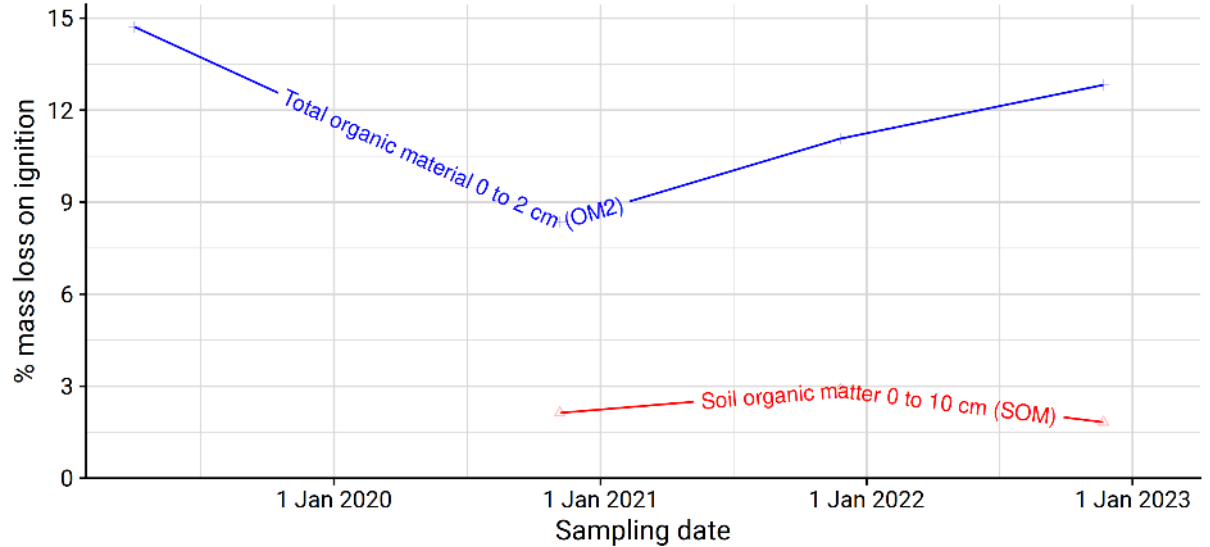
Bangsai CC, Thailand


Poa annua putting greens
samples from Chambers Bay GC
% mass loss on ignition
0
2
4
6
8
Total organic material 0 to 2 cm (OM2)
0 to 10 cm (SOM)
1 Jan 2021
1 Jan 2022
1 Jan 2023
Sampling date
All soil tests conducted at Brookside Labs


Creeping bentgrass putting greens
samples from Hazeltine National GC
% mass loss on ignition
6
4
2
0
Total organic material 0 to 2 cm (OM2)
Soil organic matter 0 to 10 cm (SOM)
1 Jan 2020
1 Jan 2021
1 Jan 2022
1 Jan 2023
Sampling date
All soil tests conducted at Brookside Labs

Tifeagle putting greens

samples from Bangsai CC



All soil tests conducted at Brookside Labs

At the laboratory

Organic matter bullet list

- Standard tests for soil organic matter *exclude* thatch, stems, & roots.
- Standard turfgrass tests are to a 10 cm depth, but organic matter accumulation (and ball reaction) are at the surface.
- Total organic matter in soil samples taken to a 2 cm (0.8 inches) depth measures *prior topdressing effect* & *future topdressing requirement*.
- I like to test 100% of the sample that is sent to the lab, with no screening, no removal of plant material, & burning at 440 °C.
- The average total OM I've measured in the top 2 cm on greens is *7.3%*.
- For golf courses, I recommend testing *at least 3 putting greens annually* & taking at least 5 subsamples per green to form a composite sample.
- By looking at *change in total OM over time*, one can adjust the topdressing amount to achieve the desired results.
- By looking at change in the total OM at the 2 to 4 cm & 4 to 6 cm depths, one can assess the need to add sand (or to remove material) at those depths. You might be surprised *at how stable the OM is at depth*, raising questions about *the need for coring*.

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