MLSN: modern turfgrass nutrition

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Fertilizer is the number one management tool. It is worth all the attention you can give it.

John Madison, *Principles of Turfgrass Culture* (1971)

The fundamental principle of successful greenkeeping is the recognition of the fact that the finest golfing grasses flourish on poor soil and that more harm is done by over-, rather than underfertilizing.

Alister MacKenzie, *The Spirit of St. Andrews* (1995)

The conventional way – low, medium, & high classification

The conventional way

RESEARCH

Clarifying soil testing: III. SLAN sufficiency ranges and recommendations

Given correct soil test results and the knowledge to interpret them, superintendents can determine proper amounts of nutrients to add to soils for healthy turf.

R.N. Carrow, Ph.D.; L. Stowell, Ph.D.; W. Gelernter, Ph.D.; S. Davis; R.R. Duncan, Ph.D.; and J. Skorulski, M.S.

EDITOR'S NOTE:

KEY points

GCSAA *GCM Magazine*, January 2004

List of ranges

- low
- medium
- high

“Low range: a high probability (80-100%) that applying the nutrient will elicit a growth response.”

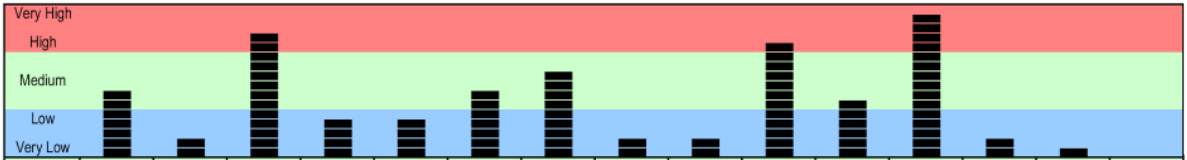
“Medium range: approximately a 50% chance of getting a plant growth response ...; if supplemental fertilizer is not applied, growth will probably be limited, especially as the season progresses.”

“High range: little or no crop response is expected from applying the particular nutrient.”

Typical snapshot soil report

Graphical Soil Analysis Report

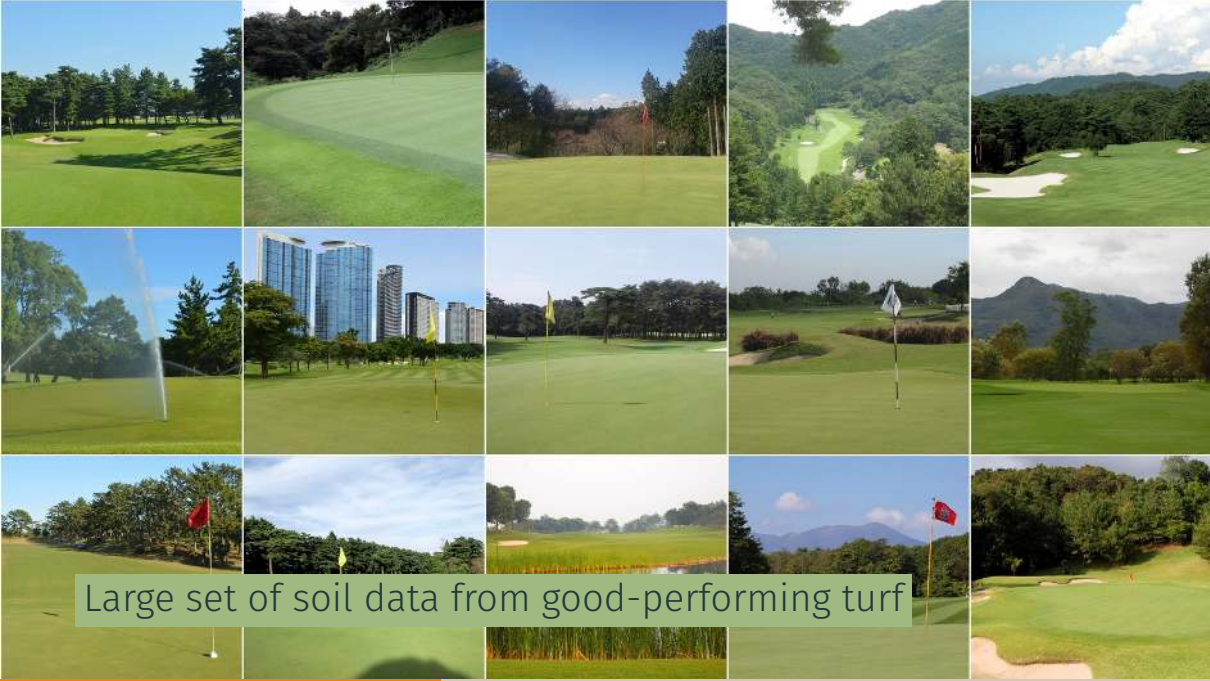
DATE OF REPORT: 10/05/18 **LAB NO:** 56182 **SAMPLE ID:** FW-3 **PAGE:** 3



Analyte	Organic Matter percent	Nitrogen NO_3-N ppm	Phosphorus Weak Bray ppm	Phosphorus $NaHCO_3$-P ppm	Potassium K ppm	Magnesium Mg ppm	Calcium Ca ppm	Sodium Na ppm	Sulfur SO_4-S ppm	Zinc Zn ppm	Manganese Mn ppm	Iron Fe ppm	Copper Cu ppm	Boron B ppm	Chloride Cl ppm
Results	3.0	4	67	18	28	78	555	11	5	5.2	6	85	0.4	0.1	

“In some cases, turfgrasses have been placed in a ‘high’ P and K requirement category, while pasture grasses were in a ‘low’ category. This decision was based on economics, not agronomics. The cost of fertilization was not considered of primary importance for turf.” – *Carrow, Waddington, and Rieke*

What MLSN is



Large set of soil data from good-performing turf

MLSN is an initialism for **Minimum Levels for Sustainable Nutrition**.

MLSN is a modern method for using soil test results to make nutrient (fertilizer) recommendations for turfgrass.

How to use MLSN

Use three numbers

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

$$\overbrace{a+b}^{\text{amount needed}} - \overbrace{c}^{\text{amount present}} = \overbrace{Q}^{\text{fertilizer requirement}}$$

a is a site-specific estimate of plant use
b is the MLSN guideline
c is the soil test result

Why MLSN works

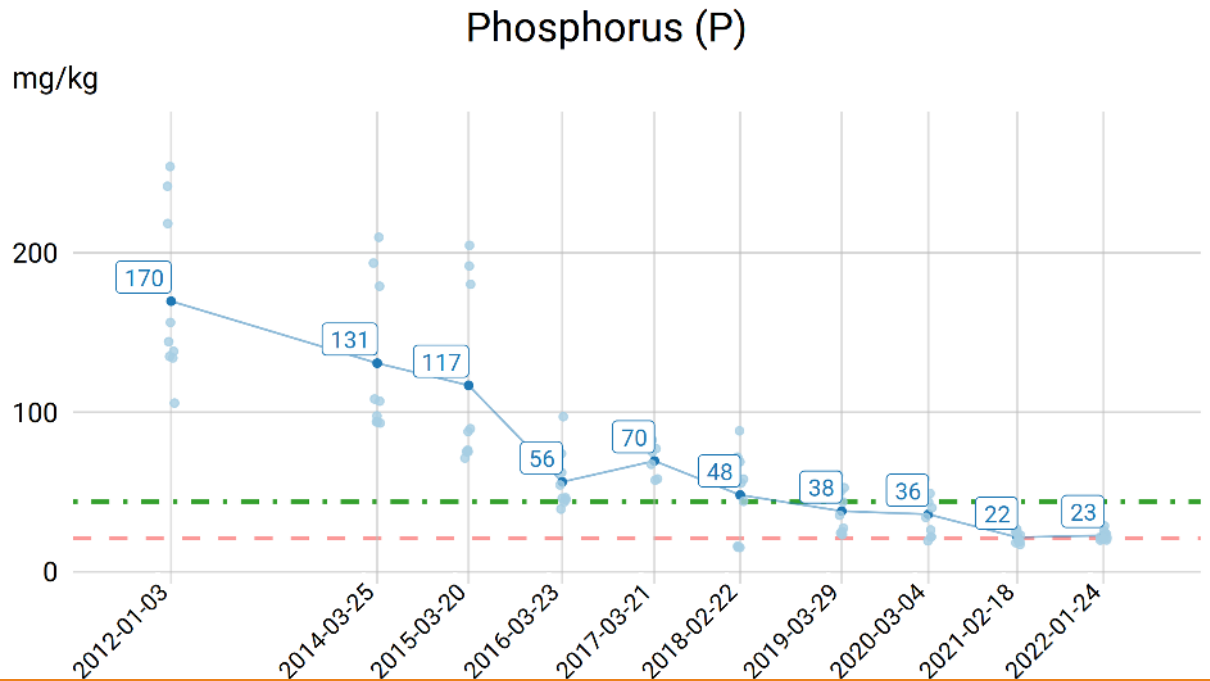

Soil test potassium on greens
Soil test K, mg/kg
80
60
40
20
0
MLSN minimum for K
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Year
Potassium applied to greens
K applied, g/m^2
8
6
4
2
0
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Year


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

Phosphorus 1.1 g/m^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

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