

Turfgrass nutrition (and related) research

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Asian Turfgrass Center
www.asianturfgrass.com

PACE Turf
www.paceturf.org

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

Madison, 1971¹

¹Madison, J.H. 1971. Principles of turfgrass culture. New York: Van Nostrand Reinhold Co. p. 270

“A study was conducted to determine differences among soil testing laboratories ... in fertilizer recommendations for turfgrass maintenance and establishment.”

Turner & Waddington, 1978²

²Turner, T.R. and D.V. Waddington. 1978. Survey of soil testing programs for turfgrasses. Comm. Soil Sci. Plant Anal. 9(1):71-87.

*“Unfortunately, turfgrass recommendations appear to be based on **research done with other crops**, such as forages, results from turfgrass fertility studies **not designed to relate to soil testing**, and the **best judgment of the agronomist making the recommendations.**”*

Turner & Waddington, 1978

“Calibration of ... soil P with turfgrass growth and subsequent P fertilization recommendations is scant, and additional data is needed. Many current recommendations for P fertilizer for turfgrasses are based on forage- or field-crop calibration data.”

Frank & Guertal, 2013³

³Frank, K.W. and E.A. Guertal. 2013. Potassium and phosphorus research in turfgrass. In: Stier, J.C., B.P. Horgan, and S.A. Bonos, editors, Turfgrass: Biology, Use, and Management, Agron. Monogr. 56. ASA, CSSA, SSSA, Madison, WI. p. 493-519.

“Relationships between extracted soil K, K fertilization rates, and turfgrass response needs additional study. Such work is especially missing for the sand-based systems in which many turfgrasses are managed.”

Frank & Guertal, 2013



We want to ensure that the grass is supplied with **all the nutrients it can use**. This quantity is the **minimum amount to supply**.

However, adding more nutrients than the grass can use, or than the soil can hold, is a waste. Adding enough to ensure that grass is supplied with **all the nutrients it can use** is also the **maximum amount to supply**.

The minimum and the maximum amount to apply are the same. I call this the **right amount**, or **just what the grass requires**.

- 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

$$\underbrace{\text{amount needed}}_{a + b} - \underbrace{\text{amount present}}_c = \underbrace{\text{fertilizer requirement}}_Q$$

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

More specifically...

One can express the quantity of an element required as fertilizer as Q .

$$a + b - c = Q$$

where,

a is the quantity of the element used by the grass
 b is the quantity of the element kept in the soil (MLSN)
 c is the quantity of the element present in the soil
 Q is the quantity of the element required as fertilizer

MLSN is an extra amount to keep in reserve

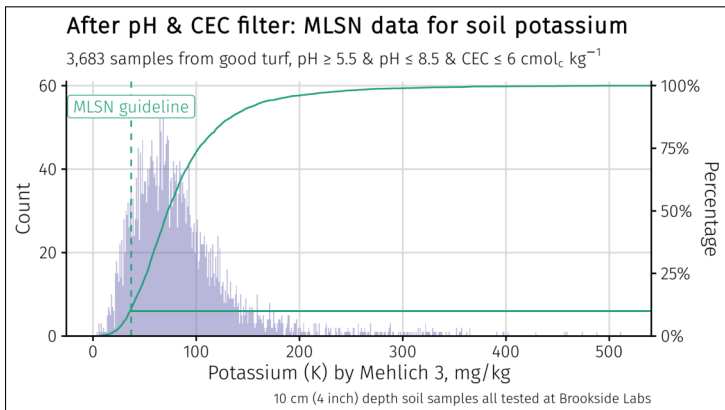
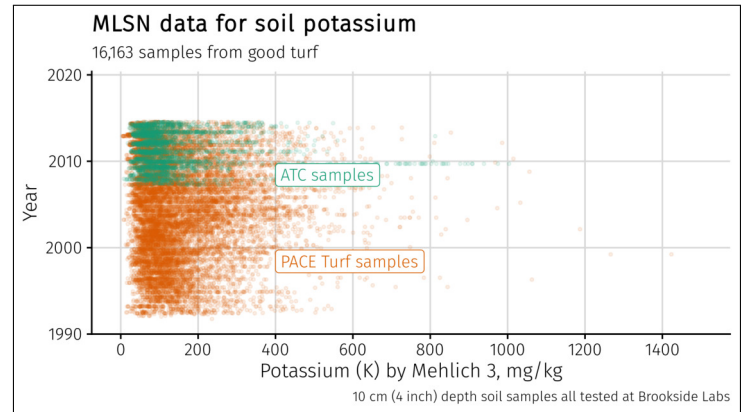
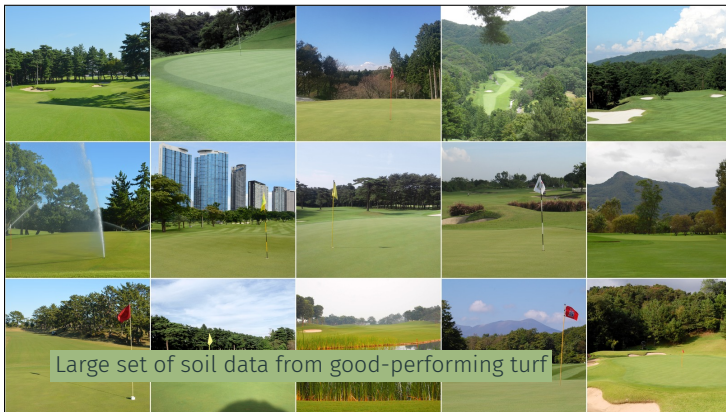
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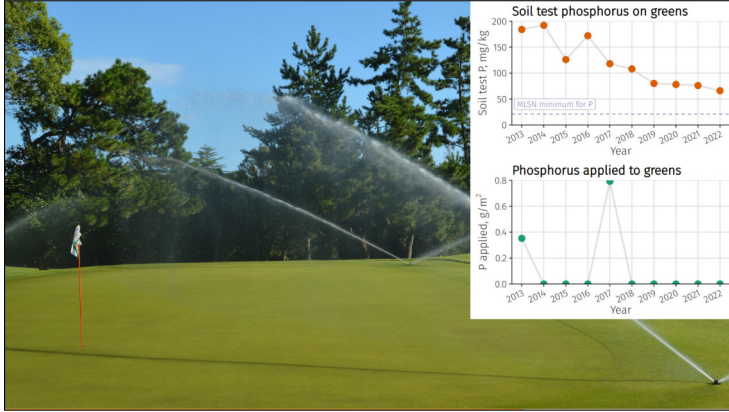
September, 2014

Minimum Levels for Sustainable Nutrition Soil Guidelines

The Minimum Level for Sustainable Nutrition (MLSN) Guideline is a new, more sustainable approach to managing soil nutrient levels that can help you to decrease fertilizer inputs and costs, while still maintaining desired turf quality and playability levels. The MLSN guidelines were developed in a joint project between PACE Turf and the Asian Turfgrass Center. All soil analyses were conducted at Brookside Laboratories, New Bremen, OH.

	MLSN Soil Guideline
pH	>5.5
Potassium (K ppm)	37
Phosphorus (P ppm)	21
Calcium (Ca ppm)	331
Magnesium (Mg ppm)	47
Sulfur as sulfate (S ppm)	7





Total applied in 9 years
 Potassium 45 g/m²
 Phosphorus 1.1 g/m²



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University research location climate appraisals

University research results are valuable tools for developing turfgrass management plans. One way to bring more confidence in application of university research data to your site is to understand the type of climate (cool season, warm season or transitional) each research location is located in. This PACE Turf website provides climate appraisal information for most of the major universities to allow you to compare your climate for each of the university research locations. Compare the GP Ratings (Climate Appraisal) for each university's location below to your own, provided on the PACE Turf Website page. For more in-depth comparisons, you can also compare the Climate Appraisals, nutrient plans and normal weather patterns for each university via those provided for your location on your PACE Turf Website page. In addition to reviewing climate impacts when reviewing research on variety trials or disease control practices, you can compare experimental additional inputs to the expected turfgrass use in the nutrient plans at each location to help better evaluate the value of these models and how they might apply to your location.

GP Rating	Location	Climate US or Mexico	Nutrient plan C3 US or Mexico	Nutrient plan C4 US or Mexico	Delta GP (C3-C4)	
	University of Alabama	US	Metric	US	Metric	Delta
	University of Arkansas	US	Metric	US	Metric	Delta
	UC Riverside	US	Metric	US	Metric	Delta
	Colorado State University	US	Metric	US	Metric	Delta
	University of Georgia	US	Metric	US	Metric	Delta

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Online handout with slides & more info



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