



## MLSN newsletter #23

Hello,

The MLSN project is now in its twelfth year. Here are the latest updates about identifying (and fine-tuning) turfgrass nutrient requirements using MLSN.

### **The PACE MLSN minimum calculated based on growth expectation**

I find myself explaining every year that the MLSN guidelines are not a substitute for the conventional SLAN guidelines. The SLAN medium levels are something like a target level that one wants to stay above, and the SLAN high range is a target level that one wants to stay within. By definition, a soil test in the SLAN medium range for an element means there is:

approximately a 50% chance of getting a plant growth response from application of the nutrient; if supplemental fertilizer is not applied, growth will probably be limited.

When a soil tests in the high range for an element:

little or no crop response is expected from applying the particular nutrient.

There is a huge safety margin built in to the SLAN ranges. It's implied that if one's soil tests in the high range, there's no need to apply that particular nutrient this year for sure, and maybe next year, and maybe the year after that.

It's not entirely clear with SLAN, but these SLAN ranges should be good for years. For example, the University of Delaware says "lawn and ornamental areas need only be sampled every 2 to 3 years." The University of Minnesota says "Test your soil every three to five years."

Although the SLAN guidelines are really high, there is also some expectation when using SLAN that the recommendation needs to be valid for many years.

With MLSN, the interpretation is different. There's no medium range for an element. There's no high range either. There is simply the MLSN value, and the interpretation goes something like this.

If the soil tests above the MLSN minimum, then one can be confident that there was enough of that element present to meet the grass requirements at the time the sample was collected. If the soil test result for an element is below the MLSN minimum, there still might be enough of the element to meet the grass requirements, but I'm not so confident about that anymore. I'm not so confident because a soil testing below the MLSN value has a test result for that element in the lowest 10% of turfgrass soils that still produce good turf. That is, we can certainly have good turf at that level of an element in the soil, but

there aren't a lot of soils producing good turf with the element that low, so proceed with caution—you'll probably want to add that element as fertilizer.

And keeping in mind that the grass is alive, and that the soil nutrient levels today are already lower than they were a couple weeks ago when you collected that soil sample, one needs to consider how much of an element is required to keep the soil from dropping below the MLSN value.

Nov		Dec		Total lb/1000 sq ft	Remove d from Soil ppm	Plus MLSN ppm
67	42	59.0	54.8			
0.2	0.1	1.2	1.9	3.1	NA	NA
0.12	0.07			1.53	50	87 K
0.03	0.02			0.38	13	34 P
0.02	0.01			0.31	10	341 Ca
0.01	0.01			0.19	6	53 Mg
0.02	0.01			0.23	8	15 S
0.00	0.00			0.015	1	45 Fe
0.00	0.00			0.006	0	6

  

Nov		Dec		Total g/m^2	Remove d from Soil ppm	Plus MLSN ppm
15	3	18.0	13.2			
0.5	0.1	12.7	22.9	21.7	NA	NA
0.26	0.05			10.86	71	108 K
0.07	0.01			2.72	18	39 P
0.05	0.01			2.17	14	345 Ca
0.03	0.01			1.36	9	56 Mg
0.04	0.01			1.63	11	18

I want to recommend the [PACE Turf Climate Appraisal Form](#) as an easy way to check this in more detail. You can adjust the monthly N amount in the spreadsheet until you see an annual N total that is similar to what you expect to apply. Then, you'll see the columns "Removed from Soil ppm" and "Plus MLSN ppm." These columns are showing, respectively, how much the soil is expected to go down in ppm in one year if that much N is applied, and what the soil test must be for one to be able to interpret the test in the same way as SLAN. That is, if your soil is at or above the "Plus MLSN ppm" column, you can make the same interpretation as you would with a soil testing in the high SLAN range: "little or no crop response is expected from applying the particular nutrient."

## MLSN project in Delaware

John Emerson is finishing up a USGA-funded soil testing project in Delaware. He's collected hundreds of soil samples from golf courses, lawns, and athletic fields across the state, and will be comparing them to the MLSN values and also to the University of Delaware recommendations for various turf types.

In all cases, he's collected the samples from good turf. These soil test results therefore represent soils that contained enough nutrients at the time the sample was collected to produce good turf. John has shared with me the soil test results obtained so far—hundreds of them. The median values are similar to what we measured in the [Global Soil Survey \(GSS\)](#). The preliminary Delaware data, all from good performing turf, have a lower median value than did the GSS for K, P, Ca, and S. The Delaware data have a slightly higher median Mg value than we measured in the GSS.

Look for a lot of information to come from this study as John gets all the results back from the lab and starts the full analysis.

## Reading about MLSN

I'm not quite sure how it is, but every time I check what I've been writing, I see that there are some new pieces about MLSN. Since the last newsletter, these are all new, and all related to MLSN:

- [Nutrient harvest turf math](#)
- [Testing MLSN](#)—this is an extraordinary story, a short read, and one you can listen to to hear more. Two golf course superintendents talk about a real life MLSN trial and what the results were.

In short, MLSN produced the same results as the other method, golfers have been effusive in their praise of course conditions, there's now been a switch to the MLSN approach on all 18 holes, I understand, and there has been a substantial amount of money re-allocated from unnecessary fertilizer cost, now being spent on improving soil physical properties.

- [A couple problems with year-round soil nutrient analysis](#)
- [No Poa after 16 years](#)
- [The time component of soil test interpretation](#)
- [SUNY Delhi MLSN discussion](#)
- [Mehlich 3 soil test P in sand rootzones](#)
- [Soil testing on the Cornell Turfgrass Show](#)
- [Reconstructing soil P from "disassembled" soil samples](#)

## Talking about MLSN

I've noticed that there are some recent ATC Doublecut episodes about MLSN too, so you can check those out at the [show home page](#). Scroll through the episodes until you find a topic you'd like to listen to.

## Coming up

I want to remind you about a conference that I'd encourage scientists, students, sod growers, turfgrass managers of all types, manufacturers—in fact anyone involved in or interested in turfgrass—to attend. That's the [2025 International Turfgrass Research Conference](#) from 12 to 16 July, 2025, in Karuizawa, Japan. This is going to be a superb conference.

I'll be at the US Amateur Championship at Hazeltine National this summer, then at the KBC Augusta Tournament in Japan. In January I'm planning to be in Harrogate for BIGGA's Continue to Learn programme.

Otherwise, I have other travel concerning my research and advisory work, and a few stretches of time at home in Thailand. Thanks for reading.

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