

# Efficient maintenance with growth rate management: case studies

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Asian Turfgrass Center

[www.asianturfgrass.com](http://www.asianturfgrass.com)

PACE Turf

[www.paceturf.org](http://www.paceturf.org)







# Normal clipping volume

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# One Bucket at a Time

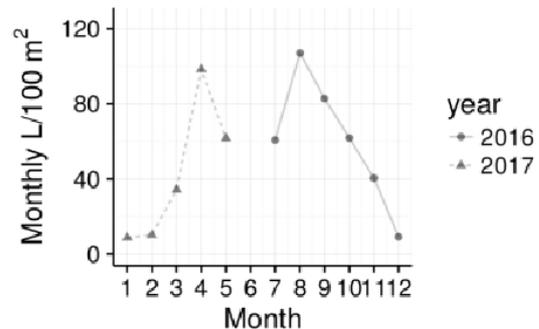
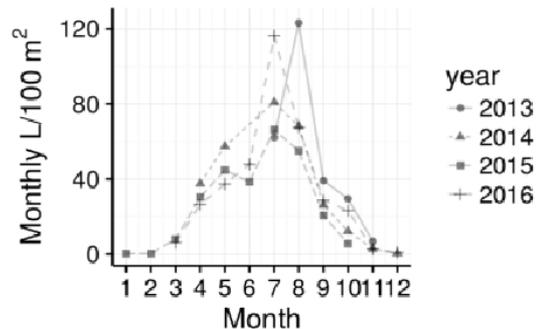
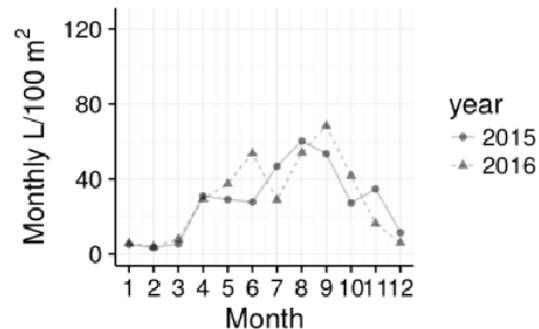
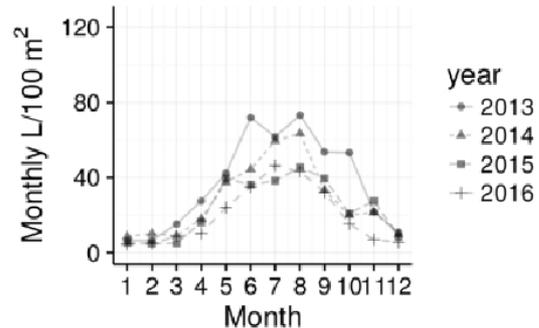
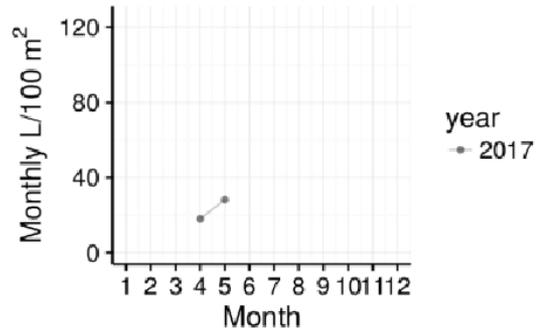
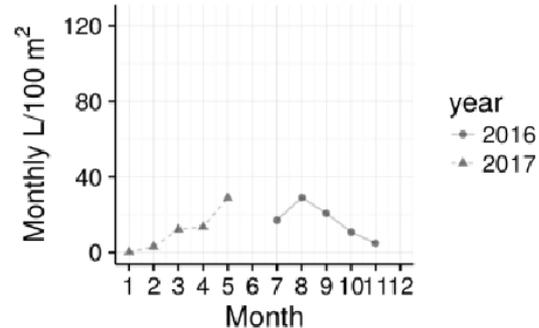
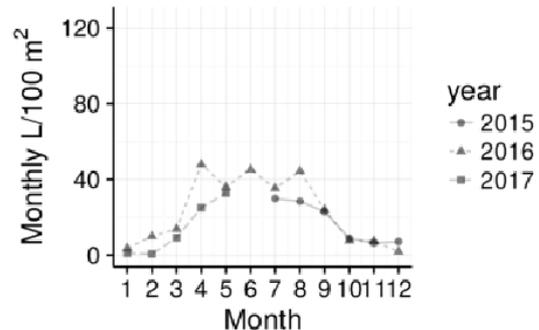
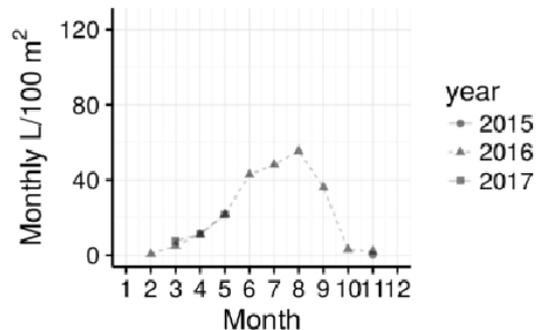
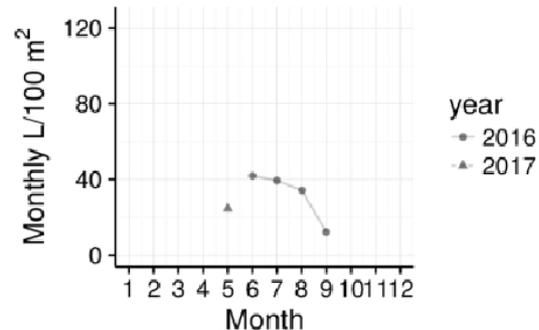
A guide to rapid measurement of clipping volume with various permutations, applications, and implications

Micah Woods

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**seashore paspalum, 21° N****zoysia, 33° N****creeping bentgrass, 35° N****creeping bentgrass, 36° N****creeping bentgrass, 45° N****fine fescue mix, 47° N****Poa annua, 48° N****bent/poa, 49° N****fine fescue mix, 64° N**

# Mower consistency

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Photo by Taku Miyamoto



Photo by Taku Miyamoto





# Measuring time

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Video time stamp: 1 second



Video time stamp: 4 seconds



Video time stamp: 10 seconds



# ClipVol and Clipping Yield

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Estimate dry mass as 6.3% of the fresh clipvol



I estimate 1 L of fresh clippings, when dried, will have a mass of 63 g.

We can predict approximate clipping yield from N rate. If we apply 10 kg N/ha (1 g N/m<sup>2</sup>), grass may take up about 60% of that. STERF suggests 3% N in clippings is sufficient.

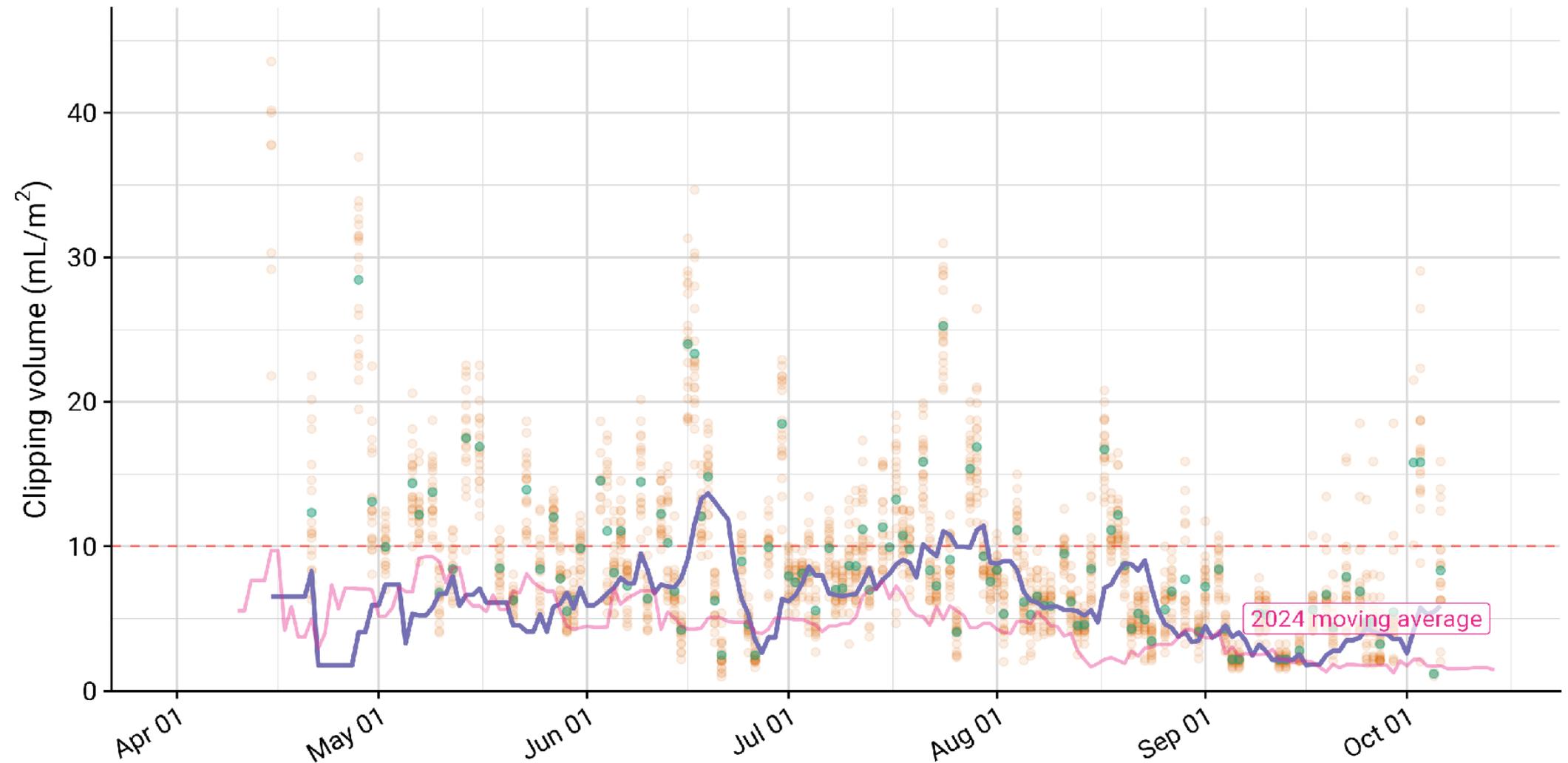
If the grass takes up 6 kg N/ha and has 3% N in the leaves, we have 20 g clippings per m<sup>2</sup>. And 20 g of dried clippings may have a volume of about 320 mL.

# Annual growth

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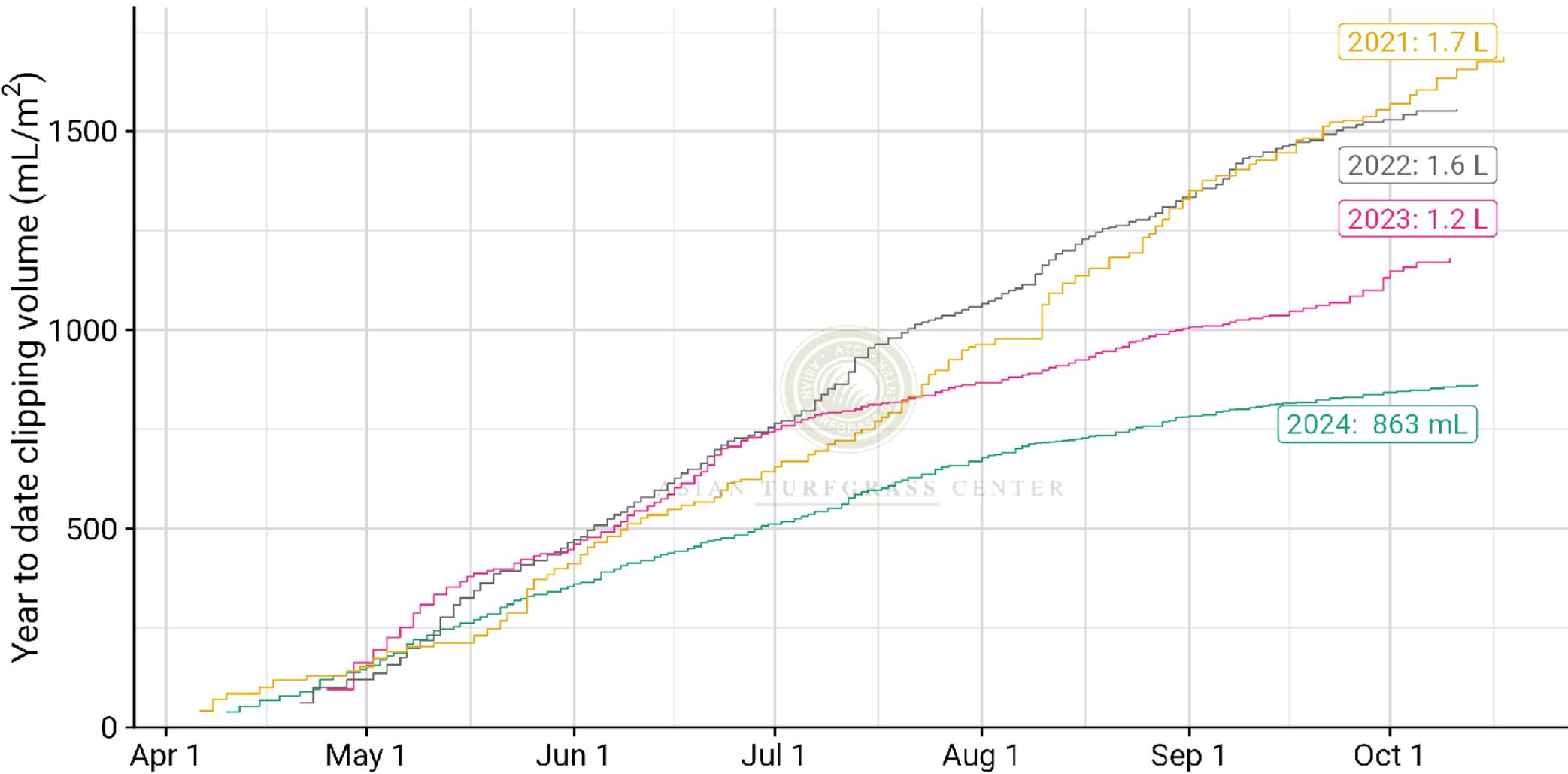


# Morning clipping volume in 2025



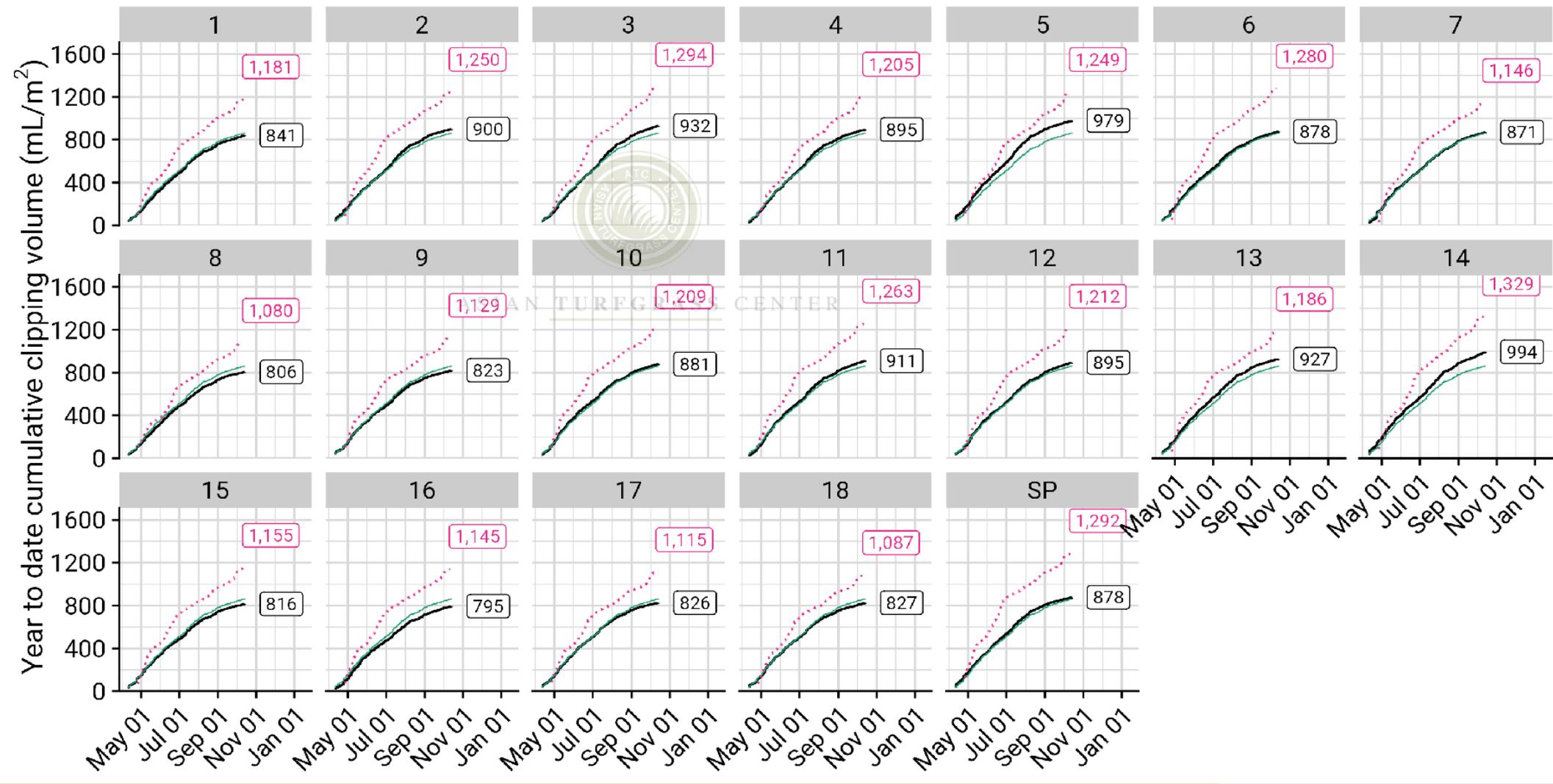
# Cumulative clipping volume

Hazeltine National Golf Club



# Cumulative clipping volume green by green

2024 in black, 2023 in pink, and the 2024 average across all holes in green.



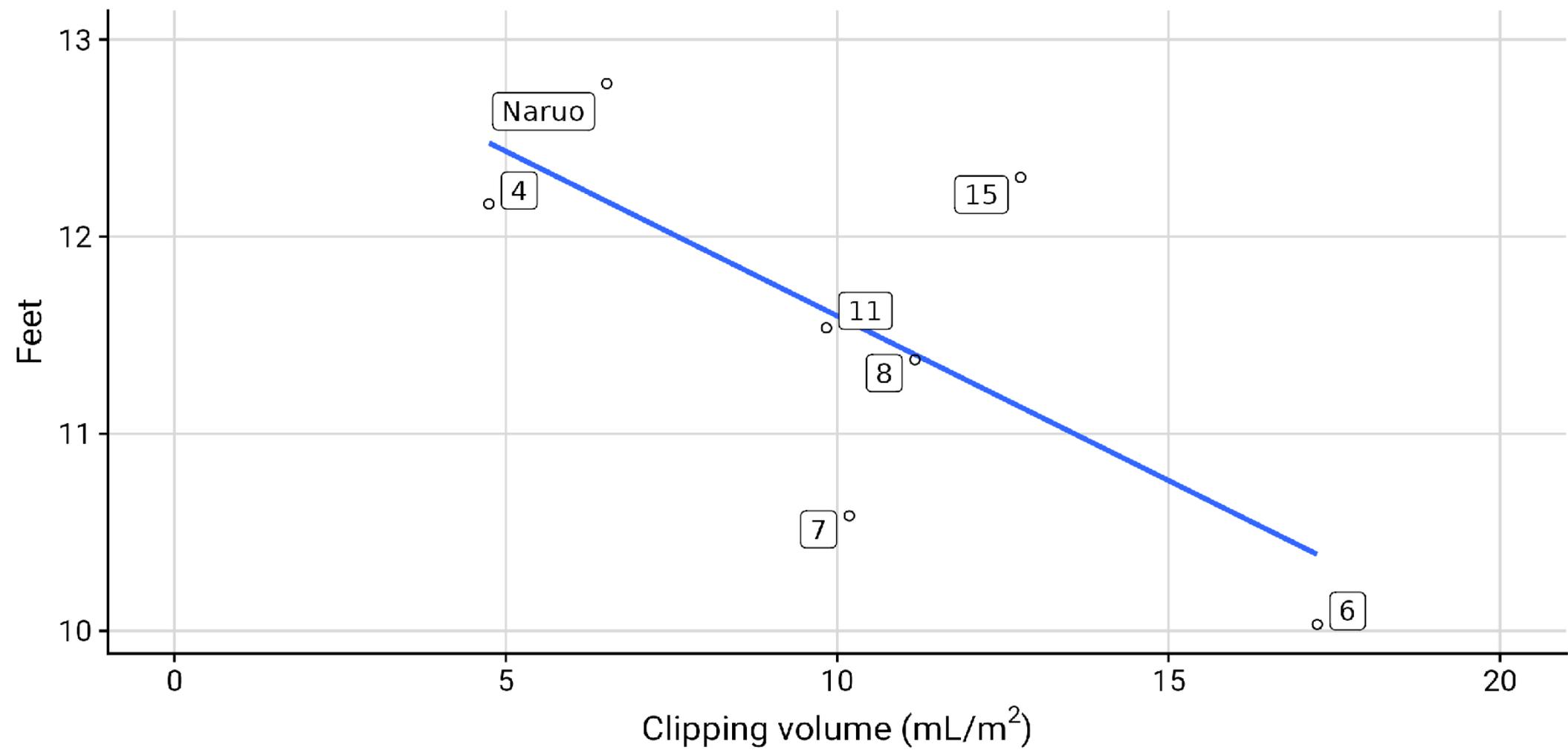


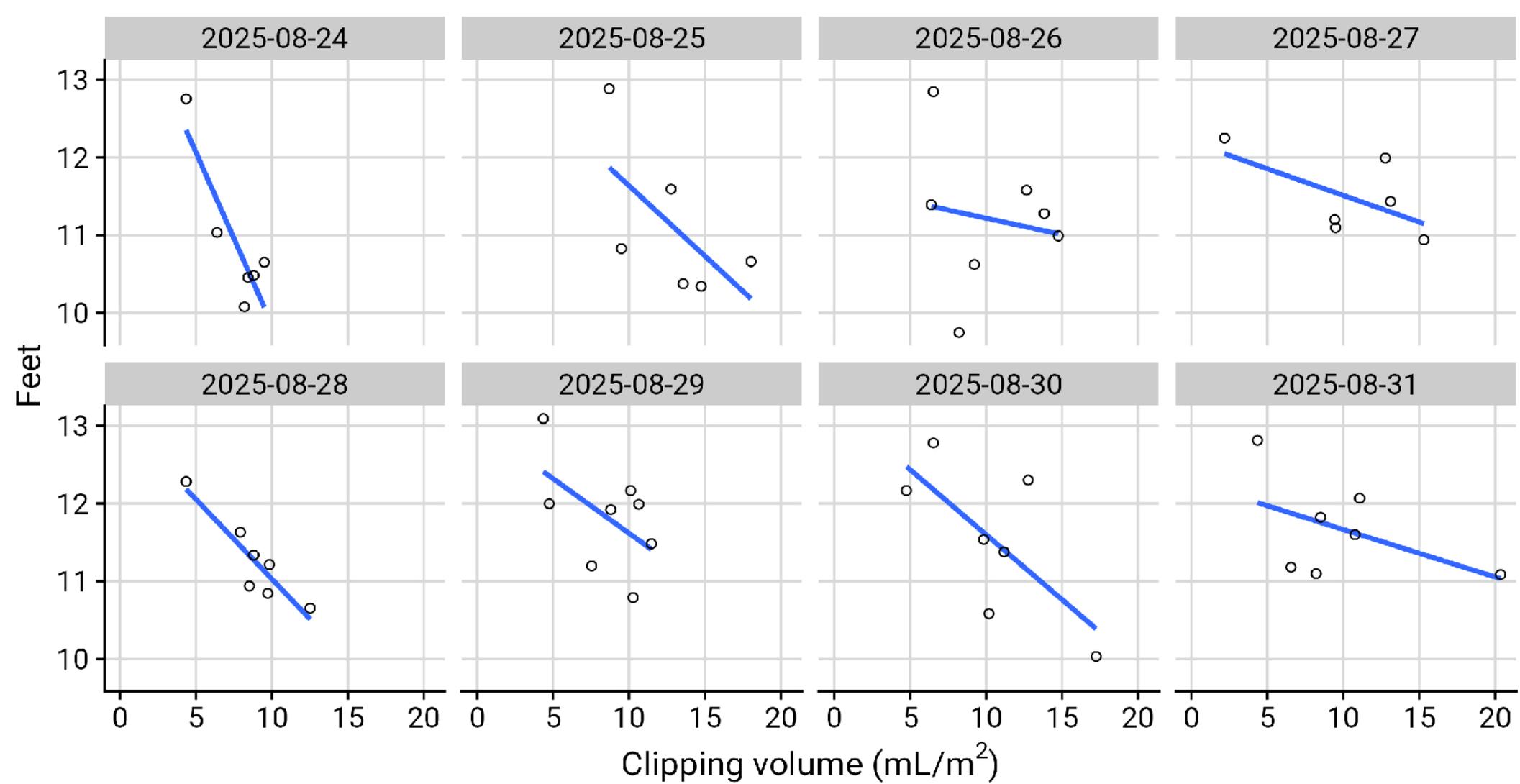
# Green speed

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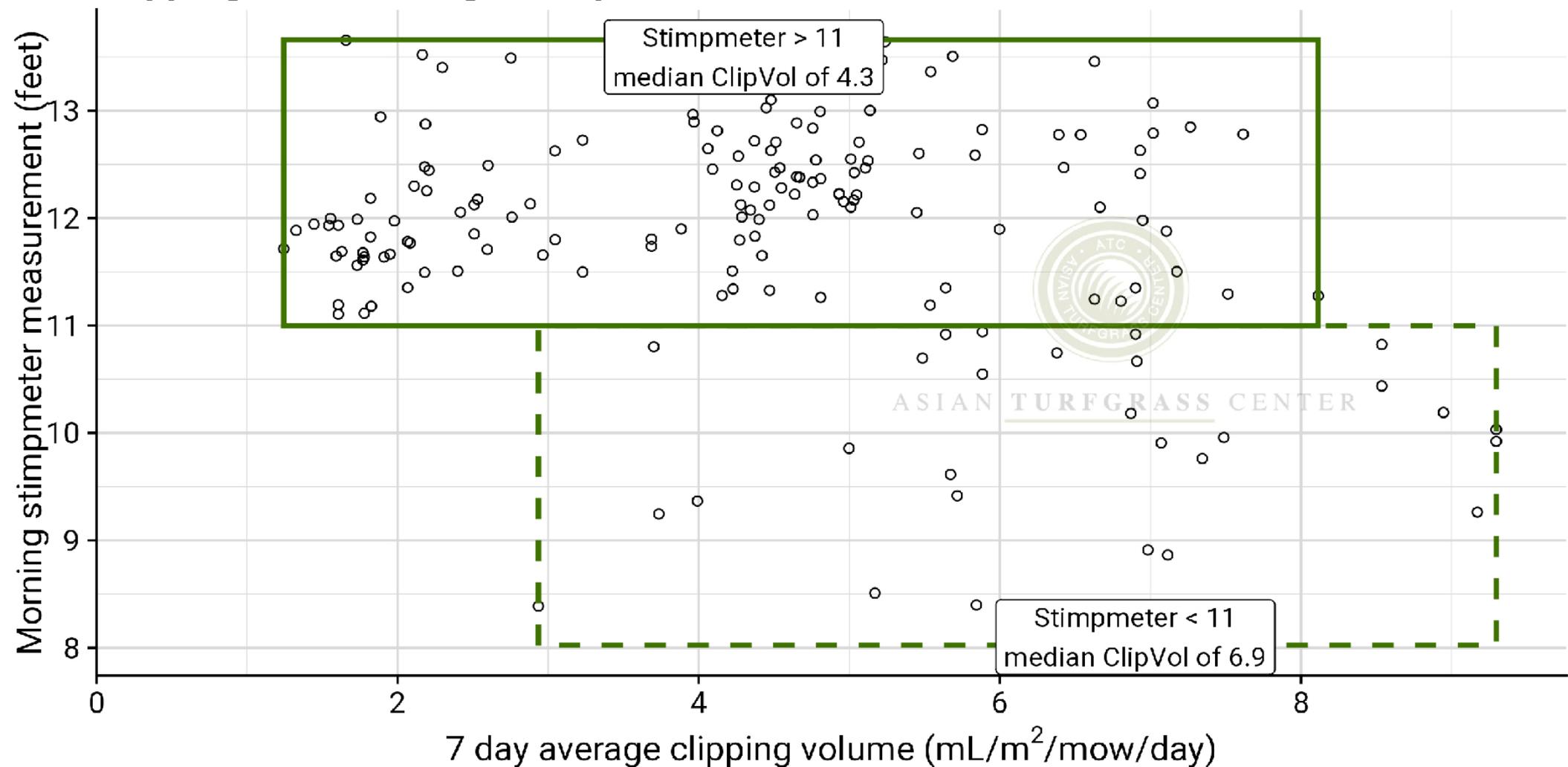


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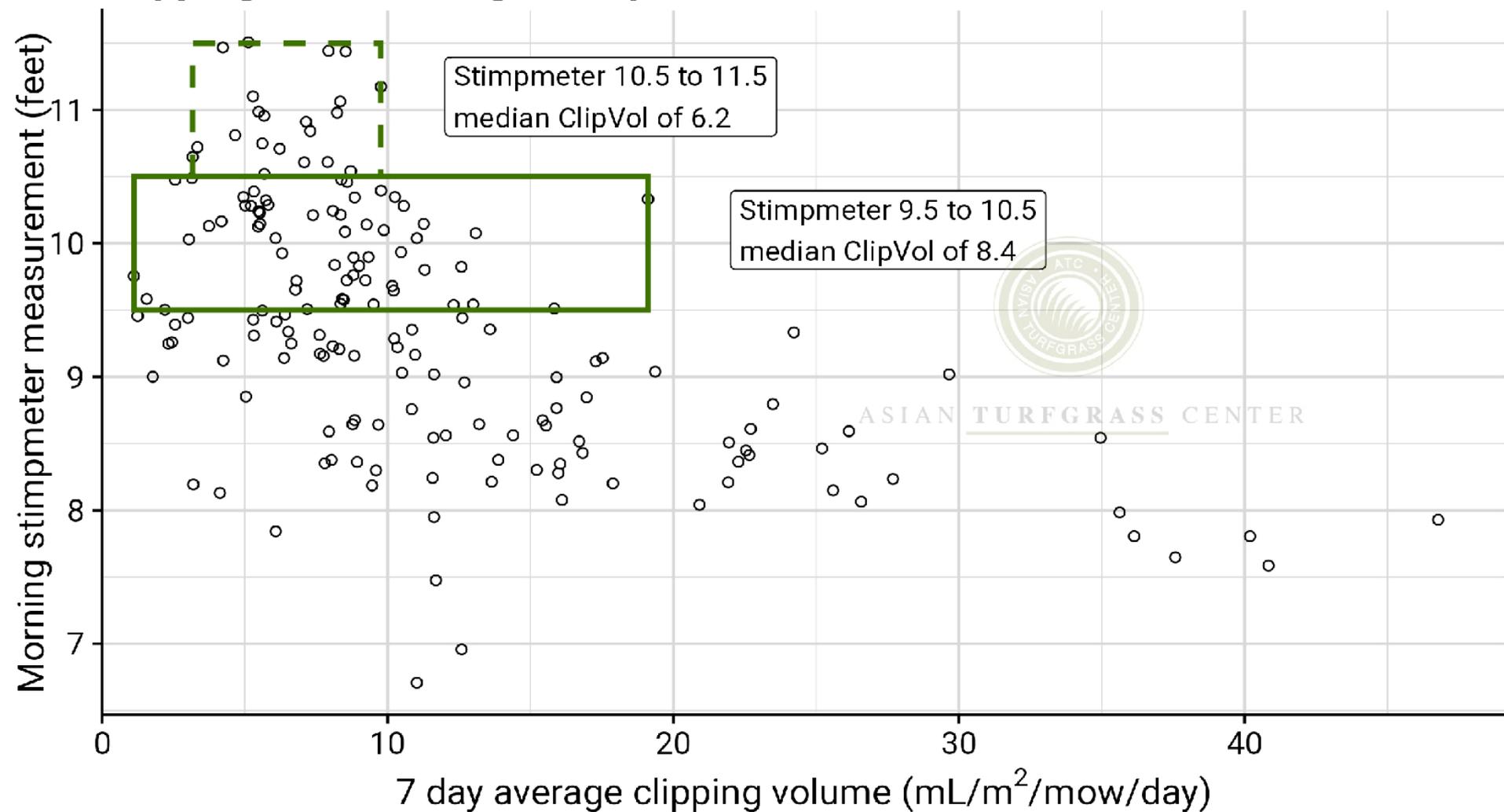


# Clipping volume vs. green speed



Data from 2024 measurements at a single golf course

# Clipping volume vs. green speed



Data from two years of measurements at a single golf course

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