Practical experiences using USGA method measuring surface organic material

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Fysikalisk analys av golfgreener

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Projektarbete 15 hp

Kursblock Golfbanemanagement (60 hp)

Självständigt arbete vid LTJ-fakulteten, SLU

Alnarp 2012

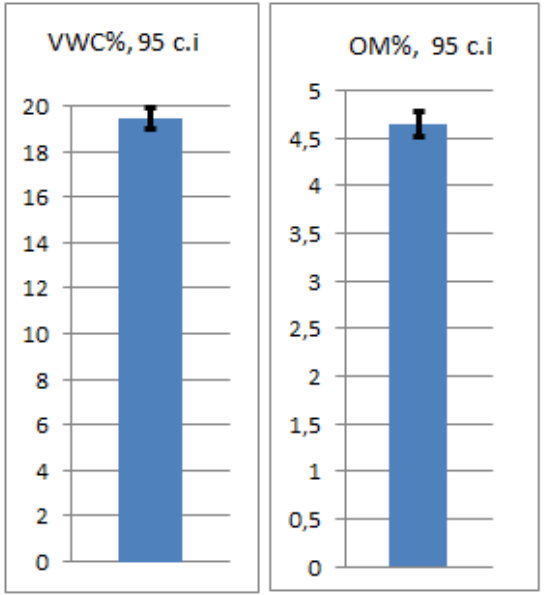
Summary

- Moisture meter to determine 5 or 10 samples
- Individual samples 0-20mm: Coefficient of variation
- Sampling is an art
- Own the process
- Aim for as much OM as you ”get way with”

New method

- Soil Organic Matter in farming. Sieving 2mm, clay compansation? LOI/TOC?
- ASTM F1647 sand based rootzone material. No turfgrass established.
- NEW method: Keep verdure. 0-20mm, 20-40mm, 40-60mm. ***5-10 samples -> mean for each level***

How many samples

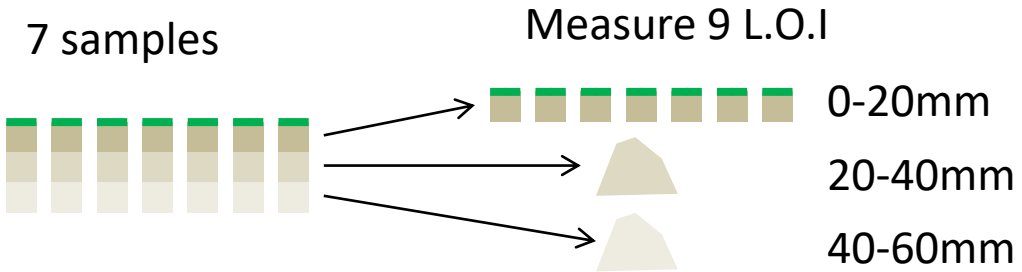


56 samples of OM 0-25 mm and VWC measured at 38 positions at same green

If moisture variation: **< 10%: 5 samples**
> 15%: 10 samples

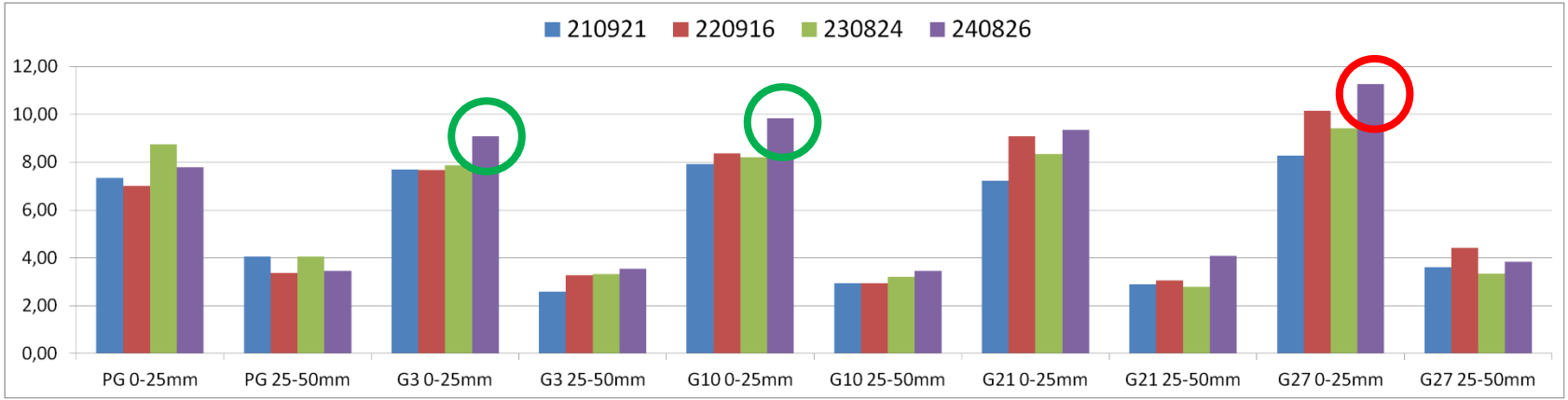
Coefficient of variation

- Individual samples 0-20mm
- Pooled samples 20-40mm and 40-60mm



$$C_v = \frac{\text{Standard deviation (s)}}{\text{Sample mean (x)}}$$

Are differences significant?



$$C_v = \frac{\text{Standard deviation (s)}}{\text{Sample mean (x)}}$$

< 0.1: low

> 0.25: high

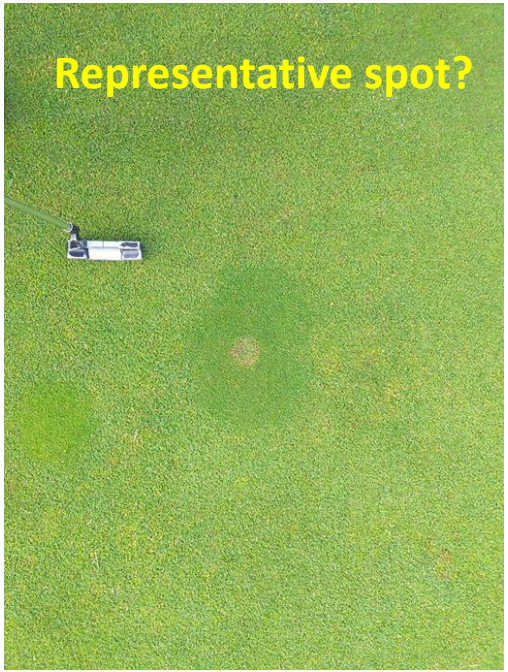
Example USGA vs Pushup greens

USGA: PG, Green 3, Green 10
Pushup: Green 21, green 27

$C_v > 0.15$?

Cv: (s/avr) n=7	Date (YYMMDD)								
green	210428	210606	210921	220428	220620	220916	230425	230824	240826**
PG	0,103*	0,122	0,067	0,076	0,109	0,106	0,135	0,118	0,087
G3	0,138	0,098	0,098	0,069	0,133	0,114	0,136	0,179	0,118
G10	0,122	0,128	0,146	0,090	0,153	0,125	0,137	0,083	0,131
G21	0,188	0,166	0,270	0,209	0,336	0,177	0,136	0,152	0,188
G27	0,118	0,082	0,241	0,118	0,123	0,147	0,113	0,206	0,232

Sampling is an art

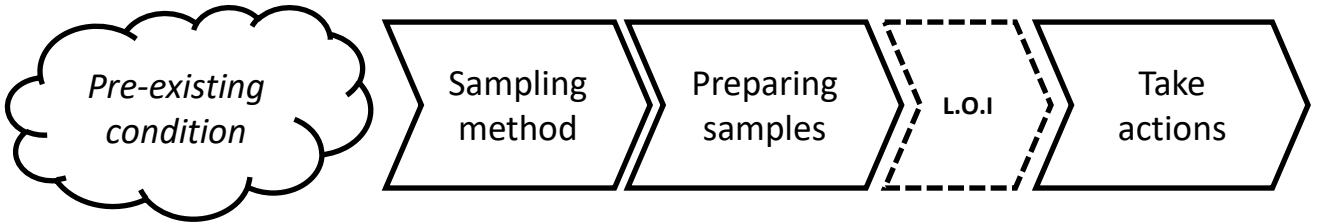


What you see is what you get

Own the process

Why measure?

Adopt method to the objectives



Combine with other project:

Irrigation

Playability

Equipment to measure loss on ignition

Answer within 24h

2000 USD

There is no magic number

- OM is beneficial in many ways.
- Problem greens are often low on OM
- Most problems are in a part of a green
- Make greens homogeneous
- Don’t bury problems
- Aim for as much OM as you ”get way with”

ありがとうございます　　質問

Thank you　　Questions?