





The role of water in dollar spot development

part of a BMP study for dollar spot in the Netherlands

Sterf

DOC
DOLLAR SPOT
OFF COURSE

STERF 20th Anniversary

Dollar Spot webinar – Oct 27 2026

DOC
DOLLAR SPOT OFF COURSE

IPM strategieën bij dollarspot – een praktijkstudie

Resultaten van een 3-jarig inventariserend praktijkgericht onderzoek naar de Best Management Practices op 12 golfbanen om de schade veroorzaakt door dollarspot op de green terug te dringen



Arthur Wolleswinkel
Gerard van 't Klooster
Casper Paulussen

GRASS2VALUE Research, Development & Consultancy
Turf Grass Consultancy
NMB ScanPro

Integrated Pest Management Strategies for Dollar Spot - a practical Case Study 2022-2024

Findings from a three-year applied field survey of Best Management Practices on 12 golf courses aimed at reducing dollar spot damage on greens



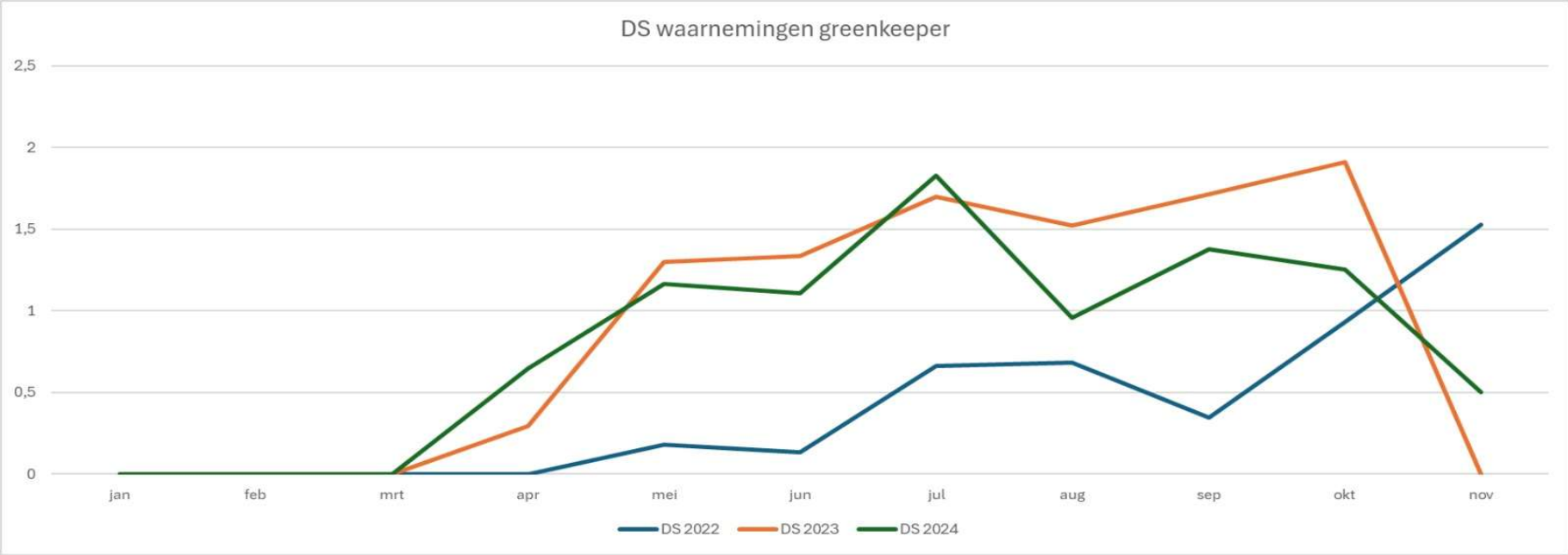
Arthur Wolleswinkel
Gerard van 't Klooster
Casper Paulussen

2nd Revised edition (English) - May 2026

GRASS2VALUE Research, Development & Consultancy
Turf Grass Consultancy
NMB ScanPro

National trend in dollar spot damage over the years 2022 – 2024

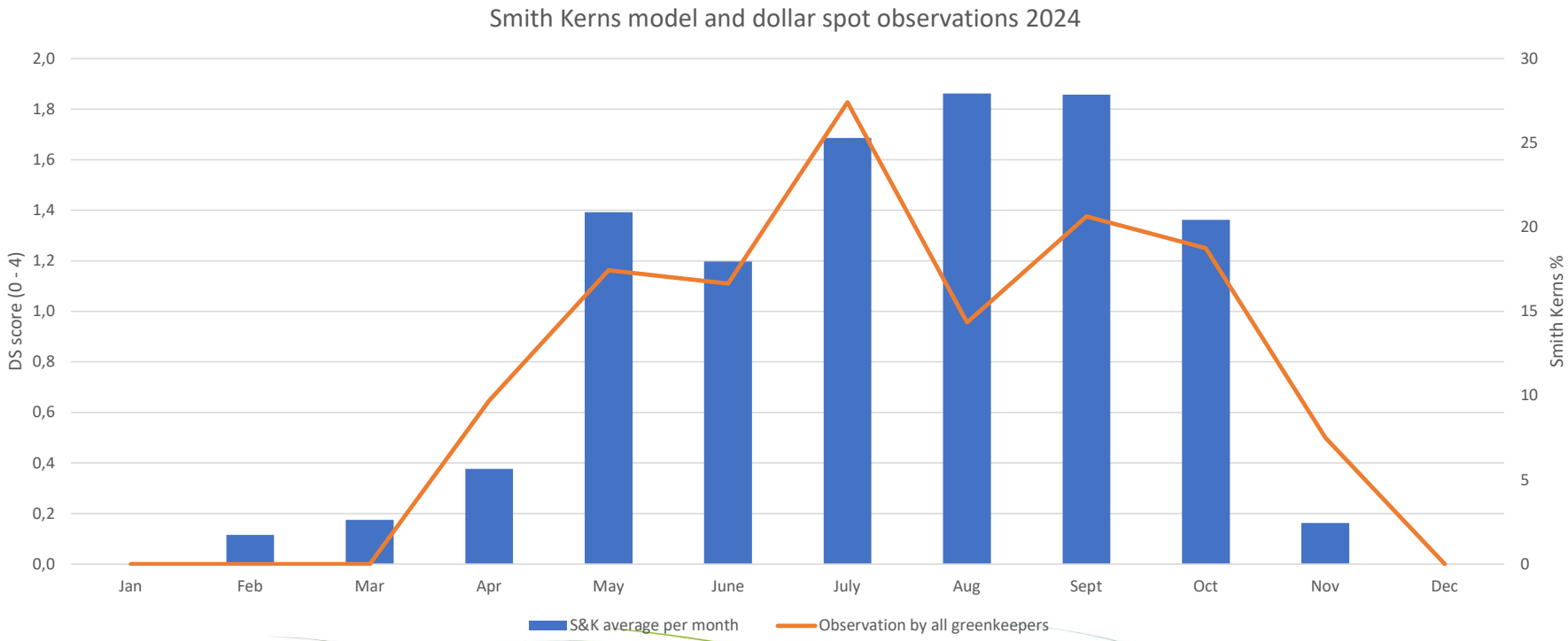
Average observations across 12 golf courses (36 greens) in the Netherlands



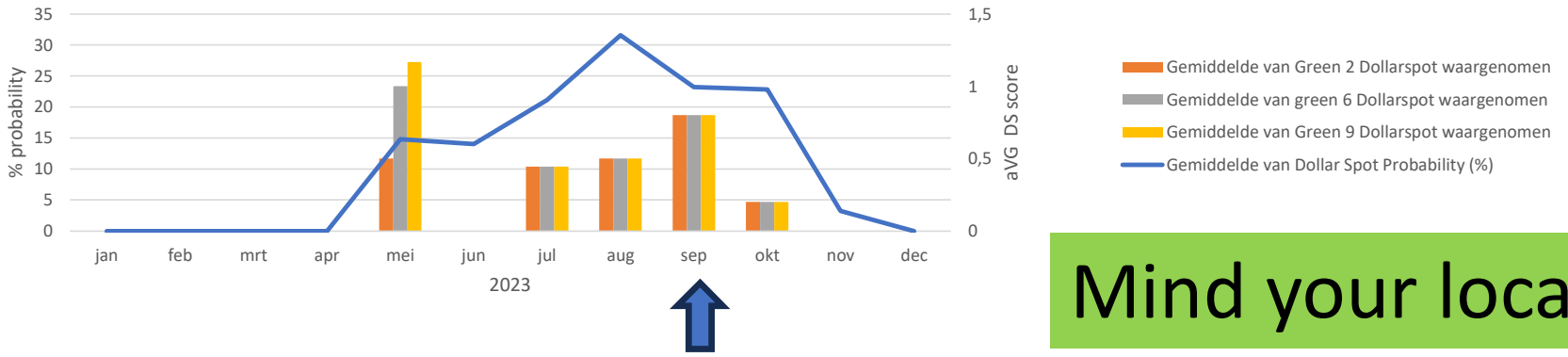
0 = no damage 4 = severe damage

DS predictions per month plotted against greenkeepers observations – 2024

average across 12 courses

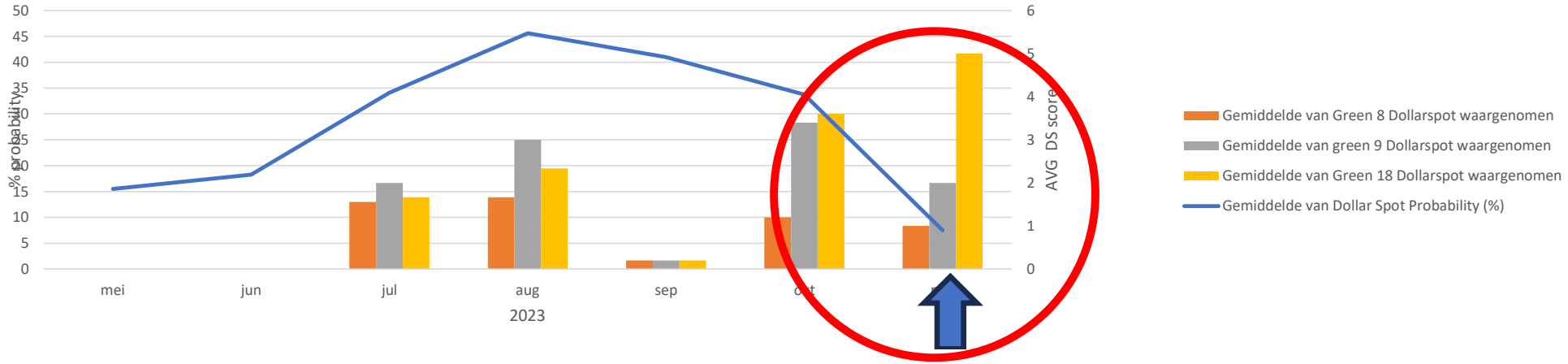


Links Valley GC - development Dollarspot 2023



Mind your local situation

‘t Zelle GC - development Dollarspot 2023



What measures can you take to minimise the damage caused by dollar spot?

	Organic matter	Nutrients – (nitrogen)	Timing N fertilization - FeSO4	Water VWC%	Right grasses (Fr en Ac)	Focus area
Amelisweerd	x	x	x			No deep aeration
Amsterdam	x	x	x			Different way of top dressing (kgs, type of sand, OM, etc)
Bentwoud	x					Improvement of root zone infiltration – no deep aeration
Domburg			x			Better timing of BMPs
Ede		x	x		x	Pro active management of BMPs
Geijsteren	x	x		x	x	Total approach of BMP towards more fine fescues
Lauswolt		x	x	x		non-disturbance approach
de Pan	x					OM management and rollin'!
Salland			x		x	Specific management required due to various green construction types
Links Valley	x	x	x	x		Improvement of root zone infiltration – no deep aeration!
Veluwse	x	x	x	x	x	Pro active management and intensive monitoring
t Zelle			x	x	x	Less is more: reduce topdressing and deep aeration

The role of leaf wetness in dollar spot infection

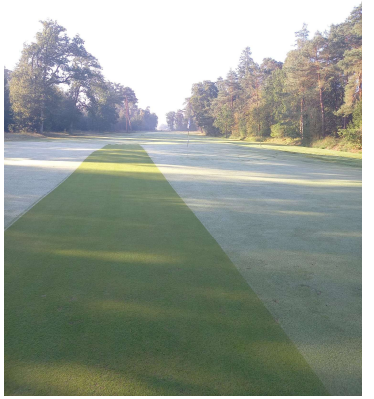
correlation Dollar spot – leaf wetness – GC ‘t Zelle

DS infection score (0 = no damage, 5 = very serious damage)



Leaf wetness (in minutes)

Can water management be related to dollar spot?



- **Leaf wetness** one of the most important factors
  Clarireedia spp –the pathogen responsible for dollar spot thrives in conditions of prolonged leaf wetness and high humidity
- However.. A **dry rootzone** is also unfavourable
  Drought stress results into higher susceptibility to dollar spot -> soil moisture management required!



Distinguish between leaf moisture and soil moisture!!

Dew wash / night ‘irrigation’

Experiences in our group:



- Natural dew formation begins → the leaf becomes wet
- Dollar spot mycelium can develop during the night
- Short irrigation cycle →
  - disrupt/wash away surface mycelium;
  - dilute guttation fluid;
  - remove concentrated nutrients/exudates from the leaf surface.
- In the morning → allow the leaves to dry as quickly as possible.

No long period during which the leaves remain wet!

Goal: finding the optimal irrigation cycle

The significance of Vapour Plant Deficit

Vapor Pressure Deficit is the difference between the amount of moisture present in the air and the total amount of moisture the air could hold if fully saturated. The VPD of a plant is the difference in vapor pressure between the leaf and the air. Normally, air is undersaturated, allowing water to flow from the plant leaves into the air (evaporation). This creates a flow within the plant, transporting the assimilates produced in the leaves and the nutrients absorbed from the soil to the right locations, leading to growth and development.

Target VPD Zone	Temp (°C)	Relative Humidity (%)	Notes
Fungal infection (<0.2 kPa)	15°C	95%	Very high risk — dew likely all morning
Fungal infection (<0.2 kPa)	18°C	98%	Peak disease conditions
Pathogen survival (0.2–0.43 kPa)	20°C	92%	Still high disease pressure
Pathogen survival (0.2–0.43 kPa)	25°C	88%	Warm + humid = risky at night
Too humid (0.43–0.8 kPa)	18°C	85%	Slow transpiration, root issues possible
Too humid (0.43–0.8 kPa)	22°C	78%	Marginal — monitor dew duration
Optimal turf (0.8–1.5 kPa)	20°C	65%	Ideal day conditions
Optimal turf (0.8–1.5 kPa)	25°C	60%	Good spring/fall range
Optimal turf (0.8–1.5 kPa)	28°C	55%	Upper end — watch afternoon stress
Drought stress (>1.5 kPa)	30°C	45%	Water loss exceeds uptake
Drought stress (>1.5 kPa)	35°C	40%	Critical — irrigate or shade needed

- **Low VPD values** mean the air is highly saturated with moisture, leading to condensation on the leaves.
- **High VPD values (>1.5 kPa)** indicate dry air, causing plants to evaporate more water

SGL models based on Wherley & Sinclair, Univ of Florida 2009

Soil moisture management

- Dollar spot cannot be prevented by keeping the turf constantly dry.
- Insufficient water availability → drought stress → weakened plant → increased susceptibility.



Therefore:

- **measure soil moisture** (TDR350 / DeltaT 0-6 and 6-12 cm) rather than relying solely on visual assessment;
- **prevent dry patches**/localised dry spots;
- ensure sufficiently **uniform moisture distribution**;
- use **wetting agents** where necessary;
- irrigate **specific dry areas** by hand rather than unnecessarily wetting the entire green.

Root zone management on specific greens

High OM% and high VWC%

Low OM% and low VWC%



Green 2 Links Valley

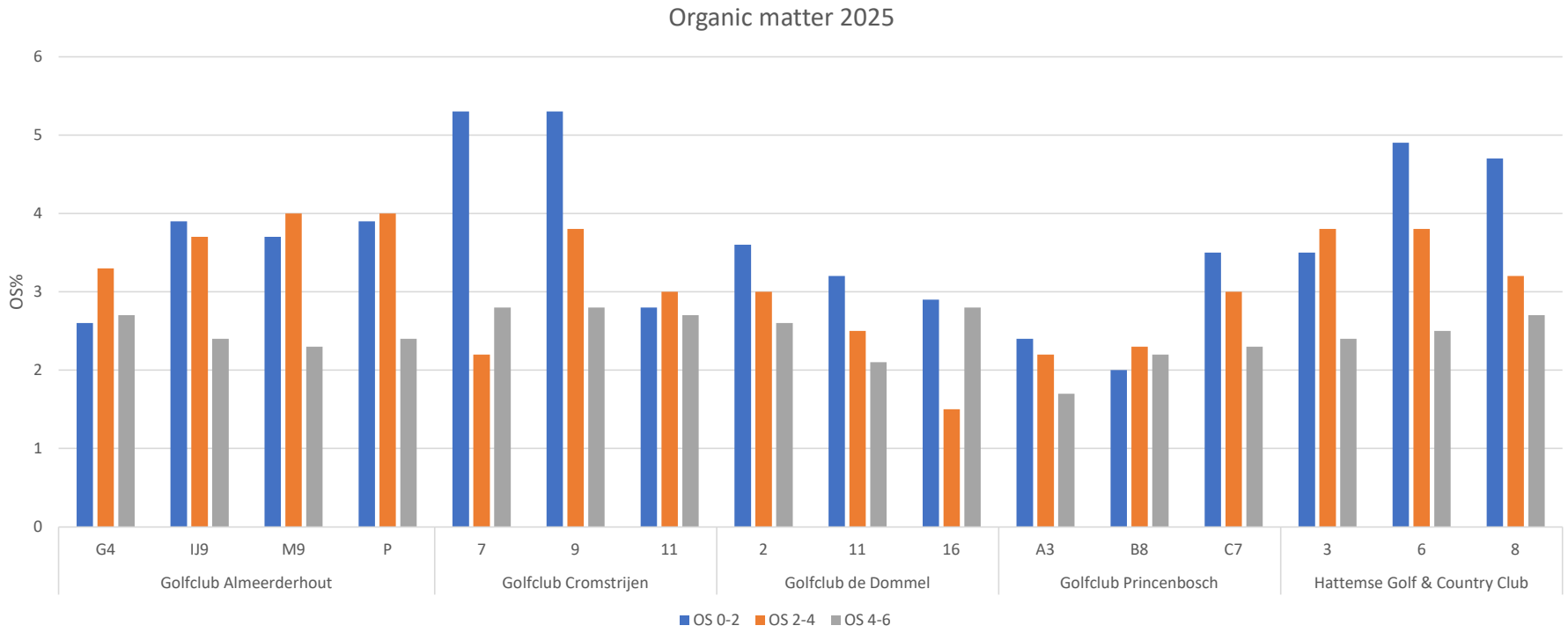


0- 6 cm

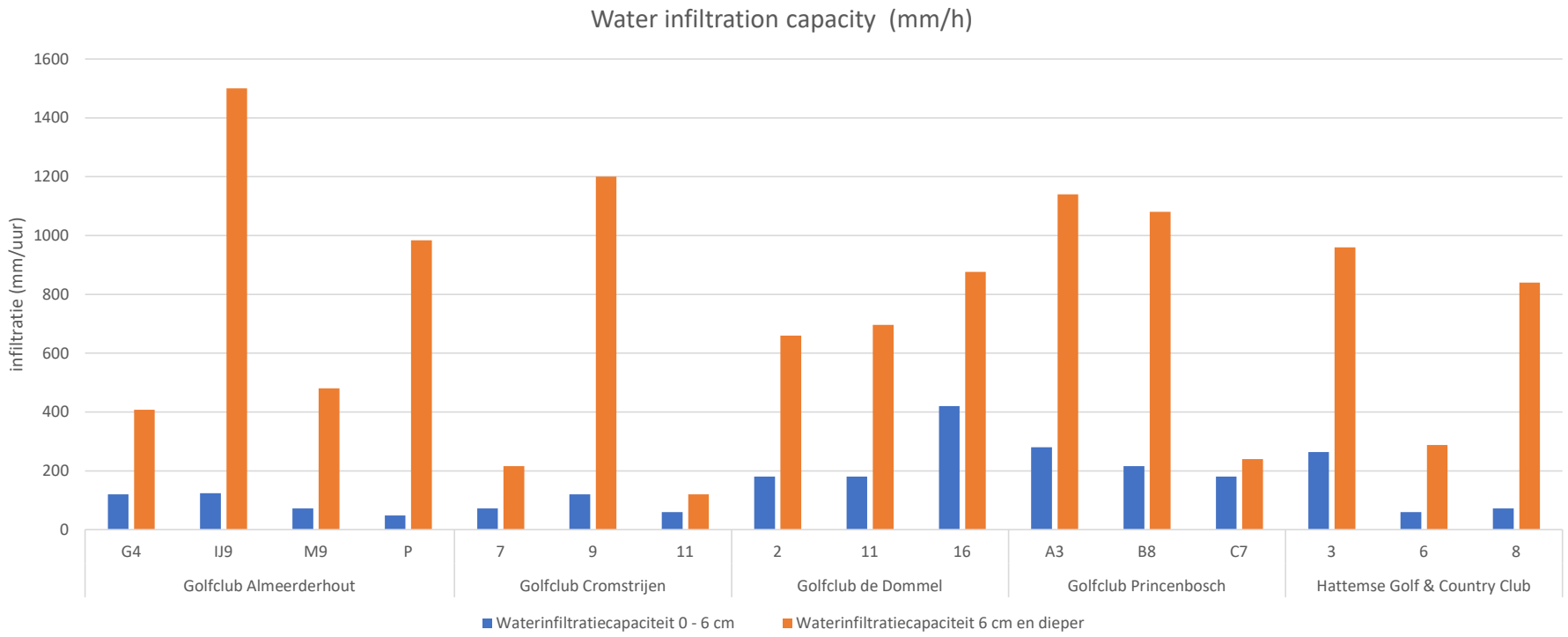
6-12 cm

Root zone green 4C Bentwoud

OM 246: what does it tell us?



Water infiltration capacity: aeration needed or unnecessary disturbance?



What have we we learned sofar?

Water management to control dollar spot = balance between the root zone and the leaf surface

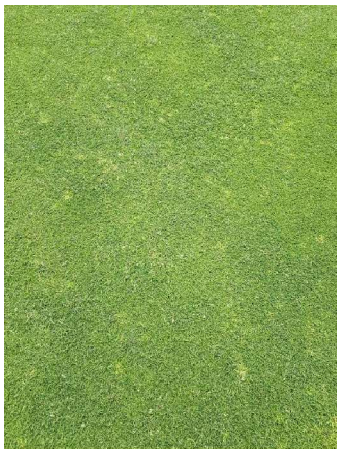
- Mind your most **susceptible greens** (local situation!)
- Prevent drought stress → ensure sufficient **soil moisture**.
- Minimize the duration of **leaf wetness** → in particular, avoid unnecessarily early evening irrigation.
- If necessary, use a **short night-time or early morning 'wash**' to dilute or displace guttation, dew and surface mycelium.
- Remove dew at the **optimum timing** (mind your **dew point**, use a weather station!)
- Ensure **rapid drying** afterwards through air movement, mowing/rolling and good drainage. Be aware of your infiltration rates to avoid unnecessary disturbance (= stress!)

Discussion: new challenges resulting from BMPs

Compromises and finding balances..!

Consider **collateral effects** of (new) pesticide-free management practices:

- Increase of Take-all patch (-> also increase of fine fescues)
- More Yellow tuft
- Changes in botanical composition? more Poa annua?





Focus on your greens -> prevention,

scouting & monitoring (staff!!)







DOC
DOLLAR SPOT OFF COURSE

‘Keep the roots moist but reduce the time the leaves stay wet’

Thank you!