De dynamiek van twee vennetjes op de Gorsselse heide
Beschreven aan de hand van sieralgen en kiezelwieren

Winterbijeenkomst Sieralgenwerkgroep 28-02-2026

© Thijs de la Court

Deventer

Zutphen

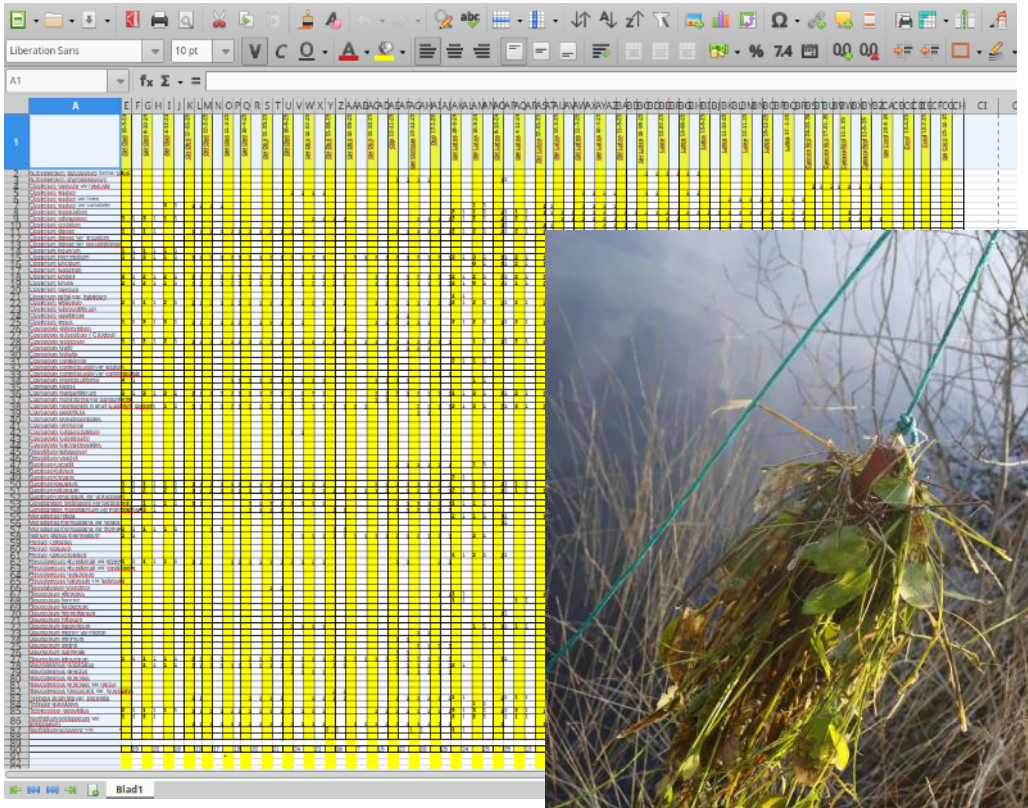
Gorsselse heide

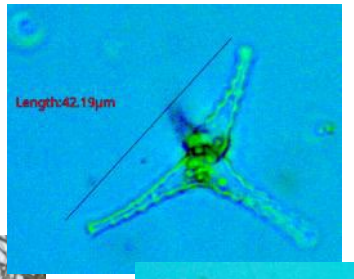
Luteaven 2018

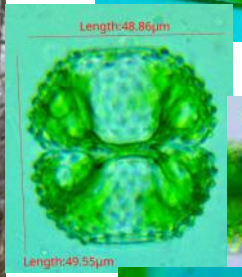
Obliquaven 2018

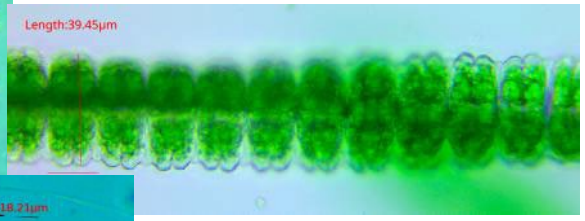
Obliquaven

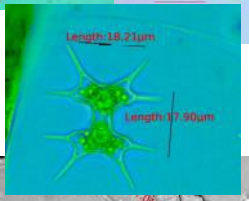
Luteaven

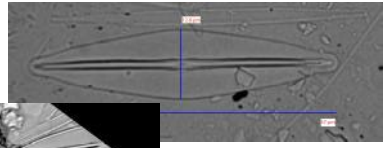


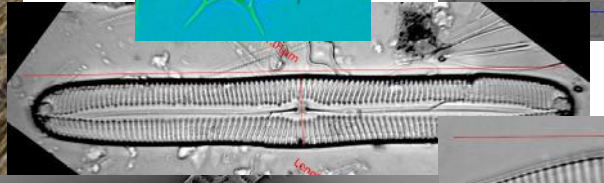


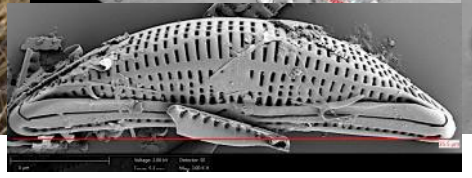


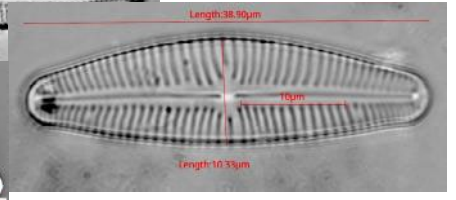






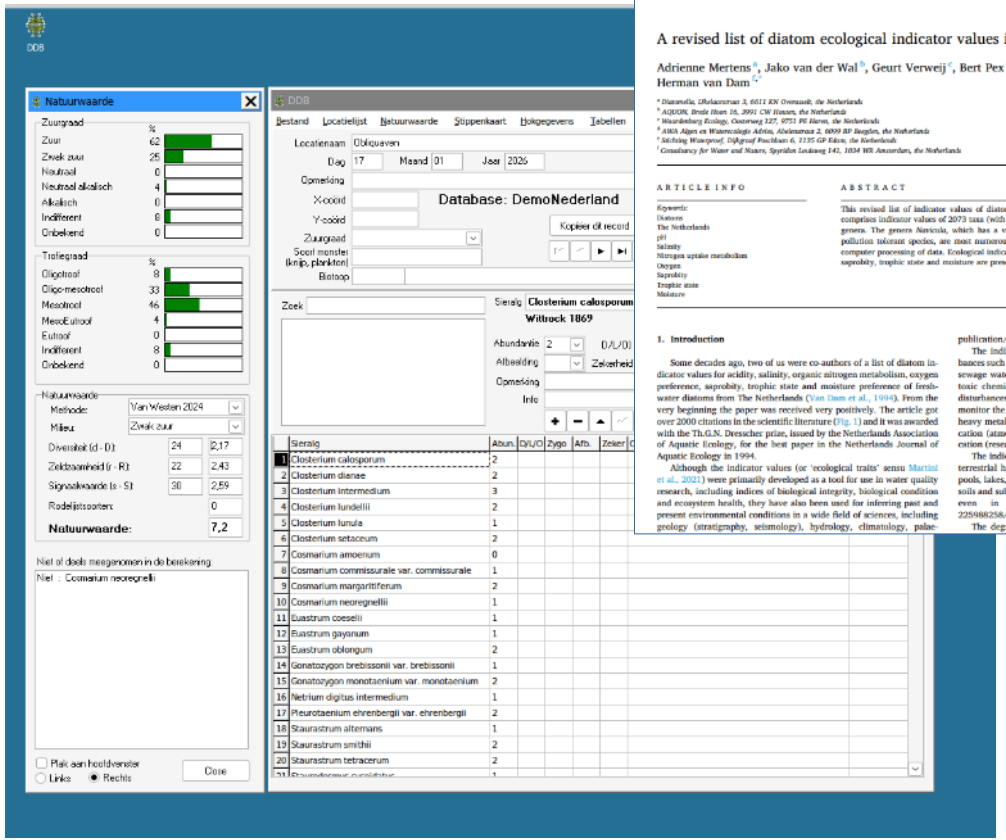


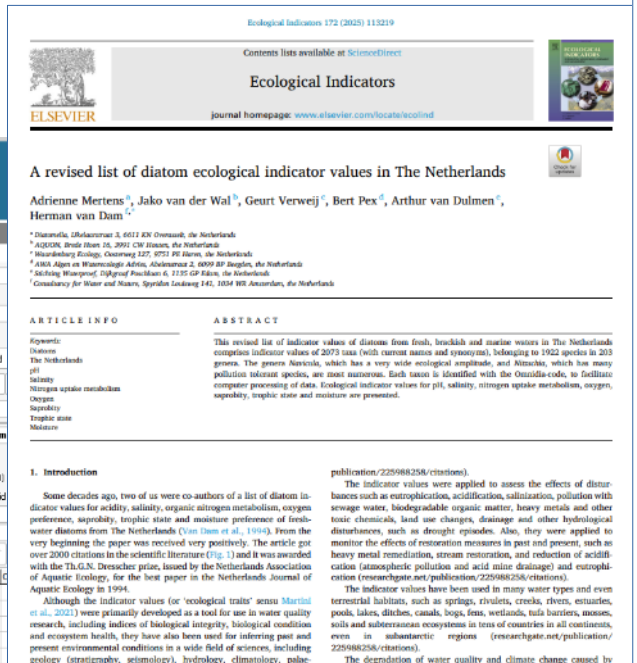




Maandelijks monsteren, nu 2 jaar, 87 taxa sieralgen, 115 taxa kiezelwieren

Abundantie vertalen naar ecologische indicaties





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ELSEVIER

A revised list of diatom ecological indicator values in The Netherlands

Adrienne Mertens [a], Jako van der Wal [b], Geurt Verweij [c], Bert Pex [d], Arthur van Dulmen [e], Herman van Dam [f,*]

[a] Diatomella, LReleaseroaat 3, 6611 KN Overasselt, the Netherlands
[b] AQUON, Brede Hoen 16, 3991 CW Houten, the Netherlands
[c] Waardenburg Ecology, Costerweg 327, 9751 PE Haren, the Netherlands
[d] AIMA Algen en Waterecologie Advies, Abelmarsse 2, 6099 BP Beegden, the Netherlands
[e] Stichting Waterproef, Dijkgraaf Paschlaan 6, 1135 GP Edam, the Netherlands
[f] Consultancy for Water and Nature, Spyridon Louisweg 141, 1034 WR Amsterdam, the Netherlands

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ABSTRACT

This revised list of indicator values of diatoms from fresh, brackish and marine waters in The Netherlands comprises indicator values of 2073 taxa (with current names and synonyms), belonging to 1922 species in 203 genera. The genera *Navicula*, which has a very wide ecological amplitude, and *Nitzschia*, which has many pollution tolerant species, are most numerous. Each taxon is identified with the Omnidia-code, to facilitate computer processing of data. Ecological indicator values for pH, salinity, nitrogen uptake metabolism, oxygen, saprobity, trophic state and moisture are presented.

1. Introduction

Some decades ago, two of us were co-authors of a list of diatom indicator values for acidity, salinity, organic nitrogen metabolism, oxygen preference, saprobity, trophic state and moisture preference of freshwater diatoms from The Netherlands (Van Dam et al., 1994). From the very beginning the paper was received very positively. The article got over 2000 citations in the scientific literature (Fig. 1) and it was awarded with the Th.G.N. Dresscher prize, issued by the Netherlands Association of Aquatic Ecology, for the best paper in the Netherlands Journal of Aquatic Ecology in 1994.

Although the indicator values (or 'ecological traits' sensu Martini et al., 2021) were primarily developed as a tool for use in water quality research, including indices of biological integrity, biological condition and ecosystem health, they have also been used for inferring past and present environmental conditions in a wide field of sciences, including geology (stratigraphy, seismology), hydrology, climatology, palae-

publication/225988258/citations).

The indicator values were applied to assess the effects of disturbances such as eutrophication, acidification, salinization, pollution with sewage water, biodegradable organic matter, heavy metals and other toxic chemicals, land use changes, drainage and other hydrological disturbances, such as drought episodes. Also, they were applied to monitor the effects of restoration measures in past and present, such as heavy metal remediation, stream restoration, and reduction of acidification (atmospheric pollution and acid mine drainage) and eutrophication (researchgate.net/publication/225988258/citations).

The indicator values have been used in many water types and even terrestrial habitats, such as springs, rivulets, creeks, rivers, estuaries, pools, lakes, ditches, canals, bogs, fens, wetlands, tufa barriers, mosses, soils and subterranean ecosystems in tens of countries in all continents, even in subantarctic regions (researchgate.net/publication/225988258/citations).

The degradation of water quality and climate change caused by

Table 1
Classification of ecological indicator values.

(R) pH

1	acidobiontic	optimal occurence at pH < 5,5
2	acidophilous	mainly occurring at pH < 7
3	circumneutral	mainly occurring at pH-values about 7
4	alkaliphilous	mainly occurring at pH > 7
5	alkalibiontic	exclusively occurring at pH > 7
X	indifferent	no apparent optimum

(H) Salinity

		Cl^- (mg l^{-1})	Salinity (‰)
1	fresh	< 100	< 0,2
2	fresh brackish	< 500	< 0,9
3	brackish fresh	500 – 1000	0,9 – 1,8
4	brackish	1000 – 5000	1,8 – 9
5	brackish marine	5000 – 10000	9 – 18
6	marine brackish	10000 – 17000	18 – 30
7	marine	> 17000	> 30

(N) Nitrogen uptake metabolism

1	nitrogen-autotrophic taxa, tolerating very small concentrations of organically bound nitrogen
2	nitrogen-autotrophic taxa, tolerating elevated concentrations of organically bound nitrogen
3	facultatively nitrogen-hetrotrophic taxa, needing periodically elevated concentrations of organically bound nitrogen
4	obligately nitrogen-hetrotrophic taxa, needing continuously elevated concentrations of organically bound nitrogen

(O) Oxygen requirements

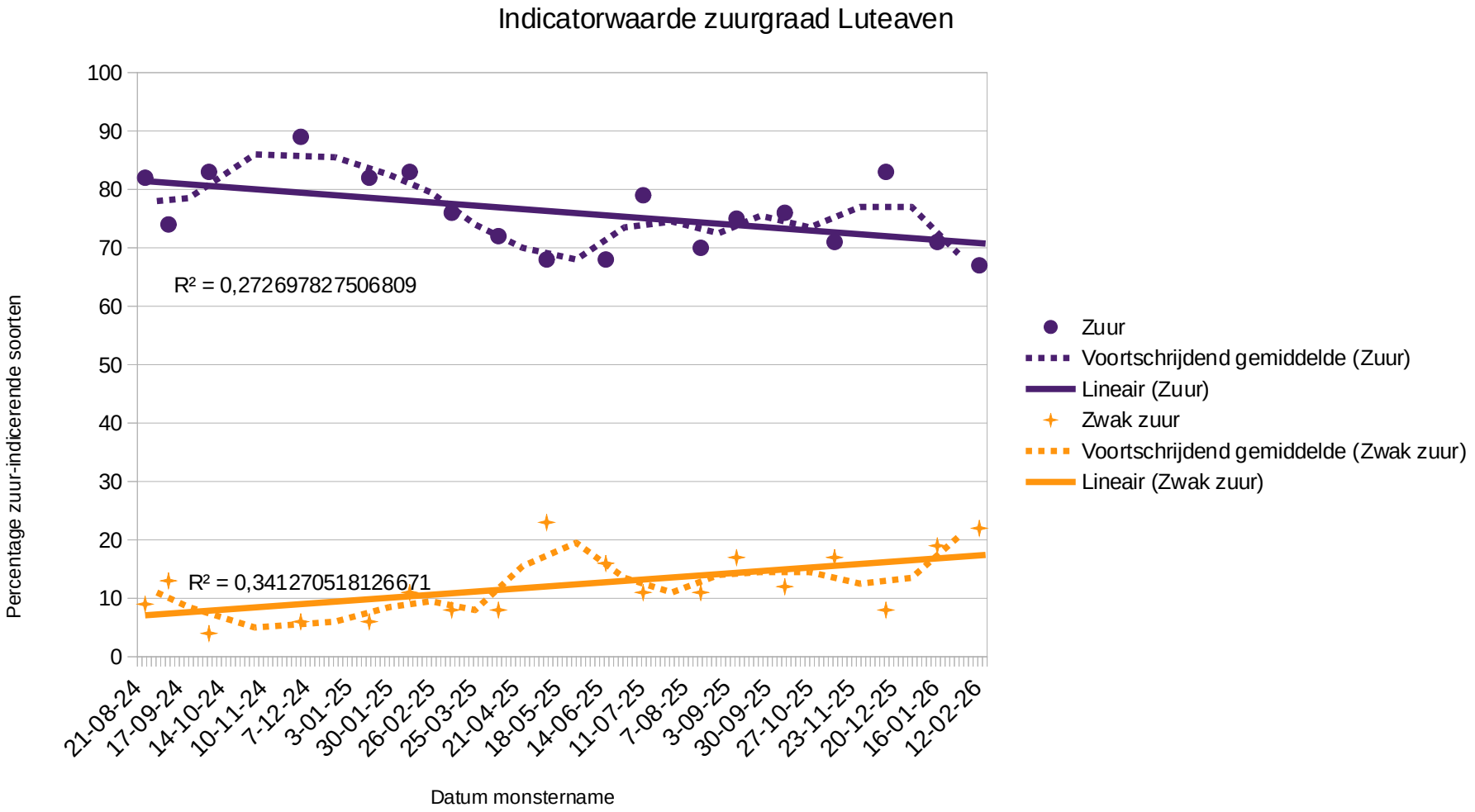
1	continuously high (about 100 % saturation)
2	fairly high (above 75 % saturation)
3	moderate (above 50 % saturation)
4	low (above 30 % saturation)
5	very low (about 10 % saturation)

(S) Saprobity

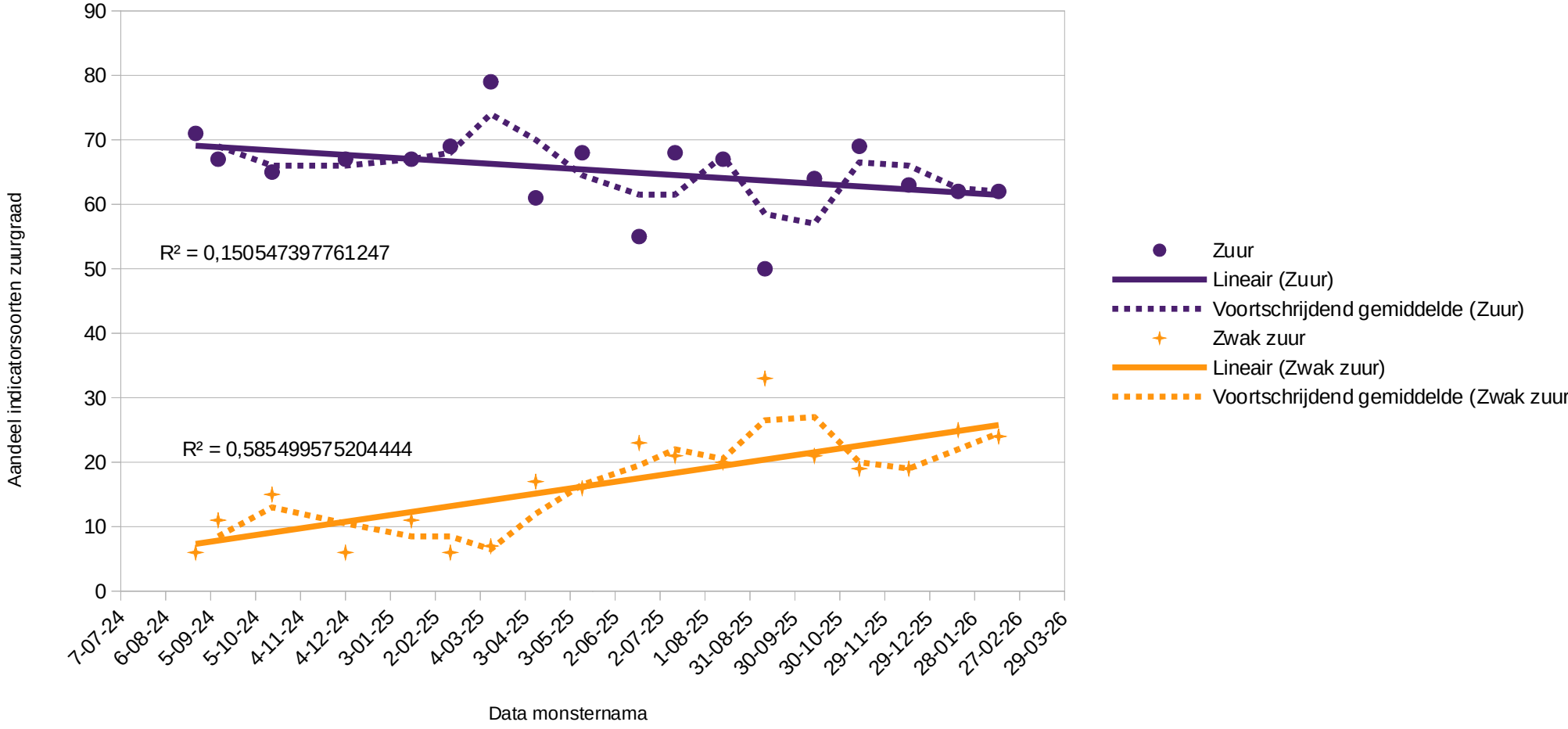
		Water quality class	O_2 saturation (%)	BOD_5^{20} (mg l^{-1})
1	oligosaprobous	I, I-II	> 85	< 2
2	β-mesosaprobous	II	70 – 85	2 – 4
3	α-mesosaprobous	III	25 – 70	4 – 13
4	α-meso-/polysaprobous	III-IV	10 – 25	13 – 22
5	polysaprobous	IV	< 10	> 22

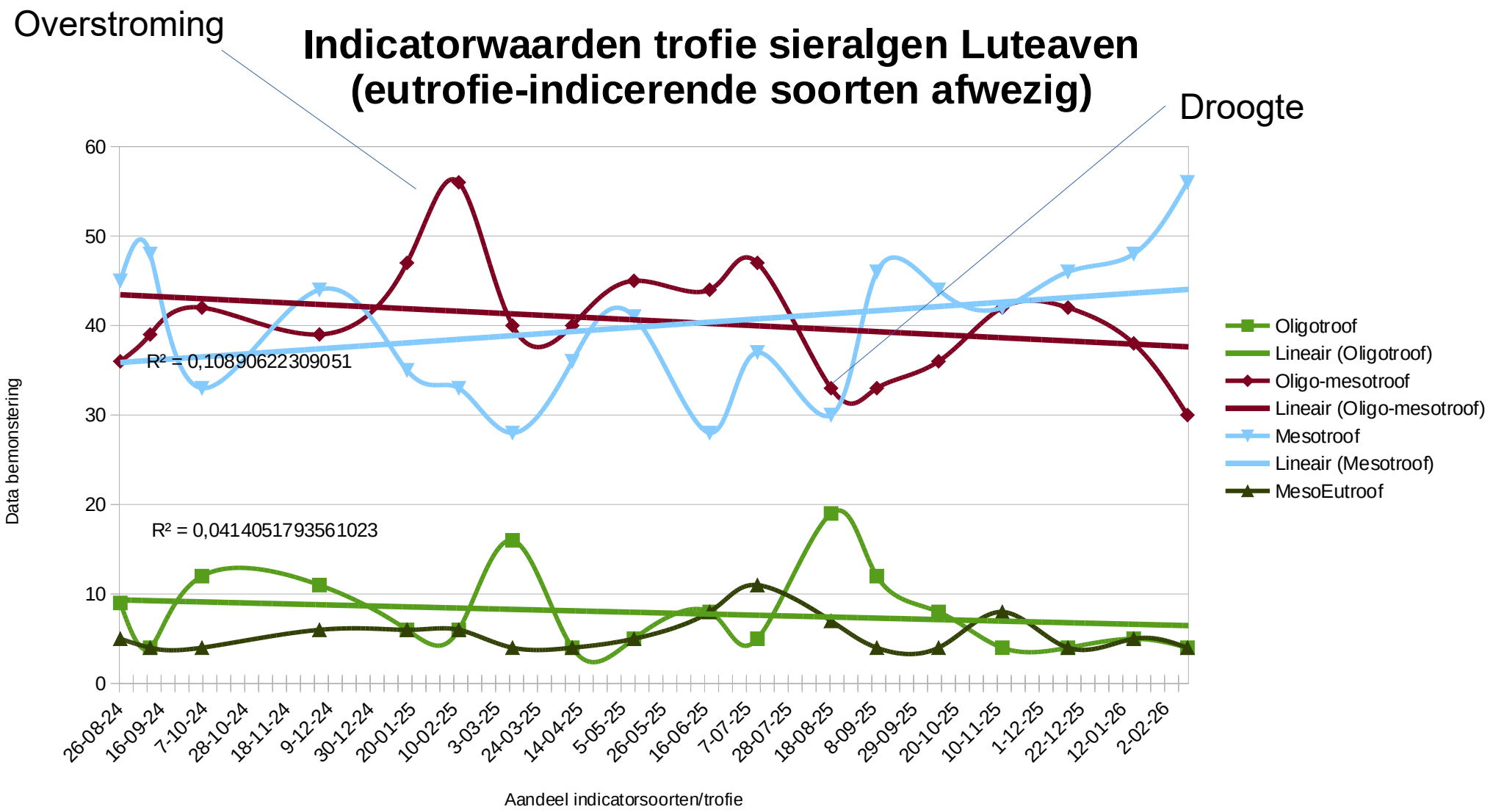
(T) Trophic state

1	oligotraphentic
2	oligo-mesotraphentic
3	mesotraphentic
4	*meso*-eutraphentic
5	eutraphentic
6	hypereutraphentic
X	indifferent


Indicatorwaarde zuurgraad Luteaven
Percentage zuur-indicerende soorten
100
90
80
70
60
50
40
30
20
10
0
R² = 0,272697827506809
R² = 0,341270518126671
21-08-24
17-09-24
14-10-24
10-11-24
7-12-24
3-01-25
30-01-25
26-02-25
25-03-25
21-04-25
18-05-25
14-06-25
11-07-25
7-08-25
3-09-25
30-09-25
27-10-25
23-11-25
20-12-25
16-01-26
12-02-26
Datum monstername
Zuur
Voortschrijdend gemiddelde (Zuur)
Lineair (Zuur)
Zwak zuur
Voortschrijdend gemiddelde (Zwak zuur)
Lineair (Zwak zuur)

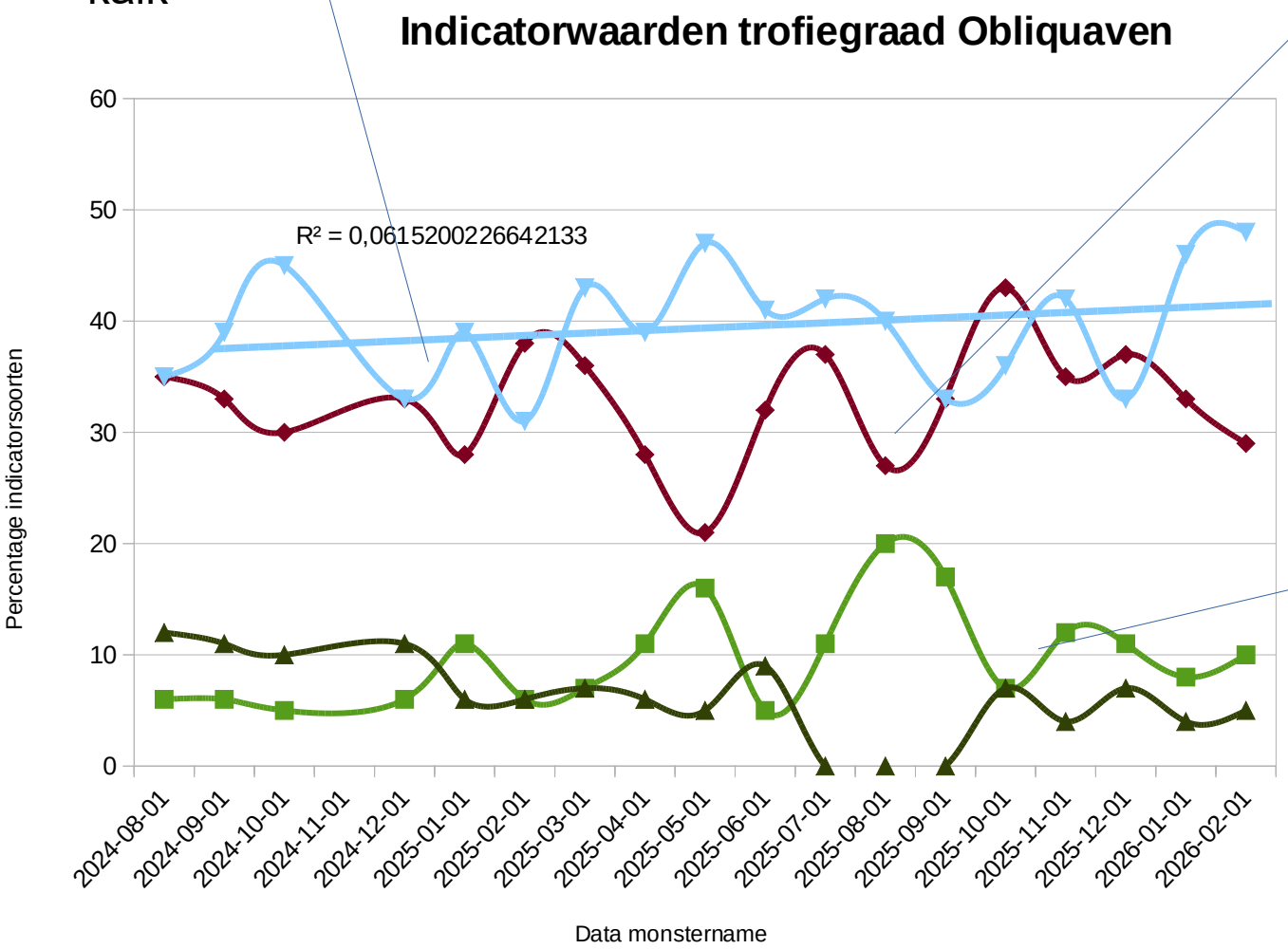
Indicatorwaarden zuurgraad Obliquaven




Overstroming
Indicatorwaarden trofie sieralgen Luteaven
(eutrofie-indicerende soorten afwezig)
Droogte
Data bemonstering
Aandeel indicatorsoorten/trofie
R² = 0,10890622309051
R² = 0,04140517935610 23
Oligotroof
Lineair (Oligotroof)
Oligo-mesotroof
Lineair (Oligo-mesotroof)
Mesotroof
Lineair (Mesotroof)
MesoEutroof
0
10
20
30
40
50
60
26-08-24
16-09-24
7-10-24
28-10-24
18-11-24
9-12-24
30-12-24
20-01-25
10-02-25
3-03-25
24-03-25
14-04-25
5-05-25
26-05-25
16-06-25
7-07-25
28-07-25
18-08-25
8-09-25
29-09-25
20-10-25
10-11-25
1-12-25
22-12-25
12-01-26
2-02-26

Overstroming, veel kalk

Ven valt droog



Ven deels gebaggerd

PH

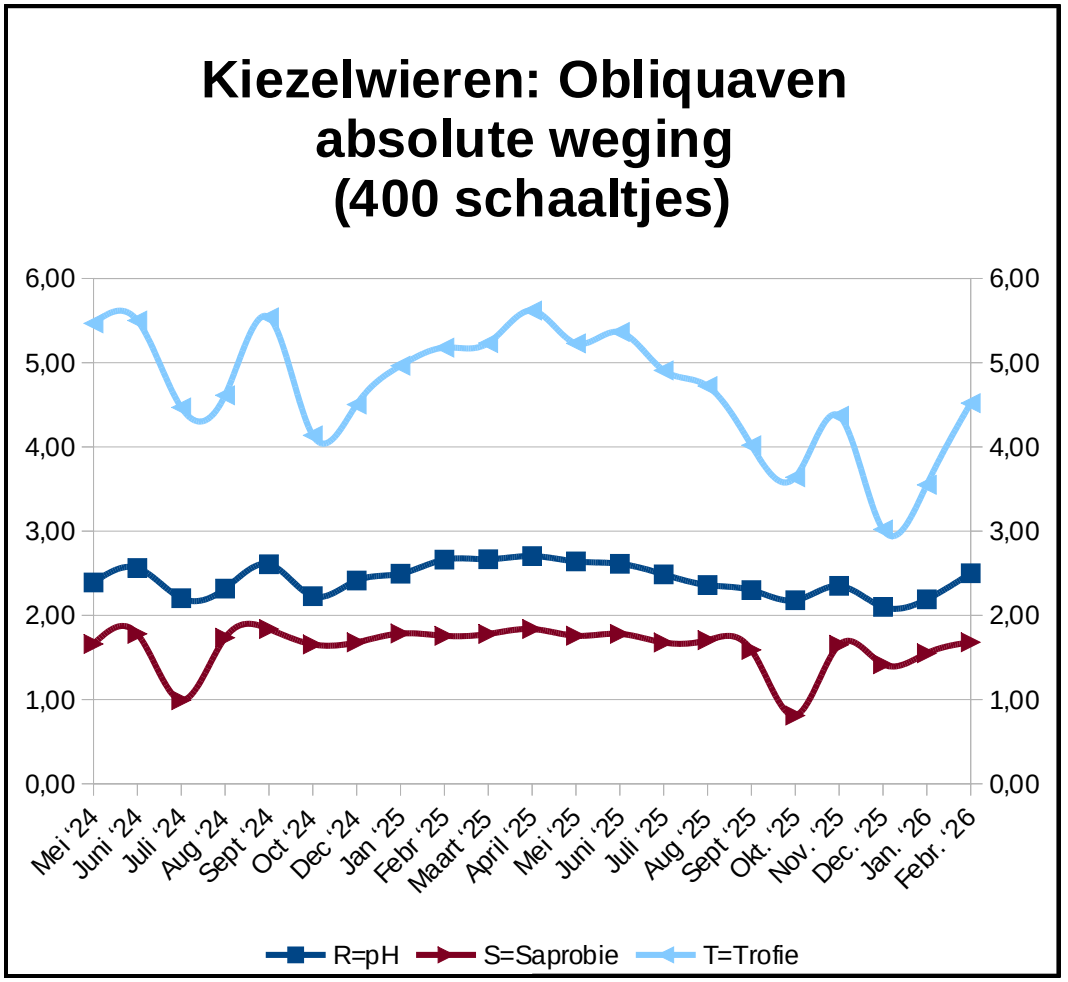
1= acidobiont
2= acidofiel
3= circumneutraal

Saprobie

1= oligosaproob
2= Beta-mesosproob
3= Allfa-mesosaaproob

Trofie

1= Oligotrafent
2= Oligo-mesotrafent
3= mesotrafent
4= meso-eutrafent
5= eutrafent
6= hypereutrafent



PH

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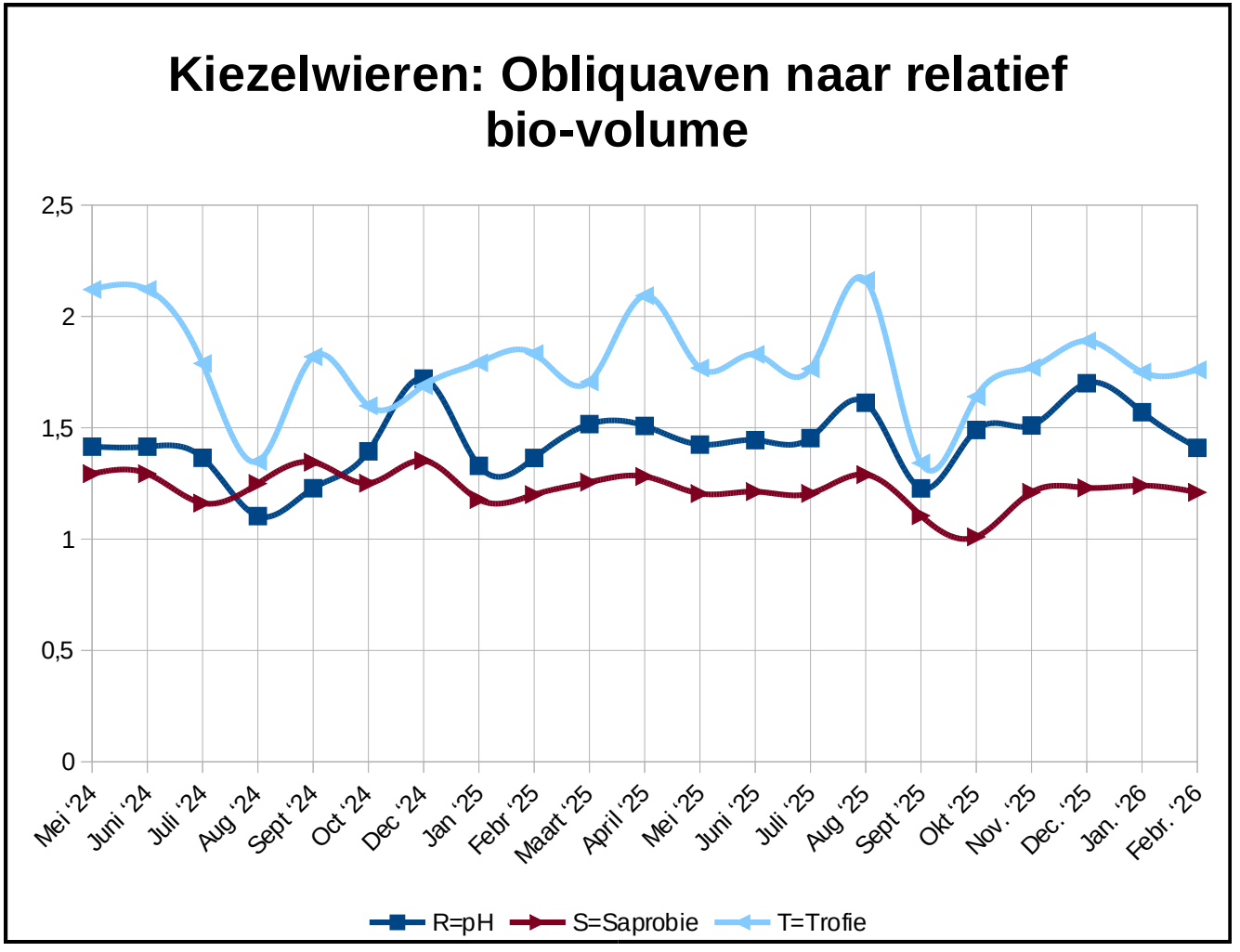
1= Oligotrafent
2= Oligo-mesotrafent
3= mesotrafent
4= meso-eutrafent
5= eutrafent
6= hypereutrafent



Enkele conclusies

- Impact kalkgift (zuurgraad of bufferend vermogen) kan goed in beeld komen
- Trofie-indicatoren leveren een beeld van dynamiek in de tijd, nauwelijks een trend maar wel een verhaal (er is ook een relatie tussen buffering en trofie)
- Bekalking van natte hei is een behoorlijk riskante onderneming als maatregel in natuurbeheer