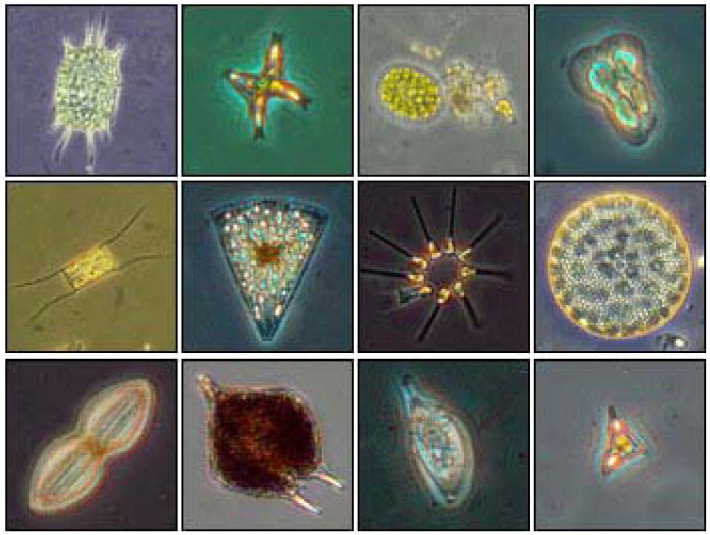
© OMES



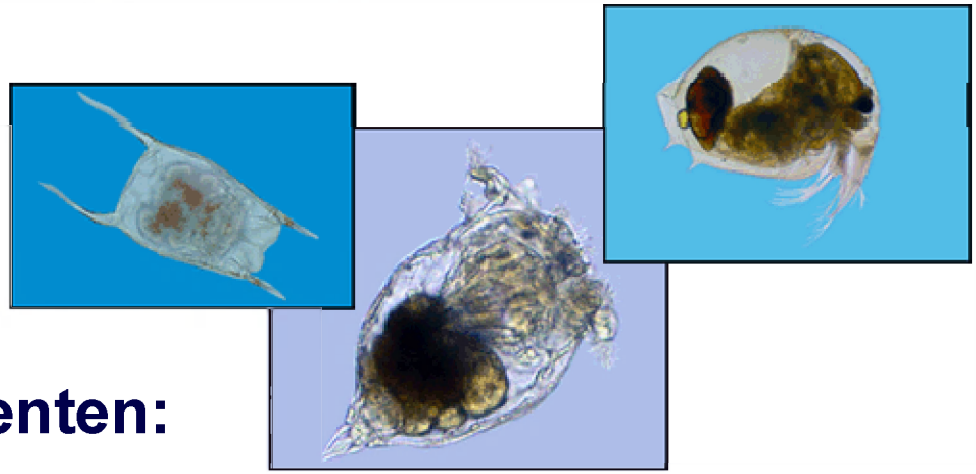
# HET ZWEVENDE LEVEN IN DE SCHELDE

© OMES

# HET ZWEVENDE LEVEN IN HET WATER



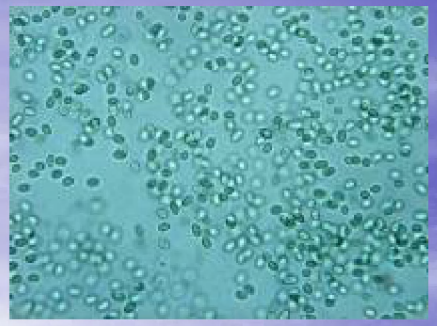
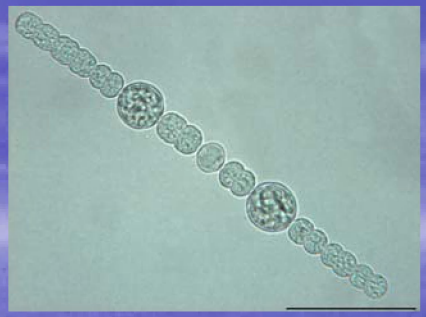
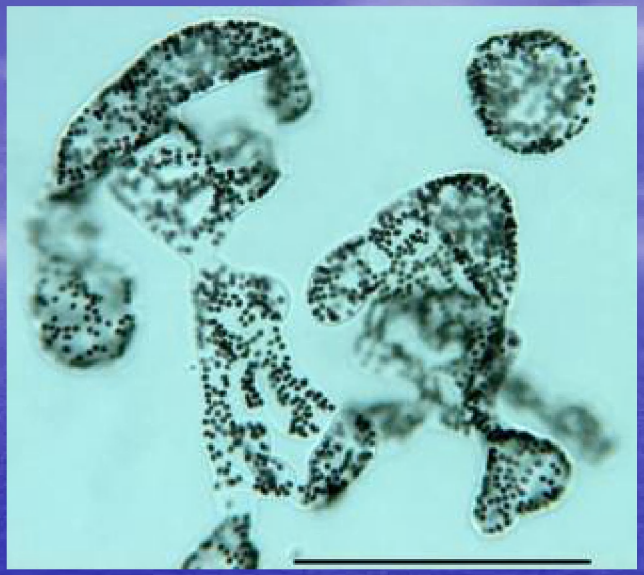
1. **De primaire producenten: het fytoplankton**

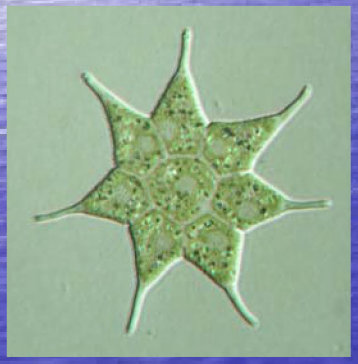


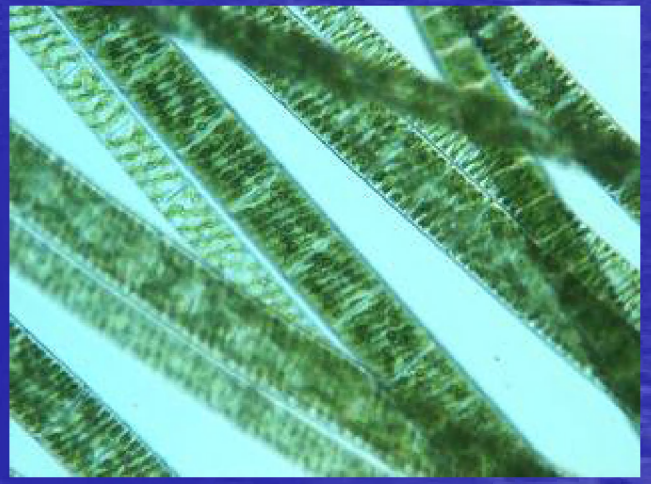
2. **De secundaire producenten: het zoöplankton**

# I. De primaire producenten: het fytoplankton

OMES

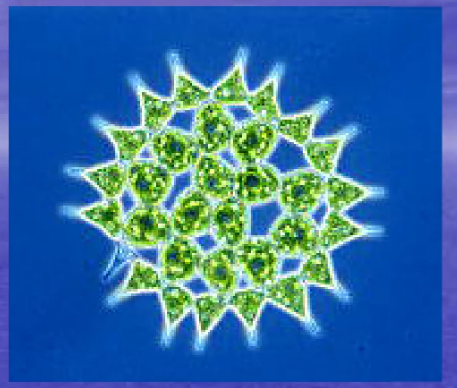
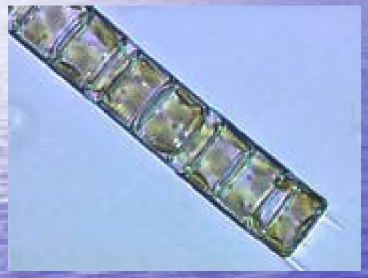



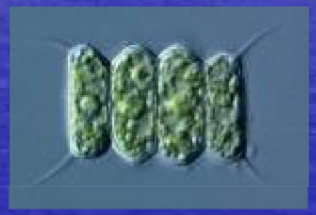


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# Fytoplankton in het Schelde-estuarium



**Kiezelwieren (diatomeeën)**
Si skelet
geen Chl b

**Groenwieren (chlorofyten)**
Chl a en b

© OMES

# Primaire productiviteit in de waterkolom

Chlb/Chla

maat voor :
groenwieren / kiezelwieren

biomassa

Organisch materiaal + $O_2$

milieu

$CO_2 + H_20 + N + P$ + Si

nutriënten

© OMES

# Europese Kaderrichtlijn Water

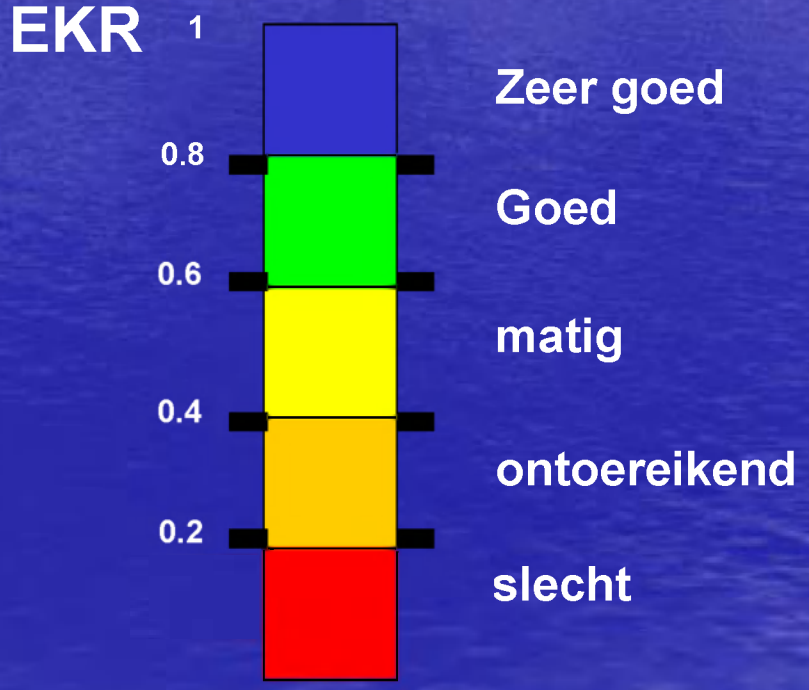
2015: 'goede' ecologische toestand voor grond – en oppervlaktewater

- fysisch – chemische kwaliteit
- biologische kwaliteitselementen

1. Fytoplankton
2. Waterplanten
3. Macro-invertebraten
4. Vis

↓

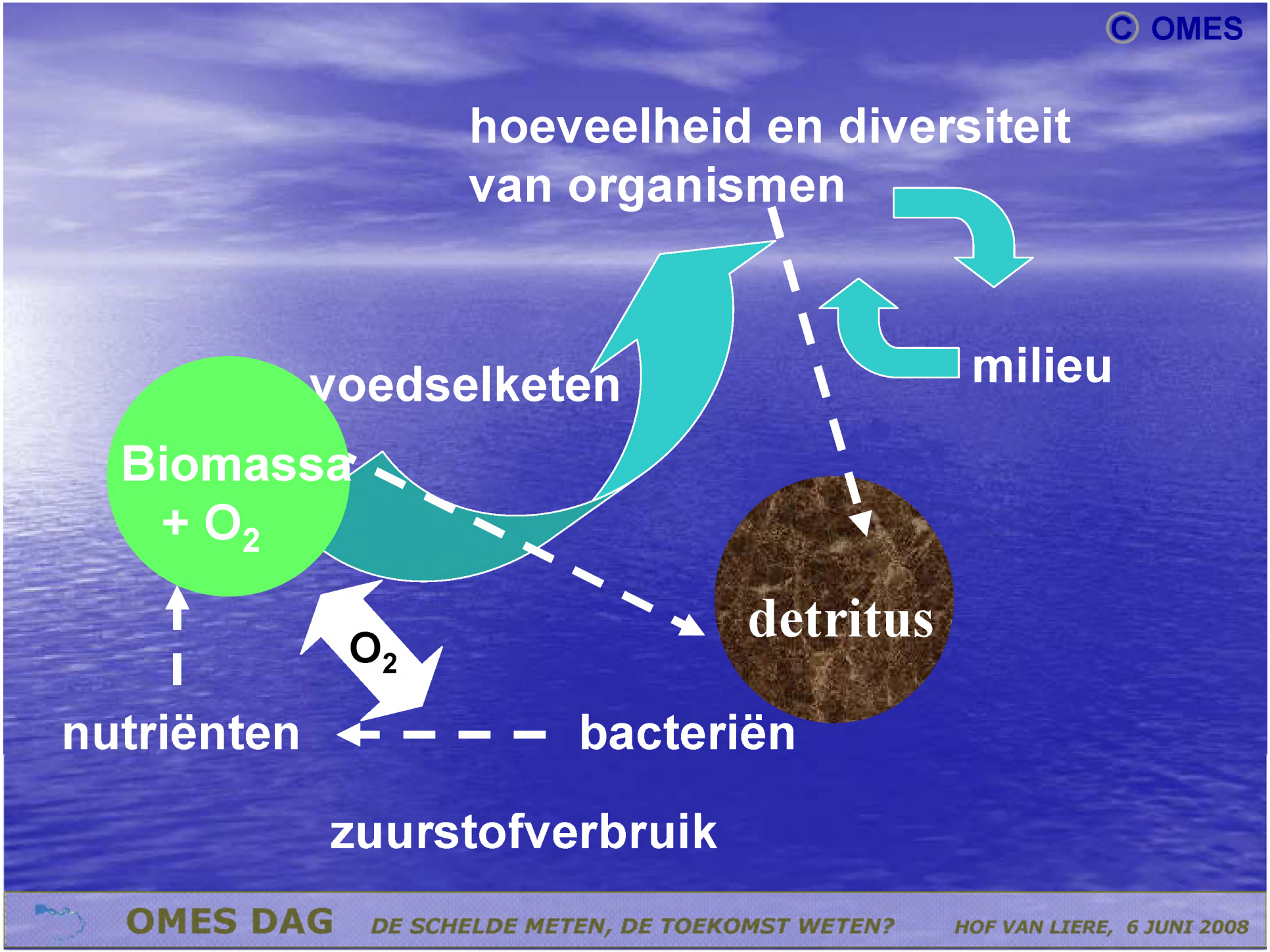
Ecologische toestand



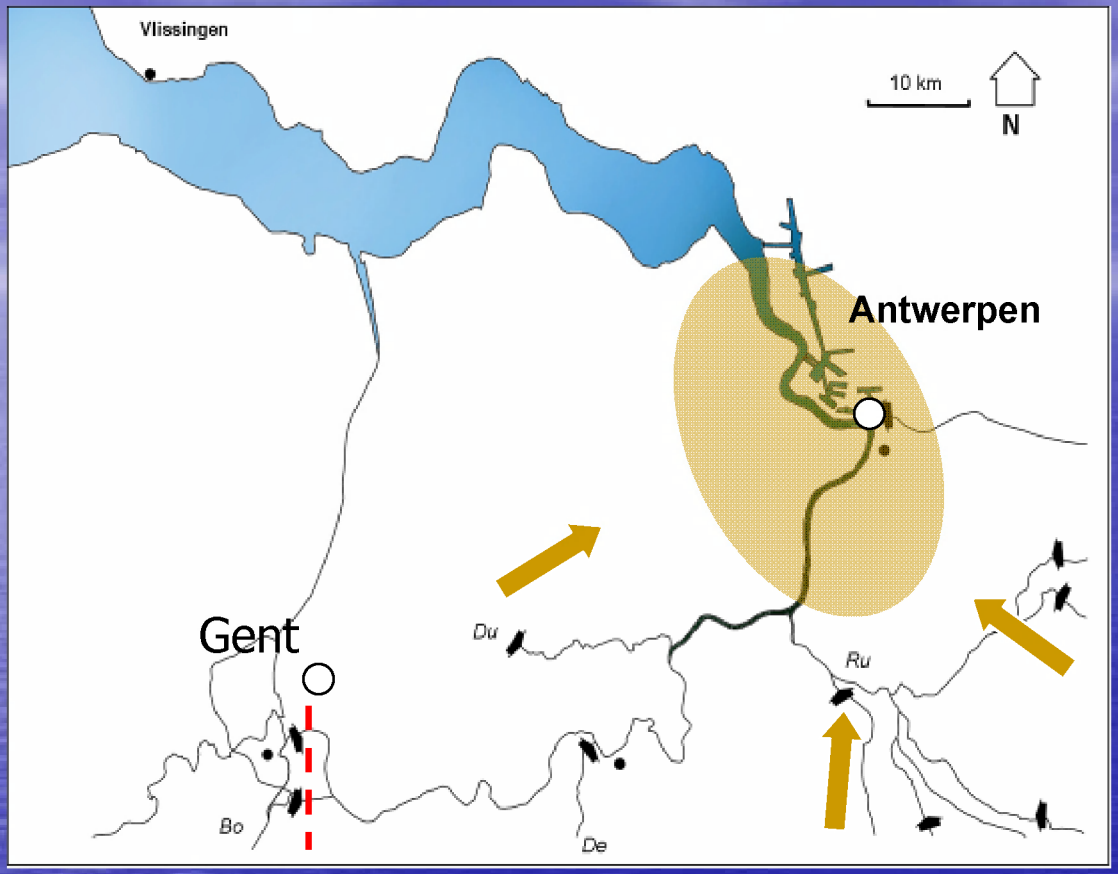
© OMES


hoeveelheid en diversiteit
van organismen
voedselketen
biomassa
milieu

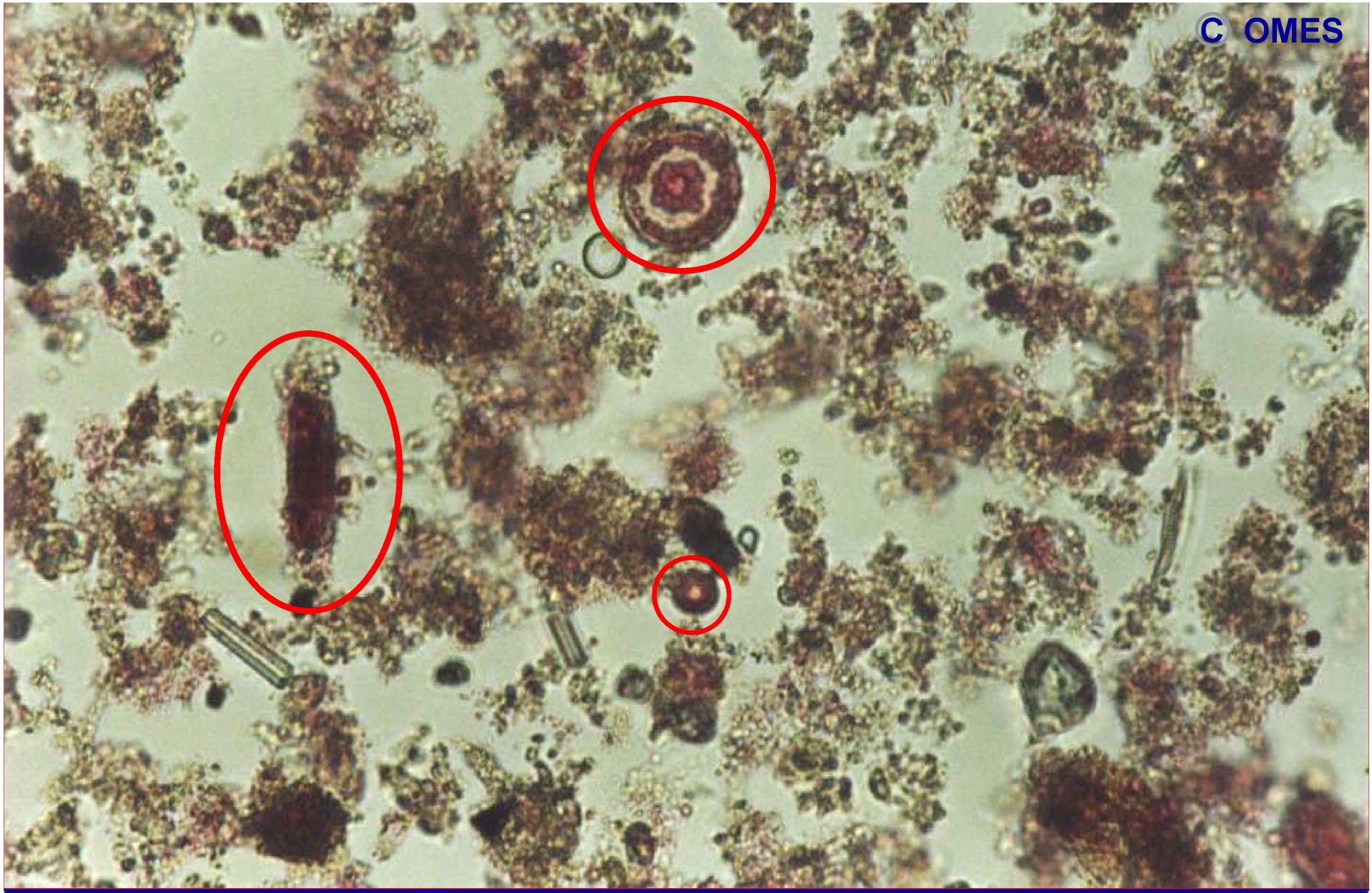
© OMES


hoeveelheid en diversiteit
van organismen
milieu
voedselketen
Biomassa
+ $O_2$
detritus
$O_2$
nutriënten
bacteriën
zuurstofverbruik

© OMES




# belasting vanuit het bekken

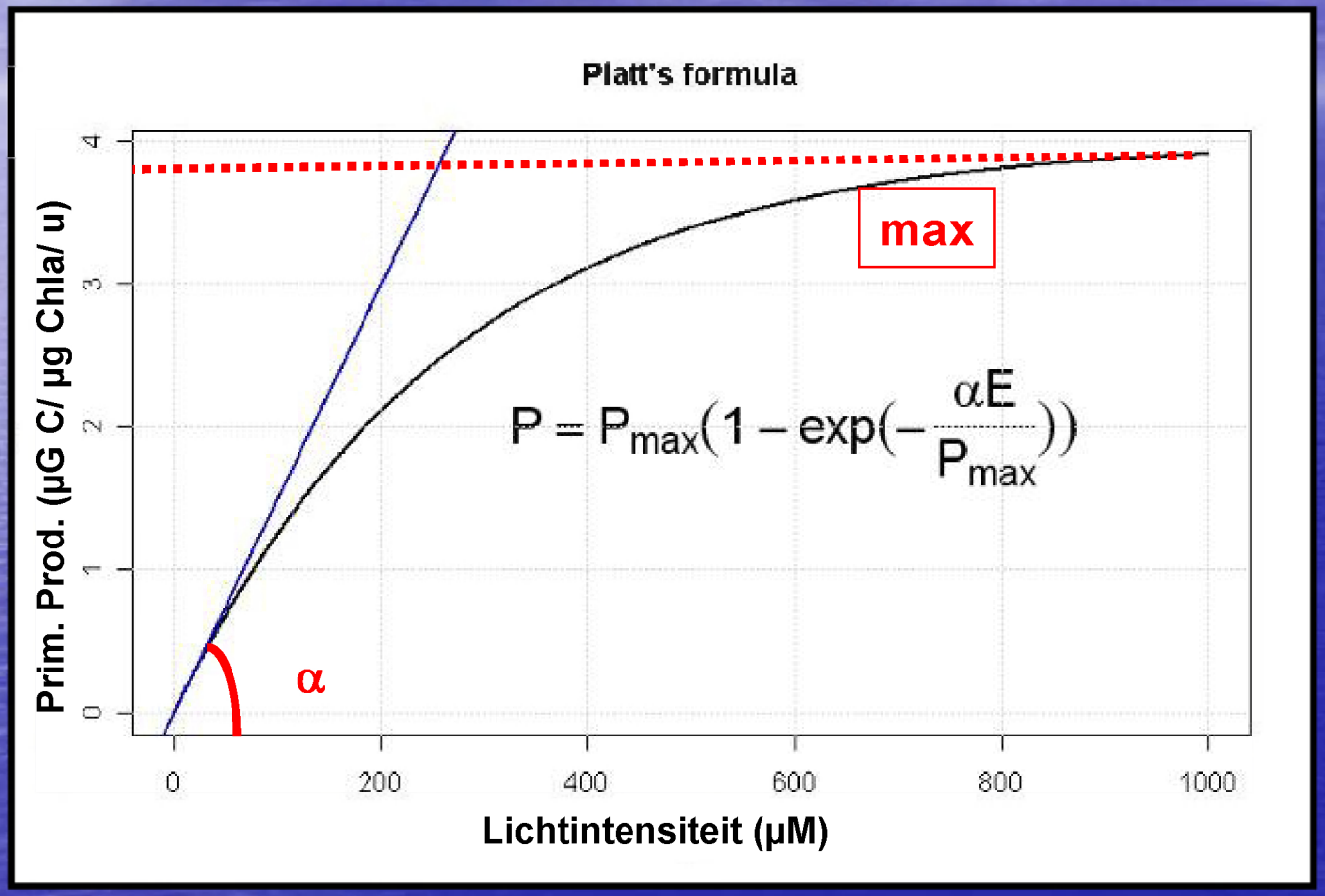



## hoge concentratie aan detritus

© OMES

# Factoren die de primaire productie beïnvloeden

## 1. lichtintensiteit



© OMES

# Factoren die de primaire productie beïnvloeden

1. lichtintensiteit

2. plankton: passief transport

→ verblijftijd (uitspoeltijd), dus debiet van belang

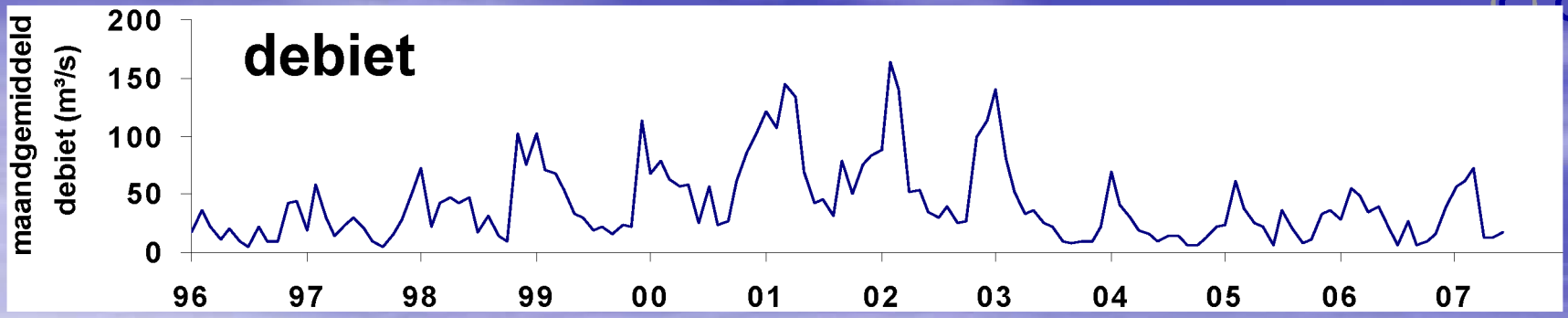


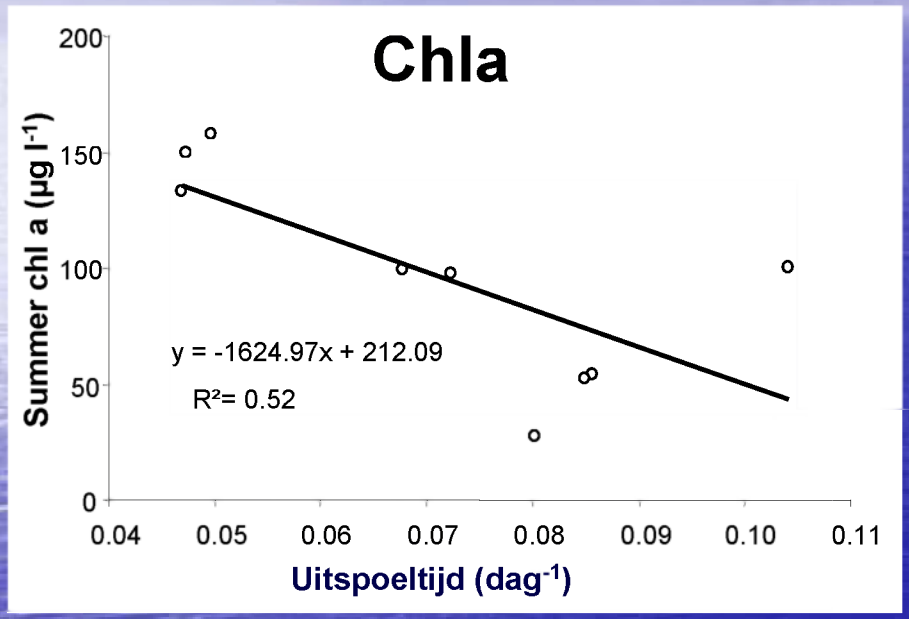


Groenwieren:

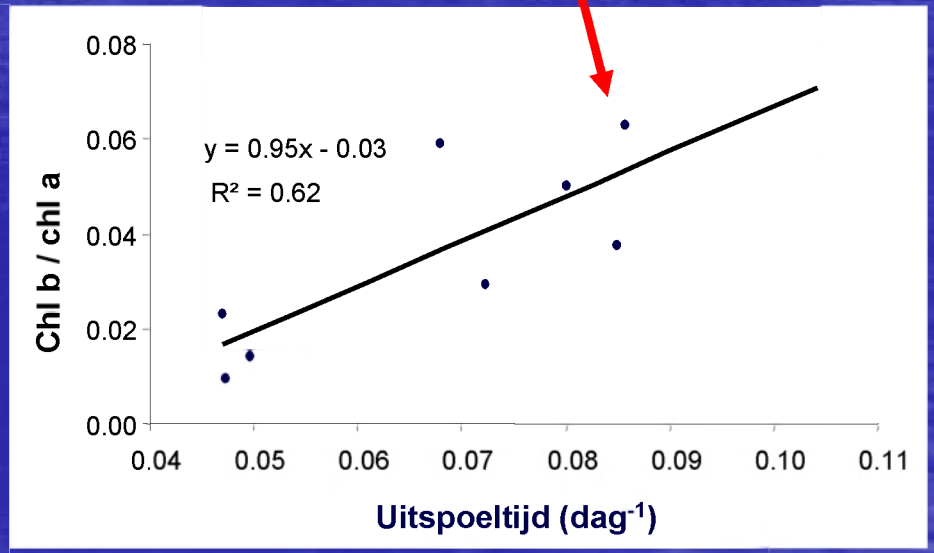
snellere levenscyclus dan

kiezelwieren




meer groenwieren



© OMES

# Factoren die de primaire productie beïnvloeden

1. lichtintensiteit

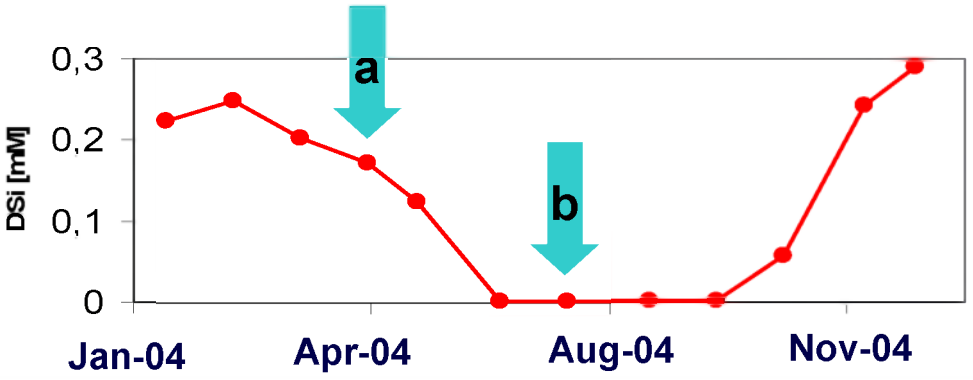
2. debiet

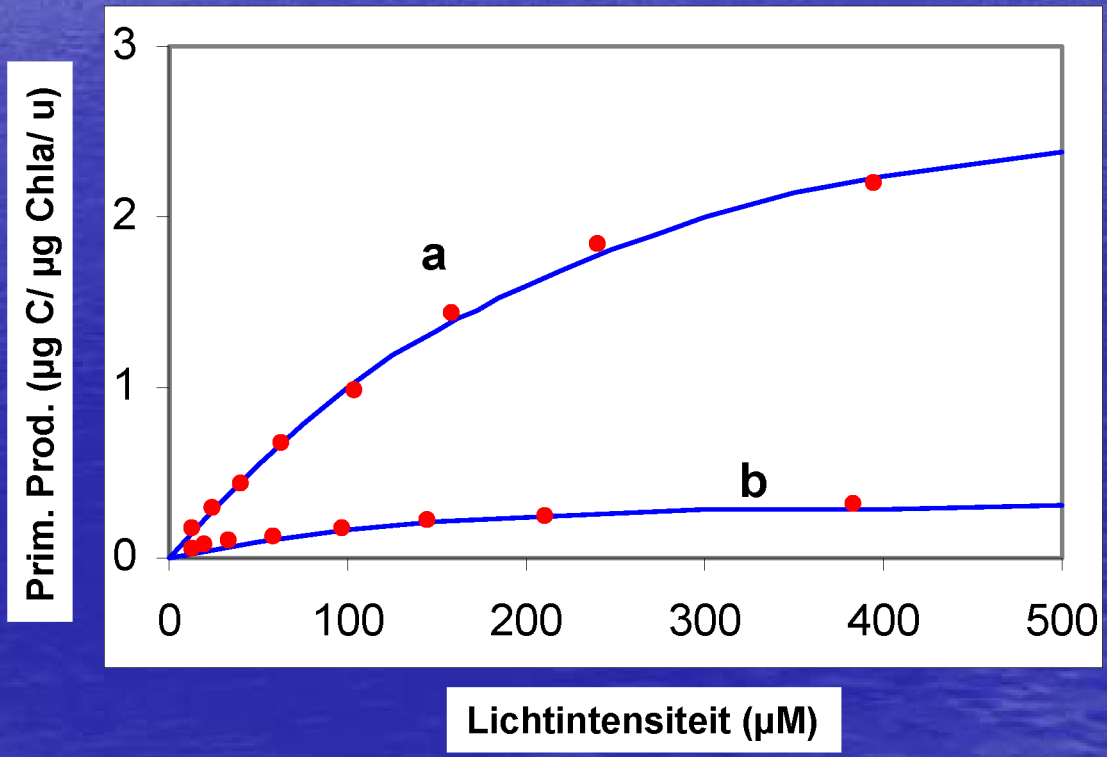
3. nutriënten:

   hoeveelheid
   verhouding N/P
   Si

© OMES

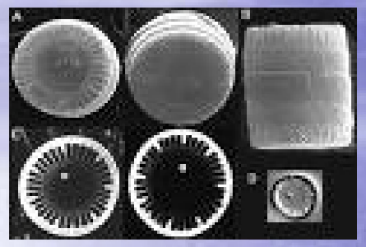
# concentratie opgelost Si

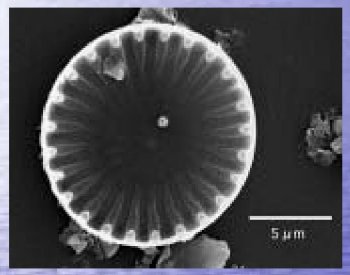


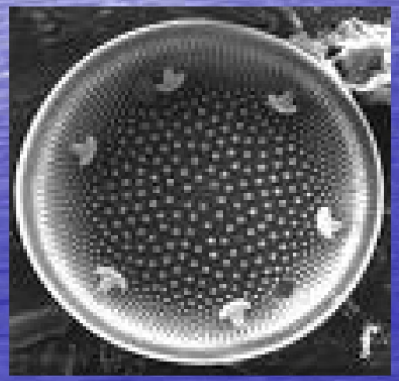



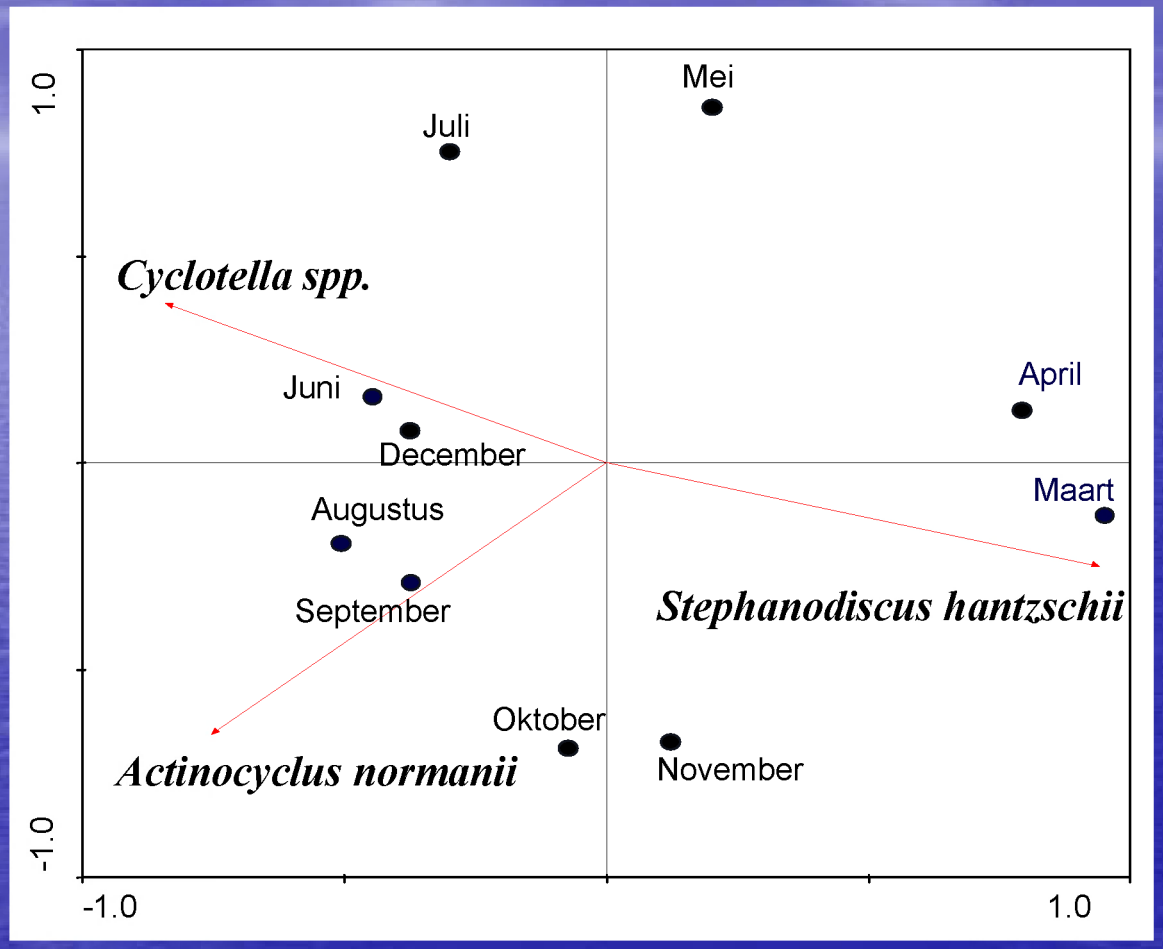
© OMES

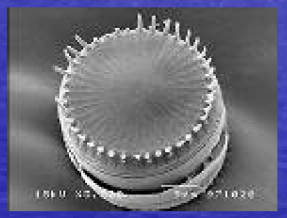
# Successie van diatomeeën soorten





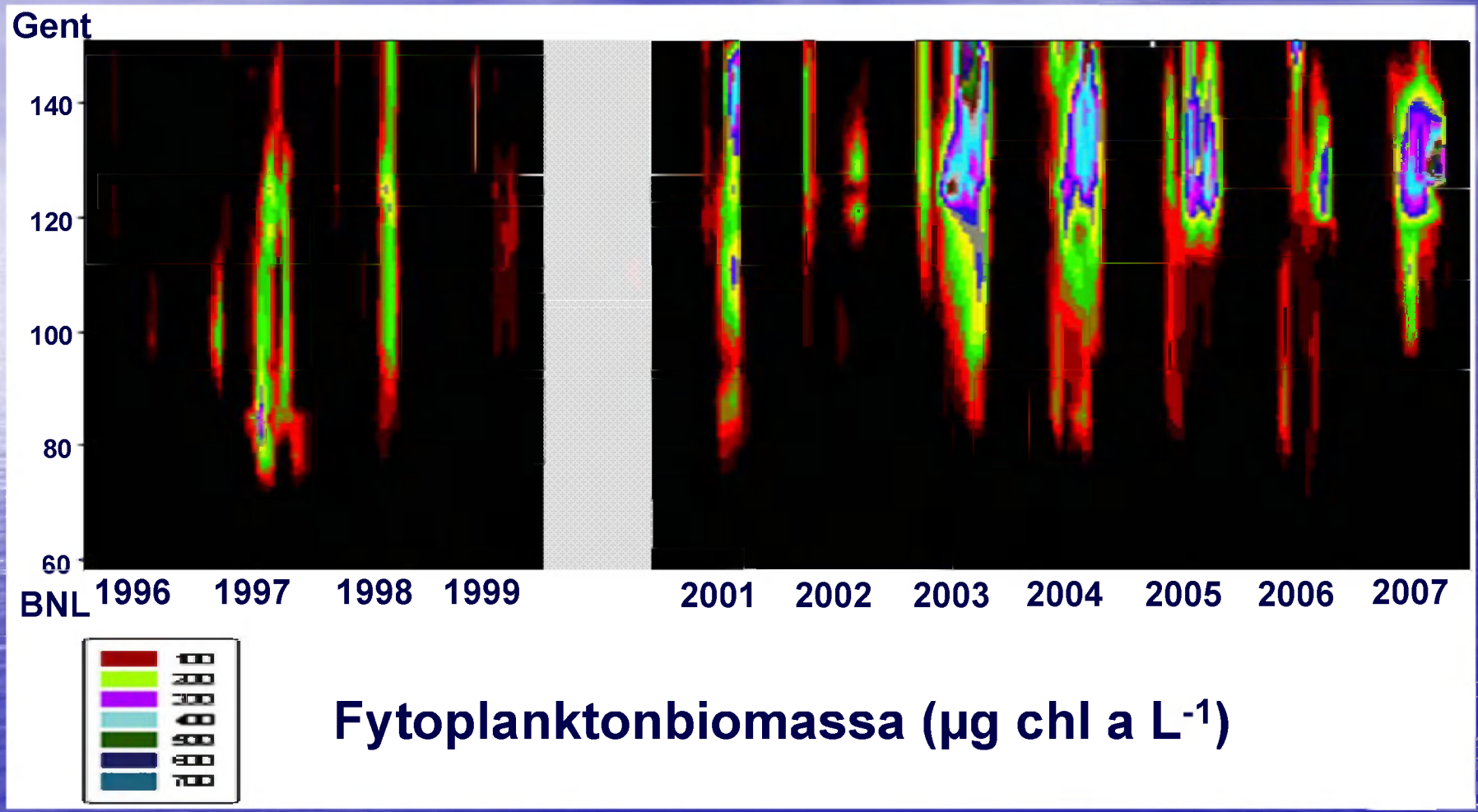





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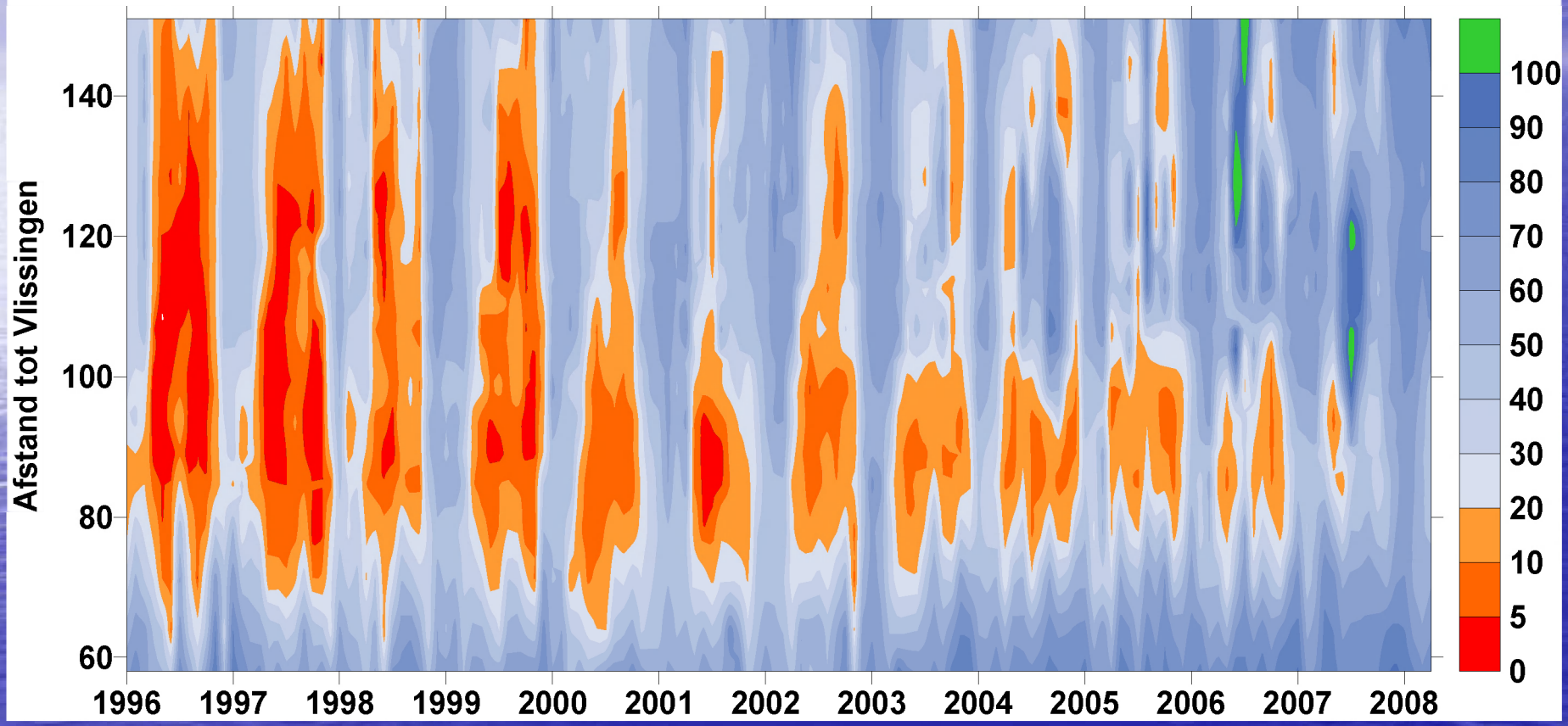
# Evolutie sinds 1996



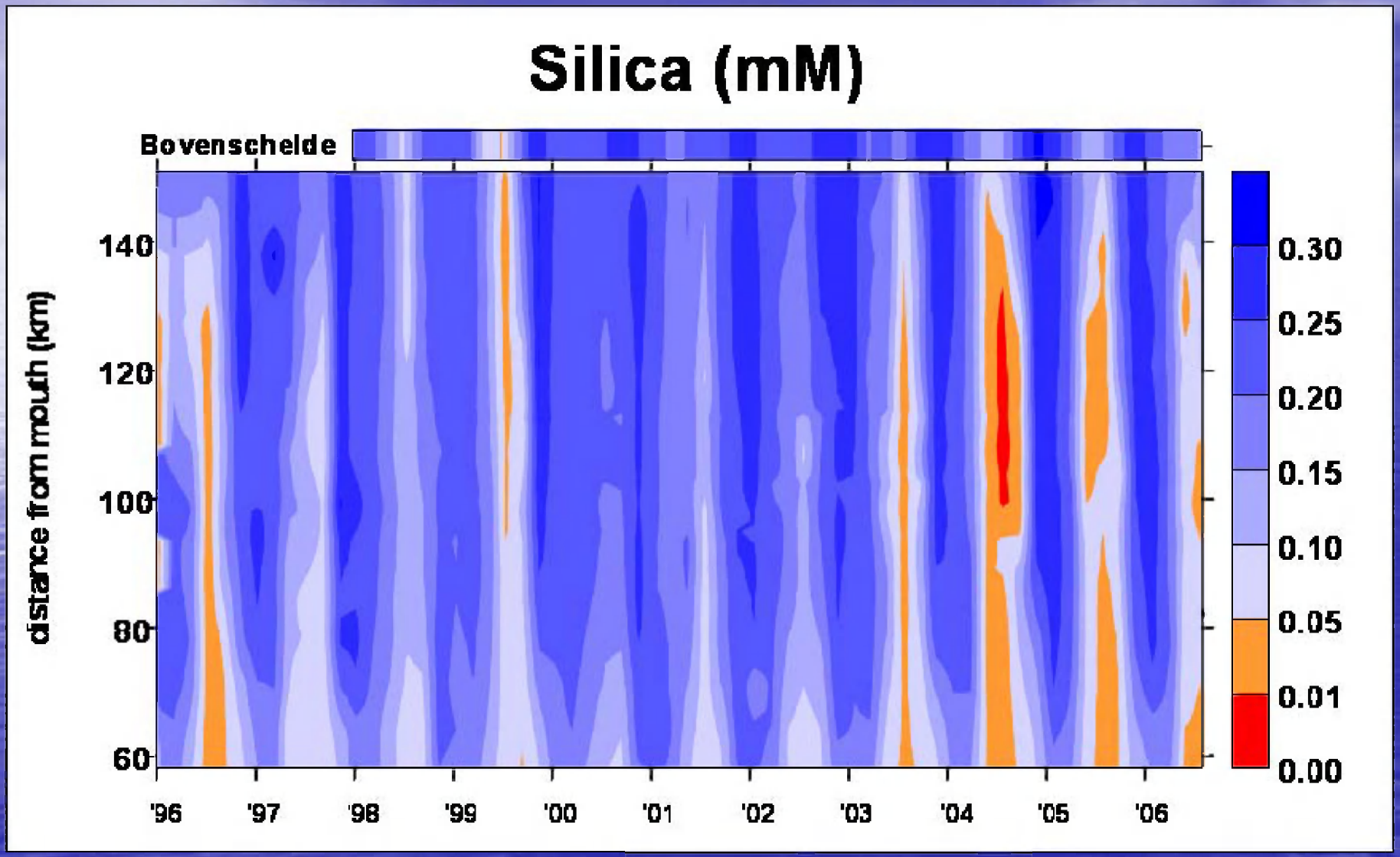

**Fytoplanktonbiomassa (µg chl a $L^{-1}$)**

© OMES

# Zuurstof (% verzadiging)



© OMES


Silica (mM)
Bovenschelde
distance from mouth (km)
140
120
100
80
60
'96
'97
'98
'99
'00
'01
'02
'03
'04
'05
'06
0.30
0.25
0.20
0.15
0.10
0.05
0.01
0.00

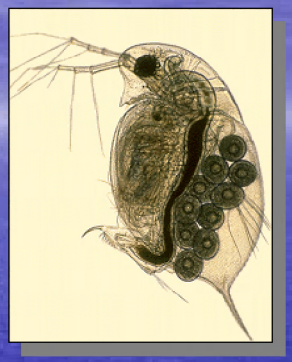
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# II. De secundaire producenten: het zoöplankton

© OMES

# mesozoöplankton

## branchiopoda (cladoceren)





## copepoden





1mm

© OMES

# microzoöplankton

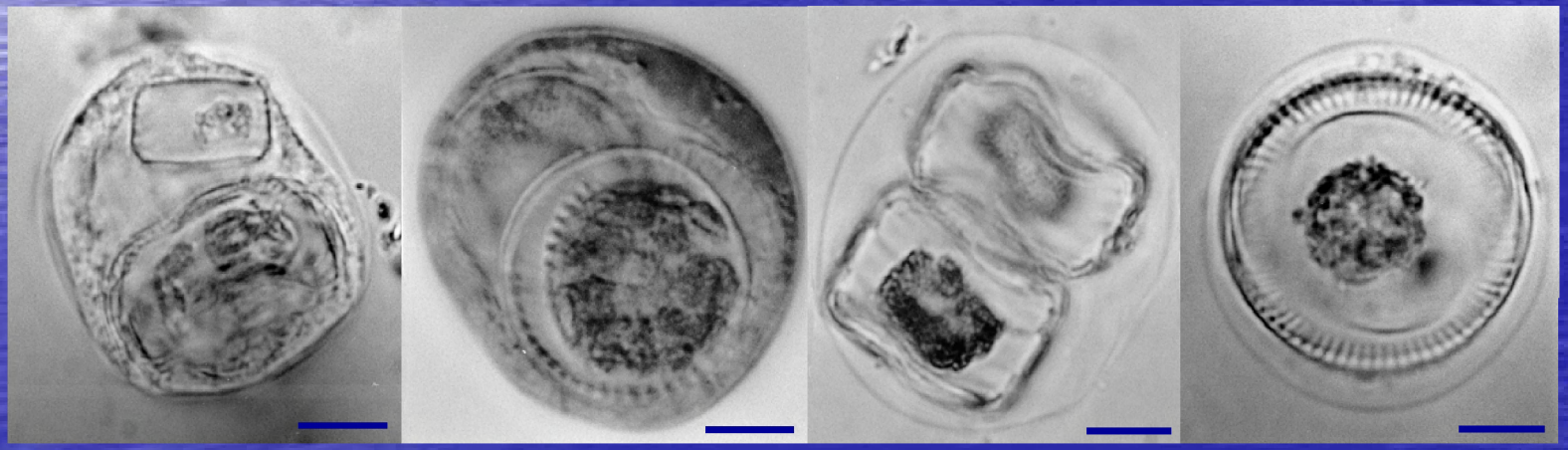
## rotiferen





— 100 µm

## amoeben



— 10 µm

© OMES

# Rol in de voedselketen

fytoplankton



© OMES



hyperbenthos
vis

meso-
zoöplankton

sterke selectiviteit
voor fytoplankton
(diatomeeën)

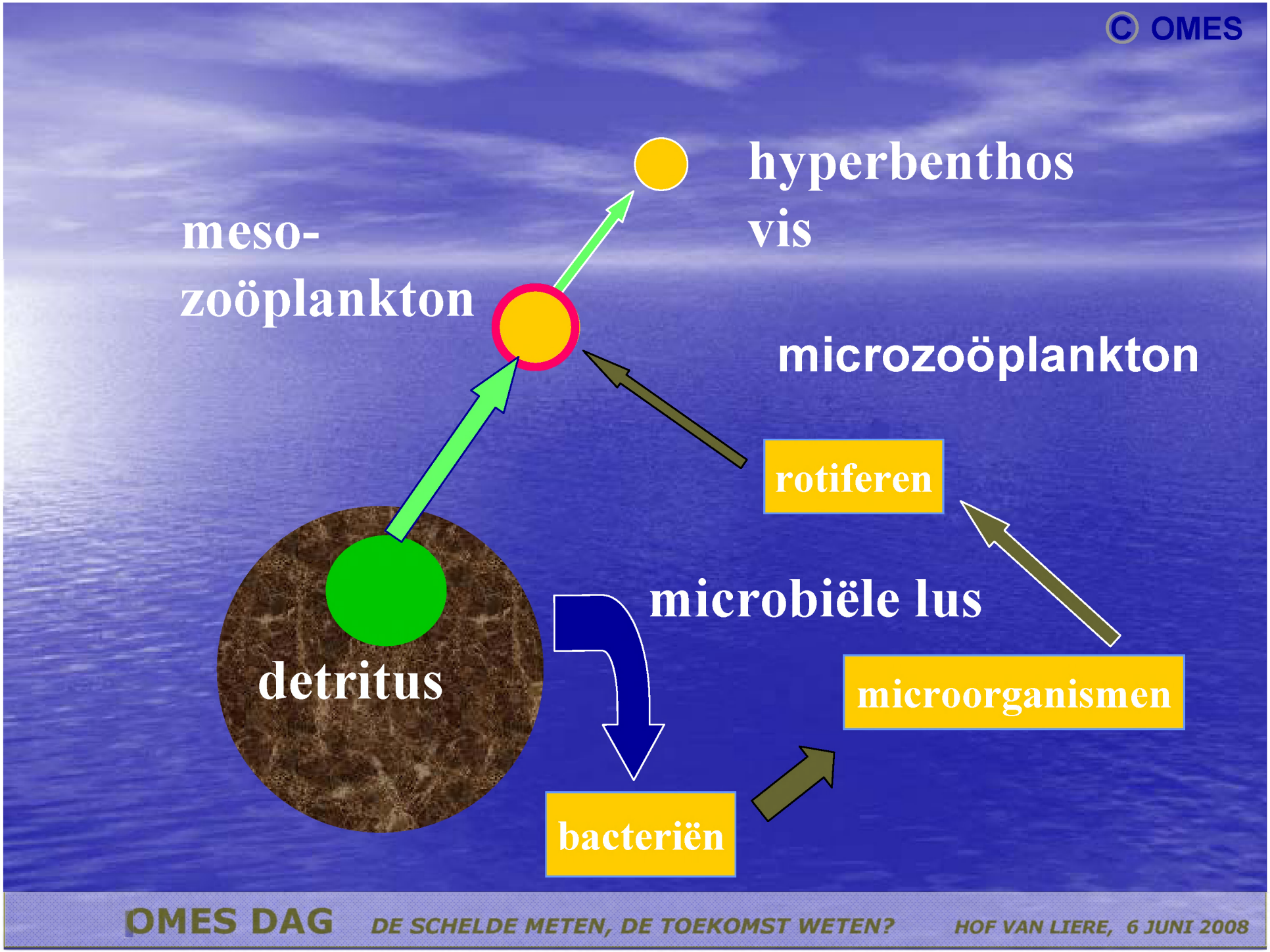
bevestiging
door stabiele isotopen

detritus

bacteriën

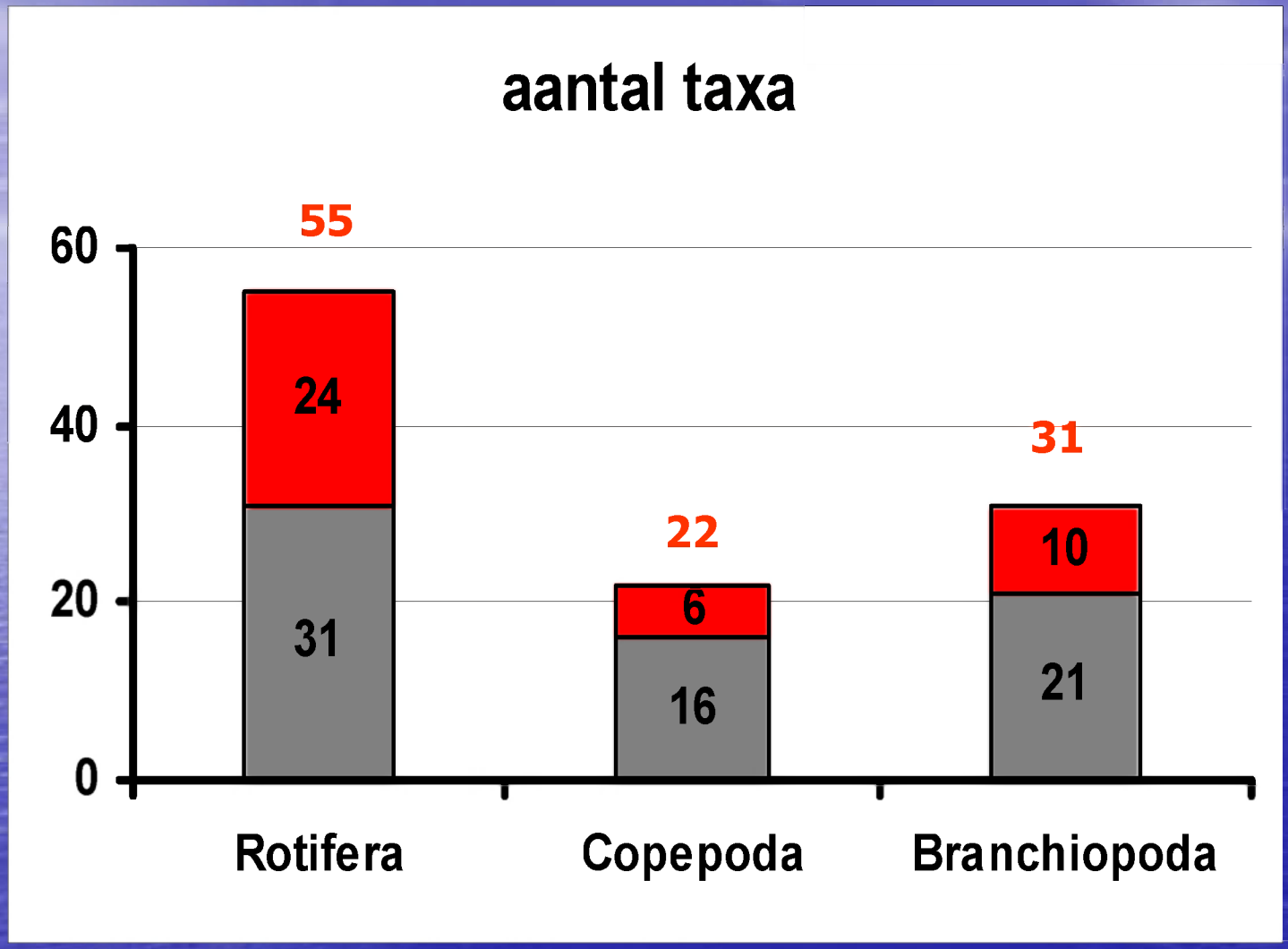
Tackx et al., 2003; De Brabandere, 2005

© OMES


hyperbenthos
vis
meso-
zoöplankton
microzoöplankton
rotiferen
microbiële lus
detritus
microorganismen
bacteriën

# OMES project

© OMES




totaal:108

40 nieuw voor de Schelde

# Taxonomiche kennis (90 % op soortsniveau)

© OMES

## Rotifera

### Monogononta

| | |
|---|---|
| * *Anuraeopsis sp.* | *Keratella valga* (Ehrenberg, 1834) |
| *Asplanchna brightwelli* (Gosse, 1850) | * *Lecane closterocerca* (Schmarda, 1853) |
| *Asplanchna priodonta* Gosse 1850 | * *Lecane decipiens* (Murray, 1913) |
| *Brachionus angularis* Gosse, 1851 | * *Lecane bulla* (Gosse, 1851) |
| * *Brachionus bidentatus* Anderson, 1889 | *Lecane flexilis* (Gosse, 1886) |
| *Brachionus calyciflorus* Pallas, 1766 | * *Lecane hamata* (Stokes, 1896) |
| * *Brachionus diversicornis* (Daday, 1883) | * *Lecane luna* (O. F. Müller, 1776) |
| * *Brachionus leydigi* (Rousselet, 1889) | *Lecane sp.* |
| *Brachionus quadridentatus* Hermann 1783 | *Lepadella ovalis* (O. F. Muller, 1786) |
| *Brachionus rubens* Ehrb. 1838 | *Notholca acuminata* (Ehrb. 1832) |
| *Brachionus urceolaris* O. F. Muller, 1773 | *Notholca squamula* (O. F. Muller, 1786) |
| *Brachionus variabilis* Hempel, 1896 | * *Ploesoma sp.* |
| *Cephalodella* sp. | * *Ploesoma hudsoni* (Imhof, 1891) |
| *Colurella sp.* | * *Ploesoma truncatum* (Levander, 1894) |
| *Epiphanes sp.* | * *Platyias quadricornis* (Ehrb. 1832) |
| *Euchlanis dilatata* Ehrenberg, 1832 | *Polyarthra sp.* |
| *Filinia brachiata* (Rousselet, 1901) | * *Pompholyx sulcata* Hudson, 1855 |
| *Filinia longiseta* (Ehrb. 1834) | * *Rhinoglena frontalis* Ehrb. 1853 |
| * *Gastropus hyptopus* (Ehrb. 1838) | *Synchaeta sp.* |
| *Herxarthra* sp. | * *Synchaeta bicornis* Smith, 1904 |
| * *Kellicottia longispina* (Kellocott, 1879) | * *Testudinella elliptica* (Ehrenberg, 1834) |
| *Keratella cochlearis* (Gosse, 1851) | * *Testudinella patina* (Hermann, 1783) |
| * *Keratella cruciformis* (Thompson, 1892) | *Trichocerca pusilla* (Lauterborn, 1898) |
| *Keratella quadrata* (Müller, 1786) | * *Trichocerca rattus* (O. F. Muller, 1776) |
| * *Keratella testudo* (Ehrb. 1832) | *Trichocerca similis* (Wiersejski, 1886) |
| *Keratella tropica* (Apstein, 1907) | * *Trichotria tetractis* (Ehrenberg, 1830) |

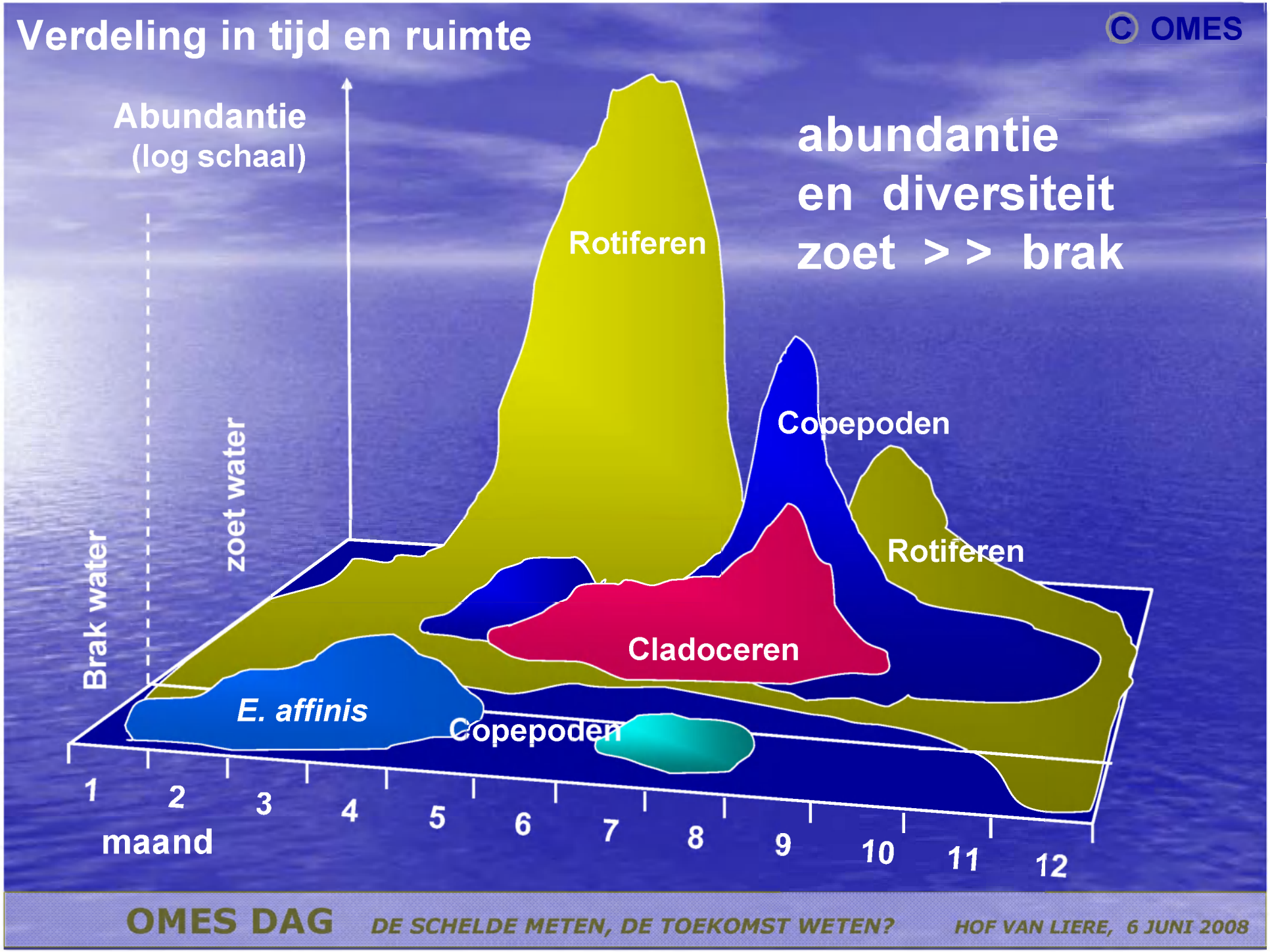
### Bdelloidea

| | |
|---|---|
| * *Dissotrocha sp.* | *Rotaria neptunia* (Ehrenberg, 1832) |
| Undetermined Bdelloids | *Rotaria sp.* |

**Toepassing in Seine - aval**

# Verdeling in tijd en ruimte

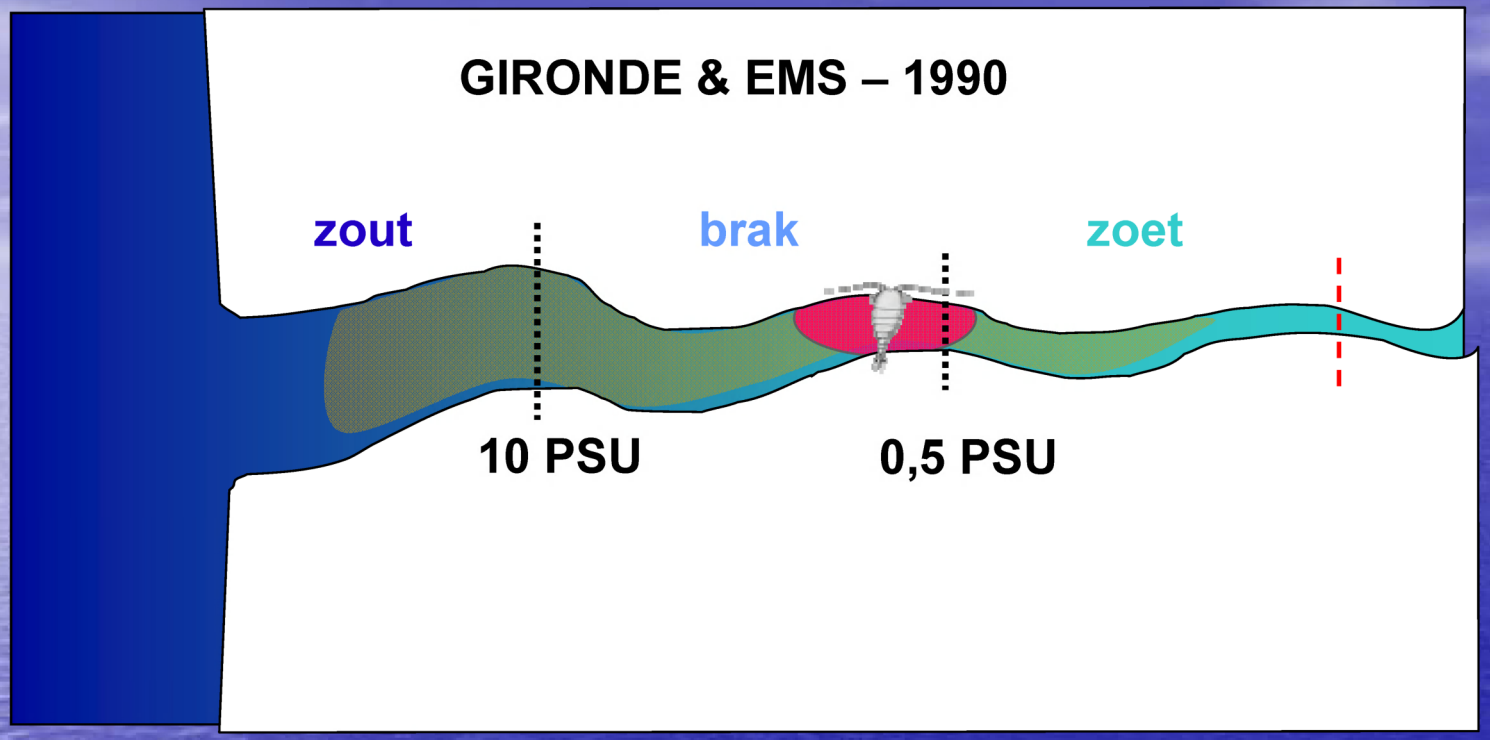
© OMES

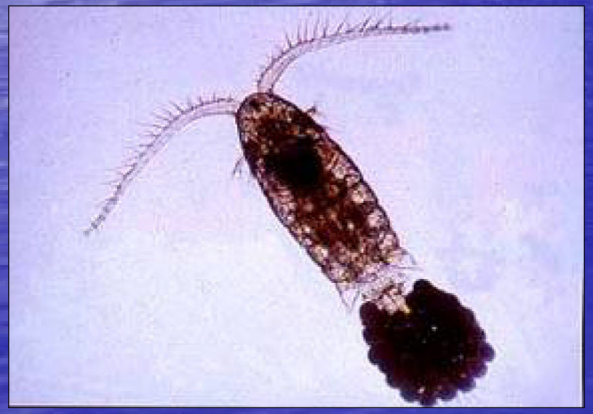



abundantie
en diversiteit
zoet > > brak

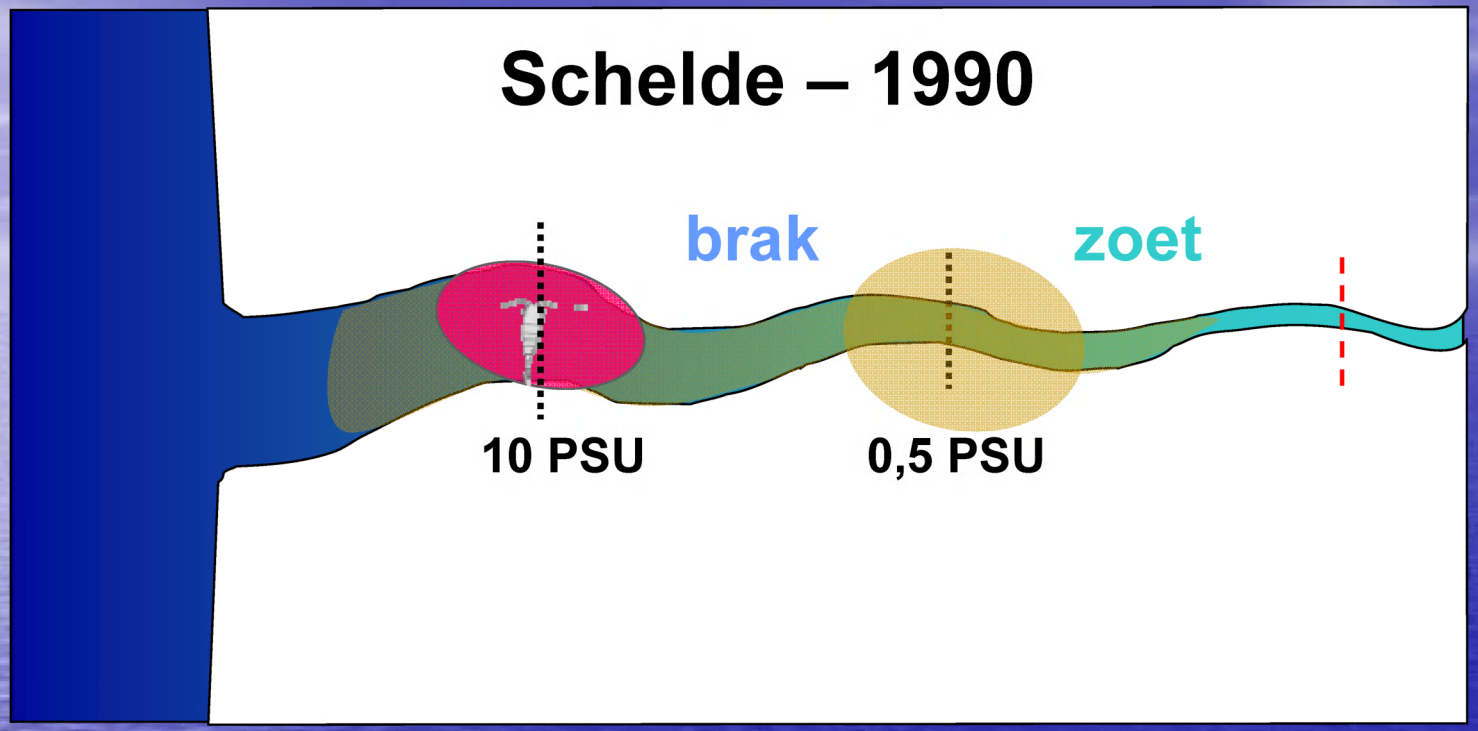
© OMES

# *Eurytemora affinis*



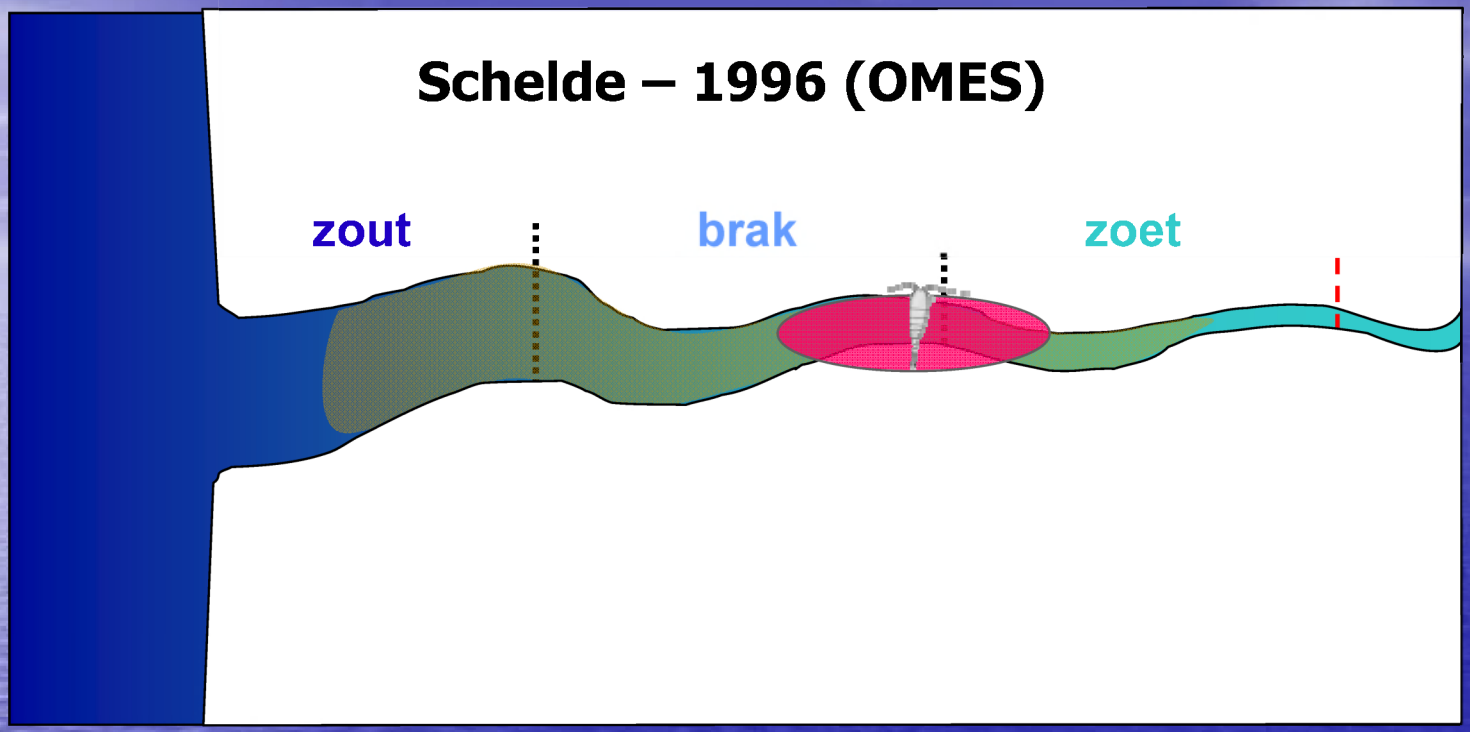
© OMES




**slechte waterkwaliteit**

Soetaert & van Rijswijk 1993; Sautour & Castel 1995

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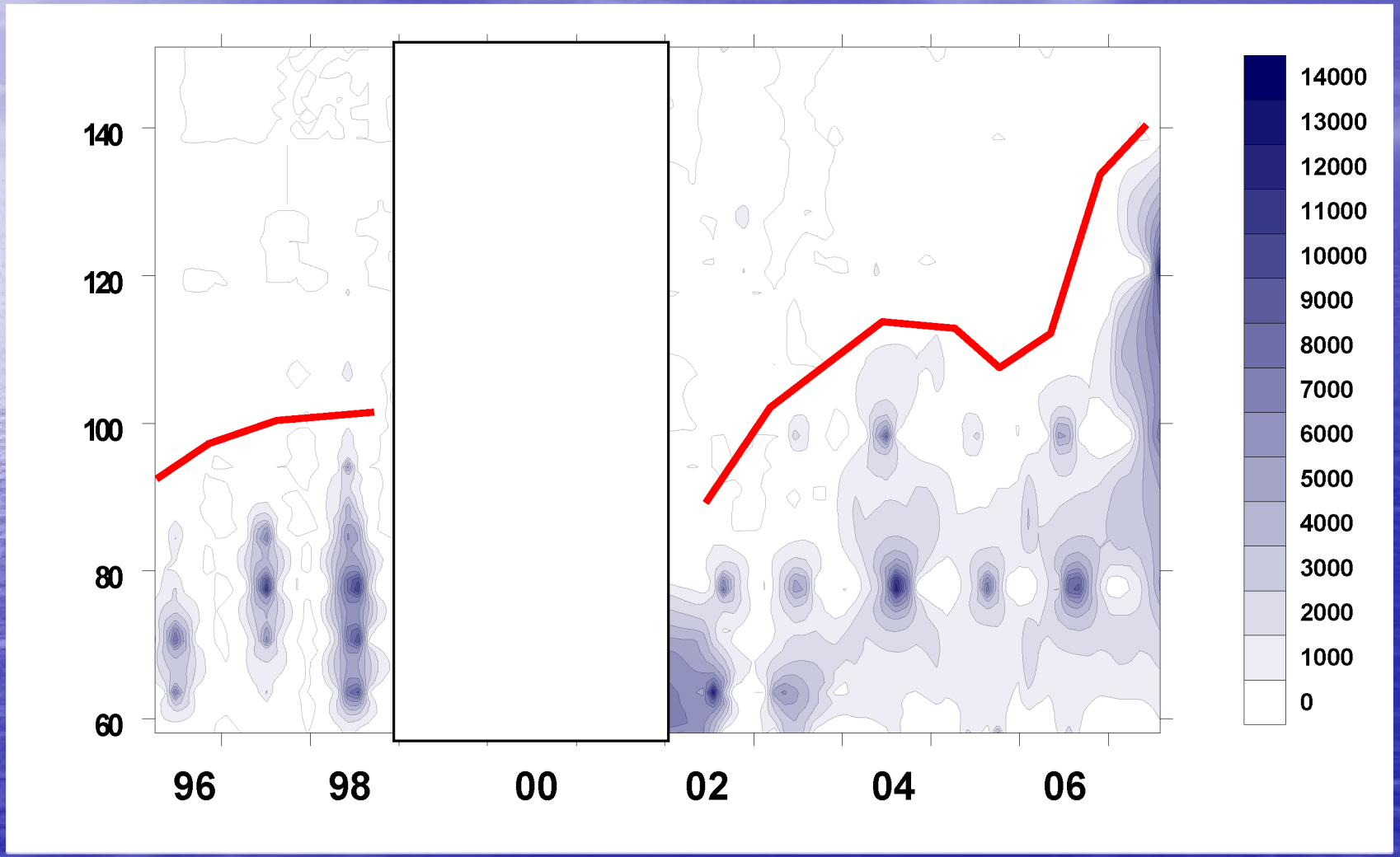



**reactie op verbeterende waterkwaliteit ?**

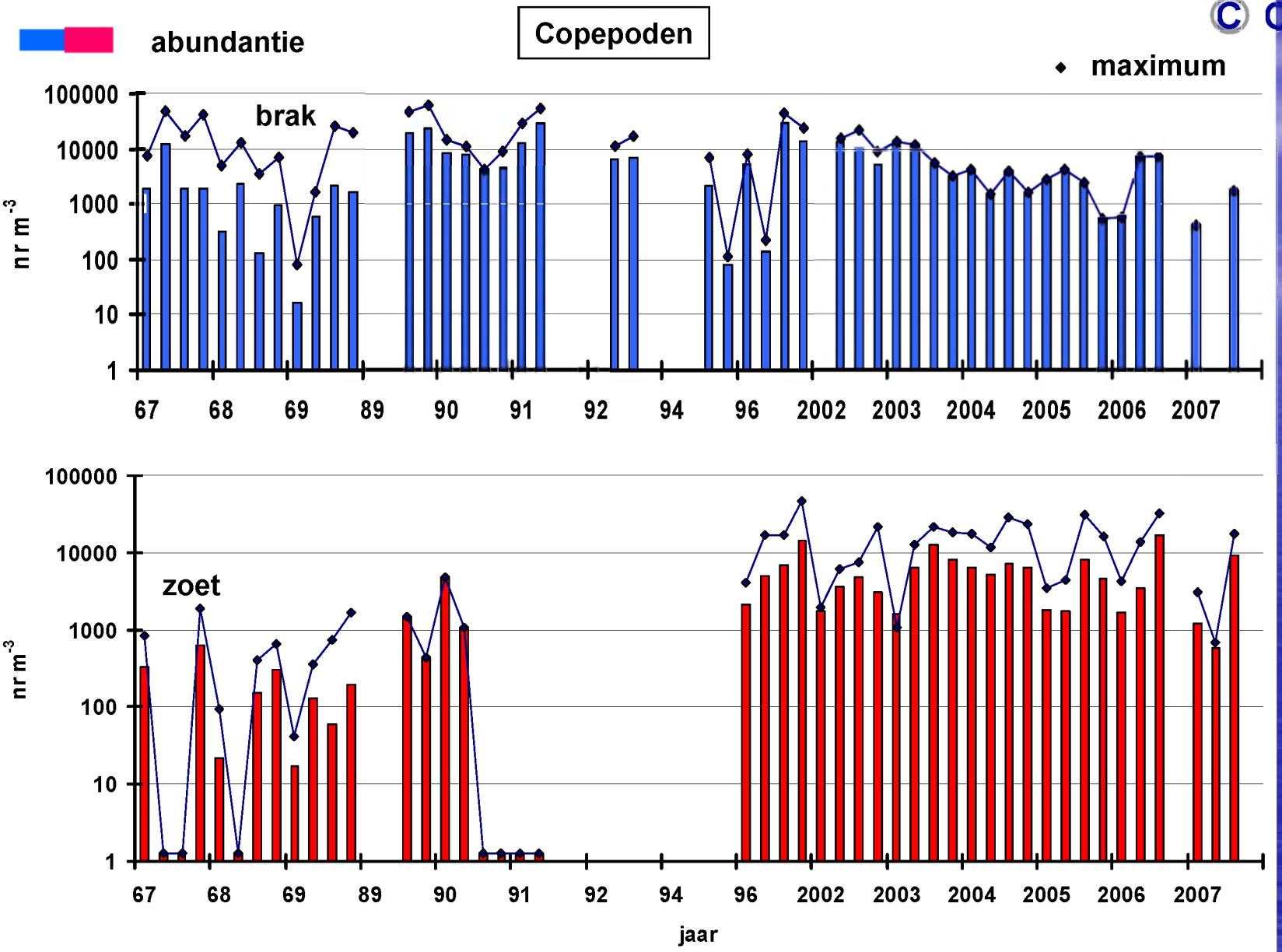
# evolutie 1996 -

© OMES

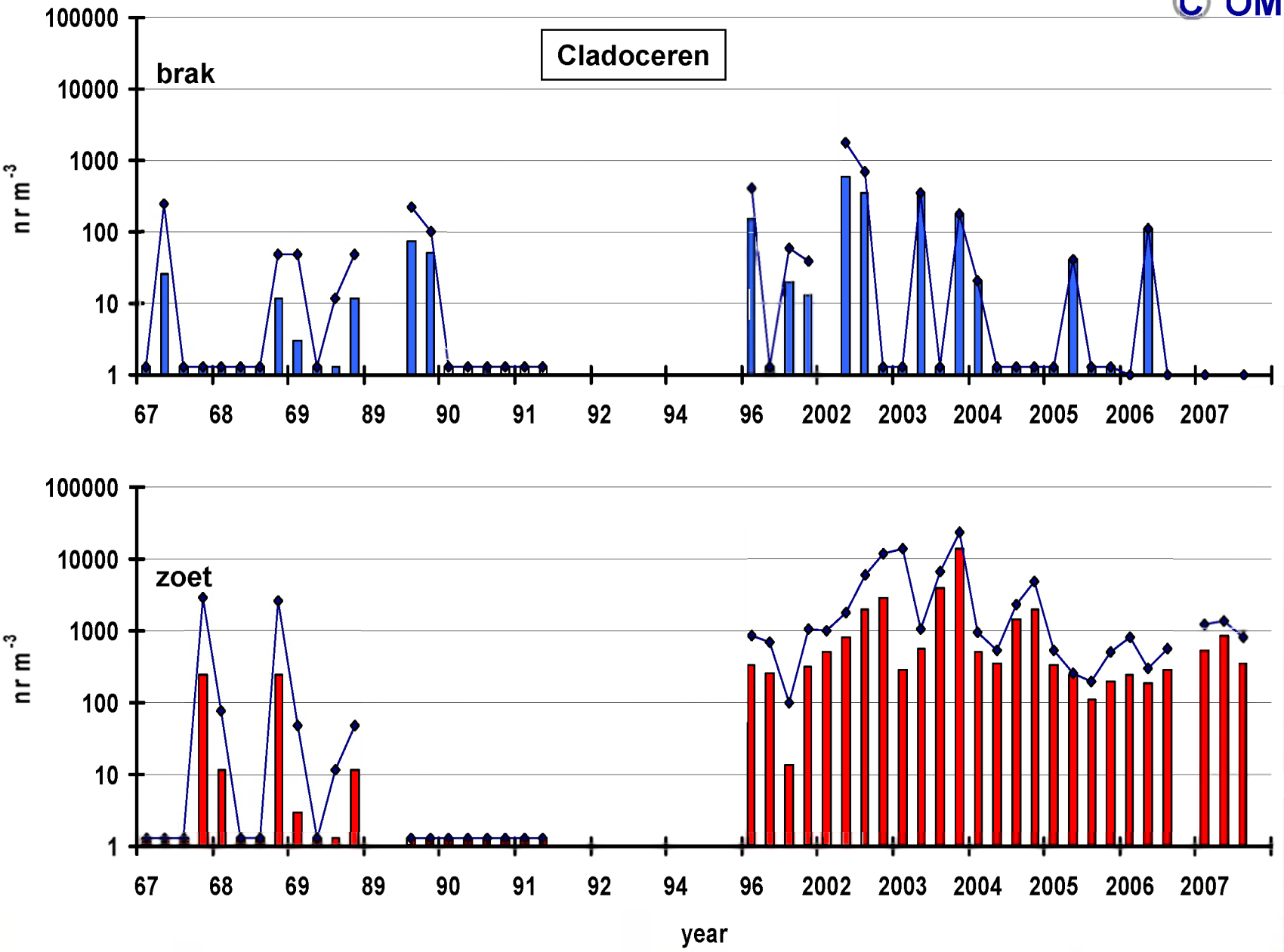
*Eurytemora affinis* (ind.m$^{-3}$)



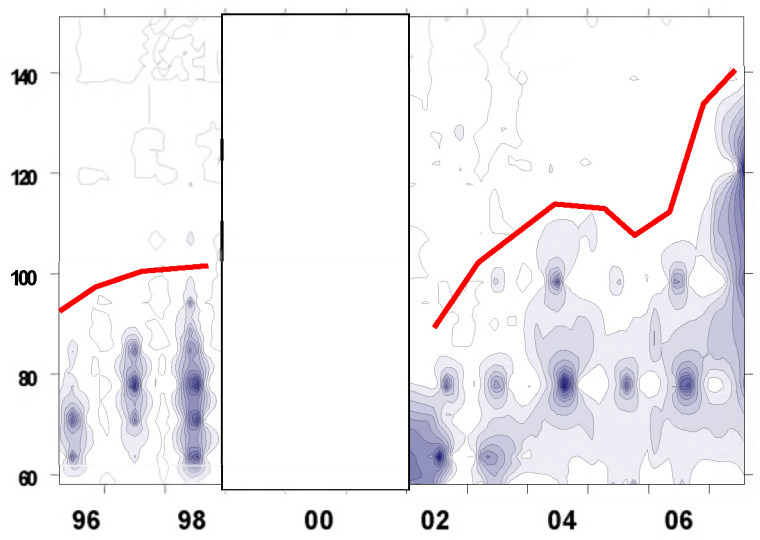
© OMES


Copepoden
abundantie
maximum
brak
zoet
nr m-3
100000
10000
1000
100
10
1
67
68
69
89
90
91
92
94
96
2002
2003
2004
2005
2006
2007
jaar

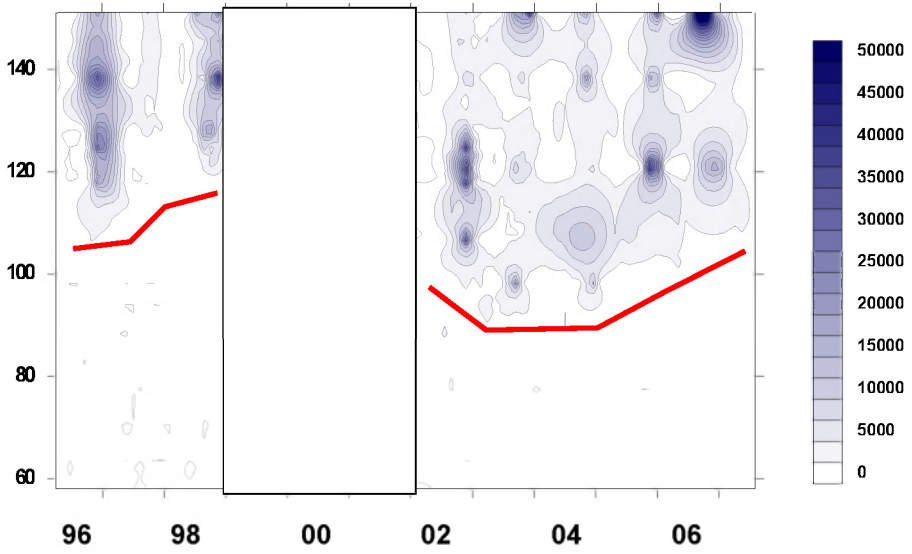
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Cladoceren
brak
zoet
nr m-3
100000
10000
1000
100
10
1
67
68
69
89
90
91
92
94
96
2002
2003
2004
2005
2006
2007
year

## *E. affinis* (Nr m$^{-3}$)




## Cladoceren (Nr m$^{-3}$)

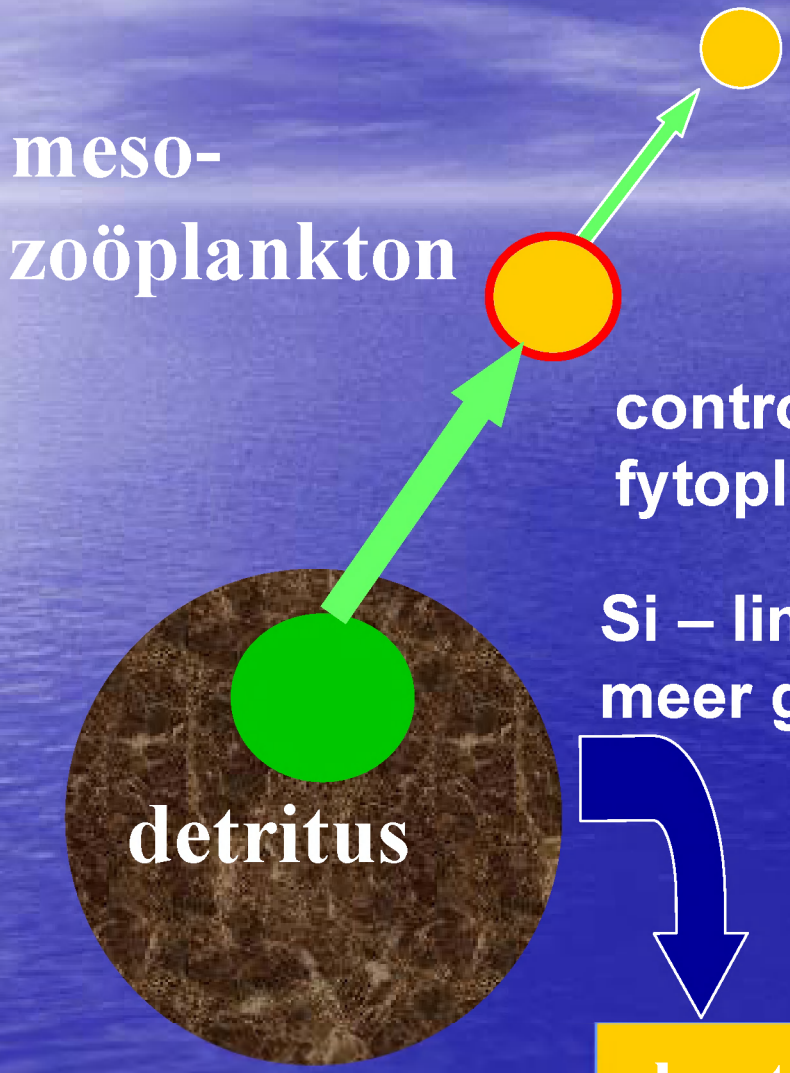



mesozooplankton:

middenzone : the place to be !

grenzen aan toename? competitie ?

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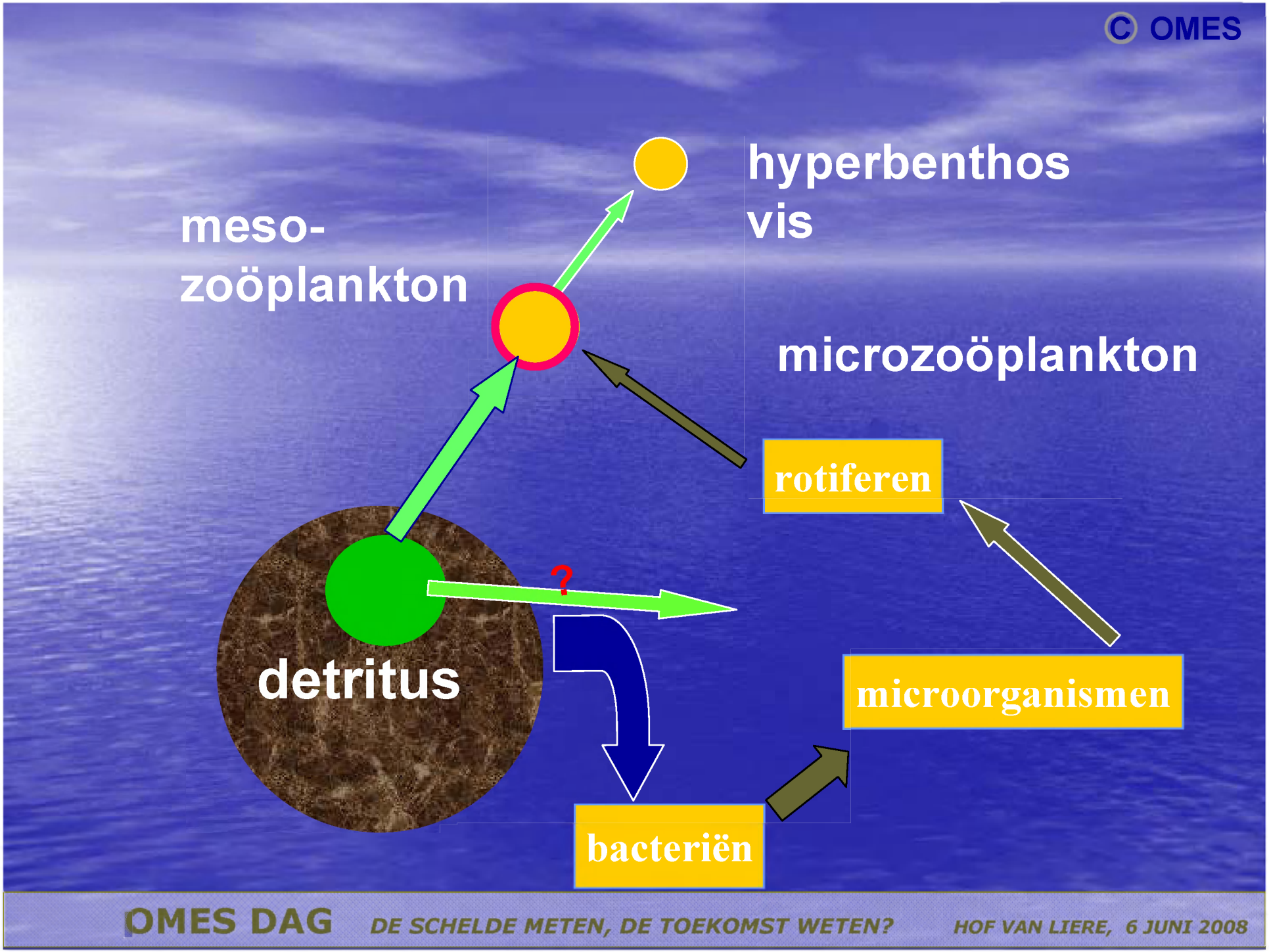


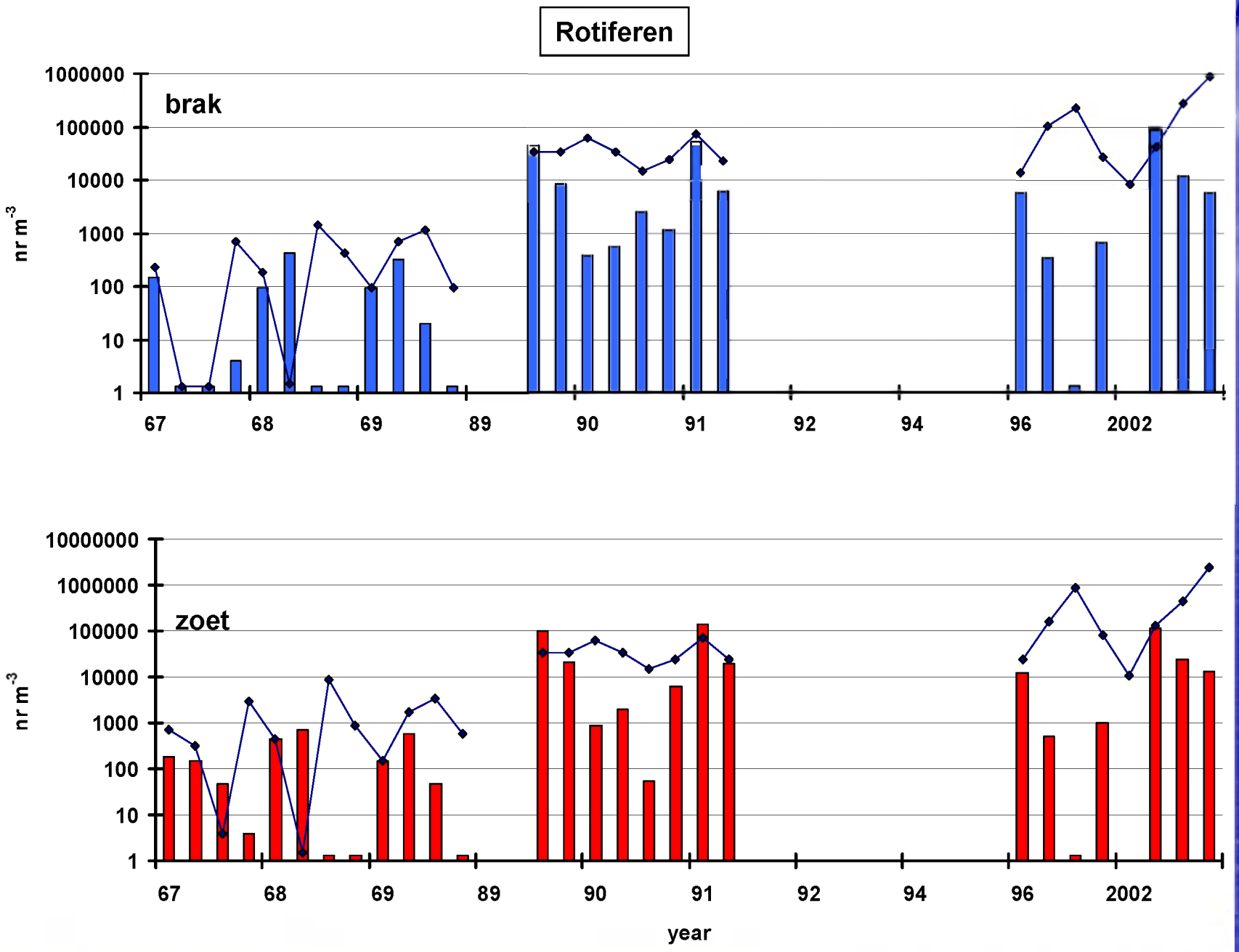

controle toenemende
fytoplanktonbiomassa?

Si – limitatie kiezelwieren?
meer groenwieren?

bacteriën

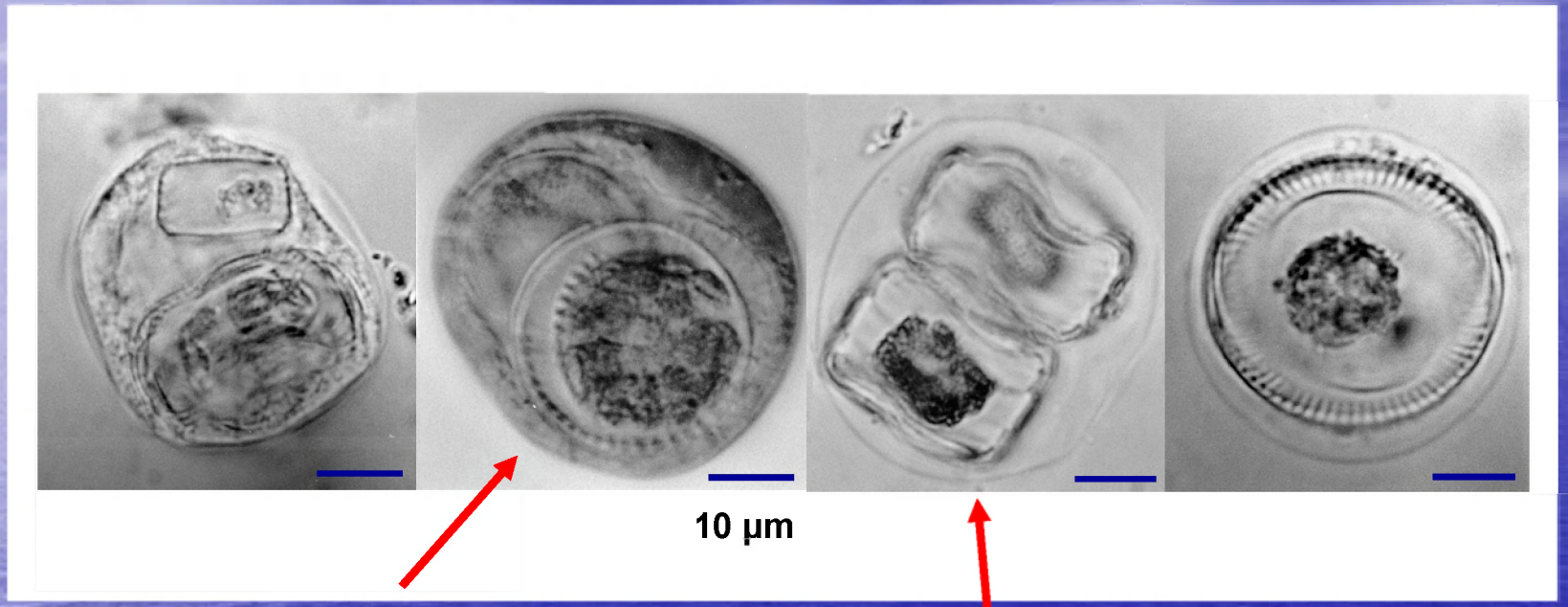
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hyperbenthos
vis
meso-
zoöplankton
microzoöplankton
rotiferen
?
detritus
microorganismen
bacteriën


Rotiferen
brak
zoet
nr m-3
1000000
100000
10000
1000
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10
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2002
year

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# Graasactiviteit amoeben



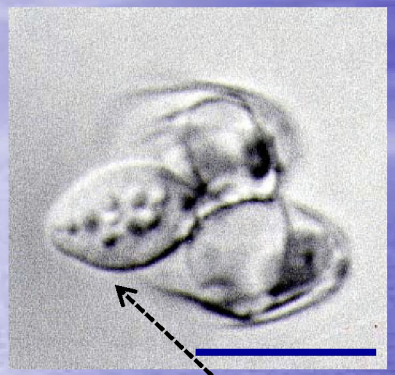

*Asterocaelum algophilum*

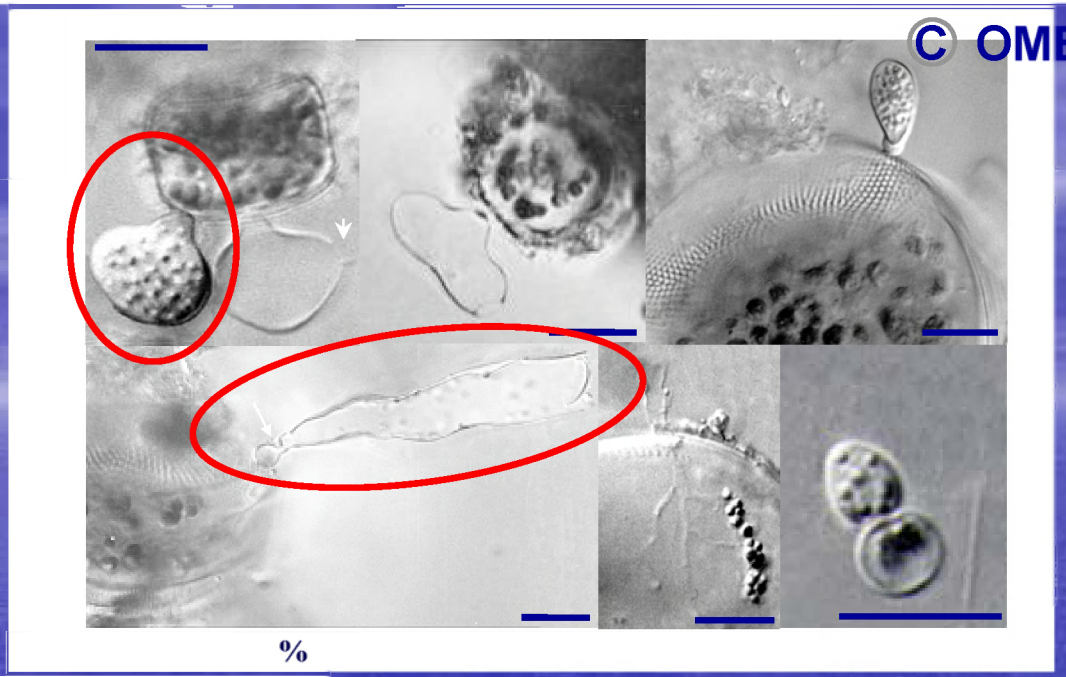
- 25 % van diatomeeënpopulatie in amoebe voedingscysten
- selectiviteit voor grotere diatomeeën

Van Wichelen *et al.* 2006

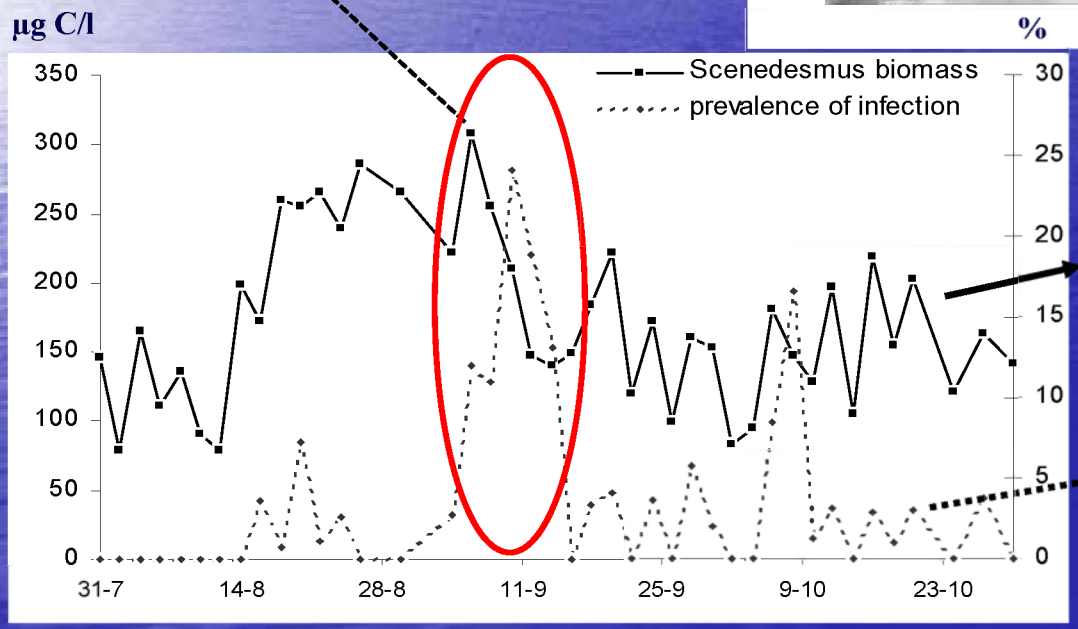
# Parasieten: schimmels

*Rhizophydium scenedesmi*






*Podochytrium* spp.



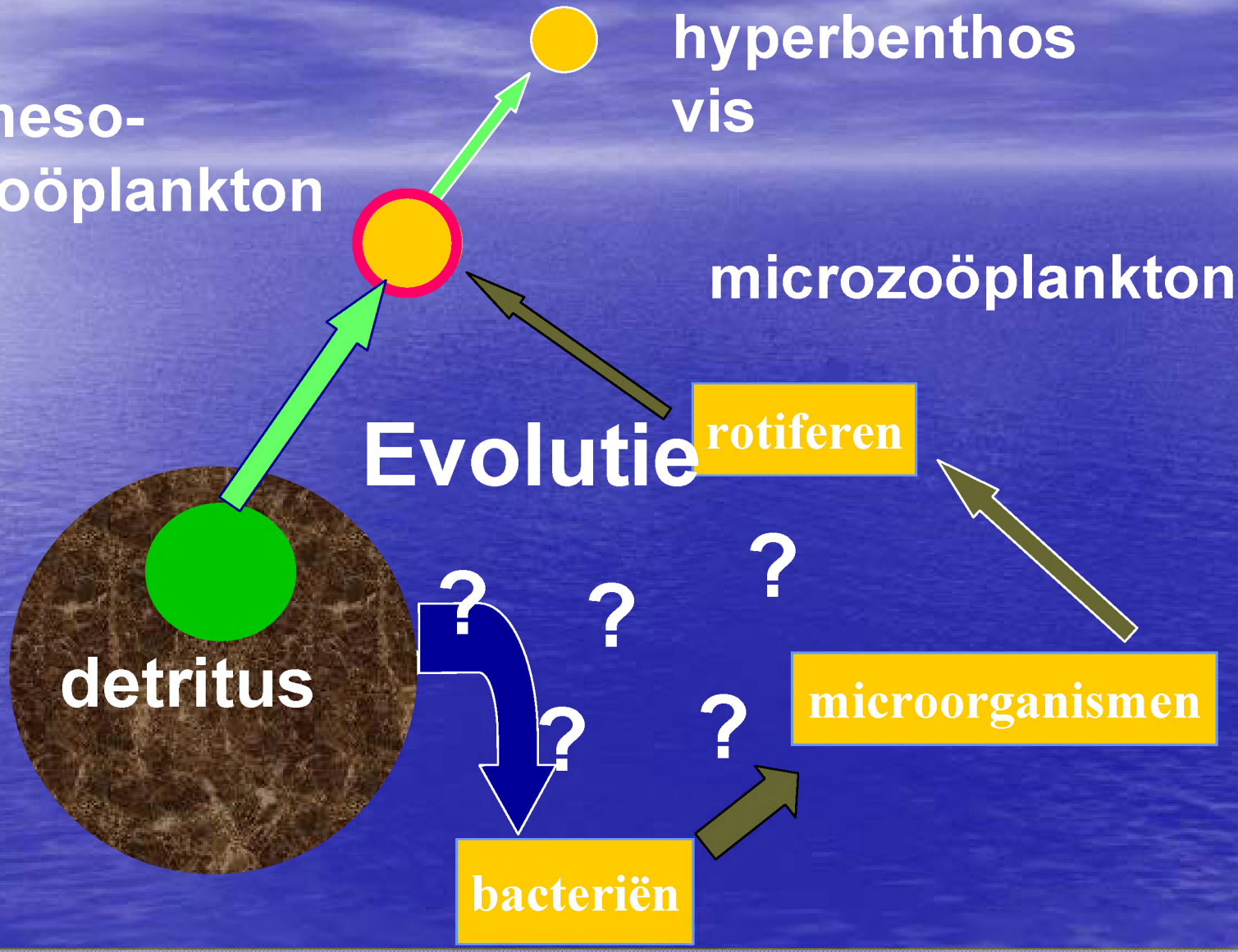

**biomassa *Scenedesmus***

**percentage infectie**

Van Wichelen *et al.* 2006

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# Conclusie



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# Dank u