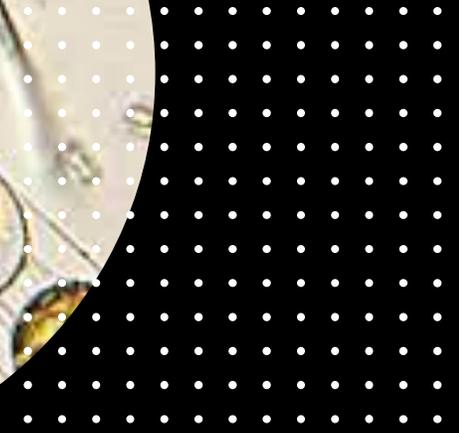
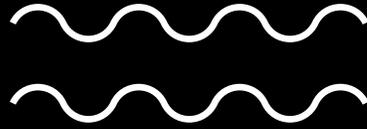


# Phytoplankton ID Guide

Common HAB species in the Gulf of Maine and their look-alikes. All photos taken under the 10x objective lens.

Department of Marine Resources



# About this Guide

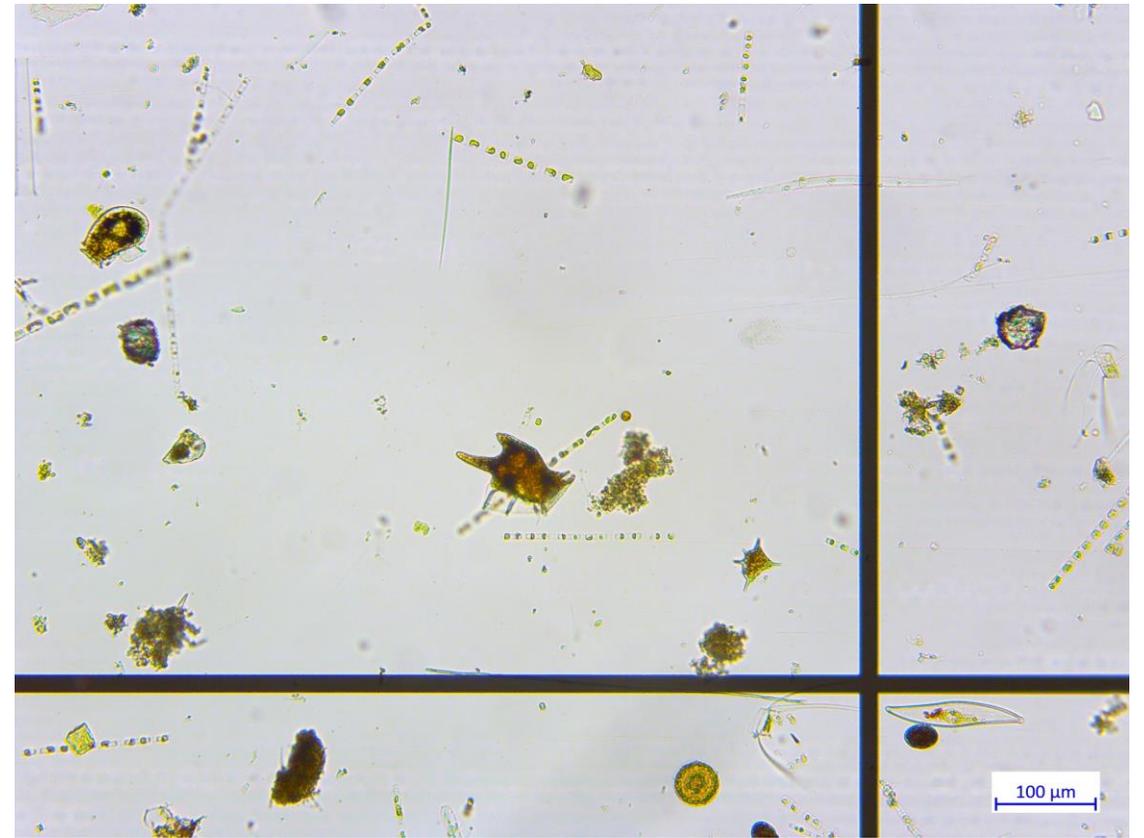
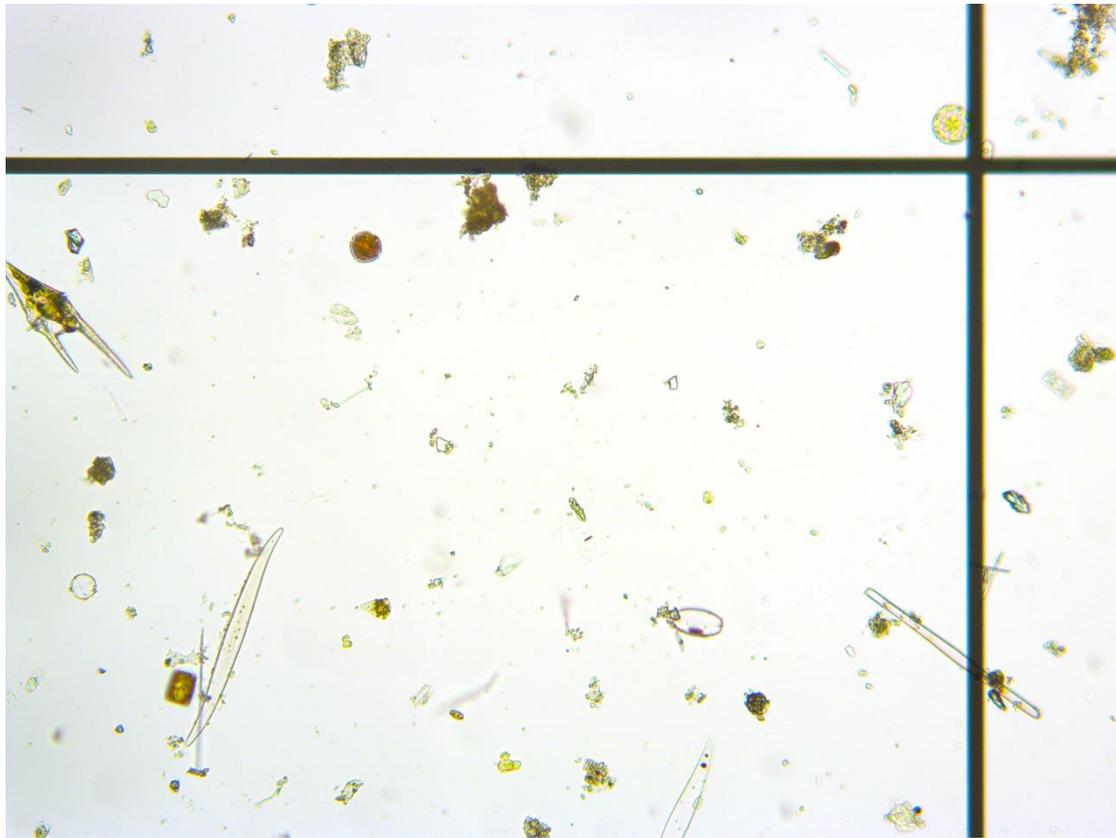
- Every photo was taken under the 10x objective by DMR staff.
- Some photos have been enlarged for a better view of cell structures, but all cell sizes are relative within a photo.
- Other Resources
  - Algae Base: <https://www.algaebase.org/>
  - Marine Species ID Portal: [http://species-identification.org/species.php?species\\_group=dinoflagellates&menuentry=identification#](http://species-identification.org/species.php?species_group=dinoflagellates&menuentry=identification#)
  - DMR Volunteer Documents: <https://www.maine.gov/dmr/shellfish-sanitation-management/programs/phytovolunteers/index.html>

# Terms

- Girdle = central band of a dinoflagellate where the flagella (cingulum) is found
- Transapical axis = width of cell
- Apex = the top of an armored dinoflagellate cell
- Epitheca = top of an armored dinoflagellate, or diatom (above girdle)
- Hypotheca = bottom of an armored dinoflagellate, or diatom (below girdle)
- Hypocone = top of an unarmored dinoflagellate (above girdle)
- Epicone = bottom of an unarmored dinoflagellate (below girdle)

# Dinoflagellates

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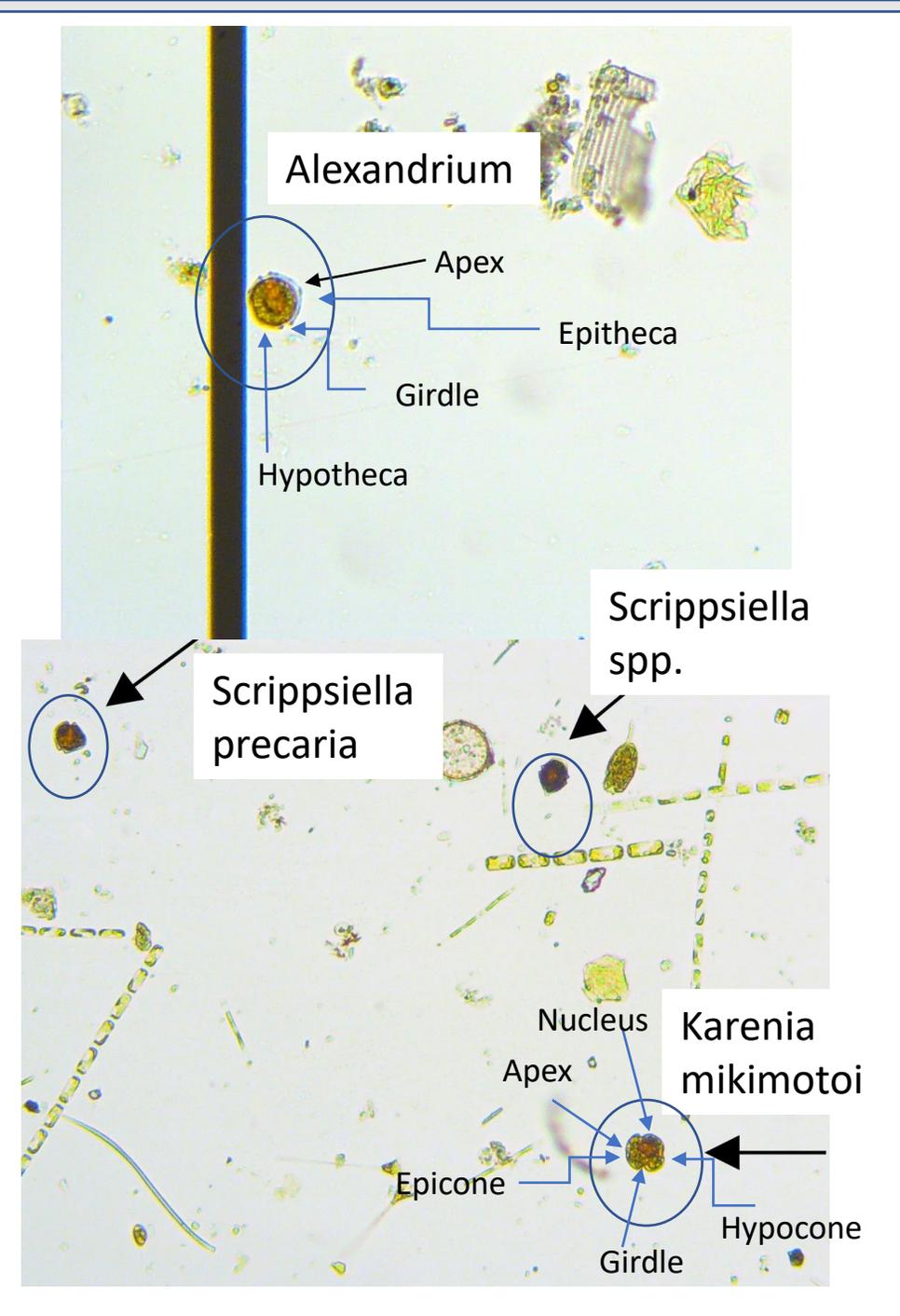
# Alexandrium and Look –Alikes

## Armored Dinoflagellates

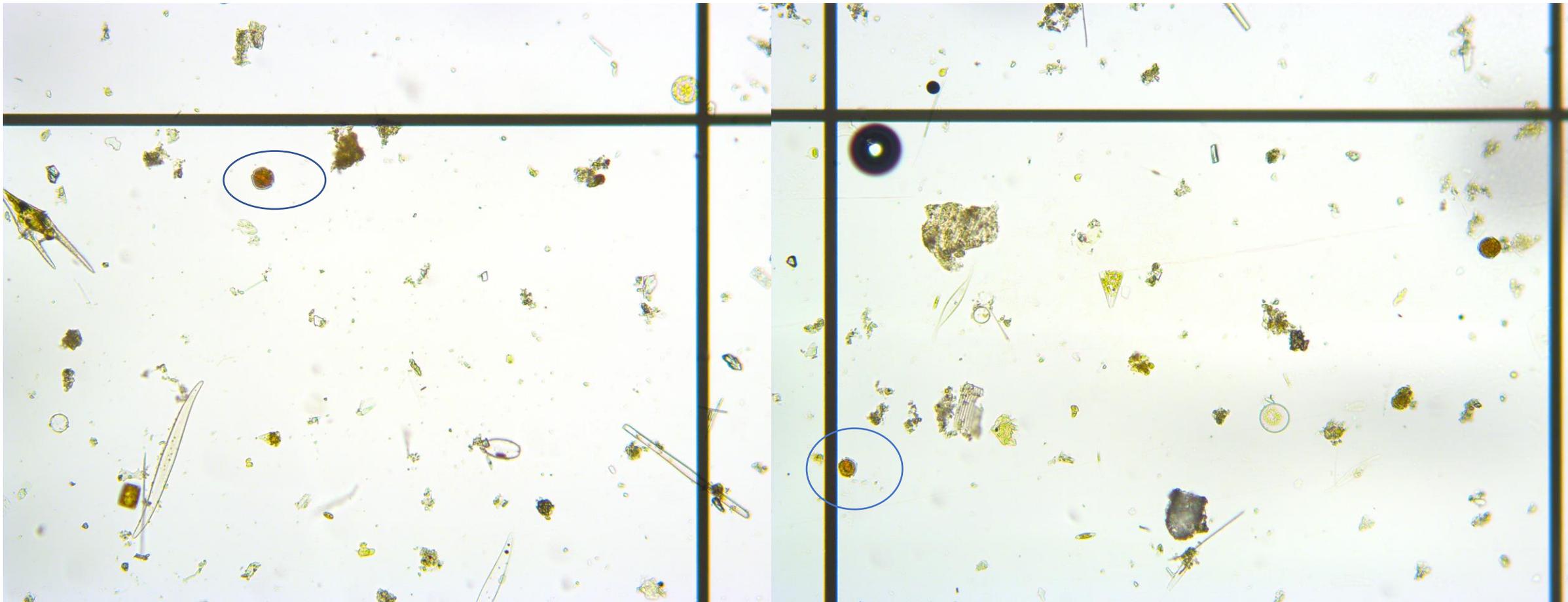
- *Alexandrium spp.*
  - Defined, even girdle
  - Rounded apex
- *Scrippsiella spp.*
  - Defined, even cingulum
  - Pointed apex
    - Generally a “bubble” like structure at the apex
- *Scrippsiella precaria*
  - Pointed apex, no “bubble”

## Unarmored Dinoflagellates

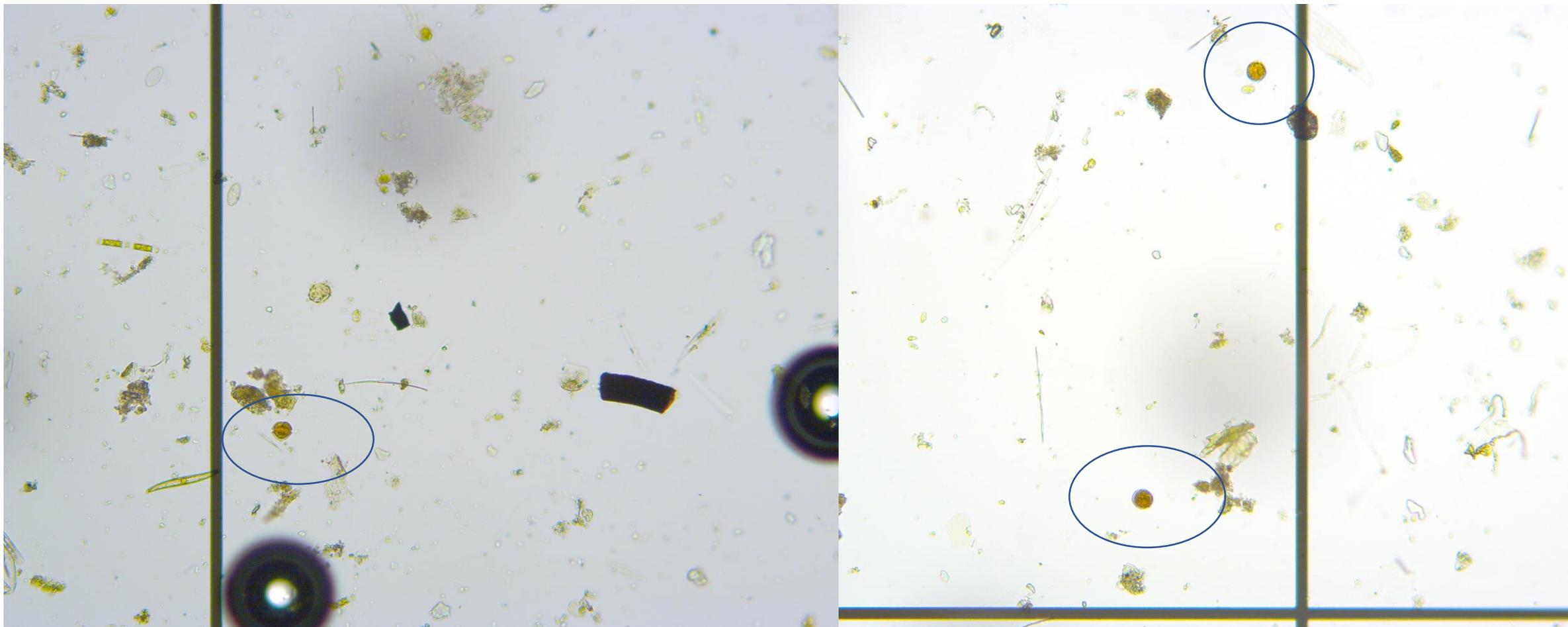
- *Karenia mikimotoi*
  - Less defined, uneven girdle
  - Visible nucleus in the hypocone and epicone
  - Rounded epicone



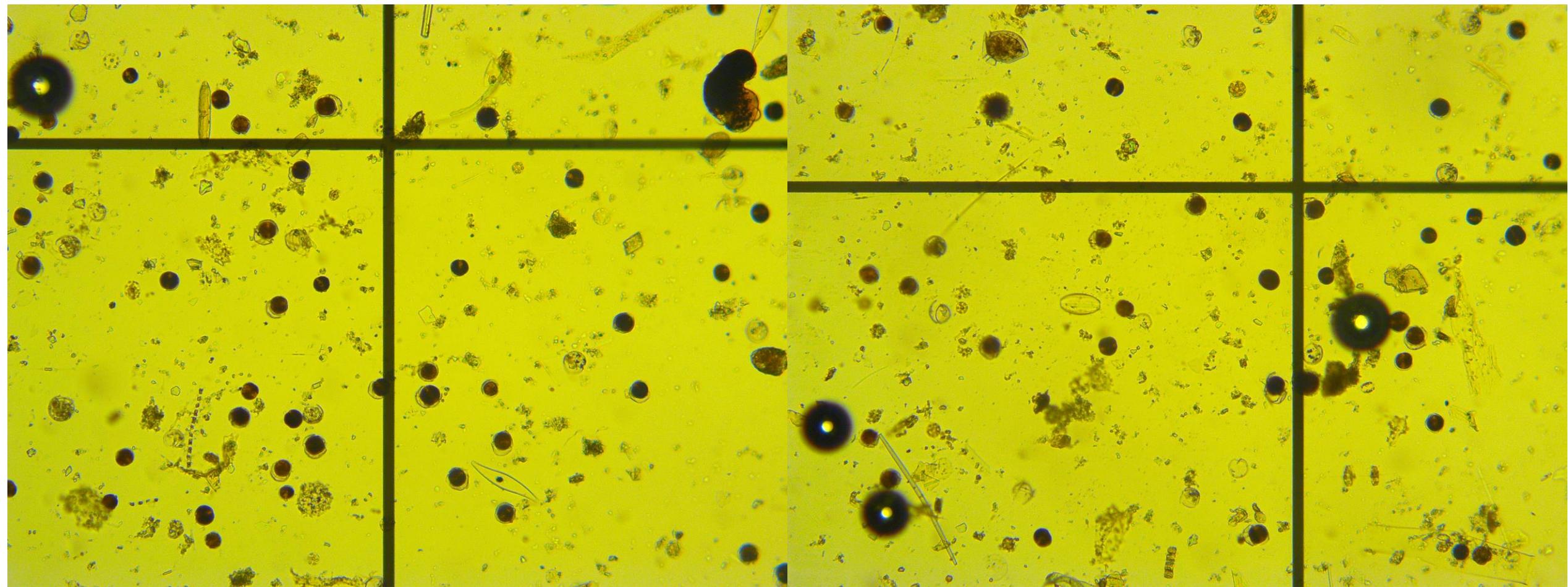
# *Alexandrium catenella* 2021



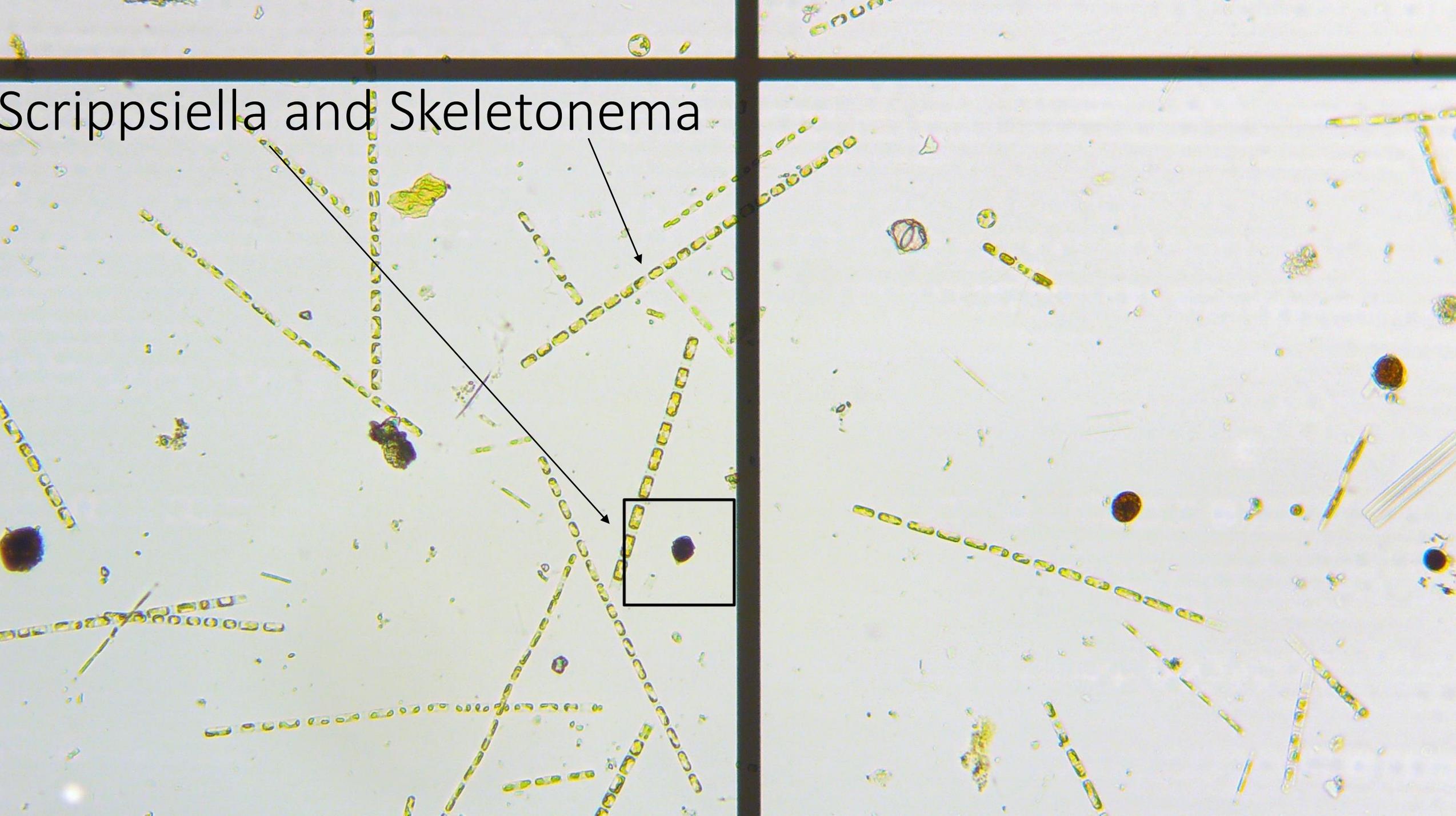
# *Alexandrium catenella* 2021



# *Alexandrium catenella* 2017



# Scripppsiella and Skeletonema

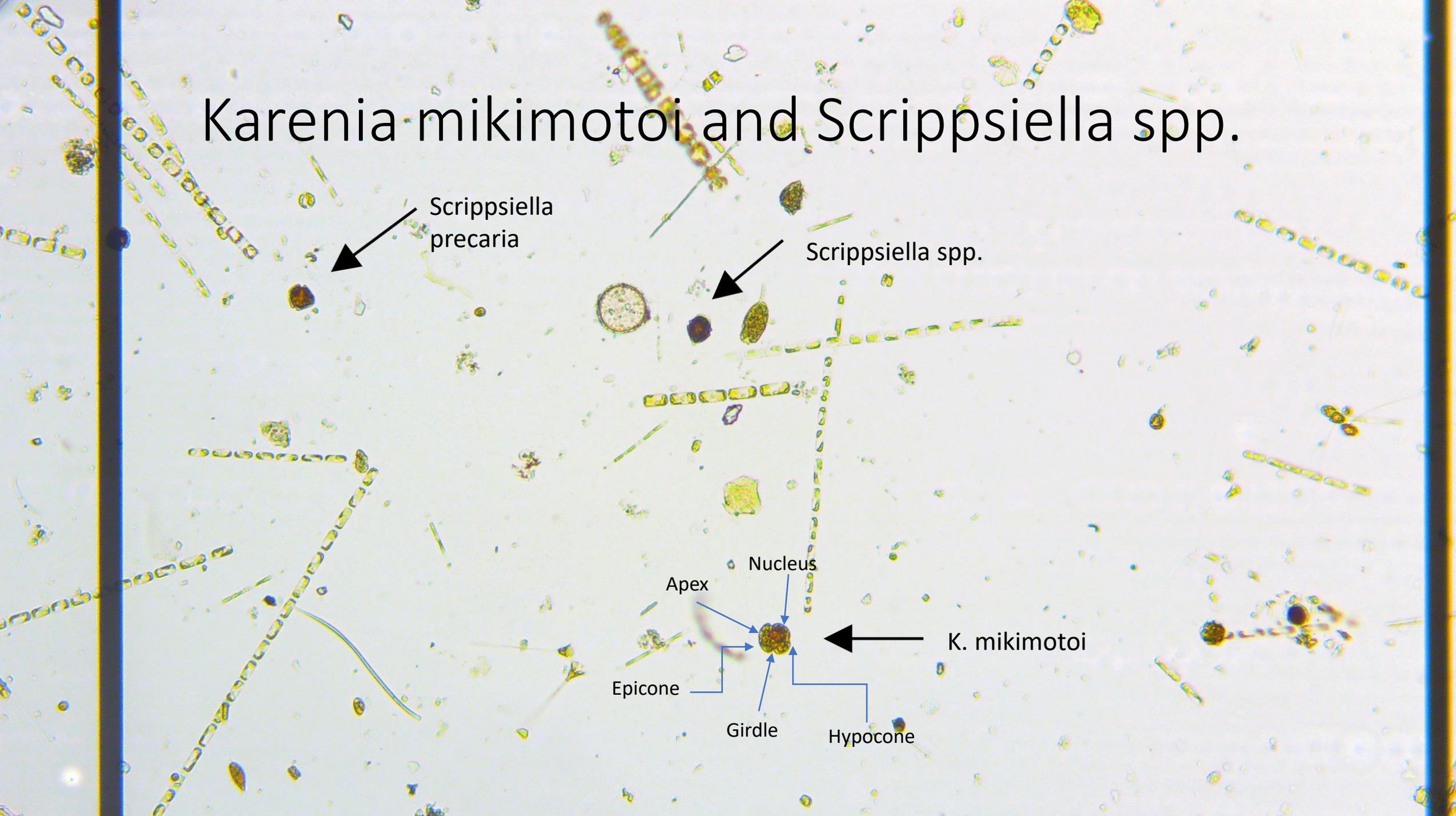


# Karenia mikimotoi and Scrippsiella spp.

Scrippsiella  
precaria

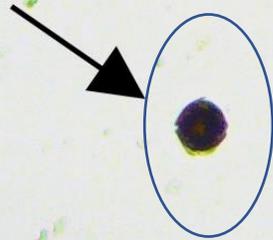
Scrippsiella spp.

Nucleus  
Apex  
Epicone  
Girdle  
Hypocone  
K. mikimotoi

A microscopic image showing various marine organisms. In the foreground, a large, circular, brownish organism is labeled 'K. mikimotoi'. It has a central 'Nucleus', a pointed 'Apex' at the top, a 'Girdle' around its middle, and a 'Hypocone' at the bottom. To the left of the nucleus is an 'Epicone'. In the background, several long, thin, yellowish chains of cells are visible, with arrows pointing to them from the labels 'Scrippsiella precaria' and 'Scrippsiella spp.'. The background is filled with other smaller, scattered organisms and debris.

Alexxandrium spp.

Coscinodiscus



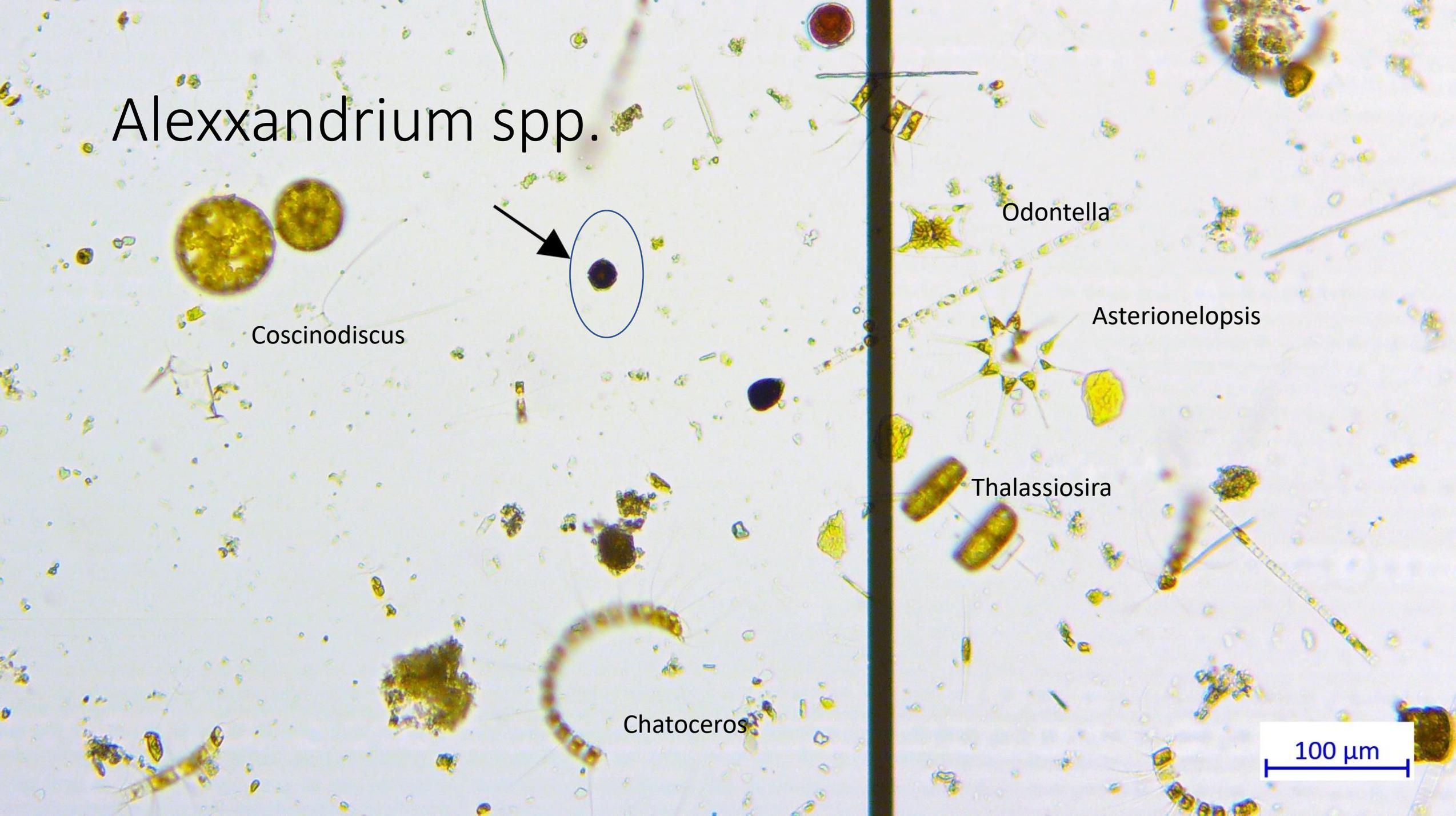
Odontella

Asterionelopsis

Thalassiosira

Chatoceros

100  $\mu$ m



# Karenia mikimotoi and Scrippsiella spp.

Dictyocha

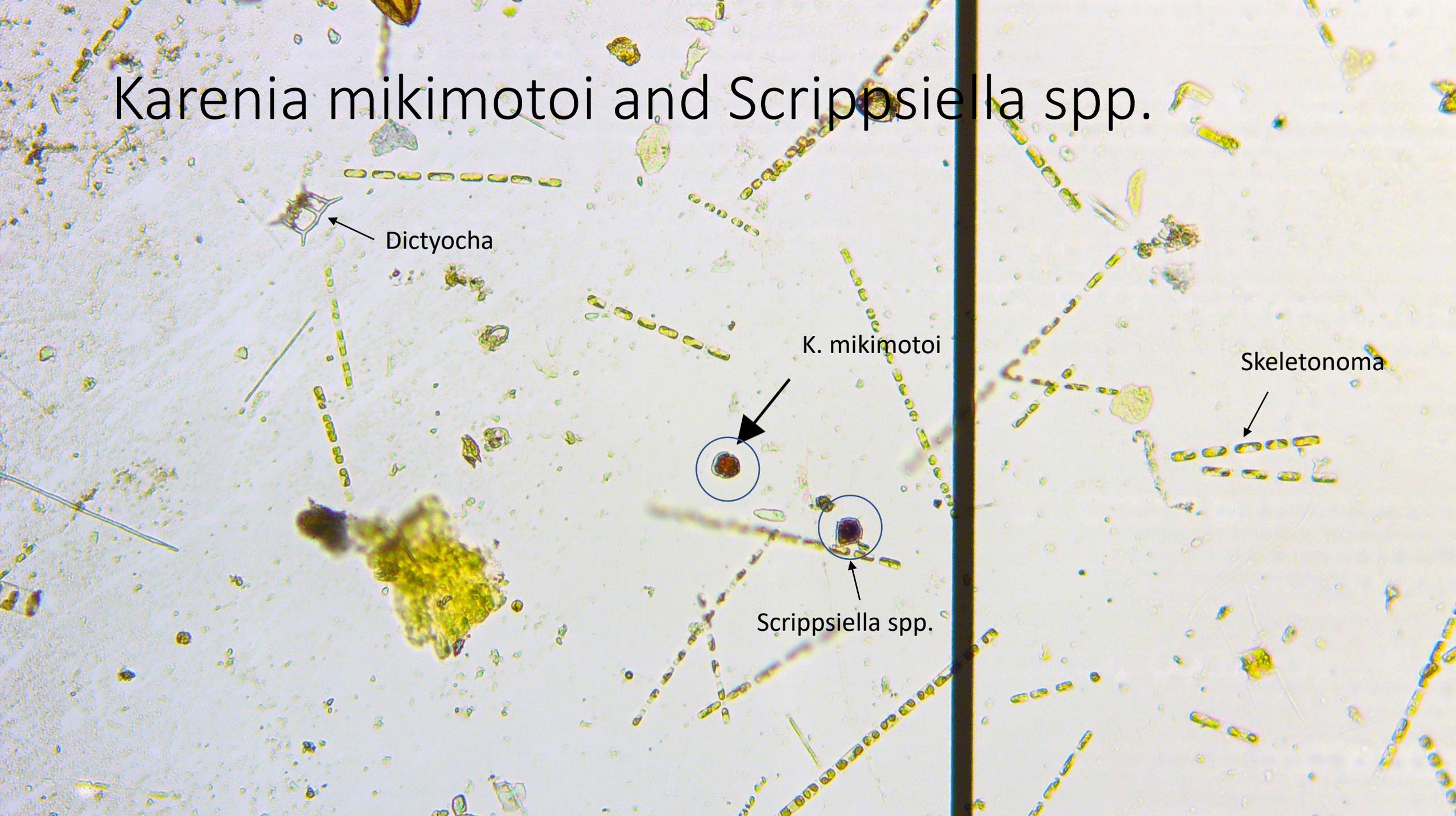
K. mikimotoi

Skeletonoma

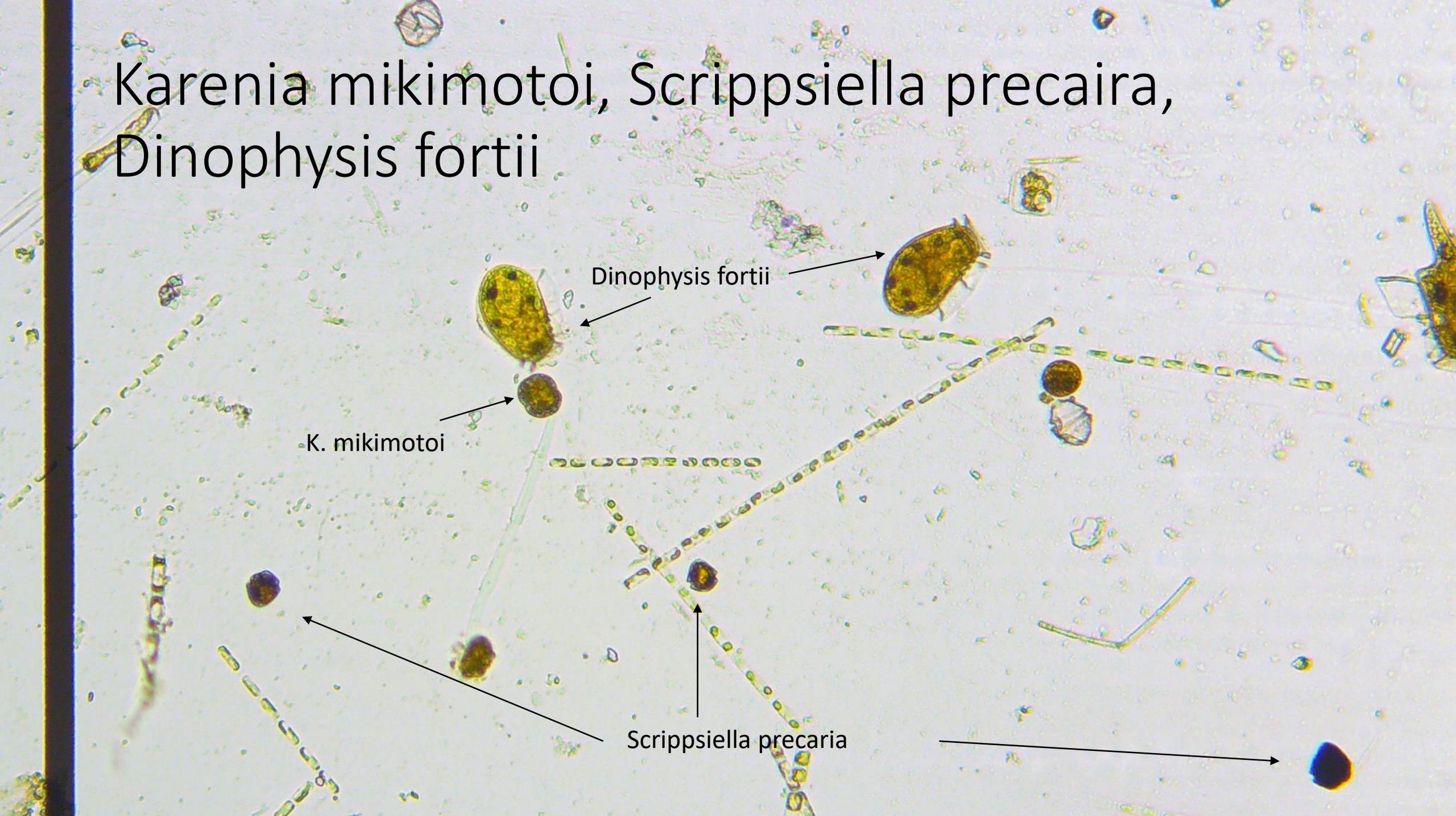
K. mikimotoi

Scrippsiella spp.

Scrippsiella spp.



# Karenia mikimotoi, Scrippsiella precaria, Dinophysis fortii

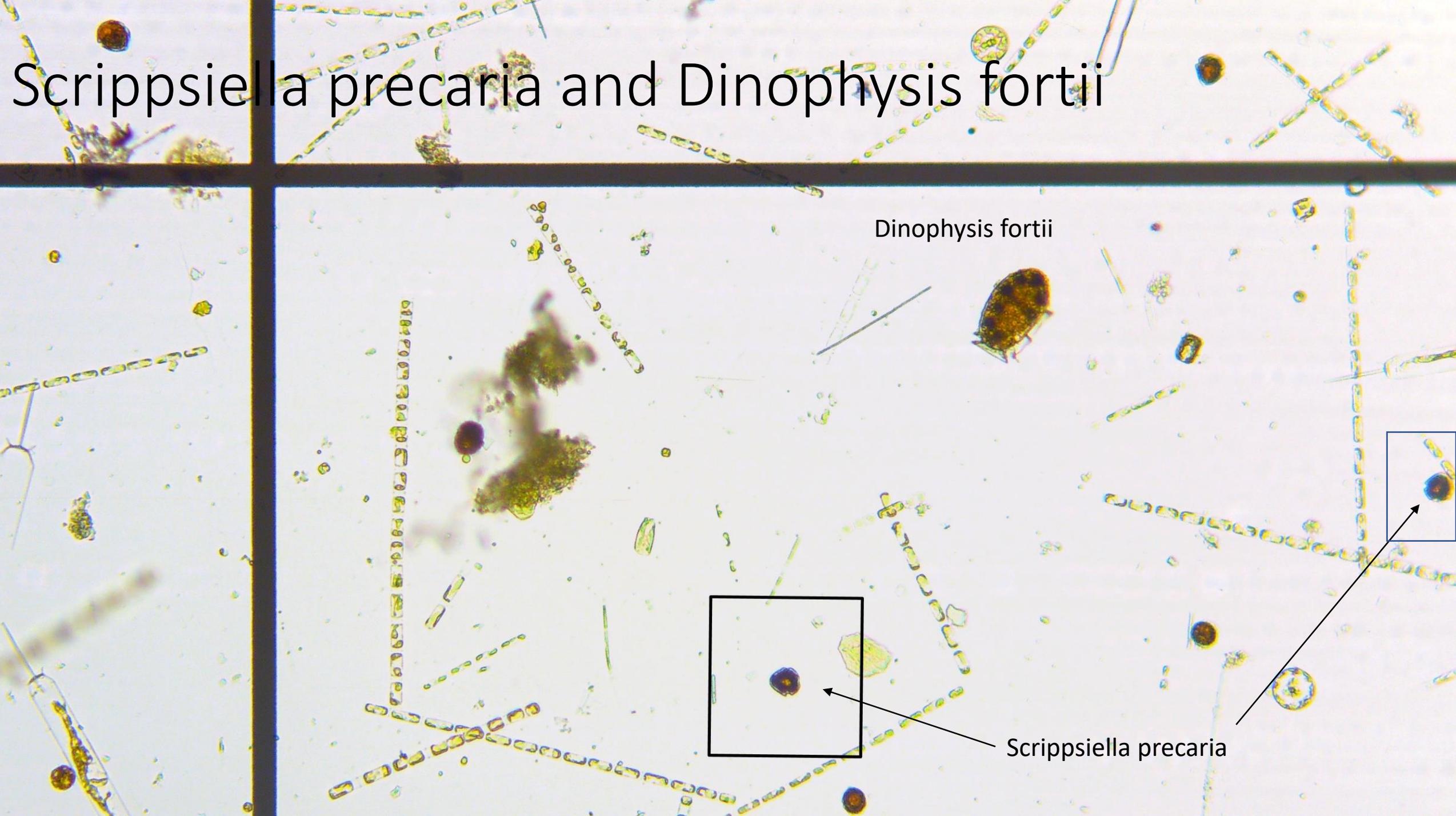


K. mikimotoi

Dinophysis fortii

Scrippsiella precaria

# Scrippsiella precaria and Dinophysis fortii



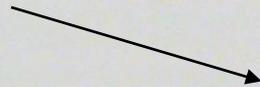
Dinophysis fortii

Scrippsiella precaria

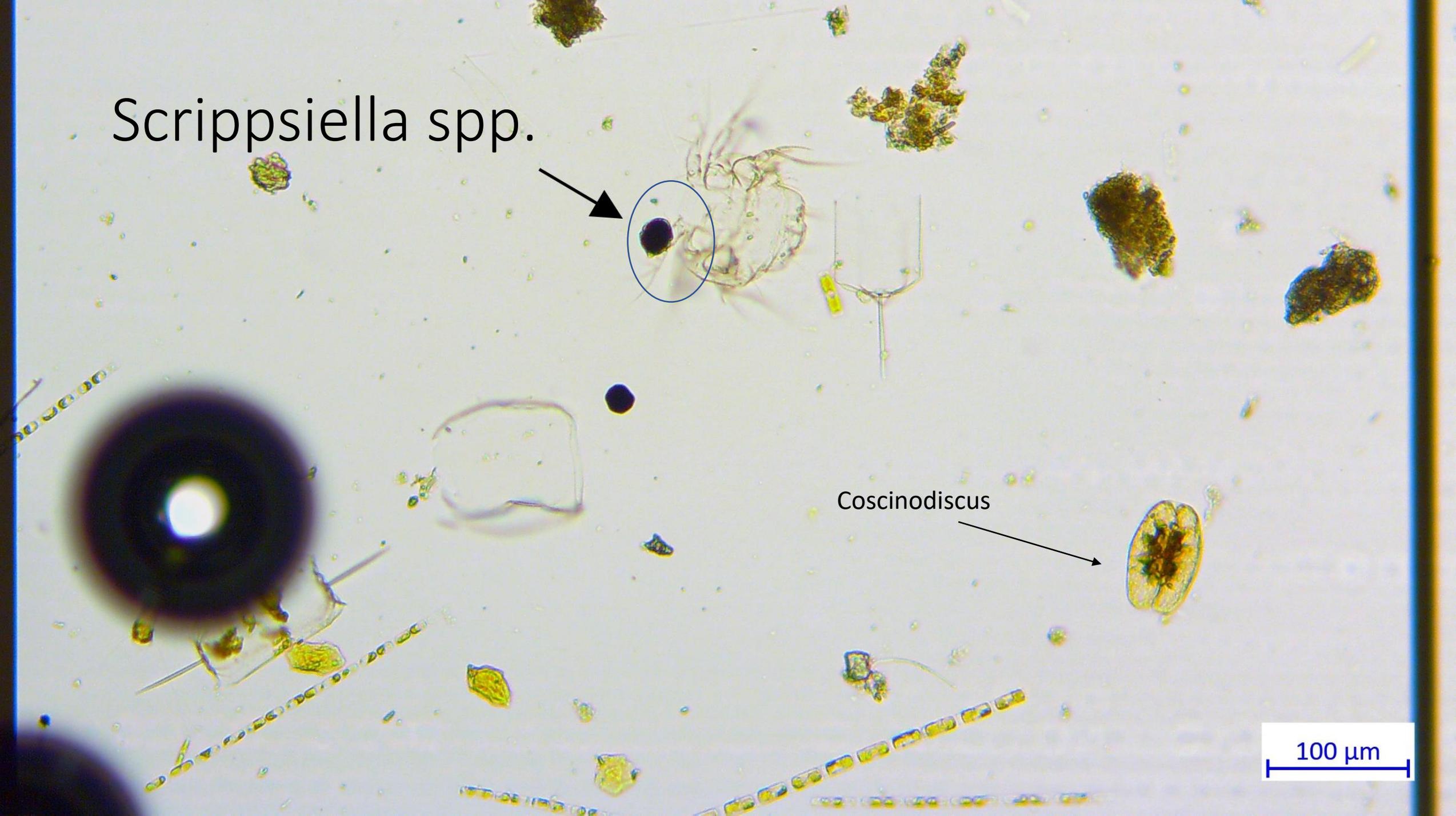
Scripppsiella spp.



Coscinodiscus



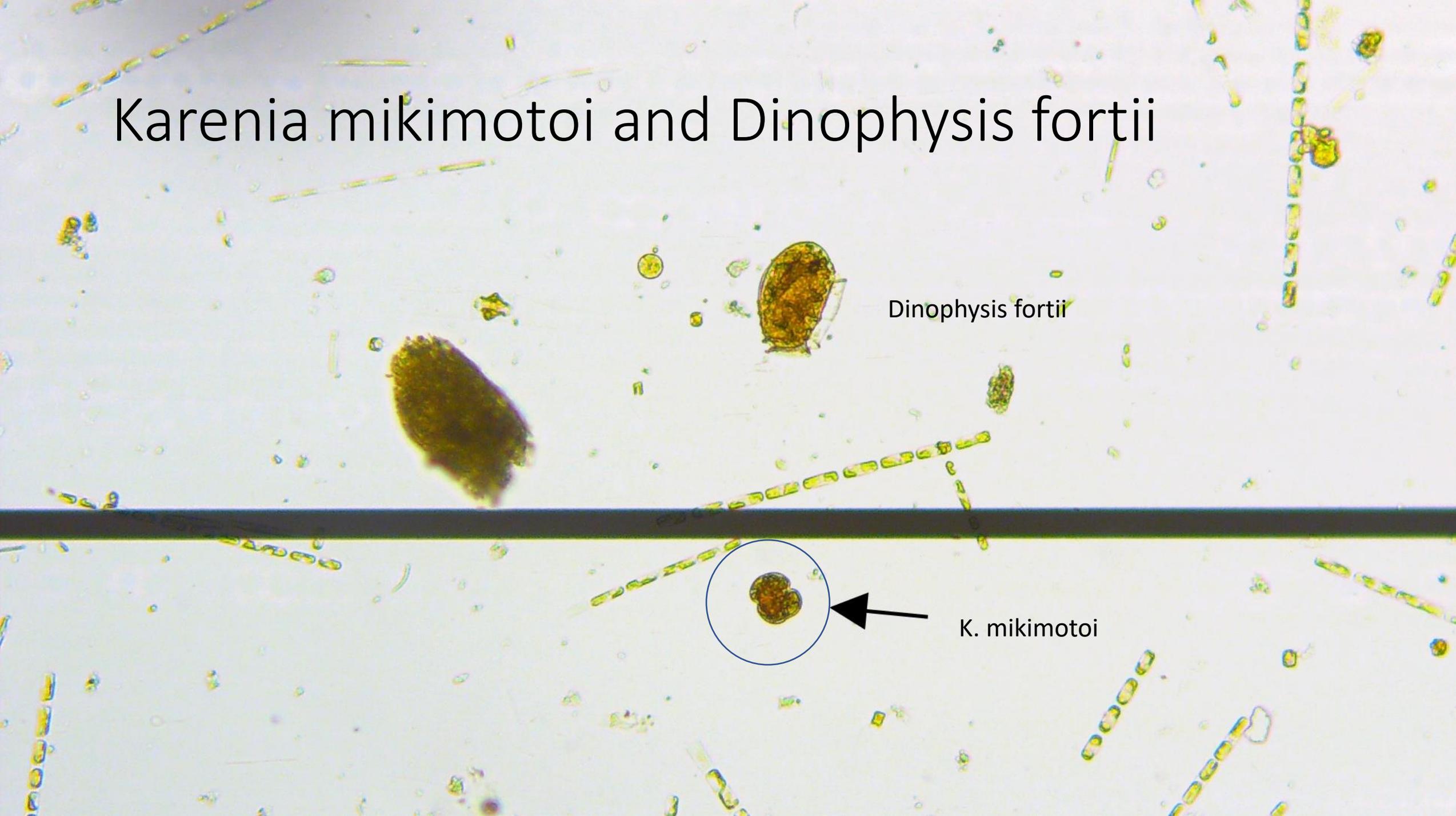
100  $\mu$ m



# Karenia mikimotoi and Dinophysis fortii

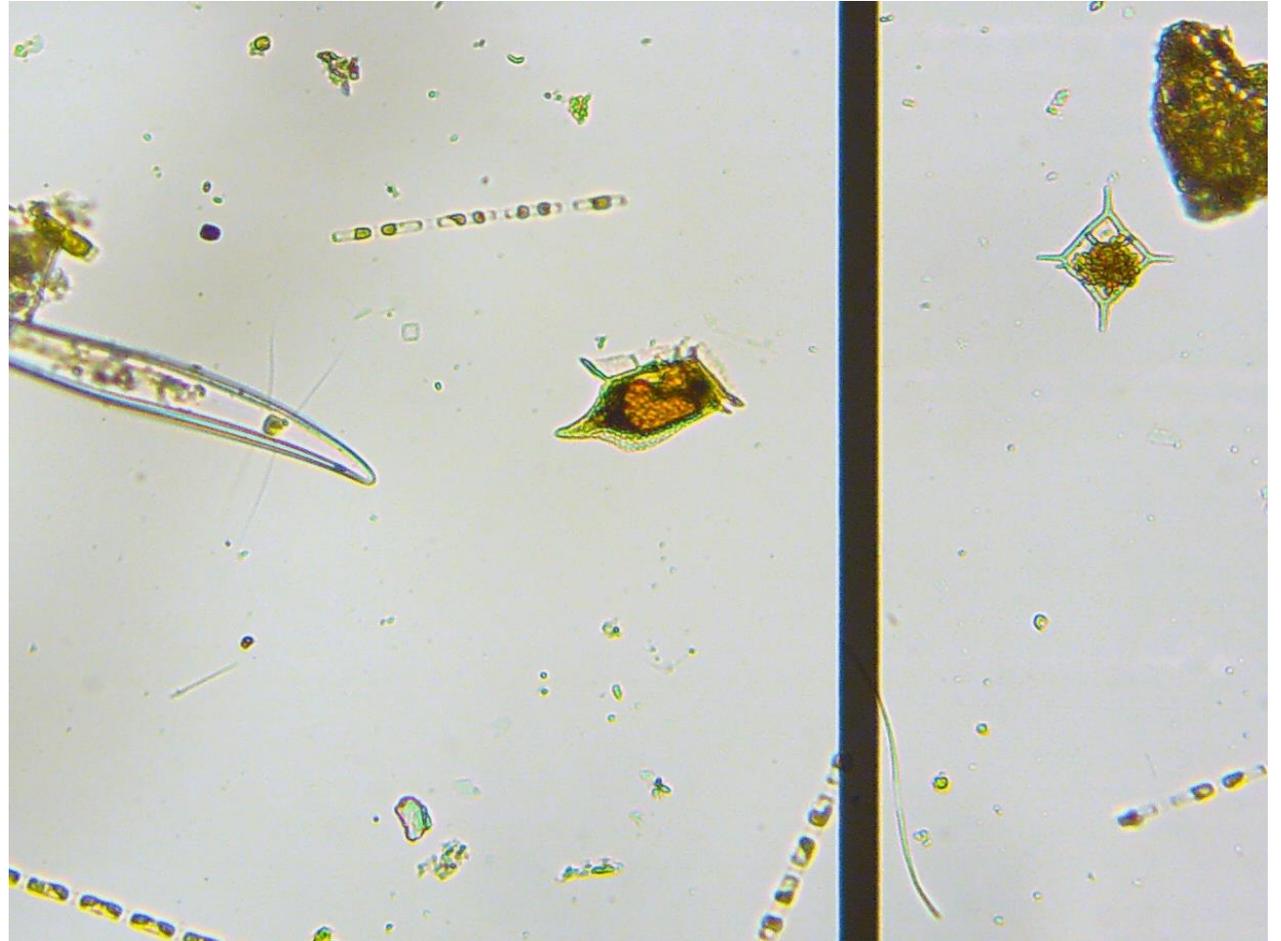
Dinophysis fortii

K. mikimotoi

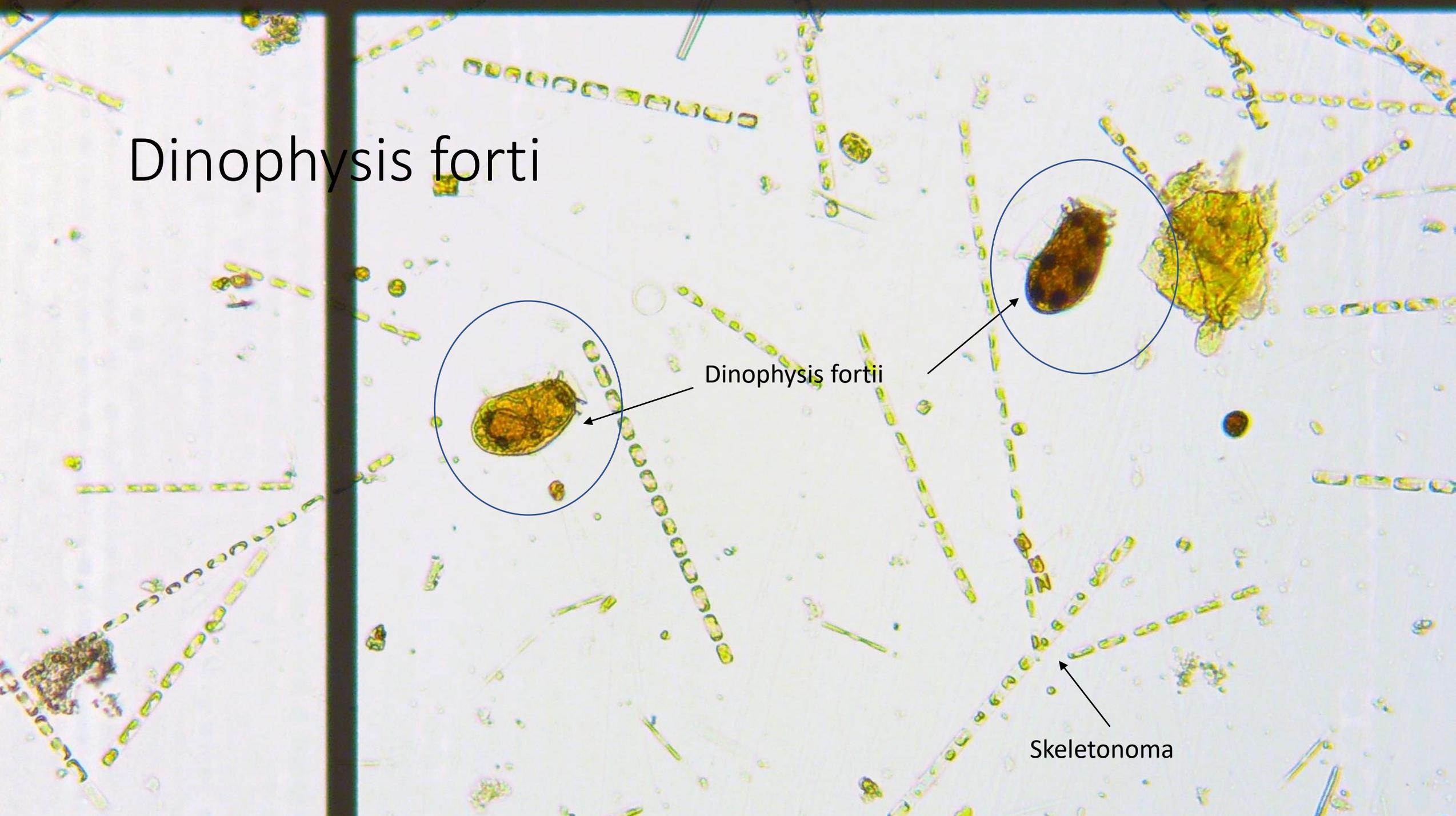


# Dinophysis

- Wing like epitheca (top of the cell)
- Large sack shaped hypotheca (bottom of the cell)
- Wing like structures on the sulcal list



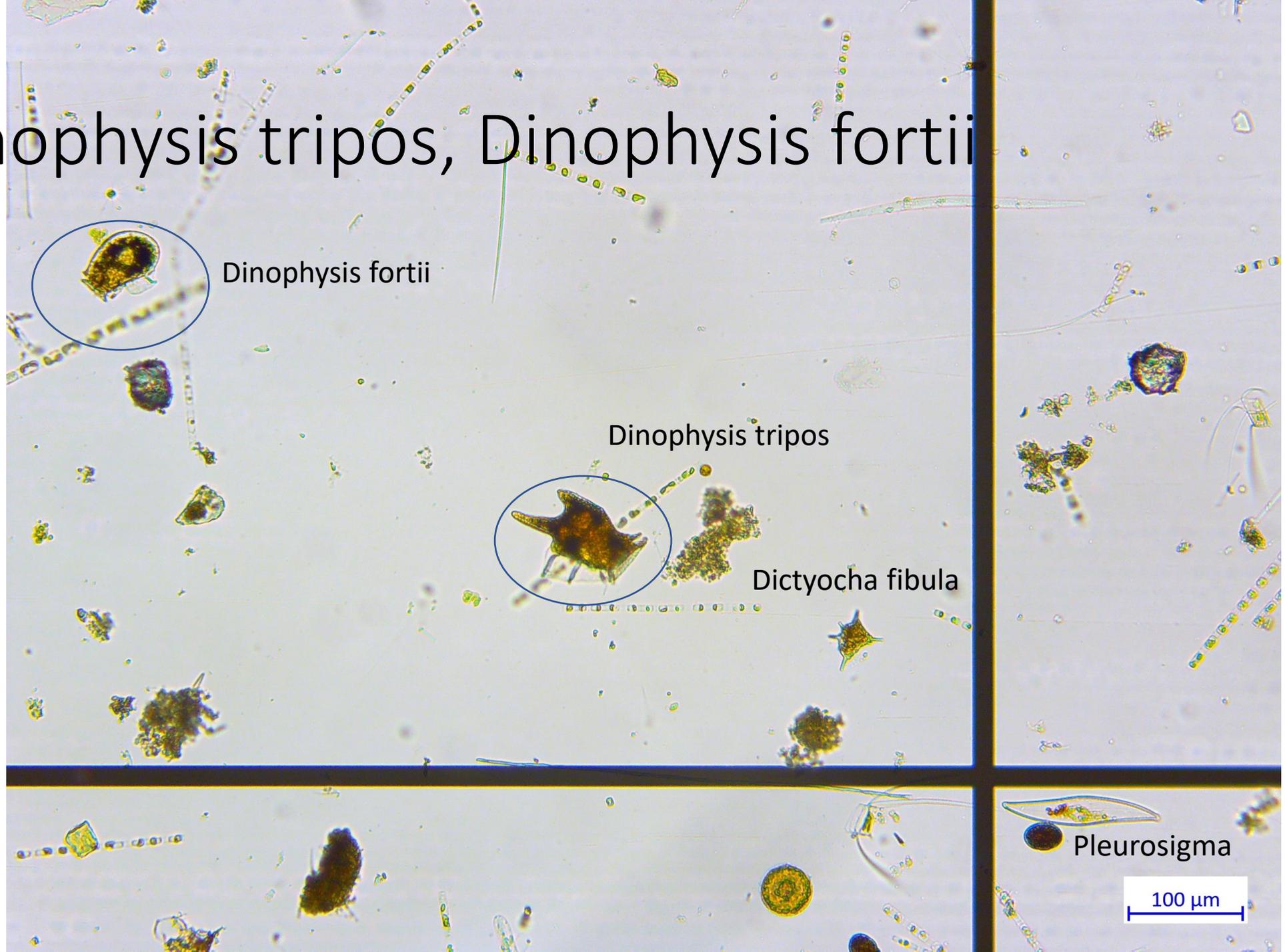
# Dinophysis fortii



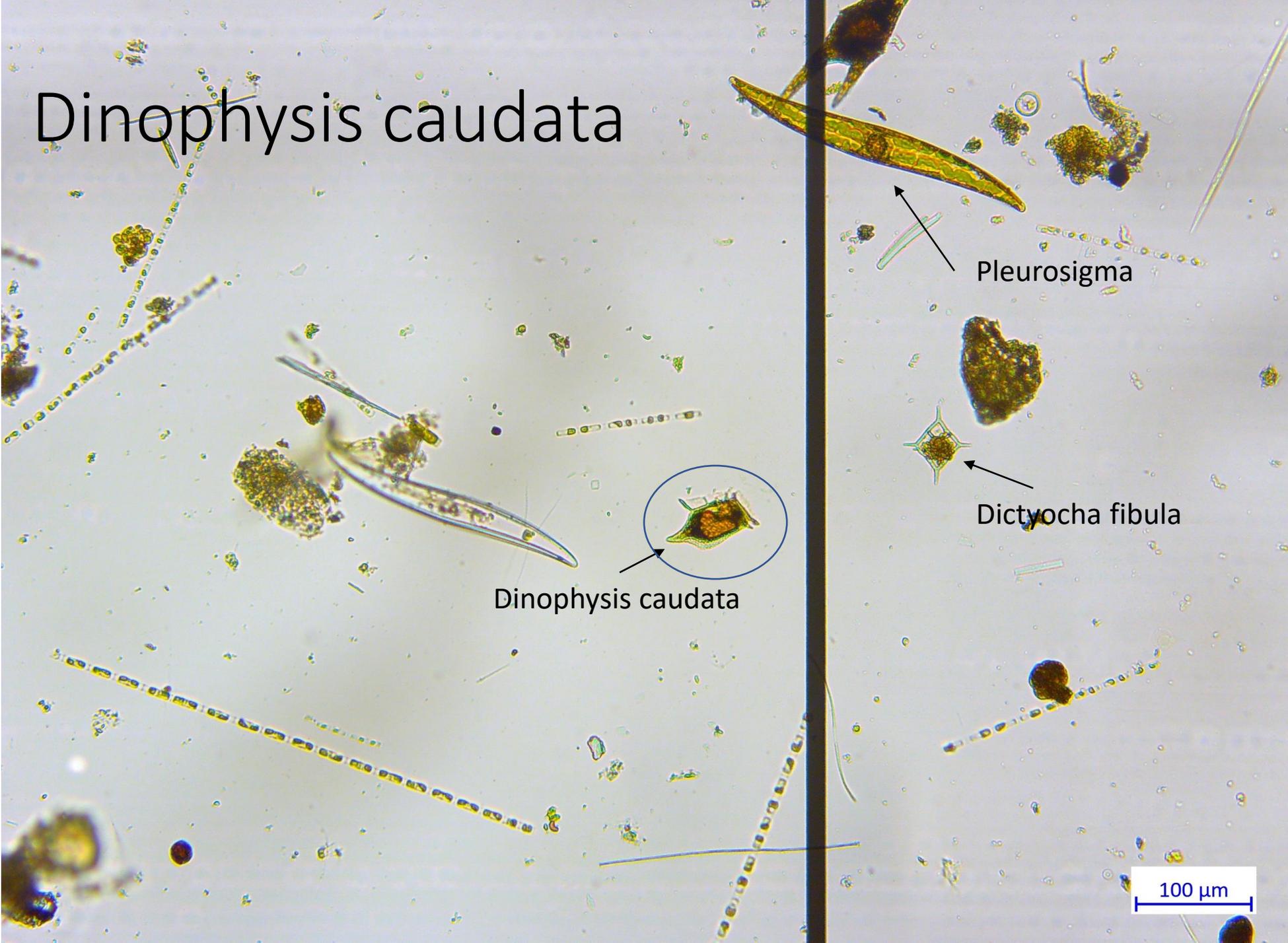
Dinophysis fortii

Skeletonoma

# Dinophysis tripos, Dinophysis fortii



# Dinophysis caudata



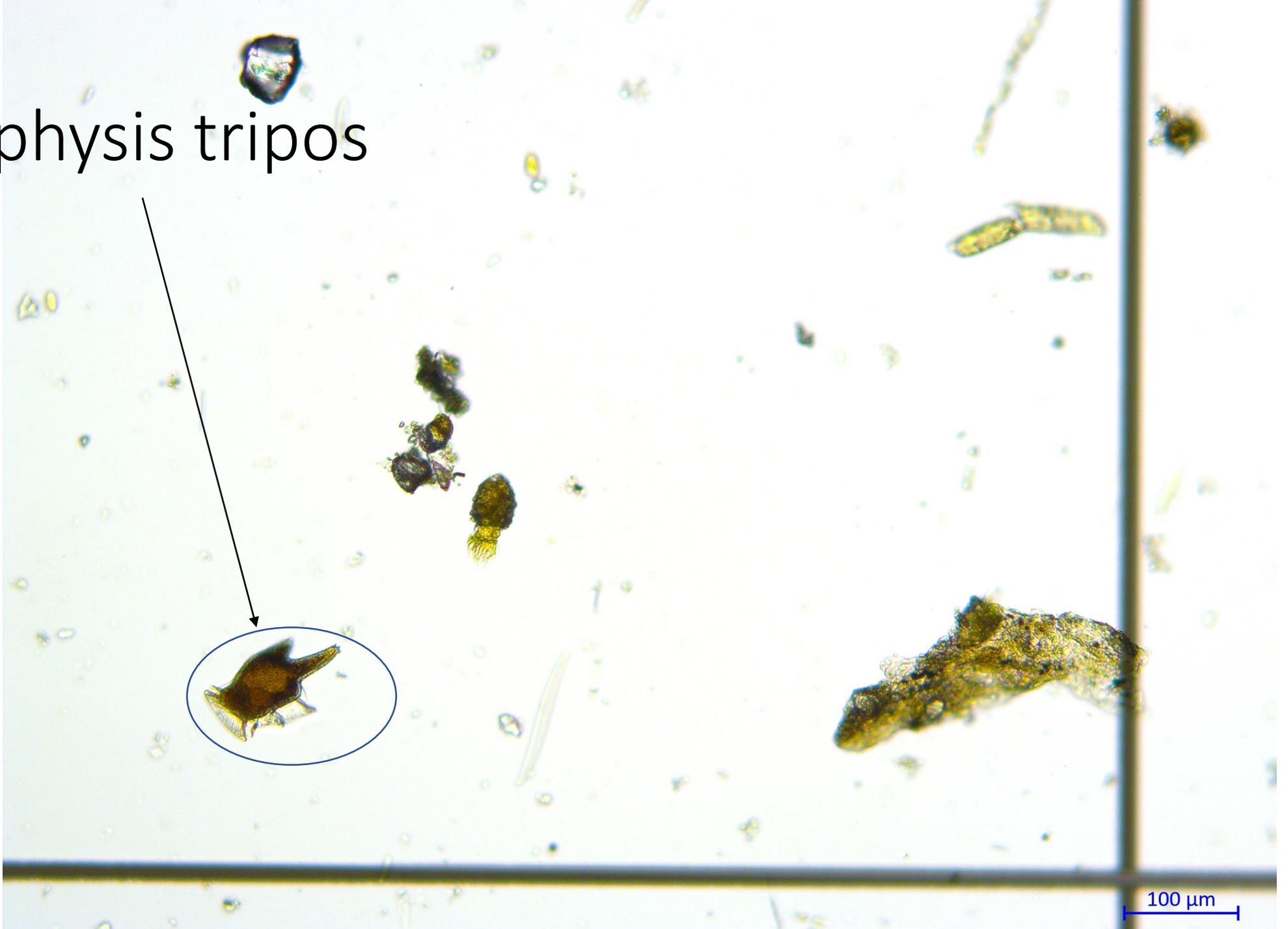
Dinophysis caudata

Pleurosigma

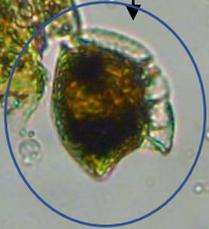
Dictyocha fibula

100  $\mu$ m

Dinophysis tripos



Dinophysis norvegica



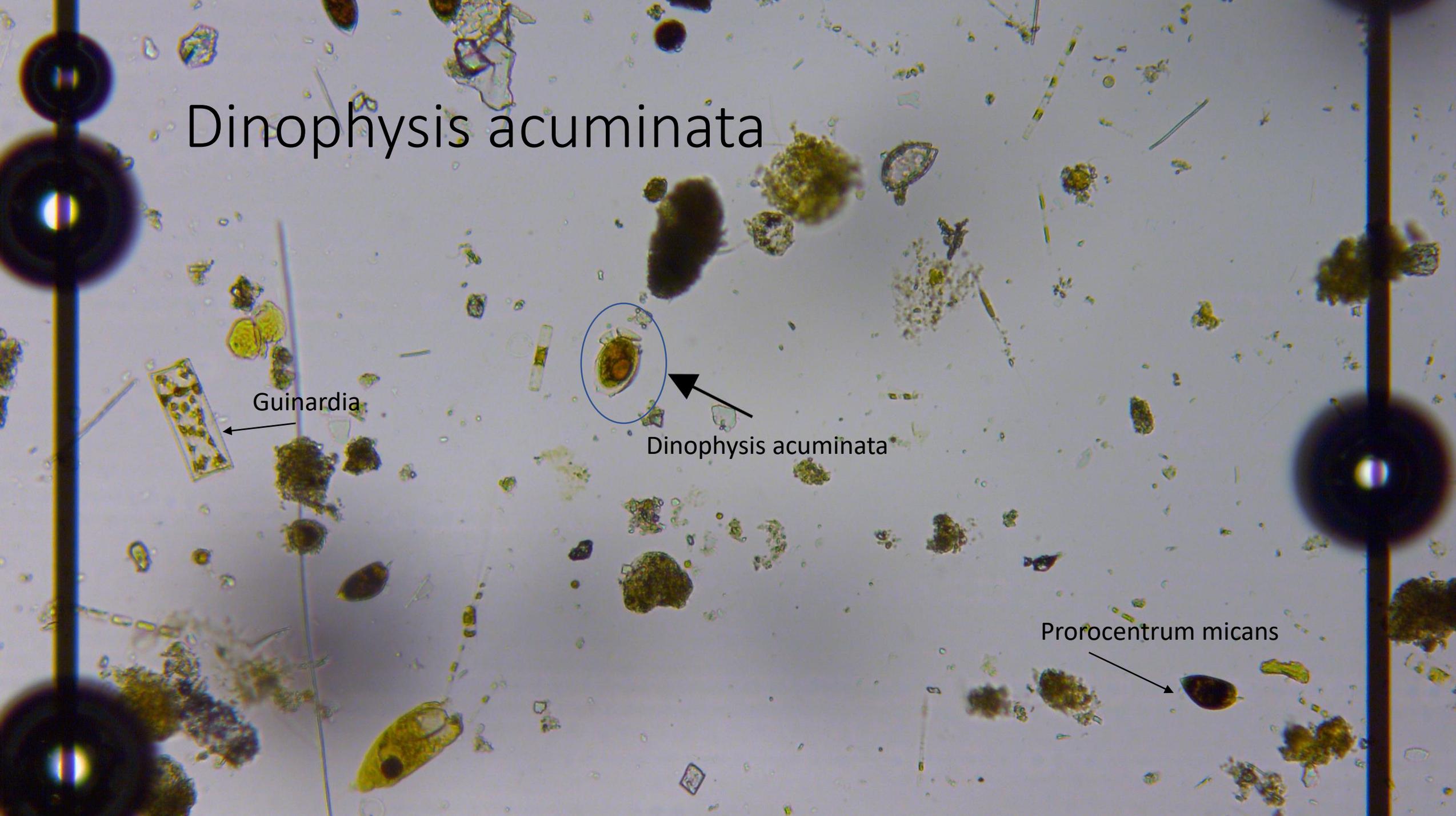
100  $\mu\text{m}$

# Dinophysis acuminata

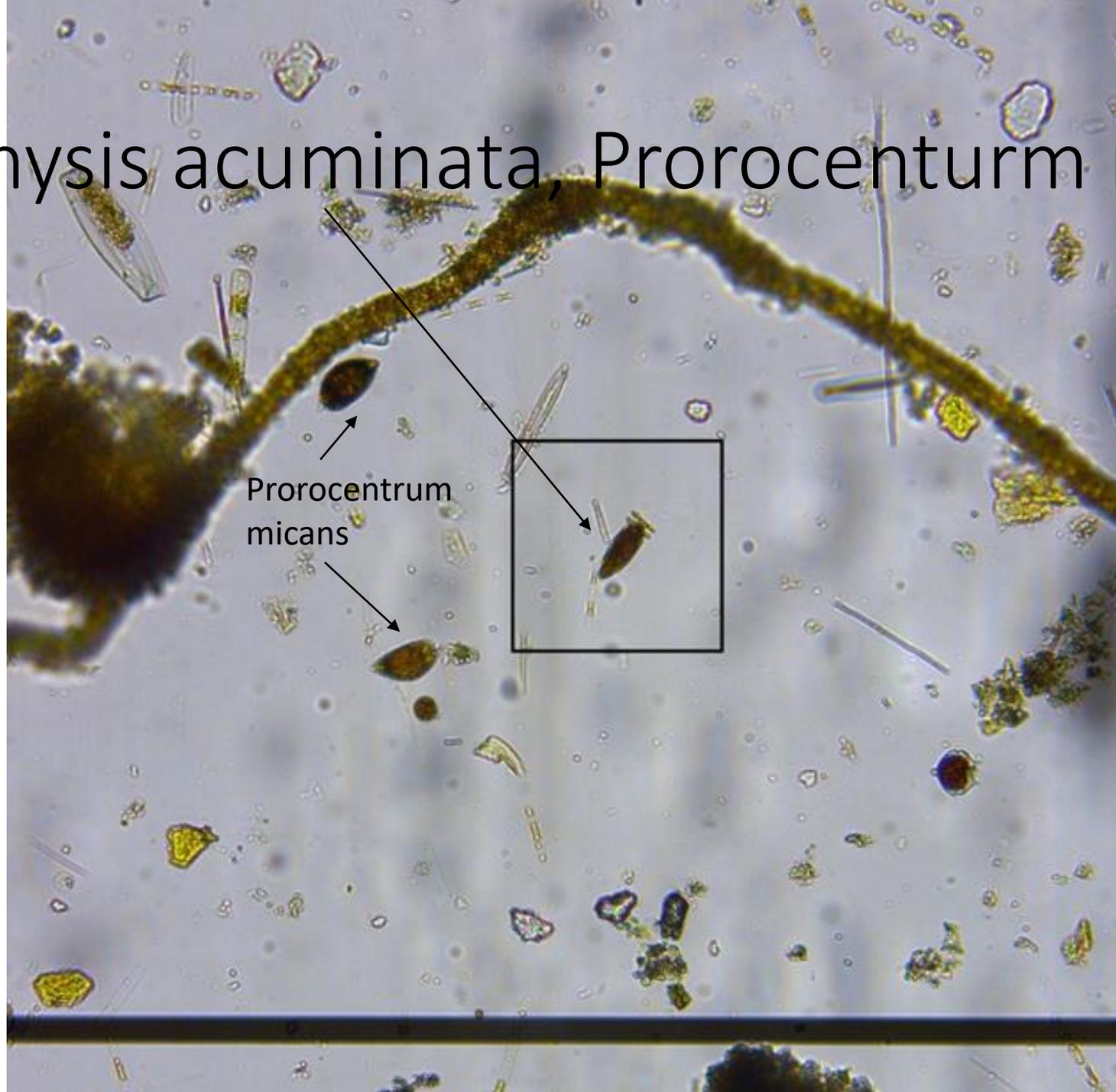
Guinardia

Dinophysis acuminata

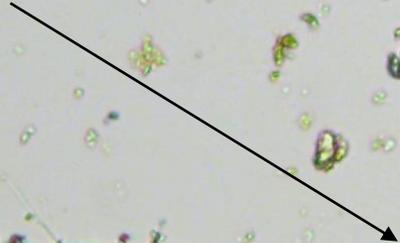
Prorocentrum micans



# Dinophysis acuminata, Prorocentrum micans



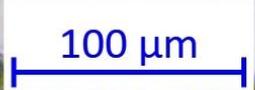
# Dinophysis acuminata, Prorocentrum micans



Dinophysis acuminata

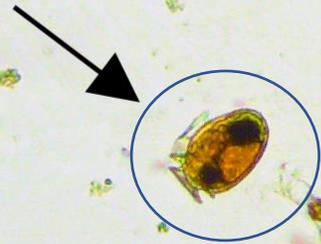
Prorocentrum micans

Prorocentrum micans



# Dinophysis acuminata

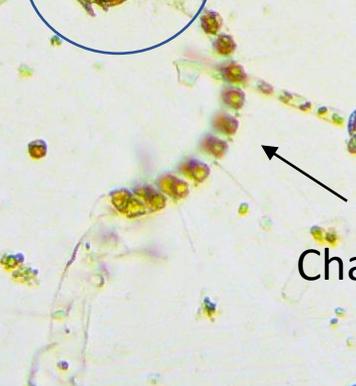
Dinophysis acuminata



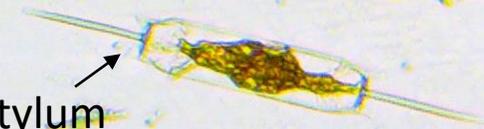
Thalassiosira spp.



Chatoceros



Ditylum



100  $\mu$ m



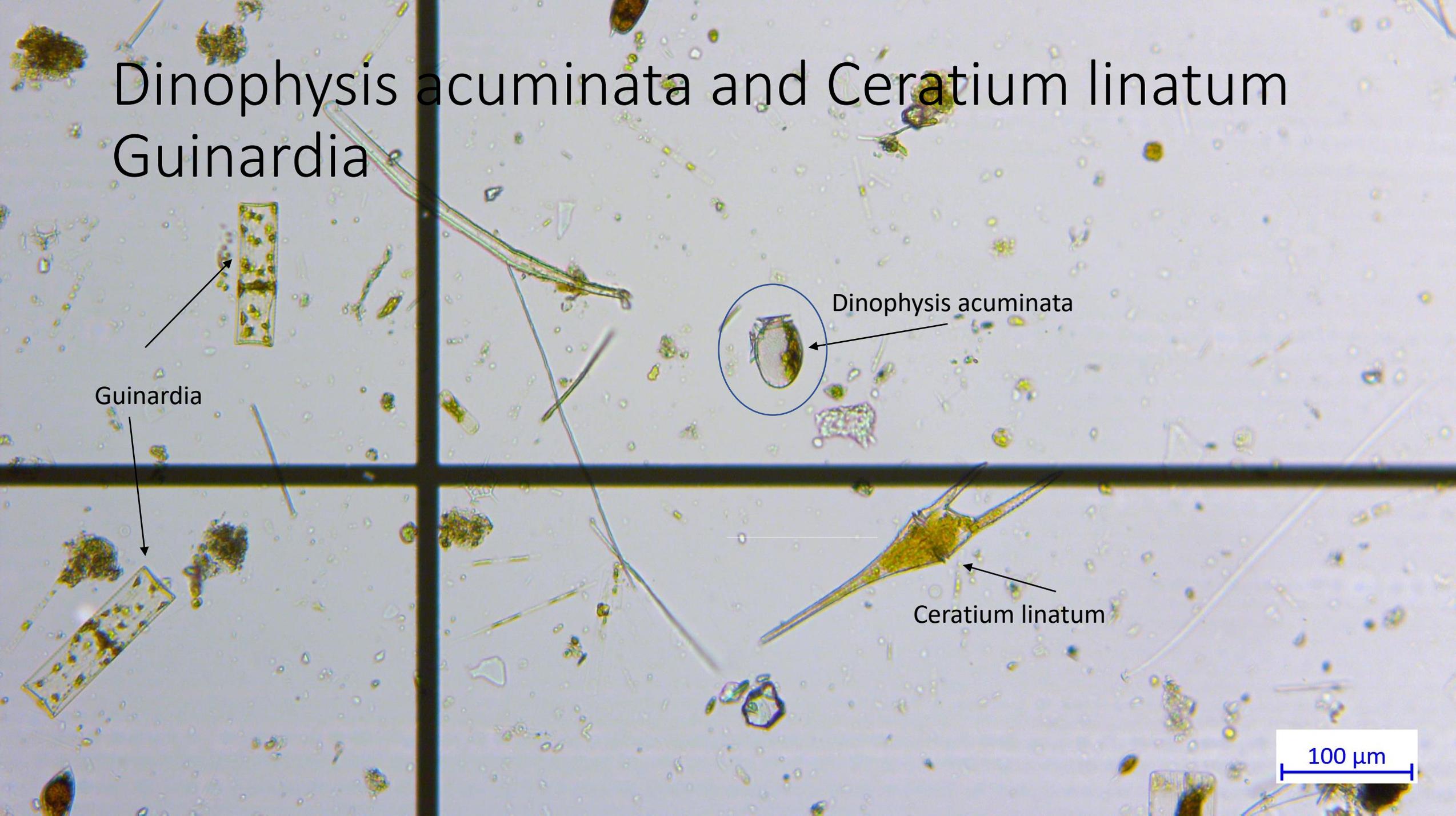
# Dinophysis acuminata and Ceratium linatum Guinardia

Guinardia

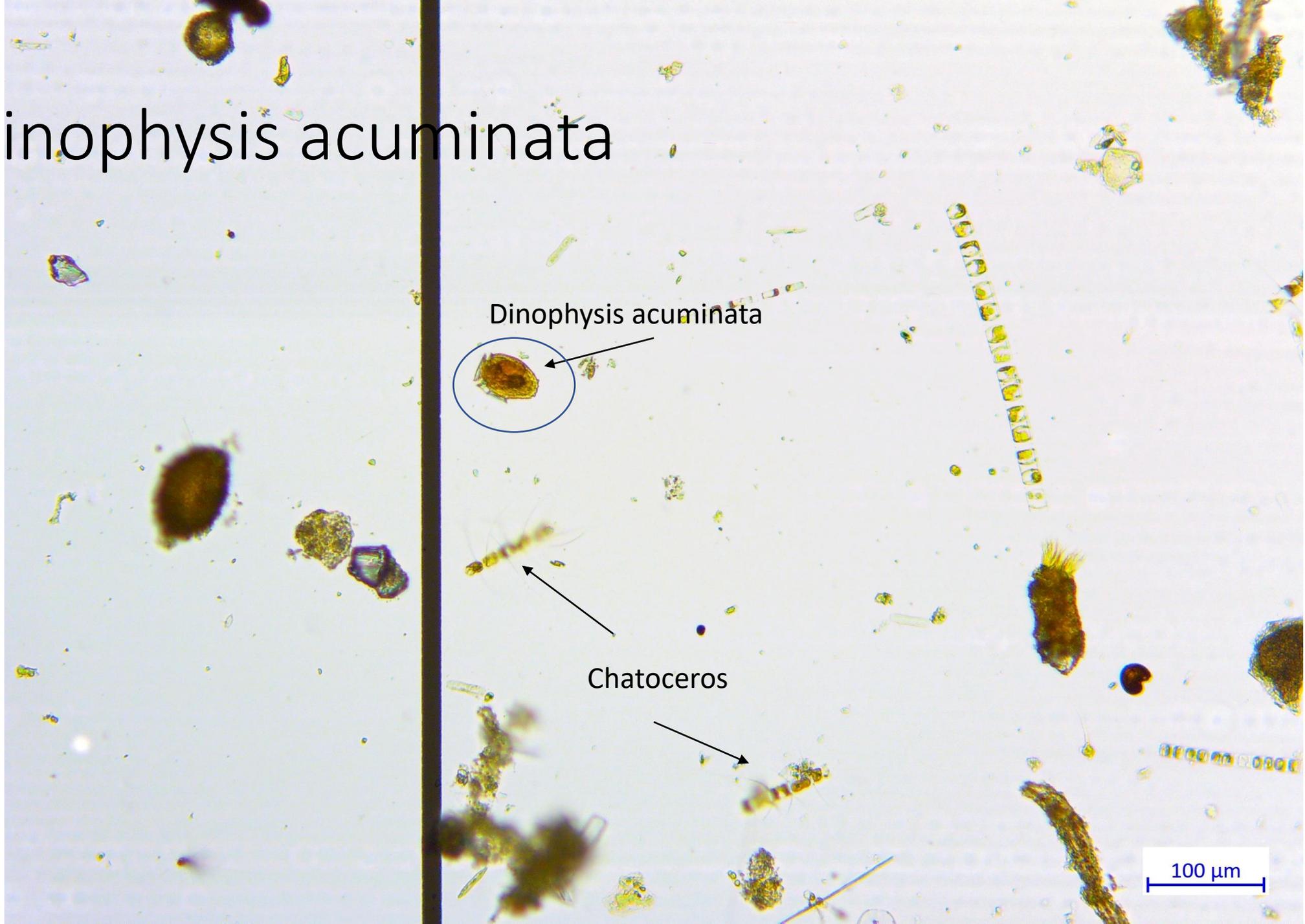
Dinophysis acuminata

Ceratium linatum

100  $\mu$ m



# Dinophysis acuminata



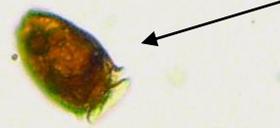
Dinophysis acuminata

Chatoceros

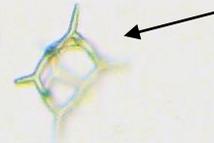
100 μm

# Dinophysis acuminata

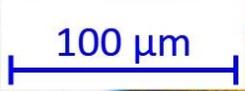
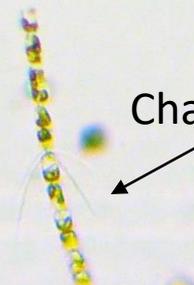
Dinophysis acuminata



Dichtyocha

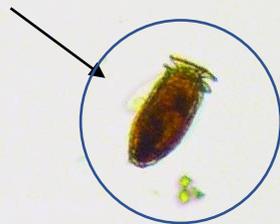


Chatoceros

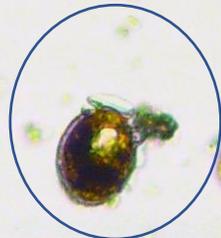


# Dinophysis acuminata

Dinophysis acuminata



# Dinophysis acuminata



Dinophysis acuminata

Chatoceros

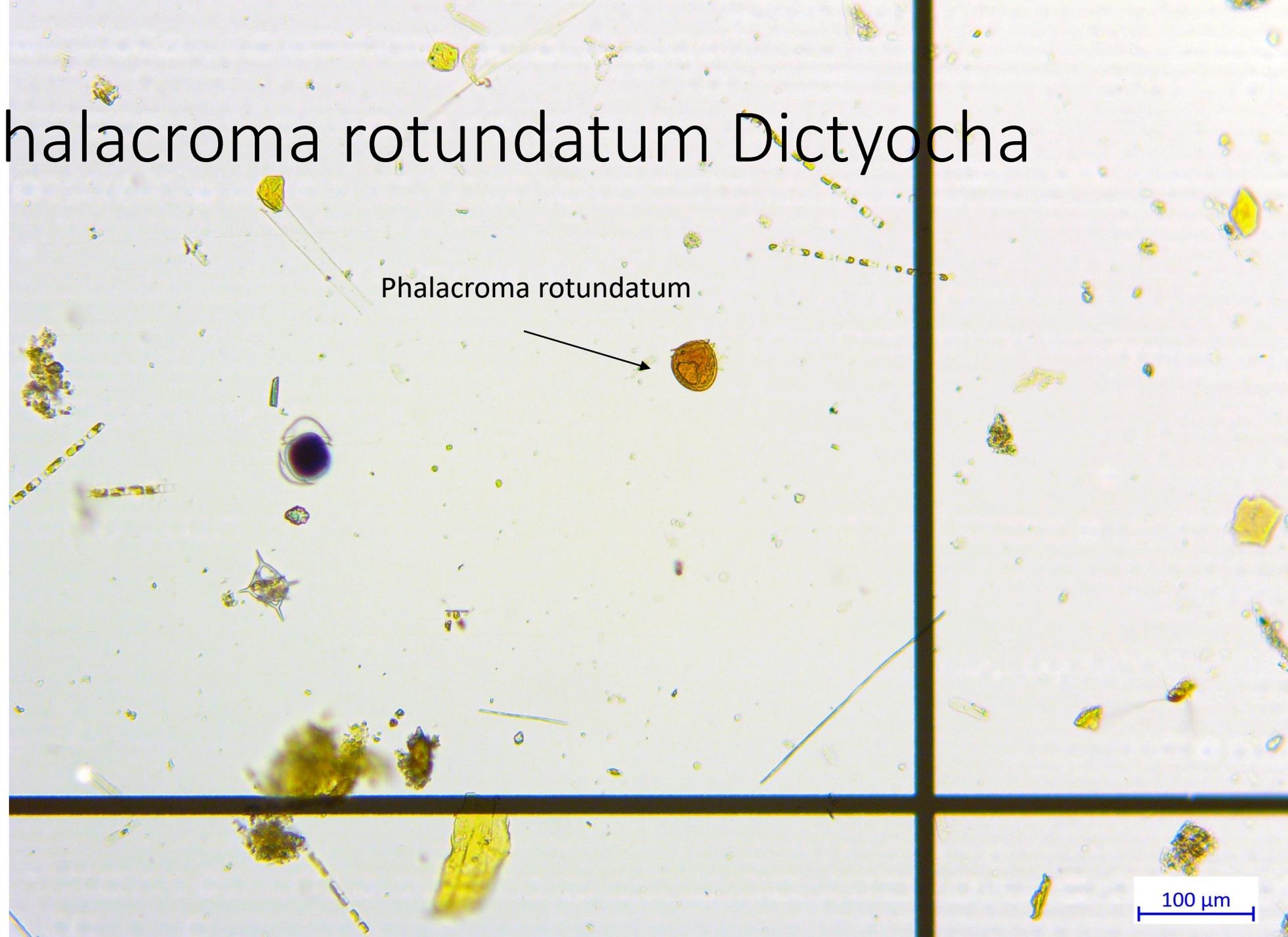


# Phalacroma rotundatum Dictyocha

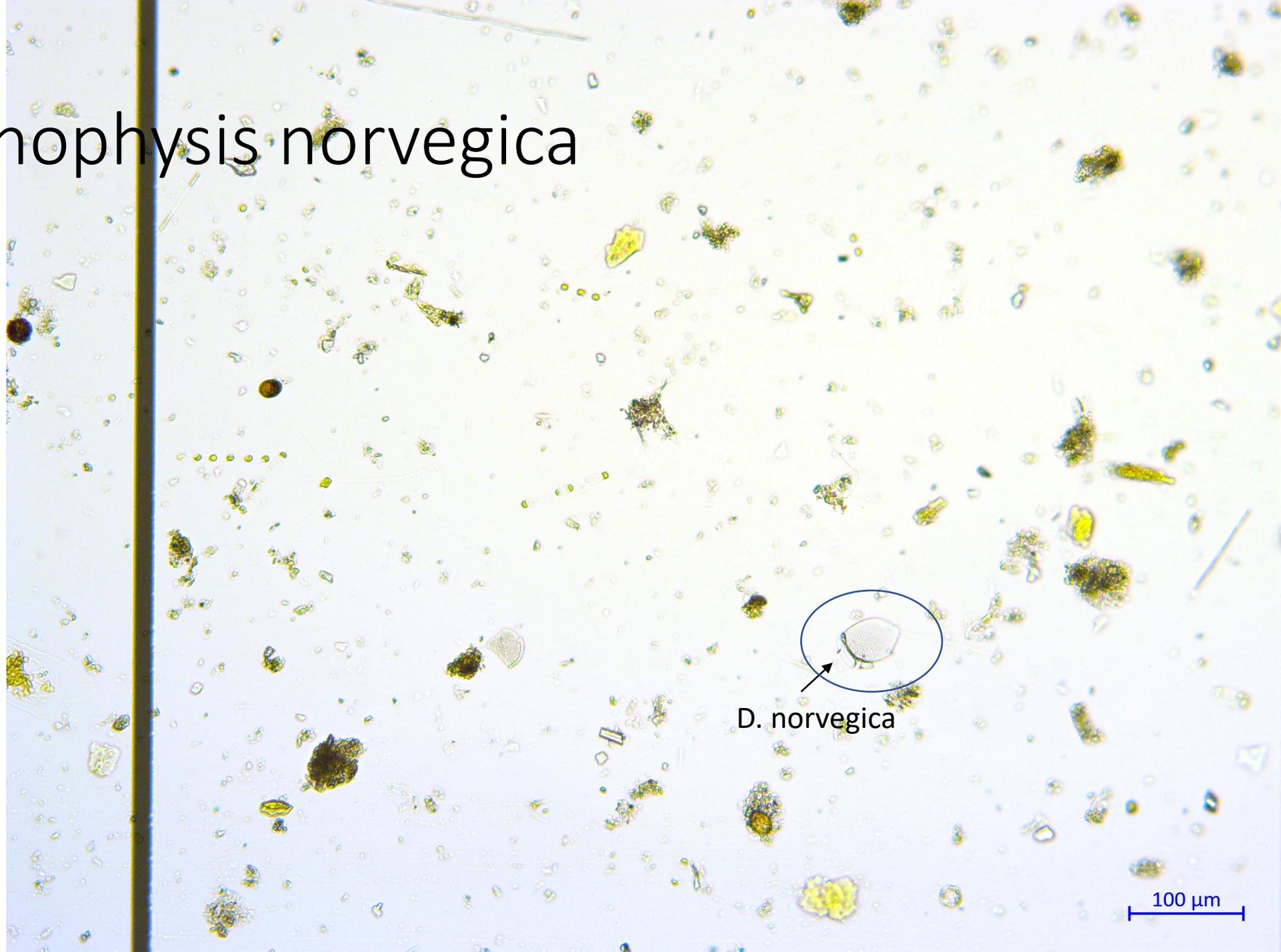
Phalacroma rotundatum



100  $\mu$ m



# Dinophysis norvegica

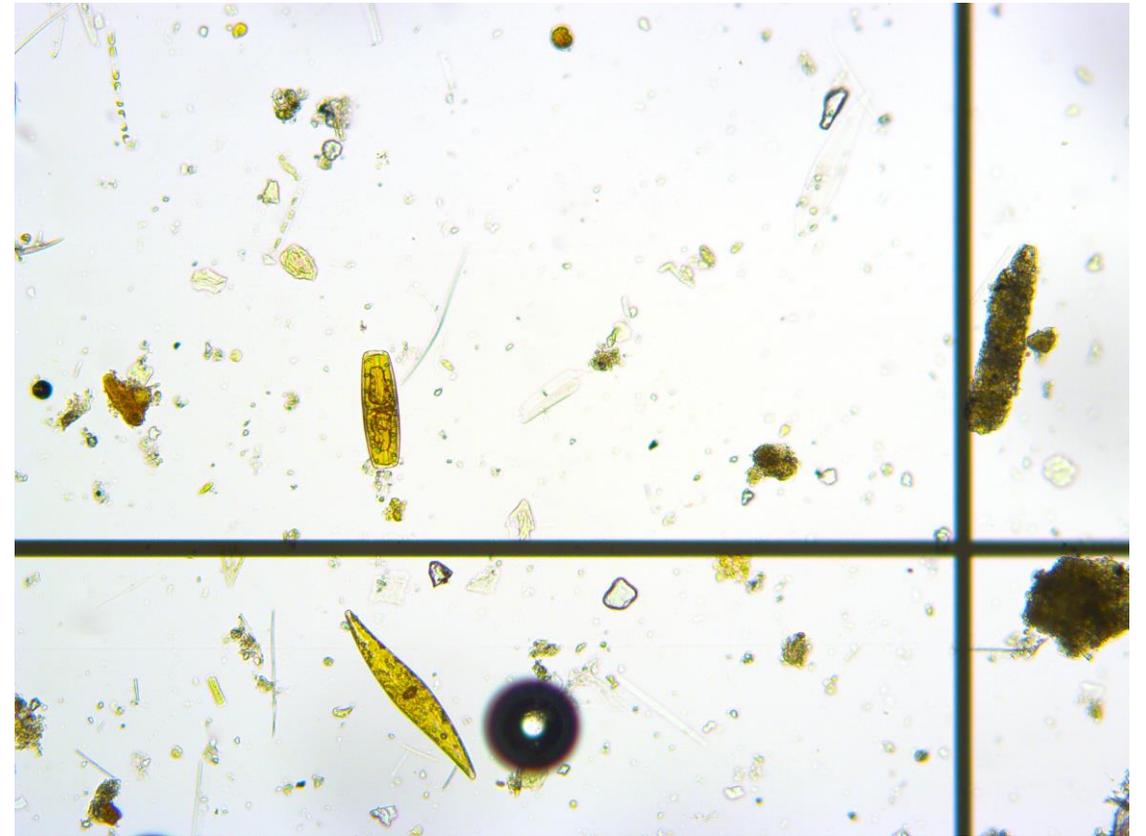
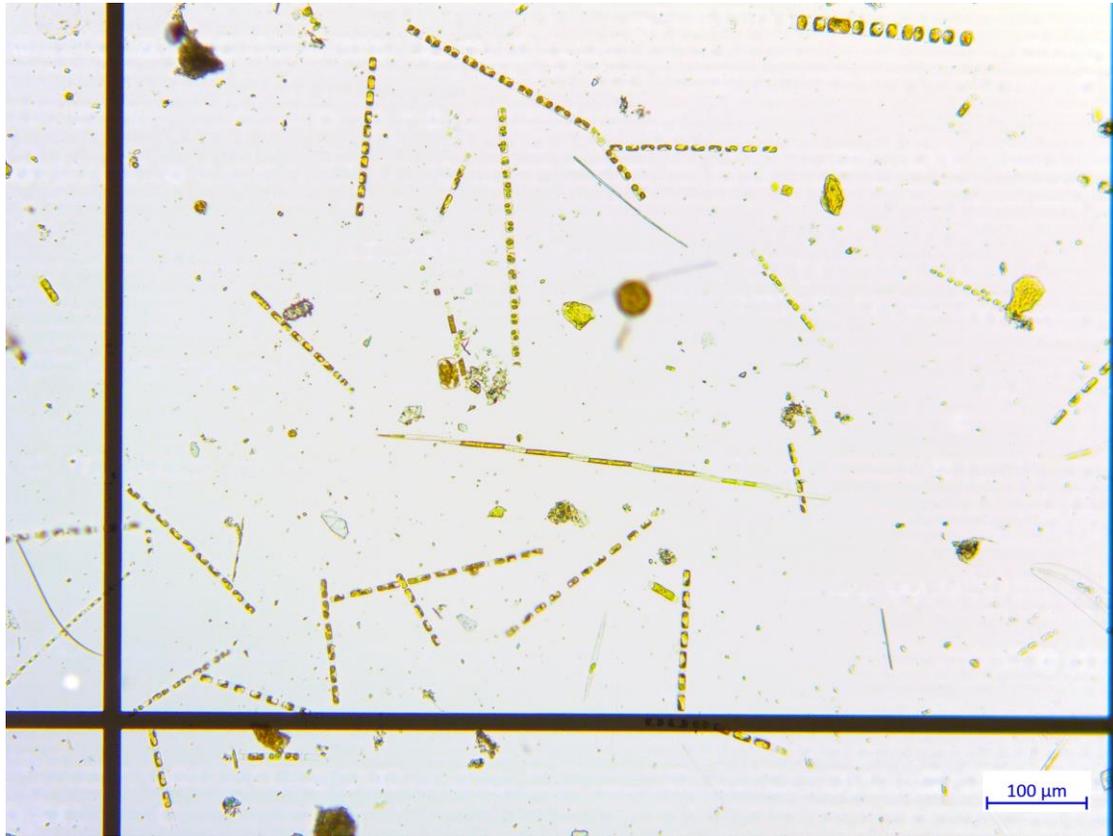


D. norvegica

100  $\mu$ m

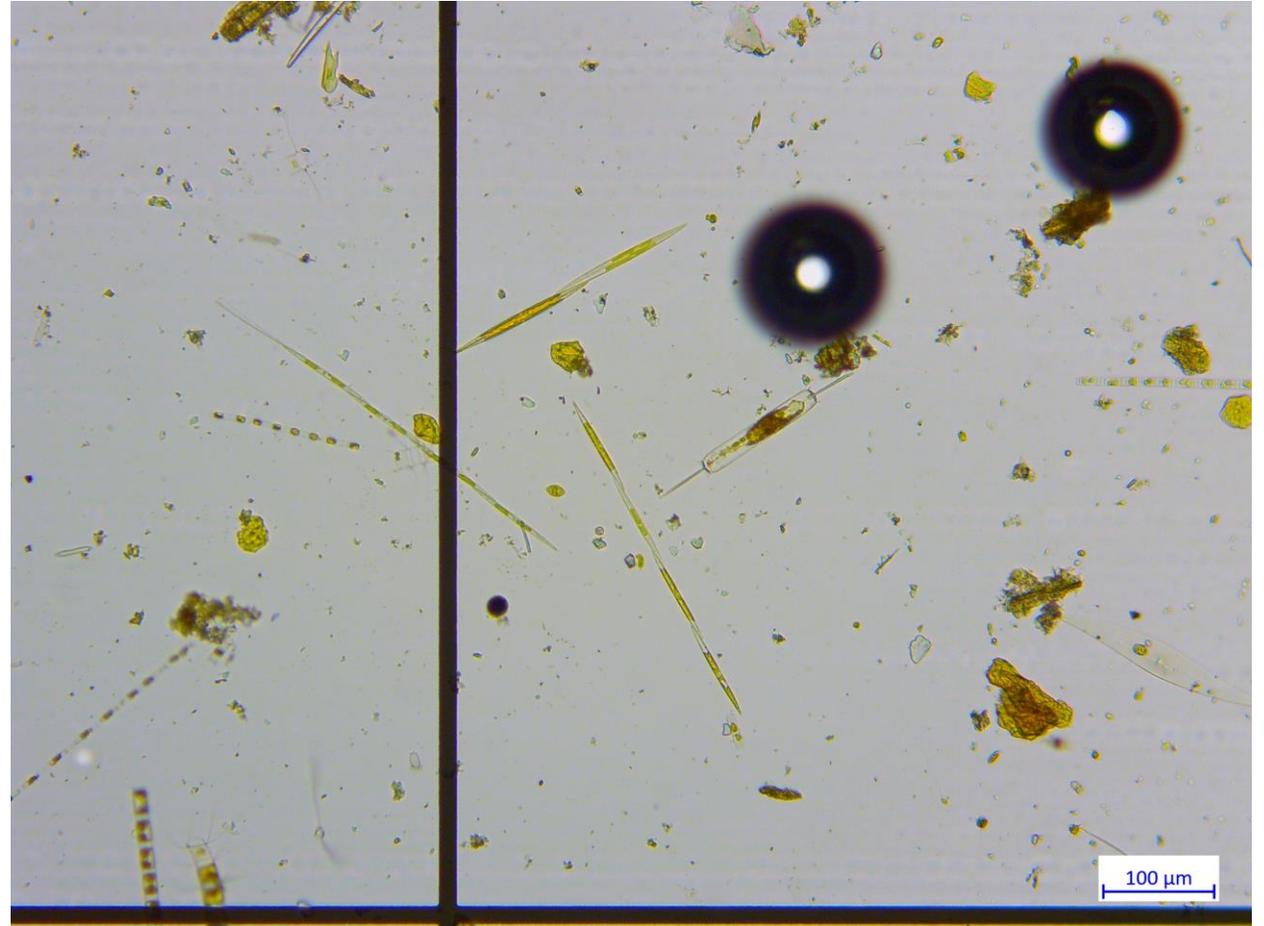
# Diatoms

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# Pseudo-nitzschia

- Pointed ends across the transapical axis towards the apex
- Visible nucleus
- Form chains
- Small
  - Transapical axis  $< 3\mu\text{m}$
  - Barely visible, hair like
- Large
  - Transapical axis  $> 3\mu\text{m}$
- Skeletonoma Look-Alike
  - Small and similar in size to Pn small
  - 2 small dot structures between cells not seen in Pn small



# Pseudo-nitzschia Large and Dinophysis norvegica

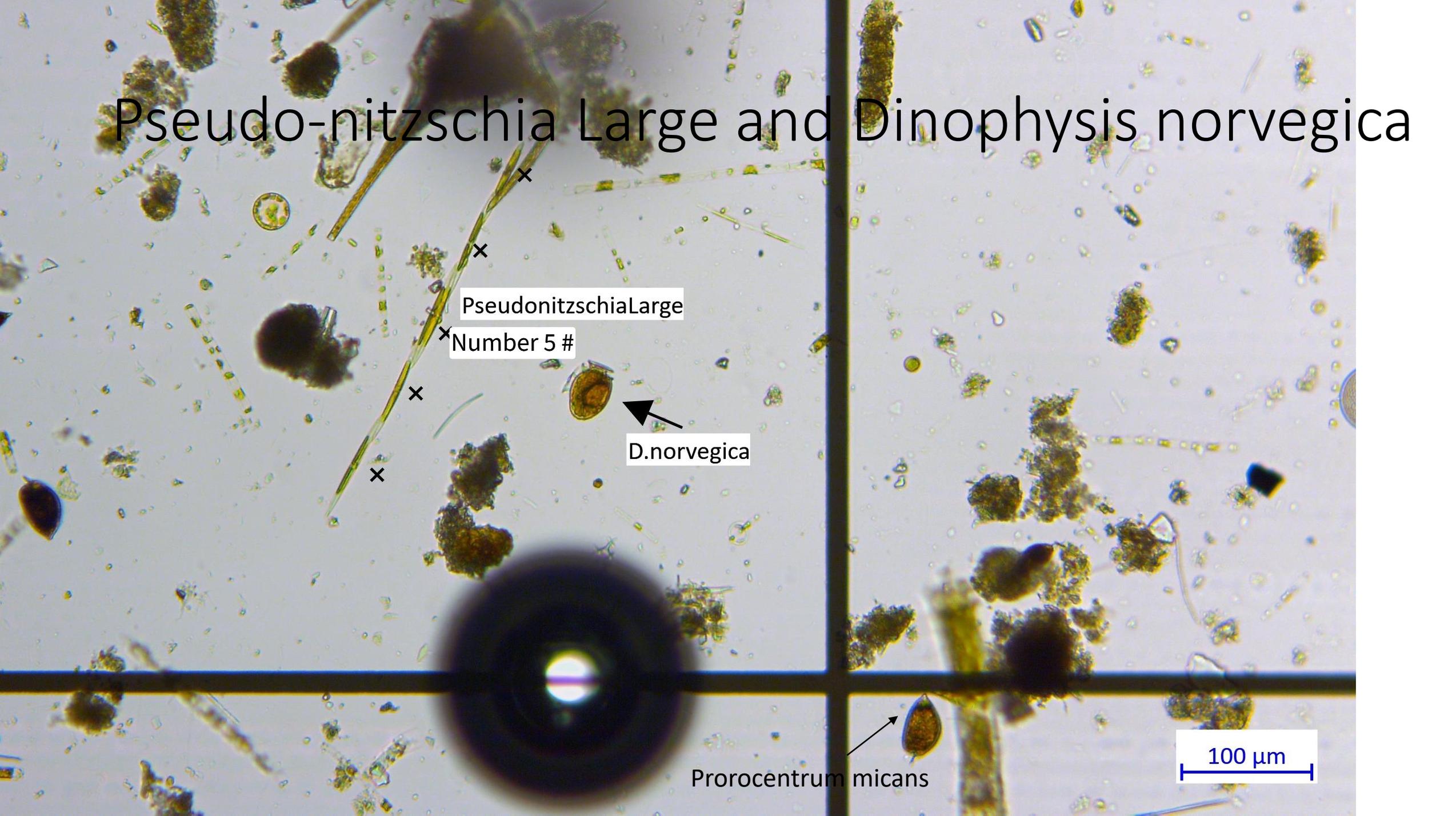
Pseudonitzschia Large

Number 5 #

D.norvegica

Prorocentrum micans

100 μm



# Pseudo-nitzschia small

Number 4 #PseudonitzschiaSmall

100  $\mu\text{m}$

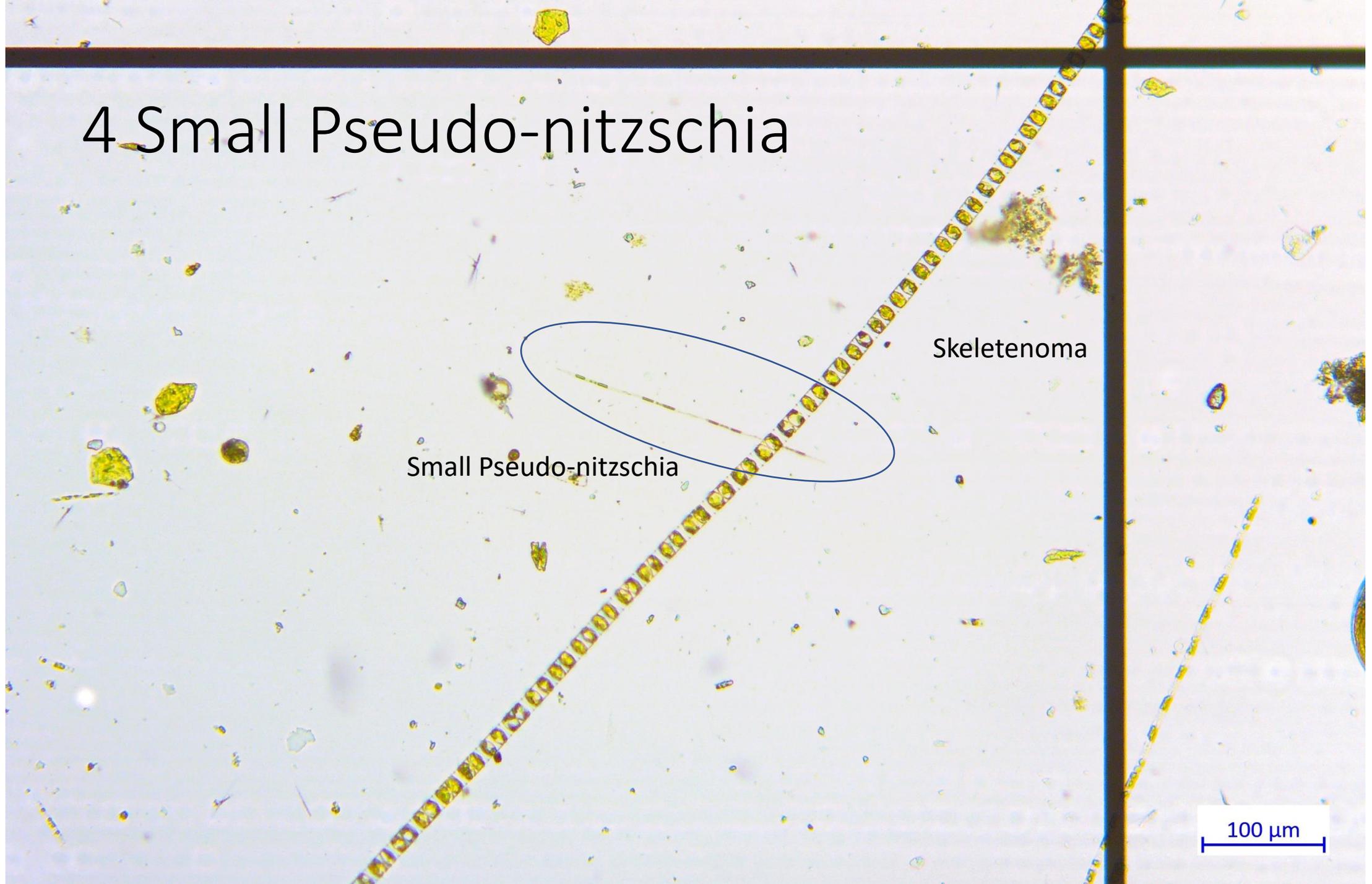


# 4 Small Pseudo-nitzschia

Small Pseudo-nitzschia

Skeletenoma

100  $\mu\text{m}$

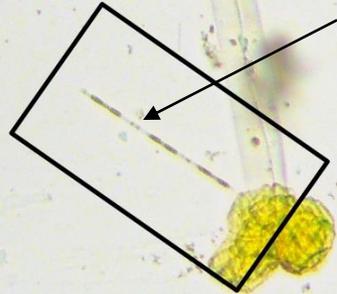


# Small skelentenoma Guinardia Eucampia

Guinardia



Chain structures  
found only in  
Skeletonoma,  
Look like 2 dots



Cylindrotheca



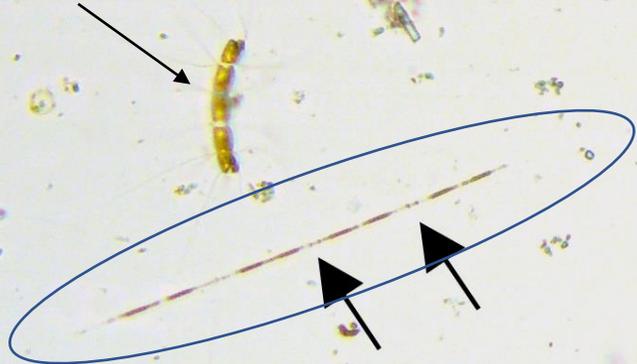
Eucampia

100  $\mu$ m

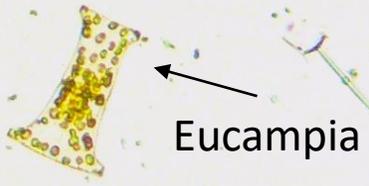


Skelentenoma (Pseudonitzia look alike)

Chaetoceros Eucampia



Chain structures  
found only in  
skelentenoma



Eucampia



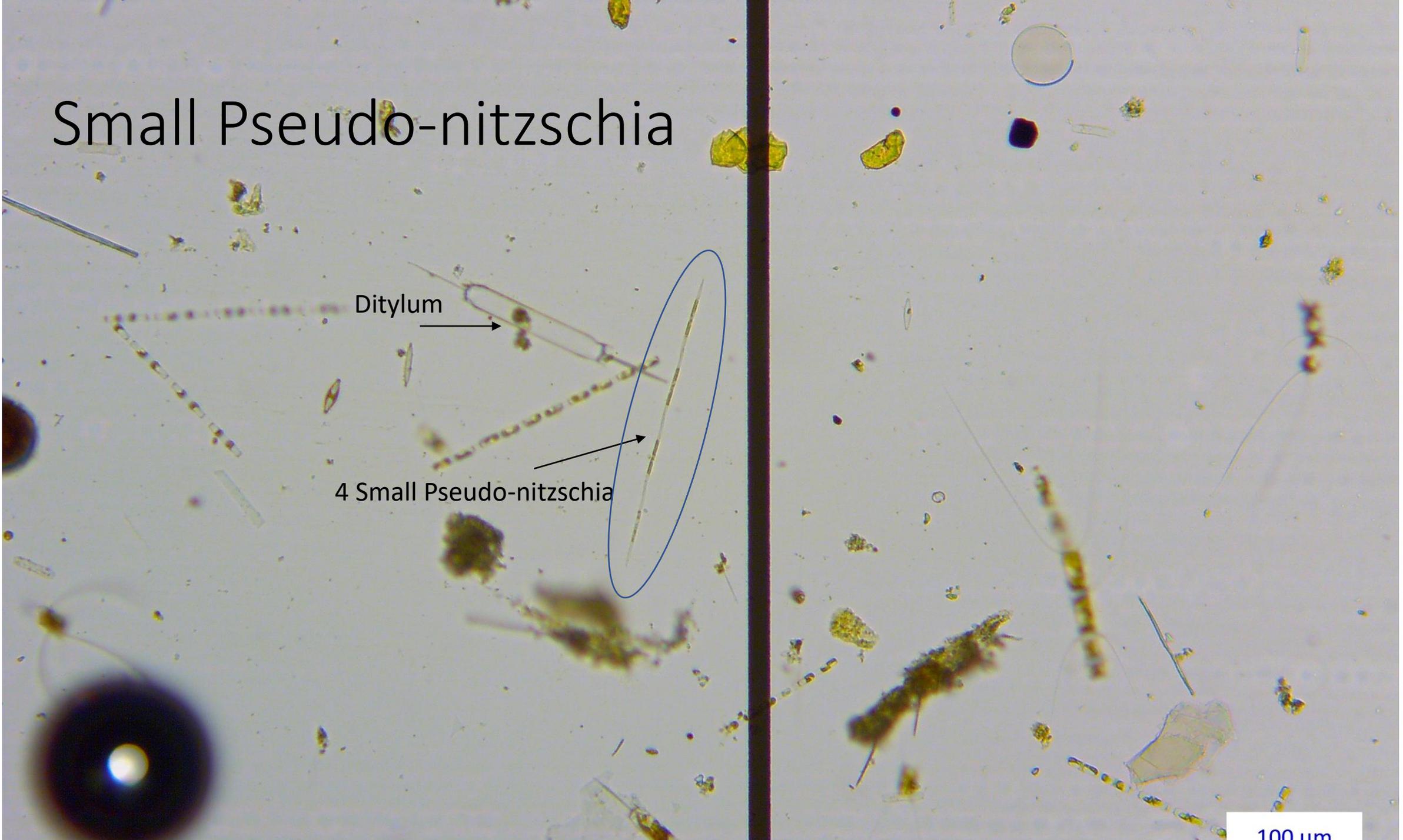
100 μm

# Small Pseudo-nitzschia

Ditylum

4 Small Pseudo-nitzschia

100  $\mu$ m



# Different pseudonitzschia Large sizes



# 6 Pseudo-nitzschia Large



100  $\mu\text{m}$

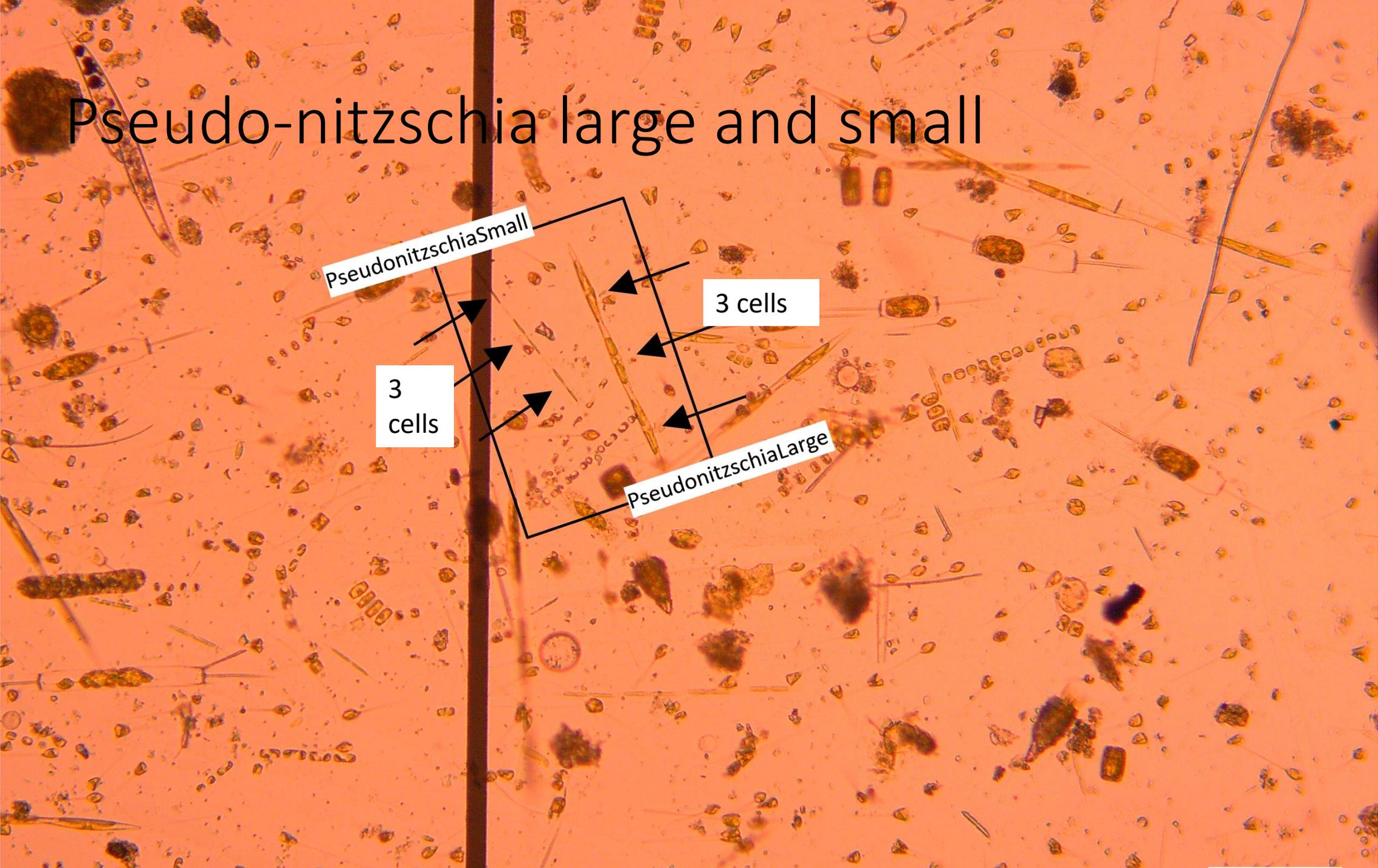
# Pseudo-nitzschia large and small

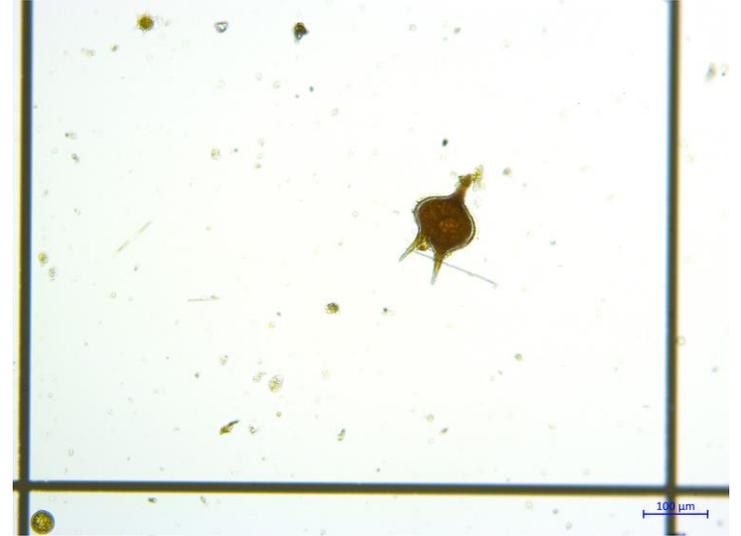
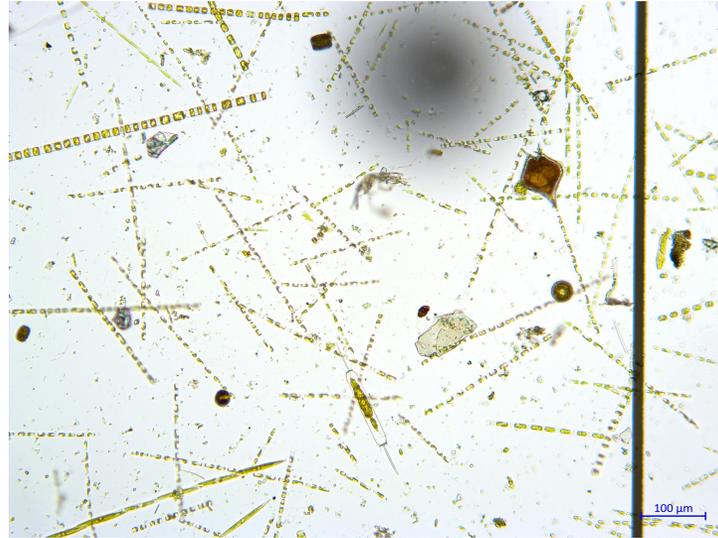
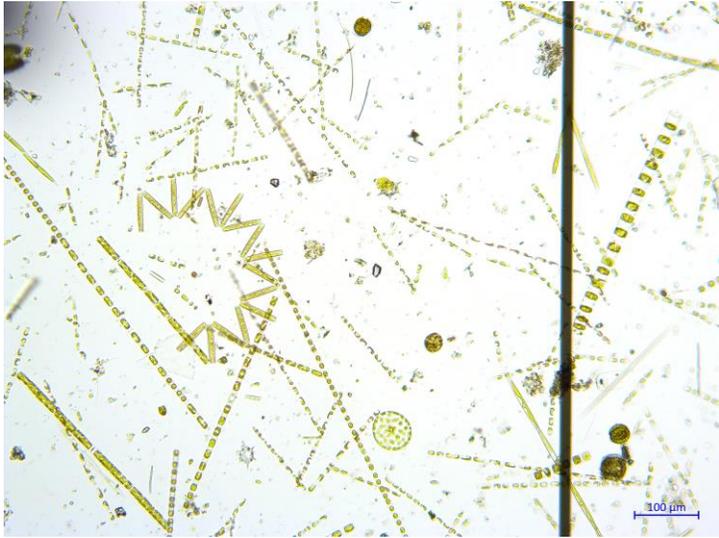
PseudonitzschiaSmall

3 cells

3 cells

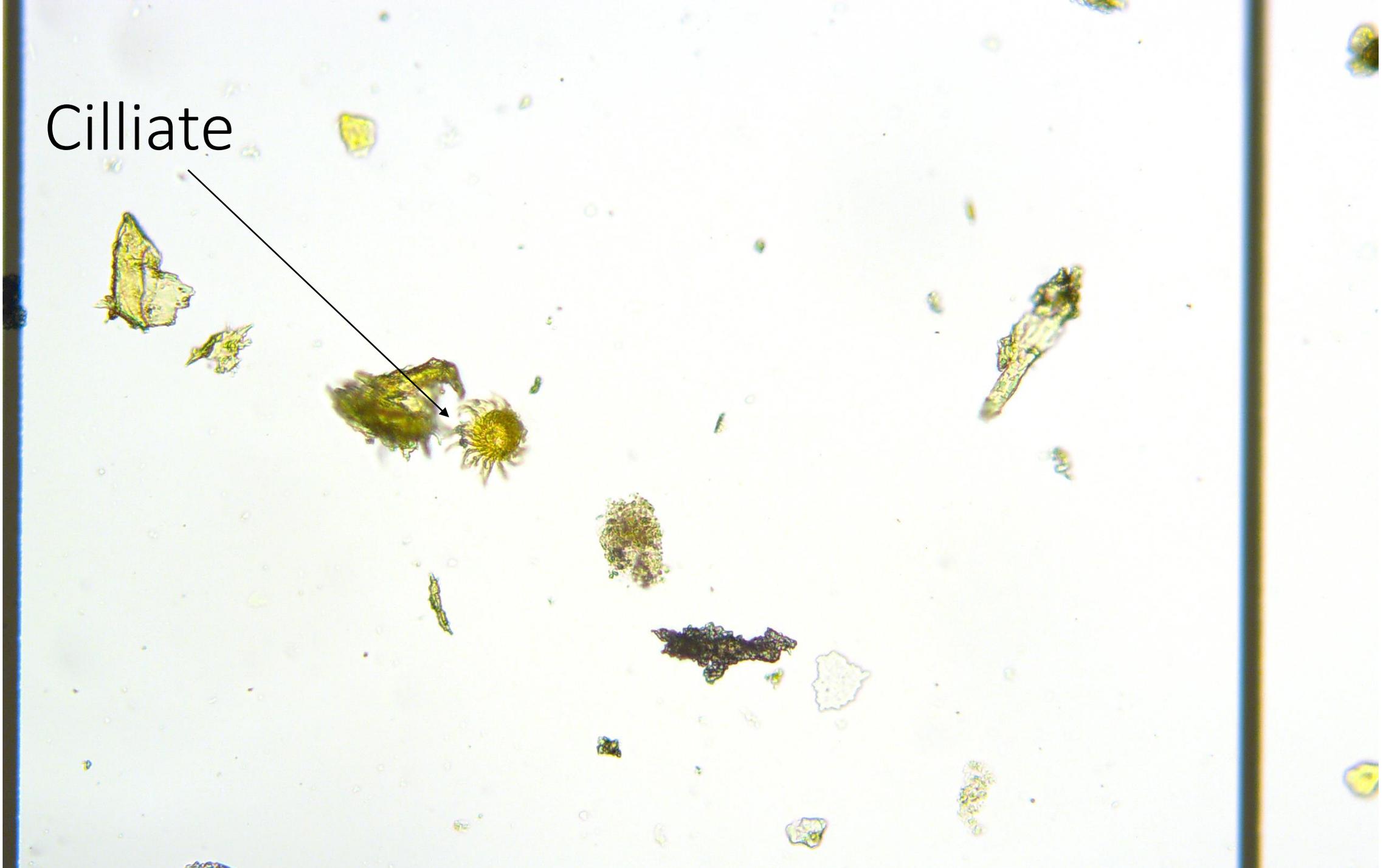
PseudonitzschiaLarge



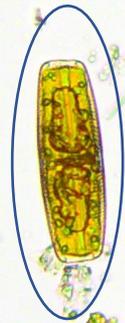


# Non-HAB Forming Species

Ciliate



# Pleurosigma and Navicula

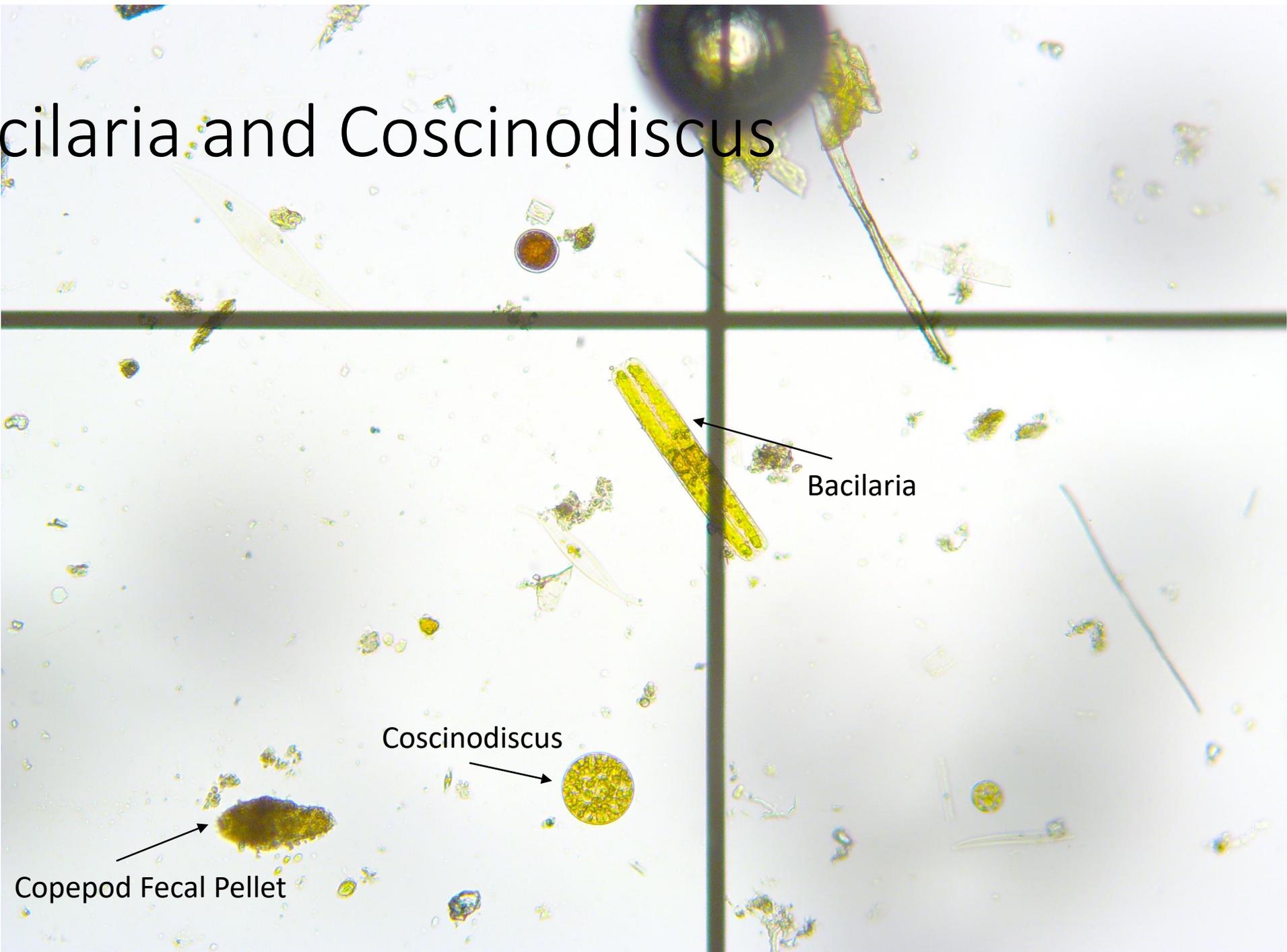


Navicula



Pleurosigma

# Bacillaria and Coscinodiscus

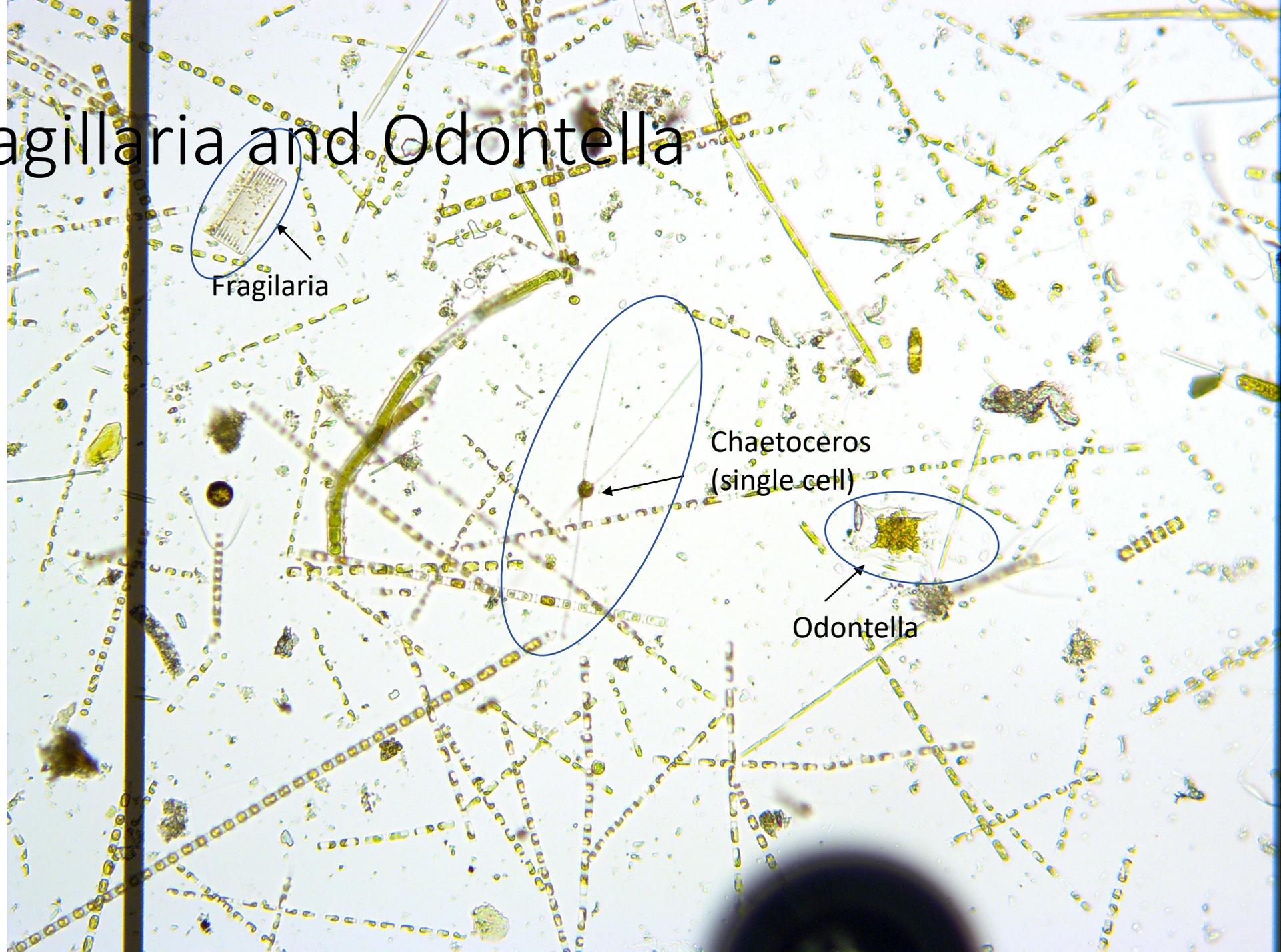


Bacillaria

Coscinodiscus

Copepod Fecal Pellet

# Fragilaria and Odontella

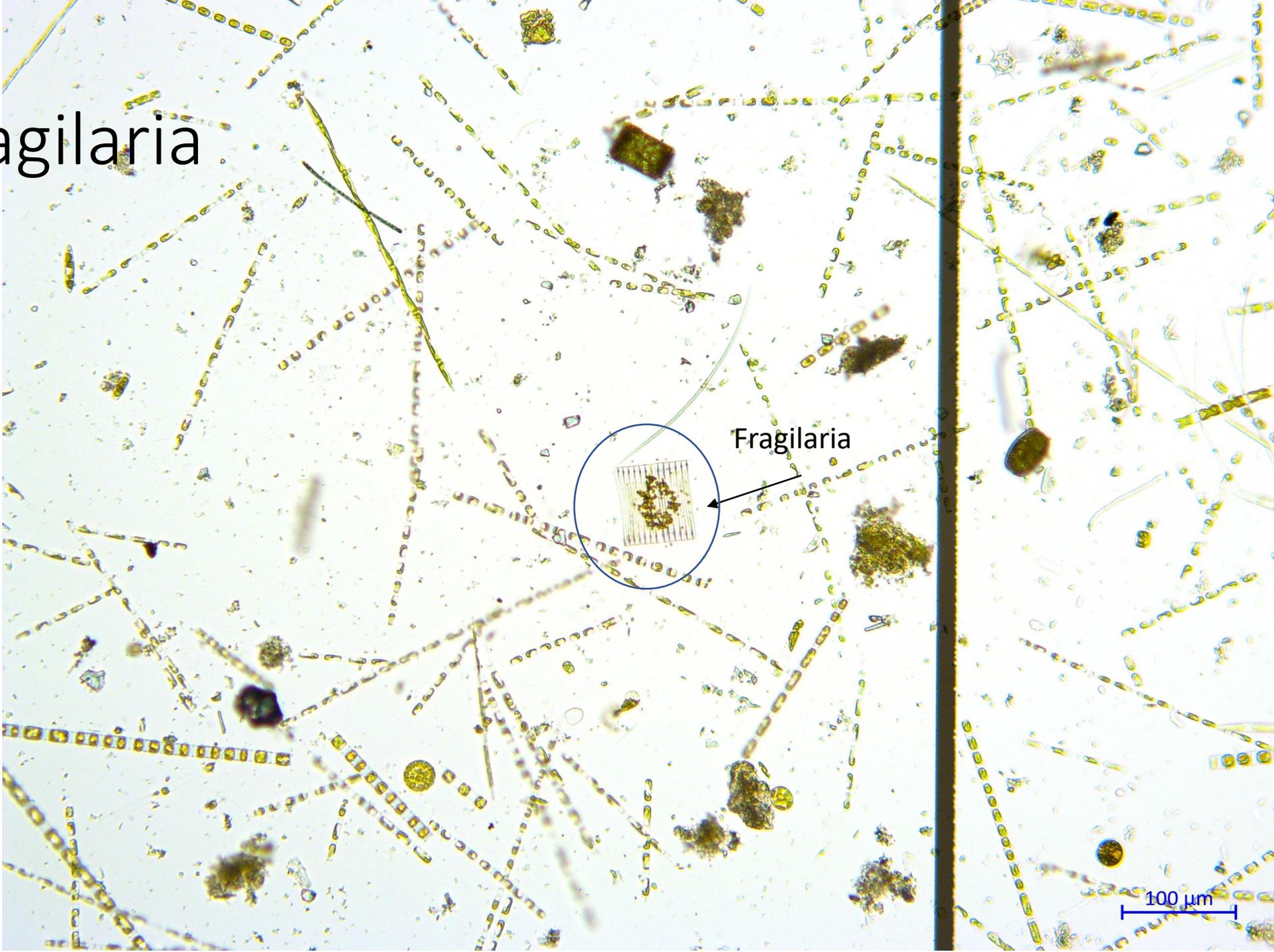


Fragilaria

Chaetoceros  
(single cell)

Odontella

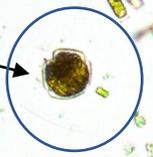
# Fragilaria



Fragilaria

100  $\mu\text{m}$

Gonyaulax

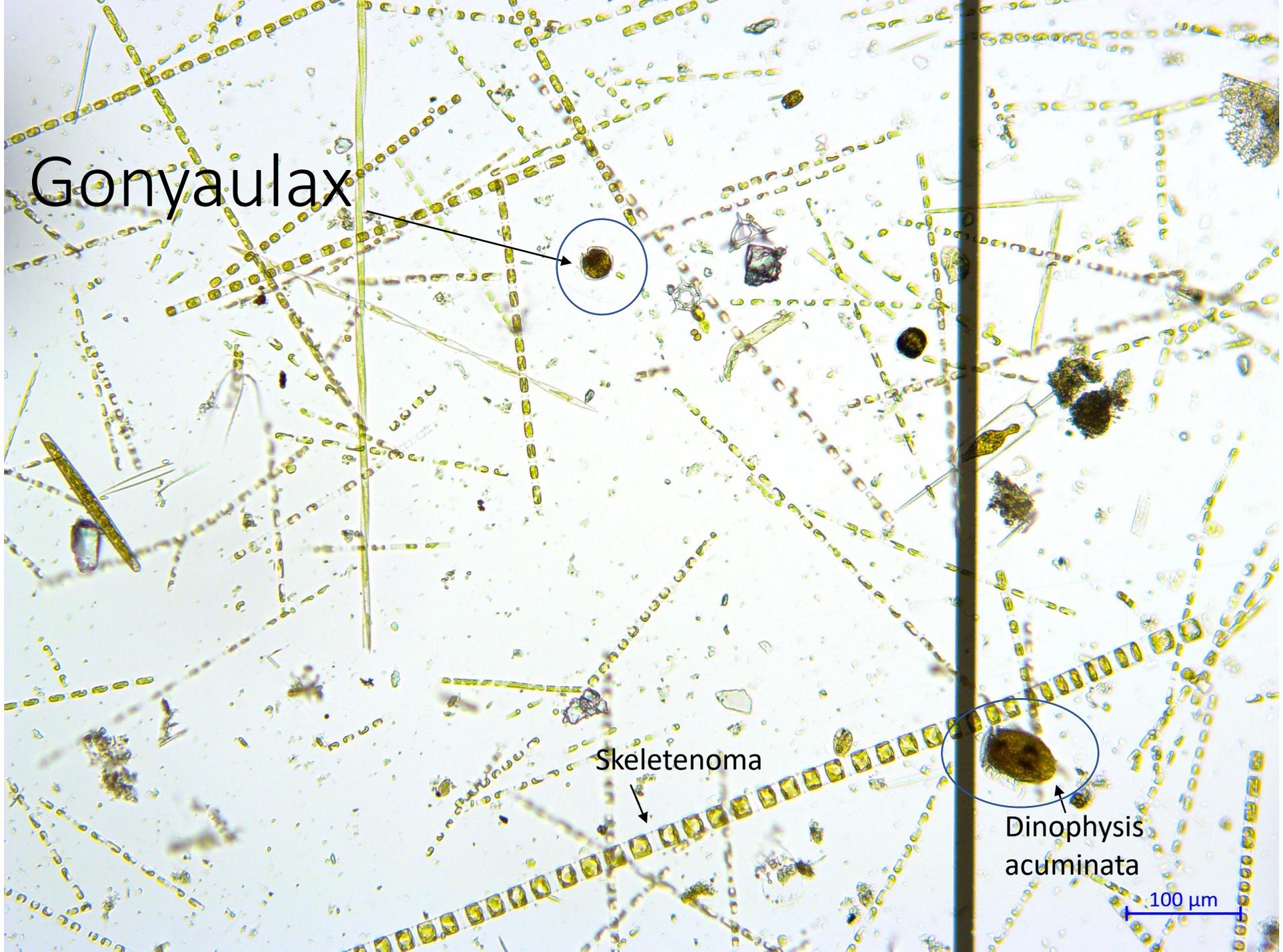


Skeletonema

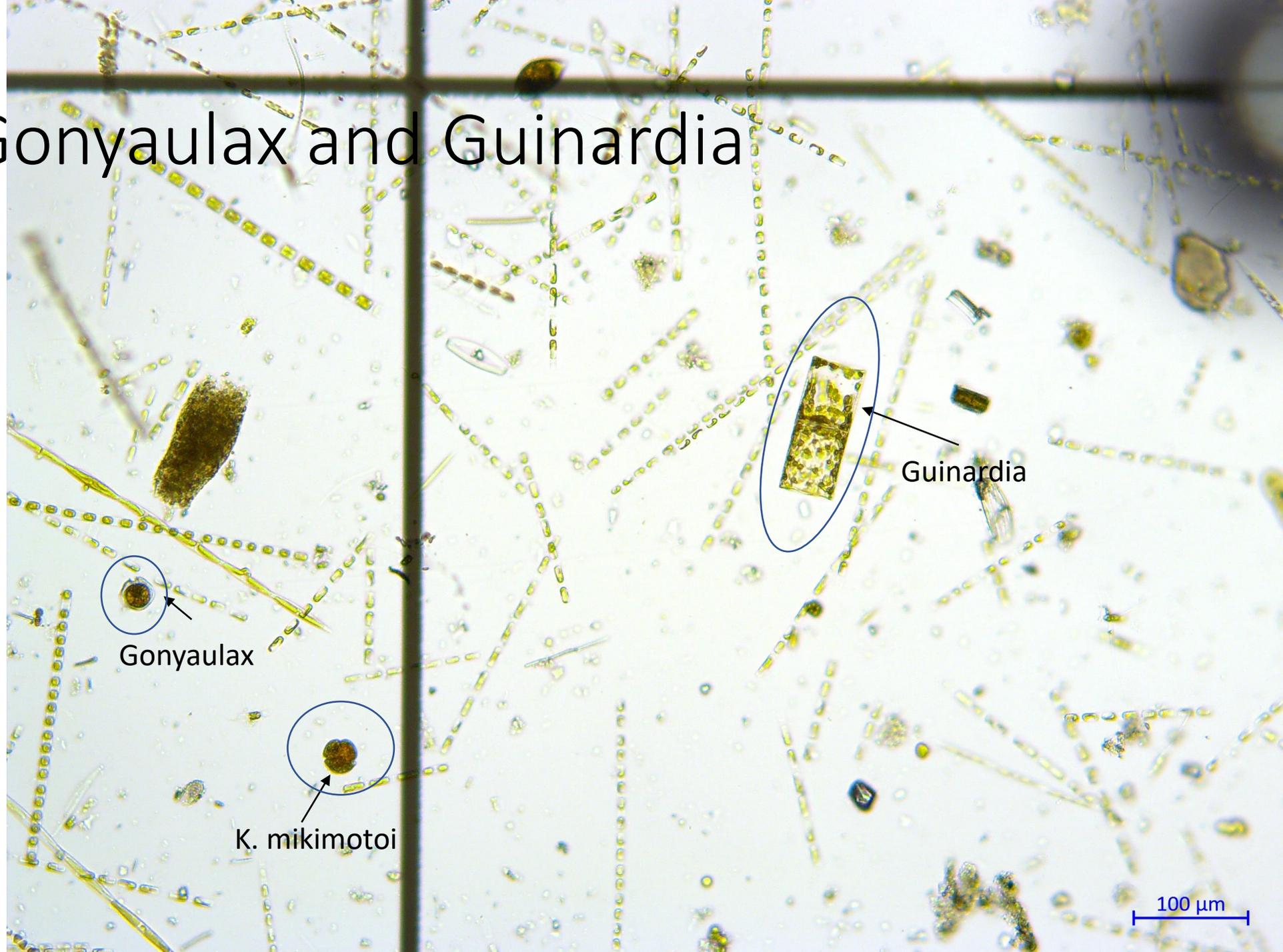


Dinophysis  
acuminata

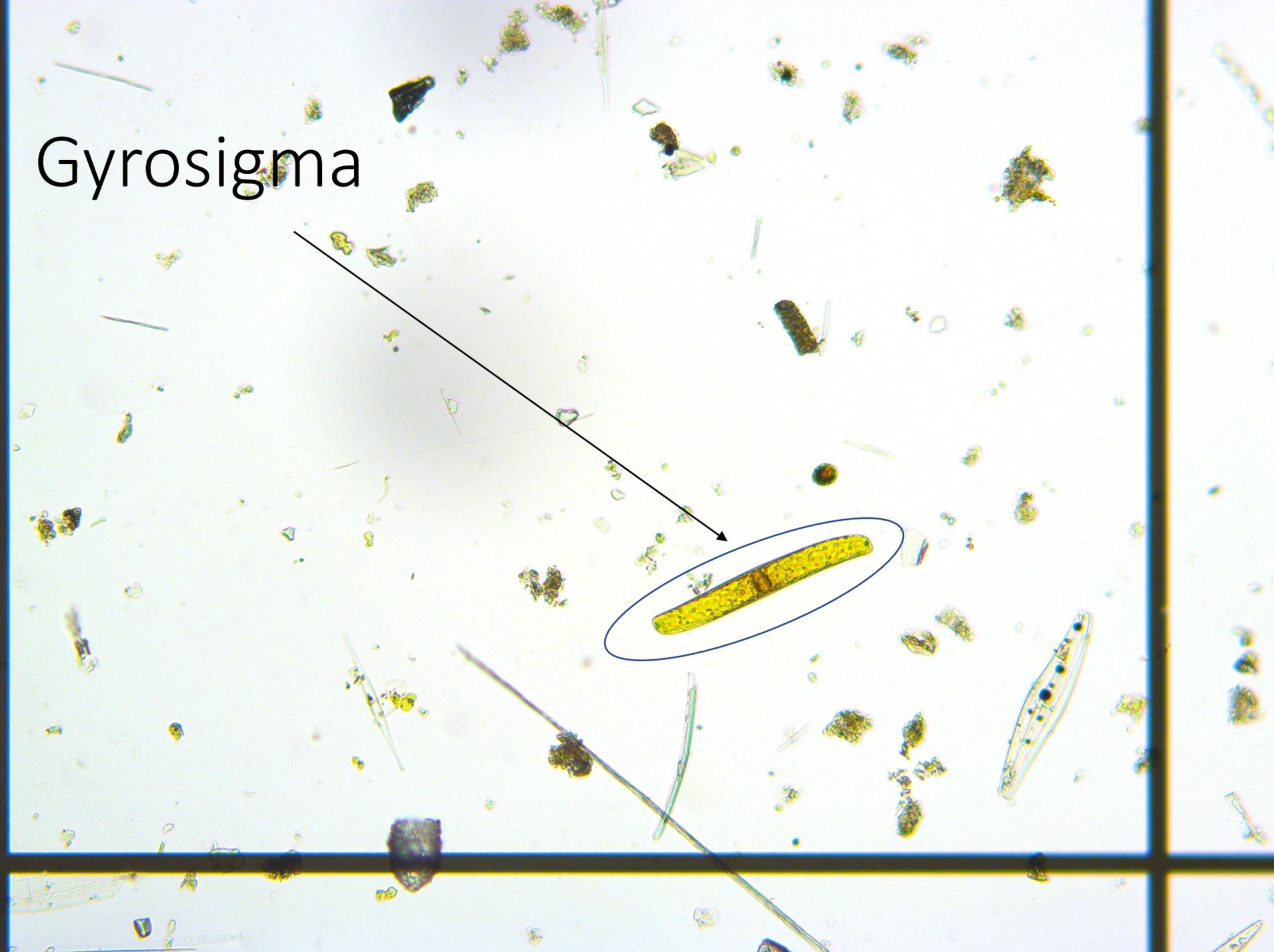
100  $\mu$ m



# Gonyaulax and Guinardia



Gyrosigma



# Ceratium fusus



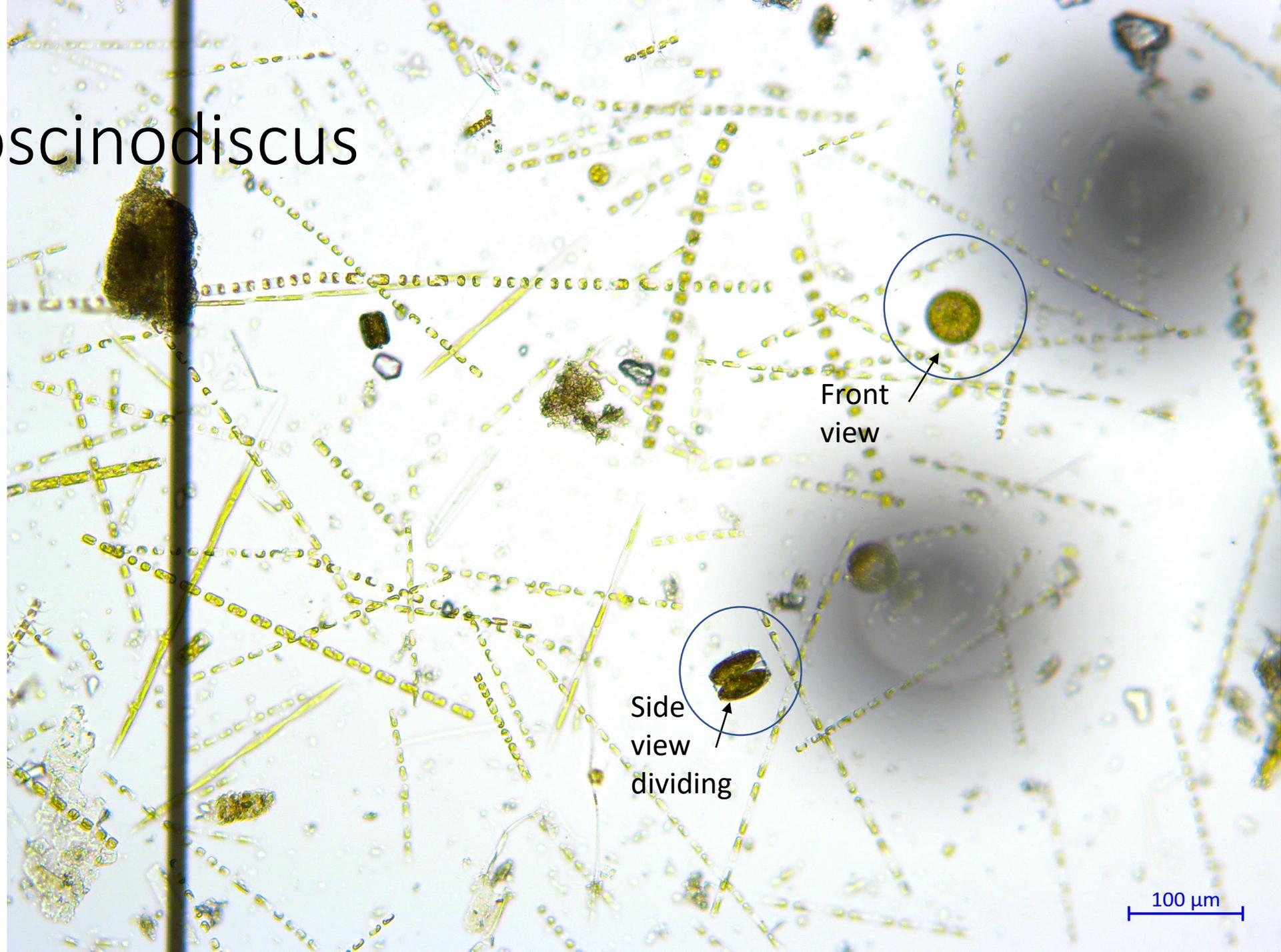
100  $\mu$ m

# Chatoceros

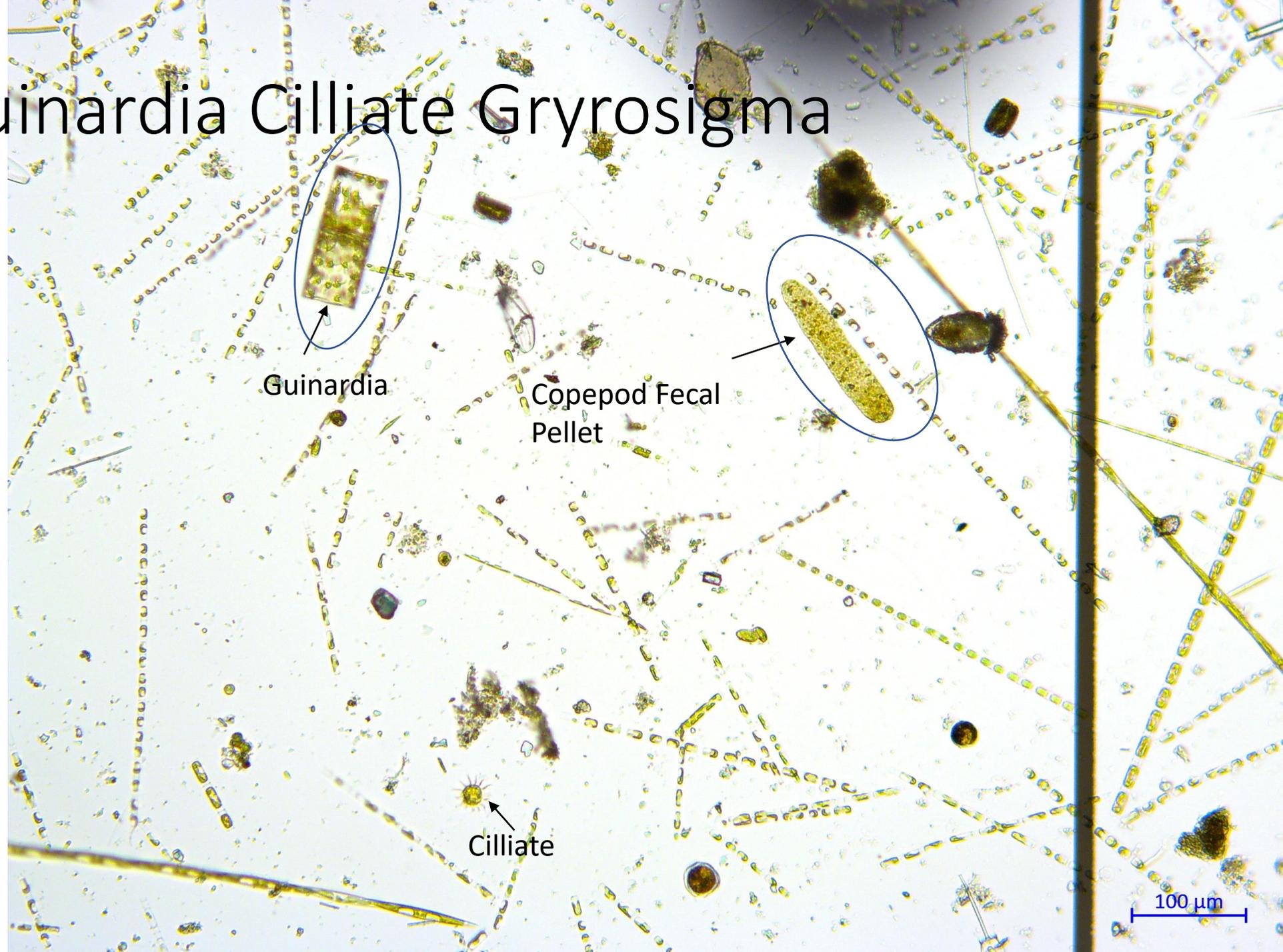


100 μm

# Coscinodiscus



# Guinardia Ciliate Gryosigma



Guinardia

Copepod Fecal  
Pellet

Ciliate

100  $\mu$ m

# Gyrosigma, Pseudo-nitzschia Large

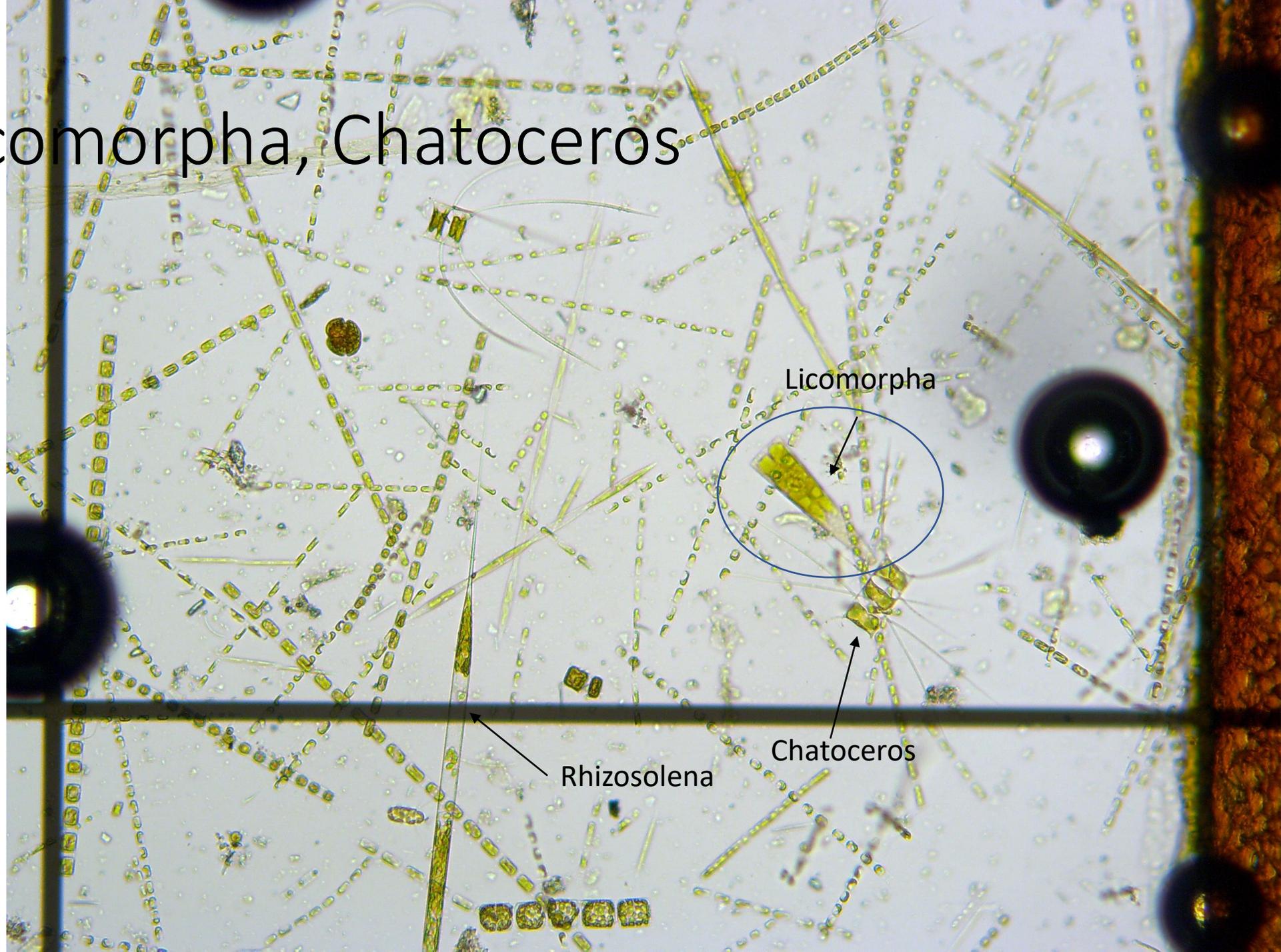


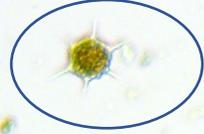
Gyrosigma

5 Pseudo-nitzschia  
large

100 μm

# Licomorpha, Chatoceros





Dictyocha

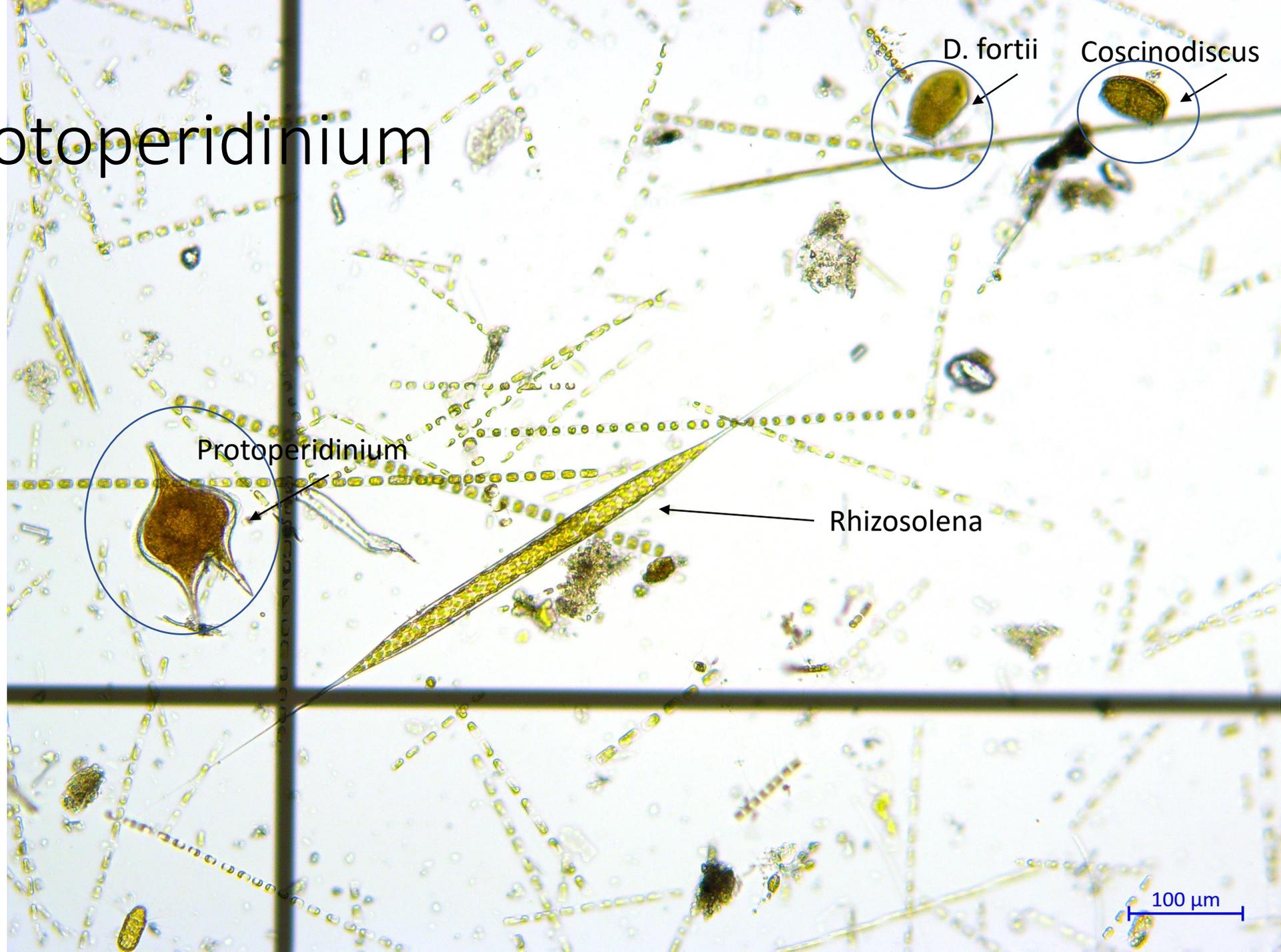
# Dictyocha, Protoperidinium



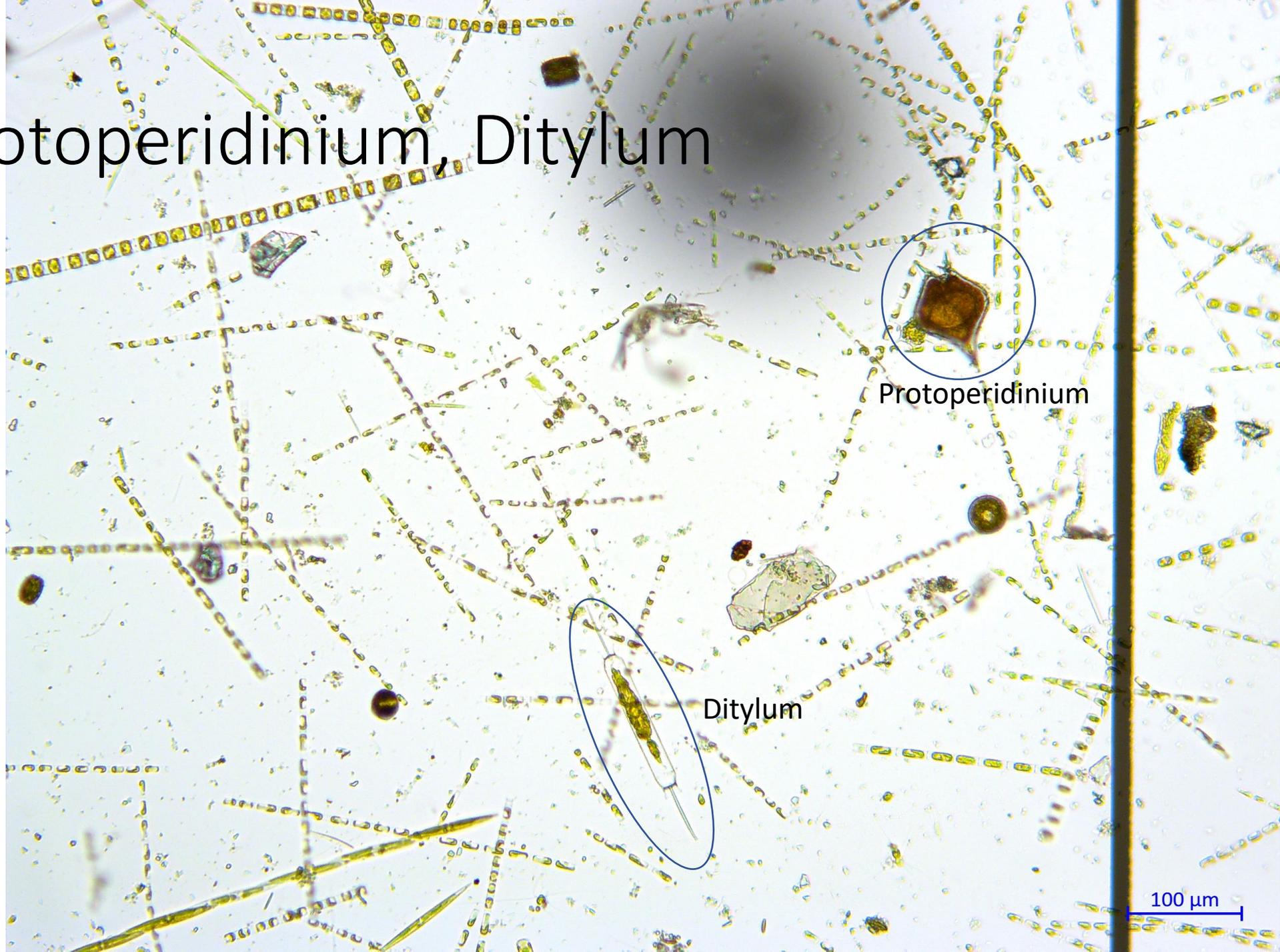
Protoperidinium

100  $\mu\text{m}$

# Protoperidinium



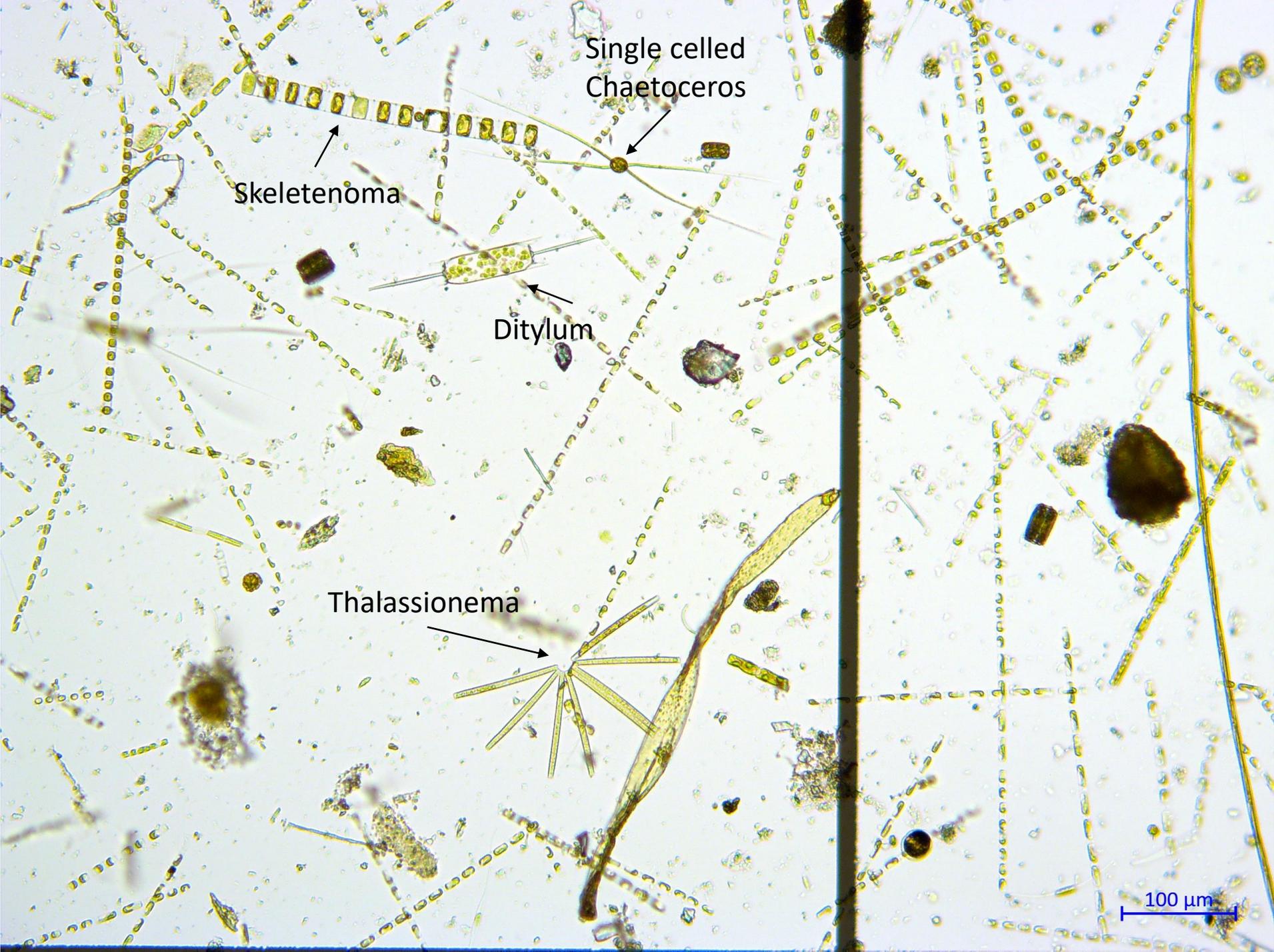
# Protoperidinium, Ditylum



Protoperidinium

Ditylum

100 μm



Single celled  
Chaetoceros

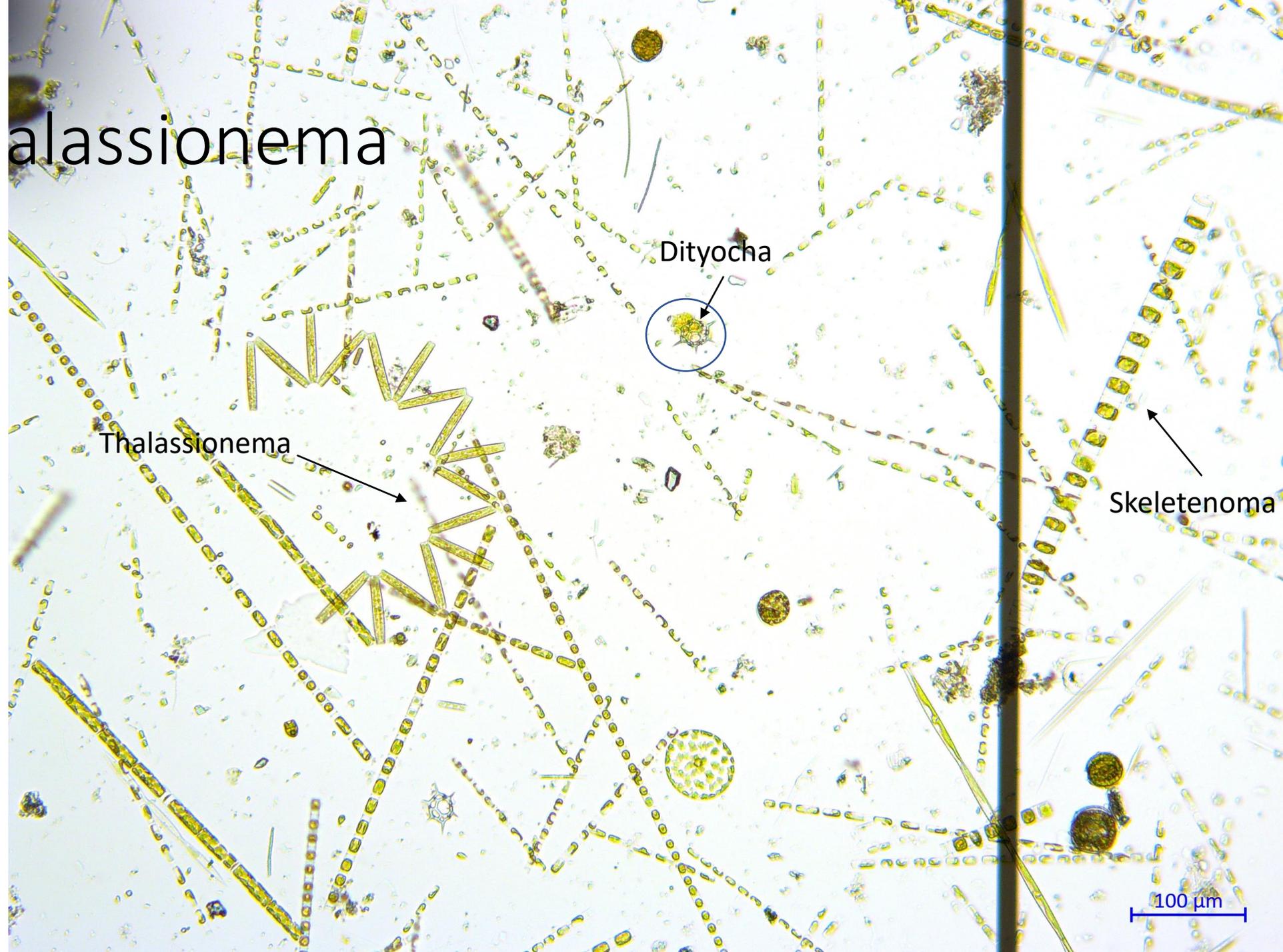
Skeletenoma

Ditylum

Thalassionema

100 µm

# Thalassionema



Dityocha

Thalassionema

Skeletenoma

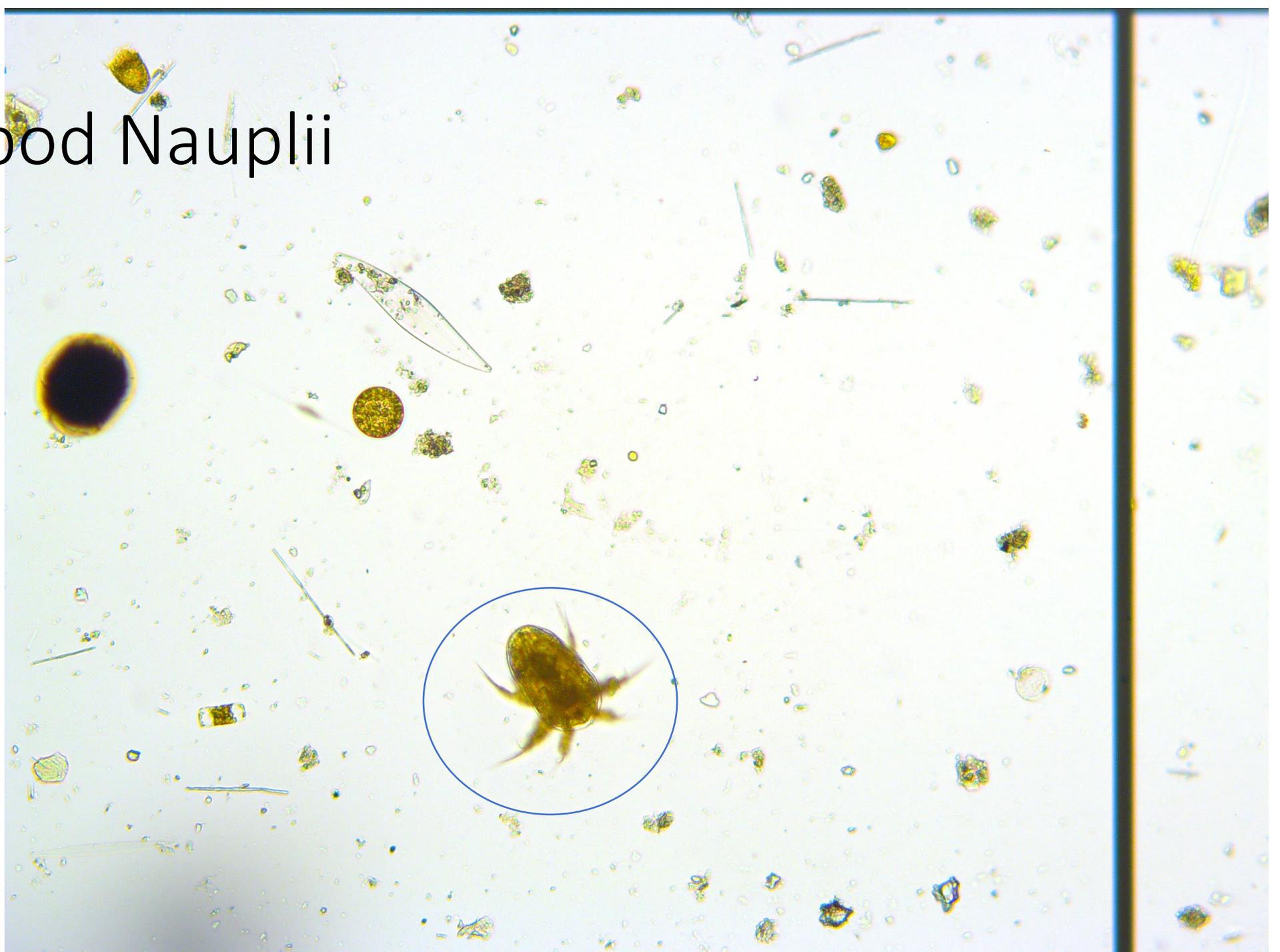
100 µm

# Zooplankton and Other Things You May Find

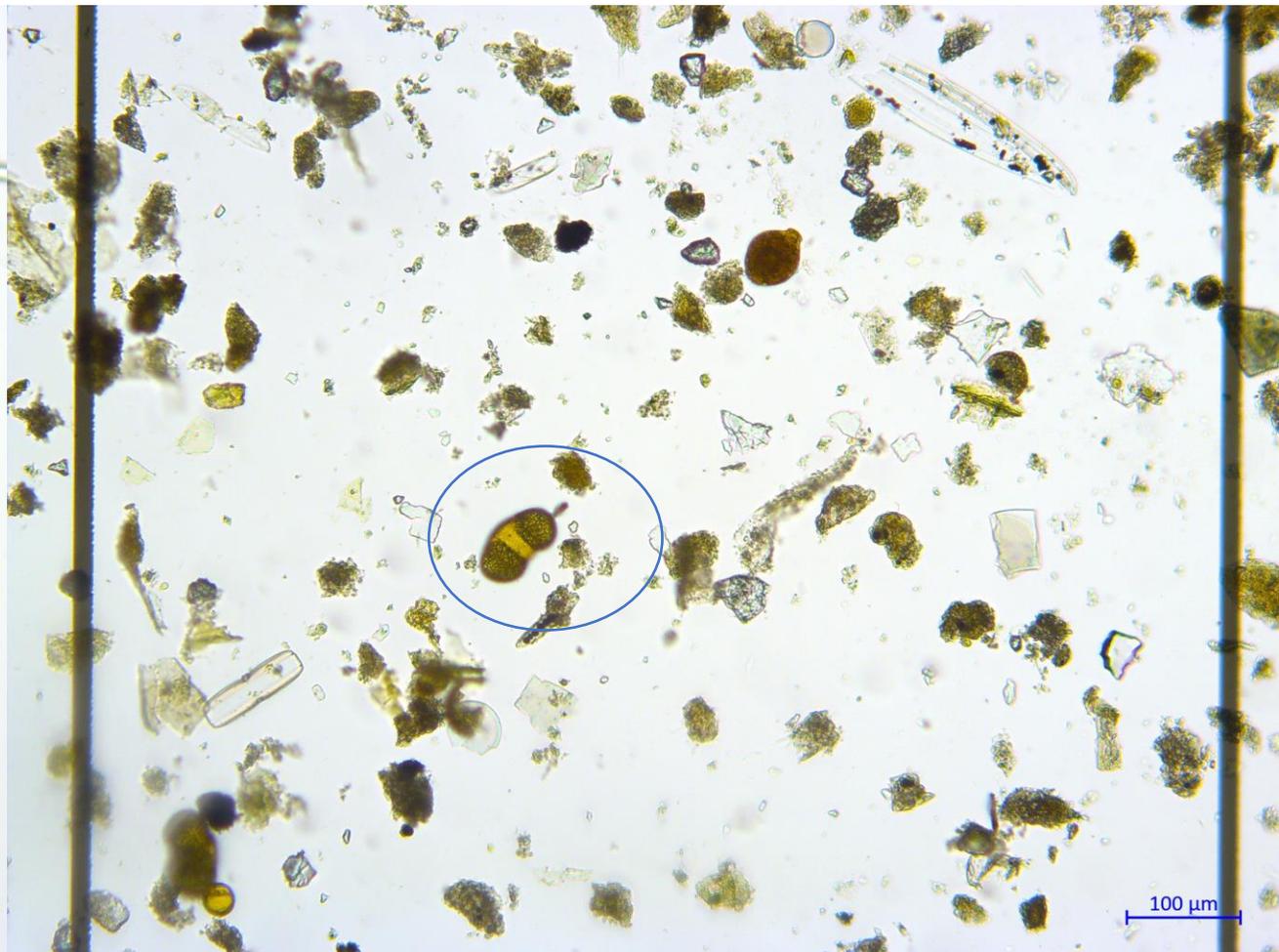
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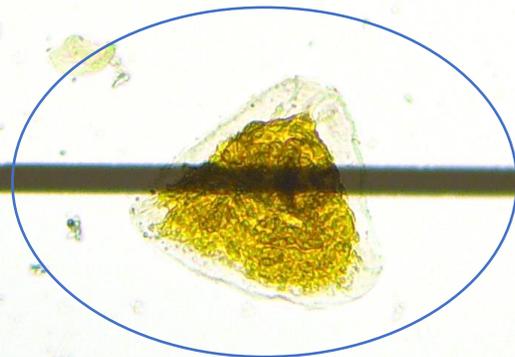
# Copepod Nauplii



# Pollen



Bryozoan



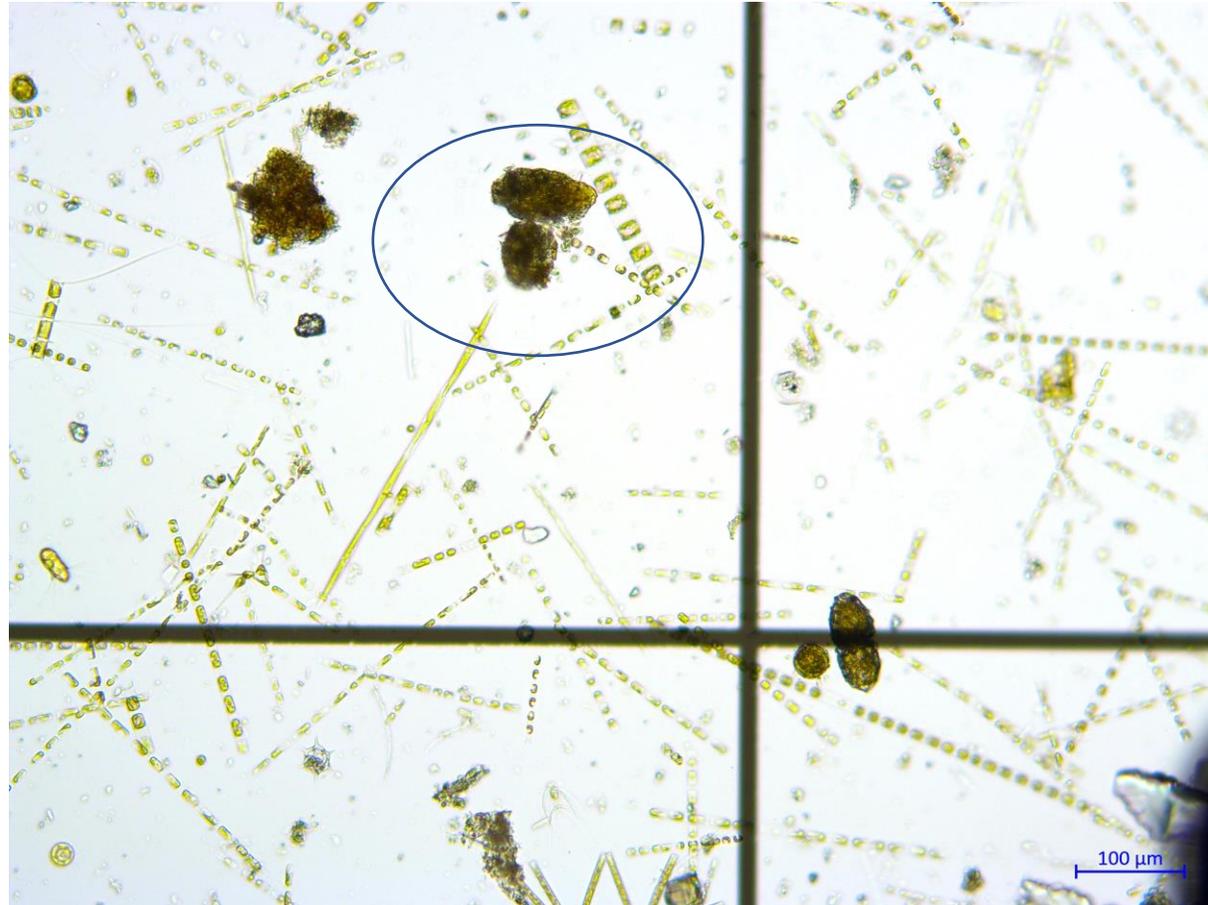
100  $\mu$ m

Female Copepod with eggs



100  $\mu$ m

# Copepod Fecal Pellets

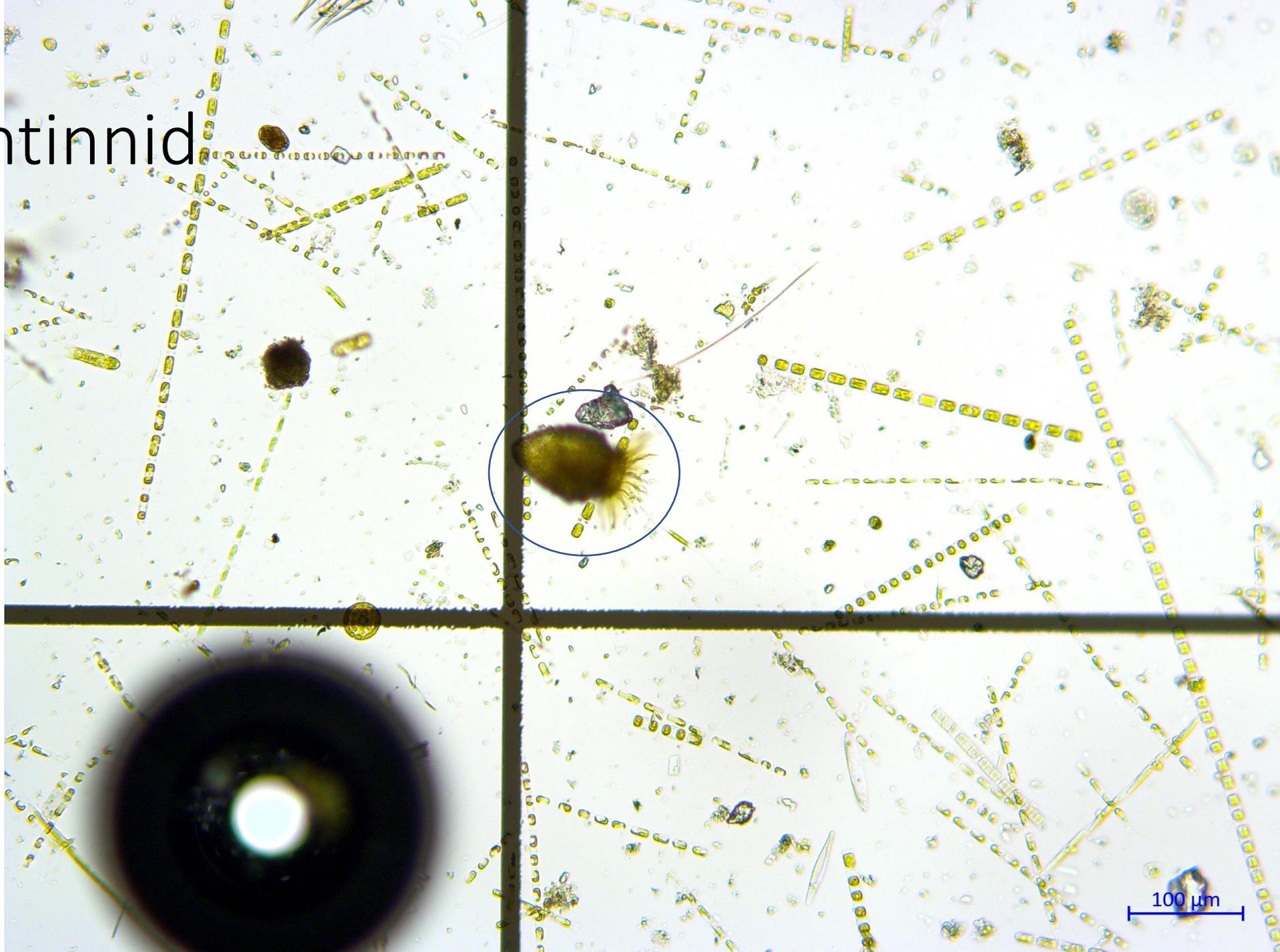


Microplastic



100  $\mu\text{m}$

Tintinnid



# Online ID Resources

- [https://www.eoas.ubc.ca/research/phytoplankton/at\\_a\\_glance/chain\\_forming\\_diatoms.html](https://www.eoas.ubc.ca/research/phytoplankton/at_a_glance/chain_forming_diatoms.html)
- <https://www.algaebase.org/>
- [http://species-identification.org/species.php?species\\_group=dinoflagellates&id=49](http://species-identification.org/species.php?species_group=dinoflagellates&id=49)